City of Corona

400 S. Vicentia Ave.
Corona, CA 92882

City Council Meeting Final Agenda - Final-revised

Wednesday, January 5, 2022

Closed Session Council Board Room 4:30 PM
Open Session Council Chambers 6:30 PM

CITY COUNCIL/SUCCESSOR AGENCY TO THE REDEVELOPMENT AGENCY OF THE CITY OF CORONA/CORONA PUBLIC FINANCING AUTHORITY/CORONA UTILITY AUTHORITY/CORONA HOUSING AUTHORITY MEETING

Wes Speake, Mayor
Tony Daddario, Vice Mayor
Jacque Casillas, Council Member
Tom Richins, Council Member
Jim Steiner, Council Member

**Revised agenda on January 5, 2022 at 2:08 p.m.
Item 17 - Exhibit 3 was revised to add the updated conditions of approval.**

CONVENE CLOSED SESSION

CITY COUNCIL

1. **CLOSED SESSION -** CONFERENCE WITH REAL PROPERTY NEGOTIATORS
Pursuant to Government Code Section 54956.8
Property: APN 172-420-029
Agency negotiator: Jacob Ellis, City Manager
Negotiating parties: Riverside County Flood Control & Water Conservation District
Under negotiation: Price and Terms of Payment

2. **CLOSED SESSION -** CONFERENCE WITH LABOR NEGOTIATORS
Pursuant to Government Code Section 54957.6
Agency Designated Representative: Jacob Ellis, City Manager
Employee Organizations: Corona General Employees Association, Corona Police Employees Association, Corona Police Supervisors Association and Corona Supervisors Association

3. **CLOSED SESSION -** CONFERENCE WITH LABOR NEGOTIATORS
Pursuant to Government Code Section 54957.6
Agency Designated Representative: Jacob Ellis, City Manager
Unrepresented Employee Group: Management/Confidential Group Employees

4. **CLOSED SESSION -** CONFERENCE WITH LABOR NEGOTIATORS
Pursuant to Government Code Section 54957.6
Agency Designated Representative: Jacob Ellis, City Manager
Unrepresented Employee Group: Executive Group Employees

INVOCATION

The invocation may be offered by a person of any religion, faith, belief or non-belief, as well as Council Members. A list of volunteers is maintained by the City Clerk and interested persons should contact the Clerk for further information.

PLEDGE OF ALLEGIANCE

CONVENE OPEN SESSION

Individuals wishing to address the City Council are requested to complete a speaker card available at the rear of the Council Chambers. Please deliver the card to the City Clerk prior to the item being heard by the City Council or, for items not listed on the agenda, before the "Communications" section of the agenda is called. Please observe a three-minute limit for communications and please note that the Communications section of the agenda is limited to items within the subject matter jurisdiction of the City Council that are not listed on the agenda. Once called upon to speak, you are requested to state your name and city of residence for the record.

PROCLAMATIONS/RECOGNITIONS/PRESENTATIONS

5. Presentation: Covid-19 Update.

MEETING MINUTES

6. **MINUTES -** Approval of Minutes for the City Council, Successor Agency to the Redevelopment Agency of the City of Corona, Corona Public Financing Authority, Corona Utility Authority, Corona Housing Authority Committee of the Whole Meeting of December 8, 2021.

7. **MINUTES -** Approval of Minutes for the City Council, Successor Agency to the Redevelopment Agency of the City of Corona, Corona Public Financing Authority, Corona Utility Authority, Corona Housing Authority City Council Meeting of December 15, 2021.

8. **MINUTES -** Approval of Minutes for the City Council, Successor Agency to the Redevelopment Agency of the City of Corona, Corona Public Financing Authority, Corona Utility Authority, Corona Housing Authority Special Closed Session Meeting of December 20, 2021.

CONSENT CALENDAR

All items listed on the Consent Calendar are considered to be routine matters, status reports or documents covering previous City Council action. The items listed on the Consent Calendar may be enacted in one motion. With the concurrence of the City Council, a Council Member or any person in attendance may request that an item be removed for further consideration.

9. **LEGISLATIVE MATTER - SECOND READING -** City Council adoption of Ordinance No. 3339, second reading, of an Ordinance of the City of Corona adding section 2.08.190 to Chapter 2.08 of the Corona Municipal Code to require electronic signature and submission of campaign disclosure documents.

10. **AGREEMENT -** First Amendment to the Professional Services Agreement with Dudek for the Mangular Blending Facility, Project No. 2018-13.

That the:

a. City Council authorize the Utilities Department General Manager to execute the First Amendment to Professional Services Agreement P21789 with Dudek of Encinitas, CA to provide construction management and inspection services for the Mangular Blending Facility in the amount of $120,000 and approve necessary change orders up to the amount provided by Corona Municipal Code Section 3.08.070(i).

b. City Council authorize the Purchasing Manager to issue a change order to purchase order number P21789 in the amount of $120,000 in accordance with duly authorized and executed agreements and renewals.

c. City Council authorize the Utilities Manager and City Attorney to negotiate and execute any amendments to this Agreement, which are either non-substantive or are otherwise in compliance with the City Council's actions hereunder.

d. Corona Utility Authority (CUA) review, ratify and to the extent necessary direct that the City Council take the above actions.

11. **AGREEMENT** - Fourth Amendment to the Professional Services Agreement with Jacobs Engineering Group, Inc. for the Cajalco Road/I-15 Interchange Improvements, Project No. 56-1203.

That the City Council:

a. Approve the Fourth Amendment to the Professional Services Agreement with Jacobs Engineering Group, Inc. to increase the total compensation by $165,163 to provide Right-of-Way Closeout Services for Cajalco/I-15 Interchange Improvements, Project No. 56-1203.

b. Authorize the City Manager, or his designee, to execute the Fourth Amendment to the Professional Services Agreement with Jacobs Engineering Group, Inc. for a total contract amount of $5,426,433.

c. Authorize the Purchasing Manager to issue a Contract Change Order to Jacobs Engineering Group, Inc.'s purchase order P11879 in the amount of $165,163.

12. **REPORT** - Personnel Report providing employee updates and details on various recruitment transactions.

That the City Council receive and file the Personnel Report.

13. **RESOLUTION** - Resolution establishing a construction charge to cover the proportionate share of constructing the sewer lines and appurtenances necessary to connect certain private property located on Rudell Road and Ontario Avenue to the City's Public Sewer System.

That the:

a. City Council adopt Resolution No. 2022-002, establishing a construction charge to cover the proportionate share of constructing the sewer lines and appurtenances necessary to connect certain private property located on Rudell Road and Ontario Avenue to the City's public sewer system.

b. City Council appropriate $1,000,000 from the Water Reclamation Capacity Fund 440 to a newly created Capital Improvement Project entitled Rudell Road Sewer Extension Project.

c. Corona Utility Authority review, ratify, and to the extent necessary, direct the City Council to take the above actions.

COMMUNICATIONS FROM THE PUBLIC

Persons wishing to address the City Council are requested to state their name and city of residence for the record. This portion of the agenda is intended for general public comment only, which means it is limited to items within the subject matter jurisdiction of the City Council that are not listed on the agenda. Please note that state law prohibits the City Council from discussing or taking action on items not listed on the agenda. The City Council will appreciate your cooperation in keeping your comments brief. Please observe a three-minute limit for communications.

PUBLIC HEARINGS

This portion of the agenda is for advertised public hearing items where formal public testimony on each individual item is accepted prior to City Council action.

14. PUBLIC HEARING - Public Hearing to review and receive feedback on the redrawing of Council Member District boundaries.

That the City Council:

a. Receive a report from staff and the City's redistricting consultant on the redistricting process and permissible criteria to be considered to redraw district boundaries.

b. Conduct a public hearing to receive input on district boundaries, communities of interest, and other preferences for the drawing of revised Council districts.

15. PUBLIC HEARING - Public Hearing and Resolution adopting the Temescal Basin Groundwater Sustainability Plan.

That the:

a. City Council hold a public hearing regarding the Temescal Basin Groundwater Sustainability Plan.

b. City Council adopt Resolution No. 2022-001, adopting the Temescal Basin Groundwater Sustainability Plan.

c. Corona Utility Authority, review, ratify, and to the extent necessary, direct the City Council to take the above actions.

ADMINISTRATIVE REPORTS

This portion of the agenda is for Council discussion and action on staff reports and new topics that may not be routine status reports, or documents covering previous City Council action.

16. ADMINISTRATIVE REPORT - Urgency ordinance and regular ordinance adding Chapter 16.18 to the Corona Municipal Code to implement Senate Bill 9 to allow for two-unit housing developments and urban lot splits in single-family residential zoning districts.

That the City Council:

a. Adopt Urgency Ordinance No. 3341 for immediate consideration of adding Chapter 16.18 to the Corona Municipal Code to implement Senate Bill 9 to allow for two-unit housing developments and urban lot splits in single family residential zoning districts.

b. Introduce by title only and waive the full reading for consideration of Ordinance No. 3342, first reading of an ordinance adding Chapter 16.18 to the Corona Municipal Code to implement Senate Bill 9 to allow for two-unit housing developments and urban lot splits in single family residential zoning districts.

LEGISLATIVE MATTERS

This portion of the agenda is for proposed ordinances presented for the City Council's consideration.

BOARDS AND COMMISSIONS – REPORTS FROM CITY COUNCIL, COMMISSIONERS, AND STAFF FOR THE:

This portion of the agenda lists items from Commissions and Boards.

A) Planning & Housing Commission

17. PLANNING & HOUSING COMMISSION REPORT - Tentative Tract Map 37980 to subdivide 4.73 acres into 19 single family residential lots located on the northwest corner of Citron Street and Taylor Street.

That the City Council approve TTM 37980 subject to the findings and conditions as recommended by the Planning and Housing Commission.

B) Parks & Recreation Commission

C) Regional Meetings

18. REGIONAL MEETING REPORT - Update from Council Member Jim Steiner on the Riverside Transit Agency (RTA) Board Meeting of December 16, 2021.

19. REGIONAL MEETING REPORT - Update from Vice Mayor Tony Daddario on the Western Riverside County Regional Conservation Authority (RCA) Board Meeting of December 6, 2021.

CITY ATTORNEY'S REPORTS AND COMMENTS

CITY MANAGER'S REPORTS AND COMMENTS

CITY COUNCIL MEMBER REPORTS AND COMMENTS

20. CITY COUNCIL MEMBER REPORT - Appointment to the Parks and Recreation Commission.

21. CITY COUNCIL MEMBER REPORT - 2022 City Council Meetings Schedule.

FUTURE AGENDA ITEMS

This portion of the agenda is for items requested by the Mayor or Council Members for consideration at a future meeting. No immediate action is taken on Future Agenda items; this section serves to highlight topics that will be considered at upcoming meetings. Council action on items that have appeared in this section takes place under Administrative Reports, when accompanied by a staff report.

1. Non Profit/Sponsored Utility Box Wraps (W. Speake) 1/12/2022
2. Consideration of Civic Center Fountain Renovation (W. Speake) 1/12/2022
3. Zoom Participation in Public Meetings (W. Speake) 1/19/2022
4. Corona Municipal Airport Update (T. Daddario) 2/23/2022
5. Historic Preservation Code Revisions (W. Speake) TBD
6. Options for Paving the Overlook Area (W. Speake) TBD
7. Options to expedite Redevelopment of Main Street and Parkridge Avenue Area (J. Casillas) TBD
8. Infill Fees in Historic Districts (W. Speake) TBD
9. Draft Agendas (T. Daddario) TBD
10. Council Code of Conduct (W. Speake) TBD

ADJOURNMENT

The next regular meeting of the City Council/Successor Agency to the Redevelopment Agency of the City of Corona/Corona Public Financing Authority/Corona Utility Authority/Corona Housing Authority is scheduled for Wednesday, January 19, 2022 at 4:30 P.M. or thereafter as noted on the posted agenda for closed session items in the City Council Board Room followed by the regular meeting at 6:30 p.m. or thereafter as noted on the posted agenda in the City Council Chambers.

Corona City Hall - Online, All the Time at www.CoronaCA.gov

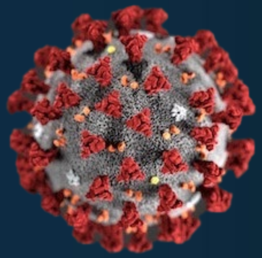
Agendas for all City Council meetings are posted at least 72 hours prior to the meeting in the entry way display case at City Hall. A complete agenda packet is available for public inspection during business hours at the City Clerk's Office. Any materials relating to an item on the agenda which are distributed to all, or a majority of all, members of the City Council after the posting of the agenda will also be available at the same time for public inspection during business hours at the City Clerk's Office.

Written communications from the public for the agenda must be received by the City Clerk's Office seven (7) days prior to the City Council meeting.

In compliance with the Americans with Disabilities Act, if you need special assistance to participate in this meeting, please contact the ADA Coordinator at (951) 736-2235. Notification 48 hours prior to the meeting will enable the City to make reasonable arrangements to ensure accessibility to this meeting.

Meeting is Being Recorded

COVID-19 UPDATE



Brian Young
Fire Chief
January 05, 2022

23,928

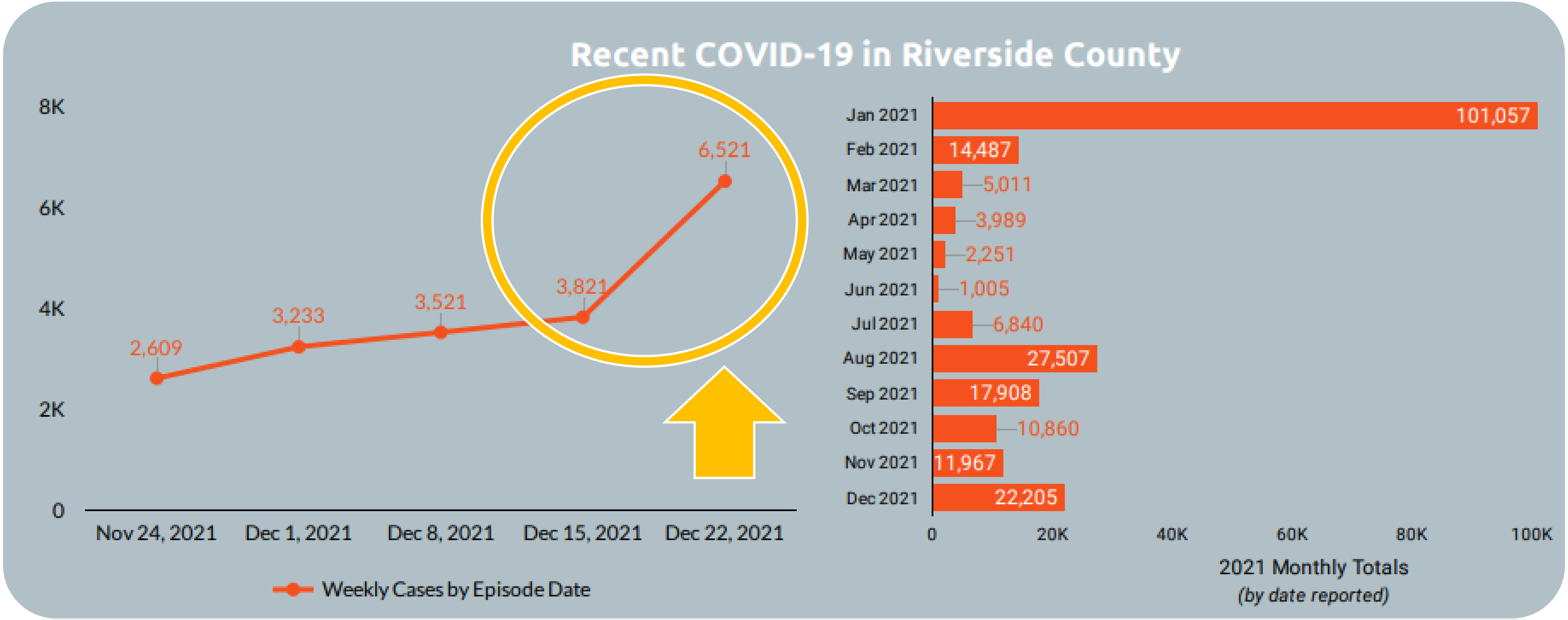
Corona cases

321

Corona fatalities

249

City of Corona employees positive



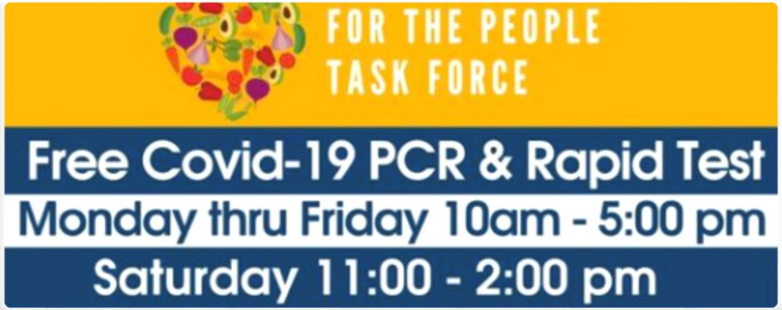
Recent COVID-19 in Riverside County
8K
6K
4K
2K
0
2,609
3,233
3,521
3,821
6,521
Nov 24, 2021
Dec 1, 2021
Dec 8, 2021
Dec 15, 2021
Dec 22, 2021
Weekly Cases by Episode Date
Jan 2021
101,057
Feb 2021
14,487
Mar 2021
5,011
Apr 2021
3,989
May 2021
2,251
Jun 2021
1,005
Jul 2021
6,840
Aug 2021
27,507
Sep 2021
17,908
Oct 2021
10,860
Nov 2021
11,967
Dec 2021
22,205
0
20K
40K
60K
80K
100K
2021 Monthly Totals
(by date reported)

Testing/Vaccine Info

Testing in Corona

Day	Time	Location	District
Monday	7:30AM-2:30PM	Buena Vista Park	4
Tuesday	7:30AM-2:30PM	Santana Park	5
Wednesday	7:30AM-2:30PM	Parkview Park	1
Thursday	7:30AM-2:30PM	City Hall	3
Friday	7:30AM-2:30PM	Butterfield Park	2

Curative Site
Oct - Dec
9,901



Vaccination

City of Corona *-and-* adjacent communities

Multiple opportunities facilitated through Riverside County Public Health and California Department of Public Health in Corona

https://rivcoph.org/COVID-19-Vaccine-with-Registration

Vaccine

Riverside County

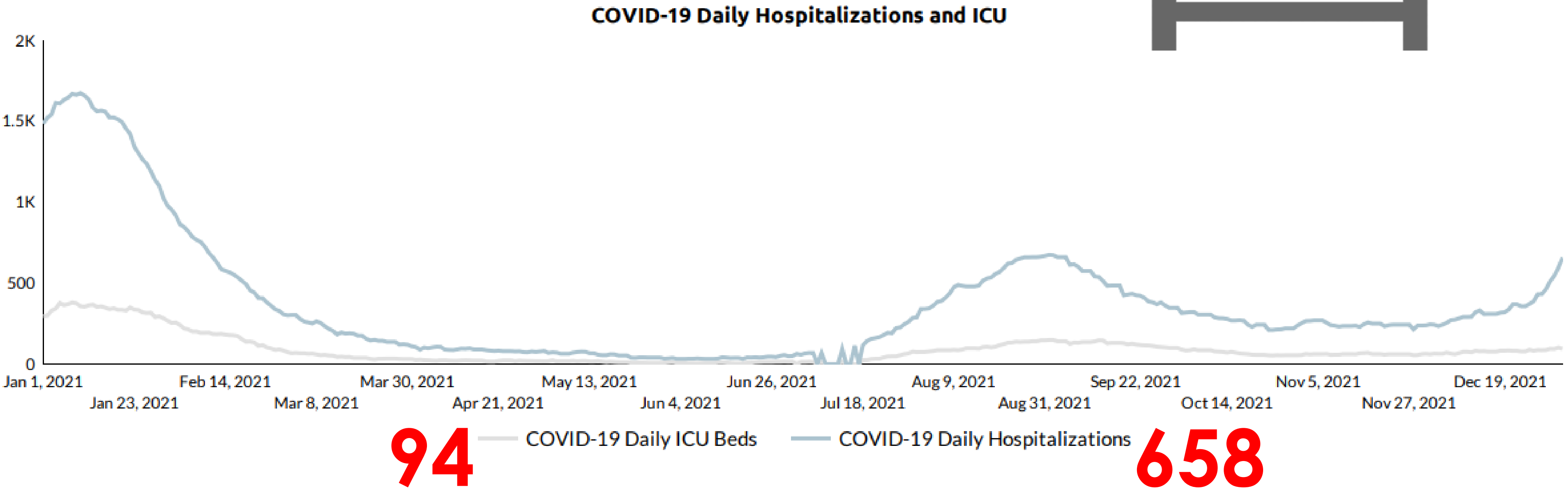
- 6.8% Partially vaccinated
- 58.5% Fully vaccinated **(5+)**
- 22.8% Boosters (3rd dose) **(16+)**

Corona

- 5.65% Partially vaccinated
- 59.85% Fully vaccinated

3,595,730

Hospitalizations
Riverside County



Stay Informed

CALL US, EMAIL US, OR VISIT OUR WEBSITE FOR THE LATEST INFO!

Call: (951) 817-5800 | Text: (833) 482-0029

COVID19info@CoronaCA.gov

www.CoronaCA.gov/COVID-19

TO RECEIVE EMAIL NOTIFICATIONS, SIGN UP AT CORONACA.GOV/SUBSCRIBE

City of Corona

400 S. Vicentia Ave.
Corona, CA 92882

Committee of the Whole Minutes - Draft

Wednesday, December 8, 2021

Council Board Room 4:00 PM

CITY COUNCIL/SUCCESSOR AGENCY TO THE REDEVELOPMENT AGENCY OF THE CITY OF CORONA/CORONA PUBLIC FINANCING AUTHORITY/CORONA UTILITY AUTHORITY/CORONA HOUSING AUTHORITY MEETING

Wes Speake, Mayor
Tony Daddario, Vice Mayor
Jacque Casillas, Council Member
Tom Richins, Council Member
Jim Steiner, Council Member

PLEDGE OF ALLEGIANCE

The Pledge of Allegiance was led by Vice Mayor Daddario.

CONVENE OPEN SESSION

Mayor Speake called the meeting to order at 4:00 p.m.

COMMUNICATIONS FROM THE PUBLIC

None.

AGENDA ITEMS

1. Wild Pig Depredation

Robert Newman, Chief of Police, introduced the item and provided a presentation. He provided an overview of the following: Background on Wild Pig Facts, Jurisdictions Involved, Response to Date, Options, Education, Advice & Information, Multi-Agency Working Group, City Contract with Private Sector, Allow Sport Hunting, Allow Immediate Take, Pros and Cons, and recommendations.

The Council and Karen Alexander, Planning and Housing Commissioner, had inquiries, and Chief Newman and Chanelle Davis, California Fish & Wildlife, provided clarification.

The following residents addressed the Council to express concerns with the wild pigs: Karen Poole, Bret Gardner, Judi Gardner, Julie Chase, Joe Morgan, and Tim Tully.

The Council discussed the proposed item and provided staff with direction. The majority of the Council agreed with Option 1, Option 2, Option 3, and Option 5 with the caveat of wild pig animal training for Animal Control, wild pig education mailers, and multi-agency response timeline.

2. Regional Housing Trust Update from Western Regional Council of Governments.

Chris Gray, Deputy Executive Director of Western Regional Council of Governments, introduced the item and provided an overview of the following: Map of Housing Trust in Southern California, Outreach, Assembly Bill (AB) 687, Outstanding Questions, and Next Steps.

The Council had inquiries and Mr. Gray and Cynthia Lara, Administrative Services Manager II, provided clarification.

The following item was taken out of order.

4. Update: Vegan Depot Event at City Park.

Jason Lass, Recreation Services Manager, introduced the item and provided an overview of the following: Request to Proceed with Vegan Depot, Vegan Depot in Corona, Background on Event, Map of City Park, Permit Cost, Cleanup of City Park, Impact of Cleanup, Considerations for Recurrent Use, and Direction Whether to Accept Request or Reject Recurrent Use.

The Council had inquiries and Mr. Lass, Anne Turner, Community Services Director, and Dean Derleth, City Attorney, provided clarification.

Joe Morgan, resident, addressed the Council regarding the update.

Christina Bohannon, Owner of Organic Junkie, addressed the Council regarding the update.

The Council had inquiries and Ms. Bohannon provided clarification.

The Council discussed the recommendation and by majority vote the Council agreed to accept the request to proceed with the recurrent use of City Park for the Vegan Depot event for one year.

3. Authorized Exceptions to “Or Equal” Contracting Requirement.

Tom Moody, General Manager, and Dean Derleth, City Manager, provided an overview of the following: "Or Equal" Contracting Requirement, "Or Equal" Requirement Exceptions, City's Use of "Match" Exception- Exclusive Standard Specifications, Delegated Authority, Other City Exclusive Lists, Utilities Exclusive Standard Specific List of 60 Items, Pros & Cons, and Direction.

The Council had inquiries and Mr. Moody and Mr. Derleth provided clarification.

Joe Morgan, resident, addressed the Council to express concerns with the item.

ADJOURNMENT

The next scheduled meeting of the Council is December 15, 2021. Mayor Speake adjourned the meeting at 6:23 p.m.

City of Corona

400 S. Vicentia Ave.
Corona, CA 92882

City Council Minutes - Draft

Wednesday, December 15, 2021

Closed Session Council Board Room 4:30 PM
Open Session Council Chambers 6:30 PM

CITY COUNCIL/SUCCESSOR AGENCY TO THE REDEVELOPMENT AGENCY OF THE CITY OF CORONA/CORONA PUBLIC FINANCING AUTHORITY/CORONA UTILITY AUTHORITY/CORONA HOUSING AUTHORITY MEETING

Wes Speake, Mayor
Tony Daddario, Vice Mayor
Jacque Casillas, Council Member
Tom Richins, Council Member
Jim Steiner, Council Member

**Revised agenda on December 15, 2021 at 11:18 a.m.
Item 21 - Staff Report PDF was updated to reflect the correct and current year.**

CONVENE CLOSED SESSION

Closed session convened at 4:30 p.m. for the purposes listed below. Present were Mayor Speake, Vice Mayor Daddario, Council Member Casillas, Council Member Richins, and Council Member Steiner. Closed session adjourned at 5:35 p.m.

CITY COUNCIL

1. CLOSED SESSION - CONFERENCE WITH REAL PROPERTY NEGOTIATORS
pursuant to Government Code Section 54956.8
Property: APN 113-340-014
Agency negotiator: Jacob Ellis, City Manager
Negotiating parties: RPP Equities, LLC (Robert H. Kim)
Under negotiation: Price and Terms of Payment

2. CONFERENCE WITH LABOR NEGOTIATORS
Pursuant to Government Code Section 54957.6
Agency Designated Representative: Jacob Ellis, City Manager
Employee Organizations: Corona General Employees Association, Corona Fire Association, Corona Police Employees Association, Corona Police Supervisors Association and Corona Supervisors Association

3. CONFERENCE WITH LABOR NEGOTIATORS
Pursuant to Government Code Section 54957.6
Agency Designated Representative: Jacob Ellis, City Manager
Unrepresented Employee Group: Management/Confidential Group Employees

4. CONFERENCE WITH LABOR NEGOTIATORS
Pursuant to Government Code Section 54957.6
Agency Designated Representative: Jacob Ellis, City Manager
Unrepresented Employee Group: Executive Group Employees

Rollcall

Present: 4 - Wes Speake, Jacque Casillas, Tom Richins, and Jim Steiner

Absent: 1 - Tony Daddario

INVOCATION - Pastor Charlie Moulton, Lakeshore City Council

The Invocation was led by Pastor Charlie Moulton.

PLEDGE OF ALLEGIANCE

The Pledge of Allegiance was led by Council Member Steiner.

PROCLAMATIONS/RECOGNITIONS/PRESENTATIONS

5. Presentation: Alcoa Dike Phase 2 Construction Update.

Derek Walker, US Army Corps of Engineers Project Manager, provided an update.

6. Presentation: Dos Lagos Power Outage.

Tom Moody, General Manager, provided an update.

The Council had inquiries and Southern California Edison staff provided clarification.

7. Presentation: Covid-19 Update.

Brian Young, Fire Chief, provided an update.

MEETING MINUTES

A motion was made by Council Member Richins, seconded by Council Member Casillas, that these Minutes be approved. The motion carried by the following vote:

Aye: 4 - Speake, Casillas, Richins, and Steiner

Absent: 1 - Daddario

8. Approval of Minutes for the City Council, Successor Agency to the Redevelopment Agency of the City of Corona, Corona Public Financing Authority, Corona Utility Authority, Corona Housing Authority Special Meeting of December 1, 2021.

These Minutes were approved.

9. Approval of Minutes for the City Council, Successor Agency to the Redevelopment Agency of the City of Corona, Corona Public Financing Authority, Corona Utility Authority, Corona Housing Authority City Council Meeting of December 1, 2021.

These Minutes were approved.

CONSENT CALENDAR

A motion was made by Council Member Richins, seconded by Council Member Casillas, that the Consent Calendar be approved, with the exception of Items 13, 15 through 18, and 24, which were voted on separately. The motion carried by the following vote:

Aye: 4 - Speake, Casillas, Richins, and Steiner

Absent: 1 - Daddario

10. City Council, Successor Agency to the Redevelopment Agency of the City of Corona, Corona Public Financing Authority, Corona Utility Authority, and Corona Housing Authority to receive and file the Monthly Investment Portfolio Report for the month of October 2021.

This Financial Report was received and filed.

11. City Council, Successor Agency to the Redevelopment Agency of the City of Corona, Corona Public Financing Authority, Corona Utility Authority, and Corona Housing Authority to receive and file the Monthly Fiscal Report for the month of October 2021.

This Financial Report was received and filed.

12. Historic Property Preservation Agreement 2021-0003 for property listed on the Corona Register of Historic Resources located at 1205 Palm Avenue (Applicant: Steve and Beata Bizal).

This Agreement was approved.

13. Cooperative Agreement for Fire Emergency Services Mutual Aid between the City of Corona and the City of Canyon Lake.

Mayor Speake provided comments regarding the proposed item.

A motion was made by Mayor Speake, seconded by Council Member Richins, that this Agreement be approved. The motion carried by the following vote:

Aye: 4 - Speake, Casillas, Richins, and Steiner

Absent: 1 - Daddario

14. Right of Entry License Agreement for use of City Property located at 3997 Temescal Canyon Road - Water Reclamation Facility No. 3.

This Agreement was approved.

15. Non-Exclusive Right-of-Way License Agreement with Sifi Networks Corona, LLC to install a Citywide Fiberoptic Network.

Chris McMasters, Chief Information Officer, provided a presentation. The Council discussed the item and provided comments.

Joe Morgan, resident, addressed the Council to express concerns with the proposed item.

A motion was made by Council Member Casillas that this Agreement be approved. The motion carried by the following vote:

Aye: 4 - Speake, Casillas, Richins, and Steiner

Absent: 1 - Daddario

16. Memorandum of Understanding with the Corona Firefighters Association effective January 1, 2022 through December 31, 2024.

Joe Morgan, resident, addressed the Council to express concerns with the proposed item and had inquiries.

Jacob Ellis, City Manager, provided clarification. Mayor Speake provided comments in support of the proposed item.

A motion was made by Mayor Speake, seconded by Council Member Steiner, that this Agreement be approved. The motion carried by the following vote:

Aye: 4 - Speake, Casillas, Richins, and Steiner

Absent: 1 - Daddario

17. Professional Services Agreement with Alta Planning + Design for the Trails Master Plan - Phase II Project.

Anne Turner, Community Services Director, provided a presentation. Mayor Speake had inquiries regarding the proposed item and Ms. Turner provided clarification.

John Donalson, resident, addressed the Council in support of the proposed item.

Jacob, resident, addressed the Council in support of the proposed item and thanked the Council for saving the trails.

A motion was made by Council Member Casillas, seconded by Council Member Richins, that this Bid & Purchase be approved. The motion carried by the following vote:

Aye: 4 - Speake, Casillas, Richins, and Steiner

Absent: 1 - Daddario

18. Consultant Services Agreement with Transportation Management & Design, Inc. to analyze and prepare a Comprehensive Operations Analysis of the City's Local Public Transit Services

Mayor Casillas provided comments regarding the proposed item.

A motion was made by Council Member Casillas, seconded by Council Member Steiner, that this Bid & Purchase be approved. The motion carried by the following vote:

Aye: 4 - Speake, Casillas, Richins, and Steiner

Absent: 1 - Daddario

19. Acceptance of a Grant from the California Department of Transportation for the Development of a Local Road Safety Plan and Award of a Professional Services Agreement with Kimley-Horn and Associates, Inc. to Prepare the Plan.

This Bid & Purchase was approved.

20. Personnel Report providing employee updates and details on various recruitment transactions.

This Report was received and filed.

21. Resolution approving a Recognized Obligation Payment Schedule and Resolution approving Successor Agency Administrative Budget for the period of July 2022 through June 2023.

This Resolution was adopted.

22. Resolution certifying the results of an election and adding territory to Community Facilities District No. 2016-1 (Public Services) of the City of Corona (Annexation No. 19).

This Resolution was adopted.

23. Resolution authorizing the destruction of certain obsolete City records.

This Resolution was adopted.

24. Resolution accepting the State of California's $8,000,000 of designated funding pursuant to the 2021 Budget Act to renovate the Las Coronas Affordable Housing Project.

Mayor Casillas acknowledged Cynthia Lara, Administrative Services Manager II, and staff for all their hard work.

A motion was made by Council Member Casillas, seconded by Mayor Speake, that this Resolution be adopted. The motion carried by the following vote:

Aye: 4 - Speake, Casillas, Richins, and Steiner

Absent: 1 - Daddario

25. Resolution approving the City of Corona Position Library and Compensation Plan and repealing all prior Plans, including Resolution No. 2021-112, to implement salary range changes for various part-time positions, add one part-time position, and update salary ranges based on the new agreement with the Corona Firefighters' Association.

This Resolution was adopted.

COMMUNICATIONS FROM THE PUBLIC

None.

PUBLIC HEARINGS

26. Public Hearing and Election for Annexation Proceedings for Annexation No. 26 into Community Facilities District No. 2016-3 (Maintenance Services).

Mayor Speake opened the Public Hearing. Sylvia Edwards, City Clerk, confirmed she had proof of publication and mailing of the notice of the Public Hearing. She confirmed that she had not received any written protests. Ms. Edwards stated there are no registered voters within the area to be annexed to the CFD, and the owners of all property proposed to be annexed to the CFD agreed to hold a special election on December 15, 2021. Ms. Edwards also agreed to hold a special election on December 15, 2021. Mayor Speake closed the Public Hearing. Ms. Edwards confirmed she received one ballot and all votes cast are in favor of levying the special taxes.

A motion was made by Council Member Richins, seconded by Council Member Steiner, that Resolution No. 2021-132 be adopted. A motion was made by Council Member Richins, seconded by Council Member Steiner, that Resolution No. 2021-133 be adopted. The motions carried by the following vote:

Aye: 4 - Speake, Casillas, Richins, and Steiner

Absent: 1 - Daddario

27. Public Hearing and Election for Annexation Proceedings for Annexation No. 31 into Community Facilities District No. 2016-3 (Maintenance Services).

Mayor Speake opened the Public Hearing. Sylvia Edwards, City Clerk, confirmed she had proof of publication and mailing of the notice of the Public Hearing. She confirmed that she had not received any written protests. Ms. Edwards stated there are no registered voters within the area to be annexed to the CFD, and the owners of all property proposed to be annexed to the CFD agreed to hold a special election on December 15, 2021. Ms. Edwards also agreed to hold a special election on December 15, 2021. Mayor Speake closed the Public Hearing. Ms. Edwards confirmed she received two ballot and all votes cast are in favor of levying the special taxes.

A motion was made by Council Member Steiner, seconded by Council Member Casillas, that Resolution No. 2021-134 be adopted. A motion was made by Council Member Casillas, seconded by Council Member Steiner, that Resolution No. 2021-135 be adopted. The motions carried by the following vote:

Aye: 4 - Speake, Casillas, Richins, and Steiner

Absent: 1 - Daddario

ADMINISTRATIVE REPORTS

28. City Council consideration to receive and file the auditor's reports related to the Fiscal Year 2021 Annual Financial Audits, Auditor's Communication, Annual Comprehensive Financial Report, Development Impact Fees Annual Report, Annual Report on Voter Approved Debt for fiscal year ending June 30, 2021.

Kim Sitton, Finance Director, introduced the item and Frances Kuo, The Pun Group, provided a presentation. Council Member Casillas had inquiries and Ms. Kuo provided clarification.

A motion was made by Council Member Casillas, seconded by Council Member Steiner, that this Administrative Report be approved. The motion carried by the following vote:

Aye: 4 - Speake, Casillas, Richins, and Steiner

Absent: 1 - Daddario

LEGISLATIVE MATTERS

29. First reading of an Ordinance, adding section 2.08.190 to Chapter 2.08 of the Corona Municipal Code to require electronic signature and submission of campaign disclosure documents.

Council Member Casillas had inquiries and Sylvia Edwards, City Clerk, provided clarification.

Joe Morgan, resident, addressed the Council to express concerns with the proposed item.

A motion was made by Council Member Casillas, seconded by Council Member Steiner, that this Ordinance be approved. The motion carried by the following vote:

Aye: 4 - Speake, Casillas, Richins, and Steiner

Absent: 1 - Daddario

BOARDS AND COMMISSIONS – REPORTS FROM CITY COUNCIL, COMMISSIONERS, AND STAFF FOR THE:

A) Planning & Housing Commission

None.

B) Parks & Recreation Commission

None.

C) Regional Meetings

30. Update from Council Member Jacque Casillas on the Western Riverside Council of Governments (WRCOG) Meeting of December 6, 2021.

Council Member Casillas provided an update.

31. Update from Council Member Tom Richins on the Riverside County Habitat Conservation Agency (RCHCA) Meeting of November 18, 2021.

Council Member Richins provided an update.

32. Update from Vice Mayor Tony Daddario on the Western Riverside County Regional Conservation Authority (RCA) Board Meeting of December 6, 2021.

The update was not provided due to the Vice Mayor's absence.

33. Update from Mayor Wes Speake on the Riverside County Transportation Commission (RCTC) Western Programs Meeting of December 8, 2021.

Mayor Speake provided an update.

CITY ATTORNEY'S REPORTS AND COMMENTS

Jamie Raymond, Chief Deputy City Attorney, reported that the Council met in Closed Session and there was no reportable action for the items listed on the agenda.

CITY MANAGER'S REPORTS AND COMMENTS

Jacob Ellis, City Manager, provided clarification to inquiries from a previous Council meeting regarding the July 30, 2020 press release concerning overtime calculation.

CITY COUNCIL MEMBER REPORTS AND COMMENTS

Council Member Casillas provided a brief overview on the Holiday Lighting Celebration. She also announced the upcoming events, Kids & Cops and Tacos & Toys, both being held on December 18, 2021.

Council Member Richins provided a brief overview on the Holiday Lighting Celebration. He thanked Mayor Speake for the Riverside County Habitat Conservation Agency appointment and wished everyone Happy Holidays.

Council Member Steiner provided a brief overview on the Sierra Del Oro Annual Christmas Fair and the Walk of honor for Officer Jeff Hedtke. He also acknowledged the passing of his friend Laurel Carlson.

Mayor Speake provided a brief overview of the following: Southern California Edison's Time-Of-Use Policy, Cajalco Road Widening Project, I-15 Express Lane Project, items discussed during Committee of the Whole and Study Sessions meetings, Riverside County Transportation Commission (RCTC) meeting, Future Agenda Items, his Town Hall meeting, Holiday Lighting Celebration, Pearl Harbor Commemoration event, McKinley Grade Separation meeting, Asian Business Association of the Inland Empire, Mayor's Youth Council, Anniversary of the American Legion Post 216, and upcoming City Hall closure dates. The Mayor wished everyone Happy Holidays.

34. 2022 appointments to Regional Boards and Commissions.

Mayor Speake provided a brief overview and announced that there no changes to the appointments of Regional Boards and Commissions.

FUTURE AGENDA ITEMS

1. Non Profit/Sponsored Utility Box Wraps (W. Speake) 1/12/2022

2. Consideration of Civic Center Fountain Renovation (W. Speake) 1/26/2022

3. Corona Municipal Airport Update (T. Daddario) 2/23/2022

4. Historic Preservation Code Revisions (W. Speake) TBD

5. Options for Paving the Overlook Area (W. Speake) TBD

6. Options to expedite Redevelopment of Main Street and Parkridge Avenue Area (J. Casillas) TBD

7. Infill Fees in Historic Districts (W. Speake) TBD

8. Draft Agendas (T. Daddario) TBD

9. Council Code of Conduct (W. Speake) TBD

10. Zoom Participation in Public Meetings (W. Speake) TBD

ADJOURNMENT

The next scheduled meeting of the Council is January 5, 2022. Mayor Speake adjourned the meeting at 8:40 p.m. in honor of Laurel Carlson.

City of Corona

400 S. Vicentia Ave.
Corona, CA 92882

Special Meeting Minutes - Draft

Monday, December 20, 2021

Council Board Room 5:15 PM

CITY COUNCIL/SUCCESSOR AGENCY TO THE REDEVELOPMENT AGENCY OF THE CITY OF CORONA/CORONA PUBLIC FINANCING AUTHORITY/CORONA UTILITY AUTHORITY/CORONA HOUSING AUTHORITY MEETING

Wes Speake, Mayor
Tony Daddario, Vice Mayor
Jacque Casillas, Council Member
Tom Richins, Council Member
Jim Steiner, Council Member

CONVENE CLOSED SESSION

Closed Session convened at 5:15 p.m. for the purposes listed below. Present were Mayor Speake, Vice Mayor Daddario, Council Member Casillas, Council Member Richins, and Council Member Steiner.

COMMUNICATIONS FROM THE PUBLIC

None.

AGENDA ITEMS

1. CONFERENCE WITH LABOR NEGOTIATORS
Pursuant to Government Code Section 54957.6
Agency Designated Representative: Jacob Ellis, City Manager
Unrepresented Employee Group: Management/Confidential Group Employees

2. CONFERENCE WITH LABOR NEGOTIATORS
Pursuant to Government Code Section 54957.6
Agency Designated Representative: Jacob Ellis, City Manager
Employee Organizations: Corona General Employees Association, Corona Police Employees Association, Corona Police Supervisors Association and Corona Supervisors Association

3. CONFERENCE WITH LABOR NEGOTIATORS
Pursuant to Government Code Section 54957.6
Agency Designated Representative: Jacob Ellis, City Manager
Unrepresented Employee Group: Executive Group Employees

ADJOURNMENT

Closed Session adjourned at 6:33 p.m.

ORDINANCE NO. 3339

AN ORDINANCE OF THE OF THE CITY OF CORONA, CALIFORNIA, ADDING SECTION 2.08.190 TO CHAPTER 2.08 OF THE CORONA MUNICIPAL CODE TO REQUIRE ELECTRONIC SIGNATURE AND SUBMISSION OF CAMPAIGN DISCLOSURE DOCUMENTS

WHEREAS, California Government Code Section 84615 authorizes the adoption of an ordinance that requires an elected officer, candidate, committee, or other person required to file statements, reports, or other documents required by Chapter 4 of the Political Reform Act, except those whose contributions and expenditures each total less than two thousand dollars ($2,000) in a calendar year, to file such statements, reports, or other documents online or electronically with the local filing officer; and

WHEREAS, the City Clerk of the City of Corona ("City Clerk") is the local filing officer for the Fair Political Practices Commission disclosure statements and is responsible for receiving, reviewing, and making available campaign disclosure statements; and

WHEREAS, since the enactment of the Political Reform Act, candidates and committees have complied with filing requirements by filing paper copies of campaign statements and reports with the City Clerk; and

WHEREAS, the elimination of manual processing of filings through electronic filing requirements authorized by California Government Code Section 84615 will conserve resources and ensure the public has access to the information disclosed in campaign statements; and

WHEREAS, the City Clerk has identified a web-based system that will allow electronic filing in compliance with California Government Code Section 84615 and has been approved by the Secretary of State for the electronic filing of campaign disclosure statements.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF CORONA DOES ORDAIN AS FOLLOWS:

SECTION 1. City Council Findings. The City Council expressly finds and determines that the City Clerk's web-based system has been approved by the Secretary of State for the electronic filing of campaign disclosure statements and that the software contains multiple safeguards to protect the integrity and security of the data, will operate securely and effectively, and will not unduly burden filers.

SECTION 2. CEQA Findings. This action is exempt pursuant to Section 15061(b)(3) of the Guidelines for the California Environmental Quality Act (CEQA), which states that a project is exempt from CEQA if the activity is covered by the common sense exemption that

CEQA applies only to projects that have the potential for causing a significant effect on the environment. Where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA. This action simply requires the electronic submission of all campaign statements, reports or other documents required to be filed with the City Clerk under the Political Reform Act, and there is no possibility that adopting this Ordinance will have a significant effect on the environment. Therefore, no environmental analysis is required.

SECTION 3. Addition of Section 2.08.190. Section 2.08.190 (Electronic campaign disclosure) is hereby added to Chapter 2.08 (City Council) of the Corona Municipal Code to read as follows:

"**2.08.190 Electronic campaign disclosure.**

(A) Any elected officer, candidate, or committee that is required to file with the City Clerk campaign statements, reports or other documents pursuant to Chapter 4 of the Political Reform Act (California Government Code section 84100, *et seq*.) and that receives a total of two thousand dollars ($2,000) or more in contributions or makes a total of two thousand dollars ($2,000) or more in expenditures, shall electronically sign, under penalty of perjury, and file such statements, reports or documents in an electronic format prescribed by the City Clerk.

(B) An elected officer, candidate or committee that has filed an electronic statement, report or document pursuant to this section is not required to file a paper copy.

(C) Once a candidate or committee is subject to the electronic filing requirements imposed by this section, the candidate or committee will remain subject to the electronic filing requirements until the candidate or committee files a termination statement pursuant to the Political Reform Act and, thus, is no longer subject to the filing requirements set forth in the Political Reform Act.

(D) Any candidate or committee not required to file an electronic statement or report by this section may voluntarily opt to file such statement or report in an electronic format prescribed by the City Clerk by submitting written notice to the City Clerk's Office. A candidate or committee that opts to file a statement or report in an electronic format prescribed by the City Clerk is not required to file a paper copy."

SECTION 4. Severability. If any provision or clause of this Ordinance or any application of it to any person, firm, organization, partnership or corporation is held invalid, such invalidity shall not affect other provisions of this Ordinance which can be given effect without the invalid provision or application. To this end, the provisions of this Ordinance are declared to be severable.

SECTION 5. Conflicting Ordinances. This Ordinance shall supersede all other previous City Council resolutions and ordinances that may conflict with, or be contrary to, this Ordinance.

SECTION 6. Effective Date. The Mayor shall sign this Ordinance and the City Clerk shall attest thereto and shall within fifteen (15) days of its adoption cause it, or a summary of it, to be published in a general circulation newspaper published in the City of Corona. This Ordinance shall take effect and be in force 30 days after its adoption.

PASSED, APPROVED AND ADOPTED this 5th day of January, 2022.

____

Mayor of the City of Corona, California

ATTEST:

____

City Clerk of the City of Corona, California

CERTIFICATION

I, Sylvia Edwards, City Clerk of the City of Corona, California, do hereby certify that the foregoing Ordinance was regularly introduced at a regular meeting of the City Council of the City of Corona, California duly held on the 15th day of December, 2021 and thereafter at a regular meeting held on the 5th day of January, 2022, it was duly passed and adopted by the following vote:

AYES:

NOES:

ABSENT:

ABSTAINED:

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of the City of Corona, California, this 5th day of January, 2022.

____
City Clerk of the City of Corona, California

[SEAL]

400 S. Vicentia Ave.
Corona, CA 92882

File #: 22-0024

REQUEST FOR CITY COUNCIL AND CORONA UTILITY AUTHORITY ACTION

DATE: 1/5/2022

TO: Honorable Mayor and City Council Members
Honorable President and Board Members

FROM: Public Works Department & Utilities Department

SUBJECT:
First Amendment to the Professional Services Agreement with Dudek for the Mangular Blending Facility, Project No. 2018-13.

EXECUTIVE SUMMARY:
On July 15, 2020, City Council approved the award of the Construction Management and Inspection Services Contract to Dudek in the amount of $663,217 to provide construction management, inspection, materials testing, and public outreach professional services during the construction of the Mangular Blending Facility. The Project includes construction of a new potable water blending facility with pumping and disinfection facilities in Mangular Park, which will enable the beneficial use of groundwater from the Temescal Groundwater Basin. The construction schedule has been extended due to COVID-19 materials and equipment supply disruptions, constructability and operational considerations, and design modifications to provide variable frequency drive pump motors. City staff is proposing to amend the Dudek contract to provide additional construction management and inspection services in the amount of $120,000 to increase the total contract amount with Dudek under purchase order P21789 to $783,217.

RECOMMENDED ACTION:
That the:

a. City Council authorize the Utilities Department General Manager to execute the First Amendment to Professional Services Agreement P21789 with Dudek of Encinitas, CA to provide construction management and inspection services for the Mangular Blending Facility in the amount of $120,000 and approve necessary change orders up to the amount provided by Corona Municipal Code Section 3.08.070(i).

b. City Council authorize the Purchasing Manager to issue a change order to purchase order number P21789 in the amount of $120,000 in accordance with duly authorized and executed agreements and renewals.

c. City Council authorize the Utilities Manager and City Attorney to negotiate and execute any amendments to this Agreement, which are either non-substantive or are otherwise in compliance with the City Council's actions hereunder.

d. Corona Utility Authority (CUA) review, ratify and to the extent necessary direct that the City Council take the above actions.

BACKGROUND & HISTORY:

On July 15, 2020, City Council approved award of the construction management and inspection services contract to Dudek in the amount of $663,217 to provide construction management, inspection, materials testing, and public outreach professional services during the construction of the Mangular Blending Facility based on a 13-month construction schedule provided by City staff.

The Project will construct a new potable water blending facility with pumping and disinfection facilities to enable the use of groundwater from the Temescal Groundwater Basin. The 2.0-million-gallon Mangular Tank, located at the east end of Mangular Park on Utilities Department property, is one of two 905 Zone domestic water storage and blending facilities serving the City of Corona.

The blending facility receives water with elevated nitrate concentrations from City-owned wells 11, 12, 14, 15, and 27 via a well collector line at flow rates ranging from 1,000 GPM to 3,800 GPM. The blending facility receives lower nitrate treated blend water via a 1060 Zone transmission main (Crosstown Feeder) within Ontario Avenue, providing the flexibility of using blend water from either the Lester Water Treatment Plant or the Sierra del Oro Water Treatment Plant. The well water will be blended with the 1060 Zone blend water to achieve targeted nitrate concentrations in the blended water prior to discharge to the Mangular Tank. The Project location and limits are shown on Exhibit "A."

ANALYSIS:

Construction commenced on October 6, 2020, with an original completion date of November 8, 2021, based on the City's estimated schedule. The schedule prepared by the general contractor determined that construction required an additional 103 working days, extending the completion date to April 11, 2022. The City issued a no-cost change order to the general contractor extending the contract period the requested 103 working days to April 11, 2021. The time extension resulted from the following.

1. The project is located on a small site with existing water facilities that must remain in operation during most of the construction schedule. Significant portions of the construction work must be performed in a linear sequence rather than concurrently to maintain active water facilities in service.

2. The existing blending and pump station facilities will need to be taken out of service and

demolished over a several month period. Scheduling of this work in winter and spring 2021/22 is most advantageous for the operation of the potable water blending and distribution system.

3. Disruptions to equipment and materials manufacturing and delivery lead times due to COVID-19 impacts have impacted the overall construction schedule.

4. Utilities Department staff requested modifications to the design to use variable frequency drive (VFD) pump motors in lieu of fixed speed motors to provide greater operational flexibility. VFD motors will allow water operations staff to match water inflows and outflows and maintain consistent water levels in the adjacent Mangular Tank and control flows to Zones 1060 and 1220 to meet the operational needs for each distribution zone. Power and controls design modifications were made in a collaborative effort between City staff, the general and electrical contractors, and the electrical and instrumentation inspectors. Additional electrical conduits, wiring, equipment, and cabinets were purchased and installed to provide the desired VFD controls.

Extension of the construction schedule requires construction management and inspection services for five additional months beyond the original 13-month construction schedule plus one month of reduced construction management activity during project closeout. The design modifications to incorporate VFD motors requires additional effort by the electrical and instrumentation inspection firm to review the proposed electrical design and controls logic changes, review additional submittals, and provide additional field inspection.

The requested additional construction management budget totals $120,000. Public outreach and soils/materials testing services can be managed within the existing budget and require no additional funding due to the extended schedule.

FINANCIAL IMPACT:
The approved Project budget of $13,650,000 includes sufficient funding for the proposed construction management contract amendment.

ENVIRONMENTAL ANALYSIS:
The Program Environmental Impact Report Addendum for the Mangular Blending Facility Project was adopted on November 6, 2019. Therefore, no further environmental analysis is required.

PREPARED BY: VERNON R. WEISMAN, P.E. DISTRICT ENGINEER

REVIEWED BY: SAVAT KHAMPHOU, PUBLIC WORKS DIRECTOR

Attachments:
1. Exhibit 1 - Location Map
2. Exhibit 2 - First Amendment to the Professional Services Agreement

City of Corona

EXHIBIT 1 - LOCATION MAP
MANGULAR BLENDING FACILITY

FIRST AMENDMENT TO
PROFESSIONAL SERVICES AGREEMENT

BETWEEN THE CITY OF CORONA
AND
DUDEK
(CONSTRUCTION MANAGEMENT & INSPECTION SERVICES – MANGULAR BLENDING FACILITY)

1. PARTIES AND DATE.

This First Amendment to the Professional Services Agreement ("First Amendment") is made and entered into this 5th day of January, 2022 by and between the City of Corona ("City") and Dudek, a California corporation ("Consultant"). City and Consultant are sometimes individually referred to as "Party" and collectively as "Parties" in this First Amendment.

2. RECITALS.

2.1 Agreement. City and Consultant entered into that certain Professional Services Agreement dated July 15, 2020 ("Agreement"), whereby Consultant agreed to provide construction management and inspection services for the Mangular Blending Facility Project.

2.2 Amendment. City and Consultant desire to amend the Agreement for the first time to (1) extend the Term of the Agreement through September 30, 2022 due to equipment procurement delays caused by COVID-19 shutdowns, site constraints related to working around existing essential facilities that must remain operational during construction and requiring linear construction activities and design modifications to provide variable frequency drive pump motors; (2) increase the Total Compensation by $120,000 to $783,217 to account for the Term extension; (3) replace Exhibit "B" (Schedule of Services) with Exhibit "B-1" (Schedule of Services); and (4) replace Exhibit "C" (Compensation) with Exhibit "C-1" (Compensation).

3. TERMS.

3.1 Term. Section 3.1.2 (Term) of the Agreement is hereby deleted in its entirety and replaced with the following:

> "3.1.2 Term. The term of this Agreement shall be from **August 1, 2020 to September 30, 2022** ("Term"), unless earlier terminated as provided herein. Consultant shall complete the Services within the Term of this Agreement, and shall meet any other established schedules and deadlines. The Parties may, by mutual, written consent, extend the Term of this Agreement one or more times by executing a written amendment pursuant to Section 3.6.8 below (each a "Renewal Term")."

3.2 Rates & Total Compensation. Section 3.3.1 (Rates & Total Compensation) and Exhibit "C" (Compensation) of the Agreement are hereby deleted in their entirety and replaced with the following:

> "3.3.1 Rates & Total Compensation. Consultant shall receive compensation, including authorized reimbursements, for all Services rendered under this Agreement at the rates set forth in Exhibit "C-1" attached hereto and incorporated herein by reference. The total compensation, including authorized reimbursements, shall not exceed **Seven Hundred Eighty-three Thousand Two Hundred Seventeen Dollars ($783,217.00)** ("Total Compensation"), without written approval of City's Representative. Extra Work may be authorized, as described below, and if authorized, will be compensated at the rates and manner set forth in this Agreement."

3.3 Exhibit "B". Exhibit "B" (Schedule of Services) of the Agreement is hereby deleted in its entirety and replaced with Exhibit "B-1" (Schedule of Services) attached hereto and incorporated herein by reference.

3.4 Continuing Effect of Agreement. Except as amended by this First Amendment, all provisions of the Agreement shall remain unchanged and in full force and effect. From and after the date of this First Amendment, whenever the term "Agreement" appears in the Agreement, it shall mean the Agreement as amended by this First Amendment.

3.5 Adequate Consideration. The Parties hereto irrevocably stipulate and agree that they have each received adequate and independent consideration for the performance of the obligations they have undertaken pursuant to this First Amendment.

3.6 Counterparts. This First Amendment may be executed in duplicate originals, each of which is deemed to be an original, but when taken together shall constitute but one and the same instrument.

[SIGNATURES ON FOLLOWING PAGE]

CITY'S SIGNATURE PAGE FOR FIRST AMENDMENT TO PROFESSIONAL SERVICES AGREEMENT BETWEEN THE CITY OF CORONA AND DUDEK (CONSTRUCTION MANAGEMENT & INSPECTION SERVICES – MANGULAR BLENDING FACILITY)

IN WITNESS WHEREOF, the Parties have entered into this First Amendment to Professional Services Agreement as of the date noted on the first page of the Amendment.

CITY OF CORONA

By: ___________________________
Savat Khamphou, P.E., P.L.S.
Public Works Director/City Engineer

Reviewed By:

____
Tom Moody
General Manager

Reviewed By:

____
Vernon R. Weisman, P.E.
District Engineer

Reviewed By:

____
Scott Briggs
Purchasing Specialist V

Attest:

____
Sylvia Edwards, City Clerk
City of Corona, California

CONSULTANT'S SIGNATURE PAGE FOR FIRST AMENDMENT TO PROFESSIONAL SERVICES AGREEMENT BETWEEN THE CITY OF CORONA AND DUDEK (CONSTRUCTION MANAGEMENT & INSPECTION SERVICES – MANGULAR BLENDING FACILITY)

IN WITNESS WHEREOF, the Parties have entered into this First Amendment to Professional Services Agreement as of the date noted on the first page of the Amendment.

DUDEK
a California corporation

By: ______________________________
Signature

____
Name

____
Title (CEO, President, V.P.)

By: ______________________________
Signature

____
Name

____
Title (Secretary, CFO, Treasurer)

(BB&K: 9-10)

ORANGE\DDERLETH\55190.2

EXHIBIT "B-1"
SCHEDULE OF SERVICES

[PROJECT SCHEDULE PROVIDED ON FOLLOWING PAGE]

EXHIBIT "C-1"
COMPENSATION

Total Compensation shall not exceed seven hundred eighty-three thousand two hundred seventeen dollars ($783,217.00) without prior written authorization from City's Representative.

Team Member Name	Hourly Rate	Hours	13-Month Cost	Additional Cost	18-Month Cost Plus 1 Month Close-Out
Project Principal George Litzinger, P.E.	$170	50	$8,500	—	$8,500
Construction Manager Marius Jaskula, P.E., CCM	$150	2,500	$375,000	$80,000	$455,000
Electrical Rockwell Construction Services	Budget		$67,840	$40,000	$107,840
Geotechnical/Materials Testing NMG Geotechnical, Inc.	Budget		$109,953	—	$109,953
Public Outreach Alliance Outreach, LLC	Budget		$49,924	—	$49,924
Direct Costs	Est.		$2,000	—	$2,000
		Subtotal	$613,217	$120,000	$733,217
		Mark-Up on Subconsultants & Contingency	$50,000	—	$50,000
		TOTAL	**$663,217**	**$120,000**	**$783,217**

2020 STANDARD SCHEDULE OF CHARGES

Engineering Services

Project Director	$290.00/hr
Principal Engineer III	$270.00/hr
Principal Engineer II	$260.00/hr
Principal Engineer I	$250.00/hr
Program Manager	$235.00/hr
Senior Project Manager	$235.00/hr
Project Manager	$230.00/hr
Senior Engineer III	$225.00/hr
Senior Engineer II	$215.00/hr
Senior Engineer I	$205.00/hr
Project Engineer IV/Technician IV	$195.00/hr
Project Engineer III/Technician III	$185.00/hr
Project Engineer II/Technician II	$170.00/hr
Project Engineer I/Technician I	$155.00/hr
Senior Designer	$175.00/hr
Designer	$165.00/hr
Assistant Designer	$160.00/hr
CADD Operator III	$155.00/hr
CADD Operator II	$145.00/hr
CADD Operator I	$130.00/hr
CADD Drafter	$120.00/hr
CADD Technician	$110.00/hr
Project Coordinator	$135.00/hr
Engineering Assistant	$115.00/hr

Environmental Services

Project Director	$245.00/hr
Senior Specialist IV	$230.00/hr
Senior Specialist III	$220.00/hr
Senior Specialist II	$200.00/hr
Senior Specialist I	$190.00/hr
Specialist V	$180.00/hr
Specialist IV	$170.00/hr
Specialist III	$160.00/hr
Specialist II	$145.00/hr
Specialist I	$130.00/hr
Analyst V	$120.00/hr
Analyst IV	$110.00/hr
Analyst III	$100.00/hr
Analyst II	$90.00/hr
Analyst I	$80.00/hr
Technician IV	$90.00/hr
Technician III	$80.00/hr
Technician II	$70.00/hr
Technician I	$60.00/hr
Compliance Monitor	$95.00/hr

Data Management Services

GIS Programmer I	$185.00/hr
GIS Specialist IV	$160.00/hr
GIS Specialist III	$150.00/hr
GIS Specialist II	$140.00/hr
GIS Specialist I	$130.00/hr
Data Analyst III	$100.00/hr
Data Analyst II	$90.00/hr
Data Analyst I	$80.00/hr
UAS Pilot	$100.00/hr

Construction Management Services

Principal/Manager	$195.00/hr
Senior Construction Manager	$180.00/hr
Senior Project Manager	$165.00/hr
Construction Manager	$155.00/hr
Project Manager	$145.00/hr
Resident Engineer	$145.00/hr
Construction Engineer	$140.00/hr
On-site Owner's Representative	$140.00/hr
Construction Inspector III	$130.00/hr
Construction Inspector II	$120.00/hr
Construction Inspector I	$110.00/hr
Prevailing Wage Inspector	$135.00/hr

Hydrogeological Services

Project Director	$285.00/hr
Principal Hydrogeologist/Engineer II	$265.00/hr
Principal Hydrogeologist/Engineer I	$250.00/hr
Sr. Hydrogeologist IV/Engineer IV	$235.00/hr
Sr. Hydrogeologist III/Engineer III	$220.00/hr
Sr. Hydrogeologist II/Engineer II	$205.00/hr
Sr. Hydrogeologist I/Engineer I	$190.00/hr
Hydrogeologist VI/Engineer VI	$175.00/hr
Hydrogeologist V/Engineer V	$165.00/hr
Hydrogeologist IV/Engineer IV	$155.00/hr
Hydrogeologist III/Engineer III	$145.00/hr
Hydrogeologist II/Engineer II	$135.00/hr
Hydrogeologist I/Engineer I	$125.00/hr
Technician	$100.00/hr

District Management & Operations

District General Manager	$195.00/hr
District Engineer	$185.00/hr
Operations Manager	$160.00/hr
District Secretary/Accountant	$120.00/hr
Collections System Manager	$135.00/hr
Grade V Operator	$125.00/hr
Grade IV Operator	$110.00/hr
Grade III Operator	$100.00/hr
Grade II Operator	$75.00/hr
Grade I Operator	$70.00/hr
Operator in Training	$65.00/hr
Collection Maintenance Worker II	$75.00/hr
Collection Maintenance Worker I	$65.00/hr

Creative Services

3D Graphic Artist	$180.00/hr
Graphic Designer IV	$160.00/hr
Graphic Designer III	$145.00/hr
Graphic Designer II	$130.00/hr
Graphic Designer I	$115.00/hr

Publications Services

Technical Editor III	$145.00/hr
Technical Editor II	$130.00/hr
Technical Editor I	$115.00/hr
Publications Specialist III	$105.00/hr
Publications Specialist II	$95.00/hr
Publications Specialist I	$85.00/hr
Clerical Administration	$90.00/hr

Forensic Engineering – Court appearances, depositions, and interrogatories as expert witness will be billed at 2.00 times normal rates.
Emergency and Holidays – Minimum charge of two hours will be billed at 1.75 times the normal rate.
Material and Outside Services – Subcontractors, rental of special equipment, special reproductions and blueprinting, outside data processing and computer services, etc., are charged at 1.15 times the direct cost.
Travel Expenses – Mileage at current IRS allowable rates. Per diem where overnight stay is involved is charged at cost.
Invoices, Late Charges – All fees will be billed to Client monthly and shall be due and payable upon receipt. Invoices are delinquent if not paid within 30 days from the date of the invoice. Client agrees to pay a monthly late charge equal to 1% per month of the outstanding balance until paid in full.
Annual Increases – Unless identified otherwise, these standard rates will increase 3% annually.

The rates listed above assume prevailing wage rates does not apply. If this assumption is incorrect Dudek reserves the right to adjust its rates accordingly.

File #: 22-0027

REQUEST FOR CITY COUNCIL ACTION

DATE: 01/05/2022

TO: Honorable Mayor and City Council Members

FROM: Public Works Department

SUBJECT:
Fourth Amendment to the Professional Services Agreement with Jacobs Engineering Group, Inc. for the Cajalco Road/I-15 Interchange Improvements, Project No. 56-1203.

EXECUTIVE SUMMARY:
City Council consideration for the approval of a Fourth Amendment to the Professional Services Agreement with Jacobs Engineering Group, Inc. (Jacobs) to provide Right-of-Way closeout for the Cajalco Road/I-15 Interchange Improvements, Project No. 56-1203 (Project) that will increase the overall approved contract value from $5,261,270 to $5,426,433 for a total increase of $165,163.

RECOMMENDED ACTION:
That the City Council:

a. Approve the Fourth Amendment to the Professional Services Agreement with Jacobs Engineering Group, Inc. to increase the total compensation by $165,163 to provide Right-of-Way Closeout Services for Cajalco/I-15 Interchange Improvements, Project No. 56-1203.

b. Authorize the City Manager, or his designee, to execute the Fourth Amendment to the Professional Services Agreement with Jacobs Engineering Group, Inc. for a total contract amount of $5,426,433.

c. Authorize the Purchasing Manager to issue a Contract Change Order to Jacobs Engineering Group, Inc.'s purchase order P11879 in the amount of $165,163.

BACKGROUND & HISTORY:
New Home Company, the developer of the Bedford Community, also known as Arantine Hills (Developer), as part of its work to improve the Cajalco Road/I-15 Interchange is conditioned to pay

all the construction and construction support costs of the Project. According to the Development Agreement between the City and Developer approved by the City Council on May 19, 2016, Section 1.1.33 "Total Cost," the Developer is required to pay the project closeout activities. The Developer provided an initial deposit to cover the anticipated costs to be incurred during the initial phase upon award of the contracts. The Developer made subsequent payments over the duration of the project to cover all anticipated costs each month. The Developer has provided funds in conformance to the Development Agreement to cover specific expenditures incurred to date.

At the Project Development Team (PDT) meeting No. 31, held on May 12, 2016, it was discussed and agreed by all parties that titles for all parcels would be initially recorded in the City's name. This required the Right-of-Way to be recorded twice; the first recording occurred after the City completed the acquisition of all parcels to be dedicated to the City. The parcels identified for State ownership will be transferred to the State in a second recording after setting the required survey monumentation to complete the closeout phase of the project.

ANALYSIS:

Construction of the Cajalco Road/I-15 Interchange improvements has been completed. The project closeout phase is in progress and requires the City to deed to the State of California select parcels acquired for the project within the Interstate 15 Right-of-Way. This effort will require revisions to Right-of-Way appraisal maps and parcel bubbles to show the correct ownership of the acquired parcels. The City will request new parcel numbers from Caltrans for all parcels being transferred to the State. The new parcel numbers will be placed on the deeds, legal descriptions, and appraisal maps. The ownership block of the appraisal map will be revised to indicate the grantor is the City of Corona.

At the Project Development Team (PDT) meeting No. 31 held on May 12, 2016 all parties agreed to defer Right-of-Way closeout and transfer of property to the State until after completion of construction. The City has conducted negotiations with Jacobs to identify what Staff believes is an appropriate scope of services that provides ROW Closeout Services per Caltrans requirements. City Staff has reviewed the proposed scope of services and believes it is appropriate given the complexity of the Right-of-Way and additional Caltrans requirements. However, City staff with Caltrans approval did not include the ROW closeout until after completion of construction. This was discussed at the aforementioned PDT meeting No. 31, which discussed the transfer of property to the State after completion of construction.

As part of its scope of work, Jacobs will set up 22 additional survey monuments requested by Caltrans at all angle points and the beginning and ending of curves along the State Right-of-Way (ROW). This additional task from Caltrans will require Jacobs to prepare Record of Survey maps, including the new monument/property ties set along the ROW lines. When completed, the maps will be submitted to the County of Riverside Surveyors Office and Caltrans for review prior to final recordation.

The City's consultant will prepare deed jackets for up to nine (9) parcels for the conveyance of the property from the City to the State. Caltrans ROW engineers, Caltrans attorneys, and City attorneys will review the deed processing and jacket contents. The Special Certification No. 3 with a Work-

Around (3W) was prepared and must be updated to capture progress pertaining to the workaround parcels. This will require coordination with Crown Castle and AT&T to verify the completion of the relocation work.

City staff recommends approval of the Fourth Amendment to the Professional Services Agreement with Jacobs per the Additional Services Request attached to this report. Jacobs was selected for the work through the competitive Request for Proposal (RFP) process RFP 12.2020 JB. This will complete the final property closeout requirements from Caltrans apart from the 3-year plant establishment period which will end on April 30, 2023.

FINANCIAL IMPACT:
Under the terms of the Agreement Recorded on July 21, 2016, Section 1.1.33 "Total Cost" Developer is required to pay all construction and project closeout activities without limitation. The following table provides the available funds in the Arantine Hills Agreement:

	DESCRIPTION	**AMOUNT**
Total Deposit Received		$64,102,059
	Relocation Agreements	<$1,631,032>
	Prior Expenditures Report	<$61,556,514>
	Drawn From Deposit Balance	<$448,059>
	Deposit Balance	**$466,454**

ENVIRONMENTAL ANALYSIS:
This action is exempt pursuant to Section 15061(b)(3) of the Guidelines for the California Environmental Quality Act (CEQA), which states that a project is exempt from CEQA if the activity is covered by the general rule that CEQA applies only to projects that have the potential for causing a significant effect on the environment. Where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA. This action merely amends an existing agreement to set the required survey monumentation, file all Records of Survey, and transfer of property to the State. Since there is no possibility that adopting this action will have a significant effect on the environment, no environmental analysis is required.

PREPARED BY: PETER RAMEY, PROJECT MANAGER

REVIEWED BY: SAVAT KHAMPHOU, PUBLIC WORKS DIRECTOR

Attachments:
1. Exhibit 1 - Jacobs Contract
2. Exhibit 2 - Jacobs Change Order
3. Exhibit 3 - Additional Work Request
4. Exhibit 4 - Developer Agreement Section 1
5. Exhibit 5 - Fourth Amendment to the Professional Services Agreement

CITY OF CORONA
PROFESSIONAL SERVICES AGREEMENT

ORIGINAL

1. **PARTIES AND DATE.**

This Agreement is made and entered into this 16th day of May, 2012 by and between the City of Corona, a municipal corporation organized under the laws of the State of California with its principal place of business at 400 South Vicentia Avenue, Corona, California 92882 ("City") and Jacobs Engineering Group Inc., a Delaware CORPORATION, with its principal place of business at 3257 E. Guasti Road, Suite 120, Ontario, CA 91761 ("CONSULTANT"). City and CONSULTANT are sometimes individually referred to as "Party" and collectively as "Parties" in this Agreement.

2. **RECITALS.**

2.1 CONSULTANT.

CONSULTANT desires to perform and assume responsibility for the provision of certain professional services required by the City on the terms and conditions set forth in this Agreement. CONSULTANT represents that it is experienced in providing Engineering and Right of Way Design services to public clients, is licensed in the State of California, and is familiar with the plans of City.

2.2 PROJECT; Corona Utility Authority.

City desires to engage CONSULTANT to render such services for the Cajalco / 15 Interchange Improvement Project No. 56-1203 RFP No. 12.020JB project ("Project") as set forth in this Agreement. CONSULTANT understands that the City has entered into a Water Enterprise Management Agreement and a Wastewater Enterprise Management Agreement, both dated as of February 6, 2002, with the Corona Utility Authority ("CUA") for the maintenance, management and operation of those utility systems (collectively, the "CUA Management Agreements"). To the extent that this Agreement is deemed to be a "material contract" under either of the CUA Management Agreements, City enters into this Agreement on behalf of the CUA and subject to the terms of the applicable CUA Management Agreement(s).

2.3 Funding

A source of funding for payment for professional services provided under this Agreement is federal funds from the United States Federal Highway Administration (FHWA), administered by the California Department of Transportation (CALTRANS), pursuant to program SAFETEA-LU. This Agreement shall not be deemed to be approved by the City until the forms shown in Exhibit "D" attached hereto and incorporated herein by reference, are executed and incorporated in this Agreement. This Agreement is valid and enforceable only if sufficient funds are made available to the City for the purpose of this Agreement. This Agreement is subject to any additional restrictions, limitations, conditions or applicable statutes enacted by the Congress, State Legislature or City Council that may affect the provisions, terms or funding of this Agreement in any manner. It is mutually agreed that if sufficient funds are not appropriated this Agreement may be amended to reflect any reduction in funds.

3. **TERMS.**

3.1 Scope of Services and Term.

3.1.1 General Scope of Services. CONSULTANT promises and agrees to furnish to the City all labor, materials, tools, equipment, services, and incidental and customary work necessary to fully and adequately supply the professional Engineering and Right of Way Design Services consulting services necessary for the Project ("Services"). The Services are more particularly described in Exhibit "A" attached hereto and incorporated herein by reference. All Services shall be subject to, and performed in accordance with, this Agreement, the exhibits attached hereto and incorporated herein by reference, and all applicable local, state and federal laws, rules, and regulations.

3.1.2 Term. The term of this Agreement shall be from 16th day of May, 2012 to 30th day of June, 2014, unless earlier terminated as provided herein. CONSULTANT shall complete the Services within the term of this Agreement, and shall meet any other established schedules and deadlines. The Parties may, by mutual, written consent, extend the term of this Agreement if necessary to complete the Services.

3.2 Responsibilities of CONSULTANT.

3.2.1 Control and Payment of Subordinates; Independent Contractor. The Services shall be performed by CONSULTANT or under its supervision. CONSULTANT will determine the means, methods and details of performing the Services subject to the requirements of this Agreement. City retains CONSULTANT on an independent contractor basis and not as an employee. CONSULTANT retains the right to perform similar or different services for others during the term of this Agreement. Any additional personnel performing the Services under this Agreement on behalf of CONSULTANT shall also not be employees of City and shall at all times be under CONSULTANT's exclusive direction and control. CONSULTANT shall pay all wages, salaries, and other amounts due such personnel in connection with their performance of Services under this Agreement and as required by law. CONSULTANT shall be responsible for all reports and obligations respecting such additional personnel, including, but not limited to: social security taxes, income tax withholding, unemployment insurance, disability insurance, and workers' compensation insurance. Any subcontract in excess of $25,000 entered into as a result of this contract, shall contain all the provisions stipulated in this contract to be applicable to subcontractors.

3.2.2 Schedule of Services. CONSULTANT shall perform the Services expeditiously, within the term of this Agreement, and in accordance with the Schedule of Services set forth in Exhibit "B" attached hereto and incorporated herein by reference. CONSULTANT represents that it has the professional and technical personnel required to perform the Services in conformance with such conditions. In order to facilitate CONSULTANT's conformance with the Schedule, City shall respond to CONSULTANT's submittals in a timely manner. Upon request of City, CONSULTANT shall provide a more detailed schedule of anticipated performance to meet the Schedule of Services.

3.2.3 Conformance to Applicable Requirements. All work prepared by CONSULTANT shall be subject to the approval of City, Caltrans and FHWA.

3.2.4 Substitution of Key Personnel. CONSULTANT has represented to City that certain key personnel will perform and coordinate the Services under this Agreement. Should one or more of such personnel become unavailable, CONSULTANT may substitute other personnel of at least equal competence upon written approval of City. In the event that City and CONSULTANT cannot agree as to the substitution of key personnel, City shall be entitled to terminate this Agreement for cause. As discussed below, any personnel who fail or refuse to perform the Services in a manner acceptable to the City, or who are determined by the City to be uncooperative, incompetent, a threat to the adequate or timely completion of the PROJECT or a threat to the safety of persons or property, shall be promptly removed from the PROJECT by the CONSULTANT at the request of the City. The key personnel for performance of this Agreement are as follows: Chao Chen.

3.2.5 City's Representative. The City hereby designates the Public Works Director, or his or her designee, to act as its representative for the performance of this Agreement ("City's Representative"). City's Representative shall have the power to act on behalf of the City for all purposes under this Contract and shall act as the Contract Administrator for purposes of this Agreement. CONSULTANT shall not accept direction or orders from any person other than the City's Representative or his or her designee.

3.2.6 CONSULTANT's Representative. CONSULTANT hereby designates Chao Chen, Project Manager, or his or her designee, to act as its representative for the performance of this Agreement ("CONSULTANT's Representative"). CONSULTANT's Representative shall have full authority to represent and act on behalf of the CONSULTANT for all purposes under this Agreement. The CONSULTANT's Representative shall supervise and direct the Services, using his best skill and attention, and shall be responsible for all means, methods, techniques, sequences, and procedures and for the satisfactory coordination of all portions of the Services under this Agreement.

3.2.7 Coordination of Services. CONSULTANT agrees to work closely with City staff in the performance of Services and shall be available to City's staff, Caltrans and FHWA representatives at all reasonable times.

3.2.8 Standard of Care; Performance of Employees. CONSULTANT shall perform all Services under this Agreement in a skillful and competent manner, consistent with the standards generally recognized as being employed by professionals in the same discipline in the State of California. CONSULTANT represents and maintains that it is skilled in the professional calling necessary to perform the Services. CONSULTANT warrants that all employees and sub-consultants shall have sufficient skill and experience to perform the Services assigned to them. Finally, CONSULTANT represents that it, its employees and sub-consultants have all licenses, permits, qualifications and approvals of whatever nature that are legally required to perform the Services, including a City Business License, and that such licenses and approvals shall be maintained throughout the term of this Agreement. As provided for in the indemnification provisions of this Agreement, CONSULTANT shall perform, at its own cost and expense and without reimbursement from the City, any services necessary to correct errors or omissions which are caused by the CONSULTANT's failure to comply with the standard of care provided for herein. Any employee of the CONSULTANT or its sub-consultants who is determined by the City to be uncooperative, incompetent, a threat to the adequate or timely completion of the PROJECT, a threat to the safety of persons or property, or any employee who fails or refuses to perform the Services in a manner acceptable to the City, shall be promptly removed from the PROJECT by the CONSULTANT and shall not be re-employed to perform any of the Services or to work on the PROJECT.

3.2.9 Period of Performance. CONSULTANT shall perform and complete all Services under this Agreement within the term set forth in Section 3.1.2 above ("Performance Time"). CONSULTANT shall also perform the Services in strict accordance with any completion schedule or PROJECT milestones described in Exhibits "A" or "B" attached hereto, or which may be separately agreed upon in writing by the City and CONSULTANT ("Performance Milestones"). CONSULTANT agrees that if the Services are not completed within the aforementioned Performance Time and/or pursuant to any such PROJECT Milestones developed pursuant to provisions of this Agreement, it is understood, acknowledged and agreed that the City will suffer damage.

3.2.10 Laws and Regulations; Employee/Labor Certifications. CONSULTANT shall keep itself fully informed of and in compliance with all local, state and federal laws, rules and regulations in any manner affecting the performance of the PROJECT or the Services, including all Cal/OSHA requirements, and shall give all notices required by law. CONSULTANT shall be liable for all violations of such laws and regulations in connection with Services. If the CONSULTANT performs any work knowing it to be contrary to such laws, rules and regulations and without giving written notice to the City, CONSULTANT shall be solely responsible for all costs arising therefrom. CONSULTANT shall defend, indemnify and hold City, its officials, directors, officers, employees, and agents free and harmless, pursuant to the indemnification provisions of this Agreement, from any claim or liability arising out of any failure or alleged failure to comply with such laws, rules or regulations.

Pursuant to the authority contained in Section 591 of the Vehicle Code, the CITY has determined that such areas are within the limits of the PROJECT and are open to public traffic. The CONSULTANT shall comply with all of the requirements set forth in Divisions 11, 12, 13, 14, and 15 of the Vehicle Code. The CONSULTANT shall take all reasonably necessary precautions for safe operation of its vehicles and the protection of the traveling public from injury and damage from such vehicles. Any subcontract entered into as a result of this contract, shall contain all of the provisions of this Article. CONSULTANT must have a Division of Occupational Safety and Health (CAL-OSHA) permit(s), as outlined in California Labor Code Sections 6500 and 6705, prior to the initiation of any practices, work, method, operation, or process related to the construction or excavation of trenches which are five feet or deeper.

3.2.10.1 Employment Eligibility; CONSULTANT. By executing this Agreement, CONSULTANT verifies that it fully complies with all requirements and restrictions of state and federal law respecting the employment of undocumented aliens, including, but not limited to, the Immigration Reform and Control Act of 1986, as may be amended from time to time. Such requirements and restrictions include, but are not limited to, examination and retention of documentation confirming the identity and immigration status of each employee of the CONSULTANT. CONSULTANT also verifies that it has not committed a violation of any such law within the five (5) years immediately preceding the date of execution of this Agreement which it had not disclosed in writing to City, and shall not violate any such law at any time during the term of the Agreement. CONSULTANT shall avoid any violation of any such law during the term of this Agreement by participating in an electronic verification of work authorization program operated by the United States Department of Homeland Security, by participating in an equivalent federal work authorization program operated by the United States

Department of Homeland Security to verify information of newly hired employees, or by some other legally acceptable method. CONSULTANT shall maintain records of each such verification, and shall make them available to the City or its representatives for inspection and copy at any time during normal business hours. The City shall not be responsible for any costs or expenses related to CONSULTANT's compliance with the requirements provided for in Section 3.2.10 or any of its sub-sections.

3.2.10.2 Employment Eligibility; Contractors, CONSULTANTS, Sub-subcontractors and Sub-consultants. To the same extent and under the same conditions as CONSULTANT, CONSULTANT shall require all of its subcontractors, CONSULTANTS, sub-subcontractors and sub-consultants performing any work relating to the PROJECT or this Agreement to make the same verifications and comply with all requirements and restrictions provided for in Section 3.2.10.1.

3.2.10.3 Employment Eligibility; Failure to Comply. Each person executing this Agreement on behalf of CONSULTANT verifies that they are a duly authorized officer of CONSULTANT, and understands that any of the following shall be grounds for the City to terminate the Agreement for cause: (1) failure of CONSULTANT or its subcontractors, CONSULTANTS, sub-subcontractors or sub-consultants to meet any of the requirements provided for in Sections 3.2.10.1 or 3.2.10.2; (2) any misrepresentation or material omission concerning compliance with such requirements (including in those verifications provided to the CONSULTANT under Section 3.2.10.2); or (3) failure to immediately remove from the PROJECT any person found not to be in compliance with such requirements.

3.2.11 Labor Certification. By its signature hereunder, CONSULTANT certifies that it is aware of the provisions of Section 3700 of the California Labor Code which require every employer to be insured against liability for Workers' Compensation or to undertake self-insurance in accordance with the provisions of that Code, and agrees to comply with such provisions before commencing the performance of the Services.

3.2.12 Equal Opportunity Employment. CONSULTANT represents that it is an equal opportunity employer and it shall not discriminate against any sub-consultant, employee or applicant for employment because of race, religion, color, national origin, handicap, ancestry, sex or age. Such non-discrimination shall include, but not be limited to, all activities related to initial employment, upgrading, demotion, transfer, recruitment or recruitment advertising, layoff or termination. CONSULTANT shall also comply with all relevant provisions of City's Minority Business Enterprise program, Affirmative Action Plan or other related programs or guidelines currently in effect or hereinafter enacted.

3.2.13 Air Quality. To the extent applicable, CONSULTANT must fully comply with all applicable laws, rules and regulations in furnishing or using equipment and/or providing services, including, but not limited to, emissions limits and permitting requirements imposed by the South Coast Air Quality Management District (SCAQMD) and/or California Air Resources Board (CARB). Although the SCAQMD and CARB limits and requirements are more broad, CONSULTANT shall specifically be aware of their application to "portable equipment", which definition is considered by SCAQMD and CARB to include any item of equipment with a fuel-powered engine. CONSULTANT shall indemnify City against any fines or penalties imposed by SCAQMD, CARB, or any other governmental or regulatory agency for violations of applicable laws, rules ,and/or regulations by CONSULTANT, its sub-consultants, or others for whom CONSULTANT is responsible under its indemnity obligations provided for in this Agreement.

3.2.14 DEBARMENT AND SUSPENSION CERTIFICATION. The CONSULTANT's signature affixed herein, shall constitute a certification under penalty of perjury under the laws of the State of California, that the CONSULTANT has complied with Title 49, Code of Federal Regulations, Part 29, Debarment and Suspension Certificate, which certifies that he/she or any person associated therewith in the capacity of owner, partner, director, officer, or manager, is not currently under suspension, debarment, voluntary exclusion, or determination of ineligibility by any federal agency; has not been suspended, debarred, voluntarily excluded, or determined ineligible by any federal agency within the past three (3) years; does not have a proposed debarment pending; and has not been indicted, convicted, or had a civil judgment rendered against it by a court of competent jurisdiction in any matter involving fraud or official misconduct within the past three (3) years. Any exceptions to this certification must be disclosed to the CITY.

Exceptions will not necessarily result in denial of recommendation for award, but will be considered in determining CONSULTANT responsibility. Disclosures must indicate to whom exceptions apply, initiating agency, and dates of action.

3.2.15 INSPECTION OF WORK. The CONSULTANT and any subcontractor shall permit the City, the State, and FHWA to conference with the CONSULTANT, visit the site of the work, and review and inspect the PROJECT activities and files at all reasonable times during the performance period of this Agreement including review and inspection on a daily basis. Costs incurred by the CONSULTANT for meetings conducted pursuant to this paragraph shall be included in the CONSULTANT's fee.

3.3 **Insurance.**

3.3.1 Time for Compliance. CONSULTANT shall not commence Work under this Agreement until it has provided evidence satisfactory to the City that it has secured all insurance required under this section. In addition, CONSULTANT shall not allow any sub-consultant to commence work on any subcontract until it has provided evidence satisfactory to the City that the sub-consultant has secured all insurance required under this section. Failure to provide and maintain all required insurance shall be grounds for the City to terminate this Agreement for cause.

3.3.2 Minimum Requirements. CONSULTANT shall, at its expense, procure and maintain for the duration of the Agreement insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the Agreement by the CONSULTANT, its agents, representatives, employees or sub-consultants. CONSULTANT shall also require all of its sub-consultant to procure and maintain the same insurance for the duration of the Agreement. Such insurance shall meet at least the following minimum levels of coverage:

(A) Minimum Scope of Insurance. Coverage shall be at least as broad as the latest version of the following: (1) *General Liability*: Insurance Services Office Commercial General Liability coverage (occurrence form CG 0001), endorsed to include contractual liability; (2) *Automobile Liability*: Insurance Services Office Business Auto Coverage form number CA 0001, code 1 (any auto); and (3) *Workers' Compensation and Employer's*

Liability: Workers' Compensation insurance as required by the State of California and Employer's Liability Insurance.

(B) Minimum Limits of Insurance. CONSULTANT shall maintain limits no less than: (1) *General Liability:* $1,000,000 per occurrence for bodily injury, personal injury and property damage. If Commercial General Liability Insurance or other form with general aggregate limit is used including, but not limited to, form CG 2503, either the general aggregate limit shall apply separately to this Agreement/location or the general aggregate limit shall be twice the required occurrence limit; (2) *Automobile Liability:* $1,000,000 per accident for bodily injury and property damage; and (3) *Workers' Compensation and Employer's Liability:* Workers' Compensation limits as required by the Labor Code of the State of California. Employer's Liability limits of $1,000,000 per accident for bodily injury or disease.

3.3.3 Professional Liability. CONSULTANT shall procure and maintain, and require its sub-consultants to procure and maintain, for a period of five (5) years following completion of the PROJECT, errors and omissions liability insurance appropriate to their profession. Such insurance shall be in an amount not less than $3,000,000 per claim.

3.3.4 Insurance Endorsements. The insurance policies shall contain the following provisions, or CONSULTANT shall provide endorsements on forms supplied or approved by the City to add the following provisions to the insurance policies:

(A) General Liability. The general liability policy shall be endorsed (amended) to state that: (1) the City, its directors, officials, officers, employees, agents, and volunteers shall be covered as additional insured with respect to the Work or operations performed by or on behalf of the CONSULTANT, including materials, parts or equipment furnished in connection with such work; and (2) the insurance coverage shall be primary insurance as respects the City, its directors, officials, officers, employees, agents, and volunteers, or if excess, shall stand in an unbroken chain of coverage excess of the CONSULTANT's scheduled underlying coverage. Any insurance or self-insurance maintained by the City, its directors, officials, officers, employees, agents, and volunteers shall be excess of the CONSULTANT's insurance and shall not be called upon to contribute with it in any way.

(B) Automobile Liability. The automobile liability policy shall be endorsed (amended) to state that: (1) the City, its directors, officials, officers, employees, agents, and volunteers shall be covered as additional insureds with respect to the ownership, operation, maintenance, use, loading or unloading of any auto owned, leased, hired or borrowed by the CONSULTANT or for which the CONSULTANT is responsible; and (2) the insurance coverage shall be primary insurance as respects the City, its directors, officials, officers, employees, agents, and volunteers, or if excess, shall stand in an unbroken chain of coverage excess of the CONSULTANT's scheduled underlying coverage. Any insurance or self-insurance maintained by the City, its directors, officials, officers, employees, agents, and volunteers shall be excess of the CONSULTANT's insurance and shall not be called upon to contribute with it in any way.

(C) Workers' Compensation and Employer's Liability Coverage. The insurer shall agree to waive all rights of subrogation against the City, its directors, officials, officers, employees, agents, and volunteers for losses paid under the terms of the insurance policy which arise from work performed by the CONSULTANT.

(D) All Coverages. Each insurance policy required by this Agreement shall be endorsed to state that: (A) coverage shall not be suspended, voided, or canceled except after thirty (30) days prior written notice has been given to the City, provided that if a thirty (30) days notice of cancellation endorsement is not available CONSULTANT shall notify City of this unavailability in writing and shall forward any notice of cancellation to the City within two (2) business days from date of receipt by CONSULTANT; and (B) any failure to comply with reporting or other provisions of the policies, including breaches of warranties, shall not affect coverage provided to the City, its directors, officials, officers, employees, agents, and volunteers. CONSULTANT's failure either to obtain an endorsement providing thirty (30) days prior written notice of cancellation endorsement or to forward the City any notice of cancellation issued to CONSULTANT shall be considered breach of contract.

3.3.5 Separation of Insureds; No Special Limitations. All insurance required by this Section shall contain standard separation of insureds provisions. In addition, such insurance shall not contain any special limitations on the scope of protection afforded to the City, its directors, officials, officers, employees, agents, and volunteers.

3.3.6 Deductibles and Self-Insurance Retentions. Any deductibles or self-insured retentions must be declared to and approved by the City. CONSULTANT shall guarantee that, at the option of the City, either: (1) the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the City, its directors, officials, officers, employees, agents, and volunteers; or (2) the CONSULTANT shall procure a bond guaranteeing payment of losses and related investigation costs, claims, and administrative and defense expenses.

3.3.7 Acceptability of Insurers. Insurance is to be placed with insurers with a current A.M. Best's rating no less than A:VIII, licensed to do business in California, and satisfactory to the City.

3.3.8 Verification of Coverage. CONSULTANT shall furnish City with original certificates of insurance and endorsements effecting coverage required by this Agreement on forms satisfactory to the City. The certificates and endorsements for each insurance policy shall be signed by a person authorized by that insurer to bind coverage on its behalf, and shall be on forms provided by the City if requested. All certificates and endorsements must be received and approved by the City before work commences. The City reserves the right to require complete, certified copies of all required insurance policies, at any time.

3.3.9 Reporting of Claims. CONSULTANT shall report to the City, in addition to CONSULTANT's insurer, any and all insurance claims submitted by CONSULTANT in connection with the Services under this Agreement.

3.3.10 Safety. CONSULTANT shall execute and maintain its work so as to avoid injury or damage to any person or property. In carrying out its Services, the CONSULTANT shall at all times be in compliance with all applicable local, state and federal laws, rules and regulations, and shall exercise all necessary precautions for the safety of employees appropriate to the nature of the work and the conditions under which the work is to be performed. Safety precautions as applicable shall include, but shall not be limited to: (A) adequate life protection and lifesaving equipment and procedures; (B) instructions in accident prevention for all employees and sub-consultants, such as safe walkways, scaffolds, fall protection ladders, bridges, gang planks, confined space procedures, trenching and shoring, equipment and other safety devices, equipment and wearing apparel as are necessary or lawfully required to prevent accidents or injuries; and (C) adequate facilities for the proper inspection and maintenance of all safety measures.

3.4 Fees and Payments.

3.4.1 COST PRINCIPLES. The CONSULTANT agrees that the Contract Cost Principles and Procedures, 48 CFR, Federal Acquisition Regulations System, Chapter 1, Part 31.000 et seq., shall be used to determine the allowability of individual cost items.

The CONSULTANT also agrees to comply with federal procedures in accordance with 49 CFR, Part 18, Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments. Any costs for which payment has been made to CONSULTANT that are determined by subsequent audit to be unallowable under 48 CFR, Federal Acquisition Regulations System, Chapter 1, Part 31.000 et seq., are subject to repayment by CONSULTANT to the City.

3.4.2. Pre-Award Audit. As a result of the federal funding for this PROJECT, and to the extent Caltrans procedures apply in connection therewith, issuance of a "Notice to Proceed" may be contingent upon completion and approval of a pre-award audit. Any questions raised during the pre-award audit shall be resolved before the City will consider approval of this Agreement. The federal aid provided under this Agreement is contingent on meeting all Federal requirements and could be withdrawn, thereby entitling the City to terminate this Agreement, if the procedures are not completed. The CONSULTANT's files shall be maintained in a manner to facilitate Federal and State process reviews. In addition, the applicable federal agency, or Caltrans acting in behalf of a federal agency, may require that prior to performance of any work for which Federal reimbursement is requested and provided, that said federal agency or Caltrans must give to City an "Authorization to Proceed".

3.4.2.1 Post-Award Audit. In the event that Caltrans authorizes the City to issue a "Limited Notice to Proceed", CONSULTANT's cost proposal, set forth in the attached Exhibit "C", will be subject to a post-award audit by Caltrans. CONSULTANT's files shall be maintained in a manner to facilitate Federal and State process reviews. If any post-award audit recommendations are received by City from Caltrans, Exhibit "C" shall be adjusted by CONSULTANT and approved by City to conform to the audit recommendations. CONSULTANT agrees that individual items of cost may be incorporated into the attached Exhibit "C", based on the interim or post-award audit recommendations of Caltrans, at City's sole discretion. Refusal by CONSULTANT to incorporate the interim audit or post-award recommendations of Caltrans will be considered a breach of this Agreement and cause for termination.

3.4.3 Compensation. The basis of payment for the services provided under this Agreement shall be cost-plus-a-fixed fee.

3.4.3.1. The CITY shall reimburse the CONSULTANT for actual costs (including labor costs, employee benefits, overhead and other direct costs) incurred by the CONSULTANT in performance of the work, in an amount not to exceed $3,813,392.26 exclusive of any fixed fee. Actual costs shall not exceed the estimated wage rates and other costs set forth in the

CONSULTANT's cost proposal attached hereto as Exhibit "C" and incorporated herein by this reference. In the event of conflict between the CONSULTANT's cost proposal and any term of condition of this Agreement, this Agreement shall prevail.

3.4.3.2. In addition to the costs referred to in Section 3.4.3.2, the CITY shall pay the CONSULTANT a fixed fee of $185,852.30. Said fixed fee shall not be altered, unless there is a significant alteration in the scope, complexity, or character of the work to be performed which is documented as an amendment.

3.4.3.3. CONSULTANT shall not be reimbursed for any expenses unless authorized in writing by City.

3.4.3.4. Total expenditures made under this Agreement, including the fixed fee shall not exceed the sum of $3,813,392.26.

3.4.4 Payment of Compensation. CONSULTANT shall submit to City a monthly itemized statement which indicates work completed and hours of Services rendered by CONSULTANT. The statement shall describe the amount of Services and supplies provided since the initial commencement date, or since the start of the subsequent billing periods, as appropriate, through the date of the statement. City shall, within 45 days of receiving such statement, review the statement and pay all approved charges thereon.

3.4.5 Extra Work. At any time during the term of this Agreement, City may request that CONSULTANT perform Extra Work. As used herein, "Extra Work" means any work which is determined by City to be necessary for the proper completion of the PROJECT, but which the parties did not reasonably anticipate would be necessary at the execution of this Agreement. CONSULTANT shall not perform, nor be compensated for, Extra Work without written authorization from City's Representative.

3.4.6 Prevailing Wages. CONSULTANT is aware of the requirements of California Labor Code Section 1720, et seq., and 1770, et seq., 1775, as well as California Code of Regulations, Title 8, Section 16000, et seq., ("Prevailing Wage Laws"), which require the payment of prevailing wage rates and the performance of other requirements on "public works" and "maintenance" projects if the Services are being performed as part of an applicable "public works" or "maintenance" project, as defined by the Prevailing Wage Laws, and if the total compensation is $1,000 or more, CONSULTANT agrees to fully comply with such Prevailing Wage Laws. CONSULTANT shall make copies of the prevailing rates of per diem wages for each craft, classification or type of worker needed to execute the Services available to interested parties upon request, and shall post copies at the CONSULTANT's principal place of business and at the PROJECT site. CONSULTANT shall defend, indemnify and hold the City, its elected officials, officers, employees and agents free and harmless from any claim or liability arising out of any failure or alleged failure to comply with the Prevailing Wage Laws.

Wage guidelines entitled, *CONSULTANT Guidelines for Prevailing Wage and Labor Compliance on Architectural and Engineering (A&E) Contracts* is used to administer Caltrans CONSULTANT contracts and is available at: http://www.dot.ca.gov/hq/construc/A&E_Guidelines/A&EGuidelines.pdf
Wage information is available through the Caltrans Division of Local Assistance web site at: http://www.dir.ca.gov/dlsr/statistics_research.html

3.5 DISPUTES

3.5.1 Any dispute, other than audit, concerning a question of fact arising under this contract that is not disposed of by agreement shall be decided by a committee consisting of the CITY's Contract Manager and Public Works Director, who may consider written or verbal information submitted by the CONSULTANT.

3.5.2 Not later than 30 days after completion of all deliverables necessary to complete the plans, specifications and estimate, the CONSULTANT may request review by the CITY COUNCIL of unresolved claims or disputes, other than audit. The request for review will be submitted in writing to Public Works Director.

3.5.3 Neither the pendency of a dispute, nor its consideration by the committee will excuse the CONSULTANT from full and timely performance in accordance with the terms of this contract.

3.6 Termination of Agreement.

3.6.1 Grounds for Termination. City may, by written notice to CONSULTANT, terminate the whole or any part of this Agreement at any time and without cause by giving written notice to CONSULTANT of such termination, and specifying the effective date thereof, at least seven (7) days before the effective date of such termination. Upon termination, CONSULTANT shall be compensated only for those services which have been adequately rendered to City, and CONSULTANT shall be entitled to no further compensation. CONSULTANT may not terminate this Agreement except for cause.

3.6.2 Effect of Termination. If this Agreement is terminated as provided herein, City may require CONSULTANT to provide all finished or unfinished Documents and Data and other information of any kind prepared by CONSULTANT in connection with the performance of Services under this Agreement. CONSULTANT shall be required to provide such document and other information within fifteen (15) days of the request.

3.6.3 Additional Services. In the event this Agreement is terminated in whole or in part as provided herein, City may procure, upon such terms and in such manner as it may determine appropriate, services similar to those terminated.

3.6.4 Additional Remedies. In addition to termination as provided herein, the CITY expressly reserves the right to pursue any remedy available in law or in equity for breach of this Agreement by CONSULTANT.

3.7 Ownership of Materials and Confidentiality.

3.7.1 Documents & Data; Licensing of Intellectual Property. This Agreement creates a non-exclusive, royalty-free, irrevocable and perpetual license for City, the State and FWHA to copy, use, publish, modify, reuse, or sublicense any and all copyrights, designs, and other intellectual property embodied in plans, specifications, studies, drawings, estimates, and other documents or works of authorship fixed in any tangible medium of expression, including but not limited to, physical drawings or data magnetically or otherwise recorded on computer diskettes, which are prepared or caused to be prepared by CONSULTANT under this Agreement ("Documents & Data"). All Documents & Data shall be and remain the property of City, and shall not be used in whole or in substantial part by CONSULTANT on other projects without the City's express written permission. Within thirty (30) days following the completion, suspension, abandonment or termination of this Agreement, CONSULTANT shall provide to City reproducible copies of all Documents & Data, in a form and amount required by City. City reserves the right to select the method of document reproduction and to establish where the reproduction will be accomplished. The reproduction expense shall be borne by City at the actual cost of duplication. In the event of a dispute regarding the amount of compensation to which the CONSULTANT is entitled under the termination provisions of this Agreement, CONSULTANT shall provide all Documents & Data to City upon payment of the undisputed amount. CONSULTANT shall have no right to retain or fail to provide to City any such documents pending resolution of the dispute. In addition, CONSULTANT shall retain copies of all Documents & Data on file for a minimum of fifteen (15) years following completion of the PROJECT, and shall make copies available to City upon the payment of actual reasonable duplication costs. Before destroying the Documents & Data following this retention period, CONSULTANT shall make a reasonable effort to notify City and provide City with the opportunity to obtain the documents.

For the purpose of determining compliance with Public Contract Code 10115, et seq. and Title 21, California Code of Regulations, Chapter 21, Section 2500 et seq., when applicable and other matters connected with the performance of the contract pursuant to Government Code 8546.7; the CONSULTANT, subcontractors, and the City shall maintain all books, documents, papers, accounting records, and other evidence pertaining to the performance of the contract, including but not limited to, the costs of administering the contract, for a minimum of three (3) years following final payment. All parties shall make such materials available at their respective offices at all reasonable times during the contract period and for three years from the date of final payment under the contract. The state, the State Auditor, City, FHWA, or any duly authorized representative of the federal government shall have access to any books, records, and documents of the CONSULTANT that are pertinent to the contract for audit, examinations, excerpts, and transactions, and copies thereof shall be furnished if requested. Subcontracts in excess of $25,000 shall contain this provision.

3.7.2 Sub-consultants. CONSULTANT shall require all sub-consultants to agree in writing that City is granted a non-exclusive and perpetual license for any Documents & Data the sub-consultant prepares under this Agreement. CONSULTANT represents and warrants that CONSULTANT has the legal right to license any and all Documents & Data. CONSULTANT makes no such representation and warranty in regard to Documents & Data which were prepared by design professionals other than CONSULTANT or its sub-consultants, or those provided to CONSULTANT by the City. If a subcontract for work, or services to be performed by such firms exceeds $25,000, the subcontract shall contain all required provisions of the prime contract.

3.7.3 Right to Use. City shall not be limited in any way in its use or reuse of the Documents and Data or any part of them at any time for purposes of this PROJECT or another project, provided that any such use not within the purposes intended by this Agreement or on a project other than this PROJECT without employing the services of CONSULTANT shall be at City's sole risk. If City uses or reuses the Documents & Data on any project other than this PROJECT, it shall remove the CONSULTANT's seal from the Documents & Data and indemnify and hold harmless CONSULTANT and its officers, directors, agents and employees from claims arising out of the negligent use or re-use of the Documents & Data on such other project. CONSULTANT shall be responsible and liable for its Documents & Data, pursuant to the terms of this Agreement, only with respect to the condition of the Documents & Data at the time they are provided to the City upon completion, suspension, abandonment or termination. CONSULTANT shall not be responsible or liable for any revisions to the Documents & Data made by any party other than CONSULTANT, a party for whom the CONSULTANT is legally responsible or liable, or anyone approved by the CONSULTANT.

3.7.4 Indemnification. CONSULTANT shall defend, indemnify and hold the City, its directors, officials, officers, employees, volunteers and agents free and harmless, pursuant to the indemnification provisions of this Agreement, for any alleged infringement of any patent, copyright, trade secret, trade name, trademark, or any other proprietary right of any person or entity in consequence of the use on the PROJECT by City of the Documents & Data, including any method, process, product, or concept specified or depicted.

3.7.5 Confidentiality. All Documents & Data, either created by or provided to CONSULTANT in connection with the performance of this Agreement, shall be held confidential by CONSULTANT. All Documents & Data shall not, without the prior written consent of City, be used or reproduced by CONSULTANT for any purposes other than the performance of the Services. CONSULTANT shall not disclose, cause or facilitate the disclosure of the Documents & Data to any person or entity not connected with the performance of the Services or the PROJECT. Nothing furnished to CONSULTANT that is otherwise known to CONSULTANT or is generally known, or has become known, to the related industry shall be deemed confidential. CONSULTANT shall not use City's name or insignia, photographs of the PROJECT, or any publicity pertaining to the Services or the PROJECT in any magazine, trade paper, newspaper, television or radio production or other similar medium without the prior written consent of City.

3.8 General Provisions.

3.8.1 Delivery of Notices. All notices permitted or required under this Agreement shall be given to the respective parties at the following address, or at such other address as the respective parties may provide in writing for this purpose:

CONSULTANT:

Jacobs Engineering Group Inc.
3257 E. Guasti Rd. Ste. 120
Ontario, CA 91761
Mr. Chao Chen

City:

City of Corona
400 South Vicentia Avenue
Corona, CA 92882
Attn: Linda Bazmi, Project Manager

Such notice shall be deemed made when personally delivered or when mailed, forty-eight (48) hours after deposit in the U.S. Mail, first class postage prepaid and addressed to the party at its applicable address. Actual notice shall be deemed adequate notice on the date actual notice occurred, regardless of the method of service.

3.8.2 Indemnification.

3.8.2.1 Scope of Indemnity. To the fullest extent permitted by law, CONSULTANT shall defend, indemnify and hold the City, its directors, officials, officers, employees, volunteers and agents free and harmless from any and all claims, demands, causes of action, costs, expenses, liability, loss, damage or injury of any kind, in law or equity, to property or persons, including wrongful death, in any manner arising out of, pertaining to, or incident to any alleged acts, errors or omissions of CONSULTANT, its officials, officers, employees, subcontractors, CONSULTANTS or agents in connection with the performance of the CONSULTANT's Services, the PROJECT or this Agreement, including without limitation the payment of all, expert witness fees and attorney's fees and other related costs and expenses. Notwithstanding the foregoing, to the extent CONSULTANT's Services are subject to Civil Code Section 2782.8, the above indemnity shall be limited, to the extent required by Civil Code Section 2782.8, to claims that arise out of, pertain to, or relate to the negligence, recklessness, or willful misconduct of the CONSULTANT. City agrees to the deletion of the words "consequential damages" but we are not necessarily waiving them.

3.8.2.2 Additional Indemnity Obligations. CONSULTANT shall defend, with Counsel of City's choosing and at CONSULTANT's own cost, expense and risk, any and all claims, suits, actions or other proceedings of every kind covered by Section **3.8.2.1** that may be brought or instituted against City or its directors, officials, officers, employees, volunteers and agents. CONSULTANT shall pay and satisfy any judgment, award or decree that may be rendered against City or its directors, officials, officers, employees, volunteers and agents as part of any such claim, suit, action or other proceeding. CONSULTANT shall also reimburse City for the cost of any settlement paid by City or its directors, officials, officers, employees, agents or volunteers as part of any such claim, suit, action or other proceeding. Such reimbursement shall include payment for City's attorney's fees and costs, including expert witness fees. CONSULTANT shall reimburse City and its directors, officials, officers, employees, agents, and/or volunteers, for any and all legal expenses and costs incurred by each of them in connection therewith or in enforcing the indemnity herein provided. CONSULTANT's obligation to indemnify shall survive expiration or termination of this Agreement, and shall not be restricted to insurance proceeds, if any, received by the City, its directors, officials officers, employees, agents, or volunteers.

3.8.3 Governing Law; Government Code Claim Compliance. This Agreement shall be governed by the laws of the State of California. Venue shall be in Riverside County. In addition to any and all contract requirements pertaining to notices of and requests for compensation or payment for extra work, disputed work, claims and/or changed conditions, CONSULTANT must comply with the claim procedures set forth in Government Code sections 900 et seq. prior to filing any lawsuit against the City. Such Government Code claims and any subsequent lawsuit based upon the Government Code claims shall be limited to those matters that remain unresolved after all procedures pertaining to extra work, disputed work, claims, and/or changed conditions have been followed by CONSULTANT. If no such Government Code claim is submitted, or if any prerequisite contractual requirements are not otherwise satisfied as specified herein, CONSULTANT shall be barred from bringing and maintaining a valid lawsuit against the City.

3.8.4 Time of Essence. Time is of the essence for each and every provision of this Agreement.

3.8.5 City's Right to Employ Other CONSULTANTS. City reserves right to employ other CONSULTANTS in connection with this PROJECT.

3.8.6 Successors and Assigns. This Agreement shall be binding on the successors and assigns of the parties.

3.8.7 Assignment or Transfer; Corona Utility Authority. CONSULTANT shall not assign, hypothecate or transfer, either directly or by operation of law, this Agreement or any interest herein without the prior written consent of the City. Any attempt to do so shall be null and void, and any assignees, hypothecates or transferees shall acquire no right or interest by reason of such attempted assignment, hypothecation or transfer. To the extent that this Agreement is deemed to be a "material contract" under either of the CUA Management Agreements, CONSULTANT has no right to terminate this Agreement, either with or without cause, based upon the existence or non-existence of either or both of the CUA Management Agreements. Therefore, if an applicable CUA Management Agreement expires or terminates for any reason, CONSULTANT shall remain fully obligated to perform under this Agreement on behalf of the CUA or another third party contracted by the CUA for the maintenance, management and operation of the applicable utility system.

3.8.8 Construction; References; Captions. Since the Parties or their agents have participated fully in the preparation of this Agreement, the language of this Agreement shall be construed simply, according to its fair meaning, and not strictly for or against any Party. Any term referencing time, days or period for performance shall be deemed calendar days and not work days. All references to CONSULTANT include all personnel, employees, agents, and sub-consultants of CONSULTANT, except as otherwise specified in this Agreement. All references to City include its elected officials, officers, employees, agents, and volunteers except as otherwise specified in this Agreement. The captions of the various articles and paragraphs are for convenience and ease of reference only, and do not define, limit, augment, or describe the scope, content or intent of this Agreement.

3.8.9 Amendment; Modification. No supplement, modification or amendment of this Agreement shall be binding unless executed in writing and signed by both Parties.

3.8.10 Waiver. No waiver of any default shall constitute a waiver of any other default or breach, whether of the same or other covenant or condition. No waiver, benefit, privilege, or service voluntarily given or performed by a Party shall give the other Party any contractual rights by custom, estoppel or otherwise.

3.8.11 No Third Party Beneficiaries. Except to the extent expressly provided for in this Agreement, there are no intended third party beneficiaries of any right or obligation assumed by the Parties.

3.8.12 Invalidity; Severability. If any portion of this Agreement is declared invalid, illegal, or otherwise unenforceable by a court of competent jurisdiction, the remaining provisions shall continue in full force and effect.

3.8.13 Prohibited Interests. CONSULTANT maintains and warrants that it has not employed nor retained any company or person, other than a bona fide employee working solely for CONSULTANT, to solicit or secure this Agreement. Further, CONSULTANT warrants that it has not paid nor has it agreed to pay any company or person, other than a bona fide employee working solely for CONSULTANT, any fee, commission, percentage, brokerage fee, gift or other consideration contingent upon or resulting from the award or making of this Agreement. CONSULTANT further agrees to file, or shall cause its employees or sub-consultants to file, a Statement of Economic Interest with the City's Filing Officer as required under state law in the performance of the Services. For breach or violation of this warranty, City shall have the right to rescind this Agreement without liability. For the term of this Agreement, no member, officer or employee of City, during the term of his or her service with City, shall have any direct interest in this Agreement, or obtain any present or anticipated material benefit arising therefrom.

3.8.14 Cooperation; Further Acts. The Parties shall fully cooperate with one another, and shall take any additional acts or sign any additional documents as may be necessary, appropriate or convenient to attain the purposes of this Agreement.

3.8.15 Attorney's Fees. If either party commences an action against the other party, either legal, administrative or otherwise, arising out of or in connection with this Agreement, the prevailing party in such litigation shall be entitled to have and recover from the losing party reasonable attorney's fees and all other costs of such action.

3.8.16 Authority to Enter Agreement. CONSULTANT has all requisite power and authority to conduct its business and to execute, deliver, and perform the Agreement. Each Party warrants that the individuals who have signed this Agreement have the legal power, right, and authority to make this Agreement and bind each respective Party.

3.8.17 Counterparts. This Agreement may be signed in counterparts, each of which shall constitute an original.

3.8.18 Entire Agreement. This Agreement contains the entire Agreement of the parties with respect to the subject matter hereof, and supersedes all prior negotiations, understandings or agreements. This Agreement may only be modified by a writing signed by both parties.

3.8.19 Federal Provisions. When funding for the Services is provided, in whole or in part, by an agency of the federal government, CONSULTANT shall also fully and adequately comply with the provisions included in Exhibit "D" (Federal Requirements) attached hereto and incorporated herein by reference ("Federal Requirements"). With respect to any conflict between such Federal Requirements and the terms of this Agreement and/or the provisions of state law, the more stringent requirement shall control.

3.8.20 Covenant Against Contingent Fees. As required in connection with federal funding, the CONSULTANT warrants that he/she has not employed or retained any company or person, other than a bona fide employee working for the CONSULTANT, to solicit or secure this Agreement, and that he/she has not paid or agreed to pay any company or person, other than a bona fide employee, any fee, City, percentage, brokerage fee, gift, or any other consideration, contingent upon or resulting from the award or formation of this Agreement. For breach or violation of this warranty, the City shall have the right to terminate this Agreement without liability pursuant to Section 3.6, or at its discretion to deduct from the Agreement price or consideration, or otherwise recover, the full amount of such fee, City, percentage, brokerage fee, gift, or contingent fee.

3.8.21 Covenant Against Expenditure of CITY, State or Federal Funds for Lobbying. The CONSULTANT certifies that to the best of his/ her knowledge and belief no state, federal or CITY appropriated funds have been paid, or will be paid by or on behalf of the CONSULTANT to any person for the purpose of influencing or attempting to influence an officer or employee of any state or federal agency; a Member of the State Legislature or United States Congress; an officer or employee of the Legislature or Congress; or any employee of a Member of the Legislature or Congress, in connection with the award of any state or federal contract, grant, loan, or cooperative agreement, or the extension, continuation, renewal, amendment, or modification of any state or federal contract, grant, loan, or cooperative agreement.

a) If any funds other than federal appropriated funds have been paid, or will be paid to any person for the purpose of influencing or attempting to influence an officer or employee of any federal agency; a Member of Congress; an officer or employee of Congress, or an employee of a Member of Congress; in connection with this Agreement, the CONSULTANT shall complete and submit the attached Exhibit "D-4", Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with the attached instructions.

b) The CONSULTANT's certification provided in this section is a material representation of fact upon which reliance was placed when this Agreement was entered into, and is a prerequisite for entering into this Agreement pursuant to Section 1352, Title 31, US. Code. Failure to comply with the restrictions on expenditures, or the disclosure and certification requirements set forth in Section 1352, Title 31, US. Code may result in a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

c) The CONSULTANT also agrees by signing this Agreement that he/she shall require that the language set forth in this Section 3.23.5 be included in all CONSULTANT subcontracts which exceed $100,000, and that all such subcontractors shall certify and disclose accordingly.

3.8.22 Accounting Records. CONSULTANT shall maintain complete and accurate records with respect to all costs and expenses incurred and fees charged under this Agreement. As required in connection with federal funding, the Federal Acquisition Regulations in Title 48, CFR 31 shall be the governing factors regarding allowable elements of cost. All such records shall be clearly identifiable. CONSULTANT shall allow a representative of the City, the State, the State Auditor, or any duly authorized representative of the Federal government having jurisdiction under Federal laws or regulations (including the basis of Federal funding in whole or in part) during normal business hours to examine, audit, and make transcripts or copies of any and all ledgers and books of account, invoices, vouchers, canceled checks, and any other records or documents created pursuant to this Agreement. All such information shall be retained by CONSULTANT for at least three (3) years following termination of this Agreement. Following final settlement of the contract accounts with the United States Department of Transportation under this Agreement, such records and documents may be microfilmed at the option of the City, but in any event shall be retained for said three (3) year period after processing of the final voucher by the United States Department of Transportation.

a) The CONSULTANT also agrees to comply with Federal procedures in accordance with 49 CFR, Part 18, Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments.

b) Any costs for which payment has been made to the CONSULTANT that are determined by subsequent audit to be unallowable under 48 CFR, Federal Acquisition Regulations System, Chapter 1, Part 31 et seq. or under 49 CFR, Part 18, Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments, are subject to repayment by the CONSULTANT to the City.

3.8.23 Standard Agreement for Sub-contractor / DBE Participation

a) Sub-contractors

i) Nothing contained in this Agreement or otherwise, shall create any contractual relation between the CITY and any subcontractors, and no subcontract shall relieve the CONSULTANT of his/her responsibilities and obligations hereunder. The CONSULTANT agrees to be fully responsible to the CITY for the acts and omissions of its subcontractors and of persons either directly or indirectly employed by any of them as it is for the acts and omissions of persons directly employed by the CONSULTANT. The CONSULTANT's obligation to pay its subcontractors is an independent obligation from the CITY's obligation to make payments to the CONSULTANT.

ii) Any subcontract in excess of $25,000, entered into as a result of this Agreement, shall contain all the provisions stipulated in this Agreement to be applicable to subcontractors.

iii) CONSULTANT shall pay its subcontractors within ten (10) calendar days from receipt of each payment made to the CONSULTANT by the CITY.

iv) Any substitution of subcontractors must be approved in writing by the CITY's Contract Manager in advance of assigning work to a substitute subcontractor.

b) Disadvantaged Business Enterprise (DBE) Participation

i) This Agreement is subject to 49 CFR, Part 26 entitled "Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs." Proposers who obtain DBE participation on this contract will assist CALTRANS in meeting its federally mandated statewide overall DBE goal.

ii) If the contract has an underutilized DBE (UDBE) goal, the CONSULTANT must meet the UDBE goal by committing UDBE participation or document a good faith effort to meet the goal. If a UDBE sub-consultant is unable to perform, the CONSULTANT must make a good faith effort to replace him/her with another UDBE sub-consultant, if the goal is not otherwise met. A UDBE is a firm meeting the definition of a DBE as specified in 49 CFR and is one of the following groups: African Americans, Native Americans, Asian-Pacific Americans, or Women.

iii) DBEs and other small businesses, as defined in 49 CFR, Part 26 are encouraged to participate in the performance of agreements financed in whole or in part with federal funds. The CONSULTANT, sub-recipient or sub-consultant shall not discriminate on the basis of race, color, national origin, or sex in the performance of this Agreement. The CONSULTANT shall carry out applicable requirements of 49 CFR, Part 26 in the award and administration of US DOT- assisted agreements. Failure by the CONSULTANT to carry out these requirements is a material breach of this Agreement, which may result in the termination of this Agreement or such other remedy as the CITY deems appropriate.

iv) Any subcontract entered into as a result of this Agreement shall contain all of the provisions of this section.

c) Performance of DBE CONSULTANT and other DBE Sub-consultants/Suppliers

i) A DBE performs a commercially useful function when it is responsible for execution of the work of the Agreement and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. To perform a commercially useful function, the DBE must also be responsible with respect to materials and supplies used on the Agreement, for negotiating price, determining quality and quantity, ordering the material, and installing (where applicable) and paying for the material itself. To determine whether a DBE is performing a commercially useful function, evaluate the amount of work subcontracted, industry practices; whether the amount the firm is to be paid under the Agreement is commensurate with the work it is actually performing; and other relevant factors.

ii) A DBE does not perform a commercially useful function if its role is limited to that of an extra participant in a transaction, Agreement, or PROJECT through which funds are passed in order to obtain the appearance of DBE participation. In determining whether a DBE is such an extra participant, examine similar transactions, particularly those in which DBEs do not participate.

iii) If a DBE does not perform or exercise responsibility for at least 30 percent of the total cost of its Agreement with its own work force, or the DBE subcontracts a greater portion of the work of the Agreement than would be expected on the basis of normal industry practice for the type of work involved, it will be presumed that it is not performing a commercially useful function.

d) Prompt Payment of Funds Withheld to Subcontractors

i) The CITY shall hold 5 percent retainage from the prime CONSULTANT and shall make prompt and regular incremental acceptances of portions, as determined by the CITY, of the contract work, and pay retainage to the prime contractor based on these acceptances. The prime CONSULTANT, or sub-consultant, shall return all monies withheld in retention from a sub-consultant within 30 days after receiving payment for work satisfactorily completed and accepted including incremental acceptances of portions of the contract work by the CITY. Federal law (49 CFR26.29) requires that any delay or postponement of payment over 30 days may take place only for good cause and with the CITY's prior written approval. Any violation of this provision shall subject the violating prime CONSULTANT or sub-consultant to the penalties, sanctions and other remedies specified in Section 7108.5 of the Business and Professions Code. These requirements shall not be construed to limit or impair any contractual, administrative, or judicial remedies, otherwise available to the prime CONSULTANT or sub-consultant in the event of a dispute involving late payment or nonpayment by the prime contractor, deficient sub-consultant performance, or noncompliance by a subcontractor. This provision applies to both DBE and non-DBE prime CONSULTANT and sub-consultants.

ii) Any subcontract entered into as a result of this Agreement shall contain all of the provisions of this section.

e) DBE Records

i) The CONSULTANT shall maintain records of materials purchased and/or supplied from all subcontracts entered into with certified DBEs. The records shall show the name and business address of each DBE or vendor and the total dollar amount actually paid each DBE or vendor, regardless of tier. The records shall show the date of payment and the total dollar figure paid to all firms. DBE prime consultants shall also show the date of work performed by their own forces along with the corresponding dollar value of the work.

ii) Upon completion of the Agreement, a summary of these records shall be prepared and submitted on the form entitled, "Final Report-Utilization of Disadvantaged Business Enterprise (DBE), First-Tier Subcontractors," CEM-2402F (Exhibit 17-F, Chapter 17, of the LAPM), certified correct by the CONSULTANT or the CONSULTANT's authorized representative and shall be furnished to the Contract Manager with the final invoice. Failure to provide the summary of DBE payments with the final invoice will result in 25% of the dollar value of the invoice being withheld from payment until the form is submitted. The amount will be returned to the CONSULTANT when a satisfactory "Final Report-Utilization of Disadvantaged Business Enterprises (DBE), First-Tier Subcontractors" is submitted to the Contract Manager.

(A) Prior to the fifteenth of each month, the CONSULTANT shall submit documentation to the CITY's Contract Manager showing the amount paid to DBE trucking companies. The CONSULTANT shall also obtain and submit documentation to the CITY's Contract Manager showing the amount paid by DBE trucking companies to all firms, including owner-operators, for the leasing of trucks. If the DBE leases trucks from a non-DBE, the CONSULTANT may count only the fee or commission the DBE receives as a result of the lease arrangement.

(B) The CONSULTANT shall also submit to the CITY's Contract Manager documentation showing the truck number, name of owner, California Highway Patrol CA number, and if applicable, the DBE certification number of the truck owner for all trucks used during that month. This documentation shall be submitted on the CALTRANS "Monthly DBE Trucking Verification Form, CEM-2404(F)" provided to the CONSULTANT by the CITY's Contract Manager.

f) DBE Certification and Decertification Status. If a DBE sub-consultant is decertified during the life of the Agreement, the decertified sub-consultant shall notify the CONSULTANT in writing with the date of decertification. If a sub-consultant becomes a certified DBE during the life of the Agreement, the sub-consultant shall notify the CONSULTANT in writing with the date of certification. Any changes should be reported to the CITY's Contract Manager within 30 days.

g) Materials and Supplies. Materials or supplies purchased from DBEs will count towards DBE credit, and if a DBE is also a UDBE, purchases will count towards the UDBE goal under the following conditions:

(A) If the materials or supplies are obtained from a DBE manufacturer, 100 % of the cost of the materials or supplies will count toward the DBE participation. A DBE manufacturer is a firm that operates or maintains a factory or establishment that produces on the premises the materials, supplies, articles, or equipment required under the Agreement and of the general character described by the specifications.

(B) If the materials or supplies purchased from a DBE regular dealer, count 60 % of the cost of the materials or supplies toward DBE goals. A regular dealer is a firm that owns, operates or maintains a store, warehouse, or other establishment in which the materials, supplies, articles or equipment of the general character described by the specifications and required under the Agreement, are bought, kept in stock, and regularly sold or leased to the public in the usual course of business. To be a regular dealer, the firm must be an established, regular business that engages, as its principal business and under its own name, in the purchase and sale or lease of the products in question. A person may be a regular dealer in such bulk items as petroleum products, steel, cement, gravel, stone or asphalt without owning, operating or maintaining a place of business provided in this section.

(C) If the person both owns and operates distribution equipment for the products, any supplementing of regular dealers' own distribution equipment, shall be by a long-term lease agreement and not an ad hoc or Agreement-by-Agreement basis. Packagers, brokers, manufacturers' representatives, or other persons who arrange or expedite transactions are not regular dealers within the meaning of this section.

(D) Materials or supplies purchased from a DBE, which is neither a manufacturer nor a regular dealer, will be limited to the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, or fees or transportation charges for the delivery of materials or supplies required on the job site, provided the fees are reasonable and not excessive as compared with fees charged for similar services.

[SIGNATURES ON NEXT PAGE]

SIGNATURE PAGE FOR PROFESSIONAL SERVICES AGREEMENT BETWEEN THE CITY OF CORONA AND JACOBS ENGINEERING GROUP INC

IN WITNESS WHEREOF, the Parties have entered into this Agreement as of the 16th day of May, 2012.

CITY OF CORONA

By: ______________________
Mayor of the City of Corona, CA

Attest: ______________________
Deputy/Chief City Clerk

JACOBS ENGINEERING GROUP INC., a DELAWARE CORPORATION

By: ______________________
Signature

JS PAQUETTE
Name (Print)

VP
Title (Print)

By: ______________________
Signature

____
Name (Print)

____
Title (Print)

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By: ______________________________
Mayor of the City of Corona, CA

Attest: ______________________________
Deputy Chief City Clerk

JACOBS ENGINEERING GROUP INC.,
a DELAWARE CORPORATION

By: ______________________________
Signature

____
Name (Print)

____
Title (Print)

By: Curtis A. Fisher
Signature

Curtis A. Fisher
Name (Print)

Assistant Secretary
Title (Print)

EXHIBIT "A"

SCOPE OF SERVICES

SECTION IV.

SCOPE OF WORK

A. OVERVIEW

The PROJECT will provide for the reconstruction of the interchange located on Interstate 15 at Cajalco Road in the City of Corona. The proposed improvements will increase the capacity of the bridge and ramps in order to reduce congestion and accommodate projected growth in the area. The CONSULTANT shall perform professional and technical services to provide support to the CITY for the preparation of plans, specifications, and estimate (PS&E) necessary to complete the construction. The work shall include the following, but not limited to:

(1) Geotechnical Engineering,

(2) Structural Engineering,

(3) Roadway Engineering,

(4) Aerial and Ground Survey,

(5) Hydraulic and Drainage Engineering,

(6) Storm Water Pollution Plan Preparation (SWPPP),

(7) Right-of-Way Drawings, Legal and Plats,

(8) Right-of-Way Acquisition

(9) Utility Coordination,

(10) Landscape and Irrigation Plans

(11) Processing all forms, maps and documents for required permits,

(12) Development of the PS&E, and

(13) Typical schedule of activities.

The objective of this work is to complete the design and secure approval of all plans, specifications, estimates, and permits from all applicable agencies for the PROJECT in order to advertise, bid, and award a construction contract.

1. Background

The I-15/Cajalco Road interchange was originally constructed in 1965 as a trumpet interchange providing access only to the east side of I-15 via northbound on- and off-ramps and a southbound off-ramp. Access was limited to the east side of I-15 because Cajalco Road did not extend west of I-15 at that time. In 1987, the interchange was reconfigured to a full service trumpet interchange with a southbound on-ramp and the original one-lane overcrossing bridge replaced with a bi-directional two-lane overcrossing. In the following years, significant development occurred in the area and Eagle Glen Parkway, a four-lane arterial extension of Cajalco Road, was constructed just west of I-15 providing access to the new housing developments. In 1999, the interchange was reconfigured once again. The southbound ramps were modified to a cloverleaf configuration and the northbound ramps were modified to a spread diamond configuration in order to provide additional access to I-15. In 2000, Cajalco Road was widened east of the I-15 between Grand Oaks and Temescal Canyon Road from one lane in each direction to accommodate three lanes in each direction. Cajalco Road remains a two-lane facility at I-15 between the ramp intersections on the original narrow overcrossing.

In 2005, Congress approved SAFETEA-LU, which earmarked $8.0 million for the construction of the PROJECT. In an effort to expedite the PROJECT, RCTC and the PROJECT team initiated preliminary engineering and environmental studies in support of the PA/ED phase in October 2006. A PROJECT Study Report/PROJECT Development Support (PSR/PDS) was completed and approved for this PROJECT by CALTRANS in April 2008. The PSR/PDS included a no-build alternative and three build alternatives. Two of the alternatives originated from the Value Analysis held in October 2006 and the third alternative originated from the Mid County Parkway (MCP) Project, a 32-mile planned east-west freeway facility connecting SR 79, I-215 and I-15. All of the PSR/PDS alternatives were carried forward into the PA/ED phase, which began in June 2007. In October 2007, an Alternative Evaluation Report was prepared and concluded that only one of the build alternatives would be viable.

The planning phase of the PROJECT has been completed, including the Categorical Exclusion/Categorical Exemption Determination, Project Report, GAD, Value Analysis, Modified Access Report and the CALTRANS Co-Op for Design and Right of Way. These documents are available for review at: http://discovercorona.com/City-Departments/Public-Works/Construction-Projects/Project-Documents.aspx.

2. **PROJECT Description**

The PROJECT includes the construction of a six-lane overcrossing bridge on a new alignment north of the existing bridge. In addition, the existing northbound and southbound ramp intersections would be reconfigured and all existing ramps would be realigned. The existing northbound on-ramp would be modified to serve the westbound Cajalco Road traffic and a northbound loop on-ramp would be constructed to serve the eastbound Cajalco Road traffic. The new bridge will consist of six 12' lanes, a 12' striped median, 8' outside shoulders, and a 5' sidewalk on the south side. The PROJECT includes all associated noise mitigation and utility relocation.

This alternative is considered the ultimate build-out because it is compatible with the MCP and the future I-15 HOV/HOT projects. Reconstruction of the Cajalco Road interchange must accommodate the potential construction of a future freeway-to-freeway interchange at the junction of I-15 and the proposed Mid-County Parkway (MCP). The alternative recommended in the Project Report accommodates the preliminary design of the future MCP.

The following presents the scope of work for the PS&E Phase based upon the selected preferred alternative identified in the PR/ED Phase. The selected CONSULTANT is expected to prepare all reports, studies and plans to meet the requirements of all oversight agencies including, but not limited to, CALTRANS and the FHWA. CITY staff will provide overall PROJECT coordination, and will handle administrative and policy matters. CALTRANS and FHWA, the County of Riverside, and the affected Cities will provide oversight, guidance and interpretation on matters relating to State, Federal, County, and CITY policies and regulations. The County of Riverside and RCTC will provide input on the proposed land use requirements, local circulation policies and coordination in regards to future planned projects.

B. DATA COLLECTION

The PROJECT will involve the review and assimilation of a large amount of existing data and the generation of new data. The selected CONSULTANT will be expected to determine what data sources are necessary to gather and by what date, and to prioritize the gathering of that data.

CONSULTANT shall research and review all previous work performed to date in the PROJECT vicinity that impacts the design of the improvements, including but not limited to:

- Existing improvement plans/engineering reports of record
- Right-of-way mapping, ownership records
- Preliminary engineering and reports for this PROJECT
- Environmental clearance and mitigation measures
- CITY/other agency engineering design standards, codes, and plan processing procedures

The CITY expects that the selected team will make the best use of existing data to minimize waste and duplication of work efforts.

C. COORDINATION

CONSULTANT shall coordinate with other involved agencies and private developers for compatible design and phasing of construction with existing and proposed conditions. Coordination may include, but will not necessarily be limited to the following:

- CALTRANS
- Federal Highway Administration
- Nationwide permit through the ACOE, pursuant to Section 404 of the Clean Water Act.
- Riverside County Flood Control and Water Conservation District
- A Section 1600 Streambed Alteration Agreement with the California Dept. of Fish and Game.
- A Section 401 Certification or waiver from the Region 4 of the Regional Water Quality Control Board.

- Utility Companies
- County of Riverside
- Riverside County Transportation Commission

CALTRANS will exercise review and approval function through the CITY PROJECT MANAGER at key points in the development process. All contacts with CALTRANS will be directed through the CITY PROJECT MANAGER. Milestone PROJECT design reviews will be performed for the specific products and deliverables listed herein. The CITY PROJECT MANAGER will conduct these reviews, in addition to the monthly project status reports and meetings. All meetings with other outside agencies will be scheduled by CONSULTANT with approval of CITY.

CONSULTANT shall supply to other agencies and utility companies the minimum number of sets required by them for their review along with any other required data, including permit applications. Process plans and technical specifications to obtain permits/approval from other agencies as required for construction of the improvements. Permit application fees will be reimbursed, and/or paid for, by the CITY for the amount stipulated on the permit or receipt.

D. MEETINGS/PUBLIC INVOLVEMENT

The selected CONSULTANT should schedule at least two (2) public workshops/public information meetings to inform the public about the PROJECT. CONSULTANT shall provide written and electronic handouts, presentations, 3-D simulations, displays, mailers, and other materials necessary to support the public meetings.

The selected CONSULTANT is expected to make presentations at City Council Meetings and/or Committees at least four (4) workshops to inform City Council about the PROJECT, PROJECT progress, proposed architectural treatments, proposed landscape, etc. CONSULTANT shall provide written and electronic handouts, presentations, displays, mailers, and other materials necessary to support the public meetings.

CONSULTANT shall conduct trend meetings with the CITY's PROJECT MANAGER and other interested parties, as requested by the CITY, on a bi-weekly basis or as may be mutually scheduled by the Parties at a standard day and time. These trend meetings will encompass focused and informal discussions concerning scope, schedule, and current progress of services, and future PROJECT objectives. CONSULTANT shall be responsible for the preparation and distribution of meeting agendas to be received by the CITY and other attendees no later than 3 working days prior to the meeting.

E. PHASES OF WORK

The services performed by CONSULTANT will be accomplished in three Phases:

- Phase I –Plans, Specifications, and Estimate
- Phase II - Construction Bid Support (optional)
- Phase III - Construction Support (optional)

F. STANDARDS

The PROJECT plans, specifications, and estimates shall be prepared in accordance with current CALTRANS' regulations, policies, procedures, manuals, and standards including compliance with Federal Highway Administration (FHWA) requirements. Improvements of local roads may be prepared in accordance with CITY standards in lieu of CALTRANS standards as directed by CITY. All Documents shall be prepared using US standards and dimensions.

1. **Survey**
   All surveys shall be performed by CONSULTANT in accordance with the current CALTRANS "Survey Manual" and its revisions. Work not covered by the manual shall be performed in accordance with accepted professional surveying standards. The CONSULTANT shall be responsible to verify datum with Caltrans and the CITY.

   The minimum standard of survey quality shall be that of similar surveys performed by CALTRANS. CALTRANS may designate the existing horizontal and vertical control monuments that are to be the basis of all performed surveys. CALTRANS may provide the California Coordinate System values and/or elevation values for these monuments. The CONSULTANT shall adjust all CONSULTANT-performed survey to the designated control monuments and their values. The CONSULTANT shall provide cross-sections at a scale and frequency approved by the CALTRANS within the limits described. Topography shall include, but not be limited to, all features within the right-of-way. Topography shall extend between Temescal Road and Bedford Canyon Road, and future curb returns at all intersections and include driveways, existing sewer manhole inverts, top of cone, and rim elevations.

   Private right-of-way acquisitions and temporary construction easements will be required. Additional survey may be required in order to develop exhibits necessary to secure right-of-way acquisition and construction easement agreements. Survey data should be of sufficient scope and area for CITY to acquire necessary right-of-way.

2. **Design**
   Roadway, Bridge, Landscape and Irrigation design shall be in accordance with the current CALTRANS Design Manuals and revisions. Basic design shall be in accordance with the approved Project Report and final environmental document with supplements and updates.

3. **PS&E**
   Plans and specifications shall be prepared in conformance with the current editions of the CALTRANS Guide for Submittal of Plans, Specifications, Estimates, Standard Plans, Standard Specifications, and Standard Special Provisions. As part of the work involved in the preparation of the plans, specifications and estimate, the CONSULTANT shall prepare and furnish special provisions for items of work included in the plans which are not covered in the Standard Specifications,

CALTRANS-approved standard special provisions, and COUNTY approved standard special provisions.

Bridge plans shall be prepared in accordance with the CALTRANS Bridge Design Details Manual, Bridge Design Aids Manual, and Bridge Memos to Designers, Division of Structures current edition.

Roadway plans shall be prepared in conformance with the current CALTRANS standards and requirements. All Roadway plans shall be on single sheet files. Graphic files shall conform to the CALTRANS current standards and requirements for Data Format.

Landscape and Irrigation plans shall be prepared in conformance with CITY'S Specific Plan, CITY'S Water Conservation Ordinance and CALTRANS standards and requirements. Irrigation Plans shall be prepared based on use of CITY's Reclaimed Water, and in conformance with standards of the Department of Health Services.

Special Provisions shall be prepared using Microsoft Word conforming to CALTRANS format and content. Bridge Specifications shall be prepared in conformance with the CALTRANS Bridge Design Specifications, Division of Structures current edition.

All plans for roadways or related facilities within CITY jurisdiction shall conform to the CITY's Standard Plans and design standards.

The responsible CONSULTANT /Engineer shall sign all Plans, Specifications, and Estimates (PS&E) and engineering data furnished by him/her, and where appropriate, indicate his/her California registration number.

4. **Geotechnical Design Report**
The Geotechnical Design Report shall be prepared in conformance with current CALTRANS standards and requirements.

5. **PROJECT Files**
PROJECT files shall be indexed in accordance with CALTRANS' Project Development Uniform File System.

6. **Calculations**
All roadway calculations and structural analyses and design will be performed using CALTRANS current standards and requirements. Data files and results will be submitted in a Digital Media format and hard copies.

7. **Computer Aided Drafting and Design (CADD)**
All plans will be prepared in conformance with the latest Caltrans CADD User's Manual and the Caltrans Drafting Manual to assure complete compatibility.

G. PROJECT ADMINISTRATION

1. **PROJECT Management**
PROJECT Development Team (PDT) meetings with the CITY PROJECT MANAGER, CALTRANS PROJECT MANAGER, and other representatives from affected agencies and private developers will be held at least once a month, and may be held on a bi-weekly basis. The CONSULTANT shall prepare meeting agendas and minutes for each meeting. The minutes shall be distributed within 5 days after the meeting to all attendees. The minutes shall include, but not be limited to, a list of attendees with phone numbers and email, a synopsis of discussion items, any pertinent information, action items, and all follow-ups to the action items.

The CONSULTANT shall monitor quality on all deliverables, calculations, and other work products. The CONSULTANT shall prepare a Quality Control Plan for use on this phase of the PROJECT, and submit a copy to the City within thirty (30) calendar days of Notice-to-Proceed. This is not a separate task, but shall be included as part of PROJECT management. The CONSULTANT shall attend meetings as required to complete the PROJECT, including CALTRANS Safety Review meetings, Design Review meetings, Pavement Peer Review meetings, Constructability Review meetings, Quality meetings, and informational meetings with stakeholders.

2. **Budgeting**
The CONSULTANT will prepare budgets for each task and milestone for the PROJECT. Such budgets will be entered in to the CONSULTANT's Management Information System along with actual costs incurred, and used as a basis for cost monitoring and control.

3. **Cost Accounting**
The CONSULTANT will prepare monthly reports of expenditures for the PROJECT by task and milestone. Expenditures include direct labor costs, other direct costs, and sub-consultant costs. These reports will be included as supporting data for invoices presented to the CITY every month.

4. **Scheduling**
Within 1 month from the Notice to Proceed (NTP), the CONSULTANT will provide a detailed PROJECT schedule which indicates milestones, major activities, and deliverables to the CITY for review and comments. This schedule will reflect assumed review times necessary by all of the agencies involved. Review of the schedule will occur at subsequent trend meetings. Adjustments will be made, if necessary, due to changing circumstances. For proposal preparation purposes, allow 4 weeks for the CITY's review of the first plan check and 3 weeks for the subsequent checks. Plans submitted to the CITY that are incomplete shall be returned to the CONSULTANT unchecked and the CONSULTANT will be expected to maintain the PROJECT delivery schedule at no additional cost to the CITY. CONSULTANT shall be familiar with CALTRANS' plan check submittal procedures and timelines and shall schedule plan check submittals in order to maintain the PROJECT schedule.

5. **Quality Control Plan**

A Quality Control Plan will be established for this PROJECT in accordance with the provisions of Article IV, Section G of the Agreement. It will be provided to the CITY within 2 weeks after NTP for review and approval.

6. **Progress Reporting**
Progress reports shall be prepared in accordance with CITY guidelines. Reports will be required monthly and shall be accompanied by an invoice.

7. **Contract Administration**
The CONSULTING PROJECT MANAGER will maintain ongoing liaison with the CITY PROJECT MANAGER, agencies, and utility companies to promote effective coordination during the course of PROJECT development. Progress meetings with CONSULTANT's staff, sub-consultants, and the CITY PROJECT MANAGER will be held regularly.

H. SURVEY AND MAPPING

1. **Review and Verify Survey Control and Base Data**
The design survey prepared during a previous phase shall be reviewed and verified prior to commencing preparation of the Plans defined in this scope of work. At a minimum, the CONSULTANT shall:

- obtain the Caltrans survey control;
- recover, tie, and verify existing survey control to the adjacent segment control;
- provide additional secondary horizontal and vertical control, as needed;
- Prepare Construction Staking Survey Control Map (CSS);
- Spot Check previously prepared TOPO mapping with design surveys.
- The centerline of Interstate 15 will be developed or provided by Caltrans. CONSULTANT shall prepare the Record of Survey. The CITY will file the Record of Survey.

2. **Drainage Surveys**
At minimum the CONSULTANT shall locate existing drainage structures within the PROJECT limits — tie and dip all related inlets and manholes.

3. **Wall Surveys**
At minimum the CONSULTANT shall:

- Recover control
- Stake wall alignment
- Profile wall centerline alignment and 3 meters RT and LT on 15 meter intervals
- Locate and tie any features that would affect the wall design or construction

4. **Geotech Boring Location Ties**

At minimum the CONSULTANT shall tie position of boring locations, with elevation.

5. **Utility Surveys and Mapping**
This task involves the collection, assembly, and mapping of existing overhead and underground utility lines within the PROJECT limits. At minimum the CONSULTANT shall:

- Research
- Prepare Notification letters
- Compile Utility Map of Records
- Utility Surveys
- Utility Potholes
- Utility Pothole Surveys
- Prepare to Relocate Notice/Final Utility Notice Form
- Notice to Relocate

The CONSULTANT shall determine the ownership rights (utilities in their own easement or utilities in by CITY franchise agreement) of utilities affected by PROJECT construction and shall coordinate and notify the CITY if any costs are to be paid by the CITY for utility relocations early in the design process. The CONSULTANT shall track the progress/schedule of the utility company relocation plan preparation in order to have the utility facility relocated prior to construction (preferred) or to ensure final approved utility relocation plans are attached to the CITY construction plans including the number of working days required by the Utility to construct their facilities clearly identified in the Special Provisions. A utility matrix shall be prepared listing the facility type, construction material, location/depth and disposition of utilities within the PROJECT limits.

I. RIGHT-OF-WAY ENGINEERING

Licensed land surveyors will perform right-of-way engineering, mapping, and field surveys required for this task. This PROJECT will require the acquisition of additional right-of-way. The acquisition process shall be conducted in accordance with CALTRANS Standards, California Civil Code, and the California Relocation Assistance law. CALTRANS will review and approve all right-of-way-related work and deliverables. The right-of-way acquisition process shall include, but not be limited to the following:

1. **Right-of-Way Requirements**
The CONSULTANT shall determine right-of-way needs and prepare maps for submittal to CALTRANS Right-of-Way. The CONSULTANT shall identify the need for new right-of-way, new access control, permanent easements, and temporary construction easements. The CONSULTANT shall coordinate with affected agencies to determine right-of-way impacts (including utility right-of-way needs).

CALTRANS shall approve right-of-way requirements prior to initiating preparation of right-of-way maps.

2. **Right-of-Way Maps**
   a. The CONSULTANT shall prepare right-of-way base maps in accordance with CALTRANS requirements. Base maps shall show existing features consisting of lots along Eagle Glen Parkway with all right-of-way and easement areas, assessor's parcel numbers, addresses, types of businesses, property lines, footprints of buildings, setback distances from right-of-way to buildings, vegetation, and improvements in the take areas and existing driveways.

   b. The CONSULTANT shall identify all utilities, including those that have prior rights.

   c. The CONSULTANT shall prepare right-of-way maps at a scale approved by CALTRANS reflecting all right-of-way for the PROJECT, including acquisitions and easements required for maintenance access, drainage, material sites, utilities, and construction work areas, as necessary. The CONSULTANT shall also show access control. Dimensions are to be shown in English units.

3. **Appraisal Maps, Plats, and Descriptions**
   a. The CONSULTANT shall prepare legal descriptions, plats, deeds, and maps for each parcel acceptable to CALTRANS and the CITY for conveyance of marketable title interests and for accurate representation of right-of-way necessary for construction of the PROJECT.

   b. The CONSULTANT shall prepare legal descriptions, plats, and maps acceptable to utility companies (as required) and the CITY for conveyance of marketable title interests and accurate representation of easements necessary for construction of the PROJECT.

   c. The CONSULTANT shall prepare a right-of-way map acceptable to CALTRANS.

   d. A licensed Appraiser hired by the CONSULTANT will be responsible preparation of appraisals as required by CALTRANS.

   e. An experienced acquisition CONSULTANT hired by the CONSULTANT shall be responsible for right of way negotiations and coordination with CITY representatives.

   f. The CONSULTANT shall prepare necessary CALTRANS Local Assistance Paperwork associated with utility relocations and ROW acquisitions.

4. **Title Reports will be provided by the CITY.**

J. STRUCTURES

1. **Structure Type Selection and Bridge General Plans**
   The culmination of preliminary design work will lead to the submittal and presentation for review and approval of a General Plan for the structure. This process

will be considered the "Structure Type Selection" process and no further design work shall be performed until written approval of the structure type is received from CALTRANS Division of Structures. A Type Selection Review Meeting will be held with the CITY and CALTRANS DOS in Sacramento, in which the CONSULTANT shall be prepared to discuss and provide information on foundation requirements, hydrological requirements, falsework requirements; seismic and aesthetic considerations; traffic handling, construction cost, and other pertinent information that is needed to determine the proper structure type.

Ten copies of the proposed General Plan, General Plan Estimate, Type Selection Memo, and Vicinity Map shall be submitted for review two weeks prior to the Structure Type Selection Review Meeting. The results of the meeting will be summarized in writing to the CONSULTANT within two weeks following the meeting.

Within 2 weeks after receiving written approval of the proposed General Plan and structure type, the CONSULTANT shall furnish CALTRANS DOS copies of the approved General Plan. These will be distributed for comments, and any comments received will be forwarded to the CONSULTANT.

2. **Geotechnical Coordination and Foundation Report**
A Foundation Report will be prepared for the structures based upon the geotechnical investigation described below. The foundation report will be prepared and signed by an Engineering Geologist or Soils Engineer, with deep foundation experience, registered in the State of California. This report shall recommend structure foundation types and footing elevations. It shall also specify pile tip elevations for pile foundations and shall provide information on ground water conditions, allowable bearing capacities, and other information needed to evaluate the chosen foundation. The report shall also address anticipated fill settlement periods to prevent excessive differential settlement between the structure and adjacent roadway approaches.

The Foundation Report will also include:

- Nature of materials found on the site.
- Liquefaction potential.
- Any geological hazards that may exist and recommend mitigation measures.
- Seismic design data in accordance with CALTRANS seismic design criteria.
- Soil parameters and load requirements to design shoring system for the possible construction of a box culvert under Galena Street.

The report will be developed in accordance with the guidelines for foundation studies and report as referenced in EFPB Information and Procedures Guide and the Bridge Design Aids Manual. It will be assured that the design parameters and potential construction difficulties are identified and addressed, together with the proper mitigation measures in the Foundation Report. For the bridge structure, alternative types of foundations will be evaluated to insure the selection of the most suitable type of foundation. A log of Test Borings sheet shall be prepared and included as part of the report and as part of the structure plans. This Foundation Report and Log Test Borings sheet will be prepared in accordance with CALTRANS Standard Procedures and will be approved by CALTRANS.

3. **Geotechnical Investigations**
A qualified geotechnical engineer shall prepare a draft Geotechnical Design Report (GDR). All reports shall be in accordance with CALTRANS procedures, regulations, manuals, standards, policies, and format. The pavement structural sections shall be determined by a qualified Geotechnical Engineer in accordance with CALTRANS policies and procedures.

Drilling and Sampling – CONSULTANT shall conduct field investigation consisting of three (one at each abutment and one at the bent) soil borings from 50 to 80 feet deep. The precise locations will be selected to minimize impacts on freeway traffic. Subsurface investigations shall conform to the requirements in Section 4.3.5 of the Bridge Design Specifications and for pile foundations shall provide for the utilization of Standard Class 45 piles (design load of 45 tons) as a minimum.

Laboratory Testing – Bulk and undisturbed samples will be selected for laboratory testing. All tests will be conducted in accordance with Caltrans Test Methods or ASTM Standards.

Engineering Analyses – Results obtained from the field and laboratory investigation program will be used to establish idealized soil profiles and design soil parameters for bridge foundation design. A foundation type and related capacity will be recommended. Seismic parameters such as peak bedrock acceleration and depth to bedrock-like materials will be provided. Other seismic hazards, if encountered, will be addressed and recommendations will be given to mitigate these hazards. The CONSULTANT shall propose a Traffic Index (TI) for the auxiliary lanes and the ramps, and obtain CALTRANS concurrence.

Report Preparation - The results obtained from the geotechnical investigation will be documented in a Draft Foundation Report, which will include a Log of Test Borings (LOTB) sheet. The draft report will be submitted to the CITY and CALTRANS for review. CONSULTANT shall finalized the report upon receipt of review comments

4. **Structural Design and Calculations**
   a. The CONSULTANT shall prepare Structure Type Selection documents and Bridge General Plans to comply with the most current CALTRANS's guidelines, including Bridge Design Details, Bridge Design Aids, and Memos to Designers. The CONSULTANT will also submit a Preliminary Foundation Report to support the Type Selection process. The CONSULTANT will prepare for and attend the Bridge Type Selection Meeting, including advance submittal of required materials. Upon completion of the Type Selection, the CONSULTANT will submit and distribute meeting summary and required copies of General Plan and General Plan Estimate. Following the approval of the General Plan and

Foundation Report, structural design calculations will be prepared using standard CALTRANS Software and procedures.

b. The CONSULTANT shall prepare the Plans in accordance with CALTRANS submittal requirements.

c. The CONSULTANT shall compile structure specifications using the applicable CALTRANS Standard Special Provisions (SSP's).

d. The CONSULTANT shall also prepare and submit required marginal estimates and design calculations, along with check calculations. The CONSULTANT will also prepare and submit workday schedule.

e. The CONSULTANT shall prepare and submit bridge four-scale plans.

f. The CONSULTANT shall prepare all bridge design and PS&E deliverables in accordance with the Office of Specially Funded Projects (OSFP) Information and Procedures Guide Manual, which can be found at http://www.dot.ca.gov/hq/esc/project-development/information-and-procedures-guide/guide.htm.

The scope of this work shall include but not be limited to construction details for each design shall be prepared on DOS format plan sheets. These standard drawings and standard plans shall be incorporated into the PROJECT Plans where applicable. Each plan sheet shall be signed and stamped by the responsible design engineer who is registered in the State of California. CONSULTANT shall have each design be independently checked by a Professional Engineer registered in the State of California, Environmental Constraint Areas (if required in Environmental Document), and shall submit documentation to the CITY for review.

5. **Structural Specification & Estimates**

Special Provisions will be prepared for items not covered by the CALTRANS Standard Specifications or Standard Special Provisions (SSP's).

The CONSULTANT shall edit the SSP's and prepare Structure Special Provisions specific to this PROJECT which will be incorporated into the final PS&E. These Structure Special Provisions shall be prepared, signed, and stamped by a Professional Engineer registered in the State of California. The CONSULTANT shall prepare quantity calculations for items which are applicable to this PROJECT and prepare the bridge cost estimate.

All contract items used shall be substantiated by calculations. Quantity calculations shall be neat and orderly and shall show all sketches, diagrams, and dimensions necessary to allow them to be independently used by field inspectors. All quantity calculations shall be independently checked and substantiated with calculations.

The Construction Cost Estimate will be prepared using the latest available CALTRANS cost data, CITY cost data, and actual recent construction costs in the PROJECT area.

6. **Independent Check Review and Quality Control**

An independent Check review will be conducted as soon as the initial design is completed for the bridge. Checking will include the preparation of an independent set of structural design check-calculations and review of the plans, specifications, and estimate (PS&E).

7. **Draft PS&E**

The checked Structure Plans will be submitted to the CITY and CALTRANS DOS for review and comments per CALTRANS current standards and requirements. CALTRANS DOS and the CITY will approve the checked details and draft PS&E.

8. **Final PS&E**

The final PS&E will incorporate all review comments from the CITY, CALTRANS DOS, and other affected agencies. The CONSULTANT will provide all the necessary documents in a "bid-ready" form.

The CONSULTANT shall at minimum deliver the following documents to CITY and CALTRANS:

- 1 set of Mylar final design plans
- 5 sets of full size final design plans, including landscaping 5 sets of half size final design plans, including landscaping
- Digital copy of final plans, including landscaping
- 1 set of final Structure Special Provisions
- 1 copy of final quantity calculations and estimate
- 1 copy of final design calculations
- 1 copy of design check calculations 1 Mylar and 2 full size plans of the Bridge
- 2 Resident Engineer's Files (Structures information)
- 2 copies of environmental constraints (if required by Environmental Document)

The responsible CONSULTANT/Engineer shall sign all Plans, Specifications, and Estimates (PS&E) and engineering data furnished by him/her, and where appropriate, indicate his/her California registration number.

K. ROADWAY

The title sheet for specifications and reports, and each sheet of plans, shall bear the professional seal, certificate number, registration classification, expiration date of the certificate, and signature of the professional engineer responsible for their preparation. All roadway plans shall also use single sheet files. The following is a summary listing of drawing types and calculations that will be prepared as part of the roadway PS&E:

1. **Basic Roadway Plans**
   - Tide sheet and location map
   - Typical sections
   - Stand plans list
   - Key map and line index
   - Layouts
   - Profiles with super-elevation diagrams
   - Construction details and construction notes
   - Summary of quantities
   - Contour grading
   - Gridded Intersection Plans with elevation for intersections throughout the PROJECT limits in order to facilitate grading/paving.

2. **Calculations**
   The following calculations will be provided:

   - Geometric traverse and right-of-way (ROW)
   - Template notes and slope staking notes
   - Profile
   - Grid grades
   - Earthwork quantities
   - Other quantities

3. **Drainage Plans**
   CONSULTANT shall perform hydrology and hydraulic studies to obtain and provide design solutions which will remove surface runoff from the upstream side of the highway to downstream side. Studies and design shall be performed in accordance with current CALTRANS Standards and requirements.

   The following list of drawing types shall be included, but not limited to:

   - Drainage layouts
   - Drainage profiles
   - Drainage details
   - Drainage summary

4. **Traffic Plans**
   The following list of drawing types shall be included, but not limited to:

   - Signing

- Detour layout plans
- Pavement delineation plans
- Stage construction and traffic handling plan
- Electrical
- Construction area sign details
- Signal and signal details
- Traffic summary

5. **Miscellaneous Plans**
   - Fencing
   - Miscellaneous
   - Safety barriers
   - Sound wall and/or retaining wall
   - NPDES erosion control plans
   - Utility relocation
   - Landscaping and Irrigation plans
   - Structure plans
   - Right of way requirements
   - Construction Phasing and Detour
   - Temporary Water Pollution Control Plan(if requested)

6. **Intermediate Reviews**
   Roadway, drainage, traffic, and miscellaneous plans shall be submitted for review to the CITY and CALTRANS at the 35%, 65%, 95% and 100% complete stage. Also, the CONSULTANT shall submit the plans to CALTRANS in accordance with CALTRANS policy.

7. **Specifications and Estimate**
   Specifications and special provisions will be prepared for items not covered by the CALTRANS Standard Specifications or Standard Special Provisions, and shall be in conformance with CALTRANS current standards and requirements

   The Roadway Construction Cost Estimate will be prepared using the latest available CALTRANS cost data, CITY cost data, and actual recent construction costs in the PROJECT area.

8. **Quality Control**

The Plans, Specifications, and Estimate (PS&E) will be subject to quality control reviews before submittal. These reviews will assure conformance to CALTRANS and CITY standards and criteria as well as minimize typographical omissions. CONSULTANT shall submit documentation of the completed QA/QC review.

9. **Draft PS&E**
The roadway plans, revised to incorporate Quality Control review comments, will be submitted to the CITY and CALTRANS for review and comments. These will include but not limited to:
    - All roadway plans
    - Special provisions
    - Design calculations
    - Roadway quantities and estimate
    - Specifications
    - Roadway cross-sections

10. **Final PS&E**
The Final PS&E will incorporate all applicable comments from the draft PS&E received from the CITY, RCTC, CALTRANS, and other affected agencies. The CONSULTANT will provide all the necessary Final PS&E documents in a bid-ready form. PROJECT files and the PROJECT Engineer's file will also be submitted with the Final PS&E. The entire PROJECT will be submitted in digital format upon final approval of the PS&E.

    The responsible CONSULTANT /Engineer shall sign all Plans, Specifications, and Estimates (PS&E) and engineering data furnished by him/her, and where appropriate, indicate his/her California registration number.

L. INDEPENDENT CONSTRUCTABILITY REVIEW

The CONSULTANT shall retain an independent CONSULTANT for constructability review of the full 95% PS&E package to ensure that the design can be constructed by a reasonable contractor. The reviewer shall comment on the following, but not be limited to these items of concern: Ingress/egress to work area, construction phasing, coordination between the plans and specifications, cost estimate items (to reflect current costs and required work), field review (to ensure existing conditions are addressed in design documents). Review comments shall be simultaneously distributed to the CITY and the CONSULTANT. A matrix of all comments and responses to those comments shall be prepared for CITY review and approval.

M. CONSTRUCTION SCHEDULE

Provide a minimally detailed construction Critical Path Method (CPM) schedule to support the calculation of the number of Working Days for the PROJECT construction.

N. ENVIRONMENTAL AND WATER QUALITY COMPLIANCE

The CONSULTANT shall review the approved environmental documents and become familiar with their requirements. The CONSULTANT shall observe all laws, rules, and regulations concerning environmental permitting.

The CONSULTANT shall provide a signed check-off list certifying that all mitigation measures have been incorporated into the PS&E prior to PROJECT completion.

Compliance with National Pollutant Discharge Elimination System (NPDES) MS4 Permit and Caltrans' NPDES Permit with the State - The CONSULTANT shall comply and implement the latest requirements of the NPDES MS4 permit including, but not limited to, incorporating in the PROJECT design the USEPA guidance, "Managing Wet Weather with Green Infrastructure; Green Streets," in a manner consistent with the maximum extent practicable standard, and preparing a PROJECT Water Quality Management Plan (WQMP). A WQMP template will be provided by the CITY. The construction documents shall require the construction Contractor engage a licensed engineer to prepare a Storm Water Pollution Prevention Plan (SWPPP) for this PROJECT that covers all items within the scope of work. CONSULTANT shall provide base PROJECT data for SWPPP preparation (areas, slopes, etc.). This work includes documentation and incorporation of environmental requirements and mitigation measures, NPDES, temporary and permanent BMPs, air/water quality, nesting birds/endangered species, erosion/sediment control) into the PROJECT construction documents.

O. CONSTRUCTION BIDDING SUPPORT (Optional)

Bidding procedures will be the responsibility of CITY. While the PROJECT is being advertised for bids, all questions concerning the intent shall be referred to CITY for resolution. In the event that the items requiring interpretation in the drawings or specifications are discovered during the bidding period, said items shall be analyzed by the CONSULTANT for decision by CITY as to the proper procedure required. Corrective action taken will either be in the form of an addendum prepared by the CONSULTANT and issued by CITY or by covering change order after the award of the construction contract.

P. CONSTRUCTION SUPPORT (Optional)

CONSULTANT shall attend the pre-construction meeting with the successful construction contractor upon notification by the CITY. Upon award of the construction contract, CONSULTANT will proceed with the Construction Support Phase services required by this contract.

During construction, the CONSULTANT shall furnish all necessary additional drawings for correcting and change orders required by errors and omissions of CONSULTANT. Such drawings will be requested in writing from the CONSULTANT by the CALTRANS and shall be at no additional cost to the CITY. The original tracing(s) of the drawings and contract wording for change orders shall be submitted to the CITY for duplication and distribution.

CONSULTANT shall review shop drawings submitted by the construction contractor (Falswork review are not included). CONSULTANT shall complete shop plan reviews within two weeks of receipt. Contract change order reviews shall be completed within 2 working days of receipt.

CONSULTANT shall be available to visit to the jobsite for on-site review of construction and other visits to the jobsite as requested by the CITY or CALTRANS to resolve any discrepancies in the contract documents. CONSULTANT shall bring to the attention of the CALTRANS Resident Engineer any defects or deficiencies in the work by the construction contractor which the CONSULTANT may observe. CONSULTANT shall have no authority to issue instructions on behalf of the CITY or to deputize another to do so. All agreements shall be between the CITY and its construction contractor. These provisions shall not be construed as making the CONSULTANT responsible for failure of the construction contractor to carry out the work in accordance with the contract documents nor the construction means or methods or techniques, sequences, procedures or safety programs in connection with the work.

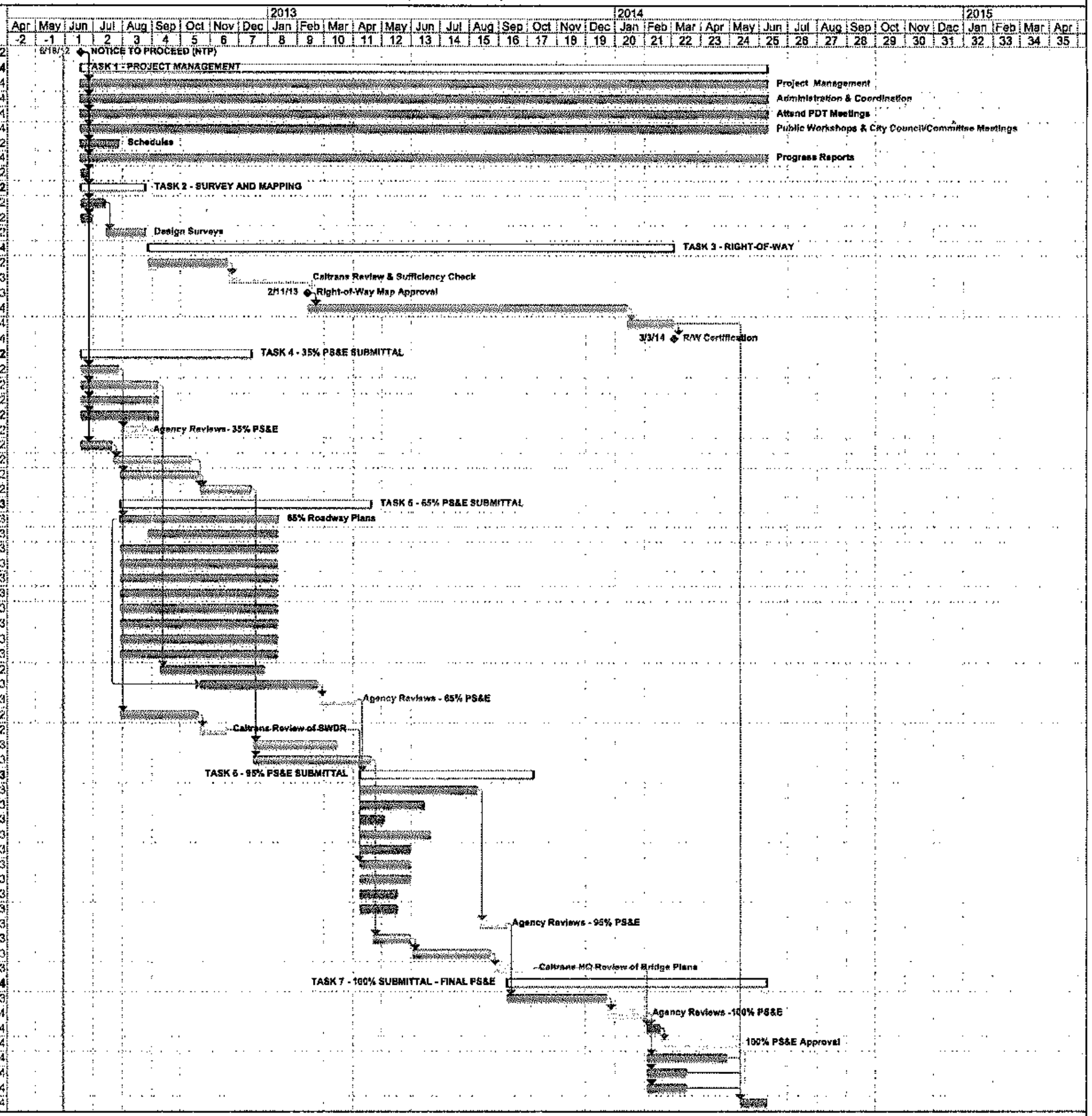
CONSULTANT shall prepare and deliver to the CITY and CALTRANS the "As-Built" plans within two months of completion of structure construction.

EXHIBIT "B"

SCHEDULE OF SERVICES

I-15 / CAJALCO RD INTERCHANGE PS&E PROJECT SCHEDULE (MAY 2012)

ID	WBS	Task Name	Duration	Duration (wks)	Start	Finish
1	-	**NOTICE TO PROCEED (NTP)**	0 days	0 wks	6/18/12	6/18/12
2	1	**TASK 1 - PROJECT MANAGEMENT**	**516 days**	**103.2 wks**	**6/18/12**	**6/9/14**
3	1.1	Project Management	516 days	103.2 wks	6/18/12	6/9/14
6	1.2	Administration & Coordination	516 days	103.2 wks	6/18/12	6/9/14
9	1.3	Attend PDT Meetings	516 days	103.2 wks	6/18/12	6/9/14
12	1.4	Public Workshops & City Council/Committee Meetings	516 days	103.2 wks	6/18/12	6/9/14
15	1.5	Schedules	30 days	6 wks	6/18/12	7/27/12
18	1.6	Progress Reports	516 days	103.2 wks	6/18/12	6/9/14
21	1.7	Quality Assurance / Quality Control (QA / QC) Plan	7 days	1.4 wks	6/18/12	6/26/12
22	2	**TASK 2 - SURVEY AND MAPPING**	**50 days**	**10 wks**	**6/18/12**	**8/24/12**
23	2.1	Encroachment Permits	20 days	4 wks	6/18/12	7/13/12
24	2.2	Review and Verify Survey Control and Base Data	10 days	2 wks	6/18/12	6/29/12
25	2.3	Design Surveys	30 days	6 wks	7/16/12	8/24/12
30	3	**TASK 3 - RIGHT-OF-WAY**	**395 days**	**79 wks**	**8/28/12**	**3/3/14**
31	3.1	R/W Requirements, R/W Maps & Survey File	60 days	12 wks	8/26/12	11/19/12
32	3.2	Caltrans Review & Sufficiency Check	60 days	12 wks	11/20/12	2/11/13
33	3.3	Right-of-Way Map Approval	0 days	0 wks	2/11/13	2/11/13
34	3.4	Right-of-Way Appraisals and Acquisitions	240 days	48 wks	2/12/13	1/12/14
35	3.5	Right-of-Way Certification	35 days	7 wks	1/14/14	3/3/14
36	-	R/W Certification	0 days	0 wks	3/3/14	3/3/14
37	4	**TASK 4 - 35% PS&E SUBMITTAL**	**130 days**	**26 wks**	**6/18/12**	**12/14/12**
38	4.1	35% Roadway Plans - Layouts, Typicals, Profile & Superelevation	30 days	6 wks	6/18/12	7/27/12
39	4.2	Utilities - Coordination, Plans, Conflict Maps, and Matrix	60 days	12 wks	6/18/12	9/7/12
40	4.3	Hazardous Waste	60 days	12 wks	6/18/12	9/7/12
41	4.4	Landscape Concept Plan	60 days	12 wks	6/18/12	9/7/12
42	-	Agency Reviews- 35% PS&E	21 days	4.2 wks	7/30/12	8/27/12
43	4.5	Geotechnical Exploration Plan	25 days	5 wks	6/18/12	7/20/12
44	4.6	Foundation Report	60 days	12 wks	7/23/12	10/12/12
45	4.7	Bridge Type Selection	60 days	12 wks	7/30/12	10/19/12
46	4.8	Bridge Type Selection Meeting and Approval	40 days	8 wks	10/22/12	12/14/12
47	5	**TASK 5 - 65% PS&E SUBMITTAL**	**190 days**	**38 wks**	**7/30/12**	**4/19/13**
48	5.1	65% Roadway Plans	120 days	24 wks	7/30/12	1/11/13
49	-	Update Layouts, Typicals, Profile & Superelevation	99 days	19.8 wks	8/28/12	1/11/13
50	-	Drainage Reports, Plans, and Calculations	120 days	24 wks	7/30/12	1/11/13
51	-	Stage Construction, Traffic Handling, and Detour Plans	120 days	24 wks	7/30/12	1/11/13
52	-	Traffic Management Plan (TMP)	120 days	24 wks	7/30/12	1/11/13
53	-	Pavement Delineation Plans	120 days	24 wks	7/30/12	1/11/13
54	-	Sign Plans	120 days	24 wks	7/30/12	1/11/13
55	-	Lighting, Signal, Ramp Metering & Communication Systems	120 days	24 wks	7/30/12	1/11/13
56	-	Planting and Irrigation Plans	120 days	24 wks	7/30/12	1/11/13
57	-	Retaining Wall/Soundwall Plans	120 days	24 wks	7/30/12	1/11/13
58	-	Utility Plans	80 days	16 wks	9/10/12	12/28/12
59	5.2	Special Provisions and Cost Estimate	90 days	18 wks	10/22/12	2/22/13
60	5.3	Agency Reviews - 65% PS&E	30 days	6 wks	2/25/13	4/5/13
61	5.4	Draft Storm Water Data Report (SWDR)	60 days	12 wks	7/30/12	10/19/12
62	5.5	Caltrans Review of SWDR	21 days	4.2 wks	10/22/12	11/19/12
63	5.6	Geotechnical and Materials Reports	65 days	13 wks	12/17/12	3/15/13
64	5.7	Bridge Plans (Unchecked Details)	90 days	18 wks	12/17/12	4/19/13
65	6	**TASK 6 - 95% PS&E SUBMITTAL**	**131 days**	**26.2 wks**	**4/8/13**	**10/7/13**
66	6.1	Update 65% Plans, Special Provisions and Cost Estimates	90 days	18 wks	4/8/13	8/9/13
67	6.2	Final Retaining Wall/Soundwall Plans	50 days	10 wks	4/8/13	6/14/13
68	6.3	Construction Schedule	20 days	4 wks	4/8/13	5/3/13
69	6.4	Utility and R/W Update	55 days	11 wks	4/8/13	6/21/13
70	6.5	Revise Drainage Report	40 days	8 wks	4/8/13	5/31/13
71	6.6	Revise SWDR	40 days	8 wks	4/8/13	5/31/13
72	6.7	Planting and Irrigation Plans	40 days	8 wks	4/8/13	5/31/13
73	6.8	Review Environmental Commitment Record (ECR)	30 days	6 wks	4/8/13	5/17/13
74	6.9	Finalize TMP	30 days	6 wks	4/8/13	5/17/13
75	-	Agency Reviews - 95% PS&E	21 days	4.2 wks	8/12/13	9/9/13
76	6.10	Bridge Independent Check	30 days	6 wks	4/22/13	5/31/13
77	6.11	Bridge and Retaining Wall Plans (Checked Details)	60 days	12 wks	6/3/13	8/23/13
78	-	Caltrans HQ Review of Bridge Plans	31 days	6.2 wks	8/26/13	10/7/13
79	7	**TASK 7 - 100% SUBMITTAL - FINAL PS&E**	**195 days**	**39 wks**	**9/10/13**	**6/9/14**
80	7.1	Roadway, Bridge, Specs, Cost Estimates	75 days	15 wks	9/10/13	12/23/13
81	7.2	Agency Reviews -100% PS&E	30 days	6 wks	12/24/13	2/3/14
82	-	Combine Roadway and Structures PS&E	10 days	2 wks	2/4/14	2/17/14
83	7.3	100% PS&E Approval	60 days	12 wks	2/18/14	5/12/14
84	7.4	Environmental Certification	60 days	12 wks	2/4/14	4/28/14
85	7.5	Resident Engineer File and Working Day Schedules	30 days	6 wks	2/4/14	3/17/14
86	7.6	Materials Handouts	30 days	6 wks	2/4/14	3/17/14
87	7.7	Construction Encroachment Permit Approval	20 days	4 wks	5/13/14	6/9/14



Printed: 5/30/12 | Summary | Roadway Task | Structures Task | Right-of-Way Task | Agency Review | Milestone

EXHIBIT "C"

CONSULTANT'S COST PROPOSAL

I-15/CAJALCO ROAD INTERCHANGE COST PROPOSAL

Contract No. 2010400911 Date 5/8/12

Consultant Jacobs

DIRECT LABOR:

Classification	Name	Range	Hours		Initial Hourly Rate			Total
Project Manager	C.Chen	$105.73	1,200	@	$105.73		$	126,880.68
Project Admin	B.Balliet	$36.79	488	@	$36.79		$	17,952.93
Roadway Design Lead	G. Jeffers	$57.42	2,756	@	$57.42		$	158,258.89
Senior Highway Engineer	Composite*	$63.46	1,760	@	$63.46		$	111,688.84
Highway Engineer	Composite*	$38.38	3,272		$38.38		$	125,585.03
Project Controls	S. Barras	$54.47	208		$54.47		$	11,329.20
Construction Planning Lead	G. Tomasetti	$76.54	320		$76.54		$	24,493.57
Structure Lead	A. Moubayed	$91.69	337		$91.69		$	30,900.84
QA/QC	S. Xie	$74.52	438		$74.52		$	32,639.45
Senior Engineer	Composite*	$67.31	408		$67.31		$	27,461.56
Project Engineer	J. Lee	$54.90	1,398		$54.90		$	76,748.10
CAD	I. Karkoutli	$47.97	1,594		$47.97		$	76,467.85
		Subtotal Direct Labor Costs				$ 820,406.95		
		Anticipated Salary Increases				$ 22,561.19		
		Total Direct Labor Costs					$	842,968.14

		Rate		Total		
Fringe Benefits						
		27.11	%	$ 228,528.66		
	Total Fringe Benefits				$	228,528.66
Indirect Costs						
Overhead		25.85	%	$ 217,907.26		
General and Administrative		69.92	%	$ 589,403.32		
	Total Indirect Costs				$	807,310.59
FEE (Profit)					$	182,852.30
OTHER COSTS						
Travel Costs				$ 2,344.00		
Equipment and Supplies (Itemize)				$ 0.00		
Other Direct Costs (Itemize)				$ 41,600.00		
	Total Other Costs				$	43,944.00
Subcontractor Costs (attach detailed cost estimate for each subcontractor)				$ 1,707,788.57		
TOTAL COST					$	3,813,392.26

City of Corona
I-15/Cajalco Road Interchange Cost Proposal

Discipline	Firm	Total
Roadway	Jacobs	$ 1,456,575.39
Structures	Jacobs/WKE	$ 745,494.09
Landscape	DEA	$ 242,766.50
Survey/ROW Engineering	DEA	$ 149,487.22
ROW Appraisal/Acquisition	Overland, Pacific & Cutler, Inc.	$ 121,166.01
Environmental	LSA	$ 133,383.00
Geotechnical	EMI *(UDBE)*	$ 297,636.52
Traffic	LIN *(UDBE)*	$ 145,657.32
Drainage	Civil Works *(UDBE)*	$ 300,739.70
Constructability Review	Falcon Engineering *(UDBE)*	$ 55,088.00
Public Outreach	Arellano Associates *(UDBE)*	$ 75,947.46

Project Total Labor	$	3,489,442.21
Project Total ODCs	$	236,714.00
Escalation at 2.5%	$	87,236.06
Project Total	$	3,813,392.26

City of Corona
I-15 / Cajalco Road Interchange Cost Proposal (Continued)

January 9, 2012

	Roadway							Drainage				Traffic		Landscape							Structures											
	Project Manager	Project Admin	Roadway Design Lead	Senior Highway Engineer	Highway Engineer	Project Controls	Construction Planning Lead	Project Manager	Drainage Engineer	Cadd Technician	Project Admin	Task Manager	Project Engineer	Senior Landscape Architect	Senior Landscape Architect	Senior Landscape Architect	Landscape Architect	Irrigation Designer	Landscape CADD	Landscape CADD	Structure Lead	QA/QC	Senior Engineer	Project Engineer	Assistant Engineer	CAD	Project Control	Project Manager	Senior Engineer	Project Engineer	Assistant Engineer	CAD
HOURLY RATES =>	$ 259.23	$ 90.19	$ 140.78	$ 155.58	$ 94.10	$ 133.54	$ 187.66	$ 186.19	$ 126.50	$ 86.49	$ 61.98	$ 178.90	$ 110.16	$ 183.10	$ 170.89	$ 152.58	$ 122.06	$ 109.88	$ 88.50	$ 82.39	$ 224.80	$ 182.70	$ 185.02	$ 134.59	$ 84.95	$ 117.61	$ 133.54	$ 215.33	$ 170.78	$ 123.75	$ 79.20	$ 81.88
TASK 1 - PROJECT MANAGEMENT																																
Project Management	600							40	20			24		40	40																	
Administration & Coordination	400	400				208		20				24	4								10		10									
Meetings (PDT, City Council & Public Mtgs)	160		300	80	40			40	40		20	12	4				45	15	12	12												
Quality Assurance/Quality Control Plan	40							30	40												68	156	40									
TASK 2 - SURVEY AND MAPPING																																
Encroachment Permits		8	8																													
Review and Verify Data									20																							
Design Surveys																																
TASK 3 - RIGHT OF WAY																																
R/W Requirements (PD26, Maps & Survey File)			120		120																											
R/W Appraisals and Acquisitions			80		120																											
R/W Certification																																
TASK 4 - 35% PS&E SUBMITTAL																																
35% Plans (Layouts, Typical, Profile & Super)			120	40	120																											
Utilities (Coordination & Design)				240	240																											
Hazardous Waste (Investigation & Report)																																
Bridge Aethetics																80	120	80	40	40												
Landscape Concept Plan																80	100	85	50	72												
Geotechnical Exploration Plan																																
Preliminary Foundation Report																																
Bridge Type Selection (Prep, Mtg & Approval)																					32		34	118		230			28		44	20
TASK 5 - 65% PS&E SUBMITTAL																																
65% Roadway Plans			1200	400	800							150	646			120	200	100	81	90												
Drainage Reports								40	200	40																						
Drainage Plans								80	560	100																						
Traffic Management Plan (TMP)			80		240		200																									
Special Provisions and Cost Estimate			180	120	200																											
Storm Water Data Report (SWDR)			40		32			40	200	40																						
Geotechnical and Foundation Reports																																
Bridge Plans (Unchecked Details)																					44	80	92	323		381		0	149	0	228	188
TASK 6 - 95% PS&E SUBMITTAL																																
95% PS&E (Plans, Specs & Estimate)			240	400	600			40	120	80		38	182			80	95	90	50	61												
Utility and R/W Update				80	120																											
Environmental Commitment Record Review																																
Finalize Reports (TMP)			60		80		120																									
Finalize Reports (SWDR & Drainage)								40	200	20																						
Bridge Independent Check																					47	20	60	80					162		344	64
Bridge Plans (Checked Details)																					34	60	39	312		286			28		41	29
Independent Constructability Review																																
TASK 7 - 100% SUBMITTAL - FINAL PS&E																																
100% PS&E (Plans, Specs & Estimate)			208	400	400			20	100	60		10	46			30	45	30	20	25	10		13	51		95			18		23	23
Environmental Certification																																
Resident Engineer File		40	60		80																6		24			8			4			
Materials Handouts		40	40		80																											
RTL Certification			40																													
TASK 8 - OPTIONAL TASK																																
Retaining Wall LRFD Design																					86	122	96	514		594						
TOTAL HOURS	1200	488	2756	1760	3272	208	320	390	1500	360	20	258	882	40	40	390	605	400	253	300	337	438	408	1398	0	1594	0	0	389	0	680	324
TOTAL LABOR COST	$311,071	$44,015	$388,000	$273,826	$307,894	$27,776	$60,050	$72,614	$189,750	$31,136	$1,239	$45,840	$97,161	$7,324	$6,838	$59,507	$73,849	$43,943	$22,390	$24,718	$75,759	$80,021	$87,327	$188,182	$0	$187,475	$0	$0	$66,431	$0	$53,858	$26,463

City of Corona
I-15 / Cajalco Road Interchange Cost Proposal (Continued)

January 9, 2012

	Geotech							Survey/ROW										Environmental									Outreach			
	Geotechnical Project Manager	Principal Geotechnical Engineer	Senior Geotechnical Engineer	Senior Geologist	Senior Field Technician	Project Geotechnical Engineer	Staff Geotechnical Engineer	Right-Of-Way Program Manager	Right-Of-Way Project Manager	Right-Of-Way Sr Consultant	Right-Of-Way Project Support	Survey Task Leader	QA/QC Surveyor	Senior Survey Analyst	HDS Survey Analyst	Survey Analyst/CAD	2-Man Field Survey Crew	Project Principal	Project Manager	Principal	Senior Professional	GIS	Graphics	Word Processing	Clerical	Falcon	Public Outreach Lead	Public Outreach Associate	Public Outreach Support	Total Labor Hours
HOURLY RATES =>	$ 212.80	$ 171.26	$ 149.10	$ 145.75	$ 131.47	$ 116.16	$ 88.62	$ 202.19	$ 133.38	$ 105.31	$ 59.87	$ 190.73	$ 173.94	$ 143.43	$ 134.27	$ 126.64	$ 260.73	$ 250.00	$ 110.00	$ 195.00	$ 160.00	$ 115.00	$ 136.00	$ 85.00	$ 60.00	$ 215.19	$ 169.42	$ 114.83	$ 33.88	
TASK 1 - PROJECT MANAGEMENT																														
Project Management								25	60									20	120								14	24	24	1051
Administration & Coordination																											20	52	120	1268
Meetings (PDT, City Council & Public Mtgs)																											138	130	104	1152
Quality Assurance/Quality Control Plan																														374
TASK 2 - SURVEY AND MAPPING																														
Encroachment Permits												2																		18
Review and Verify Data												2	8	8			60													98
Design Surveys												4	8	16	40	40	88													196
TASK 3 - RIGHT OF WAY																														
R/W Requirements (PD26, Maps & Survey File)												24	36	200		200	80													780
R/W Appraisals and Acquisitions										512	70																			782
R/W Certification								5	15																					20
TASK 4 - 35% PS&E SUBMITTAL																														
35% Plans (Layouts, Typical, Profile & Super)																														280
Utilities (Coordination & Design)																														480
Hazardous Waste (Investigation & Report)																		2	8		80									90
Bridge Aethetics																														360
Landscape Concept Plan																														387
Geotechnical Exploration Plan	20	20	20		40																									100
Preliminary Foundation Report	36		32			76																								144
Bridge Type Selection (Prep, Mtg & Approval)																														506
TASK 5 - 65% PS&E SUBMITTAL																														
65% Roadway Plans																														3787
Drainage Reports																														280
Drainage Plans																														740
Traffic Management Plan (TMP)																														520
Special Provisions and Cost Estimate																														480
Storm Water Data Report (SWDR)																														352
Geotechnical and Foundation Reports	182	172	312	80	144	336	70																							1296
Bridge Plans (Unchecked Details)																														1485
TASK 6 - 95% PS&E SUBMITTAL																														
95% PS&E (Plans, Specs & Estimate)																														2076
Utility and R/W Update																														200
Environmental Commitment Record Review																		2	14											16
Finalize Reports (TMP)																														280
Finalize Reports (SWDR & Drainage)																														260
Bridge Independent Check																														777
Bridge Plans (Checked Details)																														829
Independent Constructability Review																										256				256
TASK 7 - 100% SUBMITTAL - FINAL PS&E																														
100% PS&E (Plans, Specs & Estimate)																														1647
Environmental Certification																		14	56	14	239	18	4	14	3					362
Resident Engineer File																														222
Materials Handouts		16				24																								200
RTL Certification																														40
TASK 8 - OPTIONAL TASK																														
Retaining Wall LRFD Design																														1412
TOTAL HOURS	238	208	384	80	184	436	70	30	75	512	70	32	52	224	40	240	228	38	198	14	319	18	4	14	3	256	172	206	248	25,583
TOTAL LABOR COST	$50,646	$35,622	$54,272	$11,660	$24,190	$50,646	$6,203	$6,066	$10,003	$53,920	$4,177	$6,103	$9,045	$32,127	$5,371	$30,394	$59,447	$9,500	$21,780	$2,730	$51,040	$2,070	$540	$1,190	$180	$55,088	$29,140	$23,855	$8,402	$ 3,489,442.21

City of Corona
I-15/Cajalco Road Interchange Cost Proposal

Discipline	Position	Staff	Firm	Raw Rate	OH	Fee	Bill Rate	Total Hours	Total Revenue
	Project Manager	Chao Chen	Jacobs	$ 105.73	122.88%	10%	$ 259.23	1200	$ 311,070.83
	Project Admin	Barbara Balliet	Jacobs	$ 36.79	122.88%	10%	$ 90.19	488	$ 44,014.85
	Roadway Design Lead	Georgia Jeffers	Jacobs	$ 57.42	122.88%	10%	$ 140.78	2756	$ 388,000.16
	Senior Highway Engineer	Composite*	Jacobs	$ 63.46	122.88%	10%	$ 155.58	1760	$ 273,825.29
	Highway Engineer	Composite*	Jacobs	$ 38.38	122.88%	10%	$ 94.10	3272	$ 307,894.31
	Project Controls	Stephanie Barras	Jacobs	$ 54.47	122.88%	10%	$ 133.54	208	$ 27,775.57
Roadway	Construction Planning Lead	Gary Tomasetti	Jacobs	$ 76.54	122.88%	10%	$ 187.66	320	$ 60,050.39
	Project Manager		Civil Works				$ 186.19	390	$ 72,614.10
	Drainage Engineer		Civil Works				$ 126.50	1500	$ 189,750.00
	Cadd Technician		Civil Works				$ 86.49	360	$ 31,136.40
Drainage	Project Admin		Civil Works				$ 61.96	20	$ 1,239.20
	Task Manager		LIN				$ 176.90	258	$ 45,640.20
Traffic	Project Engineer		LIN				$ 110.16	882	$ 97,161.12
	Senior Landscape Architect	Kim S Rhodes, LA	DEA (Landscape)	$ 60.00	177.42%	10%	$ 183.10	40	$ 7,323.89
	Senior Landscape Architect	Chris Giannini, LA	DEA (Landscape)	$ 56.00	177.42%	10%	$ 170.89	40	$ 6,835.63
	Senior Landscape Architect	Jim Brands, LA	DEA (Landscape)	$ 50.00	177.42%	10%	$ 152.58	390	$ 59,506.59
	Landscape Architect	Almabeth Anderson, LA	DEA (Landscape)	$ 40.00	177.42%	10%	$ 122.06	605	$ 73,849.20
	Landscape Architect	Jon Oen, CID	DEA (Landscape)	$ 36.00	177.42%	10%	$ 109.86	400	$ 43,943.33
	Landscape Designer								
	Landscape CADD	Danny Wang	DEA (Landscape)	$ 29.00	177.42%	10%	$ 88.50	253	$ 22,389.74
Landscape	Landscape CADD	Angie Jun	DEA (Landscape)	$ 27.00	177.42%	10%	$ 82.39	300	$ 24,718.12
	Structure Lead	Alaedin Moubayed	Jacobs	$ 91.69	122.88%	10%	$ 224.80	337	$ 75,758.98
	QA/QC	Sam Xie	Jacobs	$ 74.52	122.88%	10%	$ 182.70	438	$ 80,021.50
	Senior Engineer	Composite*	Jacobs	$ 67.31	122.88%	10%	$ 165.02	408	$ 67,326.96
	Project Engineer	Jeannie Lee	Jacobs	$ 54.90	122.88%	10%	$ 134.59	1398	$ 188,161.79
	Assistant Engineer	Farinaz Jalaie	Jacobs	$ 34.65	122.88%	10%	$ 84.95	0	$ -
	CAD	Iyad Karkoutli	Jacobs	$ 47.97	122.88%	10%	$ 117.61	1594	$ 187,474.69
Structures	Project Control	Stephanie Barras	Jacobs	$ 54.47	122.88%	10%	$ 133.54	0	$ -
	Project Manager		WKE	$ 87.00	125.00%	10%	$ 215.33	0	$ -
	Senior Engineer		WKE	$ 69.00	125.00%	10%	$ 170.78	389	$ 66,431.48
	Project Engineer		WKE	$ 50.00	125.00%	10%	$ 123.75	0	$ -
	Assistant Engineer		WKE	$ 32.00	125.00%	10%	$ 79.20	680	$ 53,856.00
	CAD		WKE	$ 33.00	125.00%	10%	$ 81.68	324	$ 26,462.70
	Geotechnical Project Manager		EMI				$ 212.80	238	$ 50,646.40
	Principal Geotechnical Engineer		EMI				$ 171.26	208	$ 35,622.08
	Senior Geotechnical Engineer		EMI				$ 149.10	364	$ 54,272.40
	Senior Geologist		EMI				$ 145.75	80	$ 11,660.00
	Senior Field Technician		EMI				$ 131.47	184	$ 24,190.48
	Project Geotechnical Engineer		EMI				$ 116.16	436	$ 50,645.76
Geotech	Staff Geotechnical Engineer		EMI				$ 88.62	70	$ 6,203.40
	Right-Of-Way Lead		OPC	$ 69.23	165.50%	10%	$ 202.19	30	$ 6,065.59
	Right-Of-Way Agent		OPC	$ 45.67	165.50%	10%	$ 133.38	75	$ 10,003.44
	Right-Of-Way Agent		OPC	$ 36.06	165.50%	10%	$ 105.31	512	$ 53,920.37
	Right-Of-Way Agent		OPC	$ 20.43	165.50%	10%	$ 59.67	70	$ 4,176.61
	Survey Task Leader		DEA (Survey)	$ 62.50	177.42%	10%	$ 190.73	32	$ 6,103.24
	QA/QC Surveyor		DEA (Survey)	$ 57.00	177.42%	10%	$ 173.94	52	$ 9,045.00
	Senior Survey Analyst		DEA (Survey)	$ 47.00	177.42%	10%	$ 143.43	224	$ 32,127.46
	HDS Survey Analyst		DEA (Survey)	$ 44.00	177.42%	10%	$ 134.27	40	$ 5,370.86
	Survey Analyst		DEA (Survey)	$ 41.50	177.42%	10%	$ 126.64	240	$ 30,394.14
Survey/ROW	2-Man Field Crew**		DEA (Survey)	$ 85.44	177.42%	10%	$ 260.73	228	$ 59,446.53
	Project Principal		LSA				$ 250.00	38	$ 9,500.00
	Project Manager		LSA				$ 110.00	198	$ 21,780.00
	Principal		LSA				$ 195.00	14	$ 2,730.00
	Senior Professional		LSA				$ 160.00	319	$ 51,040.00
	GIS		LSA				$ 115.00	18	$ 2,070.00
	Graphics		LSA				$ 135.00	4	$ 540.00
	Word Processing		LSA				$ 85.00	14	$ 1,190.00
Environmental	Clerical		LSA				$ 60.00	3	$ 180.00
Const Rev	Falcon		Falcon	$ 83.96	133.00%	10%	$ 215.19	256	$ 55,088.00
	Public Outreach Lead	Cheryl Donahue	Arellano	$ 90.00	71.13%	10%	$ 169.42	172	$ 29,140.24
	Public Outreach Associate	Elsa Argomaniz	Arellano	$ 61.00	71.13%	10%	$ 114.83	206	$ 23,654.98
Outreach	Public Outreach Support	Katie Burnside	Arellano	$ 18.00	71.13%	10%	$ 33.88	248	$ 8,402.24

** A 2-Man Field Crew consists of a PLS Party Chief ($45.86) and an Instrumentman ($39.61) for a total Crew Direct Rate of $85.44. This classification also meets current prevailing wage.

Total Labor Revenue	$	3,489,442.21
Escalation	$	87,236.06

City of Corona
I-15/Cajalco Road Interchange Cost Proposal

Discipline	Position	Staff	Firm	Raw Rate	OH	Fee	Bill Rate	Total Hours	Total Revenue
ODCs									
Jacobs									$ 43,944.00
Civil Works									$ 6,000.00
LIN Consulting, Inc.									$ 2,856.00
DEA (Landscape)									$ 4,200.00
WKE									$ 2,215.00
EMI									$ 64,396.00
DEA (Survey)									$ 7,000.00
GPC									$ 47,000.00
LSA									$ 44,353.00
Falcon									$ -
Arellano									$ 14,750.00
						Total ODCs			$ 236,714.00
						Project Total			$ 3,813,392.26

Composite Rate Calculation

Discipline	Position	Staff	Firm	Raw Rate	OH	Fee	Bill Rate
Roadway	Senior Highway Engineer	Frank Lara	Jacobs	$ 70.59	122.86%	10%	$ 164.38
	Senior Highway Engineer	Tricia Walbaum	Jacobs	$ 63.63	122.88%	10%	$ 148.18
	Senior Highway Engineer	Richard Yu	Jacobs	$ 56.16	122.88%	10%	$ 130.79
	Highway Engineer	Brian Kirk	Jacobs	$ 42.60	122.88%	10%	$ 99.20
	Highway Engineer	David Garcia	Jacobs	$ 38.07	122.88%	10%	$ 88.65
	Highway Engineer	Johhny Liu	Jacobs	$ 34.48	122.88%	10%	$ 80.30
Structures	Senior Engineer	Sam Xie	Jacobs	$ 74.52	122.88%	10%	$ 182.70
	Senior Engineer	Khaled Allam	Jacobs	$ 60.10	122.88%	10%	$ 147.34

Total Subconsultants $ 1,758,072.95

EXHIBIT "D"

FEDERAL REQUIREMENTS

EXHIBIT D-1

CERTIFICATION OF CONSULTANT

Caltrans Exhibit 10-F

I HEREBY CERTIFY that I am the Vice President, and duly authorized representative of the firm of Jacobs Engineering Group Inc. whose address is 3161 Michelson Drive, Suite 500, Irvine CA 92612, and that. except as hereby

expressly stated, neither I nor the above firm that I represent have:

(a) employed or retained for a commission, percentage, brokerage, contingent fee, or other consideration, any firm or person (other than a bona fide employee working solely for me or the above consultant) to solicit or secure this agreement; nor

(b) agreed, as an express or implied condition for obtaining this contract, to employ or retain the services of any firm or person in connection with carrying out the agreement; nor

(c) paid, or agreed to pay, to any firm, organization or person (other than a bona fide employee working solely for me or the above consultant) any fee, contribution, donation, or consideration of any kind, foror in connection with, procuring or carrying out this agreement.

I acknowledge that this Certificate is to be made available to the California Department of Transportation (Caltrans) in connection with this agreement involving participation of Federal-aid Highway funds, and is subject to applicable state and federal laws, both criminal and civil.

10/20/11
Date

Signature

EXHIBIT D-2

UDBE INFORMATION - GOOD FAITH EFFORTS

Caltrans Exhibit 15-H

Federal-aid Project No.____________________ Bid Opening Date ____________

The City of Corona established an Underutilized Disadvantaged Business Enterprise (UDBE) goal of 15.57 % for this project. The information provided herein shows that good faith effort was made.

Lowest, second lowest and third lowest bidders shall submit the following information to document adequate good faith efforts. Bidders should submit the following information even if the "Local Agency Bidder UDBE Commitment" form indicates that the bidder has met the UDBE goal. This will protect the bidder's eligibility for award of the contract if the administering agency determines that the bidder failed to meet the goal for various reasons, e.g., a UDBE firm was not certified at bid opening, or the bidder made a mathematical error.

Submittal of only the "Local Agency Bidder UDBE Commitment" form may not provide sufficient documentation to demonstrate that adequate good faith efforts were made.

The following items are listed in the Section entitled "Submission of UDBE Commitment" of the Special
Provisions:

A. The names and dates of each publication in which a request for UDBE participation for this project was placed by the bidder (please attach copies of advertisements or proofs of publication):

Publications	Dates of Advertisement
No advertisements made. Instead, made direct contact with UDBE firms listed on Unified Certification Program Database.	

B. The names and dates of written notices sent to certified UDBEs soliciting bids for this project and the dates and methods used for following up initial solicitations to determine with certainty whether the UDBEs were interested (please attach copies of solicitations, telephone records, fax confirmations, etc.):

Names of UDBEs Solicited	Date of Initial Solicitation	Follow Up Methods and Dates
Arellano Associates	10/4/11	telephone 10/6/11
Civil Works Engineers	10/5/11	email 10/6/11
Falcon Engineering Services	10/13/11	email 10/14/11
Earth Mechanics, Inc.	10/3/11	email 10/20/11
LIN Consulting, Inc.	10/3/11	email 10/11/11

C. The items of work which the bidder made available to UDBE firms including, where appropriate, any breaking down of the contract work items (including those items normally performed by the bidder with its own forces) into economically feasible units to facilitate UDBE participation. It is the bidder's responsibility to demonstrate that sufficient work to facilitate UDBE participation was made available to UDBE firms.

Items of Work	Bidder Normally Performs Item (Y/N)	Breakdown of Items	Amount ($)	Percent of Contract
Public Outreach	N	Per Scope of Work	$90,697.46	2%
Drainage	Y	Per Scope of Work	$306,739.70	7.9%
Foundation (Geotech)	N	Per Scope of Work	$362,032.52	7.8%
Constructability	Y	Per Scope of Work	$55,088.00	1.4%
Traffic/Electrical	N	Per Scope of Work	$148,513.32	3.8%

D. The names, addresses and phone numbers of rejected UDBE firms, the reasons for the bidder's rejection of the UDBEs, the firms selected for that work (please attach copies of quotes from the firms involved), and the price difference for each UDBE if the selected firm is not a UDBE:

Names, addresses and phone numbers of rejected UDBEs and the reasons for the bidder's rejection of the UDBEs:

None

Names, addresses and phone numbers of firms selected for the work above:

Not Applicable

E. Efforts made to assist interested UDBEs in obtaining bonding, lines of credit or insurance, and any technical assistance or information related to the plans, specifications and requirements for the work which was provided to UDBEs:

None. All were capable of meeting requirements.

F. Efforts made to assist interested UDBEs in obtaining necessary equipment, supplies, materials or related assistance or services, excluding supplies and equipment the UDBE subcontractor purchases or leases from the prime contractor or its affiliate:

None required.

G. The names of agencies, organizations or groups contacted to provide assistance in contacting, recruiting and using UDBE firms (please attach copies of requests to agencies and any responses received, i.e., lists, Internet page download, etc.):

Names of Agency/Organization	Method/Date of Contact	Results
None.		

H. Any additional data to support a demonstration of good faith efforts (use additional sheets if necessary):

NOTE: USE ADDITIONAL SHEETS OF PAPER IF NECESSARY.

EXHIBIT D-3

NON-LOBBYING CERTIFICATION FOR FEDERAL-AID CONTRACTS

Caltrans Exhibit 10-P

The prospective CONSULTANT certifies by signing and submitting this proposal to the best of his or her knowledge and belief that:

(1) No federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any federal contract, the making of any federal grant, the making of any federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

The prospective CONSULTANT also agrees by submitting his/her proposal that he/she shall require that the language of this certification be included in all lower-tier subcontracts which exceed $100,000 and that all such sub-recipients shall certify and disclose accordingly.

Signature: ____________

Printed Name: John Steven Paquette

Title: Vice President

Phone Number: 510 457 2436

EXHIBIT D-5

DEBARMENT AND SUSPENSION CERTIFICATE

Caltrans Exhibit 12E, Attachment E

TITLE 49, CODE OF FEDERAL REGULATIONS, PART 29

The bidder, under penalty of perjury, certifies that, except as noted below, he/she or any other person associated therewith in the capacity of owner, partner, director, officer, and manager:

- Is not currently under suspension, debarment, voluntary exclusion, or determination of ineligibility by any federal agency;
- Has not been suspended, debarred, voluntarily excluded or determined ineligible by any federal agency within the past 3 years;
- Does not have a proposed debarment pending; and
- Has not been indicted, convicted, or had a civil judgment rendered against it by a court of competent jurisdiction in any matter involving fraud or official misconduct within the past 3 years.

If there are any exceptions to this certification, insert the exceptions in the following space.

Exceptions will not necessarily result in denial of award, but will be considered in determining bidder responsibility. For any exception noted above, indicate below to whom it applies, initiating agency, and dates of action.

Notes: Providing false information may result in criminal prosecution or administrative sanctions.

The above certification is part of the Proposal. Signing this Proposal on the signature portion thereof shall also constitute signature of this Certification.

Signature: ______________________

Printed Name: John Steven Paquette

Title: Vice President

Phone Number: 510 457 2436

EXHIBIT D-6
LOCAL AGENCY
PROPOSER UDBE COMMITMENT (Consultant Contract)
Caltrans Exhibit 10-O1

NOTE: PLEASE REFER TO INSTRUCTIONS ON THE REVERSE SIDE OF THIS FORM

LOCAL AGENCY: City of Corona LOCATION: Corona, CA

PROJECT DESCRIPTION: Cajalco/I-15 Interchange Improvement Project

PROPOSAL DATE: November 1, 2012

PROPOSER'S NAME: Jacobs Engineering Group Inc.

CONTRACT UDBE GOAL (%): 15.57%

WORK ITEM NO.	DESCRIPTION OR SERVICES TO BE SUBCONTRACTED (or contracted if the proposer is a UDBE)	UDBE CERT NO. AND EXPIRATION DATE	NAME OF EACH UDBE (Must be certified at the time proposals are due - include UDBE address and phone number)	PERCENT PARTICIPATION OF EACH UDBE
1	Public Outreach	33645 08/06/2013	Arellano Associates	2%
2	Drainage	35719 05/22/2014	Civil Works Engineering, Inc.	7.5%
3	Foundation (Geotech)	6956 12/19/2013	Earth Mechanics, Inc.	8%
4	Constructability	39342 02/13/2013	Falcon Engineering Services Inc.	1%
5	Traffic/Electrical Design	28897 06/30/2013	LIN Consulting, Inc.	4%
			(See addresses and phone	
			numbers on supplemental sheet)	

For Local Agency to Complete:

Local Agency Proposal Number: ________

Federal-Aid Project Number: ________

Federal Share: ________

Proposal Date: ________

Total Claimed UDBE Commitment: 22.5 %

Signature of Proposer

10/20/11 (510) 457-2436

Date (Area Code) Tel. No.

John Steven Paquette

Person to Contact (Please Type or Print)

Local Agency certifies that the UDBE certifications have been verified and all information is complete and accurate/unless noted otherwise.

Print Name Signature Date

Local Agenc Representative

(Area Code) Telephone Number: ________

Local Agency Proposer UDBE Commitment (Consultant Contracts) (Rev 6/27/09)

Distribution: (1) Original - Local agency files

Local Agency: City of Corona
Project Description: Cajalco/I-15 Interchange Improvement Project

Exhibit D-6 Supplemental Information
Name, Address, and Phone for UDBE Firms

Proposer's Name: Jacobs Engineering Group Inc.

Names, Address, and Phone Numbers of UDBE Subcontractors:

1. Arellano Associates
   13791 Rosewell Ave., Suite A
   Chino, CA91710
   (909) 627-2974

2. Civil Works Engineers, Inc.
   3151 Airway Ave., Suite T-1
   Costa Mesa, CA 92626
   (714) 966-9060

3. Earth Mechanics, Inc.
   17800 Newhope Street, Suite B
   Fountain Valley, CA 92708
   (714) 751-3826

4. Falcon Engineering Services Inc.
   1020 Aquino Circle
   Corona, CA 92879
   (951) 768-9419

5. LIN Consulting, Inc.
   21660 E. Copley Dr. #270
   Diamond Bar, CA 91765
   (909) 396-6850

INSTRUCTIONS – LOCAL AGENCY PROPOSER UDBE COMMITMENT (CONSULTANT CONTRACTS)

ALL PROPOSERS:

PLEASE NOTE: It is the proposer's responsibility to verify that the UDBE(s) falls into one of the following groups in order to count towards the UDBE contract goal: 1) African Americans; 2) Asian- Pacific Americans; 3) Native Americans; 4) Women. This information must be submitted with your proposal. Failure to submit the required UDBE commitment will be grounds for finding the proposal nonresponsive.

A "UDBE" is a firm meeting the definition of a DBE as specified in 49 CFR and is one of the following groups: African Americans, Native Americans, Asian-Pacific Americans, or Women.

The form requires specific information regarding the consultant contract: Local Agency, Location, Project Description, Proposal Date, Proposer's Name, and Contract UDBE Goal.

The form has a column for the Work Item Number and Description or Services to be subcontracted to UDBEs (or performed if the proposer is a UDBE). The UDBE prime contractors shall indicate all work to be performed by UDBEs including work to be performed by its own forces, if a UDBE. The UDBE shall provide a certification number to the Consultant and notify the Consultant in writing with the date of decertification if their status should change during the course of the contract. Enter UDBE prime consultant and sub-consultant certification numbers. The form has a column for the Names of certified UDBEs to perform the work (must be certified on the date proposals are due and include UDBE address and phone number).

There is a column for the percent participation of each UDBE. Enter the Total Claimed UDBE Participation percentage of items of work submitted with proposal pursuant to the Special Provisions. (If 100% of item is not to be performed or furnished by the UDBE, describe exact portion of time to be performed or furnished by the UDBE.) See "Notice to Proposers Disadvantaged Business Enterprise Information," (Caltrans Exhibit 10-I) to determine how to count the participation of UDBE firms. **Note**: If the proposer has not met the contract goal, the local agency must evaluate the proposer's good faith efforts to meet the goal in order to be considered for award of the contract.

Exhibit D-6 (Caltrans Exhibit 10-O1) must be signed and dated by the consultant submitting the proposal. Also list a phone number in the space provided and print the name of the person to contact.

For the Successful Proposer only, local agencies should complete the Proposal Number, Federal- aid Project Number, Federal Share, and Proposal Date fields and verify that all information is complete and accurate before filing.

EXHIBIT D-7
LOCAL AGENCY PROPOSER DBE COMMITMENT (Consultant Contract)

Caltrans Exhibit 10-O2

NOTE: PLEASE REFER TO INSTRUCTIONS ON THE REVERSE SIDE OF THIS FORM

LOCAL AGENCY: City of Corona LOCATION: Corona, CA

PROJECT DESCRIPTION: Cajalco/I-15 Interchange Improvement Project

TOTAL CONTRACT AMOUNT ($): $3,813,392.26

PROPOSER'S NAME: Jacobs Engineering Group Inc.

WORK ITEM NO.	DESCRIPTION OR SERVICES TO BE SUBCONTRACTED (or contracted if the proposer is a DBE)	DBE CERT NO. AND EXPIRATION DATE	NAME OF EACH DBE (Must be certified at the time proposals are due - include DBE address and phone number)	DOLLAR AMOUNT OF EACH DBE
1	Public Outreach	33645 08/06/2013	Arellano Associates	$90,697.46
2	Drainage	35719 05/22/2014	Civil Works Engineering, Inc.	$306,739.70
3	Foundation (Geotech)	6956 12/19/2013	Earth Mechanics, Inc.	$362,032.52
4	Constructability	39342 02/13/2013	Falcon Engineering Services Inc.	$55,088.00
5	Traffic/Electrical Design	28897 06/30/2013	LIN Consulting, Inc.	$148,513.32
			(See addresses and phone numbers on supplemental sheet)	

For Local Agency to Complete:

Local Agency Contract Number: ________

Federal-Aid Project Number: ________

Federal Share: ________

Contract Award: ________

Local Agency certifies that the DBE certifications have been verified and all information is complete and accurate.

Print Name / Signature / Date
Local Agency Representative

(Area Code) Telephone Number: ________

Total Claimed DBE Participation: $963,071 25.2 %

Signature of Proposer

5/16/12 (510) 457-2436
Date (Area Code) Tel. No.

John Steven Paquette
Person to Contact (Please Type or Print)

For Caltrans Review:

Print Name / Signature / Date
Caltrans District Local Assistance Engineer

Local Agency Proposer DBE Information (Consultant Conttarcts) (Rev 6/27/09)

Local Agency: City of Corona
Project Description: Cajalco/I-15 Interchange Improvement Project

Exhibit D-7 Supplemental Information
Name, Address, and Phone for DBE Firms

Proposer's Name: Jacobs Engineering Group Inc.

Names, Address, and Phone Numbers of DBE Subcontractors:

1. Arellano Associates
   13791 Rosewell Ave., Suite A
   Chino, CA91710
   (909) 627-2974

2. Civil Works Engineers, Inc.
   3151 Airway Ave., Suite T-1
   Costa Mesa, CA 92626
   (714) 966-9060

3. Earth Mechanics, Inc.
   17800 Newhope Street, Suite B
   Fountain Valley, CA 92708
   (714) 751-3826

4. Falcon Engineering Services Inc.
   1020 Aquino Circle
   Corona, CA 92879
   (951) 768-9419

5. LIN Consulting, Inc.
   21660 E. Copley Dr. #270
   Diamond Bar, CA 91765
   (909) 396-6850

Distribution:(1) Copy - Fax or scan a copy to the Caltrans District Local Assistance Engineer (DLAE) within 15 days after contract execution.

Failure to send a copy to the DLAE within 15 days after contract execution may result in deobligation of funds for this project.

(2) Original - Local agency files

INSTRUCTIONS - LOCAL AGENCY PROPOSER DBE INFORMATION (CONSULTANT CONTRACTS)

SUCCESSFUL PROPOSER:

The form requires specific information regarding the consultant or other contract: Local Agency, Location, Project Description, Total Contract Amount, Proposal Date, and successful Proposer's Name.

The form has a column for the Work Item Number and Description or Services to be sub-contracted to DBEs. The prime consultant shall indicate all work to be performed by DBEs including, if the prime consultant is a DBE, work performed by its own forces, if a DBE. The DBE shall provide a certification number to the prime consultant. Enter DBE prime consultant's and sub-consultant's certification number. The form has a column for the Names of DBE certified contractors to perform the work (must be certified on or before the proposals are due and include DBE address and phone number).

Enter the Total Claimed DBE Participation dollar amount of items of work in the total DBE Dollar Amount column. (If 100% of item is not to be performed by the DBE, describe exact portion of time to be performed by the DBE.) See "Notice to Proposers Disadvantaged Business Enterprise Information," (Caltrans Exhibit 10-I) to determine how to count the participation of DBE firms.

Exhibit D-7 (Caltrans Exhibit 10-O2) must be signed and dated by the successful proposer at contract execution. Also list a phone number in the space provided and print the name of the person to contact.

Local agencies should complete the Contract Number, Federal-aid Project Number, Federal Share, and Contract Award fields and verify that all information is complete and accurate before signing and sending a copy of the form to the District Local Assistance Engineer within 15 days of contract execution. Failure to submit a completed and accurate form within the 15-day time period may result in the deobligation of funds on this project.

District DBE Coordinator should verify that all information is complete and accurate. Once the information has been verified, the **District Local Assistance Engineer** signs and dates the form.

EXHIBIT D-8

FINAL REPORT-UTILIZATION OF DISADVANTAGED BUSINESS ENTERPRISES (DBE) FIRST-TIER SUBCONTRACTORS

Caltrans Exhibit 10-O2

ADA Notice

For individuals with sensory disabilities, this document is available in alternate formats. For information call (916) 654-6410 or TDD (916) 654-3880 or write Records and Forms Management, 1120 N Street, MS-89, Sacramento, CA 95814

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

CEM-2402F (REV 02/2008)

CONTRACT NUMBER	COUNTY	ROUTE	POST MILES	FEDERAL AID PROJECT NO.	ADMINISTERING AGENCY		CONTRACT COMPLETION DATE

PRIME CONTRACTOR	BUSINESS ADDRESS	ESTIMATED CONTRACT AMOUNT
		$

ITEM NO.	DESCRIPTION OF WORK PERFORMED AND MATERIAL PROVIDED	COMPANY NAME AND BUSINESS ADDRESS	DBE CERT. NUMBER	CONTRACT PAYMENTS						DATE WORK COMPLETE	DATE OF FINAL PAYMENT
				NON-DBE	DBE	BA UDBE	APA UDBE	NA UDBE	W UDBE		
				$	$	$	$	$	$		
				$	$	$	$	$	$		
				$	$	$	$	$	$		
				$	$	$	$	$	$		
				$	$	$	$	$	$		
				$	$	$	$	$	$		
				$	$	$	$	$	$		
				$	$	$	$	$	$		
				$	$	$	$	$	$		
				$	$	$	$	$	$		
				$	$	$	$	$	$		
				$	$	$	$	$	$		
ORIGINAL COMMITMENT $			TOTAL	$	$	$	$	$	$		

List all First-Tier Sub-contractors, Disadvantaged Business Enterprises (DBEs) and underutilized DBEs (UDBEs) regardless of tier, whether or not the firms were originally listed for goal credit. If actual UDBE utilization (or item of work) was different than that approved at time of award, provide comments on back of form. List actual amount paid.

UDBE: BA......Black American
APA....Asian-Pacific Islander
NA......Native American
W.......Woman

I CERTIFY THAT THE ABOVE INFORMATION IS COMPLETE AND CORRECT

CONTRACTOR REPRESENTATIVE'S SIGNATURE	BUSINESS PHONE NUMBER	DATE

TO THE BEST OF MY INFORMATION AND BELIEF, THE ABOVE INFORMATION IS COMPLETE AND CORRECT

RESIDENT ENGINEER'S SIGNATURE	BUSINESS PHONE NUMBER	DATE

Copy Distribution-Caltrans contracts:	**Original** - District Construction	**Copy**- Business Enterprise Program	**Copy**- Contractor	**Copy** Resident Engineer
Copy Distribution-Local Agency contracts:	**Original** - District Local Assistance Engineer (submitted with the Report of Expenditure	**Copy**- District Local Assistance Engineer	**Copy**- Local Agency file	

INSTRUCTIONS - FINAL REPORT – UTILIZATION OF DISADVANTAGED BUSINESS ENTERPRISES (DBE),FIRST-TIER SUBCONTRACTORS

The form requires specific information regarding the construction project: Contract Number, County, Route, Post Miles, Federal-aid Project No., the Administering Agency, the Contract Completion Date and the Estimated Contract Amount. It requires the prime contractor name and business address. The focus of the form is to describe who did what by contract item number and descriptions, asking for specific dollar values of item work completed broken down by subcontractors who performed the work both DBE and non-DBE work forces. DBE prime contractors are required to show the date of work performed by their own forces along with the corresponding dollar value of work.

The form has a column to enter the Contract Item No. (or Item No's) and description of work performed or materials provided, as well as a column for the subcontractor name and business address. For those firms who are DBE, there is a column to enter their DBE Certification Number. The DBE should provide their certification number to the contractor and notify the contractor in writing with the date of the decertification if their status should change during the course of the project.

The form has six columns for the dollar value to be entered for the item work performed by the subcontractor.

> The Non-DBE column is used to enter the dollar value of work performed for firms who are not certified DBE.
>
> The decision of which column to be used for entering the DBE dollar value is based on what program(s) status the firm is certified. This program status is determined by the California Unified Certification Program by ethnicity, gender, ownership, and control issues at time of certification. To confirm the certification status and program status, access the Department of Transportation Civil Rights web site at: http://www.dot.ca.gov/hq/bep or by calling (916) 324-1700 or the toll free number at (888) 810-6346.

Based on this DBE Program status, the following table depicts which column to be used:

DBE Program Status	Column to be used
If program status shows DBE only with no other programs listed	DBE
If program status shows DBE, Black American	BA UDBE
If program status shows DBE, Asian-Pacific Islander	APA UDBE
If program status shows DBE, Native American	NA UDBE
If program status shows DBE, Woman	W UDBE

If a contractor performing work as a DBE on the project becomes decertified and still performs work after their decertification date, enter the total dollar value performed by this contractor under the appropriate DBE identification column.

If a contractor performing work as a non-DBE on the project becomes certified as a DBE, enter the dollar value of all work performed after certification as a DBE under the appropriate identification column.

Enter the total of each of the six columns in Form CEM-2402(F).

Any changes to DBE certification must also be submitted on Form-CEM 2403(F).

Enter the Date Work Completed as well as the Date of Final Payment (the date when the prime contractor made the "final payment" to the subcontractor for the portion of work listed as being completed).

The contractor and the resident engineer sign and date the form indicating that the information provided is complete and correct.

EXHIBIT D-9

CERTIFICATION OF LOCAL AGENCY

Caltrans Exhibit 10-G

I HEREBY CERTIFY that I am the ________________________ of the City of Corona ______ and that the consulting firm of ________________________________ ,or its representative has not been required (except as herein expressly stated), directly or indirectly, as an express or implied condition in connection with obtaining or carrying out this Agreement to:

(a) employ, retain, agree to employ or retain, any firm or person, or

(b) pay or agree to pay, to any firm, person or organization, any fee, contribution, donation, or consideration of any kind.

I acknowledge that this Certificate is to be made available to the California Department of Transportation (Caltrans) in connection with this Agreement involving participation of federal-aid highway funds, and is subject to applicable state and federal laws, both criminal and civil.

______________________ (Date)

______________________ (Signature)

Distribution: 1) Local Agency Project File (original & Contract)
2) DLAE (copy)

Date: October 12, 2021

CITY OF CORONA
Public Works Department

CONTRACT CHANGE ORDER NO. 6

PROJECT DESCRIPTION: Cajalco Road/I15 Interchange Improvement - Engineering Design and Right of Way Services

PROJECT NO: 56-1203 Caltrans EA:08-0J6104 **PURCHASE ORDER NO:** P18879

CONTRACTOR: Jacobs Engineering Group, Inc
2600 Michelson Drive Suite 500
Irvine, CA 92612

DESCRIPTION OF CHANGES AND/OR EXTRA WORK:

The Contractor is hereby directed to make the herein described changes from the plans and specifications and/or perform the following described work not included in the Plans and Specifications for this project.

ITEM	DESCRIPTION	U/M	QUANTITY	UNIT PRICE	TOTAL
7	Project Management and Roadway Design (Jacobs)	LS	1.00	$32,731.00	$32,731.00
8	Survey/Right of Way Engineering (DEA)	LS	1.00	$68,080.00	$68,080.00
9	Right of Way Services (OPC)	LS	1.00	$52,242.00	$52,242.00
10	Other Direct Cost (ODC)	LS	1.00	$12,110.00	$12,110.00
TOTAL ESTIMATED PRICE FOR THIS CHANGE ORDER:					$165,163.00

This document shall become an amendment to the Contract and all provisions of the Contract will apply hereto. This Change Order constitutes a complete and final resolution of all claims of the Contract for additional time or additional compensation related to or affected by work that is the subject of this Change Order. Quantities of items other than Lump Sum are not to exceed the amounts indicated.

JUSTIFICATION: (Be specific on each item. Attach supporting documents as necessary)

S-7	Update the Right of Way appraisal maps with new parcel numbers provided by Caltrans and revise all call-outs for the correct ownership. Update ROW certification and coordinate with Crown Castle and AT&T on completion of relocation work. Update the ROW Certificate No. 3W
S-8	Prepare Record of Survey Map including the new monuments/property ties at the right of way lines. Submit to the County of Riverside Surveyors Office for review and final recordation of the map. After acceptance by the County Surveyor's Office submit a mylar version to the County Recorders for recordation.
S-9	Provide deed jackets for up to9 parcels, coordinate deed processing with Caltrans , Secure preliminary title reports if needed. Using PTR or Policy of Title Insurance, prepare Title Abstract Summary showing encumbrances on title, description of why not detrimental to State's use. If detrimental to State use coordinate to clear encumbrances from report/policy. (Assumption no cost clearing Title).
S-10	Prepare 9 deed jackets for conveyance of property from City to Caltrans, Preliminary Title Reports if needed for each parcel will be secured. Plans check fees / recording for Record of Survey

CONTRACT VARIANCE SUMMARY

CCO #	Amount	%	Time	Date Approved
1	$146,889.00	3.85%	194	12/3/2013
2	300,000.00	7.87%	0	8/17/2015
3	866,783.00	22.73%	0	3/1/2017
4	134,206.00	3.52%	11/12/2019 - 06/30/2020	8/5/2020
5	0.00	0.00%	06/30/2020 - 09/30/2020	
6	$165,163.00	4.33%	0	
Total	$1,613,041.00	42.30%	0	
Original Contract Amount	$3,813,392.26		Revised Contract Amount	$5,426,433.26
Date Started: June 11, 2012	Original Completion Date: November 12, 2019		Revised Completion Date: June 30, 2023	

AUTHORIZATION BY CITY:

Recommended for approval by:

_________________________________ Date: __________
Peter Ramey, Project Manager

_________________________________ Date: __________
Barry Ghaemi, P.E., Senior Civil Engineer

Approved by:

_________________________________ Date: __________
Savat Kamphou, P.E., Public Works Director

ACCEPTANCE BY CONTRACTOR:

We, the undersigned Contractor, have given careful consideration to the above described changes and/or extra work and hereby agree that said work is a supplement to the contract and all provisions will apply hereto.

Accepted by ____ Title: ___________________________
(Please print name and title)

Signature: ____ Date: ___________________________

Jacobs

2600 Michelson Drive
Suite 500
Irvine, CA 92612 USA
1.949.224.7500 Fax 1.949.224.7501

September 27th, 2021

Peter Ramey
Project Manager
City of Corona
400 S. Vicentia Ave., Suite 320
Corona, Ca 92882

RE: Cajalco/I-15 Interchange Improvements Change Order Request
Consultant Contract No. 5-JACOBS 10-01 MP 03-10

Dear Mr. Ramey,

Jacobs Engineering Group requests for the City of Corona to amend our contract for budget to allow us to perform closeout Right of Way (ROW) services as required by Caltrans for Construction Contract Acceptance (See Scope of Services). As this is a new request and not contained within our original scope of work, we request your kind consideration for additional compensation to address these items.

An updated Scope of Work is provided and summarized by firm below for your reference. The total change order request is $165,163.00.

Disciple	Firm	Total	
Project Management and Roadway	Jacobs	$	26,714.00
Survey/Right of Way Engineering	DEA	$	68,080.00
Right of Way (Real Estate) Services	OPC	$	52,242.00

Project Total Labor	$	147,036.00
Project Total ODCs	$	12,110.00
Sub-Markup	$	6,017.00
Project Total	$	165,163.00

We appreciate your consideration of our revised request. Please feel free to contact me should you have any questions.

Sincerely,

Nick Polichetti, PE
Project Manager
(714) 496-5193

Michael Boraks, PE
Designated Project Executive
(949) 566-3481

Jacobs

2600 Michelson Drive
Suite 500
Irvine, CA 92612 USA
1.949.224.7500 Fax 1.949.224.7501

Scope of Services:

Task 1 – Requested Additional Scope (Work not yet performed)
The following out of scope tasks have been requested by Caltrans and will require additional funding to complete. Work on these tasks has not yet been initiated.

Task 1a. Property Ties
Caltrans ROW engineering has requested additional survey monuments/property ties at all angle points and begin/end curves along State ROW. The Jacobs Design Team will set up to 22 survey monuments. Property fences and walls will also be validated as pertains to the ROW shown on the ROW Appraisal Maps. When no monuments can be set at the exact property/right of way corner, an offset monument will be set. The monuments will be marked with a tag stamped "LS 7300".

Deliverables: Monuments Placed & PDF plot of monuments set in the field.

Task 1b. Post-Construction Record of Survey
The Jacobs Design Team will prepare a Record of Survey Map including the new monuments/property ties set along the right of way lines. This map, when completed, will be submitted to the County of Riverside Surveyor's Office for review and final recordation of the map. At the time of this proposal, the County has a 4-6 week turnaround on map reviews. Once the map has been accepted by the County, a mylar version of the map will be submitted for recordation with the County Recorder. Plan check/Recording fees are included in the cost estimate as an ODC.

At the time of first submittal of the map to the county for review, a map will also be sent to Caltrans for review. Any requested revisions from Caltrans will be incorporated into the final map to be recorded. A copy of the recorded map will be provided to the client.

Deliverable: PDF plot Record of Survey map submitted to the County and Caltrans for review(s) and final recordation.

Task 1c. ROW Record Maps
The City of Corona Advertised, Awarded and Administered (AAA) the construction contract for the project, requiring the title for all needed parcels to be transferred to the City to allow for construction. The final right of way (ROW) recording occurs after construction is completed to facilitate the transfer of parcels to the State. The ROW appraisal maps will be updated prior to the State accepting the transfers of property. The Jacobs Design Team will revise the previously prepared ROW appraisal maps with new parcel numbers provided by Caltrans. Final ROW maps will be provided in PDF and DGN formats to Caltrans for review and approval.

Deliverable: PDF plot of the Right of Way map submitted to Caltrans for review and approval.

Task 1d. Transfer Deeds
The Jacobs Design Team will prepare deed jackets for up to 9 parcels for the conveyance of property from the City to Caltrans. Deed processing and jacket contents will be coordinated with Caltrans ROW engineers, Caltrans attorneys and City attorneys. Preliminary Title Reports (PTR), if needed, for each parcel will be secured, this is included in the cost estimate as an ODC. The City will provide deeds and relevant information for the property acquired from the Castle and Cooke Corona Crossings property development (NE quadrant of project).

Deliverable: Transfer the 9 parcels from the City of Corona to Caltrans

2600 Michelson Drive
Suite 500
Irvine, CA 92612 USA
1.949.224.7500 Fax 1.949.224.7501

Task 1e. Right of Way Certificate Update

A Special Certification No. 3 with a Work-Around (3W) was prepared for the project. A ROW Certification No. 3W does not need to be raised to a Certification No. 1 or 2, but must be updated to capture progress pertaining to the work-around parcels. The ROW Certification update requires the Jacobs Design Team to coordinate with Crown Castle and AT&T to verify completion of relocation work. The Jacobs Design Team will update the Right of Way Certificate No. 3W and will submit to Caltrans for review and acceptance.

> *Deliverable: Updated Right of Way Certificate updated with a timeline of the progress of the project.*

Assumptions:

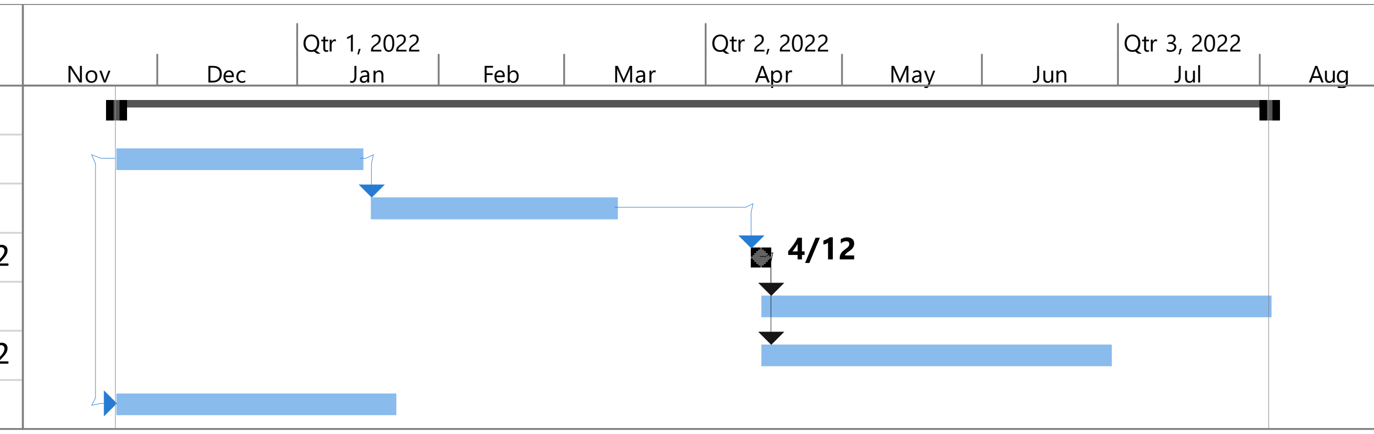
- ROW requirements have not changed during construction; previous legal descriptions remain valid and can be re-used to transfer the property from the City to Caltrans
- All elements of the project were constructed within the acquired ROW
- The City will provide property transfer information for Parcel 23310 Castle & Cook Corona Crossings II Inc.
- There are no parcel encumbrances that the State believes to be detrimental to its use, resulting in a rejection of the parcel transfer by Caltrans.
- All documents requiring Caltrans, County or City review, includes two rounds of comment review/response and document updates.
- A sample schedule is provided as reference. Task 1a will start approximately 2 weeks after NTP to allow for mobilization of the survey crew.

Jacobs

2600 Michelson Drive
Suite 500
Irvine, CA 92612 USA
1.949.224.7500 Fax 1.949.224.7501

Scope of Services Schedule:

ID	Task Name	Duration	Start	Finish
1	**Change Order 7 - ROW Closeout Services**	**182 days**	**Mon 11/22/21**	**Tue 8/2/22**
2	1a. Property Ties	40 days	Mon 11/22/21	Fri 1/14/22
3	1b. Post Construction Record of Survey (County Submittal)	40 days	Mon 1/17/22	Fri 3/11/22
4	1b.1 Record of Survey Approval	0 days	Tue 4/12/22	Tue 4/12/22
5	1c. R/W Record Maps	80 days	Wed 4/13/22	Tue 8/2/22
6	1d. Transfer Deeds	55 days	Wed 4/13/22	Tue 6/28/22
7	1e. R/W Certicificate (3W) Update	45 days	Mon 11/22/21	Fri 1/21/22



Jacobs

2600 Michelson Drive
Suite 500
Irvine, CA 92612 USA
1.949.224.7500 Fax 1.949.224.7501

Cost Proposal:

				Jacobs				DEA						OPC				Lin		
Task		Beg Date	End Date	Project Manager $ 291.00	Roadway Design Lead $ 224.00	Roadway Engineer $ 160.00	Jacobs (Subtotal)	Survey Task Manager $ 240.00	2-Man Crew $ 320.00	Survey CAD $ 145.00	Project Surveyor $ 190.00	Project Assistant $ 110.00	DEA (Subtotal)	Program Manager $ 262.86	Senior R/W Eng. Analyst $ 116.94	Agent/Analyst $ 80.48	Projecdt Support $ 73.76	OPC (Subtotal)	**Total Labor Hours**	**Total Labor Cost**
Task 1	**ROW Services**	8/23/2021	5/16/2022	30	26	76	$ 26,714	40	28	80	188	20	$ 68,080	20	382	15	15	$ 52,242	920	$ 147,036
	1a. Property Ties	8/30/2021	10/22/2021	4		8	$ 2,444	12	28		28	4	$ 17,600					$ -	84	$ 20,044
	1b. Post-Construction Record of Survey	10/25/2021	12/17/2021	4	8	16	$ 5,516	6		80	72	8	$ 27,600					$ -	194	$ 33,116
	1c. Record Maps	1/19/2022	5/10/2022	6	8	24	$ 7,378	22			88	8	$ 22,880					$ -	156	$ 30,258
	1d. Transfer Deeds	1/19/2022	4/5/2022	10	8	24	$ 8,542						$ -	12	382		10	$ 48,563	446	$ 57,105
	1e. Right of Way Certification Update	8/23/2021	5/16/2022	6	2	4	$ 2,834						$ -	8		15	5	$ 3,679	40	$ 6,513
Total Hours				30	26	76	132	40	28	80	188	20	356	20	382	15	15	432	920	
Total Labor Cost				$ 8,730	$ 5,824	$ 12,160	$ 26,714	$ 9,600	$ 8,960	$ 11,600	$ 35,720	$ 2,200	$ 68,080	$ 5,257	$ 44,671	$ 1,207	$ 1,106	$ 52,242		**$ 147,036**
Markup on Subs (5%)																				**$ 6,017**
ODC's																				**$ 12,110**
Total Cost																				**$ 165,163**

DOC # 2016-0306565
07/21/2016 03:46 PM Fees: $0.00
Page 1 of 78
Recorded in Official Records
County of Riverside
Peter Aldana
Assessor-County Clerk-Recorder

Recording Requested by And
When Recorded Return to:

City of Corona
400 S. Vicentia Avenue
Corona, CA 92882

Attn: City Clerk

This document was electronically submitted to the County of Riverside for recording
Receipted by: TERESA #134

(Space Above This Line for Recorder's Office Use Only)
(Exempt from Recording Fee per Cal. Gov. Code § 6103)

ARANTINE HILLS DEVELOPMENT AGREEMENT

This Arantine Hills Development Agreement ("**Agreement**") is entered into this 1st day of June, 2016, ("Entry Date") by and between the CITY OF CORONA, a municipal corporation ("**City**"), and ARANTINE HILLS HOLDINGS L.P., a Delaware limited partnership ("**Developer**"). The City and Developer are sometimes referred to individually as party and collectively as the "Parties", throughout this Agreement.

RECITALS

A. California Government Code Sections 65864 *et seq.* ("**Development Agreement Law**") authorizes cities to enter into binding development agreements with persons having a legal or equitable interest in real property for the development of such property, all for the purpose of strengthening the public planning process, encouraging private participation and comprehensive planning and identifying the economic costs of such development.

B. Developer is the owner of legal and/or equitable interests in certain real property consisting of approximately 276 acres, which is located in the City of Corona, California, commonly known as the Arantine Hills Specific Plan. This real property is legally described and depicted in Exhibit "A," attached hereto and incorporated herein by reference (the "**Property**"), and thus qualifies to enter into this Agreement in accordance with the Development Agreement Law.

C. In conjunction with execution of this Agreement, the City has issued the approvals that are listed in Exhibit "B" and incorporated herein by reference (hereinafter, "**Existing Project Approvals**"). In connection with the Existing Project Approvals, the City has imposed certain conditions of approval for Development of the Project and has adopted the Mitigation Monitoring Program ("**MMP**") (collectively, the "**Project Conditions of Approval**"), which are attached hereto as Exhibit "C," and incorporated herein by reference.

D. Developer desires to Develop the Property with a master planned residential community of up to 1,621[1] residential units and up to 80,000 square feet of commercial/retail uses; along

[1] The targeted maximum for single family and multifamily housing is 1621 units. However, the Specific Plan allows for up to an additional 185 units of age qualified housing units within Planning Areas 6, 10 and/or 11 if a density bonus is utilized.

Recording Requested by And
When Recorded Return to:

City of Corona
400 S. Vicentia Avenue
Corona, CA 92882

Attn: City Clerk

(Space Above This Line for Recorder's Office Use Only)
(Exempt from Recording Fee per Cal. Gov. Code § 6103)

ARANTINE HILLS DEVELOPMENT AGREEMENT

This Arantine Hills Development Agreement ("**Agreement**") is entered into this 1st day of June, 2016, ("Entry Date") by and between the CITY OF CORONA, a municipal corporation ("**City**"), and ARANTINE HILLS HOLDINGS L.P., a Delaware limited partnership ("**Developer**"). The City and Developer are sometimes referred to individually as party and collectively as the "Parties", throughout this Agreement.

RECITALS

A. California Government Code Sections 65864 *et seq.* ("**Development Agreement Law**") authorizes cities to enter into binding development agreements with persons having a legal or equitable interest in real property for the development of such property, all for the purpose of strengthening the public planning process, encouraging private participation and comprehensive planning and identifying the economic costs of such development.

B. Developer is the owner of legal and/or equitable interests in certain real property consisting of approximately 276 acres, which is located in the City of Corona, California, commonly known as the Arantine Hills Specific Plan. This real property is legally described and depicted in Exhibit "A," attached hereto and incorporated herein by reference (the "**Property**"), and thus qualifies to enter into this Agreement in accordance with the Development Agreement Law.

C. In conjunction with execution of this Agreement, the City has issued the approvals that are listed in Exhibit "B" and incorporated herein by reference (hereinafter, "**Existing Project Approvals**"). In connection with the Existing Project Approvals, the City has imposed certain conditions of approval for Development of the Project and has adopted the Mitigation Monitoring Program ("**MMP**") (collectively, the "**Project Conditions of Approval**"), which are attached hereto as Exhibit "C," and incorporated herein by reference.

D. Developer desires to Develop the Property with a master planned residential community of up to 1,621[1] residential units and up to 80,000 square feet of commercial/retail uses; along

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[1] The targeted maximum for single family and multifamily housing is 1621 units. However, the Specific Plan allows for up to an additional 185 units of age qualified housing units within Planning Areas 6, 10 and/or 11 if a density bonus is utilized.

with open space/recreational uses and public infrastructure (collectively, "**Project**"). Aside from the need to obtain Ministerial Approvals (defined herein), the Existing Project Approvals authorize Development of the Project. The Project is depicted in Exhibit "D," attached hereto and incorporated herein by reference.

E. The Parties understand that Developer may seek to expand and/or modify the Project area in the City in the future, and the Parties intend that this Agreement may be amended to and govern any such after-acquired property in the City put to such uses by Developer.

F. Developer and City agree that a development agreement should be approved and adopted for this Property in order to memorialize the expectations of City and Developer with respect to the Development of the Property and the infrastructure necessary to support Development of the Property, as more particularly described herein.

G. The City Council finds and determines that this Agreement is in the best public interest of the City and its residents and adopting this Agreement constitutes a present and valid exercise of the City's police power. The City and its City Council have determined that the Project is consistent with the Agreement and the Existing Land Use Regulations, as defined herein. This Agreement and the Project will achieve a number of City objectives, including the orderly development of the Property, the provision of public benefits to the City and its residents through public improvements, including improvements to the Property and public infrastructure improvements in and around the Property, and increased sales tax and property tax revenues.

H. The City finds and determines that all actions required of City precedent to approval of this Agreement by Ordinance No. 3232 of the City Council have been duly and regularly taken.

I. As part of the process of approving this Agreement and the Existing Project Approvals, the City Council has required the preparation of a Supplemental Environmental Impact Report ("**SEIR**") and has otherwise carried out all requirements of the California Environmental Quality Act ("**CEQA**") of 1970, as amended. The SEIR is a supplement to the Arantine Hills Specific Plan EIR (SCH No. 2006091093) certified by the City on August 15, 2012.

J. On April 25, 2016, following a duly noticed and conducted public hearing, the City Planning and Housing Commission recommended that the City Council approve this Agreement and the Existing Project Approvals (defined below).

K. On May 19, 2016, following a duly noticed and conducted public hearing and pursuant to CEQA, the City Council certified the SEIR for the Project.

L. On May 19, 2016, following a duly noticed and conducted public hearing, the City Council determined that the provisions of this Agreement are, or upon the adoption of the Existing Project Approvals will be, consistent with the City's General Plan and Zoning designation, and introduced Ordinance No. 3232 approving and authorizing the execution of this Agreement.

M. On June 1, 2016, the City Council adopted Ordinance No. 3232 approving and authorizing the execution of this Agreement. A copy of Ordinance No. 3232 is on file at the office of the City Clerk, with adopted findings and conditions pertaining thereto, including those relating to the environmental documentation for the Project.

COVENANTS

NOW, THEREFORE, in consideration of the above recitals and of the mutual covenants hereinafter contained and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties agree as follows:

1. DEFINITIONS AND EXHIBITS.

1.1 **Definitions**. This Agreement uses a number of terms having specific meanings, as defined below. These specially defined terms are distinguished by having the initial letter capitalized, when used in the Agreement. The defined terms include the following:

1.1.1 *"Administrative Project Amendments"* means an amendment or minor modification to the Project, pursuant to Section 8.5.3 of the Arantine Hills Specific Plan, that is consistent with this Agreement and Existing Land Use Regulations, and will result in no new significant impacts not addressed and mitigated in the EIR and SEIR.

1.1.2 *"Agreement"* means this Development Agreement and all attachments and exhibits hereto.

1.1.3 *"City"* means the City of Corona, a municipal corporation.

1.1.4 *"City Council"* means the City Council of the City.

1.1.5 *"CFD"* means a community facilities district established pursuant to the Mello-Roos Community Facilities Act of 1982 (Government Code §§53311 *et seq.*).

1.1.6 *"Days"* means calendar days.

1.1.7 *"Developer"* means Arantine Hills Holdings, L.P., a Delaware limited partnership, and its successors and assigns to all or any part of the Property.

1.1.8 *"Development" or "Develop"* means the improvement of the Property for the purposes of developing the Project in accordance with the Project Approvals, completing the structures, improvements and facilities comprising the Project including, but not limited to: grading; the construction of specified road, water, sewer and flood control infrastructure directly related to the Project whether located within or outside the Property; the construction of buildings, structures, and other related facilities, the installation of landscaping and other facilities and improvements necessary or appropriate for the Project, and the maintenance, repair, or reconstruction of any building, structure, improvement, landscaping or facility after the construction and completion thereof on the Property, pursuant to the Project Approvals and Project Conditions of Approval.

1.1.9 "*Development Exaction*" means any requirement of the City in connection with or pursuant to any Existing or Subsequent Land Use Regulation or Project Approvals for the dedication of land, the construction of improvements for public facilities, or the payment of fees in order to lessen, offset, mitigate or compensate for the impacts of Development on the environment or other public interests.

1.1.10 "*Development Impact Fees*" shall mean those fees established and adopted by City with respect to development and its impacts pursuant to applicable governmental requirements, including Section 66000 *et seq*., of the California Government Code, including impact fees, linkage fees, exactions, assessments or fair share charges or other similar impact fees or charges imposed on or in connection with new development by the City. Development Impact Fees do not mean or include processing fees. The Development Impact Fees applicable to the Project are set forth on Exhibit "E" attached hereto and incorporated herein by reference. Except for the Non-Locked Development Impact Fees, the Development Impact Fees that are in effect on the Entry Date are the only Development Impact Fees that the City may impose or levy on the Project. For purposes of assessing Development Impact Fees, residential densities of eight (8) units per acre or less are considered single family units while residential densities greater than this are considered multifamily units.

1.1.11 "*Discretionary Action(s)*" or "*Discretionary Approval(s)*" means an action which requires the exercise of judgment, deliberation or discretion on the part of the City, including any board, agency, commission or department and any officer or employee thereof, in the process of approving or disapproving Development of the Project, as distinguished from an activity which is defined herein as a Ministerial Permit or Ministerial Approval.

1.1.12 "*Effective Date*" means the date this Agreement is recorded.

1.1.13 "*Entry Date*" means the date the Parties execute this Agreement.

1.1.14 "*Existing Land Use Regulations*" means all ordinances, laws, resolutions, codes, rules, regulations, policies, requirements, guidelines or other actions of City, including but not limited to the provisions set forth in the City's General Plan, Municipal Code, Arantine Hills Specific Plan and Zoning Code and including all Development Impact Fees, which affect, govern or apply to the Development of the project and use of the Property in a manner consistent with this Agreement, including, without limitation, the permitted use of land, the density or intensity of use, subdivision requirements, the maximum height and size of proposed buildings, the provisions for reservation or dedication of land for public purposes, and the design, improvement and construction standards and specifications applicable to the Development of the Property, subject to the terms of this Agreement, whether adopted by the City Council or the voters in an initiative, which are in effect on the Entry Date, pursuant to California Government Code Section 65866.

1.1.15 "*Existing Project Approvals*" means all Project Approvals approved or issued on or before the Entry Date that are listed in Exhibit "B".

1.1.16 "*Ministerial Approvals(s),*" or "*Ministerial Act(s)*" means a permit approval or clearance, in substantial conformance with the Existing Land Use Regulations, including, without limitation, substantial conformance determinations for tentative tract maps, Bedford Canyon channel alignment, determinations of compliance with the Project Conditions of Approval, site plans, grading plans, grading plan modifications, improvement plans, building plans and specifications, right-of-way plans, Project advertising signs, construction/security trailer permits, authorizing the use of a private recreational center as a sales and marketing facility, and ministerial issuance of one or more final maps, zoning clearances, grading permits, grading plan modifications, improvement permits, building permits, lot line adjustments for non-recorded lot lines, encroachment permits, temporary use permits, certificates of use and occupancy, and approvals and entitlements and related matters as necessary for the Development of the Project as distinguished from an activity which is included in the definition of Discretionary Action or Discretionary Approval.

1.1.17 *"Mortgagee"* means a mortgagee of a mortgage, a beneficiary under a deed of trust or any other security device, a lender or each of their respective successors and assigns.

1.1.18 *"Non-Locked Development Impact Fees"* means any regional pass-through fees, including, but not limited to, Transportation Uniform Mitigation Fee ("TUMF") and the Multiple Species Habitat Conservation Plan ("MSHCP") fee, and any water or sewer fees imposed by the City.

1.1.19 *"Phase 1"* consists of the construction of 308 single family production units on the Property or a combination of single family and condominium/townhome production units that have the same or a lesser external trip count as 308 single family production units. Any reference in this Agreement to Phase 1, phases or phasing for construction of the Project shall not mean the same, and shall not be construed to mean the same, as the terms "phase," "phasing," or similar terms described in the Arantine Hills Specific Plan. For purposes of this Agreement, Phase 1 does not include any commercial or retail structures or uses otherwise allowed pursuant to the Project Approvals.

1.1.20 *"Phase 2"* consists of the construction of 600 production residential dwelling units. Any reference in this Agreement to Phase 2, phases or phasing for construction of the Project shall not mean the same, and shall not be construed to mean the same, as the terms "phase," "phasing," or similar terms described in the Arantine Hills Specific Plan. For purposes of this Agreement, Phase 2 does not include any commercial or retail structures or uses otherwise allowed pursuant to the Project Approvals.

1.1.21 *"Phase 3"* consists of the construction of 390 production residential dwelling units. Any reference in this Agreement to Phase 3, phases or phasing for construction of the Project shall not mean the same, and shall not be construed to mean the same, as the terms "phase," "phasing," or similar terms described in the Arantine Hills Specific Plan. For purposes of this Agreement, Phase 3 does not include any commercial or retail structures or uses otherwise allowed pursuant to the Project Approvals.

1.1.22 *"Phase 4"* consists of the construction of the remainder of the production residential dwelling units per the Existing Project Approvals following construction of Phases 1, 2 and 3. Any reference in this Agreement to Phase 4, phases or phasing for construction of the

Project shall not mean the same, and shall not be construed to mean the same, as the terms "phase," "phasing," or similar terms described in the Arantine Hills Specific Plan. For purposes of this Agreement, Phase 4 does not include any commercial or retail structures or uses otherwise allowed pursuant to the Project Approvals.

1.1.23 *"Private Parks"* means the approximate eight and seventy-three hundredths (8.73) acres of private park areas to be developed by Developer and maintained by the Homeowner's Association.

1.1.24 *"Project"* means the project allowed by the Existing Project Approvals, as set forth in Recital D to this Agreement. The Existing Project Approvals authorize Development of the Project, subject to issuance of various Ministerial Approvals and/or Discretionary Approvals, as applicable.

1.1.25 *"Project Approvals"* means all site-specific (meaning specifically applicable to the Project only and not generally applicable to some or all other properties within the City) plans, maps, permits, and entitlements to use of every kind and nature that are sought or agreed to in writing by Developer in its sole and absolute discretion to Develop the Project and that have been approved by the City or other entity with jurisdiction over the Project. Project Approvals include, but are not limited to, general plan amendments, site plans, tentative and final subdivision maps, design guidelines, variances, zoning designations, conditional use permits, grading, building, encroachment and other similar permits, the site-specific provisions of general plans, environmental assessments, including environmental impact reports and negative declarations, and any amendments, addendum or modifications to those plans, maps, permits, assessments and entitlements. "Project Approvals" include the Existing Project Approvals, Subsequent Project Approvals, and Project Conditions of Approval. All Project Approvals and amendments to any Project Approvals shall automatically vest herein with no further action required by the Developer, except as may be required by the Project Conditions of Approval.

1.1.26 *"Project Conditions of Approval"* means all of the conditions of approval contained in the Project Approvals and the MMP.

1.1.27 *"Property"* means the real property described and depicted in Exhibit "A".

1.1.28 *"Public Trail"* means the approximate one and ninety-two hundredths (1.92) acres of multi-purpose trails and parkway to be developed by Developer and maintained by the Homeowner's Association, and that allows public access.

1.1.29 *"Reservation of Authority"* means the rights and authority excepted from the assurances and rights provided to Developer under this Agreement and reserved to City under Section 3.13 of this Agreement.

1.1.30 *"Subsequent Project Approvals"* means all Ministerial and Discretionary Project Approvals that: (a) are sought or agreed to in writing by Developer, in its sole and absolute discretion, to Develop the Project; (b) have been approved by the City or other entity with jurisdiction over the Project; (c) are consistent with this Agreement; and (d) are approved or issued after the Entry Date in connection with Development of the Property.

1.1.31 *"Subsequent Land Use Regulations"* means any change in or addition to the Existing Land Use Regulations adopted or becoming effective after the Entry Date of this Agreement, including, without limitation, any change in any applicable general or specific plan, zoning, subdivision, or building regulation, including, without limitation, any such change by means of an ordinance, initiative, resolution, policy, order or moratorium, initiated or instituted for any reason whatsoever by the Mayor, City Council, Planning Commission or any other board, agency, commission or department of City, or any officer or employee thereof, or by the electorate, as the case may be, or changes in state law, which would, absent this Agreement, otherwise be applicable to the Project.

1.1.32 *"Term"* shall mean the period of time from the Entry Date until the termination of this Agreement as provided in Section 2.4, unless earlier terminated or further extended as provided in this Agreement.

1.1.33 *"Total Cost"* means, without limitation, all labor, materials, tools, equipment, services and incidental and customary work necessary to plan, engineer, design, environmentally review, permit, site, bid and construct a public facility or improvement project, including, without limitation, all costs and expenses for the following: engineering, architectural, appraisal, legal and other consultant services throughout the real property acquisition efforts and preconstruction and construction phases; real property acquisitions; bid preparation and administration services, soil, project and other inspection and testing services; construction and project management services; and all construction and project close-out activities.

1.2 **Exhibits.** The following documents are attached to, and by this reference made a part of, this Agreement: Exhibit "A," Legal Description and Depiction; Exhibit "B," Existing Project Approvals; Exhibit "C," Project Conditions of Approval; Exhibit "D," Depiction of the Project; Exhibit "E," Development Impact Fees/Credits, Exhibit "F," Map of Benefit Area for Reimbursements, and Exhibit "G," Performance Bond.

2. GENERAL PROVISIONS.

2.1 **Binding Effect of Agreement.** Subject to extension by mutual agreement of Developer and the City, this Agreement shall become operative on the Effective Date. From and following the Effective Date, actions by the City and Developer with respect to the Development of the Property, including actions by the City on applications for Subsequent Project Approvals affecting the Property, shall be subject to the terms and conditions of this Agreement.

2.2 **Ownership of Property.** City and Developer acknowledge and agree that Developer has a legal or equitable interest in the Property and thus Developer is qualified to enter into and be a Party to this Agreement under the Development Agreement Law, California Government Code Section 65864, *et seq*.

2.3 **Assignment.**

2.3.1 **Right to Assign.** Developer shall have the right to sell, mortgage, hypothecate, assign or transfer ("**Transfer**") this Agreement, and any and all of its rights, duties and obligations hereunder, either in whole or in part, to any person, partnership, joint venture,

FOURTH AMENDMENT TO
PROFESSIONAL SERVICES AGREEMENT

BETWEEN THE CITY OF CORONA
AND
JACOBS ENGINEERING GROUP, INC.
ENGINEERING AND RIGHT OF WAY DESIGN SERVICES – CAJALCO/I-15 INTERCHANGE IMPROVEMENT, PROJECT NO. 56-1203

1. PARTIES AND DATE.

This Fourth Amendment to the Professional Services Agreement ("Fourth Amendment") is made and entered into this 5th day of January, 2022 by and between the City of Corona ("City") and **Jacobs Engineering Group, Inc.** ("Consultant"). City and Consultant are sometimes individually referred to as "Party" and collectively as "Parties" in this Fourth Amendment.

2. RECITALS.

2.1 Agreement. City and Consultant entered into that certain Professional Services Agreement dated on or about May 16, 2012 ("Agreement"), whereby Consultant agreed to provide **Engineering and Right of Way Design** consulting services.

2.2 Prior Amendments. City and Consultant entered into that certain First Amendment to the Professional Services Agreement dated on or about March 1, 2017 ("First Amendment"). City and Consultant entered into that certain Second Amendment to the Professional Services Agreement dated on or about February 3, 2020, ("Second Amendment"). City and Consultant entered into that certain Third Amendment to the Professional Services Agreement dated on or about November 10, 2020, ("Third Amendment").

2.3 Amendment. City and Consultant desire to amend the Agreement for the fourth time to (1) amend the Scope of Services for Consultant to provide Right-of-Way Closeout Services; (2) amend the Consultant's compensation for the added services; (3) replace Exhibit "A-2" (Scope of Services) with Exhibit "A-3" (Scope of Services); and (4) replace Exhibit "C-2" (Compensation) with Exhibit "C-3" (Compensation).

3. TERMS.

3.1 General Scope of Services. Section 3.1.1 (General Scope of Services) of the Agreement is hereby deleted in its entirety and replaced with the following:

> "3.1.1 General Scope of Services. Consultant promises and agrees to furnish to the City all labor, materials, tools, equipment, services, and incidental and customary work necessary to fully and adequately supply the professional **Engineering and Right of Way Design** consulting services necessary for the Project ("Services"). The Services are more particularly described in Exhibit "A-3"

attached hereto and incorporated herein by reference. All Services shall be subject to, and performed in accordance with, this Agreement, the exhibits attached hereto and incorporated herein by reference, and all applicable local, state and federal laws, rules, and regulations."

3.2 Compensation. Section 3.4.3 (Compensation) and Exhibit "C" (Consultants Cost Proposal) of the Agreement as amended by the Second Amendment are hereby deleted in their entirety and replaced with the following:

"3.4.3 Compensation. The basis of payment for the services provided under this Agreement shall be cost-plus-a-fixed fee.

3.4.3.1. The City shall reimburse the Consultant for actual costs (including labor costs, employee benefits, overhead and other direct costs) incurred by the Consultant in performance of the work, in an amount not to exceed **Five Million Two Hundred Forty Thousand Five Hundred Eighty Dollars and Ninety-six Cents ($5,240,580.96)** exclusive of any fixed fee. Actual costs shall not exceed the estimated wage rates and other costs set forth in the Consultant's cost proposal attached hereto as Exhibit "C-3" and incorporated herein by this reference. In the event of conflict between the Consultant's cost proposal and any term of condition of this Agreement, this Agreement shall prevail.

3.4.3.2. In addition to the costs referred to in Section 3.4.3.1, the City shall pay the Consultant a fixed fee of **One Hundred Eighty-five Thousand Eight Hundred Fifty-two Dollars and Thirty Cents ($185,852.30).** Said fixed fee shall not be altered, unless there is a significant alteration in the scope, complexity, or character of the work to be performed which is documented as an amendment.

3.4.3.3. Consultant shall not be reimbursed for any expenses unless authorized in writing by City.

3.4.3.4. Total expenditures made under this Agreement, including the fixed fee shall not exceed the sum of **Five Million Four Hundred Twenty-six Thousand Four Hundred Thirty-three Dollars and Twenty-six Cents ($5,426,433.26)."**

3.3 Exhibit "A-3". Exhibit "A-2" (Scope of Services) of the Agreement as amended by the Second Amendment is hereby deleted in its entirety and replaced with Exhibit "A-3" (Scope of Services) attached hereto and incorporated herein by reference.

3.4 Continuing Effect of Agreement. Except as amended by this Fourth Amendment, all provisions of the Agreement shall remain unchanged and in full force and effect. From and after the date of this Fourth Amendment, whenever the term "Agreement" appears in the Agreement, it shall mean the Agreement as amended by this Fourth Amendment.

3.5 Adequate Consideration. The Parties hereto irrevocably stipulate and agree that they have each received adequate and independent consideration for the performance of the obligations they have undertaken pursuant to this Fourth Amendment.

3.6 Counterparts. This Fourth Amendment may be executed in duplicate originals, each of which is deemed to be an original, but when taken together shall constitute but one and the same instrument.

[SIGNATURES ON FOLLOWING PAGE]

**CITY'S SIGNATURE PAGE FOR
FOURTH AMENDMENT TO
PROFESSIONAL SERVICES AGREEMENT**

**BETWEEN THE CITY OF CORONA
AND
JACOBS ENGINEERING GROUP, INC.
ENGINEERING AND RIGHT OF WAY DESIGN SERVICES – CAJALCO/I-15
INTERCHANGE IMPROVEMENT, PROJECT NO. 56-1203**

IN WITNESS WHEREOF, the Parties have entered into this Fourth Amendment to Professional Services Agreement as of the date first written above.

CITY OF CORONA

By:

____
Savat Khamphou, P.E., P.L.S.
Public Works Director/City Engineer

Reviewed By:

____
Peter Ramey
Engineering Consultant

Reviewed By:

____
Scott Briggs
Purchasing Specialist V

Attest:

____
Sylvia Edwards, City Clerk
City of Corona, California

CONSULTANT'S SIGNATURE PAGE FOR
FOURTH AMENDMENT TO
PROFESSIONAL SERVICES AGREEMENT

BETWEEN THE CITY OF CORONA
AND
JACOBS ENGINEERING GROUP, INC.
ENGINEERING AND RIGHT OF WAY DESIGN SERVICES – CAJALCO/I-15 INTERCHANGE IMPROVEMENT, PROJECT NO. 56-1203

IN WITNESS WHEREOF, the Parties have entered into this Fourth Amendment to the Professional Services Agreement as of the date first written above.

JACOBS ENGINEERING GROUP, INC.
a Delaware corporation

By: ______________________________
Signature

____
Name

____
Title (President, Vice President, or CEO)

By: ______________________________
Signature

____
Name

____
Title (Secretary, Treasurer or CFO)

EXHIBIT "A-2"
SCOPE OF SERVICES

A. OVERVIEW

The PROJECT will provide for the reconstruction of the interchange located on Interstate 15 at Cajalco Road in the City of Corona. The proposed improvements will increase the capacity of the bridge and ramps in order to reduce congestion and accommodate projected growth in the area. The CONSULTANT shall perform professional and technical services to provide support to the CITY for the preparation of plans, specifications, and estimate (PS&E) necessary to complete the construction. The work shall include the following, but not limited to:

(1) Geotechnical Engineering,

(2) Structural Engineering,

(3) Roadway Engineering,

(4) Aerial and Ground Survey,

(5) Hydraulic and Drainage Engineering,

(6) Storm Water Pollution Plan Preparation (SWPPP),

(7) Right-of-Way Drawings, Legal and Plats,

(8) Right-of-Way Acquisition

(9) Utility Coordination,

(10) Landscape and Irrigation Plans

(11) Processing all forms, maps and documents for required permits,

(12) Development of the PS&E, and

(13) Typical schedule of activities.

The objective of this work is to complete the design and secure approval of all plans, specifications, estimates, and permits from all applicable agencies for the PROJECT in order to advertise, bid, and award a construction contract.

1. <u>Background</u>

The I-15/Cajalco Road interchange was originally constructed in 1965 as a trumpet interchange providing access only to the east side of I-15 via northbound on- and off-ramps and a southbound off-ramp. Access was limited to the east side of I-15 because Cajalco Road did not extend west of I-15 at that time. In 1987, the interchange was reconfigured to a full service trumpet interchange with a southbound on-ramp and the original one-lane overcrossing bridge replaced with a bi-directional two-lane overcrossing. In the following years, significant development occurred in the area and Eagle Glen Parkway, a four-lane arterial extension of Cajalco Road, was constructed just west of I-15 providing access to the new housing developments. In 1999, the interchange was reconfigured once again. The southbound ramps were modified to a cloverleaf configuration and the northbound ramps were modified to a spread diamond configuration in order to provide additional access to I-15. In 2000, Cajalco Road was widened east of the I-15 between Grand Oaks and Temescal Canyon Road from one lane in each direction to accommodate three lanes in each direction. Cajalco Road remains a two-lane facility at I-15 between the ramp intersections on the original narrow overcrossing.

In 2005, Congress approved SAFETEA-LU, which earmarked $8.0 million for the construction of the PROJECT. In an effort to expedite the PROJECT, RCTC and the PROJECT team initiated preliminary engineering and environmental studies in support of the PA/ED phase in October 2006. A PROJECT Study Report/PROJECT Development Support (PSR/PDS) was completed and approved for this PROJECT by CALTRANS in April 2008. The PSR/PDS included a no-build alternative and three build alternatives. Two of the alternatives originated from the Value Analysis held in October 2006 and the third alternative originated from the Mid County Parkway (MCP) Project, a 32-mile planned east-west freeway facility connecting SR 79, I-215 and I-15. All of the PSR/PDS alternatives were carried forward into the PA/ED phase, which began in June 2007. In October 2007, an Alternative Evaluation Report was prepared and concluded that only one of the build alternatives would be viable.

The planning phase of the PROJECT has been completed, including the Categorical Exclusion/Categorical Exemption Determination, Project Report, GAD, Value Analysis, Modified Access Report and the CALTRANS Co-Op for Design and Right of Way. These documents are available for review at: http://discovercorona.com/City-Departments/Public-Works/Construction-Projects/Project-Documents.aspx.

2. **PROJECT Description**

The PROJECT includes the construction of a six-lane overcrossing bridge on a new alignment north of the existing bridge. In addition, the existing northbound and southbound ramp intersections would be reconfigured and all existing ramps would be realigned. The existing northbound on-ramp would be modified to serve the westbound Cajalco Road traffic and a northbound loop on-ramp would be constructed to serve the eastbound Cajalco Road traffic. The new bridge will consist of six 12’ lanes, a 12’ striped median, 8’ outside shoulders, and a 5’ sidewalk on the south side. The PROJECT includes all associated noise mitigation and utility relocation.

This alternative is considered the ultimate build-out because it is compatible with the MCP and the future I-15 HOV/HOT projects. Reconstruction of the Cajalco Road interchange must accommodate the potential construction of a future freeway-to-freeway interchange at the junction of I-15 and the proposed Mid-County Parkway (MCP). The alternative recommended in the Project Report accommodates the preliminary design of the future MCP.

The following presents the scope of work for the PS&E Phase based upon the selected preferred alternative identified in the PR/ED Phase. The selected CONSULTANT is expected to prepare all reports, studies and plans to meet the requirements of all oversight agencies including, but not limited to, CALTRANS and the FHWA. CITY staff will provide overall PROJECT coordination, and will handle administrative and policy matters. CALTRANS and FHWA, the County of Riverside, and the affected Cities will provide oversight, guidance and interpretation on matters relating to State, Federal, County, and CITY policies and regulations. The County of Riverside and RCTC will provide input on the proposed land use requirements, local circulation policies and coordination in regards to future planned projects.

B. DATA COLLECTION

The PROJECT will involve the review and assimilation of a large amount of existing data and the generation of new data. The selected CONSULTANT will be expected to determine what data sources are necessary to gather and by what date, and to prioritize the gathering of that data.

CONSULTANT shall research and review all previous work performed to date in the PROJECT vicinity that impacts the design of the improvements, including but not limited to:

- Existing improvement plans/engineering reports of record
- Right-of-way mapping, ownership records
- Preliminary engineering and reports for this PROJECT
- Environmental clearance and mitigation measures
- CITY/other agency engineering design standards, codes, and plan processing procedures

The CITY expects that the selected team will make the best use of existing data to minimize waste and duplication of work efforts.

C. COORDINATION

CONSULTANT shall coordinate with other involved agencies and private developers for compatible design and phasing of construction with existing and proposed conditions. Coordination may include, but will not necessarily be limited to the following:

- CALTRANS
- Federal Highway Administration
- Nationwide permit through the ACOE, pursuant to Section 404 of the Clean Water Act.
- Riverside County Flood Control and Water Conservation District
- A Section 1600 Streambed Alteration Agreement with the California Dept. of Fish and Game.
- A Section 401 Certification or waiver from the Region 4 of the Regional Water Quality Control Board.
- Utility Companies
- County of Riverside

- Riverside County Transportation Commission

CALTRANS will exercise review and approval function through the CITY PROJECT MANAGER at key points in the development process. All contacts with CALTRANS will be directed through the CITY PROJECT MANAGER. Milestone PROJECT design reviews will be performed for the specific products and deliverables listed herein. The CITY PROJECT MANAGER will conduct these reviews, in addition to the monthly project status reports and meetings. All meetings with other outside agencies will be scheduled by CONSULTANT with approval of CITY.

CONSULTANT shall supply to other agencies and utility companies the minimum number of sets required by them for their review along with any other required data, including permit applications. Process plans and technical specifications to obtain permits/approval from other agencies as required for construction of the improvements. Permit application fees will be reimbursed, and/or paid for, by the CITY for the amount stipulated on the permit or receipt.

D. MEETINGS/PUBLIC INVOLVEMENT

The selected CONSULTANT should schedule at least two (2) public workshops/public information meetings to inform the public about the PROJECT. CONSULTANT shall provide written and electronic handouts, presentations, 3-D simulations, displays, mailers, and other materials necessary to support the public meetings.

The selected CONSULTANT is expected to make presentations at City Council Meetings and/or Committees at least four (4) workshops to inform City Council about the PROJECT, PROJECT progress, proposed architectural treatments, proposed landscape, etc. CONSULTANT shall provide written and electronic handouts, presentations, displays, mailers, and other materials necessary to support the public meetings.

CONSULTANT shall conduct trend meetings with the CITY's PROJECT MANAGER and other interested parties, as requested by the CITY, on a bi-weekly basis or as may be mutually scheduled by the Parties at a standard day and time. These trend meetings will encompass focused and informal discussions concerning scope, schedule, and current progress of services, and future PROJECT objectives. CONSULTANT shall be responsible for the preparation and distribution of meeting agendas to be received by the CITY and other attendees no later than 3 working days prior to the meeting.

E. PHASES OF WORK

The services performed by CONSULTANT will be accomplished in three Phases:

- Phase I –Plans, Specifications, and Estimate
- Phase II - Construction Bid Support (optional)
- Phase III - Construction Support (optional)

F. STANDARDS

The PROJECT plans, specifications, and estimates shall be prepared in accordance with current CALTRANS' regulations, policies, procedures, manuals, and standards including compliance with Federal Highway Administration (FHWA) requirements. Improvements of local roads may be prepared in accordance with CITY standards in lieu of CALTRANS standards as directed by CITY. All Documents shall be prepared using US standards and dimensions.

1. **Survey**

   All surveys shall be performed by CONSULTANT in accordance with the current CALTRANS "Survey Manual" and its revisions. Work not covered by the manual shall be performed in accordance with accepted professional surveying standards. The CONSULTANT shall be responsible to verify datum with Caltrans and the CITY.

   The minimum standard of survey quality shall be that of similar surveys performed by CALTRANS. CALTRANS may designate the existing horizontal and vertical control monuments that are to be the basis of all performed surveys. CALTRANS may provide the California Coordinate System values and/or elevation values for these monuments. The CONSULTANT shall adjust all CONSULTANT-performed survey to the designated control monuments and their values. The CONSULTANT shall provide cross-sections at a scale and frequency approved by the CALTRANS within the limits described. Topography shall include, but not be limited to, all features within the right-of-way. Topography shall extend between Temescal Road and Bedford Canyon Road, and future curb returns at all intersections and include driveways, existing sewer manhole inverts, top of cone, and rim elevations.

   Private right-of-way acquisitions and temporary construction easements will be required. Additional survey may be required in order to develop exhibits necessary to secure right-of-way acquisition and construction easement agreements. Survey data should be of sufficient scope and area for CITY to acquire necessary right-of-way.

2. **Design**

   Roadway, Bridge, Landscape and Irrigation design shall be in accordance with the current CALTRANS Design Manuals and revisions. Basic design shall be in accordance with the approved Project Report and final environmental document with supplements and updates.

3. **PS&E**

   Plans and specifications shall be prepared in conformance with the current editions of the CALTRANS Guide for Submittal of Plans, Specifications, Estimates, Standard Plans, Standard Specifications, and Standard Special Provisions. As part of the work involved in the preparation of the plans, specifications and estimate, the CONSULTANT shall prepare and furnish special provisions for items of work included in the plans which are not covered in the Standard Specifications, CALTRANS-approved standard special provisions, and COUNTY approved standard special provisions.

Bridge plans shall be prepared in accordance with the CALTRANS Bridge Design Details Manual, Bridge Design Aids Manual, and Bridge Memos to Designers, Division of Structures current edition.

Roadway plans shall be prepared in conformance with the current CALTRANS standards and requirements. All Roadway plans shall be on single sheet files. Graphic files shall conform to the CALTRANS current standards and requirements for Data Format.

Landscape and Irrigation plans shall be prepared in conformance with CITY'S Specific Plan, CITY'S Water Conservation Ordinance and CALTRANS standards and requirements. Irrigation Plans shall be prepared based on use of CITY's Reclaimed Water, and in conformance with standards of the Department of Health Services.

Special Provisions shall be prepared using Microsoft Word conforming to CALTRANS format and content. Bridge Specifications shall be prepared in conformance with the CALTRANS Bridge Design Specifications, Division of Structures current edition.

All plans for roadways or related facilities within CITY jurisdiction shall conform to the CITY's Standard Plans and design standards.

The responsible CONSULTANT /Engineer shall sign all Plans, Specifications, and Estimates (PS&E) and engineering data furnished by him/her, and where appropriate, indicate his/her California registration number.

4. **Geotechnical Design Report**
The Geotechnical Design Report shall be prepared in conformance with current CALTRANS standards and requirements.

5. **PROJECT Files**
PROJECT files shall be indexed in accordance with CALTRANS' Project Development Uniform File System.

6. **Calculations**
All roadway calculations and structural analyses and design will be performed using CALTRANS current standards and requirements. Data files and results will be submitted in a Digital Media format and hard copies.

7. **Computer Aided Drafting and Design (CADD)**
All plans will be prepared in conformance with the latest Caltrans CADD User's Manual and the Caltrans Drafting Manual to assure complete compatibility.

G. PROJECT ADMINISTRATION

1. **PROJECT Management**
PROJECT Development Team (PDT) meetings with the CITY PROJECT MANAGER, CALTRANS PROJECT MANAGER, and other representatives from affected agencies and private developers will be held at least once a month, and may

be held on a bi-weekly basis. The CONSULTANT shall prepare meeting agendas and minutes for each meeting. The minutes shall be distributed within 5 days after the meeting to all attendees. The minutes shall include, but not be limited to, a list of attendees with phone numbers and email, a synopsis of discussion items, any pertinent information, action items, and all follow-ups to the action items.

The CONSULTANT shall monitor quality on all deliverables, calculations, and other work products. The CONSULTANT shall prepare a Quality Control Plan for use on this phase of the PROJECT, and submit a copy to the City within thirty (30) calendar days of Notice-to-Proceed. This is not a separate task, but shall be included as part of PROJECT management. The CONSULTANT shall attend meetings as required to complete the PROJECT, including CALTRANS Safety Review meetings, Design Review meetings, Pavement Peer Review meetings, Constructability Review meetings, Quality meetings, and informational meetings with stakeholders.

2. **Budgeting**
The CONSULTANT will prepare budgets for each task and milestone for the PROJECT. Such budgets will be entered in to the CONSULTANT's Management Information System along with actual costs incurred, and used as a basis for cost monitoring and control.

3. **Cost Accounting**
The CONSULTANT will prepare monthly reports of expenditures for the PROJECT by task and milestone. Expenditures include direct labor costs, other direct costs, and sub-consultant costs. These reports will be included as supporting data for invoices presented to the CITY every month.

4. **Scheduling**
Within 1 month from the Notice to Proceed (NTP), the CONSULTANT will provide a detailed PROJECT schedule which indicates milestones, major activities, and deliverables to the CITY for review and comments. This schedule will reflect assumed review times necessary by all of the agencies involved. Review of the schedule will occur at subsequent trend meetings. Adjustments will be made, if necessary, due to changing circumstances. For proposal preparation purposes, allow 4 weeks for the CITY's review of the first plan check and 3 weeks for the subsequent checks. Plans submitted to the CITY that are incomplete shall be returned to the CONSULTANT unchecked and the CONSULTANT will be expected to maintain the PROJECT delivery schedule at no additional cost to the CITY. CONSULTANT shall be familiar with CALTRANS' plan check submittal procedures and timelines and shall schedule plan check submittals in order to maintain the PROJECT schedule.

5. **Quality Control Plan**
A Quality Control Plan will be established for this PROJECT in accordance with the provisions of Article IV, Section G of the Agreement. It will be provided to the CITY within 2 weeks after NTP for review and approval.

6. **Progress Reporting**

Progress reports shall be prepared in accordance with CITY guidelines. Reports will be required monthly and shall be accompanied by an invoice.

7. **Contract Administration**
The CONSULTING PROJECT MANAGER will maintain ongoing liaison with the CITY PROJECT MANAGER, agencies, and utility companies to promote effective coordination during the course of PROJECT development. Progress meetings with CONSULTANT's staff, sub-consultants, and the CITY PROJECT MANAGER will be held regularly.

H. SURVEY AND MAPPING

1. **Review and Verify Survey Control and Base Data**
The design survey prepared during a previous phase shall be reviewed and verified prior to commencing preparation of the Plans defined in this scope of work. At a minimum, the CONSULTANT shall:

- obtain the Caltrans survey control;
- recover, tie, and verify existing survey control to the adjacent segment control;
- provide additional secondary horizontal and vertical control, as needed;
- Prepare Construction Staking Survey Control Map (CSS);
- Spot Check previously prepared TOPO mapping with design surveys.
- The centerline of Interstate 15 will be developed or provided by Caltrans. CONSULTANT shall prepare the Record of Survey. The CITY will file the Record of Survey.

2. **Drainage Surveys**
At minimum the CONSULTANT shall locate existing drainage structures within the PROJECT limits — tie and dip all related inlets and manholes.

3. **Wall Surveys**
At minimum the CONSULTANT shall:

- Recover control
- Stake wall alignment
- Profile wall centerline alignment and 3 meters RT and LT on 15 meter intervals
- Locate and tie any features that would affect the wall design or construction

4. **Geotech Boring Location Ties**
At minimum the CONSULTANT shall tie position of boring locations, with elevation.

5. **Utility Surveys and Mapping**

This task involves the collection, assembly, and mapping of existing overhead and underground utility lines within the PROJECT limits. At minimum the CONSULTANT shall:

- Research
- Prepare Notification letters
- Compile Utility Map of Records
- Utility Surveys
- Utility Potholes
- Utility Pothole Surveys
- Prepare to Relocate Notice/Final Utility Notice Form
- Notice to Relocate

The CONSULTANT shall determine the ownership rights (utilities in their own easement or utilities in by CITY franchise agreement) of utilities affected by PROJECT construction and shall coordinate and notify the CITY if any costs are to be paid by the CITY for utility relocations early in the design process. The CONSULTANT shall track the progress/schedule of the utility company relocation plan preparation in order to have the utility facility relocated prior to construction (preferred) or to ensure final approved utility relocation plans are attached to the CITY construction plans including the number of working days required by the Utility to construct their facilities clearly identified in the Special Provisions. A utility matrix shall be prepared listing the facility type, construction material, location/depth and disposition of utilities within the PROJECT limits.

I. RIGHT-OF-WAY ENGINEERING

Licensed land surveyors will perform right-of-way engineering, mapping, and field surveys required for this task. This PROJECT will require the acquisition of additional right-of-way. The acquisition process shall be conducted in accordance with CALTRANS Standards, California Civil Code, and the California Relocation Assistance law. CALTRANS will review and approve all right-of-way-related work and deliverables. The right-of-way acquisition process shall include, but not be limited to the following:

1. Right-of-Way Requirements

The CONSULTANT shall determine right-of-way needs and prepare maps for submittal to CALTRANS Right-of-Way. The CONSULTANT shall identify the need for new right-of-way, new access control, permanent easements, and temporary construction easements. The CONSULTANT shall coordinate with affected agencies to determine right-of-way impacts (including utility right-of-way needs). CALTRANS shall approve right-of-way requirements prior to initiating preparation of right-of-way maps.

2. Right-of-Way Maps

a. The CONSULTANT shall prepare right-of-way base maps in accordance with CALTRANS requirements. Base maps shall show existing features consisting of lots along Eagle Glen Parkway with all right-of-way and easement areas, assessor's parcel numbers, addresses, types of businesses, property lines, footprints of buildings, setback distances from right-of-way to buildings, vegetation, and improvements in the take areas and existing driveways.

b. The CONSULTANT shall identify all utilities, including those that have prior rights.

c. The CONSULTANT shall prepare right-of-way maps at a scale approved by CALTRANS reflecting all right-of-way for the PROJECT, including acquisitions and easements required for maintenance access, drainage, material sites, utilities, and construction work areas, as necessary. The CONSULTANT shall also show access control. Dimensions are to be shown in English units.

3. Appraisal Maps, Plats, and Descriptions

a. The CONSULTANT shall prepare legal descriptions, plats, deeds, and maps for each parcel acceptable to CALTRANS and the CITY for conveyance of marketable title interests and for accurate representation of right-of-way necessary for construction of the PROJECT.

b. The CONSULTANT shall prepare legal descriptions, plats, and maps acceptable to utility companies (as required) and the CITY for conveyance of marketable title interests and accurate representation of easements necessary for construction of the PROJECT.

c. The CONSULTANT shall prepare a right-of-way map acceptable to CALTRANS.

d. A licensed Appraiser hired by the CONSULTANT will be responsible preparation of appraisals as required by CALTRANS.

e. An experienced acquisition CONSULTANT hired by the CONSULTANT shall be responsible for right of way negotiations and coordination with CITY representatives.

f. The CONSULTANT shall prepare necessary CALTRANS Local Assistance Paperwork associated with utility relocations and ROW acquisitions.

4. Title Reports will be provided by the CITY.

J. STRUCTURES

1. Structure Type Selection and Bridge General Plans

The culmination of preliminary design work will lead to the submittal and presentation for review and approval of a General Plan for the structure. This process will be considered the "Structure Type Selection" process and no further design work shall be performed until written approval of the structure type is received from CALTRANS Division of Structures. A Type Selection Review Meeting will be held with the CITY and CALTRANS DOS in Sacramento, in which the CONSULTANT shall be prepared to discuss and provide information on foundation requirements, hydrological requirements, falsework requirements; seismic and aesthetic considerations; traffic handling, construction cost, and other pertinent information that is needed to determine the proper structure type.

Ten copies of the proposed General Plan, General Plan Estimate, Type Selection Memo, and Vicinity Map shall be submitted for review two weeks prior to the Structure Type Selection Review Meeting. The results of the meeting will be summarized in writing to the CONSULTANT within two weeks following the meeting.

Within 2 weeks after receiving written approval of the proposed General Plan and structure type, the CONSULTANT shall furnish CALTRANS DOS copies of the approved General Plan. These will be distributed for comments, and any comments received will be forwarded to the CONSULTANT.

2. <u>Geotechnical Coordination and Foundation Report</u>

A Foundation Report will be prepared for the structures based upon the geotechnical investigation described below. The foundation report will be prepared and signed by an Engineering Geologist or Soils Engineer, with deep foundation experience, registered in the State of California. This report shall recommend structure foundation types and footing elevations. It shall also specify pile tip elevations for pile foundations and shall provide information on ground water conditions, allowable bearing capacities, and other information needed to evaluate the chosen foundation. The report shall also address anticipated fill settlement periods to prevent excessive differential settlement between the structure and adjacent roadway approaches.

The Foundation Report will also include:

- Nature of materials found on the site.
- Liquefaction potential.
- Any geological hazards that may exist and recommend mitigation measures.
- Seismic design data in accordance with CALTRANS seismic design criteria.
- Soil parameters and load requirements to design shoring system for the possible construction of a box culvert under Galena Street.

The report will be developed in accordance with the guidelines for foundation studies and report as referenced in EFPB Information and Procedures Guide and the Bridge Design Aids Manual. It will be assured that the design parameters and potential construction difficulties are identified and addressed, together with the proper mitigation measures in the Foundation Report. For the bridge structure, alternative types of foundations will be evaluated to insure the selection of the most suitable type of foundation. A log of Test Borings sheet shall be prepared and included as part of the report and as part of the structure plans. This Foundation Report and Log Test Borings sheet will be prepared in accordance with CALTRANS Standard Procedures and will be approved by CALTRANS.

3. <u>Geotechnical Investigations</u>

A qualified geotechnical engineer shall prepare a draft Geotechnical Design Report (GDR). All reports shall be in accordance with CALTRANS procedures, regulations, manuals, standards, policies, and format. The pavement structural sections shall be determined by a qualified Geotechnical Engineer in accordance with CALTRANS policies and procedures.

Drilling and Sampling – CONSULTANT shall conduct field investigation consisting of three (one at each abutment and one at the bent) soil borings from 50 to 80 feet deep. The precise locations will be selected to minimize impacts on freeway traffic. Subsurface investigations shall conform to the requirements in Section 4.3.5 of the Bridge Design Specifications and for pile foundations shall provide for the utilization of Standard Class 45 piles (design load of 45 tons) as a minimum.

Laboratory Testing – Bulk and undisturbed samples will be selected for laboratory testing. All tests will be conducted in accordance with Caltrans Test Methods or ASTM Standards.

Engineering Analyses – Results obtained from the field and laboratory investigation program will be used to establish idealized soil profiles and design soil parameters for bridge foundation design. A foundation type and related capacity will be recommended. Seismic parameters such as peak bedrock acceleration and depth to bedrock-like materials will be provided. Other seismic hazards, if encountered, will be addressed and recommendations will be given to mitigate these hazards. The CONSULTANT shall propose a Traffic Index (TI) for the auxiliary lanes and the ramps, and obtain CALTRANS concurrence.

Report Preparation - The results obtained from the geotechnical investigation will be documented in a Draft Foundation Report, which will include a Log of Test Borings (LOTB) sheet. The draft report will be submitted to the CITY and CALTRANS for review. CONSULTANT shall finalized the report upon receipt of review comments

4. <u>Structural Design and Calculations</u>

a. The CONSULTANT shall prepare Structure Type Selection documents and Bridge General Plans to comply with the most current CALTRANS's guidelines, including Bridge Design Details, Bridge Design Aids, and Memos to Designers. The CONSULTANT will also submit a Preliminary Foundation Report to support the Type Selection process. The CONSULTANT will prepare for and attend the Bridge Type Selection Meeting, including advance submittal of required materials. Upon completion of the Type Selection, the CONSULTANT will submit and distribute meeting summary and required copies of General Plan and General Plan Estimate. Following the approval of the General Plan and Foundation Report, structural design calculations will be prepared using standard CALTRANS Software and procedures.

b. The CONSULTANT shall prepare the Plans in accordance with CALTRANS submittal requirements.

c. The CONSULTANT shall compile structure specifications using the applicable CALTRANS Standard Special Provisions (SSP's).

d. The CONSULTANT shall also prepare and submit required marginal estimates and design calculations, along with check calculations. The CONSULTANT will also prepare and submit workday schedule.

e. The CONSULTANT shall prepare and submit bridge four-scale plans.

f. The CONSULTANT shall prepare all bridge design and PS&E deliverables in accordance with the Office of Specially Funded Projects (OSFP) Information and Procedures Guide Manual, which can be found at http://www.dot.ca.gov/hq/esc/project-development/information-and-procedures-guide/guide.htm.

The scope of this work shall include but not be limited to construction details for each design shall be prepared on DOS format plan sheets. These standard drawings and standard plans shall be incorporated into the PROJECT Plans where applicable. Each plan sheet shall be signed and stamped by the responsible design engineer who is registered in the State of California. CONSULTANT shall have each design be independently checked by a Professional Engineer registered in the State of California, Environmental Constraint Areas (if required in Environmental Document), and shall submit documentation to the CITY for review.

5. <u>Structural Specification & Estimates</u>

Special Provisions will be prepared for items not covered by the CALTRANS Standard Specifications or Standard Special Provisions (SSP's).

The CONSULTANT shall edit the SSP's and prepare Structure Special Provisions specific to this PROJECT which will be incorporated into the final PS&E. These Structure Special Provisions shall be prepared, signed, and stamped by a Professional Engineer registered in the State of California. The CONSULTANT shall prepare quantity calculations for items which are applicable to this PROJECT and prepare the bridge cost estimate.

All contract items used shall be substantiated by calculations. Quantity calculations shall be neat and orderly and shall show all sketches, diagrams, and dimensions necessary to allow them to be independently used by field inspectors. All quantity calculations shall be independently checked and substantiated with calculations.

The Construction Cost Estimate will be prepared using the latest available CALTRANS cost data, CITY cost data, and actual recent construction costs in the PROJECT area.

6. <u>Independent Check Review and Quality Control</u>

An independent Check review will be conducted as soon as the initial design is completed for the bridge. Checking will include the preparation of an independent set of structural design check-calculations and review of the plans, specifications, and estimate (PS&E).

7. <u>Draft PS&E</u>

The checked Structure Plans will be submitted to the CITY and CALTRANS DOS for review and comments per CALTRANS current standards and requirements. CALTRANS DOS and the CITY will approve the checked details and draft PS&E.

8. Final PS&E

The final PS&E will incorporate all review comments from the CITY, CALTRANS DOS, and other affected agencies. The CONSULTANT will provide all the necessary documents in a "bid-ready" form.

The CONSULTANT shall at minimum deliver the following documents to CITY and CALTRANS:

- 1 set of Mylar final design plans
- 5 sets of full size final design plans, including landscaping 5 sets of half size final design plans, including landscaping
- Digital copy of final plans, including landscaping
- 1 set of final Structure Special Provisions
- 1 copy of final quantity calculations and estimate
- 1 copy of final design calculations
- 1 copy of design check calculations 1 Mylar and 2 full size plans of the Bridge
- 2 Resident Engineer's Files (Structures information)
- 2 copies of environmental constraints (if required by Environmental Document)

The responsible CONSULTANT/Engineer shall sign all Plans, Specifications, and Estimates (PS&E) and engineering data furnished by him/her, and where appropriate, indicate his/her California registration number.

K. ROADWAY

The title sheet for specifications and reports, and each sheet of plans, shall bear the professional seal, certificate number, registration classification, expiration date of the certificate, and signature of the professional engineer responsible for their preparation. All roadway plans shall also use single sheet files. The following is a summary listing of drawing types and calculations that will be prepared as part of the roadway PS&E:

1. Basic Roadway Plans

- Tide sheet and location map
- Typical sections
- Stand plans list
- Key map and line index
- Layouts
- Profiles with super-elevation diagrams

- Construction details and construction notes
- Summary of quantities
- Contour grading
- Gridded Intersection Plans with elevation for intersections throughout the PROJECT limits in order to facilitate grading/paving.

2. **Calculations**

The following calculations will be provided:

- Geometric traverse and right-of-way (ROW)
- Template notes and slope staking notes
- Profile
- Grid grades
- Earthwork quantities
- Other quantities

3. **Drainage Plans**

CONSULTANT shall perform hydrology and hydraulic studies to obtain and provide design solutions which will remove surface runoff from the upstream side of the highway to downstream side. Studies and design shall be performed in accordance with current CALTRANS Standards and requirements.

The following list of drawing types shall be included, but not limited to:

- Drainage layouts
- Drainage profiles
- Drainage details
- Drainage summary

4. **Traffic Plans**

The following list of drawing types shall be included, but not limited to:

- Signing
- Detour layout plans
- Pavement delineation plans
- Stage construction and traffic handling plan
- Electrical
- Construction area sign details
- Signal and signal details

- Traffic summary

5. **Miscellaneous Plans**
    - Fencing
    - Miscellaneous
    - Safety barriers
    - Sound wall and/or retaining wall
    - NPDES erosion control plans
    - Utility relocation
    - Landscaping and Irrigation plans
    - Structure plans
    - Right of way requirements
    - Construction Phasing and Detour
    - Temporary Water Pollution Control Plan(if requested)

6. **Intermediate Reviews**
   Roadway, drainage, traffic, and miscellaneous plans shall be submitted for review to the CITY and CALTRANS at the 35%, 65%, 95% and 100% complete stage. Also, the CONSULTANT shall submit the plans to CALTRANS in accordance with CALTRANS policy.

7. **Specifications and Estimate**
   Specifications and special provisions will be prepared for items not covered by the CALTRANS Standard Specifications or Standard Special Provisions, and shall be in conformance with CALTRANS current standards and requirements

   The Roadway Construction Cost Estimate will be prepared using the latest available CALTRANS cost data, CITY cost data, and actual recent construction costs in the PROJECT area.

8. **Quality Control**
   The Plans, Specifications, and Estimate (PS&E) will be subject to quality control reviews before submittal. These reviews will assure conformance to CALTRANS and CITY standards and criteria as well as minimize typographical omissions. CONSULTANT shall submit documentation of the completed QA/QC review.

9. **Draft PS&E**
   The roadway plans, revised to incorporate Quality Control review comments, will be submitted to the CITY and CALTRANS for review and comments. These will include but not limited to:
    - All roadway plans
    - Special provisions

- Design calculations
- Roadway quantities and estimate
- Specifications
- Roadway cross-sections

10. <u>Final PS&E</u>

The Final PS&E will incorporate all applicable comments from the draft PS&E received from the CITY, RCTC, CALTRANS, and other affected agencies. The CONSULTANT will provide all the necessary Final PS&E documents in a bid-ready form. PROJECT files and the PROJECT Engineer's file will also be submitted with the Final PS&E. The entire PROJECT will be submitted in digital format upon final approval of the PS&E.

The responsible CONSULTANT /Engineer shall sign all Plans, Specifications, and Estimates (PS&E) and engineering data furnished by him/her, and where appropriate, indicate his/her California registration number.

L. INDEPENDENT CONSTRUCTABILITY REVIEW

The CONSULTANT shall retain an independent CONSULTANT for constructability review of the full 95% PS&E package to ensure that the design can be constructed by a reasonable contractor. The reviewer shall comment on the following, but not be limited to these items of concern: Ingress/egress to work area, construction phasing, coordination between the plans and specifications, cost estimate items (to reflect current costs and required work), field review (to ensure existing conditions are addressed in design documents). Review comments shall be simultaneously distributed to the CITY and the CONSULTANT. A matrix of all comments and responses to those comments shall be prepared for CITY review and approval.

M. CONSTRUCTION SCHEDULE

Provide a minimally detailed construction Critical Path Method (CPM) schedule to support the calculation of the number of Working Days for the PROJECT construction.

N. ENVIRONMENTAL AND WATER QUALITY COMPLIANCE

The CONSULTANT shall review the approved environmental documents and become familiar with their requirements. The CONSULTANT shall observe all laws, rules, and regulations concerning environmental permitting.

The CONSULTANT shall provide a signed check-off list certifying that all mitigation measures have been incorporated into the PS&E prior to PROJECT completion.

Compliance with National Pollutant Discharge Elimination System (NPDES) MS4 Permit and Caltrans' NPDES Permit with the State - The CONSULTANT shall comply and implement the latest requirements of the NPDES MS4 permit including, but not limited to, incorporating in the PROJECT design the USEPA guidance, "Managing Wet Weather with Green Infrastructure; Green Streets," in a manner consistent with the maximum extent practicable standard, and preparing a PROJECT Water Quality Management Plan (WQMP). A WQMP template will be provided by the CITY. The construction documents shall require the construction Contractor engage a licensed engineer to prepare a Storm Water Pollution Prevention Plan (SWPPP) for this PROJECT that covers all items within the scope of work. CONSULTANT shall provide base PROJECT data for SWPPP preparation (areas, slopes, etc.). This work includes documentation and incorporation of environmental requirements and mitigation measures, NPDES, temporary and permanent BMPs, air/water quality, nesting birds/endangered species, erosion/sediment control) into the PROJECT construction documents.

O. CONSTRUCTION BIDDING SUPPORT (Optional)

Bidding procedures will be the responsibility of CITY. While the PROJECT is being advertised for bids, all questions concerning the intent shall be referred to CITY for resolution. In the event that the items requiring interpretation in the drawings or specifications are discovered during the bidding period, said items shall be analyzed by the CONSULTANT for decision by CITY as to the proper procedure required. Corrective action taken will either be in the form of an addendum prepared by the CONSULTANT and issued by CITY or by covering change order after the award of the construction contract.

P. CONSTRUCTION SUPPORT (Optional)

CONSULTANT shall attend the pre-construction meeting with the successful construction contractor upon notification by the CITY. Upon award of the construction contract, CONSULTANT will proceed with the Construction Support Phase services required by this contract.

During construction, the CONSULTANT shall furnish all necessary additional drawings for correcting and change orders required by errors and omissions of CONSULTANT. Such drawings will be requested in writing from the CONSULTANT by the CALTRANS and shall be at no additional cost to the CITY. The original tracing(s) of the drawings and contract wording for change orders shall be submitted to the CITY for duplication and distribution.

CONSULTANT shall review shop drawings submitted by the construction contractor (Falswork review are not included). CONSULTANT shall complete shop plan reviews within two weeks of receipt. Contract change order reviews shall be completed within 2 working days of receipt.

CONSULTANT shall be available to visit to the jobsite for on-site review of construction and other visits to the jobsite as requested by the CITY or CALTRANS to resolve any discrepancies in the contract documents. CONSULTANT shall bring to the attention of the CALTRANS Resident Engineer any defects or deficiencies in the work by the construction contractor which the CONSULTANT may observe. CONSULTANT shall have no authority to issue instructions on behalf of the CITY or to deputize another to do so. All agreements shall be between the CITY and its construction contractor. These provisions shall not be construed as making the CONSULTANT responsible for failure of the construction contractor to carry out the work in accordance with the contract documents nor the construction means or methods or techniques, sequences, procedures or safety programs in connection with the work.

CONSULTANT shall prepare and deliver to the CITY and CALTRANS the "As-Built" plans within two months of completion of structure construction.

[ADD SERVICE SCOPE ON FOLLOWING PAGES]

ADD SERVICE 1:

Item S-1 - Design changes associated with the Arantine Hills Development southbound slip ramp

Discipline	Firm	Total
Roadway	Jacobs	$ 72,244.55
Structures	Jacobs	$ -
Landscape	DEA	$ 14,610.00
Survey/ROW Engineering	DEA	$ 23,608.00
ROW Appraisal/Acquisition	Overland, Pacific & Cutler, Inc.	
Environmental	LSA	$ 4,300.00
Geotechnical	EMI *(UDBE)*	$ -
Traffic	LIN *(UDBE)*	$ 12,600.00
Drainage	Civil Works *(UDBE)*	$ 19,526.00
Constructability Review	Falcon Engineering *(UDBE)*	
Public Outreach	Arellano Associates *(UDBE)*	

Project Total Labor	$	146,888.55
Project Total ODCs	$	-
Escalation at 2.5%	$	-
Project Total	$	146,888.55

	Roadway							Drainage				Traffic		Structures							
	Project Manager	Project Admin	Roadway Design Lead	Senior Highway Engineer	Highway Engineer	Project Controls	Construction Planning Lead	Project Manager	Drainage Engineer	Cadd Technician	Project Admin	Task Manager	Project Engineer	Structure Lead	QA/QC	Senior Engineer	Project Engineer	Assistant Engineer	CAD	Project Control	Total Labor Hours
HOURLY RATES =>	$ 259.23	$ 90.19	$ 140.78	$ 155.58	$ 94.10	$ 133.54	$ 187.66	$ 186.19	$ 126.50	$ 86.49	$ 61.96	$ 176.90	$ 110.16	$ 233.79	$ 190.01	$ 165.56	$ 153.23	$ 95.93	$ 122.31	$ 133.54	
TASK 1A - PROJECT MANAGEMENT																					
Project Management	24																				24
Administration & Coordination						12															12
Meetings (PDT, City Council & Public Mtgs)	8		8																		16
Quality Assurance/Quality Control Plan	24																				24
TASK 2A- SURVEY AND MAPPING																					
Encroachment Permits																					0
Review and Verify Data																					0
Design Surveys																					0
TASK 3A - RIGHT-OF-WAY																					
R/W Requirements (PD26, Maps & Survey File)																					0
R/W Appraisals and Acquisitions																					0
R/W Certification																					0
TASK 4A - 35% PS&E SUBMITTAL																					
GAD Resubmittal			40	40	80																160
35% Plans (Layouts, Typical, Profile & Super)																					0
Hazardous Waste (Investigation & Report)																					0
Bridge Aethetics																					0
Landscape Concept Plan																					0
Geotechnical Exploration Plan																					0
Preliminary Foundation Report																					0
Bridge Type Selection (Prep, Mtg & Approval)																					0
TASK 5A - 65% PS&E SUBMITTAL																					
65% Roadway Plans			40	40	120																200
Drainage Reports																					0
Drainage Plans																					0
Traffic Management Plan (TMP)				20																	20
Special Provisions and Cost Estimate			20		40																60
Storm Water Data Report (SWDR)																					0
Geotechnical and Foundation Reports																					0
Bridge Plans (Unchecked Details)																					0
TASK 6A - 95% PS&E SUBMITTAL																					
95% PS&E (Plans, Specs & Estimate)																					0
Utility and R/W Update																					0
Environmental Commitment Record Review																					0
Finalize Reports (TMP)																					0
Finalize Reports (SWDR & Drainage)																					0
Bridge Independent Check																					0
Bridge Plans (Checked Details)																					0
Independent Constructability Review																					0
TASK 7 - 100% SUBMITTAL - FINAL PS&E																					
100% PS&E (Plans, Specs & Estimate)																					0
Environmental Certification																					0
Resident Engineer File																					0
Materials Handouts																					0
RTL Certification																					0
TASK 8 - OPTIONAL TASK																					
Retaining Wall LRFD Design																					0
TOTAL HOURS	56	0	108	100	240	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	516
TOTAL LABOR COST	$14,517	$0	$15,205	$15,558	$22,584	$1,602	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$ 69,465.92

<u>ADD SERVICE 2</u>:

Item S-2 – Revisions required after 60% design submittal review by Caltrans to accommodate proposed Arantine Hills development along Cajalco Road resulting in four months' delay and impact to project budget.

Addition of special fixtures, furniture and equipment appraiser to prepare appraisals for cell tower owner and tenants located on Riverside County Transportation Commission property leased to Crown Castle due to lease renewal not disclosed to City resulting in additional design effort from Consultant's design team and subconsultants.

Landscape design revisions required due to new drought watering restrictions imposed by State of California requiring change in landscape pallet to meet City's water restrictions.

<u>ADD SERVICE 3</u>:

As detailed below, modify project limits and various design elements to accommodate improvements proposed by the Arantine Hills Development Project and provide bid phase and construction phase support. Caltrans Environmental oversight required Project environmental approvals to be amended via preparation and processing of an Environmental Revalidation ("ER") Document requiring supplemental technical studies in each environmental discipline pursuant to CEQA and NEPA regulations. Perform additional right-of-way acquisition services necessary to complete negotiations with various property owners. Additional services required to obtain Caltrans certification of the construction documents.

<u>Environmental Revalidation</u>:
Prepare supplemental technical documents signed by the applicable specialists to support the ER document for each discipline to the previously approved technical report as required by new Caltrans environmental oversight staff. Caltrans unwilling to accept a single memorandum stating the project changes were not significant and did not change the conclusion in the approved Categorical Exemption/Categorical Exclusion Determination with regards to impacts or required avoidance, minimization and mitigation measures. Requires additional services by Consultant's subconsultant and Consultant's project staff involving Inside Noise Abatement Report, Visual Impact Assessment Report and the Traffic Study Report

<u>Right of Way Support</u>

Extended negotiations with property owners and additional services required to obtain right of way clearances not included in original scope of work to draft purchase and sale agreements with Mountain Vistas, Castle & Cooke, cell tower owner Crown Castle and cellular carriers AT&T and Sprint.

<u>Bid Phase and Construction Phase Support Services</u>:

Task 9 - Bid Phase Support

9.1 Conduct coordination meetings with City and pre-proposal bid meeting with potential bidders.
9.2 Respond to a maximum of 50 questions from potential bidders a
9.3 Prepare up to two (2) addenda related to modifications to the plans or special provisions. Addenda generally consist of not more than 15 different items. Printing and distribution of the addenda to be conducted by City.

Task 10 - Construction Phase Support

10.1 Meetings and Field Visits
10.2 Submittal Reviews
10.3 Structure Shop Drawing Revisions
10.4 Respond to RFIs
10.5 Post Tension Reviews
10.6 As-built Preparations
10.7 ECR Monitoring

Add Service 3 Appendix A – Construction Support Labor Matrix

	Roadway (Jacobs)						Drainage (CW)			
	Project Manager	Project Admin	Roadway Design Lead	Senior Highway Engineer	Highway Engineer	Construction Planning Lead	Project Manager	Drainage Engineer	Cadd Technician	Project Admin
LABOR CLASSIFICATION HOURLY RATES =>	$ 290.69	$ 96.02	$ 223.91	$ 159.78	$ 121.06	$ -	$ 194.65	$ 144.39	$ 67.56	$ 71.52
TASK 9 - BID PHASE SUPPORT										
9.1 Meetings (2)	8		8				4			
9.2 Respond to Bidders Questions	20		40	40	40		8	20		
9.3 Addendum/Plan Revisions	20		40	80	40					
TASK 10 - CONSTRUCTION PHASE SUPPORT										
10.1 Meetings and Field Visits (See note 2)	120		80				8	16		
10.2 Submittal Reviews (See note 3)	30		120	80	80		8	20		
10.3 Structure Shop Drawing Reviews (See note 4)			80							
10.4 Respond to RFIs (See note 5)	30		110	80	80		10	40		
10.5 Post Tension Reviews (See note 6)										
10.6 As-built preparations (See note 7)	20	40	120	160	160		8	40	80	
10.7 ECR Monitoring										
TOTAL HOURS	248	40	598	440	400	0	46	136	80	0
TOTAL LABOR COST	$72,091	$3,841	$133,897	$70,304	$48,423	$0	$8,954	$19,638	$5,405	$0

	Traffic (LIN)		Structures (Jacobs)							Landscape Design (DEA)		ECR (LSA)	Geotech (EMI)		
	Task Manager	Project Engineer	Structure Lead	QA/QC	Senior Engineer	Project Engineer	Assistant Engineer	CAD	Project Control	Sr. Landscape Architect	Landscape Architect	ECR Monitoring	Geotechnical General Manager	Senior Geotechnical Engineer	Total Labor Hours
LABOR CLASSIFICATION HOURLY RATES =>	$ 176.63	$ 74.45	$ 273.08	$ -	$ 204.10	$ -	$ -	$ 195.34	$ -	$ 197.16	$ 132.40	$ 175.00	$ 229.14	$ 126.47	
TASK 9 - BID PHASE SUPPORT															
9.1 Meetings (2)	4		4							6					42
9.2 Respond to Bidders Questions	8	20	40												236
9.3 Addendum/Plan Revisions			16					24							220
TASK 10 - CONSTRUCTION PHASE SUPPORT															
10.1 Meetings and Field Visits (See note 2)	8		40							40			10	4	358
10.2 Submittal Reviews (See note 3)	16	30											60	40	484
10.3 Structure Shop Drawing Reviews (See note 4)			120		0						80				280
10.4 Respond to RFIs (See note 5)	10	30	40		80					10	80				600
10.5 Post Tension Reviews (See note 6)			100		44										144
10.6 As-built preparations (See note 7)	10	80	120		40			120		20	80				1098
10.7 ECR Monitoring															725
TOTAL HOURS	56	160	480	0	164	0	0	144	0	76	240		70	44	-
TOTAL LABOR COST	$9,891	$11,912	$131,076	$0	$33,472	$0	$0	$28,129	$0	$14,984	$31,776	$133,875	$16,040	$5,565	$779,271
Markup on Subs (5%)															$12,901.97
Jacobs ODCs															$7,818
TOTAL COST															$799,992

Assumptions:

1. Construction duration is 24 months
2. Construction meetings and field visits (1/week/9 months, 2/month/9 months, 1/month/6 months) 60 meetings and field visits
3. Submittal reviews (25 estimated)
4. Shop drawings reviews (30 estimated)
5. Respond to RFIs (75 estimated)
6. Post tension reviews (6 estimated)
7. As built plans not expecting to have to create new sheets. The contractor will provide one single set of plans with clear markups. The original set has 454 sheets.

ADD SERVICE 4:

Task 1 – Period of Performance Extension - $35,339 (Subtotal)

The current contract agreement expires on December 30, 2019. The project has an anticipated construction completion date of January 28th, 2020. Jacobs is requesting the contract agreement to be extended to June 30th, 2020 to allow for this additional duration for design services in support of construction. In addition, the contract extension will allow for As-Builts to be developed and accepted by Caltrans in addition to other project close out tasks required by Caltrans. On average, the per month invoice is approximately $17,500, this request would fully fund the month of January and the additional months required to gain Caltrans Acceptance (February through June 2020).

Task 2 – Schedule Sensitive Out of Scope Efforts (Work Completed) - $72,146 (Subtotal)

The following tasks were identified as critical items that required immediate attention and were billed using the Amendment 1 (construction support) budget. Compensation for these out of scope efforts is being requested to restore the Amendment 1 budget to complete original scope of work (As-Builts). The following items were previously completed by direction.

Task 2a. Sewer Line Casings Through Cajalco Rd Bridge – $12,996

Jacobs developed bridge plans to include sewer line casings and support blocks, quantities and estimate as requested by the City during the construction phase. These additions include two sewer casings through the Cajalco Rd bridge (approach slab to approach slab) to allow the City the ability to pull fused sewer pipe in the future if necessary. This additional design required coordination, submittals and updates based on comments, and approval from Caltrans Headquarters (Structures Department).

Task 2b. Rock Blanket Modifications - $15,408

DEA developed Plans and Quantities for the updated rock blanket design. Jacobs provided project management and coordination for this task. The design update was requested by the City due to the labor intensive construction of rock blanket. The redesign helped in accelerating the construction schedule and reduced the cost of construction by reducing the amount of rock blanket and replacing it with exposed aggregate concrete. This additional design (both hardscape layout and materials) required coordination, submittals and updates based on comments from Caltrans.

Task 2c. Cajalco Rd Bridge Visual Renderings - $7,538

DEA was requested to develop visual renderings of possible architectural treatments for the new Cajalco Rd Bridge. This request provided several focal points detailing the architectural treatments on the bridge, columns, abutments and pilasters. The draft renderings were distributed to the City and Caltrans for review and comments. This item was critical in developing a cost estimate for the City to decide on how to move forward with possible architecture treatments.

Task 2d. Local and Regional Traffic Detour Plans - $11,524

Jacobs developed local (Northbound & Southbound I-15 Detours and EB & WB Cajalco Road Detours) and regional traffic (Advance guidance to commuters to use regional routes such as SR-60, SR-91 and I-215) detour plans per Caltrans request for the new Cajalco Rd overcrossing falsework removal and for the demolition of the old Cajalco Rd overcrossing. The original planset, as approved by Caltrans, included detour information for the existing structure removal (see sheets 167-169), however Caltrans requested additional sheets for local and regional detours. This effort required preparing Traffic Handling Detour Sheets and Traffic Handling Detail sheets per the Transportation Management Plan. Caltrans requested Traffic analysis be performed using current I-15 traffic volumes to provide recommendations of the when (time of day) the I-15 mainline can be shut down completely with minimal impacts to commuters. Jacobs met with

Caltrans, the City and the Contractor four times to secure a 12 hour closure, allowing for adequate time for the contractor to have a successful and safe bridge demolition.

Task 2e. Cajalco Rd Bridge and Retaining Wall Barrier Update - $11,400

During the construction of the Cajalco Rd Overcrossing soffit Caltrans requested that the previously approved barrier identified on the final design plans for the Cajalco Rd Overcrossing and Retaining Wall 4 be updated to the new standard barrier (Type 732SW (Mod)). Jacobs developed calculations, revised design plans and details. Coordination and submittals to the Caltrans Headquarters structural team for approval were expedited to limit delay in the construction schedule.

Task 2f. Grid Grades at Various Locations - $13,280

Jacobs has prepared updates to the grid grades (staking information) to reflect current field conditions at the project site. The design and field conditions have changed since the survey and original grid grades were prepared due to changes in the field, outdated topography and recent design changes. This information was provided to the contractor and ensures that the proper elevations of pavement, drainage features and grading are constructed for the project.

Task 3 – Requested Additional Design Scope (Work not yet performed) - $22,555 (Subtotal)

The following out of scope tasks have been requested by the City and will require additional funding to complete. Work on these tasks has not yet been initiated.

Task 3a. Eagle Glen Pkwy (Cajalco Rd) & Bedford Canyon Intersection Updates - $5,441

The Jacobs Design Team (Jacobs, LIN and DEA) will coordinate with the City, the contractor and New Home Group to develop updates to the Cajalco Rd Interchange Plans which will As-built field conditions on the southside of the Eagle Glen Pkwy (Cajalco Rd)/Bedford Canyon Intersection which were constructed without a design provided by the Jacobs Design Team. Currently the Jacobs design team has attended three coordination meetings and is anticipating that no further meetings will be necessary. Jacobs will update the Layouts (pavement and curb and gutter), Signs (removing conflicting signs and prepare guide signs) and Utility Sheets (New reclaimed water connection). DEA will prepare updates to the Irrigation sheets (Irrigation, sleeve, communication, meters and controller cabinets) and Planting sheets (Landscaping) within the area along the south-east side of the Eagle Glen Pkwy/Bedford Canyon intersection. LIN Consulting will prepare updates to the Pavement Delineation sheets (removing EB left turn to The Village at Eagle Glen, provide a WB Bike lane and provided a EB Through/right turn lane).

Task 3b. Drainage Modifications along NB I-15 - $7,221

The Jacobs Design Team (Jacobs and Civil Works Engineering) will develop design modifications to capture and convey the concentrated storm water flow along NB I-15 to a proper outlet eliminating the erosion of decomposed granite. This task will require analysis of the existing drainage patterns on NB I-15 to identify existing low points for the most efficient location of a overside drain. The existing NB I-15 asphalt concrete dikes are damaged and need to be replaced to provide adequate drainage. Jacobs will develop updates to the Layout sheets to add asphalt concrete dikes and verify that any modifications are compatible with the existing or proposed safety features (Midwest guardrail system (previously known as metal beam guardrail) and concrete bridge barrier). Civil Works Engineering will update the Drainage Sheets to provided overside drains or other appropriate drainage solutions from the NB I-15 outside edge of shoulder to a proper outlet.

Task 3c. Rock Slope Protection Modifications - $7,645

Jacobs Design Team (Jacobs and Civil Works Engineering) will develop updates to the Drainage Detail Plans to provide additional rock slope protection at the drainage outlet within the Bedford Wash between the NB I-15 and the NB Cajalco Rd off-ramp. The update was requested by the City to mitigate erosion within the Bedford Wash from recent and future storms. During the final design phase this area was identified as an environmentally sensitive area, so improvements will be limited to minimize impact and to not require revalidation of the California Department of Fish and Wildlife (CDFW), Regional Water Quality Control Board (RWQCB), Army Corp of Engineers permit. This request is needed to make sure that existing rock blanket and decomposed granite is protected from erosion due to recent rainfall.

Task 3d and 3e. Planting and Irrigation at Various Locations - $2,248

DEA will develop Planting and Irrigation plans based on as-built conditions for the area east of Bedford Canyon and north of Cajalco Rd. These plan revisions/updates are necessary due to disturbance from the construction of retaining wall no. 1 along WB Cajalco Rd. Additionally, DEA will revise the planting and irrigation plans near CA1 (Northbound on-ramp) and CA2 (SB off-ramp) for the proposed tree re-locations where signage visibility conflicts with existing and proposed signage for The Crossings at Corona shopping center. Caltrans has agreed to an exhibit showing the tree relocations in addition to providing smaller trees instead of the originally planned taller trees at a rate of 2 smaller trees to 1 taller tree.

ADD SERVICE 5:

Provide Right-of-Way Close Out Services.

Task 1*a. *Property Ties

Caltrans ROW engineering has requested additional survey monuments/property ties at all anglepoints and begin/end coordinates along State ROW. Consultant’s Design Team will set up to 22 survey monuments. Property fences and walls will also be validated as pertains to the ROW shown on the ROW Appraisal Maps. When no monuments can be set at the exact property/right of way corner, an offset monument will be set. The monuments will be marked with a tag stamped "LS 7300".

Deliverables: Monuments Placed & PDF plot of monuments set in the field.

Task 1b. Post-Construction Record of Survey

Consultant’s Design Team will prepare a Record of Survey Map including the new monuments/property ties set along the right of way lines. This map, when completed, will be submitted to the County of Riverside Suveyor's Office for review and final recordation of the map. At the time of this proposal, the County has a 4-6 week turnaround on map reviews. Once the map has been accepted by the County, a mylar version of the map will be submitted for recordation with the County Recorder. Plan check/Recording fees are included in the cost estimate as an ODC.

At the time of first submittal of the map to the county for review, a map will also be sent to Caltrans for review. Any requested revisions from Caltrans will be incorporated into the final map to be recorded. A copy of the recorded map will be provided to the client.

Deliverable: PDF plot Record of Survey map submitted to the County and Ca/trans for review(s) and final recordation.

Task 1c. ROW Record Maps

The City Awarded and Administered (AAA) the construction contract for the project, requiring the title for all needed parcels to be transferred to the City to allow for construction. The final right of way (ROW) recording occurs after construction is completed to facilitate the transfer of parcels to the State. The ROW appraisal maps will be updated prior to the State accepting the transfers of property. Consultant's Design Team will revise the previously prepared ROW appraisal maps with new parcel numbers provided by Caltrans. Final ROW maps will be provided in PDF and DGN formats to Caltrans for review and approval.

Deliverable: PDF plot of the Right of Way map submitted to Ca/trans for review and approval.

Task 1d. Transfer Deeds

Consultant's Design Team will prepare deed jackets for up to 9 parcels for the conveyance of property from the City to Caltrans. Deed processing and jacket contents will be coordinated with Caltrans ROW engineers, Caltrans attorneys and City attorneys. Preliminary Title Reports (PTR), if needed, for each parcel will be secured, this is included in the cost estimate as an ODC. The City will provide deeds and relevant information for the property acquired from the Castle and Cooke Corona Crossings property development (NE quadrant of project).

Deliverable: Transfer the 9 parcels from the City of Corona to Ca/trans

Task 1e. Right of Way Certificate Update

A Special Certification No. 3 with a Work-Around (3W) was prepared for the project. A ROW Certification No. 3W does not need to be raised to a Certification No. 1 or 2 but must be updated to capture progress pertaining to the work-around parcels. The ROW Certification update requires the Consultant's Design Team to coordinate with Crown Castle and AT&T to verify completion of relocation work. Consultant's Design Team will update the Right of Way Certificate No. 3W and will submit to Caltrans for review and acceptance.

Deliverable: Updated Right of Way Certificate updated with a timeline of the progress of the project.

Assumptions:

- ROW requirements have not changed during construction; previous legal descriptions remain valid and can be re-used to transfer the property from the City to Caltrans
- All elements of the project were constructed within the acquired ROW
- The City will provide property transfer information for Parcel 23310 Castle & Cook Corona Crossings II Inc.
- There are no parcel encumbrances that the State believes to be detrimental to its use, result
- ing in a rejection of the parcel transfer by Caltrans.
- All documents requiring Caltrans, County or City review, includes two rounds of comment review/response and document updates.

EXHIBIT "C-3"
COMPENSATION

Total Compensation, including the fixed fee, shall not exceed Five Million Four Hundred Twenty-six Thousand Four Hundred Thirty-three Dollars and Twenty-six Cents ($5,426,433.26) without written authorization from City's Representative.

Consultant Cost Proposal – Agreement dated May 16, 2012	$ 3,627,539.96
Additional Design Services approved by City Council, Add Service 1	$ 146,889.00
Additional Design/Right of Way Services, Add Service 2	$ 300,000.00
Additional Services approved by City Council, Add Service 3	$866,783.00
Consultant Fixed Fee pursuant to Section 3.4.3.2	$ 185,852.30

ADD SERVICE 4: $134,206

FEE SCHEDULE BY TASK

	Task	Total Labor Hours	Total Labor Cost
Task 1	Period of Performance Extension	243	$ 35,339
Task 2	Schedule Sensitive Out of Scope Efforts (Work Completed)	447	$ 72,146
2a	Sewer Line Casings through Cajalco Rd Overcrossing	64	$ 12,996
2b	Rock Blanket Modifications	109	$ 15,408
2c	Cajalco Bridge Visual Renderings	54	$ 7,538
2d	Local and Regional Traffic Detour Plans	68	$ 11,524
2e	Bridge and Retaining wall Barrier updates	52	$ 11,400
2f	Grid Grades	100	$ 13,280
Task 3	Requested Additional Design Scope (estimated hours)	161	$ 22,555
3a	Bedford Canyon Road/Eagle Glen Intersection (New Home)	41	$ 5,441
3b	Drainage Modifications along NB I-15	50	$ 7,221
3c	Rock Slope Protection Modifications	54	$ 7,645
3d	Planting and Irrigation East of Bedford Canyon Northside	9	$ 1,256
3e	Planting and Irrigation - Tree Relocations	7	$ 992
	Total Hours	851	
	Total Labor Cost		**$ 130,040**
	Markup on Subs (5%)		**$ 2,739**
	Jacobs ODC's		**$ 1,427**
	Total Cost		**$ 134,206**

	Task	Beg Date	End Date	Jacobs Jacobs (Subtotal)	CWE CWE (Subtotal)	DEA DEA (Subtotal)	Lin LIN (Subtotal)	LSA LSA (Subtotal)	Total Labor Hours	Total Labor Cost
Task 1	Period of Performance Extension	8/15/2019	6/30/2020	$ 14,340	$ 3,629	$ 5,946	$ 2,549	$ 8,875	243	$ 35,339
Task 2	Schedule Sensitive Out of Scope Efforts (Work Completed)	8/15/2019	3/1/2020	$ 50,320	$ -	$ 21,826	$ -	$ -	447	$ 72,146
2a	Sewer Line Casings through Cajalco Rd Overcrossing	8/15/2019	3/1/2020	$ 12,996	$ -	$ -	$ -	$ -	64	$ 12,996
2b	Rock Blanket Modifications	8/15/2019	3/1/2020	$ 1,120	$ -	$ 14,288	$ -	$ -	109	$ 15,408
2c	Cajalco Bridge Visual Renderings			$ -	$ -	$ 7,538	$ -	$ -	54	$ 7,538
2d	Local and Regional Traffic Detour Plans	8/15/2019	3/1/2020	$ 11,524	$ -	$ -	$ -	$ -	68	$ 11,524
2e	Bridge and Retaining wall Barrier updates			$ 11,400	$ -	$ -	$ -	$ -	52	$ 11,400
2f	Grid Grades			$ 13,280	$ -	$ -	$ -	$ -	100	$ 13,280
Task 3	Requested Additional Design Scope (estimated hours)	8/15/2019	3/1/2020	$ 10,620	$ 7,482	$ 3,504	$ 949	$ -	161	$ 22,555
3a	Bedford Canyon Road/Eagle Glen Intersection (New Home)			$ 3,236	$ -	$ 1,256	$ 949	$ -	41	$ 5,441
3b	Drainage Modifications along NB I-15	8/15/2019	3/1/2020	$ 3,692	$ 3,529	$ -	$ -	$ -	50	$ 7,221
3c	Rock Slope Protection Modifications	8/15/2019	3/1/2020	$ 3,692	$ 3,953	$ -	$ -	$ -	54	$ 7,645
3d	Planting and Irrigation East of Bedford Canyon Northside	8/15/2019	3/1/2020	$ -	$ -	$ 1,256	$ -	$ -	9	$ 1,256
3e	Planting and Irrigation - Tree Relocations				$ -	$ 992	$ -	$ -	7	$ 992
	Total Hours			429	88	224	36	74	851	
	Total Labor Cost			$ 75,280	$ 11,111	$ 31,277	$ 3,498	$ 8,875		**$ 130,040**
	Markup on Subs (5%)									**$ 2,739**
	Jacobs ODC's									**$ 1,427**
	Total Cost									**$ 134,206**

	Task	Beg Date	End Date	Jacobs Project Manager $ 290.00	Roadway Design Lead $ 224.00	Roadway Engineer $ 213.00	Junior Roadway Engineer $ 110.00	Traffic Engineer $ 273.00	Utility Engineer $ 213.00	Senior Structural Engineer $ 222.00	Structural Engineer $ 193.00	Structural CADD Designer $ 195.00	Jacobs (Subtotal)
Task 1	Period of Performance Extension	8/15/2019	6/30/2020	4	30	20	20						$ 14,340
Task 2	Schedule Sensitive Out of Scope Efforts (Work Completed)	8/15/2019	3/1/2020	8	49		120	12		40	16	44	$ 50,320
2a	Sewer Line Casings through Cajalco Rd Overcrossing	8/15/2019	3/1/2020		4					16	16	28	$ 12,996
2b	Rock Blanket Modifications	8/15/2019	3/1/2020		5								$ 1,120
2c	Cajalco Bridge Visual Renderings												$ -
2d	Local and Regional Traffic Detour Plans	8/15/2019	3/1/2020	4	12		40	12					$ 11,524
2e	Bridge and Retaining wall Barrier updates			4	8					24		16	$ 11,400
2f	Grid Grades				20		80						$ 13,280
Task 3	Requested Additional Design Scope (estimated hours)	8/15/2019	3/1/2020	6	20		40						$ 10,620
3a	Bedford Canyon Road/Eagle Glen Intersection (New Home)			2	4		16						$ 3,236
3b	Drainage Modifications along NB I-15	8/15/2019	3/1/2020	2	8		12						$ 3,692
3c	Rock Slope Protection Modifications	8/15/2019	3/1/2020	2	8		12						$ 3,692
3d	Planting and Irrigation East of Bedford Canyon Northside	8/15/2019	3/1/2020										$ -
3e	Planting and Irrigation - Tree Relocations												
	Total Hours			18	99	20	180	12	0	40	16	44	429
	Total Labor Cost			$ 5,220	$ 22,176	$ 4,260	$ 19,800	$ 3,276	$ -	$ 8,880	$ 3,088	$ 8,580	$ 75,280
	Markup on Subs (5%)												
	Jacobs ODC's												
	Total Cost												

	Task	CWE Project Manager $ 194.65	Drainage Engineer $ 144.39	Cadd Technician $ 67.56	CWE (Subtotal)	DEA Sr. Landscape Architect $ 197.16	Landscape Architect $ 132.40	DEA (Subtotal)	Lin Task Manager $ 176.69	Project Engineer $ 74.45	Lin LIN (Subtotal)	LSA Senior Biologist $ 143.67	Biologist $ 110.52	LSA LSA (Subtotal)	Total Labor Hours	Total Labor Cost
Task 1	Period of Performance Extension	4	16	8	$ 3,629	8	33	$ 5,946	6	20	$ 2,549	21	53	$ 8,875	243	$ 35,339
Task 2	Schedule Sensitive Out of Scope Efforts (Work Completed)				$ -	14	144	$ 21,826			$ -			$ -	447	$ 72,146
2a	Sewer Line Casings through Cajalco Rd Overcrossing				$ -			$ -			$ -			$ -	64	$ 12,996
2b	Rock Blanket Modifications				$ -	8	96	$ 14,288			$ -			$ -	109	$ 15,408
2c	Cajalco Bridge Visual Renderings				$ -	6	48	$ 7,538			$ -			$ -	54	$ 7,538
2d	Local and Regional Traffic Detour Plans				$ -			$ -			$ -			$ -	68	$ 11,524
2e	Bridge and Retaining wall Barrier updates				$ -			$ -			$ -			$ -	52	$ 11,400
2f	Grid Grades				$ -			$ -			$ -			$ -	100	$ 13,280
Task 3	Requested Additional Design Scope (estimated hours)	4	38	18	$ 7,482	3	22	$ 3,504	2	8	$ 949			$ -	161	$ 22,555
3a	Bedford Canyon Road/Eagle Glen Intersection (New Home)				$ -	1	8	$ 1,256	2	8	$ 949			$ -	41	$ 5,441
3b	Drainage Modifications along NB I-15	2	18	8	$ 3,529			$ -			$ -			$ -	50	$ 7,221
3c	Rock Slope Protection Modifications	2	20	10	$ 3,953			$ -			$ -			$ -	54	$ 7,645
3d	Planting and Irrigation East of Bedford Canyon Northside				$ -	1	8	$ 1,256			$ -			$ -	9	$ 1,256
3e	Planting and Irrigation - Tree Relocations				$ -	1	6	$ 992			$ -			$ -	7	$ 992
	Total Hours	8	54	26	88	25	199	224	8	28	36	21	53	74	851	
	Total Labor Cost	$ 1,557	$ 7,797	$ 1,757	$ 11,111	$ 4,929	$ 26,348	$ 31,277	$ 1,413	$ 2,085	$ 3,498	$ 3,017	$ 5,858	$ 8,875		**$ 130,040**
	Markup on Subs (5%)															**$ 2,739**
	Jacobs ODC's															**$ 1,427**
	Total Cost															**$ 134,206**

ADD SERVICE 5: $165,163

RIGHT-OF-WAY CLOSE OUT SERVICES BY TASK

Project Management and Roadway Design	$32,731.00
Survey/Right-of-Way Engineering	$68,080.00
Right-of-Way Services	$52,242.00
Other Direct Costs	$12,110.00

				Jacobs				DEA						OPC				Lin		
				Project Manager	Roadway Design Lead	Roadway Engineer		Survey Task Manager	2-Man Crew	Survey CAD	Project Surveyor	Project Assistant		Program Manager	Senior R/W Eng. Analyst	Agent/Analyst	Projecdt Support			
	Task	Beg Date	End Date	$ 291.00	$ 224.00	$ 160.00	Jacobs (Subtotal)	$ 240.00	$ 320.00	$ 145.00	$ 190.00	$ 110.00	DEA (Subtotal)	$ 262.86	$ 116.94	$ 80.48	$ 73.76	OPC (Subtotal)	Total Labor Hours	Total Labor Cost
Task 1	**ROW Services**	8/23/2021	5/16/2022	30	26	76	$ 26,714	40	28	80	188	20	$ 68,080	20	382	15	15	$ 52,242	920	$ 147,036
	1a. Property Ties	8/30/2021	10/22/2021	4		8	$ 2,444	12	28		28	4	$ 17,600					$ -	84	$ 20,044
	1b. Post-Construction Record of Survey	10/25/2021	12/17/2021	4	8	16	$ 5,516	6		80	72	8	$ 27,600					$ -	194	$ 33,116
	1c. Record Maps	1/19/2022	5/10/2022	6	8	24	$ 7,378	22			88	8	$ 22,880					$ -	156	$ 30,258
	1d. Transfer Deeds	1/19/2022	4/5/2022	10	8	24	$ 8,542						$ -	12	382		10	$ 48,563	446	$ 57,105
	1e. Right of Way Certification Update	8/23/2021	5/16/2022	6	2	4	$ 2,834						$ -	8		15	5	$ 3,679	40	$ 6,513
Total Hours				30	26	76	132	40	28	80	188	20	356	20	382	15	15	432	0	
Total Labor Cost				$ 8,730	$ 5,824	$ 12,160	$ 26,714	$ 9,600	$ 8,960	$ 11,600	$ 35,720	$ 2,200	$ 68,080	$ 5,257	$ 44,671	$ 1,207	$ 1,106	$ 52,242		**$ 147,036**
Markup on Subs (5%)																				**$ 6,017**
ODC's																				**$ 12,110**
Total Cost																				**$ 165,163**

City of Corona
400 S. Vicentia Ave.
Corona, CA 92882

Staff Report

File #: 22-0032

REQUEST FOR CITY COUNCIL ACTION

DATE: 01/05/2022

TO: Honorable Mayor and City Council Members

FROM: Human Resources Department

SUBJECT:
Personnel Report providing employee updates and details on various recruitment transactions.

EXECUTIVE SUMMARY:
This Personnel Report includes new updated personnel activity since the previous meeting, which is included in the New Open/Competitive Recruitments, New Internal/Promotional Recruitments, and new employee Full-Time Appointment sections. The Report also includes employee updates and information on recruitments from Human Resources that are currently active but have been previously shown in prior updates. It also lists employee promotions and staff that is retiring from service with the City.

RECOMMENDED ACTION:
That the City Council receive and file the Personnel Report.

BACKGROUND & HISTORY:
The employee updates in the Personnel Report include full-time appointments, full-time promotions, and retirements. The recruitment activity portion of the report includes both open/competitive recruitments as well as internal/promotional recruitments.

ANALYSIS:
This Personnel Report includes employee updates and recruitments. These transaction types are reported to Council for informational purposes each meeting to enhance transparency. The report includes updated activity since the previous meeting. The employee updates in the Personnel Report include full-time appointments, full-time promotions, and retirements. The recruitment activity portion of the report includes both open/competitive recruitments as well as internal/promotional recruitments.

Full-Time Appointments

Employee Name	*Department*	*Position*	*Monthly Pay Range*	*Effective Date*
Ewing, Christopher	Planning & Development	Building Inspector II	$4,255 - $5,194	December 2, 2021
Gravatt, Alexis	Community Services	Senior Park Ranger	$3,266 - $3,988	November 29, 2021
Jimenez, Anthony	Police Department	Police Trainee	$3,627 - $4,428	December 1, 2021
Pablo, Eric	Police Department	Police Trainee	$3,627 - $4,428	December 1, 2021

Full-Time Promotions

Employee Name	*Department*	*Position*	*Monthly Pay Range*	*Effective Date*
Brunn, Michael	Police Department	Police Corporal	$6,868 - $8,813	November 20 2021
Hungerford, Steven	Police Department	Police Corporal	$6,868 - $8,813	November 20 2021
Lathrop, Megan	Planning & Development	Building Permit Technician III Flex	$4,255 - $5,194	November 20 2021
Medeiros, Maxwell	Police Department	Police Corporal	$6,868 - $8,813	November 20 2021
Neff, Michael	Police Department	Police Corporal	$6,868 - $8,813	November 20 2021
Rodriguez, Rafael	Utilities	Water Operator II Flex	$4,991 - $6,093	November 20 2021

Retirements

Employee Name	*Department*	*Position*	*Years of Service*	*Last Day on Payroll*
Vanderkallen, Johannes	Police Department	Police Officer II	24 years	December 3, 2021

New Open/Competitive Recruitments

Position	*Department*	*Position Type*	*Open Date*	*Closing Date*	*Status*
Assistant Recreation Coordinator - Sports	Community Services	Part-Time	12/14/2021	01/02/2022	Accepting Applications

New Open/Competitive Recruitment - Continued

Position	*Department*	*Position Type*	*Open Date*	*Closing Date*	*Status*
Economic Development Assistant	Economic Development	Part-Time	12/06/2021	12/12/2021	Accepting Applications
Fleet Technician I/I/III Flex	Public Works	Full-Time	12/06/2021	01/10/2022	Accepting Applications
Public Works Inspector II	Planning and Development	Full-Time	12/14/2021	Continuous	Accepting Applications
Senior Code Enforcement Officer	Planning and Development	Full-Time	12/07/2021	01/09/2022	Accepting Applications
Water Operator III Flex	Utilities Department	Full-Time	12/13/2021	01/09/2022	Accepting Applications

New Internal/Promotional Recruitments

Position	*Department*	*Position Type*	*Open Date*	*Closing Date*	*Status*
Purchasing Specialist III	Finance	Full-Time	12/06/2021	12/12/2021	Accepting Applications
Senior Network Architect-Provisional	Information Technology	Full-Time	12/20/2021	12/27/2021	Accepting Applications

Recruitments in Progress

Position	*Department*	*Position Type*	*Status*
Accounting Supervisor	Finance	Full-Time	First Round Interview Stage
Accounting Technician I/II/III	Finance	Full-Time	First Round Interview Stage
Administrative Assistant	Utilities Department	Full-Time	Interview Stage
Budget Manager	Finance	Full-Time	Department Review Stage
CIP Manager/Assistant City Engineer	Public Works	Full-Time	Offer Stage
Combination Plans Examiner	Planning and Development	Full-Time	Department Review Stage
Community Services Leader I	Community Services	Part-Time	Department Review Stage
Community Services Leader II-Facilities & Other Programs	Community Services	Part-Time	Department Review Stage

Recruitments in Progress - Continued

Position	*Department*	*Position Type*	*Status*
Community Services Leader III - Library Facilities	Community Services	Part-Time	Department Review Stage
Community Services Leader II- Library/Passports	Community Services	Part-Time	Department Review Stage
Crime Prevention Assistant	Police Department	Part-Time	Department Review Stage
Development Services Manager	Planning and Development	Full-Time	Review Stage
Digital Journalist	City Manager's Office	Full-Time	Offer Stage
Electric Utility Analyst II	Utilities Department	Full-Time	Department Review Stage
Facilities, Parks, and Trails Manager	Community Services	Full-Time	Interview Stage
Fire Cadet	Fire Department	Part-Time	Onboarding Stage
Help Desk I	Information Technology	Part-Time	Department Review Stage
Human Resources Analyst	Human Resources	Full-Time	Second Round Interview Stage
Human Resources Supervisor	Human Resources	Full-Time	Interview Stage
Management Analyst I	Community Services	Full-Time	Interview Stage
Management Analyst II	Public Works	Full-Time	Interview Stage
Plan Check Engineer	Planning and Development	Full-Time	Review Stage
Police Department General Assistant	Police Department	Part-Time	Department Review Stage
Police Officer I/II -Lateral	Police Department	Full Time	Department Review Stage
Police Records Technician I/II	Police Department	Full-Time	Department Review Stage
Police Trainee	Police Department	Full-Time	Interview Stage
Public Safety Dispatcher II	Police Department	Full-Time	Accepting Applications
Public Safety Technical Support Engineer	Information Technology	Full Time	Accepting Applications
Purchasing Specialist I	Finance	Full-Time	Department Review Stage
Senior Engineer	Planning & Development	Full-Time	Offer Stage
Senior Office Assistant - Police Department	Police Department	Full-Time	Department Review Stage
Senior Park Ranger	Community Services	Part-Time	Department Review Stage

Recruitments in Progress - Continued

Position	*Department*	*Position Type*	*Status*
Senior Public Safety Dispatcher	Police Department	Full-Time	Department Review Stage
Street Light Maintenance Technician	Public Works	Full-Time	Department Review Stage
Water Operator I/II	Utilities Department	Full-Time	Interview Stage
Water Resources Technician I	Utilities Department	Full-Time	Department Review Stage

FINANCIAL IMPACT:
There is no cost impact associated with the acceptance of this report. The cost of the various personnel changes listed herein are reflected in the Adopted Fiscal Year 2020-2021 Budget for the departments listed in the report.

ENVIRONMENTAL ANALYSIS:
This action is exempt pursuant to Section 15061(b)(3) of the Guidelines for the California Environmental Quality Act (CEQA), which states that a project is exempt from CEQA if the activity is covered by the common sense exemption that CEQA applies only to projects that have the potential for causing a significant effect on the environment. Where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA. This action is merely the acceptance of a report on various personnel transaction. There is no possibility that the acceptance of this report will have a significant effect on the environment. Therefore, no further environmental review is required.

PREPARED BY: SHELLY MATHEWS, HUMAN RESOURCES ADMINISTRATIVE ASSISTANT

REVIEWED BY: ANGELA RIVERA, CHIEF TALENT OFFICER

City of Corona
400 S. Vicentia Ave.
Corona, CA 92882

Staff Report

File #: 22-0026

**REQUEST FOR CITY COUNCIL AND
CORONA UTILITY AUTHORITY ACTION**

DATE: 1/5/2022

TO: Honorable Mayor and City Council Members
Honorable President and Board Members

FROM: Public Works Department & Utilities Department

SUBJECT:
Resolution establishing a construction charge to cover the proportionate share of constructing the sewer lines and appurtenances necessary to connect certain private property located on Rudell Road and Ontario Avenue to the City's Public Sewer System.

EXECUTIVE SUMMARY:
The New Horizons Elderly Residential Care Facility at 7550 Rudell Road, currently connected to a septic system, would like to expand its facility, and the State Water Resources Control Board will not allow them to build another septic system on the property to accommodate the expansion. The property owners have requested to connect to the City's public sewer system in order to expand the facility. The project would construct approximately 1,600 lineal feet of new sewer in Ontario Avenue and Rudell Road to the west end of Rudell Road, allowing 7550 Rudell Road to connect to the public sewer system. The project would benefit 18 total parcels on Rudell Road and Ontario Avenue by providing the opportunity for future sewer connections.

RECOMMENDED ACTION:
That the:

a. City Council adopt Resolution No. 2022-002, establishing a construction charge to cover the proportionate share of constructing the sewer lines and appurtenances necessary to connect certain private property located on Rudell Road and Ontario Avenue to the City's public sewer system.

b. City Council appropriate $1,000,000 from the Water Reclamation Capacity Fund 440 to a newly created Capital Improvement Project entitled Rudell Road Sewer Extension Project.

c. Corona Utility Authority review, ratify, and to the extent necessary, direct the City Council to take the above actions.

BACKGROUND & HISTORY:
Rescare Holdings, represented by Mr. Amed Franco and Mr. James Tran, own an existing parcel located at 7550 Rudell Road in the unincorporated County of Riverside area of El Cerrito, which is in the City of Corona's service area. The New Horizons Elderly Residential Care Facility operates its business at this address, which is currently being served by an existing septic system. They seek to expand their facilities and have expressed an interest in connecting to the City sewer system. The New Horizons Elderly Residential Care Facility expansion project is currently in design and has initiated permitting with the State of California Regional Water Quality Control Board - Region 8 (RWQCB8).

RWQCB8 has determined the parcel at 7550 Rudell Road will not be permitted to install an additional septic system for the proposed facilities expansion, and it has contacted City staff to request information regarding sewer availability and the closest sewer connection. Rescare Holdings subsequently contacted the City to request an extension of a sewer line from the nearest terminal manhole located at the intersection of El Cerrito Road and Ontario Avenue to their property on Rudell Road.

To coincide with the State and County's legislation and regulations to protect water quality and public health, it is the goal of the City of Corona Utilities Department to eventually have all existing homes, which currently use septic systems, be connected to the City sewer system.

ANALYSIS:
Rescare Holdings has requested an extension of the City's sewer to their property at 7550 Rudell Road to connect their existing and proposed facilities to the public sewer.

Corona Municipal Code (CMC) 13.12.100 requires that prior to connecting to the City's sewer collection system, the person requesting such connection shall pay a construction charge to cover the proportionate cost of constructing the public sewer in the amount, manner, and time of payment established by resolution of the City Council. City staff has estimated the Total Cost (as defined in the attached resolution) for the Rudell Road Sewer Extension Project to be approximately $1,000,000.

If multiple properties benefit from the construction of a sewer extension, the cost per property is determined based upon the ratio of the frontage of that property to the entire length of frontages benefited by the sewer extension. The Rudell Road Sewer Extension Project will benefit a total of 18 properties along Rudell Road and Ontario Avenue, including residential properties, commercial properties, and a church assembly building by providing the infrastructure necessary to connect to the City's sewer system. City staff is proposing that the construction charge for the Rudell Road Sewer Extension Project be established in an amount equal to the actual Total Cost to construct the project and that such construction charge be allocated to each benefitted parcel based upon the linear footage of the Rudell Road Sewer Extension Project located along the property frontage of each benefitted parcel. Resolution No. 2022-002 would establish the construction charge and the fair share percentage allocated to each benefitted parcel in the manner described above.

The property at 7550 Rudell Road, as well as any other benefitted parcels that connect to the City's sewer system in the future, will also be required to construct a sewer service lateral (lateral) to connect the benefitted parcel to the sewer main that will be constructed as part of the Rudell Road Sewer Extension. Because the lateral is exclusively for the benefit of each benefitted parcel, the cost to construct the lateral must be paid entirely by the property owner. The property owner can either construct the lateral on their own or can request the City to construct it at the time of construction of the sewer main line. Resolution No. 2022-002 would also establish a charge to construct the lateral in an amount equal to the actual construction cost in the event the City constructs the lateral.

Upon completion of the Rudell Road Sewer Extension Project, the City will document and determine the actual Total Cost of constructing the project and any laterals constructed during the project and then calculate the actual construction charges owed by each benefitted parcel based upon the fair share percentages established in Resolution No. 2022-002.

Corona Municipal Code (CMC) 13.14.060 authorizes homeowners of single-family residential properties, non-profit organizations, and industrial customers in good standing with the utility that are converting from septic service to City sewer service to enter into payment plans for the payment of construction charges. Resolution No. 2022-002 incorporates a template payment plan agreement to be used for property owners who are unable to pay the full construction charges upfront when connecting to the City's sewer system. The payment plan agreement will allow the property owner to pay the construction charges in monthly installments at 6% simple interest for 60 months. The payment plan agreement would be recorded against the property and would constitute a contractual lien until such time as the constructions charges and interest are paid in full. This will enable the City to recover the cost of the sewer line construction.

City Staff proposes to construct the sewer extension from the existing terminal manhole at the intersection of El Cerrito Road and Ontario Avenue near 19530 Ontario Avenue, extending northward on Ontario Avenue and then westward on Rudell Road for a total of approximately 1,600 linear feet, in order to serve three (3) properties on Ontario Avenue and 15 properties on Rudell Road, all of which are currently on septic systems. The sewer extension will front portions of 18 properties, as shown in Exhibit 1.

The actions requested will enable the City to recover the construction costs incurred by the City to construct the Rudell Road sewer extension as the benefited parcels connect to the City's sewer system.

FINANCIAL IMPACT:

Resolution 2022-002 identifies the proportionate share of construction costs attributed to each property based on the ratio of each property's frontage to the total frontage of all 18 properties. Cost estimates will be used to prepare the Total Cost Estimate prior to construction for 7550 Rudell Road, a commercial property. The Total Payment Amount will be adjusted after construction has been completed and actual costs have been determined. Sewer service will be provided for 7550 Rudell

Road following payment of the parcel's fair share for construction of the sewer and lateral and all other sewer service application and capacity fees.

The remaining property owners will reimburse the City for their proportionate share of construction costs and all other sewer service application and capacity fees applicable at the time if a property is converted from septic system to the City sewer system per CMC 13.14.070. The properties are not obligated to connect to the sewer unless their septic system fails. Future sewer connections by the remaining properties fronting the proposed sewer extension might take years to happen.

In addition to the new sewer construction cost, the sewer capacity fee in effect at the time of sewer connection will be assessed per CMC 13.12.120 as part of the sewer connection charge. The sewer connection charge will include a sewer capacity fee. Current sewer capacity fees are based on a cost of $15.48 per gallon per day and range from $4,644.00 per single-family home to 96 gallons per day per occupant for an assisted living care center. The sewer capacity fee for the proposed New Horizons Elderly Residential Care Facility expansion to 30 residents would total $44,582.40 based on a sewer generation rate of 96 gallons per day per occupant at a rate of $15.48 per gallon per day.

Approval of the recommended actions will result in an appropriation of $1,000,000 to the Rudell Road Sewer Extension Project in the Water Reclamation Capacity Fund 440.

Account Name	**Fund**	**Project**	**Total**
Water Reclamation Capacity Fund	440	Rudell Road Sewer Extension Project	$1,000,000
Total			**$1,000,000**

Fund	**07/01/21 Est. Working Capital**	**Budgeted Revenues/ Sources**	**Budgeted Expenditures/ Uses**	**Working Capital Impacts**	**06/30/22 Est. Working Capital**
Water Reclamation Capacity Fund 440	$8,118,177	$2,553,907	($892,162)	Appropriation ($1,000,000)	$8,779,922

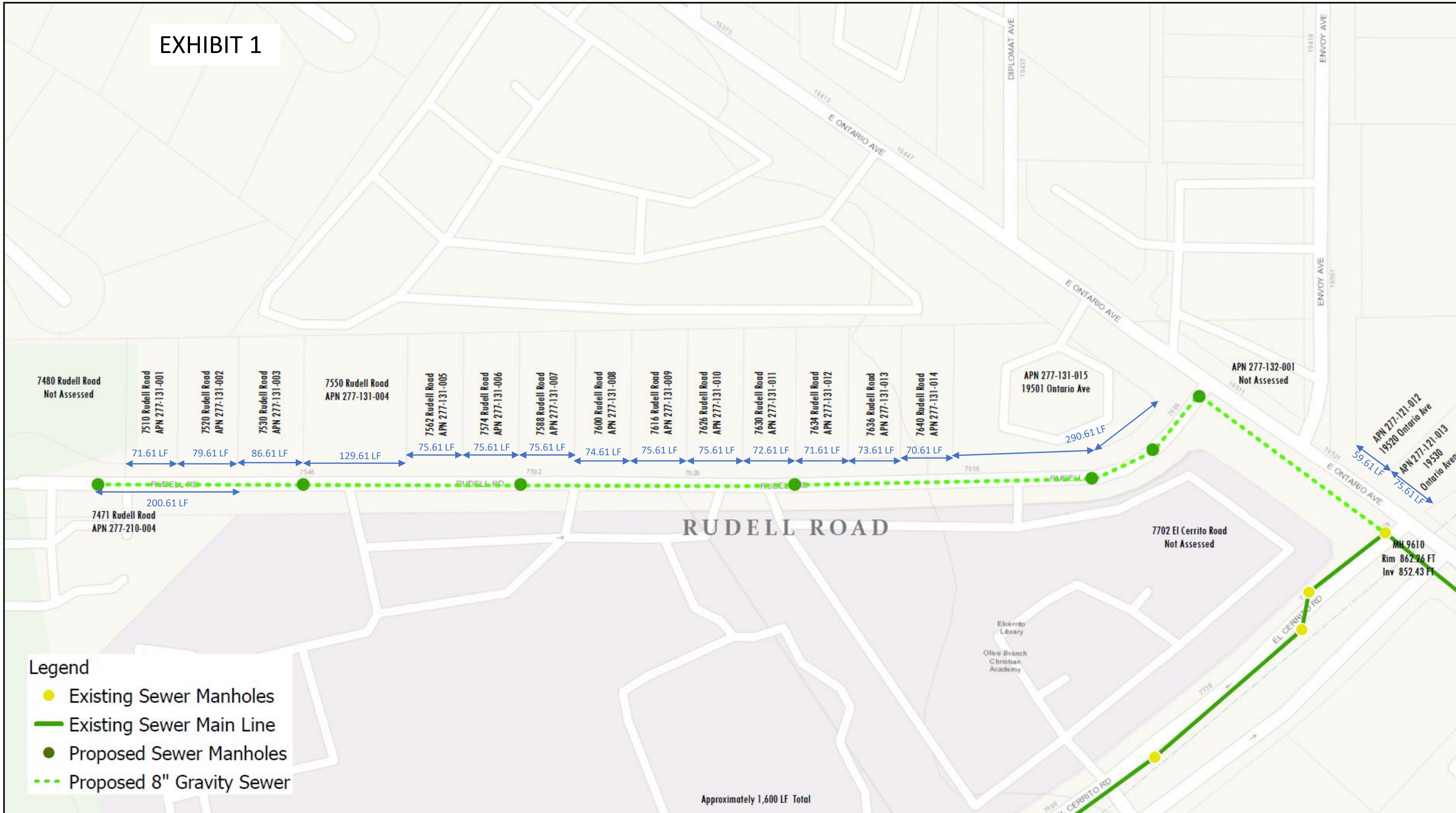
ENVIRONMENTAL ANALYSIS:
Adoption of this Resolution is exempt pursuant to Section 15061(b)(3) of the Guidelines for the California Environmental Quality Act (CEQA), which states that a project is exempt from CEQA if the activity is covered by the commonsense rule that CEQA applies only to projects that have the potential for causing a significant effect on the environment. Where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA. This Resolution simply establishes construction charges to cover the proportionate share of constructing the sewer lines and appurtenances necessary to connect certain private property located on Rudell Road to the City's public sewerage system. This project is also exempt from CEQA pursuant to Section 15282(k), which includes among the list of statutory exemptions the installation of new pipeline or maintenance, repair, restoration, removal, or demolition of an existing pipeline as set forth in Section 21080.21 of the Public Resources Code, as long as the project does not exceed one mile in length. Therefore, no further environmental analysis is required.

PREPARED BY: VERNON R. WEISMAN, P.E. DISTRICT ENGINEER

REVIEWED BY: SAVAT KHAMPHOU, PUBLIC WORKS DIRECTOR

Attachments:

1. Exhibit 1 - Location Map
2. Exhibit 2 - Resolution No. 2022-002



RUDELL ROAD SEWER EXTENSION PROJECT

RESOLUTION NO. 2022 – 002

RESOLUTION OF THE CITY COUNCIL OF THE CITY OF CORONA, CALIFORNIA, ESTABLISHING A CONSTRUCTION CHARGE TO COVER THE PROPORTIONATE SHARE OF CONSTRUCTING THE SEWER LINES AND APPURTENANCES NECESSARY TO CONNECT CERTAIN PRIVATE PROPERTY LOCATED ON RUDELL ROAD AND ONTARIO AVENUE TO THE CITY'S PUBLIC SEWER SYSTEM

WHEREAS, the City of Corona ("City") provides sanitary sewer collection and treatment services to customers within the City utility service area; and

WHEREAS, the City encourages utility customers to convert existing sewer septic systems to the City sewer collection system to protect groundwater from contamination; and

WHEREAS, pursuant to Corona Municipal Code section 13.12.060 all buildings and structures that are connected to an individual sewer septic system that is no longer sufficient and adequate are required to connect to the City's sewer collection system if such system is located within 200 feet of the building or structure; and

WHEREAS, City Municipal Code 13.12.100 requires that prior to connecting to the City's sewer collection system, the person requesting such connection shall pay a construction charge to cover the proportionate cost of constructing the public sewer in the amount, manner, and time of payment established by resolution of the City Council; and

WHEREAS, Corona Municipal Code sections 13.12.100 and 13.14.060 authorize eligible customers; i.e. homeowners of single-family residential properties, non-profit organizations, and industrial customers in good standing with the utility company, that are converting from septic service to City sewer service to enter into payment plans for the payment of the design, project management, construction, and inspection charges; and

WHEREAS, the sewer septic system serving the existing commercial structure located at 7550 Rudell Road ("Subject Parcel") remains functional, however, the property owner is requesting to connect to City sewer, which is located more than 200 feet from the Subject Parcel; and

WHEREAS, in order to connect the Subject Parcel to the City's sewer collection system, it is necessary to construct an approximately 1,600-foot extension of the City sewer collection system, consisting of a sewer main line and appurtenances from the existing terminal manhole at the intersection of El Cerrito Road and Ontario Avenue extending northward on Ontario Avenue and then westward on Rudell Road ("Rudell Road Sewer Extension Project"), as well as the sewer service lateral to connect the sewer main line to the Subject Parcel; and

WHEREAS, the Rudell Road Sewer Extension Project will provide a benefit to the Subject Parcel, as well as the fifteen additional single-family residential properties located at 19530 Ontario Avenue, 19520 Ontario Avenue, 7640 Rudell Road, 7636 Rudell Road, 7634 Rudell Road, 7630 Rudell Road, 7626 Rudell Road, 7616 Rudell Road, 7600 Rudell Road, 7588 Rudell Road, 7574 Rudell Road, 7562 Rudell Road, 7530 Rudell Road, 7520 Rudell Road, and 7510 Rudell Road, one commercial property located at 19501 Ontario Avenue, and a church assembly building and residential property located at 7471 Rudell Road which are currently connected to individual sewer septic systems ("Future Benefitted Parcels"); and

WHEREAS, the Subject Parcel and the Future Benefitted Parcels may be individually referred to as "Benefitted Parcel" or collectively as the "Benefited Parcels" in this Resolution; and

WHEREAS, each of the Benefitted Parcels may now, or in the future, desire or be required to connect to the City's sewer collection system; and

WHEREAS, pursuant to Corona Municipal Code section 13.12.100, the City Council desires to establish a construction charge for the Rudell Road Sewer Extension Project to be collected prior to connection of a Benefitted Parcel to the City's sewer collection system; and

WHEREAS, the City Council finds and determines that the construction charge should be established and allocated to each Benefitted Parcel based upon the linear footage of the Rudell Road Sewer Extension Project that is located along the property frontage of each Benefitted Parcel, since such allocation provides a fair, reasonable, and rational formula to apportion the total cost of the Rudell Road Sewer Extension in relation to the benefit received by each Benefitted Parcel; and

WHEREAS, the City Council desires that the amount of the construction charge for the Rudell Road Sewer Extension be imposed and collected based upon the actual Total Cost (defined below) for the Rudell Road Sewer Extension; and

WHEREAS, the City Council desires to authorize the City Manager or his or her designee to enter into payment plans with eligible customers pursuant to Corona Municipal Code sections 13.12.100 and 13.14.060 and to update the amount of the construction charges established herein based upon the Total Costs to construct the Rudell Road Sewer Extension; and

WHEREAS, the construction charges imposed and collected for the Rudell Road Sewer Extension Project pursuant to this Resolution shall be used to reimburse the City of the costs and expenses incurred to construct the Rudell Road Sewer Extension Project.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF CITY OF CORONA, CALIFORNIA AS FOLLOWS:

SECTION 1. Findings. The recitals set forth above are hereby adopted as findings in support of this Resolution.

SECTION 2. Construction Charge. Pursuant to Corona Municipal Code section 13.12.100, the City Council hereby establishes and adopts an amount equal to the Total Cost to construct the Rudell Road Sewer Extension Project as the construction charge to be collected from the Benefitted Parcels prior to connection to the City's sewer system ("Construction Charge"). For purposes of this Resolution and calculating the Construction Charge, the "Total Cost" of constructing the Rudell Road Sewer Extension Project shall include, without limitation, all labor materials, tools, equipment, services, and incidental and customary work necessary to plan, engineer, design, environmentally review, permit, site, bid, and construct the Rudell Road Sewer Extension Project, including without limitation, all costs and expenses for the following: engineering, architectural, appraisal, legal, and other consultant services throughout the preconstruction and construction phases; bid preparation and administration services (if necessary), soil, project and other surveying, inspection and testing services; construction and project management services; and all construction and project close out activities.

SECTION 3. Fair Share Allocation of Construction Charge. Pursuant to Corona Municipal Code section 13.12.100, the City Council hereby allocates the Construction Charge to each Benefitted Parcel based upon the percentage of linear footage of the portion of the Rudell Road Sewer Extension Project that is located along the property frontage of each Benefitted Parcel, as compared to the total linear footage of the frontages included in the Rudell Road Sewer Extension Project. The 3 parcels noted in red are two roadway intersections and one parcel which Riverside County is planning to acquire to shift the alignment of Envoy Avenue so that it lines up with Rudell Road as part of their upcoming project to widen Ontario Avenue/Temescal Canyon Road between Cajalco Road and Envoy Avenue. Therefore, these 3 areas are excluded from the fair share cost allocation and their frontage percentages are redistributed to the remaining parcels. Such fair share allocation shall be as follows:

Rudell Road Sewer Main Extension - Estimated Fair Share Allocation of Construction Charge (including Proposed Improvements from County)

Benefitted Parcel Address	APN	Frontage Along Sewer (LF)	Fair Share Percentage (%)	Adjustment of Footage	Adjusted Frontage (LF)	Adjusted Fair Share Percentage
19530 Ontario Avenue	277-121-013	65	4%		75.61	4.36%
19520 Ontario Avenue	277-121-012	49	3%		59.61	3.44%
Int. Ontario & Envoy Ave	None	66	4%	43+107+68+35/16	NA	NA
None on File	277-132-001	90	5%		NA	NA
Int. Ontario & Rudell Rd	None	35	2%	10.61	NA	NA
19501 Ontario Avenue - Kim's Auto Repair	277-131-015	280	16%		290.61	16.75%
7640 Rudell Road	277-131-014	60	3%		70.61	4.07%
7636 Rudell Road	277-131-013	63	4%		73.61	4.24%
7634 Rudell Road	277-131-012	61	4%		71.61	4.13%
7630 Rudell Road	277-131-011	62	4%		72.61	4.19%
7626 Rudell Road	277-131-010	65	4%		75.61	4.36%
7616 Rudell Road	277-131-009	65	4%		75.61	4.36%
7600 Rudell Road	277-131-008	64	4%		74.61	4.30%
7588 Rudell Road	277-131-007	65	4%		75.61	4.36%
7574 Rudell Road	277-131-006	65	4%		75.61	4.36%
7562 Rudell Road	277-131-005	65	4%		75.61	4.36%
7550 Rudell Road - New Horizons Elderly Residential Care Facility	**277-131-004**	**119**	**7%**		**129.61**	**7.47%**
7530 Rudell Road	277-131-003	76	4%		86.61	4.99%
7520 Rudell Road	277-131-002	69	4%		79.61	4.59%
7510 Rudell Road	277-131-001	61	4%		71.61	4.13%
7471 Rudell Road - Olive Branch Community Church	277-210-004	190	11%		200.61	11.56%
Total		**1735**	**100%**	(LF)	**1735.00**	**100.00%**

Note: Parcels not Included in the Estimate for Fair Share Cost Sharing are noted in red. These parcels currently are or will be public property.

SECTION 4. Estimated Fair Share Construction Charge. Upon completion of the Rudell Road Sewer Extension Project, the City shall: (1) document and determine the actual total Cost of constructing the Rudell Road Sewer Extension; (2) calculate the actual Construction Charge owed by the Benefitted Parcels based upon the fair share percentages provided in Section 3 above; and (3) provide by certified mail such information to the owner(s) of each Benefitted Parcel, as such owner(s) appear on the last secured assessment roll as of the date of mailing. Each Benefitted Parcel shall be obligated to pay its fair share allocation of the actual Construction Charge prior to its connection to the City's sewer system or enter into a payment plan agreement, as provided in Section 7. For informational purposes only, the City has estimated the Total Cost of constructing the Rudell Road Sewer Extension Project to be $1,000,000, and thus as of the date of this Resolution estimates the fair share of the Construction Charge for each Benefitted Parcel as follows:

Rudell Road Sewer Main Extension - Estimated Fair Share Allocation of Construction Charge (including Proposed Improvements from County)			
Benefitted Parcel Address	**APN**	**Adjusted Fair Share Percentage**	**Estimated Fair Share Cost**
19530 Ontario Avenue	277-121-013	4.36%	$ 43,579.89
19520 Ontario Avenue	277-121-012	3.44%	$ 34,357.99
Int. Ontario & Envoy Ave	None	NA	NA
None on File	277-132-001	NA	NA
Int. Ontario & Rudell Rd	None	NA	NA
19501 Ontario Avenue - Kim's Auto Repair	277-131-015	16.75%	$ 167,499.20
7640 Rudell Road	277-131-014	4.07%	$ 40,698.05
7636 Rudell Road	277-131-013	4.24%	$ 42,427.15
7634 Rudell Road	277-131-012	4.13%	$ 41,274.42
7630 Rudell Road	277-131-011	4.19%	$ 41,850.78
7626 Rudell Road	277-131-010	4.36%	$ 43,579.89
7616 Rudell Road	277-131-009	4.36%	$ 43,579.89
7600 Rudell Road	277-131-008	4.30%	$ 43,003.52
7588 Rudell Road	277-131-007	4.36%	$ 43,579.89
7574 Rudell Road	277-131-006	4.36%	$ 43,579.89
7562 Rudell Road	277-131-005	4.36%	$ 43,579.89
7550 Rudell Road - New Horizons Elderly Residential Care Facility	**277-131-004**	**7.47%**	**$ 74,703.81**
7530 Rudell Road	277-131-003	4.99%	$ 49,919.95
7520 Rudell Road	277-131-002	4.59%	$ 45,885.37
7510 Rudell Road	277-131-001	4.13%	$ 41,274.42
7471 Rudell Road - Olive Branch Community Church	277-210-004	11.56%	$ 115,626.00
Total		**100.00%**	$ 1,000,000.00

Note: Parcels not Included in the Estimate for Fair Share Cost Sharing are noted in red. These parcels currently are or will be public property.

SECTION 5. Site Plan for Rudell Road Sewer Extension Project**.** The site plan showing the proposed Rudell Road Sewer Extension and the Benefitted Parcels is attached hereto as Exhibit A and incorporated herein by reference.

SECTION 6. Construction Cost of Lateral Sewer Line. To the extent that the City constructs a lateral sewer line to connect the sewer main line to a Benefitted Parcel, the owner of that Benefitted Parcel shall also pay to the City one hundred percent (100%) of the Total Cost (defined above) to construct the lateral sewer line.

SECTION 7. Payment Plan Agreement. As authorized by Corona Municipal Code sections 13.12.100 and 13.14.060, the owner of a Benefitted Parcel, if they are an "eligible customer", may enter into a payment plan agreement with the City, in substantially the same form attached hereto as Exhibit B and incorporated herein by reference, for the payment of their fair share of the Construction Charge for the Rudell Road Sewer Extension Project and the Total Cost, if any, for the construction of the lateral sewer connection to the Benefitted Parcel, plus interest at the rate of 6 percent (6%) simple interest commencing upon connection of the Benefitted Parcel to the City's sewer system.

SECTION 8. CEQA Findings. The City Council finds that the adoption of this Resolution is exempt pursuant to Section 15061(b)(3) of the Guidelines for the California Environmental Quality Act (CEQA), which states that a project is exempt from CEQA if the activity is covered by the general rule that CEQA applies only to projects that have the potential for causing a significant effect on the environment. Where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA. Adoption of this Resolution is also exempt pursuant to Section 15303(d), which provides that the construction of water main, sewage, electrical, gas, and other utility extensions of reasonable length to serve an adjacent single-family residence are exempt from CEQA. This Resolution simply establishes construction charges to cover the proportionate share of constructing the sewer lines and appurtenances necessary to connect a limited number of single-family residences, commercial businesses, and non-profit organizations located on Rudell Road and on Ontario Avenue to the City's public sewer system. Construction of the sewer extension will be reviewed as a separate project. Therefore, no further environmental analysis is required for establishment of the construction charges for the Rudell Road Sewer Extension Project.

SECTION 9. Effective Date. This Resolution shall become effective on January 5, 2022.

PASSED, APPROVED AND ADOPTED this 5th day of January, 2022.

____
Mayor of the City of Corona, California

ATTEST:

____
City Clerk of the City of Corona, California

CERTIFICATION

I, Sylvia Edwards**,** City Clerk of the City of Corona, California, do hereby certify that the foregoing Resolution was regularly passed and adopted at a regular meeting of the City Council of the City of Corona, California, at a regular meeting thereof held on the 5th day of January, 2022, by the following vote:

AYES:

NOES:

ABSENT:

ABSTAINED:

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of the City of Corona, California, this 5th day of January, 2022.

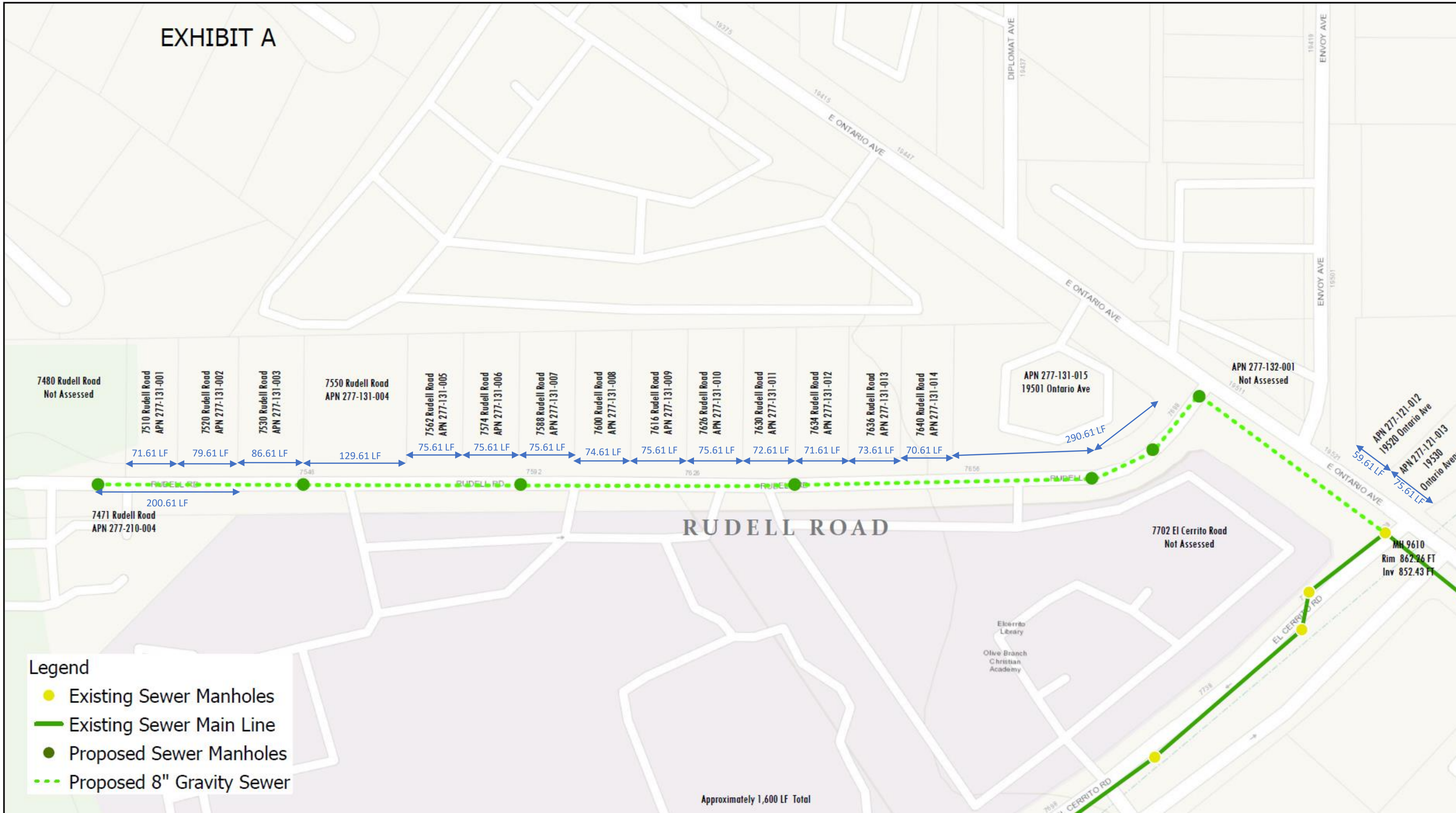
____
City Clerk of the City of Corona, California

(SEAL)

EXHIBIT A

RUDELL ROAD SEWER EXTENSION PROJECT

SEE ATTACHED 1 PAGE



RUDELL ROAD SEWER EXTENSION PROJECT

EXHIBIT B

PAYMENT PLAN AGREEMENT

SEE ATTACHED 12 PAGES

RECORDED AT REQUEST OF
AND WHEN RECORDED RETURN TO:
City of Corona
400 S. Vicentia Ave
Corona, California 92882
Attn: City Clerk (Utilities Department)

Fee Exempt - Gov't Code §27383

APN: XXX-XXX-XXX **(Space above for Recorder's Use)**

CITY OF CORONA
PAYMENT PLAN AGREEMENT

RUDELL ROAD SEWER EXTENSION - CONSTRUCTION CHARGES
(TYPE OF USER USER – ADDRESS)

1. PARTIES AND DATE.

This Payment Plan Agreement ("Agreement") is made and entered into this DAY day of MONTH, YEAR ("Effective Date") by and between the City of Corona, a California municipal corporation ("City"), and Rescare Holdings ("Owner"). City and Owner are at times referred to collectively as "Parties" and individually as "Party" herein.

2. RECITALS.

2.1 Subject Property. The Owner is the record owner of certain real property located at ADDRESS, Corona, California 92881, more particularly described in **Exhibit A** attached hereto and incorporated herein by reference ("Subject Property"). The Subject Property is currently served by an individual sewer septic system and the Owner desires to connect the Subject Property to the City's sewer collection system.

2.2 Connection Fee/Charge. Corona Municipal Code section 13.12.100 requires that prior to connecting to the City's sewer system, the person requesting such connection shall pay a construction charge to cover the proportionate cost of constructing the public sewer in the amount, manner, and time of payment established by resolution of the City Council.

2.3 Rudell Road Sewer Extension Project; Construction Charge. The parcel owner at ADDRESS is currently on septic system and would like to discontinue using his system and connect to the public sewerage system. The City's sewer collection system is located more than 200 feet from such parcel. In order to connect such parcel to the City's sewer collection system, it is necessary to construct an approximately 1,600-foot extension of the City sewer system, consisting of a sewer main line and appurtenances, from the existing terminal manhole at the intersection of El Cerrito Road and Ontario Avenue and extending northward on Ontario Avenue and then westward on Rudell Road ("Rudell Road Sewer Extension"). Pursuant to Resolution No. 2022-002, the City Council established a Construction Charge (defined below) for the construction of the Rudell Road Sewer Extension Project equal to the actual Total Cost (as defined in Resolution No. 2022-002) of construction.

2.4 Allocation for Benefitted Parcels. Including the parcel noted above, the Rudell Road Sewer Extension will permit the following eighteen (18) single-family residential properties, commercial properties, and a church assembly building, which are currently connected to individual sewer septic systems, to be connected to the City's sewer system: 19530 Ontario Avenue, 19520 Ontario Avenue, 19501 Ontario Avenue, 7640 Rudell Road, 7636 Rudell Road, 7634 Rudell Road, 7630 Rudell Road, 7626 Rudell Road, 7616 Rudell Road, 7600 Rudell Road, 7588 Rudell Road, 7574 Rudell Road, 7562 Rudell Road, 7550 Rudell Road, 7530 Rudell Road, 7520 Rudell Road, 7510 Rudell Road, and 7471 Rudell Road ("Benefitted Parcels"). Pursuant to Resolution No. 2022-002, the City Council has allocated the construction charge on a proportional basis to the Benefitted Parcels based upon the percentage of linear footage of the portion of the Rudell Road Sewer Extension that is located along the property frontage of each Benefitted Parcel compared to the total linear footage of the Rudell Road Sewer Extension.

2.5 Optional Sewer Lateral. In addition to the Rudell Road Sewer Extension, it is necessary to construct a lateral sewer line to connect the sewer main line to the Subject Property. If the Owner wishes to have the City construct such sewer lateral, this Agreement shall also obligate Owner to pay the actual Total Cost incurred by the City to construct said lateral sewer line, as provided further herein.

2.6 Payment Agreement. Pursuant to Section 13.12.100 and Resolution No. 2022-002, the construction charge for the Rudell Road Sewer Extension Project and, if applicable, the Total Cost of the lateral sewer line connecting the sewer main line to the Subject Property, may be paid pursuant to this payment plan agreement entered into by the Owner and the City.

3. AGREEMENT.

3.1 Incorporation of Recitals & Resolution No. 2022-002. The Parties acknowledge that the above recitals are true and correct, and incorporate those recitals by reference into this Agreement. The Parties also acknowledge that Corona City Council Resolution No. 2022-002 is incorporated herein by reference.

3.2 Construction Charge. Pursuant to Resolution No. 2022-002, the City has established a construction charge equal to the Total Cost (as defined in Resolution No. 2022-002) to construct the Rudell Road Sewer Extension Project to be collected from the Benefitted Parcels, including the Subject Property, prior to connection to the City's sewer system ("Construction Charge"). The Construction Charge is allocated to the Benefitted Parcels based upon the percentage of linear footage of the portion of the Rudell Road Sewer Extension Project that is located along the property frontage of each Benefitted Parcel, as compared to the total linear footage of the Rudell Road Sewer Extension Project.

3.2.1 Allocation of Construction Charge for Subject Property. Pursuant to Resolution No. 2022-002, the fair share percentage allocated to the Subject Property is PERCENTAGE IN WORDS (PERCENTAGE IN NUMBERS%).

3.2.2 Estimated Construction Charge; Financed Construction Charge. For informational purposes only, the City has estimated the Total Cost of constructing the Rudell Road Sewer Extension to be one million dollars and no cents ($1,000,000), and thus as of the Effective Date estimates that the fair share of the Construction Charge for the Subject Property is TOTAL COST IN WORDS ($TOTAL COST IN NUMBERS) ("Estimated Construction Charge"). Upon completion of the Rudell Road Sewer Extension and the Lateral Line, the City shall: (1) document and determine the actual Total Cost of constructing the Rudell Road Sewer Extension; (2) calculate the actual Construction Charge owed by the Owner for the Subject Property based upon the fair share percentages provided in Section 2.2.1 above ("Financed Construction Charge"); and (3) provide by certified mail such information to the Owner.

3.3. Requested Lateral Sewer Line - Cost. At the request of Owner, City shall construct a lateral sewer line to connect the Subject Property to the sewer main line that will be constructed as part of the Rudell Road Sewer Extension Project ("Lateral Line"). Owner agrees to pay one hundred percent (100%) of the actual Total Cost (as defined in Resolution No. 2022-002) to construct the Lateral Line ("Actual Lateral Line Cost"). For informational purposes only, the current estimated Lateral Line Cost, based upon the City's most recent engineering estimates and other reasonably available data, is Twelve Thousand Dollars ($12,000) ("Estimated Lateral Line Cost").

3.4. Total Principal Obligation. The terms "Financed Construction Charge" and, if applicable, "Actual Lateral Line Cost" shall hereafter be collectively referred to as the "Total Principal Obligation" throughout this Agreement.

3.5 Monthly Payment Schedule. In lieu of paying the Total Principal Obligation in one lump-sum payment, Owner agrees to pay the Total Principal Obligation, plus six percent (6%) simple interest, in monthly installments ("Monthly Payment") for a period of sixty (60) months in the amounts specified in the amortization schedule set forth in **Exhibit B** attached hereto and incorporated herein by reference ("Amortization Schedule"). Each Monthly Payment shall be due and payable in immediately available funds on or before fifth (5th) day of each month commencing with the first full month following completion of the Rudell Road Sewer Extension Project and the Lateral Line.

3.5.1 Estimated Total Principal Obligation; Updated Amortization Schedule. The Parties acknowledge that the Amortization Schedule is based upon the Estimated Construction Charge and the Estimated Lateral Line Cost. Once the Financed Construction Charge and the Actual Lateral Line Cost are determined pursuant to Sections 3.2.2 and 3.3 of this Agreement, the Parties agree that the Amortization Schedule will be updated accordingly to reflect the Total Principal Obligation, Owner shall sign such updated Amortization Schedule, and said updated Amortization Schedule shall be automatically incorporated into this Agreement by reference without an amendment to this Agreement.

3.6 Non-Transferable. Owner understands and agrees that the connection rights supplied by the City are not transferable and shall remain with the Subject Property, and that neither Owner nor any other person or party shall be entitled to a refund of any amounts paid under this Agreement, for any reason.

3.7 Discontinuation of Sewer/Water Service. If an Event of Default occurs, including failure to timely make any required Monthly Payment, Owner understands, acknowledges and agrees that City reserves the right to discontinue water service to the Subject Property to the extent authorized by applicable law. City shall have the right to completely discontinue water service to the Subject Property until the unpaid balance has been paid in full and shall not be required to provide limited service according to a pro rata formula. Owner expressly waives any and all rights it may have under any uniform codes (including, but not limited to, the California Building Code), or under any other applicable law(s), to receive sewer and/or water service, except in compliance with this Agreement and to the extent authorized by applicable law.

3.8 Contractual Lien. Owner further agrees for itself, its heirs, successors, and assigns, that effective upon the execution of this Agreement, City shall have a lien upon the Subject Property to guarantee the full and timely performance by Owner of its obligations under this Agreement. The lien upon the Subject Property shall be in an amount equal to the unpaid portion of the Total Principal Obligation, plus any accrued interest and any costs incurred by the City to enforce this Agreement. Such lien may be enforced in the manner provided by law. This lien is in addition to any rights or remedies which the City may have which may arise by operation of any applicable law, including, without implied limitation, the Corona Municipal Code. The lien created pursuant to this Agreement shall occupy a priority position against the Subject Property senior to all other non-statutory monetary liens and encumbrances against the Subject Property, except to the extent that Owner lacks the right to grant the lien priority over other liens and encumbrances against the Subject Property existing as of the date of this Agreement.

3.9 Recordation and Enforcement. City may record this Agreement in the official records of the County of Riverside, and may take such action in law, equity, or otherwise, as City deems necessary to enforce the provisions of this Agreement, including but not limited to actions for injunctive relief. This Agreement shall run with the land. The obligations of and the lien created by this Agreement shall run with the Subject Property, and the requirements imposed by this Agreement shall bind the heirs, successors and assigns of Owner as owner of the Subject Property until satisfied in full. Owner further agrees and acknowledges the City may take such measures as it deems necessary to collect the Total Principal Obligation in the event of nonpayment, including tendering the debt to a collection agency and/or initiating legal action for collection.

3.10 Attorneys' Fees. If any legal action, or any arbitration or other proceeding is initiated for the enforcement of this Agreement or because of any alleged dispute, breach, default or misrepresentation in connection with any of the provisions of this Agreement, the successful or prevailing party shall be entitled to recover reasonable attorneys' fees, witness fees and other costs incurred in that action or proceeding, in addition to any other relief to which it may be entitled.

3.11 Indemnity. Owner shall indemnify, defend and hold harmless City, its elected officials, board members, officers, agents, employees and authorized volunteers from and against any and all claims, damages, demands, liability, costs, losses and expenses, including, without limitation, court costs, reasonable attorneys' fees, and expert witness fees, arising out of, in connection with or in any way related to the negligence or misconduct of Owner relating to this

Agreement, including but not limited to any breach of this Agreement by Owner, and including, without limitation, all costs of collection, including attorneys' fees and all costs of suit, in the event any payment required under this Agreement is not made when due.

3.12 Term. This Agreement shall be in full force and effect from the Effective Date and shall continue in full force and effect until Owner has paid all money due to City hereunder.

3.13. Events of Default. Upon the occurrence of any of the events listed below, an "Event of Default" shall be deemed to have occurred and City may, at City's option, without prior notice, (i) declare the then-unpaid principal amount of the Total Principal Obligation, plus any accrued interest (collectively, the "Payment Amount") to be immediately due and payable, and the same shall immediately become due and payable; and (ii) exercise all rights and remedies provided in this Agreement:

3.13.1 Owner shall fail to make any payment under this Agreement when due or within ten (10) days following written notice of such failure from City; or

3.13.2 There shall occur any breach of this Agreement by Owner; or

3.13.3 Owner shall (i) become insolvent or unable to pay Owner's debts generally as they mature, (ii) make a general assignment for the benefit of creditors, (iii) admit in writing Owner's inability to pay Owner's debts generally as they mature, (iv) file or have filed against it a petition in bankruptcy or a petition or answer seeking a reorganization, arrangement with creditors or other similar relief under the Federal bankruptcy laws or under any other applicable law of the United States of America or any state thereof, or (v) consent to the appointment of a trustee or receiver for it or for a substantial part of the Subject Property; or

3.13.4 Any order, judgment or decree shall be entered appointing, without Owner's consent, a trustee or receiver for it or for a substantial part of the Subject Property that is not removed within sixty (60) days from such entry; or

3.13.5 A judgment against Owner for the payment of money totaling in excess of $10,000 shall be outstanding for a period of sixty (60) days without a stay of execution thereof; or

3.13.6 The holder of any senior or junior encumbrance on the personal property collateral encumbered by this Agreement shall institute foreclosure or other proceedings for the enforcement of its remedies thereunder; or

3.13.7 Owner permits or suffers Owner's leasehold or other interest in the Subject Property to be divested, sold, transferred, terminated or otherwise conveyed, whether voluntarily or involuntarily. This provision shall apply to each and every sale, transfer or conveyance, regardless of whether or not City has consented to, or waived, City's right hereunder, whether by action or nonaction, in connection with any previous sale, transfer, or conveyance, whether one or more.

Notwithstanding the above, in the event of an actual or deemed entry of an order for relief with respect to Owner under the United States Bankruptcy Code, this Agreement and all interest and other amounts due hereon shall automatically become and be due and payable, without presentment, demand, protest or any notice of any kind, all of which are hereby expressly waived by Owner. City may exercise its option to accelerate after any Event of Default, regardless of any prior forbearance.

3.14. Entire Agreement. This Agreement contains the entire Agreement of the parties with respect to the subject matter hereof, and supersedes all prior negotiations, understandings or agreements.

3,15. Modification. This Agreement may be modified only in writing, signed by both Parties.

3.16. Notice. Written notice, whenever required by this Agreement, shall become effective upon personal service or deposit in the United States mail, postage prepaid, addressed to the following:

CITY:	OWNER:
City of Corona	NAME
755 Public Safety Way	ADDRESS
Corona, CA 92880	Corona, CA 92881
Attn: Tom Moody, General Manager Utilities Department	

3.17. Venue. This Agreement shall be interpreted according to the laws of the State of California. Venue shall be in Riverside County, California.

3.18. Counterparts. This Agreement may be executed in counterparts, all of which, taken together, shall be deemed one original.

3.19. Corona Utility Authority. Owner understands that the City has entered into a Water Enterprise Management Agreement and a Wastewater Enterprise Management Agreement, both dated as of February 6, 2002, with the Corona Utility Authority ('CUA') for the maintenance, management and operation of those utility systems (collectively, the 'CUA Management Agreements'). To the extent that this Agreement is deemed to be a "material contract" under either of the CUA Management Agreements, the following provisions shall apply: (1) City enters into this Agreement on behalf of the CUA and subject to the terms of the applicable CUA Management Agreement(s); and (2) Owner has no right to terminate this Agreement, either with or without cause, based upon the existence or non-existence of either or both of the CUA Management Agreements. Therefore, if an applicable CUA Management Agreement expires or terminates for any reason, Owner shall remain fully obligated to perform under this Agreement on behalf of the CUA or another third party contracted by the CUA for the maintenance, management and operation of the applicable utility system. In recognition of the foregoing, the parties hereto have executed this Payment Plan Agreement for Construction Charges to Connect to City's Sewer System the day and year first stated above.

[SIGNATURES ON NEXT TWO PAGES]

CITY SIGNATURE PAGE TO

CITY OF CORONA
PAYMENT PLAN AGREEMENT

RUDELL ROAD SEWER EXTENSION - CONSTRUCTION CHARGES
(TYPE OF USER USER – ADDRESS)

CITY OF CORONA

By: ___________________________
Tom Moody
General Manager

Approved as to Form:

By: ___________________________
Dean Derleth
City Attorney

OWNER SIGNATURE PAGE TO

CITY OF CORONA
PAYMENT PLAN AGREEMENT

RUDELL ROAD SEWER EXTENSION - CONSTRUCTION CHARGES
(<u>TYPE OF USER</u> USER – <u>ADDRESS</u>)

<u>NAME</u>

By: ____________________________
Signature

____
Name (Print)

____
Title (Print)

<u>NAME</u>

By: ____________________________
Signature

____
Name (Print)

____
Title (Print)

EXHIBIT A

LEGAL DESCRIPTION/DEPICTION OF SUBJECT PROPERTY

[SEE ATTACHED ONE (1) PAGE]

PUBLIC WORKS DEPARTMENT

(951) 736-22
(951) 279-362

400 SOUTH VICENTIA AVENUE, P.O. BOX 940, CORONA, CALIFORNIA 92879-0940
CITY HALL - ON LINE ALL THE TIME (http://www.discovercorona.com)

Legal Description/Depiction of Subject Property

WRITE IN LEGAL DESCRIPTION OF PROPERTY PER TITLE RECORDS

EXHIBIT B

AMORTIZATION SCHEDULE

[SEE ATTACHED ONE (1) PAGE]

Amortization Schedule

Payment Plan Agreement Exhibit "B"

Loan Amount	$29,752.94
Annual Interest Rate	6.0%
Loan Period in Months	60
Payments	$575.21

PMT No.	Beginning Balance	Payment	Principal	Interest	Cumulative Principal	Cumulative Interest	Ending Balance
1	$29,752.94	$575.21	$426.45	$148.76	$426.45	$148.76	$29,326.49
2	$29,326.49	$575.21	$428.58	$146.63	$855.03	$295.39	$28,897.91
3	$28,897.91	$575.21	$430.72	$144.49	$1,285.75	$439.88	$28,467.19
4	$28,467.19	$575.21	$432.87	$142.34	$1,718.62	$582.22	$28,034.32
5	$28,034.32	$575.21	$435.04	$140.17	$2,153.66	$722.39	$27,599.28
6	$27,599.28	$575.21	$437.21	$138.00	$2,590.87	$860.39	$27,162.07
7	$27,162.07	$575.21	$439.40	$135.81	$3,030.27	$996.20	$26,722.67
8	$26,722.67	$575.21	$441.60	$133.61	$3,471.87	$1,129.81	$26,281.07
9	$26,281.07	$575.21	$443.80	$131.41	$3,915.67	$1,261.22	$25,837.27
10	$25,837.27	$575.21	$446.02	$129.19	$4,361.69	$1,390.41	$25,391.25
11	$25,391.25	$575.21	$448.25	$126.96	$4,809.94	$1,517.37	$24,943.00
12	$24,943.00	$575.21	$450.49	$124.72	$5,260.43	$1,642.09	$24,492.51
13	$24,492.51	$575.21	$452.75	$122.46	$5,713.18	$1,764.55	$24,039.76
14	$24,039.76	$575.21	$455.01	$120.20	$6,168.19	$1,884.75	$23,584.75
15	$23,584.75	$575.21	$457.29	$117.92	$6,625.48	$2,002.67	$23,127.46
16	$23,127.46	$575.21	$459.57	$115.64	$7,085.05	$2,118.31	$22,667.89
17	$22,667.89	$575.21	$461.87	$113.34	$7,546.92	$2,231.65	$22,206.02
18	$22,206.02	$575.21	$464.18	$111.03	$8,011.10	$2,342.68	$21,741.84
19	$21,741.84	$575.21	$466.50	$108.71	$8,477.60	$2,451.39	$21,275.34
20	$21,275.34	$575.21	$468.83	$106.38	$8,946.43	$2,557.77	$20,806.51
21	$20,806.51	$575.21	$471.18	$104.03	$9,417.61	$2,661.80	$20,335.33
22	$20,335.33	$575.21	$473.53	[illegible]	$9,891.14	$2,763.48	$19,861.80
23	$19,861.80	$575.21	$475.90	$99.31	[illegible]	$2,862.79	$19,385.90
24	$19,385.90	$575.21	$478.28	$96.93	[illegible]	$2,959.72	$18,907.62
25	$18,907.62	$575.21	$480.67	[illegible]	[illegible]	$3,054.26	$18,426.95
26	$18,426.95	$575.21	$483.08	[illegible]	$11,809.07	$3,146.39	$17,943.87
27	$17,943.87	$575.21	[illegible]	[illegible]	$12,294.56	$3,236.11	$17,458.38
28	$17,458.38	$575.21	$487.92	$87.29	$12,782.48	$3,323.40	$16,970.46
29	$16,970.46	$575.21	[illegible]	$84.85	$13,272.84	$3,408.25	$16,480.10
30	$16,480.10	$575.21	[illegible]	$82.40	$13,765.65	$3,490.65	$15,987.29
31	$15,987.29	$575.21	[illegible]	$79.94	$14,260.92	$3,570.59	$15,492.02
32	$15,492.02	$575.21	[illegible]	$77.46	$14,758.67	$3,648.05	$14,994.27
33	$14,994.27	$575.21	$500.24	$74.97	$15,258.91	$3,723.02	$14,494.03
34	$14,494.03	[illegible]	[illegible]	$72.47	$15,761.65	$3,795.49	$13,991.29
35	$13,991.29	[illegible]	[illegible]	$69.96	$16,266.90	$3,865.45	$13,486.04
36	$13,486.04	$575.21	[illegible]	$67.43	$16,774.68	$3,932.88	$12,978.26
37	$12,978.26	$575.21	$510.32	$64.89	$17,285.00	$3,997.77	$12,467.94
38	$12,467.94	[illegible]	$512.87	$62.34	$17,797.87	$4,060.11	$11,955.07
39	$11,955.07	[illegible]	$515.43	$59.78	$18,313.30	$4,119.89	$11,439.64
40	$11,439.64	[illegible]	$518.01	$57.20	$18,831.31	$4,177.09	$10,921.63
41	$10,921.63	[illegible]	$520.60	$54.61	$19,351.91	$4,231.70	$10,401.03
42	$10,401.03	$575.21	$523.20	$52.01	$19,875.11	$4,283.71	$9,877.83
43	$9,877.83	$575.21	$525.82	$49.39	$20,400.93	$4,333.10	$9,352.01
44	$9,352.01	$575.21	$528.45	$46.76	$20,929.38	$4,379.86	$8,823.56
45	$8,823.56	$575.21	$531.09	$44.12	$21,460.47	$4,423.98	$8,292.47
46	$8,292.47	$575.21	$533.75	$41.46	$21,994.22	$4,465.44	$7,758.72
47	$7,758.72	$575.21	$536.42	$38.79	$22,530.64	$4,504.23	$7,222.30
48	$7,222.30	$575.21	$539.10	$36.11	$23,069.74	$4,540.34	$6,683.20
49	$6,683.20	$575.21	$541.79	$33.42	$23,611.53	$4,573.76	$6,141.41
50	$6,141.41	$575.21	$544.50	$30.71	$24,156.03	$4,604.47	$5,596.91
51	$5,596.91	$575.21	$547.23	$27.98	$24,703.26	$4,632.45	$5,049.68
52	$5,049.68	$575.21	$549.96	$25.25	$25,253.22	$4,657.70	$4,499.72
53	$4,499.72	$575.21	$552.71	$22.50	$25,805.93	$4,680.20	$3,947.01
54	$3,947.01	$575.21	$555.47	$19.74	$26,361.40	$4,699.94	$3,391.54
55	$3,391.54	$575.21	$558.25	$16.96	$26,919.65	$4,716.90	$2,833.29
56	$2,833.29	$575.21	$561.04	$14.17	$27,480.69	$4,731.07	$2,272.25
57	$2,272.25	$575.21	$563.85	$11.36	$28,044.54	$4,742.43	$1,708.40
58	$1,708.40	$575.21	$566.67	$8.54	$28,611.21	$4,750.97	$1,141.73
59	$1,141.73	$575.21	$569.50	$5.71	$29,180.71	$4,756.68	$572.23
60	$572.23	$575.21	$572.35	$2.86	$29,753.06	$4,759.54	-$0.12
		$34,512.60	**$29,753.06**	**$4,759.54**			

File #: 22-0022

REQUEST FOR CITY COUNCIL ACTION

DATE: 01/05/2022

TO: Honorable Mayor and City Council Members

FROM: City Manager's Office - City Clerk

SUBJECT:
Public Hearing to review and receive feedback on the redrawing of Council Member District boundaries.

EXECUTIVE SUMMARY:
Every ten years upon the release of the decennial census data, the City of Corona must redraw its five (5) City Council districts based on the new census data and criteria set forth in state law. Conducting the public hearings will fulfill the requirements needed so that the districts are redrawn and are substantially equal in population as required by the United States Constitution. Substantially equal has generally been defined by the U.S. Supreme Court as meaning districts exhibit no more than a 10% deviation between the least populated and greatest populated district.

RECOMMENDED ACTION:
That the City Council:

a. Receive a report from staff and the City's redistricting consultant on the redistricting process and permissible criteria to be considered to redraw district boundaries.

b. Conduct a public hearing to receive input on district boundaries, communities of interest, and other preferences for the drawing of revised Council districts.

BACKGROUND & HISTORY:
Pursuant to Election Code Section 21601, cities with by-district election systems are required to redraw their district boundary maps after each decennial Census to ensure compliance with the California and federal Voting Rights Acts. The process to complete the redistricting requires a minimum of four public hearings and dedicated public outreach to ensure minority populations and communities of interest are aware of the redistricting effort and are provided with options to participate.

ANALYSIS:
Every 10 years, cities with by-district election systems must use the new census data to review and, if needed, redraw district lines to reflect how local populations have changed. This process, called redistricting, ensures all districts have a nearly equal population. The redistricting process for the City of Corona must be completed by April 17, 2022.

The City adopted its current district boundaries in 2016, with the passage of Measure N, which authorized the transition to districts process. The map approved with Measure N was drawn based on 2010 census data as required by law. The districts must now be redrawn using the 2020 census data and in compliance with the FAIR MAPS Act, which was adopted by the California legislature as AB 849 and took effect January 1, 2020.

Under the Act, the City Council shall draw and adopt boundaries using the following criteria in the listed order of priority (Elections Code 21601(c)):

1. Comply with the federal requirements of equal population and the Voting Rights Act.
2. Be geographically contiguous.
3. Undivided neighborhoods and "communities of interest" (socio-economic geographic areas that should be kept together).
4. Display easily identifiable boundaries.
5. Be compact (do not bypass one group of people to get to a more distant group of people).
6. Shall not favor or discriminate against a political party.

Once the prioritized criteria are met, other traditional districting principles can be considered, such as:

1. Minimize the number of voters currently scheduled to vote in 2022 which, as a result of redistricting, would move some voters to districts not scheduled until 2024, resulting in a 6-year gap in their opportunity to participate in Council elections.
2. Respect voters' choices/continuity in office.
3. Future population growth.

By law, the City must hold at least four public hearings that enable community members to provide input on the drawing of district maps:

- At least one hearing must occur before the city or county draws draft maps.
- At least two hearings must happen after the drawing of draft maps.
- The fourth hearing can happen either before or after the drawing of draft maps.
- City or county staff or consultants may hold a public workshop instead of one of the required public redistricting hearings.

To increase the accessibility of these hearings, cities and counties must take the following steps:

- At least one hearing must occur on a Saturday, Sunday, or after 6:00 p.m. on a weekday.

- If a redistricting hearing is consolidated with another local government meeting, the redistricting hearing must be begin at a pre-designated time.
- Local public redistricting hearings must be made accessible for people with disabilities.

The purpose of this public hearing is to inform the public about the redistricting process and to hear from the community about factors that should be taken into consideration while creating district boundaries. The public is requested to provide input regarding communities of interest and other local factors that should be considered while drafting district maps. A community of interest under the relevant Elections Code for cities (Section 21621(c) is, "a population that shares common social or economic interests that should be included within a single district for purposes of its effective and fair representation."

First Public Hearing	January 5, 2022	First hearing, will review redistricting basics with City Council
Second Public Hearing	February 2, 2022	First review of draft maps, discuss and take feedback from Council and Public.
Third Public Hearing	February 16, 2022	Review revised maps, discuss and take feedback from Council and public. Ideally Council will select final map for up/down vote at the March meeting.
Fourth Public Hearing	March 2, 2022	Introduce final map for approval . If Council asks for any changes, then map must go to next meeting for introduction.
Fifth Public Hearing (if necessary)	TBD	Council will vote on final map if necessary.

<u>Community Engagement</u>

The City Clerk's Office and Broadcast Team will work on a Community Outreach Plan to include the following activities:

Public messaging via social media, City's website, Inner Circle News, press releases, and other public communications, in English and Spanish, including:

- Social media engagement via Facebook, Instagram, and Twitter
- Dedicated redistricting webpage on City's website for information, updates, calendars, and maps
- Targeted information to various outlets and groups, including non-profits, churches and schools
- Public notices posted at City facilities and published in the Sentinel
- Display advertisements on Channel 29 on Time Warner Spectrum and Channel 99 on AT&T

and YouTube video streaming

Online Interactive Tools:

- Updated online interactive mapping tool
    - Allows the public to draw and submit their own maps for analysis and consideration.
- Written public comment via email at CityClerk@Coronaca.gov

<u>Next Steps</u>

Following this hearing, the City's redistricting consultant will draft district maps for consideration at Public Hearings 2, 3, and 4. Prior to the hearings, the draft maps will be posted to the City website and available at City Hall.

The dates for the remaining public hearings to consider draft maps, are scheduled for Wednesday, February 2, 2022, Wednesday, February 16, 2022, and Wednesday, March 2, 2022, respectively. At these hearings the City Council may also discuss adjusting the sequencing of district elections so as to balance the number of officers on the ballot at any given election. Any changes to the current sequencing of district elections would be made part of the final ordinance adopting the revised district boundaries. If no change to the sequencing is required, the final ordinance would focus solely on approving the revised district boundaries.

FINANCIAL IMPACT:
There is no fiscal impact associated with this request.

ENVIRONMENTAL ANALYSIS:
This action is exempt pursuant to Section 15061(b)(3) of the Guidelines for the California Environmental Quality Act (CEQA), which states that a project is exempt from CEQA if the activity is covered by the common sense exemption that CEQA applies only to projects that have the potential for causing a significant effect on the environment. Where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA. This action merely requires electronic filing of campaign statements, and there is no possibility that this project will have a significant effect on the environment.

PREPARED BY: SYLVIA EDWARDS, CITY CLERK

REVIEWED BY: ROGER BRADLEY, ASSISTANT CITY MANAGER

Redistricting 2021 - 2022
First Public Hearing

Corona

2021/22 Redistricting Process

AGENDA

01 Project timelines

02 Key deadlines

03 Next steps and hearings

Corona Council Terms

Council Members hold 4-year terms*

- Measure N, adopted by voters in 2016, created a by-district election system
- Five districts drawn from 2010 Census data
- First district election held in 2018

City of Corona

- Districts 1, 4 and 5 will elect in 2022
- Districts 2 and 3 will elect in 2024

Redistricting Process

STEPS	DESCRIPTION
1. Public Hearing No. 1	Present an overview of the redistricting process, hearing from community on communities of interest
2. Release draft maps	Draft maps posted to project website
3. Public hearing No. 2	Review Draft maps Take public input Consider Communities of Interest
4. Initial deadline for draft maps	Deadline for the public to submit draft maps for inclusion in the next hearing packet and presentation
5. Public Hearing No. 3	Public Hearing to discuss and revise, if desired, the draft map(s)
5. Public Hearing No. 4 - Map adoption	• Map adopted via ordinance or resolution • Final map must be posted at least 7 days prior to adoption

Redistricting Rules & Goals

Federal Law

- Equal Population
- Federal Voting Rights Act
- No Racial Gerrymandering

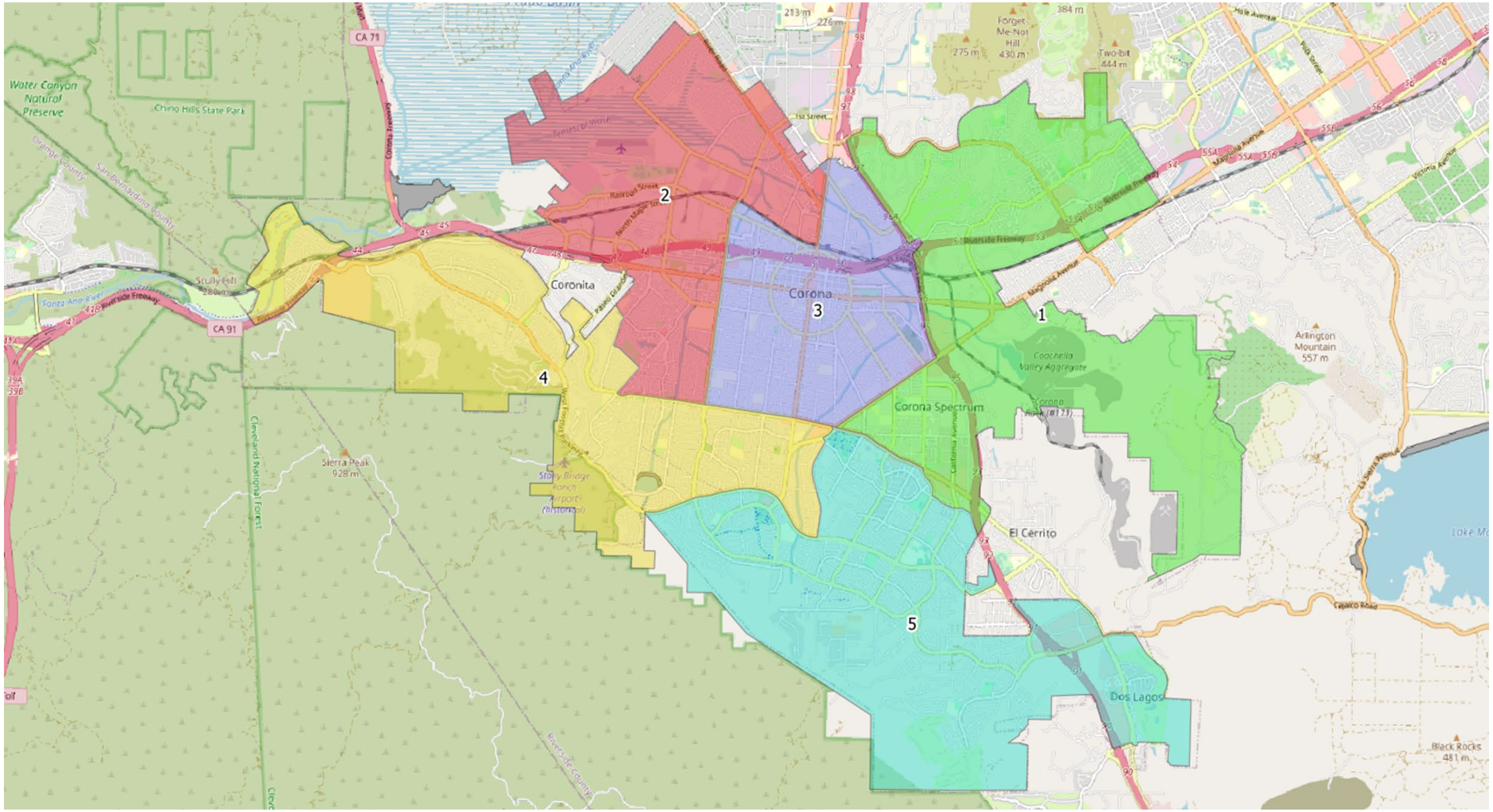
California Criteria for Cities

Other traditional principles

- Minimize voters shifted to different election years
- Respect voters' choices / continuity in office
- Future population growth
- Preserving the core of existing districts

BEST BEST & KRIEGER LLP
ATTORNEYS AT LAW

Existing Districts



Existing District Boundaries with 2020 Census Data

District	Total Pop	Raw Deviation	% Deviation	Latino	CVAP Total	CVAP NL White	CVAP NL Black	CVAP Hispanic	CVAP Not Hispanic	CVAP NL AIAN	CVAP NL ASIAN	CVAP NL Hawaiian	CVAP NL Other
1	30,314	-1,222	-3.87%	12,450	21,028	8,284	1,865	7,098	13,911	83	3,114	127	73
2	32,952	1,416	4.49%	19,230	20,560	7,339	1,298	9,868	10,689	66	1,324	72	79
3	30,301	-1,235	-3.92%	21,632	18,184	6,508	476	10,424	7,780	55	691	10	26
4	30,957	-579	-1.84%	10,824	24,231	11,336	1,136	7,586	16,658	58	3,400	232	145
5	33,155	1,619	5.13%	9,263	25,283	12,629	1,755	6,081	19,170	31	4,115	91	142

Total Population: 157,679 • **Ideal Population:** 31,536 **Total Deviation:** 9.05%

BEST BEST & KRIEGER LLP
ATTORNEYS AT LAW

Findings

- Total Deviation is below the “acceptable” range at 9.05%
- Current district boundaries may be adjusted for population balance
- Creating a majority/minority district is possible. District 3 is already a majority/minority Hispanic voting district

Preeminent Considerations

- Equal population (one person/one vote)
- Racial minority voice
- Geographically contiguous districts
- Measured objectively

Important Considerations

"Communities of Interest”

- Physical boundaries
  - Natural or artificial barriers
  - Roadways, rivers, railways
  - Parks, schools, and other landmarks

- Geographic integrity, compactness

Important Considerations

"Communities of Interest"

- Political boundaries
  - School attendance areas
  - Special district service areas
  - Federal, state, and county divisions

Important Considerations

"Communities of Interest"

- Not:
  - Incumbents' residences
  - Political affiliations

Public Hearing & Discussion

- What is your neighborhood and what are its boundaries?
- What other notable areas are in the city, and what are their boundaries?
- Inform the public on how they can participate

Public Hearing & Discussion

Any questions about what's next?

Following tonight's hearing, BB&K will begin drawing draft maps for presentation at 2nd Public Hearing.

Sources of Information

- Demographic data
- Staff expertise
- Public input
    - The City may wish to conduct a workshop to further engage the public
- Council input

ReMapCorona.org

- Dedicated Repository for all redistricting information

- Must be maintained online for 10 years

- Updated regularly as the process unfolds

ReMapCorona.org

City of Corona Redistricting 2022

Help Re-Draw City Council District Boundaries

Welcome | Public Meetings and Agenda | Draw a Map | Draft Maps | Frequently Asked Questions (FAQ's) | Resources | Contact Us

Welcome

Every 10 years, local governments use new data from the Census to redraw their district lines to reflect how local populations have changed. The City of Corona is asking for your help to plan, draw, and reapportion new City districts. Even though the City just transitioned to district based elections in 2018, it is still required to redraw the lines following the release of the 2020 Census Data.

The finalized maps that you will help us create will change how you elect your City Council Members for the next 10 years.

Our primary goal when drawing election districts is to draw lines that respect neighborhoods, history and geographical elements. So we want to know: What do *you* consider the boundaries of your neighborhood?

Share your specific thoughts, draw a map or attend an upcoming public hearing to get involved!

This page will serve as your go-to homepage for all things Redistricting. You will find agendas for Council workshops and hearings, proposed maps for consideration, information on how you can get involved, and a list of resources if you want more information. You will also find our contact information.

Website Translation Available

Select Language

January 2022

M	T	W	T	F	S	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

« Dec

Timeline & Next Steps

- Provide input on the redistricting process and communities of interest
- Launch Mapping Tool online
- Evaluate any publicly submitted maps
- Return at Public Hearing #2 with first review of proposed maps

Timeline & Next Steps

January 5, 2022	Public Hearing No. 1, Overview of redistricting process
February 2, 2022	Public Hearing No. 2 – first review of draft maps
February 5 2022	Deadline for the public to submit draft maps for evaluation at Public Hearing No. 3.
February 16, 2022	Public Hearing No. 3 to review publicly submitted maps and consider input from workshops
March 2, 2022	Public Hearing No. 4 to discuss and select the top (3) maps for further consideration
April 17, 2022	Deadline to adopt and submit map to Registrar of Voters

File #: 22-0007

REQUEST FOR CITY COUNCIL AND
CORONA UTILITY AUTHORITY ACTION

DATE: 01/05/2022

TO: Honorable Mayor and City Council Members
Honorable President and Board Members

FROM: Utilities Department

SUBJECT:
Public Hearing and Resolution adopting the Temescal Basin Groundwater Sustainability Plan.

EXECUTIVE SUMMARY:
The City prepared a Groundwater Sustainability Plan for the Upper Santa Ana Valley Groundwater Basin, referred to as the Temescal Basin. The Groundwater Sustainability Plan (GSP) has been prepared in compliance with the Sustainable Groundwater Management Act (SGMA) and with guidance from the California Department of Water Resources (DWR). SGMA requires all medium- and high-priority groundwater basins to be managed by a Groundwater Sustainability Agency (GSA) and prepare a GSP. The City prepared the Temescal Basin GSP in concert with other agencies in the Temescal Basin and in consideration of input from local stakeholders. Through this Resolution, the City will formally adopt the Temescal Basin GSP as the lead agency of the Temescal Basin GSA.

RECOMMENDED ACTION:
That the:

a. City Council hold a public hearing regarding the Temescal Basin Groundwater Sustainability Plan.

b. City Council adopt Resolution No. 2022-001, adopting the Temescal Basin Groundwater Sustainability Plan.

c. Corona Utility Authority, review, ratify, and to the extent necessary, direct the City Council to take the above actions.

BACKGROUND & HISTORY:

On September 16, 2014, the Governor signed a three-bill package, known collectively as the Sustainable Groundwater Management Act (SGMA), into law that established a new structure for sustainable groundwater management. The Sustainable Groundwater Management Act went into effect on January 1, 2015. SGMA requires all medium- and high-priority groundwater basins, as designated by the California Department of Water Resources (DWR) Bulletin 118, to be managed by a Groundwater Sustainability Agency (GSA) or multiple GSAs. The Temescal Basin GSA was created consisting of the City of Corona, City of Norco, and the Home Gardens County Water District. Through a Memorandum of Understanding (MOU), the City of Corona accepted the responsibility to develop a Groundwater Sustainability Plan (GSP) for the Temescal Basin, a medium-priority groundwater basin.

ANALYSIS:

The City of Corona Purchasing division issued a Request for Proposals (RFP) for GSP development in November 2019. The RFP was awarded to Todd Groundwater and approved by the City Council on May 20, 2020. The approved proposal included two subconsultants, Carollo Engineers and Kearns & West. Todd Groundwater was the lead consultant assisting the City of Corona in preparing a GSP for the Temescal Basin. The City of Corona has been working with Todd Groundwater since May 2020 to prepare a GSP for the Temescal Basin. The GSP has been prepared to be consistent with SGMA, using guidance from DWR, and input from local stakeholders.

<u>Public Outreach and Stakeholder Engagement</u>

The Temescal Basin GSP preparation was a transparent process where stakeholders and the public were invited to participate and comment throughout its creation. A dedicated Temescal Basin groundwater webpage was created, hosted by the City of Corona. The webpage was updated with meeting dates/times, registration links, meeting presentations, meeting summaries, and drafts of the GSP chapters as they became available. A Technical Advisory Committee (TAC) was formed from select neighboring agencies and local stakeholders. The TAC members included:

- City of Corona - Utilities Department
- City of Corona - Council Members
- Home Gardens County Water District
- City of Norco
- Riverside County Flood Control and Water Conservation District
- California Regional Water Quality Control Board - Santa Ana Region 8
- All American Asphalt
- 3M Industrial Mineral Products Division

Four TAC meetings were held on April 19, 2020, November 18, 2020, February 17, 2021, and June 16, 2021. TAC members received presentations on SGMA, groundwater conditions in the Temescal Basin, draft plans for continued sustainable management of the Basin, and drafts of GSP chapters as they were created to review and provide feedback to the Temescal Basin GSA and the consultant team.

The Temescal Basin GSA also hosted public workshops where anyone interested in the Temescal

Basin GSP could attend, comment, and/or ask questions. Three Public Workshops were held on September 29, 2020, March 2, 2021, and July 8, 2021. The public workshops were open to the public. In order to promote participation, the Temescal Basin GSA maintained an open-enrollment "Interested Parties List" that was used to distribute information regarding meeting dates, times, and availability of GSP component drafts. All meetings were held virtually via Zoom, and were simultaneously broadcasted on YouTube, Facebook, and Corona's public broadcast cable channel. The Public Workshops were all led in English while simultaneously translated to Spanish. Viewers who wished to view meetings in Spanish could do so via a "Spanish room" option within the Zoom platform.

Additional outreach included distribution of public information fliers in both English and Spanish and targeted outreach meetings to local community leaders and community advocacy groups.

Basin Setting

The Temescal Basin is bound on the west by the Santa Ana Mountains and the east by low-lying El Sobrante de San Jacinto and La Sierra Hills and it is adjacent to the Bedford Coldwater, Chino, and Riverside-Arlington Sub-basins of the Upper Santa Ana Groundwater Basin and the Coastal Plain of the Orange County Basin.

The Temescal Basin is located within one of the structural blocks of the Peninsular Ranges of Southern California. The Basin occurs in a linear low-lying block, referred to as the Elsinore-Temecula trough, that extends from Corona to the southeast some 30 miles and was formed along an extensive northwest-southeast trending fault zone including the Elsinore, Chino, and related faults.

The basin-fill alluvial deposits and, to some extent, the underlying sedimentary units make up the aquifers in the Basin. Three aquifer packages provide water supply to wells in the Basin: the Channel Aquifer, the Alluvial Fan aquifers, and, to a lesser extent, consolidated sandstone aquifers. Of these three aquifers, the Channel Aquifer is the only principal aquifer as it is the most productive aquifer and provides most of the groundwater supply in the Basin.

Groundwater Conditions

Water levels in the Channel Aquifer vary in response to wet and dry hydrologic cycles. Increased pumping and prolonged drought have resulted in a slight decline in water levels over the past twenty years. Groundwater levels reached their respective highs in the early 1980s in response to a wet hydrologic cycle that began in 1978. The lowest groundwater levels generally correspond to dry periods and periods of increased pumping, though the responses throughout the Basin are not uniform.

Total Dissolved Solids (TDS) and nitrates are the primary water quality constituents of concern in the Basin. Groundwater in the Basin is somewhat mineralized, with high TDS concentrations in many monitored wells. Groundwater in the Basin has been impacted by human activities both in the Basin and watershed including agricultural, urban, and industrial land uses. Elevated nitrate concentrations have been documented in the Basin since, at least, the 1950s.

Water Budget

A water balance (or water budget) is a quantitative tabulation of all inflows, outflows, and storage change of a hydrologic system. This GSP contains a detailed water balance for both the groundwater system and surface water system of the Basin. The water budgets were developed for time periods representing historical, current, future no project (baseline), and future growth plus climate change conditions. The two future scenarios were simulated to test sustainability, and both showed sustainable conditions in the future.

Sustainable Management Criteria

The sustainable management goal of the Temescal Basin is to sustain groundwater resources for the current and future beneficial uses of the Basin in a manner that is adaptive and responsive to the following objectives:

- Provide a long-term, reliable, and efficient groundwater supply for municipal, industrial, and other uses;
- Provide reliable storage for water supply resilience during droughts and shortages;
- Protect groundwater quality;
- Support beneficial uses of interconnected surface waters; and
- Support integrated and cooperative water resource management.

This goal is consistent with SGMA and is based on information from other aspects of the GSP.

A GSP must develop quantitative sustainability criteria for all applicable sustainability indicators that allow the Temescal Basin GSA to define, measure, and track the progress of sustainable management criteria of the Temescal Basin. These criteria include the following:

- Undesirable Result - significant and unreasonable conditions for any of the six sustainability indicators which are groundwater level declines, groundwater storage reductions, land subsidence, degradation groundwater quality, seawater intrusion, and depletion of interconnected surface water (including impacts on groundwater dependent ecosystems).
- Minimum Threshold (MT) - numeric value used to define undesirable results for each sustainability indicator.
- Measurable Objective (MO) - specific, quantifiable goal to track the performance of sustainable management.

The sustainability indicators and sustainable management criteria are clearly defined and provide a quantitative analysis of the Basin’s sustainability. As the Basin has been managed without significant undesirable results, the sustainability criteria are defined to avoid future undesirable results.

Monitoring Network

The monitoring network for GSP implementation has been established to document groundwater and related surface conditions as relevant to the sustainability indicators, MTs, and MOs. The components of the monitoring network are built from existing programs and will be carried out by the Temescal GSA. The monitoring network comprises a set of existing wells in which groundwater elevations and water quality parameters have been measured historically and will continue to be measured in the future. There are currently 27 existing wells in which groundwater elevation has and will be monitored. Many of these wells are also used for monitoring groundwater quality, along with other water supply and water quality monitoring wells in the Temescal Basin. Additional monitoring wells may be added to the network in the future as necessary. The GSP includes plans to add several shallow wells for monitoring interconnected surface water conditions in the southern part of the Prado management zone.

Projects and Management Actions
During the preparation of the GSP, the Temescal Basin GSA identified five specific management actions (Actions) and three projects (Projects) to achieve the sustainability goal. The Actions are generally focused on data collection, storage and reporting of information necessary to monitor sustainability, and assessment of when Actions may be necessary (i.e., when MTs are approached or exceeded). The projects are generally designed to reduce uncertainty in areas where data gaps have been identified during development of the GSP. These projects and management actions are aimed at achieving sustainability goals and responding to changing conditions in the Basin.

GSP Implementation
The official adoption of the GSP by the Temescal Basin GSA will initiate Plan implementation. After submittal of the GSP to DWR, and during the DWR review period, the Temescal Basin GSA will continue to communicate with stakeholders via the City of Corona's website and begin implementing the projects and management actions described in the GSP. The Plan will be implemented to sustainably manage groundwater in the Basin under the authority of the Temescal Basin GSA and its member agencies.

The Temescal Basin GSA is required to submit an annual report to DWR by April 1st of each year following adoption of the GSP. The first annual report will be due in April of 2022. The Temescal Basin GSA has committed to implementing the GSP upon adoption and completing the projects and management actions necessary to monitor and maintain sustainability within the first five years of initiation of the GSP.

The Temescal Basin GSP is presented in draft form to allow for modifications based on public comments during the public hearing portion of the Council meeting. After adopting Resolution 2022-001, the Temescal Basin GSP will be finalized and submitted to DWR as a final document.

FINANCIAL IMPACT:
Funding for the recommended action is included in the Fiscal Year 2022 Utilities Department Operating Budget. Funding in future fiscal years will be recommended through the budget process.

ENVIRONMENTAL ANALYSIS:
This action is exempt pursuant to Section 15061(b)(3) of the Guidelines for the California Environmental Quality Act (CEQA), which states that a project is exempt from CEQA if the activity is covered by the commonsense exemption that CEQA applies only to projects that have the potential for causing a significant effect on the environment. Where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA. This action involves the approval of a plan, and there is no possibility that adopting this resolution will have a significant effect on the environment. Therefore, no

environmental analysis is required.

PREPARED BY: KRISTIAN ALFELOR, OPERATIONS MANAGER

REVIEWED BY: TOM MOODY, DIRECTOR OF UTILITIES

Attachments:
Exhibit 1 - Resolution No. 2022-001

RESOLUTION NO. 2022-001

RESOLUTION OF THE CITY COUNCIL OF THE CITY OF CORONA, CALIFORNIA, ADOPTING THE 2022 TEMESCAL BASIN GROUNDWATER SUSTAINABILITY PLAN

WHEREAS, On September 16, 2014, the Governor signed a three-bill package, known collectively as the Sustainable Groundwater Management Act (SGMA), into law that establishes a new structure for groundwater management; and

WHEREAS, the Sustainable Groundwater Management Act of 2014 went into effect on January 1, 2015; and

WHEREAS, SGMA requires all medium- and high-priority groundwater basins, as designated by the California Department of Water Resources (DWR) Bulletin 118, to be managed by a Groundwater Sustainability Agency (GSA) or multiple GSAs; and

WHEREAS, Water Code Section 10723.6 authorizes a combination of local agencies overlying a groundwater basin to elect to become a GSA by using a memorandum of agreement or other legal agreement; and

WHEREAS, the City of Corona (Corona), the City of Norco (Norco), and the Home Gardens County Water District (HGCWD) (collectively the Temescal Basin GSA) overlie the Temescal Groundwater Basin; and

WHEREAS, the Members have developed a Memorandum of Understanding (MOU) with the purpose of complying with SGMA requirements to form a GSA and to cooperatively develop, adopt, implement and manage a Groundwater Sustainability Plan (GSP) for the Temescal Groundwater Basin in accordance with SGMA; and

WHEREAS, through the MOU, the City of Corona has accepted the primary responsibility to develop a GSP for the Temescal Basin of the Upper Santa Ana Basin, submit the final draft to the Department of Water Resources (DWR), and prepare annual reports thereafter.

WHEREAS, after public review and hearing, the Corona City Council shall adopt the Temescal Basin Groundwater Sustainability Plan, which shall be filed with the Department of Water Resources by January 31, 2022.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Corona, California, that the 2022 Temescal Basin Groundwater Sustainability Plan is hereby adopted, and it is authorized to be filed with the DWR along with any additional information required by law.

PASSED, APPROVED AND ADOPTED on the 5th day of January, 2022.

____
Mayor of the City of Corona, California

ATTEST:

____
City Clerk of the City of Corona, California

CERTIFICATION

I, Sylvia Edwards, City Clerk of the City of Corona, California, do hereby certify that the foregoing Resolution was regularly passed and adopted by the City Council of the City of Corona, California, at an adjourned meeting thereof held on the 5th day of January 2022, by the following vote:

AYES:

NOES:

ABSTAINED:

ABSENT:

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of the City of Corona, California, this 5th day of January 2022.

____
City Clerk of the City of Corona, California

(SEAL)

EXHIBIT "A"

TEMESCAL BASIN GROUNDWATER SUSTAINABLITY PLAN

Home Gardens
County Water District

Groundwater Sustainability Plan

Temescal Basin

DRAFT

January 2022

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Home Gardens
County Water District

TEMESCAL BASIN GROUNDWATER SUSTAINABILITY PLAN

January 2022

TODD GROUNDWATER

And

carollo
Engineers...Working Wonders With Water®

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SIGNATURE PAGE

Chad N. Taylor, PG, CHG
Principal Hydrogeologist, Todd Groundwater

PROFESSIONAL GEOLOGIST
CHAD N TAYLOR NO. 8443
STATE OF CALIFORNIA

CERTIFIED HYDROGEOLOGIST
CHAD N TAYLOR NO. 915
STATE OF CALIFORNIA

Maureen K Reilly, PE
Senior Engineer, Todd Groundwater

REGISTERED PROFESSIONAL ENGINEER
MAUREEN K. REILLY
C 67841
EXP. 6/30/23
CIVIL
STATE OF CALIFORNIA

Gus Yates, PG, CHG
Senior Hydrologist, Todd Groundwater

CERTIFIED HYDROGEOLOGIST
Eugene B. Yates
No. 740
Exp. 1/31/22
STATE OF CALIFORNIA

PROFESSIONAL GEOLOGIST
Eugene B. Yates
No. 7178
Exp. 1/31/22
STATE OF CALIFORNIA

Michael P. Maley, PG, CHG, CEG, PE
Principal Hydrogeologist, Todd Groundwater

CERTIFIED HYDROGEOLOGIST
MICHAEL PAUL MALEY
No. 654
Exp. 3/31/23
STATE OF CALIFORNIA

PROFESSIONAL GEOLOGIST
MICHAEL PAUL MALEY
No. 5270
Exp. 3/31/23
STATE OF CALIFORNIA

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Acronyms

1,2,3-TCP	1,2,3- Trichloropropane
AF	acre-feet
AFY	acre-feet per year
Basin Plan	Water Quality Control Plan for the Santa Ana River Basin
Basin	Temescal Subbasin
BMP	Best management practices
CASGEM	California Statewide Groundwater Elevation Monitoring
CDA	Chino Desalter Authority
CEQA	California Environmental Quality Act
cfs	cubic feet per second
cfs/mi	cubic feet per second per mile
CIMIS	California Irrigation Management Information System
COC	constituent of concern
Corona	City of Corona
DAC	disadvantaged community
DBP	disinfection byproduct
DDW	State Water Resources Control Board Division of Drinking Water
DMS	Data Management System
DWR	California Department of Water Resources
DWSAP	Drinking Water Source Water Assessment Program
ET	Evapotranspiration
ET_o	Reference evapotranspiration
ft	feet
ft/day	feet per day
GAMA	Groundwater Ambient Monitoring and Assessment
GDE	groundwater dependent ecosystem
GIS	geographic information system
gpcd	gallons per-capita per day
gpd/ft^2	gallons per day per square foot
GPS	global positioning system
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
GWMP	Groundwater Management Plan
HCP	habitat conservation plan
HGCWD	Home Gardens County Water District
in/yr	inches per year
InSAR	Synthetic Aperture Radar
IRWMP	Integrated Regional Water Management Plan
JPA	joint powers authority
K	hydraulic conductivity
km^2	square kilometers
LSCE	Luhdorff and Scalmanini Consulting Engineers

M&I	Municipal, commercial, and industrial
MA	Management Area
MCL	Maximum Contaminant Level
Met	Metropolitan Water District of Southern California
mg/L	milligrams per liter
mgd	million gallons per day
mi^2	square miles
mm	millimeter
MO	Measurable Objective
MODFLOW	United States Geological Survey modular finite-difference flow model
MOU	Memorandum of Understanding
MSHCP	Western Riverside County Multiple Species Habitat Conservation Plan
msl	mean sea level
MT	Minimum Threshold
NAD83	North American Datum of 1983
NAVD88	North American Vertical Datum of 1988
NCCAG	Natural Communities Commonly Associated with Groundwater
NDMI	Normalized Difference Moisture Index
NDVI	Normalized Difference Vegetation Index
NO_3	nitrate
NOAA	National Oceanic and Atmospheric Administration
Norco	City of Norco
NPS	nonpoint source
NRCS	U.S. Department of Agriculture, Natural Resources Conservation Service
NTU	Nephelometric Turbidity Unit
NWIS	National Water Information System
O&M	operation and maintenance
ORP	oxidation-reduction potential
Outreach Plan	Stakeholder Outreach Plan
OWOW Plan	One Water One Watershed Plan
OWTS	On-Site Wastewater Treatment System
PCE	Tetrachloroethylene
pCi/L	picocuries per liter
PFAS	per and polyfluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
PLSS	Public Land Survey System
POTW	publicly owned treatment works
ppt	parts per trillion
PVC	polyvinyl chloride
QA/QC	Quality Assurance and Quality Control

RCDEH	Riverside County Department of Environmental Health
RCFCWCD	Riverside County Flood Control and Water Conservation District
RFP	request for proposals
RMP	Recharge Master Plan
RO	reverse osmosis
RWMP	Reclaimed Water Master Plan
RWQCB	Santa Ana Regional Water Quality Control Board
SAR	Santa Ana River
SARHCP	Upper Santa Ana River Habitat Conservation Plan
SARWQCB	Santa Ana Regional Water Quality Control Board
SAWPA	Santa Ana Watershed Project Authority
SCAG	Southern California Association of Governments
SDAC	severely disadvantaged community
SFR	Streamflow Routing Package
SGMA	Sustainable Groundwater Management Act
SMCL	Secondary maximum contaminant level
SNMP	Salt and Nutrient Management Plan
SSURGO	Soil Survey Geographic Database
SWP	State Water Project
SWRCB	State Water Resources Control Board
TAC	Technical Advisory Committee
TCE	Trichloroethylene
TCP	1,2,3-Trichloropropane
TDS	total dissolved solids
Temescal GSA	Temescal Groundwater Sustainability Agency
TMDL	Total Maximum Daily Load
TSS	total suspended solids
TVWD	Temescal Valley Water District
µg/L	micrograms per liter
USBR	United States Bureau of Reclamation
USDA	United States Department of Agriculture
USEPA	United State Environmental Protection Agency
USFS	United States Forest Service
USGS	United States Geological Survey
UWMP	Urban Water Management Plan
VOCs	volatile organic compounds
WMWD	Western Municipal Water District
WRCRWA	Western Riverside County Regional Wastewater Authority
WRF	Water Reclamation Facility
WSCP	water shortage contingency plan

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EXECUTIVE SUMMARY

The Sustainable Groundwater Management Act (SGMA) requires local agencies in groundwater basins designated as high- or medium-priority to form Groundwater Sustainability Agencies (GSAs) and develop a Groundwater Sustainability Plan (GSP) to plan for achieving and/or maintaining sustainability within 20 years of implementing the plan. The Temescal Groundwater Subbasin (Basin) has been designated by the California Department of Water Resources (DWR) as medium priority and must prepare a GSP.

Wishing to provide a framework for cooperative groundwater management and SGMA compliance, the City of Corona (Corona), City of Norco (Norco), and the Home Gardens County Water District (HGCWD) executed a Memorandum of Understanding (MOU) in March 2017 establishing the Temescal Basin Groundwater Sustainability Agency (Temescal GSA). In August 2017, the Temescal GSA became the GSA for the Basin by submitting a formation notice to DWR. While Corona is leading this effort, the GSP will be developed jointly among the three agencies, with coordinated implementation toward sustainable management.

ES-1 BASIN SETTING

Figure ES-1 shows the Basin located in western Riverside County. **Figure ES-1** also shows the adjacent Bedford Coldwater, Chino, and Riverside-Arlington Subbasins of the Upper Santa Ana Groundwater Basin and the Coastal Plain of Orange County Basin. The Temescal Basin is bounded on the west by the Santa Ana Mountains and the east by low-lying El Sobrante de San Jacinto and La Sierra hills.

The Basin is located within one of the structural blocks of the Peninsular Ranges of Southern California. The Basin occurs in a linear low-lying block, referred to as the Elsinore-Temecula trough, between the Santa Ana Mountains on the west and the Perris Plain on the east (Todd and AKM 2008). The trough extends from Corona to the southeast some 30 miles and was formed along an extensive northwest-southeast trending fault zone including the Elsinore, Chino, and related faults. The Elsinore and Chino fault zones bound the Basin on the west and trend along the mountain fronts.

The basin-fill alluvial deposits and, to some extent, the underlying sedimentary units make up the aquifers in the Basin. However, these deposits do not fall neatly into two categories of permeability, such as bedrock and basin fill. Aquifer packages composed of various geologic units have been defined based on depositional environment, degree of consolidation, groundwater production, and location throughout the Basin.

Three aquifer packages provide water supply to wells in Basin: the Channel Aquifer, the Alluvial Fan aquifers, and, to a lesser extent, consolidated sandstone aquifers (Todd and AKM 2008). Of these three aquifers, the Channel Aquifer is the only principal aquifer as it the most productive aquifer and provides most of the groundwater supply in the Basin, **Figure ES-2**.

Figure ES-1. Temescal Basin

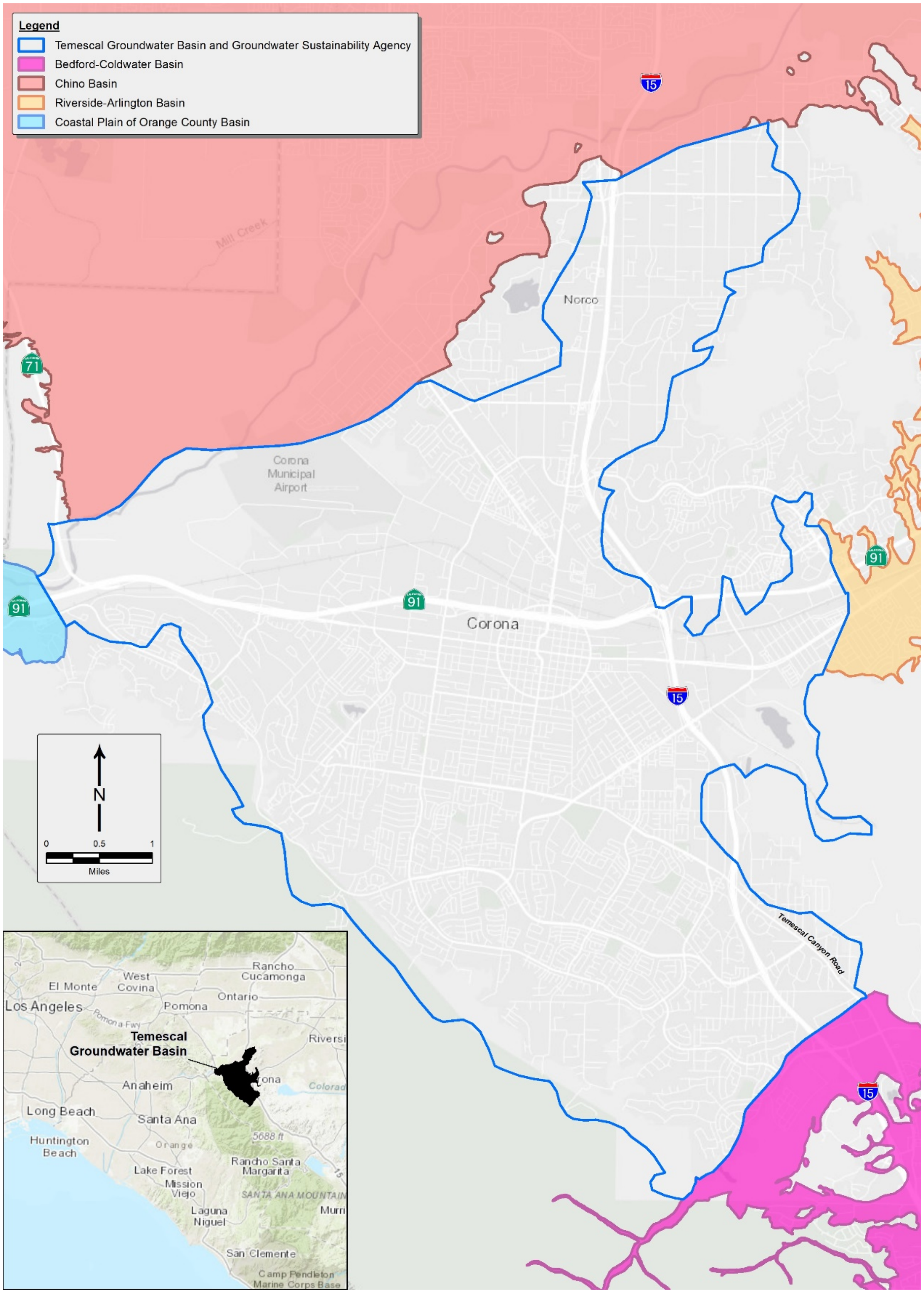
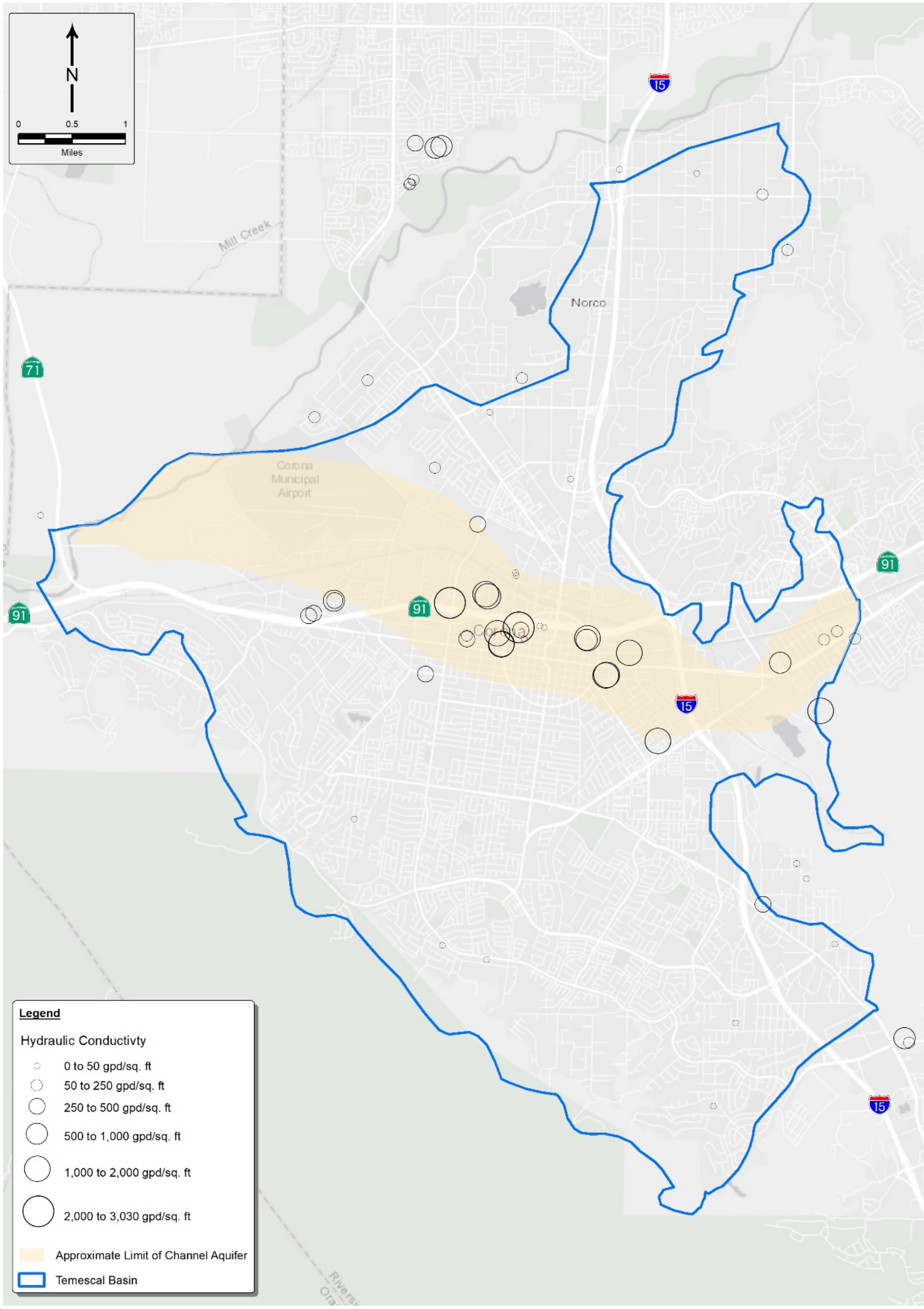


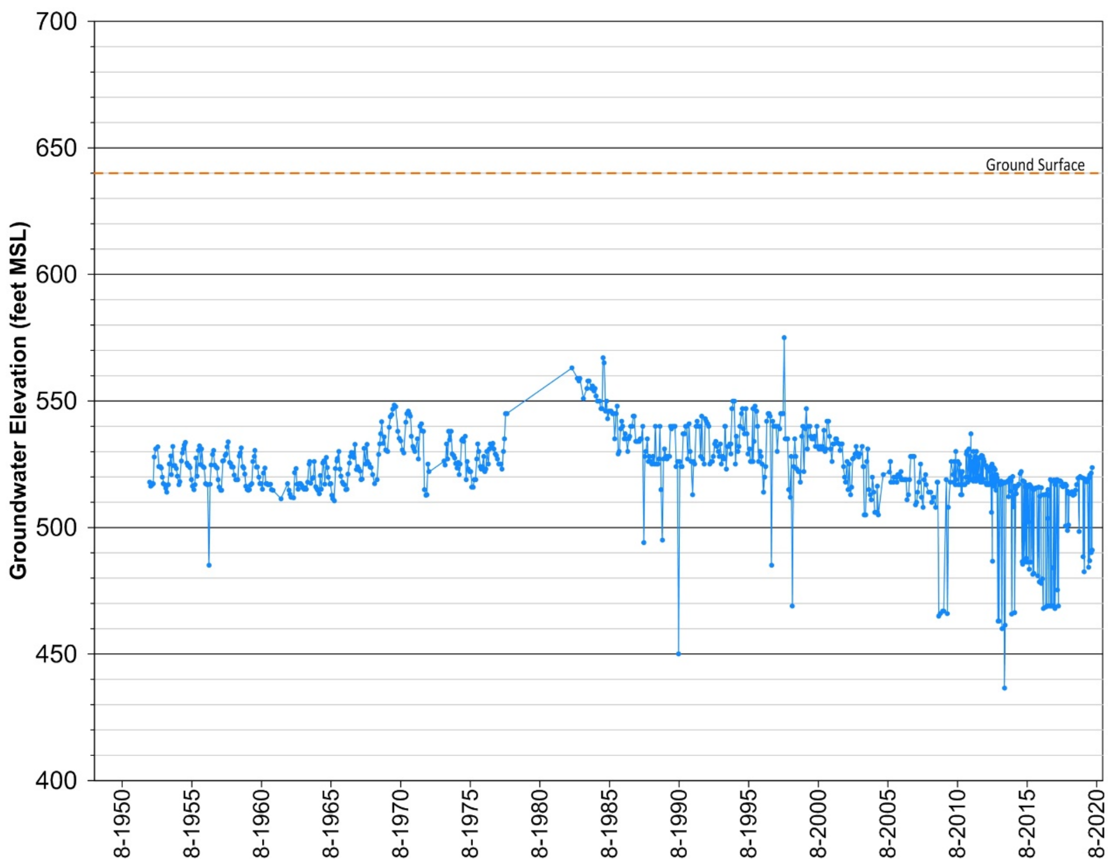
Figure ES-2. Channel Aquifer



ES-2 GROUNDWATER CONDITIONS

Water levels in the Channel Aquifer vary in response to wet and dry hydrologic cycles. Increased pumping and prolonged drought have resulted in a slight decline in water levels over the past twenty years. Groundwater levels reached their respective highs in the early 1980s in response to a wet hydrologic cycle that began in 1978. These higher levels also correlate to a period of relatively low pumping in the Basin. During a later wet cycle from 1992 to 1998, water levels did not recover to 1980s levels, likely related to an increase in Basin pumping. The lowest groundwater levels generally correspond to dry periods and periods of increased pumping, though the responses throughout the Basin are not uniform.

Figure ES-3. Representative Hydrograph, Corona Well 15



1980s levels; pumping in the Basin had increased in this period. Hydrographs from most wells show lowering water levels from 2000 to 2004, a period that was not hydrologically dry but had increased pumping in Corona. In the Well 15 hydrograph, the lowest water levels occurred during the 2015 to 2017 period, during and following drought conditions. There have been slight increases since then in 2018 through 2019 due in part to increased precipitation after 2015.

Total Dissolved Solids (TDS) and nitrate are the primary constituents of concern in the Basin. Groundwater in the Basin is somewhat mineralized, with high TDS concentrations in many monitored wells. Recent average TDS concentrations in the Basin are above the 500 milligrams per liter (mg/L) lower secondary maximum contaminant level (SMCL) for drinking water, but below the upper SMCL of 1,000 mg/L.

Groundwater in the Basin has been impacted by human activities both in the Basin and watershed including agricultural, urban, and industrial land uses. Elevated nitrate concentrations have been documented in the Basin since at least the 1950s. Recent average nitrate as nitrate (NO_3) concentrations in the Basin are moderate; the recent average concentration in the Basin is 42.8 mg/L. The maximum contaminant level (MCL) for nitrate as NO_3 in drinking water is 45 mg/L.

ES-3 WATER SUPPLY

Sources of water supply for agricultural, municipal and industrial (M&I), and domestic uses include groundwater, imported water, and recycled water. Metropolitan Water District of Southern California (Met) is the wholesaler for imported water and its sources of water include the Colorado River and the State Water Project. Both Corona and Norco receive imported water from Met for distribution in the Basin.

Groundwater has been an important component of water supply in the Basin for more than 100 years. Until the 1970s, most of the groundwater production in the Basin was for agricultural supply. A few well owners have also produced small amounts of groundwater for domestic and industrial use. There are no current private domestic groundwater users in the Basin. Production for municipal supply increased in the 1960s and 1970s and continues today.

For more than 50 years, Corona and HGCWD have relied on groundwater from the Basin for municipal uses, and these agencies have long been responsible for managing groundwater conditions in the Basin. Norco has also relied on groundwater but their wells are located outside of the Temescal Basin (in the unadjudicated portion of the Chino Subbasin). Corona, in coordination with HGCWD and Norco, adopted a Groundwater Management Plan (GWMP) in 2008 that covers the Basin.

ES-4 WATER BUDGET

A water balance (or water budget) is a quantitative tabulation of all inflows, outflows, and storage change of a hydrologic system. This GSP contains a detailed water balance for both the groundwater system and surface water system of the Basin. The water budgets were developed for time periods representing historical, current, future no project (baseline), and future growth plus climate change (growth plus climate change) conditions.

Surface water and other inflows came from multiple sources. Monthly inflows in Temescal Wash were obtained from the baseline and growth plus climate change simulations produced by the Bedford-Coldwater Subbasin groundwater model (Todd, H&H, and Stantec 2021), which is concurrently being used to develop the GSP for that subbasin. Small stream and bedrock inflows simulated for 1993 to 2017 of the calibration model period were repeated twice to obtain 50 years of data.

In the historical model, the Basin water budgets were overall negative for the historical and current analysis periods, due to a variety of reasons and reflecting the different time periods. Storage declines during the early years of the simulation may have resulted from incorrectly estimated initial water levels. During 2000 to 2011, relatively high amounts of municipal groundwater pumping might have caused a gradual decrease in storage. Since 2011, the predominantly dry climatic conditions have resulted in reduced inflows and thus a decrease in storage. These historical storage declines have not resulted in undesirable results related to water levels or groundwater storage in the Basin to date. Most groundwater production in the Basin is for Corona municipal use, and Corona and the other GSA agencies have a portfolio of alternative water supply sources for future use.

Two future scenarios were simulated to test sustainability. In the baseline scenario, land use remains the same as the current conditions. The growth plus climate change scenario incorporated anticipated effects of climate change, urban development, and associated changes in water and wastewater management.

In both future scenarios, the total pumping was adjusted to pump within the sustainable yield of the Basin; the remaining municipal water demand will be supplied by imported and recycled water. Simulating pumping within the sustainable yield of the Basin in the groundwater model produced essentially no long-term storage change in the future baseline simulation.

Growth and climate change had relatively small effects that tended to offset each other. The warmer, drier climatic conditions tended to decrease stream percolation and rainfall recharge. Urban growth—much of which is projected to be in tributary watershed areas—tended to increase recharge because of irrigation deep percolation, pipe leaks and percolation of runoff from disconnected impervious areas. Notably, total water use and percolation of reclaimed water were assumed not to change appreciably, consistent with assumptions in the Corona's Urban Water Management Plan (UWMP) (Michael Baker 2021) that population growth will be offset by decreases in per-capita water use. Consequently, individual inflows and outflows in the growth plus climate change scenario were identical to or very close to the values in the future baseline scenario.

Average annual storage changes during both future scenarios were very slightly positive, with total inflows about34 AFY greater than total outflows. This was the intentional result of adjusting Corona pumping to achieve close to zero net storage change during 2019 to 2068.

ES-5 SUSTAINABLE MANAGEMENT CRITERIA

The sustainable management goal of the Temescal Basin is to sustain groundwater resources for the current and future beneficial uses of the Basin in a manner that is adaptive and responsive to the following objectives:

- Provide a long-term, reliable and efficient groundwater supply for municipal, industrial, and other uses
- Provide reliable storage for water supply resilience during droughts and shortages
- Protect groundwater quality
- Support beneficial uses of interconnected surface waters, and
- Support integrated and cooperative water resource management.

This goal is consistent with SGMA and is based on information from the Plan Area, Hydrogeologic Conceptual Model, Groundwater Conditions, and Water Budget sections of this GSP that:

- Identify beneficial uses of Temescal Basin groundwater and document the roles of local water and land use agencies
- Describe the local hydrogeologic setting, groundwater quality conditions, groundwater levels and storage, and inflows and outflows of the Basin
- Document the ongoing water resource monitoring and conjunctive management of groundwater, local surface water, recycled water, and especially imported water sources that help protect groundwater quality and maintain water supply.

A GSP must develop quantitative sustainability criteria for all applicable sustainability indicators that allow the GSA to define, measure, and track sustainable management. These criteria include the following:

- Undesirable Result – significant and unreasonable conditions for any of the six sustainability indicators.
- Minimum Threshold (MT) – numeric value used to define undesirable results for each sustainability indicator.
- Measurable Objective (MO) – specific, quantifiable goal to track the performance of sustainable management.

The sustainability indicators and sustainable management criteria are clearly defined and provide a quantitative analysis of the Basin's sustainability. As the Basin has been managed without significant undesirable results, the following sustainability criteria are defined to avoid future undesirable results:

- The Minimum Threshold for defining undesirable results relative to chronic lowering of groundwater levels is defined at each Key Well by historical groundwater low levels. Undesirable results are indicated when two consecutive exceedances occur in each of two consecutive years, in sixty percent or more of the Key Wells.

- The Minimum Threshold for reduction of groundwater storage for all Management Areas is fulfilled by the minimum threshold for groundwater levels as proxy.
- The Minimum Threshold for subsidence is defined as a cumulative decline equal to or greater than one foot since 2015, which represents current conditions and the SGMA start date. This corresponds to a rate of decline equal to or greater than 0.2 feet in any five-year period.
- The Minimum Thresholds for degradation of water quality address nitrate and total dissolved solids (TDS) for the entire Basin.
    - The Minimum Threshold for nitrate is defined initially as the percentage of wells with concentrations exceeding the nitrate MCL (45 mg/L) based on current conditions (2015-2019).
    - The Minimum Threshold for TDS is defined initially as the percentage of wells with concentrations exceeding the TDS value of 1,000 mg/L based on current conditions (2015-2019).
- The Minimum Threshold for depletion of interconnected surface water is the amount of depletion that occurs when the depth to the water along the southern edge of the Prado Wetlands is greater than 15 feet for a period exceeding one year.

ES-6 MONITORING NETWORK

The monitoring network for GSP implementation has been established to document groundwater and related surface conditions as relevant to the sustainability indicators, MTs, and MOs. The components of the monitoring network are built from existing programs and will be carried out by the Temescal GSA.

The Temescal GSA, Corona specifically, has actively engaged in assessment and improvement of its monitoring network. This process has been intensified as part of the GSP, given the need to identify data gaps and to assess uncertainty in setting and tracking sustainability criteria. Monitoring improvements such as adding or replacing monitoring infrastructure are part of GSP implementation and will be reviewed and updated for each five-year GSP update.

ES-7 PROJECTS AND MANAGEMENT ACTIONS

During the preparation of the GSP, the Temescal GSA identified five specific management actions (Actions) and three projects (Projects) to achieve the sustainability goal. The Actions are generally focused on data collection, storage and reporting of information necessary to monitor sustainability, and assessment of when Actions may be necessary (i.e., when MTs are approached or exceeded). The projects are generally designed to reduce uncertainty in areas where data gaps have been identified during development of the GSP. These projects and management actions are aimed at achieving sustainability goals and responding to changing conditions in the Basin. The projects and management actions are divided into three groups:

- Group 1 - Existing or established projects and management actions
    - Groundwater Treatment

- Water Reclamation Facility (WRF) Percolation Ponds
- Water Level Quality Assurance and Quality Control (QA/QC)
- Water Shortage Contingency Plans
- Water Conservation Program
- Participation in Integrated Regional Water Management Plans (IRWMP)
- Western Riverside County Regional Wastewater Authority (WRCRWA)
- Santa Ana Watershed Involvement

- Group 2 - Projects and management actions that have been or are under development
    - Shallow Monitoring Well Installation
    - Potable Reuse Feasibility Study
    - Mountain Runoff Capture Feasibility Study
- Group 3 - Conceptual projects and management actions that can be considered in the future if any Group 2 projects fail to be implemented or additional intervention is required to achieve basin sustainability goals
    - Groundwater Treatment
    - Stormwater Capture, Treatment, and Recharge
    - Santa Ana River Wastewater Discharge Coordination for Shallow

The Projects and Actions will be implemented by a combination of existing resources from the three agencies within the Plan Area and contracted resources.

ES-8 IMPLEMENTATION

The official adoption of the GSP by the Temescal GSA will initiate Plan implementation. After submittal of the GSP to DWR, and during the DWR review period, the Temescal GSA will continue to communicate with stakeholders via the Corona's website and begin implementing the projects and management actions described in this GSP. The Plan will be implemented to sustainably manage groundwater in the Basin under the authority of the Temescal GSA and its member agencies.

The Temescal GSA is required to submit an annual report to DWR by April 1st of each year following adoption of the GSP. The first annual report will be due in April of 2022. The Temescal GSA has committed to implementing the GSP upon adoption and completing the projects and management actions necessary to monitor and maintain sustainability within the first five years of initiation of the GSP.

1. INTRODUCTION

The City of Corona (Corona) is actively managing the Temescal Subbasin (Basin) of the Upper Santa Ana River Groundwater Basin (**Figure 1-1**) in collaboration with the City of Norco (Norco) and Home Gardens County Water District (HGCWD). Corona, Norco, and HGCWD have previously participated in active management of water resources in the Basin. This management has included cooperation in preparing the 2008 Groundwater Management Plan (Todd and AKM 2008) and participation in regional planning and management. This historical experience provides a good foundation for continuation of groundwater management consistent with the Sustainable Groundwater Management Act (SGMA).

Wishing to provide a framework for cooperative groundwater management and SGMA compliance Corona, Norco, and HGCWD executed a Memorandum of Understanding (MOU) in March 2017 (**Appendix A**) establishing the Temescal Basin Groundwater Sustainability Agency (Temescal GSA). In August 2017, the Temescal GSA became the GSA for the Basin by submitting a formation notice to the California Department of Water Resources (DWR). This notice included publication of the MOU and each individual party's resolutions to become a GSA to DWR through the SGMA web portal. In the MOU, Corona has accepted the primary responsibility to develop a GSP for the Basin, to submit the GSP to DWR, and to prepare Annual Reports and GSP updates thereafter. While Corona is leading this effort, the GSP will be developed jointly among the three agencies, with coordinated implementation toward sustainable management.

The GSP reflects the rigorous, systematic process through which the Temescal GSA will manage the Basin. **Figure 1-1** shows the Plan Area for this GSP, which encompasses the entire Basin.

Sustainable management of the Temescal Basin is critical to local water supply reliability. The three local agencies (both individually and jointly) in the Temescal GSA have developed water supply portfolios including imported water, groundwater from multiple local basins, and reclaimed water for landscape irrigation. Water conservation measures also have been implemented (as documented in the recent Corona and Norco Urban Water Management Plans (Michael Baker 2021, Norco 2021)), providing an important tool for responding to water shortages. Local agencies are active in regional water management and recognize that local groundwater is a primary source of supply and needs to be reliable. The Temescal Basin area historically has experienced significant land use changes—shifting from agricultural to urban land uses—and subsequent water demand and supply changes. This transition was achieved in part with reliance on local groundwater. In fact, the Corona Groundwater Management Plan indicated that overdraft conditions occurred in the Temescal Basin during the last three years of the 1990 to 2004 period as pumping increased. While conditions subsequently improved, this illustrates that overdraft can occur. Concerns about water supply reliability persist, given the uncertainties of imported water and climate change. Moreover, groundwater quality generally is poor; in fact, sustainable groundwater use is dependent on treatment at the Temescal Desalter. SGMA and the GSP process provide an important set of tools for Corona and the Temescal GSA partners to address these conditions and plan for water supply reliability into the future.

1.1. PURPOSE OF THE GROUNDWATER SUSTAINABILITY PLAN

The purpose of this GSP is to assess water resource and land use conditions within the Basin, through an open and collaborative process, and to implement management activities to achieve (or maintain) long-term groundwater sustainability as defined by SGMA.

The GSP assesses sustainability related to each of the six SGMA defined sustainability criteria listed below:

- Lowering Groundwater Levels
- Reduction of Groundwater Storage
- Seawater Intrusion
- Degraded Water Quality
- Land Subsidence
- Surface Water Depletion.

The GSP presents conditions in the Basin relevant to each of these categories, defines thresholds for maintaining sustainability, outlines groundwater monitoring protocols, and management actions and projects designed to improve monitoring capabilities and/or to protect and enhance groundwater conditions. The GSP also includes a schedule and cost estimate for GSP implementation. Each element of the GSP is designed to promote Basin health and achieve and maintain the sustainability goal established for the Basin by the GSA.

1.2. SUSTAINABILITY GOAL

The sustainability goal is to sustain groundwater resources for the current and future beneficial uses of the Basin in a manner that is adaptive and responsive to the following objectives:

- Provide a long-term, reliable, and efficient groundwater supply for municipal, industrial, and other uses
- Provide reliable storage for water supply resilience during droughts and shortages
- Protect groundwater quality
- Support beneficial uses of interconnected surface waters, and
- Support integrated and cooperative water resource management.

1.3. AGENCY INFORMATION

The GSA agencies collaborated on preparation of this GSP, as described in the March 2017 MOU between the agencies. The City of Corona, City of Norco, and HGCWD each passed resolutions to authorize the MOU to establish the GSA:

- City of Corona - On March 15, 2017, Corona held a public hearing to determine whether to become a GSA, and adopted Resolution No. 2017-013, electing to jointly become a GSA with Norco and HGCWD.
- Norco - On March 15, 2017, Norco held a public hearing to determine whether to become a GSA, and adopted Resolution No. 2017-12, electing to jointly become a GSA with Corona and HGCWD.

- HGCWD - On March 23, 2017, HGCWD held a public hearing to determine whether to become a GSA, and, by minute action, elected to jointly become a GSA with Corona and Norco.

On May 10, 2017, Temescal GSA submitted to DWR a Notice of Decision to Become a Groundwater Sustainability Agency, along with required information including a boundary map of the GSA and a list of interested parties. After the 90-day review period, on August 8, 2017, Temescal GSA became the groundwater sustainability agency for the Basin.

As required by GSP Regulations §354.6 and SGMA §10723.8, the Notices of Decision to become a Groundwater Sustainability Agency are included in **Appendix B**. These each include the resolution, list of interested parties, and boundary map.

The point of contact for the Temescal GSA is:

Katie Hockett, Assistant General Manager
City of Corona Department of Water and Power
Temescal Basin GSA
755 Corporation Yard Way Corona, CA 92880
(951) 279-3601
Katie.Hockett@CoronaCA.gov

1.4. GROUNDWATER SUSTAINABILITY AGENCY INFORMATION

As described above, the Temescal GSA was formed through a MOU between Corona, Norco, and HGCWD to act as the GSA for the Basin (Temescal Subbasin of the Upper Santa Ana Valley Basin, Basin Number 8-002.09), which is a DWR-designated medium priority basin. The Temescal GSA is dedicated to participating in the collective goal of reaching groundwater sustainability in California.

Corona, Norco, and HGCWD have relied on groundwater from the Basin for municipal use for decades. In 2008, Corona adopted a Groundwater Management Plan that covers the entire Basin.

1.4.1. Decision Making

As detailed in the MOU, decisions in by the Temescal GSA are reached by unanimous consent of the parties; however, if unanimous consent is not possible, a majority vote of the three agencies rules.

1.4.2. Roles and Responsibilities

The MOU also documents the responsibilities of the individual agencies, including:

- Corona shall have the primary responsibility to develop a GSP within the boundaries of the Temescal GSA and submit the GSP to DWR for review and evaluation.Corona shall also have the primary responsibility to prepare and submit the annual and five year reports to DWR pursuant to SGMA and DWR's implementing regulations.

- The parties will work jointly to fulfill the purpose of the MOU within the boundaries of the Temescal GSA.
- The parties will meet regularly to discuss SGMA, GSP development, and implementation activities, assignments, and ongoing work progress.
- The parties may form committees as necessary from time to time to discuss issues that impact the Temescal GSA.
- Corona is responsible for implementing the GSP in areas of the Temescal GSA that are within Corona's service area boundaries and within Corona's sphere of influence.
- Norco is responsible for implementing the GSP in areas of the Temescal GSA that are within Norco's service area boundaries.
- HGCWD is responsible for implementing the GSP in areas of the Temescal GSA that are within HGCWD's service area boundaries.

1.4.3. Legal Authority of the GSA

The GSA has authority to develop a GSP and implement SGMA in the Temescal Basin. SGMA specifies additional enabling powers; for example, GSAs may choose to adopt standards for measuring and reporting water use, develop and implement metering, and manage extraction from individual wells.

Corona's Authority. Corona is a local agency qualified to become a GSA because Corona manages water, has a water supply, and has land use responsibilities over a portion of the Basin.

Norco's Authority. Norco is also a local agency qualified to become a GSA because Norco manages water, has a water supply, and has land use responsibilities over a portion of the Basin.

HGCWD's Authority. HGCWD is also a local agency qualified to become a GSA because HGCWD is a county water district formed and operating pursuant to and in accordance with Division 12 of the California Water Code that manages water, has a water supply and overlies a portion of the Basin.

Those portions of the Basin outside of these service areas are not within the area of any other proposed GSA. While the service areas of Corona, Norco, and HGCWD do not cover the entire Basin, these agencies do propose to serve as the GSA for the entire Basin. The three agencies in the GSA are coordinating with Riverside County Flood Control and Water Conservation District (RCFCWCD) for these currently unmanaged areas. Specifically, the RCFCWCD recognized the ongoing efforts for this GSA and offered to participate in any advisory or stakeholder committee formed by the GSA.

1.4.4. GSP Development Costs and Funding Sources

In November 2017, the City of Corona applied for a Sustainable Groundwater Management Planning (SGMP) Grant to fund preparation of this GSP. In April 2018, DWR awarded the City of Corona with full funding of $732,338.

Each party will be financially responsible for collecting data or information from within that party's service area that is required to be provided for development of the GSP. Norco and HGCWD will not incur any financial expense related to development of the GSP and submittal of the GSP to the DWR.

Implementation costs include costs to continue monitoring as described in Chapter 7, implement management actions and projects as described in Chapter 8, and complete annual reports and periodic GSP evaluation and updates as required by SGMA. As summarized in Chapter 9, total annual costs (2021 dollars) are estimated at approximately $100,000 per year and single occurrence costs for projects and management actions anticipated to occur in the first five years of GSP implementation and the first periodic GSP evaluation and update total approximately $515,000 to $575,000 (2021 dollars).

The funding method for operating expenses and GSP implementation costs is by contributions by GSA member agencies (Corona, Norco, and HGCWD). This is the same mechanism utilized to fund development of the GSP (with significant supplemental contribution though California Proposition 1 Grant funding). Corona will be responsible for most of the ongoing implementation costs, which are within budget projections for the next several years. Funding for planning and implementation of some projects and management actions may be achieved with local, state, and federal sources. The local agencies track opportunities for outside financing (grants or loans) from state water programs and federal infrastructure funding. For local financing, the agencies update their financial plans and rates as needed.

1.5. GSP ORGANIZATION

This GSP is organized generally to follow the GSP Annotated Outline provided by DWR as one of its Guidance Documents (DWR 2016a). Major sections include:

- **Executive Summary**
- **Chapter 1 – Introduction**, purpose of the GSP, sustainability goal, agency information, and GSP organization.
- **Chapter 2 – Plan Area** description, water use sectors, water supply sources, water resources monitoring and management programs, current general plans, and other GSP elements.
- **Chapter 3 – Hydrogeologic Conceptual Model**, description of the physical basin setting including surface water features, soils, geologic setting, faults, and aquifers, defined basin bottom, recharge and discharge areas, and cross sections.
- **Chapter 4 – Current and Historical Groundwater Conditions**, discussion of groundwater elevations, land subsidence, groundwater quality and current monitoring, constituents of concern regarding water quality, interconnection of surface water and groundwater and the effects on groundwater dependent ecosystems (GDEs).
- **Chapter 5 – Water Budget**, discussion of the water budget, groundwater model, surface water and groundwater balance, change in groundwater storage, and estimate of sustainable yield.

- **Chapter 6 – Sustainable Management Criteria**, sustainability goal and sustainability criteria for the six undesirable results.
- **Chapter 7 – Monitoring Network**, discussion of the monitoring that will continue to assess sustainability in the future.
- **Chapter 8 – Projects and Management Actions**, descriptions of projects and management actions for the Basin.
- **Chapter 9 – Implementation Plan**, estimate of GSP implementation costs, schedule, and plan for annual reporting and periodic evaluations.
- **Chapter 10 – References**

A Preparation Checklist providing further organizational guidance to the GSP content requirements is provided in **Table 1-1** and the GSP Elements Guide detailing GSP content in comparison to SGMA articles is included in **Appendix C**.

Table 1-1. GSP Preparation Checklist

GSP Regulations Section	Water Code Section	Requirement	Description	Section(s) or Page Number(s) in the GSP
Article 3. Technical and Reporting Standards				
352.2		Monitoring Protocols	- Monitoring protocols adopted by the GSA for data collection and management - Monitoring protocols that are designed to detect changes in groundwater levels, groundwater quality, inelastic surface subsidence for basins for which subsidence has been identified as a potential problem, and flow and quality of surface water that directly affect groundwater levels or quality or are caused by groundwater extraction in the basin	Section 7.2
Article 5. Plan Contents, Subarticle 1. Administrative Information				
354.4		General Information	- List of references and technical studies	Section 10
354.6		Agency Information	- GSA mailing address - Organization and management structure - Contact information of Plan Manager - Legal authority of GSA - Estimate of implementation costs	Section 1.3
354.8(a)	10727.2(a)(4)	Map(s)	- Area covered by GSP (Figure 1-1) - Adjudicated areas, other agencies within the basin, and areas covered by an Alternative (Figure 1-1) - Jurisdictional boundaries of federal or State land (Figure 2-1) - Existing land use designations (Figures 2-7, 2-8) - Density of wells per square mile (Figures 2-3 through 2-6)	Section 2
354.8(b)		Description of the Plan Area	- Summary of jurisdictional areas and other features	Section 2.1
354.8(c) 354.8(d) 354.8(e)	10727.2(g)	Water Resource Monitoring and Management Programs	- Description of water resources monitoring and management programs - Description of how the monitoring networks of those plans will be incorporated into the GSP - Description of how those plans may limit operational flexibility in the basin - Description of conjunctive use programs	Section 2.4,2.5 Section 2.4 Section 2.6 Section 2.3.2
354.8(f)	10727.2(g)	Land Use Elements or Topic Categories of Applicable General Plans	- Summary of general plans and other land use plans - Description of how implementation of the GSP may change water demands or affect achievement of sustainability and how the GSP addresses those effects - Description of how implementation of the GSP may affect the water supply assumptions of relevant land use plans - Summary of the process for permitting new or replacement wells in the basin - Information regarding the implementation of land use plans outside the basin that could affect the ability of the Agency to achieve sustainable groundwater management	Section 2.6 Section 2.6.4 Section 2.6.5 Section 2.7.3 Section 2.7.6
Article 5. Plan Contents, Subarticle 1. Administrative Information (Continued)				
354.8(g)	10727.4	Additional GSP Contents	**Description of Actions related to:** - Control of saline water intrusion - Wellhead protection - Migration of contaminated groundwater - Well abandonment and well destruction program - Replenishment of groundwater extractions - Conjunctive use and underground storage - Well construction policies - Addressing groundwater contamination cleanup, recharge, diversions to storage, conservation, water recycling, conveyance, and extraction projects - Efficient water management practices - Relationships with State and federal regulatory agencies - Review of land use plans and efforts to coordinate with land use planning agencies to assess activities that potentially create risks to groundwater quality or quantity - Impacts on groundwater dependent ecosystems	Section 2.7
354.10		Notice and Communication	- Description of beneficial uses and users - List of public meetings - GSP comments and responses - Decision-making process - Public engagement - Encouraging active involvement - Informing the public on GSP implementation progress	Section 2.3 Section 2.8 and Appendices E and F Appendix J (pending) Section 1.4.1 Appendix D Section 2.8 Section 2.8

Table 1-1. GSP Preparation Checklist

GSP Regulations Section	Water Code Section	Requirement	Description	Section(s) or Page Number(s) in the GSP
Article 5. Plan Contents, Subarticle 2. Basin Setting				
354.14		Hydrogeologic Conceptual Model	- Description of the Hydrogeologic Conceptual Model - Two scaled cross-sections - Map(s) of physical characteristics: topographic information, surficial geology, soil characteristics, surface water bodies, source and point of delivery for imported water supplies	Section 3, Figure 3-6 through 3-9
9	10727.2(a)(5)	Map of Recharge Areas	- Map delineating existing recharge areas that substantially contribute to the replenishment of the basin, potential recharge areas, and discharge areas	Figure 3-12
	10727.2(d)(4)	Recharge Areas	- Description of how recharge areas identified in the plan substantially contribute to the replenishment of the basin	Section 3.9
354.16	10727.2(a)(1) 10727.2(a)(2)	Current and Historical Groundwater Conditions	- Groundwater elevation data - Estimate of groundwater storage - Seawater intrusion conditions - Groundwater quality issues - Land subsidence conditions - Identification of interconnected surface water systems - Identification of groundwater-dependent ecosystems	Section 4
354.18	10727.2(a)(3)	Water Budget Information	- Description of inflows, outflows, and change in storage - Quantification of overdraft - Estimate of sustainable yield - Quantification of current, historical, and projected water budgets	Section 5.7 Not Applicable Section 5.9 Section 5.7
	10727.2(d)(5)	Surface Water Supply	- Description of surface water supply used or available for use for groundwater recharge or in-lieu use	Sections 2.3.2, 2.4.6, and 5.6.2
354.20		Management Areas	- Reason for creation of each management area - Minimum thresholds and measurable objectives for each management area - Level of monitoring and analysis - Explanation of how management of management areas will not cause undesirable results outside the management area - Description of management areas	Not Applicable
Article 5. Plan Contents, Subarticle 3. Sustainable Management Criteria				
354.24		Sustainability Goal	- Description of the sustainability goal	Section 6.1
354.26		Undesirable Results	- Description of undesirable results - Cause of groundwater conditions that would lead to undesirable results - Criteria used to define undesirable results for each sustainability indicator - Potential effects of undesirable results on beneficial uses and users of groundwater	Section 6.2.1, 6.3.1, 6.5.1, 6.6.1, 6.7.1 Section 6.2.2, 6.3.2, 6.5.2, 6.6.2, 6.7.2 Section 6.2.3, 6.3.3, 6.5.3, 6.6.3, 6.7.3 Section 6.2.4, 6.3.4, 6.5.4, 6.6.4, 6.7.4
354.28	10727.2(d)(1) 10727.2(d)(2)	Minimum Thresholds	- Description of each minimum threshold and how they were established for each sustainability indicator - Relationship for each sustainability indicator - Description of how selection of the minimum threshold may affect beneficial uses and users of groundwater - Standards related to sustainability indicators - How each minimum threshold will be quantitatively measured	Sections 6.2 through 6.7
354.30	10727.2(b)(1) 10727.2(b)(2) 10727.2(d)(1) 10727.2(d)(2)	Measureable Objectives	- Description of establishment of the measureable objectives for each sustainability indicator - Description of how a reasonable margin of safety was established for each measureable objective - Description of a reasonable path to achieve and maintain the sustainability goal, including a description of interim milestones	Sections 6.2 through 6.7

Table 1-1. GSP Preparation Checklist

GSP Regulations Section	Water Code Section	Requirement	Description	Section(s) or Page Number(s) in the GSP
Article 5. Plan Contents, Subarticle 4. Monitoring Networks				
354.34	10727.2(d)(1) 10727.2(d)(2) 10727.2(e) 10727.2(f)	Monitoring Networks	- Description of monitoring network - Description of monitoring network objectives - Description of how the monitoring network is designed to: demonstrate groundwater occurrence, flow directions, and hydraulic gradients between principal aquifers and surface water features; estimate the change in annual groundwater in storage; monitor seawater intrusion; determine groundwater quality trends; identify the rate and extent of land subsidence; and calculate depletions of surface water caused by groundwater extractions - Description of how the monitoring network provides adequate coverage of Sustainability Indicators - Density of monitoring sites and frequency of measurements required to demonstrate short-term, seasonal, and long-term trends - Scientific rational (or reason) for site selection - Consistency with data and reporting standards - Corresponding sustainability indicator, minimum threshold, measureable objective, and interim milestone - Location and type of each monitoring site within the basin displayed on a map, and reported in tabular format, including information regarding the monitoring site type, frequency of measurement, and the purposes for which the monitoring site is being used - Description of technical standards, data collection methods, and other procedures or protocols to ensure comparable data and methodologies	Section 7.1 Section 7.0
354.36		Representative Monitoring	- Description of representative sites - Demonstration of adequacy of using groundwater elevations as proxy for other sustainability indicators - Adequate evidence demonstrating site reflects general conditions in the area	Section 7.3
354.38		Assessment and Improvement of Monitoring Network	- Review and evaluation of the monitoring network - Identification and description of data gaps - Description of steps to fill data gaps - Description of monitoring frequency and density of sites	Section 7.5 Section 7.5.1 Section 7.5.2 Section 7.1.1
Article 5. Plan Contents, Subarticle 5. Projects and Management Actions				
354.44		Projects and Management Actions	- Description of projects and management actions that will help achieve the basin's sustainability goal - Measureable objective that is expected to benefit from each project and management action - Circumstances for implementation - Public noticing - Permitting and regulatory process - Time-table for initiation and completion, and the accrual of expected benefits - Expected benefits and how they will be evaluated - How the project or management action will be accomplished. If the projects or management actions rely on water from outside the jurisdiction of the Agency, an explanation of the source and reliability of that water shall be included. - Legal authority required - Estimated costs and plans to meet those costs - Management of groundwater extractions and recharge	Section 8.0
354.44(b)(2)	10727.2(d)(3)		- Overdraft mitigation projects and management actions	Not Applicable
Article 8. Interagency Agreements				
357.4	10727.6	Coordination Agreements - Shall be submitted to the Department together with the GSPs for the basin and, if approved, shall become part of the GSP for each participating Agency.	**Coordination Agreements shall describe the following:** - A point of contact - Responsibilities of each Agency - Procedures for the timely exchange of information between Agencies - Procedures for resolving conflicts between Agencies - How the Agencies have used the same data and methodologies to coordinate GSPs - How the GSPs implemented together satisfy the requirements of SGMA - Process for submitting all Plans, Plan amendments, supporting information, all monitoring data and other pertinent information, along with annual reports and periodic evaluations - A coordinated data management system for the basin - Coordination agreements shall identify adjudicated areas within the basin, and any local agencies that have adopted an Alternative that has been accepted by the Department	Not Applicable

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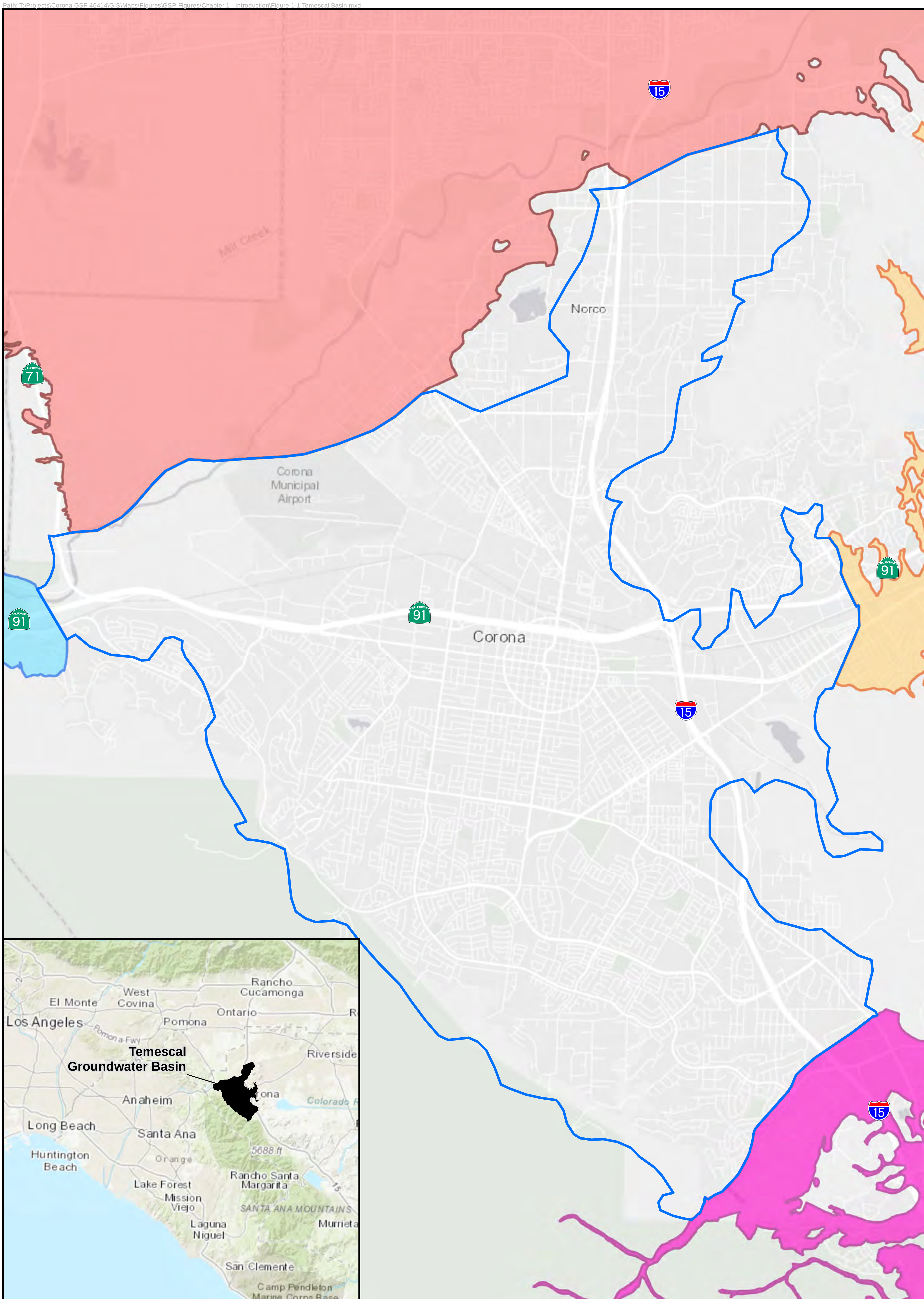

- Temescal Groundwater Basin and Groundwater Sustainability Agency
- Bedford-Coldwater Basin
- Chino Basin
- Riverside-Arlington Basin
- Coastal Plain of Orange County Basin

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Figure 1-1
Temescal Groundwater Basin, GSA, and Adjacent Basins

TODD GROUNDWATER

2. PLAN AREA

This chapter provides a general description of the Temescal Baasin Groundwater Sustainability Plan Area (GSP Area, Plan Area or Basin), consistent with GSP Regulations §354.8, and is organized into the follow sections:

- Geographic Area
- Jurisdictional Agencies
- Water Supply
- Water Resources Monitoring and Management Programs
- General Plans
- Additional GSP Elements
- Notice and Communication

The description of the Plan Area was developed from previous reports and studies, including the 2008 Groundwater Management Plan (2008 GWMP) for the City of Corona (Corona) (Todd and AKM 2008).

2.1. GEOGRAPHIC AREA

The GSP Area is the Temescal Subbasin of the Upper Santa Ana Valley Groundwater Basin (DWR 2016b) located in Riverside County. The Temescal Subbasin (Basin) underlies the southwest portion of the upper Santa Ana Valley, as shown on **Figure 2-1**.

The GSP Area is coincident with the Basin and covers approximately 23,500 acres or 37 square miles. The Basin borders the Chino Subbasin to the north, the Riverside-Arlington Subbasin to the east, the Bedford-Coldwater Subbasin of the Elsinore Basin to the south, and the Coastal Plain Subbasin of the Orange County Basin to the west. These adjacent basins are shown on **Figures 2-1**.

In general, the Basin is bounded by the Santa Ana River to the north, the El Sobrante de San Jacinto and La Sierra Hills and the Riverside-Arlington Subbasin to the east, the Santa Ana Mountains to the west, and Bedford-Coldwater Subbasin to the south (DWR 2016b).

2.2. LAND USE AND WATER MANAGEMENT JURISDICTIONAL AGENCIES

Land use and land management activities can influence water demands, recharge potential, and water quality. This section identifies and describes the agencies with land use management responsibilities within the Basin. Detailed discussion of land use planning and policies relevant to groundwater management is included in Section 2.6. In general, these agencies can be categorized as follows:

- Counties
- Cities
- Federal

- State
- Conservation Easements
- Water Management Entities.

The jurisdictional boundaries for agencies that have land use management responsibilities in the Basin are shown on **Figures 2-2** and **2-3.**

2.2.1. Counties

The Basin lies within the northwestern portion of Riverside County. Riverside County has jurisdiction for land use planning for unincorporated areas in the County. Small portions of the Basin along its northwestern side are unincorporated areas in Riverside County. Riverside County also has responsibility for on-site wastewater treatment systems (i.e., septic systems) through its Department of Environmental Health. Riverside County Department of Environmental Health (RCDEH) is also responsible for regulation of the construction, destruction, and maintenance of groundwater wells.

2.2.2. Cities

The Basin is almost entirely overlaid by Corona's sphere of influence and the City of Norco (Norco). Corona and Norco have land use planning authority within their respective boundaries. General plan elements relevant to the GSP are discussed in Section 2.6. In addition to land use planning, the cities of Corona and Norco are responsible for stormwater management for their respective jurisdictions, which can impact basin recharge and therefore shallow ground water quality.

2.2.3. Federal

Federal Lands in the Basin, presented on **Figure 2-3**, include small portions of the northwestern Basin owned by the Department of Defense. Land along the southwestern edge of the Basin is US Forest Service (USFS) Cleveland National Forest and other federal Non-Forest Service Land within USFS. Resource management efforts in the Cleveland National Forest target fire, ecology, archaeological resources, and recreational resources. These management activities can impact basin recharge, surface run-off, and surface and groundwater quality.

Prado Dam lies in the northwest corner of the Basin and is owned and operated by the U.S. Army Corps of Engineers. The Prado Dam and Reservoir is the principle regulating structure on the Santa Ana River.

2.2.4. State

State Lands in the Basin are presented on **Figure 2-3**. A very small portion of northwestern edge of the Basin is in the Chino Hills State Park.

2.2.5. Conservation Easements

Conservation easements for the Dos Lagos Golf Course, Temescal Canyon, and Lee Lake are held by the Riverside-Corona Resource Conservation District (RCRCD) just to the south of the Basin. RCRCD aims to conserve natural resources, including soil, water, plants, and wildlife in western Riverside and San Bernardino counties. RCRCD activities include conducting conservation projects, educating the community, and providing technical advice to land users.

Additionally, there is a 13-acre Fresno Canyon conservation easement that partially overlaps a small area of the westernmost portion of the Basin.

2.2.6. Water Management Entities

While Corona and Norco are the primary water suppliers in the Basin, other water management entities have jurisdictional and/or monitoring and management responsibilities in the Basin.

The Riverside County Flood Control and Water Conservation District (Flood Control District) is located in the western portion of Riverside County and overlies the Basin. The Flood Control District regulates development in relation to floodplains and drainage, identifies potential flood hazards, and constructs flood control structures.

The Santa Ana Watershed Project Authority (SAWPA) is a joint power authority formed of several water agencies in the Santa Ana River watershed aimed at protecting the watershed and maximizing beneficial uses within the watershed. SAWPA focuses on water resource issues including water supply reliability, water quality improvement, recycled water, wastewater treatment, groundwater management, brine disposal, and integrated regional planning. SAWPA also administers the Basin Monitoring Program Task Force for the watershed, which monitors and reports surface water quality as well as produces Santa Ana River Wasteload Allocation Model Reports. These monitoring and reporting activities are necessary to determine compliance with the nitrogen and total dissolved solids (TDS) objectives for the watershed.

The Orange County Water District (OCWD) owns and operates the Prado Wetlands, 2,150 acres of constructed wetlands behind the Prado Dam, located just north of the northeast corner of the Basin. These wetlands improve water quality in the Santa Ana River by removing nitrate from the water.

Chino Basin Watermaster manages groundwater in the adjacent basin, Chino Basin (Upper Santa Ana Valley Basin 8-002.01). Chino Basin is upgradient of Temescal Basin and groundwater management in Chino will likely impact Temescal Basin. The GSA has been in communication with Chino Basin Watermaster through the GSP preparation process.

2.3. WATER SUPPLY

Water supply for municipal and industrial uses include groundwater and imported water from the Western Municipal Water District (WMWD). In addition, recycled water is used for non-potable uses. The water providers within the Basin and additional detail on their various water sources are described in the following sections.

2.3.1. Water Providers

Corona serves water to the majority of the population within the Basin. Norco and the Home Gardens County Water District (HGCWD) serve water to smaller portions of the Basin.

Corona provides water and wastewater services to residential, institutional, commercial, and industrial customers within the city as well as to the unincorporated communities of El Cerrito, Coronita, and parts of Temescal Canyon. Corona's water service area encompasses approximately 39 square miles. Corona's water sources include groundwater pumped from the Basin and the Coldwater Subbasin and imported water purchased from WMWD.

Norco is the sole water purveyor for the residents and businesses within its city boundaries, which encompass approximately 15 square miles. Norco purchases imported water from WMWD, purchases desalinated groundwater from the Chino Desalter Authority (CDA), and pumps groundwater from the Basin.

HGCWD serves water to a portion of the census-designated place of HGCWD and purchases all water from Corona.

The 2020 water supplies for each water purveyor from each water source are shown on **Figure 2-4**. Purchased imported water and groundwater from the Basin make up 53 percent and 47 percent of Corona's supply, respectively (Michael Baker 2021). Purchased imported water and groundwater from the Chino Subbasin make up 93 percent and 7 percent of Norco's supply, respectively (Norco 2021). Purchased imported water makes up 100 percent of the supply for HGCWD. Note that all of HGCWD purchased supply and a portion of Norco's purchased supply are from Corona and are thus included in Corona's total supply. It should be noted that these water supply distributions are based on year 2020 only and typically vary from year to year.

2.3.2. Water Supply Sources

2.3.2.1. Groundwater

Corona is the primary producer of groundwater in the Basin. Corona has 18 wells that extract water from the Basin for the purpose of potable water supply (Michael Baker 2021). Norco has four active wells but they are located in the unadjudicated portion of the Chino Subbasin not the Basin.

A number of private wells were historically installed in the Basin. Well densities for domestic wells, production wells, public wells, and all groundwater wells completed and reported to DWR are shown on **Figures 2-5, 2-6, 2-7**, and **2-8** respectively. Well density varies throughout the Basin from 0 to 15 wells per square mile section. These well density maps show all the well completion reports that have been submitted to DWR over time. There are no records of which of these wells are currently active. However, the GSA agencies searched for existing active wells within the Basin. This search included reviewing water use records and contacting owners of large private properties (domestic, commercial, and industrial), inquiring about private wells in discussions with knowledgeable local residents and community leaders, and polling interested parties during public meetings. This effort indicated that the only private pumpers in the Basin are All American Asphalt, Dart Corporation, and 3M. No active private domestic wells were identified in this search.

Corona owns and operates the 10 million gallons per day (mgd) Temescal Desalter, a reverse osmosis (RO) treatment facility where groundwater from the Basin high in TDS is forced one-way through membranes that reject salts as waste brine. Corona then blends this water with locally produced groundwater. The location of the Temescal Desalter is shown along with other Corona water and wastewater facilities in **Figure 2-9**.

In addition to pumping groundwater from the Basin, Norco purchases groundwater from the CDA, which is extracted from the Chino Subbasin. This water purchase is further described in Section 2.3.2.3.

2.3.2.2. Local Surface Water

No surface water is used as a water supply source within the Basin. Just to the south of the Basin, Corona utilizes surface flows from Coldwater Canyon in percolation basins and then extracts groundwater from the Coldwater portion of the Bedford-Coldwater Subbasin.

2.3.2.3. Purchased or Imported Water

The Basin's primary sources of imported water are supplied through WMWD, a member agency of Metropolitan Water District of Southern California (Met). Imported water supply from WMWD consists of treated surface water, untreated surface water and desalinated brackish groundwater.

WMWD supplies treated surface water via the Mills Pipeline from Henry J. Mills filtration plant. The Mills Pipeline delivers treated water directly to Corona through metered turnout WR-24. This connection has an effective capacity of 6.5 mgd (Michael Baker 2021). Norco also receives water from WMWD via the Mills Pipeline, which is then wheeled through a metered connection from Corona to Norco (Norco 2021).

WMWD supplies untreated surface water via the Lower Feeder. The Lower Feeder supplies raw water to Corona's Lester Water Treatment Plant through metered turnout WR-19 and to Corona's Sierra del Oro Water Treatment Plant through metered turnout WR-33. The Lester Plant has a peak capacity of 30 mgd, and the Sierra del Oro Plant has a peak capacity of 9.0 mgd (Michael Baker 2021).

WMWD supplies desalinated brackish groundwater via the Arlington Desalter to both Corona and Norco. Norco entered into a purchase water agreement with WMWD to purchase a minimum of 4,400 acre-feet per year (AFY) of treated groundwater annually from the Arlington Desalter reverse-osmosis treatment facility (Norco 2021). Excess production from the desalter is made available to Corona (Michael Baker 2021).

Norco is a member agency of the CDA, a Joint Powers of Authority. Norco has an annual obligation to purchase 1,000 AFY of reverse osmosis treated potable groundwater water from CDA (City of Norco 2021).

The City of Corona operates well(s) for HGCWD and supplies them with all their water supply.

The reliability of imported water is documented in WMWD's 2020 UWMP (WSC 2021). The WMWD UWMP details the potential constraints facing Met, the wholesaler that provides most of the imported water supply for WMWD, Corona, and Norco. Various past and ongoing actions address the water supply threats including water conservation, increased storage programs, and augmenting water supplies. Because of their robust planning efforts, WMWD's UWMP indicates there would be 99 percent of supply available in a single dry year and 100 percent of supply in multiple dry years. In addition, Corona maintains a two-way connection with the City of Riverside that can be used in the event of an emergency.

2.3.2.4. Recycled Water

As shown on **Figure 2-9**, three wastewater reclamation facilities are located in the Basin. Existing reclaimed water supply is provided by three Water Reclamation Facilities (WRF1, WRF2 and WRF3) and two non-potable wells owned and operated by Corona. The average annual production from these sources is approximately 11.35 mgd or 12,700 AFY. Corona is a member of the Western Riverside County Regional Wastewater Authority (WRCRWA), which operates a new wastewater reclamation facility in Eastvale. When WRCRWA is fully implemented, Corona's level of recycled water production will stay the same. However, the location of sources of supply will shift to the north and Corona will have access to additional recycled water supply from WRCRWA (Corona 2018).

Norco is also a member of WRCRWA but does not currently receive and distribute recycled water.

2.3.2.5. Conjunctive Use/Managed Recharge/In-Lieu Recharge

In 2013, Corona prepared a Recharge Master Plan (RMP) for the Basin that defines the groundwater management objectives for the Basin. The RMP lays out goals and alternatives for artificial recharge in the Basin. Implementation of the RMP is ongoing. Corona currently discharges tertiary treated effluent from its Wastewater Treatment Plants No. 1 and No. 2 to the Lincoln/Cota Ponds, where the effluent is either lost to evapotranspiration or percolated to groundwater (WEI 2013).

2.3.3. Water Use Sectors

Water use sectors are defined in the GSP Regulations as categories of water demand based on the general land uses to which the water is applied, including urban, industrial, agricultural, managed wetlands, managed recharge, and native vegetation.

The distribution of current land use types in the Basin is presented on **Figure 2-10**. While the land use types are more detailed than the water sector categories, the land use mapping provides relevant background information for understanding the various water uses and locations of these uses in the Basin. A significant portion of the Basin is characterized as single-family residential land use. The next most common land use type within the Basin is industrial. Water use and land use by sector for Corona, Norco, and the Basin are presented in **Table 2-1**.

Table 2-1. Water Use and Land Use by Sector (2020)[1]

Water Use Sector	Corona Water Use	Norco Water Use	Basin Land Use
Urban[2]	87 percent	82 percent	70 percent
Industrial[3]	13 percent	18 percent	11 percent
Agricultural	0 percent	0 percent	1 percent
Managed Wetlands	0 percent	0 percent	0 percent
Managed Recharge	0 percent	0 percent	0 percent
Native Vegetation	0 percent	0 percent	18 percent

Notes:
1) Water use data is provided by Corona and Norco's Urban Water Management Plans (UWMPs) (Michael Baker 2021 and Norco 2021) and land use data is based on an analysis of the land use parcels included in the Basin as shown in **Figure 2-10**.
2) Urban water use for Corona does not include commercial uses, which is reported as combined with industrial.
3) Industrial water use includes commercial uses.

2.4. WATER RESOURCES MONITORING PROGRAMS

This section summarizes the following water resources monitoring activities in the Basin:

- Climate
- Surface Water Flow
- Surface Water Quality
- Groundwater Levels
- Groundwater Quality
- Groundwater Production
- Conjunctive Use/Managed Recharge
- Recycled Water
- Imported Water
- Land Use
- Land Subsidence
- Incorporation of Existing Monitoring into GSP

Several ongoing monitoring programs provide data and information relevant to the Basin. Corona, Norco, other local agencies, state agencies and federal agencies are responsible for the various monitoring programs, which are summarized briefly below (Sections 2.4.1 through 2.4.12).

2.4.1. Climate

The State Water Resources Control Board (SWRCB) Division of Drinking Water (DDW) compiles climate data in the California Irrigation Management Information System (CIMIS). This database includes total solar radiation, soil temperature, air temperature/relative humidity, wind direction, wind speed, and precipitation. While the CIMIS database is a comprehensive source for climate data, there are no CIMIS stations in the Basin. The closest CIMIS stations are:

- Chino No. 255 - This station is located north of the Basin (Latitude: 33.985350, Longitude: -117.656528).
- U.C. Riverside No. 44 - This station is located east of the Basin (Latitude: 33.964942, Longitude: -117.33698).

2.4.2. Surface Water Flows

United States Geological Survey (USGS) owns and operates two streamflow gauges in the Basin. These include:

- TEMESCAL C AB MAIN ST A CORONA CA (11072100) - This station is located on the Temescal Creek near Main Street in Corona.
- SANTA ANA R BL PRADO DAM CA (11074000) - This station is located along the Santa Ana River below Prado Dam.

2.4.3. Surface Water Quality

Corona and Norco are both members of the Middle Santa Ana River Watershed Total Maximum Daily Load (TMDL) Task Force. The Task Force is a collaborative effort of public- and private-sector agencies and interests focused on the development of pathogen TMDLs for Santa Ana River Reach 3, its tributaries, and other water bodies in the Chino Basin area, located immediately north of the Basin. Formed in 2007, the Task Force has been working on several pathogen-related activities and studies for the Chino Basin. The objectives of this Task Force are to implement a number of tasks identified by the Regional Board in their 2005 Amendment to the water quality control plan (Basin Plan) (SWRCB 2020a). These include the implementation of a watershed-wide monitoring program to assess compliance with water contact recreation (REC-1) beneficial use water quality objectives for fecal coliform, evaluate numeric targets established for E. coli, and identify and implement measures to control sources of impairment. The Task Force works with the Regional Board in the formulation of pathogen TMDL allocation and implementation strategies (SAWPA 2018).

The Upper Temescal Valley Salt and Nutrient Management Plan (SNMP) developed by Elsinore Valley Municipal Water District and Eastern Municipal Water District includes several management actions, one of which is the implementation of a monitoring program. This monitoring program includes seven surface water monitoring sites, one of which is in the GSP Area. This privately-owned continuous flow gage is located at the All American Aggregate pit in Corona, the discharge point of the Temescal Wash (WEI 2017).

Data is also collected by OCWD and other monitoring entities associated with local habitat conservation programs (HCPs) throughout the Santa Ana River region, including in the Prado Management Area. These data have been and will continue to be incorporated into the GSA's database.

Releases to the Temescal Wash are monitored by various dischargers through NPDES permit requirements (Todd and AKM 2008), and these data also have been and will continue to be incorporated into the GSA's database.

2.4.4. Groundwater Levels

Corona has monitored water quality in production wells in the Basin to protect water quality and to comply with regulations over time. Since 1998, Corona has conducted a monitoring program including water level measurements in about 19 production wells, maintaining these data in a water level database. In 2006, Corona expanded the water level monitoring program to include wells that are not currently pumping (or pump on a limited basis). These wells include inactive irrigation wells, inactive or periodically used production wells, and dedicated monitoring wells installed by Corona (Todd and AKM 2008).

In addition, groundwater levels are measured in and around the Basin by Western Riverside County Regional WastewaterAuthority, OCWD, Chino Basin Watermaster, monitoring programs through the Upper Santa Ana River Habitat Conservation Plan (SARHCP). Data from these ongoing programs are used to supplement GSA collected data and inform the understanding of the Basin.

2.4.5. Groundwater Quality

Groundwater quality monitoring occurs at Corona's active production wells on a continuous basis, ranging in frequency from semi-monthly to semiannual depending on the water quality constituent. However, no formal water quality monitoring program has been established at the monitoring wells, primarily because of an inability to pump some of the wells. Additional groundwater quality is available from neighboring basins including OCWD and Chino Basin Watermaster. The SWRCB groundwater ambient monitoring program (GAMA) Groundwater Information System (SWRCB 2020b) also compiles available water quality data from cooperating agencies. Data from these sources has been compiled and assessed as needed.

2.4.6. Groundwater Production

Corona's groundwater pumping accounts for most groundwater production from the Basin, however, there are also a few known private pumpers. WMWD serves as the Santa Ana Watershed water master and records annual production for the watershed.

According to Watermaster records, other current and historical pumpers include:

- All American Asphalt
- Dart Corporation
- 3M Company (formerly Minnesota Mining and Manufacturing Company).

2.4.7. Conjunctive Use/Managed Recharge

Corona currently discharges tertiary treated effluent from its Wastewater Treatment Plants No. 1 and No. 2 to the Lincoln/Cota Ponds, where the effluent is either lost to evapotranspiration or percolated to groundwater. Effluent discharge quantity is monitored and recorded by Corona (WEI 2013).

2.4.8. Recycled Water

Corona records recycled water flows and quality at the three reclamation facilities: WRF1, WRF2 and WRF3. Corona also records recycled water deliveries to the 282 metered connections in the recycled water service areas for landscape irrigation, toilet flushing via dual plumbed systems, firefighting, dust control and various construction applications.

2.4.9. Imported Water

Corona maintains records of imported water purchases and deliveries from WMWD and water delivered to Norco and HGCWD.

2.4.10. Land use

Land use data for the Basin are available through the Southern California Association of Governments (SCAG), as well as the planning departments of the cities of Corona and Norco. The most recent land use mapping data from SCAG are from 2016, while the latest general plans from Corona and Norco were adopted in 2004 and 2014, respectively. The current land use shows much of the Basin is now single-family residential homes with very little agricultural area.

The Basin was historically an agricultural area and has significantly urbanized since the middle 1980s. In the 1950s and 1960s, the Basin consisted mainly of irrigated agricultural lands with a variety of crops, especially citrus. The 1984 land use map on **Figure 2-11** suggests that much of the southern part of the Basin continued to be used for agriculture, but most of this land was likely fallow or non-irrigated pasture by 1984.

The contributing watersheds that surround the Basin consist mostly of native vegetation or grasslands used for grazing. With the exception of urbanization of the small watershed on the northeastern side of the Basin, land use in the contributing watersheds has not changed significantly over the last 20 years.

2.4.11. Natural Resources

Additional monitoring from OCWD and other local HCP programs focus on natural resources including biological surveys and other information.

2.4.12. Land subsidence

While the potential for subsidence was recognized in the 2008 Groundwater Management Plan, it has not been a known issue in the Basin and ground surface elevations have not been monitored until recently. The TRE Altamira Interferometric Synthetic Aperture Radar

(InSAR) Dataset, provided by the California Department of Water Resources (DWR) through the Sustainable Groundwater Management Act (SGMA) Data Viewer (DWR 2020), shows vertical ground surface displacement from June 2015 to September 2019 and indicates that the Basin has been characterized by uplift over that period, likely reflecting tectonic factors. No known available sources of data indicate subsidence in the Basin.

2.4.13. Incorporation of Existing Monitoring into GSP

Data from existing monitoring programs have been collected and incorporated into the GSP. The existing monitoring data and locations are discussed further as part of the Monitoring Plan, Chapter 7 of this GSP.

2.5. WATER RESOURCES MANAGEMENT

This section summarizes previous plans related to different aspects of water resources management in the Basin. Generally, this previous work falls into two main categories: groundwater basin management and water resources management. The categorization helps to provide some context for the summaries that follow:

- **Groundwater Basin Management** - Plans and studies focusing on groundwater management include the 2008 GWMP, the monitoring program in the 2008 GWMP, and the 2013 RMP. Management of groundwater quality is described in general in the Water Quality Control Plan for the Santa Ana Basin.
- **Water Resources Management** - There are a number of water resources planning documents. WMWD's Updated Integrated Regional Water Management Plan (IRWMP) (Kennedy/Jenks 2008) and SAWPA's One Water One Watershed Plan (OWOW Plan) (SAWPA 2018) provide information on water resources on a regional scale. However, WMWD's IRWMP plan is over 10 years old and SAWPA's OWOW Plan is very high level as it covers the entire Santa Ana River Watershed. Additional plans developed by Corona and Norco are more recent and more focused on the Basin. The 2020 Corona Urban Water Management Plan and the 2020 Norco Urban Water Management Plan include information on existing and future water demands and supplies, including groundwater, imported water, surface water, and recycled water (Michael Baker 2021 and Norco 2021). The 2020 Urban Water Management Plans (UWMPs) also identified water supply strategies for meeting future demands. The Reclaimed Water Master Plan (Corona 2018) provides recommendations for expansion of Corona's reclaimed water program.

2.5.1. AB3030 Groundwater Management Plan

The GWMP was prepared in June 2008 and includes the Basin and the Bedford-Coldwater Subbasin (Todd and AKM 2008). The goals of the 2008 GWMP included operating the groundwater basin in a sustainable manner for beneficial uses and increasing the reliability of water supply for basin users.

The major components of the 2008 GWMP included:

- Data compilation and management
- State of the groundwater basins
- Corona water demand and supply
- Basin management objectives
- Basin management strategies
- Implementation plan.

The 2008 GWMP included a thorough evaluation of the groundwater conditions and conceptual model. The study found that the Basin was potentially in a state of overdraft from 2001 through 2004, when groundwater pumping in the Basin increased from a previous average of 10,000 AFY to an average of 20,000 AFY. The 2008 GWMP recommended numerous strategies for managing groundwater while maintaining groundwater production including:

- Develop new wells that will allow flexibility in pumping distribution and maintenance of water levels
- Enhance recharge directly into the Basin
- Provide the infrastructure necessary for the conveyance of water to recharge facilities
- Provide replacement water sources for a portion of the groundwater demand, potentially decreasing Basin production
- Increase monitoring of groundwater levels and storage for the tracking of overdraft mitigation.

Since 2008, Corona has added new wells, which allow flexibility in pumping distribution.

2.5.2. Groundwater Monitoring Program and Protocols

The 2008 GWMP included a groundwater monitoring program for the Basin and the Bedford-Coldwater Subbasin (Todd and AKM 2008).

Objectives of the 2008 GWMP monitoring program included:

- Characterize water levels and water quality basin-wide
- Monitor areas of concern to address specific problems
- Evaluate the performance of groundwater management activities
- Track changes in groundwater levels, quality and storage over time.

2.5.3. Recharge Master Plan for the Temescal Basin

The RMP for Corona's use of the Temescal Basin was prepared in September 2013 by Wildermuth Environmental to address the groundwater overdraft identified in the 2008 GWMP. The major components of the RMP included:

- Define goals for artificial recharge and develop planning criteria
- Characterize potential source waters for artificial recharge
- Characterize the universe of potential sites for artificial recharge

- Develop alternatives for artificial recharge
- Evaluate and rank alternatives for artificial recharge.

The RMP recommended implementation of Alternative 1 (Divert base flow in Temescal Creek for Recharge at the Lincoln/Cota Ponds) and Alternative 4b (Stormwater and recycled water recharge at the Main Street and Oak Street basins), which would result in about 7,200 to 9,300 AFY of new recharge to the Temescal Basin. This would exceed the goal for the RMP to increase recharge by 4,000 AFY and would allow Corona to decrease its reliance on purchased imported water and decrease the total cost of its water supply.

Since 2013, Corona conducted research on Alternative 4b and found that the water quality analysis of stormwater is not high enough to use for recharge to the Basin. Implementing this alternative would require the additional use of clarifying equipment to address debris and silt in the stormwater runoff. Although it may be pursued in the future, Alternative 4b is not being pursued at this time.

2.5.4. Water Quality Control Plan for the Santa Ana River Basin

The Water Quality Control Plan for the Basin Plan provides the framework for how surface water and groundwater quality in the Santa Ana Region should be managed to provide the highest water quality reasonably possible. The Basin Plan (i) designates beneficial uses for surface and ground waters, (ii) sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the state's antidegradation policy, and (iii) describes implementation programs to protect all waters in the Santa Ana Region (SWRCB 2020a).

The Basin Plan includes site-specific objectives for un-ionized ammonia, cadmium, copper, and lead for the Santa Ana River System, which includes Temescal Creek. These objectives aim to prevent chronic toxicity to aquatic life in the Santa Ana River. The Basin Plan also states water quality objectives for the Temescal Groundwater Management Zone for 770 milligrams per liter (mg/L) TDS and 10.0 mg/L nitrate as nitrogen.

The Basin Plan outlines the statewide monitoring activities aimed at assessing attainment of water quality goals and objectives specified in the Basin Plan. The groundwater monitoring program relies on data collected by municipal supply districts. The Santa Ana Regional Water Quality Control Board (SARWQCB) contributes to the data collection effort.

2.5.5. Integrated Regional Water Management Plan Update

Corona and Norco purchase imported water from WMWD. Therefore, it is relevant to track WMWD planning efforts that affect the Corona and Norco service areas or the imported water delivered to Corona and Norco.

WMWD completed its most recent Integrated Regional Water Management Plan in 2008 (Kennedy/Jenks 2008). The purpose of the IRWMP was to address long range water quantity, quality, and environmental planning needs within WMWD's service area.

The 2008 WMWD IRWMP focused on:

- Identifying and evaluating water management strategies that could increase local water supply, thereby improving water supply reliability.
- Evaluating local and regional water quality, environmental, and disadvantaged community issues.

The IRWMP also includes discussion of other regional planning efforts that impact water management within the WMWD service area as well as compilation of estimates of water demands by member agencies, water supplies (e.g., local groundwater, recycled water, surface water, and imported water) available to the agencies, and efforts to coordinate investments in water management, as appropriate, between agencies.

The IRWMP included several projects relevant to Corona:

- New water wells
- Replacement water wells
- Groundwater blending program
- Improvement of groundwater quality/quantity monitoring program
- Recharge basins within Oak Avenue detention basin
- Recharge basins within Main Street detention basin
- Upgradient injection wells
- Recycled water injection wells
- Lincoln and Cota street percolation ponds maintenance program.

Several of these projects include groundwater recharge projects that were also recommended in the 2013 RMP.

2.5.6. Santa Ana River Watershed One Water One Watershed Plan

Corona, Norco, and HGCWD are involved in SAWPA, which in 2018 updated its One Water One Watershed Plan (OWOW Plan). The OWOW Plan's goals for the entire Santa Ana River Watershed are as follows:

- Achieve resilient water resources through innovation and optimization
- Ensure high-quality water for all people and the environment
- Preserve and enhance recreational areas, open space, habitat, and natural hydrologic function
- Engage with members of disadvantaged communities and associated supporting organizations to diminish environmental injustices and their impacts on the watershed
- Educate and build trust between people and organizations
- Improve data integration, tracking, and reporting to strengthen decision making.

The Plan includes ongoing water management projects and programs undertaken by Corona, Norco, and HGCWD.

2.5.7. Corona and Norco Urban Water Management Plans

The California Urban Water Management Planning Act requires preparation of Urban Water Management Plans (UWMPs) by urban water providers with 3,000 or more connections. The UWMPs, generally required every five years, provide information on water supply and water demand—past, present, and future—and allow comparisons as a basis for ensuring reliable water supplies. UWMPs examine water supply and demand in normal years and during one-year and multi-year droughts. UWMPs also provide information on per-capita water use, encourage water conservation, and present contingency plans for addressing water shortages.

According to its 2020 UWMP, Corona is in compliance with the state requirements to reduce per capita water use by 20 percent by 2020 (Senate Bill X7-7). The 2020 per capita daily water use of 180 gallons per capita per day (gpcd) was below the target of 213 gpcd (Michael Baker 2021). Per the UWMP, Corona should be able to meet demands through 2040 in normal, dry, and multiple-dry years using their existing water sources.

For the City of Norco, the 2020 per capita daily water use of 151 gpcd was currently below the target of 263 gpcd (Norco 2021). Per its 2020 UWMP, Norco is in compliance with Senate Bill X7-7 and should be able to meet demands through 2040 in normal, dry, and multiple-dry years using their existing water sources.

2.5.8. Reclaimed Water Master Plan

The purpose of the 2018 Reclaimed Water Master Plan (RWMP) (Corona 2018) was to assist Corona with meeting its goals for reclaimed water use by recommending the implementation of appropriate projects, programs, and additional studies. The RWMP identified, evaluated, prioritized, and scheduled 33 projects. The recommendations from the RWMP fell into four categories:

- Improvements involving receiving future supply from WRCWRA
- Improvements to add demand for reclaimed water
- Enhancements to data collection
- Additional studies related to future uses of reclaimed water

The RWMP does not include projects relating to recharge of the Basin with reclaimed water.

2.5.9. Water Resources Management Implementation Status

Most of the previous plans summarized above have included recommendations for water resources management activities in the Basin. Since the time of publication, many of these recommendations have been implemented.

2.6. GENERAL PLANS

This section presents elements of general plans and other land use planning in the Basin as relevant to groundwater sustainability. It focuses on planning goals and objectives that are aligned with potential groundwater management activities. In addition, this section highlights the potential for future changes in land use that may influence water demands and infiltration/recharge of the Basin.

The goals, objectives, policies, and implementation measures as described in the general plans for Riverside County, Corona, and Norco, which together encompass the Basin, are summarized below. The jurisdictional boundaries in the Basin are presented on **Figure 2-2**.

Applicable general plans include:

- The Riverside County General Plan - The entire Basin is within Riverside County (Riverside County 2015).
- Corona General Plan - Most of the Basin is within the Corona jurisdictional boundary. Corona's General Plan includes plans and policies applicable to the entire city as well as its sphere of influence (Corona 2021).
- Norco - The northeastern portion of the Basin is within the Norco jurisdictional boundary (Norco 2009).

The goals and policies that are water resources related are summarized as follows.

2.6.1. Riverside County General Plan

The Riverside County General Plan was adopted in 2015. The General Plan covers the entire unincorporated portion of the County and also includes 19 detailed Area Plans covering most of the County.

The Multipurpose Open Space Element of the Riverside County General Plan addresses the conservation, development, and use of natural resources including water, soils, rivers, and mineral deposits. A number of policies are related to water supply and conveyance, water conservation, watershed management and groundwater recharge. Several of these policies are summarized in **Table 2-2**.

2.6.2. City of Corona General Plan

The City of Corona's General Plan was updated in 2021 and covers the 37.6 square miles within City limits and provides guidance to Riverside County for the 35.2 square miles within the Corona Sphere of Influence. The General Plan chapters most relevant to water resource management are the chapters on Infrastructure and Public Services and Environmental Resources. Additional relevant policies are in the Land Use and Public Health and Safety chapters as well.

Relevant policies included in the General Plan are summarized in **Table 2-3**.

Table 2-2. Select Policies in the Riverside County General Plan

Category	Policy[1]
Water Supply and Conveyance	Balance consideration of water supply requirements between urban, agricultural, and environmental needs.
	Provide active leadership in the regional coordination of water resource management and sustainability efforts affecting Riverside County.
	Promote the use of recycled water for landscape irrigation.
Water Conservation	Implement water-efficient landscape ordinance and policies.
	Seek opportunities to coordinate water-efficiency policies and programs with water service providers.
Watershed Management	Encourage wastewater treatment innovations, sanitary sewer systems, and groundwater management strategies that protect groundwater quality in rural areas.
	Minimize pollutant discharge to storm drainage systems, natural drainages, and aquifers
	Where feasible, decrease stormwater runoff by reducing pavement in development areas, reducing dry weather urban runoff, and by incorporating "Low Impact Development," green infrastructure and other Best Management Practice design measures.
Groundwater Recharge	Support efforts to create additional water storage where needed, in cooperation with federal, state, and local water authorities.
	Participate in the development, implementation, and maintenance of a program to recharge the aquifers underlying the county.
	Ensure that aquifer water recharge areas are preserved and protected.
	Use natural approaches to managing streams, to the maximum extent possible, where groundwater recharge is likely to occur.
	Discourage development within watercourses and areas within 100 feet of the outside boundary of the riparian vegetation, the top of the bank, or the 100 year floodplain, whichever is greater.

Notes:

1 : Some policy statements have been shortened for use in this table. The full text is included in the Riverside County General Plan.

Table 2-3. Selected Policies in the City of Corona General Plan

Category	Policy[1]
Land Use	Accommodate the types, densities, and mix of land uses that can be adequately supported by transportation and utility infrastructure (water, sewer, etc.) and public services (schools, parks, libraries, etc.)
	Require new residential, commercial, office, and industrial development be designed to minimize consumption of and sustain scarce environmental resources through methods including drought-tolerant species and recycled water for irrigation in landscaping, capturing rainwater and using it onsite, and water efficient fixtures.
Infrastructure and Utilities	Establish guidelines and standards for water conservation and actively promote use of water conserving devices and practices in both new construction and major alterations and additions to existing buildings.
	Encourage the use of recycled water by industrial, commercial, and institutional, users through incentives such as differential pricing.
	Require the use of recycled water for landscaped irrigation, grading, and other non-contact uses in new developments, parks, golf courses, sports fields, and comparable uses, where feasible.
	Encourage the use of rainwater capture and storage facilities in residential and nonresidential developments.
Environmental Resources	Prohibit the discharge of toxins, debris, refuse, and other pollution into watercourses, other drainages and groundwater basins.
	Balance consideration of water supply requirements between urban, agricultural, and environmental needs so that sufficient supply is available to meet each of these different demands.
	Provide active leadership in the regional coordination of water resource management and sustainability efforts affecting Riverside County and continue to monitor and participate in, as appropriate, regional activities to prevent overdraft caused by population growth.
	Support efforts to create additional water storage where needed, in cooperation with federal, State, and local water authorities. Additionally, support and/or engage in water banking in conjunction with these agencies where appropriate, as needed.
	In cooperation with Riverside County, participate in the development, implementation, and maintenance of a program to recharge the aquifers underlying Corona and SOI areas.
	Retain storm water at or near the site of generation for percolation into the groundwater to conserve for future uses and mitigate flooding.
	Use natural approaches to managing streams, to the maximum extent possible, where groundwater recharge is likely to occur.
	Require new private or public developments to preserve and enhance riparian habitat and prevent obstruction of natural watercourses.
	Consider wetlands for use as natural water treatment areas that will result in improvement of water quality
Public Health & Safety	Promote the collection of relevant data on groundwater levels and liquefaction susceptibility, as a basis for future refinement of liquefaction policies or procedures.
	Use natural watercourses as Corona's primary flood control channels, whenever feasible and practical.
	Minimize the potential risk of contamination to surface water and groundwater resources and implement restoration efforts to resources adversely impacted by past urban and rural land use activities.

Notes:

[1] : Some policy statements have been shortened for use in this table. The full text is included in the City of Corona General Plan.

T:\Projects\Corona GSP 46414\Deliverables\GSP\2 Plan Area\Tables 2-2 and 2-3 20210827.xlsx - Table 2-3 Corona General Plan

Des by: EG
Ckd by: IW

2.6.3. City of Norco General Plan

Norco's General Plan Update includes several elements, of which Conservation is the most relevant for water resources planning (Norco 2014). Relevant policies included in the General Plan are listed in **Table 2-4.**

Table 2-4. Selected Policies in the City of Norco General Plan

Category	Policy(1)
Water Supply	Continue to promote water conservation through the use of xeriscape designs in new development and public spaces where feasible.
	Continue to provide information to the public on ways to conserve water and reduce consumption.
	Monitor the demand for reclaimed water and file for Petitions of Change with the SARWQCB as-needed to reduce the amount of reclaimed water that is discharged from treatment facilities and make that water available for transmission into Norco's reclaimed water infrastructure system.
	Insure that there are adequate increases in water production and distribution capabilities to meet future growth demands.
Water Quality	Develop and maintain inter-agency agreements and infrastructure improvements to have back-up water supply sources from adjoining water districts during times of emergencies and system maintenance requirements.
	Continue public information campaigns to all residents with large animals to ensure awareness that manure spreading as a means of disposal is strictly prohibited to prevent contamination to groundwater supplies.

Notes:
1. Some policy statements have been shortened for use in this table. The full text is included in the City of Norco General Plan Update.

2.6.4. General Plan Influences on Groundwater Sustainability Agency Ability to Achieve Sustainability

The general plans for Riverside County, Corona, and Norco all include policies to increase water conservation and protect groundwater and surface water quality. They also include policies promoting the preservation of natural floodplains, which contribute to groundwater recharge. However, the planned growth in the Basin would convert open space uses that allow groundwater infiltration to more developed land use types with more impervious cover that will likely not allow the same amount of groundwater infiltration. Use of low impact development practices and stormwater best management practices (BMPs) that promote infiltration would help mitigate loss of infiltration due to land use changes.

Riverside County. The Riverside County General Plan addresses the importance of groundwater. The policies and implementation of the land use and public facilities/services elements indicate that the County role is to support and encourage local water agencies in ensuring that water supply is available. Similarly, with wastewater issues and protection of water quantity and quality, the County role is limited to encouragement of other agencies, developers, and landowners. The General Plan contains little policy to manage land use within the constraints of available water supply other than to encourage drought resistant plants and the use of recycled water.

Corona serves a population that is predicted to increase from 170,100 in 2020 to about 185,600 residents by 2045 (Michael Baker 2021). Some of this growth will be along the southern edge of Corona in the Eagle Creek area within and adjacent to the Basin. The UWMP anticipates future growth in the City will be offset by lower per capita water use. However, the general plan indicates that Met may build an additional treatment plant in the area to meet increased water demand, if warranted. Corona land use policies generally are protective of agricultural land and hillsides, and conservation policies address water efficiency, water recycling, sustainability measures, and coordination with other agencies, including HGCWD and Norco.

The increased development included in the general plans was simulated by the numerical model described in Chapter 5. Based on these scenarios, the Basin remains sustainable even with future growth.

2.6.5. GSP Influences on General Plans

The Temescal Groundwater Sustainability Agency (Temescal GSA) agencies will work together to implement this GSP and rely on their portfolio of water supply to maintain sustainability. Future growth is expected to be limited based on the general plans.

City of Corona. Implementation of the GSP will support Corona in providing continued groundwater to its population. In addition, the GSP will ensure good quality water in sufficient quantities to serve its residents into the future, including drought periods.

Riverside County. The Riverside County General Plan generally assumes that local water agencies can ensure adequate high-quality water supplies into the future. The GSP provides additional specific information, documents potential challenges to water supply, and explores undesirable results that may occur with future increases in groundwater demand. Undesirable results will be defined with sustainability criteria, and if identified, will be addressed with management actions. These management actions may have ramifications for County land use planning. For example, GSPs are authorized within the GSP Plan Areas to impose well spacing requirements and control groundwater pumping and control extractions by regulating, limiting, or suspending extractions from individual groundwater wells. Such regulation may present a constraint on potential land uses.

2.7. ADDITIONAL GSP ELEMENTS

The GSP requirements include a list of additional GSP elements from Water Code Section 10727.4 that may or may not be relevant to a GSP. As shown in **Table 2-5**, several of these elements are not applicable to the Basin. The elements that are applicable to the Basin, are presented in the sections below.

Table 2-5. Additional GSP Elements included in Water Code Section 10727.4

Water Code Section 10727.4 Elements	GSP Section or N/A
a) **Control of saline water intrusion**	N/A
b) **Wellhead protection areas and recharge areas**	2.7.1
c) **Migration of contaminated groundwater**	2.7.2
d) **A well abandonment and well destruction program**	2.7.3
e) **Replenishment of groundwater extractions**	N/A
f) **Activities implementing, opportunities for, and removing impediments to, conjunctive use or underground storage**	N/A
g) **Well construction policies**	2.7.3
h) **Measures addressing groundwater contamination cleanup, groundwater recharge, in-lieu use, diversions to storage, conservation, water recycling, conveyance, and extraction projects**	N/A
i) **Efficient water management practices, as defined in Section 10902, for the delivery of water and water conservation methods to improve the efficiency of water use**	2.7.4
j) **Efforts to develop relationships with state and federal regulatory agencies**	2.7.5
k) **Processes to review land use plans and efforts to coordinate with land use planning agencies to assess activities that potentially create risks to groundwater quality or quantity**	2.7.6
l) **Impacts on groundwater dependent ecosystems**	4.10 and 6.7

2.7.1. Wellhead Protection Areas and Recharge Areas

In 2002, Corona conducted an assessment of the vulnerability of their drinking water wells under the California Drinking Water Source Assessment Program. This program, developed by the California Department of Public Health, delineates the area around drinking water sources, such as wells, through which contaminants might reach the water supply. This assessment identified surface recharge areas in the vicinity of Corona's wells. In addition, the analysis in the 2008 GWMP identified the main areas of basin recharge for the aquifers tapped by Corona's wells. These areas include the entire footprint of the unconfined Channel Aquifer, recharge areas along washes and alluvial fans, and areas of subsurface inflow such as Temescal Canyon and Arlington Gap (Todd and AKM 2008).

2.7.2. Groundwater Contamination Migration and Clean-up

There are several groundwater contaminated sites in the Basin in varied stages of remediation. The pollutants of concern for these sites include gasoline, diesel, and volatile organic compounds (VOCs). The status of each site is summarized in **Table 2-6**. The remediation activities for contaminated sites directly over the Basin are managed and tracked by the SARWQCB. GeoTracker is the SWRCB data management system for sites that impact groundwater or have the potential to impact groundwater. GeoTracker provides information on sites that require groundwater cleanup and the status of required clean-up activities. In the Basin, there are a number of closed sites (where clean-up activities have been completed) and five open sites, as shown on **Figure 2-12**.

Table 2-6. Status of Contamination Sites in the Basin

Site	Contaminants of Concern	Status
ARCO #1924	Gasoline	OPEN – Eligible for closure as of 2/18/2016
Thomas Ranch (Schofield)	Benzene, other acid or corrosive, other petroleum, xylene	OPEN – Site assessment as of 8/21/1986
Dry Clean Express	Tetrachloroethylene (PCE), Trichloroethylene (TCE)	OPEN - Inactive as of 2/13/2020
Private Residence	Diesel	OPEN - Inactive as of 11/17/2017
All American Asphalt Landfill	Non-Specified	OPEN – Operating as of 11/1/2014

2.7.3. Well Permitting, Construction, and Destruction Requirements

The RCDEH is responsible for issuing well permits. Permits are required for the construction and/or abandonment of all water wells including, but not limited to driven wells, monitoring wells, cathodic wells, extraction wells, agricultural wells, and community water supply wells. The process includes an application by the property owner and certified well driller, and a site inspection by the County. The wells are also inspected during different stages of construction to help verify standards are being met. All drinking water wells are evaluated once they complete installation to ensure they comply with State well standards and meet minimum drinking water standards. If found in compliance, the land or well owner is issued a clearance letter authorizing their use.

Corona and Norco have not developed their own well construction standards but do require compliance with DWR standards and RCDEH standards.

Through their Water Engineering Program, RCDEH requires that a permit be obtained for the abandonment of any well in the County (RC DEH 2020). Guidance for well abandonment procedures is consistent with the standards developed by DWR and included in the California Water Code (§ 13800 through 13806) for drilling and destroying wells in California. The 2008 GWMP recommended increased coordination with RCDEH Water Engineering Program regarding well abandonment procedures.

2.7.4. Efficient Water Management Practices

Corona and Norco encourage and facilitate efficient water management practices, which are discussed at a high level in each city's General Plan (Corona 2021 and Norco 2014). In addition, specific water conservation targets and demand management measures, including metering, conservation pricing, public education, water loss auditing, and other water conservation program activities, are documented in each city's 2020 UWMP (Michael Baker 2021 and Norco 2021). As documented in Section 2.5.7 of this GSP, Corona and Norco have both met and exceeded their 2020 water efficiency goals.

Water conservation reduces reliance on potable water supplies, including groundwater. Increasing water conservation through the implementation of water efficiency practices may reduce groundwater pumping and promote sustainable groundwater management.

2.7.5. Relationships with State and Federal Agencies

The Temescal GSA has developed an interested parties list, which includes stakeholders, neighboring water agencies, local groups, State and Federal agencies, and others who have expressed interest in the GSP process. Notices have been sent to these interested parties throughout GSP preparation. In addition, State and Federal agencies have had the opportunity to participate in the Technical Advisory Committee (TAC), attend public meetings, and review and comment on public drafts of the GSP.

2.7.6. Land Use Plan Coordination

Land use planning agencies have been invited as interested parties to the GSP planning process. The GSA recognizes the importance of the natural recharge areas, where stormwater is recharged into the Basin and has developed projects and management actions to further assess enhanced recharge in coordination with local land use planning efforts (see Chapter 8).

2.8. NOTICE AND COMMUNICATION

As described in this and later chapters, groundwater is a major source of supply in the Basin and supports a range of beneficial uses: municipal, industrial, commercial, agricultural, and environmental. To some degree in the Basin, all land and property owners, residents, businesses, employees, and visitors are potentially affected by groundwater use. This reflects the orientation of the communities in the Basin and the amenities for small-city living and recreation. While recognizing the critical importance of imported supply, reliable groundwater is essential.

The Temescal GSA has encouraged public participation in the ongoing planning and development activities supporting the GSP process. Corona organized a TAC to support the GSP process; regularly scheduled TAC meetings have been announced on the GSA website and have been open to the public. In addition, public workshops regarding development of the GSP have been conducted to encourage public participation and to provide educational outreach. Early in the GSP preparation process the GSA contacted potential interested partis, including private well owners, environmental stakeholder, local and regional community organizations, and the community at large. Parties that expressed interest were included on the list of interested maintained pursuant to Water Code Section 10723.2.

Organizations and individuals that expressed interest throughout GSP preparation were added to this list. Meeting notices were provided to all those on the interested parties list in advance of all public meetings relating to the GSP and when draft portions of the GSP were made available on the GSA website. Additionally, GSP development information and meeting notices have been regularly posted to the GSA website.

The Communication Plan in **Appendix D** provides an overview of outreach to the public by means of public TAC meetings, public workshops, informational materials (e.g., Fact Sheets), focused outreach, and the GSA website. These inform the public about the GSP development and implementation process and encourage active involvement by interested parties.

The GSA developed and maintained an interested parties list and has communicated to the individuals and organizations on the list during GSP development. These parties represent a variety of interests and perspectives. Additionally, the interested parties group brings a variety of expertise, including public and private groundwater users, local business interests, public water systems, land use planning agencies, regulatory agencies, etc. These parties have been engaged throughout the development of this GSP to provide them with information about the purpose of the GSP, educate about Basin characteristics, and obtain input on sustainability goals and management actions. A list of public meetings held during development of the GSP, comments received on the draft GSP prior to adoption, and how those comments were addressed is included in **Appendix E**.

2.8.1. Technical Advisory Committee (TAC)

The Temescal GSA formed a TAC to provide input and guidance to the staff and consultant team of the GSA during preparation of the GSP based on their expertise, knowledge, resources, and understanding of their communities, environment, commerce, and applicable regulations. The intent of the TAC is to contribute community and stakeholder perspectives and interests in GSP planning and GSP and SGMA implementation in the Basin. The TAC includes representatives from the following public and private organizations:

- 3M Industrial Mineral Products Division
- All American Asphalt
- Santa Ana Regional Water Quality Control Board (RWQCB)
- City of Norco
- Home Gardens County Water District
- Riverside County Flood Control and Water Conservation District
- Corona City Council
- City of Corona Department of Water and Power.

The TAC held quarterly meetings throughout the GSP preparation period that were open to the public. Notification for these meetings was posted on the GSA's website prior to meeting dates and presentation materials and meeting summaries were posted following each meeting. Meeting summaries and presentation materials from the TAC meetings are included in **Appendix F**.

2.8.2. Public Workshops

Three public workshops were held during preparation of the GSP to engage with interested parties and stakeholders. The GSA agencies publicized these public meetings through the GSA website, social media, and distribution of targeted bilingual Fact Sheets. The workshops were held virtually in 2020 and 2021 and all presentations and materials were presented simultaneously in English and Spanish. These workshops were also streamed on Corona's website, Facebook, and YouTube channels and on Corona TV (locally Channel 29 on Time Warner Spectrum and Channel 99 on AT&T).

Meeting summaries, presentation materials, and associated Fact Sheets from the public workshops are included in **Appendix G**.

2.8.3. Directed Outreach and Coordination

The GSA focused significant outreach efforts to engage and inform important local and regional stakeholders. This included engaging community leaders in historically underserved communities in the Basin and coordination with neighboring basins and local agencies.

2.8.4. Disadvantaged Community Outreach

Areas of the Basin identified as disadvantaged and severely disadvantaged communities (DACs and SDACs) are shown on **Figure 2-13**. These DACs and SDACs are within the service areas of Corona and HGCWD and receive water supply from those agencies. There are no active private wells in these DAC and SDAC areas. This fact notwithstanding, the GSA worked to identify individuals and/or organizations in or representing these DACs and SDACs and engage them in the GSP process. Outreach to DAC and SDAC areas of the Basin included communication with and distribution of Fact Sheets to and through local churches and community centers in the DAC/SDAC areas and individual and group meetings with politically active individuals, community leaders, and community action organizations, and elected officials. This outreach focused on presentations regarding SGMA, the Basin, the GSP process and components, and encouraged participation in public meetings and GSP review. These meetings also generated feedback on additional outreach that the GSA could undertake, much of which was implemented. Notes from these meetings are included in **Appendix H**.

2.8.5. Neighboring Basin Coordination

The GSA held meetings to facilitate communication and coordination with groundwater basins neighboring the Temescal Basin. This included meetings with representatives of the Chino Basin, Riverside-Arlington Basin GSA, and Coastal Plain of Orange County Basin GSA. The meetings focused on data sharing between basins, water budget coordination, and GSP preparation timelines. Summary notes from these meetings are included in **Appendix H**.

2.8.6. Comments and Responses on Draft GSP

On September 15, 2021, the GSA notified stakeholders, including local City and County agencies, of their intent to adopt this GSP after a 90-day review period. Two letters with comments on the Draft GSP were received in mid-December. These letters, along with responses from the GSA and indications of how the GSP has been modified are included in **Appendix I**.

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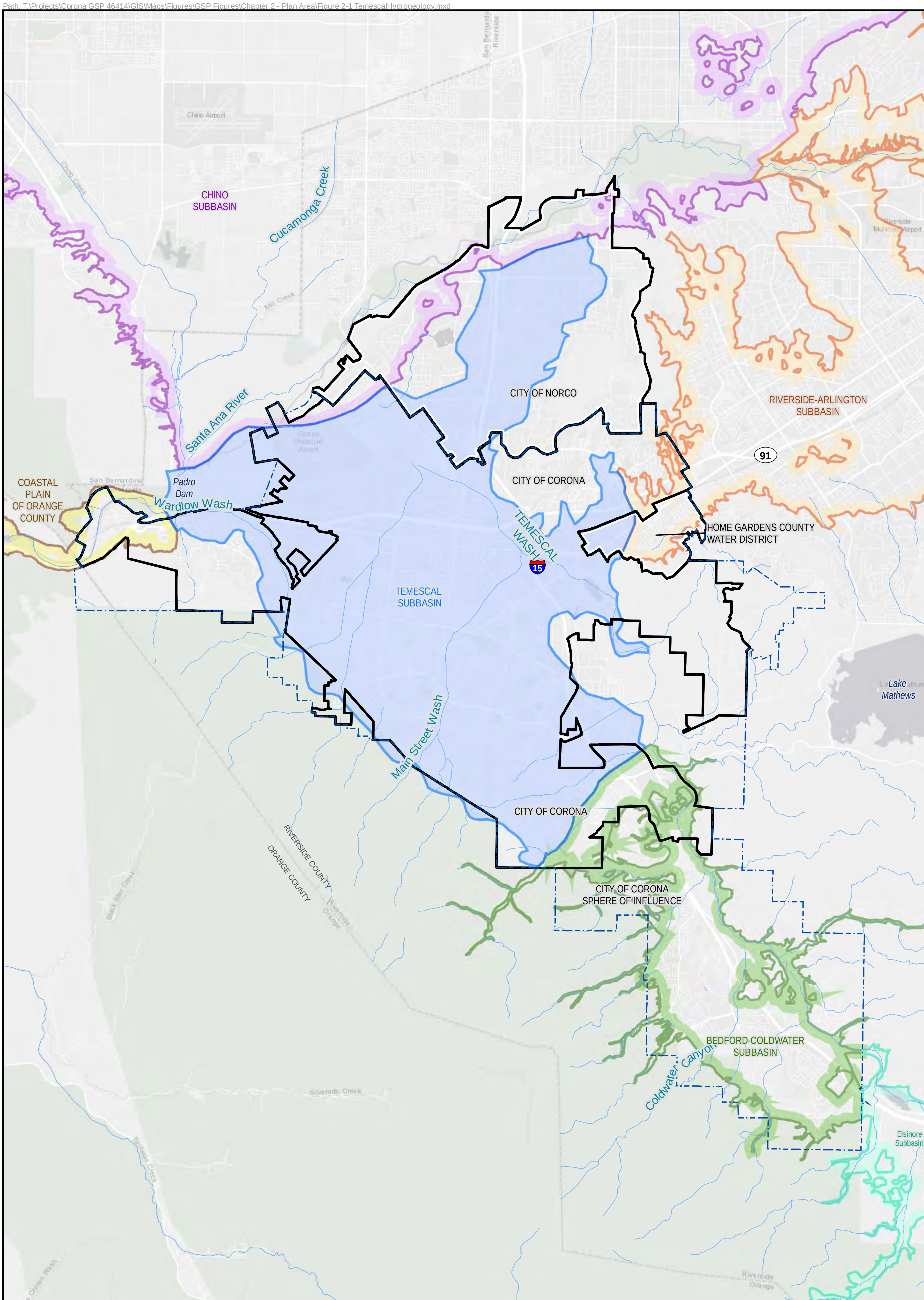

Streams
Temescal Basin GSP Area
Coastal Plain of Orange County Basin
Bedford-Coldwater Subbasin
Chino Subbasin
Elsinore Valley Subbasin
Riverside-Arlington Subbasin
Cities
City of Corona Sphere of Influence

Data Sources:
Cal-Atlas, DWR Bulletin 118, National Hydrography Dataset, SAWPA

Disclaimer:
Features shown in this figure are for planning purposes and represent approximate locations. Engineering and/or survey accuracy is not implied.

N
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Miles

**Figure 2-1
Temescal Basin
GSP Area**

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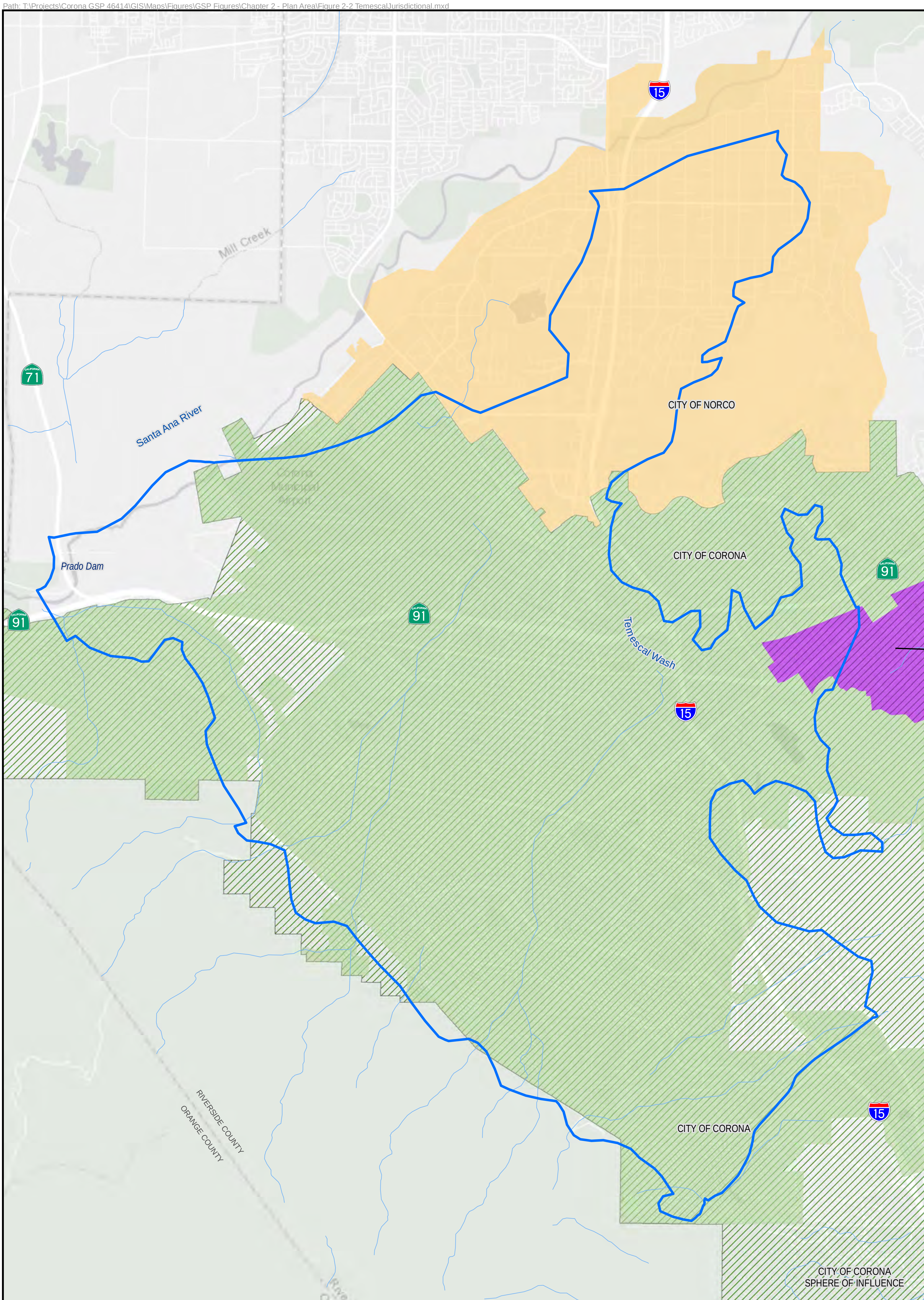

Streams
Temescal Basin
City of Corona
City of Norco
Home Gardens County Water District
City of Corona Sphere of Influence

Data Sources:
Cal-Atlas, DWR Bulletin 118, National Hydrography Dataset, SAWPA

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Figure 2-2
Jurisdictional Areas

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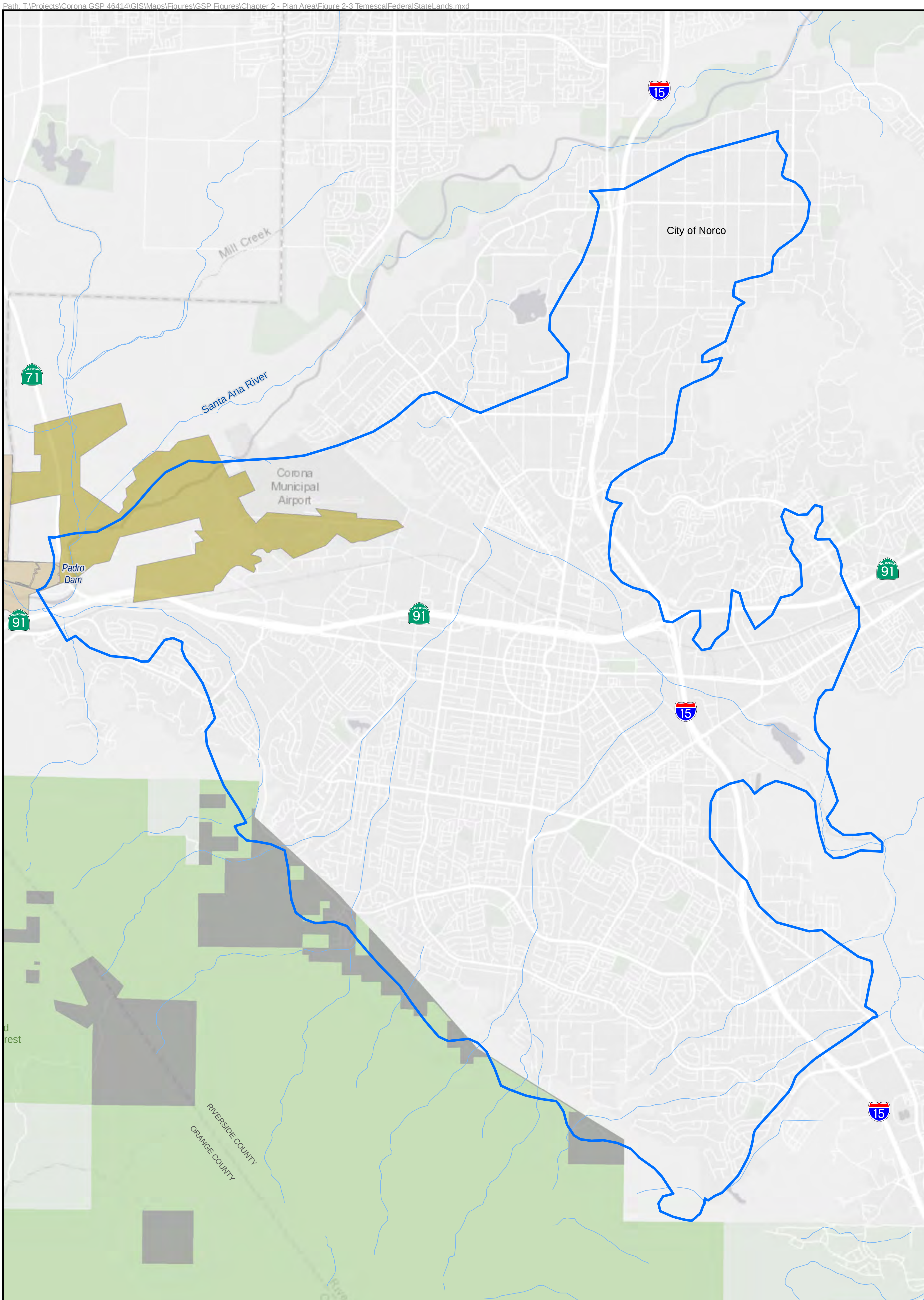

Department of Defense
State of California
Federal Lands - Non-Forest Service Land within USFS
Federal Lands - US Forest Service
Temescal Basin

Data Sources:
EVMUD, Cal-Atlas, DWR Bulletin 118, BLM

Disclaimer:
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Figure 2-3
Federal and State Lands

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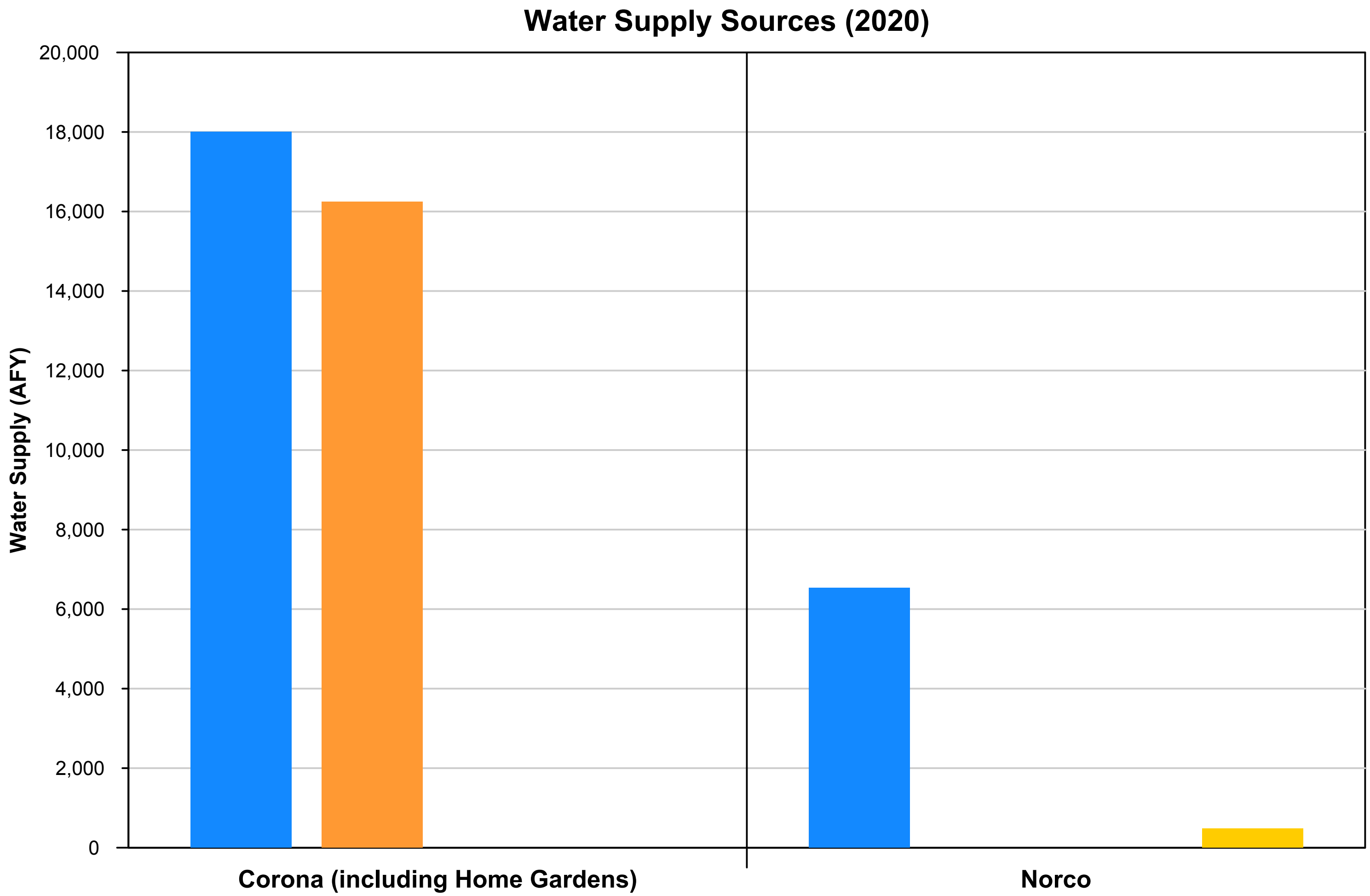

Imported Water
Temescal Basin Groundwater
Bedford-Coldwater Basin Groundwater
Chino Basin Groundwater

Notes:

Corona has the ability to pump groundwater from the Coldwater portion of the Bedford-Coldwater Basin, but did not do so in 2020.

Norco produces groundwater from wells in the un-adjudicated portion of the Chino Basin; they currently have no wells in the Temescal Basin.

Figure 2-4
Water Supply Sources within Basin - 2020

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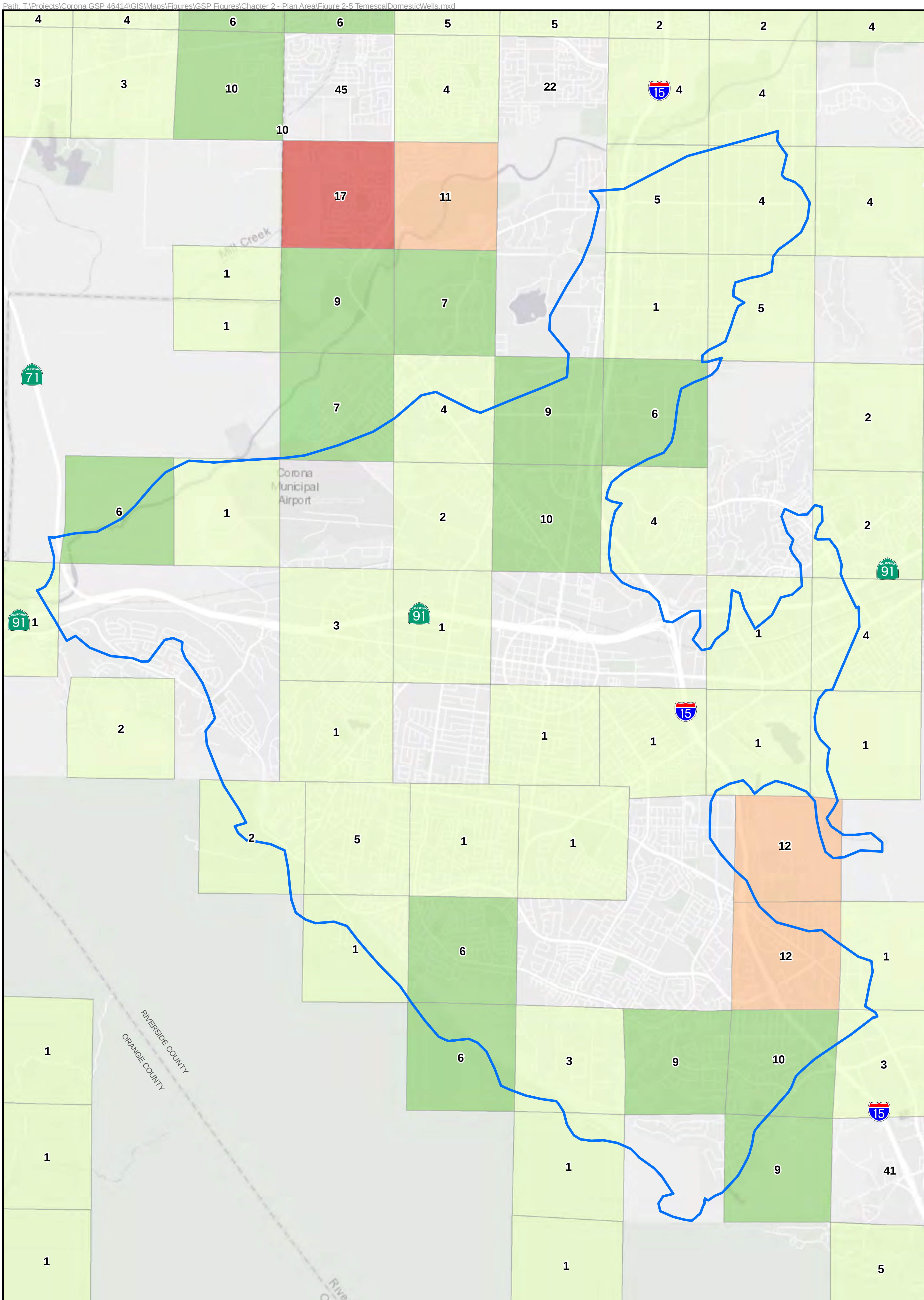

Domestic Wells by Section

- 1 - 5
- 6 - 10
- 11 - 15
- 16 - 20
- Temescal Basin

Data Sources:
Cal-Atlas, DWR Bulletin 118, National Hydrography Dataset

Disclaimer:
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Figure 2-5
Basin Domestic Groundwater Wells

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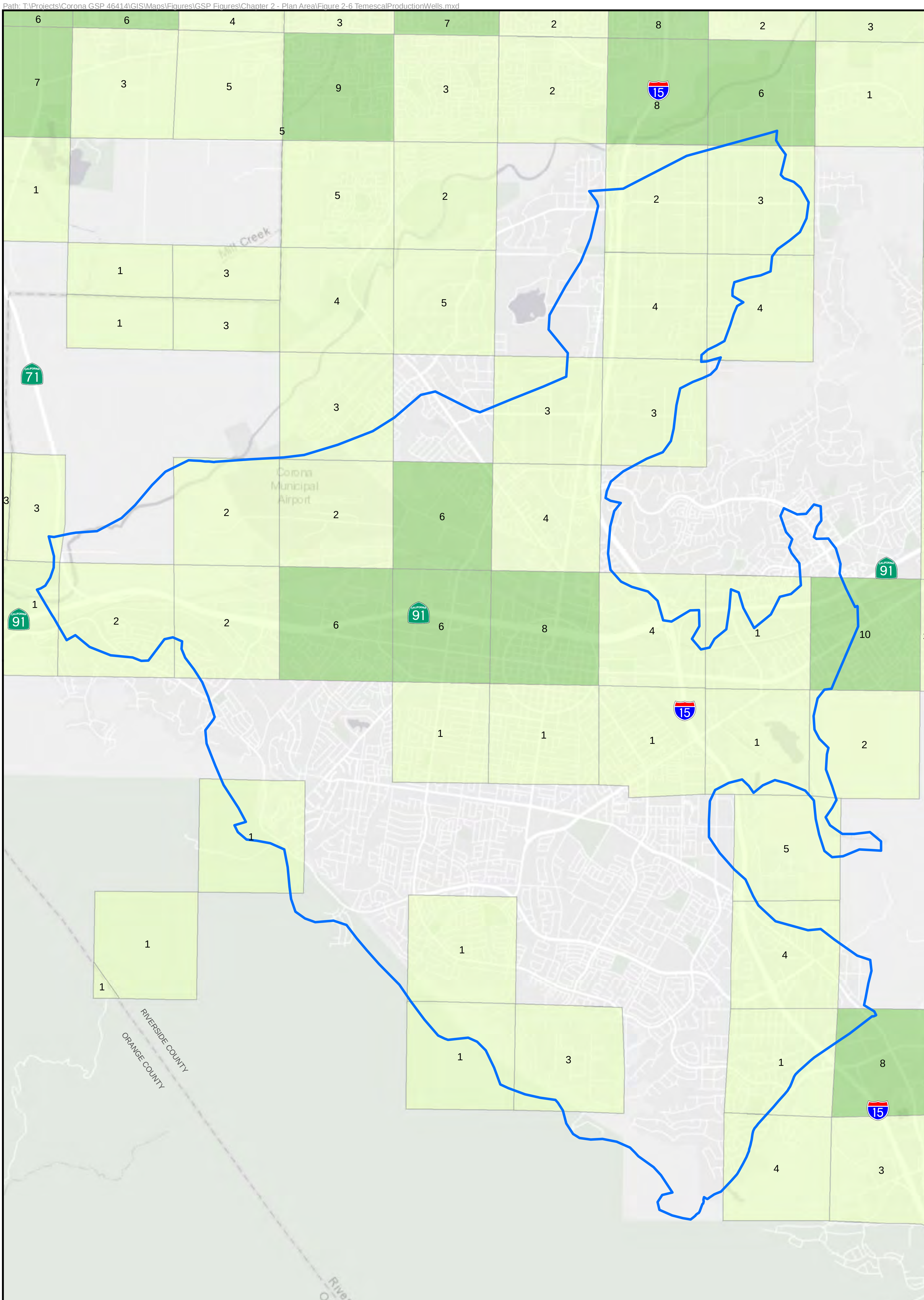

Production Wells by Section

- 1 - 5
- 6 - 10
- 11 - 15
- 16 - 20
- Temescal Basin

Data Sources:
Cal-Atlas, DWR Bulletin 118, National Hydrography Dataset

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Figure 2-6
Basin Production Groundwater Wells

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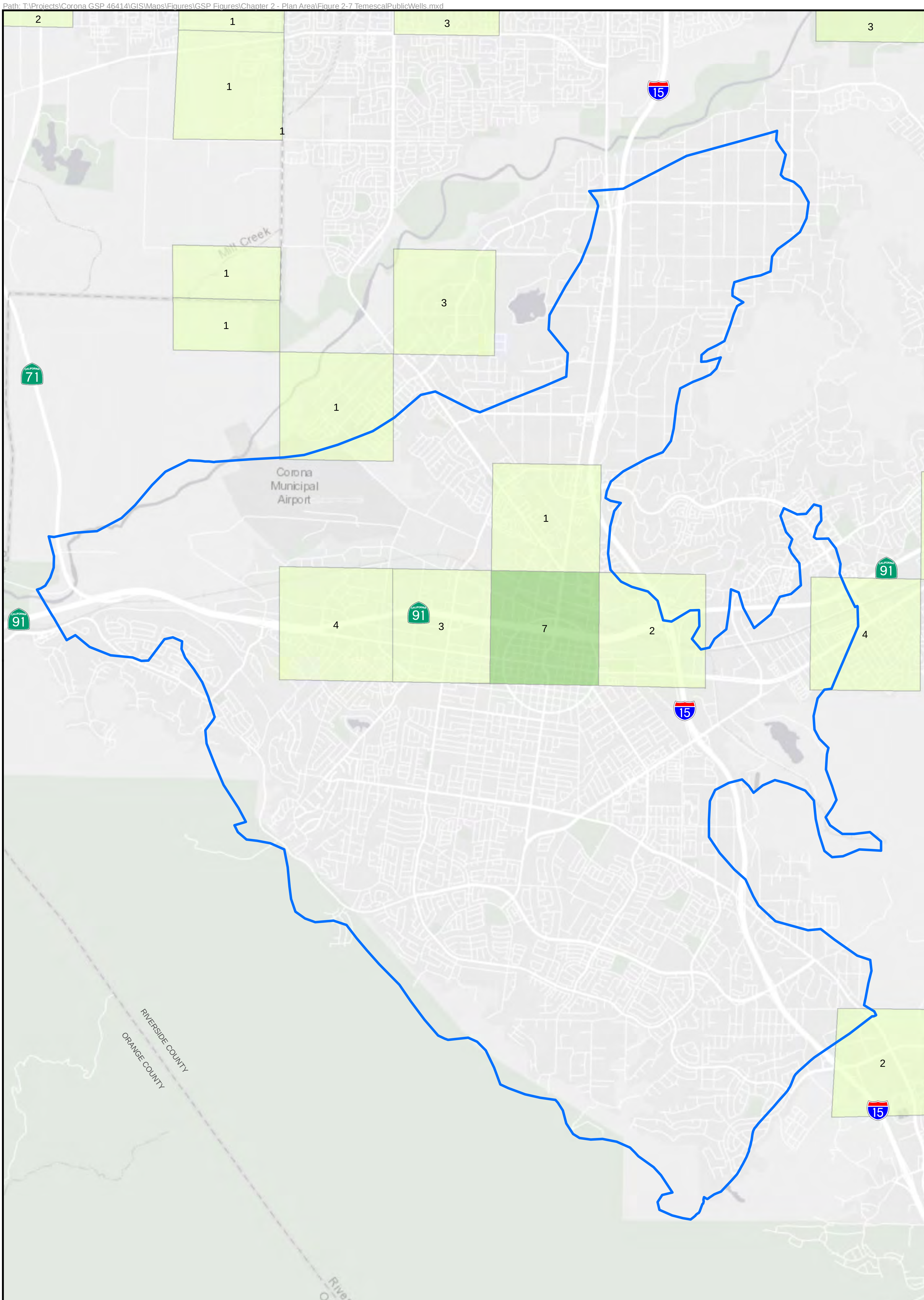

Public Wells by Section

- 1 - 5
- 6 - 10
- 11 - 15
- 16 - 20
- Temescal Basin

Data Sources:
Cal-Atlas, DWR Bulletin 118, National Hydrography Dataset

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Figure 2-7
Basin Public Groundwater Wells

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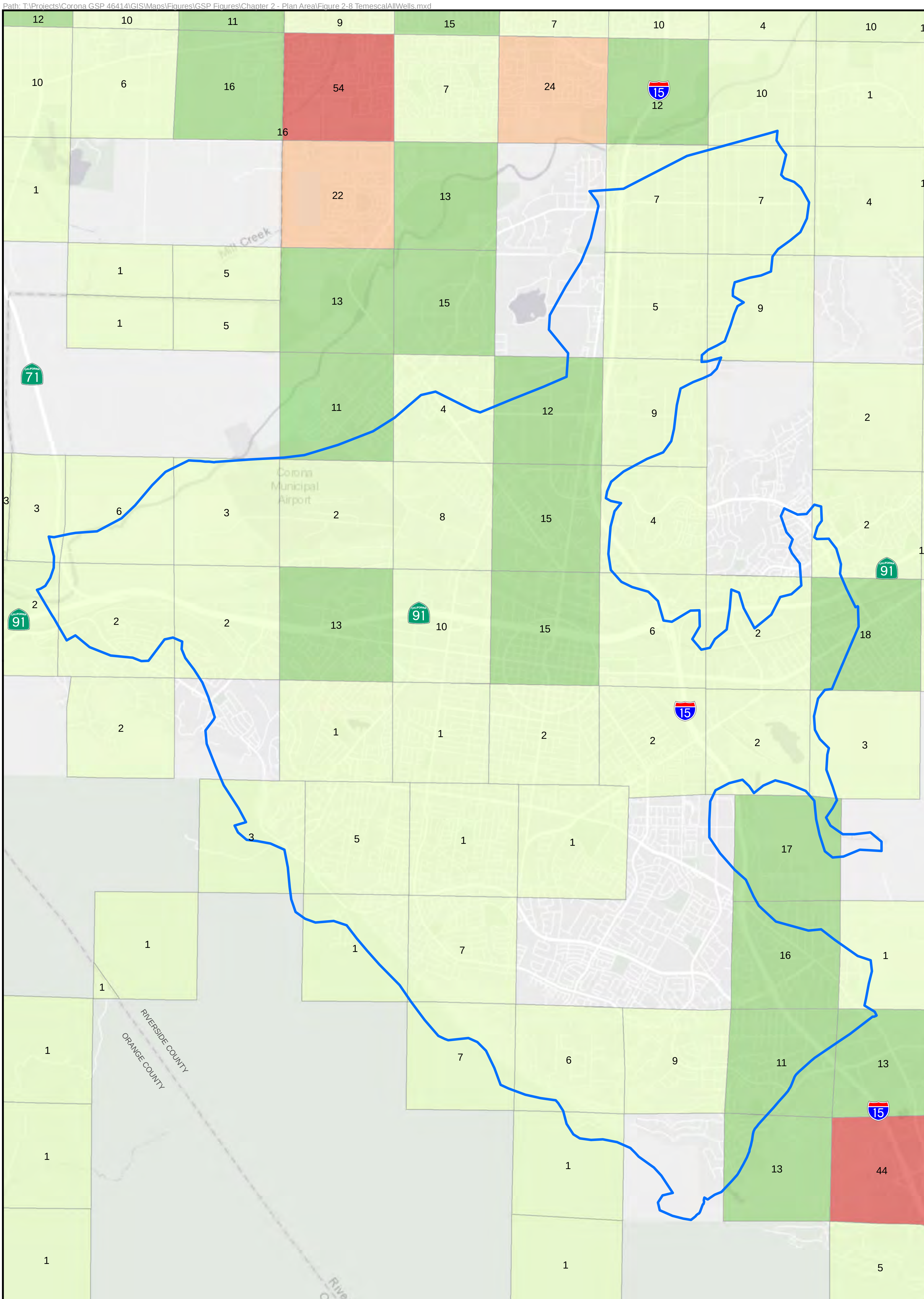

All Wells by Section

- 1 - 10
- 11 - 20
- 21 - 40
- 41 - 80
- Temescal Basin

Data Sources:
Cal-Atlas, DWR Bulletin 118, National Hydrography Dataset

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Figure 2-8
All Basin Groundwater Wells

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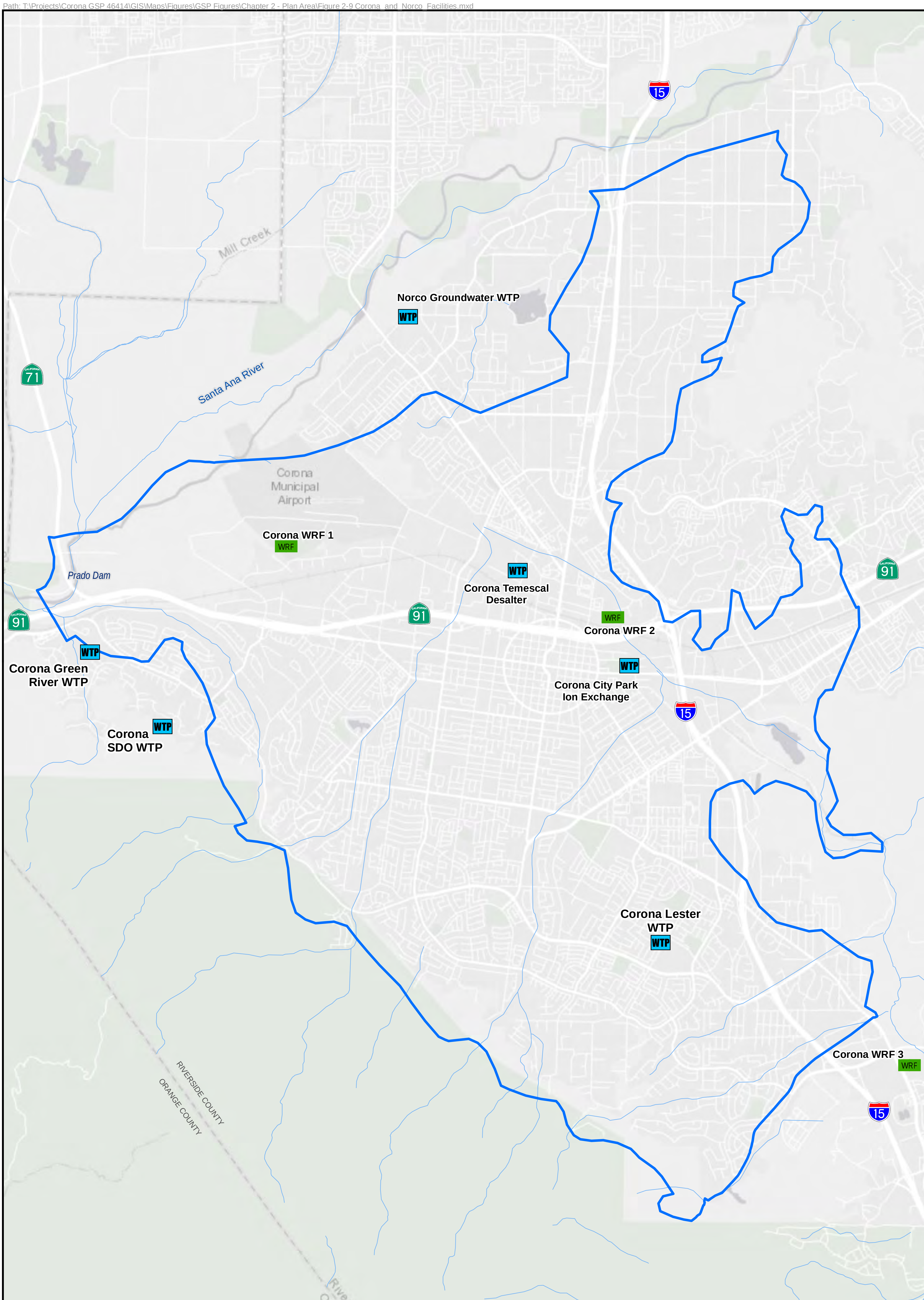

WTP Water Treatment Plant

WRF Water Reclamation Facility

Temescal Basin

Data Sources:
Cal-Atlas, DWR Bulletin 118, National Hydrography Dataset, SAWPA

Disclaimer:
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Figure 2-9
Corona and Norco Facilities

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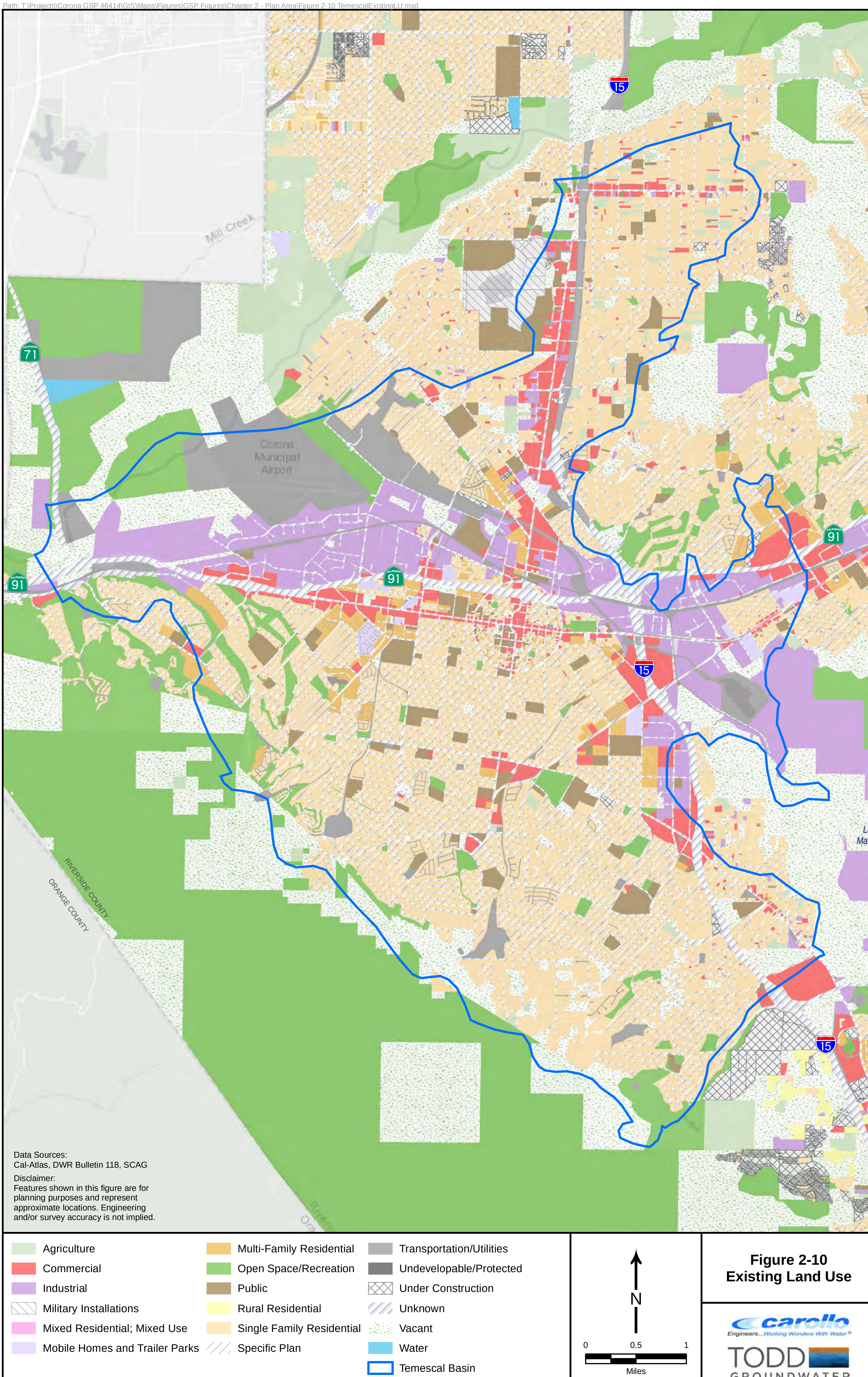
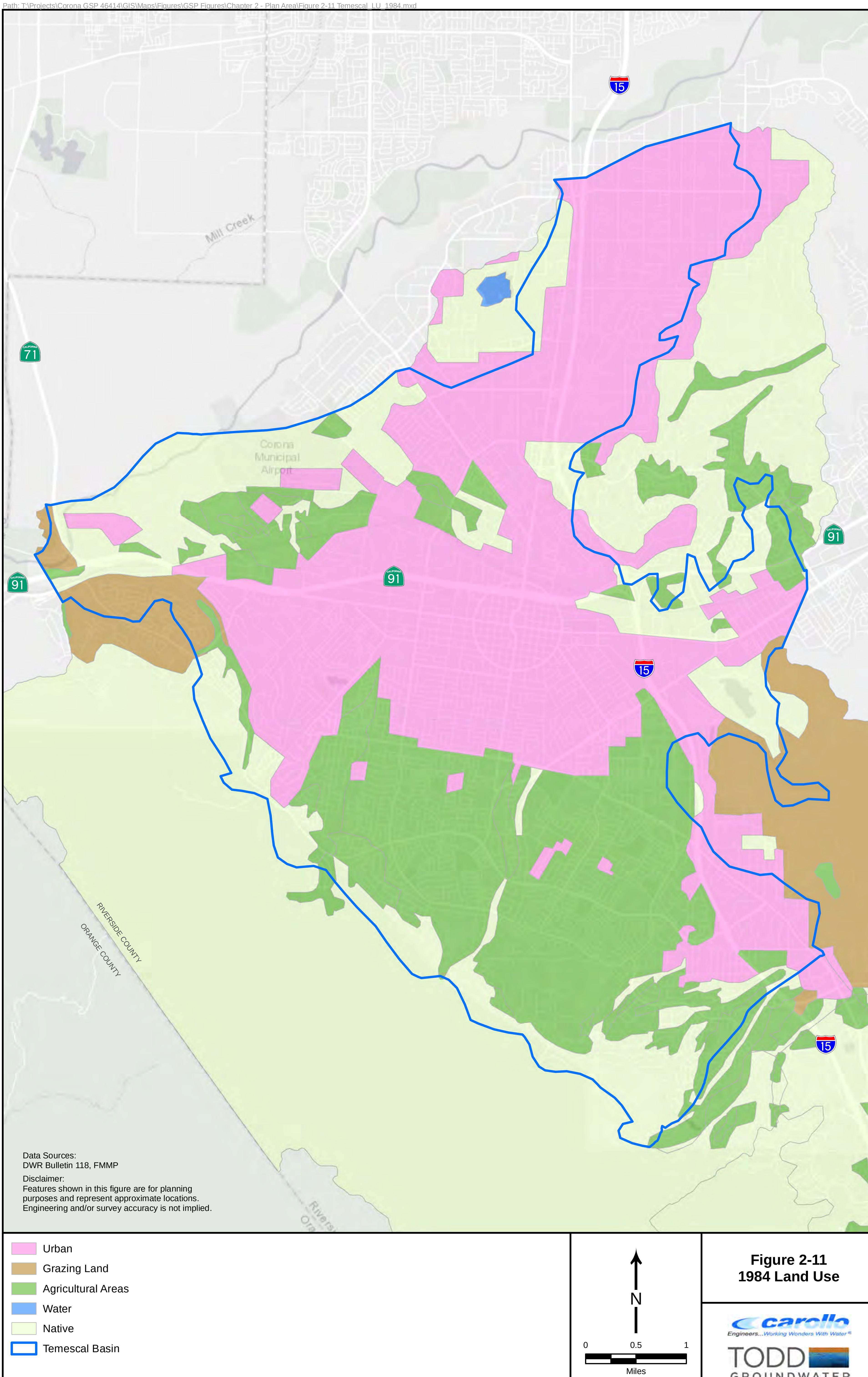


Figure 2-10
Existing Land Use



Data Sources:
DWR Bulletin 118, FMMP

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Figure 2-11
1984 Land Use

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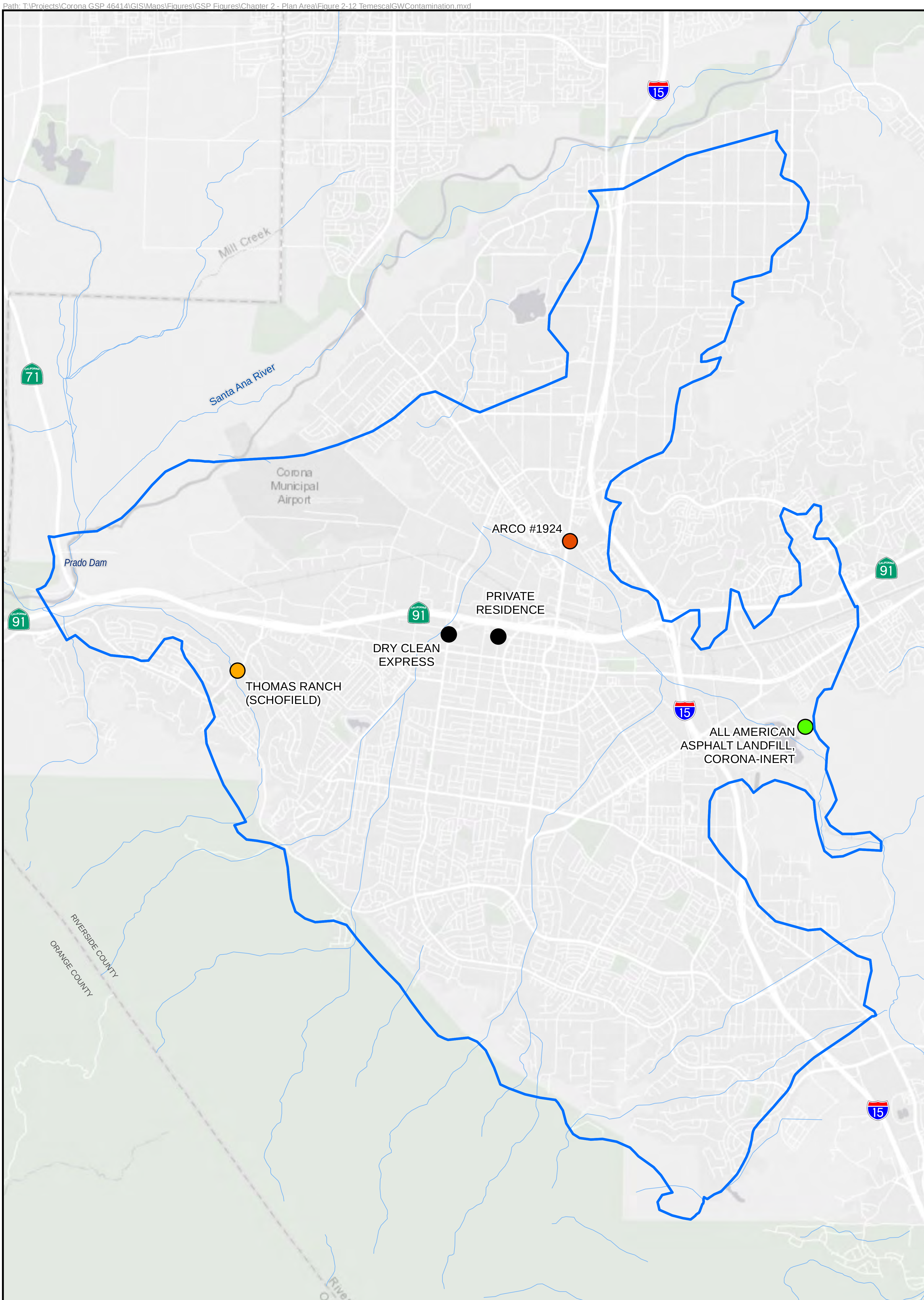

- Open - Eligible for Closure
- Open - Inactive
- Open - Operating
- Open - Site Assessment
- Temescal Basin

Data Sources:
Cal-Atlas, DWR Bulletin 118, National Hydrography Dataset, CA GeoTracker

Disclaimer:
Features shown in this figure are for planning purposes and represent approximate locations. Engineering and/or survey accuracy is not implied.

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Figure 2-12
Groundwater Contamination Sites

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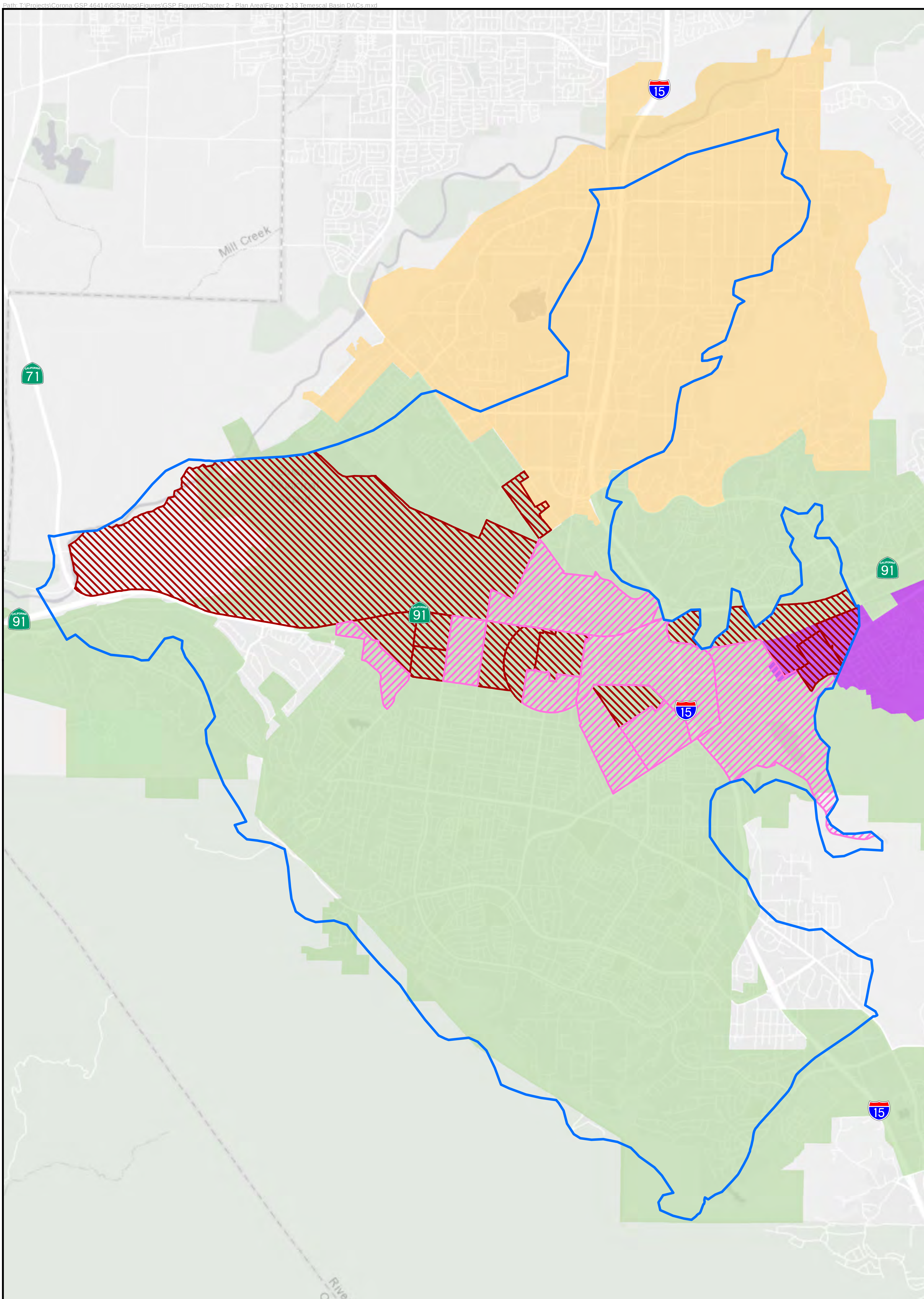

Disadvantaged Community
Severely Disadvantaged Community
City of Corona
City of Norco
Home Gardens County Water District
Temescal Basin
Temescal Basin

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Figure 2-13
Disadvantaged and Severely Disadvantaged Communities

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3. HYDROGEOLOGICAL CONCEPTUAL MODEL

This chapter describes the hydrogeologic conceptual model of the Temescal Subbasin (Basin) of the Upper Santa Ana Groundwater Basin, including the Basin boundaries, geologic formations and structures, and principal aquifer units. The chapter also discusses groundwater recharge and discharge areas. The hydrogeologic conceptual model presented here is a summary of relevant and important aspects of the Basin hydrogeology that influence groundwater sustainability. While the Chapter 1 Introduction and Chapter 2 Plan Area establish the institutional framework for sustainable management in the Groundwater Sustainability Plan (GSP), this chapter, along with Chapter 4 Groundwater Conditions and Chapter 5 Water Budget, sets the physical framework.

The hydrogeologic conceptual model and basin conditions description document the Basin's hydrogeology as the technical foundation for management. Later sections addressing the water budget and sustainability criteria will refer to and rely on the technical material contained here.

3.1. PHYSICAL SETTING AND TOPOGRAPHY

The Temescal Basin as defined by the California Department of Water Resources (DWR) is bounded on the west by the Santa Ana Mountains and the east by low-lying El Sobrante de San Jacinto and La Sierra hills. **Figure 3-1** illustrates the topography of the Basin.

The Basin is connected to three adjacent groundwater basins, the Chino and Riverside-Arlington Subbasins of the Upper Santa Ana Groundwater Basin and the Bedford-Coldwater Subbasin of the Elsinore Groundwater Basin. The boundary with the Chino Subbasin (DWR Basin No. 8-2.01) to the north is generally marked by the Santa Ana River and a series of low-lying hills in the Norco area. The Basin is connected to the Riverside-Arlington Subbasin (DWR Basin No. 8-2.03) in a narrow valley groundwater restriction between the El Sobrante de San Jacinto and La Sierra hills, referred to as the Arlington Gap. Groundwater flows into the Basin from the Riverside-Arlington Subbasin through the Arlington Gap. The southern boundary of the Basin is located at the Bedford Canyon where it connects with the Bedford-Coldwater Subbasin of the Elsinore Groundwater Basin (DWR Basin No. 8-4).

The floor of Basin slopes from about 1,500 feet above mean sea level (msl) along the base of the Santa Ana Mountains in the southwest to about 500 feet msl in the northwest. The ground surface elevation in the city center is about 650 feet msl. In the southeast where the Temescal Wash enters the Basin from the Bedford-Coldwater Subbasin, the ground surface elevation is approximately 850 feet msl (**Figure 3-1**).

The Basin receives runoff and recharge from over 8,000 acres of uplands in the adjacent Santa Ana Mountains. Watersheds contributing runoff from the east are almost as large but contribute less runoff because of lower elevations and corresponding precipitation.

3.2. SURFACE WATER FEATURES

The Basin includes a portion of the Santa Ana River watershed and a main tributary to the Santa Ana River, Temescal Wash, which flows through the Basin from the southeast to northwest. Surface water in the Basin originates as runoff from undeveloped tributary watersheds on the eastern slopes of the Santa Ana Mountains, wastewater treatment plant discharges, urban runoff within the Basin, flow in Temescal Wash, and flow in the Santa Ana River where it arrives at the Prado (flood control) Basin. Temescal Wash originates at Lake Elsinore, 17 miles upstream of the Basin and passes from south to north through the Bedford-Coldwater Subbasin and then through the Basin before discharging into the Prado Basin wetlands. This waterway is ephemeral and dry much of the year, flowing mainly during the winter. Tributary streams in the Santa Ana Mountains adjacent to the west side of the Basin flow primarily in response to rainstorm events, with limited base flow that enters groundwater where streams enter the Basin.

Figure 3-2 shows surface water features including rivers, streams, lakes, and ponds. The sub-watersheds that drain into and through the Basin are shown on **Figure 3-3**.

3.3. SOILS

Characteristics of soils are important factors in natural and managed groundwater infiltration (recharge) and are therefore an important component of a hydrogeologic system. Soil hydrologic group data from the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO) (NRCS 2020) are shown on **Figure 3-4**. The soil hydrologic group is an assessment of soil infiltration rates determined by the water transmitting properties of the soil, which include hydraulic conductivity and percentage of clays in the soil, relative to sands and gravels. The groups are defined as:

- Group A – High Infiltration Rate: water is transmitted freely through the soil; soils typically less than 10 percent clay and more than 90 percent sand or gravel.
- Group B – Moderate Infiltration Rate: water transmission through the soil is unimpeded; soils typically have between 10 and 20 percent clay and 50 to 90 percent sand.
- Group C – Slow Infiltration Rate: water transmission through the soil is somewhat restricted; soils typically have between 20 and 40 percent clay and less than 50 percent sand.
- Group D – Very Slow Infiltration Rate: water movement through the soil is restricted or very restricted; soils typically have greater than 40 percent clay, less than 50 percent sand.

The hydrologic group of the soil generally correlates with the potential for infiltration of water to the subsurface. However, a correlation does not necessarily exist between the soils at the ground surface and underlying geology or hydrogeology.

3.4. GEOLOGIC SETTING

The Basin is located within one of the structural blocks of the Peninsular Ranges of Southern California. The Basin occurs in a linear low-lying block, referred to as the Elsinore-Temecula trough, between the Santa Ana Mountains on the west and the Perris Plain on the east (Todd and AKM 2008). The trough extends from the City of Corona (Corona) to the southeast some 30 miles and was formed along an extensive northwest-southeast trending fault zone including the Elsinore, Chino, and related faults. The Elsinore and Chino fault zones bound the Basin on the west and trend along the mountain fronts. The surficial geology and the surrounding area are shown on **Figure 3-5**.

The oldest rocks in the Basin crop out in the Santa Ana Mountains. These uplands are composed principally of volcanic (including the Santiago Peak Volcanics) and metamorphic rocks (including the Bedford Canyon Formation) of Jurassic and Cretaceous age. A thin rim of younger sedimentary units of Tertiary age crops out along the mountain front generally lying between the Elsinore and Chino faults. This zone of sedimentary units broadens to the north and contains numerous mapped formations of Cretaceous and Tertiary age. The northeastern side of the valley is flanked primarily by granitic rocks of Cretaceous age. Erosion of these units has filled in the trough over time resulting in quaternary-age alluvial fan, channel, and other deposits making up the permeable portions of the Basin (USGS 2004 and 2006).

The geologic map on **Figure 3-5** shows the distribution of these units in the Basin (USGS 2004 and 2006). The main surficial deposits on the floor of the Basin include younger and older alluvial fans deposited from the erosion of volcanic rocks and Bedford Canyon Formation to the west. These units prograde across the Basin to the northeast and are truncated by channel deposits along Temescal Wash.

3.5. FAULTS

The Basin was formed along an extensive northwest-southeast trending fault zone including the Elsinore, Chino, and related faults. The Elsinore and Chino fault zones bound the Basin on the west and trend along the mountain fronts. Fault locations and orientations are shown on **Figure 3-5.**

3.6. AQUIFERS

The basin-fill alluvial deposits and, to some extent, the underlying sedimentary units make up the aquifers in the Basin. However, these deposits do not fall neatly into two categories of permeability, such as bedrock and basin fill. Aquifer packages composed of various geologic units have been defined based on depositional environment, degree of consolidation, groundwater production, and location throughout the Basin.

Three aquifer packages provide water supply to wells in Basin: the Channel Aquifer, the Alluvial Fan aquifers, and, to a lesser extent, consolidated sandstone aquifers (Todd and AKM 2008). Of these three aquifers, only the Channel Aquifer is a principal aquifer as it is the most productive aquifer and provides most of the groundwater supply in the Basin. The

Alluvial Fan and consolidated sandstone are secondary aquifers with limited production capacity and historical use. These aquifers meet one another in multiple areas throughout the Basin along erosional and depositional contacts. These contacts are permeable, and the aquifers are hydraulically connected. The geometry of these aquifers within the Basin are shown in cross sections presented on **Figures 3-6** through **3-9**. The thicknesses of these units vary significantly across the Basin, as indicated in the cross sections.

3.6.1. Description of Principal Aquifer Units

The Channel Aquifer is the principal aquifer in the Basin. This aquifer is a package of relatively homogeneous and highly permeable sands up to 200 feet thick that have been encountered in many of the Corona wells in the northern half of Basin. This sand package is interpreted as channel deposits of an ancestral arm of the Santa Ana River and, as such, has been referred to as the Channel Aquifer (Todd and AKM 2008). The alignment of the aquifer suggests that an ancestral river channel had entered the Basin at Arlington Gap, eroding the sedimentary units and possibly older alluvial fan deposits in the area. Permeable channel sands were deposited in the eroded channel over time. From the Arlington Gap, the Channel Aquifer trends northwest toward Prado Dam.

The orientation of The Channel Aquifer is illustrated on cross sections A to A’, B to B’, and C to C’ on **Figures 3-7, 3-8,** and **3-9**, respectively (Todd and AKM 2008). Cross Section A to A’ extends from the Santa Ana Mountains to the northeast across Temescal Wash to the bedrock high in the northeast. As shown on the section, the Channel Aquifer occurs in the northeastern portion of the Basin and has a saturated thickness that ranges from 125 to 150 feet along this section. As illustrated on the section, Channel Aquifer sediments lie directly above granitic bedrock beneath Temescal Wash and above the Sandstone Aquifer in other areas (**Figure 3-7**).

The Channel Aquifer at Arlington Gap is shown on Cross Section B to B’ (**Figure 3-8**). Here the saturated thickness is approximately 200 feet and well data indicate a thick and permeable sand package. The Channel Aquifer is underlain by the Sandstone Aquifer throughout most of this area.

Cross-section C to C’ is located north of A-A’ and extends from the Santa Ana Mountains through the Norco area (**Figure 3-9**). The Channel Aquifer is shown on the western side of the section southeast of the Prado Management Area. Similar to Cross Section A-A’, the saturated thickness of the Channel Aquifer is about 100 to 150 feet thick. The cross section also shows the absence of the Channel Aquifer in the Norco area and illustrates the shallow depth to bedrock there (generally less than 100 feet). The saturated thickness of alluvial sediments in Norco is generally less than 50 feet. Also indicated on the section is a groundwater divide in the Norco area (near Well 53-499) indicating possible groundwater outflow from the Norco area to the Santa Ana River (**Figure 3-9**).

Figure 3-10 shows estimated values of hydraulic conductivity (K) derived from test data on driller’s logs and/or Corona well aquifer testing data and the aerial extents of the Channel Aquifer. The K value is an indicator of the aquifer’s permeability and is expressed in gallons per day per square foot (gpd/ft^2) or feet per day (ft/day). As shown on **Figure 3-10**, the wells within the limits of the Channel Aquifer have the highest hydraulic conductivity values in the Basin. The lower K values shown within the extent of the Channel Aquifer area on **Figure 3-10** are generally from deeper wells tapping the underlying Sandstone Aquifer. The average K value of City of Corona production wells screened solely in the Channel Aquifer (Wells 7A, 8A, 9A, 17, 25, and 28) is 2,062 gpd/ft^2 (276 ft/day) (Todd and AKM 2008).

The Channel Aquifer adjoins the secondary aquifers described below as shown in the cross sections on **Figures 3-7** through **3-9** and the map on **Figure 3-10**. These adjoining aquifers do have hydraulic connection and there is groundwater flow between the aquifers where they meet.

3.6.1.1. Secondary Aquifers

The recent alluvial fan aquifers and sandstone aquifer are also present within the Basin and have historically been used to a lesser extent than the principal aquifer. These secondary aquifers are described below.

3.6.1.1.1. Alluvial Fan Aquifers

Both older and recent alluvial fans have been deposited through time along the mountain front on the western edge of the Basin. These fans have prograded across the Basin from west to east (**Figure 3-5**). Although these deposits are relatively thick, the entire unit is heterogeneous and cannot be considered one single aquifer. Rather, sand lenses within the deposits collectively form the Alluvial Fan Aquifers. Lithologic data from wells are insufficient to map out the extent of the aquifers or characterize the deposits. Limited data indicate relatively fine-grained textures throughout much of the area, especially with depth (Todd and AKM 2008).

The geometry of these units in the subsurface, including the contact with the Channel Aquifer, is illustrated on Cross Section A to A’ on **Figure 3-7**. The section illustrates the alluvial fan deposits that have infilled the Basin. The fans have prograded across the Basin and a thin veneer of these deposits likely overlies the Channel Aquifer at the surface (not shown on the section). Wells that penetrate the entire thickness of the Channel Aquifer in the east do not appear to encounter alluvial fan deposits on top of the Sandstone Aquifer. The total thickness of the deposits is unknown but appears to exceed 1,400 feet in the central Basin.

Only limited data exist for estimating K values in the alluvial fan deposits of Basin. Sparse data from a few wells indicate a K value of generally less than 50 gpd/ft^2 in the Alluvial Fan Aquifers and in the Norco area (**Figure 3-10**). Specific capacity data from a City of Corona production well (Well 27) drilled in the Alluvial Fan, indicated a lower K value of about 7 ft/day (PBS&J 2004).

3.6.1.1.2. Sandstone Aquifer

Some of the sedimentary units underlying the alluvial Basin provide sufficient well yields to categorize them as aquifers. Although generally grouped with other bedrock units, the subsurface sedimentary rocks of Tertiary age in the northeast Basin area contain sandstone layers that are screened in several Corona wells. The estimated K value is 22 gpd/ft^2 (3 ft/day) for one Corona production well (Well 24) screened solely in the Sandstone Aquifer (below the Channel Aquifer) (Todd and AKM 2008). Due to the limited production, small areal extent, increasing depths, and relatively low permeability in most areas, the Sandstone Aquifer is not considered a primary source of water supply.

3.6.2. Description of Lateral Boundaries

The lateral boundaries of the Basin are formed by contacts with bedrock units and borders with neighboring basins. The entire western Basin boundary and much of the eastern boundary of the Basin are contacts between Basin sedimentary units and upland bedrock outcrops. Along the north, the Basin is bounded by the contact with the Chino Subbasin, which is generally marked by the Santa Ana River and a series of low-lying hills in the Norco area. The boundary between the Basin and the Riverside-Arlington Subbasin is in the Arlington Gap and there is some flow into the Basin through this boundary. The southern boundary of the Basin is located at the Bedford Canyon where it connects with the Bedford-Coldwater Subbasin of the Elsinore Groundwater Basin.

Within the Basin the Channel Aquifer is bounded by its physical extents which are controlled by erosion and deposition. Near the Temescal Wash, an unnamed fault truncates the Channel Aquifer with an indeterminate amount of offset. The lateral extents of the Channel Aquifer are shown on **Figure 3-10**.

3.7. STRUCTURES AFFECTING GROUNDWATER

The Basin is defined by the lateral extents of the alluvial material described above. This material is bounded by bedrock in the Santa Ana Mountain on the west and the Peninsular Ranges to the east. The southern and northern boundaries of the Basin are formed by areas of thin alluvial material over shallow bedrock in narrow valleys (Todd and AKM 2008 and WEI 2015). A topographic rise in the subsurface bedrock appears to make a groundwater divided in the Norco area. The units in the Basin are also truncated by an inferred unnamed fault as part of the Elsinore and Chino fault zone along the base of the Santa Ana Mountains. The location and effect of the Elsinore and Chino fault zone on the units of the Basin are shown on cross sections on **Figures 3-6** through **3-9**.

3.8. DEFINABLE BASIN BOTTOM

The Basin bottom is defined by bedrock, which is shallow around the perimeter and deep in the center, as shown on **Figure 3-11**. Depth to bedrock ranges in depth from 10 feet to approximately over 1,000 feet (Todd and AKM 2008 and WEI 2015). The depth to the bottom of the alluvial materials in the Basin and the contact with the bedrock bottom of the Basin are shown in the contours presented in **Figure 3-11**.

The thickest portion of the alluvial Basin (the deepest depth to bedrock) occurs in the central-west portions of the Basin as seen on **Figure 3-7**. The formation of a trough along the Elsinore and Chino fault zone is indicated by the asymmetric basin geometry. Unconsolidated sediments are estimated to be more than 1,000 feet thick in this area.

Bedrock is much shallower in the eastern portion of the Basin, however there is a slight deepening near the Arlington Gap, as indicated on **Figure 3-8**. Here, unconsolidated sediments are approximately 250 feet thick. This area is interpreted to have been eroded by a branch of the ancestral Santa Ana River, accounting for the depth. Sediments throughout the northern portion of the Basin, including in the Norco area, are about 100 feet thick as shown on **Figure 3-8**. Outcropping bedrock in the northern and eastern portions of the Basin is further evidence of the thin alluvial sediments.

3.9. RECHARGE AND DISCHARGE AREAS

Recharge to the Basin occurs primarily from wastewater discharge and subsurface inflow from outside the Basin, and to a lesser extent from deep percolation of precipitation, urban return flows, and infiltration of agriculture irrigation runoff as shown in **Figure 3-12**.

Discharge from wastewater treatment and subsurface inflow are the largest inflows to the Basin. Recharge associated with wastewater occurs when treated wastewater is discharged to ponds. Subsurface inflow occurs along the Basin boundaries and is a significant source of recharge to the Basin (Todd and AKM 2008).

Deep percolation of precipitation is the process by which precipitation enters groundwater. Recharge to groundwater from deep percolation occurs throughout the Basin (Todd and AKM 2008). To a more limited extent, Basin recharge comes from the infiltration of runoff from precipitation in the Santa Ana Mountains west of the Basin and the Peninsular Ranges east of the Basin. Large amounts of runoff from the mountains flows into channels and the shallow subsurface at the edges of the Basin and then into and through the Basin. The amount of water available for recharge varies annually with changes in rainfall and runoff. Runoff into the Basin is subject to evapotranspiration, infiltration, and continued surface flow to and in the Temescal Wash. The watersheds contributing to the Basin include multiple drainages, all of which flow across the Basin in generally east-west orientations. Wet years generate large amounts of water that exceed the recharge capacity of the Basin (Todd and AKM 2008).

Return flows are those portions of applied water (e.g., landscape irrigation) that are not consumed by evapotranspiration and hence return to the groundwater system through deep percolation or infiltration. Return flows associated with urban, industrial, and agricultural water uses all have the potential to contribute to recharge to the Basin (Todd and AKM 2008).

Discharge from the Basin is primarily from groundwater pumping. A significant discharge also occurs to the Santa Ana River near the Prado Management Area (Todd and AKM 2008).

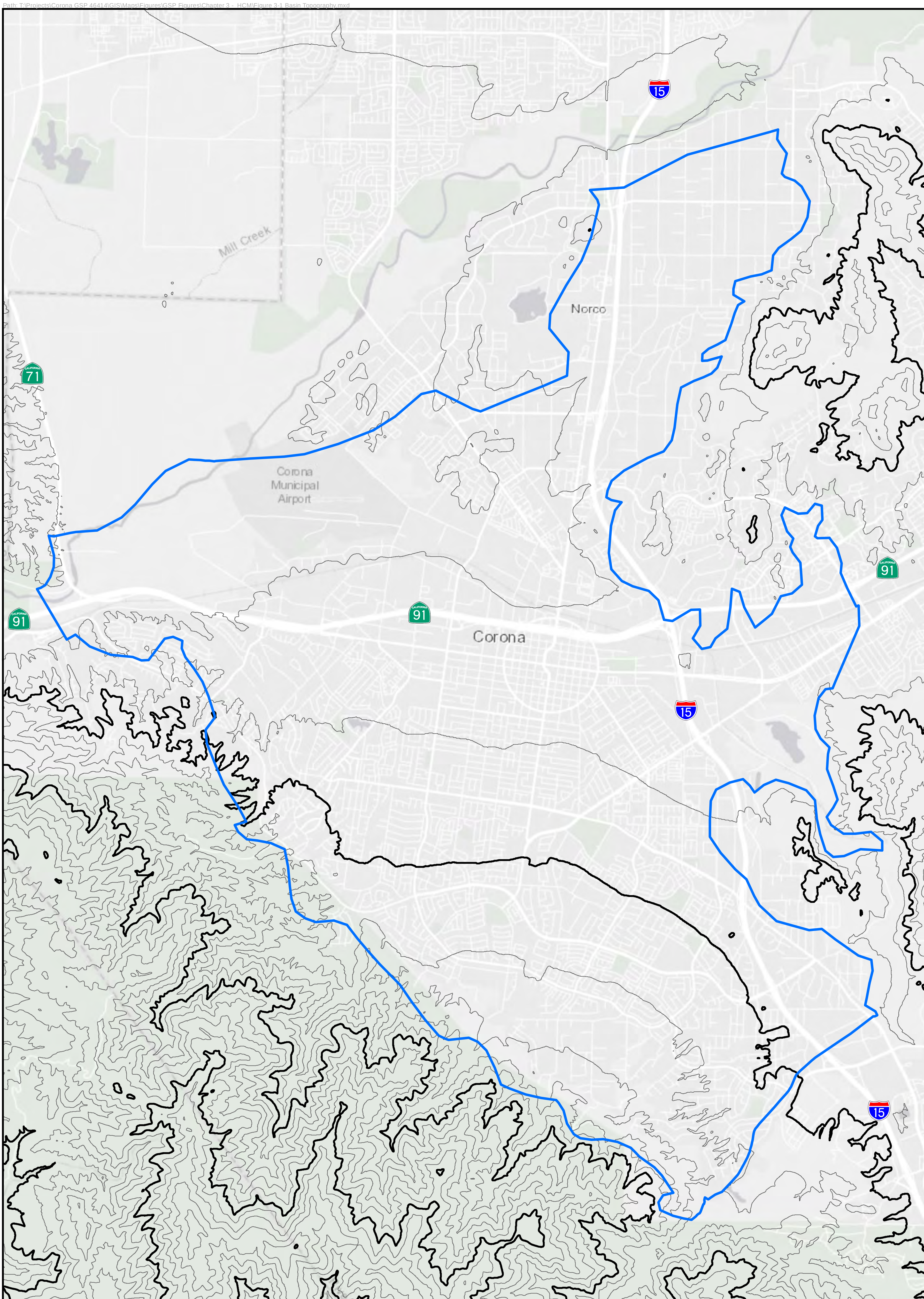
3.10. PRIMARY GROUNDWATER USES

The primary groundwater uses from both the principal and secondary aquifers in the Basin include municipal, rural residential, small community water systems, and small commercial uses. Groundwater pumped from the Basin aquifers supplies water for urban, agricultural, and industrial uses. Municipal uses account for most of this groundwater production. Groundwater pumping also represents most of the outflow from the Basin.

3.11. DATA GAPS IN THE HYDROGEOLOGIC CONCEPTUAL MODEL

The hydrogeologic conceptual model has not identified data gaps in available information.

Path: T:\Projects\Corona GSP 46414\GIS\Maps\Figures\GSP Figures\Chapter 3 - HCM\Figure 3-1 Basin Topography.mxd



200 foot Ground Surface Elevation Contour
1,000 foot Ground Surface Elevation Contour
Temescal Basin

N

0 0.5 1
Miles

Figure 3-1
Basin Topography

TODD GROUNDWATER

Path: T:\Projects\Corona GSP 46414\GIS\Maps\Figures\GSP Figures\Chapter 3 - HCM\Figure 3-2 Tributary Surface Water.mxd

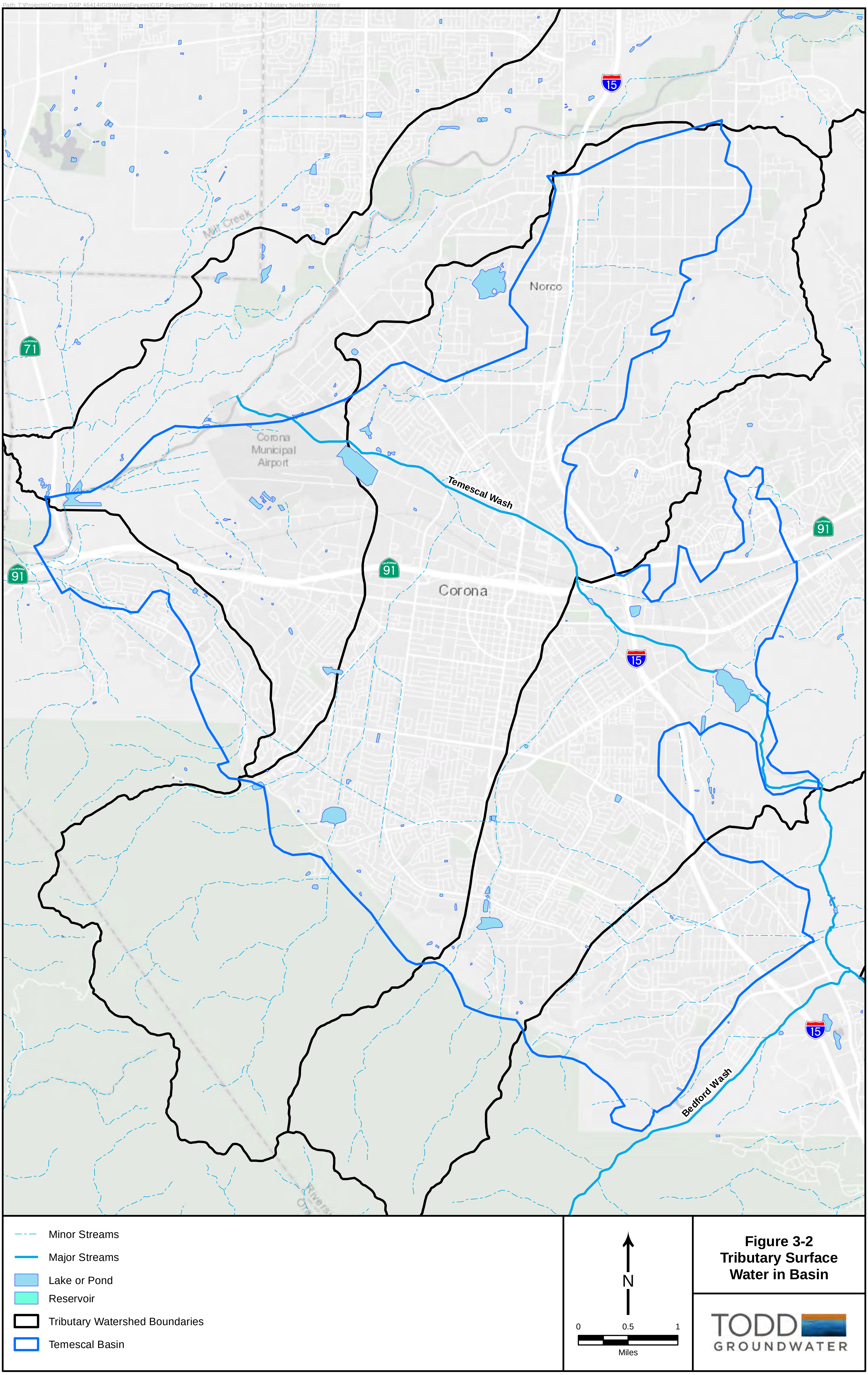
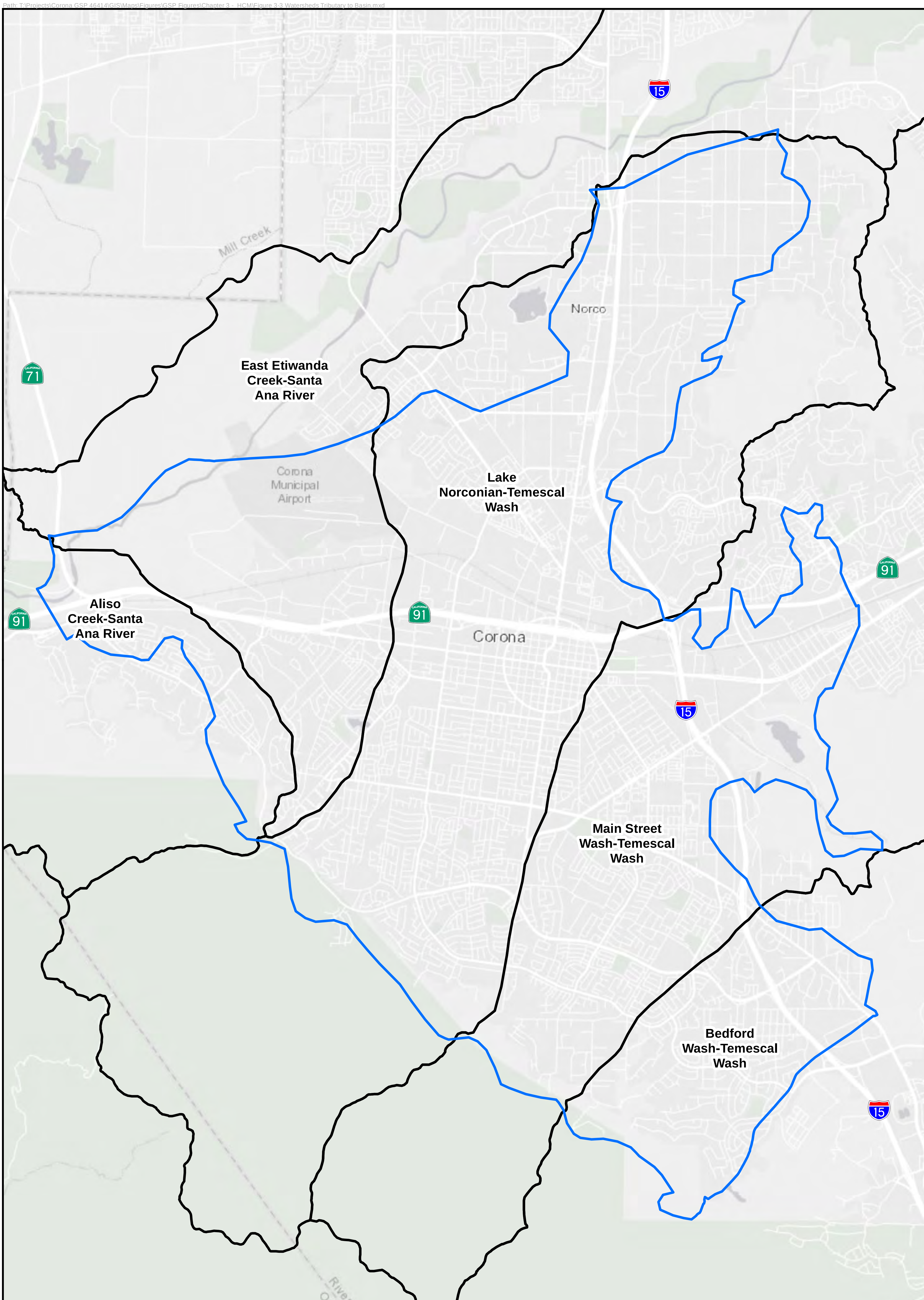


Figure 3-2
Tributary Surface Water in Basin

TODD GROUNDWATER

Path: T:\Projects\Corona GSP 46414\GIS\Maps\Figures\GSP Figures\Chapter 3 - HCM\Figure 3-3 Watersheds Tributary to Basin.mxd



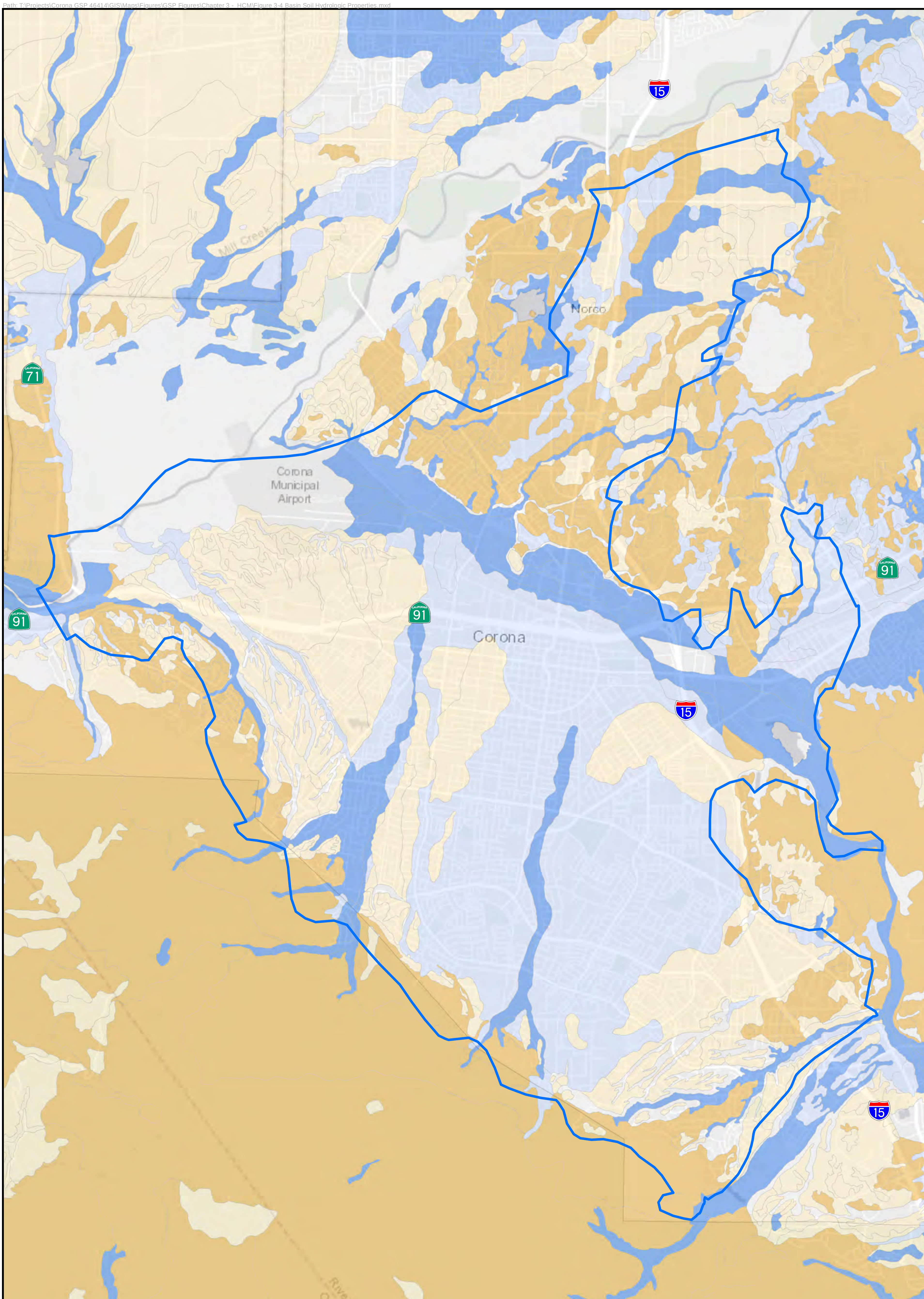
Tributary Watershed Boundaries

Temescal Basin

Figure 3-3
Watersheds Tributary to Basin

TODD GROUNDWATER

Path: T:\Projects\Corona GSP 46414\GIS\Maps\Figures\GSP Figures\Chapter 3 - HCM\Figure 3-4 Basin Soil Hydrologic Properties.mxd



A: High Infiltration Rate
B: Moderate Infiltration Rate
C: Slow Infiltration Rate
D: Very Slow Infiltration Rate
No Data
Temescal Basin

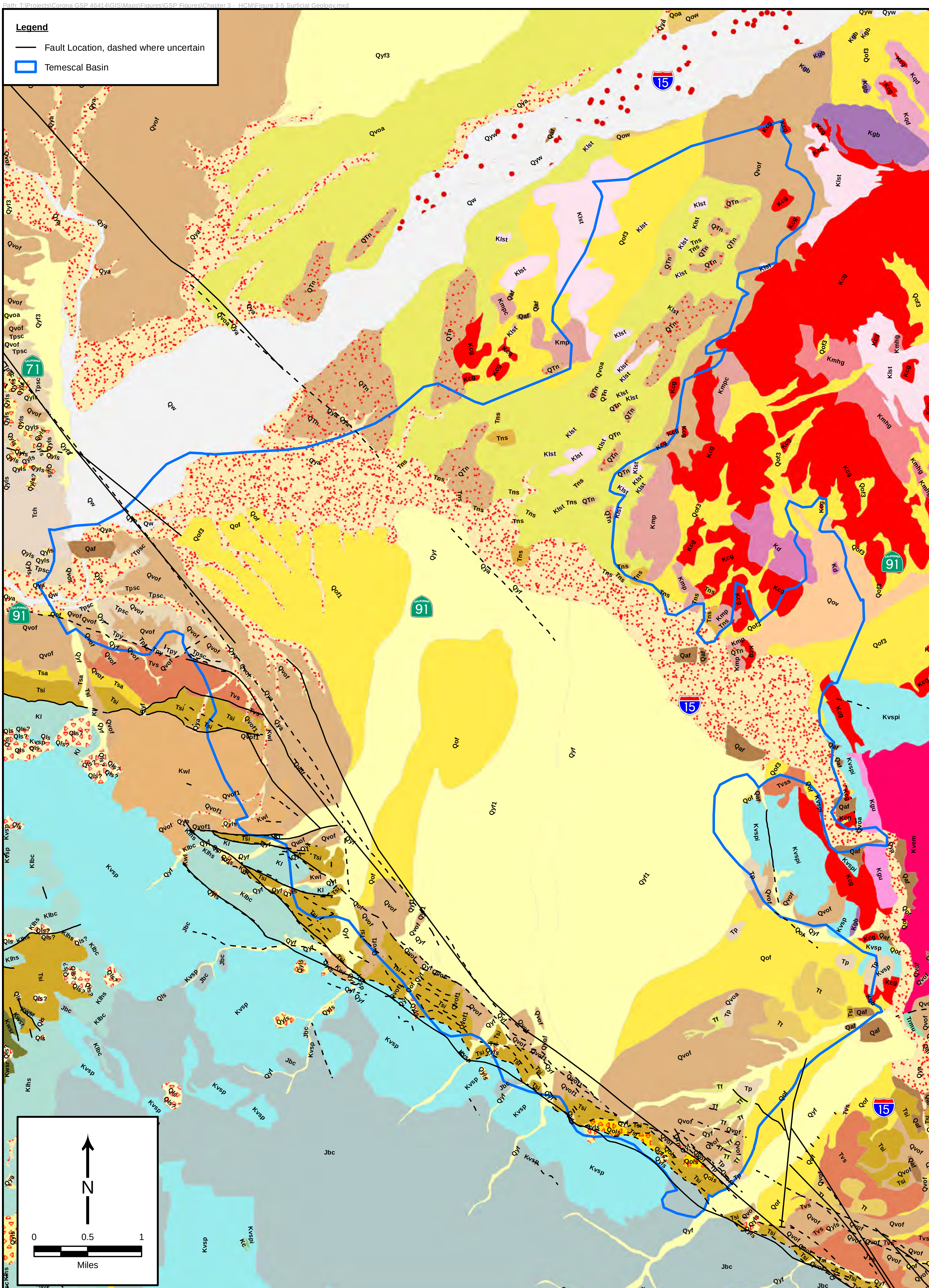
N

0 0.5 1
Miles

Figure 3-4
Basin Soil
Hydrologic Properties

TODD GROUNDWATER

Path: T:\Projects\Corona GSP 46414\GIS\Maps\Figures\GSP Figures\Chapter 3 - HCM\Figure 3-5 Surficial Geology.mxd

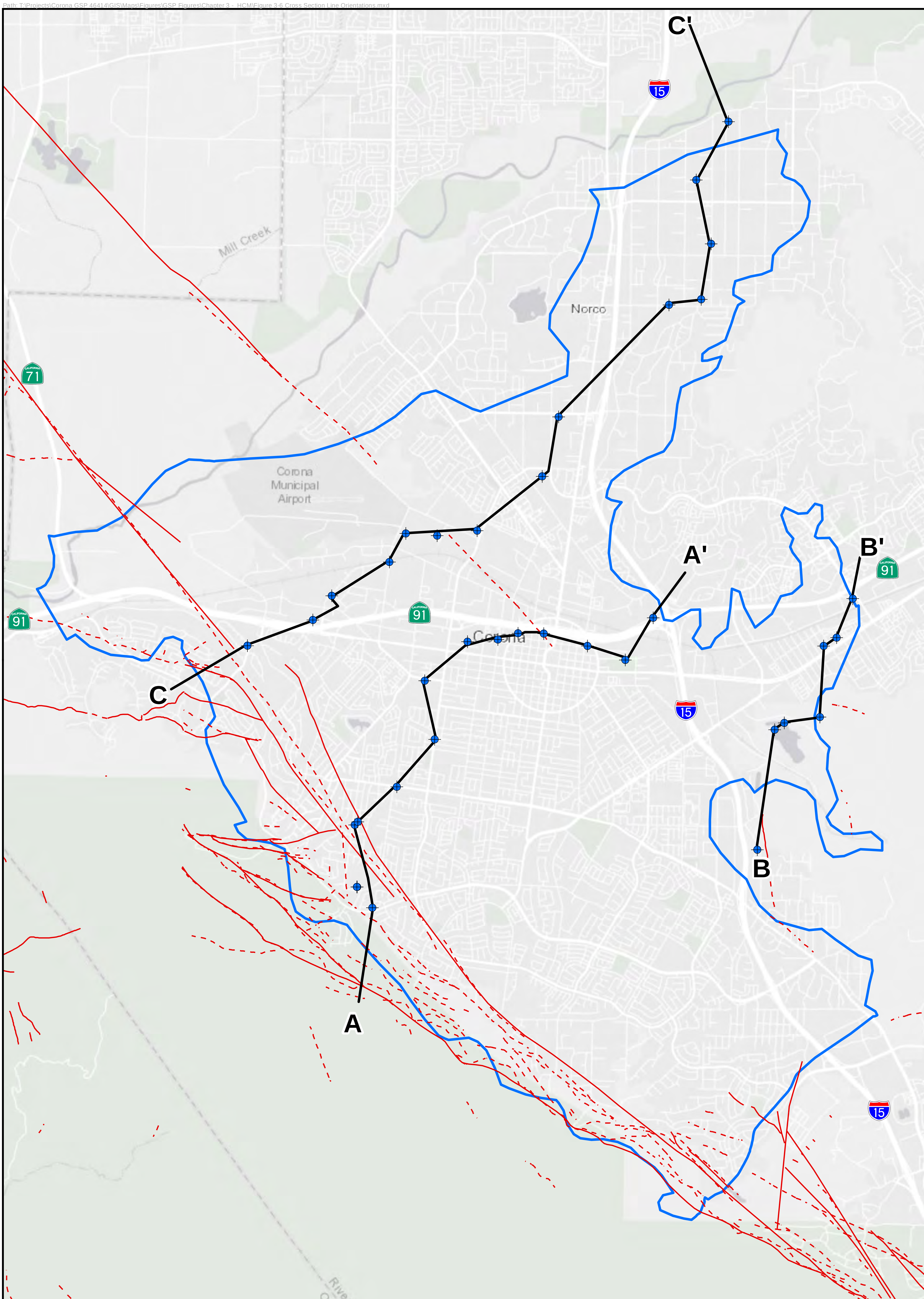


- Qaf, Artificial fill
- Qw, Very young wash deposits
- Qyw, Young wash deposits
- Qyf/Qyf1/Qyf3, Young alluvial-fan deposits; Qyf3
- Qya, Young axial-channel deposits
- Qyls, Young landslide deposits
- Qls/Qls, Landslide Deposit
- Qof, Old alluvial-fan deposits
- Qoa, Old axial-channel deposits
- Qow, Old wash deposits
- Qov, Old alluvial-valley deposits
- Qols, Old landslide deposits
- Qvof, Very old alluvial-fan deposits
- Qvoa, Very old axial-channel deposits
- QTc, Conglomerate of Riverside West 7.5 Quad
- QTt, Conglomerate of Temescal area
- QTn, Sedimentary rocks of Norco area
- QTs, Sedimentary rocks in Riverside and Corona areas
- Tch, Chino Hills, sandstone and conclomerate
- Tcga, Conglomerate of Arlington Mountain
- Tf, Fernando Formation
- Tns, Sandstone of Norco Area
- Tsa, Santiago Formation
- Tp/Tpsc/Tpsq/Tpy, Puente Formation; Tplv
- Tt, Topanga Group
- Tvs/Tvss, Vaqueros and Sespe Formations, undifferentiated
- Tsi, Silverado Formation
- Kc, Carbonate Silicate Rock
- Kcg/Kcgq/Kcto, Cajalco Pluton
- Kd, Diorite, undifferentiated
- Kgu, Granite, undifferentiated
- Kgb, Gabbro, undifferentiated
- Khg, Heterogeneous granitic rocks
- Kl/Klbc/Klhsc/Klhs, Ladd Formation
- Klst, La Sierra Tonalite
- Kmhg, Mount Hole Granodiorite
- Kmp/Kmpc, Micropegmatite
- Kqd, Quartz diorite
- Krg, Granite of Riverside area
- Ks, Serpentinite
- Kt, Tonalite, undifferentiated
- Ktr, Trabuco Formation
- Kvsp/Kvspi, Santiago Peak Volcanics
- Kvem/Kvs, Estelle Mountain volcanics of Herzig
- Kwl, Williams and Ladd Formations
- Kwps/Kwsr, Williams Formation
- Jbc, Bedford Canyon Formation
- Trmu, Rocks of Menifee Valley

Figure 3-5
Surficial Geology

TODD GROUNDWATER

Path: T:\Projects\Corona GSP 46414\GIS\Maps\Figures\GSP Figures\Chapter 3 - HCM\Figure 3-6 Cross Section Line Orientations.mxd



Wells on Cross Sections

Cross Section Line Orientation

Fault Location, dashed where uncertain

Temescal Basin

N

0 0.5 1

Miles

Figure 3-6
Cross Section
Line Orientation

TODD GROUNDWATER

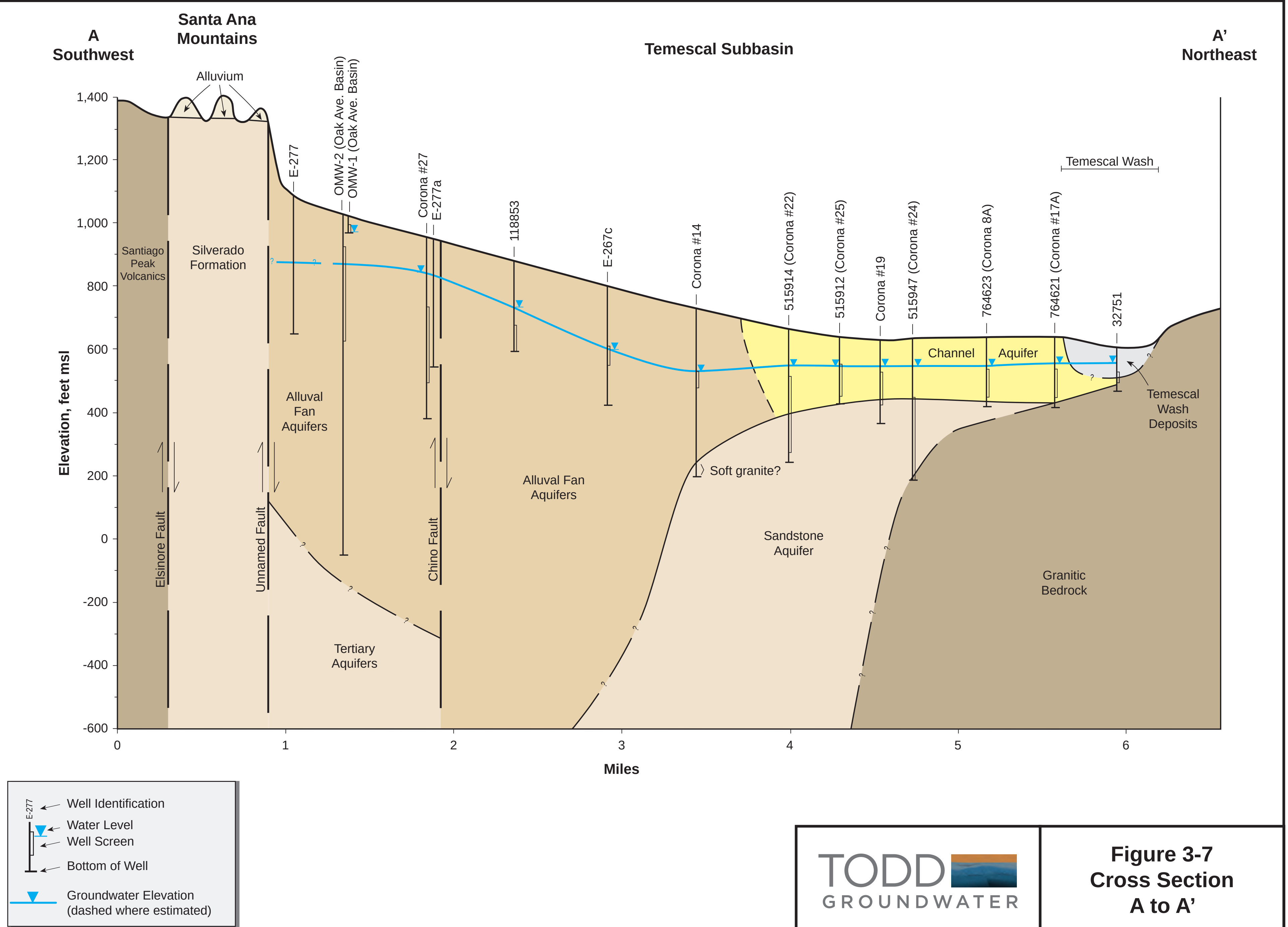


Figure 3-7
Cross Section
A to A'

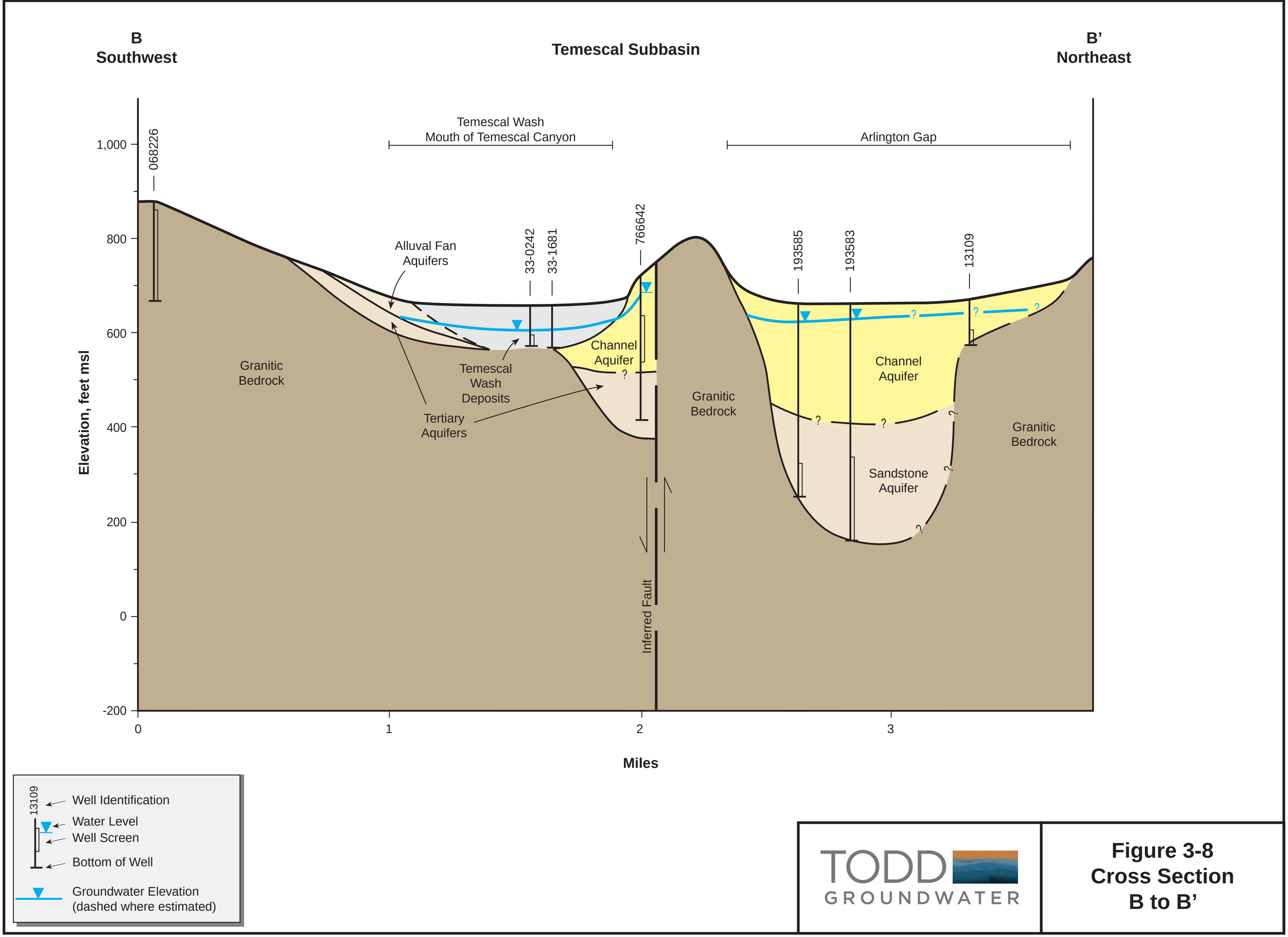


Figure 3-8
Cross Section
B to B’

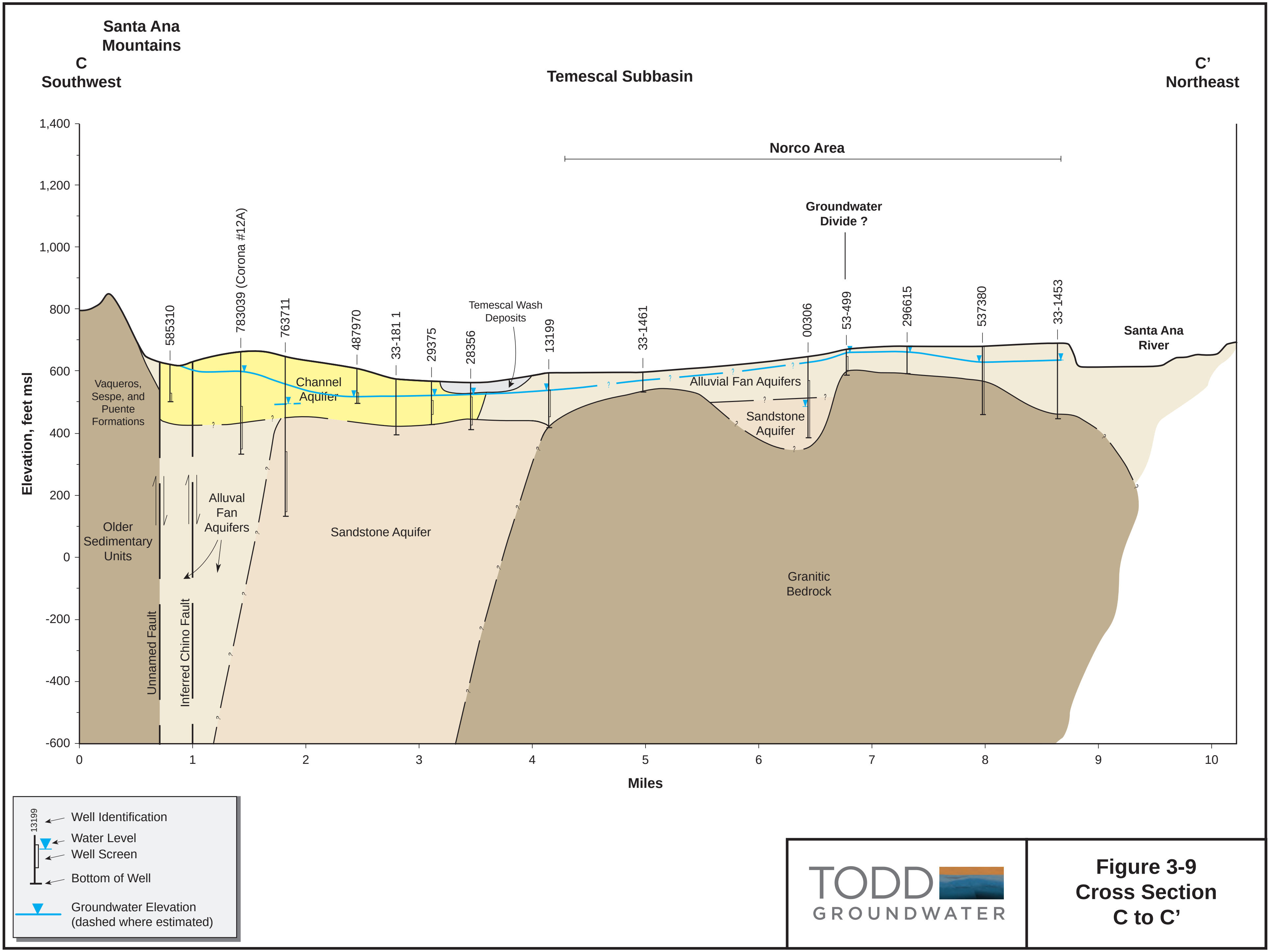
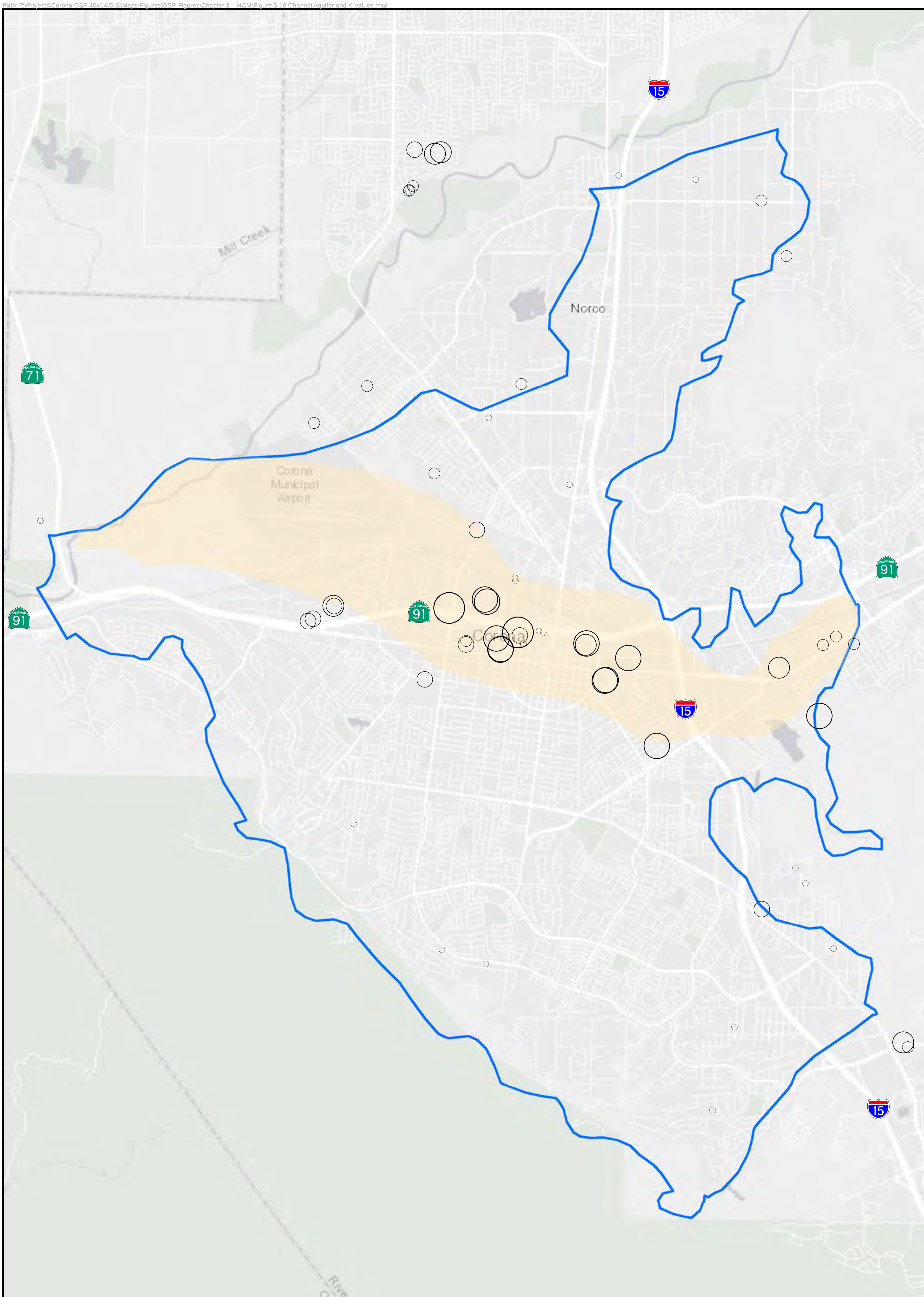


Figure 3-9
Cross Section
C to C'

Path: T:\Projects\Corona GSP 46414\GIS\Maps\Figures\GSP Figures\Chapter 3 - HCM\Figure 3-10 Channel Aquifer and K Values.mxd



Hydraulic Conductivty

0 to 50 gpd/sq. ft

50 to 250 gpd/sq. ft

250 to 500 gpd/sq. ft

500 to 1,000 gpd/sq. ft

1,000 to 2,000 gpd/sq. ft

2,000 to 3,030 gpd/sq. ft

Approximate Limit of Channel Aquifer

Temescal Basin

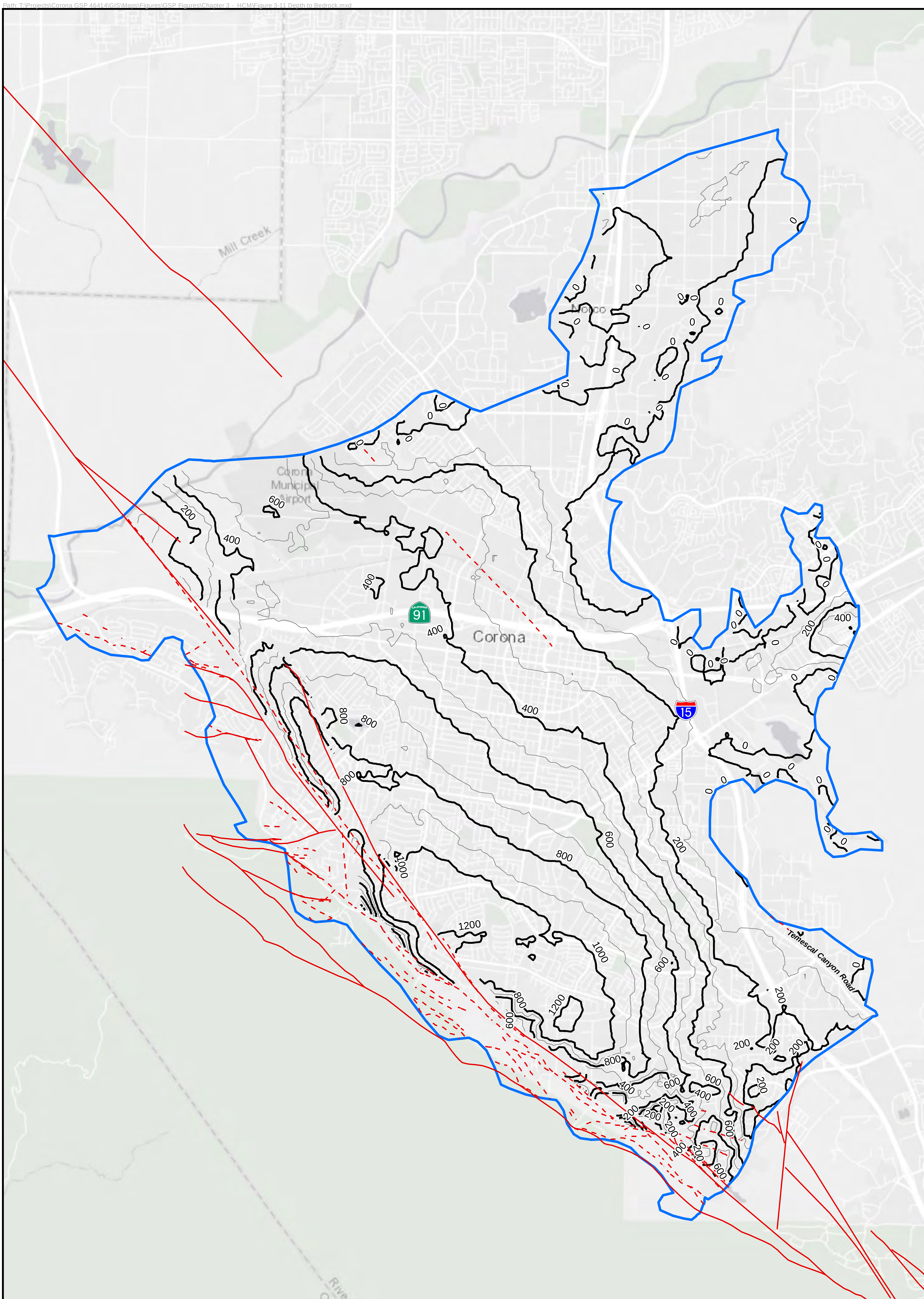
N

0 0.5 1

Miles

Figure 3-10
Channel Aquifer Extent and Hydraulic Conductivity

TODD GROUNDWATER



50-foot Depth to Bedrock Contour
200-foot Depth to Bedrock Contour
Fault Location, dashed where uncertain
Temescal Basin

N
0 0.5 1
Miles

Figure 3-11
Depth to Bedrock

TODD GROUNDWATER

Path: T:\Projects\Corona GSP 46414\GIS\Maps\Figures\GSP Figures\Chapter 3 - HCM\Figure 3-12 Recharge and Discharge Areas.mxd

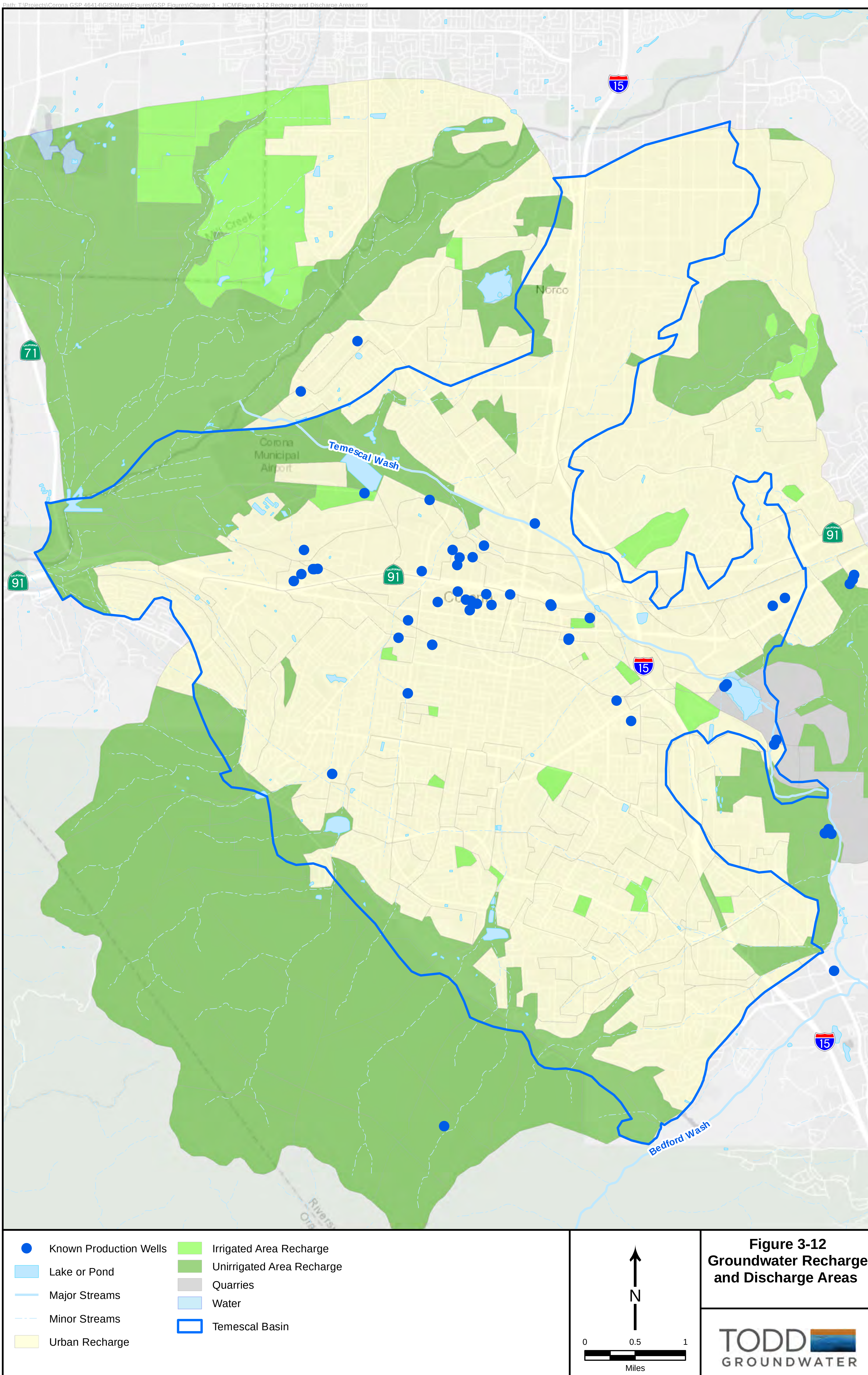


Figure 3-12 Groundwater Recharge and Discharge Areas

4. CURRENT AND HISTORICAL GROUNDWATER CONDITIONS

This chapter describes the current and historical groundwater conditions in the Basin. The Sustainable Groundwater Management Act (SGMA) requires definition of various study periods for current, historical, and projected future conditions. Current conditions, by SGMA definition, include those occurring after January 1, 2015 and accordingly, historical conditions occurred before that date. A historical period must include at least 10 years.

The study period 1990 through 2019 is based on the cumulative departure from mean precipitation at Riverside, Claremont-Pomona, and Lake Elsinore climate monitoring stations. This period is representative and includes droughts and wet periods, with an average annual rainfall of 9.34 inches, comparable to the long-term average of 9.48 inches (1961 to 2019). Accordingly, groundwater conditions over time are described through 2020.

Groundwater conditions are described in terms of the six sustainability indicators identified in SGMA; these include:

- Groundwater elevations
- Groundwater storage
- Potential subsidence
- Groundwater quality
- Seawater intrusion (which is not likely to occur in this inland basin)
- Interconnected surface water and groundwater dependent ecosystems.

4.1. GROUNDWATER ELEVATIONS

4.1.1. Available Data

Groundwater elevation records were collected from multiple sources, including the City of Corona, United States Geological Survey (USGS) National Water Information System (NWIS), California Department of Water Resources (DWR) California Statewide Groundwater Elevations Monitoring (CASGEM), and others. All wells with water level data are shown on **Figure 4-1**. Data from these sources were collected, reviewed, and compiled into a single unified groundwater elevation dataset (USGS 2020a and DWR 2010). Wells with groundwater level data are not distributed evenly throughout the Basin, and most measurement points are within Corona. Many wells have historical water level observations but have not been measured in recent years. In addition, there are temporal gaps in some of the data records and these are discussed in the data gaps section below.

4.1.2. Groundwater Occurrence

As summarized in Chapter 3, groundwater is present in one principal aquifer and two secondary aquifers and these aquifers are hydraulically connected. Groundwater in the Basin occurs under unconfined conditions and there are insufficient data to define vertical zones and to provide zone-specific groundwater elevation hydrographs or maps.

4.1.3. Groundwater Elevations and Trends

Hydrographs showing groundwater elevation trends over time were prepared for all 39 wells with regular water level measurements in the Basin (**Figure 4-1**); these hydrographs were reviewed to identify wells with long term data that could be used to present representative hydrographs. The selection of representative wells was based a quantitative approach that considered hydrographs with long records characteristic of an area and distribution of wells across the Basin. In brief, all available groundwater elevation data for these wells were plotted as hydrographs and well locations were plotted on a basin-scale map. All wells with water level data are shown in **Figure 4-1**. Representative wells with long term hydrographs were selected based the following criteria:

- Location – Wells were prioritized considering broad distribution across the Basin availability of other wells nearby.
- Ongoing and/or recent monitoring – Wells were selected that are part of the active monitoring network or have recent data.
- Trends – Each hydrograph was assessed for continuity of monitoring, representation of local or regional trends, and presence of outliers or unrealistic data.

Recent and historical water level data inconsistently identified groundwater level measurements that were recorded during or immediately after pumping. Most groundwater level records are not identified as either pumping or static measurements. Review of these data showed some records identified as pumping water levels to be closely related to water levels not correlated with pumping. As such, for this study all water levels excluding obvious reporting errors are shown to preserve the overall trends.

Hydrographs in **Figures 4-2** through **4-9** show groundwater level trends over time. In general, water levels correlate to wet and dry hydrologic. In general, water levels have been less responsive to wet and dry periods since 2000. Wells in some portions of the Basin show relatively stable groundwater levels over the past 20 years, while others show non-pumping water level changes during this period by up to 25 feet. The hydrographs do not show dramatic changes in historical water levels in the Basin. The range of historical non-pumping water levels in most wells is under 50 feet.

Figure 4-2 is the long-term hydrograph for Corona Well 15, showing water level changes in the Basin from 1953 to 2020. Since 1953, water levels in Well 15 have fluctuated a total of about 45 feet, from an elevation of 560 feet msl to about 515 feet msl (assuming the spikes below that level are influenced by local drawdown in the pumping well).

The highest water levels in wells with long-term data were measured in the early 1980s in response to a wet hydrologic cycle that began in 1978. These higher levels also correlate to a period of relatively low pumping in the Basin. During a later wet cycle from 1992 to 1998, water levels did not recover to 1980s levels, likely related to an increase in Basin pumping. Groundwater elevation responses to changes in pumping and precipitation patterns are discussed further in Chapter 5 – Water Budget.

The lowest groundwater levels generally correspond to dry periods and periods of increased pumping, though the responses throughout the Basin are not uniform. Hydrographs from most wells show lowering water levels during 2000 to 2004, a period that was not hydrologically dry but had increased pumping in Corona. In the long-term hydrograph from Corona Well 15 (**Figure 4-2**), within Corona, the lowest water levels occurred during the 2015 to 2017 period, after very low rainfall during 2011 through 2015. From 2010 to 2015, water levels declined 10 to 15 feet. Slight increases occurred in 2018 through 2019, likely the result of increased precipitation after 2015. Current levels are near record lows.

Overall, other wells in the Basin follow similar trends, although some wells have more variation in water levels in response to wet and dry periods. The westernmost hydrograph in the Basin is from Corona Well 11 and it shows very little groundwater level change from 2002 through 2020 (**Figure 4-3**). The wells further east in the Channel Aquifer show similar patterns, including Corona Well 22 (**Figure 4-4**), Corona 19 (**Figure 4-5**), Corona 17 A (**Figure 4-7**), and Corona 8a (**Figure 4-8**). Groundwater elevations in these wells were at their highest elevations in 2010 and declined at slow but steady rates through the most recent drought period of 2014 through 2016. Water level declines ranged from 10 to 20 feet from 2011 to 2015. Water levels in these four wells have remained stable or increased since 2018.

Corona Well 26 (**Figure 4-6**) is located on the northeastern part of the Channel Aquifer. Groundwater elevations in this well were also high in 2010, but then decreased sharply in 2013, perhaps due to increased local pumping. The pumping water level in this well is significantly lower than the static water level, which could indicate lower specific capacity on the edges of the Channel Aquifer. Since 2013, water levels have been stable or increasing in Corona Well 26.

Corona Well 13 (**Figure 4-9**), located on the southeastern part of the Channel aquifer shows little change in groundwater levels from 2014 through 2020

4.1.4. Groundwater Flow

Figures 4-10 and **4-11** are groundwater elevation contour maps constructed to examine current groundwater flow conditions using data from fall 2015 and spring 2017. These time periods were chosen to represent dry and wet conditions, respectively. Contours were developed based on available groundwater elevation data for all wells. The median water levels during each season were used. These contours were prepared assuming no barriers to horizontal groundwater flow, including local faults. Due to limited water level data in the southern portion of the Basin, there is a higher level of uncertainty in groundwater flow direction and gradient in the south. Contours in zones with a higher level of uncertainty are shown with dashed lines.

Groundwater flow in the Basin is generally from the surrounding uplands toward Temescal Wash and then north and northwest toward the groundwater and surface water discharge location at Prado Dam. The fall 2015 groundwater elevation contours (**Figure 4-10**) indicate flow from south to north in the Basin. The groundwater elevations in this period represent relatively dry conditions at the end of a drought period. A small depression is depicted in the northern portion of the Basin, most likely due to pumping.

Spring 2017 groundwater elevation contours (**Figure 4-11**) look very similar to groundwater conditions in fall 2015, indicating almost identical groundwater flow conditions. Spring 2017 was a wet period following the 2011 to 2015 dry period. This groundwater elevation surface also indicates flow generally south to north with a small depression in the Corona area. This period was selected because every well with water level data during fall 2015 also had data collected during spring 2017. In areas with similar data availability, spring 2018 groundwater elevation contours also look like the spring 2017 contours.

The similarities between these two groundwater elevation surfaces suggest that the groundwater levels and flow direction in the Basin are not entirely controlled by wet and dry periods and the groundwater flow conditions have been relatively constant in recent years. Several hydrographs support this, with many showing little change in water levels over the past five years.

4.1.5. Vertical Groundwater Gradients

The current monitoring network for groundwater elevations provides little information about vertical head (groundwater elevation) gradients within the Basin. Available data are almost entirely from water supply wells, which typically have long screened zones and are not appropriate for evaluating vertical groundwater gradients. The potentiometric head at the depth of the well screens can be different from the true water table, which is the first zone of saturation reached when drilling down from the ground surface.

Vertical head gradients are an important factor affecting the viability of riparian vegetation. As discussed in greater detail in Section 4.10.3, Riparian Vegetation, phreatophytic vegetation along streams generally survives droughts even when groundwater elevations are tens of feet below the ground surface for two or more years. This suggests that some shallow zones of saturation persist even when the water level in deep aquifers declines. This implies the presence of large vertical head gradients within the aquifer system.

4.2. CHANGES IN GROUNDWATER STORAGE

Change in storage estimates based on evaluation of groundwater elevation changes have not historically been completed for the Basin. Such storage change estimates are based on available groundwater elevation data that are limited geographically and temporally and thus include uncertainty. In addition, the storativity, or storage coefficient (the volume of water released from storage per unit decline in hydraulic head), is largely unknown across the Basin. The volume of groundwater storage change over time is sometimes calculated by multiplying the groundwater elevation changes during a period by the storage coefficient. Storage coefficient values and storage change estimates representing the Basin were developed for the numerical model, as described in **Appendix J**. The numerical model is the best tool for estimating groundwater storage changes. The resulting change in storage estimates are presented in the Water Budget chapter.

4.3. LAND SUBSIDENCE AND POTENTIAL FOR SUBSIDENCE

Land subsidence is the differential lowering of the ground surface, which can damage structures and facilities. This may be caused by regional tectonism or by declines in groundwater elevations due to pumping. The latter process is relevant to the GSP. In brief, as groundwater elevations decline in the subsurface, dewatering and compaction of predominantly fine-grained deposits (such as clay and silt) can cause the overlying ground surface to subside.

This process is illustrated by two conceptual diagrams shown on **Figure 4-12**. The upper diagram depicts an alluvial groundwater basin with a regional clay layer and numerous smaller discontinuous clay layers. Groundwater elevation declines associated with pumping cause a decrease in water pressure in the pore space (pore pressure) of the aquifer system. Because the water pressure in the pores helps support the weight of the overlying aquifer, the pore pressure decrease causes more weight of the overlying aquifer to be transferred to the grains within the structure of the sediment layer. If the weight borne by the sediment grains exceeds the structural strength of the sediment layer, then the aquifer system begins to deform. This deformation consists of re-arrangement and compaction of fine-grained units[1], as illustrated on the lower diagram of **Figure 4-12**. The tabular nature of the fine-grained sediments allows for preferred alignment and compaction. As the sediments compact, the ground surface can sink, as illustrated by the right-hand column on the lower diagram of **Figure 4-12**.

Land subsidence due to groundwater withdrawals can be temporary (elastic) or permanent (inelastic).

Elastic deformation occurs when sediments compress as pore pressures decrease but expand by an equal amount as pore pressures increase. A decrease in groundwater elevations from groundwater pumping causes a small elastic compaction in both coarse-and fine-grained sediments; however, this compaction recovers as the effective stress returns to its initial value. Because elastic deformation is relatively minor and fully recoverable, it is not considered an impact.

Inelastic deformation occurs when the magnitude of the greatest pressure that has acted on the clay layer since its deposition (preconsolidation stress) is exceeded. This occurs when groundwater elevations in the aquifer reach a historically low groundwater elevation. During inelastic deformation, or compaction, the sediment grains rearrange into a tighter configuration as pore pressures are reduced. This causes the volume of the sediment layer to reduce, which causes the land surface to subside. Inelastic deformation is permanent because it does not recover as pore pressures increase. Clay particles are often planar in form and more subject to permanent realignment (and inelastic subsidence). In general, coarse-grained deposits (e.g., sand and gravels) have sufficient intergranular strength and do not undergo inelastic deformation within the range of pore pressure changes

[1] Although extraction of groundwater by pumping wells causes a more complex deformation of the aquifer system than discussed herein, the simplistic concept of vertical compaction is often used to illustrate the land subsidence process (LSCE et al. 2014).

encountered from groundwater pumping. The volume of compaction is equal to the volume of groundwater that is expelled from the pore space, resulting in a loss of storage capacity. This loss of storage capacity is permanent but may not be substantial because clay layers do not typically store significant amounts of usable groundwater. Inelastic compaction, however, may decrease the vertical permeability of the clay resulting in minor changes in vertical flow.

The following potential impacts can be associated with land subsidence due to groundwater withdrawals (modified from LSCE et al. 2014):

- Damage to infrastructure including foundations, roads, bridges, or pipelines;
- Loss of conveyance in canals, streams, or channels;
- Diminished effectiveness of levees;
- Collapsed or damaged well casings; and
- Land fissures.

Inelastic subsidence has not been a known issue in the Basin.

4.3.1. Interferometric Synthetic Aperture Radar (InSAR)

InSAR data are provided by DWR on its SGMA Data Viewer (DWR 2020) and document vertical displacement of the land surface across a broad area of California from June 13, 2015 to September 19, 2019. The TRE Altamira InSAR data, shown on **Figure 4-13**, shows land surface deformation between 2015 and 2019.

The TRE Altamira InSAR data indicates effectively no change in ground surface elevation within the Basin (**Figure 4-13**). Further review of the TRE Altamira InSAR data shows that ground surface elevations in the Basin rose by up to 0.08 feet (0.96 inches) between June 2015 and September 2019, with most of the Basin rising by about 0.02 feet (0.24 inches). A few small areas within the Basin subsided by up to 0.08 feet (0.96 inches). Given this data and the understanding of the hydrogeological conceptual model, there is no issue with subsidence at this time.

4.4. GROUNDWATER QUALITY

The natural quality (chemistry) of groundwater is generally controlled by interactions between rainwater and rocks/soil in the vadose zone and aquifer (Drever 1988). As rainfall infiltrates the soil column, anions and cations from sediments are dissolved into the water. These changes are influenced by soil and rock properties, weathering, organic matter, and geochemical processes occurring in the subsurface. Once in the groundwater system, changing geochemical environments continue to alter groundwater quality. A long contact time between the water and sediments may allow for more dissolution and overall higher salinity level in groundwater (Drever 1988). The natural groundwater quality in a basin is the net result of these complex subsurface processes that have occurred over time. Under natural conditions, older, deeper groundwater often has higher salinity than shallow groundwater because of a longer residence time.

Human processes can increase soil salinity and introduce higher levels of nitrate, inorganic chemicals, and organic compounds to soils in the vadose zone. When recharging water flows through saline soils, ions are dissolved into the infiltrating water and the salinity of shallow groundwater increases.

Most of the groundwater pumped in Temescal Subbasin (Basin) by the City of Corona is treated at the Temescal Desalter, a reverse osmosis membrane treatment facility. The facility treats nitrates, per-fluorinated compounds, 1,2,3-Trichloropropane (1,2,3-TCP), perchlorates, and suspended and dissolved solids. The remaining groundwater is treated at the City Park Ion Exchange Treatment Plant which utilizes two different types of resin, the first treats for perchlorates and the second for nitrates. Water delivered to municipal users is tested regularly to ensure all drinking water standards are met (Corona 2019). There are no other active domestic users of groundwater in the Basin, see Sections 2.3.2.1 and 6.2. The City of Corona recognizes the human right to water and is committed to providing safe drinking water to City residents and has expanded service to the Home Gardens County Water District (HGCWD) service area.

The water quality of the groundwater discussed in this section is the ambient water quality of Basin and does not reflect the treated water delivered to customers by Corona.

Groundwater quality data for this study were sourced from the California Water Boards Groundwater Ambient Monitoring and Assessment (SWRCB 2020a) datasets (which includes data collected by Division of Drinking Water, USGS, DWR, and Regional Water Quality Control Board). In addition, water quality data collected by Corona were included in the analysis. **Figure 4-14** shows the location and data source of the 113 wells with water quality data since 2010 that are in the Basin. The distribution of wells within the Basin is not uniform. Water quality data are primarily available for the Corona wells in the north-central portion of the Basin. In total, 22 wells with recent water quality data were used to assess water quality in the Basin.

Additional monitoring wells for facilities regulated by the Regional Water Quality Control Board do exist in several clusters within the Basin, but these wells were excluded from this groundwater quality assessment. The Regional Water Quality Control Board wells monitor facilities with point source contamination, and their measurements may not be representative of the ambient water quality in the Basin.

A 2008 analysis of the inorganic water quality in the Basin showed that water quality is primarily a sodium/calcium-bicarbonate water type (Todd and AKM 2008). However, the major ion concentration ratios can vary by region. By analyzing the ion ratio characteristics of different areas, the 2008 Corona Groundwater Management Plan identified regions with groundwater mixing and supported the groundwater flow paths identified in the conceptual model. The inorganic major ion analyses identified the following regional trends:

- Groundwater in the Bedford Canyon portion of Temescal Wash or Temescal Canyon has a higher ratio of calcium-to-sodium and sulfate-to-chloride than wells located in Arlington Gap. Groundwater in the Temescal Wash area upgradient of the Norco area has relative cation concentrations that are most like that of the Arlington Gap groundwater. However, the relative cation concentrations do suggest some mixing with waters from the Temescal Canyon area.

- Groundwater in wells located in the Norco area have a lower ratio of calcium-to-sodium and sulfate/bicarbonate-to-chloride than most other areas.
- Groundwater in wells located in the southwestern alluvial fan have the highest ratio of calcium-to-sodium and sulfate-to-chloride/bicarbonate compared to groundwater in other areas. The water type in the alluvial fan may result from geochemical interaction between rainfall runoff and the outcropping Santiago Peak volcanics in the western catchment area of Basin prior to aquifer recharge along the base of the mountains.
- Cation concentrations indicate that groundwater in wells located in Temescal Wash downgradient of the Norco area appear to be mixtures of groundwater from three sources: Temescal Wash upgradient of the Norco area, Arlington Gap, and the western alluvial fan.

This water quality assessment indicates the major sources of water by analyzing the blending of different water quality from different areas. Identifying major areas of inflow and outflow is critical to developing a strong conceptual model of the aquifer. These results are particularly useful given the sparse water level data available in the southern part of the Basin. Based on water quality type, the groundwater in the Channel Aquifer appears to be derived mainly from Arlington Gap and to lesser extent Temescal Wash. In addition to these sources, the western Channel Aquifer also receives inflow from the Alluvial Fan.

4.5. KEY CONSTITUENTS OF CONCERN

The review of available water quality data indicates that total dissolved solids (TDS) and nitrate are the primary constituents of concern (COCs) in the Basin. Other substances known to contribute to poor groundwater quality were reviewed and are discussed later in this chapter.

Elevated TDS concentrations in groundwater are common, resulting from dissolution of minerals from soil and rocks. TDS in groundwater can also be an indicator of anthropogenic impacts from sources such as urban runoff, agricultural return flows, and wastewater disposal. TDS data are available for both inflows and outflows from the Basin.

Nitrate is the primary form of nitrogen detected in groundwater. While natural nitrate levels in groundwater are generally very low, elevated concentrations of nitrate in groundwater are associated with agricultural activities, septic systems, landscape fertilization, and wastewater treatment facility discharges.

Recent water quality results indicate average TDS concentrations of 785 milligrams per liter (mg/L) and nitrate concentrations of 42.8 mg/L (All nitrate concentrations are reported in terms of nitrate as NO_3). These values represent the average concentrations of these constituents from the most recent water quality data for all drinking water and ambient groundwater monitoring events between water year 2010 and water year 2019. Water quality samples from regulated facilities were not included in the analysis. These average conditions serve as a snapshot of water quality conditions within the Basin.

4.5.1. Total Dissolved Solids (TDS)

Groundwater in the Basin is somewhat mineralized, with high TDS concentrations in many monitored wells. The recent average TDS concentrations in the Basin referenced previously are above the 500 mg/L lower secondary maximum contaminant level (SMCL) for drinking water, but below the upper SMCL of 1,000 mg/L. The SMCLs are based on aesthetic considerations (such as taste) and are not health-based.

Most of the recent maximum TDS concentrations from monitored wells in the Basin were above the 500 mg/L SMCL, as indicated on **Figure 4-15**. In total, all but two of the 20 wells with data have TDS concentrations over 500 mg/L, and most of the recent TDS measurements were similar to the median and mean TDS concentrations reported for the respective wells in the 2000 to 2019 period. The highest TDS concentrations on **Figure 4-15** are in wells near the City of Corona, where concentrations from several wells exceed 1,000 mg/L. A total of three wells in the Basin have median TDS concentrations over 1,000 mg/L.

TDS concentrations in some wells have fluctuated by several hundred mg/L during the 2010 to 2019 period. The two wells on **Figure 4-15** with TDS concentrations less than 250 mg/L, Corona Wells 11A and 13, have only shown low TDS concentrations in recent years. Prior to 2016, TDS measurements in these wells were generally greater than 700 mg/L.

4.5.2. Nitrate as Nitrate (NO_3)

Elevated nitrate concentrations have been documented in the Basin since at least the 1950s. Recent data indicate that the average nitrate concentration in the Basin is 42.8 mg/L. The maximum contaminant level (MCL) for nitrate as NO_3 in drinking water is 45 mg/L.

The most recently reported nitrate as NO_3 concentrations for wells in the Basin are shown on **Figure 4-16**. Water quality data indicate nitrate concentrations ranging from less than 1 mg/L to 100 mg/L. Nine wells in the Basin have recent median nitrate concentrations greater than 45 mg/L. The highest nitrate concentrations are those associated with wells at the Arlington Gap. Eight water supply wells in the Basin have had nitrate concentrations exceeding the MCL and have required treatment and/or blending to meet regulatory requirements.

Nitrate contamination in groundwater is commonly related to activities at the ground surface (e.g., fertilizer application, septic systems), and as a result, shallow groundwater typically has higher concentrations than deep groundwater. The wide range of nitrate concentrations in wells in the Basin could be due to vertical variations in nitrate concentrations, but well construction information for monitored wells are limited so it is not possible to adequately assess nitrate concentration variation with depth.

4.6. OTHER CONSTITUENTS

While recent water quality data are limited, available data do not indicate that other constituents of concern pose a significant threat to beneficial uses of groundwater in the Basin. The ambient water quality is discussed in Section 4.4 but this does not reflect on the quality of available drinking water. As noted, groundwater pumped from the Basin for domestic and municipal use is treated at the Temescal Desalter or the City Park Treatment facility prior to distribution by Corona. There are no other domestic groundwater users, either public or private, in the Basin. Nonetheless, these and other naturally occurring and emerging anthropogenic constituents will continue to be monitored and analyzed.

4.6.1. Naturally Occurring Contaminants

Arsenic, uranium, fluoride, and hexavalent chromium are chemicals that can naturally occur at elevated concentrations in groundwater. These contaminants originate in the eroded rocks that make up aquifer sediments and enter groundwater through reactions between groundwater and the sediments. In general, the occurrence of arsenic, uranium, fluoride, and hexavalent chromium depend on regional geology and local groundwater conditions. As documented in this section, no naturally occurring contaminants were identified as widespread constituents of concern in the Basin. However, continued monitoring of these chemicals is recommended.

4.6.1.1. Arsenic

Arsenic in a known carcinogen with a MCL of 10 micrograms per liter (µg/L). Elevated arsenic concentrations occur in groundwater throughout the United States, often in aquifers with low-oxygen (reducing) conditions or high pH levels (USGS 2020b). In the Basin, groundwater in all but one well recorded arsenic concentrations under 5 µg/L. The one well showing groundwater with high arsenic concentrations (32 µg/L) is located near the Arlington Gap (HGCWD Well 5) and it is near a well with arsenic concentrations less than 2 µg/L. This suggests that arsenic may be depth-dependent in the Arlington Gap, but the depths of both wells are unknown.

4.6.1.2. Uranium

Uranium in California groundwater is often derived from eroded granite, such as the Mesozoic granites east of the Basin (Jurgens et al. 2010). The MCL for uranium is 20 picocuries per liter (pCi/L), equivalent to about 30 µg/L. At this concentration, the effect of radiation is negligible, but the chemical properties of uranium can cause kidney damage. Uranium often occurs in shallow, oxygen-rich groundwater (Jurgens et al. 2010). Uranium has been measured in 18 wells in the Basin since 2010. Groundwater in two wells, one in the Arlington Gap region (34 pCi/L) (HGCWD Well 5) and one in Corona (20.8 pCi/L) (Corona Well 19), indicate uranium concentrations greater than the 20 pCi/L MCL. The well with high uranium concentrations in the Arlington Gap is adjacent to a well with groundwater with a uranium concentration of 12.7 pCi/L.

4.6.1.3. Fluoride

Fluoride is a necessary component of a healthy diet to prevent dental cavities, and a fluoride concentration of 0.7 mg/L in drinking water is recommended by the United States Department of Health and Human Services (USDHHS 2015). At extremely high concentrations, however, fluoride can cause mottling of teeth and damage bones. Groundwater in aquifers with sediment originating from igneous rocks can often have fluoride concentrations above the 2 mg/L MCL for fluoride. One well in the Basin had a recent fluoride concentration above the MCL, with a recent concentration of 2.7 mg/L (Corona 26).

4.6.1.4. Hexavalent Chromium

Hexavalent chromium, the oxidized form of the metal chromium, occurs in oxygen-rich groundwater in western California, near chromium-bearing rocks. Hexavalent chromium in California drinking water is currently regulated along with total chromium; the MCL for total chromium is 50 µg/L. In 2014, California adopted a 10 µg/L MCL for hexavalent chromium, but this was overturned in 2017 due to a ruling that the California Department of Public Health had failed to consider the economic feasibility of complying with the MCL (SWRCB 2020c). All 18 wells recently monitored for hexavalent chromium showed groundwater concentrations under 4 µg/L, far below the 50 µg/L MCL.

4.6.2. 1,2,3- Trichloropropane

1,2,3- Trichloropropane (1,2,3- TCP) is a human-made chemical used in pesticide products and as a cleaning and degreasing solvent. It has a high chemical stability and can remain in groundwater for long periods of time (SWRCB 2020d). 1,2,3-TCP has been shown to cause cancer to laboratory animals and is believed to be carcinogenic to humans. California OEHHA established a 0.0007 ug/L public health goal (PHG) for 1,2,3-TCP in 2009. The notification level of 1,2,3-TCP is 0.005 ug/L. In total, 24 wells in the Basin have been tested for 1,2,3-TCP. Seven wells have detected 1,2,3-TCP above the notification level and public health goal. These wells are located near or in the City of Corona in the central part of the Basin.

Water pumped from wells with high concentrations of 1,2,3- TCP have been identified and all water produced by these wells is treated using RO technology at the Temescal Desalter before delivery to customers (Corona 2019). There are no active domestic wells in the Basin and no future domestic pumping is expected. Corona will continue to treat groundwater for 123-TCP and other constituents and provide the and HGCWD with safe drinking water.

4.6.3. Per- and Polyfluoroalkyl Substances (PFAS)

Per- and polyfluoroalkyl substances (PFAS) are a group of emerging contaminants that may pose a danger to reproductive, developmental, immunological, and renal health in humans. Contaminants of emerging concern, or emerging contaminants, are chemicals that have only recently been identified as being present in soil and groundwater or were not previously monitored or detected but pose a risk to human health (USEPA 2019). The two most common PFAS are perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA). Currently, California has a drinking water response level of 10 parts per trillion (ppt) for

PFOA and 40 ppt for PFOS. PFAS have been used in products including firefighting foams, nonstick cookware, and stain- and water-repellant fabrics for many decades. PFAS contamination of groundwater often occurs near firefighting training facilities or landfills.

The California State Water Resources Control Board has undertaken PFAS monitoring throughout the state, measuring PFAS concentrations in groundwater and identifying point sources of PFAS contamination (SWRCB 2020e). A study of PFAS in the Santa Ana River Watershed has identified elevated PFAS concentrations in groundwater and contamination sources within the Basin (Behrooz 2020). Because of the emerging nature of PFAS, these studies are ongoing. Additionally, the state is still developing guidelines and regulatory limits for PFAS in water supplies.

4.6.4. Monitoring Networks

City of Corona

The Corona water system includes water supply wells in the Basin that are actively monitored for water quality. Since 2010, Corona has routinely collected water quality data from 19 active and inactive wells in the Basin.

Division of Drinking Water

Public drinking water systems in the Basin report water quality data to the State Water Resources Control Board (SWRCB) Division of Drinking Water (DDW). Each system monitors and reports water quality parameters to DDW and is required to participate in the Drinking Water Source Water Assessment Program (DWSAP) to assure wells are not subject to local contamination. While most of the public supply well water quality data was received directly from Corona, some additional data are available from DDW.

Orange County Water District (OCWD)

OCWD also monitors groundwater quality near Temescal Basin in the Prado area. OCWD is currently installing more than a dozen shallow monitoring wells in the Prado area to provide more information on shallow groundwater conditions. These wells will provide additional data on impacts interconnected surface water and groundwater dependent ecosystems in the Prado Area.

Other Agencies

The Santa Ana Regional Water Quality Control Board (RWQCB) monitors clean-up sites throughout the Basin. Water quality data from 91 wells in this system have been collected. However, data from these wells are not used in this analysis because they often represent point source contamination and cannot accurately capture the ambient water quality in the Basin.

Wells with water quality data from all available sources are shown on **Figure 4-14**.

4.7. THREATS TO WATER QUALITY

4.7.1. Regulated Facilities

The Santa Ana Regional Water Quality Control Board (RWQCB) regulates thirteen cleanup sites in the Basin. These sites include a military site, leaking underground storage tanks, and dry cleaning facilities. Since 2010, 91 wells at regulated facilities have been monitored for chemical constituents.

4.7.2. Septic Systems

Limited areas of the Basin are not served by municipal sewers and rely on on-site wastewater treatment (OWTS or septic systems). These represent sources of TDS and nitrate loading to groundwater, as well as potential sources of other contaminants. Riverside County Department of Environmental Health is the permitting agency for septic systems and wells in the County. The Riverside County Department of Environmental Health maintains an inventory of septic system installations. While it is unclear how many of these septic systems still exist, it is assumed minimal because most of the Groundwater Sustainability Agency (GSA) area is served by municipal wastewater collection systems.

4.7.3. Non-point Sources

Nonpoint source (NPS) pollution is defined by the SWRCB as contamination that *does not originate from regulated point sources and comes from many diffuse sources*. NPS could occur when rainfall carries contaminants to surface waterways or percolates contaminants to groundwater. One example is loading to groundwater of nitrate from agricultural or landscaping land applications. While groundwater may have natural salinity, increasing TDS concentrations from soil salinization is another common non-point source pollution.

4.8. VERTICAL VARIATIONS IN WATER QUALITY

Water quality monitoring programs in the Basin do not show a distinct difference of water quality in depth, in part because most of the ambient monitoring wells have long screened intervals or are collected from wells with unknown construction.

4.9. SEAWATER INTRUSION CONDITIONS

The Basin is located approximately 25 miles inland from the Pacific Ocean and the lowest elevation at the northwestern boundary of the Basin is about 450 feet above sea level. No risk of seawater intrusion exists in the Basin given its location.

4.10. INTERCONNECTION OF SURFACE WATER AND GROUNDWATER

Interconnection of groundwater and surface water occurs wherever the water table intersects the land surface and groundwater discharges into a stream channel or spring. These stream reaches gain flow from groundwater and are classified as gaining reaches. Conversely, connection can occur along stream reaches where water percolates from the stream into the groundwater system (losing reaches), provided that the regional water table is close enough to the stream bed elevation that the subsurface materials are fully saturated along the flow path.

Groundwater pumping near interconnected surface waterways or springs can decrease surface flow by increasing the rate of percolation from the stream or intercepting groundwater that would have discharged to the stream or spring. If a gaining stream is the natural discharge point for a groundwater basin, pumping anywhere in the Basin can potentially decrease the outflow, particularly over long time periods such as multi-year droughts.

Because of the long dry season that characterizes the Mediterranean climate in Riverside County, vegetation exploits any near-surface water sources, including the water table along perennial stream channels, the wet soil areas around springs, and areas where the water table is within the rooting depth of the plants. Plants that draw water directly from the water table are called phreatophytes. They are able to continue growing vigorously during the dry season and typically stand out in summer and fall aerial photographs as patches of vegetation that are denser, taller and brighter green than the adjacent vegetation.

4.10.1. Stream Flow Measurements

Stream flow in the Basin includes runoff from undeveloped tributary watersheds on the eastern slopes of the Santa Ana Mountains, wastewater treatment plant discharges, urban runoff within the Basin, flow in Temescal Wash, and flow in the Santa Ana River where it arrives at the Prado (flood control) Basin. The flow regimes in these waterways are quite different. The locations of surface water features mentioned in this discussion are shown in **Figure 4-17**. Tributary streams in the Santa Ana Mountains adjacent to the west side of the Basin flow primarily in response to rainstorm events, but accretions of groundwater from fractured bedrock create a small, more persistent base flow. These small flows rapidly percolate where the creek enters the Basin and generally do not reach Temescal Wash. None of the local tributaries is gaged, but a gage was installed in 2018 on Coldwater Canyon Creek about five miles south of the Basin, and its watershed is similar to those of the Basin tributaries. Daily flows at that gage and two Temescal Wash gages during water years 2013 through 2020 are shown in **Figure 4-18**.

Temescal Wash originates at Lake Elsinore, 17 miles upstream of Basin. It passes from south to north through the Bedford-Coldwater Subbasin and then through Basin before discharging into the Prado Basin wetlands. There are two stream gages on Temescal Wash, one below Lee Lake at the upstream end of the Bedford-Coldwater Subbasin (Temescal Wash at Corona Lake; USGS 11071900) and one at Main Street downstream of the wastewater treatment plant in Corona (Temescal Creek above Main Street at Corona; USGS 11072100). The flow regime at the outlet of Lee Lake is probably similar to the flow regime at the upstream end of Basin. Surface flow occurs primarily during and immediately following rainstorm events. No flow was recorded for three consecutive years during the recent drought.

Reduction in wastewater treatment plant discharges to Temescal Wash over the preceding 10 to 20 years is thought to have contributed to the exceptionally low flows during the drought (Russell 2020). A comparison of total flow in Temescal Wash with recycled water discharges entering the wash confirms that base flow did decrease after 2012 but by only a small amount relative to total flows entering the Prado Wetlands. **Figure 4-19** shows monthly average flows at the gauge above Main Street in Corona and monthly recycled water discharges to Temescal Wash from three water reclamation facilities. Gaged flows above Main Street experienced many more peak flow events than seen at gages farther upstream. Most of these additional flow events probably derive from impervious runoff in the surrounding urban area. Base flow closely tracks the discharge from Corona Wastewater Reclamation Facility 1 (WRF-1), which is located less than 1 mile upstream of the gage on the concrete-line Temescal Wash channel. There might be additional contributions of so-called nuisance water (for example, sprinkler overspray onto paving, or pipe leaks). Average discharges from WRF-1 decreased by about 2 cubic feet per second (cfs) following a SWRCB decision approving the City of Corona's petition to decrease minimum discharges from 4.57 cfs to 2.25 cfs (SWRCB 2012). In December 2012, the RWQCB issued Order R8-2012-0028, which allowed the Temescal Valley Water District (TVWD) to recycle or percolate all reclaimed water at the Lee Lake WRF and cease all discharges to Temescal Wash. That WRF is located 4 miles upstream of Temescal Basin. Those discharges had already been decreasing and were less than 1 cfs during 2010 to 2012, which means they would have been consumed entirely by percolation and evapotranspiration before reaching Temescal Basin. The decrease in Lee Lake WRF discharges would not have affected Temescal Wash inflow to the Prado Wetlands. By the same token, discharges from the City of Corona WRF-3 (located 2.2 miles upstream of the Temescal Basin) were also too small to affect inflow to Prado Wetlands. For comparison, median annual outflow from Prado Dam decreased by 129 cfs, or fifty times more than the decrease in Temescal Wash base flow at the Main Street gage in Corona.

A review of 27 high-resolution aerial photographs (Google Earth 2021) between 1994 and 2020 revealed localized flowing or ponded reaches of Temescal Wash along a 2-mile reach where the Wash traverses bedrock between the Bedford-Coldwater Subbasin and the Basin. The location of this reach along with vegetation and estimated depth to groundwater in spring 2017 are shown in **Figure 4-20**. Open water was also visible in the Wash channel in some of the air photos from the Minnesota Road bridge down to Temescal Wash Lake, a 33-acre lake that is a former gravel mining pit. The greater resistance of bedrock to subsurface flow appears to force groundwater into the creek channel and/or riparian root zone as it crosses the bedrock. Upon entering the Basin a short distance downstream of the Minnesota Road bridge, surface flow percolates back into the ground. Groundwater levels are probably far below the creek bed in that area, however, sufficient surface flow reaches Temescal Wash Lake to make it a perennial water body. For 3.4 miles below Temescal Wash Lake, the creek flows in a cement-lined culvert, finally discharging into the outer fringes of Prado Basin at North Lincoln Avenue.

Aerial photographs from 1967 show almost no riparian vegetation along the bedrock reach of Temescal Wash between the Bedford-Coldwater Subbasin and Temescal Basin. Precipitation had been consistently below-average since 1947 and pumping along Temescal

Wash in the Bedford-Coldwater Subbasin during that period was 167 percent of recent pumping (WEI 2015). Thus, dense riparian vegetation has not been a constant feature of Temescal Wash but has waxed and waned over the past several decades in response to changes in surface flow and groundwater levels.

4.10.2. Depth to Groundwater

Depth to groundwater provides a general indication of locations where gaining streams and riparian vegetation are likely to be present. However, available data are of limited use for this purpose due to insufficient vertical and geographic coverage. Available data are almost entirely from water supply wells, which are typically screened far below the water table. The groundwater elevation (potentiometric head) at the depth of the well screen can be different from the true water table, which is the first zone of saturation reached when drilling down from the ground surface. Because recharge occurs at the land surface and pumping occurs at depth, deep alluvial basins such as this one typically have large downward head gradients within the aquifer system. Thus, water level information from wells can potentially underestimate the locations where the water table is shallow enough to support phreatophytic riparian vegetation. Conversely, in areas where groundwater discharges into streams or wetlands—such as in the Prado Basin—vertical water-level gradients are typically upward.

The geographic coverage of water-level data for the Basin is limited because the wells with data are clustered near the north-central part of the Basin. The closest well to Temescal Wash is about 0.5 mile away. The error associated with extrapolating water levels to Temescal Wash could easily be greater than 10 feet. Horizontal water table gradients can be high near losing streams. Creeks and rivers that lose water commonly form a mound in the water table near the creek. The height and width of the mound depends on the transmissivity of the shallowest aquifer. For example, groundwater elevations in a shallow well adjacent to the Arroyo Seco in the Salinas Valley rose 5 to 10 feet more than groundwater elevations in wells 1,000 feet away when the river started flowing (Feeney 1994). A groundwater ridge up to 12 feet high develops beneath Putah Creek in Yolo County during the flow season, but the width of this ridge was estimated to be only a few hundred feet (Thomasson et al. 1960). These examples suggest that shallow wells within 100 to 200 feet of a stream channel would be needed to confirm the presence of hydraulic connection between surface water and groundwater.

Groundwater does not discharge into streams unless the water table is equal to or higher than the elevation of the stream bed. In addition, the water table does not provide water to phreatophytic vegetation unless it is at least as high as the base of the root zone. The depth of the root zone is uncertain, partly because the relatively few studies of rooting depth have produced inconsistent results and partly because rooting depth for some riparian species is facultative. This means that the plants will grow deeper roots if the water table declines. Many species (including cottonwood and willow) germinate on moist soils along the edge of a creek in spring. As the stream surface recedes during the first summer, the seedlings survive if the roots grow at the same rate as the water-level decline. Over a period of years, roots grow deeper as the land surface accretes from sediment deposition and/or the creek channel meanders away from the young tree or shrub. For screening purposes, a depth to water of less than 30 feet in water supply wells near streams was selected as a threshold for identifying possible phreatophyte areas. This depth allows for 10 to 15 feet of root depth, 5 feet of elevation difference between the water level in the well and the overlying true water table, and 15 feet of topographic elevation difference between well heads and the bottoms of nearby creek channels where the vegetation is located.

In spite of these accuracy limitations, contours of depth to water measured in wells—in combination with depth to water data for the downstream end of the Bedford-Coldwater Subbasin (also shown in **Figure 4-20**)—indicates that there are only two areas in or near the Basin where depth to water is likely shallow enough to be within the root zone of vegetation or possibly discharge into stream channels or wetlands (**Figure 4-20**). One of the areas is the 2-mile bedrock reach of Temescal Wash between the Bedford-Coldwater Subbasin and Basin, and the other is the Prado Wetlands, where contouring suggests groundwater discharges into the wetlands. Depth to water in spring of 2017 was less than 20 feet downstream of about North Lincoln Avenue.

Depth to water in the Corona area was incorrectly characterized in a shallow groundwater and evapotranspiration assessment competed for the Upper Santa Ana River Integrated Model summary report (Ballau 2018). The map of shallow groundwater areas in slide 8 of Appendix E of that report shows shallow groundwater conditions extending up Temescal Wash from Prado Basin to the center of Corona. Shallow groundwater conditions were inferred from the presence of perennial flow in the Wash, as shown on the National Hydrography Dataset map. There is perennial flow, but it consists almost entirely of wastewater discharges from the Corona WRF-1 treatment plant, which is located about 1 mile upstream of the Main Street gage. All wells in that area—including deep supply wells and shallow monitoring wells at cleanup sites—have water levels generally more than 70 feet below the ground surface. Furthermore, the reach of Temescal Wash that is perennial is lined with concrete and not suitable for riparian habitat.

4.10.3. Riparian Vegetation

Vegetation data provides evidence that the water table near some reaches of Temescal Wash is shallow enough to supply water to phreatophytes. Where tree and shrub roots are able to reach the water table, riparian vegetation is typically denser and greener than along reaches where vegetation is supplied only by stream flow or residual soil moisture from the preceding wet season. Patches of dense riparian vegetation are visible in multiple historical photographs and are indicated by a crosshatch pattern in **Figure 4-21**. The figure also shows the distribution of vegetation classified as Natural Communities Commonly Associated with Groundwater (NCCAG) by the Nature Conservancy. Based on multiple historical vegetation surveys, the Nature Conservancy prepared detailed statewide mapping of NCCAG vegetation that is accessible on-line (DWR et al. 2020). Note that the NCCAG map does not include the corridor of dense riparian trees and shrubs along the bedrock reach of Temescal Wash between the Bedford-Coldwater Subbasin and the Basin. It does include 44 acres of red willow and 12 acres of cottonwood between Minnesota Road and Temescal Wash Lake, which is a reach where surface flow and shallow groundwater are probably leaking downward to a deeper regional water table. Red willow is a facultative phreatophyte, which means it will exploit a water table if it is within a reachable depth but otherwise survive on soil moisture (typically with smaller stature and greater spacing between plants).

Another waterway mapped as supporting riparian vegetation in the NCCAG database is the lower reach of Wardlow Wash, which drains the northwest corner of the Basin to the Santa Ana River. Most of the mapped vegetation is facultative phreatophytes (mainly sycamore), but one polygon of Fremont cottonwood (an obligate phreatophyte) is mapped about 0.5 mile from the southern edge of the Prado Wetlands, in an area where shallow depth to water is plausible.

An additional test for groundwater dependence of riparian vegetation was to compare changes in groundwater elevation with changes in vegetation health during the recent drought. Vegetation health can be detected by changes in the way the plant canopy absorbs and reflects light. The spectral characteristics of satellite imagery can be processed to obtain two metrics commonly used to characterize vegetation health: the Normalized Difference Vegetation Index (NDVI) and the Normalized Difference Moisture Index (NDMI). Both are calculated as ratios of selected visible and infrared light wavelengths. The Nature Conservancy developed a second on-line mapping tool called GDE Pulse that provides annual dry-season averages of NDVI and NDMI for each mapped NCCAG polygon for 1985-2018 to assist with the identification of groundwater dependent ecosystems (GDEs) (TNC 2020). For the Fremont cottonwood polygon, NDVI and NDMI declined by 0.25 and 0.26, respectively, from 2012 to 2017, and for the red willow areas, the metrics declined by 0.15 and 0.16. These fairly substantial declines were clearly related to the drought. Field observations of riparian vegetation documented riparian tree mortality of approximately 80 percent between 2014 and 2016 along the downstream end of Bedford-Coldwater Subbasin, the bedrock reach, and the Basin reach down to Temescal Wash Lake (Russell 2020 and Google Earth 2021). The question is whether the cause of the moisture stress was reduced rainfall, reduced streamflow or lower groundwater levels. After the relatively wet winters of 2019 and 2020, the stands of riparian trees are now recovering.

In summary, riparian vegetation along the bedrock reach of Temescal Wash is very likely phreatophytic and therefore affected by groundwater levels in the thin ribbon of channel deposits along the Wash. Once the Wash enters the Basin, however, the regional water table is far below the channel. The depth to water in the three wells with historical water level data closest to the Temescal Wash vegetation (south of well Corona 13 in Figure 4-1) was historically 50 to 150 feet below the ground surface. Depth to water increases from the center of the Channel Aquifer area toward the margins of the Basin because the ground slope (0.04-0.13 ft/ft from Figure 3-1) is four or more times steeper than the water table slope (about 0.01 ft/ft from Figures 4-10 and 4-11). Thus, the depth to water at the Temescal Wash riparian vegetation is likely greater than the 50 to 150 foot range of the three wells farther north. Groundwater elevations at the vegetation location is not considered a data gap because available data indicate that the regional water table could not plausibly be less than 30 ft below the ground surface. The riparian vegetation along that reach is probably supported by perched groundwater along the channel sustained by percolation of surface flow in Temescal Wash as it exits the bedrock reach.

4.10.4. Wetlands and Interconnected Surface Water

The north end of the Basin is beneath the Santa Ana River and surrounding Prado Wetlands, which is a managed wetland maintained by operation of Prado Dam. Prado Dam impounds the river to regulate flood flows in winter and sustain a perennial wetland. In some previous reports, the impoundment area was referred to as the Prado Flood Control Basin. “Basin” in this case refers to a surface water feature. The RWQCB Basin Plan designates the area behind Prado Dam up to an elevation of 566 feet as the “Prado Basin Management Zone”. This GSP refers to the dense wetland and riparian vegetation within that area as the Prado Wetlands. Surface water behind the dam is maintained at a specified elevation, which currently is 505 feet. The extent of wetland vegetation has increased from 1.8 square miles (mi^2) in 1960 to about 6.8 mi^2 today, with most of the increase occurring prior to 1985 (WEI 2020). Approximately 1.4 mi^2 of the total is within the Basin.

Evapotranspiration is higher in wetland and riparian vegetation areas where plant roots can access the water table than in areas where the water table is too deep to be accessed by roots. Thus, maps of remotely-sensed evapotranspiration (ET) show where the water table is shallow and being utilized by plants. Color-coded ET maps based on spectral analysis of Landsat imagery are available annually, and the maps from 1986 through 2016 consistently show a very sharp and stable boundary between high- and low-ET regions defining the southern edge of the Prado Wetlands (Ballau 2018). Temescal Basin along the lower reach of Temescal Wash between the wetlands and downtown Corona did not exhibit high ET between 1986 and 2016. This further confirms that the assumption of shallow groundwater in that region based on perennial flow in the channel was erroneous, as discussed earlier.

A systematic comparison of factors potentially related to groundwater levels in the Prado Wetlands was completed for this GSP. The Prado Basin Habitat Sustainability Program includes monitoring of groundwater levels and quality in scores of wells in and north of the Prado Wetlands, including 18 monitoring wells constructed specifically to detect changes in the shallow water table elevation within the wetlands (WEI 2020). It was found that wetland vegetation and riparian vegetation along the lower reaches of two north-side tributary creeks were associated with depths to water of 15 feet or less. **Figure 4-22** compares water levels in shallow wells in Prado Wetlands with water levels to the north and south of the wetlands. For the wells in and to the north of the wetlands, the wells show the maximum depth to water between 2010 and 2020. In the central part of the wetlands, the maximum depth to water was 13 feet or less at all wells, which is shallow enough to be accessible to roots of established riparian vegetation. The most common species mapped in that area is red willow. In contrast, the minimum depths to water in wells in Temescal Basin south of the wetlands were all greater than 40 feet (beyond the reach of vegetation roots) except for the well closest to the wetlands, where it was 23 feet (within the possible rooting depth range of some riparian tree species). Those water levels are from water supply wells, which are relatively deep. To check for the possible presence of a shallow aquifer with higher water levels, data for shallow monitoring wells at groundwater contamination sites were obtained from the SWRCB Geotracker database and reviewed (SWRCB 2021). GeoTracker has information for six sites in the central part of Corona, and in all cases the depths to water were 42 to 172 feet, which is roughly consistent with the water supply wells and beyond the reach of vegetation roots. Thus, somewhere near the southern edge of the Prado Wetlands there is an abrupt transition to deeper water levels.

Various factors that could potentially affect shallow groundwater levels in the Prado Wetlands were evaluated for this GSP by comparing their variations over time between 2000 and 2019. **Figure 4-23** shows depth to water hydrographs for four Prado Wetland wells, annual pumping at the Chino Basin desalter wells and in all wells in the Temescal Basin, water levels in several wells in the Temescal Basin, annual discharge in the Santa Ana River below Prado Dam and annual precipitation in Riverside. The 2012 through 2016 period is highlighted in the figure for discussion purposes. The Prado wells all show water-level declines from 2012 to 2015 followed by a rise in 2016. If groundwater pumping caused the declines during 2012 to 2015, it would have been above average during that period. However, pumping at the Chino desalter wells (locations shown in **Figure 4-22**) was relatively constant during that period, and Temescal Basin pumping actually declined. Furthermore, the large step increase in desalter pumping from 2005 to 2007 was not associated with a corresponding decrease in Prado Wetland groundwater levels.

Groundwater elevation trends in the Temescal Basin also show no correlation with shallow groundwater levels in the Prado Wetlands. The most common trend was a steady decline of 10 to 20 feet during 2012 through 2016. This is counterintuitive given the decrease in Temescal Basin pumping during that period. It suggests that sources of recharge—primarily percolation from Temescal Wash and stormwater retention basins on other streams—decreased during the drought by a total amount greater than the decrease in pumping.

A variable that does correlate with Prado Wetland groundwater levels is annual discharge in the Santa Ana River at the gage below Prado Dam. The flow at that location is a direct measure of the amount of surface water flowing through the wetlands. Annual discharge declined during 2011 through 2015, increased slightly in 2016 and even more in 2017. Median and average annual discharge are shown in the figure and exhibit similar patterns. Median discharge emphasizes moderate, steady flows such as discharges from wastewater treatment plants. Average discharge also includes the effects of runoff during large storm events. In wetter years such as 2011 and 2017 the average flow is considerably larger than the median flow. Annual precipitation at Riverside also correlates with the Prado groundwater trends. Precipitation was high in 2010 through 2011 and 2017 and low during 2012 through 2016.

The correlation of precipitation and river flow with Prado groundwater levels and the lack of correlation with groundwater pumping north and south of the wetlands indicates that the wetlands are primarily sustained by surface inflows.

Another evaluation of factors potentially correlated with changes in NDVI in the Prado Wetlands was presented in the 2019 annual report of the Prado Basin Habitat Sustainability Committee (WEI 2020). Using a spatially and temporally detailed statistical analysis of trends in time series plots for 1984 through 2019, no correlation was found between NDVI and groundwater levels. However, in some years changes in NDVI correlated with annual precipitation, growing-season average maximum and minimum temperatures, wastewater discharges, vegetation management activities or wildfires. These results are consistent with those presented above and support a conclusion that the wetlands are now primarily supported by surface inflows including storm runoff and reclaimed water discharges.

Prado Dam operation also strongly influences water availability in the wetlands because the impounded pool of water is more perennial than it would be in a natural condition.

Modeling completed for other studies projected large water-level declines in the Temescal Basin, with an implication that groundwater is being over-exploited and potentially impacting Prado Wetlands. However, actual water-level data from Temescal Basin show that the simulated declines are incorrect. The simulated declines were first presented in the Prado Basin Adaptive Management Plan (WEI 2016; see Figure 1-4 of that report). The same results were presented again in the 2019 Annual Report of the Prado Basin Habitat Sustainability Committee (WEI 2020; see Figure 1-3). The simulations indicated 20 feet of cumulative water level decline from 2005 to 2030 near the southern edge of the Prado Wetlands, increasing to 60 feet near downtown Corona. In reality, water levels in the Temescal Basin have shown no net increase or decrease from 2005 to 2020 (see, for example, **Figure 4-23**). It is possible that the groundwater model used for those simulations included the southward propagation of drawdown from the Chino desalter wells but did not fully include recharge from Temescal Wash and small streams in the Temescal Basin.

The low importance of groundwater as a factor in managing Prado Wetlands is also implicit in the Upper Santa Ana River Habitat Conservation Plan (HCP) (ICF 2020). Groundwater modeling completed for the HCP projected declining groundwater levels for the region surrounding the Prado Wetlands. However, none of the management actions in the HCP target groundwater pumping or levels beyond simply monitoring them. The actions focus on establishing an HCP Preserve, enhancing channel morphology, substrate, and in a few places flow to improve habitat quality. The thirty-three "avoidance and mitigation measures" listed in the HCP deal exclusively with land and vegetation disturbance and related construction activities. Most of the proposed actions are along the mainstem of the Santa Ana River. The surface hydrology model, for example, extended only about 2 miles up Temescal Wash—a reach that is concrete-lined, has no habitat value and is not connected to groundwater.

Small wetlands might be present outside of the Prado Wetlands. The Nature Conservancy NCCAG mapping includes a wetland layer separate from the riparian vegetation layer. It indicates the locations of possible wetlands outside of the Prado Wetlands area. Along Temescal Wash, the largest mapped polygons are within the riparian vegetation polygons between Minnesota Road and Temescal Wash Lake. Additional small polygons are shown along the shore of the lake. As stated earlier, water levels in wells are thought to be far below the creekbed and lake at that location, which would indicate that the wetlands and lake are sustained by surface discharges, not groundwater. The mapping also shows two strips of wetland in the channelized reach of the Wash downstream of the lake. The channel has a cement bottom, so wetlands are not likely present (i.e., there is a mapping error). The mapping shows no off-channel wetlands in the Basin, which is not surprising given its largely urban land cover.

The Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) was reviewed for additional information regarding plant species that might be affected by groundwater (RCRCA 2020). Two large regions mapped as *narrow endemic plants* and *criteria area species* partially overlap the Basin. However, those categories together contain 16 upland plant species that are unaffected by groundwater.

4.10.5. Animals and Interconnected Surface Water

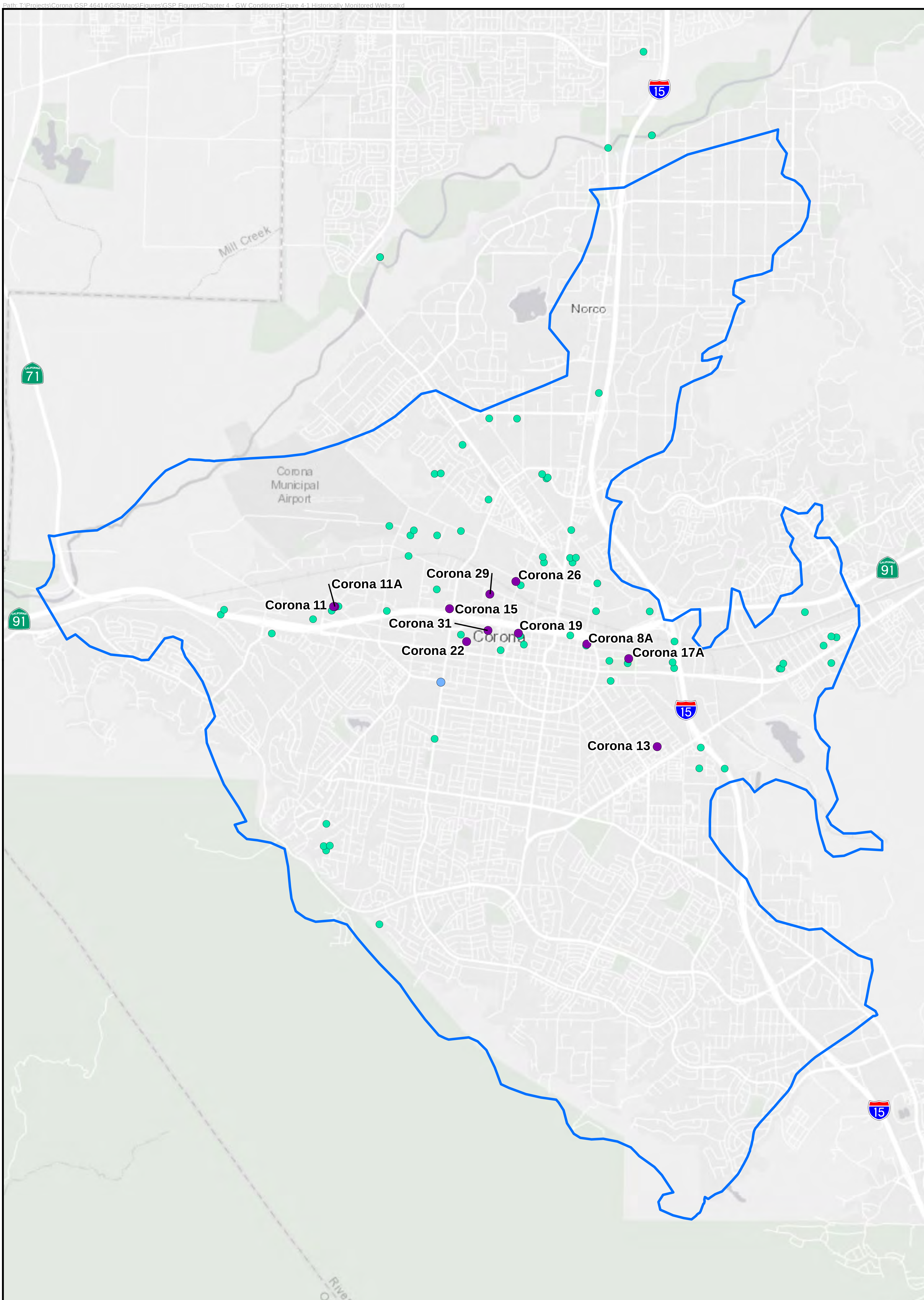
Animals that depend on groundwater include fish and other aquatic organisms that rely on groundwater-supported stream flow, amphibious or terrestrial animals that lay their eggs in water and birds that inhabit riparian vegetation. Management of habitat for animals typically focuses on species that are listed as threatened or endangered under the state or federal Endangered Species Acts. That convention is followed here. Flow in Temescal Wash is too ephemeral to support migration of anadromous fish, although the population of rainbow trout in Coldwater Canyon Creek above the Bedford-Coldwater Subbasin is thought to be the remnant of a steelhead trout population present as recently as the 1930s (Russell 2020). No native fish species presently inhabit Temescal Wash. Resident fish are nonnatives such as bass, bullhead, sunfish, and carp. Arroyo chub (*Gila orcuttii*) is a native fish listed as a species of special concern that is present in Prado Wetlands and could potentially inhabit some reaches of Temescal Wash. The Riverside-Corona Resource Conservation District implemented the Temescal Wash Native Fish Restoration Project during 2007 through 2009. The focus of that effort was on eradication of nonnative plants and animals, particularly arroyo chub predators. Modifying flow conditions was not part of the project. No habitat areas for arroyo toad or red-legged frog are mapped within the Basin.

The Upper Santa Ana River HCP documents historical sightings and current potentially suitable habitat for a number of listed species, including six at various locations along Temescal Wash between Lake Elsinore and the Prado Wetlands: Arroyo chub, California glossy snake (*Arizona elegans occidentalis*), southwestern pond turtle (*Emys pallida*), yellow-breasted chat (*Icteria virens*), least Bell's vireo (*Vireo bellii pusillus*), and southwestern willow flycatcher (*Empidonax traillii extimus*). In all cases there were either a number of historical sightings but little suitable habitat or vice versa. Apparently, habitat restoration opportunities are richer along the Santa Ana River than along Temescal Wash, and this led to the HCP's focus on the former.

Two bird species that inhabit the Prado Wetlands are federally listed as endangered: least Bell's vireo and southwestern willow flycatcher. Critical habitat areas have been delineated by the U.S. Fish and Wildlife Service for many listed species. Critical habitat maps for three species are shown in **Figure 4-21**. Critical habitat for the least Bell's vireo and southwestern willow flycatcher in the Temescal Basin region more or less coincide with the extent of the Prado Wetlands. Critical habitat for the coastal California gnatcatcher (*polioptila californica californica*) includes areas on the eastern slopes of the Santa Ana Mountains that very slightly overlap the western edge of the Temescal Basin. The only vegetation in those areas that might utilize groundwater would be along tributary streams, where a small amount of base flow is sustained by groundwater discharging at a low rate from fractured bedrock. That discharge would not be affected by pumping and water levels in the Basin, so Basin management would not impact the extent or health of vegetation along streams in the mapped habitat areas.

In summary, groundwater management is unlikely to impact habitat in the Prado Wetlands and along Temescal Wash with possible minor exceptions where Temescal Wash first enters the Basin from the bedrock reach and along the southern edge of the Prado Wetlands. Additional data are needed regarding the presence of a shallow water table in those locations to reach a more definitive conclusion.

Path: T:\Projects\Corona GSP 46414\GIS\Maps\Figures\GSP Figures\Chapter 4 - GW Conditions\Figure 4-1 Historically Monitored Wells.mxd



Wells with Regular Monitoring

Wells with Representative Hydrographs (labeled)

Other Historically Monitored Wellls

Temescal Basin

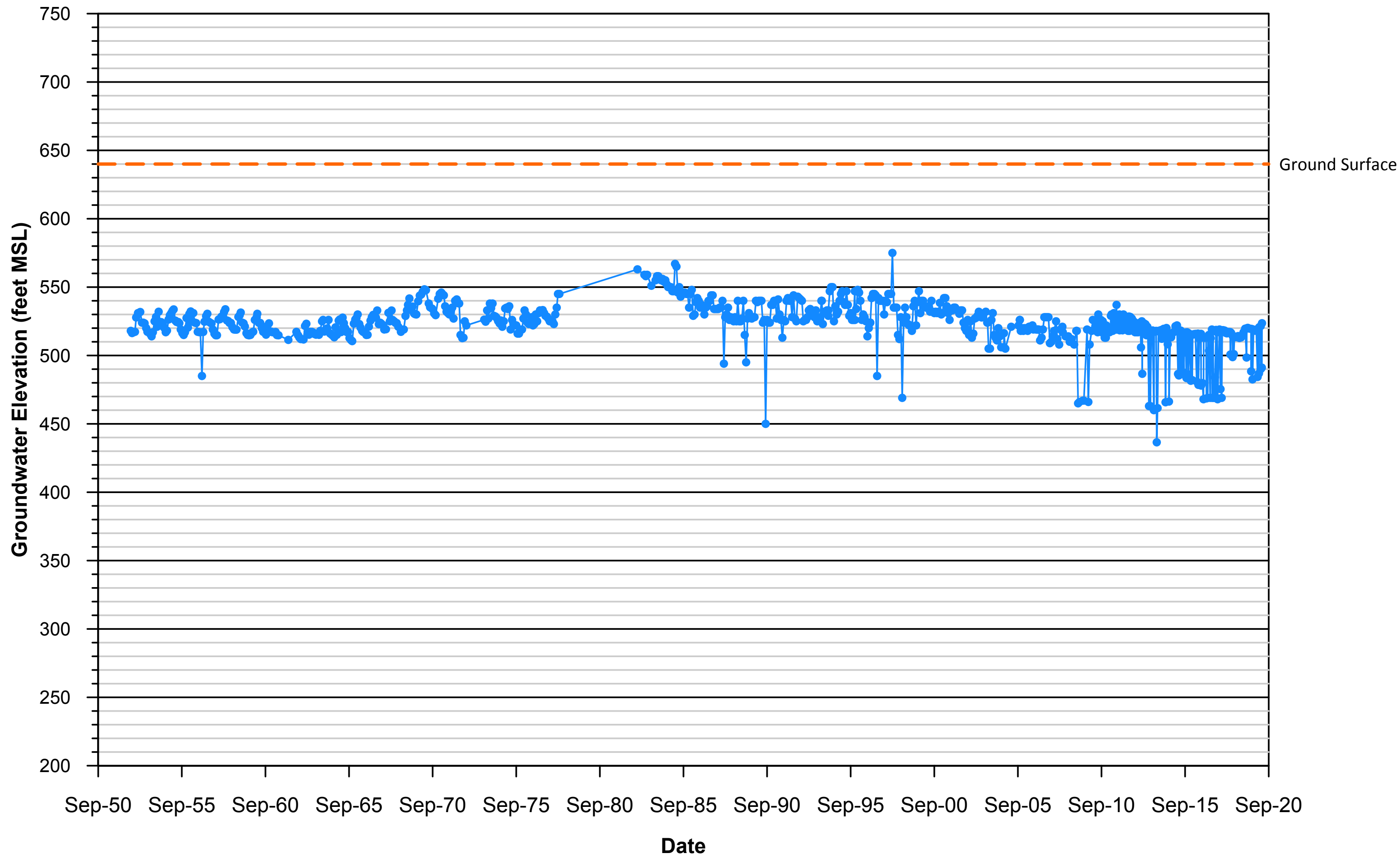
N

0 0.5 1

Miles

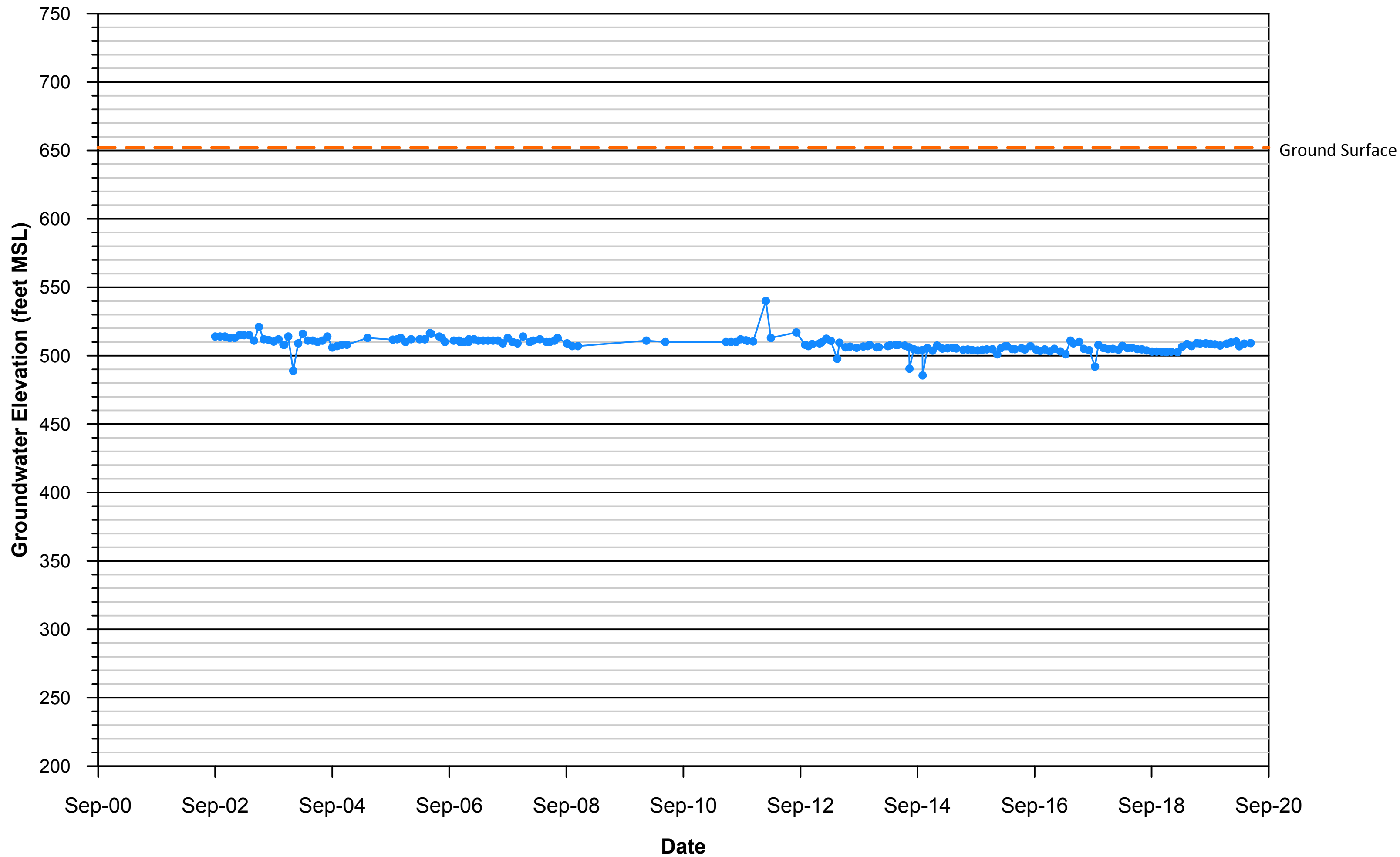
Figure 4-1
Historically Monitored Wells

TODD GROUNDWATER



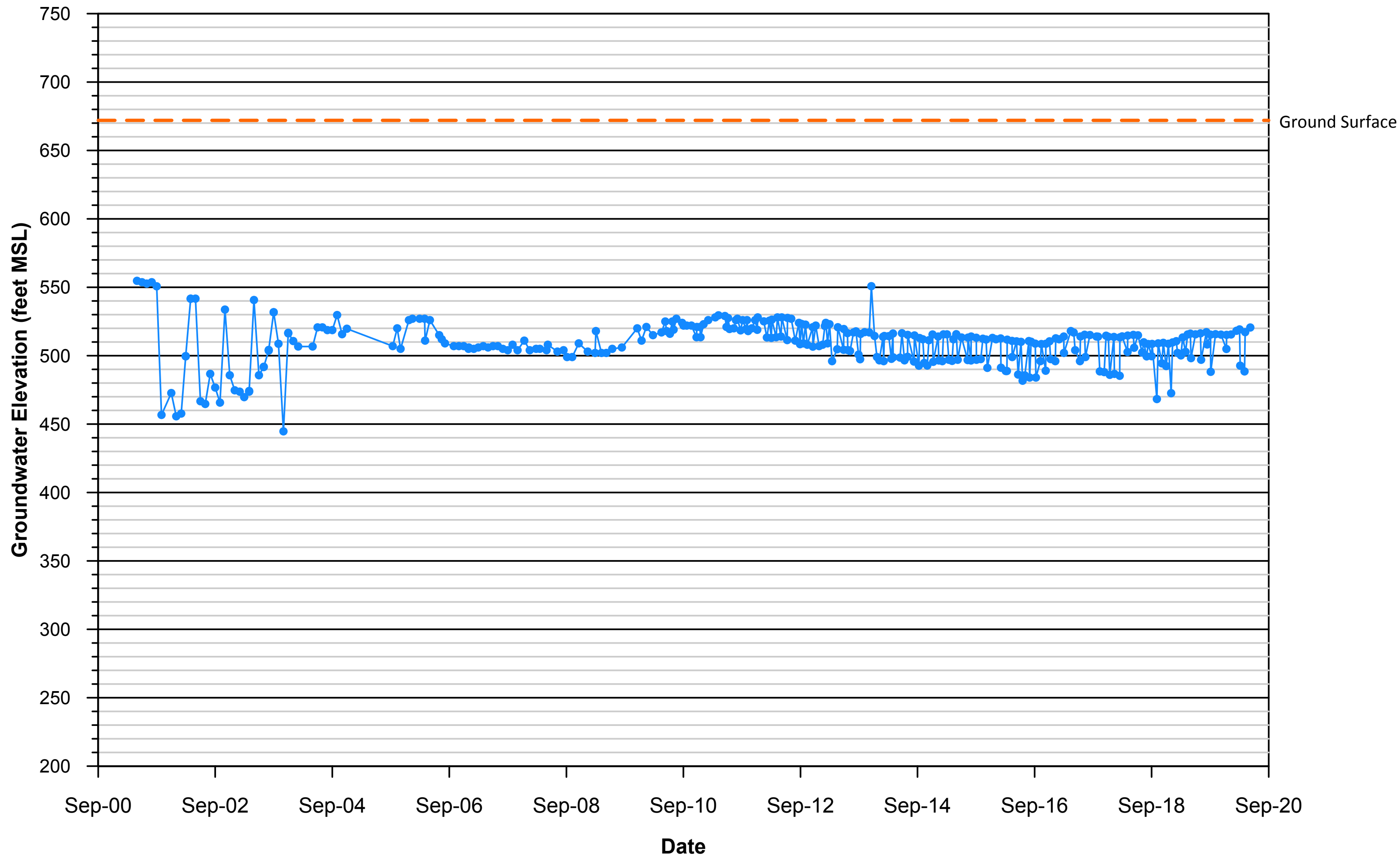
TODD GROUNDWATER

Figure 4-2
Representative Hydrographs
Corona Well 15



TODD GROUNDWATER

Figure 4-3
Representative Hydrographs
Corona Well 11

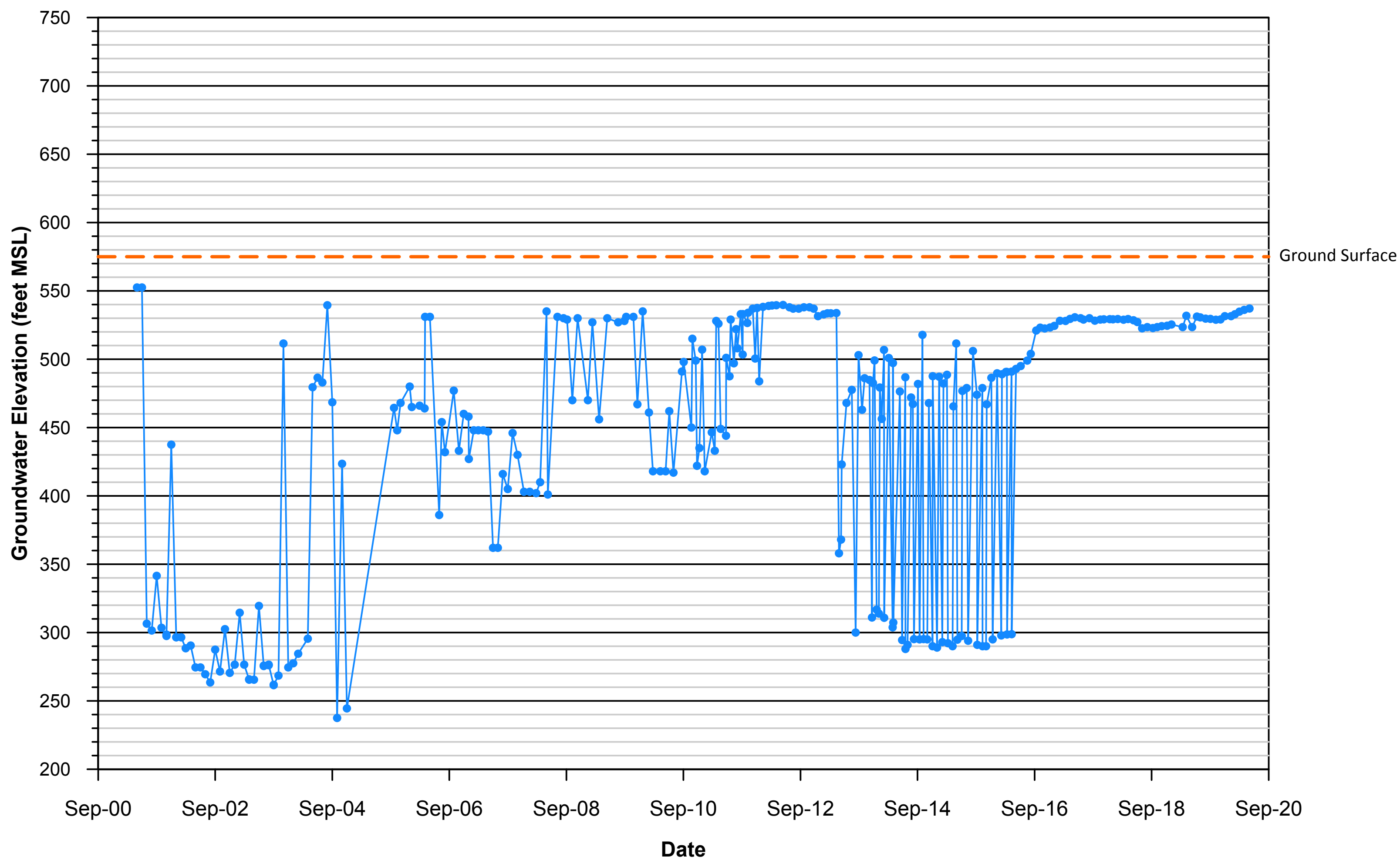


TODD GROUNDWATER

Figure 4-4
Representative Hydrographs
Corona Well 22

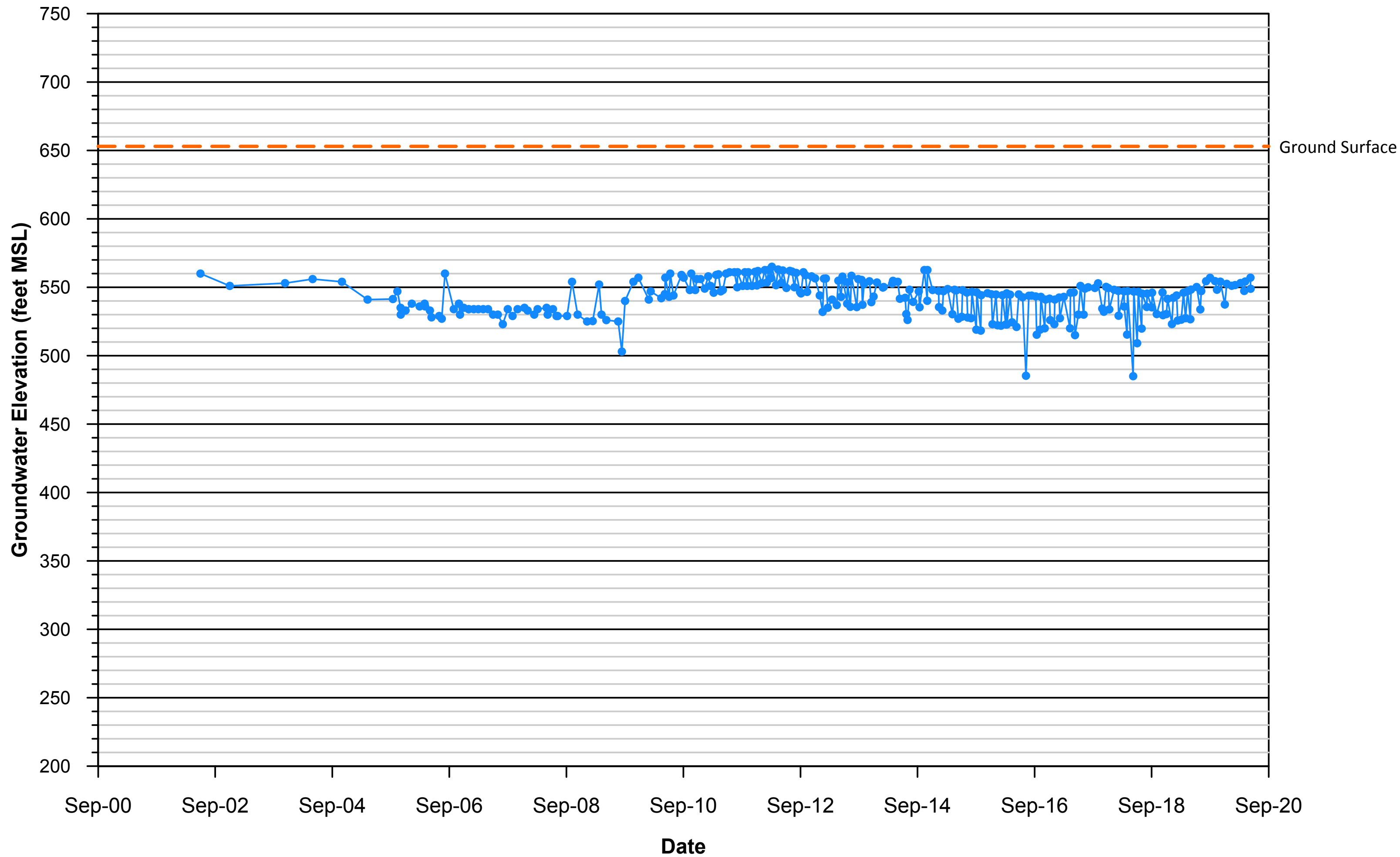
TODD GROUNDWATER

Figure 4-5
Representative Hydrographs
Corona Well 19



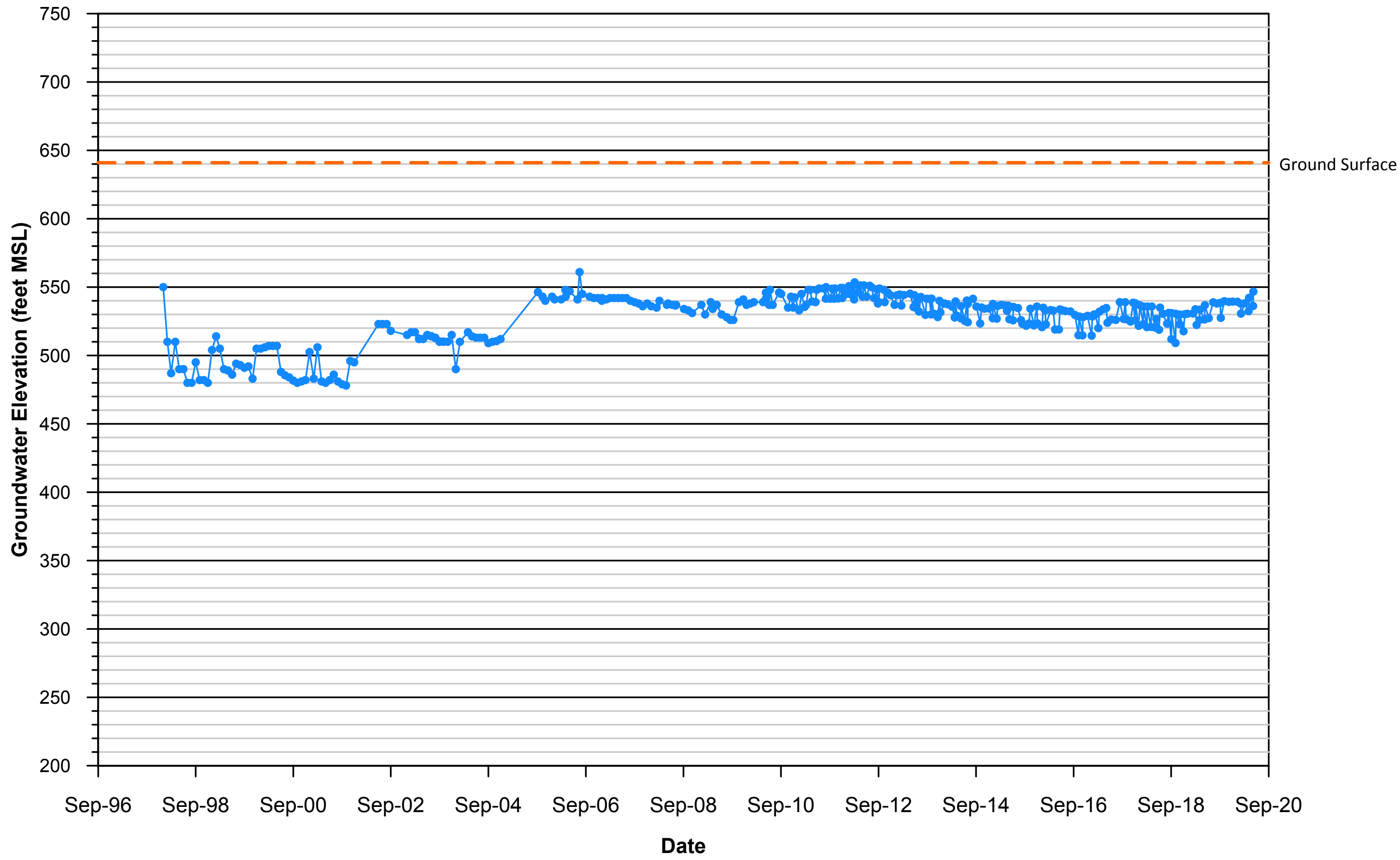
TODD GROUNDWATER

Figure 4-6
Representative Hydrographs
Corona Well 26



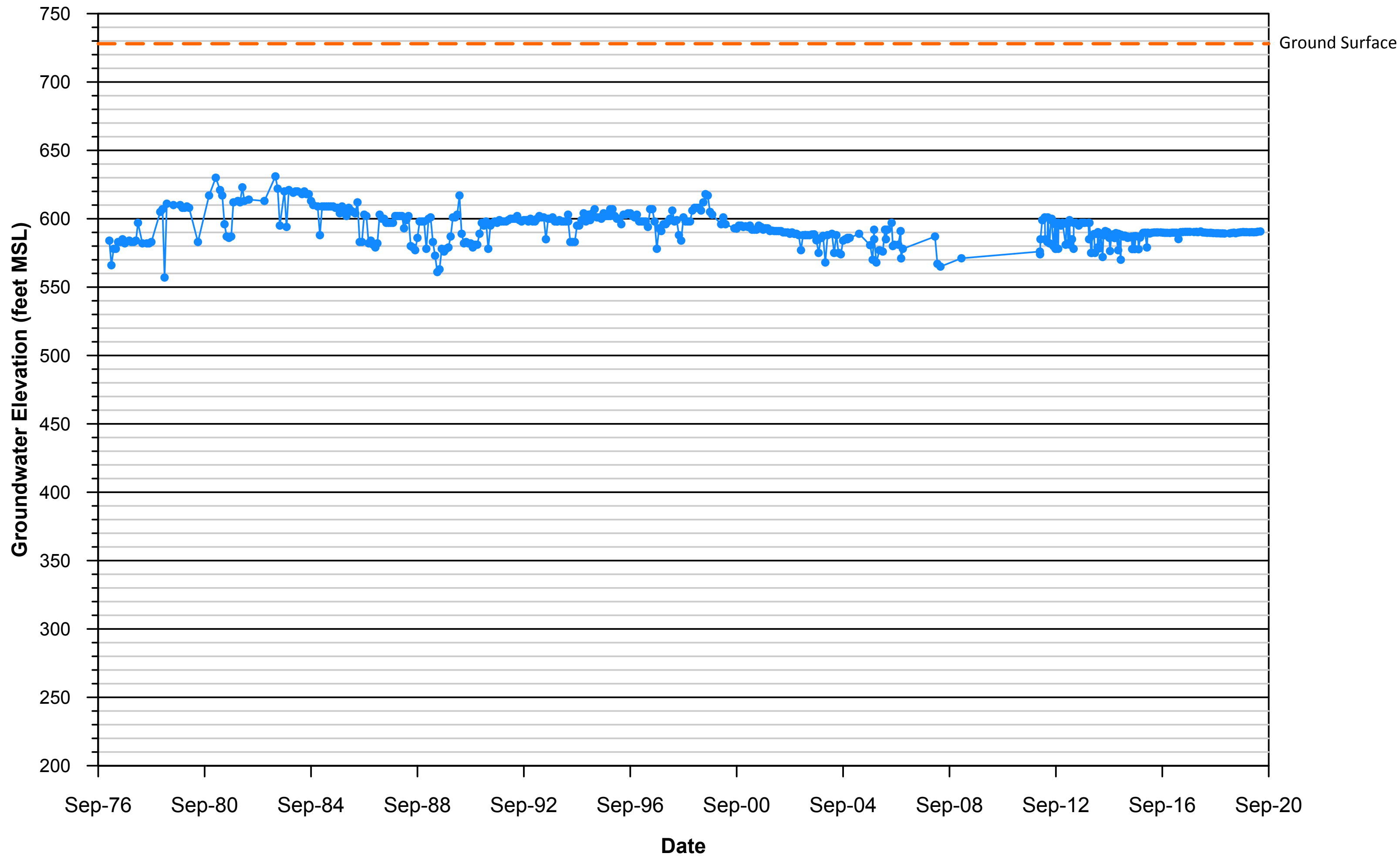
TODD GROUNDWATER

Figure 4-7
Representative Hydrographs
Corona Well 17A



TODD GROUNDWATER

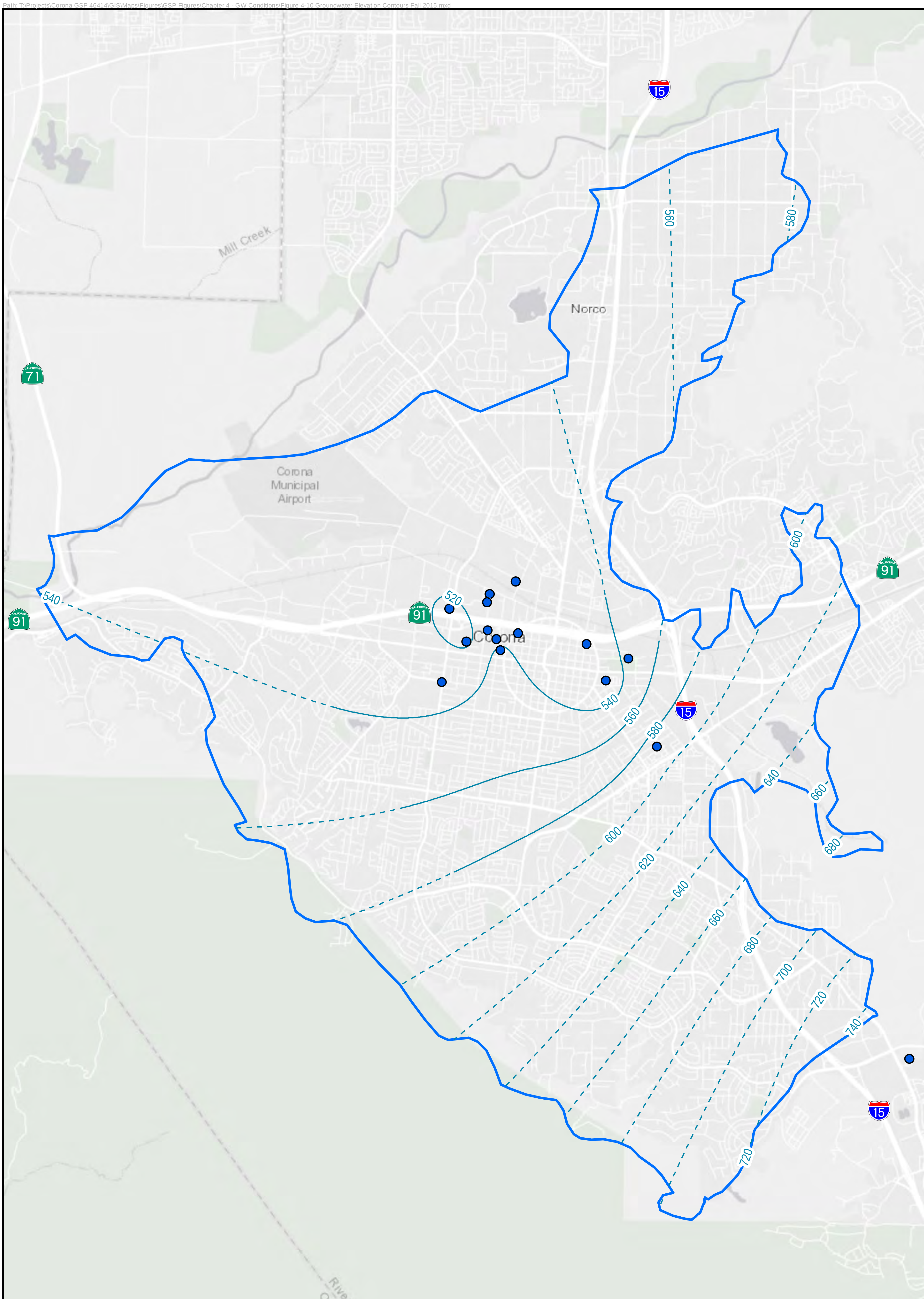
Figure 4-8
Representative Hydrographs
Corona Well 8A



TODD GROUNDWATER

Figure 4-9
Representative Hydrographs
Corona Well 13

Path: T:\Projects\Corona GSP 46414\GIS\Maps\Figures\GSP Figures\Chapter 4 - GW Conditions\Figure 4-10 Groundwater Elevation Contours Fall 2015.mxd

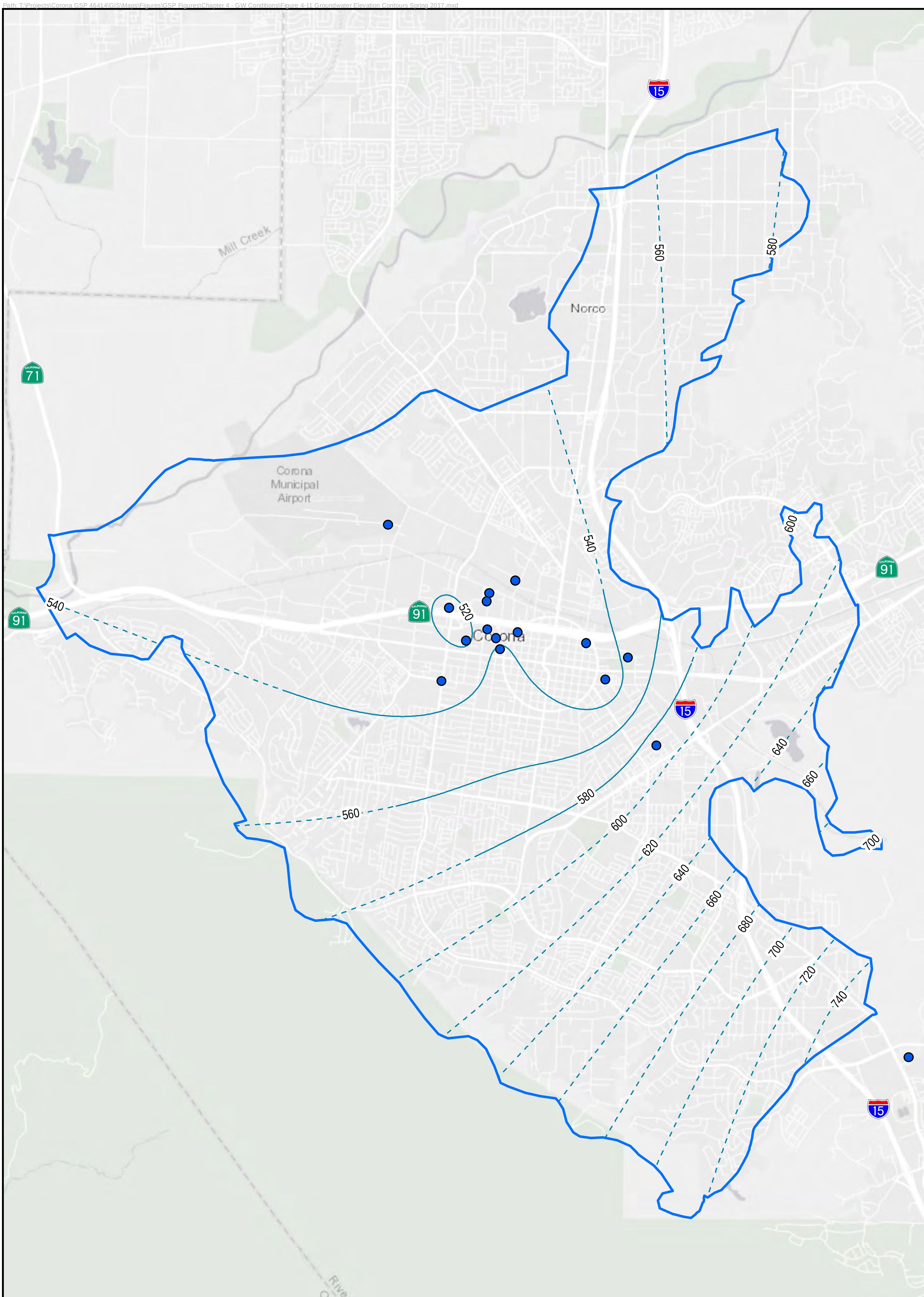


- Well Monitored Fall 2015
- Groundwater Elevation Contour - feet above mean sea level, Fall 2015 (dashed where inferred)
- Temescal Basin

Figure 4-10
Groundwater Elevation Contours Fall 2015

TODD GROUNDWATER

Path: T:\Projects\Corona GSP 46414\GIS\Maps\Figures\GSP Figures\Chapter 4 - GW Conditions\Figure 4-11 Groundwater Elevation Contours Spring 2017.mxd



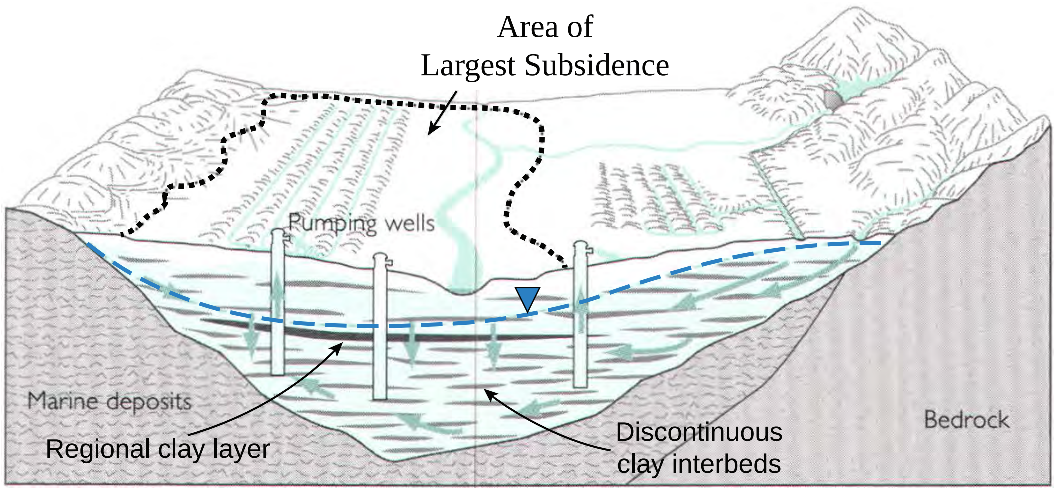
- Well Monitored Spring 2017
- Groundwater Elevation Contour - feet above mean sea level, Spring 2017 (dashed where inferred)
- Temescal Basin

N

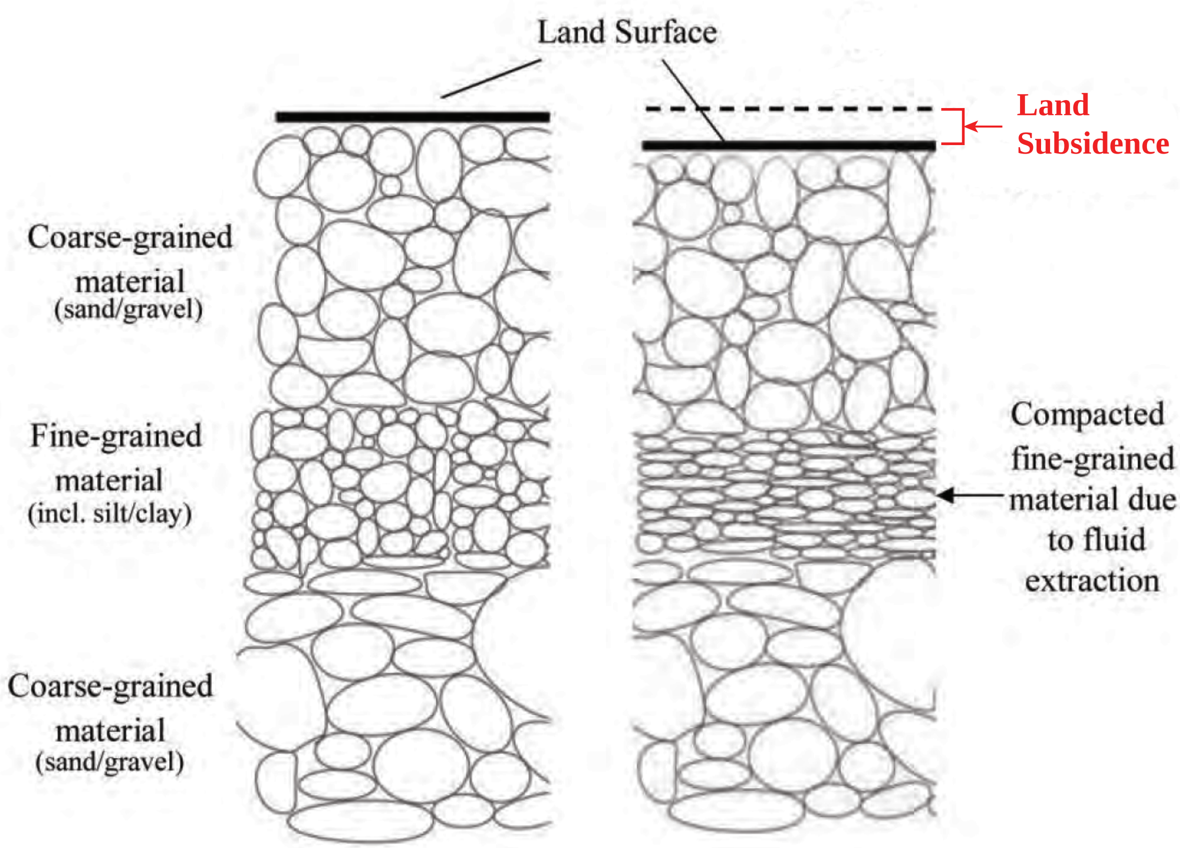
0 0.5 1
Miles

Figure 4-11
Groundwater Elevation Contours Spring 2017

TODD GROUNDWATER



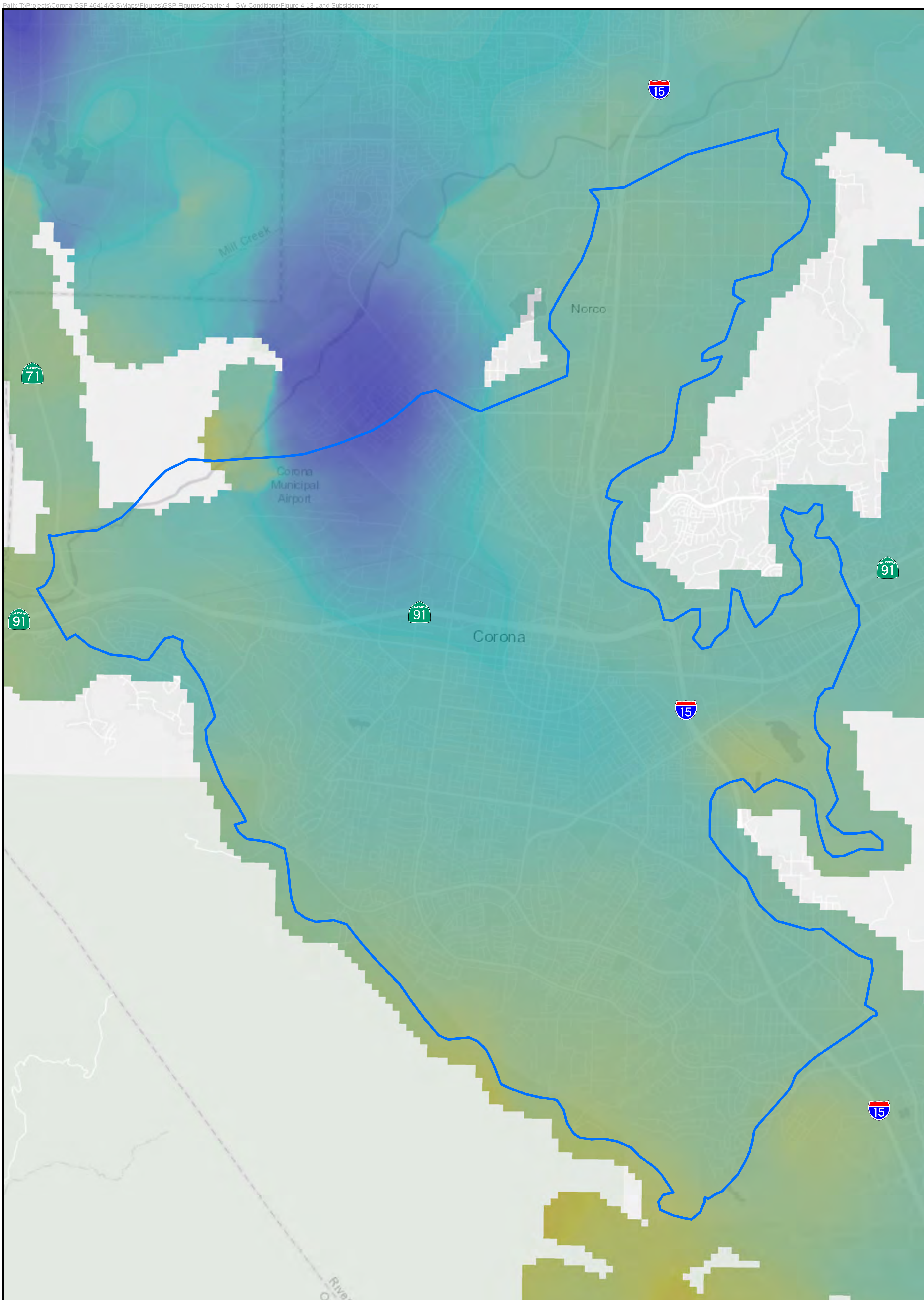
Source: Galloway et al., 1999.



After LSCE et al., 2014.

TODD GROUNDWATER

Figure 4-12
Concepts of
Land Subsidence



Ground Surface Vertical Displacement (feet)

High : 0.08

Low : -0.08

Temescal Basin

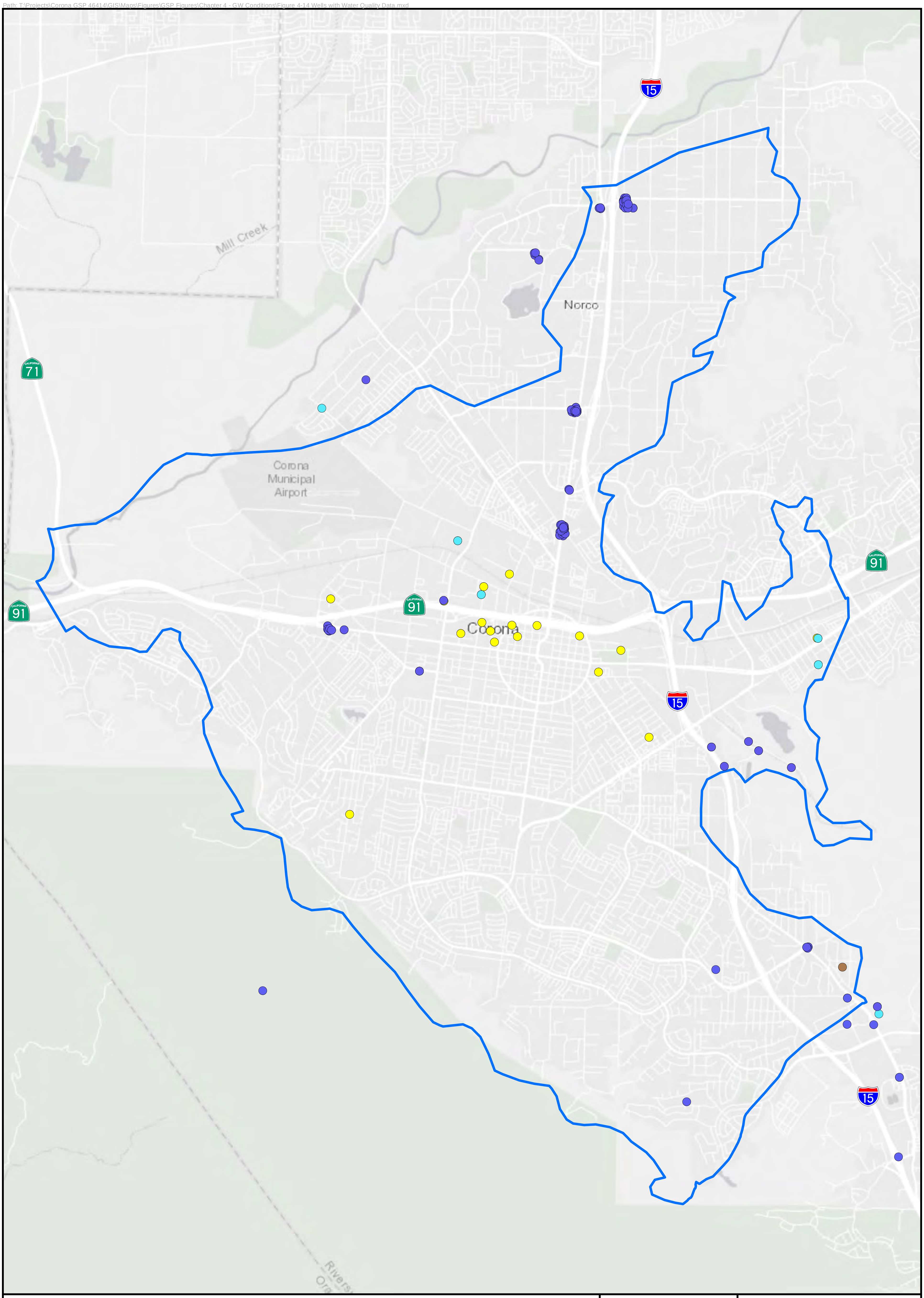
Data Source:
Subsidence estimates from satellite measurements provided by the TRE ALTAMIRA InSAR provided by the California Department of Water Resources, June 13 2015 to September 19 2019 (downloaded July 31 2020).
https://gis.water.ca.gov/arcgisimg/rest/services/SAR/Vertical_Displacement_TRE_ALTAMIRA_v2019_Total_Since_20150613_20190919/ImageServer

N

0 0.5 1
Miles

Figure 4-13
Basin-Wide Subsidence Estimates from Satellite Measurements

TODD GROUNDWATER



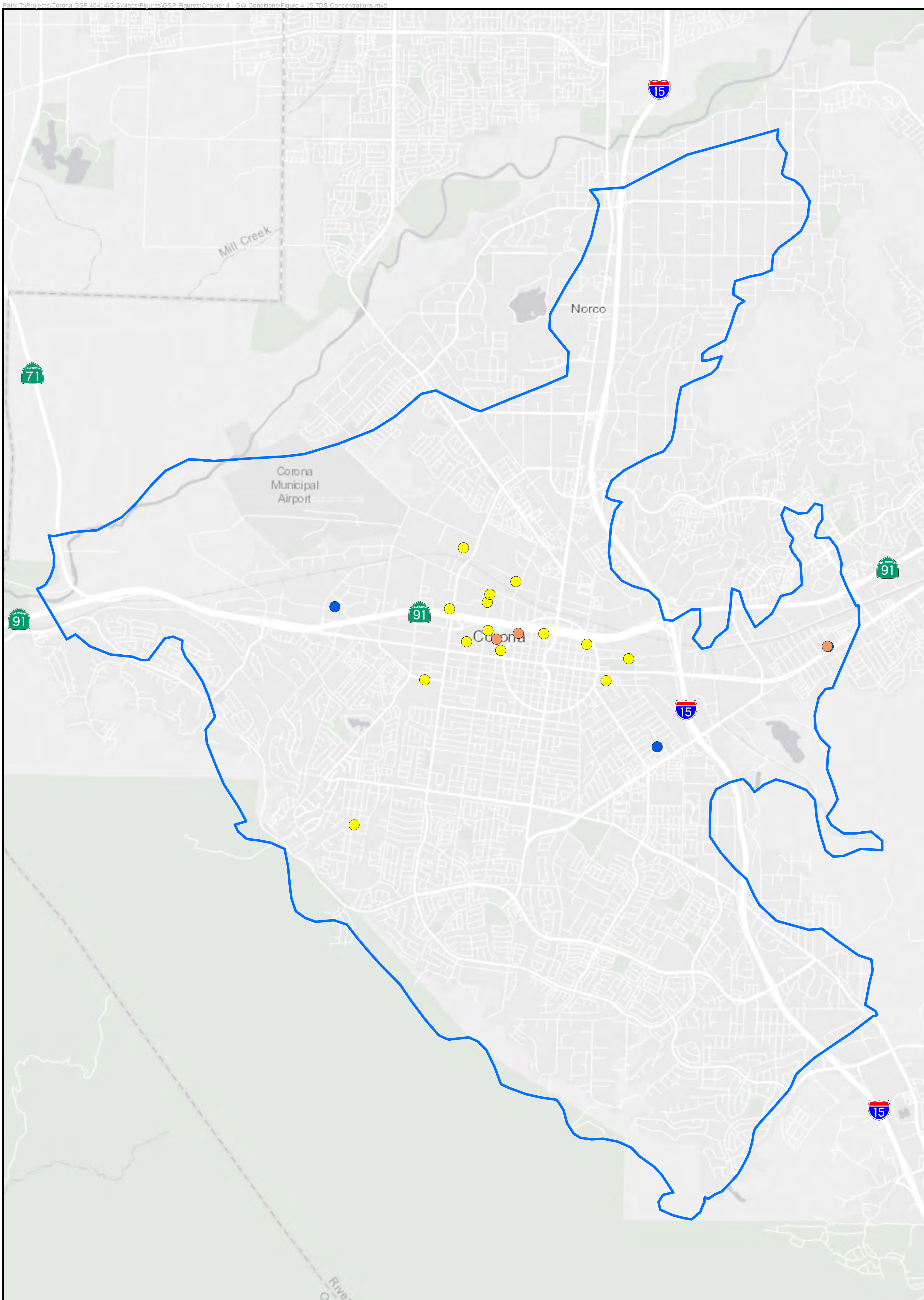
Well with Water Quality Data from the City of Corona
Well with Water Quality Data from State Water Resources Control Board Division of Drinking Water
Well with Water Quality Data from Regional Water Quality Control Board
Well with Water Quality Data from United States Geologic Survey
Temescal Basin

N
0 0.5 1
Miles

Figure 4-14
Wells with
Water Quality Data

TODD GROUNDWATER

Path: T:\Projects\Corona GSP 46414\GIS\Maps\Figures\GSP Figures\Chapter 4 - GW Conditions\Figure 4-15 TDS Concentrations.mxd



Recent Average Total Dissolved Solids Concentration in Wells

- <250 mg/L
- 250 - 500 mg/L
- 500 - 1 000 mg/L
- 1,000 - 1,500 mg/L
- >1,500 mg/L
- Temescal Basin

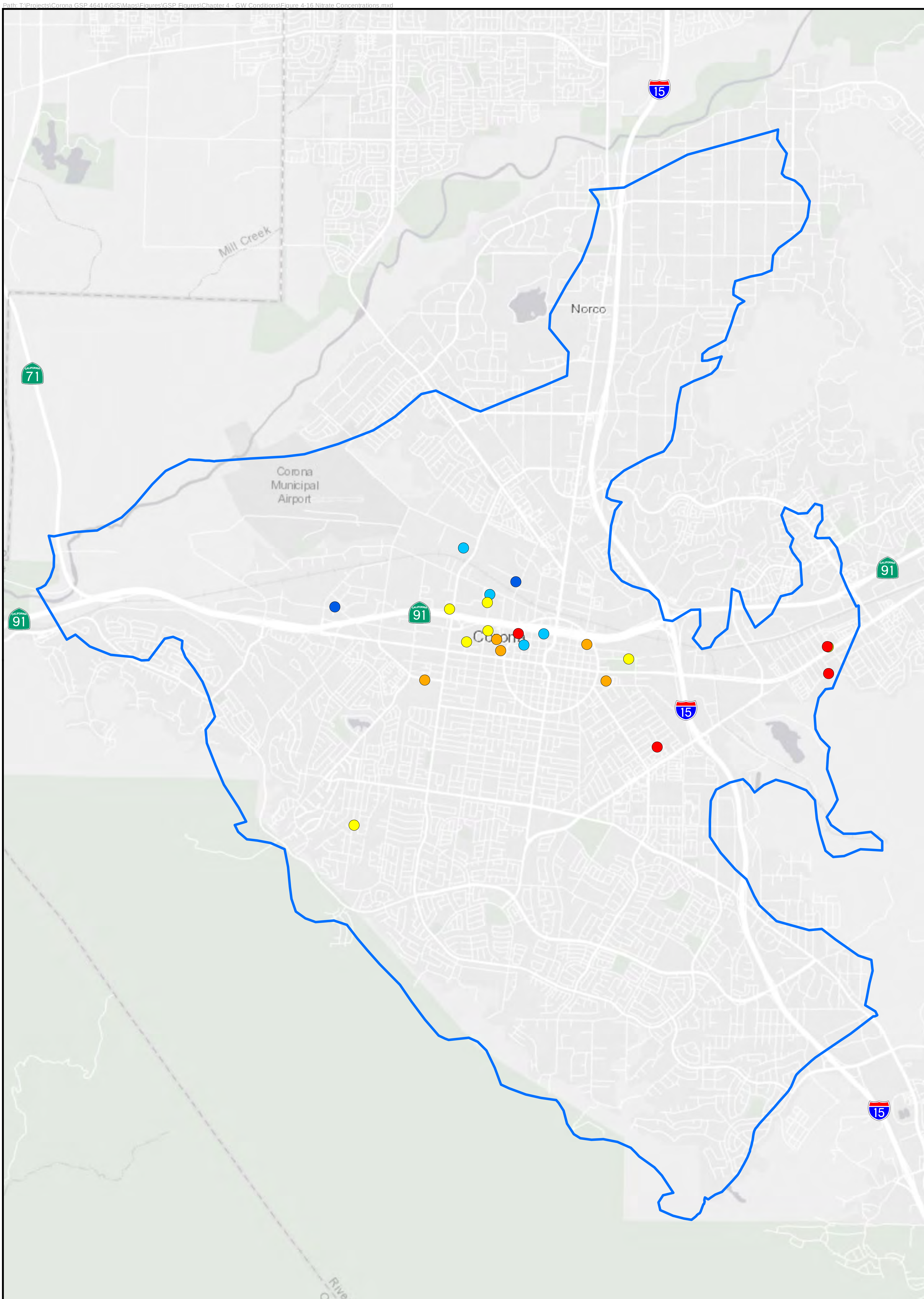
N

0 0.5 1
Miles

Figure 4-15
Total Dissolved Solids Concentrations in Wells Water Years 2010 through 2019

TODD GROUNDWATER

Path: T:\Projects\Corona GSP 46414\GIS\Maps\Figures\GSP Figures\Chapter 4 - GW Conditions\Figure 4-16 Nitrate Concentrations.mxd



Recent Average Nitrate as Nitrate (NO3) Concentration in Wells

- 0 - 2
- 3 - 10
- 11 - 45
- 46 - 75
- 76 - 150
- Temescal Basin

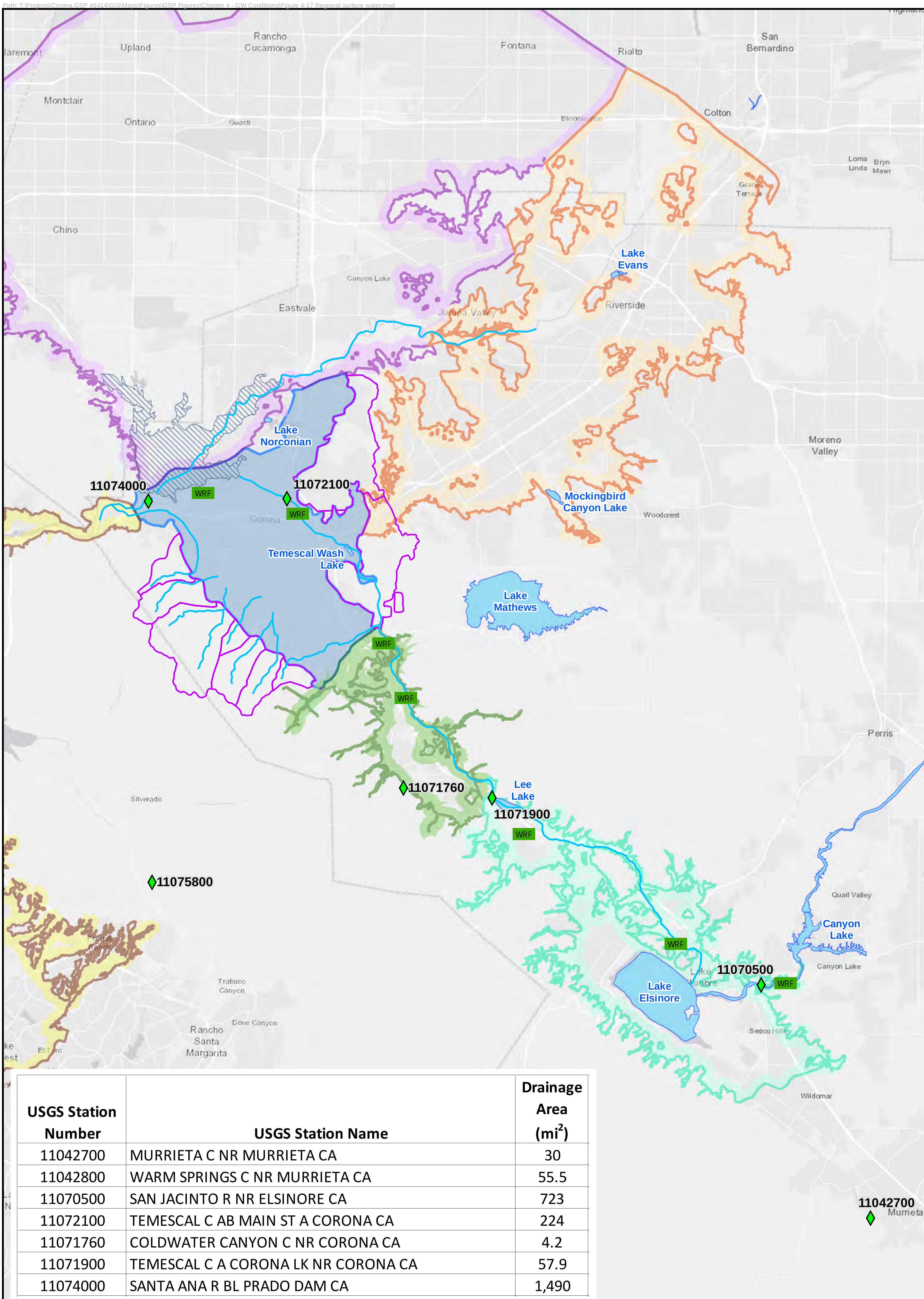
N

0 0.5 1
Miles

Figure 4-16
Nitrate Concentrations in Wells, Water Years 2010 through 2019

TODD GROUNDWATER

Path: T:\Projects\Corona GSP 46414\GIS\Maps\Figures\GSP Figures\Chapter 4 - GW Conditions\Figure 4-17 Regional surface water.mxd



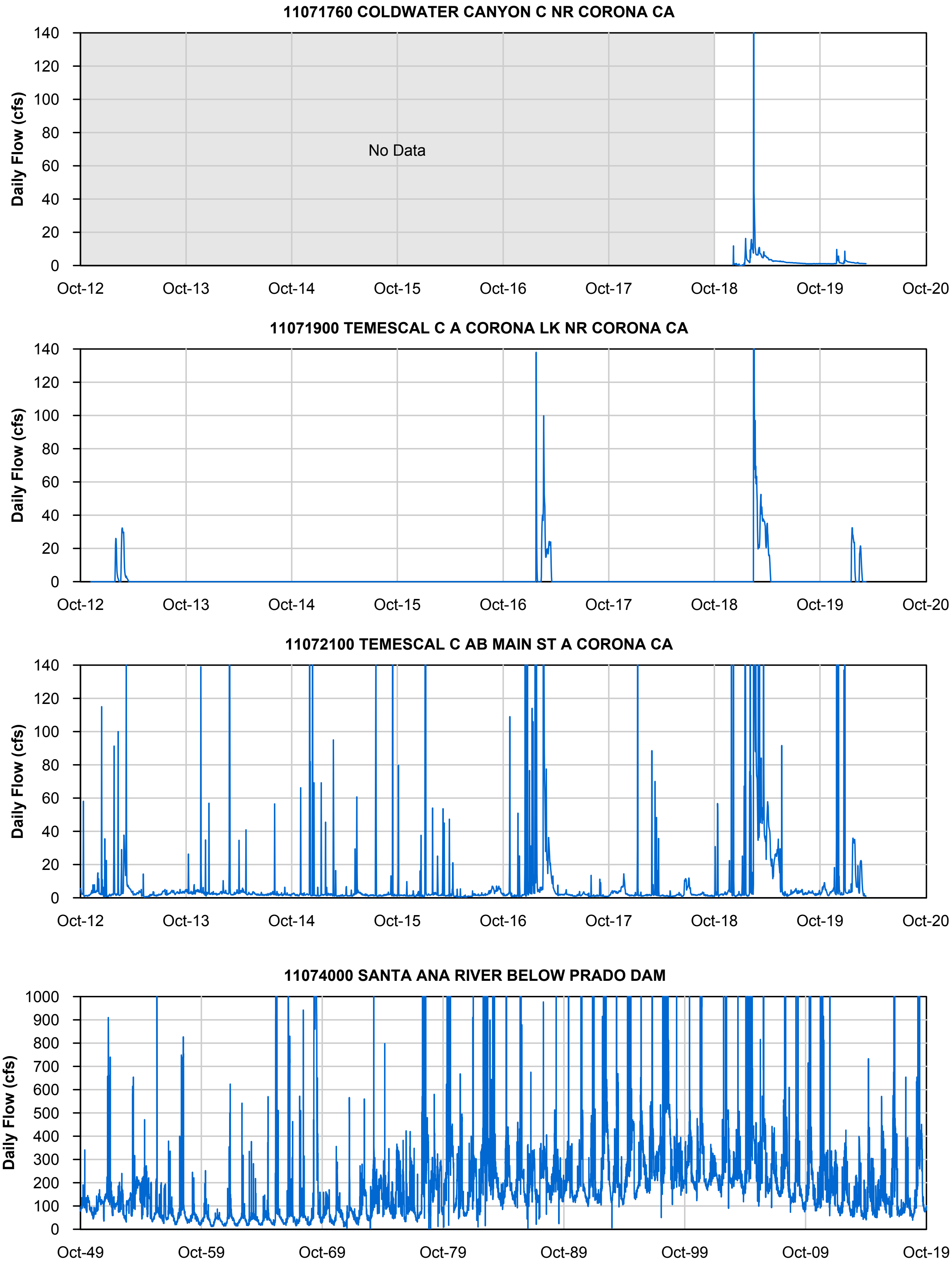
USGS Station Number	USGS Station Name	Drainage Area (mi^2)
11042700	MURRIETA C NR MURRIETA CA	30
11042800	WARM SPRINGS C NR MURRIETA CA	55.5
11070500	SAN JACINTO R NR ELSINORE CA	723
11072100	TEMESCAL C AB MAIN ST A CORONA CA	224
11071760	COLDWATER CANYON C NR CORONA CA	4.2
11071900	TEMESCAL C A CORONA LK NR CORONA CA	57.9
11074000	SANTA ANA R BL PRADO DAM CA	1,490

WRF Water Reclamation Facility
Stream Gauge
Stream
Tributary Watersheds
Prado Wetlands
Coastal Plain of Orange County Basin
Bedford-Coldwater Subbasin
Chino Subbasin
Elsinore Valley Subbasin
Riverside-Arlington Subbasin
Temescal Basin

N
0 1.5 3
Miles

Figure 4-17
Regional Surface Water Features

TODD GROUNDWATER



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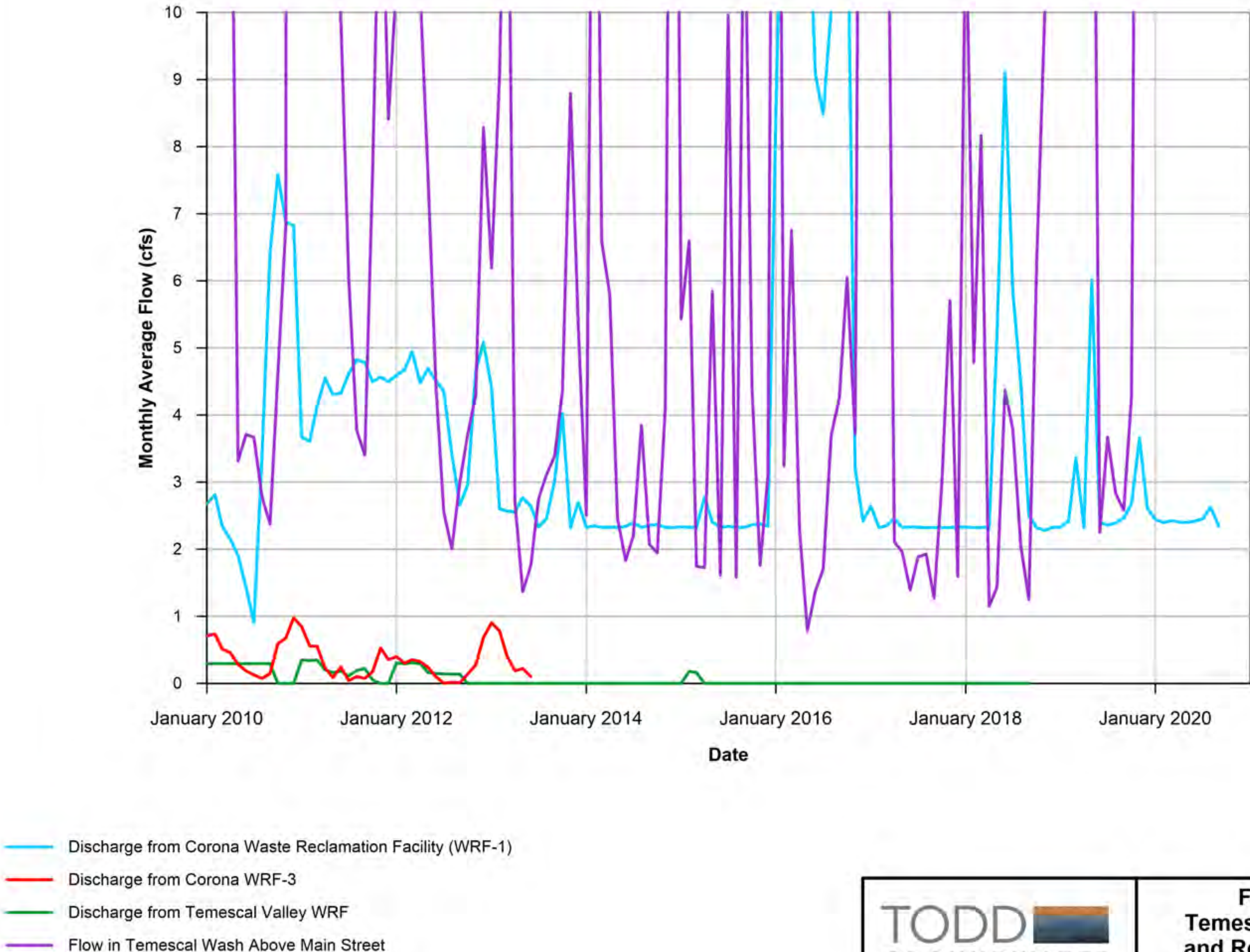
TODD GROUNDWATER

Figure 4-18
Stream Flow
at Four Gages



TODD GROUNDWATER

Figure 4-19
Temescal Wash Flow and Reclaimed Water Discharge

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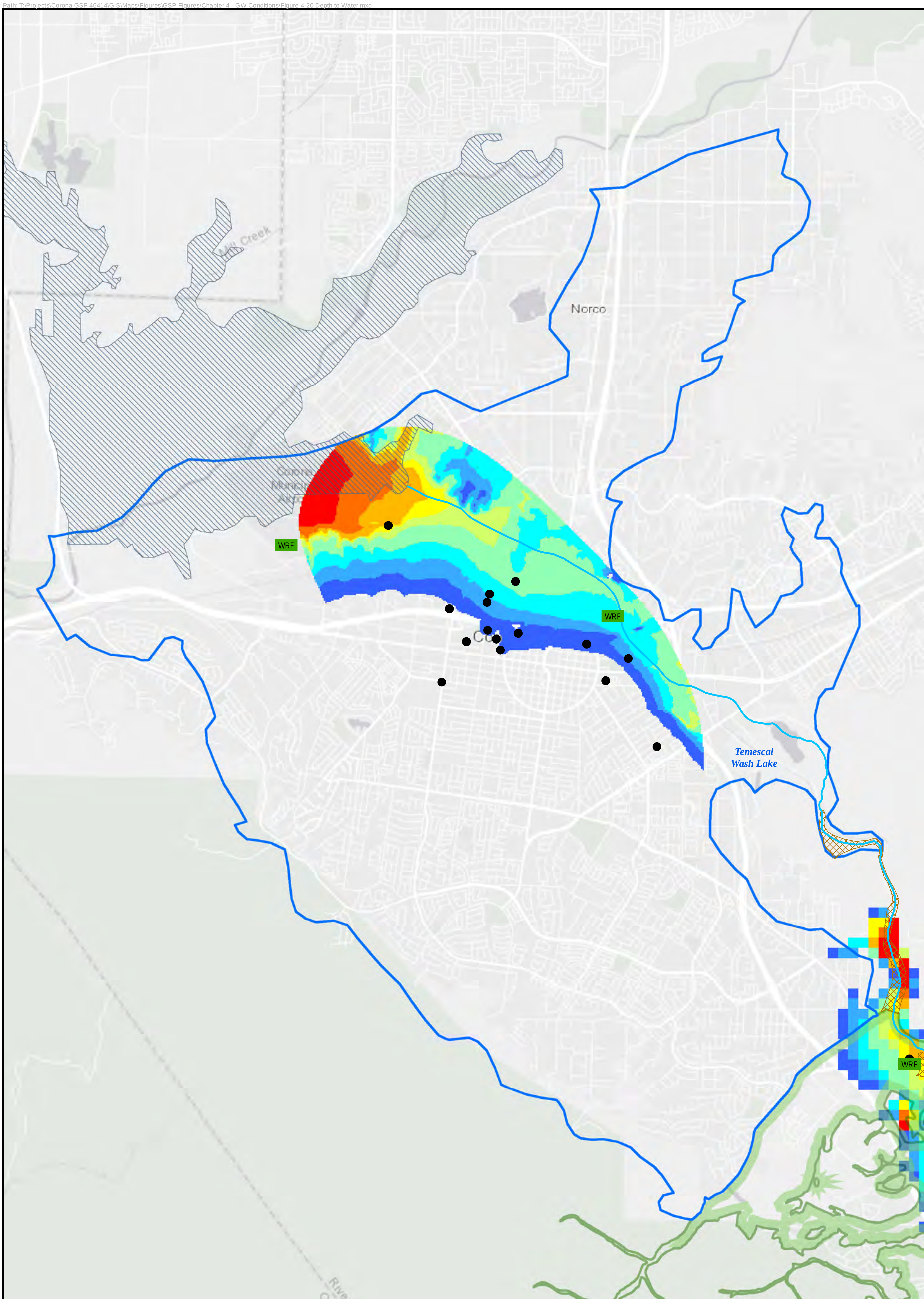


WRF Water Reclamation Facility

● Spring 2017 Water Level Wells

Depth To Water, Spring 2017

- < 0 feet
- 0 to 10 feet
- 10 to 20 feet
- 20 to 30 feet
- 30 to 40 feet
- 40 to 60 feet
- 60 to 80 feet
- 80 to 100 feet
- 100 to 120 feet
- > 120 feet

Dense Riparian Vegetation

Prado Wetlands

Bedford-Coldwater Subbasin

Temescal Basin

N

0 0.5 1
Miles

Figure 4-20
Depth to Water
Spring 2017

TODD GROUNDWATER

Path: \\todd-file\Data\Projects\Corona GSP 46414\GIS\Maps\Figures\GSP Figures\Chapter 4 - GW Conditions\Figure 4-21 Critical Habitat Areas.mxd

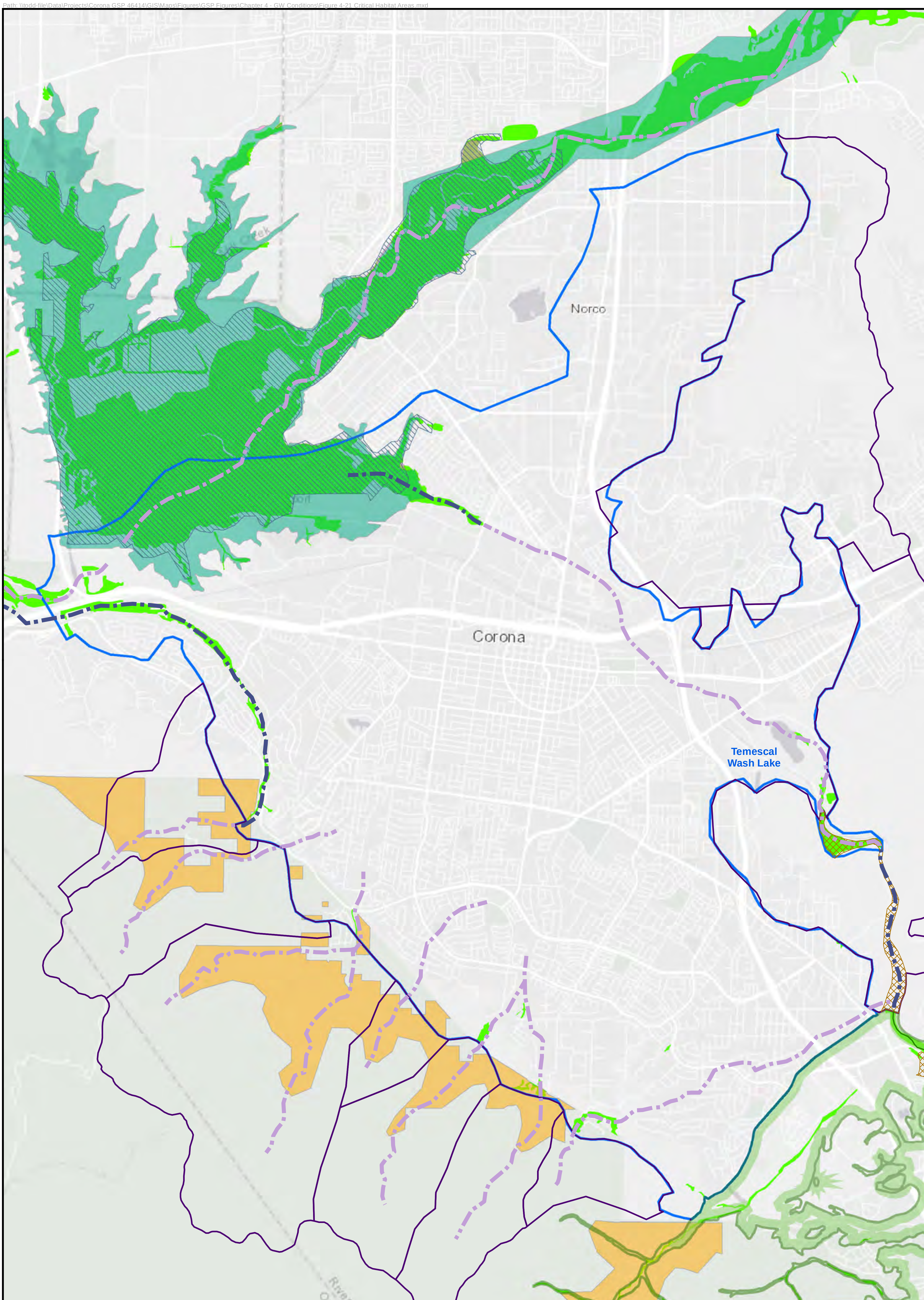


Figure 4-21
Critical Habitat Areas

TODD GROUNDWATER

Path: T:\Projects\Corona GSP 46414\GIS\Maps\Figures\GSP Figures\Chapter 4 - GW Conditions\Figure 4-22 Depth to Water Near Prado.mxd

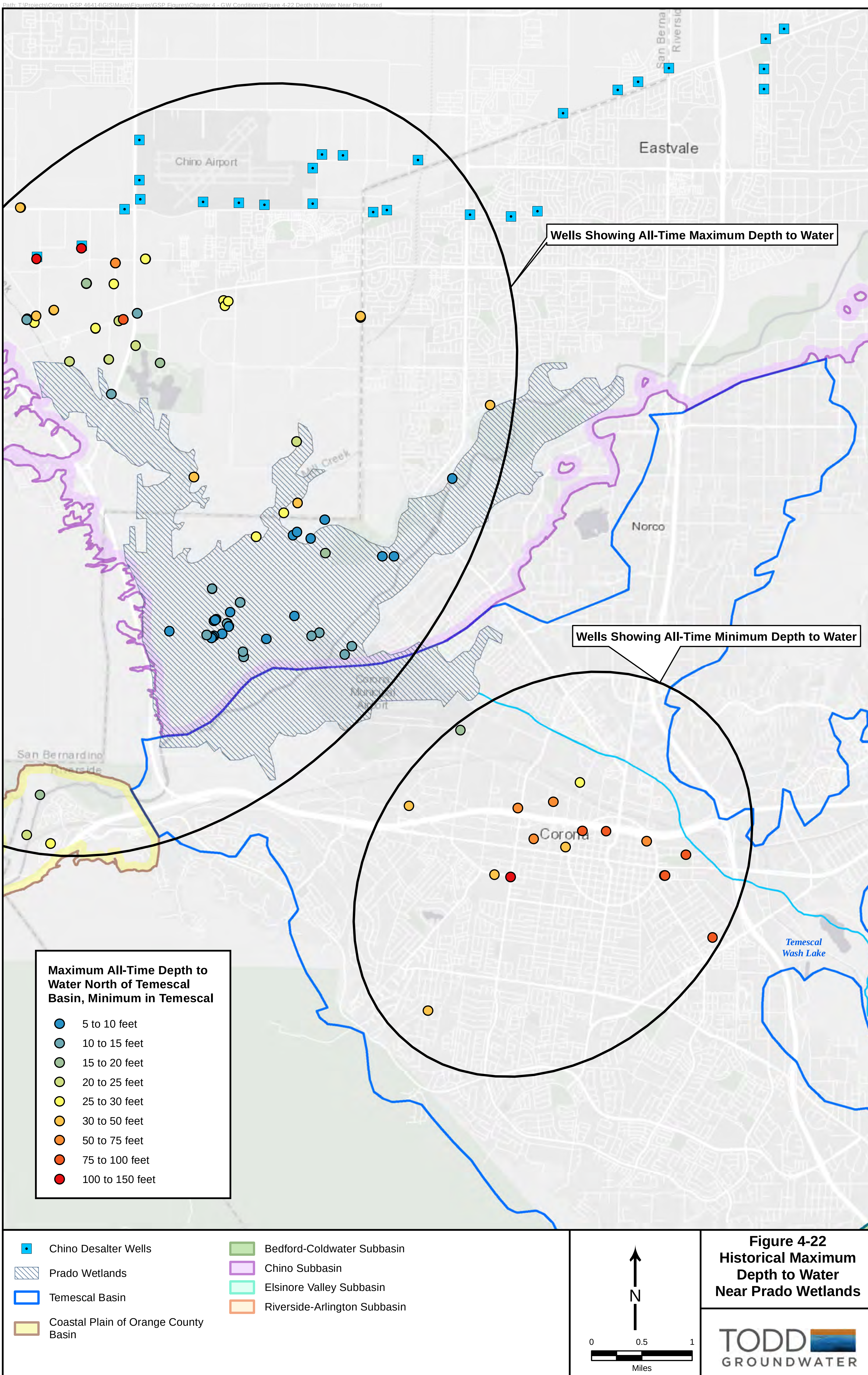
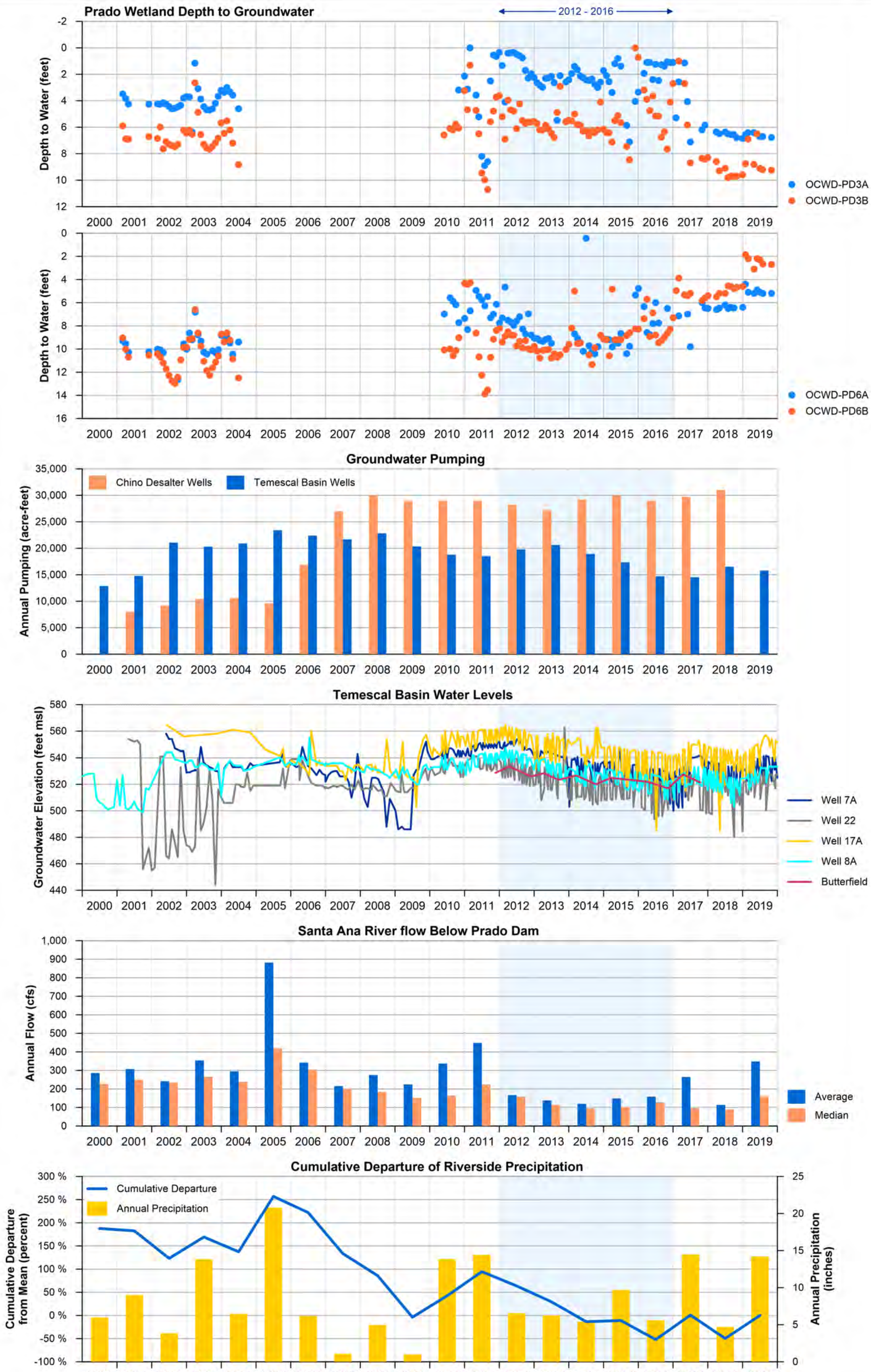


Figure 4-22
Historical Maximum Depth to Water Near Prado Wetlands



TODD GROUNDWATER

Figure 4-23
Factors Related to Prado Wetland Groundwater Levels

5. WATER BUDGET

A water balance (or water budget) is a quantitative tabulation of all inflows, outflows, and storage change of a hydrologic system. The Sustainable Groundwater Management Act (SGMA) requires that water balances be prepared for the groundwater system and surface water system of a basin. If a basin contains multiple management areas, separate balances must be developed for each of them. Management areas have not been defined for the Temescal Subbasin (Basin). Furthermore, water budgets must be developed for time periods representing historical, current, future no project (baseline), and future growth plus climate change (growth plus climate change) conditions.

This chapter presents the basis for selecting the water budget analysis periods for the Basin, describes modeling tools used to estimate some water budget items, and presents the surface water and groundwater budgets.

5.1. WATER BUDGET METHODOLOGY

Annual balances were developed for water years 1990 through 2018, the period simulated by the numerical groundwater model. The model is described in **Appendix J** and provides estimates for several items in the water balance for which direct measurements are not available: flows between groundwater and surface water bodies, flows to and from adjacent basins, evapotranspiration of riparian vegetation, and storage change. The numerical model allows a dynamic and comprehensive quantification of the water balance wherein all estimated water balance elements fit together and are calibrated to groundwater level changes over time. Accordingly, the numerical model is the best tool to quantify those water balance items. It will be updated regularly through the Groundwater Sustainability Plan (GSP) process, providing a better understanding of the surface water-groundwater system and a tool to evaluate future conditions and management actions.

5.2. DRY AND WET PERIODS

Dry and wet periods in historical hydrology can be identified on the basis of individual years or sequences of dry and wet years. GSP Regulations require that each year during the water budget analysis period be assigned a water year type*,* which is a classification based on the amount of annual precipitation. **Figure 5-1** shows annual precipitation at Elsinore (National Oceanic and Atmospheric Administration (NOAA) Station GHCND:USC00042805) for water years 1899 through 2020. Water year types are also indicated and are assigned to five categories corresponding to quintiles of annual precipitation. The categories used here (dry, below normal, normal, above normal, and wet) accurately describe the quintiles but differ from the categories commonly used in the Central Valley (critical, dry, below normal, above normal, and wet). Those categories do not accurately describe quintiles and are based on the Sacramento River Index, which has little relevance to conditions in the Basin. The quintile divisions for precipitation during 1899 to 2020 at the Lake Elsinore station are shown in **Table 5-1**.

Table 5-1. Water Year Type Classification

Water Year Type		Range as Percent of Mean	Precipitation Range (inches)
Wet	W	>139	> 16.5
Above Normal	AN	101 to 139	12.0 to 16.5
Normal	N	75 to 101	8.9 to 12.0
Below Normal	BN	56 to 75	6.6 to 8.9
Dry	D	<56	< 6.6

Average precipitation for 1899 to 2020 was 11.89inches per year

Individual wet and dry years are not particularly useful for groundwater management in basins where groundwater storage greatly exceeds annual pumping and recharge, which is the case in the Basin. In those basins, multi-year droughts and sequences of wet years are more relevant, because they relate to the amount of operable groundwater storage needed to support sustainable groundwater management. Multi-year wet and dry periods can be identified from a plot of cumulative departure of annual precipitation, which is also shown on **Figure 5-1**. Wet periods appear as upward-trending segments of the cumulative departure curve, and droughts appear as declining segments. By far the largest climatic deviations in this record were the sustained wet conditions from 1937 to 1944 and dry conditions from 1946 to 1965. These events pre-dated the most recent 30 years, which is the period the California Department of Water Resources (DWR) states should be used for determining year types (DWR 2016c). They also pre-date the period simulated by the groundwater model. However, large wet and dry events like those could recur in the future, and it is prudent to consider climate uncertainty in planning for groundwater sustainability.

5.3. WATER BALANCE ANALYSIS PERIODS

GSP regulations require evaluation of the water balances over historical, current, and future periods. The historical period must include at least 10 years, and the future period must include exactly 50 years. The duration of the current period is not specified, but to be consistent with SGMA concepts it needs to include several years around 2015, which was the implementation date of SGMA. Historical and current analysis periods for the Basin were selected from within the 1990 through 2018 modeling period. Ideally, each period is characterized by average precipitation and relatively constant land and water use. In the Basin, urbanization increase has been gradual throughout the 1990 to 2018 period. The historical period is represented by water years 1993 through 2007, and the current period by water years 2010 to 2013. Those periods had 101 percent and 102 percent of the 1899 to 2020 average annual rainfall, respectively.

The future period is intended to represent conditions expected to occur over the next 50 years. The model simulation period is only 29 years (1990 to 2018). To obtain a 50-year period, simulations of future conditions used the 1993 through 2017 sequence of rainfall and natural stream flow repeated twice. Average annual precipitation during 1993 to 2017 was 94 percent of the long-term average. For the baseline scenario, no adjustments were made to the hydrologic sequence. Adjustments made to simulate future climate change are described in Section 5.5.3.

5.4. MANAGEMENT AREAS

As defined in the GSP regulations, a Management Area (MA) is an area within a basin for which the GSP may identify different minimum thresholds, measurable objectives, monitoring, or projects and management actions based on differences in water use sector, water source type, geology, aquifer characteristics, or other factors. The Channel Aquifer area is more permeable than the alluvial fan aquifer areas, and it is where almost all groundwater pumping now occurs. However, there is no reason that monitoring, sustainability criteria, and management actions need to be different for the Channel Aquifer and alluvial fan aquifer areas. Accordingly, the Channel Aquifer area is not designated as a management area, and the Temescal Basin is managed as a whole.

5.5. METHODS OF ANALYSIS

Complete, itemized surface water, and groundwater balances were estimated by combining raw data (rainfall, stream flow, municipal pumping, and wastewater percolation from septic tanks and wastewater treatment plant discharge) with values simulated using models[2]. Collectively, the models simulate the entire hydrologic system, but each model or model module focuses on part of the system, as described below. In general, the models were used to estimate flows in the surface water and groundwater balances that are difficult to measure directly or that relate to time-dependent groundwater levels. These include surface and subsurface inflows from tributary areas, percolation from stream reaches within the Basin, groundwater discharge to streams, potential subsurface flow to and from neighboring basins, the locations and discharges of pumping wells, consumptive use of groundwater by riparian vegetation, and changes in groundwater storage. Descriptions of the inflows and outflows to the surface water and groundwater models are included below in Sections 5.6 and 5.7.

5.5.1. Rainfall-Runoff-Recharge Model

This Fortran-based model developed over a number of years by Todd Groundwater staff simulates hydrologic processes that occur over the entire land surface, including

[2] Water balance values are shown to nearest acre-foot to retain small items, but entries are probably accurate to only two significant digits.

precipitation, interception[3], infiltration, runoff, evapotranspiration, irrigation, effects of impervious surfaces, pipe leaks in urban areas, deep percolation below the root zone, and shallow groundwater flow to streams and deep recharge. The model simulates these processes on a daily time step for 286 recharge zones delineated to reflect differences in physical characteristics as well as basin and jurisdictional boundaries. Simulation of watershed areas outside the Basin are included to provide estimates of stream flow and subsurface flow entering the Basin. Daily simulation results were subtotaled to monthly values for input to the groundwater model. Additional details regarding the rainfall-runoff-recharge model can be found in **Appendix J** and the model code is available on request.

5.5.2. Groundwater Model

A numerical groundwater flow model of the Basin was completed in 2008 for the Groundwater Management Plan (Todd and AKM 2008). For this GSP, the model was revised, expanded to include the entire Basin, updated with new geological information, and updated through water year 2018.

The revised and updated model uses the MODFLOW 2005 code developed by the U.S. Geological Survey that is a public domain open-source software as required by GSP regulation §352.4(f)(3). The model produces linked simulation of surface water and groundwater, as described below. Additional documentation of the model update and calibration is provided in **Appendix J**.

5.5.2.1. Surface Water Module

Stream flow in MODFLOW is simulated using the Streamflow Routing Package (SFR) where a network of stream segments represents the small streams entering the Basin from Temescal Wash and tributary watersheds.

Surface water inflows to Temescal Wash were obtained from a similar groundwater flow model of the Bedford-Coldwater Subbasin. Small stream inflows were estimated using the rainfall-runoff-recharge model. Each stream segment is divided into reaches, one per model grid cell traversed by the segment. Flow is routed down each segment from reach to reach. Along each reach mass balance is conserved in the stream, including inflow from the upstream reach and tributaries, inflow from local runoff, head-dependent flow across the stream bed to or from groundwater, evapotranspiration losses, and outflow to the next downstream reach. Flow across the stream bed is a function of the wetted channel length and width, the bed permeability and the difference in elevation between the stream surface and groundwater at the reach cell. Wetted width and depth of the stream are functions of stream flow.

5.5.2.2. Groundwater Module

The MODFLOW groundwater model is constructed to cover the entire Basin. The model grid size is oriented north-south and has a uniform 100 feet (ft) horizontal grid spacing to

[3] Interception refers to precipitation that does not reach the soil, but instead falls on (and is intercepted by) plant leaves, branches, and plant litter, and is subject to evaporation loss.

provide sufficient resolution to resolve hydraulic gradients, well drawdown cones, and groundwater-surface water interactions in the Basin.

The model covers the entire Basin as delineated by DWR and also the southern part of the Chino Basin. Including part of the Chino Basin improves the ability of the model to simulate groundwater conditions beneath Prado Basin.

The numerical model has been constructed to reflect the hydrogeological conceptual model developed for the GSP, Chapter 3. The vertical extent of the Basin is based on the mapped depth to consolidated rock. The elevation of surface features and streambed elevations have been derived from geographic information system (GIS) files developed from the local topography and stream information.

Citrus orchards irrigated with groundwater were common in the Basin in the early 1990s, but except for one small grove those have all been replaced by urban development. Agricultural irrigation pumping of the orchards was estimated by the rainfall-runoff-recharge model, with pumping assigned to a hypothetical irrigation well at the center of each irrigated recharge zone. This pumping was phased out over time as urban development occurred. Urban irrigation is supplied by the municipal water system, which uses imported water and local wells. Municipal well extractions are known and are entered directly into the model. All major pumpers in the Basin report their annual production to Western Municipal Water District (WMWD), which was the source of data for several non-municipal pumping wells. Pumping at private domestic wells is not reported and there is currently no private domestic groundwater use in the Basin so none is included in the model.

5.5.3. Simulation of Future Conditions

GSP regulations §354.18(c)(3) require simulation of three future scenarios to determine their effects on water balances, yield and sustainability indicators. The growth and climate change scenarios were combined, resulting in the following two scenarios:

> **Baseline.** This represents a continuation of existing land and water use patterns, imported water availability, and climate.
>
> **Growth Plus Climate Change.** This scenario implements anticipated changes in land use and associated water use, such as urban expansion, and anticipated effects of future climate change on local hydrology (rainfall recharge and stream percolation) and on the availability of imported water supplies.

Both of the future simulations assume that the level of development and related water demand are constant throughout the simulation. That is, development in the growth plus climate change simulation is not phased in over time but rather corresponds to 2068 development throughout the simulation. This is the best way to demonstrate whether 2068 land use is sustainable because it allows for assessment of the effects of variations in climatic conditions (wet and dry cycles) on groundwater conditions, avoids subjective decisions about the concurrent timing of droughts and development, and provides time for the full effect of future conditions on groundwater to become apparent.

5.5.3.1. Baseline Scenario

The baseline simulation is a 50-year period, as required by SGMA regulations, with water budget components developed using the criteria and assumptions described below. Initial water levels are simulated water levels for September 2018 from the historical calibration simulation. That year represents relatively recent, non-drought conditions. These simulated water levels are internally consistent throughout the model flow domain and reasonably matched measured water levels at wells with available data (see **Appendix J** for discussion of model calibration).

Surface water and other inflows came from multiple sources. Monthly inflows in Temescal Wash were obtained from the baseline and growth plus climate change simulations produced by the Bedford-Coldwater Subbasin groundwater model (Todd, H&H, and Stantec 2021), which was used to develop the GSP for that subbasin. Small stream and bedrock inflows simulated for 1993 to 2017 of the calibration model period were repeated twice to obtain 50 years of data.

In the baseline scenario, land use remains the same as the current conditions. In the model, land use is represented by 2014 land use mapped by remote sensing methods and obtained from DWR (2017), adjusted for subsequent urbanization identified in Google Earth imagery (Google Earth 2021).

Municipal, commercial, and industrial (M&I) pumping was set equal to the estimated sustainable yield. M&I pumping was relatively high during 2002 to 2014 and exceeded the sustainable yield, as evidenced by the steady declines in groundwater storage during that period. Using the groundwater model, City of Corona (Corona) pumping (which represents 97 percent of the M&I total) was decreased until the future baseline scenario no longer produced long-term storage declines. The adjusted M&I pumping equaled 98 percent of the 2010 to 2018 average, or 15,615 acre-feet per year (AFY). Total municipal use was assumed to equal the 2010 to 2018 average. This reflects an assumption that the amounts of imported water are adjusted to make up the difference between total water demand and sustainable groundwater yield. In the groundwater model, total municipal water use was used only to estimate pipe leaks.

The Baseline scenario also assumes that wastewater percolation and recycling continue as they have in recent years. Discharges from Water Reclamation Facility 1 (WRF-1) and WRF-2 to percolation ponds, streams and recycled uses were estimated as the average amounts during 2010 to 2018.

5.5.3.2. Growth Plus Climate Change Scenario

The growth plus climate change scenario incorporated anticipated effects of climate change, urban development, and associated changes in water and wastewater management. In this scenario, rainfall and reference evapotranspiration (ET_0) were adjusted to 2070 conditions using monthly multipliers developed by DWR based on climate modeling studies. The multipliers were applied to historical monthly data for the 1993 to 2017 hydrologic period used in the model. DWR prepared a unique set of multipliers for each four square kilometer (km^2) cell of a grid covering the entire state. Nine climate grid cells overlie the Basin and its tributary watershed areas. For each recharge analysis polygon in the rainfall-runoff-recharge model, multipliers from the nearest climate grid cell were used. The climate in 2070 is expected to be drier and warmer than it presently is.

Figure 5-2 compares average monthly precipitation and ET_0 before and after applying the climate change multipliers. Simulations of irrigated turf in the rainfall-runoff-recharge model indicated that the combined effect of the warmer and drier climate will increase annual irrigation demand by about 10 percent.

In the growth plus climate change scenario, bedrock inflow and surface inflow from tributary streams along the perimeter of the Basin were re-simulated using the rainfall-runoff-recharge model to reflect the effects of urban development in some of the tributary watersheds and of climate change. Urbanization also increased surface runoff within the Basin, which was routed to small streams and Temescal Wash.

For inflows from Temescal Wash, Cucamonga Creek and Chino Creek (which were not simulated using the rainfall-runoff-recharge model) and future baseline flows were adjusted to 2070 conditions using DWR streamflow multipliers. The DWR data set ends in 2011. Multipliers for 1987 to 1992 were used for 2012 to 2017 based on similarity of cumulative departure of precipitation for the two periods. Then 1992 to 2017 adjusted stream flows were used twice in succession to simulate 2019 to 2068. Surface discharges from the WRCRWA reclaimed water facility were from future projections developed during planning studies for that facility.

Land use in 2018 is shown in **Figure 5-3**. Land use maps for 1990, 2018 and 2068 were developed on the basis of Riverside County digital crop maps (1993 and 2000), Google Earth historical imagery (Google Earth 2021), a 2014 statewide crop map developed by DWR (DWR 2017), Corona General Plan 2020 to 2040 (Corona 2021), and Corona's 2020 Urban Water Management Plan (Michael Baker 2021). Corona was one of the fastest growing cities in the United States during the past several decades. From 1990 to 2018, the dominant land use change was conversion of citrus groves and natural grassland to residential use. **Table 5-2** lists the acreages of several categories of land use in the Basin and tributary watersheds in 1990, 2018 and 2068.

The rate of growth is expected to slow considerably during the next few decades. Within the current Corona city limits, population is expected to increase by 11 percent between 2020 and 2040, and commercial/industrial building space by 18 percent. The Urban Water Management Plan (UWMP) directs more growth to its sphere of influence areas outside the Corona city limits, with a projected 55 percent increase in population and 490 percent increase in commercial/industrial building space. Redevelopment within Corona will have minor effects on groundwater recharge, but development in the sphere of influence areas will have a major effect.

Land use is held constant at the 2068 level of development throughout the 50-year simulation period. This approach avoids errors that can arise from the assumed timing of future droughts and provides a long hydrologic analysis period for assessing the sustainability of 2068 land and water use conditions.

The 2020 draft UWMP (Michael Baker 2021) anticipates a steady decline in per-capita water use from 180 gallons per-capita per day (gpcd) in 2020 to 155 gpcd in 2045. This is plausible but possibly optimistic given that per-capita use has not been declining in recent years and rebounded slightly from drought-related decreases achieved during 2015 to 2016. It was conservatively assumed here that per-capita water use would not continue to decline during 2045 to 2068.

Combining the estimates of population and per-capita water use for 2068, total municipal water use in 2068 would be 34,490 AFY, or essentially the same as the 2010 to 2018 average (about 1 percent higher).

Pipe leaks were assumed to remain at the existing percentage of total water use in Corona and Norco. Municipal groundwater pumping was assumed to remain at the sustainable yield level, which was tentatively estimated to equal average production during 2010 to 2018.

Percolation of reclaimed water at WRF-2 was assumed to remain at the average for 2010 to 2018. This assumes that future decreases in per-capita water use will be achieved primarily through reductions in landscape irrigation. It also implies that future increases in wastewater generation due to population growth will be partially offset by increased indoor water conservation, and any remaining increase will become recycled water for irrigation.

Flow across the northern model boundary that cuts through the Chino Basin was set to zero, consistent with the mandated objective of *hydraulic control*. Hydraulic control is the elimination of groundwater discharge from the Chino Basin to the Prado Wetlands and Santa Ana River, achieved by pumping from a line of desalter wells located roughly parallel to and 2 to 4 miles north of the Santa Ana River. The objective of hydraulic control was included in the 2004 update of the Santa Ana River Basin Plan (SWRCB 2020a). Hydraulic control is considered necessary to maximize the safe yield and to prevent degraded groundwater from discharging from the Chino Basin to the Santa Ana River and impacting downstream beneficial uses (WEI 2005 and 2019).

Subsurface inflow from the Arlington Basin through Arlington Gap was assumed to be zero, consistent with long-term declining trends and modeling of future conditions in the Arlington Basin (Shaw 2020).

Table 5-2. Temescal Basini Land Use in 1990, 2018, and 2068 (acres)

Land Use	Channel Aquifer			Alluvial Fan Aquifder			Prado/Chino Area			Tributary Watersheds		
	1990	2018	2068	1990	2018	2068	1990	2018	2068	1990	2018	2068
Citrus	0	0	0	2,997	0	0	0	0	0	29	0	0
Truck crops	0	0	0	0	0	0	93	93	93	0	0	0
Pasture	0	0	0	0	0	0	379	379	379	0	0	0
Non-irrigated grain	0	0	0	0	0	0	2,499	1,176	1,176	0	0	0
Grassland	47	86	86	193	190	190	406	406	406	72	72	72
Shrubs/Trees	782	782	782	0	0	0	3,719	3,719	3,719	0	0	0
Dense riparian	0	0	0	0	0	0	0	0	0	0	0	0
Sparse riparian	0	0	0	499	1,036	1,734	0	0	0	234	1,097	2,414
Open water	799	799	799	6,425	10,956	10,867	1,389	2,833	2,833	704	2,704	2,704
Low-density residential	37	103	103	100	231	231	25	25	25	121	247	247
Residential	1,138	2,431	1,978	434	2,987	2,718	0	174	174	204	538	538
Turf	98	98	573	5	52	717	0	0	0	0	0	1,105
Commercial	1	1	1	219	121	0	0	0	0	142	646	368
Industrial	11	11	11	884	332	166	0	0	0	0	91	0
Quarry	0	0	0	0	0	0	0	0	0	0	0	0
Vacant	0	0	0	0	0	0	0	0	0	0	0	0

5.6. SURFACE WATER BALANCE

This section describes and quantifies the water balance of creeks and rivers that cross the Basin. All significant inflows to and outflows from these surface water bodies are included in the water balance. The surface water balance shares two flows in common with the groundwater balance: 1) percolation from surface water to groundwater and 2) seepage of groundwater into surface water. Each of these is an outflow from one system and an inflow to the other. Key features of the surface water balances for each management area and analysis period are described below, followed by additional information about the methods used to quantify items in the water balances.

Historical annual surface water balances for the Temescal Basin during 1990 to 2018 are shown in **Figure 5-4** (upper graph). Average annual surface water budgets for the model, historical, current, and future budget analysis periods are listed in **Table 5-3** and detailed surface water budget tables are included in **Appendix K**. The largest inflows to the Temescal Basin are from Temescal Wash and tributary watersheds along the western and eastern edges of the Basin, and those occur predominantly in wet years. The only other surface flow of significance is the small but relatively steady discharge of reclaimed water from WRF-1 to Butterfield Drain, which enters Temescal Wash just upstream of the Prado Wetlands. Outflow is almost entirely surface outflow from Temescal Wash to the Prado Wetlands, with some losses to percolation along unlined reaches of stream channels.

Surface flows in the Prado Wetlands and southern Chino Basin part of the groundwater model flow domain are generally steadier than surface flows in the Temescal Basin part of the model (**Figure 5-4**, middle graph). This is partly because the data shown in the graph are monthly flows used in the groundwater model, which may exclude some ephemeral high flow events. But in addition, flow in the Santa Ana River consists to a significant degree of discharges from wastewater treatment plants, which are relatively steady. Outflows from Prado Dam are also relatively steady because streamflow fluctuations upstream are absorbed to some extent by storage fluctuations in the wetlands.

A substantial amount of water has been imported into the Basin since before 1990. It is delivered directly to users and does not flow into streams or lakes. Use of imported water by Corona is shown in **Figure 5-4** (bottom graph). Imported water consists of State Water Project (SWP) water purchased from the Metropolitan Water District of Southern California (Met) and delivered to Corona.

Table 5-3 Average Annual Surface Water Budgets

Inflow or Outflow	Historical 1993 to 2007	Current 2010 to 2013	Baseline[1] 2019 to 2068	Growth Plus Climate Change[1] 2019 to 2068
Inflows				
Temescal Wash	18,560	10,761	14,920	12,857
Tributary inflow	25,617	23,016	21,399	4,643
Wastewater discharges	3,644	2,761	2,895	2,895
Groundwater flow into streams	5,980	4,917	990	1,380
Total Inflows	53,801	41,455	40,206	21,776
Outflows				
Stream percolation	-10,046	-10,544	-1,661	-1,714
Surface outflows	-44,001	-38,894	-38,544	-20,062
Total Outflows	-54,048	-49,437	-40,206	-21,776

[1] The 50-year future baseline simulation uses historical hydrology for 1993 to 2017 two times in succession.

5.6.1. Inflows to Surface Water

5.6.1.1. Precipitation and Evaporation

Precipitation and evapotranspiration on the land surface are accounted for in the rainfall-runoff-recharge model. Those processes are not included in the surface water balances, which address only water in stream channels, lakes, and imported water. Precipitation and evaporation on the surface of creeks and rivers are invariably miniscule percentages of total stream flow and are not included in the water budget.

5.6.1.2. Tributary Inflows

Tributary inflows to the Basin are from Temescal Wash and tributary watersheds along the east and west sides of the Basin. Temescal Wash inflows were obtained from the Bedford-Coldwater Subbasin groundwater model. Surface inflows from seven Santa Ana Mountain watersheds and four watersheds along the east side of the Basin were calculated on a daily basis by the rainfall-runoff-recharge model. Daily flows could not simply be averaged over each month to produce inflows for the groundwater model because the model would then overestimate the amount of stream recharge. This error stems from the ephemeral occurrence of stream flow and the nonlinear relationship between stream flow and percolation. The error can best be illustrated by a hypothetical example in which daily stream flows during a month consist of one day of flow at 60 cubic feet per second (cfs) and zero flow the rest of the days. If the percolation capacity of the stream reach over the groundwater basin is 10 cfs, total percolation for the month would be 10 cfs for one day, or 19.83 acre-feet (AF). The 50 cfs that exceeded the percolation capacity would flow out to the Santa Ana River. If the daily flows were simply averaged over a 30-day month, the monthly flow would be 2 cfs. The groundwater model would calculate that all of that water would percolate because 2 cfs is less than the percolation capacity of the channel. This would result in 2 cfs of percolation over the course of 30 days, or 119 AF, during the month.

To minimize this error, daily flows entering the Basin from each tributary were clipped at the estimated percolation capacity of the unlined reach of channel overlying the Basin. That is, daily flows in excess of the estimated percolation capacity were assumed to flow out to the Santa Ana River. Averaging the clipped daily flows produced monthly flows realistically capable of percolating. **Figure 5-5** compares average annual stream flow with and without clipping. The largest decreases were where large watersheds discharged into channels that are cement-lined along most of their length overlying the Basin, leaving only a short reach where percolation can occur.

5.6.1.3. Valley Floor Runoff

The rainfall-runoff-recharge model simulates runoff from valley floor areas, which include impervious surfaces in urban areas. Runoff from valley floor areas was added to flows in tributary streams or Temescal Wash at several locations.

5.6.1.4. Wastewater Discharges

The only discharge of reclaimed water to surface waterways in the Temescal Basin is the discharge from Corona WRF-1 plant to Butterfield Drain, which enters Temescal Wash at the southern edge of the Prado Wetlands. In 2012, the State Water Resources Control Board allowed Corona to decrease the discharge from 4.57 cfs to 2.25 cfs (1,625 AFY).

5.6.1.5. Groundwater Discharge to Streams

Groundwater can discharge into streams when the water table next to the stream is higher than the stream bed or the water level in the stream. The depth to groundwater is tens of feet in the southern part of the Temescal Basin, but the depth decreases to the north (see **Figure 4-22**). At the Butterfield well near the southern edge of the Prado Wetlands, depth to water was 18 to 35 feet during 2012 to 2018 (the period of record for that well). The only natural outflow path from the Basin is discharge to the Santa Ana River near Prado Dam. Somewhere between the Butterfield Well and Prado Dam the depth to water presumably decreases to zero. No shallow wells are available in that region to confirm and monitor depth to water.

5.6.2. Outflows of Surface Water

5.6.2.1. Net Evaporation

Evaporation from streams is almost always a negligible fraction of total flow and is not explicitly itemized in the water budgets or simulated in the model.

5.6.2.2. Surface Water Percolation to Groundwater

The lower reaches of almost all streams entering the Temescal Basin are concrete-lined. The only opportunity for percolation is along the unlined reaches near the Basin margin (see **Figure 4-17**). The percolation capacities of the unlined reaches of tributary streams were estimated to be approximately 5 cfs per mile (cfs/mi). This would be the percolation rate along a creek channel with a wetted width of 16 feet and a bed permeability of 5 feet per day. Temescal Wash was estimated to have a percolation capacity of 20 cfs/mi along the 2-mile unlined reach where it enters the Basin, based on greater channel width and permeability. These capacities were applied to simulated daily flows to obtain a time series of flows capable of percolating. Those flows were averaged to monthly values and used in the groundwater model, which included adjustments for shallow depth to groundwater (relevant only near Prado). Based on these assumptions and calculations, percolation from streams contributes on the order of 10,000 AFY of recharge to the Basin, which is about 18 to 20 percent of total recharge on an average annual basis.

5.6.2.3. Surface Outflow from the Basin

Surface outflow from the Temescal Basin equals stream inflows minus percolation losses plus groundwater discharge to streams. Over periods of months or years, storage change of surface water is negligible in the absence of lakes or reservoirs. Surface outflow is by far the largest outflow, especially in wet years. The values in **Table 5-3** understate the dominance of this outflow because the table excludes peak flows that were not passed to the groundwater model.

5.7. GROUNDWATER BALANCE

Annual groundwater inflows and outflows for the Basin for the 1990 to 2018 model simulation period are shown as stacked bars in **Figure 5-6**. Inflows are stacked in the positive (upward) direction and outflows are stacked in the negative (downward) direction. A similar stacked-bar chart for the baseline simulation is shown in **Figure 5-7** and for the growth plus climate change simulation in **Figure 5-8**. Average annual groundwater budgets for the Channel Aquifer area and the alluvial fan aquifer area during each of the water budget analysis periods are listed in **Table 5-4**. Detailed groundwater budget tables are included in **Appendix K**. Highlights of the water budgets are described below, followed by additional information on methods used to quantify each budget item.

Percolation from streams and percolation of reclaimed water have been the largest sources of recharge to the Basin, followed by rainfall recharge in non-irrigated areas. Percolation from streams varies substantially from year to year but averaged about 34 to 39 percent of total inflows in the historical and current scenarios. In the baseline and growth plus climate change scenario stream percolation represented a slightly smaller portion of inflows. Percolation of reclaimed water was of a similar magnitude in the historical and future scenarios but became a larger percentage of total inflow because of decreases in other inflows. Inflows from irrigation deep percolation, bedrock inflow and pipe leaks were of similar magnitudes in the historical and current periods (7 to 9 percent of total inflows). Because of urbanization in recent years, irrigation deep percolation and pipe leaks became larger percentages of total inflow in the future scenarios. Inflow from the Chino Basin is the smallest inflow, amounting to only 2 to 6 percent of total inflows in all scenarios.

Pumping by municipal wells increased during the historical simulation, increasing from 43 percent of total outflows in the historical period to 59 percent in the current period. Although municipal pumping was smaller in the future simulations, it represented a larger percentage (71 percent) of total outflows because of decreases in other outflows. The next largest outflows were of roughly similar magnitudes: groundwater discharge to streams, riparian evapotranspiration (ET) and subsurface outflow to the Chino Basin. These each accounted for 10 to 19 percent of total outflows during the historical and current periods and slightly smaller percentages in the future simulations. Pumping at agricultural wells decreased rapidly in the 1990s, dwindling to negligible amounts in the current period.

The Basin water budgets were negative for the historical and current analysis periods, due to a variety of reasons and reflecting the different time periods. During 2000 to 2011, relatively high amounts of municipal groundwater pumping contributed to a gradual decrease in storage. Since 2011, the predominantly dry climatic conditions have resulted in reduced inflows and thus a decrease in storage. As documented in Section 4.1, water levels in wells located in the Channel Aquifer decreased slightly over the historical period. The observed water level decline was not significant and did not impact beneficial users of the Basin. However, relatively high estimated storativity in the Channel Aquifer and the slight water level decline resulted in a net negative change in storage over the time period.

Storage declines during the early years of the simulation may have resulted from incorrectly estimated initial water levels. Initial conditions in the model are user defined and act as boundary conditions, if initial groundwater levels are set too high at the start of the simulation, the model will reduce water levels to reach equilibrium. The result is a calculated change in storage that may be an artifact of the prescribed starting water levels. Geographically distributed water level data is not available pre-1990 and the initial conditions are largely set by interpolating sparsely observed water levels. Additional improvements and sensitivity analysis could provide more information on the effect of the initial conditions and should be considered for the next GSP update.

The future baseline scenario is intended to represent a continuation of existing conditions. For most of the budget items that are inputs to the model (for example, irrigation deep percolation, pipe leaks, reclaimed water percolation and pumping), average values during 2010 to 2018 were used. An exception was municipal pumping by Corona, which was relatively high during 2002 to 2014. Using the 2010 to 2018 average produced storage depletion in the future baseline simulation. While the numerical model simulates declines in storage over the historical period, groundwater level declines have been relatively small and undesirable results relative to groundwater levels or storage have not occurred in the Basin.

Corona's objective is to pump within the sustainable yield of the Basin and to supply the remaining municipal water demand with imported and recycled water. This policy is reflected in the generally decreasing amounts of municipal pumping from 2008 to 2017. Through iteration, using the groundwater model, municipal pumping of 15,600 AFY was found to produce essentially no long-term storage change in the future baseline simulation. This equals 98 percent of average Corona pumping during 2010 to 2018 but is more than the amounts of Corona pumping in 2016 and 2017.

However, adaptive management and continued assessment of pumping volumes will be critical to maintaining sustainability as inflow to the Basin can vary widely based on hydrology and the model simulation is only a forecast of future conditions.

Growth and climate change had relatively small effects that tended to offset each other. The warmer, drier climatic conditions tended to decrease stream percolation and rainfall recharge. Urban growth—much of which is projected to be in tributary watershed areas—tended to increase recharge because of irrigation deep percolation, pipe leaks and percolation of runoff from disconnected impervious areas. Notably, total water use and percolation of reclaimed water were assumed not to change appreciably, consistent with assumptions in the Corona's UWMP that population growth will be offset by decreases in per-capita water use. Consequently, individual inflows and outflows in the growth plus climate change scenario were identical to or very close to the values in the future baseline scenario.

Table 5-4. Average Annual Groundwater Budgets

Water Balance Items	Temescal Basin				
	SGMA Historical 1993 to 2007	SGMA Current 2010 to 2013	25-Year Historical 1993 to 2017	Baseline[1] 2019 to 2068	Growth Plus Climate Change[2] 2019 to 2068
Groundwater Inflow					
Percolation from streams	8,112	9,942	7,976	7,918	8,817
Bedrock inflow	1,024	952	980	1,084	1,314
Dispersed recharge: non-irrigated land	4,921	4,380	4,331	2,742	2,668
Dispersed recharge: irrigated land	2,042	1,680	1,892	3,172	3,253
Pipe leaks	2,585	2,520	2,560	2,151	2,174
Reclaimed water percolation	8,915	6,200	7,885	6,122	6,122
Inflow from Adjoining Basins	2,003	1,400	1,895	1,026	126
Total Inflow	**29,601**	**27,075**	**27,520**	**24,213**	**24,473**
Groundwater Outflow					
Wells - M&I and domestic	-13,631	-17,239	-14,668	-15,615	-15,615
Wells - agricultural	-3,622	-1,386	-2,722	-22	-23
Groundwater discharge to streams	-4,545	-1,295	-3,179	-1,739	-1,504
Riparian evapotranspiration	-4,980	-3,922	-4,482	-4,538	-4,997
Outflow to Adjoining Basins	-2,966	-2,085	-2,664	-2,364	-2,301
Total Outflow	**-29,744**	**-25,927**	**-27,714**	**-24,278**	**-24,439**
Net Change in Storage					
Inflows minus outflows	-143	1,148	-194	-65	34

Notes:

[1] : The 50-year future baseline simulation uses historical rainfall and evapotranspiration for 1993 to 2017 two times in succession.

[2] : Future baseline rainfall and evapotranspiration are adjusted for climate change in this scenario.

5.7.1. Inflows to Groundwater

Inflows to the Temescal Basin groundwater flow system include dispersed recharge from rainfall and irrigation, percolation from streams, percolation of reclaimed water and subsurface inflow. The methods and data used to calculate each of these flows is described below.

5.7.1.1. Dispersed Recharge from Rainfall and Irrigation

Dispersed recharge from rainfall and applied irrigation water is estimated by the rainfall-runoff-recharge model. The model simulates soil moisture storage in the root zone, with inflows from rainfall infiltration and irrigation, and outflows to evapotranspiration and deep percolation. Simulation is on a daily basis. In recharge zones with irrigated crops—which includes urban landscaping and agricultural irrigation (citrus)—irrigation is assumed to be applied when soil moisture falls below a certain threshold. When soil moisture exceeds the root zone storage capacity, the excess becomes deep percolation. Rainfall and irrigation water comingle in the root zone and in deep percolation. For the purposes of displaying an itemized water balance, the amount of deep percolation derived from irrigation is estimated as a percentage of the simulated irrigation quantity, and the remainder of the dispersed recharge is attributed to rainfall. Deep percolation of applied irrigation water (irrigation return flow) is generally similar from year to year, whereas rainfall percolation varies significantly on an annual basis. Because urban landscape irrigation increased while agricultural irrigation decreased during the simulation period, total recharge on irrigated lands decreased only slightly. Water pipe leaks were estimated as the percentage of unaccounted for water listed in the 2015 Corona UWMP, which was seven percent of delivered water (KWC Engineers 2016), distributed uniformly over areas of urban land use. Sewer pipes convey only water used indoors, and their leak rate was assumed to be half of the leak rate for water pipes. For input to the groundwater model, the one-dimensional dispersed recharge rates are mapped onto model grid cells overlying each recharge polygon on an area-weighted average basis.

Figure 5-9 shows a map of average annual dispersed recharge during 1993 to 2007, which is a relatively long averaging period that includes a wide range of year types. Most dispersed recharge occurs during relatively wet years. Average annual recharge rates ranged from less than 0.3 to slightly over 12 inches per year (in/yr). Much of the southern half of the Temescal Basin converted from citrus orchards to residential development during that period. Recharge from agricultural irrigation was replaced by irrigation from landscape irrigation, pipe leaks and percolation of runoff from disconnected impervious surfaces. As a result, average annual dispersed recharge in that part of the Basin was similar to recharge in the northern part, which was urbanized throughout the simulation period. Dispersed recharge in tributary watersheds appears to be low because most of the deep percolation beneath the root zone was assumed to become stream base flow rather than deep recharge.

5.7.1.2. Percolation from Streams

Inflows to the stream network in the surface water module of the groundwater model include a combination of simulated runoff from tributary watersheds and valley floor areas obtained from the rainfall-runoff-recharge model and simulated inflows from adjacent groundwater models of the Bedford-Coldwater and Chino Basins.

The surface water module of the groundwater model simulates percolation reach by reach along each stream that crosses the Basin. The percolation rate is a function of stream bed permeability, wetted area, and the difference in elevation between the stream surface and the underlying water table. Along reaches with natural channel materials, a permeability of 5 feet per day (ft/day) was assumed. Most of the streams that cross the Temescal Basin are lined with concrete along much of their length. Those reaches were assigned a permeability of zero. The natural channel reaches of the tributary streams are probably tens of feet above the water table, which means they are not hydraulically connected to groundwater. Percolation is a function of wetted area and permeability only.

Converting from daily to monthly analysis can introduce large errors in estimated percolation. If daily flows are averaged over a month, estimated stream flow appears to be much more moderate and perennial than the actual stream flow. The groundwater model would overestimate percolation in that case. To avoid this error, monthly flows were obtained from daily flows by first clipping the daily flows to values less than or equal to the estimated percolation capacity of the unlined reach of channel. Those flows were then be averaged to obtain monthly flow for input to the groundwater model.

The Santa Ana River, Cucamonga Creek and Chino Creek are not lined. Monthly inflows to those waterways were obtained from an existing groundwater model of the Chino Basin (WEI 2019).

5.7.1.3. Reclaimed Water Percolation

Reclaimed wastewater is currently percolated at the Lincoln Cota Percolation Ponds, which are adjacent to the left bank of Temescal Wash between Lincoln Avenue and Cota Street. They are just outside the Channel Aquifer area. Prior to 1998, reclaimed water was also percolated in ponds at WRF-1 next to the Prado Wetlands. Since then, water from that facility has been sent to the Lincoln Cota ponds. Measured percolation volumes are added directly to the top layer of the groundwater model.

5.7.1.4. Subsurface Groundwater Inflow

Subsurface inflows from tributary watersheds and neighboring basins are estimated by various methods. Subsurface flow from tributary watersheds is calculated by the rainfall-runoff-recharge model by partitioning rainfall deep percolation into stream base flow and subsurface inflow. The subsurface flow is added as specified monthly volumes of water to model cells adjacent to the tributary watershed. Although the Bedford-Coldwater Basin and Temescal Basin share a boundary, models of both basins indicated little flow across it because groundwater tends to flow parallel to the boundary toward Temescal Wash. Based on previous studies, a small amount of subsurface inflow from the Arlington Basin through the Arlington Gap was included in historical simulations. That flow is expected to decrease to zero in the future. Flow between the Temescal and Chino Basins is simulated by the groundwater model as a function of water-level gradients and permeability along the boundary between the basins.

5.7.2. Outflows from Groundwater

Major outflows from the water budget analysis areas are groundwater pumping (municipal, industrial, and agricultural), subsurface outflow, groundwater discharge into streams, and evapotranspiration by riparian vegetation.

5.7.2.1. Pumping by Wells

Pumping from M&I wells has been measured and recorded for many years by Corona and WMWD. Those data are used in the groundwater model. Agricultural pumping to irrigate citrus orchards in the 1990s was estimated using the rainfall-runoff-recharge model, which produces estimates of irrigation demand based on reference evapotranspiration, crop type and growth state, and availability of soil moisture from rainfall. Ten percent of applied irrigation water was assumed to percolate past the root zone and return to the groundwater supply. As described in Section 5.7, Corona pumping for the future baseline and growth plus climate change scenarios was set at 98 percent of the 2010 to 2018 average historical pumping.

5.7.2.2. Subsurface Outflow

Subsurface outflows to the Chino Basin were calculated with the groundwater model by the same methods used to simulate subsurface inflows. There are no outflows from the Temescal Basin to the Arlington or Bedford-Coldwater Basins because the water level gradients are always toward the Temescal Basin.

5.7.2.3. Groundwater Discharge to Streams

Where streams are hydraulically connected to the water table, discharges of groundwater into the streams are simulated by the groundwater model based on streambed wetted area, permeability, and on the amount by which the simulated groundwater elevation in a model stream cell is higher than the simulated surface water elevation. This condition is present primarily along the lower reaches of the Santa Ana River and other channels within the Prado Wetlands.

5.7.2.4. Riparian Evapotranspiration

Evapotranspiration of groundwater by phreatophytic riparian vegetation is influenced by available soil moisture and by depth to the water table. Like other types of vegetation, phreatophytes use soil moisture supplied by rainfall when it is available. Any remaining evapotranspiration demand is met by drawing water from the water table. Phreatophyte use of groundwater is assumed to decrease from the maximum rate when the water table is at the land surface to zero when the water table is 20 feet or more below the ground surface. These calculations are applied at model cells within the Prado Wetlands. A patch of dense riparian vegetation is also present where Temescal Wash enters the Basin from an upstream bedrock reach. However, that vegetation appears to be supported by percolation from the Wash, not groundwater, because the water table appears to be more than 30 feet below the ground surface in that area. The water demand of riparian vegetation was assumed to equal reference evapotranspiration.

5.8. CHANGE IN GROUNDWATER STORAGE

Figure 5-10 shows the cumulative change in Basin storage from the model during 1990 through 2068. The baseline and growth plus climate change scenario results for 2019 to 2068 are displayed as continuations of the historical storage changes from 1990 to 2018.

As shown, groundwater storage decreased fairly steadily during 1990 to 2018. Average annual storage changes for the current and two historical periods ranged from decreases of 194 AFY to an increase of 1,148 AFY, as shown in **Table 5-4**. Total outflows were between 0.7 percent greater and 4.2 percent lower than total inflows. Factors that could have contributed to this simulated decline include incorrectly estimated initial water levels, relatively high amounts of municipal groundwater pumping during the early 2000s, and predominantly dry climatic conditions since 2011.

Average annual storage changes during both future scenarios were very slightly positive, with total inflows about two percent greater than total outflows. This was the intentional result of adjusting Corona pumping to achieve close to zero net storage change during 2019 to 2068. The abruptness of the transition from historical to future conditions is primarily the result of decreased pumping, but also to the effects of drought conditions at the end of the historical period. The similarity of the future baseline and growth plus climate change scenarios is due to the small differences in all water budget items between those two scenarios. Also, the effects of urban growth tended to offset the effects of the warmer, drier climate.

5.9. ESTIMATE OF SUSTAINABLE YIELD

The sustainable yield is defined as the volume of pumping that the Basin can sustain without causing undesirable effects. It is not a fixed or inherent natural characteristic of a groundwater basin. Rather, it is influenced by land use activities, importation of water, wastewater and stormwater management methods, potential recharge with recycled water, and the locations of wells with respect to interconnected streams. The estimates of sustainable yield presented in this section reflect the current status of those variables under the historical and future scenarios.

A long analysis period is needed to evaluate yield because of the episodic nature of natural recharge. Whereas pumping, irrigation return flow, and pipe leaks are fairly constant from year to year, recharge from precipitation and streams varies widely. Because of evolving land use during 1990 to 2018, no subset of years is ideal for estimating sustainable yield. For the purposes of this GSP historical sustainable yield was calculated based on 1993 to 2017, which is representative of long-term average conditions in terms of precipitation and stream flow. Sustainable yield was estimated for the historical simulation (using 1993 to 2017) and the two future simulations (both using all 50 years of the simulation), as shown in **Table 5-5**.

Table 5-5. Estimated Sustainable Yield

25-Year Historical 1993 to 2017[1] (AFY)	Baseline 2019 to 2068[2] (AFY)	Growth Plus Climate Change 2019 to 2068[2] (AFY)
17,195	15,572	15,672

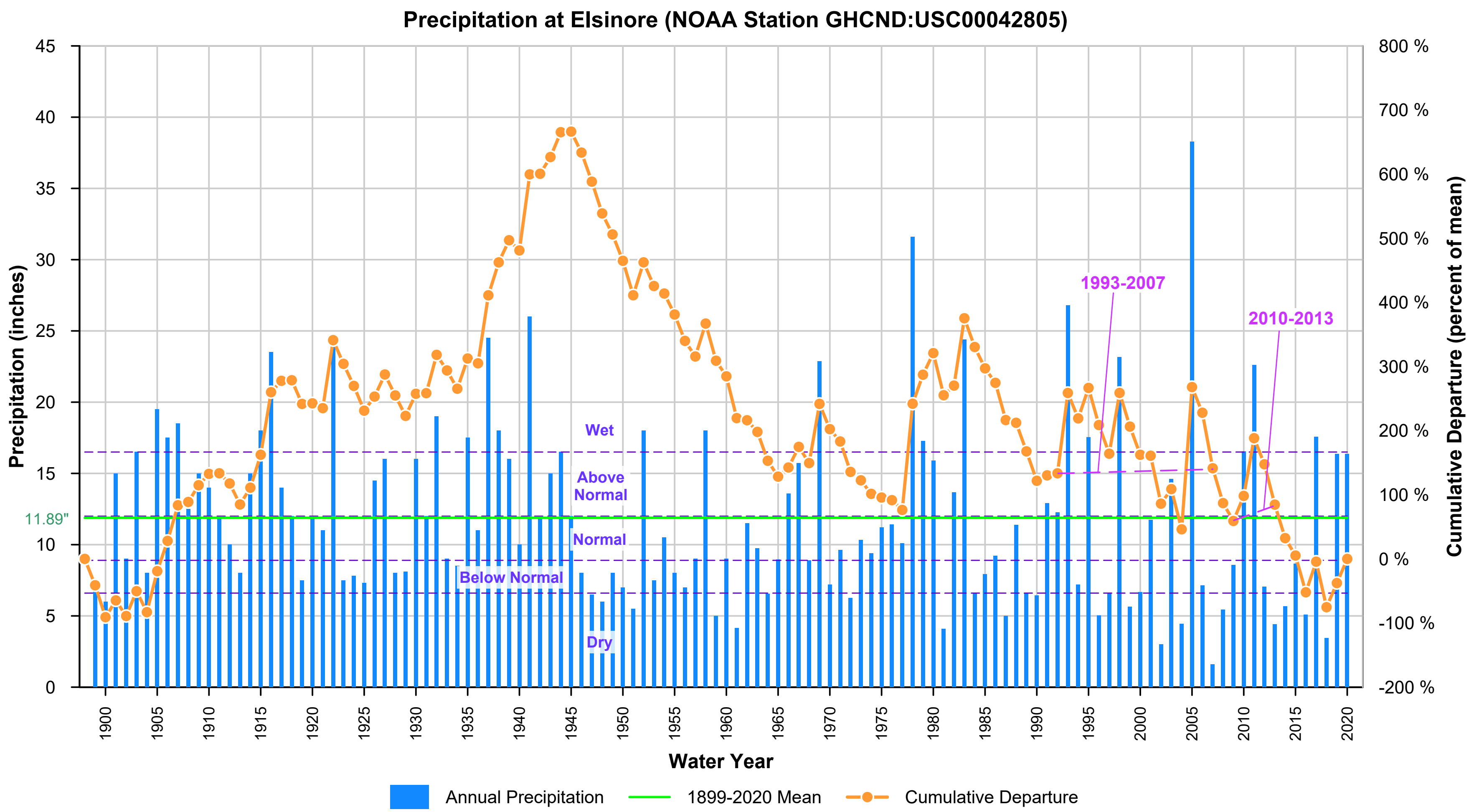
[1] For the historical sustainable yield estimate, average annual water budgets during 1993 to 2017 were used.
[2] The 50-year future simulation uses historical hydrology for 1993 to 2017 two times in succession.

These sustainable yield estimates equal total pumping plus storage change. This simple method of estimating yield ignores the interaction of pumping with other head-dependent boundaries, including interconnected surface water, riparian vegetation ET and subsurface inflows and outflows. All four of those types of boundaries are present in the Temescal Basin, which means that increasing the amount of pumping can theoretically increase the yield of the Basin, by increasing head-dependent inflows and decreasing head-dependent outflows. Conversely, a decrease in pumping will not result in an equal decrease in the rate of storage depletion because the other head dependent boundaries absorb some of the change in pumping. The amount of pumping in the future baseline simulation accounts for these complex interactions. It was obtained by trial and error as the amount of Corona pumping that resulted in close to zero long-term storage change. That means it also results in zero long-term change in other head-dependent boundary flows such as groundwater discharge to the Prado Wetlands. Large changes in those flows could cause undesirable results for groundwater dependent ecosystems.

The yield estimates in the table are for total groundwater pumping in the Basin, not just Corona pumping. Although Corona pumping is currently about 93 percent of total pumping, several industrial users also pump groundwater and others might do so in the future.

The yield estimates based on the future scenarios are probably a better basis for planning than the estimates based on the historical and current periods because the latter periods were influenced by factors that do not apply to the future period and because the future scenarios have a long hydrologic averaging period. Sustainable yields calculated from the future scenarios are based on projections far into the future. Slight imbalances in estimated water budgets can result in large cumulative changes in storage, and hence in the calculated yields. By the same token, the long planning horizon provides ample time to adjust water management (recharge and pumping) to maintain basin operation within the sustainable yield if long-term rising or falling trends in cumulative storage in fact occur. In the context of this GSP, sustainable yield estimated from the water budget is contingent on the absence of undesirable results related to water levels, storage, subsidence, water quality, or depletion of interconnected surface water. Quantitative sustainability criteria are presented in Chapter 6 that define thresholds at which groundwater conditions become undesirable for each of those sustainability indicators. For example, if pumping at the above estimates of sustainable yield caused subsidence or significant impacts on riparian or aquatic habitats, the yield may need to be reduced to avoid those impacts. It should be noted that the future sustainable yield is calculated in the model using projected hydrological conditions. Conditions vary widely in the Basin between wet years and dry years and the actual precipitation (along with ET and other inflows) would influence the available yield of the Basin.

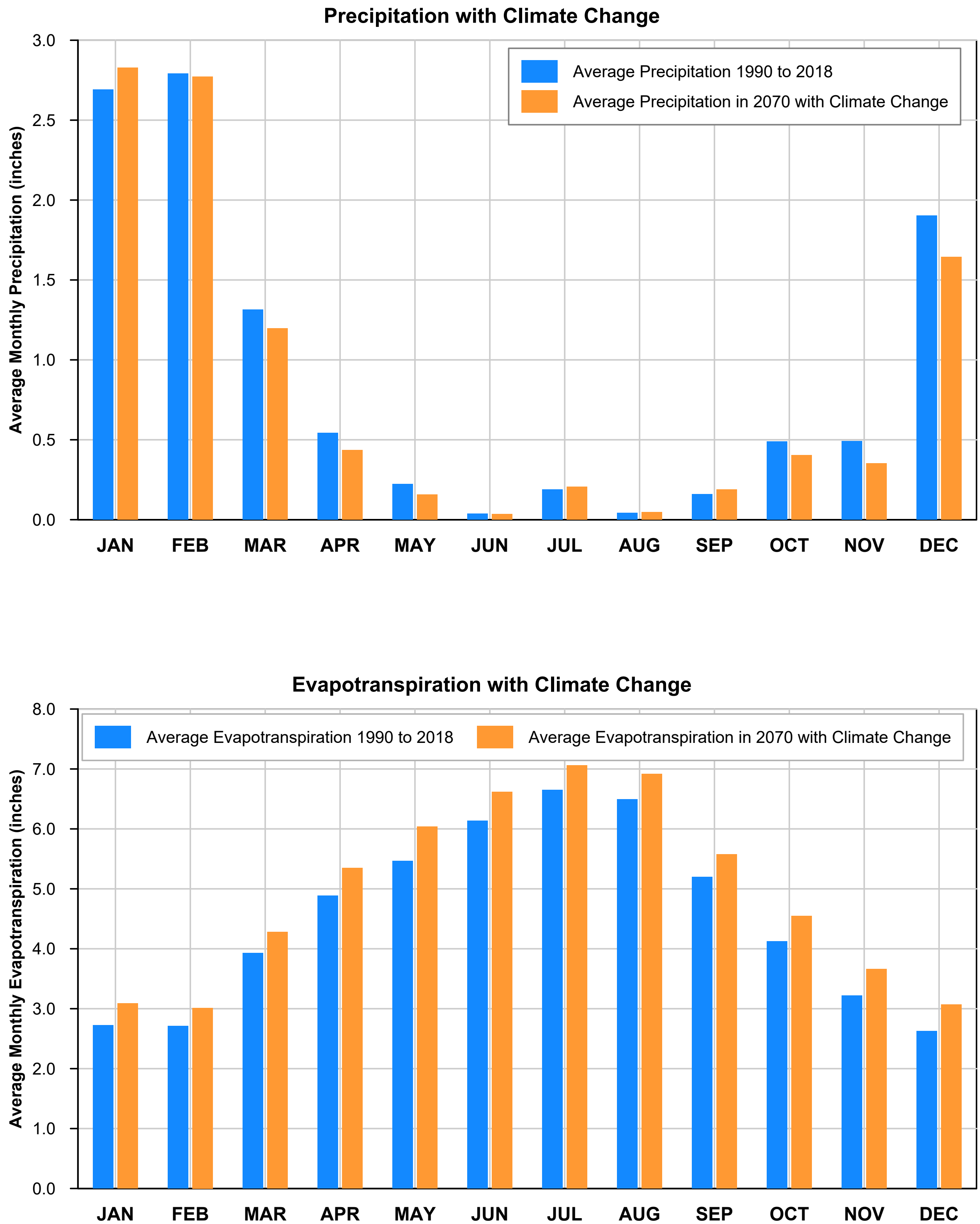
Accordingly, this sustainable yield value is a broad indicator. It indicates no overdraft based on the water budget, but it must be interpreted through evaluation of undesirable results.



Path: T:\Projects\Corona GSP 46414\GRAPHICS\Figure 5-1 Cumulative Departure of Precipitation.gpj

TODD GROUNDWATER

Figure 5-1
Cumulative Departure of Annual Precipitation at Lake Elsinore



TODD GROUNDWATER

Figure 5-2
Effect of Climate Change on Precipitation and Evapotranspiration

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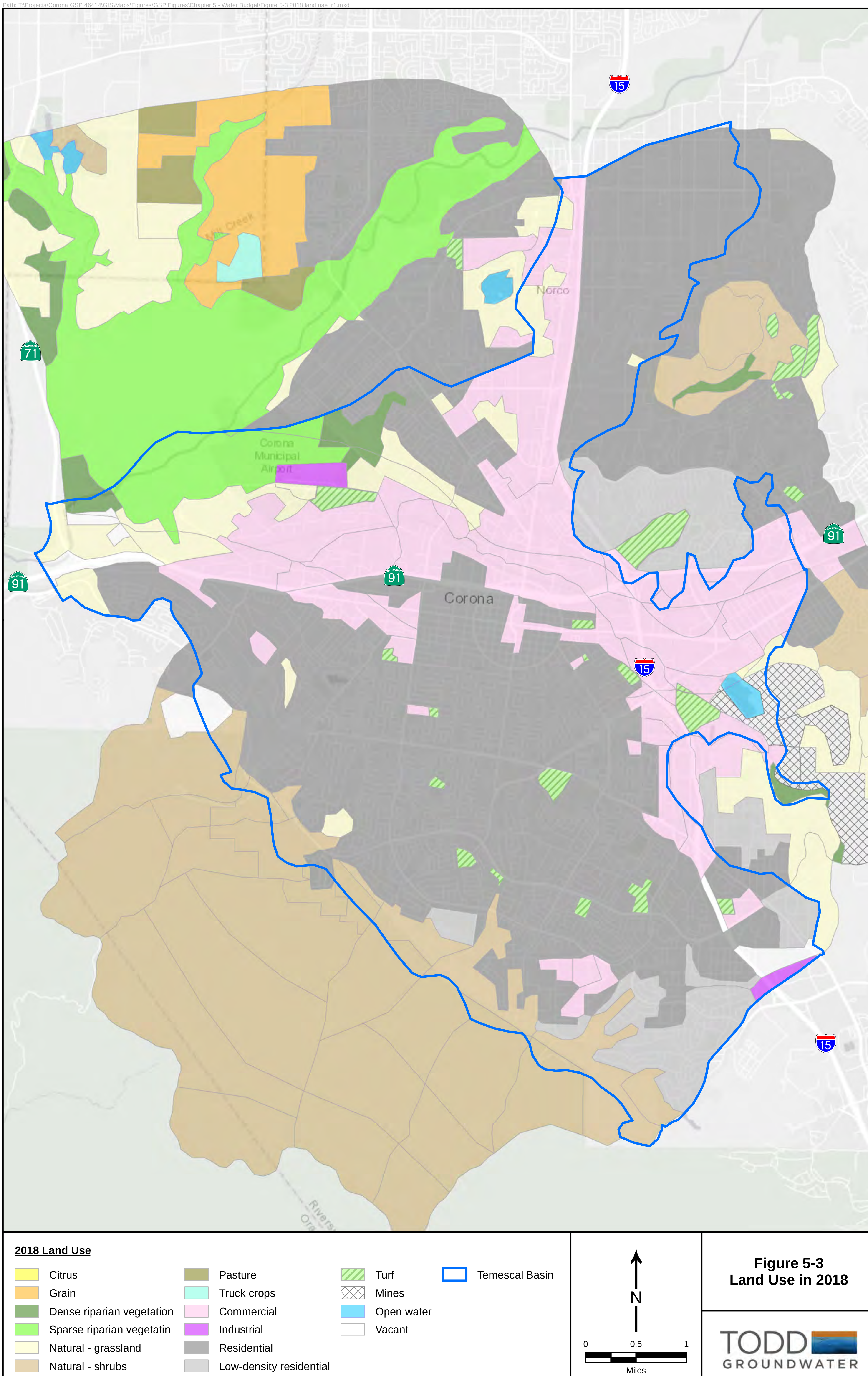
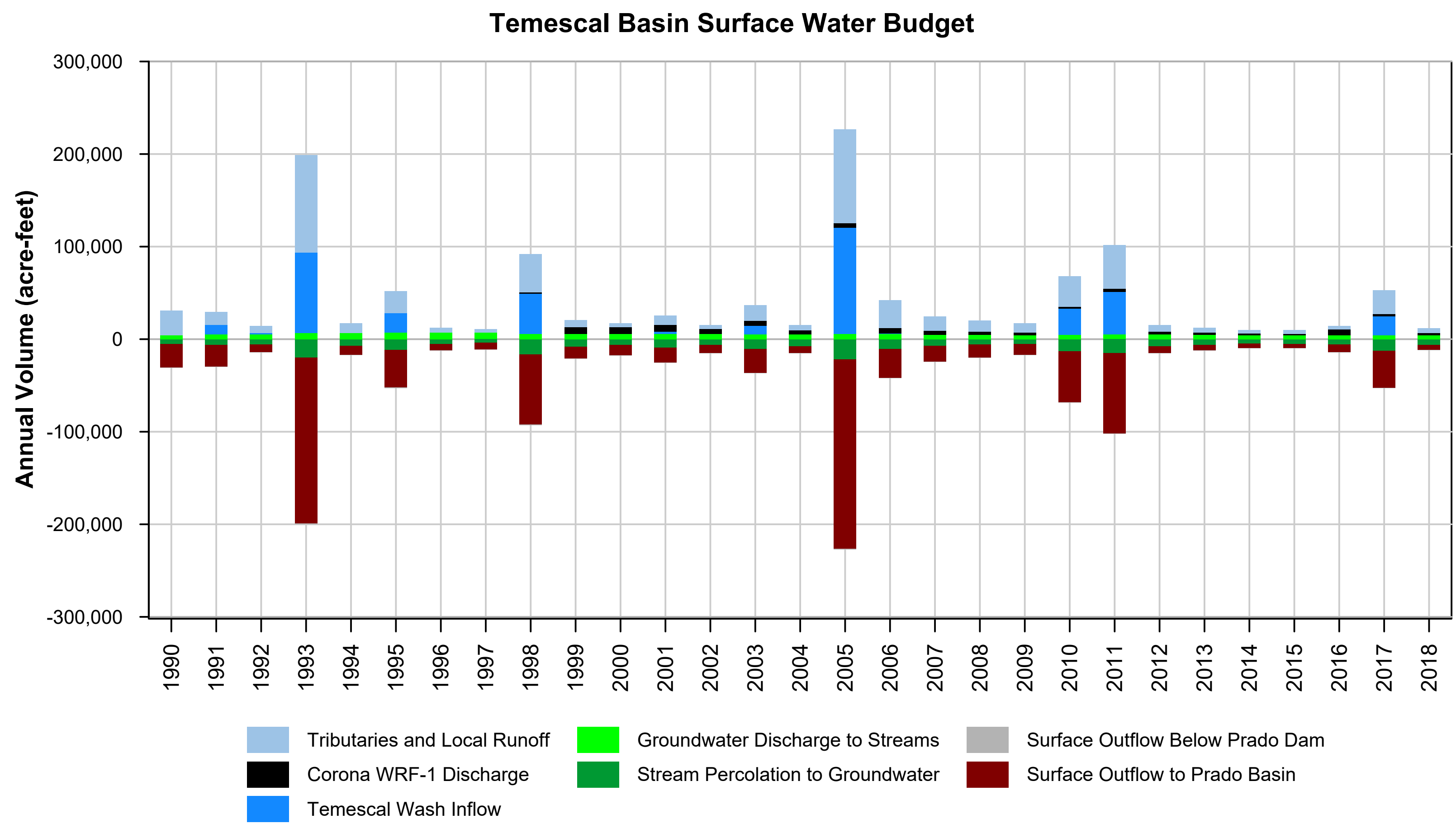
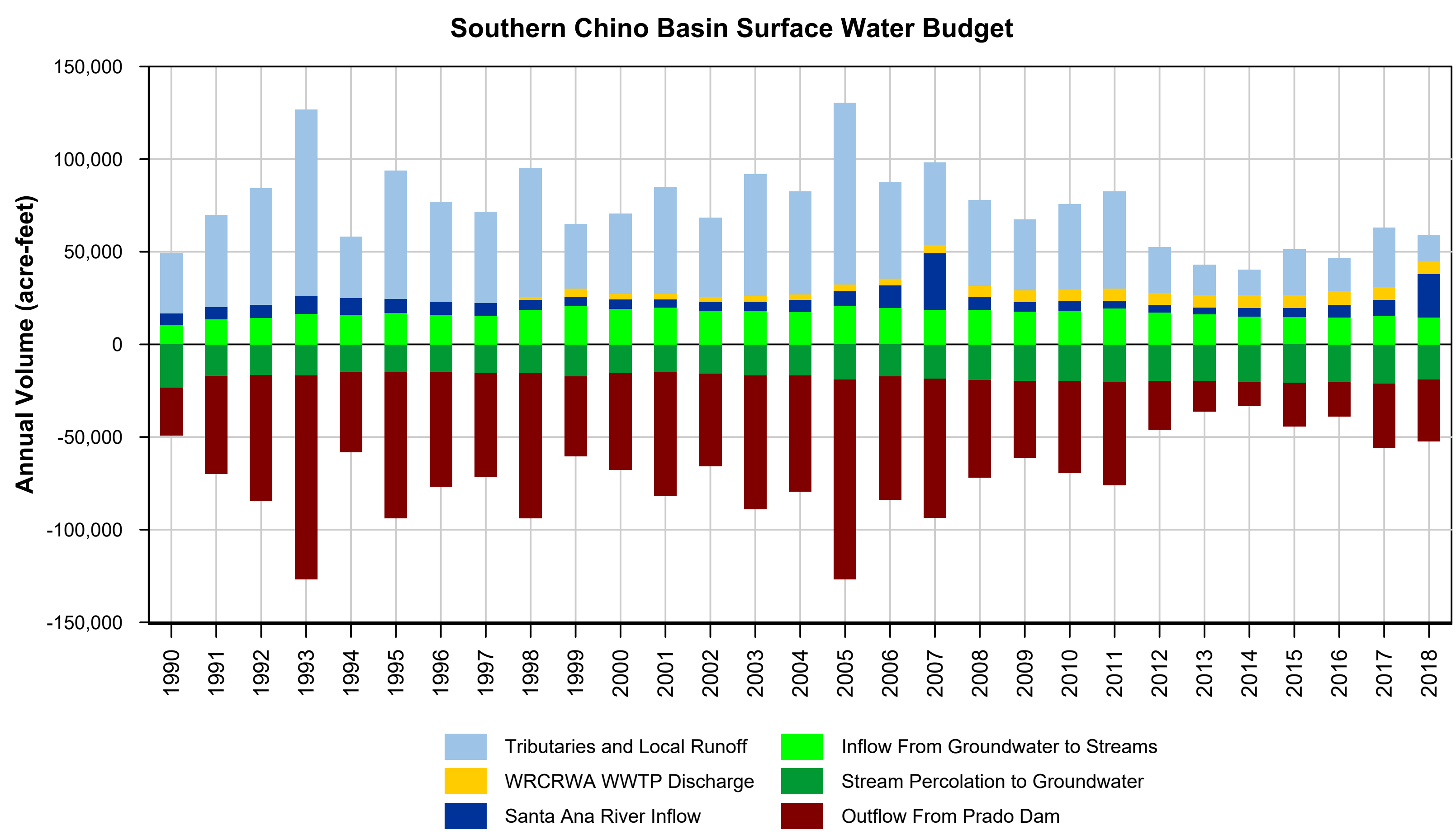
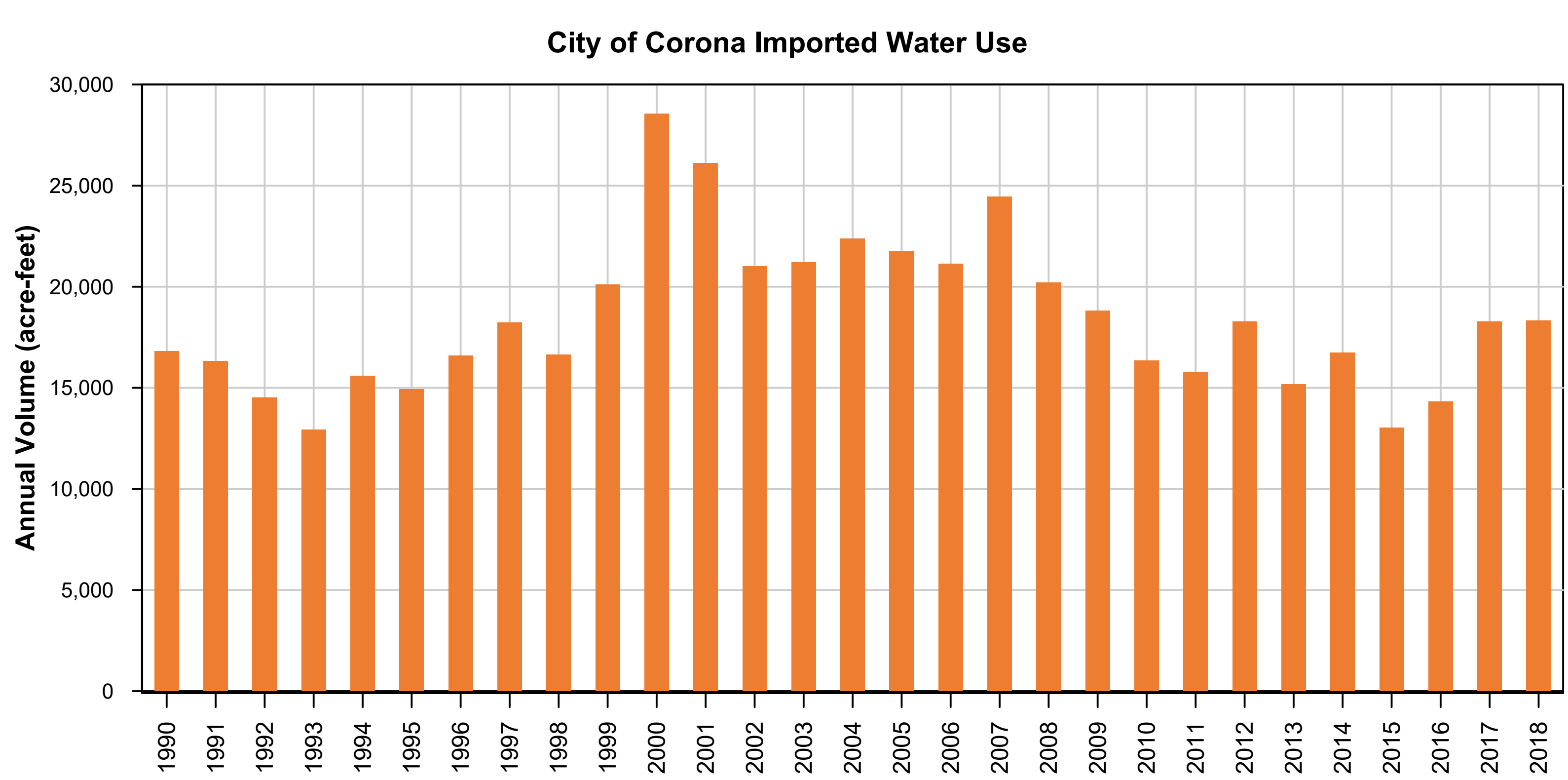


Figure 5-3
Land Use in 2018



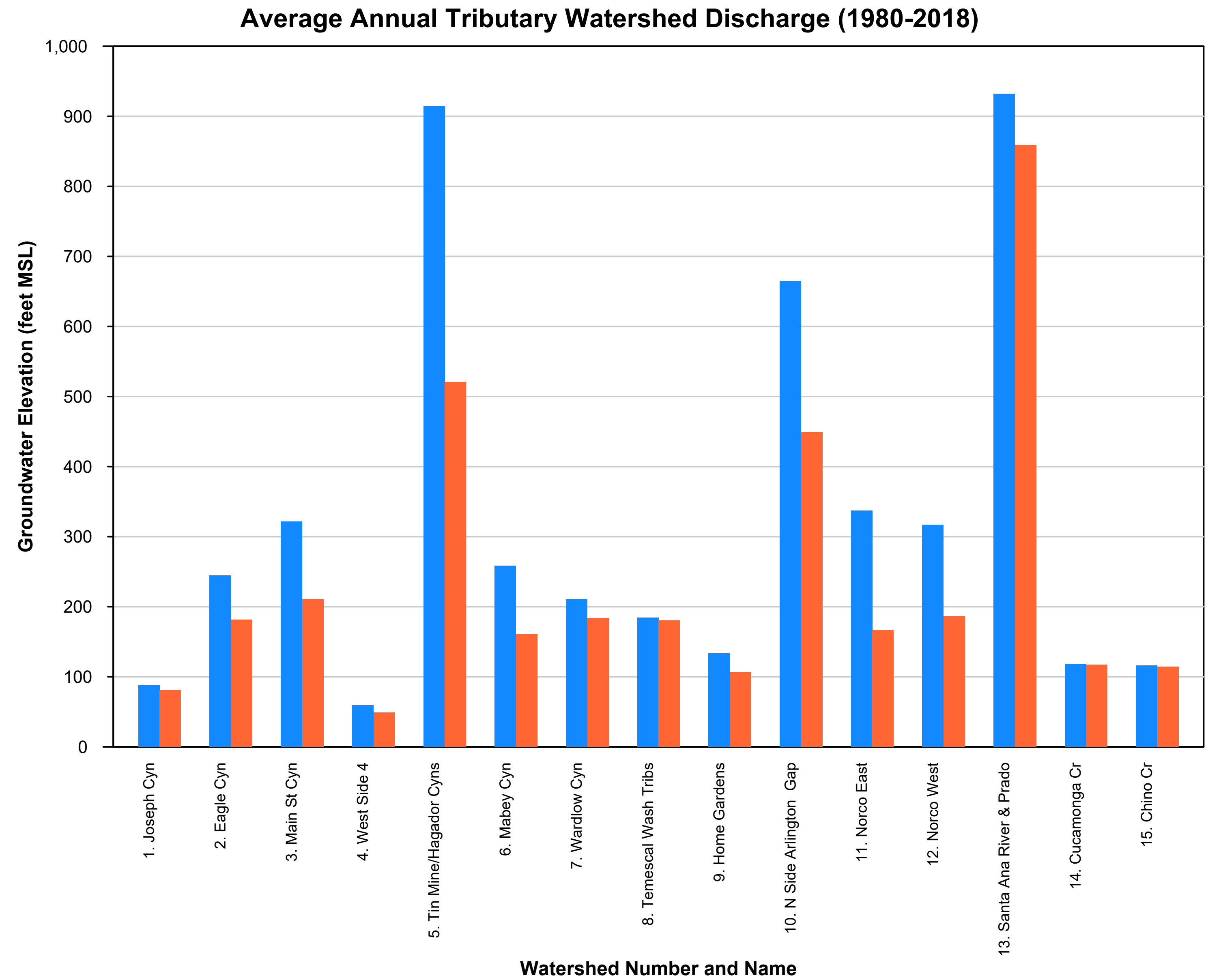




Path: T:\Projects\Corona GSP 46414\GRAPHICS\Figure 5-4 Annual Surface Water Budgets 1990-2018.grpj

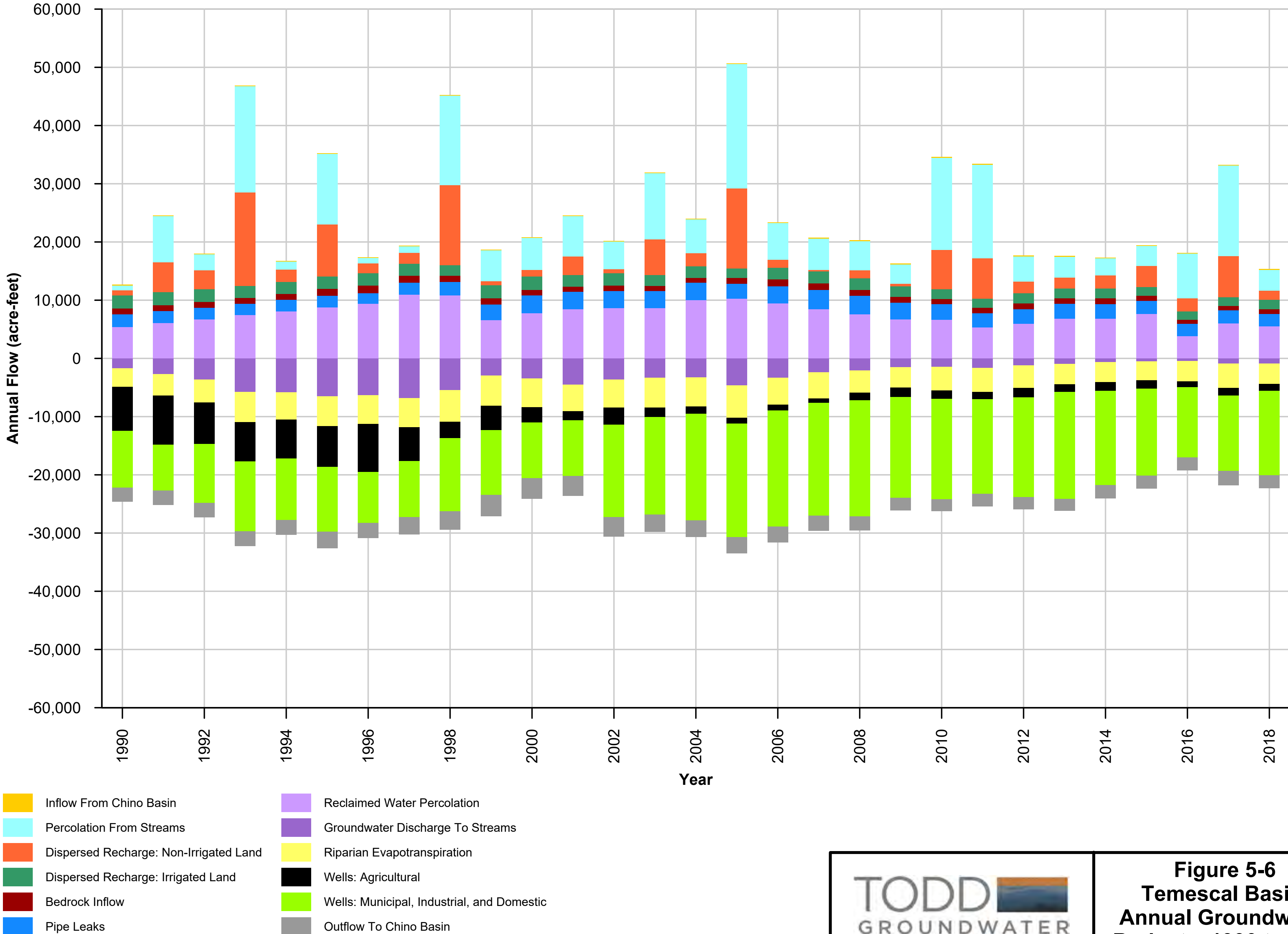
TODD GROUNDWATER

Figure 5-4
Surface Water Budgets
1990 through 2018



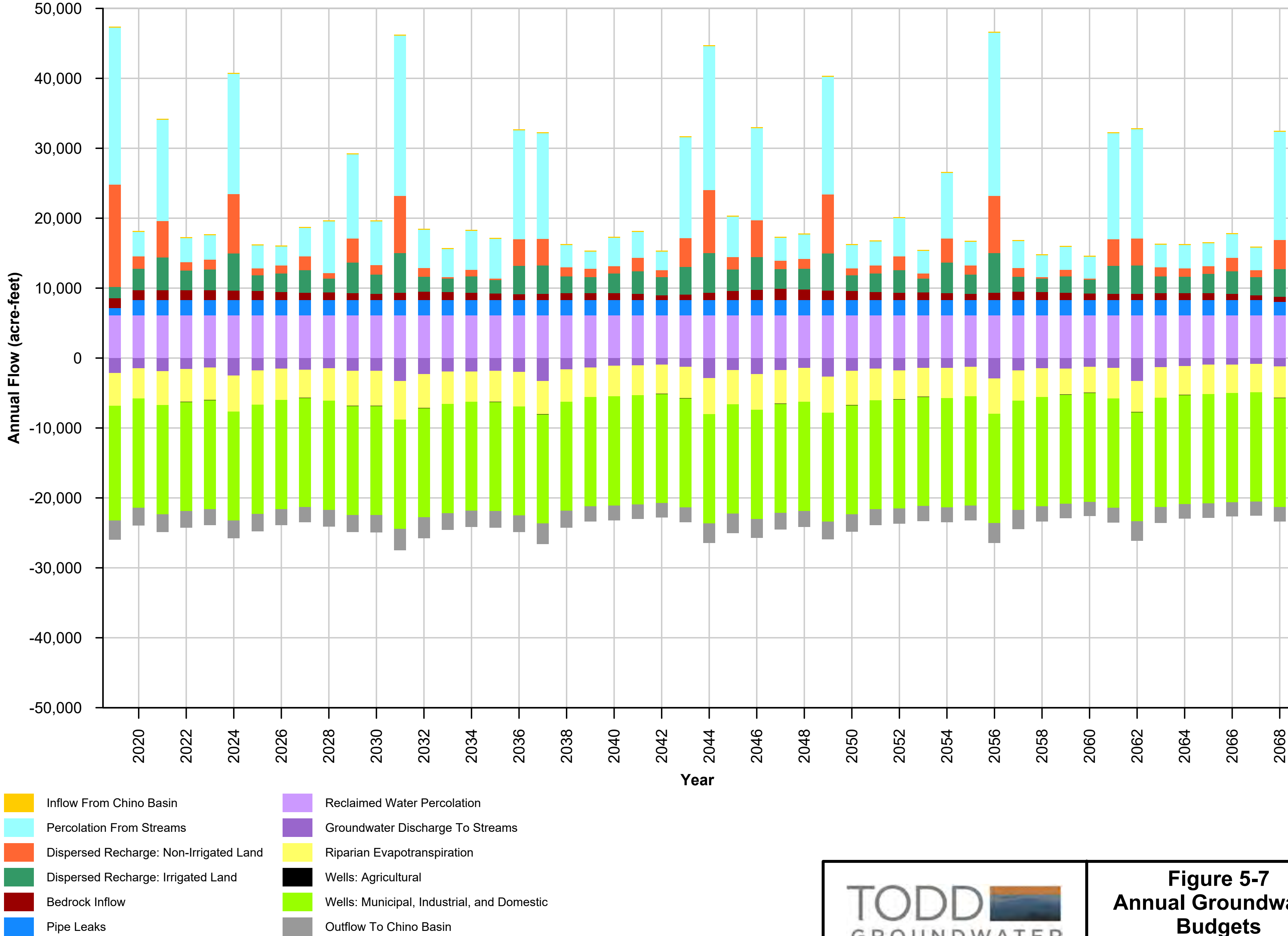
TODD GROUNDWATER

Figure 5-5
Effect of Clipping on Simulated Tributary Stream Flow



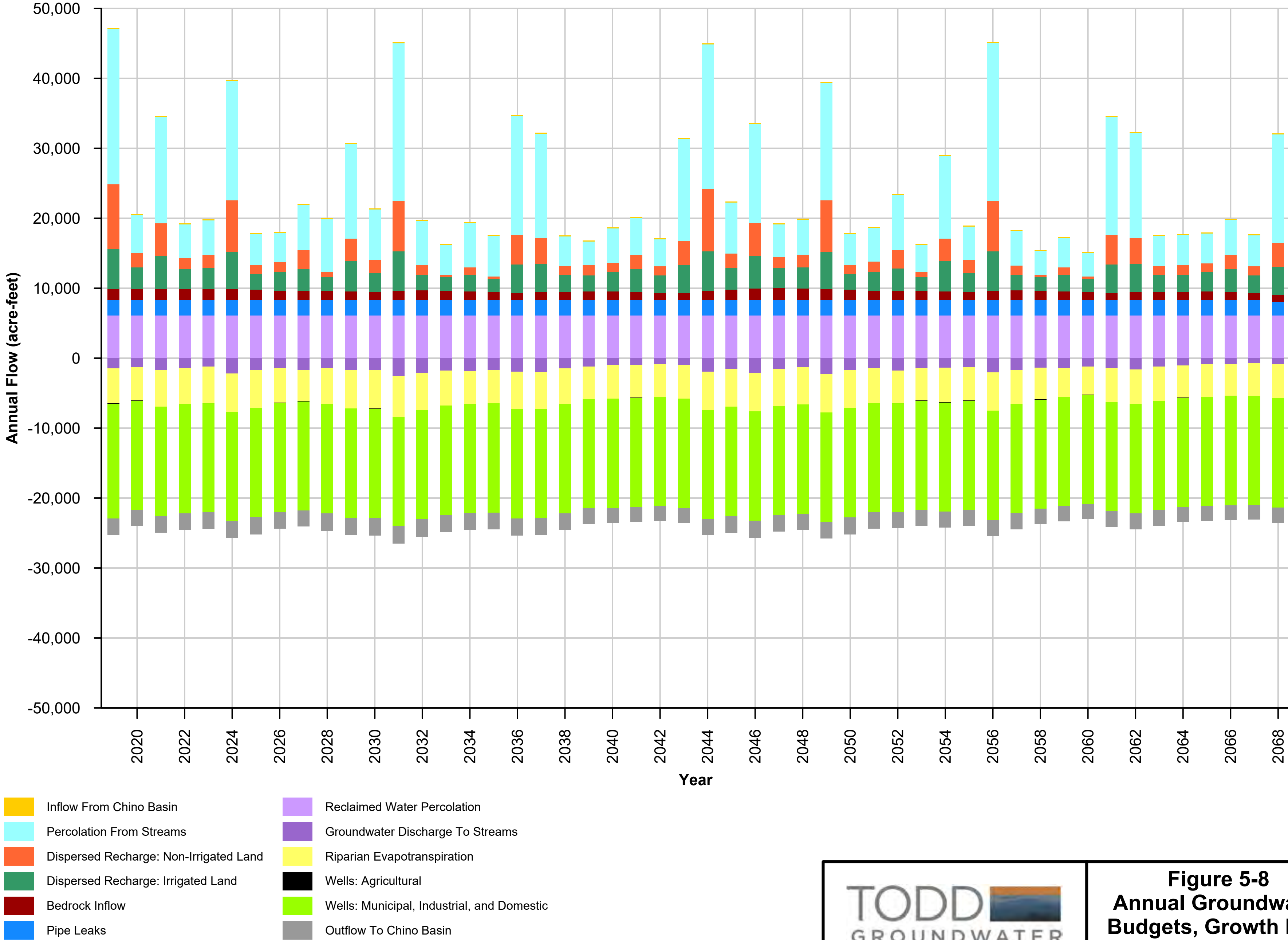
TODD GROUNDWATER

Figure 5-6
Temescal Basin
Annual Groundwater
Budgets, 1990 to 2018



TODD GROUNDWATER

Figure 5-7
Annual Groundwater Budgets
Future Baseline



TODD GROUNDWATER

Figure 5-8
Annual Groundwater Budgets, Growth Plus Climate Change

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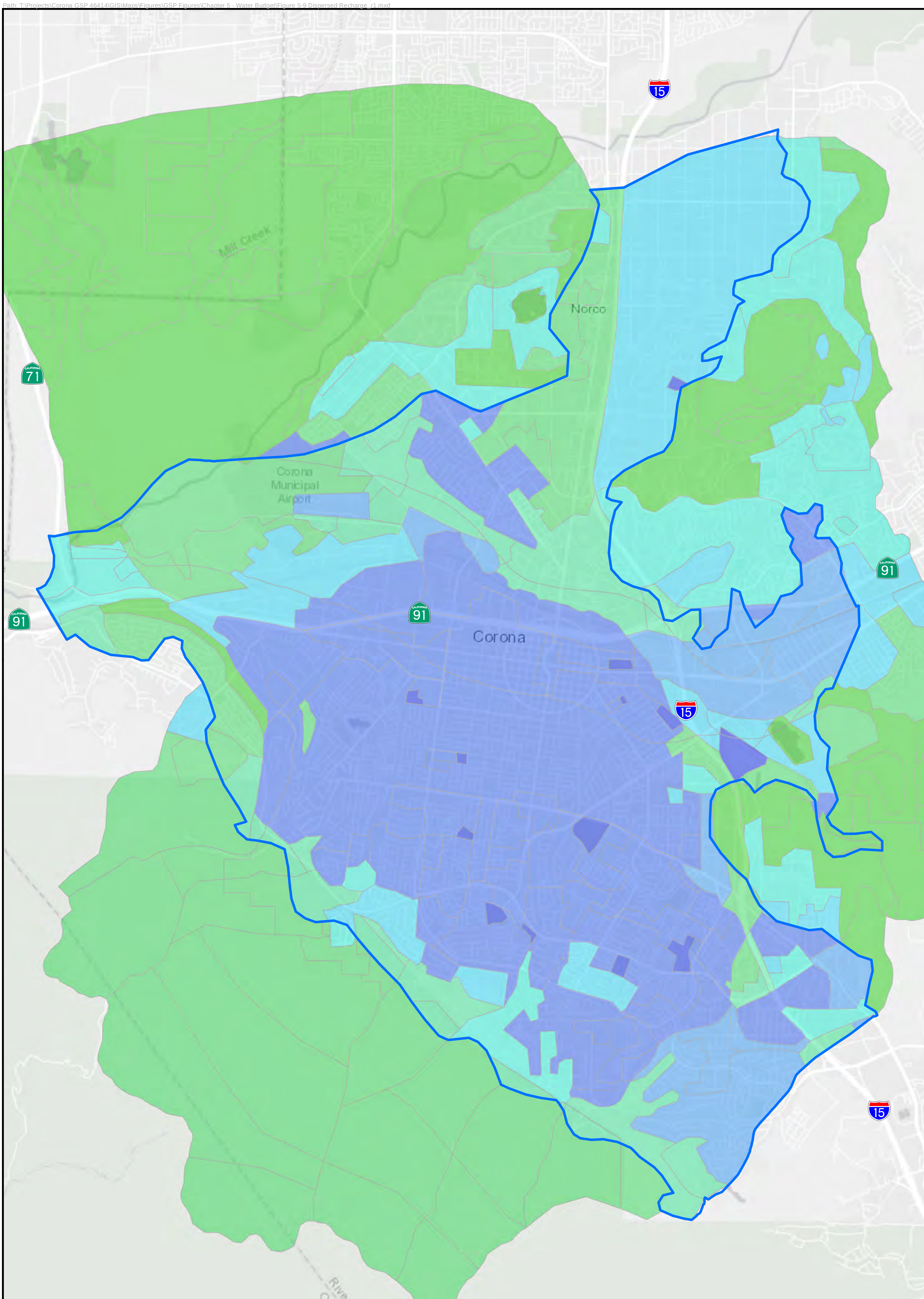


Average Annual Dispersed Recharge 1993-2007 (in/yr)

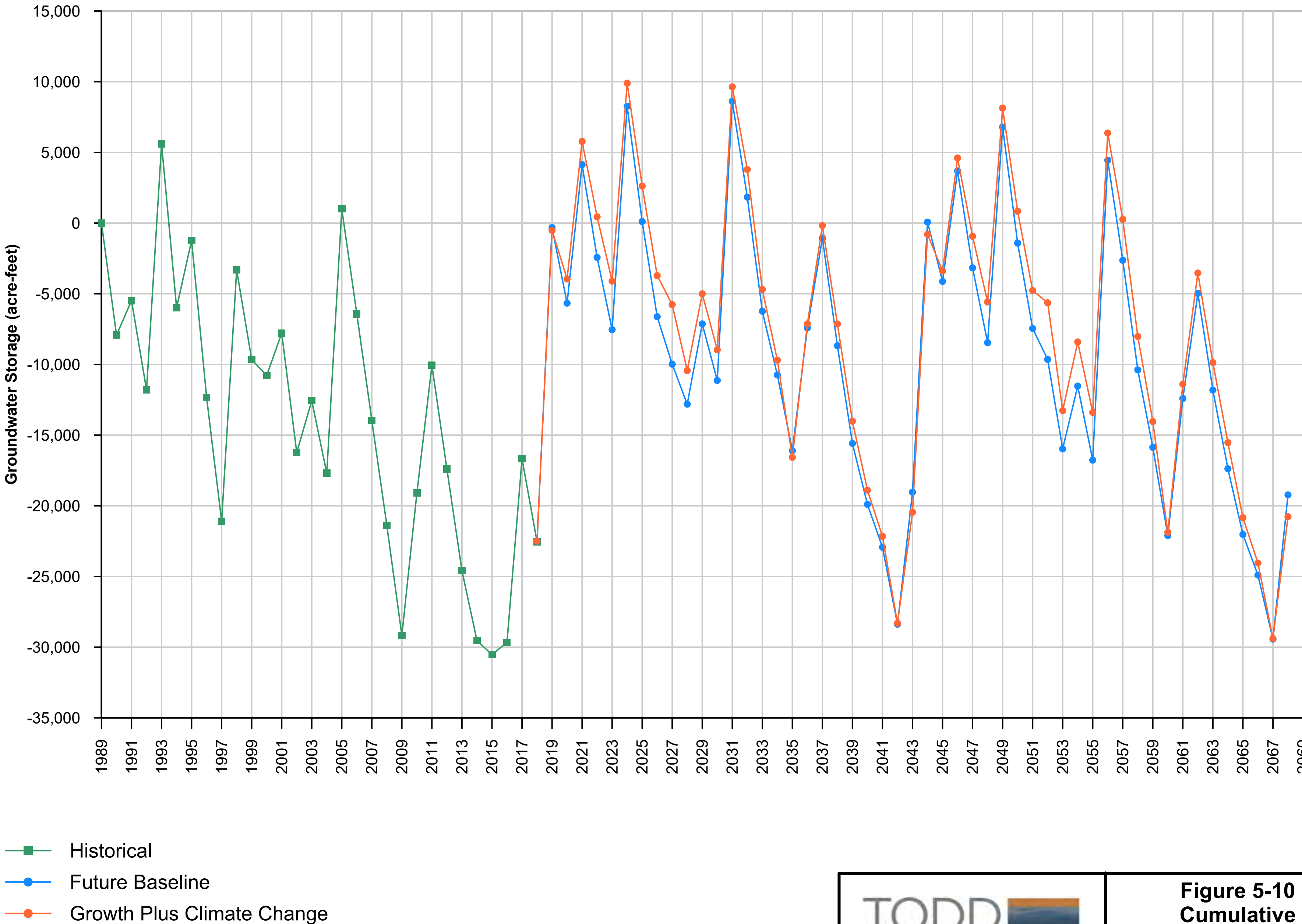
- 0 - 0.3
- 0.3 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5
- 5 - 8
- 8 - 13
- Temescal Basin

N

0 0.5 1
Miles

Figure 5-9
Dispersed Recharge

TODD GROUNDWATER



TODD GROUNDWATER

Figure 5-10
Cumulative Storage Changes
1990 to 2068

6. SUSTAINABLE MANAGEMENT CRITERIA

The Sustainable Groundwater Management Act (SGMA) defines sustainable management as the use and management of groundwater in a manner that can be maintained without causing *undesirable results*, which are defined as significant and unreasonable effects caused by groundwater conditions occurring throughout a groundwater basin:

- Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply
- Significant and unreasonable reduction of groundwater storage
- Significant and unreasonable seawater intrusion
- Significant and unreasonable land subsidence that substantially interferes with surface land uses
- Significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies
- Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water

For these sustainability indicators[4], a Groundwater Sustainability Plan (GSP) must develop quantitative sustainability criteria that allows the Groundwater Sustainability Agency (GSA) to define, measure, and track sustainable management. These criteria include the following:

- Undesirable Result – significant and unreasonable conditions for any of the six sustainability indicators
- Minimum Threshold (MT[5]) – numeric value used to define undesirable results for each sustainability indicator
- Measurable Objective (MO) – specific, quantifiable goal to track the performance of sustainable management
- Interim Milestone – target value representing measurable groundwater conditions, in increments of five years, set by the GSA as part of the GSP.

Together, these sustainability criteria provide a framework to define sustainable management, delineate between favorable and unfavorable groundwater conditions, and support quantitative tracking that identifies problems promptly, allows assessment of management actions, and demonstrates progress in achieving the goal of sustainability.

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[4] If one or more undesirable results can be demonstrated as not present and not likely to occur, a GSA is not required to establish the respective sustainability criteria per GSP Regulations §354.26(d); in the inland Temescal Basin seawater intrusion is not present and not likely to occur.

[5] The abbreviations for Minimum Threshold (MT) and Measurable Objective (MO) are provided because these terms are used often; however, the full unabbreviated term is used when helpful for clarity or when included in a quotation.

6.1. SUSTAINABILITY GOAL

The sustainability goal can be described as the mission statement of the GSA for managing the Basin; it embodies the purpose of sustainably managing groundwater resources and reflects the local community's values—economic, social, and environmental. The sustainability goal for the Temescal Subbasin (Basin), stated below, was developed through discussion at several public meetings with the GSA and the Technical Advisory Committee (TAC).

6.1.1. Description of Sustainability Goal

To sustain groundwater resources for the current and future beneficial uses of the Basin in a manner that is adaptive and responsive to the following objectives:

- Provide a long-term, reliable and efficient groundwater supply for municipal, industrial, and other uses
- Provide reliable storage for water supply resilience during droughts and shortages
- Protect groundwater quality
- Support beneficial uses of interconnected surface waters, and
- Support integrated and cooperative water resource management.

This goal is consistent with SGMA and is based on information from the Plan Area, Hydrogeologic Conceptual Model, Groundwater Conditions, and Water Budget sections of this GSP that:

- Identify beneficial uses of Temescal Basin groundwater and document the roles of local water and land use agencies
- Describe the local hydrogeologic setting, groundwater quality conditions, groundwater levels and storage, and inflows and outflows of the Basin
- Document the ongoing water resource monitoring and conjunctive management of groundwater, local surface water, recycled water and especially imported water sources that help protect groundwater quality and maintain water supply.

6.1.2. Approach to Sustainability Indicators

The approach to assessing the sustainability indicators and setting the sustainability criteria has been based on 1) review of available information from the Plan Area, Hydrogeologic Conceptual Model, Groundwater Conditions, and Water Budget sections of this GSP and 2) discussions with Temescal Basin stakeholders and local agency representatives, for example at TAC meetings and workshops.

This approach has developed since mid-2020 and generally began with definition of what an undesirable result is; this initially has been exploratory and qualitative and based on plain-language understanding of what *undesirable* means. Potential minimum thresholds have been explored in terms of when, where, how long, why, under what circumstances, and what beneficial use is adversely affected. This step identified seawater intrusion as not present and not likely to occur.

Beyond a qualitative identification of undesirable, the approach to defining sustainability indicators varies among the undesirable results. Several of the undesirable results are directly or indirectly related to groundwater levels, including conditions related to groundwater storage, subsidence, and interconnected surface water. The definition began in terms of groundwater levels in individual wells but has recognized that storage depletion, subsidence, and impacts on connected surface water occur as water levels decline. As a result, the sustainability criteria for those indicators are interrelated across space and time, coordinated and as consistent as is reasonable and as available data allow.

The consideration of the causes and circumstances of undesirable results is important in the Basin particularly for groundwater quality because general quality is poor throughout much of the Basin and has been poor for decades. Sustainable management relating to groundwater quality is all about use and management of groundwater without *causing* undesirable results but does not necessarily include reversing natural undesirable conditions. Moreover (per SGMA §10727.2(b)(4)), a GSP may but is not required to address undesirable results that occurred before and have not been corrected by the SGMA benchmark date of January 1, 2015.

While native groundwater quality is poor, salt and nitrate loading are recognized as potential sources of groundwater quality deterioration throughout much the Basin. Such loading has been occurring for more than 100 years, however changes in groundwater quality at depth (where groundwater typically is pumped) will lag behind the salt and nutrient loading at the ground surface by decades. This means that groundwater quality monitoring data can be misleading, sustainability criteria potentially could be reactive to decades-old land use conditions and insensitive to the future, and the effects of management activities will not be seen for decades. Given all that, implementation of management actions is recognized as needed and such actions will be helpful in the long term.

Another important aspect to defining sustainability criteria has been considering what we know and more importantly what we don't know about undesirable results that may be detected or may potentially occur in the Basin. From a big picture perspective, the Basin is well managed—historical groundwater levels have been largely stable, subsidence has not been perceived, groundwater storage has been managed such that recent drought impacts have been minimized, local groundwater quality degradation is being addressed through treatment and blending, and inter-connected surface water and groundwater dependent ecosystems (GDEs) are being maintained. While water resource monitoring has been useful and adaptive, significant data gaps and uncertainties exist. Because groundwater conditions are regarded generally as good and because considerable uncertainties exist, the process of setting sustainability criteria has been directed toward open discussion of uncertainties, in-depth identification of data gaps and the means to fill them, and a strong intention for flexibility and adaptive management.

The intent is to quantify and qualify sustainability criteria such that they guide good management without setting off false alarms or triggering costly, ineffective, or harmful management actions.

6.1.3. Summary of Sustainable Management Criteria

This section documents the six sustainability criteria as relevant to the Basin and as guided by the Sustainability Goal. The GSAs have managed the Basin without experiencing undesirable results, but continuation and improvement is needed of existing management actions—most notably continuing to use imported water and its conjunctive use with groundwater. It also will include improvement and expansion of management actions and monitoring; these are addressed for each sustainability criterion's Measurable Objective in a subsection, Discussion of Monitoring and Management Measures to be Implemented.

While significant and unreasonable undesirable results have not been experienced in the Basin, the following sustainability criteria are defined in this section because potential exists for undesirable results.

- The Minimum Threshold relative to **chronic lowering of groundwater levels** is defined at designated Key Wells by historical groundwater low levels. Undesirable results are indicated when two consecutive exceedances occur in each of two consecutive years, in 60 percent or more of the Key Wells. The Measurable Objective is to maintain groundwater levels above the MTs and to maintain groundwater levels within the historical operating range.
- The Minimum Threshold for **reduction of storage** is fulfilled by the minimum threshold for groundwater levels as proxy. The Measurable Objective for storage is fulfilled by the MT for groundwater levels, which maintains groundwater levels within the historical operating range.
- The Minimum Threshold for **land subsidence** is defined as a rate of decline equal to or greater than 0.2 feet (ft) in any five-year period. This has been considered in terms of a potential cumulative decline equal to or greater than one foot of decline since 2015; 2015 represents current conditions and the SGMA start date. The extent of cumulative subsidence across the Basin will be monitored and evaluated using Interferometric Synthetic Aperture Radar (InSAR) data. Subsidence is closely linked to groundwater levels and it is unlikely that significant inelastic subsidence would occur if groundwater levels remain above their minimum thresholds.
- The Minimum Thresholds for **degradation of water quality** address nitrate and total dissolved solids (TDS). The MT for nitrate is defined initially as no statistically significant increase in the percentage of wells with 5-year average concentrations exceeding the nitrate maximum contaminant limit (MCL) of 45 milligrams per liter (mg/L) based on current conditions (2015 through 2019). The MT for TDS is defined initially as no statistically significant increase in the percentage of wells with 5-year average concentrations exceeding the TDS Secondary MCL of 1,000 mg/L based on current conditions. The Measurable Objectives for both are defined as maintaining or reducing the percentage of wells with average concentrations exceeding the MTs.
- The Minimum Threshold for **depletion of interconnected surface water** is defined as a depth to water of 15 feet in shallow monitoring wells in the southern Prado

area, where declines to lower water levels are correlated with Temescal Basin pumping and/or water levels.

6.2. CHRONIC LOWERING OF GROUNDWATER LEVELS

Chronic lowering of groundwater levels can indicate significant and unreasonable depletion of supply, causing undesirable results to domestic, industrial, or municipal groundwater users if continued over the planning and implementation horizon. As a clarification, drought-related groundwater level declines are not considered chronic if groundwater recharge and discharge are managed such that groundwater levels recover fully during non-drought periods.

Declining groundwater levels directly relate to other potential undesirable effects (for example regarding groundwater storage, land subsidence and interconnected surface water); these are described in subsequent sections. Effects on well users are described here.

Groundwater elevation trends in Basin are documented in Groundwater Conditions Section 4.1; hydrographs of representative wells are presented for the Basin. The Basin is not characterized by overdraft with widespread chronic groundwater level declines. Groundwater levels in broad areas of the Basin have been maintained at relatively high levels because of the availability of imported water supplies. In addition, while groundwater level declines still occur with dry and critically-dry years, recent drought-related declines have not been as rapid or deep as in previous droughts. Many areas of the Basin experienced record lows during the most recent drought. However, the Basin was not marked by reports of significant water level decline impacts to production wells.

6.2.1. Description of Undesirable Results

As groundwater levels decline in a well, a sequence of increasingly severe undesirable results will occur. These include an increase in pumping costs and a decrease in pump output (in gallons per minute). With further declines, the pump may break suction, which means that the water level in the well has dropped to the level of the pump intake. This can be remedied by lowering the pump inside the well, which can cost thousands of dollars. Chronically declining water levels will eventually drop below the top of the well screen. This exposes the screen to air, which can produce two adverse effects. In the first, water entering the well at the top of the screen will cascade down the inside of the well, entraining air; this air entrainment can result in cavitation damage to pumping equipment. The other potential adverse effect is accelerated corrosion of the well screen. Corrosion eventually creates a risk of well screen collapse, which would likely render the well unusable. If water levels decline by more than about half of the total thickness of the aquifer (or total length of well screen), water might not be able to flow into the well at the desired rate regardless of the capacity or depth setting of the pump. This might occur where the thickness of basin fill materials is relatively thin. While describing a progression of potential adverse effects, at some point the well no longer fulfills its water supply purpose and is deemed to have “gone dry.” For the purposes of this discussion, a well going dry means that the entire screen length (to the bottom of the deepest screen) is unsaturated.

For purposes of setting a Minimum Threshold, undesirable results are defined as a well going dry. This appears to be a low standard and not protective of private wells; but this is an initial definition to start the analysis. The rationale is summarized as follows with more explanation in the following sections:

- There are very few active private wells in the Basin (see Section 2.3.2.1). The owners and operators of those wells are known and they have not reported any adverse effects to those wells in the past.
- None of the existing private well owners report that their wells went dry or were otherwise affected during the recent drought. Because of this, some flexibility exists for purposes of analysis.
- Responsibility for potential undesirable results to shallow wells is shared between a GSA and a well owner; there is a reasonable expectation that a well owner would construct, maintain, and operate the well to provide its expected yield over the well's life span, including droughts.
- As discussed below, MTs are set at historical groundwater level lows.
- No private wells have been reported to have water shortages for the Basin in the DWR led *Household Water Supply Shortage Reporting System* (DWR 2021), Including during recent dry periods corresponding to historical groundwater level lows in some monitored wells.

6.2.2. Potential Causes of Undesirable Results

For the Basin, the primary potential cause of groundwater level undesirable results would be reduction of surface water supplies and associated increase in groundwater use and reduction in groundwater recharge from return flows. Reduction of imported water could have direct adverse impacts on municipal and industrial water users throughout the Basin.

Given that the Basin is not characterized by basin-wide chronic groundwater level declines, then the undesirable results of a well losing yield, having damage, or "going dry" represent a more complex interplay of causes and shared responsibility.

Some of the potential causes are within GSA responsibility; most notably, a GSA is responsible for groundwater basin management without causing undesirable results such as chronic groundwater level declines. SGMA also requires that a GSA address significant and unreasonable effects caused by groundwater conditions *throughout the basin.* This indicates that a GSA is not solely responsible for local or well-specific problems and furthermore that responsibility is shared with a well owner. A reasonable expectation exists that a well owner would construct, maintain, and operate the well to provide its expected yield over the well's life span, including droughts, and with some anticipation that neighbors also might construct wells (consistent with land use and well permitting policies). As indicated above, there are very few active private wells in the Basin and those wells have not shown impacts in the past.

6.2.3. Definition of Undesirable Results

As context, the Basin Sustainability Goal has the objective to provide a long-term, reliable and efficient groundwater supply for municipal, industrial, and other uses.

In that light, the definition of undesirable results would be the chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon. This is defined by groundwater conditions occurring throughout the Basin. This definition also recognizes that chronic lowering of groundwater levels could affect groundwater flow to or from the hydraulically connected Bedford-Coldwater, Chino, and Coastal Plain of Orange County basins, and thereby potentially affect the maintenance of sustainability in those basins.

As documented in Groundwater Conditions Section 4.1, analysis of hydrographs reveals that the Basin is not characterized by basin-wide chronic groundwater level declines. While affected at times by drought, groundwater levels in broad areas of the Basin have been maintained at relatively high levels because of the availability of imported water. Moreover, the Basin has not been marked by reports of significant water level decline impacts to shallow supply wells. In the absence of reported well problems, it can be concluded that undesirable results for the chronic lowering of water levels are not occurring in Basin and that the Basin is managed sustainably relative to groundwater levels.

While water levels have declined slightly in recent years due to dry climatic conditions, modeling of future expected conditions show these declines are not expected to continue in the future (see Chapter 5). This finding is consistent with the water budget analyses that indicate (within the range of uncertainty) balanced inflows and outflows in the future.

6.2.4. Potential Effects on Beneficial Uses and Users

Groundwater is a significant source of supply in the Basin and supplies wells municipal, industrial, and other beneficial uses. Groundwater has been and is being used for the range of beneficial uses, even during drought, and with reasonable operation and maintenance by well owners. Historically, changes in water levels in production wells have not correlated with changes in vegetation health or density in the Prado Wetlands (see Sections 4.10.4). The mutual consistency of the water-level MT and interconnected surface water MT is discussed in Section 6.7.4.

6.2.5. Sustainable Management Criteria for Groundwater Levels

The general approach to defining sustainability criteria (minimum thresholds and measurable objectives) for groundwater levels has involved selection of representative monitoring wells (Key Wells), review of groundwater level data, and review of supply well location/construction information to gage potential undesirable effects on wells. Specifically, this has included evaluating historical low levels in Key Wells. This approach is founded on the idea that undesirable results were not reported when groundwater elevations were at their minimum values and therefore returning to those minima should not cause undesirable results in the future.

6.2.5.1. Selection of Key Wells

The approach includes selection of existing monitored wells within the Basin that are or represent active supply wells. Sustainability criteria would be defined for each of these Key Wells and each would be monitored for groundwater levels with respect to MTs and MOs. The Key Wells (**Figure 6-1**) have been identified by reviewing groundwater level hydrographs from all currently monitored wells and selecting wells that have a long, reliable, and recent record of groundwater level monitoring, that represent local or regional trends, and that together provide a broad geographic distribution for the Principal Aquifer, the Secondary Aquifer, and the Basin as a whole. The distribution of these wells also has been reviewed with respect to maps showing density of wells across the Basin (e.g., **Figures 2-5** through **2-8**). These wells are mostly production wells, which is not optimal for monitoring; on the other hand, they are generally representative of production wells.

Groundwater level data and hydrographs of each Key Well have been reviewed to identify the all-time lowest groundwater elevation at each Key Well. As discussed in Groundwater Conditions Section 4.1.3, historical minima in many wells were recorded with the most recent drought, which implies that most currently active wells in the Basin would have experienced those historical minima.

The identified historical low at each Key Wells (i.e., historical maximum depth to water) represents the first approximation of a minimum threshold, with the realization that the final selection of the MT for a Key Well could be adjusted upward to be more protective of nearby supply wells.

6.2.5.2. Evaluation of Existing Wells

Existing wells in the Basin were assessed in the development of water level sustainability criteria. The California Department of Water Resources (DWR) has developed a database of information relating to well locations, use, construction, yield, and other information. By way of background, information on local supply wells has been recorded on Water Well Drillers Reports and is available mostly as paper or scanned copies. DWR has identified 383 individual paper records for wells in the Basin. However, detailed information from most of these records has not been digitized.

Accurate data on the location and elevation of most wells is not available. Most of the wells identified by DWR within the Basin have only been located to the center of a Public Land Survey System (PLSS) section. As a result, precise locations relating to Basin aquifer units and Key Wells are unknown.

In addition, construction information on most wells has not been entered into databases where it can be analyzed readily, and the status of wells is not known. Currently, DWR only has digitized construction information for 53 domestic, agricultural, or other production wells within the Basin. The current status of these wells is unknown, and most are fairly old. Of the 53 domestic, agricultural, or other production wells in the Basin with construction records in the DWR database, only seven were constructed after January 1, 2000 and 41 of the 53 were constructed before 1990. As described in Water Budget Section 5, land use and groundwater production has changed significantly since the late 1980s. Additionally, the GSA agencies are the municipal water purveyors in the Basin and in this capacity they have assessed the presence of private domestic wells in the Basin; no existing active private domestic wells were identified through this assessment.

Given the age of the existing wells, they should have been present during the recent historical groundwater level minima in the Basin. In fact, DWR records indicate that only three wells have been constructed in the Basin since the end of the recent drought. One of these wells (Corona Well 32) is a municipal supply well and the other two are listed as landscape irrigation wells. Given the age of most of the wells in the Basin, the historical minima in Key Wells are deemed to be protective with regard to groundwater level declines. As discussed in Sections 6.2.1 and 6.2.2, groundwater level declines involve a continuum of potential impacts that range from those effects not noticed by the well owner to those that are noticed and reasonably handled by the well owner.

6.2.6. Minimum Thresholds

According to GSP Regulations Section 354.28(c)(1) the minimum threshold for chronic lowering of groundwater levels must be the groundwater elevation indicating a depletion of supply at a given location that may lead to undesirable results. MTs for chronic lowering of groundwater levels are to be supported by information on the rate of groundwater elevation decline based on historical trends, water year type, and projected water use in a basin. However, as documented in the Groundwater Conditions Section 4.1.3, groundwater levels are not chronically declining in the Basin. While groundwater levels decline in dry and critically-dry years, they have recovered in normal, above normal, and wet years. Groundwater levels in many Key Wells were at historical lows during the recent drought (thereby defining the respective MT) but all have since recovered.

Under current conditions, groundwater levels in Key Wells are above the MTs and no undesirable results are known to occur. Nonetheless, MTs have been developed because the potential exists for chronic lowering of groundwater levels.

Using recent and reliable information on the construction of existing supply wells, the MT levels shown in **Table 6-1** are protective of most supply wells, based on available information. The MTs are based on historical low groundwater levels or levels that are higher. Because of this, the MTs are not only protective of local wells but also would help minimize potential impacts on groundwater flow to or from other area, such as the neighboring basins.

Based on historical lows, the MTs account for historical groundwater level variations, and consideration has been given to supporting basin management flexibility, for example to avoid setting off false alarms or triggering costly, ineffective, or harmful management actions. However, MTs have not been adjusted downward at this time, although periods of record for some groundwater level hydrographs are short and may not include actual historical lows that could recur.

Table 6-1. Minimum Thresholds for Groundwater Levels

Local Well Name	Earliest Monitoring Date	Average Depth to Groundwater (ft bgs)	Pump Intake Depth (ft bgs)	Date of Static Maximum Depth to Groundwater	Maximum Static Depth to Groundwater (ft bgs)
Corona 7A	6/1/2002	156.84	230	1/1/2003	178
Corona 8	12/13/2012	112.6	No Pump	5/4/2014	129.5
Corona 8A	1/1/1998	119.69	192	10/1/2001	131
Corona 9A	7/1/2002	80.72	220	7/1/2002	159
Corona 11	7/18/1959	134.14	180	9/13/2017	158
Corona 11A	12/6/2017	143.48	221.2	5/31/2014	155.2
Corona 12A	3/1/1993	158.59	280.3	11/2/2005	164
Corona 13	2/1/1977	141.19	182	6/1/1989	174
Corona 14	2/1/1924	184.92	250	5/1/2009	239
Corona 15	8/13/1952	116.63	171.6	12/1/2004	134
Corona 16	12/13/2012	140.3	No Pump	7/2/2018	159.5
Corona 17A	6/1/2002	110.63	182	5/13/2006	125
Corona 19	4/1/1992	102.73	200	9/1/2003	124.5
Corona 22	4/1/2001	150.19	387	5/1/2004	153.3
Corona 25	4/1/2001	61.71	180	7/1/2003	161.5
Corona 26	5/1/2001	136.86	333	10/1/2004	122
Corona 27	3/1/2003	154.19	436.7	3/3/2020	211
Corona 28	3/1/2003	90.59	174	9/6/2016	95.2
Corona 29	3/18/2009	88.63	230	8/1/2018	88.2
Corona 30	8/28/2009	56.9	No Pump	4/24/2014	70.6
Corona 31	3/18/2009	95.13	217	8/7/2009	132.2
Corona 33	3/13/2019	58.8	255	2/4/2020	68.1
Corona 10th/Lincoln	11/17/2011	197.5	No Pump	9/21/2013	204

6.2.6.1. Minimum Thresholds and Criteria for Undesirable Results

Undesirable results are based on exceedances of MT levels and must be defined not only in terms of how they occur (see Section 6.2.2 Potential Causes of Undesirable Results), but also when and where. By definition, undesirable results are not just drought-related but chronic and are not just local but basin-wide.

The distinction between drought and chronic declines may not be clear when declines are occurring, particularly during drought when it is not known whether subsequent years will bring recovery. Moreover, effects of declining levels on individual well owners may be real problems, whether or not they represent basin-wide sustainability issues.

The groundwater level monitoring program in the Basin is currently primarily monthly, with some wells monitored quarterly. These data will be incorporated into annual GSP reporting as required by SGMA and discussed in Section 7 of this GSP. Accordingly, groundwater level monitoring and annual reporting provides an early warning system that allows response by the GSA and local groundwater users. From this perspective, two consecutive exceedances in each of two consecutive years is regarded as indicating when an undesirable result is occurring. The exceedances would be measured at a Key Well as part of the regular quarterly monitoring program. It should be noted that GSA responses do not have to wait for two years and may involve a staged response as in urban water shortage contingency plans.

To summarize for the Basin:

> The **Minimum Threshold** for defining undesirable results relative to chronic lowering of groundwater levels is defined at each Key Well by historical groundwater low levels. Undesirable results are indicated when two consecutive exceedances occur in each of two consecutive years, in sixty percent or more of the Key Wells.

6.2.6.2. Relationship of Minimum Threshold to Other Sustainability Indicators

The establishment of MTs also needs to consider potential effects on other sustainability indicators. These indicators are discussed later in this section; the following are brief discussions.

- **Groundwater Storage**. The MTs for groundwater levels are protective of groundwater storage. These MTs are defined in terms of historical groundwater low levels and groundwater storage is recovering following the recent historical lows; it is not being depleted. The major concern expressed in the Sustainability Goal is to have reliable storage for drought or shortage; the MTs for groundwater levels will maintain groundwater levels and thus storage, too.
- **Seawater Intrusion.** There is no possibility of seawater intrusion in the Basin. Accordingly, there is no seawater intrusion minimum threshold and no relationship with other minimum thresholds.
- **Subsidence.** Subsidence is closely linked to groundwater levels. It is unlikely that significant inelastic subsidence would occur if groundwater levels remain above

historical levels, which have been used to define groundwater level MTs. Accordingly, the minimum threshold for groundwater levels is consistent with and supportive of the objective to prevent subsidence undesirable results.

- **Water Quality.** General relationships are recognized, for example that contaminants may be mobilized by changing groundwater levels or flow patterns. Maintenance of groundwater levels above historical low levels and within historical ranges would minimize any effects on maintenance of water quality at or above minimum thresholds. The groundwater quality issues in the Basin are associated primarily with salt and nutrient loading and not likely to be affected by groundwater levels or flow within historical ranges.
- **Interconnected Surface Water.** The minimum thresholds for interconnected surface water are shallow groundwater levels in the southern portion of the Prado Wetlands. The storage reduction minimum threshold does not propose decreased groundwater elevations below historical levels, so groundwater levels are expected to remain within the historical range. This means that water table depths in the Prado Wetlands will remain within the historical range, which was adequate to maintain the vegetation in good health.

6.2.6.3. Effect of Minimum Threshold on Sustainability in Adjacent Areas

The Basin shares portions of its boundary with four other basins, the Bedford-Coldwater Basin to the south, the Riverside-Arlington Basin along the Arlington Gap to the east, the Chino Basin on the north, and Coastal Plain of Orange County Basin along the canyon between the Chino Hills and Santa Ana Mountains. Groundwater flows are generally north and west, from the Bedford-Coldwater Basin and from the Chino and Riverside-Arlington basins into the Basin. Bedrock is very shallow in the canyon connecting the Basin to the Coastal Plain of Orange County Basin, forcing groundwater into the Santa Ana River and Wardlow Wash, so little subsurface outflow occurs along this boundary. The groundwater level MTs would support maintenance of groundwater levels above their respective MTs throughout the Basin. This in turn will support maintenance of groundwater levels in all four neighboring basins.

6.2.6.4. Effect of Minimum Threshold on Beneficial Uses and Users

Groundwater is the major source of supply in the GSP Area and supplies wells for municipal, industrial, and other beneficial uses and users. The MTs are based on historical lows, which recognizes that groundwater has been and is being used reasonably for the range of beneficial uses even during drought, and with reasonable operation and maintenance by well owners. The MTs quantify undesirable results as involving two consecutive exceedances in each of two consecutive years, which provides early warning of declining groundwater levels.

6.2.6.5. Relationship of Minimum Threshold to Regulatory Standards

No federal, state or local standards exist for groundwater levels.

6.2.6.6. How Management Areas Can Operate without Causing Undesirable Results

Management areas have not been defined for the Basin so the establishment of MTs has been consistently conceived and applied to the entire Basin.

6.2.6.7. How the Minimum Threshold will be Monitored

Monitoring for the groundwater levels MT will be conducted as part of the ongoing groundwater level monitoring programs performed by the GSA agencies, data and analytical results will be presented in annual reports.

6.2.7. Measurable Objectives

MOs are defined herein as an operating range of groundwater levels, allowing reasonable fluctuations with changing hydrologic and surface water supply conditions and with conjunctive management of surface water and groundwater. The groundwater level MTs represent the bottom of the operating range and are protective of well owners and groundwater users. The top of the operating range is generally where the water table approaches the soil zone and ground surface, except where groundwater and surface water are interconnected or groundwater dependent ecosystems exist. Section 6.7 addresses these areas and potential undesirable results with Depletions of Interconnected Surface Water. With these important exceptions, the top of the operating range is below the soil zone, thereby minimizing potential agricultural drainage problems.

> The **Measurable Objective** is to maintain groundwater levels above the groundwater level MTs (as quantified above or the interconnected surface water MTs, whichever is higher at the relevant measurement event), and to maintain groundwater levels within the operating range as defined in this section.

Groundwater conditions with respect to chronic groundwater level declines are already sustainable. Therefore, no interim milestones are needed to achieve sustainability by 2042.

6.2.7.1. Discussion of Monitoring and Management Measures to be Implemented

Management actions to maintain groundwater levels have been ongoing and effective for decades. These actions (consistent with the Sustainability Goal objective to support integrated and cooperative water resource management) have included developing local surface water for percolation, acquiring imported water for direct use, providing recycled water for irrigation, and other conjunctive use operations. The GSA agencies also have education and outreach programs to promote water use efficiency and to reduce water demand.

Monitoring measures for water levels are discussed in Section 7.

6.3. REDUCTION OF GROUNDWATER STORAGE

Groundwater storage is the volume of water in the Basin; it provides a reserve for droughts or surface water supply shortages. The MT for reduction of groundwater storage is the volume of groundwater that can be withdrawn from a Basin without leading to undesirable results. Undesirable results would involve insufficient stored groundwater to sustain beneficial uses through drought or shortage. The storage criteria are closely linked to groundwater levels. The sustainability indicator for groundwater storage addresses the ability of the groundwater Basin to support existing and planned beneficial uses of groundwater, even during drought and surface water supply shortage.

The water budget has been calculated using the numerical model, as described in Water Budget Chapter 5. In brief, this has included analyses of the cumulative change in storage for the historical and current period, 1993 through 2017, and for simulated future conditions. The future water budget analyses have shown the dynamic effects of drought and changes in groundwater use and indicate that groundwater storage in the Basin can be sustainably managed relative to storage. The water budget inflow and outflows have been balanced over the long term under expected future conditions. Furthermore, as indicated in Section 6.2, none of the water supply wells have been reported as going dry in the Basin during the historical period of record. No private wells have been reported to have water shortages for the Basin in the DWR led *Household Water Supply Shortage Reporting System* (DWR 2021).

6.3.1. Description of Undesirable Results

Given that the Basin has not experienced any impacts to wells related to groundwater storage, the undesirable result associated would be an insufficient supply to support beneficial uses during droughts. Storage is related to groundwater levels. Thus, undesirable results associated with storage would likely be accompanied by one or more undesirable results associated with groundwater levels, including reduced well yields, subsidence, and depletion of interconnected surface water.

6.3.2. Potential Causes of Undesirable Results

For groundwater storage in the Basin, the basic cause of undesirable results would be an imbalance of the water budget, such that outflows exceed inflows resulting in reduction of groundwater storage that adversely affects beneficial uses in the Basin. This imbalance could be caused in turn by reduced surface water supplies and associated groundwater recharge. Such reduction could potentially include the following conditions: 1) increased pumping due to disruption of imported water, 2) reduced percolation from Temescal Wash, 3) reduced natural recharge due to increased impervious area (development), or 4) increased pumping due to reduced recycled/non potable discharge and use. Undesirable results also could occur because of changes in land use causing increased demand for groundwater; this would be most problematic if these land uses do not have access to water supplies other than groundwater.

6.3.3. Definition of Undesirable Results

Undesirable results are defined with the understanding that the objective of groundwater management is to provide reliable storage for water supply resilience during droughts and shortages. Accordingly, the definition of potential undesirable results for storage reduction includes consideration of how much storage has been used historically (i.e., operating storage) and how much stored groundwater reserve is needed to withstand droughts.

In thinking about conceptual operating storage or groundwater reserves, it is important to bear in mind that these are not the total amount of groundwater that could potentially be extracted from the Basin. Most wells are in the range of 50 to 700 feet deep.

The depth of the Basin ranges from near zero feet in some areas to more than 1,200 feet in others (see **Figure 3-11**). Groundwater wells used for water supply are generally located in the Channel Aquifer portions of the Basin (see **Figure 3-10**). Additional groundwater storage could be utilized, with the foremost assumption that withdrawals and reduction are followed by commensurate recharge and recovery. This could occur as part of enhanced conjunctive use programs.

6.3.4. Potential Effects on Beneficial Uses and Users

Groundwater is a source of water supply in the GSP Area and supplies wells for municipal, industrial, and other beneficial uses. Reduction of groundwater storage would reduce access to that supply with adverse effects on the community, economy, and environmental setting of the Basin. However, groundwater has been and is being used for the beneficial uses, even during drought.

6.3.5. Sustainable Management Criteria for Groundwater Storage

The general approach to defining sustainability criteria for groundwater storage has involved review of historical cumulative change in storage and expected future storage declines during droughts. Review of historical change in storage is revealing about how much storage has been used in the Basin, effectively defining an *operating storage*. Similarly, the approach focuses on the beneficial uses of the Basin and acknowledges much of the pumping occurs in larger municipal wells with dynamic operations. Sustainability criteria for groundwater levels also take into account historical ranges and the management of dynamic operation of municipal wells.

6.3.5.1. Description of Change in Storage: Historical and Future Conditions

Figure 5-10 shows the cumulative change in storage for historical conditions (1990 through 2017), the baseline future scenario, and the growth plus climate change future scenario as simulated by the numerical model. Starting from an assigned value of zero at the end of 1989, the storage change in each year is added to the cumulative total of the preceding years. Wet periods appear as upward trends or relative peaks in the cumulative total and droughts appear as downward trends or relative lows. Cumulative storage reached its minimum in 2016, corresponding with the 2014 to 2017 drought period. While the historical period shows a declining trend in storage over the period, the main causes of these declines, including severe dry climatic conditions and high pumping early in the simulation, are not expected to continue in the future.

Table 5-4 shows the average change in storage for the historical period (1993 through 2017), baseline, and the simulated future conditions (baseline and with future demand and supply assumptions).

The cumulative storage declined slightly in the historical period (1993 through 2017) due to increased groundwater pumping and reduced imported water, with an average loss of storage of 194 acre-feet per year (AFY) in the Temescal Basin. Simulated groundwater storage mostly recovered during the one to two years following droughts, but still showed a general decrease in groundwater storage due to increased groundwater production over the same time. Under the future baseline conditions, the average annual change in storage in the Basin is expected to be nearly balanced, with a very slight decrease of 65AFY resulting in stable storage conditions for the Basin over the period. While the overall change in storage is slightly negative, the annual change in storage shows that expected inflows and outflows are evenly balanced. In the future growth plus climate change scenario, the average annual change in storage is an increase of 34 AFY, very slightly larger than baseline conditions as urban growth increases municipal irrigation return flows. Adaptive management will be key to respond to changing conditions including unexpected decreases to natural inflows or unexpected increases in groundwater pumping.

Given the relative stability of storage in the most recent period (2008 to 2017), and future simulations showing expected increases in storage, the current groundwater management practices will likely continue to increase groundwater storage on average and recover from short term droughts on the order of one to five years.

6.3.6. Minimum Threshold

Undesirable results relative to groundwater storage have not occurred in the Basin and numerical modeling of future conditions indicate that groundwater storage can continue to be operated within historical limits. Nonetheless, the potential for reduction of groundwater storage exists (probably involving disruption of imported water supply) and thus this section considers minimum thresholds for storage. According to GSP Regulations, the minimum threshold for storage is to be defined as the maximum groundwater volume that can be withdrawn without leading to undesirable results.

However, GSP Regulations allow the use of the groundwater level sustainability criteria (MTs and MOs) as a proxy for groundwater storage, provided that the GSP demonstrates a correlation between groundwater levels and storage. Groundwater levels and storage are closely related. This is demonstrated by comparison of groundwater level and storage trends, which reveal the same patterns of historical response to drought and recovery. The relationship of levels and storage is embodied in the calibrated numerical model.

The rationale for using groundwater levels as a proxy metric for groundwater storage is that the groundwater level MTs and MOs are sufficiently protective to ensure prevention of significant and unreasonable results relating to storage. In brief, groundwater level MTs have been defined to protect supply wells (see Section 6.2.6) and are based on the following:

- A broad geographic distribution of Key Wells that are representative of Basin production wells
- MTs that are based on historical minimum groundwater levels, consistent with analyses of storage change

- Analysis of existing wells with construction information
- MTs are relatively shallow; as shown in **Table 6-1**, all MTs are relatively shallow in comparison to production well depths
- Groundwater level MTs include two consecutive exceedances in each of two years, providing early warning for storage changes, while also involving sixty percent or more of the Key Wells in the Basin, thus involving a broad area, consistent with storage change

As a practical matter, the availability of groundwater storage will be constrained by water levels (including groundwater level proxies for depletion of interconnected surface water) and given all the above, the MTs for groundwater levels are more than sufficiently protective of groundwater storage.

To summarize for the Basin:

> The **Minimum Threshold** for storage is fulfilled by the minimum threshold for groundwater levels. The **Minimum Threshold** for defining undesirable results relative to chronic lowering of groundwater levels is defined at each Key Well (two consecutive quarters in two years, providing early warning for storage changes, in 60 percent or more of the Key Wells).

The Sustainability Goal for the Basin includes an objective to provide reliable storage for water supply resilience during droughts and shortages. Use of groundwater levels as a proxy also fulfills that objective. No additional MT definition is needed.

6.3.6.1. Relationship of Minimum Threshold to Other Sustainability Indicators

- **Water Levels.** The minimum thresholds for groundwater levels are protective of the beneficial use of the Basin – municipal and industrial water supply; therefore, these levels are protective of and serve as a proxy for groundwater storage and the provision of reliable storage for drought and shortage.
- **Seawater Intrusion.** There is no possibility of seawater intrusion in the Basin. Accordingly, there is no minimum threshold and no relationship with other minimum thresholds.
- **Subsidence.** Subsidence is linked to groundwater levels. Because the storage reduction minimum threshold would not cause water levels to drop below their minimum thresholds, it would not interfere with the subsidence minimum threshold.
- **Water Quality.** Maintenance of groundwater storage within historical ranges would minimize any effects on water quality relative to water quality minimum thresholds. Groundwater quality issues in the Basin are associated primarily with salt and nutrient loading and not likely to be affected by groundwater storage within historical ranges.
- **Interconnected Surface Water.** The minimum thresholds for interconnected surface water are shallow groundwater levels in the southern portion of the Prado

Wetlands. The storage reduction minimum threshold does not propose decreased groundwater elevations below historical levels, so groundwater levels are expected to remain within the historical range. This means that water table depths in the Prado Wetlands will remain within the historical range, which was adequate to maintain the vegetation in good health.

6.3.6.2. Effect of Minimum Threshold on Sustainability in Adjacent Areas

As noted in Section 6.2.6.3, the Basin borders portions of the Bedford-Coldwater Basin to the south, the Riverside-Arlington Basin along the Arlington Gap to the east, the Chino Basin on the north, and Coastal Plain of Orange County Basin at the west where the Santa Ana River exists the Basin. The groundwater level MTs would support maintenance of groundwater levels above their respective MTs throughout the Basin. This in turn will support maintenance of groundwater levels and storage in all four neighboring basins.

6.3.6.3. Effect of Minimum Threshold on Beneficial Uses and Users

Beneficial uses and users of groundwater storage include maintenance of interconnected surface water and associated GDEs and municipal, industrial and other groundwater users. The MTs for groundwater levels are based on historical minima, which recognizes that groundwater has been and is being used reasonably for the range of beneficial uses even during droughts. The storage minimum threshold is consistent with the water level minimum threshold, which means that available storage will be adequate to supply beneficial uses as long as water levels remain above their minimum thresholds.

6.3.6.4. Relationship of Minimum Threshold to Regulatory Standards

Other than SGMA, no federal, state or local standards exist for reduction of groundwater storage.

6.3.6.5. How Management Areas Can Operate without Causing Undesirable Results

Management areas have not been defined for the Basin so the establishment of MTs has been consistently conceived and applied to the entire Basin.

6.3.6.6. How the Minimum Threshold will be Monitored

Monitoring for the groundwater levels MT, which is the proxy for storage, will be part of the GSA groundwater level monitoring program (see Chapter 7). Data and analytical results, including assessment of change in storage, will be presented in GSP Annual Reports.

6.3.7. Measurable Objectives

MOs would be defined as an operating range of groundwater storage, allowing changes in groundwater storage with varying hydrologic and surface water supply conditions and as with conjunctive management of surface water and groundwater. The groundwater level MTs provide a protective level that corresponds to the minimum threshold for storage, which would keep groundwater storage within the historical operating range. The Five-Year GSP Update could include consideration of using more of this storage locally as part of ongoing conjunctive use while also protecting shallow wells.

The **Measurable Objective** for storage is fulfilled by the MT for groundwater levels, which maintains groundwater levels above the historical maximum groundwater depths in each Key Well (as quantified in **Table 6-1**).

Groundwater conditions with respect to depletion of groundwater storage are already sustainable. Therefore, no interim milestones are needed to achieve sustainability by 2042.

6.3.7.1. Discussion of Monitoring and Management Measures to be Implemented

Monitoring and management actions to prevent chronic reduction of groundwater storage and to provide groundwater reserves for drought will be the same as those for maintenance of groundwater levels. No other specific management actions for storage have been identified and no specific implementation is warranted.

6.4. SEAWATER INTRUSION

Seawater intrusion does not occur in the Basin because of its inland location. According to the GSP Regulations, the GSP is not required to establish criteria for such undesirable results that are not likely to occur. Accordingly, the remaining discussion in this section does not address seawater intrusion.

6.5. LAND SUBSIDENCE

Subsidence has not been a known issue in the Basin and undesirable results have not been reported. Nonetheless, the potential has been recognized that subsidence could occur as a result of groundwater pumping and groundwater level declines, typically in areas underlain by thick layers of fine-grained alluvial sediments.

As described in Section 4.3, available information on vertical land displacement (subsidence) includes estimates from InSAR satellite data systems. InSAR data provides mapping of ground surface elevations across the Basin, presented at regular (typically monthly) intervals.

InSAR data are made available by DWR from the TRE Altamira InSAR Dataset with vertical displacement data beginning in June 2015 and in monthly intervals thereafter until September 2019. The accuracy of the InSAR ground surface elevation change estimates is reported to be ±16 millimeters (mm), or ±0.052 feet (Towill 2020). While these data do currently represent a relatively short period of record, the InSAR data do not show significant changes in ground surface elevation in the Basin. The Basin shows small rise and fall within the margin of error throughout. Given the short records of these datasets and small vertical displacements, these data have not been analyzed systematically to identify specific areas that might be subject to long-term subsidence. As datasets are updated, that may be warranted in the future.

Data are limited not only on groundwater-related subsidence, but also potentially associated pumping and groundwater levels. SGMA allows groundwater level data to be used as a proxy for subsidence; however, relationships between pumping, groundwater levels, and subsidence have not been determined to support that. Subsidence information from DWR InSAR data will be reviewed as it becomes available.

6.5.1. Description of Undesirable Results

Land subsidence is the differential lowering of the ground surface, which can damage structures, roadways, and hinder surface water drainage. Subsidence remains a potential risk and inelastic subsidence is irreversible. Potential undesirable results associated with land subsidence due to groundwater withdrawals include the following:

- Potential damage to building structures and foundations, including water facilities, due to variations in vertical displacement causing potential cracking, compromised structural integrity, safety concerns and even collapse.
- Potential differential subsidence affecting the gradient of surface drainage channels, locally reducing the capacity to convey floodwater and causing potential drainage problems and ponding.
- Potential differential subsidence affecting the grade or drainage of other infrastructure such as railroads, roads, and sewers.
- Potential subsidence around a production well, disrupting wellhead facilities or resulting in casing failure.
- Potential non-recoverable loss of groundwater storage as fine-grained layers collapse.

None of these undesirable results has been observed in the Basin. However, subsidence may be subtle and cumulative over time. Accordingly, the potential for future subsidence cannot be ruled out if regional groundwater levels were to decline below historical lows and minimum thresholds.

6.5.2. Potential Causes of Undesirable Results

As described in Section 4.3, changes in ground surface elevations may be caused by regional tectonism or by subsidence related to declines in groundwater elevations due to pumping. Regarding the former, the InSAR data shows a general rising trend in the western portion of the Basin suggesting possible regional tectonic rise. In contrast, inelastic subsidence associated with groundwater pumping and level declines would generally show a long-term downward trend, with greater subsidence occurring during times of groundwater level decline (e.g., drought) and a flattening trend with no recovery during times of rising groundwater levels and reduced pumping (e.g., wet years).

In brief, as groundwater levels decline in the subsurface, dewatering and compaction of predominantly fine-grained deposits (such as clay and silt) can cause the overlying ground surface to settle. Land subsidence due to groundwater withdrawals can be temporary (elastic) or permanent (inelastic). While elastic deformation is relatively minor, fully recoverable, and not an undesirable result, inelastic deformation involves a permanent compaction of clay layers that occurs when groundwater levels in a groundwater basin decline below historical lows. This causes not only subsidence of the ground surface, but also compaction of sediments and loss of storage capacity.

Given the above, the potential for problematic land subsidence is affected by the proportion, overall thickness, and configuration of fine-grained sediments (with greater proportions and thicknesses suggesting greater potential). Because of the variability of local sediments, subsidence also is likely to be geographically variable. Moreover, the potential for subsidence is affected by the history of groundwater level fluctuations, such that areas with previous groundwater level declines may have already experienced some compaction and subsidence.

The potential for subsidence is possible, especially in the deeper portions of the Basin where there is more pumping, but there is no indication that permanent inelastic subsidence has occurred.

6.5.3. Potential Effects on Beneficial Uses and Users

The lack of any reports of undesirable results is an indication of no noticeable effects. However, there is a general awareness in the Basin of subsidence problems in the Central Valley that cause the above listed effects. Nonetheless, some subsidence could have occurred because of historical groundwater level declines without being noticed and could have contributed to drainage or flooding problems, which are also affected by multiple and sometimes more noticeable factors including variable weather, changes in streams and drainage systems, land use changes in the watershed, erosion and sedimentation. Accordingly, continued tracking of subsidence is warranted.

6.5.4. Minimum Threshold

According to the GSP regulations Section 354.28(c)(5) the minimum threshold for land subsidence is defined as the rate and extent of subsidence that substantially interferes with surface land uses. This section first addresses the rate at which subsidence substantially interferes with surface land uses and then describes how available InSAR data can be used to measure rate and extent across the Basin.

> The M**inimum Threshold** for subsidence is defined as a cumulative decline equal to or greater than one foot since 2015, which represents current conditions and the SGMA start date. This corresponds to a rate of decline equal to or greater than 0.2 feet in any five-year period.

The 1-foot criterion is reasonable based on standards for flooding and drainage and on empirical data for well casing collapse:

- In the southwestern part of the Sacramento Valley, where documented cumulative subsidence has reached several feet, video surveys of 88 undamaged wells and 80 damaged wells showed that casing damage was uncommon in wells where subsidence was less than 1 foot (Borchers and Carpenter 2014).

- Ground floor elevations are recommended or required to be at least 1 foot above the Base Flood Elevation in some jurisdictions (see for example FEMA 2011 and City of Temecula 2020). Subsidence above 1 foot may cause some buildings to become flooded.
- The minimum freeboard along roadside ditches is often required to be 1 foot above the maximum anticipated water level (see for example San Diego County 2005). Greater subsidence may cause sewer and stormwater flows to flow in unintended directions.

Subsidence impacts can be relatively rapid and noticeable. However, in the Basin any subsidence in the future is likely to be gradually cumulative as would be its undesirable results. Accordingly, the 0.2 feet per 5-year rate of decline is an appropriate criterion, with the understanding that it will be re-evaluated in the 2027 GSP Update.

Based on available data and using the above criterion, significant and unreasonable subsidence has not occurred since 2015 in the Basin. Moreover, it is unlikely that the criterion will be exceeded in the future as groundwater pumping will be constrained with the MT set for groundwater levels and storage.

The extent of cumulative subsidence across the Basin will be monitored using the InSAR satellite-based data that DWR has been providing on the SGMA Data Portal website. The data consist of a closely spaced grid of elevation points and are characterized by considerable "noise," meaning that adjacent points often have very different readings at the scale of 1 to 2 inches. These data will be smoothed to provide results at a spatial scale at which subsidence would plausibly occur. These values for cumulative elevation change will then be compared annually with the minimum threshold criterion.

6.5.4.1. Relationship of Minimum Threshold to Other Sustainability Indicators

Subsidence is closely linked to groundwater levels. It is unlikely that significant inelastic subsidence would occur if groundwater levels remain above historical levels, which have been used to define groundwater level MOs. In addition, the operationally defined MT levels will prohibit significant pumping if water levels decline below historical lows. Accordingly, the minimum threshold for groundwater levels is consistent with and supportive of the objective to prevent subsidence undesirable results.

The subsidence MT would have little or no effect on other MTs. Specifically, subsidence MTs would not result in significant or unreasonable groundwater elevations, would not affect pumping and change in storage, would not affect groundwater quality, or result in undesirable effects on connected surface water.

6.5.4.2. Effect of Minimum Threshold on Sustainability in Adjacent Areas

As noted in Section 6.2.6.3, the Basin borders portions of the Bedford-Coldwater Basin to the south, the Riverside-Arlington Basin along the Arlington Gap to the east, the Chino Basin on the north, and Coastal Plain of Orange County Basin at the west where the Santa Ana River exists in the Basin. The groundwater level MTs would support maintenance of groundwater levels above their respective MTs throughout the Basin. This in turn will support maintenance of groundwater levels above historical minima and, thus, subsidence affecting other basins is not expected to occur.

6.5.4.3. Effect of Minimum Threshold on Beneficial Uses and Users

Subsidence problems have not been reported in the Basin, but subsidence remains a potential undesirable result that may contribute incrementally to reduced drainage, increased flooding, or other undesirable results. The effects of establishing the numerical subsidence MT are beneficial because they support a greater chance of detecting subsidence, supporting management actions to maintain groundwater levels, and preventing significant subsidence.

6.5.4.4. Relationship of Minimum Threshold to Regulatory Standards

There are no federal, state or local standards specifically addressing subsidence. There are standards for flood depth, floodplain encroachment, freeboard in ditches and canals and slopes of gravity-flow plumbing pipes. These vary somewhat from jurisdiction to jurisdiction, but they are generally similar and were used as the basis for selecting the MT.

6.5.4.5. How Management Areas Can Operate without Causing Undesirable Results

Management areas have not been defined for the Basin so the establishment of MTs has been consistently conceived and applied to the entire Basin.

6.5.4.6. How the Minimum Threshold will be Monitored

The minimum threshold will be monitored using InSAR areal data. Cumulative subsidence will be monitored using the InSAR satellite-based geodetic data that DWR has been providing on the SGMA Data Portal website. The data are “raster” data sets consisting of a grid of elevation points spaced approximately 300 feet apart. The InSAR data will be evaluated to identify any occurrence and areal extent of subsidence. As data are provided over the next few years, this evaluation will involve review of temporal InSAR data to discern seasonal elastic fluctuations and potential inelastic declines. In addition, any areal extent will be examined; this may involve smoothing of elevation changes over the InSAR grid to summarize the results to a spatial scale at which subsidence would plausibly occur. The cell values for cumulative elevation change will then be compared with the minimum threshold criterion.

6.5.5. Measurable Objectives

The Sustainability Goal includes the objective to prevent subsidence. Accordingly, the MO is zero subsidence. Undesirable subsidence results have not occurred, and accordingly, no interim milestones are defined.

6.5.5.1. Representative Monitoring

It is assumed that the InSAR subsidence monitoring programs will continue for the foreseeable future and InSAR data will be available from the DWR website. The GSP monitoring program for subsidence will involve annual download of InSAR data with analysis for signs of cumulative inelastic subsidence.

6.5.5.2. Discussion of Management Actions to be Implemented

Management actions to prevent subsidence will be coordinated with actions relative to maintenance of groundwater levels. These actions involve maintaining groundwater levels above historical low water levels and will prevent significant inelastic subsidence. No other specific management actions for subsidence have been identified and no specific implementation is warranted.

6.6. DEGRADATION OF WATER QUALITY

Degraded water quality can impair water supply and affect human health and the environment. Impacts to drinking water supply wells can result in increased sampling and monitoring, increased treatment costs, use of bottled water, and the loss of wells. As described in Groundwater Conditions Sections 4.5 and 4.6, elevated concentrations in drinking water of some constituents, such as nitrate, can adversely affect human health. Impacts to agricultural supply can include reduced yields, the need to change irrigation methods/sources, and other economic effects. Discharge of degraded groundwater can harm ponds, wetlands, and associated ecosystems (e.g., eutrophication).

Consideration of the causes and circumstances of water quality conditions is important in the Basin because general mineral quality (e.g., TDS, etc.) is naturally poor throughout much of the Basin, has been poor for decades, and nonetheless has been used for beneficial purposes including irrigation, municipal, and domestic purposes. The main beneficial use in the Basin is municipal supply and Corona uses blending with imported water and treatment to meet federal, state, and local drinking water guidelines.

Sustainable management is about use and management of groundwater without causing undesirable results but does not necessarily include reversing natural undesirable conditions. According to SGMA (§10727.2(b)(4)), a GSP may—but is not required to—address undesirable results that occurred before and have not been corrected by the SGMA benchmark date of January 1, 2015.

Given all that, the sustainability goal—to protect groundwater quality—is not to reverse undesirable water quality conditions by 2042 but rather to prevent circumstances wherein future management activities might make water quality worse and insofar as possible to improve water quality in the long run. Implementation of management actions is recognized as needed now and, whether or not the results are perceptible in the short term, such actions will be helpful in the long term.

6.6.1. Potential Causes of Undesirable Results

The quality of groundwater in the Basin is characterized as somewhat mineralized, reflecting natural hydrogeologic processes (see Groundwater Conditions Section 4.4). Groundwater also has been affected by human activities including agricultural, rural, urban, and industrial land uses. While contaminant sources of groundwater quality degradation exist, these are effectively regulated as described in Groundwater Conditions Section 4.6 and regularly tracked as part of the GSA’s monitoring program.

As described in the Groundwater Conditions section, total dissolved solids (TDS) and nitrate are constituents of concern for the Basin. While there are elevated natural background TDS concentrations in groundwater, TDS also is an indicator of human impacts including infiltration of urban runoff, agricultural return flows, and wastewater disposal. Natural nitrate levels in groundwater are generally very low, and elevated concentrations are associated with agricultural activities, septic systems, landscape fertilization, and wastewater treatment facility discharges.

Other constituents have been documented (see Groundwater Conditions Section 4.8) but occurrences of these are either under regulation by RWQCB (e.g., perchlorate) or are naturally occurring with no recent exceedances of MCLs and limited potential for mobilization due to management actions (e.g., arsenic, chromium, iron, and manganese).

6.6.2. Description of Undesirable Results

The processes and criteria relied on to define Undesirable Results included review of available data and information summarized in the Plan Area and Groundwater Conditions sections and discussions with Temescal Basin stakeholders and local agency representatives.

Undesirable Results are defined in the GSP Regulations (§354.26) as occurring when significant and unreasonable effects for any of the sustainability indicators are caused by groundwater conditions occurring throughout the Basin. The GSA is not responsible for local problems or degradation caused by others. While the Basin includes regulated facilities with soil and groundwater contamination (see Groundwater Conditions Sections 4.4 and 4.7), these sites are under regulatory oversight by State agencies; the GSA does not have the mandate or authority to duplicate these programs. Nonetheless, the GSA plans to regularly cooperate with these agencies and check regulator files regularly as part of its water quality monitoring program. In addition, this GSP avoids management actions that would spread groundwater contamination through managed aquifer recharge, pumping, or other activities.

In fact, the GSA agencies have historically conducted management actions and programs (often in cooperation with other agencies) to improve groundwater quality. These activities have included treatment of groundwater and imported surface water for municipal use (which improves wastewater quality), wastewater treatment plant improvement and water recycling, and programs to reduce urban and agricultural salt and nutrient loading.

6.6.3. Potential Effects on Beneficial Uses and Users

Groundwater is a source of supply in the GSP Area and supports a range of beneficial uses: agricultural, municipal, rural, and environmental. Beneficial uses of water and respective water quality objectives are defined by the RWQCB in the Santa Ana Basin Water Quality Control Plan (Basin Plan). For TDS and nitrate, these are tabulated in the GSP Groundwater Conditions (Section 4.5 Key Constituents of Concern); this section indicates that water quality in the Basin is naturally mineralized and affected by human activities and has not been shown to change significantly. It is recognized that groundwater has been and is being used for the range of beneficial uses with reasonable accommodation by users. Blending and treatment of groundwater for municipal supply has been successful to provide drinking water to the Basin. This recognition does not preclude or ignore a desire by the community or intent of local agencies including the GSA to improve local groundwater quality.

6.6.4. Sustainable Management Criteria for Groundwater Quality

The definition of an Undesirable Result due to degraded water quality—TDS and nitrate concentrations—was evaluated in the context of regulatory objectives in the Basin.

GSP regulations require that the minimum threshold for degraded water quality be based on "the number of supply wells, a volume of water, or a location of an isocontour that exceeds concentrations of constituents determined by the agency to be of concern for the basin" (§354.28(4)). The number of supply wells are considered here for the minimum threshold. This is because the issues of concern in the Basin are focused on regional nitrate and salt loading, data are insufficient to define plumes or volumes of water, and the position of an isocontour is not applicable.

6.6.4.1. Temescal Water Quality Monitoring Program

The GSA agencies established a water quality monitoring program for the protection of beneficial uses, understanding of human and natural factors that affect water quality, and support for groundwater management decisions. The City of Corona (Corona) has been the primary agency implementing this program in the Basin and regularly monitors groundwater production wells as well as select dedicated monitoring wells. The network of wells historically has been focused on the Channel Aquifer where Corona pumps most of its water for municipal supply. The wells generally are sampled quarterly with lab analysis for general minerals, physical parameters, and selected constituents of concern. Accordingly, this data set can be used to detect a range of problems quickly, to track trends, allow geochemical investigation, and support focused management actions.

In addition, the GSA will regularly compile, reviews, and summarizes all available information on water quality in the Basin from the groundwater ambient monitoring program (GAMA) Groundwater Information System (SWRCB 2020b).

Limitations of this data set include the uneven and potentially shifting distribution of sampled wells across the Basin, lack of information on the vertical zone being sampled (well construction information), relatively less frequent sampling schedule and absence of historical record, variable data availability on specific constituents and parameters, and multiple sources of information from programs with differing objectives and procedures. These limitations present significant uncertainties to the GSA and stakeholders who are required to establish quantitative, measurable criteria and then comply with them, with real-world consequences.

6.6.5. Minimum Thresholds

Minimum Thresholds (MTs) are presented for nitrate and TDS using the best available information, namely data generated by the Water Quality Monitoring Program and compiled data. As summarized above, the limitations of this data set are recognized, and additional investigations and monitoring program improvements will be presented in this GSP for planned implementation. With adaptive management in mind, MTs may be revised to rely more on the GSA in the future as needed.

The MTs for nitrate and TDS quantify current conditions (2015 through 2019) based on available monitoring data. Water quality monitoring serves two useful purposes. First, it will eventually confirm whether concentrations begin leveling off as intended. Second, it can detect local sources of degradation that impact groundwater quality more strongly and rapidly than the slow, dispersed loading from agricultural activities. Early detection of local impacts can enable appropriate actions to halt further contamination before the impacts become severe or widespread.

6.6.5.1. Minimum Threshold for Nitrate (NO_3)

Table 6-2 summarizes current conditions for nitrate in reference to the maximum contaminant level (MCL) for nitrate as nitrate (NO_3) in drinking water, 45 mg/L, which also is the Basin Plan Objective for municipal use. Current conditions are expressed in terms of the percent of wells with concentrations over 45 mg/L. To compute the percent of wells, nitrate sampling results were compiled for each well over the period 2015 through 2019. For wells with one sample, the single value was used; for wells with two samples, the average value was used; and for wells with three or more values, the average value was used. Accordingly, each well was represented by one value. This was followed by computation of the percentage of wells with concentrations exceeding 45 mg/L.

This process of summarizing current conditions makes use of all available data. It also is recognized that the data are not representative of water supply conditions throughout the Basin because the geographic distribution of wells is uneven and information from shallow and deep wells are combined. Monitoring program improvements will be implemented as part of the GSP to improve the data set (see Section 6.6.6.2) and provide a more reasonable basis for sustainability criteria.

Table 6-2. Summary of Current Conditions for Nitrate (NO_3) and TDS

Water Quality Parameter	Minimum Threshold (MT)	Total Wells	Number of Wells Exceeding MT	Percent of Wells Exceeding MT
Nitrate as Nitrate (NO_3)	45 mg/L	24	12	50 percent
TDS	1,000 mg/L	23	6	26 percent

As documented in **Table 6-2**, there are wells in the Basin yielding water with nitrate concentrations exceeding the MCL. While recognizing the number of wells affected by high nitrate concentrations, there has been historical and ongoing groundwater use with reasonable accommodation by users and accordingly, these conditions are considered sustainable.

Despite the significant uncertainties, the following MT is presented as a starting point for maintenance and planned improvement of groundwater quality for the 2042 deadline for sustainability.

> The **Minimum Threshold** for nitrate is defined initially as the percentage of wells with concentrations exceeding the nitrate MCL (45 mg/L) based on current conditions (2015-2019).

Given the above definition, the MT for nitrate is expressed in **Table 6-2**. This MT refers to the numeric MCL and Basin Plan objective, honors the non-degradation policy, and quantifies current conditions based on available data. As described in the following section, Measurable Objectives, the approach is to implement management actions that will maintain or reduce nitrate concentrations in the future.

6.6.5.2. Minimum Threshold for Total Dissolved Solids

Table 6-2 summarizes current conditions for TDS with reference to the 1,000 mg/L secondary maximum contaminant level (SMCL). This value is far from ideal, but reflects the widespread conditions of elevated TDS concentrations in groundwater. The main beneficial use in the Basin is municipal supply and Corona uses blending with imported water and treatment to meet federal, state, and local drinking water guidelines.

As with nitrate, computation of the percent of wells in **Table 6-2** involved compilation of sampling results for each well over the period 2015 through 2019. For wells with one sample, the single value was used; for wells with two samples, the average was used; and for wells with multiple values, the average was used, such that each well was represented by one value. This was followed by computation of the percent of wells with concentrations exceeding 1,000 mg/L.

This process makes use of all available data. The data are not representative of water supply conditions throughout the Basin because the depths and geographic distribution of wells is uneven. Monitoring program improvements will be implemented as part of the GSP to improve the data set and provide a more reasonable basis for sustainability criteria.

Despite the uncertainties, the following MT is presented as a starting point for maintenance and planned improvement of groundwater quality for the 2042 deadline for sustainability.

> The **Minimum Threshold for TDS** is defined initially as the percentage of wells with concentrations exceeding the TDS value of 1,000 mg/L based on current conditions (2015-2019).

As with nitrate, this MT is presented with full recognition of data gaps and uncertainties, and with the commitment incorporated in this GSP to investigate nitrate and salt loading under current conditions and to expedite management actions for reduction of nitrate and salt loading.

Accordingly, the TDS MT is expressed in **Table 6-2**. This MT refers to the numeric Basin Plan objective, honors the non-degradation policy, and quantifies current conditions based on available data. Given historical and ongoing groundwater use, these conditions are considered sustainable. As described in the following section, Measurable Objectives, the approach is to implement management actions that will maintain or reduce nitrate concentrations in the future.

6.6.5.3. Relationship of Minimum Threshold to Other Sustainability Indicators

Three of the other sustainability indicators (groundwater level declines, storage depletion, subsidence) are directly linked to groundwater levels, while the sustainability indicator for connected surface water-groundwater dependent ecosystems is related to a rate or volume of surface water depletion, also linked to groundwater levels. The MTs for water quality are not known to be directly related to specific groundwater levels or fluctuations in groundwater levels. Nonetheless, general relationships are recognized, for example that contaminants may be mobilized by changing groundwater levels or flow patterns. Accordingly, the water quality MTs will help guide potential projects that alter groundwater levels or flow.

6.6.5.4. Effect of Minimum Threshold on Sustainability in Adjacent Areas

The Basin borders portions of the Bedford-Coldwater Basin to the south, the Riverside-Arlington Basin along the Arlington Gap to the east, the Chino Basin on the north, and Coastal Plain of Orange County Basin at the west where the Santa Ana River exists in the Basin. The MTs for the Basin represent current conditions; establishment of MTs and maintenance of such conditions, which reflect native conditions, would not affect the ability of the neighboring basins to achieve or maintain sustainability.

As consideration beyond the requirements of this section, some management actions to improve groundwater quality in the Basin (for example enhancing outflow of poor-quality groundwater) could potentially have adverse impacts downstream. However, potential impacts of management actions and projects will be addressed through the California Environmental Quality Act (CEQA). Overall improvement of the Basin groundwater quality through other management actions (e.g., increased CVP percolation with maintenance of outflow) would be beneficial.

6.6.5.5. Effect of Minimum Threshold on Beneficial Uses and Users

The establishment of the MTs reflects the current condition of the Basin relative to nitrate and TDS concentrations, insofar as available data and monitoring allow us to know. Establishing the MTs represents no change and recognizes that groundwater has been and is being used reasonably for the range of beneficial uses. The MTs represent a quantified starting point for protection of groundwater quality and for projects and management actions to improve groundwater quality, consistent with a best management practices approach.

6.6.5.6. Relationship of Minimum Threshold to Regulatory Standards

The MTs have been established with direct reference to regulatory standards, most notably the Maximum Contaminant Levels, drinking water standards set by the State of California, while recognizing that current nitrate and TDS concentrations in many wells do not meet regulatory standards. It should be noted all water delivered to users in the Basin met all drinking water standards, as achieved through blending and treatment.

6.6.5.7. How Management Areas Can Operate without Causing Undesirable Results

Management areas have not been defined for the Basin so the establishment of MTs has been consistently conceived and applied to the entire Basin.

6.6.5.8. How the Minimum Threshold will be Monitored

The GSP is using the best available information, namely data from the GSA's Water Quality Monitoring Program and available data from GAMA. The GSA's Water Quality Monitoring Program, along with its regular sampling schedule, historical records, and data on specific constituents and parameters will be the primary basis for MT tracking with reference to GSP 5-year updates.

6.6.6. Measurable Objectives

The sustainability goal is to protect groundwater quality, with general objectives of maintaining groundwater quality, preventing circumstances where future management activities might make water quality worse, and improving groundwater quality in the long run. In setting Measurable Objectives (MOs), a key issue is legacy loading, where the amount of historical loading is not known nor is the rate at which it is moving down to affect deep pumping zones. Because of the uncertainties associated with legacy loading, the use of water quality monitoring to track or verify sustainability needs to be tempered with a broad margin of operational flexibility. This margin should acknowledge the possibility (and even likelihood) that monitoring could indicate undesirable results—those stemming from past practices—while present reductions in loading are not yet perceptible.

6.6.6.1. Description of Measurable Objectives

Measurable Objectives are defined in this GSP using the same metrics and monitoring data as used to define Minimum Thresholds and are established to maintain or improve groundwater quality. Given the significant uncertainties presented by legacy loading and by data limitations, a reasonable margin of safety includes the possibility of "negative" monitoring results while positive progress is being made.

> The **Measurable Objective for nitrate** is defined as maintaining or reducing the percentage of wells with average concentrations exceeding the nitrate MCL (45 mg/L) based on conditions documented in GSP 5-year updates.
>
> The **Measurable Objective for TDS** is defined as maintaining or reducing the percentage of wells with average concentrations exceeding the TDS value of 1,000 mg/L based on conditions documented in the GSP 5-year updates.

Measurable Objectives will be evaluated in increments of five years and the numeric values will be presented with comparison to the Current Conditions. This comparison will be discussed in the context of actual progress in implementing measures to improve monitoring and management.

6.6.6.2. Discussion of Monitoring and Management Measures to be Implemented

The strategy of this GSP is to identify and implement monitoring and management measures to reduce nitrate and salt loading. Monitoring and management actions already undertaken are summarized in Plan Area Section 2 and would be continued, most notably including the following:

- Corona water treatment that continues to use imported water and thereby improve wastewater quality.
- Corona wastewater treatment improvements (nitrate reduction) and water recycling.

Additional **management measures** include the following:

- Development of a stormwater recharge program including cooperation with local agencies to prepare a Storm Water Resource Plan, with identification of opportunities to increase recharge using local storm runoff.
- Analysis of Basin outflows relative to salt management.
- Enhanced outreach to Temescal Basin stakeholders (including disadvantaged communities) on groundwater quality issues.

6.6.6.3. Description of Reasonable Pathway

Implementation of this GSP will include regular updates on a five-year basis. This will include evaluation of Measurable Objectives with comparison to Current Conditions (2015-2019). Because groundwater quality conditions are considered sustainable, interim milestones toward sustainability are not relevant. These comparisons will be discussed in the context of actual progress in implementing measures to improve monitoring and management.

A first step along the pathway will be analysis of the triennial data set used to establish criteria. A subset of the wells will be selected considering factors such as: uniform geographic representation, availability of well depth information, and continuity from one triennial period to the next. This first step will be completed during the first five years of GSP implementation.

The Management Actions and Implementation Plan sections of this GSP are intended to provide additional detail on the scope, scheduling, and estimated costs of the measures to be implemented.

6.7. DEPLETIONS OF INTERCONNECTED SURFACE WATER

This section builds and extends the discussion of interconnection of surface water and groundwater presented in in Section 4. That section provided information on surface water-groundwater connections (both seasonally and with wet years and drought), identification of potential groundwater dependent ecosystems (GDEs), distribution of riparian vegetation, and assessment of animal species that rely on groundwater-supported streamflow. Briefly, the analysis found that the only location within the Basin where pumping might affect surface flow or vegetation is along the southern edge of Prado Wetlands. Small patches of riparian vegetation in canyons where tributary streams enter the west side of the Basin are supplied by groundwater discharging from bedrock uplands and are not affected by pumping in the Basin. No isolated springs or seeps are located in the Basin.

6.7.1. Description of Undesirable Results

If a stream is hydraulically connected to groundwater, pumping from nearby wells can reduce the amount of stream flow by intercepting groundwater that would have discharged into the stream or by inducing seepage from the stream. Undesirable results associated with stream flow depletion include reduced quality and quantity of aquatic and riparian habitats and reduced water supply to downstream users. Areas of interconnected surface water can also contain riparian vegetation that relies on shallow groundwater as an important source of water. Conceptually, adverse impacts for stream and riparian habitat can result from decreased rainfall, decreased stream flow, and lowered groundwater levels. These variables are highly correlated in time: droughts include rainfall reductions, decreased stream flows, and lowered groundwater levels at a time when habitat impacts are usually the most severe. Furthermore, droughts and wet periods are a natural feature of California's climate and are associated with waxing and waning of habitat conditions.

6.7.2. Potential Causes of Undesirable Results

Depletion of interconnected surface water by groundwater pumping can impact a variety of beneficial uses of surface water. A systematic evaluation of each potential impact is warranted, including impacts on downstream water users, and plants and animals that rely on flow or shallow water table conditions along streams.

6.7.2.1. Surface Water Users

There are no known diverters of surface water from Temescal Wash in the Basin. However, the Wash is tributary to the Santa Ana River, which is a source of supply to Orange County Water District downstream of Prado Dam. Pursuant to a 1968 agreement with Western Municipal Water District (WMWD), the Corona is required to discharge 1,625 acre-feet (AF) of water from Temescal Wash into the Prado Wetlands. That amount is equivalent to a continuous flow of 2.25 cubic feet per second (cfs) and has always been met by discharges of recycled water from Water Reclamation Facility 1 (WRF-1) to the lined reach of Temescal Wash upstream of the wetlands.

Groundwater discharge into the Prado Wetlands is apparently not viewed as a significant source of supply to downstream surface water users, based on active efforts over the past two decades to eliminate groundwater discharge into the wetlands from the Chino Basin. The Regional Water Quality Control Board mandated that the Chino Basin be operated to achieve "hydraulic control", which means eliminating groundwater discharge into the Wetlands (WEI 2019). The objective is to prevent saline groundwater in the area from seeping into the Santa Ana River. Beginning in 2000 and increasing in stages since then, the Chino Desalter Wells now pump approximately 30,000 AFY of groundwater, most of which would otherwise discharge into the Prado Wetlands. This decrease in groundwater inflow has been offset by increases in surface water inflow, primarily discharges of reclaimed water from treatment plants along the Santa Ana River and its tributaries.

The expectation that flow requirements of Prado Wetlands and downstream water users will be met by surface inflows to the Wetlands rather than groundwater inflow is echoed in the Upper Santa Ana River Habitat Conservation Plan (SARHCP, ICF 2020). The plan notes that simulations using a regional groundwater model project about 5 feet of groundwater decline in the Prado Wetland area by 2030. However, no mitigation measures or management actions related to groundwater are included in the plan.

Groundwater discharge from the Basin into the Prado Wetlands is not expected to decrease in the future because groundwater levels are not expected to decrease. This assertion stems from the lack of long-term declines in water levels since at least 2005 (see **Figure 4-23**) and the selection of minimum historical water levels as the minimum thresholds for water levels in this GSP (see Section 6.2.6). However, the preceding discussion indicates that an increase in groundwater pumping resulting in slightly lowered groundwater levels and reduced groundwater discharge into Prado Wetlands would not cause an undesirable result for downstream water users.

6.7.2.2. Animals Dependent on Groundwater

The primary animal species that depend on groundwater in the Basin are birds that inhabit riparian vegetation in the Prado Wetlands, including several listed species. The nexus between groundwater and those species is via the extent and health of riparian vegetation, discussed below.

6.7.2.3. Riparian Vegetation

The beneficial use of interconnected surface water with the greatest potential to be impacted by groundwater pumping is riparian vegetation along the southern edge of the Prado Wetlands, where the Basin groundwater discharges into the Wetlands. As described above (Section 6.7.2.1 Surface Water Users), the Wetlands are presently sustained almost entirely by surface water inflow rather than groundwater discharge. Although substantial or long-term decreases in groundwater discharge from the Basin into the Prado Wetlands are not expected, they would tend to cause vegetation die-back along the southern fringe of the Wetlands by lowering the water table to a depth beyond the reach of vegetation roots.

6.7.3. Definition of Undesirable Results

The Sustainability Goal includes an objective to support beneficial uses in the Basin, and specifically those related to interconnected surface water. Consistent with that objective, undesirable results of excessive depletion of surface water are:

> Riparian vegetation die-back or mortality during droughts of a magnitude that disrupts ecological functions or causes substantial reductions in populations of riparian-associated species.

6.7.4. Potential Effects on Beneficial Uses and Users

The analysis presented in this section demonstrates that groundwater conditions are currently sustainable with respect to interconnected surface water and GDEs. There are no users of surface water in the Basin, and the needs of Santa Ana River users downstream of the Basin appear to be met by surface inflows to the Prado Wetlands and past Prado Dam. Although lowering of the water table in the Prado Wetlands could stress or kill riparian vegetation, the extent and health of riparian vegetation do not appear to be correlated with groundwater levels in water supply wells in the Basin (see Section 4.10.4).

6.7.5. Sustainable Management Criteria for Interconnected Surface Water

SGMA requires that the minimum threshold for depletions of interconnected surface water shall be the rate or volume of surface water depletions caused by groundwater use that has adverse impacts on beneficial uses of the surface water and may lead to undesirable results (§354.28(c)(6)). However, GSP Regulations allow GSAs to use groundwater elevation as a proxy metric for any of the sustainability indicators when setting minimum thresholds and measurable objectives (23 CCR § 354.28(d) and 23 CCR § 354.30(d)).

It would be difficult to define a minimum threshold in terms of flow depletion in this Basin because phreatophytic riparian vegetation in the Prado Wetlands is more dependent on surface inflows from outside the Basin (that is, from the Santa Ana River) than from groundwater discharge within the Basin. Also, groundwater does not need to discharge at the land surface to support vegetation; it only needs to rise up to the root zone. Thus, it is reasonable to define the minimum threshold in terms of water levels instead of flow.

6.7.6. Minimum Threshold

Given the above, the minimum threshold is defined here by groundwater levels. As noted previously, wells in the groundwater level monitoring program are production wells with relatively deep screens that have not been sited and designed for tracking surface water-groundwater interactions or water table depths in areas of riparian vegetation. The lack of such shallow monitoring wells is a data gap and a source of uncertainty. Hence, the minimum threshold described here is initial. Nonetheless, it is intended to be protective of GDEs until the monitoring program can be refined to better represent water-table depths along the southern edge of the Prado Wetlands.

Therefore, in the Basin:

> The **Minimum Threshold** for depletion of interconnected surface water is the amount of depletion that occurs when the depth to the water along the southern edge of the Prado Wetlands is greater than 15 feet for a period exceeding one year.

This threshold corresponds approximately to the maximum depth to water measured in shallow monitoring wells in the northern part of the Prado Wetlands.

Undesirable results are considered to commence if the water-table depth along the southern edge of the Prado Wetlands declines below the MT and the decline correlates with declining water levels in production wells in the Basin.

6.7.6.1. Relationship of Minimum Threshold to Other Sustainability Indicators

- **Groundwater Levels.** The water level MTs are set to equal the minimum historical water levels in existing monitored wells, all of which are over 1 mile from the Wetlands. The now-destroyed Butterfield Park Well was much closer to the Wetlands than the other monitored wells, and its water levels indicated that groundwater elevations and depths to water decreased continuously from the production wells in the center of the Basin to the Prado Wetlands. Assuming hydraulic connection between those two locations, the water level MT should prevent the water table at the edge of the Wetlands from declining below the historical minimum. Water levels in shallow monitoring wells in the northern part of the Prado Wetlands either did not decline much during the 2013 to 2015 drought or declined slightly to reach their lowest historical levels. There did not appear to be widespread die-back of vegetation in the Prado Wetlands during the 2013 to 2015 drought. Historical aerial photos confirmed a substantial reduction in riparian tree/shrub canopy coverage along the lowermost reach of Temescal Wash, where it enters the Prado Wetlands (a roughly 8,300-foot reach from North Lincoln Avenue to below West Rincon Avenue) (McMichael 2021). However, the decrease in vegetation appeared to start around 2009 (before the drought) and has been attributed to decreased base flow in Temescal Wash (McMichael 2021). The period of record for the Butterfield Park Well is only 2011 through 2017, so it is not possible to correlate the change in vegetation with groundwater levels over the entire period of interest. However, the MT for interconnected surface water is consistent with the water-level MT in that they both avoid water levels lower than historical minimum levels, which in most wells occurred during the 2013 to 2015 drought. Thus, the two MTs are consistent, and managing for one would not impact managing for the other.

- **Groundwater Storage.** The minimum threshold for interconnected surface water would similarly be consistent with the minimum threshold for groundwater storage near GDE reaches, because the latter is functionally the same as the minimum threshold for water levels.
- **Seawater Intrusion.** Seawater intrusion would not occur in the Basin due to its inland location. No minimum threshold was defined and there is no consistency issue.
- **Land Subsidence.** Significant land subsidence is only likely to occur with groundwater levels below historical minimum levels. The levels specified as minimum thresholds for interconnected surface water are thought to be within the historical range and thus unlikely to cause subsidence.
- **Water Quality.** Water quality issues in the Basin are primarily associated with dispersed loading of nitrate and salinity and long-term increases in ambient concentrations of those constituents. Those processes are generally independent of groundwater levels.

6.7.6.2. Effect of Minimum Threshold on Sustainability of Adjacent Areas

The Basin is separated from the Bedford-Coldwater Basin by a reach of Temescal Wash that flows over bedrock. Changes in groundwater-surface water interactions in the Basin would not propagate upstream to the Bedford-Coldwater Basin. The hydraulic connection between the Basin and the Arlington Basin is small and far from the Prado Wetlands. Water levels at the edge of the Wetlands would not affect flow across that boundary. The Chino Basin abuts the Basin beneath the Prado Wetlands. The Chino Basin does not rely on northward flow of groundwater from the Basin. On the contrary, basin operation in the Chino Basin seeks to minimize southward groundwater flow. The adjacent area with the greatest potential to be affected is Orange County downstream of Prado Dam. However, those areas are not heavily reliant on groundwater outflow from the Basin (see Section 6.7.2.1 Surface Water Users), and the minimum threshold for interconnected surface water would ensure that outflow does not drop below the historical minimum in any case.

6.7.6.3. Effect of Minimum Threshold on Beneficial Uses

Surface diversions are not a source of supply in the Basin; all water uses are supported by imported water or groundwater. With respect to groundwater, this GSP does not propose decreased groundwater elevations below historical levels, so groundwater levels are expected to remain within the historical range. This means that water table depths in the Prado Wetlands will remain within the historical range, which was adequate to maintain the vegetation in good health.

Riparian vegetation along Wardlow Wash would not be adversely affected if groundwater levels dropped to the groundwater elevation MT or the interconnected surface water MT because Wardlow Wash is far from the location of intensive pumping in the Basin (the Channel Aquifer) and on the opposite side of one or more faults that appear to sustain high groundwater levels along Wardlow Wash.

6.7.6.4. Relationship of Minimum Threshold to Regulatory Standards

Other than SGMA, there are no local, state, or federal regulations that specifically address stream flow depletion by groundwater pumping. The California and federal Endangered Species Acts protect species listed as threatened or endangered, including least Bell's vireo and Southwestern Willow Flycatcher. The minimum threshold for depletion of surface water is designed to prevent groundwater conditions from impacting those species beyond the level of impact that has historically occurred.

6.7.6.5. How the Minimum Threshold Will Be Monitored

There presently are no shallow monitoring wells in the southern part of the Prado Wetlands; all of them are in the northern part. This is a data gap that will be filled during the first 5-year implementation period of this GSP. In the meantime, if water levels in the Basin unexpectedly drop below their MT elevations, the levels will be evaluated in conjunction with shallow-well water levels in the northern part of the Wetlands to estimate whether the depth to water near the southern edge of the Wetlands might be increasing to more than 15 feet.

6.7.7. Measurable Objective

The Measurable Objective for interconnected surface water is a depth to the water table along the southern edge of the Prado Wetlands that is less than the MT of 15 feet. Groundwater conditions with respect to interconnected surface water and most GDE parameters are currently sustainable. Therefore, no interim milestones are needed to achieve sustainability at this time.

6.7.8. Data Gaps

The primary data gap for interconnected surface water is the lack of shallow wells to monitor water table depth along the southern edge of the Prado Wetlands. Orange County Water District (OCWD) recently installed several shallow monitoring wells in the southern Prado Wetlands and has plans to install more in the near future. Water levels from these OWCD wells and additional wells that will be installed by the GSA (see Chapter 8) will be incorporated into the GSAs monitoring program as they become available, which will fill this data gap.

6.7.8.1. Discussion of Monitoring and Management Measures to be Implemented

The primary management action that will be implemented during the first 5-year implementation period will be to install two to four shallow piezometers along the southern edge of the Prado Wetlands, between the wetlands and the major production wells in Corona. These would consist of 2-inch polyvinyl chloride (PVC) casings and screens extending below the water level at the time of drilling to capture seasonal and long-term fluctuations in shallow groundwater levels. Reference point elevations at the well heads will be surveyed so that water levels can be tied to sea level.

Basin pumping and water levels are not expected to adversely impact riparian vegetation in the Prado Wetlands. In the unlikely event that such an impact does occur, Corona has various potential options available that could be temporarily implemented to minimize or mitigate impacts during droughts. These include reducing total pumping, shifting pumping to wells farther from the Wetlands, or temporarily increasing reclaimed water discharges down Temescal Wash to the Wetlands. Corona will select the most effective response based on the circumstances of the impact.

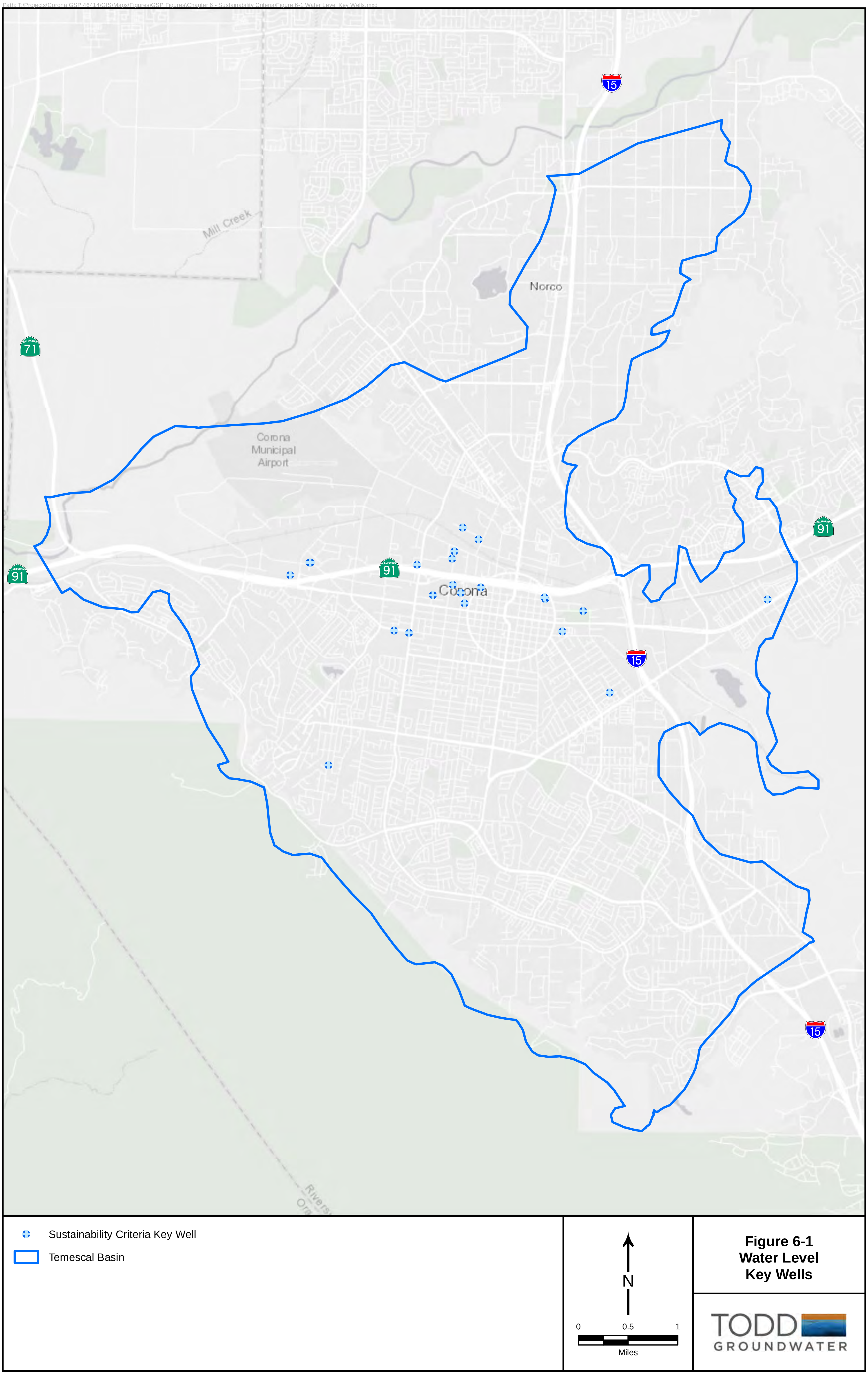

Figure 6-1
Water Level
Key Wells

TODD GROUNDWATER

7. MONITORING NETWORK

The overall objective of the monitoring network for this Groundwater Sustainability Plan (GSP) is to yield representative information about water conditions in the Temescal Subbasin (Basin) as necessary to guide and evaluate GSP implementation. Specifically, monitoring network objectives are to:

- Build on the existing monitoring network data to represent the entire Basin,
- Reduce uncertainty and provide better data to guide management actions, document the water budget, and better understand how the surface water/groundwater system works,
- Monitor groundwater conditions relative to sustainability criteria, and
- Identify and track potential impacts on groundwater users/uses and better communicate the state of the Basin.

With the intent to provide sufficient data for demonstrating short-term, seasonal, and long-term trends in groundwater and related surface conditions, this GSP builds on existing monitoring programs (summarized in Chapter 2, Plan Area) that provide historical information and a context for monitoring. Data gaps are addressed in terms of information needed for understanding the basin setting, evaluation of the efficacy of GSP implementation, and the ability to assess whether the Basin is being sustainably managed.

This GSP section describes the monitoring network as enhanced to fulfill Sustainable Groundwater Management Act (SGMA) requirements and explains how it will be implemented. This includes description of the monitoring protocols for data collection, the development and maintenance of Temescal Groundwater Sustainability Agency (GSA) data management system (DMS), and the regular assessment and improvement of the monitoring program.

7.1. DESCRIPTION OF MONITORING NETWORK

The monitoring network for GSP implementation has been established to document groundwater and related surface conditions as relevant to the sustainability indicators: groundwater levels, storage, land subsidence, water quality, and interconnected surface water[6.] The components of the monitoring network are presented in **Table 7-1**.

[6] Seawater intrusion is noted, but no risk of seawater intrusion exists in this inland basin.

Table 7.1 - Temescal GSP Monitoring Program Summary

Monitored Variable	Type of Measurement	Locations	Data Interval	Data Collection Agency	Database Storage Agency	Notes
Groundwater levels						
Temescal Basin	Depth to water, feet	37 monitored wells (see Table 7-2)	Continuous to Annual	City of Corona	Temescal GSA	Data from all sources compiled into unified groundwater elevation database
Groundwater storage						
Rainfall	Rain gauge, daily total, inches	Lake Elsinore, Santiago Peak, and Riverside	Daily and Monthly	NOAA, Orange County, and UC Riverside CIMIS	Temescal GSA	Download from web annually for annual water budget and model update
Rainfall (Interpolated)	Interoplated spatially from point data	Basin-wide		PRISM Climate Group	Temescal GSA	Rainfall gauges are not within the basin, and PRISM data helps interpolate in regions with climatic variation
Reference ET (ET_0)	Daily ETo, inches	Lake Elsinore and Riverside	Daily	NOAA, UC Riverside CIMIS	DWR	Download from web
Stream flow	Daily average flow, cfs	Two active USGS gages near Temescal	Daily	USGS	USGS	Download from web
Wastewater pond water budgets	WRF effluent discharge, evaporation, percolation, AF	Corona	Monthly	City of Corona	Temescal GSA	
Wastewater/ Recycled Water percolation	WRF/RW percolation volume, AF	Corona	Monthly	City of Corona	Temescal GSA	
Recycled water use	Recycled water delivery, AF	Basin-wide	Monthly	City of Corona	Temescal GSA	Recycled water use is a relatively small but increasing supply
Imported Water	Volume imported water AF	Imported to Temescal	Monthly	City of Corona	Temescal GSA	
Crop patterns	Map of farmland use by category	Basin-wide	Annual	DWR	DWR	Field scale annual agricultural land use mapping data from remote sensing
Land Use Maps	Maps of Land Use	Basin-wide		DWR (2014) and Riverside County (1993 and 2000)	DWR and Riverside County	DWR data is statewide
Municipal Water Use	Metered water use by sector	Corona, Home Gardens and Norco	Monthly	City of Corona, Norco	Temescal GSA	Annual data reported in Annual Report: CVP, groundwater, recycled water use (AFY)
Groundwater pumping						
Community Water Systems	Estimated	Basin-wide	Annual	DDW		
Groundwater Production	Annual Volume, AFY	Basin-wide	Annual	City of Corona	Western Municipal Water District as Watermaster and Temescal GSA	
Rural domestic, commercial, industrial	Estimated	Basin-wide	Annual	City of Corona	Western Municipal Water District as Watermaster and Temescal GSA	Annual estimates provided in water budget updates of Annual Report
Subsidence						
Subsidence	InSAR satellite mapping of ground displacement	Basin-wide	Annual change	DWR (InSAR)	DWR SGMA Data Portal	Download annually, smooth InSAR raster data sets (see Section 4.2.3.1), compare cumulative elevation change since 2015 against Minimum Threshold criterion.
Groundwater quality						
Groundwater Quality	Major and minor ions and contaminants	27 currently monitored wells	Quarterly/ Semi-annual	City of Corona , DDW, RWQCB	Temescal GSA	Wells with water qualtiy data may be added or removed over time
Interconnected Surface Water and GDEs						
Groundwater Depth to Water	Depth to water, feet	Multiple monitored wells outside the Basin, three new wells will be installed in the future	Annual	City of Corona	Temescal GSA	Groundwater in the Prado Management Area is shallow enough to support riprarian vegetation. Water levels in wells within the Prado area will be used.

7.1.1. Chronic Lowering of Groundwater Levels

As described in Plan Area Section 2, there are wells in the Basin with elevation data that are monitored by the City of Corona (Corona) and other agencies. The wells in the groundwater level monitoring program are shown on **Figure 7-1** and listed in **Table 7-2**. The distribution of existing monitoring wells is uneven, with most monitoring wells clustered in the Channel Aquifer. All of the wells in the GSP monitoring network listed in **Table 7-2** will continue to be monitored by the GSA.

Data for GSP implementation collected by Corona, with support from the other GSA members, will be compiled into the DMS developed as part of the GSP. Benefits of these efforts will accrue over the next few years and will support review and update of the monitoring program in the 2027 GSP evaluation and update.

7.1.1.1. Spatial and Vertical Coverage

Well density has been a consideration in identifying new dedicated monitoring well sites and adding existing wells to the monitoring program. California Department of Water Resources (DWR) guidance (DWR 2016d) generally recommends a monitoring well density of 4 wells per 100 mi^2, which would equate to 1.48 wells for the 37 mi^2 Basin. The Temescal Basin monitoring program is consistent with this guidance. Many of the active wells are clustered in the Channel Aquifer, the principal aquifer. This is appropriate because most of the pumping for beneficial uses occurs in the Channel Aquifer and monitoring is needed to assess the sustainability management criteria.

Data on vertical groundwater gradients generally are lacking, as discussed in the Hydrogeologic Conceptual Model, Chapter 3. Vertical gradients also have not been distinguished because most monitoring data is from public supply wells, which generally have long screen zones and have not been designed to assess or monitor vertical gradients either locally or Basin-wide.

7.1.1.2. Monitoring Frequency

SGMA and the California Statewide Groundwater Elevation Monitoring (CASGEM) program require collection of static groundwater elevation measurements at least two times per year to represent seasonal low and seasonal high groundwater conditions (DWR 2010). Currently, the water level wells in the monitoring network are monitored at least quarterly, and most are monitored either monthly or continuously.

7.1.2. Reduction of Groundwater in Storage

As described in GSP Section 6.3, groundwater level Minimum Thresholds (MTs) are used as a proxy metric for groundwater in storage. Accordingly, the monitoring of groundwater levels described above in Section 7.1.1 also pertains to tracking sustainability for groundwater in storage.

In addition, GSP Regulations require annual evaluation and reporting of change in groundwater in storage.

Table 7-2. Wells in the Temescal Groundwater Sustainability Agency Monitoring Network

Local Well Name	State Well Number	X Coordinate (feet State Plane CA Zone 6, NAD 83)	Y Coordinate (feet State Plane CA Zone 6, NAD 83)	Production or Monitoring Well	Water Level Monitoring Well (Yes/No)	Water Level Key Well (Yes/No)	Water Quality Monitoring Well (Yes/No)
Corona 1	005S006W03Q001	6185537.873	2221306.937	Production	Yes	No	No
Corona 2	005S006W03J004	6185467.308	2222915.663	Production	Yes	No	No
Corona 3	005S006W03K001	6184752.886	2222980.793	Production	Yes	No	Yes
Corona 4	004S006W16C001	6178772.45	2246463.254	Production	Yes	No	No
Corona 6	003S006W31D002	6164825.949	2263859.333	Monitoring	Yes	No	No
Corona 7	003S006W31D001	6164856.185	2263922.413	Production	Yes	No	Yes
Corona 7A	003S006W30N003	6164825.605	2263909.491	Production	Yes	Yes	Yes
Corona 8	003S007W25J001	6163919.615	2265638.126	Monitoring	Yes	Yes	Yes
Corona 8A	003S007W25J002	6163885.958	2265713.322	Production	Yes	Yes	Yes
Corona 9	003S007W25M002	6159626.551	2265408.669	Production	Yes	No	No
Corona 9A	003S007W25M003	6159626.551	2265408.669	Production	Yes	Yes	Yes
Corona 11	003S007W27G001	6151398.941	2267565.162	Monitoring	Yes	Yes	Yes
Corona 11A	Unavailable	6151465.535	2267567.377	Production	Yes	Yes	Yes
Corona 12	003S007W27F008	6150390.638	2266941.266	Production	Yes	No	No
Corona 12A	003S007W27F002	6150373.592	2266916.031	Production	Yes	Yes	Yes
Corona 13	003S006W31K001	6167356.423	2260664.289	Production	Yes	Yes	Yes
Corona 14	003S007W35C001	6155892.961	2263969.337	Production	Yes	Yes	Yes
Corona 15	003S007W26G001	6157114.482	2267464.919	Production	Yes	Yes	Yes
Corona 16	003S007W27A001	6151422.875	2267564.036	Monitoring	Yes	Yes	Yes
Corona 17	003S006W30N002	6165945.52	2265005.116	Monitoring	Yes	No	Yes
Corona 17A	003S006W25J003	6165945.52	2265005.116	Production	Yes	Yes	Yes
Corona 18	003S007W30F001	6134626.863	2268406.393	Production	Yes	No	No
Corona 19	003S007W25L001	6160509.304	2266247.265	Production	Yes	Yes	Yes
Corona 20	005S006W11D001	6187461.58	2220776.802	Production	Yes	No	Yes
Corona 21	005S006W03J005	6185101.792	2224409.774	Production	Yes	No	Yes
Corona 22	003S007W26J003	6157958.891	2265844.063	Production	Yes	Yes	Yes
Corona 23	003S007W25L002	6160785.538	2265696.4	Production	Yes	No	Yes
Corona 24	003S007W25K002	6161759.128	2266231.81	Production	Yes	No	Yes
Corona 25	003S007W25E002	6159434.755	2265962.111	Production	Yes	Yes	Yes
Corona 26	003S007W25C003	6160385.783	2268810.243	Production	Yes	Yes	Yes
Corona 27	003S007W01A001	6152402.182	2256818.413	Production	Yes	Yes	Yes
Corona 28	003S007W26K	6158978.97	2267786.881	Production	Yes	Yes	Yes
Corona 29	003S007W26A001	6159105.364	2268178.328	Production	Yes	Yes	Yes
Corona 30	Unavailable	6159542.311	2269428.52	Monitoring	Yes	Yes	No
Corona 31	003S007W26J004	6159001.737	2266396.339	Production	Yes	Yes	Yes
Corona 33	Unavailable	6175732.137	2265615.765	Production	Yes	Yes	No
Corona 10th/Lincoln	003S007W35B001	6156682.367	2263845.603	Monitoring	Yes	Yes	No

For the GSP, the numerical groundwater model has been used to quantify the water budget and change in storage (see Water Budget, Chapter 5) using available information from the Monitoring Well Network. The numerical model (described in GSP **Appendix J**) fulfills data and reporting standards described in SGMA Section 352.4.

As described in Plan Area Section 2.4 and summarized in **Table 7-1**, the Temescal GSA monitoring program provides information needed to update the water budget and assess annual change in groundwater storage. This program compiles and reviews information on climate (rainfall and evapotranspiration), stream flow, imported water deliveries, wastewater percolation and water recycling, and groundwater pumping (municipal, industrial, and other). Groundwater in storage will be assessed annually using the numerical model, which will be recalibrated during each five-year GSP update.

7.1.2.1. Spatial Coverage

Evaluation of change in groundwater in storage involves several of the monitored variables listed in **Table 7-1**; monitoring locations are described in the table. **Table 7-1** indicates locations of climate stations and stream gage locations.

7.1.2.2. Surface Water Monitoring

Temescal Wash is the main drainage in the Basin, originating at Lake Elsinore, 17 miles upstream of Basin. It passes from south to north through the Bedford-Coldwater Subbasin and then through the Basin before discharging into the Prado Management Area. There are two stream gages on Temescal Wash, one below Lee Lake at the upstream end of the Bedford-Coldwater Subbasin (Temescal Wash at Corona Lake; USGS 11071900) and one at Main Street downstream of the water reclamation facility in Corona (Temescal Creek above Main Street at Corona; USGS 11072100). These stream gages are operated and maintained by the United States Geological Survey (USGS 2020a).

7.1.2.3. Monitoring Frequency

Table 7-1 describes the data interval for the monitored variables that contribute to evaluation of groundwater in storage. Groundwater in storage will be assessed annually using the numerical model, which will be recalibrated during each five-year GSP update.

7.1.3. Seawater Intrusion

There is no monitoring for seawater intrusion and no gaging of tidal influence. The Basin is located over 20 miles inland from the Pacific Ocean, and its lowest elevations are around 1,000 feet above sea level. No risk of seawater intrusion exists in the Basin given its location and therefore no monitoring is needed.

7.1.4. Subsidence

The monitoring program will review Interferometric Synthetic Aperture Radar (InSAR) satellite-based data to identify and evaluate land subsidence in the Basin (see **Table 7-1**). These data will be used to monitor rate and extent of ground surface elevation change as applicable and with reference to the MT and Measurable Objective (MO), which are described in Sustainability Criteria Section 6.5. These data represent measurements of ground surface displacement and thus are directly applicable to scientific assessment of potential subsidence.

7.1.4.1. Spatial Coverage

The InSAR data provide adequate coverage of the Temescal Basin. As described in Groundwater Conditions Section 4.3 and Sustainability Criteria Section 6.5. InSAR data are available for the entire Basin (and beyond), as shown with recent InSAR information from DWR on **Figure 4-13**. InSAR data will be cross-checked, and in conjunction with local groundwater level and pumping data, will be used to assess relationships between levels, pumping, and subsidence data.

7.1.4.2. Monitoring Frequency

Assuming continued data availability, the monitoring program will involve annual download of InSAR data with analysis for any signs (rate and extent) of cumulative inelastic subsidence. To date there have been no reports or other indications of subsidence in the Basin. While data will be reviewed annually, at this time detailed analysis relative to the Minimum Threshold and Measurable Objective is planned as part of the five-year GSP update. The reporting will be consistent with GSP Regulations.

7.1.5. Degraded Water Quality

In addition to the general monitoring objectives listed above, specific objectives for the GSP water quality monitoring program include the following:

- Collect groundwater quality data from the principal aquifer to identify and track trends of any water quality degradation,
- Map the movement of degraded water quality,
- Define the three-dimensional extent of any existing degraded water quality impact,
- Assess groundwater quality impacts to beneficial uses and users, and
- Evaluate whether management activities are contributing to water quality degradation.

Figure 7-2 shows the location of the existing wells that are sampled for water quality. The existing water quality monitoring programs for the Basin are described in Plan Area Section 2.4 Groundwater Conditions Section 4, and Sustainability Criteria Section 6.6. To summarize, the Temescal Basin monitoring program relies on annual or semi-annual measurements from Corona wells, the Santa Ana Regional Water Quality Control Board (RWQCB), and State Water Resources Control Board Division of Drinking Water (SWRCB-DDW). Corona currently monitors wells periodically for general minerals, physical parameters, and selected constituents of concern. These wells are shown on **Figure 7-2** and listed in **Table 7-2**. As described in Groundwater Conditions Section 4 and discussed in depth in Section 6.6, a broad suite of inorganic constituents is sampled and analyzed and known regulated contamination sites are tracked. Total dissolved solids (TDS) and nitrate have been identified as the key constituents of concern for which sustainability criteria have been defined.

7.1.5.1. Spatial and Vertical Coverage

The current monitoring network in the Basin is focused in the Channel Aquifer and is limited in other areas of the Basin. **Figure 7-2** shows the spatial distribution of wells currently monitored. As with the groundwater level monitoring program, existing wells monitored by the GSA for groundwater quality will be evaluated relative to SGMA Section 352.4 requirements for well information. Also similar to the groundwater level monitoring program, the focus of monitoring is the Channel Aquifer as this is the primary source for municipal drinking water, a critical beneficial use of the Basin.

Vertical coverage is discussed in Groundwater Conditions Section 4.8, which indicates that the water quality monitoring programs in the Basin do not reveal vertical differences in water quality. Otherwise, vertical differences in water quality are uncertain; this reflects the fact that most monitored wells are pumping wells with long screens.

As stated in Section 6.6, the GSA will continue to improve and expanded the monitoring program to address spatial and vertical coverage.

7.1.6. Depletion of Interconnected Surface Water

The minimum threshold defined for depletion of interconnected surface water is defined by groundwater levels monitored near the Prado Management Area. At this time, wells in the groundwater level monitoring program are production wells with relatively deep screens that have not been sited and designed for tracking surface water-groundwater interactions. The lack of shallow monitoring wells has been identified as a data gap.

Improvement of the surface water-groundwater monitoring program includes addition of three dedicated shallow monitoring wells, implemented as part of the projects and management actions outlined in this GSP.

Benefits of the new wells will accrue over the next few years and support characterization of the spatial and temporal exchanges between surface water and groundwater, plus identification of thresholds for undesirable results relating to riparian vegetation, which will be evaluated as part of the 2027 GSP evaluation and update.

7.1.6.1. Spatial and Vertical Coverage

As noted above, the existing monitoring network does not provide adequate coverage for monitoring interconnected surface water. New shallow monitoring wells will be installed to fill this data gap, as described in Chapter 8.

7.1.6.2. Temporal Coverage and Monitoring Frequency

Groundwater level monitoring in the new shallow monitoring wells will be implemented as part of the overall groundwater level monitoring program as described in Section 7.1.1. Once sited and installed, the periods of record for new dedicated shallow wells will be established. Groundwater level data will be reviewed annually (for each annual report). Detailed analyses of the relationships among deep and shallow groundwater level data, stream flow, and riparian conditions will be provided in the 2027 GSP evaluation and update (or sooner if extreme drought conditions and riparian mortality occur; see GSP Section 6.7).

7.2. PROTOCOLS FOR DATA COLLECTION AND MONITORING

This section focuses on groundwater level monitoring (including regional and surface water-oriented) and groundwater quality sampling by the GSA. Other data (e.g., climate, streamflow, municipal pumping, subsidence) are compiled by other agencies.

This section describes general procedures for documenting wells in the monitoring program and for collecting consistent high-quality groundwater elevation and groundwater quality data. In general, the methods for establishing location coordinates (and reference point elevations for elevation monitoring) follow the data and reporting standards described in the GSP Regulations (Section 352.4) and the guidelines presented in USGS Groundwater Technical Procedures (Cunningham and Schalk 2011 and USGS 2021). These procedures are summarized below.

7.2.1. Field Methods for Monitoring Well Data

Background data for each monitoring well is required for its inclusion in the monitoring program. These data are generally available for wells in the network described in **Table 7-2** and shown on **Figures 7-1**. As part of GSP implementation, location and elevation data will be acquired where missing, revised if conditions at a monitored well change, and added when new wells are brought into the program. The methods for acquiring these data follow:

- Location coordinates will be surveyed with a survey grade global positioning system (GPS) device. The coordinates will be in Latitude/Longitude decimal degrees and reference the North American Datum of 1983 (NAD83).
- Reference point elevations will also be surveyed with a survey grade GPS with elevation accuracy of approximately 0.5 feet.
  - During surveying, the elevations of the reference point and ground surface near the well will be measured to the nearest 0.5 foot.
  - All elevation measurements will reference North American Vertical Datum of 1988 (NAVD88).

7.2.2. Field Methods for Groundwater Elevation Monitoring

Reference points and ground surface elevations will be documented as described above prior to groundwater elevation monitoring in the field. Field methods for collection of depth-to-water measurements are described below:

1. Measurements in all wells will be collected within a three-day window whenever possible.
2. Active production wells should be turned off prior to collecting a depth to water measurement.
3. The standard period of time that a well needs to be off before a static measurement is taken is 48 hours.
4. To verify that the wells are ready for measurement, agency staff (from Corona, the City of Norco [Norco], and Home Gardens County Water District [HGCWD]) will coordinate with well operators and/or owners as necessary.

5. Coordination with well operators/owners should occur approximately four days prior to the expected measurement date.
6. Depth to groundwater measurements collected by either electric sounding tape (Solinst or Powers type sounders) or by steel tape methods. Depth-to-water measurement methods are described in DWR's *Groundwater Elevation Monitoring Guidelines* (DWR 2010). Depth to groundwater will be measured and reported in feet to at least 0.1 foot.

7.2.3. Field Methods for Groundwater Quality Monitoring

Groundwater sampling is conducted by trained professionals from the GSA. Sampling follows standard monitoring well sampling guidelines such as those presented in the National Field Manual for the Collection of Water-Quality Data (USGS 2021).

Generally, the wells have been pumped prior to sample collection, or are purged. Purging is conducted until field instruments indicate that water quality parameters (pH, oxidation-reduction potential (ORP), specific conductance, and temperature) have stabilized and turbidity measurements are below five Nephelometric Turbidity Unit (NTUs). The pumping or purging demonstrate that the sample collected is representative of formation water and not stagnant water in the well casing or well filter pack. For groundwater, field temperature and conductivity are recorded while the well is being purged to ensure that physical parameters have stabilized before collecting a sample.

All groundwater samples are collected in laboratory-supplied, pre-labeled containers and include prescribed preservatives.

All field measurements are recorded in a field logbook or worksheets and the sample containers are labeled correctly and recorded on the chain-of-custody form. The applicable chain-of-custody sections are completed and forwarded with the samples to the laboratory. Upon receipt of the samples at the laboratory, laboratory personnel complete the chain-of-custody.

Quality assurance and quality control (QA/QC) assessment of field sampling includes use of field blanks. Field blanks identify sample contamination that is associated with the field environment and sample handling. These samples are prepared in the field by filling the appropriate sample containers with the distilled water used for cleaning and decontamination of all field equipment. One field blank per sampling event is collected.

Samples are sent to a State-certified laboratory that has a documented analytical QA/QC program including procedures to reduce variability and errors, identify and correct measurement problems, and provide a statistical measure of data quality. The laboratory conducts all QA/QC procedures in accordance with its QA/QC program. All QA/QC data are reported in the laboratory analytical report, including: the method, equipment, and analytical detection limits, the recovery rates, an explanation for any recovery rate that is less than 80 percent, the results of equipment and method blanks, the results of spiked and surrogate samples, the frequency of quality control analysis, and the name of the person(s) performing the analyses. Sample results are reported unadjusted for blank results or spike recovery.

7.3. REPRESENTATIVE MONITORING

To allow quantification and tracking of sustainability criteria, representative monitoring sites, or wells, have been identified for 1) regional groundwater level monitoring and 2) monitoring shallow groundwater conditions where surface water-groundwater connection is likely and tied to groundwater dependent ecosystems (GDEs). These Key Wells are shown on **Figure 7-1** and listed in **Table 7-2**. These have been designated by the GSA as the point at which sustainability indicators are monitored. Information on the quantitative values for minimum thresholds, measurable objectives, and interim milestones is included in Sustainability Criteria Section 6.

As discussed in Sustainability Criteria Section 6.3, change in groundwater in storage is closely related to groundwater levels, which can serve as a proxy for monitoring change in storage. Moreover, groundwater level MTs and MOs are sufficiently protective to ensure prevention of significant and unreasonable results relating to storage. Accordingly, continued monitoring of wells for groundwater levels also serve to track sustainability for storage.

As discussed in Section 6.5, the definition of undesirable results and the quantification of the MT and MO for subsidence are based on InSAR information on vertical displacement of the ground surface; these spatial and temporal data are publicly available from DWR.

Section 6.4 discusses seawater intrusion, which is not possible in this inland basin.

Section 6.6 describes undesirable results and defines sustainability criteria for water quality. MTs and MOs are quantified in terms of the percentage of wells with concentrations exceeding the local and state goals for nitrate and TDS based on current conditions. The GSP water quality monitoring wells shown on **Figure 7-2** and listed in **Table 7-2** are sampled regularly to identify water quality problems and to track water quality trends.

7.4. DATA MANAGEMENT SYSTEM (DMS)

The GSA has been collecting and compiling groundwater data including water levels, water quality, and water use for the GSP. Before the creation of the GSA, the individual agencies of (Corona, Norco, and HGCWD) monitored water levels and water quality independently. These data are compiled in relational databases, which consists of Access databases and ESRI geodatabases that have the capabilities for queries to quickly check and summarize data. As part of the GSP, the DMS has been modified to be practicable, usable, and intuitive for the purpose of GSP preparation and implementation. **Appendix L** details the final DMS. The databases include easy to update tables and other datasets that assist in comparison of real time conditions and sustainability goals.

7.5. ASSESSMENT AND IMPROVEMENT OF MONITORING NETWORK

The GSA has actively engaged in assessment and improvement of its monitoring network. This process has been intensified as part of the GSP, given the need to identify data gaps and to assess uncertainty in setting and tracking sustainability criteria. Monitoring improvements are a major part of GSP implementation and will be reviewed and updated for each five-year GSP evaluation.

7.5.1. Identification and Description of Data Gaps

Data gaps are identified in **Table 7-3** according to major monitored variable and described in terms of insufficient number of monitoring sites and utilization of monitoring sites that are unreliable (including those that do not satisfy minimum standards). Data gaps also are described in terms of the location and reason for data gaps in the monitoring network, and local issues and circumstances that limit or prevent monitoring. Data gaps listed in **Table 7-3** do not include gaps in understanding, which build on the monitoring network but also require investigation and analysis. These planned studies are described as Management Actions in GSP Chapter 8.

Table 7-3. Identification and Description of Data Gaps

Monitored Variable	Insufficient Sites	Local Issues
Regional groundwater levels	No	The water level network has historically relied largely on production wells.
Stream flow	No	There are gages on the major streams in the Basin.
Groundwater extraction	No	Most pumping is reported, there may be unreported pumping but it is assumed to be de minimis.
Groundwater quality	No	Water quality sampling in the Basin is typically tied to regulatory requirements, the GSA will perform regular monitoring of the well network and collect water quality data from all available sources.
Shallow groundwater levels	Yes	No shallow dedicated groundwater monitoring wells are currently in the Basin. Long well screens in monitoring wells limit vertical groundwater quality characterization. New shallow monitoring wells are included as a project in Chapter 8.

7.5.2. Description of Steps to Fill Data Gaps

Monitoring data gaps have been identified for surface water and shallow groundwater level measurements.

Additional shallow groundwater level monitoring is required to better monitor interconnected surface water and GDEs in the Basin. Corona will locate and install three new shallow water level monitoring wells/piezometers adjacent to Prado Management Area, as described in Chapter 8, Projects and Management Actions.

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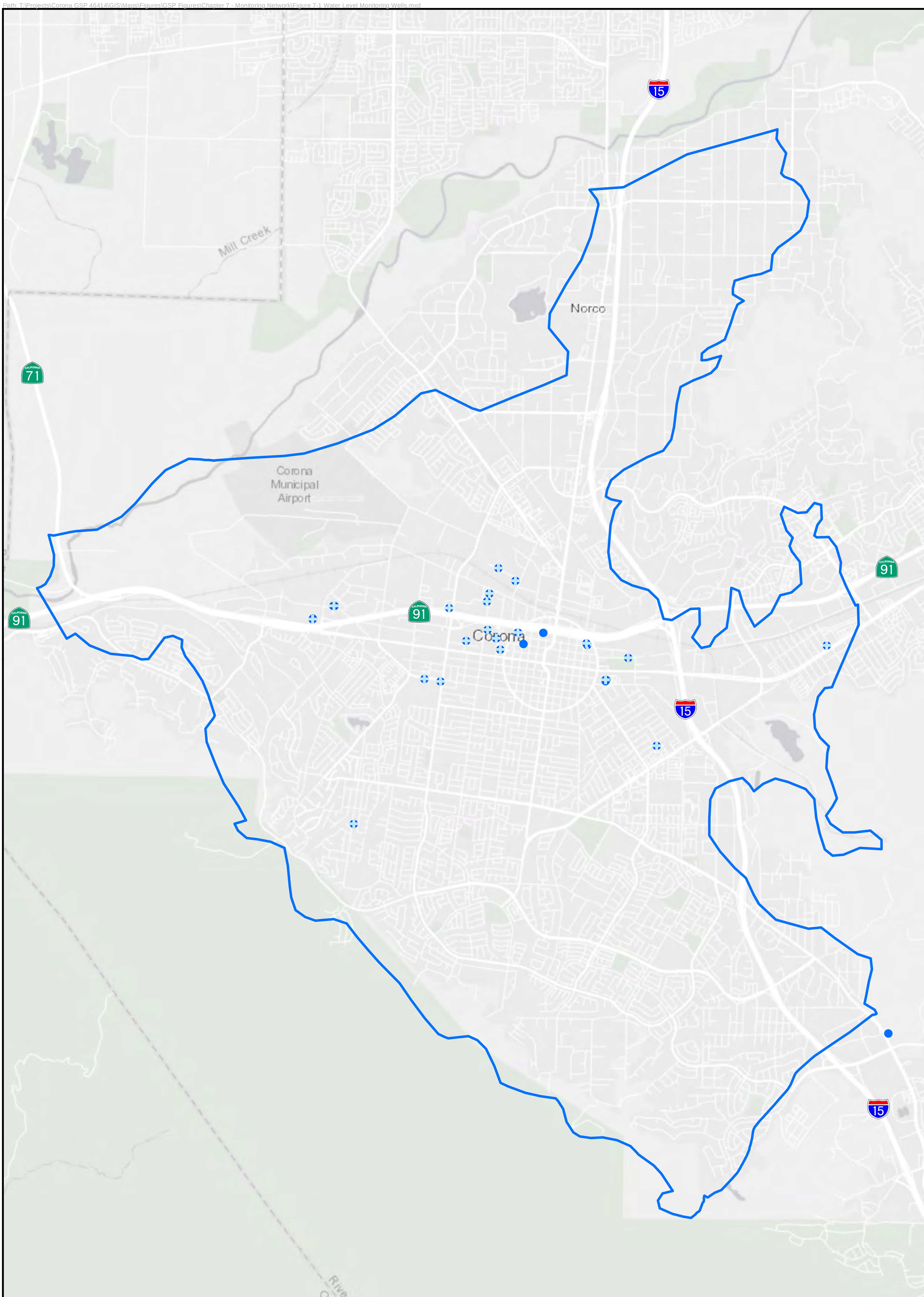

Water Level Monitoring Well
Sustainability Criteria Key Well
Temescal Basin

N
0 0.5 1
Miles

Figure 7-1
Groundwater Level
Monitoring Wells

TODD
GROUNDWATER

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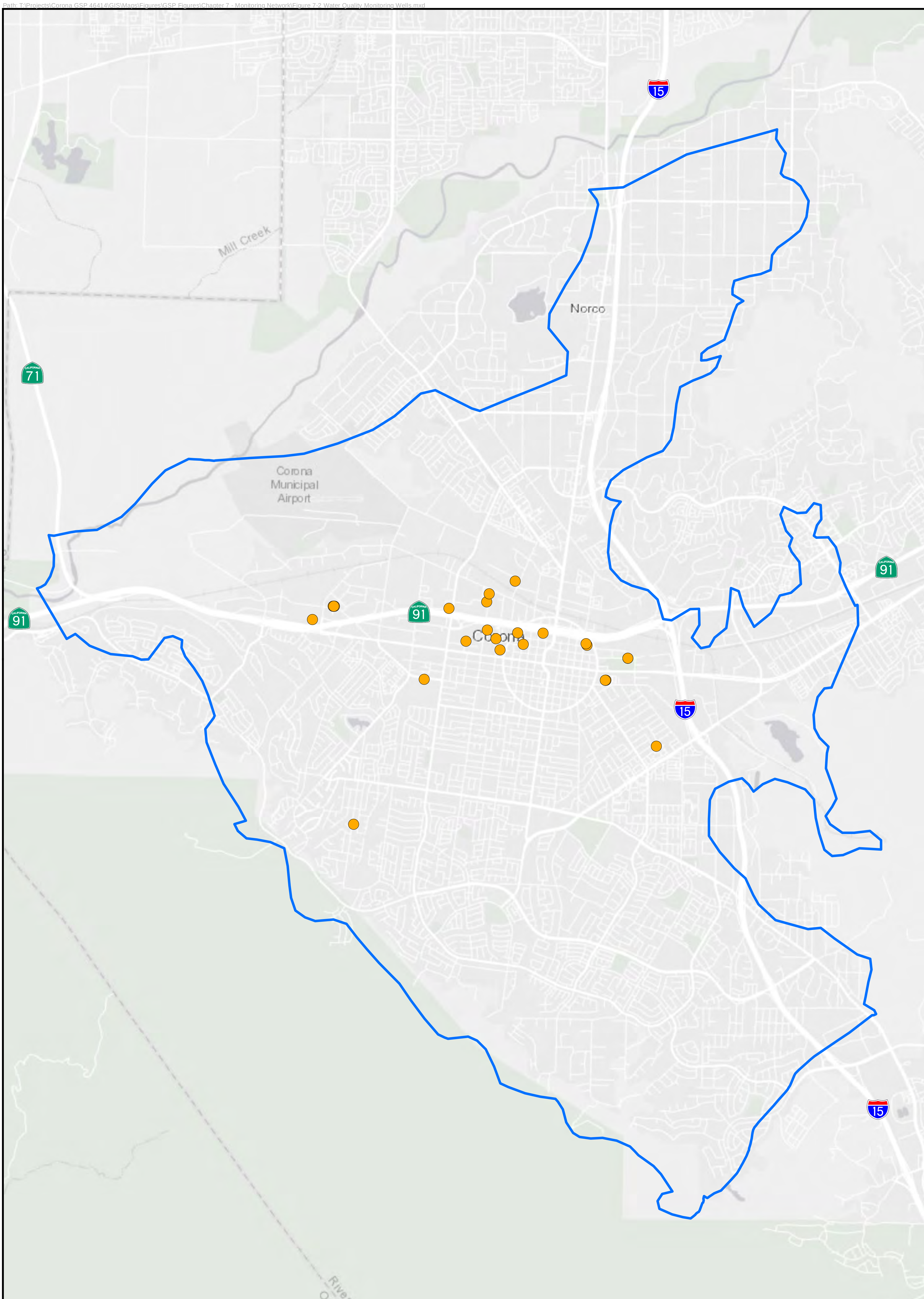


Water Quality Monitoring Well

Temescal Basin

N

0 0.5 1

Miles

Figure 7-2
Water Quality
Monitoring Wells

TODD GROUNDWATER

8. PROJECTS AND MANAGEMENT ACTIONS

This chapter of the Groundwater Sustainability Plan (GSP) includes projects and management actions aimed at achieving sustainability goals and responding to changing conditions in the Temescal Subbasin (Basin). The projects and management actions are divided into three groups:

- Group 1 - Existing or established projects and management actions
- Group 2 - Projects and management actions that have been or are under development
- Group 3 - Conceptual projects and management actions that can be considered in the future if any Group 2 projects fail to be implemented or additional intervention is required to achieve basin sustainability goals.

A summary of the projects and management actions in each of the groups is presented in **Table 8-1**. Additional discussion of each project is included in the sections that follow.

Table 8 1. Summary of Projects and Management Actions

Description	Agency	Category	Status	Anticipated Timeframe
Group 1 - Existing or established projects and management actions				
Groundwater Treatment	City of Corona	Project	Ongoing	Implemented
WRF Percolation Ponds	City of Corona	Project	Ongoing	Implemented
Water Level QA/QC	City of Corona	Project	Ongoing	Implemented
Water Shortage Contingency Plans	Cities of Corona and Norco	Management Action	Ongoing	Implemented
Water Conservation Programs	Cities of Corona and Norco	Management Action	Ongoing	Implemented
Western Municipal Water District - IRWMP	10 local cities/agencies including the GSA	Management Action	Ongoing	Implemented
Western Riverside County Regional Wastewater Authority (WRCRWA)	GSA, Jurupa Community Services District, and WMWD	Project	Ongoing coordination	Pending coordination with WRCRWA and partner agencies
Santa Ana Watershed Involvement	GSA, Santa Ana Watershed Project Authority (SAWPA), and Santa Ana River Dischargers Association (SARDA) members	Management Action	Ongoing	Implemented
Group 2 – Projects and management actions have been developed or are under development				
Interconnected Surface Water Monitoring Wells Implementation	GSA	Project	In planning	Well implementation within the first year of GSP adoption
Potable Reuse Feasibility Study	GSA	Project	Not started	Study initiation within the second year of GSP adoption
Mountain Runoff Capture Investigation	GSA and RCFCWCD	Project	Not started	Study initiation within five years of GSP adoption
Group 3 – Conceptual future projects and management actions				
Future Groundwater Treatment	GSA	Project	Not started	No current anticipated timeline
Stormwater Capture, Treatment and Recharge	GSA	Project	Not started	No current anticipated timeline
Santa Ana River Wastewater Discharge Coordination for Shallow Groundwater Conditions	GSA, SAWPA, and SARDA members	Management Action	Not started	No current anticipated timeline

8.1. GROUP 1 PROJECTS

Group 1 projects and management actions are considered existing or established commitments by the City of Corona (Corona), other agencies within the Temescal Groundwater Sustainability Agency (GSA), and/or affiliated agencies. Group 1 projects are either already in operation or are currently being implemented with anticipated near-term operation.

8.1.1. Groundwater Treatment

Corona relies on groundwater from the Temescal and Bedford-Coldwater Basins for up to 50 percent of its potable water supply. **Table 8-2** shows Corona's current and projected annual groundwater extraction volumes from these basins. As shown in the table, the Temescal Basin is responsible for most of Corona's current and future groundwater supply.

Table 8-2. Existing and Projected Corona Groundwater Extraction Volumes (AFY)

Basin	2020	2025	2030	2035	2040	2045
Bedford-Coldwater	0	2,112	2,112	2,112	2,112	2,112
Temescal	16,239	13,000	13,000	13,000	13,000	13,000

Data Source: 2020 Urban Water Management Plan (Michael Baker 2021)

Approximately half of the groundwater pumped in Corona is treated at the Temescal Desalter Facility, a city-owned, reverse osmosis (RO) facility. This facility reduces nitrates, per- and polyfluoroalkyl substances (PFAS), 1,2,3-Trichloropropane (TCP), perchlorates, and total suspended and dissolved solids (TSS and TDS) from water pumped from the Temescal Basin. In addition, ammonium hydroxide and sodium hypochlorite is added to the treated groundwater to act as a disinfectant and mitigate the formation of disinfection byproducts (DBPs) (Michael Baker 2021). The Temescal Desalter produces 10 million gallons per day (mgd) on average.

Corona maintains five continuously monitored blending facilities that blend the treated groundwater with both surface water and non-Desalter treated, locally produced groundwater. A portion of the groundwater utilized at the blend station that has not been treated by the Desalter is treated with sodium hypochlorite and ammonium hydroxide. This blend reduces the elevated amounts of fluoride, nitrate, and perchlorates found in the groundwater to a safe, consumable level.

The City of Norco (Norco) and Home Gardens County Water District (HGCWD) have service areas that overlie the Basin. The two entities do not currently pump groundwater from the Basin; however, should they utilize it for future supply they would likely require implementation of similar treatment.

8.1.2. Water Reclamation Facility (WRF) Percolation Ponds

Wastewater is treated at three Corona-owned and operated Water Reclamation Facilities (WRF-1, WRF-2 and WRF-3). The average annual production of treated wastewater (effluent) from these sources is approximately 11.35 mgd, or 12,700 acre-feet per year (AFY). Supply is anticipated to increase incrementally due to population growth by an additional 0.88 mgd through 2040 (about 7.8 percent).

WRF effluent is allocated to three end uses: 1) discharge to the Santa Ana River Watershed (SWRCB 2021), 2) reuse via the reclaimed water distribution system, and 3) discharge to offsite percolation ponds. WRF-1 and WRF-2 both contribute effluent to all of these end uses while WRF-3 only contributes effluent to the reclaimed water system. The three offsite percolation ponds overlie the Basin and allow for recharge. One of the ponds is located along Lincoln Avenue and the other two at the end of Rincon Street near Cota Street. **Table 8-3** shows the total annual effluent sent to the percolation ponds in the last five years.

Table 8-3. WRF Annual Percolation Pond Contributions (AFY)

Facility	2016	2017	2018	2019	2020
WRF-1	1,364	5,273	4,493	5,026	4,987
WRF-2	734	1,207	1,306	1,462	1,774

Data Source: 2020 Urban Water Management Plan (Michael Baker 2021)

8.1.3. Water Level Quality Assurance and Quality Control (QA/QC)

Corona is conducting water level quality assurance and quality control (QA/QC) activities to maintain and increase the integrity and reliability of ongoing groundwater elevation data collection. Static and pumping water level depths are collected, by Corona water operators, once a month from each groundwater well location identified in Chapter 7, Monitoring Network.

The current QA/QC process practiced by Corona involves the following activities:

- The data is entered into Corona’s database at the end of the water operator’s shift.
- The data is also written on a whiteboard in the Drinking Water staff crew room.

Corona is updating their QA/QC policies to ensure manual entry errors are minimized by creating “Alert” pop up boxes in their database.

- The minimum, maximum, average, and standard deviation static and pumping water level depths are calculated for each monitored well.
- The “Alert” pop up will appear if the data entered is greater than the upper limit or less than the lower limit for any monitoring event.
    - The upper limit for each well will be the standard deviation times two plus the average.
    - The lower limit will be the average minus two times the standard deviation.

- The Alert pop up still allows the operator to enter the data but makes them aware that the data being entered is outside the range of the historical measurements.
- It will be up to the water operator to recheck the data being entered, and either confirm or correct the measurement.
- A report including the most recent static and pumping water levels for each monitored well will be created once a month, and this report will be reviewed by operators and management to identify data collection errors and/or trends in water levels.

8.1.4. Water Shortage Contingency Plans

Corona's 2020 Urban Water Management Plan (UWMP) estimated the available supply from imported water, groundwater, and reclaimed water at a total of 50,000 AFY. Using this baseline supply, a water shortage contingency plan (WSCP) was developed. The WSCP has six shortage stages based on available supply and associated deficit. Each stage has associated response actions to ensure appropriate reductions in water use (Michael Baker 2021). **Table 8-4** shows each of the stages and associated supply. Note that the Ordinance 2962 Water Conservation Stage column will be discussed further in Section 8.1.5. Detailed information on response actions for a given stage can be found in the 2020 UWMP and is discussed further in Section 8.1.5.

Table 8-4. WSCP Shortage Level Determination

WSCP Stage	Ordinance 2962 Water Conservation Stage	Condition	Available Supply (AFY)	Deficit (AFY)
0	1	No Shortage	50,000	None
1	1	10 percent Shortage	45,000	None
2	1	20 percent Shortage	40,000	None
3	2	30 percent Shortage	35,000	5,000
4	3	40 percent Shortage	30,000	10,000
5	4	50 percent Shortage	25,000	15,000
6	5	> 50 percent Shortage	< 25,000	> 15,000

Data Source: 2020 Urban Water Management Plan (Michael Baker 2021)

Norco has developed their own respective WSCP based on the six stages and respective percent shortage condition as well (Norco 2021).

8.1.5. Water Conservation Program

In 2009, Corona implemented Ordinance No. 2962, amending the Corona Municipal Code to provide framework for water conservation and drought response measures. The Ordinance defines five stages of water conservation, corresponding water consumption objectives (10 percent to 40 percent or greater), and associated conservation and drought response measures. **Table 8-4**, above, shows the five stages and associated storage condition and available supply. The following is a summary of the shortage response actions to be taken at each water conservation stage (per Ordinance No. 2962), more detailed information can be found in the 2020 UWMP (Michael Baker 2021).

- **Stage 1:** No water shortage, or "normal water supply", applies when Corona is able to fully meet all customer water demands. Normal water efficiency programs will be in effect during this time.
- **Stage 2:** Water customers shall reduce consumption by 10 to 15 percent. Examples of water reduction measures include irrigation limitations and residential car washing and drainage restrictions.
- **Stage 3:** Water customers shall reduce consumption by 16 to 20 percent. This includes all restrictions in Stages 1 and 2 and adds additional restrictions, such as limiting new construction water meters and prohibiting ornamental fountains or similar structures.
- **Stage 4:** Water customers shall reduce consumption by 21 to 40 percent. This includes all restrictions in Stages 1, 2, and 3 and adds additional restrictions, such as prohibiting the issuance of new construction water meters and prohibiting issuance of new building permits.
- **Stage 5:** Water customers shall reduce consumption by at least 41 percent. This includes all restrictions in Stages 1, 2, 3, and 4 and adds additional restrictions, such as prohibiting all outdoor watering, except for recycled water use for fruit tree irrigation.

Norco has developed their own respective conservation plan based more directly on the WSCP stages discussed in the prior section (Norco 2021).

8.1.6. Participation in Integrated Regional Water Management Plans (IRWMP)

The Western Municipal Water District (WMWD) Integrated Regional Water Management Plan (IRWMP) was prepared in 2008 (KJ 2008). The purpose of the plan was to address long range water quantity, quality, and environmental planning needs within the WMWD service area. The IRWMP was prepared in cooperation with the ten cities/water districts receiving water from WMWD, including the cities of Corona and Norco. The creation of the IRWMP provided a coordinated water management strategy to make sure water resources are being used responsibly throughout the region.

More recently, in 2018, the Santa Ana River Watershed Project Authority (SAWPA) developed the One Water One Watershed (OWOW) Plan Update to serve as the IRWMP for the Santa Ana River Watershed (SAWPA 2018). The OWOW Plan was initially developed in 2010 and has been subsequently updated in 2014 and 2019. The OWOW Plan was prepared with engagement from over 4,000 stakeholders. Including 120 water agencies and 63 incorporated cities within the watershed. All three GSA members were involved in the planning process.

The goals of the 2019 OWOW Plan are to achieve resilient water supply, improve water quality, preserve natural spaces, improve data integration and tracking, diminish environmental injustices, and educate visitors within the Santa Ana River Watershed.

8.1.7. Western Riverside County Regional Wastewater Authority (WRCRWA)

The Western Riverside County Regional Wastewater Authority (WRCRWA) is a joint powers authority (JPA) consisting of the cities of Norco and Corona, Jurupa Community Services District, Home Gardens Sanitary District, and WMWD. The WRCRWA Plant has a 14 mgd capacity and will soon produce recycled water for local irrigation use.

As JPA partners, Corona and Norco will be entitled to up to 2 and 2.7 mgd respectively of recycled water allocated for use in their service areas, reducing local pumping from the Temescal Basin.

8.1.8. Santa Ana Watershed Involvement

SAWPA is a JPA formed to develop and maintain regional plans and projects that will protect the Santa Ana River Basin and associated water resources. Corona participates in the task forces and working groups within the watershed noted in **Table 8-5**.

Table 8-5. City of Corona Santa Ana Watershed Task Forces/Groups

Name	Brief Description
SAWPA – Emerging Constituents Task Force	In 2007, a workgroup was formed among the water recharging agencies and publicly owned treatment works (POTWs) to address a characterization program for emerging constituents. SAWPA was requested to administer the development of a 2-phase approach.
SARDA – Santa Ana River Discharge Agencies	Working group of Santa Ana River (SAR) discharge agencies jointly implementing the annual mercury monitoring in the SAR.
SAWPA – Basin Monitoring Task Force	As an outgrowth of the Nitrogen/TDS Task Force, the agencies responsible for implementing the Basin Plan Amendments formed the Basin Monitoring Task Force, and SAWPA was identified to administer/facilitate that effort.
SAWPA – Imported Water Recharge Workgroup	The purpose of this Workgroup is to undertake tasks defined in a Cooperative Agreement among the water recharging agencies to assure that the water quality (Nitrogen and TDS) in groundwater is protected. These tasks include regular reporting on the amount and quality of water recharged, the ambient water quality in each groundwater management zone, and 20-year groundwater flow and quality model projections for each groundwater management zone that is recharged. All reports are provided to the Regional Water Quality Control Board.

In addition, Corona discharges treated wastewater from one of their three water reclamation plants (WRF-1) to Temescal Wash within the Santa Ana River Watershed. Corona discharged an average of approximately 2,000 AFY to the watershed from WRF-1 (Michael Baker 2021). The discharged water serves a dual purpose of maintaining riparian habitat as well as recharging the Basin via percolation.

8.2. GROUP 2 PROJECTS

Group 2 projects will be implemented to meet Basin sustainability goals, in conjunction with Group 1 projects.

8.2.1. Shallow Monitoring Well Installation

A total of three shallow monitoring wells will be drilled in the Prado Management Area. The wells will be approximately 40 to 60 feet in depth and 2-inches in diameter. **Figure 8-1** shows the proposed, approximate locations of these monitoring wells.

The approximate locations have been identified based on existing groundwater conditions, land access, and the ongoing construction of the new Prado Dike. Areas north of the Prado Dike will potentially be inundated in the future, and future monitoring wells need to be located outside the area of inundation. The locations shown on **Figure 8-1** are above 545-feet mean sea level (msl) elevation. The existing spillway elevation of the Prado Dam is 543-feet msl, so these monitoring well locations should be above the future area of inundation.

8.2.1.1. Measurable Objective Expected to Benefit from Project or Management Action

The project will allow for continuous monitoring at representative sites in the Prado Management Area. This will allow Corona to track groundwater levels in the southern part of the Management Area along with the rest of the Basin. Groundwater levels in these wells will be incorporated into the interconnected surface water sustainable management criteria in the 5-year GSP update. Once established, the sustainable management criteria for these wells will help guide future management actions required by upstream Santa Ana River Watershed partners.

8.2.1.2. Circumstances for Implementation

Corona has already initiated the planning process to install these monitoring wells. It is anticipated that these can be implemented with existing on-call contracts.

8.2.1.3. Public Noticing

The public will be notified per California Environmental Quality Act (CEQA)requirements.

8.2.1.4. Permitting and regulatory process

Wells will be drilled on private or City of Corona property. The project will comply with all CEQA, Riverside County, and discharge permitting requirements. Corona will coordinate with the Santa Ana Regional Water Quality Control Board (RWQCB) to plan for discharging any and all water in accordance with RWQCB general permits.

8.2.1.5. Project Timetable
The monitoring wells will be installed within two years of GSP implementation.

8.2.1.6. Plan for Project Implementation
Three monitoring wells will be drilled in areas in the Prado Management Area. The wells will be approximately 40 to 60 feet deep and will be 2-inches in diameter with polyvinyl chloride (PVC) casings and screens, bentonite seals, and cement sanitary seals. The well drilling process will be completed with existing Corona on-call contracts.

8.2.1.7. Expected Benefits
The installation of three monitoring wells will allow Corona to track groundwater levels in the Prado Management Area and identify timing and triggers for future management actions, if needed.

8.2.1.8. Legal Authority
By California state law, water districts and land use jurisdictions have the authority to take action to ensure sufficient water supply is available for present or future beneficial use within their service areas.

8.2.1.9. Estimated Costs and Funding Plan
Costs are anticipated to be $40,000 to $50,000 in total for the installation of the three wells. The project will be financed from existing Corona budgets.

8.2.1.10. Management of Project
The project will be managed by the City of Corona Department of Water and Power with support from other staff and outside technical experts, as necessary.

8.2.1.11. Relationship to Additional GSP Elements
The addition of three new monitoring wells in the Basin will identify future management actions required by upstream Santa Ana River Watershed partners. This is discussed in further detail in Group 3.

8.2.2. Potable Reuse Feasibility Study

As noted in the Group 1 project section, the WRCRWA facility is near-future reclaimed water supply source for Corona. Corona will conduct a potable reuse feasibility study to evaluate various potable reuse strategies and opportunities for optimizing use of reclaimed water supply in conjunction with existing reclaimed water supply from WRF-1, 2, and 3. This study would likely involve looking at specific end uses, water supply benefits, regulatory requirements, treatment requirements, infrastructure requirements, and associated costs.

8.2.2.1. Measurable Objective Expected to Benefit from Project or Management Action
Corona is exploring future options to optimize use of recycled water in the Basin in order to reduce groundwater dependence.

8.2.2.2. Circumstances for Implementation
Corona is currently exploring a wide range of options to increase their water supply portfolio.

8.2.2.3. Public Noticing
Public noticing is not required for this project. Should potable reuse projects be recommended for the region, Corona may choose to adopt a comprehensive outreach and education program to solicit public input.

8.2.2.4. Permitting and regulatory process
Permits are not required for this project. This study will evaluate potential potable reuse projects and will consider potential regulatory requirements for implementation.

8.2.2.5. Project Timetable
The study is anticipated to be one year in duration, initiating approximately two years after adoption of the GSP.

8.2.2.6. Plan for Project Implementation
Corona would need to develop a study scope, issue a project solicitation, and hire a technical consultant to perform the evaluation.

8.2.2.7. Expected Benefits
This study will evaluate and recommend future potable reuse projects to be implemented in the region.

8.2.2.8. Legal Authority
Legal authority is not required to perform a feasibility study.

8.2.2.9. Estimated Costs and Funding Plan
The study is anticipated to cost between $150,000 to $200,000 and will likely be funded through City of Corona sources. Grant funding is available through the State Water Resources Control Board (SWRCB) and the United States Bureau of Reclamation (USBR) should Corona choose to pursue alternate means of funding.

8.2.2.10. Management of Project
The project will be managed by the City of Corona Department of Water and Power with support from other staff and outside technical experts, as necessary.

8.2.2.11. Relationship to Additional GSP Elements
Because this project is a feasibility study, it is not anticipated to have any impact on other GSP projects or management actions described in this chapter. Future potable reuse projects recommended as a result of this study will reduce groundwater dependence in the region.

8.2.3. Mountain Runoff Capture Feasibility Study

Riverside County Flood Control and Water Conservation District (RCFCWCD) operates major flood control facilities such as dams, flood basins, levees, open channels, and major (36-inch or larger) underground storm drains in a 2,700 square mile service area in the western portion of Riverside County. Rainwater runoff from the Santa Ana Mountains flows into RCFCWCD flood basins during storm events to mitigate downstream flood damage. A Mountain Runoff Capture Feasibility Study would explore options for operational changes that would provide the dual benefit of flood control and groundwater recharge.

8.2.3.1. Measurable Objective Expected to Benefit from Project or Management Action

Although this study would yield no direct measurable objectives, future recommended projects would help to raise groundwater levels in the Basin and reduce the threat of land subsidence.

8.2.3.2. Circumstances for Implementation

Corona is currently exploring options to increase groundwater recharge. An initial study would be conducted to establish a basis for inter-agency coordination between RCFCWCD and Corona on the subsequent feasibility study.

8.2.3.3. Public Noticing

Public noticing is not required for this project. Should implementation projects be recommended for the region, Corona may choose to adopt a comprehensive outreach and education program to solicit public input.

8.2.3.4. Permitting and regulatory process

Permits are not required for this project. This study will evaluate potential runoff capture projects and will consider potential regulatory requirements for implementation.

8.2.3.5. Project Timetable

The initial study would be undertaken within the first five years of GSP adoption and be approximately three months in duration. After appropriate inter-agency coordination, the subsequent feasibility study is anticipated to be approximately six months in duration.

8.2.3.6. Plan for Project Implementation

RCFCWCD owns and operates this infrastructure. Interagency discussion should be conducted during the initial study to coordinate on development of the feasibility study.

8.2.3.7. Expected Benefits

This study will evaluate and recommend operational changes to the RCFCWCD flood basins that would enable the system to be used for both flood control and groundwater recharge to the Basin.

8.2.3.8. Legal Authority

Legal authority is not required to perform a feasibility study.

8.2.3.9. Estimated Costs and Funding Plan

The study is anticipated to cost approximately $75,000. Corona could explore potential funding sources through the California Department of Water Resources (DWR).

8.2.3.10. Management of Project

The project will be managed by the City of Corona Department of Water and Power with support from other staff and outside technical experts, as necessary.

8.2.3.11. Relationship to Additional GSP Elements

Because this project is a feasibility study, it is not anticipated to have any impact on other GSP projects or management actions described in this chapter. Future projects implemented as a result of this study will reduce groundwater dependence in the region.

8.3. GROUP 3 PROJECTS

Group 3 projects are conceptual activities that can be considered in the future if any Group 2 projects fail to be implemented or additional intervention is required to achieve basin sustainability goals. These projects are not planned for near-term implementation and have been developed to a lesser degree than Group 2 projects but will be evaluated further, as needed, should a given Group 3 project be deemed critical for Basin sustainability.

8.3.1. Groundwater Treatment

A study conducted in 2016 focused on the detection of PFAS in Corona wells as well as potential treatment options (Carollo 2017). Subsequently, Corona initiated an ongoing PFAS study likely to be complete in mid to late 2021.

Corona has future interests in advanced groundwater treatment to treat for previously detected PFAS as well as addressing TDS, nitrate, and TCP. Groundwater treated to remove these contaminants could potentially be recharged back into the Basin, improving water quality.

8.3.2. Stormwater Capture, Treatment, and Recharge

Harvesting of urban stormwater has a potential benefit of reducing the loss of water from the Basin. There are a number of different approaches to stormwater capture and use including:

- Onsite rain barrels to promote reuse and reduce generation of urban runoff
- Larger scale capture in stormwater vaults/cisterns and reuse
- Capture and infiltration approaches including infiltration basins, bioretention, and permeable pavement
- Dry wells for capture and recharge
- Diversion to WRFs for treatment and reuse.

Corona has conducted a preliminary investigation on capture of stormwater from a lined channel on Oak Avenue and transfer to the existing percolation ponds (Todd 2011).

It is anticipated that a future study would explore potential sources of urban runoff, estimated yield, mechanisms for augmenting or offsetting water supplies, treatment needs, capital costs, and operation and maintenance (O&M) costs. An initial investigation would establish the basis for further exploration of the feasibility of specific stormwater capture approaches and projects.

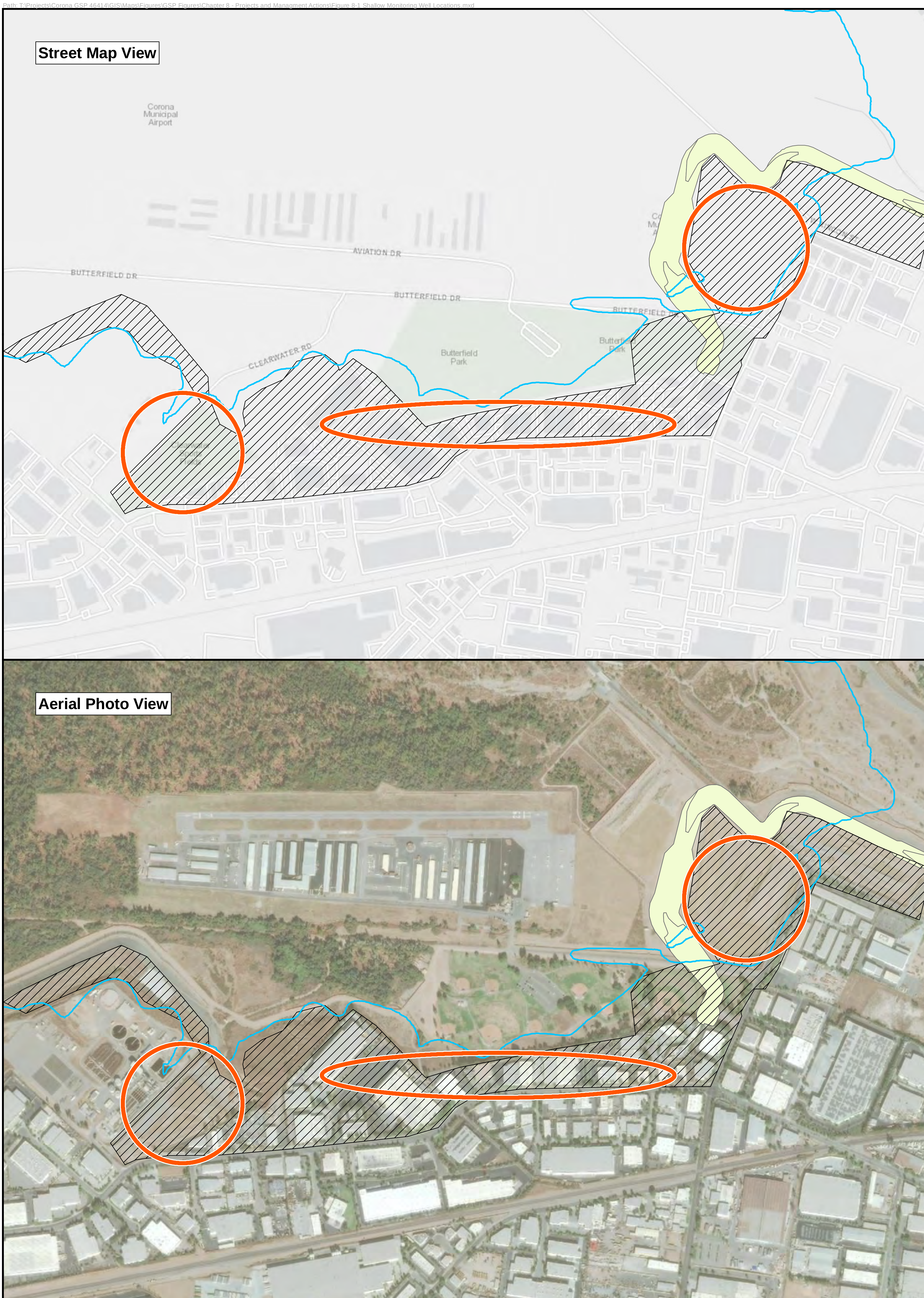
8.3.3. Santa Ana River Wastewater Discharge Coordination for Shallow Groundwater Conditions

This project would be implemented contingent on the outcome of the Prado Management Area monitoring well installation, a previously discussed Group 2 project. The Prado Management Area is currently maintained by wastewater discharge from upstream parties. If monitoring well data indicates that groundwater elevations are falling, it is likely due to reduction of wastewater discharge flow.

The project approach would be two-fold and encompass the following:

1. Evaluation and examination of current wastewater discharges into the Prado Management Area from contributing parties including SAWPA member agencies (Eastern Municipal Water District, Inland Empire Utilities Agency, Orange County Water District, San Bernardino Valley Municipal Water District, and Western Municipal Water District).
2. Coordinate with partners to identify solutions to falling groundwater water levels in the Prado Management Area.

Path: T:\Projects\Corona GSP 46414\GIS\Maps\Figures\GSP Figures\Chapter 8 - Projects and Managment Actions\Figure 8-1 Shallow Monitoring Well Locations.mxd



Approximate 545 foot Ground Surface Elevation Contour

Recommended Shallow Monitoring Well General Search Area

Focused Shallow Well Search Area

Planned Prado Dike

N

0 800

Feet

Figure 8-1
Potential
Shallow Monitoring
Well Locations

TODD GROUNDWATER

9. IMPLEMENTATION PLAN

While the Temescal Subbasin (Basin) is considered to be sustainably managed, this status is by no means taken for granted. Potential effects of growth and climate change have been evaluated by means of modeling simulations, but effects are likely to be cumulative, and thereby present challenges to sustainability. Accordingly, additional projects and actions must be continued or implemented to satisfy the Sustainability Goal to the foreseeable planning horizon. Implementation of the Groundwater Sustainability Plan (GSP) by the Temescal Groundwater Sustainability Agency (GSA) will begin following adoption of the plan by the GSA in 2022 and continue through 2042. The GSP will be implemented to sustainably manage groundwater in the Basin under the authority of the GSA and its member agencies the City of Corona (Corona), the City of Norco (Norco), and the Home Gardens County Water District (HGCWD) as provided by the Sustainable Groundwater Management Act (SGMA).

After submittal of the GSP to the California Department of Water Resources (DWR) and during the DWR review period, the GSA will begin implementing the projects and management actions described in Chapter 8 and will communicate with stakeholders throughout implementation.

9.1. PLAN IMPLEMENTATION RESOURCES AND RESPONSIBILITIES

Resources to implement the GSP will be derived from funds and personnel from the GSA parties (Corona, Norco, and HGCWD) and qualified firms contracted to perform specific specialized services.

Personnel from the three GSA parties will be responsible for collection of information from their respective facilities or within their area of influence in the Basin. This will include depth to groundwater measurements, collection of groundwater quality samples, groundwater extractions, use of surface water supplies, and total water use. This information will be maintained by each GSA party for inclusion in annual reports, GSP updates, and storage in the Data Management System (DMS).

Annual GSP reporting, specialized activities included in projects and/or management actions, and periodic GSP updates will be contracted by the GSA to specific specialized firms with relevant experience and expertise. Individual parties within the GSA may be responsible for developing requests for proposals (RFPs), contracting, and managing these activities with contractors and/or consultants.

9.2. ANNUAL REPORTING

The GSA is required to submit annual reports to DWR by April 1st of each year following adoption of the GSP. The first annual report will be due April 1, 2022. Each annual report will include the following components for the preceding water year as described in GSP Regulations:

- General information – Executive summary, location map.

- Detailed description and graphical representation of the following components of the Basin:
    - Groundwater elevation data from monitoring wells within the monitoring network.
    - Groundwater extraction data for the preceding water year.
    - Surface water supply used or available for use.
    - Total water use.
    - Change in groundwater storage.
- Description of progress towards implementing the GSP – implementation of projects or management actions since the previous annual report.

The first annual report will be prepared to include data and information from the end of the period included in this GSP (end of water year 2018) through to the end of water year 2021. The costs associated with producing annual reports will be incorporated into the Corona annual budget.

9.3. NEW INFORMATION AND CHANGES

The GSP has been developed based on the best available information. However, it is recognized that during implementation of the GSP, new information on groundwater conditions, changes in land use or climate, and or changes in the regulatory environment can be expected. Changes in GSP administration may also be appropriate based on experience. When these changes occur, the GSA will react with appropriate changes in GSP administration, data collection, and/or groundwater management methods. If the changes are significant, stakeholders and the GSA will be kept informed of these changes via the Corona GSP website and emails to stakeholders.

9.4. PERIODIC EVALUATIONS

The GSA will evaluate the GSP at least every five years and provide an assessment to DWR as required by GSP Regulations. This will include an update on the progress of achieving sustainability goals in the Basin and assessment of the following:

- Current groundwater conditions for each sustainability indicator applicable to the Basin relative to measurable objectives and minimum thresholds.
- The implementation of any projects or management actions and their effect on groundwater conditions.
- Revisions to the basin setting, management areas, or the identification of undesirable results and the setting of minimum thresholds and measurable objectives resulting from significant changes, new information, or changes in water use.
- The monitoring network within the Basin, including any data gaps and areas of the Basin that are represented by data that does not satisfy the requirements of SGMA requirements.
- Significant new information that has been made available since GSP adoption, amendment, or last assessment.

- Relevant actions taken by the GSA, including a summary of regulations or ordinances related to the GSP.
- Any enforcement or legal actions taken by the GSA to continue the sustainability goals of the Basin.
- Completed or proposed GSP amendments.

The cost of the periodic updates is dependent on the complexity of changes occurring in the Basin since adoption of the GSP but are estimated to be $250,000 per update (2021 dollars).

9.5. PROJECTS AND MANAGEMENT ACTIONS

Projects and management actions are described in Chapter 8, each in terms of technical description, feasibility and implementation, benefits, costs and financing, and timeline. The Projects and Management Actions are listed below in the same order as presented in Chapter 8.

Group 1 - Existing or established projects and management actions

- Groundwater Treatment
- Water Reclamation Facility (WRF) Percolation Ponds
- Water Level Quality Assurance and Quality Control (QA/QC)
- Water Shortage Contingency Plans (WSCPs)
- Water Conservation Programs
- Western Municipal Water District Integrated Regional Water Management Plan (IRWMP)
- Western Riverside County Regional Wastewater Authority (WRCRWA)
- Santa Ana Watershed Involvement

Group 2 – Projects and management actions that have been or are under development

- Interconnected Surface Water Monitoring Wells Implementation
- Potable Reuse Feasibility Study
- Mountain Runoff Capture Investigation

Group 3 – Conceptual future projects and management actions

- Future Groundwater Treatment
- Stormwater Capture, Treatment and Recharge
- Santa Ana River Wastewater Discharge Coordination for Shallow Groundwater Conditions

The projects and management actions described here work together toward the sustainability goal and objectives, namely: to provide a reliable and efficient groundwater supply, to provide reliable storage, to protect groundwater quality, to support beneficial uses of interconnected surface waters, and to support integrated and cooperative water resource management.

9.6. SCHEDULE FOR IMPLEMENTATION

Table 9-1 is an estimated timeline for implementation. The timeline columns include the individual years 2021 through 2025, which are followed by five-year intervals to 2040 to 2045. With implementation officially starting in 2022, the last interval includes the 2042 deadline for the 20-year implementation to achieve the sustainability goal.

The projects and management actions, and GSP Administration, Monitoring, and Reporting are listed in rows and as warranted. As shown, most projects and management actions have been ongoing. Some will be initiated following GSP adoption and continued during implementation.

Table 9 1. Estimated Timeline for Projects and Management Actions

Description	GSP Implementation Period								
	2021	2022	2023	2024	2025	2026-2030	2031-2035	2036-2040	2041-2045
Group 1 - Existing or established projects and management actions									
Groundwater Treatment									
WRF Percolation Ponds									
Water Level QA/QC									
Water Shortage Contingency Plans									
Water Conservation Programs									
Western Municipal Water District - IRWMP									
Western Riverside County Regional Wastewater Authority (WRCRWA)									
Santa Ana Watershed Involvement									
Group 2 – Projects and management actions that have been or are under development									
Interconnected Surface Water Monitoring Wells Implementation									
Potable Reuse Feasibility Study									
Mountain Runoff Capture Investigation									
Group 3 – Conceptual future projects and management actions									
Future Groundwater Treatment	(to be determined)								
Stormwater Capture, Treatment and Recharge	(to be determined)								
Coordination with Upstream Santa Ana River Partners	(to be determined)								
GSP Administration, Monitoring, and Reporting									
GSP Administration									
Ongoing Monitoring									
Annual Reporting									
Periodic GSP Evaluation and Updates									

9.7. GSP IMPLEMENTATION COSTS

Implementation costs include costs to continue monitoring as described in Chapter 7, implement management actions and projects as described in Chapter 8, and complete annual reports and periodic GSP evaluation and updates as required by SGMA. As summarized in **Table 9-2**, total annual costs (2021 dollars) are estimated at $100,000 per year for GSP administration and annual reporting. Costs for previously implemented existing ongoing Group 1 management actions and project and monitoring activities are not included in this total. Estimated single occurrence costs for activities anticipated to occur in the first 5 years of GSP implementation and the first periodic GSP evaluation and update total $515,000 to $575,000 (2021 dollars). Costs for conceptual future Group 3 projects and management actions are not included in this total.

Table 9-2. GSP Implementation Cost Estimates

Management Actions, Projects, and GSP Administration	Estimated Costs
GSP Administration and Annual Reporting	$100,000/year
Total Estimated Annual Implementation Costs	**$100,000/year**
Interconnected Surface Water Monitoring Wells Implementation	$40,000 to $50,000
Potable Reuse Feasibility Study	$150,000 to $200,000
Mountain Runoff Capture Investigation	$75,000
First Periodic Evaluation and GSP Update (2027)	$250,000
Total Estimated One-Occurrence Costs (First 5 years)	**$515,000 to $575,000**
Future Groundwater Treatment	To be decided
Stormwater Capture, Treatment and Recharge	To be decided
Coordination with Upstream Santa Ana River Partners	To be decided

9.7.1. Funding Methods

The funding method for operating expenses and GSP implementation costs is by contributions by GSA member agencies (Corona, Norco, and HGCWD). This is the same mechanism utilized to fund development of the GSP (with significant supplemental contribution though California Proposition 1 Grant funding). Corona will be responsible for most of the ongoing implementation costs, which are within budget projections for the next several years.

Sources of funding have and will continue to vary according to the project or management action (see Chapter 8). Funding for planning and implementation of some projects and management actions may be achieved with local, state, and federal sources. The local agencies track opportunities for outside financing (grants or loans) from state water programs and federal infrastructure funding. For local financing, the agencies update their financial plans and rates as needed.

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APPENDIX A

Memorandum of Understanding forming the Temescal Groundwater Sustainability Agency

MEMORANDUM OF UNDERSTANDING
(TEMESCAL SUB-BASIN GROUNDWATER SUSTAINABILITY AGENCY)

1. PARTIES AND DATE.

This Memorandum of Understanding ("**MOU**") is made and entered into by and between the City of Corona, a municipal corporation organized under the laws of the State of California with its principal place of business at 400 South Vicentia Avenue, Corona, California 92882 ("**Corona**"), the City of Norco, a municipal corporation organized under the laws of the State of California with its principal place of business at 2870 Clark Avenue, Norco, California 92860 ("**Norco**") and the Home Gardens County Water District, a county water district with its principal place of business at 3832 Grant Street, Corona, CA 92879 ("**HGCWD**"). Corona, Norco and HGCWD are sometimes individually referred to as "Party" and collectively as "Parties" in this MOU.

2. RECITALS.

2.1 Adoption of SGMA. On September 16, 2014, Governor Jerry Brown signed into law Senate Bills 1168 and 1319 and Assembly Bill 1739, known collectively as the Sustainable Groundwater Management Act ("**SGMA**").

2.2 Purpose of SGMA. The purpose of SGMA is to create a comprehensive management system in the State of California by creating a structure to manage groundwater at the local level, while providing authority to the State to oversee and regulate, if necessary, the local groundwater management system.

2.3 Groundwater Management Plans. SGMA empowers local agencies to adopt groundwater management plans that are tailored to the resources and needs of their communities to provide a buffer against drought and contribute to reliable water supply for the future.

2.4 Groundwater Sustainability Agencies. Water Code Section 10723.6 authorizes a combination of local agencies overlying a groundwater basin to elect to become a Groundwater Sustainability Agency ("**GSA**") by using a memorandum of understanding or other legal agreement.

2.5 Corona's Authority. Corona is a local agency qualified to become a GSA because Corona manages water, has a water supply, and has land use responsibilities over a portion of the Temescal Sub-Basin of the Upper Santa Ana Valley Groundwater Basin (DWR Basin Number 8-2.09) ("**Sub-Basin**"), which is a DWR-designated medium priority basin.

2.6 Norco's Authority. Norco is also a local agency qualified to become a GSA because Norco manages water, has a water supply, and has land use responsibilities over a portion of the Sub-Basin.

2.7 HGCWD's Authority. HGCWD is also a local agency qualified to become a GSA because HGCWD is a county water district formed and operating pursuant to and in accordance with Division 12 of the California Water Code that manages water, has a water supply and overlies a portion of the Sub-Basin.

2.8 Corona's Election to Join GSA. On March 15, 2017, Corona held a public hearing to determine whether to become a GSA, and adopted Resolution No. 2017-013, electing to jointly become a GSA with Norco and HGCWD, a copy of which (without exhibits) is attached hereto as **Exhibit "A-1"** attached hereto and incorporated herein by reference.

2.9 Norco's Election to Join GSA. On March 15, 2017, Norco held a public hearing to determine whether to become a GSA, and adopted Resolution No. 2017-12, electing to jointly become a GSA with Corona and HGCWD, a copy of which is attached hereto as **Exhibit "A-2"** attached hereto and incorporated herein by reference.

2.10 HGCWD's Election to Join GSA. On March 23, 2017, HGCWD held a public hearing to determine whether to become a GSA, and, by minute action, elected to jointly become a GSA with Corona and Norco.

2.11 Submission of Notice of Decision. Corona, Norco and HGCWD will jointly submit a Notice of Decision to form and be the founding Parties of a GSA, which will cover the Sub-Basin as shown on the map in **Exhibit "B-1"** attached hereto and incorporated herein by reference.

2.12 Boundaries of Sub-Basin. Additional detail identifying boundaries of the Parties and agencies covering the Sub-Basin is shown on the map attached as **Exhibit "B-2"** attached hereto and incorporated herein by reference.

2.13 Preparation of Groundwater Sustainability Plan for Sub-Basin. The Parties will work collaboratively with other interested agencies to develop and implement a Groundwater Sustainability Plan ("**GSP**") to sustainably manage the Sub-Basin pursuant to SGMA.

2.14 Corona Utility Authority. The Parties to this MOU understands that Corona has entered into a Water Enterprise Management Agreement and a Wastewater Enterprise Management Agreement, both dated as of February 6, 2002, with the Corona Utility Authority ("CUA") for the maintenance, management and operation of those utility systems (collectively, the "Corona Management Agreements"). To the extent that this MOU is deemed to be a "material contract" under either of the Corona Management Agreements, Corona enters into this MOU on behalf of the CUA and subject to the terms of the applicable Corona Management Agreement(s).

3. TERMS.

3.1 Purpose. This MOU is entered into by and between the Parties to facilitate a cooperative and ongoing working relationship that will allow compliance with the SGMA and other applicable State law, both as may be amended from time to time.

3.2 Temescal Sub-Basin Groundwater Sustainability Agency. The Parties hereby establish the Temescal Sub-Basin Groundwater Sustainability Agency ("**Temescal GSA**") to manage the portion of the Sub-Basin as set forth in Exhibit **"B-1"** attached hereto and incorporated herein by reference.

3.3 Additional Agencies. Additional agencies with service area boundaries outside the jurisdiction of the Parties may join and incorporate their service area boundaries or portions thereof into the Temescal GSA upon the mutual consent of all Parties. The additional agencies will be added to **Exhibit "C-1"** attached hereto and incorporated herein by reference, as amended from time to time in compliance with SGMA, and the boundaries of the Temescal GSA may be expanded accordingly.

3.4 Powers. In addition to any other action available to develop and implement the SGMA, including a GSP, the Temescal GSA may perform the following functions:

A. Adopt standards for measuring and reporting water use.

B. Develop and implement policies designed to reduce or eliminate overdraft within the boundaries of the GSA.

C. Develop and implement conservation best management practices.

D. Develop and implement metering, monitoring and reporting related to groundwater pumping.

E. Exercise any and all powers described in Part 2.74 of Division 6 of the Water Code, the Sustainable Groundwater Management Act.

3.5 Decision Making Process.

3.5.1 Majority Vote Required. Each party shall have one vote through its representative designated pursuant to Section 3.7 of this MOU. With the exceptions noted herein, it is the preference of the Parties that actions undertaken by the Temescal GSA are done by unanimous consent of the Parties; however, if unanimous consent is not possible, a majority vote of all then current Parties to this MOU is required.

3.5.2 Impasse Procedures. In the event of an impasse or disagreement where a majority vote cannot be reached, the Parties shall use their best efforts to find a mutually agreeable result. To this effect, the Parties shall consult and negotiate with each other in good faith in an attempt to reach a solution that is mutually satisfactory. If the Parties do not reach a solution that is acceptable to a majority of all then current Parties to this MOU, then the matter shall be submitted to non-binding arbitration or mediation within a reasonable period of time.

3.6 Roles and Responsibilities of the Parties.

A. Corona shall have the primary responsibility to develop a GSP within the boundaries of the Temescal GSA and submit the GSP to the California Department of Water Resources ("**DWR**") for review and evaluation. Corona shall also have the primary responsibility to prepare and submit the annual and five year reports to DWR pursuant to SGMA and DWR's implementing regulations.

B. The Parties will work jointly to fulfill the purpose of this MOU within the boundaries of the Temescal GSA.

C. The Parties will meet regularly to discuss SGMA, GSP development and implementation activities, assignments, and ongoing work progress.

D. The Parties may form committees as necessary from time to time to discuss issues that impact the Temescal GSA.

E. Corona is responsible for implementing the GSP in areas of the Temescal GSA that are within Corona's service area boundaries and within Corona's sphere of influence.

F. Norco is responsible for implementing the GSP in areas of the Temescal GSA that are within Norco's service area boundaries.

G. HGCWD is responsible for implementing the GSP in areas of the Temescal GSA that are within HGCWD's service area boundaries.

3.7 Designation of Representatives.

3.7.1 Corona's Representative. Corona hereby designates Tom Moody, or his or her designee, to act as its representative for the performance of this MOU ("Corona's Representative"). Corona's Representative shall have the power to act on behalf of the Corona for all purposes under this MOU. Corona's Representative may be changed at any time by providing notice to the other Parties pursuant to Section 3.12.

3.7.2 Norco's Representative. Norco hereby designates Chad Blais, or his or her designee, to act as its representative for the performance of this MOU ("Norco's Representative"). Norco's Representative shall have the power to act on behalf of the Norco for all purposes under this MOU. Norco's Representative may be changed at any time by providing notice to the other Parties pursuant to Section 3.12.

3.7.3 HGCWD's Representative. HGCWD hereby designates David Vigil, or his or her designee, to act as its representative for the performance of this MOU ("HGCWD's Representative"). HGCWD's Representative shall have the power to act on behalf of HGCWD for all purposes under this MOU. HGCWD's Representative may be changed at any time by providing notice to the other Parties pursuant to Section 3.12.

3.8 Funding. Unless agreed to otherwise, each Party's participation in this MOU is at its sole cost and expense. Each Party shall be financially responsible for collecting data or information from within that Party's service area that is required to be provided for development of the GSP. Norco and HGCWD shall not incur any financial expense related to development of the GSP and submittal of the GSP to the DWR.

3.9 Term and Termination. This MOU shall remain in effect unless terminated by the mutual written consent of the Parties. Any Party may elect to withdraw its participation in the Temescal GSA by providing sixty (60) days' written notice to the other Parties. Additionally, the Parties may mutually agree to terminate this MOU and instead enter into a joint powers agreement pursuant to the Joint Exercise of Powers Act, Government Code Section 6500 *et seq*. for the purpose of creating a separate public agency to serve as the Temescal GSA and carry out all obligations and exercise all powers under SGMA.

3.10 Amending the MOU. This MOU and Exhibits hereto may only be amended by a subsequent writing, approved and signed by all Parties.

3.11 Hold Harmless and Mutual Indemnification. No Party, nor any officer or employee of a Party, shall be responsible for any damage or liability occurring by reason of anything done or omitted to be done by another Party under or in connection with this MOU. Each Party shall defend, indemnify and hold harmless the other Parties and their elected officials, officers, agents and employees from and against any and all claims, demands, judgments or liabilities arising from any and all alleged acts or omissions of the indemnifying Party and its elected officials, officers, agents and employees during those times when said elected officials, officers, agents and employees are acting in connection with this MOU.

3.12 Notices. Except as otherwise expressly provided by law, any and all notices or other communications required or permitted by this MOU to be served on or given to a Party to this MOU shall be in writing and shall be deemed duly served or given when personally delivered to the Party to whom it is directed or to any managing or executive officer or director of that Party. In lieu of personal service, all notices or other communications shall be deemed duly served when sent via electronic mail or when deposited in the United States mail, first class postage prepaid, addressed as follows:

If to Corona: City of Corona
Attn: Department of Water and Power, General Manager
755 Public Safety Way
Corona, CA 92882
E-mail: Tom.moody@ci.corona.ca.us

If to Norco: City of Norco
Attn: Public Works Director
2870 Clark Avenue
Norco, CA 92860
E-mail: Cblais@ci.norco.ca.us

If to HGCWD: Home Gardens County Water District
Attn: General Manager
3832 Grant Street
Corona, CA 92879
E-mail: hgcwd@yahoo.com

3.13 Counterparts. This MOU may be signed in counterparts, each of which shall constitute an original.

3.14 Cooperation; Further Acts. The Parties shall fully cooperate with one another, and shall take any additional acts or sign any additional documents as may be necessary, appropriate or convenient to attain the purposes of this MOU.

3.15 Entire Agreement. This MOU contains the entire agreement of the Parties with respect to the subject matter hereof, and supersedes all prior negotiations, understandings or agreements.

3.16 Corona Utility Authority. To the extent that this MOU is deemed to be a "material contract" under either of the Corona Management Agreements, the Parties to this MOU have no right to terminate this MOU, either with or without cause, based upon the existence or non-existence of either or both of the Corona Management Agreements. Therefore, if an applicable Corona Management Agreement expires or terminates for any reason, the Parties to this MOU shall remain fully obligated to perform under this MOU contracting directly with the CUA or another third party contracted by the CUA for the maintenance, management and operation of the applicable utility system.

[SIGNATURES ON FOLLOWING 3 PAGES]

CORONA'S SIGNATURE PAGE FOR

MEMORANDUM OF UNDERSTANDING
(TEMESCAL SUB-BASIN GROUNDWATER SUSTAINABILITY AGENCY)

CITY OF CORONA

By: ______________________ Dated: 3/15/17
Dick Haley
Mayor

Attest:

By: ______________________
Lisa Mobley
City Clerk

Approved as to Form:

By: ______________________
Dean Derleth
City Attorney

Consent:

____
Darrell Talbert
Executive Director
Corona Utility Authority

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**NORCO'S SIGNATURE PAGE FOR
MEMORANDUM OF UNDERSTANDING
(TEMESCAL SUB-BASIN GROUNDWATER SUSTAINABILITY AGENCY)**

CITY OF NORCO

By: ______________________ Date: March 15, 2017
Greg Newton
Mayor

Attest:

By: ______________________
Cheryl L. Link, CMC
City Clerk

Approved as to Form:

By: ______________________
John Harper
City Attorney

HGWD'S SIGNATURE PAGE FOR

MEMORANDUM OF UNDERSTANDING
(TEMESCAL SUB-BASIN GROUNDWATER SUSTAINABILITY AGENCY)

HOME GARDENS COUNTY WATER DISTRICT

By: ______________________ Dated: 3/23/17

David Vigil
General Manager

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EXHIBIT “A-1”
TO
MEMORANDUM OF UNDERSTANDING
(TEMESCAL SUB-BASIN GROUNDWATER SUSTAINABILITY AGENCY)

CORONA RESOLUTION ON FORMATION OF THE TEMESCAL SUBBASIN GROUNDWATER SUSTAINABILITY AGENCY

[SEE ATTACHED FOUR (4) PAGES]

RESOLUTION NO. 2017-013

RESOLUTION OF THE CITY COUNCIL OF THE CITY OF CORONA AUTHORIZING THE EXECUTION AND DELIVERY OF A MEMORANDUM OF UNDERSTANDING WITH THE CITY OF NORCO AND THE HOME GARDENS COUNTY WATER DISTRICT FOR THE PURPOSE OF JOINTLY ESTABLISHING AND SERVICING AS THE TEMESCAL SUB-BASIN GROUNDWATER SUSTAINABILITY AGENCY

WHEREAS, in September 2014, the Governor signed three bills (SB 1168, SB 1319, and AB 1739) into law creating the Sustainable Groundwater Management Act of 2014 ("SGMA"), which generally requires the formation of one or more Groundwater Sustainability Agencies ("GSA") responsible for implementing sustainable groundwater management and preventing "undesirable results" in groundwater basins and sub-basins designated as a medium or high or priority basin by the California Department of Water Resources ("DWR"); and

WHEREAS, DWR has designated the Temescal Sub-Basin of the Upper Santa Ana Valley Groundwater Basin (the "Sub-Basin"), as a medium priority groundwater basin; and

WHEREAS, the City of Corona ("City"), the City of Norco ("Norco") and the Home Gardens County Water District ("HGWD") each overlay a portion of the Sub-Basin and each exercise water management, water supply or land use authority within a portion of the Sub-Basin; and

WHEREAS, under SGMA, a combination of local agencies may elect to form a GSA for all or portions of the Sub-Basin through a memorandum of understanding; and

WHEREAS, the City, Norco and HGWD have negotiated that certain Memorandum of Understanding (Temescal Sub-Basin Groundwater Sustainability Agency) ("MOU") by and between the City of Corona, the City of Norco, and the Home Gardens Water District for the purpose of jointly establishing and servicing as the Temescal Sub-Basin Groundwater Sustainability Agency; and

WHEREAS, the Temescal Sub-Basin Groundwater Sustainability Agency will implement SGMA in the entire Sub-Basin; and

WHEREAS, the City held a public hearing on March 15, 2017 pursuant to California Water Code Section 10723(b), after publication of notice of such hearing pursuant to California Government Code Section 6066.

NOW, THEREFORE, BE IT RESOLVED, by the City Council of the City of

Corona, California, as follows:

SECTION 1. Election to Form GSA. The City of Corona hereby elects, jointly with the City of Norco and the Home Gardens Water District, to become the Temescal Sub-Basin Groundwater Sustainability Agency to serve as the groundwater sustainability agency over the entire Temescal Sub-Basin of the Upper Santa Ana Valley Groundwater Basin pursuant to California Water Code Section 10723.6(a)(2). The Temescal Sub-Basin Groundwater Sustainability Agency shall have all the powers granted to a groundwater sustainability agency pursuant to SGMA. The City, Norco and HGWD will jointly submit to DWR a notice of their decision to form the Temescal Sub-Basin Groundwater Sustainability Agency for the Temescal Sub-Basin of the Upper Santa Ana Valley Groundwater Basin.

SECTION 2. Sub-Basin Boundaries Managed by GSA. The portion of the Temescal Sub-Basin to be managed by the Temescal Sub-Basin Groundwater Sustainability Agency shall be that portion of the Sub-Basin as depicted in Exhibit "A" attached hereto and incorporated herein by reference, which boundary may be modified from time to time.

SECTION 3. Interested Persons. The Temescal Sub-Basin Groundwater Sustainability Agency shall consider the interests of all beneficial users and users of groundwater, as well as those responsible for implementing groundwater sustainability plans, as required by California Water Code Section 10723.2. The Temescal Sub-Basin Groundwater Sustainability Agency shall establish and maintain a list of persons interested in receiving notices regarding preparation of the GSP, meeting announcements, and availability of draft plans, maps, and other documents, as required by California Water Code Section 10723.4.

SECTION 4. Approval of MOU. The City hereby approves the MOU in substantially the form attached hereto as Exhibit "B" and incorporated herein by reference, which provides the governing structure of the Temescal Sub-Basin Groundwater Sustainability Agency.

SECTION 5. Implementation. The Mayor and the City Clerk are hereby authorized and directed to execute and deliver the MOU for and on behalf of the City, and the Mayor and City staff are authorized to take any actions and execute any documents necessary to carry out the stated purposes of this Resolution, including authorizing non-substantive changes to the MOU, which are approved as to form by the City Attorney.

SECTION 6. Severability. If any provision of this Resolution or the application of any such provision to any person or circumstance is held invalid, such invalidity shall not affect other provisions or applications of this Resolution that can be given effect without the invalid provision or application, and to this end the provisions of this Resolution are severable.

SECTION 7. Effective Date. This Resolution shall become effective immediately upon its adoption.

PASSED, APPROVED AND ADOPTED this 15th day of March 2017.

Karen Spiegel

Mayor of the City of Corona, California

ATTEST:

City Clerk of the City of Corona, California

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CERTIFICATION

I, Lisa Mobley, City Clerk of the City of Corona, California, do hereby certify that the foregoing Resolution was regularly passed and adopted by the City Council of the City of Corona, California, at a regular meeting thereof held on the 15th day of March 2017, by the following vote:

AYES:	**FOX, MONTANEZ, SCOTT, SPIEGEL**
NOES:	**NONE**
ABSENT:	**HALEY**
ABSTAINED:	**NONE**

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of the City of Corona, California, this 15th day of March 2017.

City Clerk of the City of Corona, California

(SEAL)

CA\JR\06100.30901\10179374.1

EXHIBIT "A-2"
TO
MEMORANDUM OF UNDERSTANDING
(TEMESCAL SUB-BASIN GROUNDWATER SUSTAINABILITY AGENCY)

NORCO RESOLUTION ON FORMATION OF THE TEMESCAL SUBBASIN GROUNDWATER SUSTAINABILITY AGENCY

[SEE ATTACHED TWO (2) PAGES]

RESOLUTION NO. 2017-02

RESOLUTION OF THE CORONA UTILITY AUTHORITY AUTHORIZING THE CITY OF CORONA TO EXECUTE AND DELIVER THE MEMORANDUM OF UNDERSTANDING WITH THE CITY OF NORCO AND THE HOME GARDENS COUNTY WATER DISTRICT FOR THE PURPOSE OF JOINTLY ESTABLISHING AND SERVICING AS THE TEMESCAL SUB-BASIN GROUNDWATER SUSTAINABILITY AGENCY

WHEREAS, in September 2014, the Governor signed three bills (SB 1168, SB 1319, and AB 1739) into law creating the Sustainable Groundwater Management Act of 2014 ("SGMA"), which generally requires the formation of one or more Groundwater Sustainability Agencies ("GSA") responsible for implementing sustainable groundwater management and preventing "undesirable results" in groundwater basins and sub-basins designated as a medium or high or priority basin by the California Department of Water Resources ("DWR"); and

WHEREAS, DWR has designated the Temescal Sub-Basin of the Upper Santa Ana Valley Groundwater Basin (the "Sub-Basin"), as a medium priority groundwater basin; and

WHEREAS, the City of Corona ("City"), the City of Norco ("Norco") and the Home Gardens County Water District ("HGCWD") each overlay a portion of the Sub-Basin and each exercise water management, water supply or land use authority within a portion of the Sub-Basin; and

WHEREAS, under SGMA, a combination of local agencies may elect to form a GSA for all or portions of the Sub-Basin through a memorandum of understanding; and

WHEREAS, the City, Norco and HGCWD have negotiated that certain Memorandum of Understanding (Temescal Sub-Basin Groundwater Sustainability Agency) ("MOU") by and between the City of Corona, the City of Norco, and the Home Gardens County Water District for the purpose of jointly establishing and servicing as the Temescal Sub-Basin Groundwater Sustainability Agency; and

WHEREAS, the Temescal Sub-Basin Groundwater Sustainability Agency will implement SGMA in the entire Sub-Basin; and

WHEREAS, the City has entered into a Water Enterprise Lease Agreement and a Wastewater Enterprise Management Agreement, both dated as of February 6, 2002, with the Corona Utility Authority (a joint powers agency and a public entity organized under the laws of the State of California) ("CUA") whereby the City has leased the City's water and wastewater systems to the CUA; and

WHEREAS, the City has also entered into a Water Enterprise Management Agreement and a Wastewater Enterprise Management Agreement, both dated as of February 6, 2002, with the CUA for the maintenance, management and operation of said water and wastewater systems (collectively "the CUA Management Agreements"); and

WHEREAS, to the extent that the MOU is deemed to be a "material contract" under the CUA Management Agreements, the CUA desires to authorize and direct the City to execute and deliver the MOU on behalf of the CUA and subject to the terms of the applicable CUA Management Agreements.

NOW, THEREFORE, BE IT RESOLVED, by the Corona Utility Authority, as follows:

SECTION 1. Approval of Agreement. The Corona Utility Authority hereby authorizes the City Council of the City to execute and deliver the MOU in substantially the form attached hereto as Exhibit "A" and incorporated herein by reference.

SECTION 2. City Implementation. The Corona Utility Authority hereby authorizes the City Council of the City to authorize the Mayor and City staff to take any actions and execute any documents necessary to carry out the stated purposes of this Resolution and the City Council's resolution approving the MOU, including authorizing non-substantive changes to the MOU, which are approved as to form by the City Attorney.

SECTION 3. CUA Implementation. The Corona Utility Authority hereby authorizes all officers of the Corona Utility Authority to take any actions and execute any documents necessary to carry out the stated purposes of this Resolution, including authorizing non-substantive changes to the MOU.

SECTION 4. Severability. If any provision of this Resolution or the application of any such provision to any person or circumstance is held invalid, such invalidity shall not affect other provisions or applications of this Resolution that can be given effect without the invalid provision or application, and to this end the provisions of this Resolution are severable.

SECTION 5. Effective Date. This Resolution shall become effective immediately upon its adoption.

PASSED, APPROVED AND ADOPTED this 15th day of March 2017.

Karen Spiegel
President of the Corona Utility Authority

ATTEST:

Secretary of the Corona Utility Authority

CA\JR\06100.30901\10179506.1

CERTIFICATION

I, Lisa Mobley, Secretary of the Corona Utility Authority, do hereby certify that the foregoing Resolution was adopted by the Board of Directors of the Corona Utility Authority, at its regular meeting held on the 15th day of March 2017, by the following vote:

AYES:	**FOX, MONTANEZ, SCOTT, SPIEGEL**
NOES:	**NONE**
ABSENT:	**HALEY**
ABSTAINED:	**NONE**

IN WITNESS WHEREOF, I have hereunto set my hand this 15th day of March 2017.

Secretary of the Corona Utility Authority

[SEAL]

CA\JR\06100.30901\10179506.1

RESOLUTION NO. 2017-12

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF NORCO, CALIFORNIA, APPROVING A MEMORANDUM OF UNDERSTANDING (MOU) BETWEEN THE CITY OF CORONA, HOME GARDENS COUNTY WATER DISTRICT AND THE CITY OF NORCO FOR THE ESTABLISHMENT OF THE TEMESCAL SUB-BASIN GROUNDWATER SUSTAINABILITY AGENCY, LOCATED IN NORCO, CALIFORNIA

WHEREAS, On September 16, 2014, Governor Jerry Brown signed into law Senate Bills 1168 and 1319 and Assembly Bill 1739, known collectively as the Sustainable Groundwater Management Act ("SGMA"); and

WHEREAS, the Sustainable Groundwater Management Act (SGMA) is for groundwater to be managed sustainably in California's groundwater basins (California Water Code Sections 10733.2, *et seq*.) requires urban water suppliers to prepare and adopt groundwater sustainability plans (GSPs); and

WHEREAS, the Sustainable Groundwater Management Act requires that groundwater sustainability plans are to be prepared and submitted by January 31, 2020 by medium and priority groundwater basins; and

WHEREAS, the Department of Water Resources has determined the Temescal Basin to be a medium priority basin under the Sustainable Groundwater Management Act; and

WHEREAS, the Temescal Basin is not an adjudicated basin and the City of Norco is required to prepare a groundwater sustainability plan as an individual agency or with all agencies who extract groundwater from the basin as required by the Sustainable Groundwater Management Act; and

WHEREAS, the City of Corona, Home Gardens County Water District and the City of Norco desire to establish the Temescal Sub-Basin Groundwater Sustainability Agency to manage the Temescal groundwater basin; and

NOW, THEREFORE, BE IT RESOLVED that the Council of the City of Norco approve the Memorandum of Understanding to establish the Temescal Sub-Basin Groundwater Sustainability Agency.

PASSED AND ADOPTED by the City Council of the City of Norco at a regular meeting held on March 15, 2017.

Greg Newton, Mayor
City of Norco, California

ATTEST:

Cheryl L. Link, CMC, City Clerk
City of Norco, California

I, Cheryl L. Link, City Clerk of the City of Norco, do hereby certify that the foregoing Resolution was adopted by the City Council of the City of Norco, California at a regular meeting thereof held on March 15, 2017 by the following vote of the City Council:

AYES:	NEWTON, HOFFMAN, BASH, GRUNDMEYER, HANNA
NOES:	NONE
ABSENT:	NONE
ABSTAIN:	NONE

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of the City of Norco, California, on March 15, 2017.

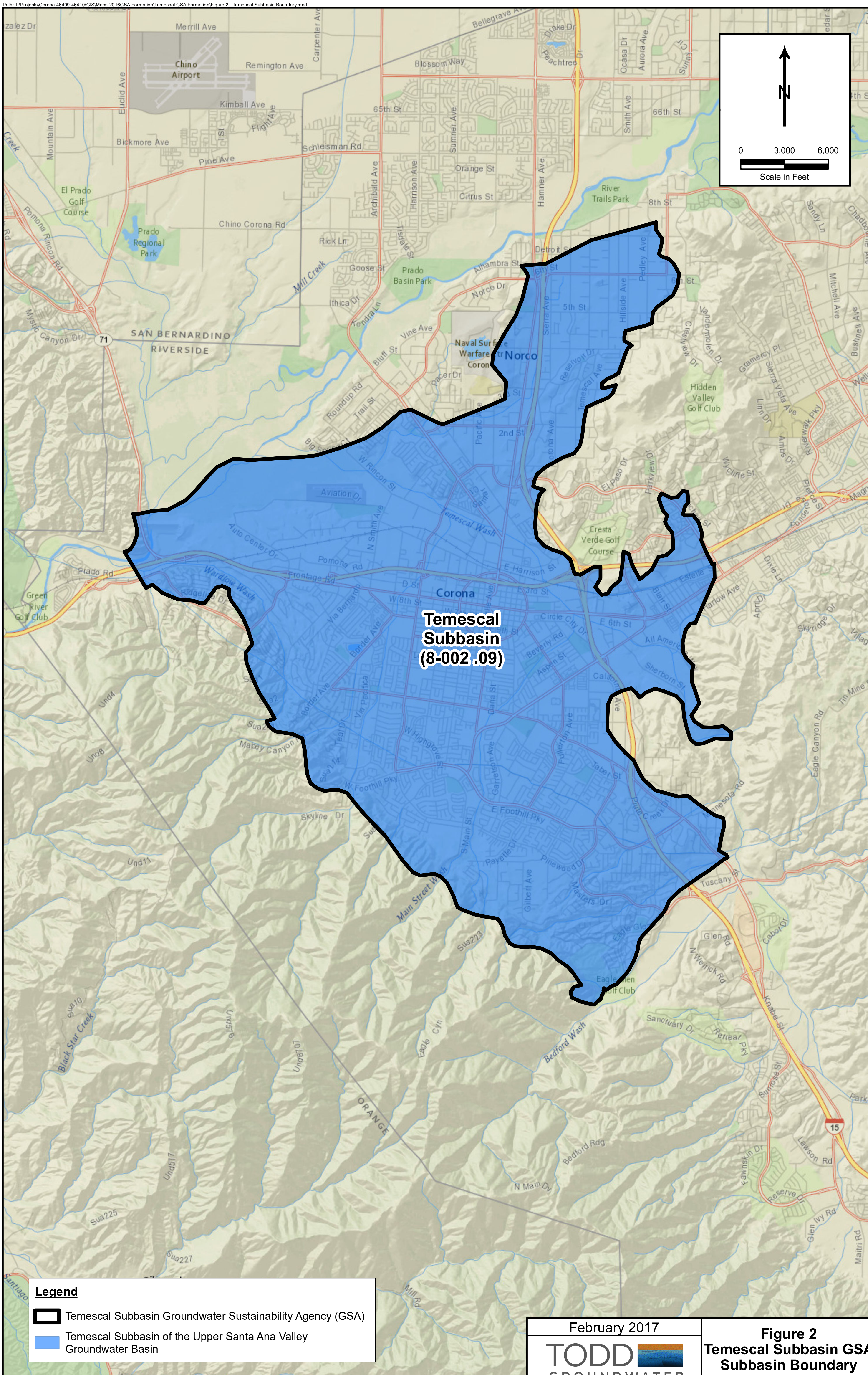
Cheryl L. Link, CMC, City Clerk
City of Norco, California

EXHIBIT "B-1"
TO
MEMORANDUM OF UNDERSTANDING
(TEMESCAL SUB-BASIN GROUNDWATER SUSTAINABILITY AGENCY)

MAP OF TEMESCAL SUB-BASIN

[SEE ATTACHED ONE (1) PAGE]

Path: T:\Projects\Corona 46409-46410\GIS\Maps-2016GSA Formation\Temescal GSA Formation\Figure 2 - Temescal Subbasin Boundary.mxd



Legend

Temescal Subbasin Groundwater Sustainability Agency (GSA)

Temescal Subbasin of the Upper Santa Ana Valley Groundwater Basin

February 2017

TODD GROUNDWATER

Figure 2
Temescal Subbasin GSA Subbasin Boundary

EXHIBIT “B-2”
TO
MEMORANDUM OF UNDERSTANDING
(TEMESCAL SUB-BASIN GROUNDWATER SUSTAINABILITY AGENCY)

MAP OF PARTIES’ SERVICE AREAS
WITHIN THE TEMESCAL SUB-BASIN

[SEE ATTACHED ONE (1) PAGE]

Path: T:\Projects\Corona 46409-46410\GIS\Maps-2016GSA Formation\Temescal GSA Formation\Figure 1 - Temescal Subbasin GSA Service Areas.mxd

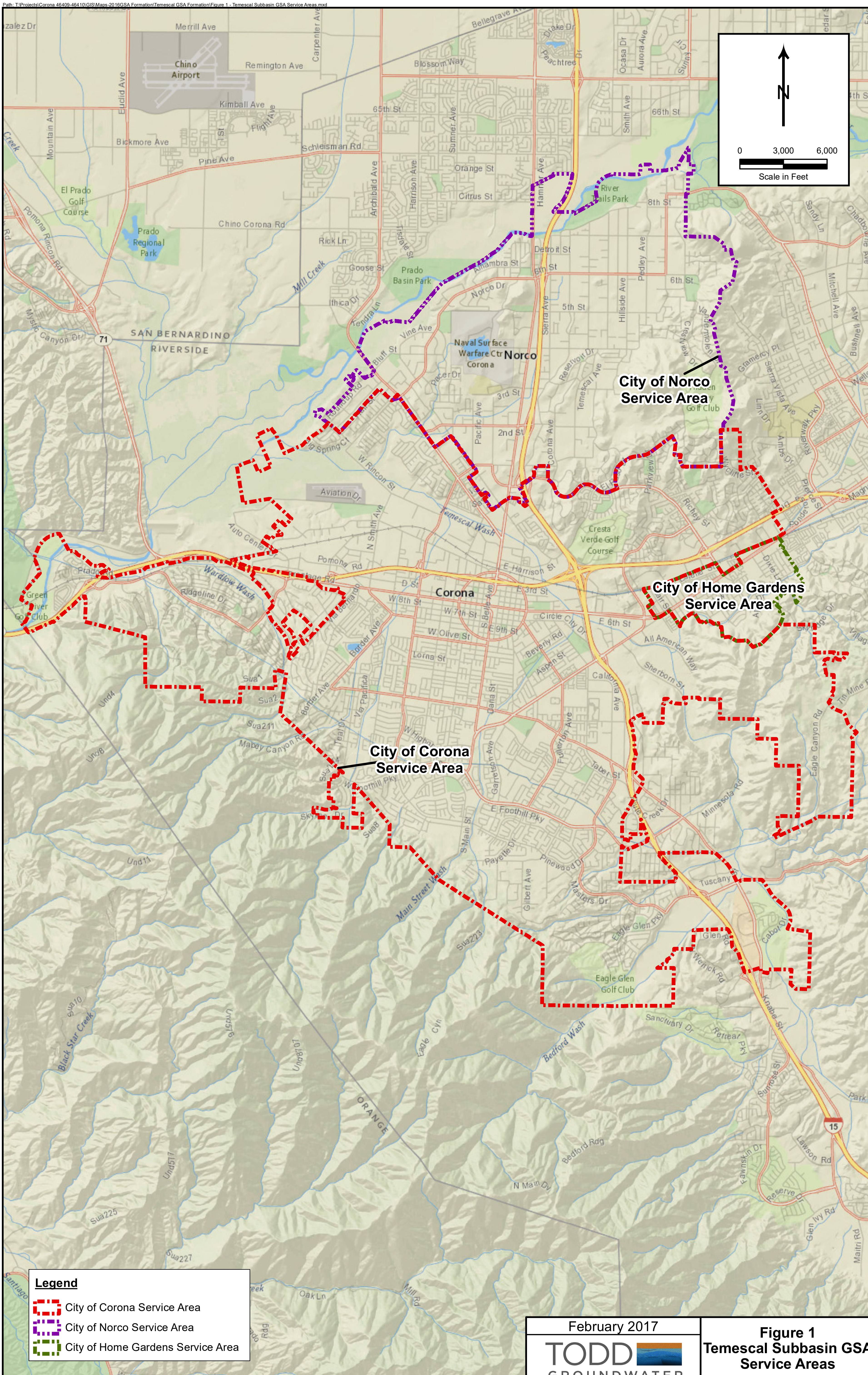


Figure 1
Temescal Subbasin GSA Service Areas

APPENDIX B

Temescal GSA Notice of Decision to become a Groundwater Sustainability Agency

PROOF OF PUBLICATION

THIS SPACE RESERVED FOR CLERK / RECORDING STAMP

CITY OF CORONA
OFFICE OF THE CITY CLERK
NOTICE OF PUBLIC HEARING

PUBLIC NOTICE IS HEREBY GIVEN that the City Council of the City of Corona, California, and the Corona Utility Authority will conduct a public hearing in the Council Chambers, at City Hall, 400 South Vicentia Avenue, in said City of Corona,
ON WEDNESDAY, MARCH 15, 2017 AT 6:30 P.M. or thereafter upon the following:

PROPOSED ACTION:
The City Council and the Corona Utility Authority will consider entering into a Memorandum of Understanding ("MOU") with the City of Norco ("Norco") and the Home Gardens Water District ("HGWD") for the purpose of establishing the Temescal Sub-Basin Groundwater Sustainability Agency to serve as the groundwater sustainability agency for the Temescal Sub-Basin of the Upper Santa Ana Valley Groundwater Basin (DWR Basin Number 8-2.09) ("Sub-Basin") pursuant to the requirements of the Sustainable Groundwater Management Act of 2014 ("SGMA"). The primary purpose of a groundwater sustainability agency under SGMA is to develop a groundwater sustainability plan ("GSP") to achieve long-term groundwater sustainability. The parties to the MOU will work jointly and cooperatively to serve as the groundwater sustainability agency and to satisfy the requirements of SGMA. Each party to the MOU will participate at its sole cost and expense and will be financially responsible for collecting data or information from that party's service area. The City of Corona will have the primary responsibility to develop a GSP and submit it to the California Department of Water Resources ("DWR") for review and evaluation.

This is a public hearing and you are invited to attend and comment on the application described above. If you challenge any portion of this project in court, you may be limited to raising only those issues you or someone else raised at the public hearing described in this notice, or in written correspondence delivered at, or prior to, the public hearing. If you have written comments that you wish to be included in the staff report, please deliver them to the City Clerk, on or before the Tuesday prior to the meeting. If you have questions about this notice or the application to be heard, please call Katie Hockett with the Department of Water and Power at (951) 279-3601.

//S// Lisa Mobley, City Clerk
PUBLISHED: March 1, 2017 and March 8, 2017
JOB CC17-019
SENTINEL WEEKLY NEWS
"Adjudicated for City of Corona, Corona Judicial Dist., Riverside County, California"
SWN-2509 JOB CC17-019
MARCH 1, 8, 2017

Sentinel Weekly News

Adjudicated for the City of Corona, California
1307-C West 6th St., Suite 139
Corona, CA. 92882
Tel: (951) 737-9784 / Fax: (951) 737-9785
E-mail: SentinelWeekly@aol.com

PROOF OF PUBLICATION

(2010, 2015.5 C.C.P.)
STATE OF CALIFORNIA
COUNTY OF RIVERSIDE

I am a Citizen of the United States. I am over the age of eighteen years and not a party to or interested in the above entitled matter. I am an Authorized Representative of *SENTINEL WEEKLY NEWS* (formerly known as The Lake Mathews Sentinel), a Newspaper of General Circulation, printed and published weekly in the City of Corona, County of Riverside, and which Newspaper has been Adjudicated a Newspaper of General Circulation by the Superior Court of the County of Riverside, State of California, under the date of March 30, 1995, Case Number 262254; and under the date of December 7, 1999, Case Number 334071; and the Notice, of which the annexed is a printed copy, has been published in said Newspaper in accordance with the instructions of the Person(s) requesting publication, and not in any supplement thereof on the following dates to wit:

(1) ***March 1, 2017***
(2) ***March 8, 2017***
(3)
(4)

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

/S/ ______________________________
Authorized Representative

DATED: __ ***MARCH 8, 2017*** __

THE PRESS-ENTERPRISE

1825 Chicago Ave, Suite 100
Riverside, CA 92507
951-684-1200
951-368-9018 FAX

PROOF OF PUBLICATION
(2010, 2015.5 C.C.P)

Publication(s): The Press-Enterprise

PROOF OF PUBLICATION OF

Ad Desc.: /

I am a citizen of the United States. I am over the age of eighteen years and not a party to or interested in the above entitled matter. I am an authorized representative of THE PRESS-ENTERPRISE, a newspaper in general circulation, printed and published daily in the County of Riverside, and which newspaper has been adjudicated a newspaper of general circulation by the Superior Court of the County of Riverside, State of California, under date of April 25, 1952, Case Number 54446, under date of March 29, 1957, Case Number 65673, under date of August 25, 1995, Case Number 267864, and under date of September 16, 2013, Case Number RIC 1309013; that the notice, of which the annexed is a printed copy, has been published in said newspaper in accordance with the instructions of the person(s) requesting publication, and not in any supplement thereof on the following dates, to wit:

03/04/2017

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Date: March 04, 2017
At: Riverside, California

Legal Advertising Representative, The Press-Enterprise

NORCO, CITY OF
2870 CLARK AVE
NORCO, CA 92860-1903

Ad Number: 0010910947-01

P.O. Number:

Ad Copy:

NOTICE OF PUBLIC HEARING

PUBLIC NOTICE IS HEREBY GIVEN that the City Council of the City of Norco, California, will conduct an public hearing in the Council Chambers, 2820 Clark Avenue, in said City on Wednesday, March 15, 2017, at 7:00 p.m. or thereafter, to consider the following:

Appeal Hearing: Conditional Use Permit 2015-28, Modification 1 (DeKruyf): A request to modify a condition of approval in Resolution 2015-73 for development of a service station associated with Site Plan 2015-23.

City staff has determined that the listed project above is consistent with the environmental determination for Site Plan 2015-23 pursuant to the California Environmental Quality Act and the City of Norco Environmental Guidelines and no additional action is needed. Please contact the Norco Planning Division at (951) 270-5682 for more information regarding said items.

Public Hearing: Approval of a Memorandum of Understanding (MOU) to Establish a Groundwater Sustainability Agency ("GSA") *

Any person desiring may appear at said public hearing and be heard. Any person unable to attend said public hearing may submit written comments to the City Clerk on or before Wednesday, March 15, 2017, by 5:45 p.m. at Norco City Hall, 2870 Clark Avenue, Norco California 92860.

/S/
Cheryl L. Link, CMC
City Clerk
City of Norco

Posted: March 2, 2017
Published: March 4, 2017

THE PRESS-ENTERPRISE

1825 Chicago Ave, Suite 100
Riverside, CA 92507
951-684-1200
951-368-9018 FAX

PROOF OF PUBLICATION
(2010, 2015.5 C.C.P)

Publication(s): The Press-Enterprise

PROOF OF PUBLICATION OF

Ad Desc.: /

I am a citizen of the United States. I am over the age of eighteen years and not a party to or interested in the above entitled matter. I am an authorized representative of THE PRESS-ENTERPRISE, a newspaper in general circulation, printed and published daily in the County of Riverside, and which newspaper has been adjudicated a newspaper of general circulation by the Superior Court of the County of Riverside, State of California, under date of April 25, 1952, Case Number 54446, under date of March 29, 1957, Case Number 65673, under date of August 25, 1995, Case Number 267864, and under date of September 16, 2013, Case Number RIC 1309013; that the notice, of which the annexed is a printed copy, has been published in said newspaper in accordance with the instructions of the person(s) requesting publication, and not in any supplement thereof on the following dates, to wit:

3/09, 03/16/2017

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Date: March 16, 2017
At: Riverside, California

Legal Advertising Representative, The Press-Enterprise

HOME GARDENS COUNTY WATER DISTRICT
2832 N. GRANT ST.
CORONA, CA 92879

Ad Number: 0010913312-01

P.O. Number:

Ad Copy:

HOME GARDENS COUNTY WATER DISTRICT
NOTICE OF PUBLIC HEARING

PUBLIC NOTICE IS HEREBY GIVEN that the Board of Directors of the Home Gardens County Water District will conduct a public hearing at the District Office, at 3832 N. Grant Street, Corona, CA 92879, on Thursday, March 23rd, 2017 at 6:00 p.m. or thereafter upon the following:

PROPOSED ACTION: The Board of Directors will consider entering into a Memorandum of Understanding ("MOU") with the City of Norco ("Norco") and the City of ("Corona") for the purpose of establishing the Temescal Sub-Basin Groundwater Sustainability Agency to serve as the groundwater sustainability agency for the Temescal Sub-Basin of the Upper Santa Ana Valley Groundwater Basin (DWR Basin Number 8-2.09) ("Sub-Basin") pursuant to the requirements of the Sustainable Groundwater Management Act of 2014 ("SGMA"). The primary purpose of a groundwater sustainability agency under SGMA is to develop a groundwater sustainability plan ("GSP") to achieve long-term groundwater sustainability. The parties to the MOU will work jointly and cooperatively to serve as the groundwater sustainability agency and to satisfy the requirements of SGMA. Each party to the MOU will participate at its sole cost and expense and will be financially responsible for collecting data or information from that party's service area. The City of Corona will have the primary responsibility to develop a GSP and submit it to the California Department of Water Resources ("DWR") for review and evaluation.

This is a public hearing and you are invited to attend and comment on the application described above. If you challenge any portion of this project in court, you may be limited to raising only those issues you or someone else raised at the public hearing described in this notice, or in written correspondence delivered at, or prior to, the public hearing. If you have written comments, please deliver them to the District Office, on or before the Tuesday prior to the meeting. If you have questions about this notice or the application to be heard, please call David Vigil with the Home Gardens County Water District at (951) 737-4741.

David Vigil, Secretary/District Manager

PUBLISHED: March 9th, 2017 and March 16th, 2017

THE PRESS-ENTERPRISE

1825 Chicago Ave, Suite 100
Riverside, CA 92507
951-684-1200
951-368-9018 FAX

PROOF OF PUBLICATION
(2010, 2015.5 C.C.P)

Publication(s): The Press-Enterprise

PROOF OF PUBLICATION OF

Ad Desc.: /

I am a citizen of the United States. I am over the age of eighteen years and not a party to or interested in the above entitled matter. I am an authorized representative of THE PRESS-ENTERPRISE, a newspaper in general circulation, printed and published daily in the County of Riverside, and which newspaper has been adjudicated a newspaper of general circulation by the Superior Court of the County of Riverside, State of California, under date of April 25, 1952, Case Number 54446, under date of March 29, 1957, Case Number 65673, under date of August 25, 1995, Case Number 267864, and under date of September 16, 2013, Case Number RIC 1309013; that the notice, of which the annexed is a printed copy, has been published in said newspaper in accordance with the instructions of the person(s) requesting publication, and not in any supplement thereof on the following dates, to wit:

3/09, 03/16/2017

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Date: March 16, 2017
At: Riverside, California

Legal Advertising Representative, The Press-Enterprise

HOME GARDENS COUNTY WATER DISTRICT
2832 N. GRANT ST.
CORONA, CA 92879

Ad Number: 0010913312-01

P.O. Number:

Ad Copy:

HOME GARDENS COUNTY WATER DISTRICT
NOTICE OF PUBLIC HEARING

PUBLIC NOTICE IS HEREBY GIVEN that the Board of Directors of the Home Gardens County Water District will conduct a public hearing at the District Office, at 3832 N. Grant Street, Corona, CA 92879, on Thursday, March 23rd, 2017 at 6:00 p.m. or thereafter upon the following:

PROPOSED ACTION: The Board of Directors will consider entering into a Memorandum of Understanding ("MOU") with the City of Norco ("Norco") and the City of ("Corona") for the purpose of establishing the Temescal Sub-Basin Groundwater Sustainability Agency to serve as the groundwater sustainability agency for the Temescal Sub-Basin of the Upper Santa Ana Valley Groundwater Basin (DWR Basin Number 8-2.09) ("Sub-Basin") pursuant to the requirements of the Sustainable Groundwater Management Act of 2014 ("SGMA"). The primary purpose of a groundwater sustainability agency under SGMA is to develop a groundwater sustainability plan ("GSP") to achieve long-term groundwater sustainability. The parties to the MOU will work jointly and cooperatively to serve as the groundwater sustainability agency and to satisfy the requirements of SGMA. Each party to the MOU will participate at its sole cost and expense and will be financially responsible for collecting data or information from that party's service area. The City of Corona will have the primary responsibility to develop a GSP and submit it to the California Department of Water Resources ("DWR") for review and evaluation.

This is a public hearing and you are invited to attend and comment on the application described above. If you challenge any portion of this project in court, you may be limited to raising only those issues you or someone else raised at the public hearing described in this notice, or in written correspondence delivered at, or prior to, the public hearing. If you have written comments, please deliver them to the District Office, on or before the Tuesday prior to the meeting. If you have questions about this notice or the application to be heard, please call David Vigil with the Home Gardens County Water District at (951) 737-4741.

David Vigil, Secretary/District Manager

PUBLISHED: March 9th, 2017 and March 16th, 2017

APPENDIX C

Groundwater Sustainability Plan Elements Guide

Article 5.			Plan Contents for Temescal Basin	GSP Document References				
				Page Numbers of Plan	Or Section Numbers	Or Figure Numbers	Or Table Numbers	Notes
§ 354.			**Introduction to Plan Contents**					
			This Article describes the required contents of Plans submitted to the Department for evaluation, including administrative information, a description of the basin setting, sustainable management criteria, description of the monitoring network, and projects and management actions.					
			Note: Authority cited: Section 10733.2, Water Code.					
			Reference: Section 10733.2, Water Code.					
SubArticle 1.			**Administrative Information**					
§ 354.2.			**Introduction to Administrative Information**					
			This Subarticle describes information in the Plan relating to administrative and other general information about the Agency that has adopted the Plan and the area covered by the Plan.					
			Note: Authority cited: Section 10733.2, Water Code.					
			Reference: Section 10733.2, Water Code.					
§ 354.4.			**General Information**					
			Each Plan shall include the following general information:					
(a)			An executive summary written in plain language that provides an overview of the Plan and description of groundwater conditions in the basin.		ES			
(b)			A list of references and technical studies relied upon by the Agency in developing the Plan. Each Agency shall provide to the Department electronic copies of reports and other documents and materials cited as references that are not generally available to the public.		10			
			Note: Authority cited: Section 10733.2, Water Code.					
			Reference: Sections 10733.2 and 10733.4, Water Code.					
§ 354.6.			**Agency Information**					
			When submitting an adopted Plan to the Department, the Agency shall include a copy of the information provided pursuant to Water Code Section 10723.8, with any updates, if necessary, along with the following information:					
(a)			The name and mailing address of the Agency.		1.3			
(b)			The organization and management structure of the Agency, identifying persons with management authority for implementation of the Plan.		1.4			
(c)			The name and contact information, including the phone number, mailing address and electronic mail address, of the plan manager.		1.3			
(d)			The legal authority of the Agency, with specific reference to citations setting forth the duties, powers, and responsibilities of the Agency, demonstrating that the Agency has the legal authority to implement the Plan.		1.4.3			
(e)			An estimate of the cost of implementing the Plan and a general description of how the Agency plans to meet those costs.		1.4.4			
			Note: Authority cited: Section 10733.2, Water Code.					
			Reference: Sections 10723.8, 10727.2, and 10733.2, Water Code.					
§ 354.8.			**Description of Plan Area**					
			Each Plan shall include a description of the geographic areas covered, including the following information:					

Article 5.			Plan Contents for Temescal Basin	GSP Document References				
				Page Numbers of Plan	Or Section Numbers	Or Figure Numbers	Or Table Numbers	Notes
(a)			One or more maps of the basin that depict the following, as applicable:					
	(1)		The area covered by the Plan, delineating areas managed by the Agency as an exclusive Agency and any areas for which the Agency is not an exclusive Agency, and the name and location of any adjacent basins.		2.1	Figure 1-1		
	(2)		Adjudicated areas, other Agencies within the basin, and areas covered by an Alternative.		2.1	Figure 2-2		
	(3)		Jurisdictional boundaries of federal or state land (including the identity of the agency with jurisdiction over that land), tribal land, cities, counties, agencies with water management responsibilities, and areas covered by relevant general plans.		2.2	Figure 2-1, 2-2		
	(4)		Existing land use designations and the identification of water use sector and water source type.		2.4.9, 2.3.3, 2.3.2	Figure 2-4, Figure 2-10, Figure 2-11		
	(5)		The density of wells per square mile, by dasymetric or similar mapping techniques, showing the general distribution of agricultural, industrial, and domestic water supply wells in the basin, including de minimis extractors, and the location and extent of communities dependent upon groundwater, utilizing data provided by the Department, as specified in Section 353.2, or the best available information.		2.1.2.1	Figures 2-5,2-6, 2-7, 2-8		
(b)			A written description of the Plan area, including a summary of the jurisdictional areas and other features depicted on the map.		2.1	Figure 2-1, 2-2		
(c)			Identification of existing water resource monitoring and management programs, and description of any such programs the Agency plans to incorporate in its monitoring network or in development of its Plan. The Agency may coordinate with existing water resource monitoring and management programs to incorporate and adopt that program as part of the Plan.		2.4			
(d)			A description of how existing water resource monitoring or management programs may limit operational flexibility in the basin, and how the Plan has been developed to adapt to those limits.		2.4			
(e)			A description of conjunctive use programs in the basin.		2.3.2			
(f)			A plain language description of the land use elements or topic categories of applicable general plans that includes the following:					
	(1)		A summary of general plans and other land use plans governing the basin.		2.6	Figure 2-8, 2-9		
	(2)		A general description of how implementation of existing land use plans may change water demands within the basin or affect the ability of the Agency to achieve sustainable groundwater management over the planning and implementation horizon, and how the Plan addresses those potential effects		2.6.4			
	(3)		A general description of how implementation of the Plan may affect the water supply assumptions of relevant land use plans over the planning and implementation horizon.		2.6.5			

				GSP Document References				
				Page Numbers of Plan	Or Section Numbers	Or Figure Numbers	Or Table Numbers	Notes
	(4)		A summary of the process for permitting new or replacement wells in the basin, including adopted standards in local well ordinances, zoning codes, and policies contained in adopted land use plans.		2.7.3			
	(5)		To the extent known, the Agency may include information regarding the implementation of land use plans outside the basin that could affect the ability of the Agency to achieve sustainable groundwater management.		2.7.5			
(g)			A description of any of the additional Plan elements included in Water Code Section 10727.4 that the Agency determines to be appropriate.		2.7			
			Note: Authority cited: Section 10733.2, Water Code.					
			Reference: Sections 10720.3, 10727.2, 10727.4, 10733, and 10733.2, Water Code.					
§ 354.10.			**Notice and Communication**					
			Each Plan shall include a summary of information relating to notification and communication by the Agency with other agencies and interested parties including the following:					
(a)			A description of the beneficial uses and users of groundwater in the basin, including the land uses and property interests potentially affected by the use of groundwater in the basin, the types of parties representing those interests, and the nature of consultation with those parties.		3.10, 6.2.4, 6.3.4, 6.5.4, 6.6.4, 6.6.7, Appendix D			
(b)			A list of public meetings at which the Plan was discussed or considered by the Agency.		Appendix E			
(c)			Comments regarding the Plan received by the Agency and a summary of any responses by the Agency.		Appendix I			
(d)			A communication section of the Plan that includes the following:					
	(1)		An explanation of the Agency's decision-making process.		Section 1.4.1, Appendix A			
	(2)		Identification of opportunities for public engagement and a discussion of how public input and response will be used.		Section 2.8, Appendices D, E, F, G, and H			
	(3)		A description of how the Agency encourages the active involvement of diverse social, cultural, and economic elements of the population within the basin.		Section 2.8, Appendices D, E, F, G, and H			

				GSP Document References				
				Page Numbers of Plan	Or Section Numbers	Or Figure Numbers	Or Table Numbers	Notes
	(4)		The method the Agency shall follow to inform the public about progress implementing the Plan, including the status of projects and actions.		Section 2.8, Appendices D, E, F, G, and H			
			Note: Authority cited: Section 10733.2, Water Code.					
			Reference: Sections 10723.2, 10727.8, 10728.4, and 10733.2, Water Code					
SubArticle 2.			**Basin Setting**					
§ 354.12.			**Introduction to Basin Setting**					
			This Subarticle describes the information about the physical setting and characteristics of the basin and current conditions of the basin that shall be part of each Plan, including the identification of data gaps and levels of uncertainty, which comprise the basin setting that serves as the basis for defining and assessing reasonable sustainable management criteria and projects and management actions. Information provided pursuant to this Subarticle shall be prepared by or under the direction of a professional geologist or professional engineer.					
			Note: Authority cited: Section 10733.2, Water Code.					
			Reference: Section 10733.2, Water Code.					
§ 354.14.			**Hydrogeologic Conceptual Model**					
(a)			Each Plan shall include a descriptive hydrogeologic conceptual model of the basin based on technical studies and qualified maps that characterizes the physical components and interaction of the surface water and groundwater systems in the basin.		3	Figures 3-1 through 3-12		
(b)			The hydrogeologic conceptual model shall be summarized in a written description that includes the following:					
	(1)		The regional geologic and structural setting of the basin including the immediate surrounding area, as necessary for geologic consistency.		Sections 3.4 and 3.5	Figures 3-1 through 3-5		
	(2)		Lateral basin boundaries, including major geologic features that significantly affect groundwater flow.		3.5, 3.6, and 3.7	Figure 3-5, 3-10		
	(3)		The definable bottom of the basin.		3.8	Figure 3-11		
	(4)		Principal aquifers and aquitards, including the following information:					
		(A)	Formation names, if defined.		3.6.1	Figure 3-5		
		(B)	Physical properties of aquifers and aquitards, including the vertical and lateral extent, hydraulic conductivity, and storativity, which may be based on existing technical studies or other best available information.		3.4, 3.5, 3.6, 3.7, 3.8, and Appendix J	Figure 3-5, 3-10, Appendix J		
		(C)	Structural properties of the basin that restrict groundwater flow within the principal aquifers, including information regarding stratigraphic changes, truncation of units, or other features.		3.4, 3.5, 3.6, 3.7, 3.8, and Appendix J	Figure 3-5, 3-10, Appendix J		

Article 5.			Plan Contents for Temescal Basin	GSP Document References				
				Page Numbers of Plan	Or Section Numbers	Or Figure Numbers	Or Table Numbers	Notes
		(D)	General water quality of the principal aquifers, which may be based on information derived from existing technical studies or regulatory programs.		4.4 and 4.5	Figures 4-15, 4-16		
		(E)	Identification of the primary use or uses of each aquifer, such as domestic, irrigation, or municipal water supply.		3.10		Table 2-1	
	(5)		Identification of data gaps and uncertainty within the hydrogeologic conceptual model		3.11			
(c)			The hydrogeologic conceptual model shall be represented graphically by at least two scaled cross-sections that display the information required by this section and are sufficient to depict major stratigraphic and structural features in the basin.		3.6	Figure 3-6 through 3-9		
(d)			Physical characteristics of the basin shall be represented on one or more maps that depict the following:					
	(1)		Topographic information derived from the U.S. Geological Survey or another reliable source.			Figure 3-1		
	(2)		Surficial geology derived from a qualified map including the locations of cross-sections required by this Section.			Figure 3-5 and Figure 3-6		
	(3)		Soil characteristics as described by the appropriate Natural Resources Conservation Service soil survey or other applicable studies.		3.2	Figure 3-4		
	(4)		Delineation of existing recharge areas that substantially contribute to the replenishment of the basin, potential recharge areas, and discharge areas, including significant active springs, seeps, and wetlands within or adjacent to the basin.			Figure 3-10		
	(5)		Surface water bodies that are significant to the management of the basin.			Figure 3-2 and Figure 3-3		
	(6)		The source and point of delivery for imported water supplies.		2.1.2.1	Figure 2-9		
			Note: Authority cited: Section 10733.2, Water Code.					
			Reference: Sections 10727.2, 10733, and 10733.2, Water Code.					
§ 354.16.			**Groundwater Conditions**					
			Each Plan shall provide a description of current and historical groundwater conditions in the basin, including data from January 1, 2015, to current conditions, based on the best available information that includes the following:					
(a)			Groundwater elevation data demonstrating flow directions, lateral and vertical gradients, and regional pumping patterns, including:					
	(1)		Groundwater elevation contour maps depicting the groundwater table or potentiometric surface associated with the current seasonal high and seasonal low for each principal aquifer within the basin.			Figure 4-10 and Figure 4-11		
	(2)		Hydrographs depicting long-term groundwater elevations, historical highs and lows, and hydraulic gradients between principal aquifers.			Figure 4-2 and Figure 4-9		

				GSP Document References				
				Page Numbers of Plan	Or Section Numbers	Or Figure Numbers	Or Table Numbers	Notes
(b)			A graph depicting estimates of the change in groundwater in storage, based on data, demonstrating the annual and cumulative change in the volume of groundwater in storage between seasonal high groundwater conditions, including the annual groundwater use and water year type.			Figure 5-6		
(c)			Seawater intrusion conditions in the basin, including maps and cross-sections of the seawater intrusion front for each principal aquifer.		4.9			
(d)			Groundwater quality issues that may affect the supply and beneficial uses of groundwater, including a description and map of the location of known groundwater contamination sites and plumes.		4.4, 4.5, 4.6, 4.7, and 4.8	Figure 4-14 through 4-16		
(e)			The extent, cumulative total, and annual rate of land subsidence, including maps depicting total subsidence, utilizing data available from the Department, as specified in Section 353.2, or the best available information.		4.3	Figure 4-12 and 4-13		
(f)			Identification of interconnected surface water systems within the basin and an estimate of the quantity and timing of depletions of those systems, utilizing data available from the Department, as specified in Section 353.2, or the best available information.		4.10	Figures 4-17 through 4-23		
(g)			Identification of groundwater dependent ecosystems within the basin, utilizing data available from the Department, as specified in Section 353.2, or the best available information.		4.10	Figures 4-17 through 4-23		
			Note: Authority cited: Section 10733.2, Water Code.					
			Reference: Sections 10723.2, 10727.2, 10727.4, and 10733.2, Water Code.					
§ 354.18.			**Water Budget**					
(a)			Each Plan shall include a water budget for the basin that provides an accounting and assessment of the total annual volume of groundwater and surface water entering and leaving the basin, including historical, current and projected water budget conditions, and the change in the volume of water stored. Water budget information shall be reported in tabular and graphical form.		5.1, 5.5	Figure 5-5 and 5-6		
(b)			The water budget shall quantify the following, either through direct measurements or estimates based on data:					
	(1)		Total surface water entering and leaving a basin by water source type.		5.6	Figure 5-4	Table 5-3	
	(2)		Inflow to the groundwater system by water source type, including subsurface groundwater inflow and infiltration of precipitation, applied water, and surface water systems, such as lakes, streams, rivers, canals, springs and conveyance systems.		5.7.1	Figure 5-6	Table 5-4	
	(3)		Outflows from the groundwater system by water use sector, including evapotranspiration, groundwater extraction, groundwater discharge to surface water sources, and subsurface groundwater outflow.		5.7.2	Figure 5-6	Table 5-4	
	(4)		The change in the annual volume of groundwater in storage between seasonal high conditions.		5.8, Appendix J	Figure 5-6	Table 5-4	

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				Page Numbers of Plan	Or Section Numbers	Or Figure Numbers	Or Table Numbers	Notes
	(5)		If overdraft conditions occur, as defined in Bulletin 118, the water budget shall include a quantification of overdraft over a period of years during which water year and water supply conditions approximate average conditions.		NA			
	(6)		The water year type associated with the annual supply, demand, and change in groundwater stored.		5.2	Figure 5-1		
	(7)		An estimate of sustainable yield for the basin.		5.9		Table 5-5	
(c)			Each Plan shall quantify the current, historical, and projected water budget for the basin as follows:					
	(1)		Current water budget information shall quantify current inflows and outflows for the basin using the most recent hydrology, water supply, water demand, and land use information.		5.7	Figure 5-6	Table 5-4	
	(2)		Historical water budget information shall be used to evaluate availability or reliability of past surface water supply deliveries and aquifer response to water supply and demand trends relative to water year type. The historical water budget shall include the following:					
		(A)	A quantitative evaluation of the availability or reliability of historical surface water supply deliveries as a function of the historical planned versus actual annual surface water deliveries, by surface water source and water year type, and based on the most recent ten years of surface water supply information.		Section 2.3.2, 5.7, Appendix J	Figure 5-6	Table 5-4	
		(B)	A quantitative assessment of the historical water budget, starting with the most recently available information and extending back a minimum of 10 years, or as is sufficient to calibrate and reduce the uncertainty of the tools and methods used to estimate and project future water budget information and future aquifer response to proposed sustainable groundwater management practices over the planning and implementation horizon.		5.7, Appendix J	Figure 5-6	Table 5-4	
		(C)	A description of how historical conditions concerning hydrology, water demand, and surface water supply availability or reliability have impacted the ability of the Agency to operate the basin within sustainable yield. Basin hydrology may be characterized and evaluated using water year type.		5.8, 5.9	Figure 5-6, Figure 5-1	Table 5-4	
	(3)		Projected water budgets shall be used to estimate future baseline conditions of supply, demand, and aquifer response to Plan implementation, and to identify the uncertainties of these projected water budget components. The projected water budget shall utilize the following methodologies and assumptions to estimate future baseline conditions concerning hydrology, water demand and surface water supply availability or reliability over the planning and implementation horizon:					
		(A)	Projected hydrology shall utilize 50 years of historical precipitation, evapotranspiration, and streamflow information as the baseline condition for estimating future hydrology. The projected hydrology information shall also be applied as the baseline condition used to evaluate future scenarios of hydrologic uncertainty associated with projections of climate change and sea level rise.		5.3, 5.6, 5.7	Figures 5-7,5-8,5-10		

				GSP Document References				
				Page Numbers of Plan	Or Section Numbers	Or Figure Numbers	Or Table Numbers	Notes
		(B)	Projected water demand shall utilize the most recent land use, evapotranspiration, and crop coefficient information as the baseline condition for estimating future water demand. The projected water demand information shall also be applied as the baseline condition used to evaluate future scenarios of water demand uncertainty associated with projected changes in local land use planning, population growth, and climate.		5.3, 5.6, 5.7	Figures 5-7,5-8,5-10	Table 5-2	
		(C)	Projected surface water supply shall utilize the most recent water supply information as the baseline condition for estimating future surface water supply. The projected surface water supply shall also be applied as the baseline condition used to evaluate future scenarios of surface water supply availability and reliability as a function of the historical surface water supply identified in Section 354.18(c)(2)(A), and the projected changes in local land use planning, population growth, and climate.		5.5, 5.6, 5.7, Appendix J	Figures 5-7,5-8,5-10		
(d)			The Agency shall utilize the following information provided, as available, by the Department pursuant to Section 353.2, or other data of comparable quality, to develop the water budget:					
	(1)		Historical water budget information for mean annual temperature, mean annual precipitation, water year type, and land use.		5.2, Appendix J	Figure 5-6		
	(2)		Current water budget information for temperature, water year type, evapotranspiration, and land use.		5.2,5.3, Appendix J	Figure 5-6		
	(3)		Projected water budget information for population, population growth, climate change, and sea level rise.		5.5.3, Appendix J	Figure 5-7 and 5-8		
(e)			Each Plan shall rely on the best available information and best available science to quantify the water budget for the basin in order to provide an understanding of historical and projected hydrology, water demand, water supply, land use, population, climate change, sea level rise, groundwater and surface water interaction, and subsurface groundwater flow. If a numerical groundwater and surface water model is not used to quantify and evaluate the projected water budget conditions and the potential impacts to beneficial uses and users of groundwater, the Plan shall identify and describe an equally effective method, tool, or analytical model to evaluate projected water budget conditions.		5.5, 5.6, 5.7, 5.8, Appendix J			
(f)			The Department shall provide the California Central Valley Groundwater-Surface Water Simulation Model (C2VSIM) and the Integrated Water Flow Model (IWFM) for use by Agencies in developing the water budget. Each Agency may choose to use a different groundwater and surface water model, pursuant to Section 352.4.		5.1, Appendix J			
			Note: Authority cited: Section 10733.2, Water Code.					
			Reference: Sections 10721, 10723.2, 10727.2, 10727.6, 10729, and 10733.2, Water Code.					
§ 354.20.			**Management Areas**					

				GSP Document References				
				Page Numbers of Plan	Or Section Numbers	Or Figure Numbers	Or Table Numbers	Notes
(a)			Each Agency may define one or more management areas within a basin if the Agency has determined that creation of management areas will facilitate implementation of the Plan. Management areas may define different minimum thresholds and be operated to different measurable objectives than the basin at large, provided that undesirable results are defined consistently throughout the basin.		NA			
(b)			A basin that includes one or more management areas shall describe the following in the Plan:					
	(1)		The reason for the creation of each management area.		NA			
	(2)		The minimum thresholds and measurable objectives established for each management area, and an explanation of the rationale for selecting those values, if different from the basin at large.		NA			
	(3)		The level of monitoring and analysis appropriate for each management area.		NA			
	(4)		An explanation of how the management area can operate under different minimum thresholds and measurable objectives without causing undesirable results outside the management area, if applicable.		NA			
(c)			If a Plan includes one or more management areas, the Plan shall include descriptions, maps, and other information required by this Subarticle sufficient to describe conditions in those areas.		NA			
			Note: Authority cited: Section 10733.2, Water Code.					
			Reference: Sections 10733.2 and 10733.4, Water Code.					
SubArticle 3.			**Sustainable Management Criteria**					
§ 354.22.			**Introduction to Sustainable Management Criteria**					
			This Subarticle describes criteria by which an Agency defines conditions in its Plan that constitute sustainable groundwater management for the basin, including the process by which the Agency shall characterize undesirable results, and establish minimum thresholds and measurable objectives for each applicable sustainability indicator.					
			Note: Authority cited: Section 10733.2, Water Code.					
			Reference: Section 10733.2, Water Code.					
§ 354.24.			**Sustainability Goal**					
			Each Agency shall establish in its Plan a sustainability goal for the basin that culminates in the absence of undesirable results within 20 years of the applicable statutory deadline. The Plan shall include a description of the sustainability goal, including information from the basin setting used to establish the sustainability goal, a discussion of the measures that will be implemented to ensure that the basin will be operated within its sustainable yield, and an explanation of how the sustainability goal is likely to be achieved within 20 years of Plan implementation and is likely to be maintained through the planning and implementation horizon.		6.1.1			
			Note: Authority cited: Section 10733.2, Water Code.					
			Reference: Sections 10721, 10727, 10727.2, 10733.2, and 10733.8, Water Code.					
§ 354.26.			**Undesirable Results**					

Article 5.			Plan Contents for Temescal Basin	GSP Document References				
				Page Numbers of Plan	Or Section Numbers	Or Figure Numbers	Or Table Numbers	Notes
(a)			Each Agency shall describe in its Plan the processes and criteria relied upon to define undesirable results applicable to the basin. Undesirable results occur when significant and unreasonable effects for any of the sustainability indicators are caused by groundwater conditions occurring throughout the basin.		6.2.1, 6.3.1, 6.5.1, 6.6.1, 6.7.1			
(b)			The description of undesirable results shall include the following:					
	(1)		The cause of groundwater conditions occurring throughout the basin that would lead to or has led to undesirable results based on information described in the basin setting, and other data or models as appropriate.		6.2.2, 6.3.2, 6.5.2, 6.6.2, 6.7.2			
	(2)		The criteria used to define when and where the effects of the groundwater conditions cause undesirable results for each applicable sustainability indicator. The criteria shall be based on a quantitative description of the combination of minimum threshold exceedances that cause significant and unreasonable effects in the basin.		6.2.3, 6.3.3, 6.5.3, 6.6.3, 6.7.3			
	(3)		Potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results.		6.2.4, 6.3.4, 6.5.4, 6.6.4, 6.7.4			
(c)			The Agency may need to evaluate multiple minimum thresholds to determine whether an undesirable result is occurring in the basin. The determination that undesirable results are occurring may depend upon measurements from multiple monitoring sites, rather than a single monitoring site.		6.2.5, 6.3.5, 6.5.5, 6.6.5, 6.7.5			
(d)			An Agency that is able to demonstrate that undesirable results related to one or more sustainability indicators are not present and are not likely to occur in a basin shall not be required to establish criteria for undesirable results related to those sustainability indicators.		6.4			
			Note: Authority cited: Section 10733.2, Water Code.					
			Reference: Sections 10721, 10723.2, 10727.2, 10733.2, and 10733.8, Water Code.					
§ 354.28.			**Minimum Thresholds**					
(a)			Each Agency in its Plan shall establish minimum thresholds that quantify groundwater conditions for each applicable sustainability indicator at each monitoring site or representative monitoring site established pursuant to Section 354.36. The numeric value used to define minimum thresholds shall represent a point in the basin that, if exceeded, may cause undesirable results as described in Section 354.26.		6.2.6, 6.3.6, 6.5.6, 6.6.6, 6.7.6			
(b)			The description of minimum thresholds shall include the following:					

				GSP Document References				
				Page Numbers of Plan	Or Section Numbers	Or Figure Numbers	Or Table Numbers	Notes
	(1)		The information and criteria relied upon to establish and justify the minimum thresholds for each sustainability indicator. The justification for the minimum threshold shall be supported by information provided in the basin setting, and other data or models as appropriate, and qualified by uncertainty in the understanding of the basin setting.		6.2.5, 6.3.5, 6.5.5, 6.6.5, 6.7.5			
	(2)		The relationship between the minimum thresholds for each sustainability indicator, including an explanation of how the Agency has determined that basin conditions at each minimum threshold will avoid undesirable results for each of the sustainability indicators.		6.2.6, 6.3.6, 6.5.6, 6.6.6, 6.7.6			
	(3)		How minimum thresholds have been selected to avoid causing undesirable results in adjacent basins or affecting the ability of adjacent basins to achieve sustainability goals.		6.2.6, 6.3.6, 6.5.6, 6.6.6, 6.7.6			
	(4)		How minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests.		6.2.6, 6.3.6, 6.5.6, 6.6.6, 6.7.6			
	(5)		How state, federal, or local standards relate to the relevant sustainability indicator. If the minimum threshold differs from other regulatory standards, the Agency shall explain the nature of and basis for the difference.		6.2.6, 6.3.6, 6.5.6, 6.6.6, 6.7.6			
	(6)		How each minimum threshold will be quantitatively measured, consistent with the monitoring network requirements described in Subarticle 4.		6.2.6, 6.3.6, 6.5.6, 6.6.6, 6.7.6			
(c)			Minimum thresholds for each sustainability indicator shall be defined as follows:					
	(1)		Chronic Lowering of Groundwater Levels. The minimum threshold for chronic lowering of groundwater levels shall be the groundwater elevation indicating a depletion of supply at a given location that may lead to undesirable results. Minimum thresholds for chronic lowering of groundwater levels shall be supported by the following:					
		(A)	The rate of groundwater elevation decline based on historical trends, water year type, and projected water use in the basin.		4.1.3, 6.2	Figure 4-2 through 4-9, Figure 6-1		
		(B)	Potential effects on other sustainability indicators.		6.2.6.2			

				Page Numbers of Plan	Or Section Numbers	Or Figure Numbers	Or Table Numbers	Notes
	(2)		Reduction of Groundwater Storage. The minimum threshold for reduction of groundwater storage shall be a total volume of groundwater that can be withdrawn from the basin without causing conditions that may lead to undesirable results. Minimum thresholds for reduction of groundwater storage shall be supported by the sustainable yield of the basin, calculated based on historical trends, water year type, and projected water use in the basin.		6.3			
	(3)		Seawater Intrusion. The minimum threshold for seawater intrusion shall be defined by a chloride concentration isocontour for each principal aquifer where seawater intrusion may lead to undesirable results. Minimum thresholds for seawater intrusion shall be supported by the following:					
		(A)	Maps and cross-sections of the chloride concentration isocontour that defines the minimum threshold and measurable objective for each principal aquifer.		6.4			
		(B)	A description of how the seawater intrusion minimum threshold considers the effects of current and projected sea levels.		6.4			
	(4)		Degraded Water Quality. The minimum threshold for degraded water quality shall be the degradation of water quality, including the migration of contaminant plumes that impair water supplies or other indicator of water quality as determined by the Agency that may lead to undesirable results. The minimum threshold shall be based on the number of supply wells, a volume of water, or a location of an isocontour that exceeds concentrations of constituents determined by the Agency to be of concern for the basin. In setting minimum thresholds for degraded water quality, the Agency shall consider local, state, and federal water quality standards applicable to the basin.		6.5			
	(5)		Land Subsidence. The minimum threshold for land subsidence shall be the rate and extent of subsidence that substantially interferes with surface land uses and may lead to undesirable results. Minimum thresholds for land subsidence shall be supported by the following:					
		(A)	Identification of land uses and property interests that have been affected or are likely to be affected by land subsidence in the basin, including an explanation of how the Agency has determined and considered those uses and interests, and the Agency's rationale for establishing minimum thresholds in light of those effects.		6.6			
		(B)	Maps and graphs showing the extent and rate of land subsidence in the basin that defines the minimum threshold and measurable objectives.		6.6	Figure 4-10		
	(6)		Depletions of Interconnected Surface Water. The minimum threshold for depletions of interconnected surface water shall be the rate or volume of surface water depletions caused by groundwater use that has adverse impacts on beneficial uses of the surface water and may lead to undesirable results. The minimum threshold established for depletions of interconnected surface water shall be supported by the following:					
		(A)	The location, quantity, and timing of depletions of interconnected surface water.		6.7	Figures 4-17 through 4-23		

Article 5.			Plan Contents for Temescal Basin	GSP Document References				
				Page Numbers of Plan	Or Section Numbers	Or Figure Numbers	Or Table Numbers	Notes
		(B)	A description of the groundwater and surface water model used to quantify surface water depletion. If a numerical groundwater and surface water model is not used to quantify surface water depletion, the Plan shall identify and describe an equally effective method, tool, or analytical model to accomplish the requirements of this Paragraph.		6.7.5	Figures 4-17 through 4-23		
(d)			An Agency may establish a representative minimum threshold for groundwater elevation to serve as the value for multiple sustainability indicators, where the Agency can demonstrate that the representative value is a reasonable proxy for multiple individual minimum thresholds as supported by adequate evidence.		6.3			
(e)			An Agency that has demonstrated that undesirable results related to one or more sustainability indicators are not present and are not likely to occur in a basin, as described in Section 354.26, shall not be required to establish minimum thresholds related to those sustainability indicators.		6.4			
			Note: Authority cited: Section 10733.2, Water Code.					
			Reference: Sections 10723.2, 10727.2, 10733, 10733.2, and 10733.8, Water Code.					
§ 354.30.			**Measurable Objectives**					
(a)			Each Agency shall establish measurable objectives, including interim milestones in increments of five years, to achieve the sustainability goal for the basin within 20 years of Plan implementation and to continue to sustainably manage the groundwater basin over the planning and implementation horizon.		6.2.7, 6.3.7, 6.5.7, 6.6.7, 6.7.7			
(b)			Measurable objectives shall be established for each sustainability indicator, based on quantitative values using the same metrics and monitoring sites as are used to define the minimum thresholds.		6.2.7, 6.3.7, 6.5.7, 6.6.7, 6.7.7			
(c)			Measurable objectives shall provide a reasonable margin of operational flexibility under adverse conditions which shall take into consideration components such as historical water budgets, seasonal and long-term trends, and periods of drought, and be commensurate with levels of uncertainty.		6.2.7, 6.3.7, 6.5.7, 6.6.7, 6.7.7			
(d)			An Agency may establish a representative measurable objective for groundwater elevation to serve as the value for multiple sustainability indicators where the Agency can demonstrate that the representative value is a reasonable proxy for multiple individual measurable objectives as supported by adequate evidence.		6.3.7			
(e)			Each Plan shall describe a reasonable path to achieve the sustainability goal for the basin within 20 years of Plan implementation, including a description of interim milestones for each relevant sustainability indicator, using the same metric as the measurable objective, in increments of five years. The description shall explain how the Plan is likely to maintain sustainable groundwater management over the planning and implementation horizon.		6.1			

Article 5.			Plan Contents for Temescal Basin	GSP Document References				
				Page Numbers of Plan	Or Section Numbers	Or Figure Numbers	Or Table Numbers	Notes
(f)			Each Plan may include measurable objectives and interim milestones for additional Plan elements described in Water Code Section 10727.4 where the Agency determines such measures are appropriate for sustainable groundwater management in the basin.		6.2.7, 6.3.7, 6.5.7, 6.6.7, 6.7.7			
(g)			An Agency may establish measurable objectives that exceed the reasonable margin of operational flexibility for the purpose of improving overall conditions in the basin, but failure to achieve those objectives shall not be grounds for a finding of inadequacy of the Plan.		6.2.7, 6.3.7, 6.5.7, 6.6.7, 6.7.7			
			Note: Authority cited: Section 10733.2, Water Code.					
			Reference: Sections 10727.2, 10727.4, and 10733.2, Water Code.					
SubArticle 4.			**Monitoring Networks**					
§ 354.32.			**Introduction to Monitoring Networks**					
			This Subarticle describes the monitoring network that shall be developed for each basin, including monitoring objectives, monitoring protocols, and data reporting requirements. The monitoring network shall promote the collection of data of sufficient quality, frequency, and distribution to characterize groundwater and related surface water conditions in the basin and evaluate changing conditions that occur through implementation of the Plan.					
			Note: Authority cited: Section 10733.2, Water Code.					
			Reference: Section 10733.2, Water Code.					
§ 354.34.			**Monitoring Network**					
(a)			Each Agency shall develop a monitoring network capable of collecting sufficient data to demonstrate short-term, seasonal, and long-term trends in groundwater and related surface conditions, and yield representative information about groundwater conditions as necessary to evaluate Plan implementation.		7.1		Table 7-1	
(b)			Each Plan shall include a description of the monitoring network objectives for the basin, including an explanation of how the network will be developed and implemented to monitor groundwater and related surface conditions, and the interconnection of surface water and groundwater, with sufficient temporal frequency and spatial density to evaluate the affects and effectiveness of Plan implementation. The monitoring network objectives shall be implemented to accomplish the following:					
	(1)		Demonstrate progress toward achieving measurable objectives described in the Plan.		7.1		Table 7-1	
	(2)		Monitor impacts to the beneficial uses or users of groundwater.		7.1		Table 7-1	
	(3)		Monitor changes in groundwater conditions relative to measurable objectives and minimum thresholds.		7.1		Table 7-1	
	(4)		Quantify annual changes in water budget components.		7.1		Table 7-1	
(c)			Each monitoring network shall be designed to accomplish the following for each sustainability indicator:					

Article 5.			Plan Contents for Temescal Basin	GSP Document References				
				Page Numbers of Plan	Or Section Numbers	Or Figure Numbers	Or Table Numbers	Notes
	(1)		Chronic Lowering of Groundwater Levels. Demonstrate groundwater occurrence, flow directions, and hydraulic gradients between principal aquifers and surface water features by the following methods:					
		(A)	A sufficient density of monitoring wells to collect representative measurements through depth-discrete perforated intervals to characterize the groundwater table or potentiometric surface for each principal aquifer.		7.1.1	Figure 7-1	Table 7-2	
		(B)	Static groundwater elevation measurements shall be collected at least two times per year, to represent seasonal low and seasonal high groundwater conditions.		7.1.1	Figure 7-1	Table 7-2	
	(2)		Reduction of Groundwater Storage. Provide an estimate of the change in annual groundwater in storage.		7.1.2			
	(3)		Seawater Intrusion. Monitor seawater intrusion using chloride concentrations, or other measurements convertible to chloride concentrations, so that the current and projected rate and extent of seawater intrusion for each applicable principal aquifer may be calculated.		7.1.3			
	(4)		Degraded Water Quality. Collect sufficient spatial and temporal data from each applicable principal aquifer to determine groundwater quality trends for water quality indicators, as determined by the Agency, to address known water quality issues.		7.1.5	Figure 7-2	Table 7-2	
	(5)		Land Subsidence. Identify the rate and extent of land subsidence, which may be measured by extensometers, surveying, remote sensing technology, or other appropriate method.		7.1.4			
	(6)		Depletions of Interconnected Surface Water. Monitor surface water and groundwater, where interconnected surface water conditions exist, to characterize the spatial and temporal exchanges between surface water and groundwater, and to calibrate and apply the tools and methods necessary to calculate depletions of surface water caused by groundwater extractions. The monitoring network shall be able to characterize the following:					
		(A)	Flow conditions including surface water discharge, surface water head, and baseflow contribution.		7.1.6			
		(B)	Identifying the approximate date and location where ephemeral or intermittent flowing streams and rivers cease to flow, if applicable.		7.1.6			
		(C)	Temporal change in conditions due to variations in stream discharge and regional groundwater extraction.		7.1.6			
		(D)	Other factors that may be necessary to identify adverse impacts on beneficial uses of the surface water.		7.1.6			
(d)			The monitoring network shall be designed to ensure adequate coverage of sustainability indicators. If management areas are established, the quantity and density of monitoring sites in those areas shall be sufficient to evaluate conditions of the basin setting and sustainable management criteria specific to that area.		7.1	Figure 7-1 and 7-2		
(e)			A Plan may utilize site information and monitoring data from existing sources as part of the monitoring network.		7.1		Table 7-1	

				GSP Document References				
				Page Numbers of Plan	Or Section Numbers	Or Figure Numbers	Or Table Numbers	Notes
(f)			The Agency shall determine the density of monitoring sites and frequency of measurements required to demonstrate short-term, seasonal, and long-term trends based upon the following factors:					
	(1)		Amount of current and projected groundwater use.		7.1			
	(2)		Aquifer characteristics, including confined or unconfined aquifer conditions, or other physical characteristics that affect groundwater flow.		7.1			
	(3)		Impacts to beneficial uses and users of groundwater and land uses and property interests affected by groundwater production, and adjacent basins that could affect the ability of that basin to meet the sustainability goal.		7.1			
	(4)		Whether the Agency has adequate long-term existing monitoring results or other technical information to demonstrate an understanding of aquifer response.		7.1			
(g)			Each Plan shall describe the following information about the monitoring network:					
	(1)		Scientific rationale for the monitoring site selection process.		7.1			
	(2)		Consistency with data and reporting standards described in Section 352.4. If a site is not consistent with those standards, the Plan shall explain the necessity of the site to the monitoring network, and how any variation from the standards will not affect the usefulness of the results obtained.		7.2			
	(3)		For each sustainability indicator, the quantitative values for the minimum threshold, measurable objective, and interim milestones that will be measured at each monitoring site or representative monitoring sites established pursuant to Section 354.36.		7.1			
(h)			The location and type of each monitoring site within the basin displayed on a map, and reported in tabular format, including information regarding the monitoring site type, frequency of measurement, and the purposes for which the monitoring site is being used.		7.1			
(i)			The monitoring protocols developed by each Agency shall include a description of technical standards, data collection methods, and other procedures or protocols pursuant to Water Code Section 10727.2(f) for monitoring sites or other data collection facilities to ensure that the monitoring network utilizes comparable data and methodologies.		7.2			
(j)			An Agency that has demonstrated that undesirable results related to one or more sustainability indicators are not present and are not likely to occur in a basin, as described in Section 354.26, shall not be required to establish a monitoring network related to those sustainability indicators.		7.1			
			Note: Authority cited: Section 10733.2, Water Code.					
			Reference: Sections 10723.2, 10727.2, 10727.4, 10728, 10733, 10733.2, and 10733.8, Water Code					
§ 354.36.			**Representative Monitoring**					
			Each Agency may designate a subset of monitoring sites as representative of conditions in the basin or an area of the basin, as follows:					
(a)			Representative monitoring sites may be designated by the Agency as the point at which sustainability indicators are monitored, and for which quantitative values for minimum thresholds, measurable objectives, and interim milestones are defined.		7.3			

				GSP Document References				
				Page Numbers of Plan	Or Section Numbers	Or Figure Numbers	Or Table Numbers	Notes
(b)			(b) Groundwater elevations may be used as a proxy for monitoring other sustainability indicators if the Agency demonstrates the following:					
	(1)		Significant correlation exists between groundwater elevations and the sustainability indicators for which groundwater elevation measurements serve as a proxy.		7.3			
	(2)		Measurable objectives established for groundwater elevation shall include a reasonable margin of operational flexibility taking into consideration the basin setting to avoid undesirable results for the sustainability indicators for which groundwater elevation measurements serve as a proxy.		7.3			
(c)			The designation of a representative monitoring site shall be supported by adequate evidence demonstrating that the site reflects general conditions in the area.		7.3			
			Note: Authority cited: Section 10733.2, Water Code.					
			Reference: Sections 10727.2 and 10733.2, Water Code					
§ 354.38.			**Assessment and Improvement of Monitoring Network**					
(a)			Each Agency shall review the monitoring network and include an evaluation in the Plan and each five-year assessment, including a determination of uncertainty and whether there are data gaps that could affect the ability of the Plan to achieve the sustainability goal for the basin.		7.5		Table 7-3	
(b)			Each Agency shall identify data gaps wherever the basin does not contain a sufficient number of monitoring sites, does not monitor sites at a sufficient frequency, or utilizes monitoring sites that are unreliable, including those that do not satisfy minimum standards of the monitoring network adopted by the Agency.		7.5		Table 7-3	
(c)			If the monitoring network contains data gaps, the Plan shall include a description of the following:					
	(1)		The location and reason for data gaps in the monitoring network.				Table 7-3	
	(2)		Local issues and circumstances that limit or prevent monitoring.		7.5		Table 7-3	
(d)			Each Agency shall describe steps that will be taken to fill data gaps before the next five-year assessment, including the location and purpose of newly added or installed monitoring sites.		7.5		Table 7-3	
(e)			Each Agency shall adjust the monitoring frequency and density of monitoring sites to provide an adequate level of detail about site-specific surface water and groundwater conditions and to assess the effectiveness of management actions under circumstances that include the following:					
	(1)		Minimum threshold exceedances.		7.1			
	(2)		Highly variable spatial or temporal conditions.		7.1			
	(3)		Adverse impacts to beneficial uses and users of groundwater.		7.1			
	(4)		The potential to adversely affect the ability of an adjacent basin to implement its Plan or impede achievement of sustainability goals in an adjacent basin.		7.1			
			Note: Authority cited: Section 10733.2, Water Code.					
			Reference: Sections 10723.2, 10727.2, 10728.2, 10733, 10733.2, and 10733.8, Water Code					
§ 354.40.			**Reporting Monitoring Data to the Department**					

Article 5.			Plan Contents for Temescal Basin	GSP Document References				
				Page Numbers of Plan	Or Section Numbers	Or Figure Numbers	Or Table Numbers	Notes
			Monitoring data shall be stored in the data management system developed pursuant to Section 352.6. A copy of the monitoring data shall be included in the Annual Report and submitted electronically on forms provided by the Department.					
			Note: Authority cited: Section 10733.2, Water Code.					
			Reference: Sections 10728, 10728.2, 10733.2, and 10733.8, Water Code.					
SubArticle 5.			**Projects and Management Actions**					
§ 354.42.			**Introduction to Projects and Management Actions**					
			This Subarticle describes the criteria for projects and management actions to be included in a Plan to meet the sustainability goal for the basin in a manner that can be maintained over the planning and implementation horizon.					
			Note: Authority cited: Section 10733.2, Water Code.					
			Reference: Section 10733.2, Water Code.					
§ 354.44.			**Projects and Management Actions**					
(a)			Each Plan shall include a description of the projects and management actions the Agency has determined will achieve the sustainability goal for the basin, including projects and management actions to respond to changing conditions in the basin.		8			
(b)			Each Plan shall include a description of the projects and management actions that include the following:					
	(1)		A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent. The Plan shall include the following:					
		(A)	A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of projects or management actions, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.		8.1,8.2,8.3		Tables 8-1 through 8-4	
		(B)	The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken.		8.1,8.2,8.3		Tables 8-1 through 8-4	
	(2)		If overdraft conditions are identified through the analysis required by Section 354.18, the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.		NA			
	(3)		A summary of the permitting and regulatory process required for each project and management action.		8.1,8.2,8.3		Tables 8-1 through 8-4	

Article 5.			Plan Contents for Temescal Basin	GSP Document References				
				Page Numbers of Plan	Or Section Numbers	Or Figure Numbers	Or Table Numbers	Notes
	(4)		The status of each project and management action, including a time-table for expected initiation and completion, and the accrual of expected benefits.		8.1,8.2,8.3		Tables 8-1 through 8-4	
	(5)		An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.		8.1,8.2,8.3		Tables 8-1 through 8-4	
	(6)		An explanation of how the project or management action will be accomplished. If the projects or management actions rely on water from outside the jurisdiction of the Agency, an explanation of the source and reliability of that water shall be included.		8.1,8.2,8.3		Tables 8-1 through 8-4	
	(7)		A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.		8.1,8.2,8.3		Tables 8-1 through 8-4	
	(8)		A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.		8.1,8.2,8.3		Tables 8-1 through 8-4	
	(9)		A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.		8.1,8.2,8.3		Tables 8-1 through 8-4	
(c)			Projects and management actions shall be supported by best available information and best available science.		8.1,8.2,8.3		Tables 8-1 through 8-4	
(d)			An Agency shall take into account the level of uncertainty associated with the basin setting when developing projects or management actions.		8.1,8.2,8.3		Tables 8-1 through 8-4	
			Note: Authority cited: Section 10733.2, Water Code.					
			Reference: Sections 10727.2, 10727.4, and 10733.2, Water Code.					

APPENDIX D

Temescal Groundwater Sustainability Plan
Stakeholder Outreach Plan

Temescal Subbasin Groundwater Sustainability Plan Outreach and Stakeholder Involvement Communications Plan

July 22, 2020

Prepared for:

City of Corona Department of Water and Power

Prepared by:

Kearns & West, in coordination with Todd Groundwater

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Appendices

1. Introduction

Background

The State of California Sustainable Groundwater Management Act (SGMA), passed in 2014, calls for the development and implementation of groundwater sustainability plans for all basins determined high and medium priority by the California Department of Water Resources. Under SGMA, these basins should reach sustainability within 20 years of implementing their sustainability plans with a deadline of 2042. SGMA gives local agencies authority to define and plan for achieving and maintaining sustainable groundwater management while avoiding specific undesirable results through the preparation and implementation of a Groundwater Sustainability Plan (GSP).

The Temescal Subbasin is designated as a medium-priority basin. The basin lies mostly within the boundaries of the cities of Corona and Norco, and Home Gardens, an unincorporated area of Riverside County within the City of Corona's sphere of influence. See Appendix A for the Temescal Subbasin map. The City of Corona Department of Water and Power, the City of Norco, and Home Gardens County Water District provide water service to most of the basin, but there are some small areas outside the agencies' combined jurisdictions. These areas are either managed by the U.S. Forest Service, or underlie Prado Reservoir, which is operated by the United States Army Corps of Engineers.

Public agencies with water or land use authority are eligible to sustainably manage groundwater resources locally through the formation of a Groundwater Sustainability Agency (GSA) and preparation of a GSP. The Temescal Subbasin GSA (hereafter GSA) was formed by a Memorandum of Understanding (MOU) among the City of Corona, the City of Norco, and the Home Gardens County Water District. The GSA is dedicated to participating in the collective goals of groundwater sustainability and good basin management through the development of a GSP for the Temescal Subbasin.

Sustainable management of the Temescal Subbasin is critical to local water supply reliability. The three local agencies have water supply portfolios that include imported water, groundwater from multiple local basins, and Corona and Norco use reclaimed water for landscape irrigation. Water conservation measures have also been implemented (as documented in the recent Corona and Norco Urban Water Management Plans) and provide an important tool for responding to water shortages.

The GSA members have long cooperated in water supply planning, monitoring, and management in the Temescal Subbasin. The City of Corona has had a lead role, including preparation in 2008 of a Groundwater Management Plan for the Temescal Subbasin in accordance with State Assembly Bill 3030. This cooperative management will continue for preparation of the Temescal Subbasin GSP (hereafter GSP). The GSP will be prepared and applied jointly among the three agencies. Under the MOU establishing the GSA, the City of

Corona accepted the lead role in developing a GSP for the Temescal Subbasin and submitting it to the California Department of Water Resources.

Purpose

The purpose of this Outreach and Stakeholder Involvement Communications Plan is to provide a framework for integrating public and stakeholder outreach and involvement into GSP preparation. The Outreach and Stakeholder Involvement Communications Plan clarifies objectives, outlines important categories of stakeholders and potential interests, determines methods and timing of outreach and involvement activities, and establishes a process for evaluation and adaptation should the plan need to be updated. Under the requirements of SGMA, GSAs must consider the interests of all beneficial uses and users of groundwater and provide opportunities for public engagement and active involvement of diverse social, cultural, and economic elements of the population.

Objectives

This plan will help ensure SGMA requirements are met for the unique needs of the communities and stakeholders connected to the groundwater of the Temescal Subbasin. The plan will also be guided by the additional stakeholder outreach and stakeholder involvement objectives determined by the GSA. These objectives are to:

- Inform all stakeholders of the GSP development process, including purpose, opportunities and issues, core recommendations, and timeline.
- Provide meaningful opportunities for stakeholders and the public to learn, ask questions, and provide input.
- Involve the many diverse communities and stakeholders of Corona, Norco, and Home Gardens, recognizing that different approaches may be needed to reach specific populations like Disadvantaged Communities, and flexibility and adaptation in approach may be required.
- Ensure a transparent process where stakeholders and the public can understand what important discussions are taking place, how they can participate in them, and how input is being used.

A Note on Covid-19

Given the current Covid-19 crisis, many activities that would usually take place in-person during a planning process, such as workshops and community events, may not be possible. With the uncertainty of when in-person activities will be allowed by local and state authorities or deemed safe by communities, other involvement tools like virtual public meetings and communication and calls with partners will be employed where appropriate to meet the involvement goals for the GSP. Furthermore, even when in-person gatherings are allowed by health authorities, there may be community members who are not able to attend due to individual risk factors. Weaving different virtual activities together with the GSP process will require flexibility as well as thoughtfulness in involving the public.

2. GSA Decision Making Process

As noted, the cities of Corona and Norco and the Home Gardens County Water District have developed and adopted an MOU forming the GSA for the Temescal Subbasin. The GSP will be prepared under the authority of the GSA, with the City of Corona serving as lead agency.

The City of Corona is a General Law City operating with a City Council/City Manager form of government. The City Council is composed of five Council Members including the Mayor and Vice Mayor. Corona's City Council Members are community leaders who listen to all citizens of the City, prioritize plans and projects, allocate funds, and make decisions essential to the future of Corona. The Corona City Council members are elected officers identified in Government Code Section 87200. The City Council meets the first and third Wednesday of each month at 6:30 PM at Corona City Hall, 400 South Vicentia Ave, Corona, California. Meetings are announced, and agenda are posted on the City of Corona website; the meetings are open to the public. The vote of a majority of City Council Members present at any meeting attended by a quorum is necessary to determine any proposition or resolution presented. The City Council is supported by City staff from multiple departments. The Department of Water and Power is leading the GSP work for the City and other members of the GSA.

The City of Norco is a Charter City operating with a City Council/City Manager form of government. The Norco City Council is the elected body of city government within the City of Norco. The Norco City Council consists of five members elected at large for four-year terms by the citizens of Norco. Annually, the Norco City Council appoints a Mayor and Mayor Pro-Tem from its own membership to serve a one-year term. The Norco City Council makes all policy decisions and adopts laws for the City of Norco. The Norco City Council members are elected officers identified in Government Code Section 87200. The City Council meets the first and third Wednesday of each month at 7:00 p.m. at Council Chambers located at 2820 Clark Avenue, Norco, California. Meetings are announced and open to the public. The vote of a majority of City Council Members present at any meeting attended by a quorum is necessary to determine any proposition or resolution presented. Norco City Council meeting agenda are posted on the City of Norco website.

The Home Gardens County Water District is a special district formed under State law to provide water supply within its service area. Home Gardens is governed by a 5-person Board of Directors that elects a president from its members and appoints a secretary. The Board meets every 3rd Thursday of every month at its office, located at 3832 Grant St, Corona, California. Meetings are announced, and agenda are posted at various public locations throughout Home Gardens; the meetings are open to the public. The board (except as otherwise specifically provided in the California Water Code) manages and conducts the business and affairs of the Home Gardens County Water District. The vote of a majority of directors present at any meeting attended by a quorum is necessary to determine any proposition or resolution presented.

3. Stakeholders and Potential Interests

List of Interested Parties

Formulating an effective GSP will rely in part on soliciting input from as many stakeholders as possible to ensure that the plan explores and addresses the topics of greatest interest. During formation, the GSA submitted an initial list of parties interested in receiving notices regarding plan preparation, meeting announcements, and availability of draft plans, maps, and other relevant documents (see Appendix B). This initial list was used to create a list of stakeholders that will be updated throughout the GSP preparation.

Stakeholder Categories

Community members and contacts from stakeholder organizations (such as local, state, and federal agencies; businesses; community organizations; and non-profits) will be sought and involved throughout GSP preparation. The following are key stakeholder categories:

- Agricultural Interests
- California Native American Tribes
- California Statewide Groundwater Elevation Monitoring Agencies
- Businesses and Development
- Disadvantaged Communities
- Domestic Well Owners
- Environmental and Conservation
- Extractive Industry
- Federal Government Agencies
- Groundwater Right Holders
- Industrial Well Operators
- Land Use Planning Agencies
- Local Water Districts
- Municipal Well Operators
- Private Water Users
- Regulatory Agencies
- Surface Water User

Disadvantaged and Severely Disadvantaged Communities

Disadvantaged Communities are characterized by an annual median household income less than 80% of the California statewide median household income and Severely Disadvantaged Communities are characterized by an annual median household income less than 60% of the California statewide median household income. In many instances, members of these communities have faced historical disinvestment, systemic racism, and environmental injustices among other systemic challenges. Focused attention is required to ensure that they are provided opportunities to be informed and involved in planning processes.

The map in Appendix C shows the Disadvantaged and Severely Disadvantaged Communities within the Temescal Subbasin, representing all the areas identified from census-designated places, tracts, and block groups. The map reveals broad disadvantaged areas across the communities of the City of Corona and Home Gardens, centered around the State Route 91 corridor stretching from both sides of its intersection with Interstate 15 to State Route 71, including areas near the Corona Municipal Airport. As noted in the One Water One Watershed Plan Update 2018 (the Integrated Regional Water Management Plan for the Santa Ana River Watershed), specific communities who meet the criteria for disadvantaged communities may need to be involved, but are not yet identifiable by currently available census information. These communities will be included in focused outreach as they are identified. Involving these communities is needed for the preparation and implementation of the GSP in a way that supports a long-term sustainable water supply while reducing cost burdens.

Several of the identified areas score in the 70th to 80th percentiles for linguistic isolation on CalEnviroScreen, indicating that many households have low levels of English proficiency. American Community Survey data indicates Spanish as the most commonly spoken language other than English in Corona, Home Gardens, and Norco. The communities near the center of the City of Corona contain many single-family residences near commercial areas. Away from the center of Corona, including Home Gardens, the neighborhoods contain higher density residential and more mixed use and industrial areas. These factors are important to consider while developing focused outreach and involvement. For example, outreach material language translation will likely be needed in areas with limited English proficiency. Multiple means of communication (e.g., flyers, posters) will be utilized, recognizing that some communication methods directed toward rate payers (e.g., water bill insert) might not reach community members in multi-unit buildings if water is included in their rent. See the "Focused Outreach" subsection in Section 4 for more details on strategy.

Potential Stakeholder Interests

When planning for public outreach and stakeholder involvement, it is important to consider the types of questions and concerns stakeholders and the public may have. To help guide involvement efforts, a list of potential stakeholders and example interests is presented below in Table 1.

Table 1 – Potential Stakeholder Interests

Category	**Example Interests**
Agriculture	• Crop prices • Groundwater production and use costs • Water supply availability • Water rights • Water quality • Land value
Business and Development	• Economic growth • Population growth

Table 1 – Potential Stakeholder Interests	
Category	**Example Interests**
	• Water rates • Water quality
Cultural Resources	• Community history • Cultural identity
Environment and Conservation	• Climate change • Groundwater dependent ecosystems • Habitat and species of concern • Managed/preserved land • Water quality
Equity and Environmental Justice	• Access to planning process • Benefits to disadvantaged communities • Greater exposure to air, land, and water contaminants • Water quality • Water rates
Water Suppliers	• Drought • Groundwater supply availability • Groundwater production and use costs • Potential future limits on groundwater pumping • Water quality

4. Steps for Preparation of the Groundwater Sustainability Plan

Activities for this Outreach and Stakeholder Involvement Communications Plan will take place during six steps of preparation for the GSP. The steps are outlined below with brief descriptions of the key activities in each step.

- **Step 1: Launch Project.** During project launch, the project team will organize itself for the GSP preparation and stakeholder outreach and involvement. Project planning and project management structures will be established.
- **Step 2: Conduct Baseline Studies**. In this step, describing the plan area and conducting baseline studies for the planning process will occur. This includes describing current and historical groundwater conditions and developing the hydrogeologic conceptual model, which describes the occurrence and movement of groundwater in the Temescal Subbasin.
- **Step 3: Build Water Budget and Numerical Model.** At this step, the water budget will be quantified, which describes the amount of water that flows in and out of the subbasin, estimates changes in the amount of stored groundwater, and discusses the annual sustainable yield of the subbasin. A numerical groundwater model of the subbasin will be built in this step to assist in groundwater budget quantification. The model will be used

to evaluate future sustainability in multiple scenarios (including projected growth and climate change) and to simulate potential projects and management actions.

- **Step 4: Define Sustainability Goal and Criteria.** Building from the baseline studies, water budget, modeling, and input of stakeholders in the previous steps, the activities of this step will define the unique sustainability goal for the Temescal Subbasin. This goal and associated sustainable management criteria will define undesirable results and identify thresholds to avoid significant and unreasonable lowering of groundwater levels, reduction in storage, degraded water quality, land subsidence, and surface water depletion in the subbasin.
- **Step 5: Prepare Draft GSP.** This step will identify monitoring and management actions to fulfill the sustainability goal and sustainable management criteria and provide a plan for GSP implementation. The technical contents of the Draft GSP will then be completed.
- **Step 6: Review Draft GSP and Adopt Final GSP.** In the final step, the draft and final plan will be distributed for public review and comment.

See Section 4 for a process chart that aligns these planning steps with outreach and involvement activities.

5. Outreach and Involvement Process

The process chart on the next page provides an overview of how stakeholder and public outreach, and involvement activities align with the GSP preparation steps described in Section 3.

Temescal Subbasin GSP Outreach and Stakeholder Involvement Process

	Step 1 **Launch Project** Summer 2020	**Step 2** **Conduct Baseline Studies** Summer 2020	**Step 3** **Build Water Budget and Numerical Model** Fall and Winter 2020	**Step 4** **Define Sustainability Goal and Criteria** Winter 2021	**Step 5** **Prepare Draft GSP** Spring 2021	**Step 6** **Review Draft GSP and Adopt Final GSP** Summer – Winter 2021
Stakeholder and Public Dialogue Focus	Announce project launch.	Provide info on project purpose and methodology, and role of stakeholder involvement.	Share information regarding Step 2 activities and gather feedback on water budget and modeling, and sustainability criteria.	Review draft sustainability criteria and gather feedback on management actions.	Gather feedback on draft management actions and inform about implementation and monitoring.	Comments on Draft GSP Final GSP Submittal to DWR
City Website Page and Social Media						
Stakeholder and Public Involvement	Community Leader/ Organization Interviews Stakeholder Identification Outreach and Stakeholder Involvement Communications Plan	TAC Meeting #1 Updates at City Council/ Board Meetings Pre-Workshop Outreach Round 1: Outreach to drive people to recent website updates and workshop through such things as partnerships with community organizations/leaders, bill inserts, Inner Circle, or social media. Public Workshop #1 Kickoff Meeting	TAC Meeting #2 Updates at City Council/ Board Meetings	TAC Meeting #3 Updates at City Council/ Board Meetings Pre-Workshop Outreach Round 2 Public Workshop #2	TAC Meeting #4 Updates at City Council/ Board Meetings Pre-Workshop Outreach Round 3 Public Workshop #3	Pre-Workshop Outreach Round 4 Public Workshop #4 Public notice of process and availability of review draft. 90 Day Comment Period Adoption Hearings

Outreach and Involvement Activities

Listed below are the anticipated stakeholder and public involvement activities that will occur during GSP preparation. They are listed in the order of appearance in the above process chart. The activities are designed to be flexible to meet evolving needs and issues during GSP preparation. Detailed logistics plans will be prepared prior to public workshops and technical advisory committee meetings, and will outline notification methods, formats, key messages, topics, and input and feedback opportunities.

Groundwater Sustainability Plan Webpage

Purpose: Host information about GSP preparation and related involvement activities.

Description: A webpage will be created on the City of Corona Department of Water and Power's website. It will host project information such as general SGMA/GSP information, project timeline, draft chapters, project updates, meeting materials and summaries, and FAQs. It will also allow visitors to sign up for the interested parties list.

Timing: All Steps.

Pre-Workshop Outreach

Purpose: Inform stakeholders about GSP preparation and drive attendance at public workshops.

Description: Pre-workshop outreach will use outreach materials and social media materials.

Outreach Materials

Potential outreach materials include one-page fact sheets (or similar materials such as project updates or notices) or bill insert announcements. The materials will be posted on the webpage, distributed to the interested parties list via email, and to the public using social media and community organizations. The timing of the creation and distribution of outreach materials will be tied to project milestones and public workshops.

Social Media, Websites, and Email

The GSA members will utilize their existing social media accounts to spread the word following completion of project milestones and in advance of public workshops. Posts on the City of Corona's Facebook, Twitter, Instagram, and/or Nextdoor pages will distribute information, outreach materials, and/or direct interested parties to the GSP webpage and public workshops. The City of Corona's Inner Circle email distribution list will likewise be used to disseminate information. The City of Norco will distribute information using its Facebook and Twitter accounts. Home Gardens County Water District has a webpage where workshop information will be posted. Stakeholder organizations will be encouraged to repost social media communications for wider distribution.

Timing: Step 2, Conduct Baseline Studies; Step 4, Define Sustainability Goal and Criteria; Step 5, Prepare Draft GSP; Step 6, Review Draft GSP and Adopt Draft GSP

Focused Outreach

Purpose: Involve Disadvantaged Communities and Severely Disadvantaged Communities.

Description: Throughout GSP preparation, opportunities will be for outreach to Disadvantaged and Severely Disadvantaged Communities. In Step 1, the foundation will be laid by reaching out to community leaders and organizations to begin to build relationships and learn what strategies have been successful for them, how to overcome any existing barriers, and best methods for engaging in culturally and linguistically appropriate ways. Using this information and the previously discussed demographic information, gaps in pre-workshop outreach methods will be identified and addressed. Spanish translation of materials and interpretation at events will also be woven into outreach and involvement. Examples of effective outreach that has already been identified include posts on community social media pages and receiving information in the mail. Potential outreach materials could include customized social media posts for community organizations to share.

In Step 2, focused outreach, such as virtual stakeholder meetings, social media livestreams, social media posts, or flyer distribution, will be conducted, possibly in partnership with community groups and leaders. The purpose is to inform community members of their groundwater resources, how they are managed, and who manages them so that they are more comfortable in engaging in discussions later in GSP preparation. Basic information about the role of the GSP in groundwater management and public involvement will also be introduced. Potential outreach materials could include stakeholder meeting presentations, social media posts, or informational flyers.

Steps 3-6 will include continuation of pre-workshop outreach methods. It is also possible that some community members in disadvantaged communities may not have easy access to internet or cell phone data, so in-person meetings may be considered, if allowed by health authorities and community members are not excluded from public gatherings due to vulnerability to infection.

Timing: All Steps.

Technical Advisory Committee Meetings

Purpose: The purpose of the Technical Advisory Committee (TAC) is to contribute community and stakeholder perspectives and interests in GSP planning and GSP and SGMA implementation in the Temescal Subbasin.

Description: TAC members will provide input and feedback on GSP development and implementation and GSA policies based on their expertise, knowledge, resources, and understanding of their communities, environment, commerce, and applicable regulations. The GSA and the project team will consider the TAC's input throughout GSP preparation, along with input from the broader community, other stakeholders, and other government agencies involved in groundwater management and associated regulatory requirements.

TAC members represent the diverse interests of GSA-eligible agencies and groundwater uses and users. The intent of the Technical Advisory Committee is to contribute community and stakeholder perspectives and interests in GSP planning and GSP and SGMA implementation in the Temescal Subbasin.

See Appendix D for the protocols and operating principals document.

Timing: Step 2, Conduct Baseline Studies; Step 3, Build Water Budget and Numerical Model; Step 4, Define Sustainability Goal and Criteria; Step 5, Prepare Draft GSP.

Public Workshops

Purpose: Create a forum to share project information with the public and stakeholders and provide input and feedback opportunities.

Description: Public workshops will allow stakeholders an opportunity to provide incremental input at meaningful points in GSP development. The workshop series will also help community members and other stakeholders understand the purpose, need, benefits, and issues associated with sustainable groundwater planning. The planned focus of these workshops is the following:

1. Kickoff (Step 2, Conduct Baseline Studies)
2. Criteria for sustainability (Step 4, Define Sustainability Goal and Criteria)
3. Preliminary evaluation of management actions (Step 5, Prepare Draft GSP)
4. Presentation of draft GSP (Step 6, Review Draft GSP and Adopt Draft GSP)

Public workshops could include elements such as a presentation, Q&A sessions, and various opportunities for attendees to provide input or feedback such as live polling, breakout groups, or comment cards. The first public workshop will likely take the form of a virtual meeting. The project team will assess the conditions for future workshops and weigh the risks and benefits of holding them in-person. Any in-person workshops will be held in a venue that maximizes accessibility and convenience for the communities of Corona, Home Gardens, and Norco.

Timing: Step 2, Conduct Baseline Studies; Step 3, Build Water Budget and Numerical Model; Step 4, Define Sustainability Goal and Criteria; Step 5, Prepare Draft GSP; Step 6, Review Draft GSP and Adopt Draft GSP

City Council and Board of Directors Meeting Presentations

Purpose: Update the city councils of the Cities of Corona and Norco, and the Board of Directors of Home Gardens, and their respective communities, on GSP development and hold the GSP adoption hearing.

Description: The public will be able to hear updates on GSP preparation as an agenda item and provide comment periodically throughout the planning process and at the final adoption hearing.

Timing: Step 2, Conduct Baseline Studies; Step 3, Step 4, Define Sustainability Goal and Criteria; Step 5, Prepare Draft GSP; Step 6, Review Draft GSP and Adopt Draft GSP

Public Comment Period

Purpose: Allow the public to comment on the GSP before adoption.

Description: According to SGMA, a GSA may adopt a GSP after a public hearing, held at least 90 days after providing public notice of a comment period. Draft GSP materials, including draft chapters and supporting documents will also be released for public review periodically throughout GSP preparation to facilitate additional public review.

Timing: Step 2, Conduct Baseline Studies; Step 3, Step 4, Define Sustainability Goal and Criteria; Step 5, Prepare Draft GSP; Step 6, Review Draft GSP and Adopt Draft GSP

Inter-basin Coordination

Purpose: SGMA requires coordination of specific GSP elements between connected basins and/or subbasins.

Description: The GSA and their technical consultants will communicate with the GSAs, agencies, and/or technical consultants in and for neighboring basins and subbasins to coordinate water budget and sustainability criteria. This will facilitate consistency in estimates of flow across basin boundaries and make sure that sustainable basin management does not adversely affect neighboring basins.

Timing: Step 2, Conduct Baseline Studies; Step 3, Step 4, Define Sustainability Goal and Criteria; Step 5, Prepare Draft GSP; Step 6, Review Draft GSP and Adopt Draft GSP

6. Evaluation and Adaptation

This is a working plan, recognizing that an outreach and involvement plan should allow for evaluation and adaptation. After each public workshop, a discussion and evaluation of outreach and involvement activities will occur at internal GSA workgroup meetings to determine what went well, what could be improved, and what the key lessons learned are.

To help answer those questions, the outreach and involvement plan objectives will be reviewed:

- Were all stakeholders informed of the GSP development process, including purpose, opportunities and issues, core recommendations, and timeline?
- Were stakeholders and the public provided meaningful opportunities to learn, ask questions, and provide input?
- Were the many diverse communities and stakeholders of Corona, Norco, and Home Gardens, involved? Were tailored approaches used to reach specific populations like Disadvantaged Communities?

- Was the process transparent such that stakeholders and the public can understand what important discussions are taking place, how they can participate in them, and how input is being used ensured?

The following information can also be collected and used as indicators:

- **Interested Party List Additions:** Number of contacts added to the list since the last workshop.
- **Social Media Interactions:** Number of likes, comments, and shares.
- **Public Workshops Attendance:** Number of attendees and change over time.
- **Public Workshop Feedback:** Public workshops will end with a poll and/or short survey, asking attendees how they learned about the workshop, recommending means for getting the word out to other community members, what they liked about the format, and what they liked least**.**

The evaluation input will inform the adaptation of subsequent outreach and involvement activities.

Appendix A

Temescal Subbasin Map

Path: T:\Projects\Corona GSP 46414\GIS\Maps\Figures\Outreach Figures\Outreach Exhibit A - Temescal Subbasin GSA.mxd

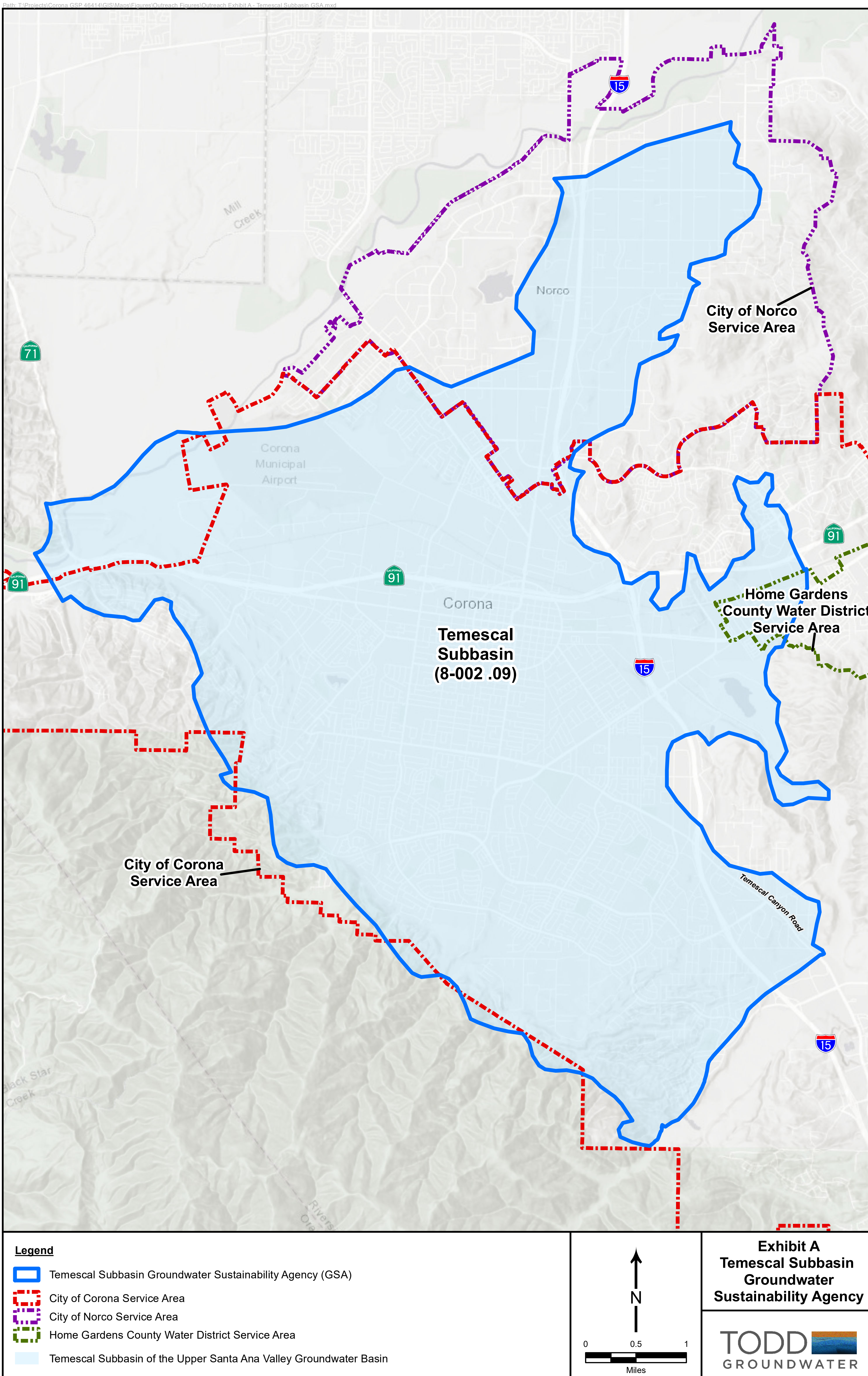


Exhibit A
Temescal Subbasin
Groundwater
Sustainability Agency

Appendix B

List of Interested Parties

TEMESCAL VALLEY SUBBASIN
GROUNDWATER SUSTAINABILITY AGENCY
LIST OF PARTIES INTERESTED IN THE TEMESCAL SUBBASIN

The following list satisfies Water Code Section 10723.2, which states: a GSA shall consider the interests of all beneficial uses and users of groundwater, as well as those responsible for implementing Groundwater Sustainability Plans (GSPs). The list of interested parties presented below has been developed for the GSA. Many of the agencies identified below have already been contacted by the parties to the MOU for the GSA. The interests of all the agencies, organizations, and individuals identified below shall be considered during the development of the GSP for the GSA.

1. Local Water Districts within or adjoining the GSA:
    a. Metropolitan Water District of Southern California
    b. City of Riverside
    c. The MOU/GSA member agencies
    d. Western Municipal Water District (adjacent to the subbasin/GSA)
    e. City of Eastvale (adjacent)
    f. City of Chino Hills (adjacent)
    g. Jurupa Community Services District (adjacent)
    h. Temescal Valley Water District (adjacent)
    i. Eagle Valley Water District (adjacent)
    j. Orange County Water District (adjacent)
    k. Orange County Water Public Works Department (adjacent)
    l. Inland Empire Utilities Agency (adjacent)
    m. Chino Basin Water Management District (adjacent)

2. Holders of Overlying Groundwater Rights:
    a. There are a limited number of known agricultural, industrial, and domestic well owners that account for a very small proportion of subbasin annual groundwater use. These existing pumpers include the Dairy Farmers of America and other small producers. Known pumping is tracked on behalf of the Santa Ana River Watermaster, and these producers interests will be considered during the development of the GSP for the subbasin.
    b. Municipal and Industrial Well Operators
        i. The MOU/GSA member agencies are the only municipal well operators within the Temescal Subbasin
        ii. All American Asphalt, Dart Container Corporation of California, and Minnesota Mining and Manufacturing Corporation operate industrial supply wells in the subbasin. Known pumping is tracked on behalf of the Santa Ana River Watermaster, and these producers interests will be considered during the development of the GSP for the subbasin.

3. Surface Water Users
    a. Santa Ana Watershed Protection Authority
    b. Santa Ana River Watermaster. The Santa Ana River overlies portions of the Basin. Surface flows in the Santa Ana River are monitored by the Santa Ana River Watermaster. The Santa Ana River is adjudicated and minimum flows are required to reach the Prado Basin on an annual basis.
    c. The MOU/GSA member agencies

4. Environmental Users of Groundwater
    a. Riverside County Flood Control and Water Conservation District
    b. Santa Ana River Watermaster
    c. California Regional Water Quality Control Board - Santa Ana Region (8)

5. Local Land Use Planning Agencies
    a. Riverside County, Planning Department
    b. City of Corona
    c. City of Norco

6. The Federal Government
    a. United States Army Corps of Engineers (Prado Dam Management Area)
    b. United States Forest Service

7. California Native American Tribes
    a. Not present within the Temescal Subbasin or proposed GSA area.

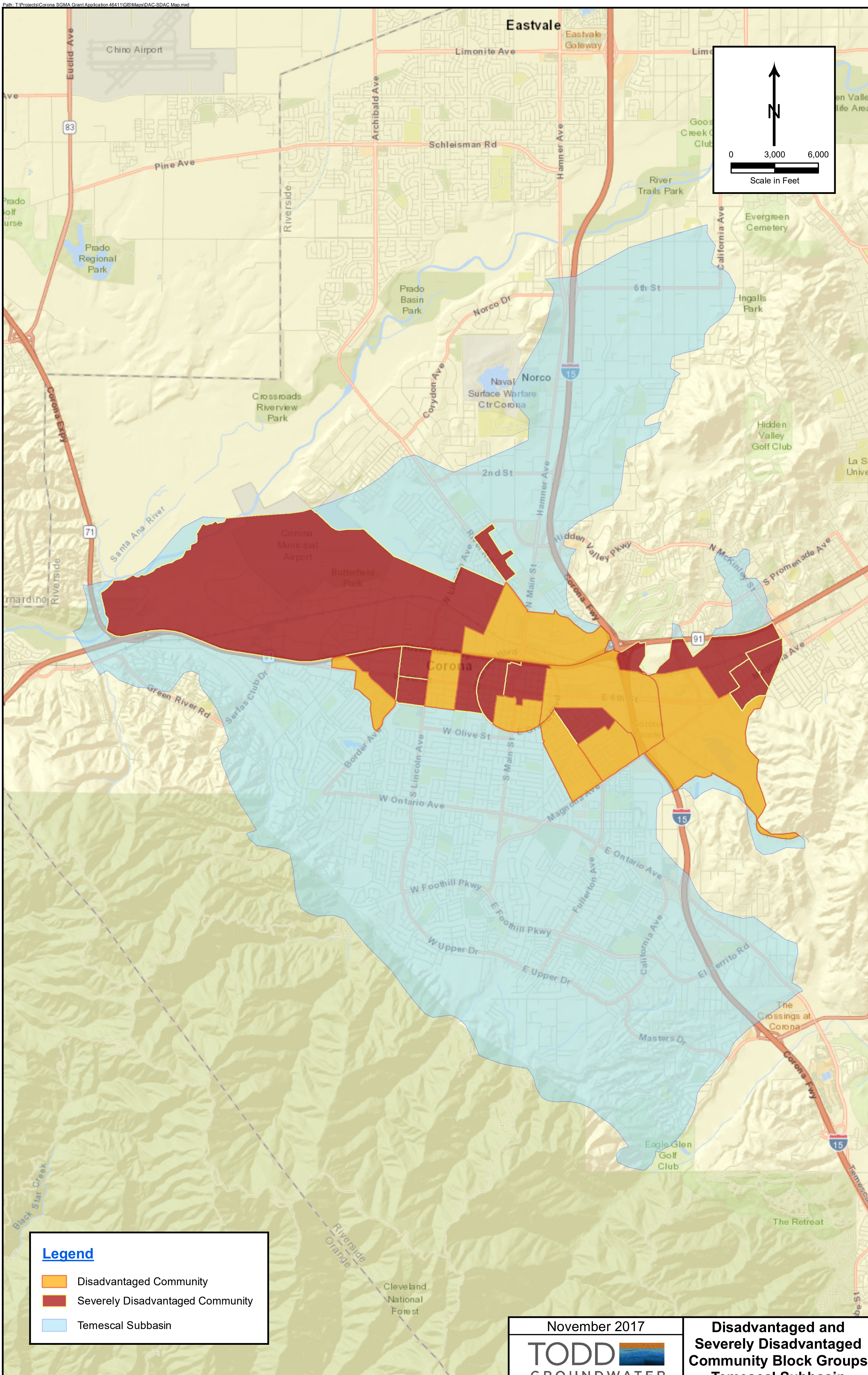
8. Disadvantaged Communities
    a. There are 21 Census block groups within the City of Corona where median income is below the threshold for disadvantaged communities, and 13 of these block groups are below the severely disadvantaged community income threshold.
    b. There are 4 Census block groups within the Home Gardens County Water District where median income is below the threshold for severely disadvantaged communities.

9. CASGEM Agencies
    a. Western Municipal Water District is the monitoring entity responsible for CASGEM program in the Temescal Subbasin

Appendix C

Disadvantaged and Severely Disadvantaged Communities Map

Path: T:\Projects\Corona SGMA Grant Application 46411\GIS\Maps\DAC-SDAC Map.mxd



Legend

- Disadvantaged Community
- Severely Disadvantaged Community
- Temescal Subbasin

November 2017

TODD GROUNDWATER

Disadvantaged and Severely Disadvantaged Community Block Groups Temescal Subbasin

C-1

Appendix D

Protocol and Operating Principles for Temescal GSA Technical Advisory Commitee

Protocols and Operating Principles for Temescal Subbasin Groundwater Sustainability Agency Technical Advisory Committee

August 7, 2020

1. INTRODUCTION

The State of California Sustainable Groundwater Management Act (SGMA), passed in 2014, calls for the development and implementation of groundwater sustainability plans for all basins determined high and medium priority by the California Department of Water Resources. Under SGMA, these basins should reach sustainability within 20 years of implementing their sustainability plans with a deadline of 2042. SGMA gives local agencies authority to define and plan for achieving and maintaining sustainable groundwater management while avoiding specific undesirable results through the preparation and implementation of a Groundwater Sustainability Plan (GSP).

The Temescal Subbasin, a medium-priority basin, lies mostly within the boundaries of the cities of Corona and Norco, and Home Gardens, an unincorporated area of Riverside County within the City of Corona's sphere of influence. The Temescal Subbasin GSA (GSA) was formed by a Memorandum of Understanding among the City of Corona, the City of Norco, and the Home Gardens County Water District. The GSA is dedicated to participating in the collective goals of groundwater sustainability and good basin management through the development of a GSP for the Temescal Subbasin.

GSAs must consider the interests of all beneficial uses and users of groundwater and provide opportunities for public engagement and the Temescal Subbasin GSA is seeking active involvement of diverse social, cultural, and economic elements of the population. In order to achieve those requirements and provide more opportunities for stakeholders to represent diverse interests and provide input to inform GSP preparation, the GSA chose to form a Technical Advisory Committee (TAC). This document establishes the protocols and operating principles and records the charge and role of the TAC in GSP preparation, collaborative principles, meeting logistics information, and additional considerations for productive meetings where all TAC members can participate equally and effectively.

2. CHARGE

The purpose of the TAC is to provide input and guidance to the staff and consultant team of the GSA who are preparing the GSP. At the request of the GSA, the TAC members will provide input and feedback on GSP development and implementation and GSA policies based on their expertise, knowledge, resources, and understanding of their communities, environment, commerce, and applicable regulations. The GSA and the project team will consider the TAC's input throughout GSP preparation, along with input from the broader community, other stakeholders, and other government agencies involved in groundwater management and associated regulatory requirements.

Additionally, Technical Advisory Committee members represent the diverse interests of GSA-eligible agencies and groundwater uses and users. The intent of the Technical Advisory Committee is to contribute community and stakeholder perspectives and interests in GSP planning and GSP and SGMA implementation in the Temescal Subbasin.

The Technical Advisory Committee will provide review and guidance to the GSA on groundwater-related issues during the development of the GSP that may include:

- Sustainability goals and objectives
- Monitoring programs
- Annual work plans and reports
- Modeling scenarios
- Inter-basin coordination activities
- Projects and management actions to achieve sustainability
- Community outreach, including engagement with disadvantaged communities
- Local regulations to implement SGMA
- General advice

3. ROLES AND RESPONSIBILITIES

To accomplish the above charge, Technical Advisory Committee members agree to the following:

- Contribute input towards long-term sustainable management of the Temescal Subbasin based on their knowledge and expertise in policy, technical, and community matters
- Communicate to other stakeholders and community members about the GSA, GSP process, and SGMA
- Work collaboratively with others on the Technical Advisory Committee
- Commit time needed to review material and participate in ongoing discussions
- Collectively reflect diversity of interests
- Represent constituents' perspectives, but also consider broader community input and input from other members during Technical Advisory Committee meeting discussions

- Participate in all Technical Advisory Committee meetings for the entire planning process
- Partner with the GSA and project team in publicizing public involvement activities

4. PARTICIPATION AND COLLABORATION PRINCIPLES

All Technical Advisory Committee members will work together to create a collaborative, problem-solving environment. The preferred deliberation process is a collaborative process whereby Technical Advisory Committee members choose to cooperate to achieve shared and/or overlapping objectives, in support of the GSA's direction for the creation of a GSP for the Temescal Subbasin.

By agreeing to serve on the Technical Advisory Committee, members commit to the following principles:

- Commit to a good faith effort.
- Use common conversational courtesy.
- All ideas and point of view have value. All ideas have value in this setting. We are looking for innovative ideas. The goal is to achieve understanding. Simply listen, you do not have to agree. If you hear something you do not agree with or you think is "silly" or "wrong," please remember that the purpose of the forum is to share ideas.
- Be honest, fair and as candid as possible. Help others understand you and work to understand others.
- Share relevant information.
- Avoid editorials. It will be tempting to analyze the motives of others or offer editorial comments. Please talk about *your own* ideas and thoughts. Avoid commenting on why you believe another participant thinks something.
- Honor time and be concise. People's time is precious; treat it with respect.
- Think innovatively and welcome new ideas. Creative thinking and problem solving are essential to success. Attempt to think about the problem in a new way.
- Seek solutions for all – help to integrate each other's interests into creative solutions that address diverse needs.
- Invite humor and good will.

Meetings will be conducted using a facilitator, who will:

- Maintain a neutral position during Technical Advisory Committee discussions.
- Work to ensure that all Technical Advisory Committee members have the opportunity to participate equally.
- Guide meeting discussions per the agenda and manage time.
- Provide dialogue activities as needed for productive outcomes.
- Enforce the Technical Advisory Committee collaboration principles stated above.
- Ask "why" to clarify interests.

- Track actions, next steps, and deadlines.
- Participate in agenda preparation as part of meeting the above responsibilities and integrating the Technical Advisory Committee in the planning process.

5. MEMBERSHIP

The intent of the Technical Advisory Committee is to provide broad participation and advice to the GSA. To facilitate effective meetings and manage group size, the Technical Advisory Committee will not exceed 18 members.

The GSA Staff (made up of City of Corona Department of Water and Power staff) will manage its membership and composition and the Staff may make appointments from time-to-time after receiving Technical Advisory Committee recommendations from interested parties to serve on Technical Advisory Committee. When an organization's representative is no longer able to serve, the organization will recommend a new representative to the Technical Advisory Committee. If the organization withdraws from the Technical Advisory Committee, the Technical Advisory Committee and Staff will identify another organization and corresponding representative to fill that seat and recommend the organization to the GSA for appointment.

The Technical Advisory Committee strives to include a range of interests in groundwater in the Temescal Subbasin as outlined in SGMA. Technical Advisory Committee members live in the Temescal Subbasin or represent organizations with a presence or agencies with jurisdiction in the Subbasin, including:

- All Groundwater Users
- Municipal Well Operators, Public Utilities Commission-Regulated Water Companies, and Private and Public Water Systems
- County and City Governments
- Planning Departments/Land Use
- Local Landowners
- Disadvantaged Communities
- Business and Agriculture
- Rural Residential Well Owners
- Environmental Users
- Water Supply and Management Surface Water Users (if connection between surface and ground water)

No Technical Advisory Committee member shall be compensated by the GSA for preparation for or attendance at meetings of the GSA or any committee created by the GSA. The fiscal responsibility of the Technical Advisory Committee falls under the oversight of the GSA.

6. REQUEST FOR NO USE OF ALTERNATES

The GSA requests that once each Technical Advisory Committee member identifies its representative, each representative will commit to attending all meetings in person for the duration of the study. The meetings will build on each other, where discussions in one meeting will shape and inform the discussions at the next meeting. Because continuity is only optimized by consistency in attendance and participation by the representatives, the GSA has established a "no alternate" policy.

7. TERM OF SERVICE

The Technical Advisory Committee is being formed with an understanding that it will serve through submittal of the GSP by January 31, 2022.

8. MEETING LOGISTIC AND COMMUNICATION

Project Duration

The final GSP will be submitted to the State of California Department of Water Resources by January 31, 2022.

Meeting Schedule and Length

There will be four Technical Advisory Committee meetings, currently scheduled for Summer 2020, Fall, 2020, Winter 2021, and Spring 2021. Meetings will last 2 to 4 hours.

Meeting Location

The first Technical Advisory Committee meeting will take place as a virtual meeting online, largely due to restrictions implemented in response to COVID-19. The GSA and project team will assess the latest State and local social distancing requirements and guidance to determine in-person and online venues for future meetings.

Agendas

Agendas will be distributed via email one week in advance of each meeting.

Meeting Summaries

Meeting summaries will be prepared and distributed.

9. COMMUNICATION & MEDIA

GSA Staff will serve as primary contacts for all communication, outreach and media. At the request of the GSA, or Staff, the Technical Advisory Committee may advise on outreach and community engagement.

Media Interaction

Technical Advisory Committee members reserve freedom to express their own opinions to media representatives, but not the opinions of others. The temptation to discuss someone else's statements or position should be avoided. Participants can refer media inquiries to Technical Advisory Committee members for individual comments.

If contacted by the press or an external party concerning discussions, participants are asked to:

- Point out that they are not speaking on behalf of the Technical Advisory Committee, unless specifically authorized by the Technical Advisory Committee to do so
- Present their views only and conscientiously refrain from expressing, characterizing or judging the view of others
- Avoid using the press as a vehicle for negotiation

Member-To-Member Communications

Technical Advisory Committee members may want to share information and documents with other members during the study process. To ensure that all members have the same information available to them, all documents are to be distributed through the established point of contact, who is listed at the end of this document.

The Technical Advisory Committee is intended to be a collaborative experience, in which members work through ideas, issues and solutions in person to gain mutual understanding. As such, Technical Advisory Committee members agree to avoid engaging in email "dialogue" with other members outside the meeting process, and instead commit to using the Technical Advisory Committee meetings for dialogue and discussion purposes.

10. OPEN MEETINGS

All Technical Advisory Committee meetings will be open to the public and announced in advance on the project website. Meeting materials and summaries for each meeting will be posted on the project website.

11. POINT OF CONTACT FOR TECHNICAL ADVISORY COMMITTEE MEMBERS

The established point of contact for Technical Advisory Committee members' questions, suggestions, and input is Melissa Estrada-Maravilla, who is reachable by email at Melissa.Estrada-Maravilla@CoronaCA.gov or phone at 951.736.2479.

APPENDIX E

List of Public Meetings During GSP Development and GSP Comments and Responses

Public Meetings Held During Development of the Temescal Basin Groundwater Sustainability Plan

August 19, 2020 – Temescal Basin Technical Advisory Committee Meeting 1

November 18, 2020 – Temescal Basin Technical Advisory Committee Meeting 2

February 17, 2021 – Temescal Basin Technical Advisory Committee Meeting 3

June 16, 2021 – Temescal Basin Technical Advisory Committee Meeting 4

September 29, 2020 – Public Workshop 1 for Temescal Basin Groundwater Sustainability Plan Development

March 2, 2021 – Public Workshop 2 for Temescal Basin Groundwater Sustainability Plan Development

July 8, 2021 – Public Workshop 3 for Temescal Basin Groundwater Sustainability Plan Development

APPENDIX F

Summaries of Technical Advisory Committee Meetings

Technical Advisory Committee Meeting #1

Meeting Summary

Wednesday, August 19, 2020
2:00 p.m. – 4:00 p.m.
Location: Zoom Virtual Meeting

Attendees

Technical Advisory Committee Members

- Ava Moussavi, Riverside County Flood Control and Water Conservation District
- Chad Blais, City of Norco Public Works Department
- David Vigil, Home Garden County Water District
- Eric Lindberg, California Regional Water Quality Control Board – Santa Ana Region
- Jacque Casillas, Vice Mayor, City of Corona
- Katie Hockett, City of Corona Department of Water and Power
- Roberta A. Reed, 3M Industrial Mineral Products Division
- Timothy Ballon, All American Asphalt
- Tom Moody, City of Corona Department of Water and Power
- Wes Speake, Councilmember, City of Corona

City of Corona Department of Water and Power Staff

- Kristian Alfelor
- Melissa Estrada-Maravilla

Consultant Team

- Chad Taylor, Todd Groundwater
- Phyllis Stanin, Todd Groundwater
- Alyson Scurlock, Kearns & West
- Jack Hughes, Kearns & West
- Joan Isaacson, Kearns & West

Summary

1. Welcome and Introductions

Tom Moody, General Manager at the City of Corona Department of Water and Power, welcomed all to the first meeting of the Temescal Groundwater Sustainability Agency Technical Advisory Committee (TAC). He introduced Todd Groundwater, Carollo Engineers, and Kearns & West as the consultants assisting the Temescal Groundwater Sustainability Agency (Temescal GSA) with preparation of the Temescal Groundwater Sustainability Plan (Temescal GSP) and meeting facilitation.

2. Overview of Meeting Agenda

Joan Isaacson serving as TAC meeting facilitator, Kearns & West, led roundtable introductions for all attending. Isaacson thanked all for attending since their expertise, track record of working collaboratively with other agencies and organizations, and relationships with communities and other stakeholders would be very valuable throughout preparation of the Temescal GSP. She then reviewed the meeting agenda (see Appendix A), noting that the meeting would focus on an introduction to the Sustainable Groundwater Management Act (SGMA), Temescal GSP workplan and schedule, Outreach and Stakeholder Involvement Communications Plan, and TAC members' roles.

3. Orientation to the Sustainable Groundwater Management Act

Chad Taylor, Senior Hydrogeologist at Todd Groundwater, presented the background and purpose of SGMA, an overview of the Temescal Basin and Temescal GSA, and the Temescal GSP development timeline. SGMA is California State legislation that establishes requirements and specifies deadlines for achieving and maintaining groundwater sustainability. These requirements include forming a GSA and preparing a GSP to facilitate local groundwater management informed by stakeholders. SGMA requires that groundwater basins designated as medium (such as the Temescal Basin) or high priority form GSAs and file GSPs by January 31, 2022 and subsequently demonstrate sustainable groundwater management by 2042. See page 10 in Appendix B for map of the Temescal Basin. Sustainability, as defined in SGMA, is the local management and use of groundwater in a way that can be maintained without experiencing undesirable results. SGMA requires evaluation of undesirable results in consideration of six sustainability indicators which are chronic lowering of groundwater levels; reduction of groundwater storage; degradation of water quality; depletion of interconnected surface water affecting beneficial uses; land subsidence affecting land uses; and seawater intrusion.

Taylor explained that the City of Corona, the City of Norco, and Home Gardens County Water District formed the Temescal GSA in 2017 through a memorandum of understanding. The Temescal GSA will work with the California Department of Water Resources (DWR), the TAC, consultants, residents, local public, and other agencies and stakeholder organizations during the Temescal GSP preparation. The Temescal GSA has begun the process of developing and implementing a GSP for the Temescal Basin, including data gathering and review, preparation of a Draft Plan Area Chapter, and preparation of an Outreach and Stakeholder Involvement Communications Plan. For more information on the Temescal GSA, see pages 11 through 12 in Appendix B.

Discussion/Q&A

The team opened the floor for questions and discussion. Taylor listed two discussion questions for consideration: 1) What have you heard about groundwater and/or SGMA and what do you think are some important groundwater management issues? 2) Are you aware of any data or studies we should review during GSP preparation? Discussions, comments, and questions are summarized below.

- The State of California requires local municipal organizations to serve as GSA partners, so private companies are not eligible, but they can participate in GSP preparation in other ways.
- The Temescal Basin has a current Groundwater Management Plan and the majority of water after a rainfall event goes to local recharge. This is interesting, and we should find a way to inform the public on how this happens in the Temescal Basin, so they can know about it and understand it.

- The fact sheet sent prior to this meeting was great. The public should know that the GSA agencies have been and are good stewards of our groundwater.
- Other GSPs have considered what it would mean to decrease water use in the future and that is a concern this TAC should think about.
- It is important that TAC members work with and train others in their agency or organization in consideration of the 2042 sustainability mark so that there is capacity for someone to provide input over 20 years.
- Let's not shy away from talking about Direct Potable Reuse and Indirect Potable Reuse projects as part of this process. They can be hard to talk about but should be talked about sooner rather than later as they are a big part of groundwater replenishment.

4. Summary of Groundwater Sustainability Plan Workplan and Schedule

Taylor provided a summary of the Temescal GSP workplan and schedule. The Temescal GSP will build from past and existing management activities, including the 2008 Groundwater Management Plan. Major Temescal GSP elements include data compilation; plan area; hydrogeologic conceptual model; groundwater model; sustainability goals and criteria; management actions, projects, and monitoring; and plan development. Data compilation and a Draft Plan Area Chapter are already complete. The next steps are to develop the hydrogeological conceptual model, assess current and historical groundwater conditions, and construct a numerical groundwater model. These will be used to calculate groundwater budgets and sustainable yield, so that it is known how much groundwater is available for use. After that comes the creation of sustainability goals and criteria, which define what sustainability means in the Temescal Basin. Next, management actions will be identified to meet sustainability goals and criteria and a monitoring program will be established.

Taylor reviewed the Temescal GSP preparation schedule noting that there will be four TAC meetings total and three public workshops and a presentation of the Draft GSP during the process. The Draft Temescal GSP will be made available for public review in Summer 2021. The final Temescal GSP will be completed by Fall 2021 prior to submittal to DWR. See pages 13 through 16 in Appendix B for more information on the Temescal GSP workplan and schedule.

Discussion/Q&A

There were no questions or comments from the TAC members for this agenda item.

5. Outreach and Involvement

Jack Hughes, Kearns & West, provided an overview of the purpose, objectives, and components of the Outreach and Stakeholder Involvement Communications Plan. The purpose is to provide a framework for integrating public and stakeholder outreach and involvement into the Temescal GSP preparation. The objectives include making sure all stakeholders are informed of the Temescal GSP process and how they can get involved; providing meaningful opportunities for stakeholders and the public to learn and provide input; involving the diverse communities and stakeholders of Corona, Norco, and Home Gardens; and ensuring a transparent process. An important component is involving communities and stakeholders with diverse groundwater interests.

Hughes reviewed the planned outreach and involvement activities included in the plan and how they would be aligned with the Temescal GSP planning steps. The public will have opportunities to get information and provide comment during the public workshops and/or during the presentation on Temescal GSP updates provided during the City Council or Board of Directors meetings of each respective Temescal GSA member. There will also be three public workshops. Each workshop will be accompanied by several methods of pre-workshop outreach to boost attendance and circulate information such as emails, social media posts, and distributing fact sheets.

Hughes noted the importance of engaging underrepresented communities throughout the Temescal GSP process. He displayed areas in the Temescal Basin that DWR has identified as Disadvantaged Communities and Severely Disadvantaged Communities. The consultant team has talked with local community leaders to discuss strategies and best practices for conducting engagement with underrepresented communities and what community organizations will be important to partner with.

Hughes then overviewed the outreach materials being developed in preparation for the first public workshop. The Temescal GSA website (www.CoronaCA.gov/Groundwater) will serve as a hub for project information and updates. It will include a comment form for anyone to contribute input during the Temescal GSP process. The Temescal GSA fact sheet (see Appendix C) introduces broader groundwater concepts to bring public awareness to local groundwater resources in addition to information about SGMA and the Temescal GSP. The first public workshop is tentatively scheduled for September 29, 2020 and will be held virtually. See pages 17 through 24 in Appendix B for more information on outreach and involvement.

Discussion/Q&A

Hughes posed the following questions for discussion: 1) How can we reach more of your community members, constituents/other stakeholders, and the public in our pre-workshop outreach? 2) How might you be able to help us spread awareness of the first public workshop?

- The TAC discussed what stakeholders had already been identified. A working list has been developed that includes many agencies, businesses, private pumpers, and other stakeholders upstream and downstream, as well as those in neighboring basins. TAC members can suggest additional interested parties to add. The website, via the comment page, provides an additional option for anyone interested in signing up for updates.
- The TAC discussed if the project team had target numbers for engagement in underrepresented communities in mind. There are no target numbers for engagement.
- One question asked was, how many members of the public attended public meetings for other GSPs? A member of the consultant team stated that the public attendance at public meetings for other GSPs varies. Depending on the Basin, attendance has ranged from zero members of the public and several agency representatives to many members of the public and agency representatives.
- The idea of a focus group was also mentioned. One suggestion was to incentivize participation by offering gift cards or coupons. People in line at bi-weekly food drives at city hall could be engaged. Another idea was to encourage people to answer a one-question survey that drives them to the project website. TAC members discussed options for what that question could be.
- The TAC noted that the fact sheet was very good but might be a little too dense, and it could maybe be reduced to one-page with English on one side and Spanish on the other.

6. Role of the Technical Advisory Committee

Isaacson explained the role of the TAC and reviewed the TAC Protocols and Operating Principles document (see Appendix D), which was provided to TAC members before the meeting. The general purpose of the TAC is to provide input and guidance to the Temescal GSA and consultant team during the development of the Temescal GSP. TAC members represent diverse groundwater interests and will work collaboratively to contribute input towards long-term sustainable management of the Temescal Basin, communicate with additional stakeholders and community members about the Temescal GSA, Temescal GSP process, and SGMA, review material and participate in ongoing discussions, and help to publicize public involvement activities. TAC members were asked to provide a general confirmation of the operating protocols and to reach out to the project team contact (Melissa Estrada-Maravilla) if they saw any red flags.

Discussion/Q&A

There were no questions or comments from the TAC members for this agenda item.

7. Public Comment

No members of the public provided comment.

8. Next Steps and Final Comments

Isaacson summarized next steps for the TAC members. Following this meeting, Estrada will send out the Draft Plan Area Chapter of the Temescal GSP for TAC members to review. The consultant team will continue preparing the technical analyses. Comments on the Draft Plan Area Chapter of the Temescal GSP are due to the GSA on September 4, 2020. Additional next steps are preparing for the upcoming public workshop tentatively scheduled for September 29, 2020 and the next TAC meeting on November 18, 2020.

Discussion/Q&A

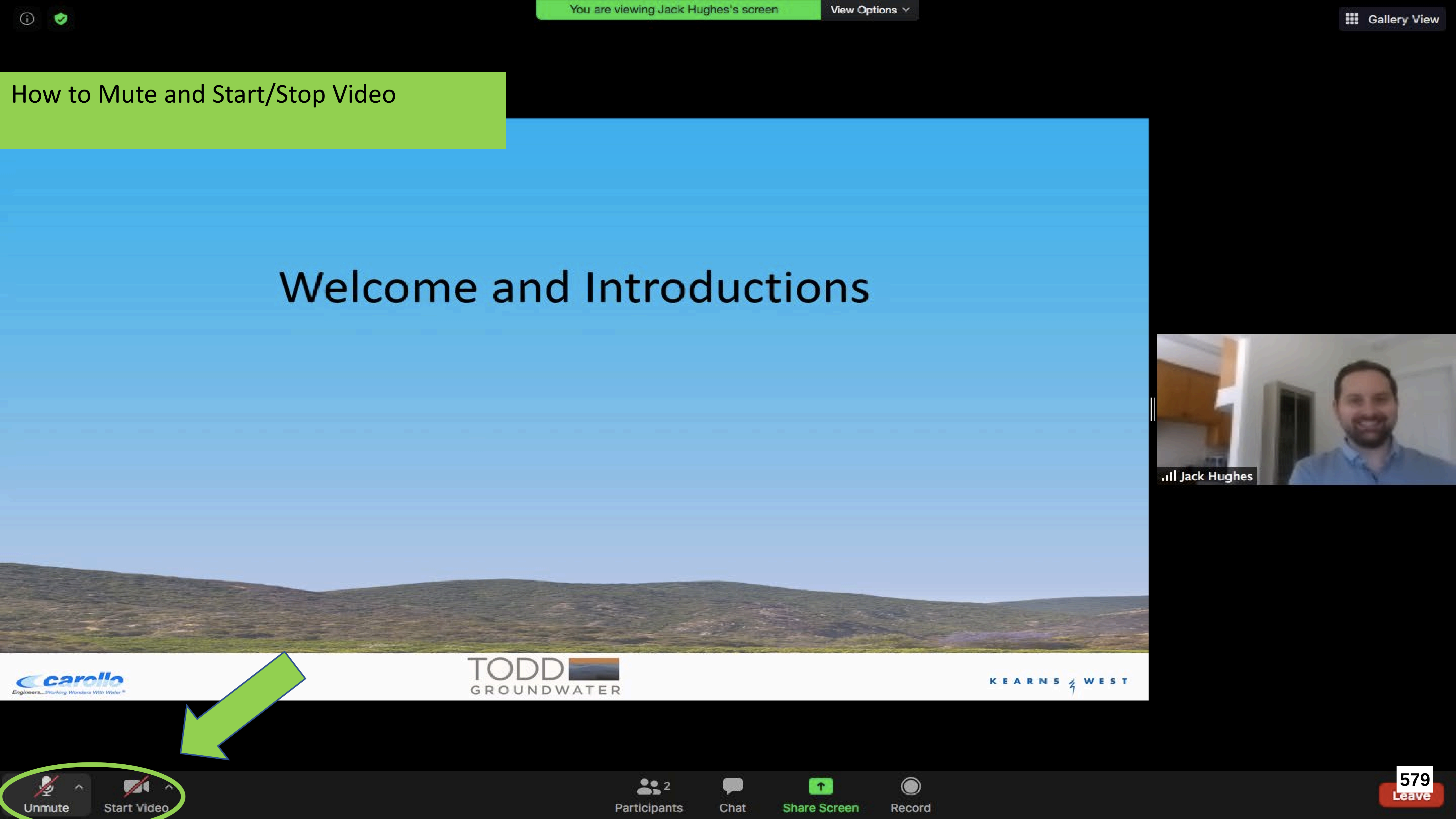
- The time for the first public workshop was discussed. A start time before 6:00 p.m. would be good as it is difficult to conduct a virtual public workshop later in the evening. Also, the timing of future workshops could be alternated to see what works best.

Temescal Subbasin Groundwater Sustainability Agency

Technical Advisory Committee

August 19, 2020

How to Mute and Start/Stop Video



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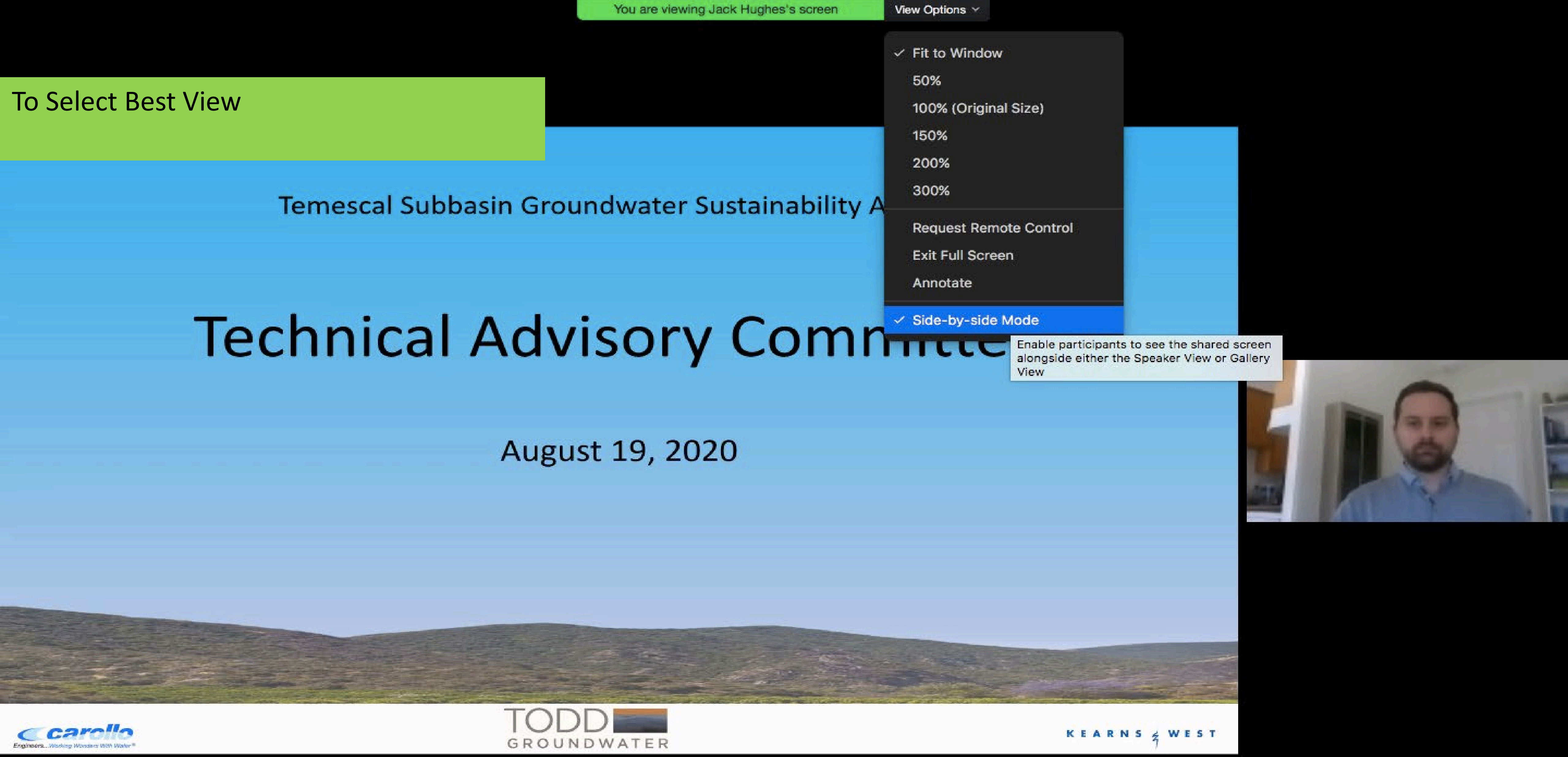
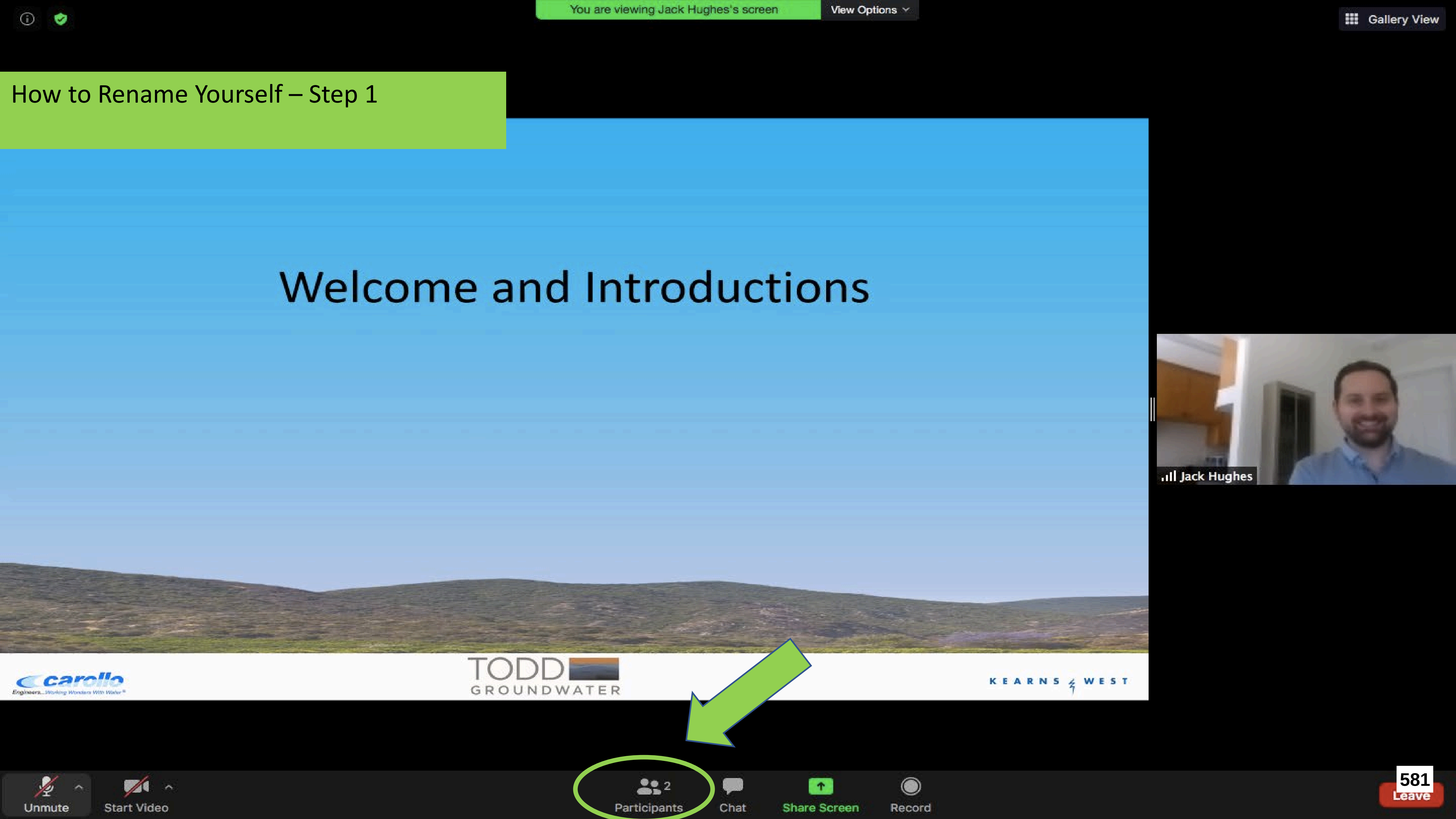
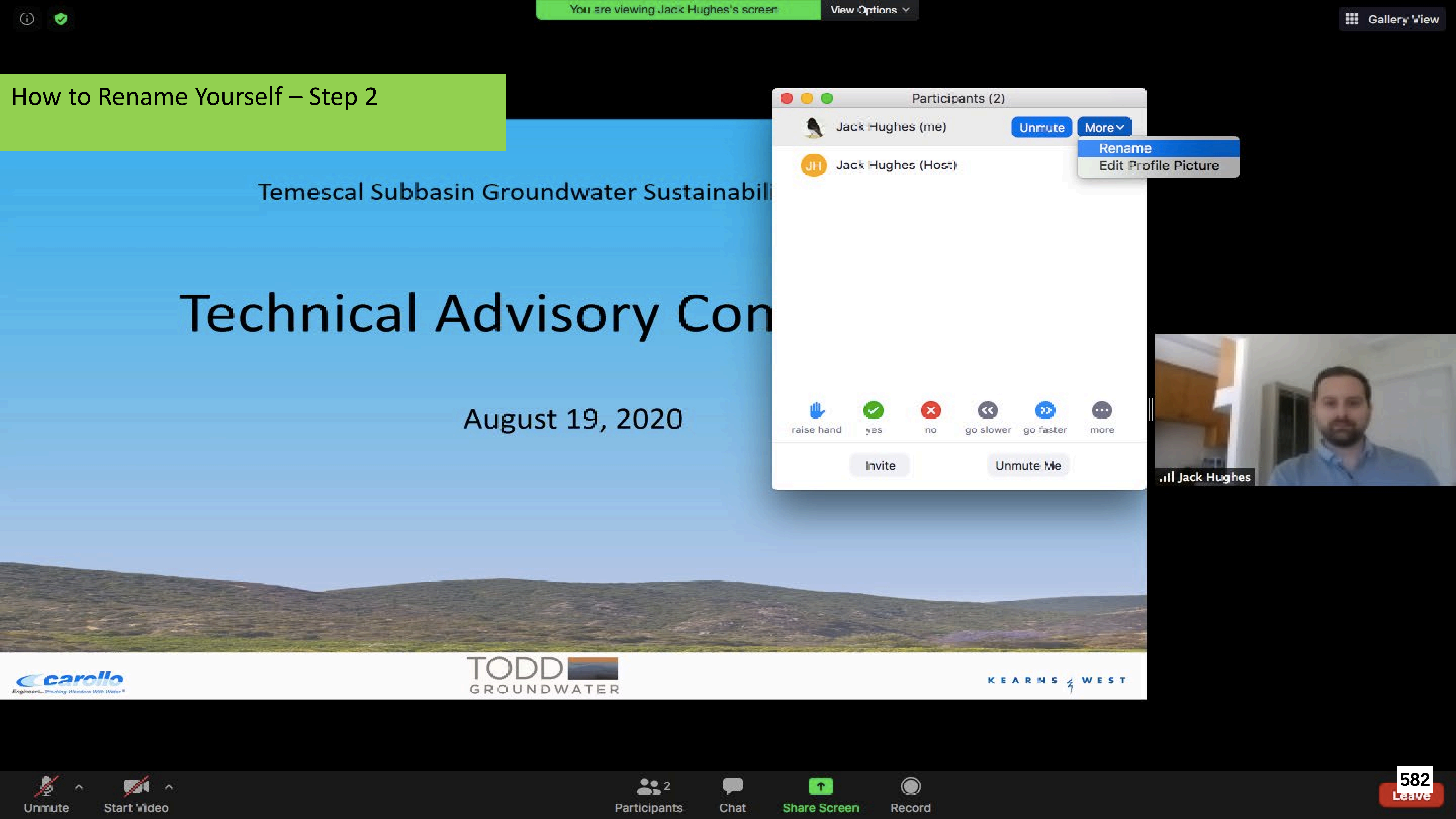


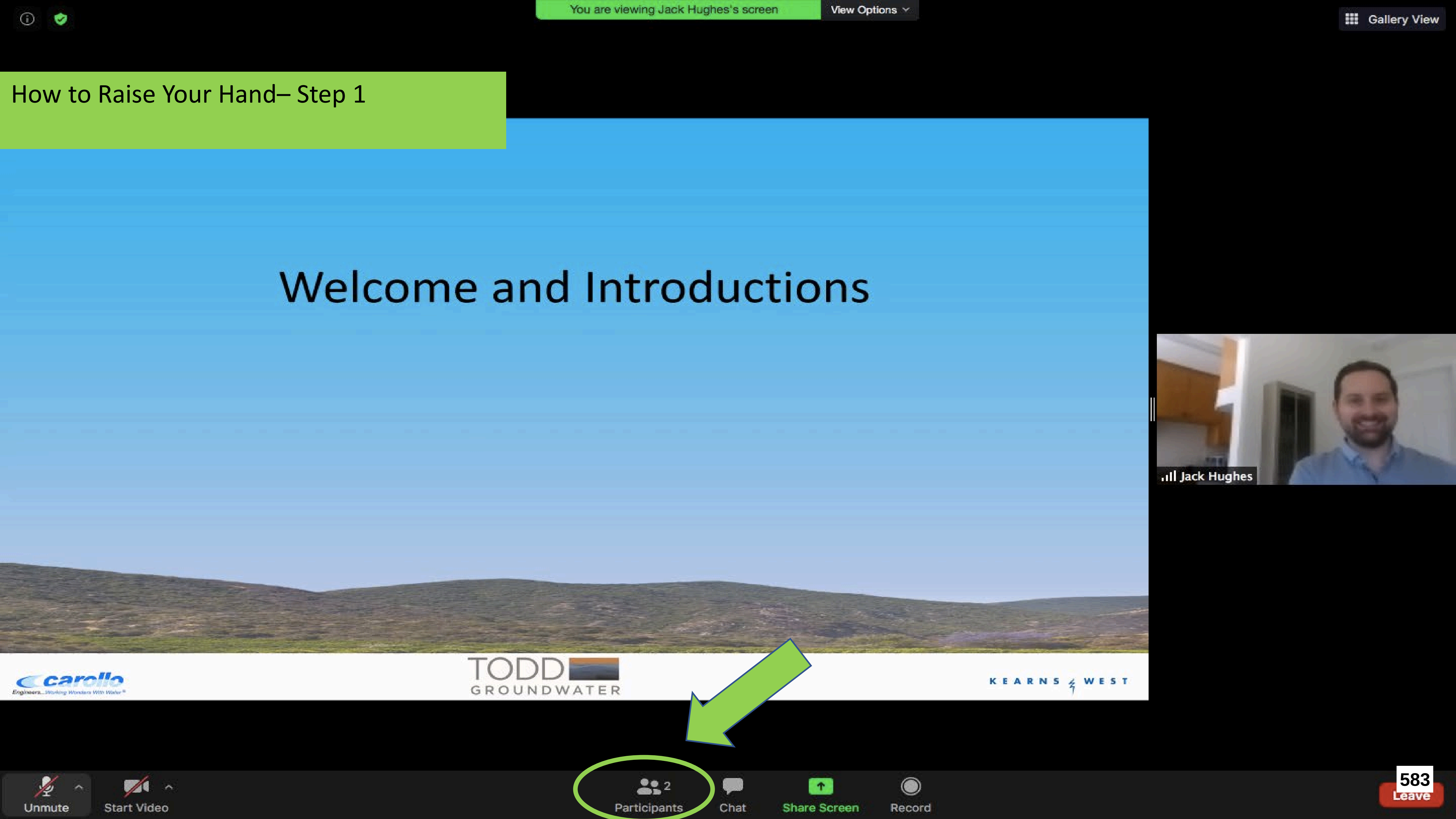
How to Rename Yourself – Step 1



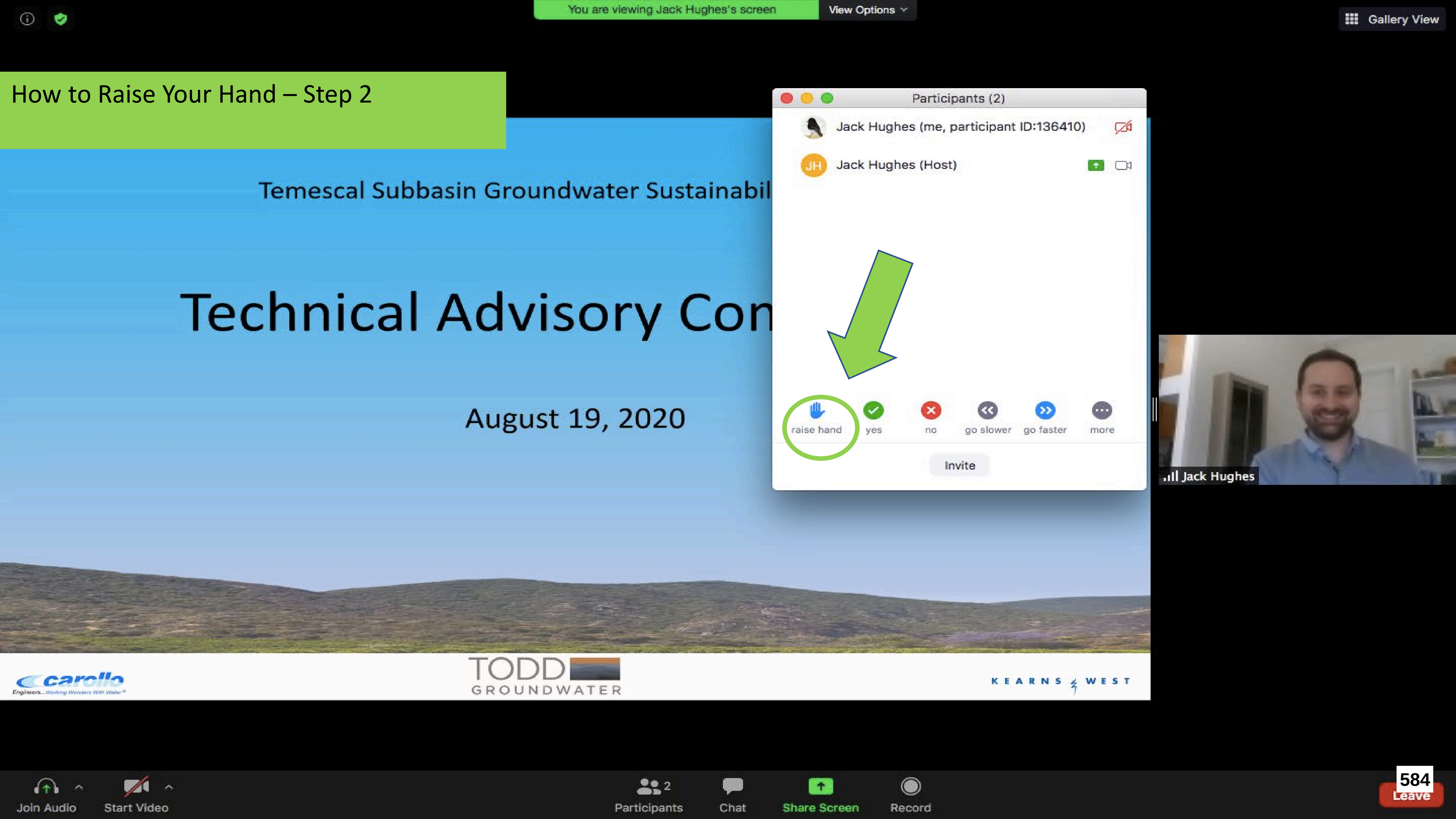
How to Rename Yourself – Step 2



How to Raise Your Hand– Step 1



How to Raise Your Hand – Step 2



Welcome and Introductions

Introductions

- Name
- Who you are representing
- What have you been pleasantly surprised by recently?

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TODD GROUNDWATER

KEARNS & WEST

Why the Temescal Groundwater Sustainability Agency Needs You

Tips for a Productive Discussion

- Let one person speak at a time
- Help make sure everyone gets equal time to give input
- Keep your input concise so others have time to participate
- Actively listen to others and seek to understand their perspectives
- Offer ideas to address questions and concerns raised by others

Overview of Meeting Agenda

Meeting Agenda

1. Welcome and Introductions
2. Overview of Meeting Agenda
3. Orientation to the Sustainable Groundwater Management Act
   - Sustainable Groundwater Management Act (SGMA) Overview
   - Temescal Subbasin GSA
   - Discussion/Q&A
4. Summary of GSP Workplan and Schedule
   - GSP Workplan and Schedule
   - Discussion/Q&A
5. Outreach and Involvement
   - Outreach and Stakeholder Involvement Plan
   - Focus on Disadvantaged Community Engagement
   - Website Overview
   - Fact Sheets
   - Public Workshop 1
   - Discussion/Q&A
6. Role of the Technical Advisory Committee
   - Technical Advisory Committee (TAC) formation and purpose
   - Draft TAC Protocols and Operating Principles and Confirmation
   - Discussion of TAC roles and responsibilities
7. Public Comment
8. Next Steps and Final Comments

Orientation to the Sustainable Groundwater Management Act

Sustainable Groundwater Management Act (SGMA)

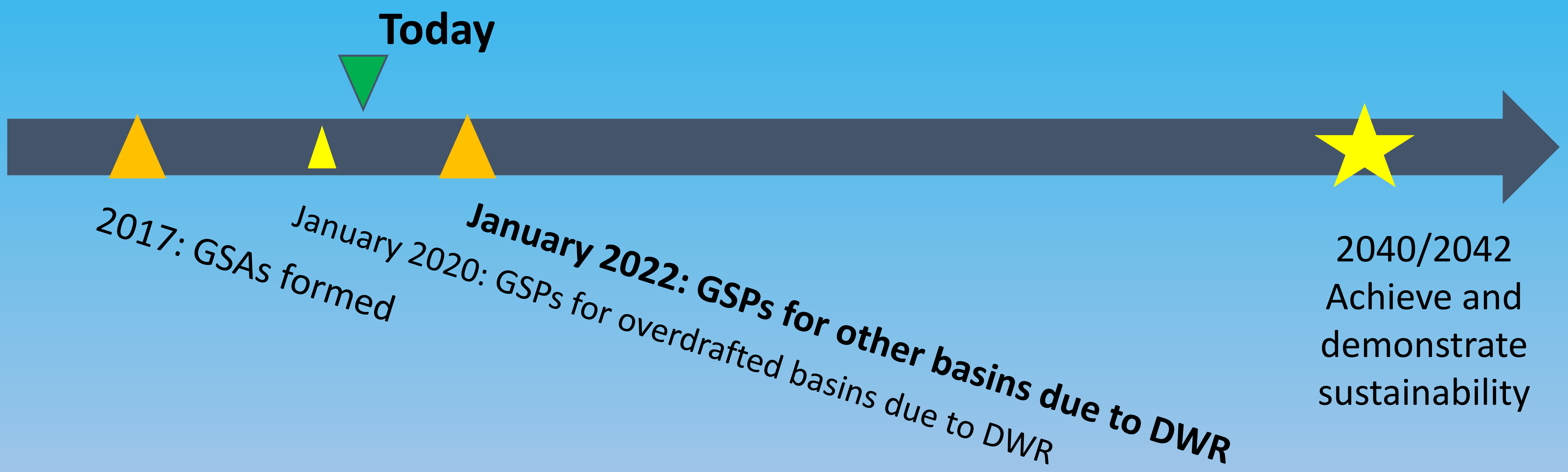
Landmark legislation signed into law in 2014

- Provides framework for sustainable groundwater management
- Purpose is to facilitate local management of groundwater
- State assistance, and intervention if necessary

Includes comprehensive requirements for:

- Forming groundwater sustainability agencies (GSA)
- Preparing groundwater sustainability plans (GSP)
- Meeting deadlines

SGMA has a required timeline



Achieving sustainable groundwater management

The BMPs and Guidance Documents inform various steps in the workflow toward increased sustainability.

These steps may be repeated or re-ordered as a basin approaches its sustainability goal.

Increased Sustainability

	BMPs	Guidance Documents
Monitoring	• *Monitoring Protocols, Standards, and Sites* • *Monitoring Networks and Identification of Data Gaps*	
Projects and Management Actions	*Use existing and/or develop new projects and management actions to achieve sustainability.* *Actions from existing programs may include, but are not limited to: GMPs. IRWMPs, UWMPs, WMPs, AWMPs*	
Planning	• *Modeling*	• *Establishing Sustainable Management Criteria** • *Preparation Checklist for GSP Submittal* • *GSP Annotated Outline*
Basin Setting	• *Hydrogeologic Conceptual Model* • *Water Budget*	
Outreach		• *Engagement with Tribal Governments** • *Stakeholder Engagement and Communication**

** In Development*

What is Sustainable Groundwater Management?

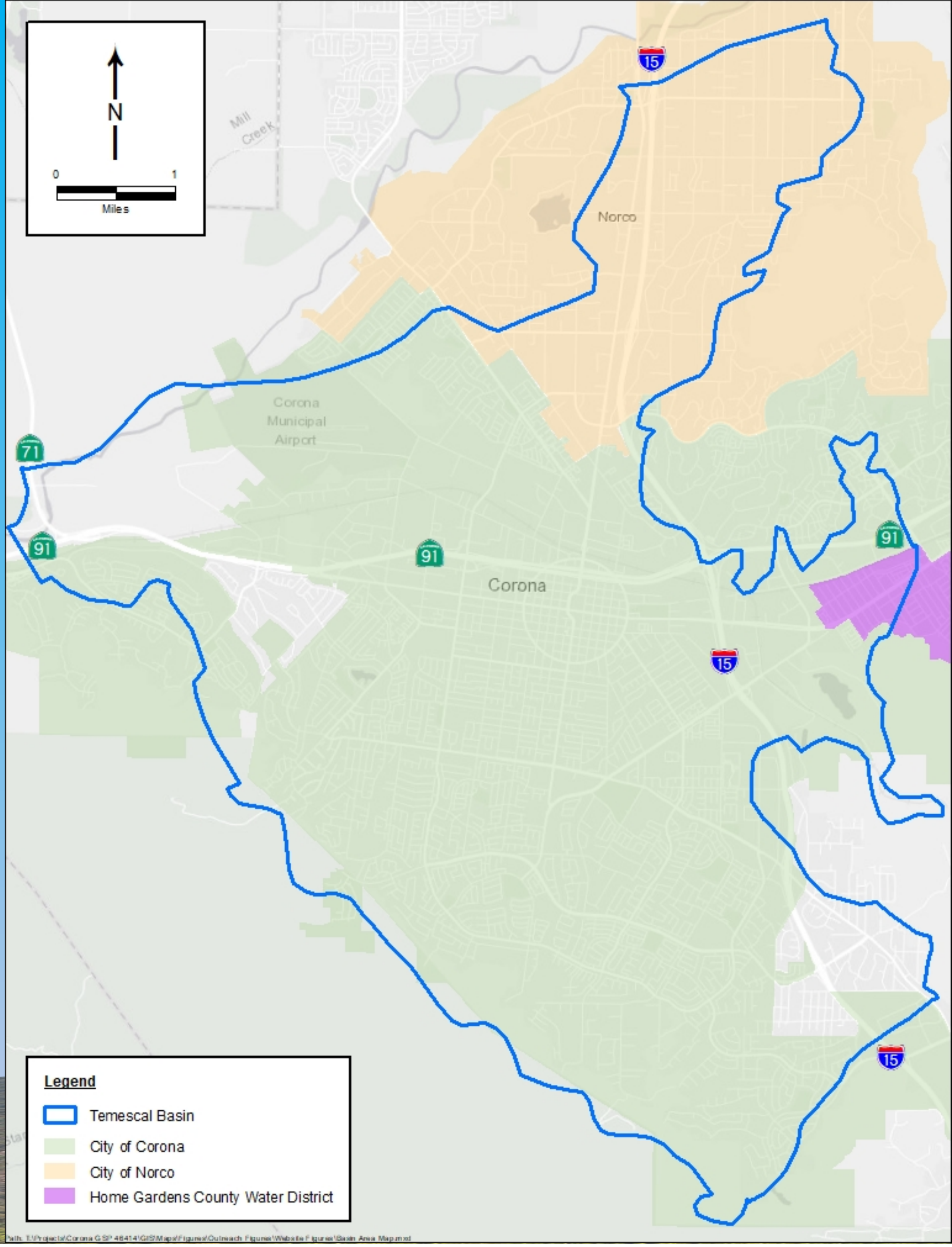
- The management and use of groundwater in a manner that can be maintained without causing undesirable results
- Evaluated with respect to specific Sustainability Indicators
- Locally defined

Sustainability Indicators

- Chronic lowering of groundwater levels
- Reduction of groundwater storage
- Degradation of water quality
- Depletions of interconnected surface water affecting beneficial uses
- Land subsidence affecting land uses
- Seawater intrusion (not applicable here)

The Temescal Basin

- DWR categorized as a Medium Priority Basin
- Contiguous and connected



Groundwater Sustainability Agency for the Temescal Basin

- Managed together historically
- Corona, Norco, and Home Gardens County Water District formed GSA led by Corona
- Allows for preparation of one, unified GSP

GSA Organization

City of Corona

City of Norco

Home Gardens County Water District

Department of Water and Power

Staff and Consultants
- Corona DWP Staff
- Todd Groundwater
- Carollo Engineers
- Kearns & West

Technical Advisory Committee
- Public agencies
- Local business community
- Well owners
- Community interests

Other agencies and interested parties

To Date, the Groundwater Sustainability Agency

- Awarded grant for GSP preparation
- Assembled GSP team
- Initiated technical work on GSP
- Created outreach plan
- Formed TAC
- Creating new SGMA section on DWP website

GRANT AGREEMENT BETWEEN THE STATE OF CALIFORNIA
(DEPARTMENT OF WATER RESOURCES) AND
CITY OF CORONA
AGREEMENT NUMBER 4600012652
2017 PROPOSITION 1 SUSTAINABLE GROUNDWATER PLANNING (SGWP) GRANT

THIS GRANT AGREEMENT is entered into by and between the Department of Water Resources of the State of California, herein referred to as the "State" or "DWR" and the City of Corona, a public agency in the State of California, duly organized, existing, and acting pursuant to the laws thereof, herein referred to as the "Grantee," which parties do hereby agree as follows:

1) PURPOSE. The State shall provide funding from the Water Quality, Supply, and Infrastructure Improvement Act of 2014 (Proposition 1) to assist the Grantee in financing the planning and/or selected project activities (Project) that will improve sustainable groundwater management, pursuant to Water Code Section 79700 et seq. The provision of State funds pursuant to this Agreement shall not be construed or interpreted to mean that the Groundwater Sustainability Plan (GSP), or any components of the GSP, implemented in accordance with the Work Plan as set forth in Exhibit A, will be: adopted by the applicable Groundwater Sustainability Agency (GSA); obtain the necessary desirable results of Sustainable Management Criteria; or, meet all of the evaluation and assessment criteria when submitted to the Department of Water Resources as required by the Sustainable Groundwater Management Act and implementing regulations.

2) TERM OF GRANT AGREEMENT. The term of this Grant Agreement begins on the date this Grant Agreement is executed by the State, through final payment plus three (3) years unless otherwise terminated or amended as provided in this Grant Agreement. However, all work shall be completed in accordance with the Schedule as set forth in Exhibit C.

3) GRANT AMOUNT. The maximum amount payable by the State under this Grant Agreement shall not exceed $732,338.

4) GRANTEE COST SHARE. The Grantee is required to provide a Local Cost Share (non-State funds) of not less than 50 percent of the Total Project Cost. The cost share requirement for projects benefiting a Severely Disadvantaged Community (SDAC), Disadvantaged Community (DAC), or an Economically Distressed Areas (EDA) may be waived or reduced. The Grantee agrees to provide a Local Cost Share (non-State funds) for the amount as documented in Exhibit B (Budget). Local Cost Share may include Eligible Project Costs directly related to Exhibit A incurred after January 1, 2015.

5) BASIC CONDITIONS. The State shall have no obligation to disburse money for a project under this Grant Agreement until the Grantee has satisfied the following conditions (if applicable):
   1. Prior to execution of this Grant Agreement, selected applicants (Groundwater Sustainability Agency) for GSP Development projects must submit evidence of a notification to the public and DWR prior to initiating development of a GSP in compliance with California Code of Regulations, title 23, Section 350 et seq. (GSP Regulations) and Water Code Section 10727.8.
   2. The Grantee must demonstrate compliance with all relevant eligibility criteria as set forth on pages 7 and 8 of the 2015 Grant Program Guidelines for the SGWP Grant Program.
   3. For the term of this Grant Agreement, the Grantee submits timely reports and all other deliverables as required by Paragraph 16, "Submission of Reports" and Exhibit A.

6) DISBURSEMENT OF FUNDS. The State will disburse to the Grantee the amount approved, subject to the availability of funds through normal State processes. Notwithstanding any other provision of this Grant Agreement, no disbursement shall be required at any time or in any manner which is in violation of, or in conflict with, federal or state laws, rules, or regulations, or which may require any rebates to the federal government, or any loss of tax-free status on state bonds, pursuant to any federal statute or regulation. Any and all money disbursed to the Grantee under this Grant Agreement shall be deposited in a non-interest bearing account and shall be used solely to pay Eligible Project Costs.

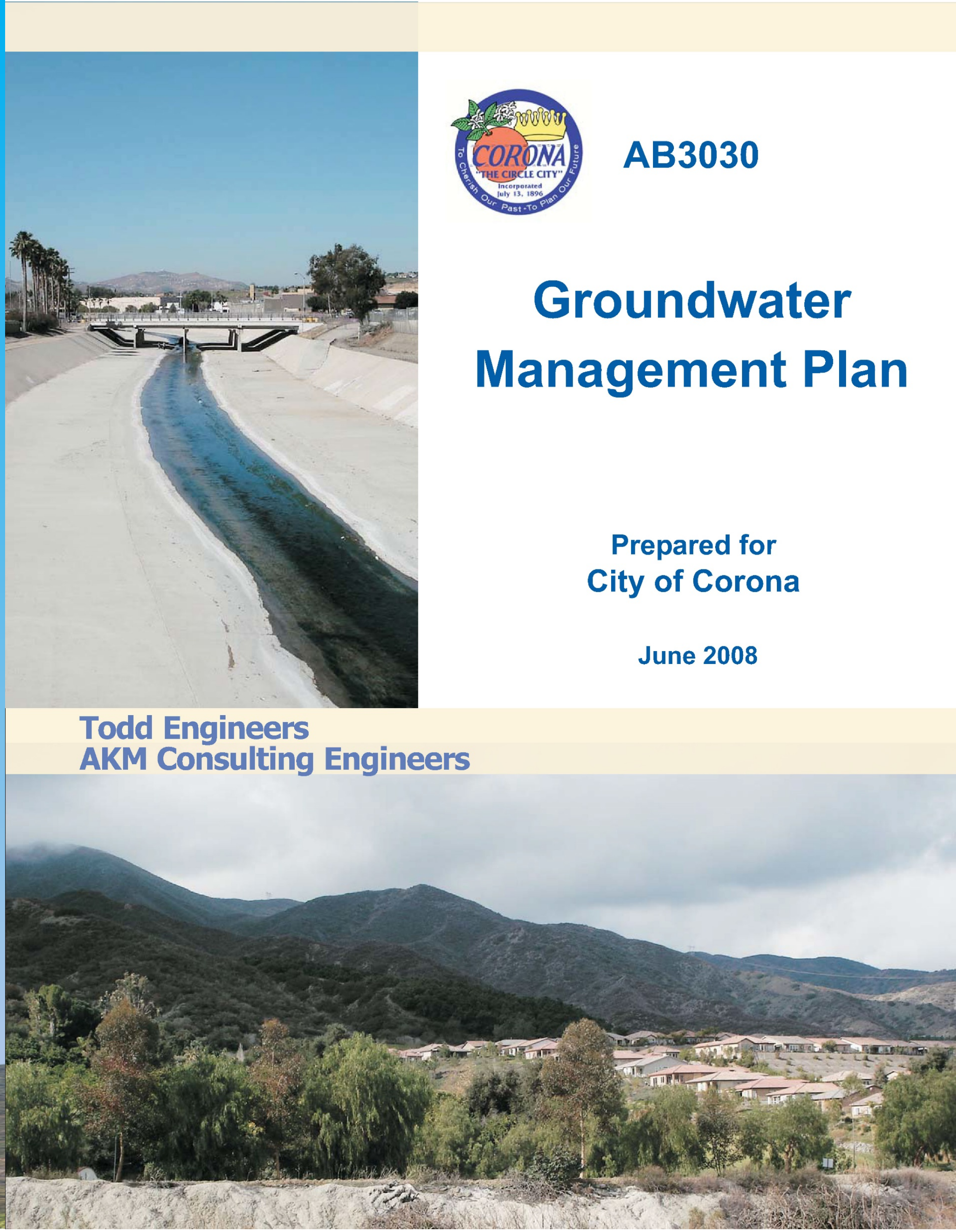
Discussion / Q&A

- What have you heard about groundwater and/or SGMA and what do you think are some important groundwater management issues?
- Are you aware of any data or studies we should review during GSP preparation?

Summary of GSP Workplan and Schedule

The GSP will Build on Existing Management

- Local groundwater
- Imported water
- Water recycling and water conservation
- Monitoring
- Collaboration with other local agencies
- Transition to SGMA requirements



Temescal GSP Overview

Plan Development

Identify and evaluate actions
Establish monitoring program

Management Actions, Projects, and Monitoring

Evaluate sustainability indicators
Define undesirable results
Establish minimum thresholds

Sustainability Goals and Criteria

Construct numerical groundwater model
Calculate water budgets and sustainable yield

Groundwater Model / Water Budgets

Evaluate hydrogeologic setting
Define groundwater conditions

Hydrogeologic Conceptual Model / GW Conditions

Plan Area / Institutional Setting

Data Compilation / Management System

Sustainability Indicator Requirements

- Groundwater elevation decline based on historical trends, water year type, and projected water use in the basin
- Sustainable yield, calculated based on historical trends, water year type, and projected water use in the basin
- Number of supply wells, volume of water, or location of an isocontour exceeding constituents of concern, considering state and federal standards
- Depletion that has adverse impacts on beneficial use of surface water supported by the location, quantity, and timing of depletions; assumes use of a numerical model.
- Rate and extent of subsidence that interferes with surface land use supported by identification of land/property interests affected or likely to be affected.

Considerations for Temescal

- Historic low levels? Consider beneficial uses of wells; problems during the recent drought? **– Must be water levels in representative wells.**
- Use Water Level criteria? Develop operational range of storage with an emergency supply? **– Related to water levels.**
- Title 22, basin plan objectives, GAMA, GeoTracker, SNMP? **– Should coordinate with existing regional programs.**
- Interconnected Surface Water and Groundwater Dependent Ecosystems (GDEs), Prado area? **– Modeling to identify potential undesirable results.**
- Subsidence does not currently interfere with land uses **– Can take advantage of statewide satellite estimates.**

GSP Schedule

- Plan Development
- Management Actions, Projects, and Monitoring
- Sustainability Goals and Criteria
- Groundwater Model / Water Budgets
- Hydrogeologic Conceptual Model / GW Conditions
- Plan Area / Institutional Setting
- Data Compilation / Management System

2021

2020

TAC Meetings and Workshops

TAC Meeting 4 – May 19, 2021

Draft GSP Presentation
(Q3 2021)

TAC Meeting 3 – February 17, 2021

Public Workshop 3
Management Actions (Q2 2021)

Public Workshop 2
Sustainability Criteria (Q1 2021)

TAC Meeting 2 – November 18, 2020

Public Workshop 1
Kickoff and Introduction to SGMA (Q3 2020)

TAC Meeting 1 – August 19, 2020

GSP Workplan and Schedule Discussion/Q&A

Questions?

Comments?

Outreach and Stakeholder Involvement

Outreach and Stakeholder Involvement Plan Purpose

- Provide a framework for integrating public and stakeholder outreach and involvement into GSP preparation.
- Meet SGMA requirements
  - GSAs must consider the interests of all beneficial uses and users of groundwater and provide opportunities for public engagement and active involvement of diverse social, cultural, and economic elements of the population.

Outreach and Stakeholder Involvement Plan Objectives

- ***Inform*** all stakeholders of the GSP development process, including purpose, opportunities and issues, core recommendations, and timeline.
- Provide ***meaningful opportunities*** for stakeholders and the public to learn, ask questions, and provide input.
- Involve the many ***diverse communities and stakeholders*** of Corona, Norco, and Home Gardens, recognizing that different approaches may be needed to reach specific populations like Disadvantaged Communities, and flexibility and adaptation in approach may be required.
- Ensure a ***transparent process*** where stakeholders and the public can understand what important discussions are taking place, how they can participate in them, and how input is being used.

Outreach and Stakeholder Involvement Plan

Stakeholder Categories

- Agriculture
- California Statewide Groundwater Elevation Monitoring Agencies
- Businesses and Development
- Disadvantaged Communities
- Domestic Well Owners
- Environmental and Conservation
- Extractive Industry
- Federal Government Agencies
- Groundwater Right Holders
- Industrial Well Operators
- Land Use Planning Agencies
- Local Water Districts
- Municipal Well Operators
- Private Water Users
- Regulatory Agencies
- Surface Water Users

Outreach and Stakeholder Involvement Plan

Temescal Subbasin GSP Outreach and Stakeholder Involvement Process

	Step 1 Launch Project Summer 2020	Step 2 Conduct Baseline Studies Summer and Fall 2020	Step 3 Build Water Budget and Numerical Model Fall and Winter 2020	Step 4 Define Sustainability Goal and Criteria Winter 2021	Step 5 Prepare Draft GSP Spring 2021	Step 6 Review Draft GSP and Adopt Final GSP Summer – Winter 2021
Stakeholder and Public Dialogue Focus	Announce project launch.	Provide info on project purpose and methodology, and role of stakeholder involvement.	Share information regarding Step 2 activities and gather feedback on water budget and modeling, and sustainability criteria.	Review draft sustainability criteria and gather feedback on management actions.	Gather feedback on draft management actions and inform about implementation and monitoring.	Comments on Draft GSP Final GSP Submittal to DWR

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Outreach and Stakeholder Involvement Plan Activities

- Pre-Workshop Outreach
- Public Workshops
- Technical Advisory Committee Meetings
- City Council and Board of Directors Meeting Presentations
- Public Comment Period

Temescal Subbasin GSP Outreach and Stakeholder Involvement Process

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City Website Page and Social Media						
Stakeholder and Public Involvement	Community Leader/ Organization Interviews Stakeholder Identification Outreach and Stakeholder Involvement Communications Plan	TAC Meeting #1 Updates at City Council/Board Meetings Pre-Workshop Outreach Round 1 Public Workshop #1 Kickoff Meeting	TAC Meeting #2 Updates at City Council/Board Meetings	TAC Meeting #3 Updates at City Council/Board Meetings Pre-Workshop Outreach Round 2 Public Workshop #2	TAC Meeting #4 Updates at City Council/Board Meetings Pre-Workshop Outreach Round 3 Public Workshop #3	Pre-Workshop Outreach Round Public Workshop #4 Public notice of process and availability of review draft. 90 Day Comment Period & Adoption

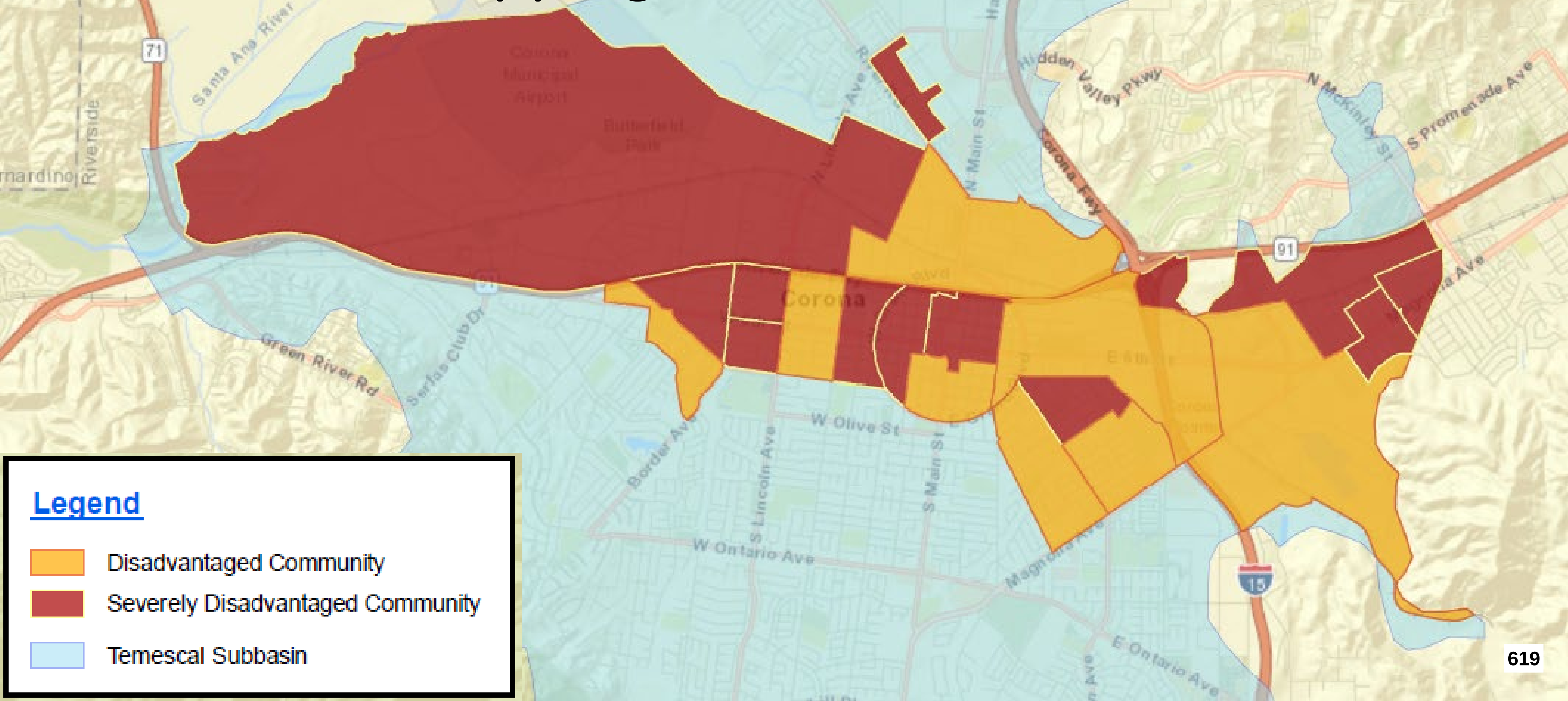
Focus on Underrepresented Community Engagement

Underrepresented Community Engagement Definition

Underrepresented Communities are:

- Disadvantaged Communities characterized by an annual median household income less than 80% of the California statewide median household income.
- Severely Disadvantaged Communities are characterized by an annual median household income less than 60% of the California statewide median household income.

Disadvantaged Communities in Project Area Per DWR Mapping Tool



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Website

CITY OF CORONA THE CIRCLE CITY

DEPARTMENT OF WATER & POWER

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    - Community Involvement
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    - Comment Form

Government » Departments/Divisions » Department of Water and Power » About DWP

SUSTAINABLE GROUNDWATER MANAGEMENT

Font Size: Share & Bookmark Feedback Print

For many decades, the City of Corona (Corona), City of Norco (Norco), and Home Gardens County Water District (HGCWD) have been steadfast stewards of groundwater resources in the Temescal Groundwater Subbasin, actively managing groundwater to protect water quality and maintain a reliable and sustainable water supply. For Corona, Norco, HGCWD, and other water agencies, it's getting more and more difficult to ensure long-term groundwater sustainability, with climate variability, growth in urban water use, availability and cost of imported water, and other factors.

To assist water agencies like Corona, Norco, and HGCWD in meeting these significant groundwater challenges, the state-wide Sustainable Groundwater Management Act was passed in 2014. This law outlines new requirements and tools for ensuring the long-term sustainability of these critical sources of water supply.

Updates

Agendas and presentations from previous meetings and workshops can be found on the Community Involvement webpage.

Learn more!

Click on a heading to expand and learn more!

About Groundwater & Our Basin

About the SGMA

Fact Sheet

TEMESCAL GSA

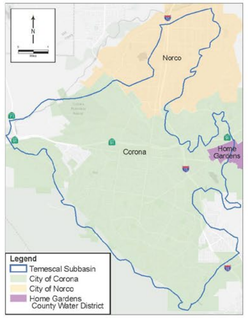
GROUNDWATER FOR PEOPLE, THE ENVIRONMENT, AND THE FUTURE

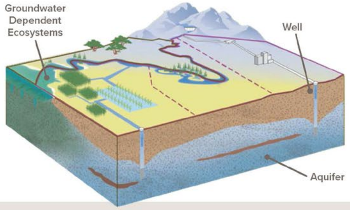
GET INVOLVED! Community input is needed! We want your help to create an effective plan for the future of our groundwater. Visit **CoronaCA.gov/Groundwater** or send an email to **Groundwater@CoronaCA.gov** to attend a workshop or learn more!

THE WATER BENEATH YOUR FEET AND IN YOUR FAUCET

You may not know it, but if you live in Corona, Norco, or Home Gardens, you are likely using groundwater that comes from the **Temescal Basin**. Groundwater from the Temescal Basin and other local groundwater basins, along with water purchased from other areas, is treated and blended together. It then arrives as tap water at your home or business.

The groundwater beneath your feet is an important local resource that will be even more important in the future. On the other side of this factsheet, you can learn more about who manages groundwater in the Temescal Basin and how you can get involved in protecting local groundwater for your community and all who depend on it.





WHAT IS GROUNDWATER?

Groundwater is an important source of water stored in the earth beneath our feet, in spaces between sand, soils, and fractured rock known as an **aquifer**. The areas of the most productive aquifers in California have been defined as **groundwater basins**, which can extend for many miles. The Temescal Basin covers nearly 66 square miles.

WHO USES GROUNDWATER?

Groundwater from aquifers is drawn out by pumps. Cities and water districts pump groundwater from **wells** to supply to businesses and homes. People in rural areas may have their own wells for personal use and/or to water crops. Groundwater also has many uses in manufacturing and industry. It can be used to process, wash, cool, or transport a product.

Groundwater is important to the environment, it flows to and from wetlands, springs, creeks, lakes, and other bodies of water. The plants and animals that live near or in these bodies of water sometimes depend on it for their survival. These areas are called **Groundwater Dependent Ecosystems**.

Home Gardens County Water District

TEMESCAL GROUNDWATER SUSTAINABILITY PLAN

TEMESCAL GSA

GROUNDWATER FOR PEOPLE, THE ENVIRONMENT, AND THE FUTURE

GROUNDWATER MANAGEMENT

For many decades, the City of Corona, City of Norco, and Home Gardens County Water District have carefully managed groundwater in the Temescal Basin. They have made sure that there is enough clean and drinkable water for the communities that need it. This has become more of a challenge due to changes in climate, the cost of importing water, and the fact that more water is needed because communities are growing. To help all stewards of groundwater plan for these changes, the state-wide **Sustainable Groundwater Management Act** was passed in 2014.

The Sustainable Groundwater Management Act or "SGMA" is a California law that gives local agencies new tools for managing groundwater and planning for the future. The City of Corona, City of Norco, and Home Gardens County Water District have formed the Temescal Subbasin Groundwater Sustainability Agency (Temescal GSA) in order to make a **Groundwater Sustainability Plan** for the Temescal Basin. Since groundwater is such an important resource for everyone, we need your help!

GROUNDWATER FOR THE FUTURE

Important factors for groundwater basin management can be seen on the right. By creating a Groundwater Sustainability Plan, we will better manage the groundwater in the Temescal Basin and ensure we have enough for current and future generations. We will seek understanding of past groundwater use and plan for the sustainable use of future groundwater. Whether you own your own well, use water from the tap, irrigate your crops, or pump groundwater for your business, **everyone can participate in making this plan a success!** We want to hear your questions, ideas, and concerns about protecting our groundwater supply and quality in the Temescal Basin. To find out how, please visit the website at CoronaCA.gov/Groundwater.

To learn more about the TEMESCAL GROUNDWATER SUSTAINABILITY PLAN, including dates of public workshops and other ways to get involved:

- Please visit **CoronaCA.gov/Groundwater**
- Send an email to **Groundwater@CoronaCA.gov**

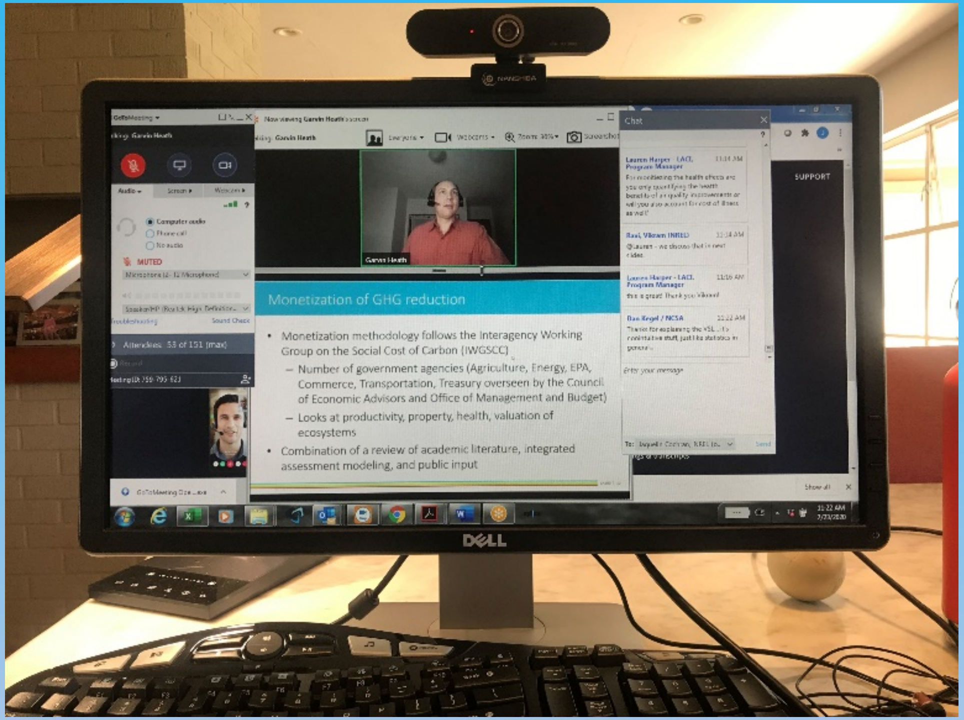
Home Gardens County Water District

TEMESCAL GROUNDWATER SUSTAINABILITY PLAN

Public Workshop 1

- The first Public Workshop is tentatively scheduled for September 29th
- Focus
  - Introduction to SGMA and GSPs, the Temescal Basin, planning process, and resources

Public Workshop 1 . . . Virtual + Inclusive



Creative and innovative tools will be employed to accomplish workshop objectives

Discussion / Q&A

- How can we reach more of your community or constituents/other stakeholders and the public in our pre-workshop outreach?
- How might you be able to help us spread awareness of the first public meeting?

Role of the Technical Advisory Committee

TAC Protocols and Operating Principles

Introduction

Charge

Roles and Responsibilities

Participation and Collaboration Principles

Membership

Request for No Use of Alternatives

Term of Service

Meeting Logistics and Communication

Communication and Media

Open Meetings

Point of Contact

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Term of Service

Meeting Logistics and Communication

Communication and Media

Open Meetings

Point of Contact

TAC Protocols and Operating Principles

Introduction

Charge

Roles and Responsibilities

Participation and Collaboration Principles

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Technical Advisory Committee Contact

Melissa Estrada-Maravilla

Email: Melissa.Estrada-Maravilla@CoronaCA.gov

Phone: 951.736.2479

Discussion of TAC Roles and Responsibilities and Confirmation

Questions?

Comments?

Protocols and Operating Principles Confirmation

Public Comment

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Next Steps and Final Comments

Next Steps

- Continue Technical Analyses
  - Prepare internal draft Hydrogeologic Conceptual Model and Groundwater Conditions chapters of the GSP
  - Continue numerical model and water budget analysis
- Provide Administrative Draft Plan Area chapter of the GSP to TAC today, with all ***comments back by September 4th***.
- Prepare for and hold Public Workshop 1 (September 29th)
- Next TAC meeting November 18, 2020
  - Update on technical analyses
  - Conceptual sustainability criteria discussion

Thank You!

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Technical Advisory Committee Meeting 2

Meeting Summary

Wednesday, November 18, 2020
1:00 p.m. – 3:00 p.m.
Location: Zoom Virtual Meeting

Attendees

Technical Advisory Committee Members

- Ava Moussavi, Riverside County Flood Control and Water Conservation District
- Chad Blais, City of Norco Public Works Department
- Eric Lindberg, California Regional Water Quality Control Board – Santa Ana Region
- Jacque Casillas, Vice Mayor, City of Corona
- Katie Hockett, City of Corona Department of Water and Power
- Timothy Ballon, All American Asphalt
- Tom Moody, City of Corona Department of Water and Power
- Wes Speake, Councilmember, City of Corona

City of Corona Department of Water and Power Staff

- Kristian Alfelor
- Melissa Estrada-Maravilla

Consultant Team

- Chad Taylor, Todd Groundwater
- Maureen Reilly, Todd Groundwater
- Alyson Scurlock, Kearns & West
- Jack Hughes, Kearns & West
- Joan Isaacson, Kearns & West

Summary

1. Welcome and Introductions

Joan Isaacson, meeting facilitator from Kearns & West, welcomed all to the second Technical Advisory Committee (TAC) meeting for the Temescal Basin Groundwater Sustainability Plan (Temescal GSP). The meeting took place online, via ZOOM, hosted by the Temescal Basin Groundwater Sustainability Agency (Temescal GSA). Isaacson led roundtable introductions for TAC members and the consultants assisting the Temescal GSA with meeting facilitation and preparation of the Temescal GSP.

2. Overview of Meeting Agenda

Isaacson reviewed the meeting agenda (see Appendix A). The focus of the meeting was on providing an overview of Public Workshop 1, reviewing Draft Temescal GSP chapters, and then reviewing and getting input from the TAC on beneficial uses, the Draft Temescal GSP Sustainability Goal, and Conceptual Sustainability Criteria.

3. Public Workshop 1

Jack Hughes, Kearns & West, recapped the attendance and engagement from the first public workshop on September 29, 2020 held from 4:00 to 5:30 p.m. The workshop was held virtually via the Zoom platform, individuals also had the option to view and participate from the City of Corona Council Chambers. The workshop was streamed on the City of Corona's website, Facebook, and YouTube channels and on Corona TV, viewable on Channel 29 on Time Warner Spectrum and Channel 99 on AT&T. There were 13 participants on Zoom representing water districts, non-profits, and residents of the City of Norco and Riverside County. There were 452 Facebook engagements, which includes comments, likes, clicks, and shares, and 23 YouTube views as of November 6, 2020.

Hughes then described the input and feedback that was heard during and after the first public workshop. Participants asked questions about water quality early in the workshop when the project team was discussing water supply and groundwater basics. Later comments focused on coordination with stakeholders in neighboring basins when the project team was discussing the Temescal Basin and GSP development. Hughes noted that meetings with representatives from each neighboring basin are currently being set up to establish this coordination. Additional feedback was received in two post-workshop feedback forms regarding outreach and involvement. One participant suggested sending out questions or topics for discussion ahead of the workshops and another participant volunteered to make workshop announcements at pertinent Santa Ana Watershed Project Authority meetings. The next public workshop will take place in Spring 2021 and will focus on sustainability criteria. For more information, see Appendix B.

Discussion/Q&A

There were no questions or comments from the TAC members for this agenda item.

4. Draft Groundwater Sustainability Plan Chapters

Chad Taylor, Senior Hydrogeologist at Todd Groundwater, presented on the Draft Hydrogeologic Conceptual Model and Groundwater Conditions Chapters that were distributed to TAC members on November 17, 2020. Taylor provided an overview of the Temescal Basin, noting that it is a contiguous and connected basin that is categorized as medium-priority by the Department of Water Resources. The Draft Hydrogeologic Conceptual Model Chapter establishes the physical framework of the basin while the Draft Groundwater Conditions Chapter documents the historical and current status of the basin. Future analyses will include the water budget, which will quantify inflows, outflows, and storage change in the Temescal Basin, and the numerical model, which will evaluate sustainability criteria, monitoring, and project and management actions.

Taylor reviewed highlights of the Draft Hydrogeologic Conceptual Model Chapter. The Temescal Basin is primarily comprised of young unconsolidated deposits and is surrounded by older bedrock on most of the western and eastern boundaries. In addition, faulting affects groundwater in much of the Temescal Basin, especially on the western side. Taylor displayed three cross section orientations that help illustrate subsurface conditions in the Temescal Basin, noting that only one cross section would be the focus in the presentation. Taylor showed Cross Section A to A' and described the aquifers in the Basin. The Channel Aquifer has been identified as the principal aquifer used for groundwater production in the Temescal Basin. There are also two secondary aquifers in the Basin; they have historically been less productive alluvial and sandstone aquifers. Taylor noted that the most productive wells in the Temescal Basin, measured by hydraulic conductivity, are in the Channel Aquifer. The basin thickness, or depth to the bottom of the basin, varies and is deepest in the southwest portion of the Channel Aquifer.

Taylor next reviewed highlights of the Draft Groundwater Conditions Chapter. Groundwater flows consistently towards the northwestern portion of the Temescal Basin and towards the western portion in the Prado area. The Draft Groundwater Conditions Chapter also includes historical groundwater elevation conditions and trends. Taylor showed an example of a hydrograph and described basin-wide trends seen in wells. The highest water levels in most wells were measured in the early 1980s and the lowest water levels are generally present in periods of dry conditions and increased pumping. Taylor noted that current water levels are near record lows.

For water quality, the primary constituents of concern in the Temescal Basin are total dissolved solids and nitrate. Total dissolved solids were found to be highest in the productive portion of the Temescal Basin and nitrate was also found to be high in some areas, both of which will be considered for future management. The Temescal Basin has areas of interconnected surface water in addition to areas where groundwater dependent ecosystems will need to be addressed. Taylor described subsidence as vertical displacement of ground surface, which has been estimated from satellite measurements and noted that there is no evidence of subsidence in the Temescal Basin. Taylor also noted that monitoring of subsidence will continue to ensure there are no changes in the future. For more information on the Draft Hydrogeologic Conceptual Model and Groundwater Conditions Chapters, see Appendix B.

Discussion/Q&A

The team opened the floor for questions and discussion. Discussions, comments, and questions are summarized below.

- Can you provide more detail on the depth of bedrock estimates, how many wells there are, and what interpolation method was used?
- The water quality map shows wells with differing water quality clustered together. What would drive the difference in water quality in the same aquifer? It would be helpful to state that the wells are at different depths.

5. Input on Beneficial Uses

Taylor presented the preliminary list below of known beneficial uses in the Temescal Basin and asked for TAC members' input on additional beneficial uses to include in the Temescal GSP.

- Municipal water supply
- Industrial water supply
- Rural residential water supply
- Small community water system supply
- Small commercial water supply
- Groundwater dependent ecosystems in Temescal Wash and Prado

Discussion and feedback from TAC members on beneficial uses included these comments:

- Cemetery landscaping uses groundwater.
- Industrial water supply includes mining as wash water is used for operations.

- Mining operations use water for processing and dust control in the area.
- It is important to understand the balance between local and imported resources in municipal water supply.
- Scattered residents have their own wells.
- Dust control for development could be included in municipal water supply and rural residential water supply.
- It would be interesting to find out if there are agricultural users in the Temescal Basin.
- There are recreational water uses where groundwater and surface water interface. One known recreational use is a ski club in the Temescal Canyon Lake.

6. Draft Sustainability Goal and Conceptual Sustainability Criteria

Taylor presented the Draft Sustainability Goal for TAC members' feedback. The goal is tailored to the local meaning of sustainability and is the starting point for defining sustainability in the Temescal GSP. The following Draft Sustainability Goal was presented:

To sustain groundwater resources for the current and future beneficial uses of the Temescal Basin in a manner that is adaptive and responsive to the following objectives:

- Provide a long-term, reliable, and efficient groundwater supply for municipal, industrial, and other uses;
- Provide reliable storage for water supply resilience during droughts and shortages;
- Protect groundwater quality;
- Support beneficial uses of interconnected surface waters; and
- Support integrated and cooperative water resource management.

Taylor explained the sustainability criteria required for evaluation according to the Sustainable Groundwater Management Act. The six sustainability indicators include chronic lowering of groundwater levels, reduction of groundwater storage, degradation of water quality, depletions of interconnected surface water affecting beneficial uses, land subsidence affecting land uses, and seawater intrusion (not applicable in the Temescal Basin). Taylor explained undesirable results, minimum thresholds, and measurable objectives. Undesirable results are significant and unreasonable conditions for any of the six sustainability indicators whereas minimum thresholds are numeric values used to define undesirable results. Measurable objectives are specific, quantifiable goals used to track the performance of sustainable management.

Taylor reviewed the six sustainability indicators and gave examples of undesirable results for each of them. He noted that subsidence, or the lowering of the ground surface due to the collapse of subsurface materials, is not a known issue in the Temescal Basin. Potential for undesirable results include reductions in drainage capacity, impacts on the grade of facilities, subsidence around a wellhead, and non-recoverable loss of storage capacity in the aquifers. The interconnected surface water indicator analyzes the relationship between water levels in a stream and groundwater for stream flow. When groundwater is higher, interconnected surface water flows from the groundwater to the stream.

The next indicator, groundwater storage, is directly connected to water levels, therefore this indicator can use water levels to establish minimum thresholds and measurable objectives to ensure that there is enough water to meet the needs of beneficial uses and users. The groundwater levels indicator will consider what undesirable effects should be avoided in the Temescal Basin, such as impacts to shallow wells and maintenance of municipal and industrial water supply. Lastly, the water quality indicator will establish a numeric value to define significant and unreasonable degraded water quality throughout the Temescal Basin. Taylor noted that local, state, and federal water quality standards should be considered. See Appendix B for more information on the Draft Sustainability Goal and sustainability criteria.

Discussion/Input

The team asked for feedback on the Draft Sustainability Goal.

- The Draft Sustainability Goal and criteria look good.
- Groundwater recharge should be factored into redevelopment. New development should have landscapes that collect water to help create sustainable water storage. Basins should have their supply refreshed by rain and runoff. This can be accomplished in part by incorporating new parking lot designs and directing runoff differently to a landscaped area that can naturally filter water and allow it to percolate into the ground. There should be a target for quantifying recharge. Some of these stormwater capture elements are included in the City of Corona's General Plan Update.

The team posed the following questions for discussion: 1) Are you aware of undesirable results that have occurred in the past? 2) Are there specific undesirable results you are concerned about?

- Nitrate levels in basin groundwater have been rising recently and total dissolved solid levels might be dropping.
- Trichloropropane (TCP) and Per- and polyfluoroalkyl substances (PFAS) are contaminants of concern that have had undesirable results for the Temescal Basin. TCP and PFAS, along with total dissolved solids and nitrate, could potentially impact groundwater use.
- The more refined analytical technologies become, the more contaminants are found at smaller concentrations. There are contaminants that may exist in the water that are not currently known, and they may create future issues that we are not yet aware of. There should be some acknowledgement that unregulated contaminants today may be regulated in the future. The allowable limit for PFAS has changed drastically since it first started being regulated.
- PFAS and other contaminants are concerning for future groundwater uses. Groundwater will not be a sustainable water source if contaminants make it unusable.
- There has been pressure at the state level for regulating PFAS and it would be proactive to get ahead of the issue.

7. Public Comment

No members of the public provided comment.

8. Next Steps and Wrap Up

Isaacson summarized next steps for the consultant team and TAC members. The consultant team will prepare an internal draft of the Water Budget Chapter and continue conducting the numerical model analysis and developing the sustainability criteria. The consultant team distributed the Draft Hydrogeologic Conceptual Model and Groundwater Conditions Chapters to the TAC on November 17, 2020 and asked members to provide comments by December 4, 2020. Additional next steps are preparing for the upcoming public workshop, which will be held in Spring 2021 and the next TAC meeting on February 17, 2021.

Discussion/Q&A

There were no questions or comments from the TAC members for this agenda item.

Appendix A

Meeting Agenda

Temescal GSP

Technical Advisory Committee Meeting 2

November 18, 2020

1:00 – 3:00 p.m.
Zoom Meeting: https://zoom.us/j/97160500385

Agenda

1) Welcome and Introductions
2) Overview of Meeting Agenda
3) Public Workshop 1
   - Attendance and Engagement
   - Input and Feedback
   - Timeline and Focus for Public Workshop 2
   - Discussion/Q&A
4) Draft GSP Chapters
   - Hydrogeologic Conceptual Model
   - Groundwater Conditions
   - Discussion/Q&A
5) Input on Beneficial Uses
6) Draft Sustainability Goal and Conceptual Sustainability Criteria
   - Purpose of Sustainability Goal
   - Draft Goal, Presentation
   - Definition of Undesirable Results, Minimum Thresholds, and Measurable Objectives
   - Discussion of Draft Goal and Conceptual Undesirable Results for Consideration for Sustainability Indicators
7) Public Comment
8) Next Steps and Wrap Up

Appendix B

Presentation Slides


Temescal Groundwater Sustainability Agency
Technical Advisory Committee
November 18, 2020
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Welcome and Introductions
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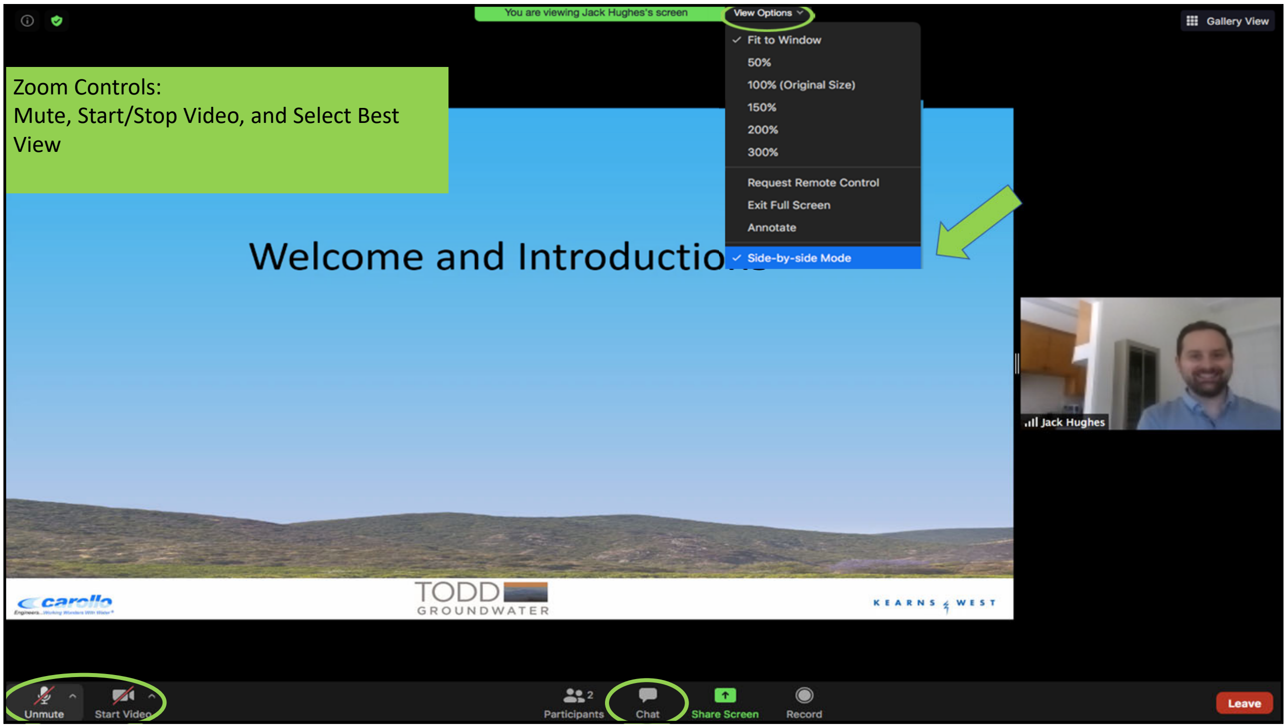

Tips for a Productive Discussion

- Let one person speak at a time
- Help make sure everyone gets equal time to give input
- Keep your input concise so others have time to participate
- Actively listen to others and seek to understand their perspectives
- Offer ideas to address questions and concerns raised by others

Overview of Meeting Agenda

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Meeting Agenda

1. Welcome and Introductions
2. Overview of Meeting Agenda
3. Public Workshop 1
4. Draft GSP Chapters
5. Input on Beneficial Uses
6. Draft Sustainability Goal and Conceptual Sustainability Criteria
7. Public Comment
8. Next Steps and Final Comments

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Public Workshop 1

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Public Workshop 1
Attendance and Engagement

- 13 Participants on Zoom
- 452 Facebook Engagements
- 23 YouTube Views (as of 11/6)

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Public Workshop 1 - Input and Feedback

Questions:

- Why might water taste bad?
- How is water cleaned?
- Why does water taste different in different areas?

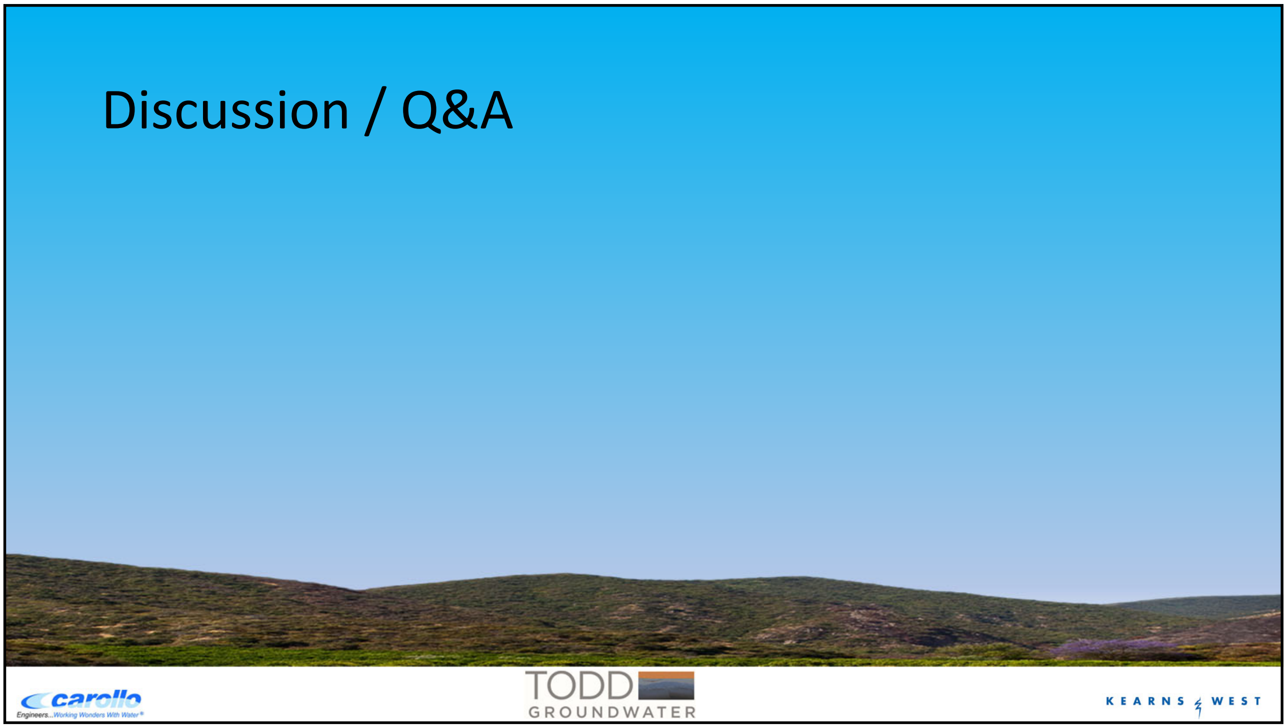
Comments:

- Coordination with Chino, Riverside-Arlington, and Orange County Water District important
- Wetland behind Prado Dam has interconnected surface water and groundwater dependent ecosystems

Feedback on outreach and involvement:

- Send out questions or topics for discussion ahead of the workshops
- Make announcements at pertinent Santa Ana Watershed Project Authority task forces
- Good use of background slides, good presenters, and keeping things concise

Public Workshop 2


Discussion / Q&A
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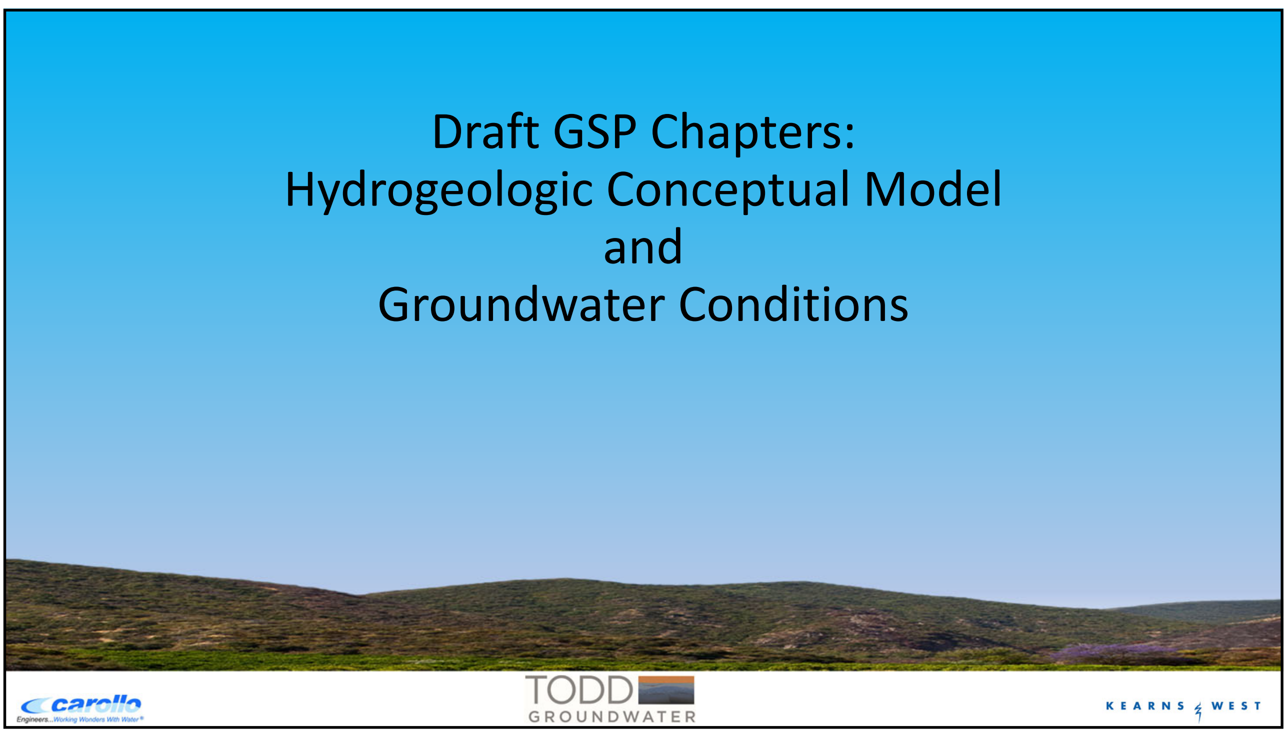
Draft GSP Chapters:
Hydrogeologic Conceptual Model
and
Groundwater Conditions
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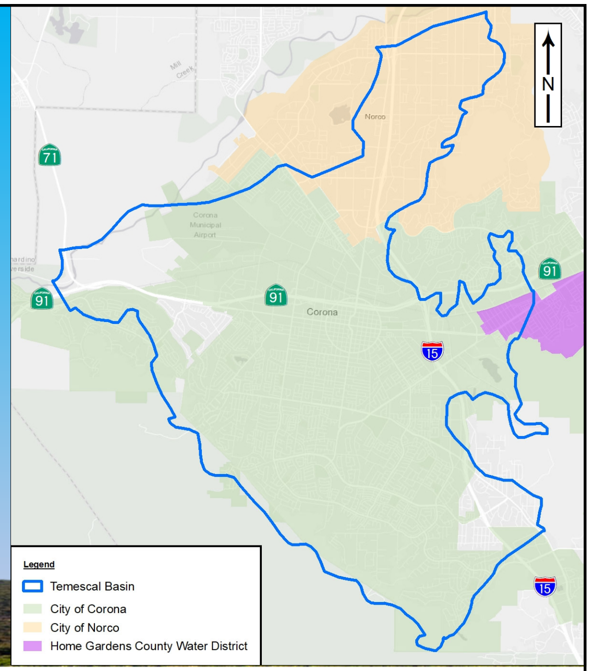
The Temescal Basin

- DWR categorized as a Medium Priority Basin
- Contiguous and connected



Where are we now in GSP process?

- HCM establishes physical framework of the groundwater basin
- GW Conditions chapter documents historical and current status
- Water Budget will quantify inflows, outflows and storage change
- Numerical Model will support understanding of how the groundwater system works and provide the key analytical tool to evaluate:
  - Sustainability Criteria
  - Monitoring
  - Projects and management actions

Hydrogeologic Conceptual Model Highlights

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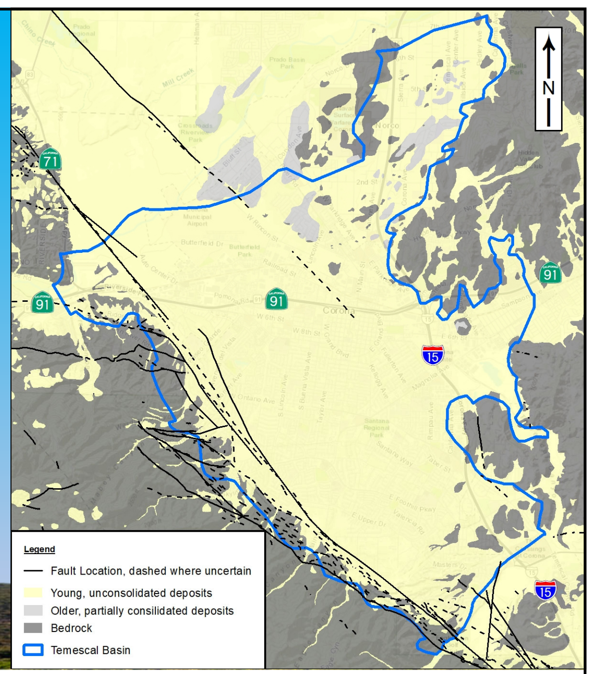
Surficial Geology

- Temescal Basin is primarily young unconsolidated deposits
- Older bedrock surrounds the Basin on the west and much of the east
- Faulting affects groundwater in much of the Basin



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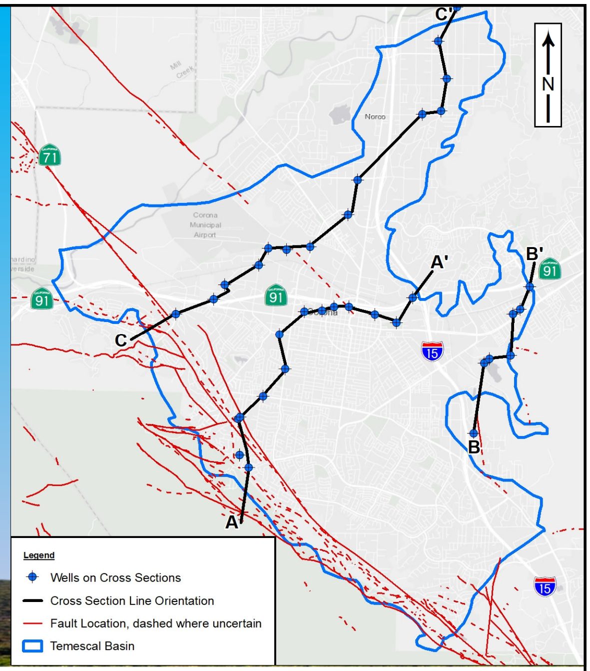
Cross Sections

- Three cross sections
- Illustrate subsurface conditions
- Relationship between aquifers in the Temescal Basin



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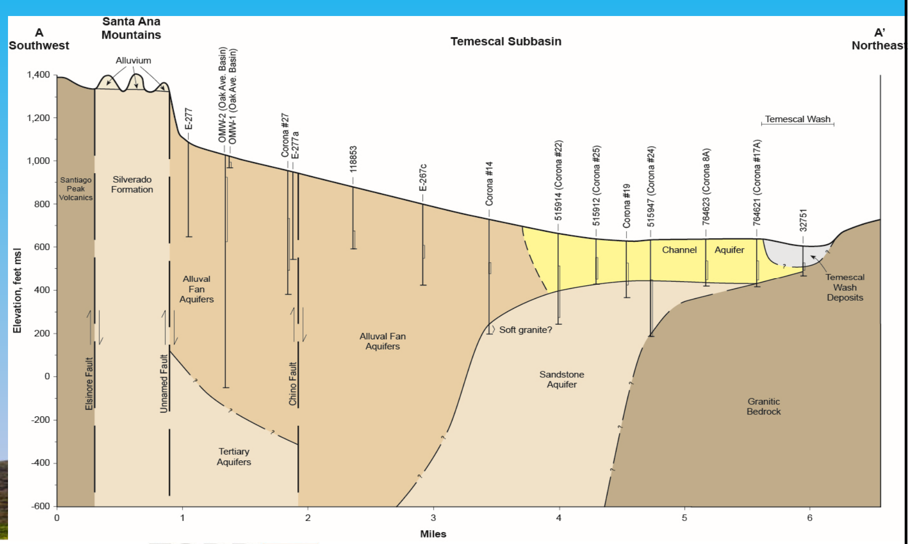
Cross Section A

- Channel Aquifer is the principal aquifer
- Alluvial and Sandstone aquifers secondary



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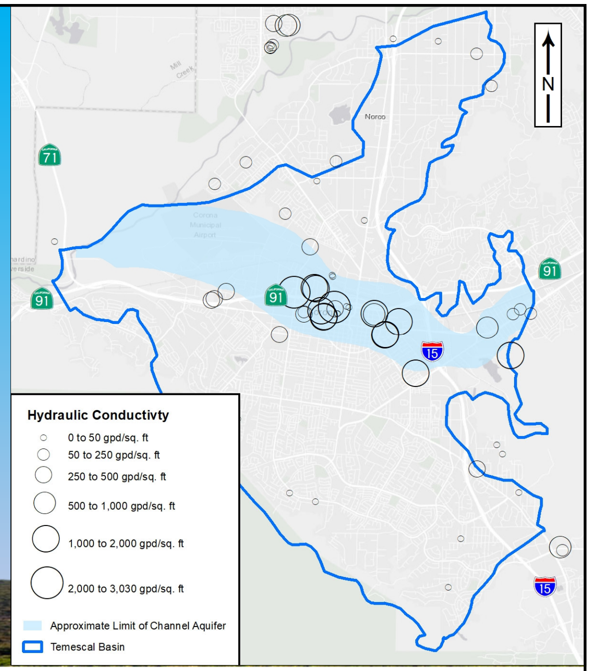
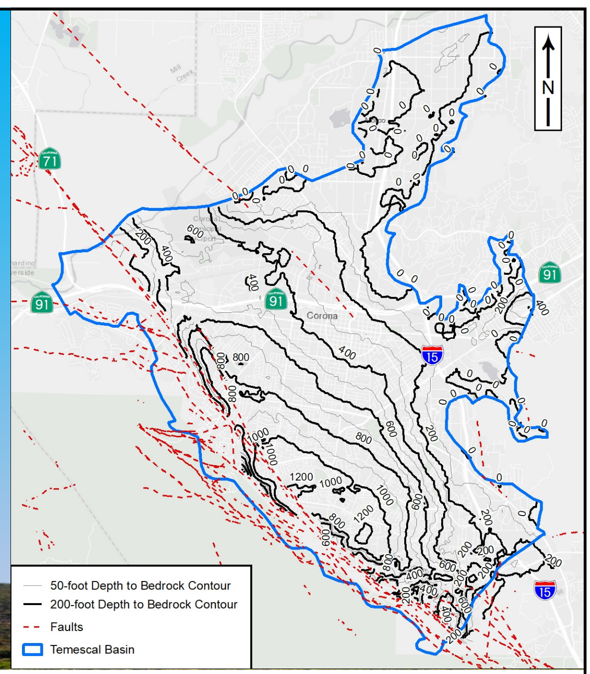
Channel Aquifer

- Channel Aquifer not present everywhere
- The most productive wells (highest hydraulic conductivity) in the Temescal Basin are in the Channel Aquifer



Temescal Basin Thickness

- Deepest in the southwest
- Shallower in the area of the Channel Aquifer
- Deepens near the Arlington Gap



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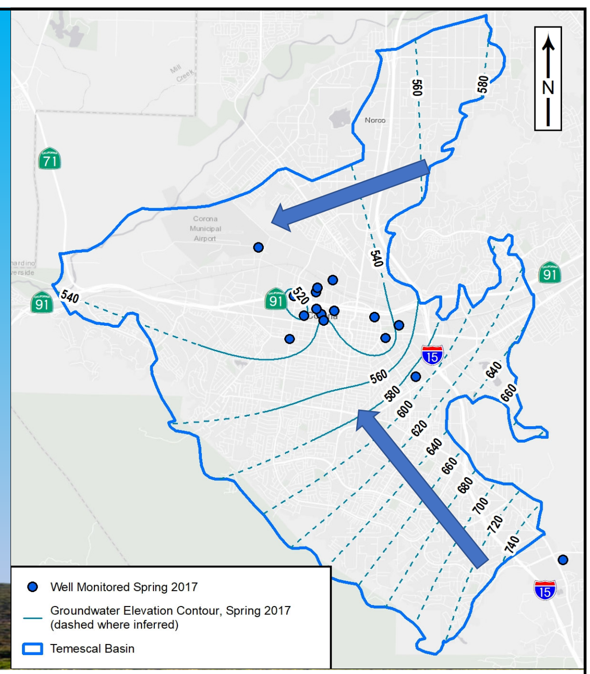
Groundwater Conditions Highlights

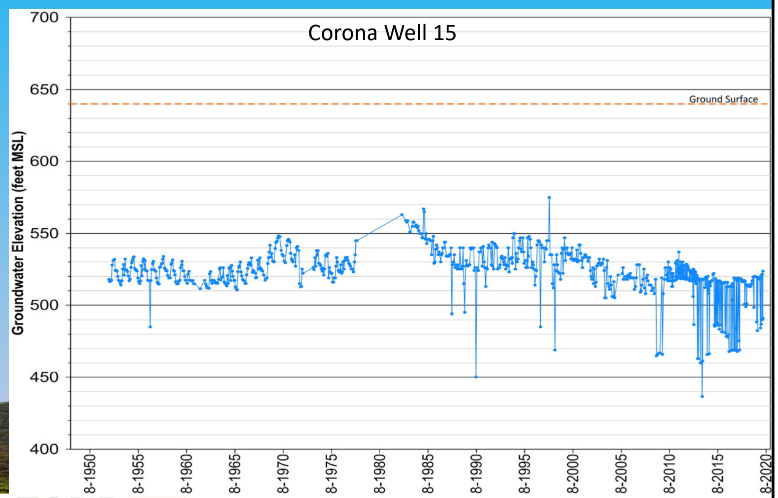
Groundwater Elevation Contours

- Flow in the Temescal Basin is towards the northwest, turning to the west in Prado
- Groundwater flow direction generally consistent



Historical Groundwater Elevations

- Highest water levels in most wells measured in early 1980s
- Lowest levels generally in periods of dry conditions and increased pumping
- Most hydrographs show low water levels during 2000 to 2004, from increased pumping
- Current levels are near record lows



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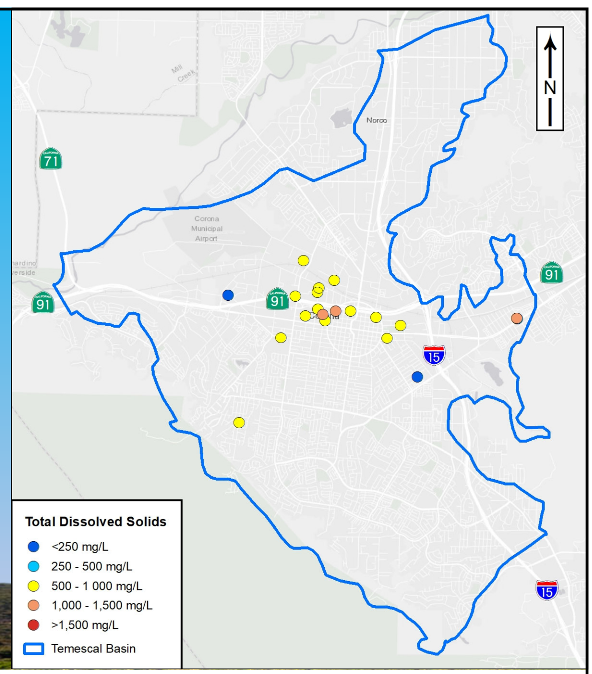
Water Quality

- Available groundwater quality data reviewed
- Primary constituents of concern in the Temescal Basin are total dissolved solids and nitrate
- Total dissolved solids (TDS) elevated in the productive portion of the Basin
- Nitrate also high in some areas



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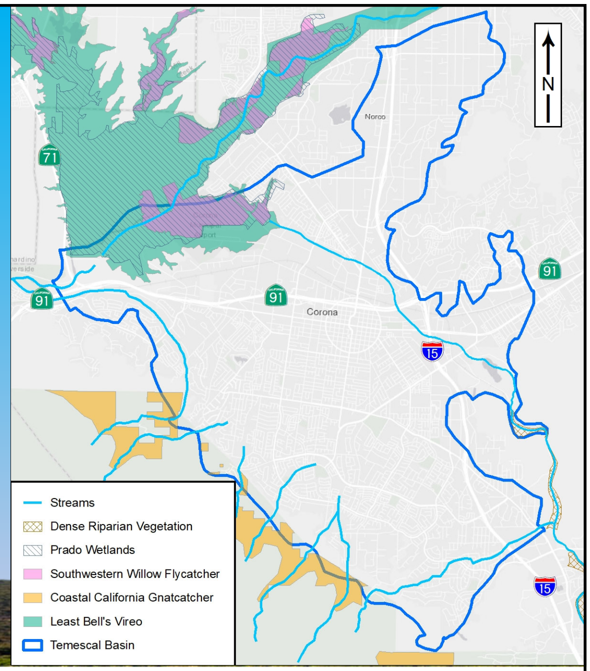
Interconnected Surface Water

- First phase of surface water groundwater evaluation
- Combined review of depth to water, aerial imagery, conceptual model, and mapped features
- There are areas of interconnected surface water in the Basin
- Also areas where there are groundwater dependent ecosystems (GDEs) that will need to be addressed



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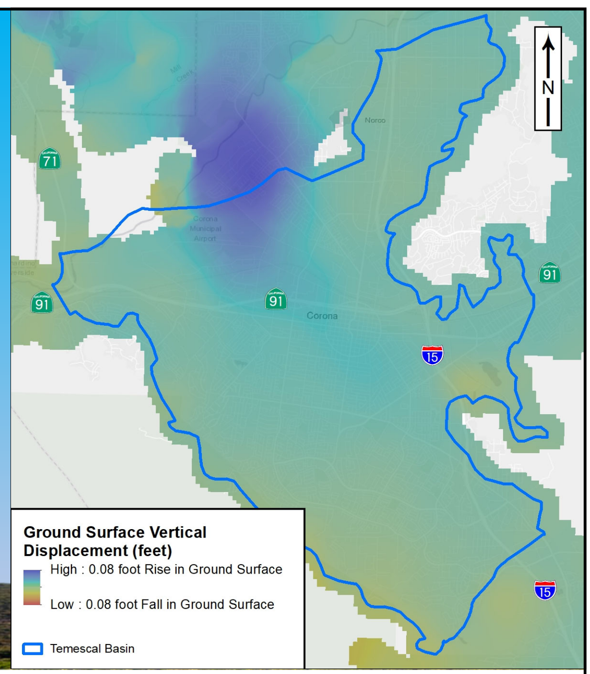
Subsidence

- Basin-wide vertical displacement estimates from satellite measurements
- No evidence of ground surface change in these measurements



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Discussion / Q&A

Input on Beneficial Uses

Known Beneficial Uses

- Municipal water supply
- Industrial water supply
- Rural residential water supply
- Small community water system water supply
- Small commercial water supply
- Groundwater dependent ecosystems in Temescal Wash and Prado

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Sustainability Goal and Criteria

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Draft Sustainability Goal

To sustain groundwater resources for the current and future beneficial uses of the Temescal Basin in a manner that is adaptive and responsive to the following objectives:

- Provide a long-term, reliable and efficient groundwater supply for municipal, industrial, and other uses
- Provide reliable storage for water supply resilience during droughts and shortages
- Protect groundwater quality
- Support beneficial uses of interconnected surface waters, and
- Support integrated and cooperative water resource management.

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Sustainability Indicators

- Chronic lowering of groundwater levels
- Reduction of groundwater storage
- Degradation of water quality
- Depletions of interconnected surface water affecting beneficial uses
- Land subsidence affecting land uses
- Seawater intrusion (not applicable here)

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Undesirable Results, Minimum Thresholds, and Measurable Objectives

Undesirable Result – significant and unreasonable conditions for any of the six sustainability indicators

Minimum Threshold (MT) – numeric value used to define undesirable results for each sustainability indicator

Measurable Objective (MO) – specific, quantifiable goal to track the performance of sustainable management

Sustainability Criteria Considerations for Temescal Basin

Subsidence

- Subsidence is lowered ground surface resulting from collapse of subsurface materials, commonly related to pumping and dewatering fine grained units
- Not a known issue and undesirable results not reported
- But potential exists for undesirable results
  - Reduction in drainage capacity; drainage problems
  - Impacts on grade of facilities, e.g. pipelines, roads, runways
  - Subsidence around a wellhead, e.g., casing collapse
  - Non-recoverable loss of storage capacity in the aquifers

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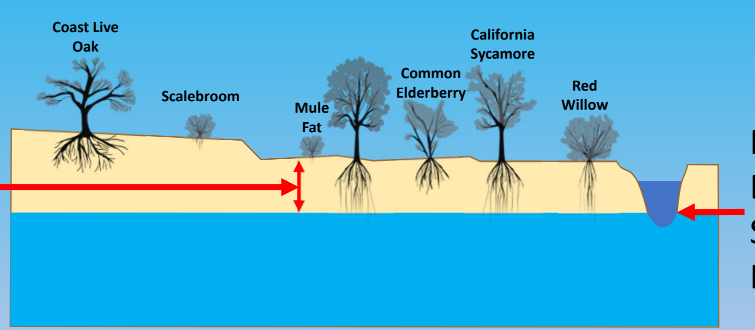
Interconnected Surface Water

For Riparian Vegetation: About 20 to 30 feet



For Stream Flow Depletion: Stream Bed Elevation

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Reduction of Groundwater Storage

- Storage is connected to water levels and the intent is to make sure there is enough water to meet the needs of the beneficial uses and users
- GSP regulations allow use of groundwater level MTs and MOs as a proxy, provided that the GSP demonstrate a correlation between groundwater levels and storage

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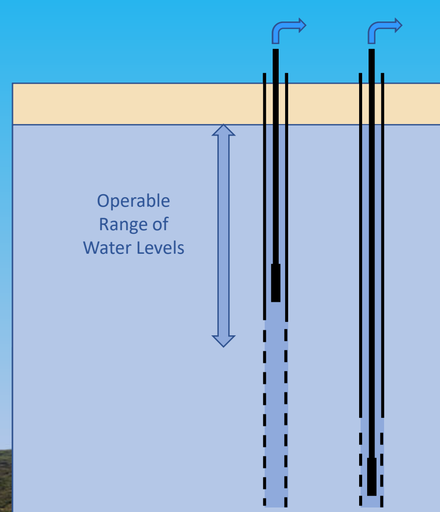
Groundwater Levels

What undesirable effects do we want to avoid?

- Impacts to shallow wells?
- Maintenance of municipal and industrial water supply?
- Other?



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Water Quality

- Numeric value used to define significant and unreasonable degraded water quality throughout the basin
- In setting MTs for degraded water quality, GSAs shall consider local, state, and federal water quality standards applicable to the basin
- Basin Plan and Maximum Concentration Limits
  - 10 mg/L Nitrate as N (both)
  - 770 mg/L TDS (basin plan) and 500 mg/L (MCL)

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Discussion / Q&A

- Are you aware of undesirable results that have occurred in the past?
- Are there specific undesirable results you are concerned about?
- Comments on the Sustainability Goal:

  To sustain groundwater resources for the current and future beneficial uses of the Temescal Basin in a manner that is adaptive and responsive to the following objectives:
  - Provide a long-term, reliable and efficient groundwater supply for municipal, industrial, and other uses
  - Provide reliable storage for water supply resilience during droughts and shortages
  - Protect groundwater quality
  - Support beneficial uses of interconnected surface waters, and
  - Support integrated and cooperative water resource management.

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Public Comment
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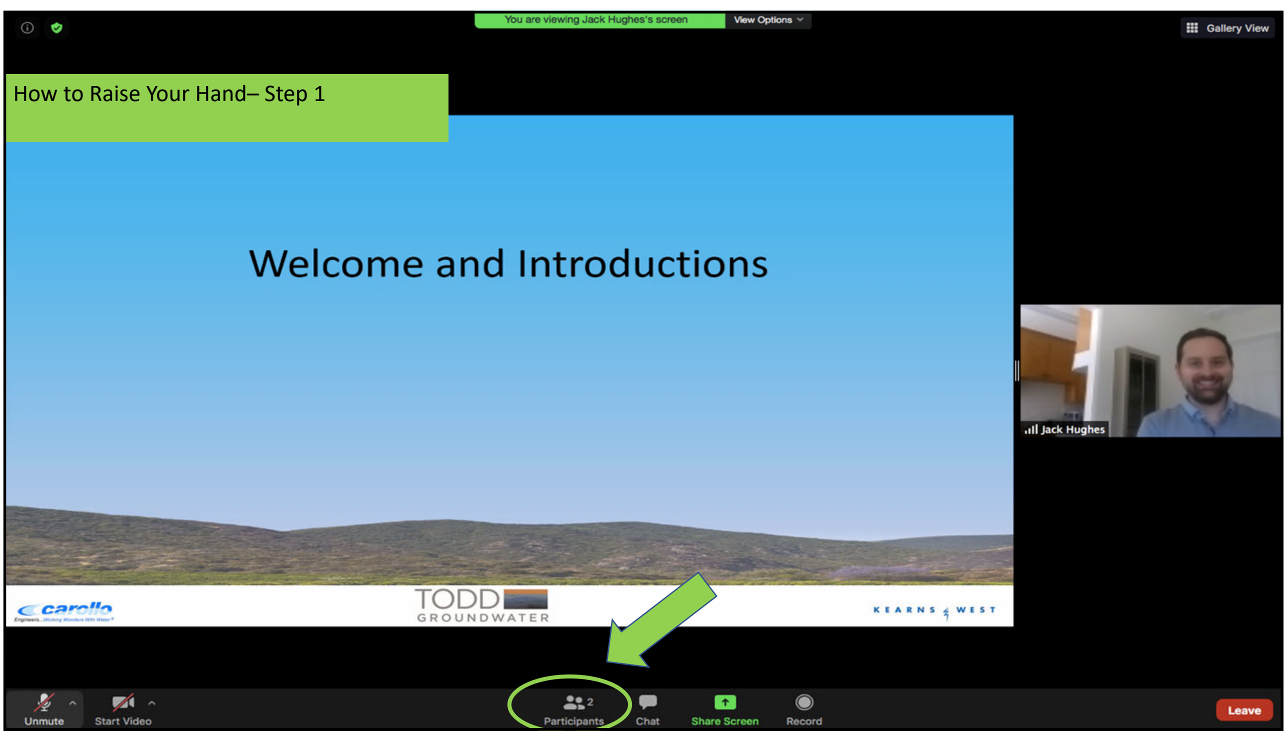
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How to Raise Your Hand– Step 1
Welcome and Introductions
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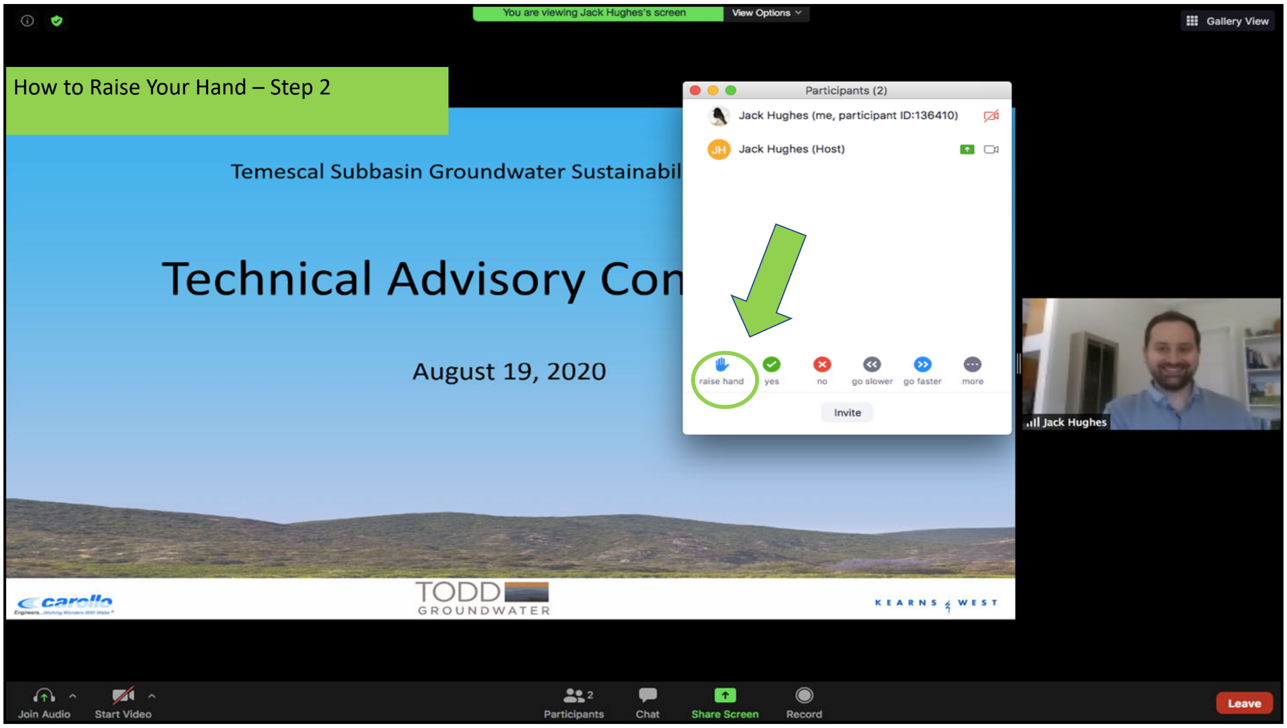
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How to Raise Your Hand – Step 2
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Technical Advisory Con
August 19, 2020
Participants (2)
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Jack Hughes (Host)
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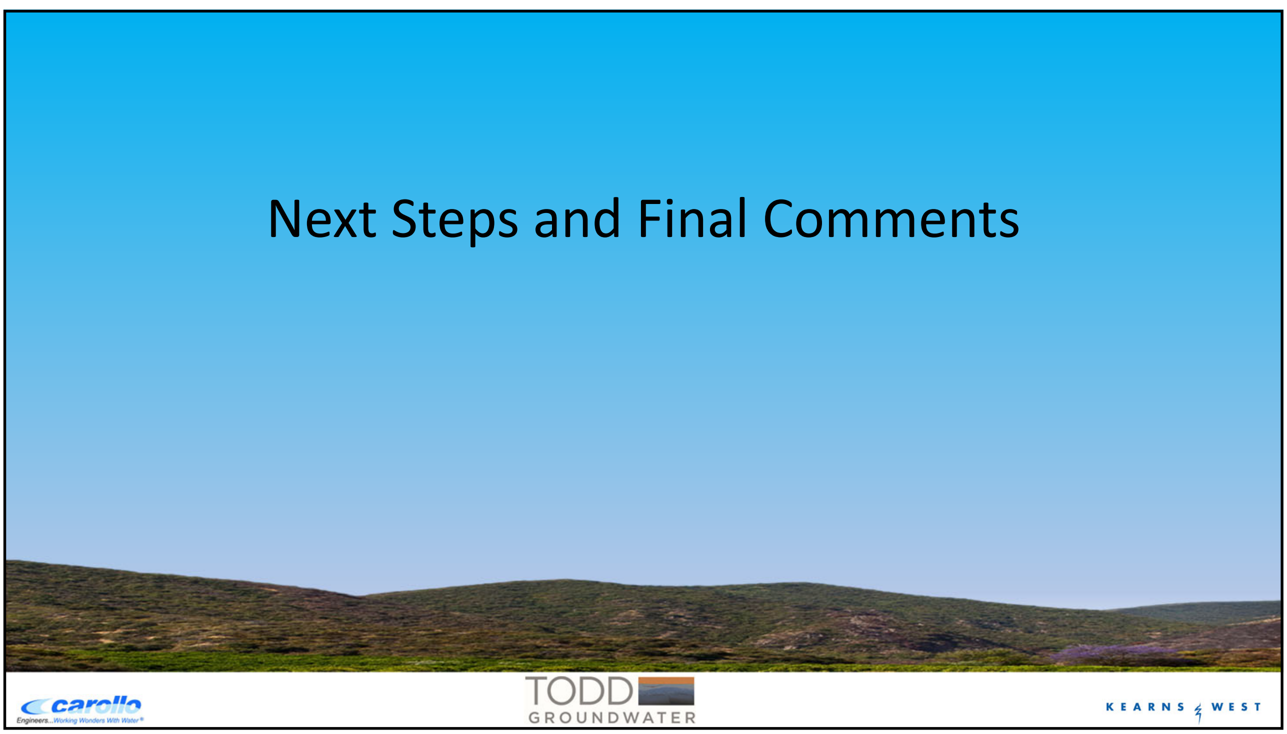
Next Steps and Final Comments
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Next Steps

- Continue Technical Analyses
  - Prepare internal draft Water Budget chapter of the GSP
  - Continue numerical model analysis
  - Continue sustainability criteria development
- Administrative Draft HCM and GW Conditions chapters of the GSP provided to TAC November 17th, all ***comments back by December 4th***.
- Prepare for and hold Public Workshop 2 (date TBD)
- Next TAC meeting February 17, 2021
  - Update on technical analyses
  - Present sustainability criteria

Thank You!

Technical Advisory Committee Meeting 3

Meeting Summary

Wednesday, February 17, 2020
1:00 p.m. – 3:00 p.m.
Location: Zoom Virtual Meeting

Attendees

Technical Advisory Committee Members

- Ava Moussavi, Riverside County Flood Control and Water Conservation District
- Chad Blais, City of Norco Public Works Department
- Eric Lindberg, California Regional Water Quality Control Board – Santa Ana Region
- Jacque Casillas, Mayor, City of Corona
- Katie Hockett, City of Corona Department of Water and Power
- Roberta Reed, 3M Industrial Mineral Products Division
- Timothy Ballon, All American Asphalt
- Tom Moody, City of Corona Department of Water and Power
- Wes Speake, Vice Mayor, City of Corona

Additional City of Corona Department of Water and Power Staff

- Kristian Alfelor
- Melissa Estrada-Maravilla

Consultant Team

- Chad Taylor, Todd Groundwater
- Gus Yates, Todd Groundwater
- Maureen Reilly, Todd Groundwater
- Alyson Scurlock, Kearns & West
- Jack Hughes, Kearns & West
- Joan Isaacson, Kearns & West

Summary

1. Welcome and Introductions

Joan Isaacson, facilitator from Kearns & West, welcomed all to the third meeting of the Temescal Groundwater Sustainability Agency (Temescal GSA) Technical Advisory Committee (TAC). She led roundtable introductions for TAC members and the consultants assisting the Temescal GSA with meeting facilitation and preparation of the Temescal Groundwater Sustainability Plan (Temescal GSP).

2. Overview of Meeting Agenda

Isaacson reviewed the meeting agenda (see Appendix A). The focus was providing an update on the status of the Temescal GSP, presenting the draft sustainability criteria and getting input from TAC members, and providing an overview of Public Workshop 2.

3. Temescal GSP Status

Chad Taylor, Principal Hydrogeologist at Todd Groundwater, provided a status update on the Temescal GSP. The Hydrogeologic Conceptual Model and Groundwater Conditions chapters are now complete and posted to the Temescal GSA website for the public to access. The Numerical Model, which is used to calculate the water budget, and the Water Budget chapter, are underway and will include forecast modeling for growth and climate change.

Taylor described coordination meetings that have taken place with GSA representatives of neighboring basins, including the Orange County Water District, Chino Basin Watermaster, and Western Municipal Water District. All are willing to share information and data and are interested in reviewing documents as they become available. Todd Groundwater will continue to coordinate with stakeholders in neighboring basins, especially with the Western Municipal Water District and Chino Basin Watermaster to ensure the water budget for the Temescal Basin is similar to the ones they have prepared. For more information on the Temescal GSP Status, see pages 4 through 5 in Appendix B.

Discussion/Q&A

There were no questions or comments from the TAC members for this agenda item.

4. Draft Sustainability Criteria Presentation and Discussion

Before presenting the draft sustainability criteria for the Temescal Basin, Taylor reviewed the following sustainability goal that was presented at the last TAC meeting on November 18, 2020:

To sustain groundwater resources for the current and future beneficial uses of the Temescal Basin in a manner that is adaptive and responsive to the following objectives:

- Provide a long-term, reliable, and efficient groundwater supply for municipal, industrial, and other uses;
- Provide reliable storage for water supply resilience during droughts and shortages;
- Protect groundwater quality;
- Support beneficial uses of interconnected surface waters; and
- Support integrated and cooperative water resource management.

Taylor explained that according to the Sustainable Groundwater Management Act, there are six sustainability indicators for which they must develop criteria. The six indicators include chronic lowering of groundwater levels, reduction of groundwater storage, degradation of water quality, land subsidence affecting land uses, depletions of interconnected surface water affecting beneficial uses, and seawater intrusion. Seawater intrusion is not applicable in the inland Temescal Basin. The five applicable indicators will be evaluated for the Temescal Basin.

Next, Taylor explained the factors relating to and defining sustainability that will be developed for each sustainability indicator. These include undesirable results, minimum thresholds, and measurable objectives. Undesirable results are significant and unreasonable conditions for any of the six sustainability indicators. Minimum thresholds are numeric values used to define undesirable results.

Measurable objectives are specific, quantifiable goals used to track the performance of sustainable management. Lastly, he recapped the known beneficial uses in the Temescal Basin that were discussed by TAC members at the previous meeting. See pages 6 through 23 in Appendix B for more information on the draft sustainability criteria.

Chronic Lowering of Groundwater Levels

Taylor presented the sustainability criteria for chronic lowering of groundwater levels. Undesirable results for this indicator can occur progressively as water levels fall. These results can include increased pumping costs/decreased pump output, entrained air and/or broken suction on pumps, exposed screens, cascading water in the well, increased clogging of screens and/or accelerated corrosion, reduced saturated aquifer thickness, and reduced aquifer capacity. Taylor explained that the minimum threshold for defining undesirable results relative to chronic lowering of groundwater levels is defined at each key well by the historic minimum static groundwater elevation (or maximum historical depth to groundwater). Undesirable results are indicated when exceedances occur in measurements from two consecutive quarters in each of two consecutive years, in two-thirds or more of the key wells.

Taylor displayed the table of key wells, which are a subset of the current water level monitoring wells with representative records that continue to be monitored. The key wells table includes wells in the principal channel aquifer and secondary aquifers and wells that have been monitored a long time. Most wells have had historic maximum depths to groundwater within the last 10 years and the pump intake depth for most wells is below the historic depth to water. Taylor reviewed the measurable objective to maintain groundwater levels above the historic maximum depth to water, which maintains groundwater levels within the historical operating range. In summary, the water level conditions are currently sustainable and historic static lows will be used as the minimum threshold; the objective is to be above historical static lows.

Discussion/Q&A

The team opened the floor for questions and discussion. Discussion, comments, and questions are summarized below.

- Having visuals to accompany the data would be helpful.
- Seeing how long the wells have been operational is good, but it would be nice to know how the differences between relate to the location of the wells. It seems shallower wells are closer to the river and deeper wells are farther away.

Reduction of Groundwater Storage

Taylor presented the sustainability criteria for reduction of groundwater storage, noting that storage is connected to water levels. He explained that GSP regulations allow the use of groundwater level minimum thresholds and measurable objectives as a proxy, and that the historic minimum-based water level threshold is well-suited for use as a proxy for groundwater storage. Undesirable results are defined as insufficient supply to support beneficial uses during droughts. Since groundwater storage is related to water levels, undesirable results are also associated with groundwater level declines.

Taylor explained the minimum threshold for groundwater storage, which is the same for groundwater levels. Using the historical minimum maintains the historical operational storage range in the principal channel aquifer and protects the most productive wells. The measurable objective for storage is also fulfilled by the measurable objective for groundwater levels, which maintains groundwater levels within the historical operating range. In summary, there is currently sufficient storage in the Temescal Basin and water level sustainability criteria will be used as a proxy for storage.

Discussion/Q&A

There were no questions or comments from the TAC members for this sustainability criteria.

Degradation of Water Quality

Maureen Reilly, Senior Engineer at Todd Groundwater, presented the sustainability criteria for degradation of water quality. She explained that the Temescal GSA is not responsible for local problems or degradation caused by others and that groundwater quality is under regulatory oversight by state agencies. However, the Temescal GSA is responsible for increased concentrations of water quality constituents due to groundwater management, such as through recharge and changes in pumping patterns relating to groundwater management. Undesirable results for this indicator will focus on total dissolved solids and nitrate, with other constituents being tracked as well. Total dissolved solids are both naturally occurring and anthropogenic. High nitrate concentrations in the Temescal Basin may be a result of previous agricultural or wastewater disposal. Because high concentrations of total dissolved solids and nitrate can limit beneficial uses, the main users of water either treat or blend groundwater.

To help inform measurable objectives, Reilly reviewed what other agencies in the basin are already doing. Water quality objectives have been defined in the Regional Water Quality Control Board Santa Ana Basin Plan and by the State of California in drinking water maximum contaminant levels. Nitrate levels have been set at 45 milligrams per liter (mg/L) and total dissolved solids levels have been set at 770 mg/L in the Regional Water Quality Control Board Santa Ana Basin Plan. She noted that total dissolved solids have a secondary maximum contaminant level for aesthetics which is 1,000 mg/L. Todd Groundwater looked at average concentrations in wells in the Temescal Basin before water entered the treatment process in the last 5 years. This showed 58 percent of wells exceeding the nitrate maximum contaminant levels and 33 percent exceeding the total dissolved solids secondary maximum contaminant level. Reilly explained that while concentrations at some wells exceed the maximum contaminant levels, all water delivered to end users meets all local, state, and federal standards.

Reilly described the minimum threshold for water quality as a statistically significant increase in the percentage of wells with 5-year averages exceeding the maximum contaminant level for total dissolved solids and/or nitrate, relative to current conditions. Statistically significant is defined as more than a 10 percent increase in the number of wells in a 5-year period. The measurable objective for total dissolved solids and nitrate is to maintain or reduce the percentage of wells with average concentrations exceeding the threshold based on conditions assessed in each 5-year Temescal GSP update. In summary, total dissolved solids and nitrate concentrations are elevated in some Temescal Basin wells, but all water delivered meets local, state, and federal drinking water standards through the use of treatment and blending facilities. The threshold is based on the number of currently affected wells.

Discussion/Q&A

The team opened the floor for questions and discussion. Discussion, comments, and questions are summarized below.

- The first question asked for confirmation of the water quality threshold being a change from the present, even though some wells currently exhibit issues. A consultant team member stated that current water quality constituents already exist, and the threshold is set to avoid any future degradation to water quality.

- Another question asked was whether the statistically significant change identified as 10 percent was based on any standards. A consultant team member explained that 10 percent is what other GSAs are using because anything less than 10 percent is typically within the natural variability of the data.
- TAC members discussed if maintaining current nitrate levels would be achievable without making any other changes in runoff and discharge from the surrounding areas. A consultant team member said that maintaining current levels could be compromised by legacy nitrate loading from historic agricultural uses. The nitrates flow slowly through the system and may not have reached groundwater or monitored wells yet. This will be important to monitor and report on in the 5-year Temescal GSP updates. A TAC member added that Corona has a desalination facility that assists in nitrate removal. The facility will help to improve water quality in the future, but it takes time. Nitrates are still being applied as part of fertilizers, but the nitrate fertilizer was more common when most of the basin's agricultural activity was made up of orange groves. The small size and relatively shallow groundwater conditions in the Temescal Basin reduces the potential for legacy loading compared to other basins.

Land Subsidence Affecting Land Uses

Reilly presented the sustainability criteria for land subsidence affecting land uses and explained that when water is removed from the aquifer, fine-grain materials can compact and the ground surface can decline. Undesirable results for subsidence include damage to drainage channels; reduction in flood management capacity; damage to facilities; impacts on the grade of infrastructure such as pipelines, roads, and highways; damage to wellheads; casing failures; and non-recoverable loss of groundwater storage as fine-grained layers collapse. Subsidence in the Temescal Basin has been estimated by satellite via remote sensing using InSAR data provide by DWR going back to 2015. This method has a margin of error of approximately 0.1 feet. InSAR datasets estimate ground surface change in the Temescal Basin ranging between a rise of 0.08 feet to a fall of 0.08 which is very small and within the margin of error. She noted that none of these undesirable results have been observed in the Temescal Basin but that they will continue to be monitored over time.

Reilly presented the minimum threshold for subsidence, defined as a rate of decline equal to or greater than 0.2 feet in any 5-year period. This has been considered in terms of a cumulative decline equal to or greater than one foot of decline since 2015, which represents current conditions and aligns with the Sustainable Groundwater Management Act start date. The measurable objective is conceptually zero subsidence, while acknowledging measurement error and other uncertainties. In summary, there is no known current or historical subsidence in the Temescal Basin. The threshold is based on potential impacts to infrastructure using remotely sensed ground surface changes.

Discussion/Q&A

There were no questions or comments from the TAC members for this sustainability criteria.

Depletions of Interconnected Surface Water Affecting Beneficial Uses

Gus Yates, Senior Hydrogeologist at Todd Groundwater, presented the sustainability criteria for depletions of interconnected surface water affecting beneficial uses. He explained that groundwater close to the surface can interact with vegetation or stream flows. Vegetation that relies on groundwater is referred to as phreatophytes and ecosystems that rely on groundwater are referred to as groundwater dependent ecosystems. Yates displayed a map showing the potential groundwater dependent ecosystems in the Temescal Basin and focused on the Prado Basin area. Depths in all wells around the Prado Basin and trends for groundwater levels, groundwater pumping, river flow, and rainfall were analyzed to determine if the Prado wetlands were supported by groundwater. The conclusion is that the Prado wetlands are more dependent on surface flows. Changes in surface inflows have much more influence than changes in groundwater pumping or levels to the north or south. More monitoring is needed in the southern Prado Basin and between Prado and central Temescal Basin pumping.

Yates explained the undesirable results for interconnected surface water. Declining groundwater levels in areas with riparian vegetation can reduce water availability to phreatophytic plant species, which are ones that extend roots to the water table and extract groundwater during the dry season when soil moisture is depleted. Another undesirable result is die-back, or mortality of Prado Basin vegetation. The minimum threshold for depletion of interconnected surface water is historical minimum water levels (maximum depth to water) in shallow monitoring wells in the southern Prado area, correlated with Temescal Basin pumping or water levels. The measurable objective for interconnected surface water is an amount of depletion that is less than the amount specified as the minimum threshold. Given that the objective is based on historical conditions, no specific rise in shallow groundwater levels or increase in stream flow is identified as providing a preferred set of groundwater dependent ecosystem conditions. In summary, changes in surface inflows have much more influence than changes in groundwater pumping or levels to the north or south; additional monitoring in the southern Prado Basin is needed.

Discussion/Q&A

The team opened the floor for questions and discussion. Discussion, comments, and questions are summarized below.

- TAC members said the presentation of the sustainability criteria was great.
- TAC members discussed the interplay of groundwater and surface water with the Prado wetlands. It was suggested that other stakeholders have interests in the health of the Prado wetlands and the surrounding water quality concerns. TAC members thought there was a lot of value in adding monitoring near the Prado wetlands to better understand the nearby groundwater practices.

5. Public Workshop 2

Jack Hughes, Kearns & West, provided an overview of the second public workshop on March 2, 2021 from 4:00-6:00 p.m. The public workshop will be held virtually on the Zoom platform and will be streamed on the City of Corona Facebook page, website, and on Corona TV. Spanish interpretation will be available for those in the Zoom meeting. The second public workshop will focus on the Hydrogeologic Conceptual Model, Groundwater Conditions, and Water Budget. Additionally, the project team is currently finalizing the second fact sheet. The second fact sheet will accompany the emails sent to interested parties and will be posted to the Temescal GSA website to provide the public an opportunity to learn about the topics prior to the workshop. Hughes invited TAC members to attend the second public workshop and to help spread the word to others who might be interested. See page 24 in Appendix B for more information.

Discussion/Q&A

The team opened the floor for questions and discussion. Discussion, comments, and questions are summarized below.

- TAC members discussed the attendance at the first public workshop and ways to publicize the second workshop. About 13 people attended the first public workshop and additional participants connected via live streaming. The consultant team is finalizing the invitation materials for the second public workshop and will send them to TAC members for assistance with distribution.

6. Public Comment

No members of the public provided comment.

7. Next Steps and Wrap Up

Isaacson summarized next steps for the consultant team and TAC members. The consultant team will continue conducting the technical analyses, including the Water Budget calculations and Numerical Model analysis. The consultant team will also continue preparing the Sustainability Criteria Temescal GSP chapter and begin drafting the Monitoring Program Temescal GSP chapter. Additional next steps include the upcoming second public workshop, to be held on March 2, 2021, and the final TAC meeting on May 19, 2021. The final TAC meeting will focus on the Water Budget and Groundwater Model and include discussion of projects and management actions.

Discussion/Q&A

The team opened the floor for questions and discussion. Discussion, comments, and questions are summarized below.

- Review times for the Draft Sustainability Criteria Temescal GSP and Monitoring Program Temescal GSP chapters were discussed. TAC members should expect to receive the chapters to review in March.

Appendix A

Meeting Agenda

Temescal GSP

Technical Advisory Committee Meeting 3

February 17, 2020

1:00 – 3:00 p.m.
Zoom Meeting: https://zoom.us/j/96317714187

DRAFT Agenda

1) Welcome and Introductions

2) Overview of Meeting Agenda

3) Temescal GSP Status
   - Hydrogeologic Conceptual Model and Groundwater Conditions Chapters
   - Coordination with Neighboring Basins
   - Discussion/Q&A

4) Draft Sustainability Criteria Presentation and Q&A/Discussion
   - Sustainability Goal
   - Beneficial Uses Recap
   - Draft Sustainability Criteria
     - Chronic Lowering of Groundwater Levels
     - Reduction of Groundwater Storage
     - Degradation of Water Quality
     - Land Subsidence
     - Depletions of Interconnected Surface Water
     - Seawater Intrusion – Not applicable

5) Public Workshop 2
   - Virtual Workshop, March 2, 2021, 4-6 p.m.
   - Focused on Hydrogeologic Conceptual Model, Groundwater Conditions, and Water Budget
   - Discussion/Q&A

6) Public Comment

7) Next Steps and Wrap Up

Appendix B

Presentation Slides


Temescal Groundwater Sustainability Agency
Technical Advisory Committee
February 17, 2021
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Welcome and Introductions
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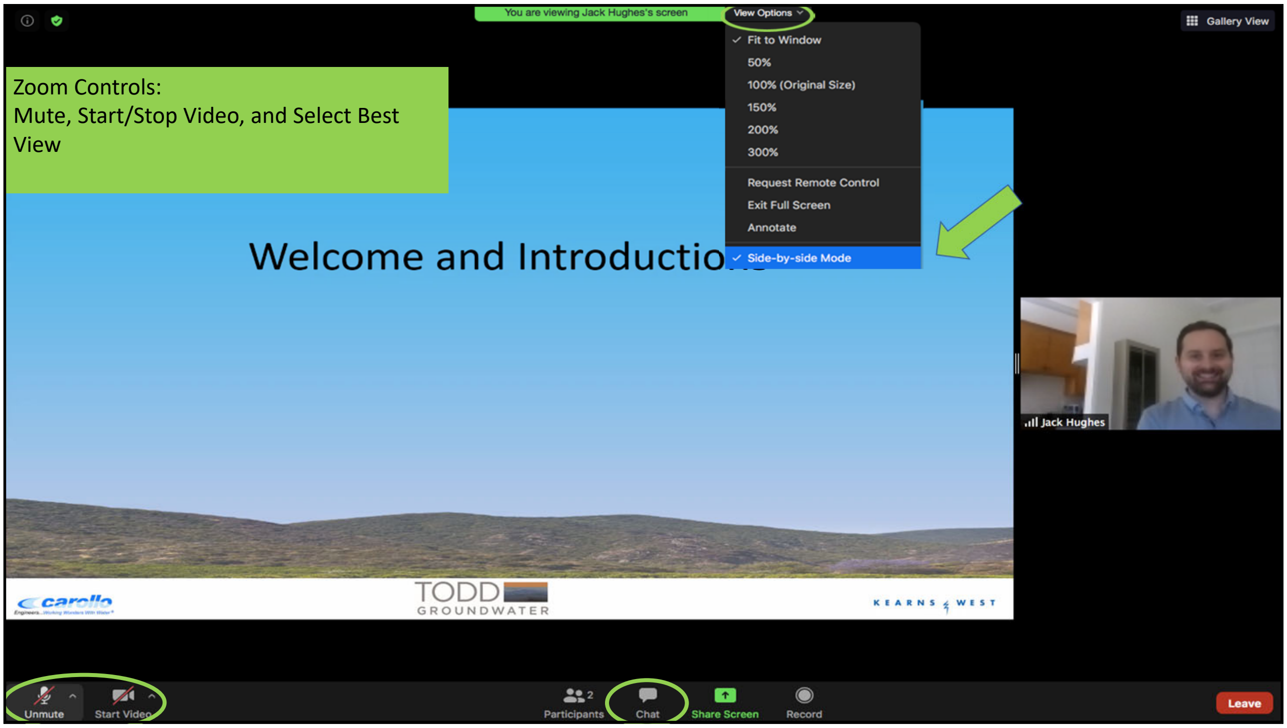

Tips for a Productive Discussion

- Let one person speak at a time
- Help make sure everyone gets equal time to give input
- Keep your input concise so others have time to participate
- Actively listen to others and seek to understand their perspectives
- Offer ideas to address questions and concerns raised by others

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Overview of Meeting Agenda

Meeting Agenda

1. Welcome and Introductions
2. Overview of Meeting Agenda
3. Temescal GSP Status
4. Draft Sustainability Criteria Presentation and Discussion
5. Public Workshop 2
6. Public Comment
7. Next Steps and Wrap Up

Temescal GSP Status

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Where are we now in Temescal GSP process?

- Hydrogeologic Conceptual Model (HCM) and Groundwater Conditions chapters posted to GSA website
- Water Budget analyses and chapter and numerical model are underway

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Coordination with Neighboring Basins

- Consultant team and GSA meetings with neighboring groundwater basins:
  - Orange County Water District
  - Chino Basin Watermaster
  - Arlington Basin GSA/Western Municipal Water District
- All willing to share information and data
- Coordination will continue

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Discussion / Q&A

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Draft Sustainability Criteria

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Sustainability Goal

To sustain groundwater resources for the current and future beneficial uses of the Temescal Basin in a manner that is adaptive and responsive to the following objectives:

- Provide a long-term, reliable and efficient groundwater supply for municipal, industrial, and other uses
- Provide reliable storage for water supply resilience during droughts and shortages
- Protect groundwater quality
- Support beneficial uses of interconnected surface waters, and
- Support integrated and cooperative water resource management.

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Sustainability Indicators

- Chronic lowering of groundwater levels
- Reduction of groundwater storage
- Degradation of water quality
- Depletions of interconnected surface water affecting beneficial uses
- Land subsidence affecting land uses
- Seawater intrusion (not applicable here)

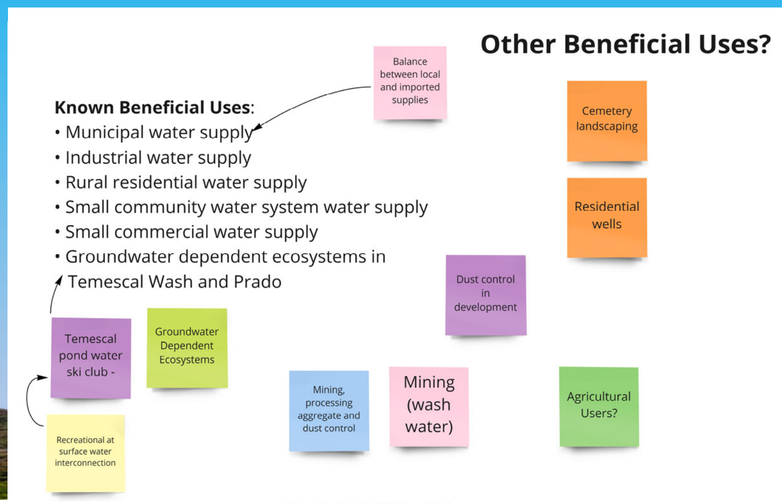
Undesirable Results, Minimum Thresholds, and Measurable Objectives

Undesirable Result – significant and unreasonable conditions for any of the six sustainability indicators

Minimum Threshold (MT) – numeric value used to define undesirable results for each sustainability indicator

Measurable Objective (MO) – specific, quantifiable goal to track the performance of sustainable management

Beneficial Uses from Last TAC Meeting



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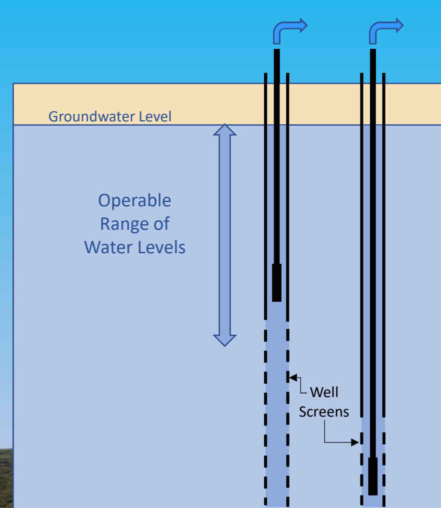
Undesirable Results - Groundwater Levels

Groundwater level declines result in a sequence of increasing undesirable results:

1. Increased pumping costs and a decrease in pump output
2. Entrained air and or broken suction on pumps
3. Exposed screens, cascading water in the well, increased clogging of screens, and/or accelerated corrosion
4. Reduced saturated aquifer thickness and reduced aquifer capacity



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Minimum Threshold - Groundwater Levels

The Minimum Threshold for defining undesirable results relative to chronic lowering of groundwater levels is defined at each Key Well by the historic minimum static groundwater elevation (maximum historical depth to groundwater)

Undesirable results are indicated when exceedances occur in measurements from two consecutive quarters in each of two consecutive years, in two-thirds or more of the Key Wells

Key Wells are a subset of the current water level monitoring wells with representative records that will continue to be monitored

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Minimum Threshold - Groundwater Levels

Local Well Name	Earliest Monitoring Date	Average Depth to Groundwater (ft bgs)	Pump Intake Depth (ft bgs)	Date of Static Maximum Depth to Groundwater	Maximum Static Depth to Groundwater (ft MSL)
Corona 7A	6/1/2002	156.84	230	1/1/2003	178
Corona 8	12/13/2012	112.6	No Pump	5/4/2014	129.5
Corona 8A	1/1/1998	119.69	200	10/1/2001	169
Corona 9A	7/1/2002	80.72	220	7/1/2002	242
Corona 11	7/18/1959	134.14	180	9/13/2017	158
Corona 11A	12/6/2017	143.48	221.2	5/31/2014	155.2
Corona 12A	3/1/1993	158.59	280	11/2/2005	164
Corona 13	2/1/1977	141.19	182	6/1/1989	174
Corona 14	2/1/1924	184.92	250	5/1/2009	239
Corona 15	8/13/1952	116.63	180	12/1/2004	134
Corona 16	12/13/2012	140.3	No Pump	7/2/2018	159.5
Corona 17A	6/1/2002	110.63	180	5/13/2006	125
Corona 19	4/1/1992	102.73	200	9/1/2003	124.5
Corona 22	4/1/2001	150.19	370	5/1/2004	153.3
Corona 25	4/1/2001	61.71	180	7/1/2003	161.5
Corona 26	5/1/2001	136.86	333	10/1/2004	340.5
Corona 27	3/1/2003	154.19	436.7	3/3/2020	211
Corona 28	3/1/2003	90.59	170	9/6/2016	95.2
Corona 29	3/18/2009	88.63	230	8/1/2018	88.2
Corona 30	8/28/2009	56.9	No Pump	4/24/2014	70.6
Corona 31	3/18/2009	95.13	271	8/7/2009	132.2
Corona 33	3/13/2019	58.80	255	2/4/2020	68.1
Corona 10th/Lincoln	11/17/2011	197.5	No Pump	9/21/2013	204

Measurable Objective - Groundwater Levels

The Measurable Objective is to maintain groundwater levels above the historical maximum depth to water (minimum groundwater elevation), equivalent to the Minimum Threshold.

This maintains groundwater levels within the historical operating range

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Summary/Questions/Comments – Groundwater Levels

Summary:

- Water level conditions are currently sustainable
- Historical static lows will be used as the Minimum Threshold, and Objective is to be above historical static lows

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Reduction of Groundwater Storage

- Storage is connected to water levels
- GSP regulations allow use of groundwater level Minimum Thresholds and Measurable Objectives as a proxy
- Historical minimum-based water level threshold is well suited to use as a proxy

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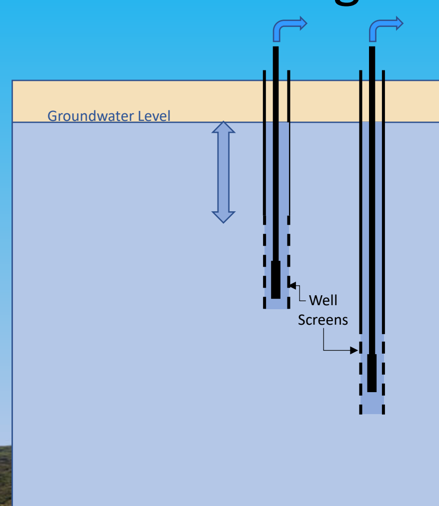
Undesirable Results - Groundwater Storage

- Insufficient supply to support beneficial uses during droughts.
- Storage is related to groundwater levels and undesirable results are associated with groundwater level declines.



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Minimum Threshold - Groundwater Storage

The Minimum Threshold for storage is fulfilled by the minimum threshold for groundwater levels

Groundwater level thresholds have been defined to reflect historical conditions, which is also protective of storage

Groundwater level thresholds and objectives are sufficiently protective to ensure prevention of significant and unreasonable results relating to storage

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Measurable Objective - Groundwater Storage

The Measurable Objective for storage is fulfilled by the Measurable Objective for groundwater levels, which maintain groundwater levels within the historical operating range.

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Summary/Questions/Comments – Groundwater Storage

Summary:

- There is currently sufficient storage in the Temescal Basin
- Water level criteria used as proxy for storage

Water Quality

The GSA is not responsible for local problems or degradation caused by others and groundwater quality is under regulatory oversight by State Agencies.

The GSA is responsible for increased concentrations in water quality due to management (recharge, pumping).

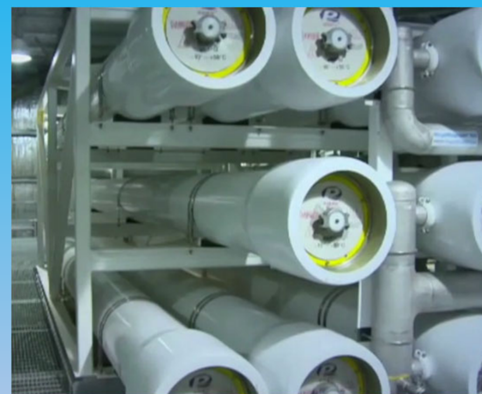
Undesirable Result - Water Quality

Focus will be on total dissolved solids (TDS) and nitrate (other constituents will be tracked, too).

TDS is both naturally occurring and anthropogenic.

High nitrate concentrations in the Temescal Basin may be a result of previous agricultural or wastewater disposal (septic systems and other).

High concentrations of TDS and nitrate could limit beneficial uses. The main users of water treat or blend groundwater before use



(one form of treatment includes Reverse Osmosis pictured here)

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Minimum Threshold - Water Quality

Beneficial uses of water and water quality objectives are defined in the RWQCB Santa Ana Basin Plan and by the State in drinking water maximum contaminant levels (MCLs).

- Nitrate has a primary MCL for health concern whereas TDS has a secondary MCL for aesthetics.

	RWQCB Basin Plan (mg/L)	MCL (mg/L)
Nitrate (NO3)	45	45
TDS	770	1,000

Current ambient conditions (average concentrations in monitored wells between 2014 and 2019):

- 58 Percent of wells exceed nitrate MCL
- 33 Percent of wells exceed TDS Secondary MCL

While concentrations at some wells exceed the MCLs, all water delivered to end users meet all local, state, and federal standards.

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Threshold and Objective - Water Quality

Minimum Threshold - Statistically significant increase in the percentage of wells with averages exceeding the MCL for TDS and nitrate, relative to current conditions. *Statistically significant is defined as more than 10 percent increase in number of wells in 5-year period.*

The Measurable Objective for nitrate and TDS is to maintain or reduce the percentage of wells with average concentrations exceeding the threshold, MCL, based on conditions assessed in each 5-year Temescal GSP update

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Summary/Questions/Comments – Water Quality

Summary:

- TDS and nitrate concentrations are elevated in some Temescal Basin wells
- Treatment and blending facilitates municipal use – all water delivered meets local, state, and federal drinking water standards
- Threshold is based on currently affected number of wells

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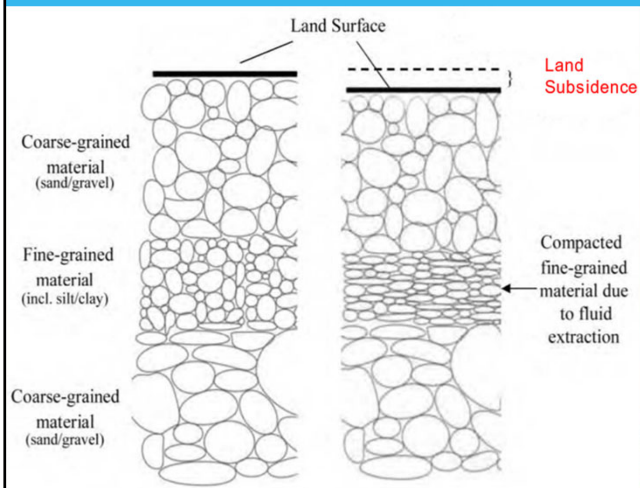
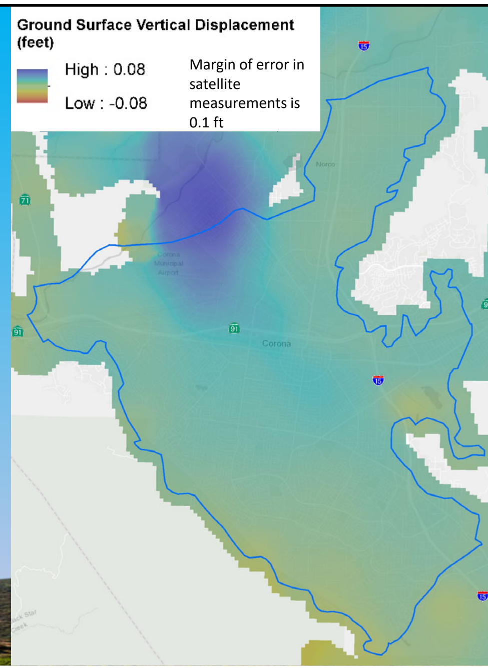
Subsidence





Undesirable Result - Subsidence

Differential subsidence can affect:

- Drainage channels
- Reducing flood management capacity
- Damaging facilities
- Affecting the grade of infrastructure such as pipelines, roads, and highways
- Damaging wellheads or causing casing failure
- Non-recoverable loss of groundwater storage as fine-grained layers collapse

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Minimum Threshold - Subsidence

The Minimum Threshold for subsidence is defined as a rate of decline equal to or greater than 0.2 feet in any five-year period.

This has been considered in terms of a cumulative decline equal to or greater than one foot of decline since 2015.

2015 represents current conditions and the SGMA start date.

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Measurable Objective - Subsidence

The Measurable Objective is conceptually zero subsidence while acknowledging measurement error and other uncertainties.

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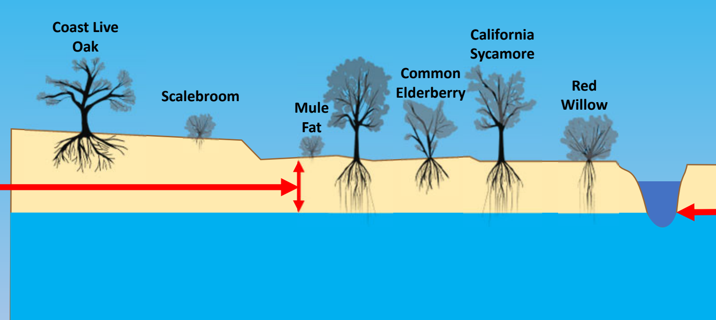
Summary/Questions/Comments – Subsidence

Summary:

- No known current or historical subsidence in the Temescal Basin
- Threshold based on potential impacts to infrastructure using remotely sensed ground surface changes

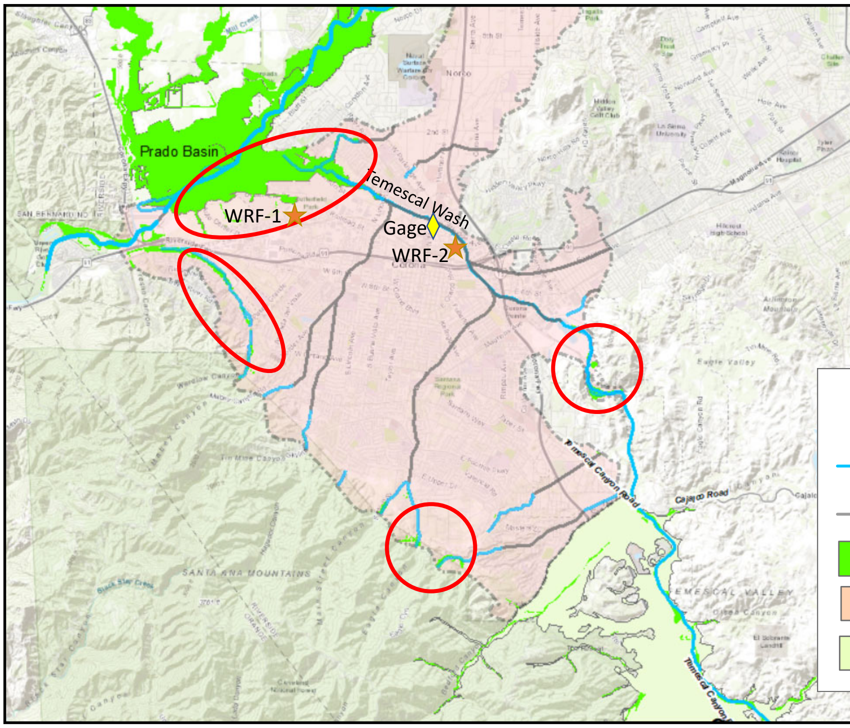
Interconnected Surface Water

For Riparian Vegetation: About 20 to 30 feet

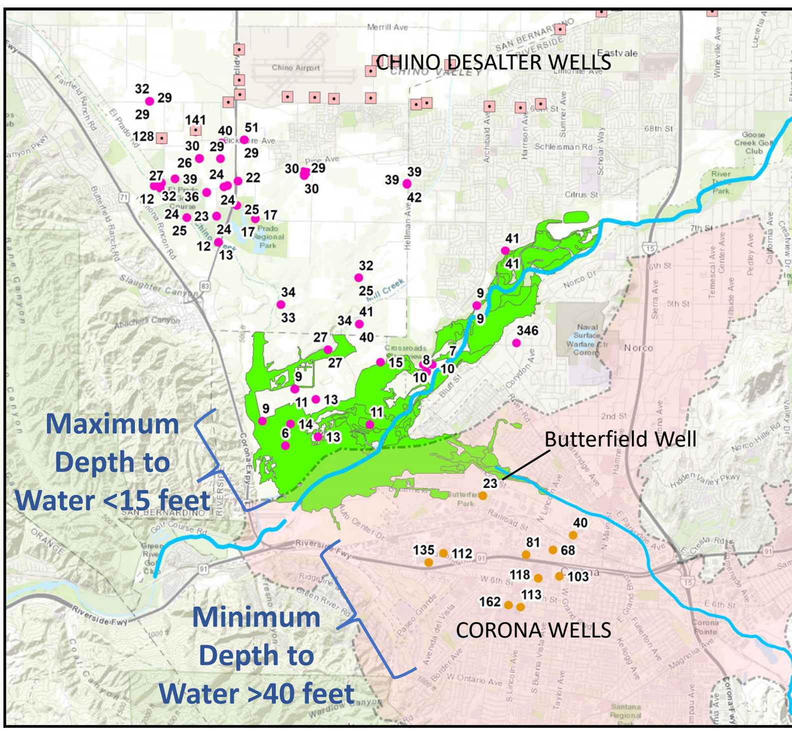


For Stream Flow Depletion: Stream Bed Elevation

Temescal Basin Groundwater Dependent Ecosystem(GDE) Vegetation



Temescal Basin Depth to Groundwater

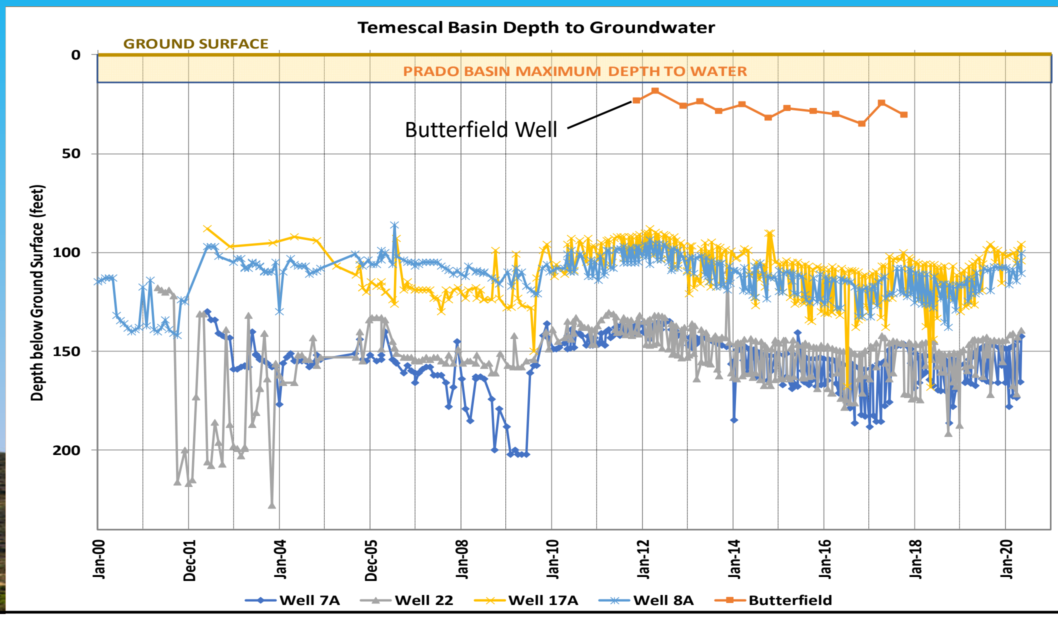


Evaluated depth to water in all monitored wells (production and monitoring)

Maximum depth less than 15 feet in northern Prado Basin

Minimum depth greater than 40 feet in Corona

Temescal Basin Depth to Groundwater



Factors Affecting Prado Groundwater Levels

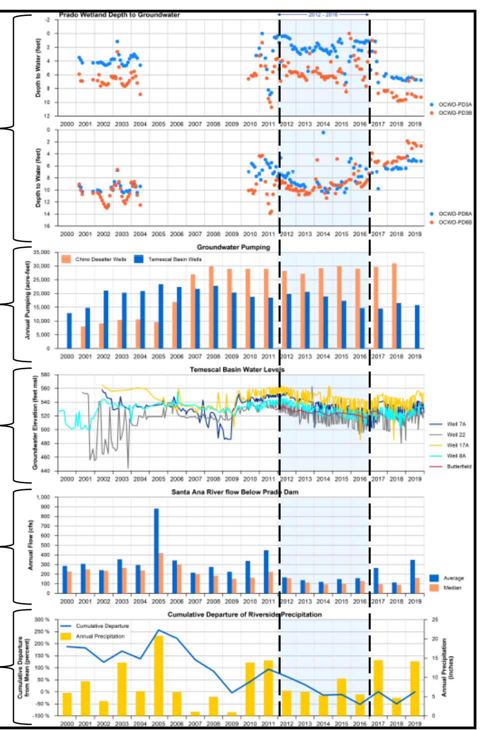
Prado Groundwater Levels

GW Pumping North South

Temescal Groundwater Levels

Santa Ana River Flow

Rainfall



Interconnected Surface Water / Groundwater Dependent Ecosystem (GDE) Conclusions:

- Prado wetlands were supported by groundwater prior to development.
- Now they are more dependent on surface inflows
- Changes in surface inflows have much more influence than changes in groundwater pumping or levels to the north or south
- More monitoring is needed in the southern Prado Basin and between Prado and southern Temescal Basin pumping
  - This is a SGMA data gap that should be filled to protect the Temescal GSA

Undesirable Result - Interconnected Surface Water / Groundwater Dependent Ecosystem

- Declining groundwater levels in areas with riparian vegetation can reduce water availability to phreatophytic plant species, which are ones that extend roots to the water table and extract groundwater during the dry season when soil moisture is depleted.
- Die-back or mortality of Prado Basin vegetation

Minimum Threshold - Interconnected Surface Water / Groundwater Dependent Ecosystem

The Minimum Threshold for depletion of interconnected surface water is historical minimum water levels (maximum depth to water) in shallow monitoring wells in the southern Prado area, correlated with Temescal Basin pumping or water levels.

Measurable Objective - Interconnected Surface Water / Groundwater Dependent Ecosystem

The Measurable Objective for interconnected surface water is an amount of depletion that is less than the amount specified as the Minimum Threshold

Given that the objective is based on historical conditions, no specific rise in shallow groundwater levels or increase in stream flow is identified as providing a preferred set of GDE conditions

Summary/Questions/Comments – Interconnected Surface Water / Groundwater Dependent Ecosystem

Summary:

- Changes in surface inflows have much more influence than changes in groundwater pumping or levels to the north or south
- Additional monitoring in southern Prado is needed

Discussion / Q&A

Public Workshop 2

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Public Workshop 2

- March 2, 2021, 4 to 6 PM
- Focused on Hydrogeologic Conceptual Model, Groundwater Conditions, and Water Budget
- Fact Sheet No. 2 to accompany this workshop will be available soon
- Virtual workshop link: (https://zoom.us/j/93530179115)
- Please forward invite to interested parties

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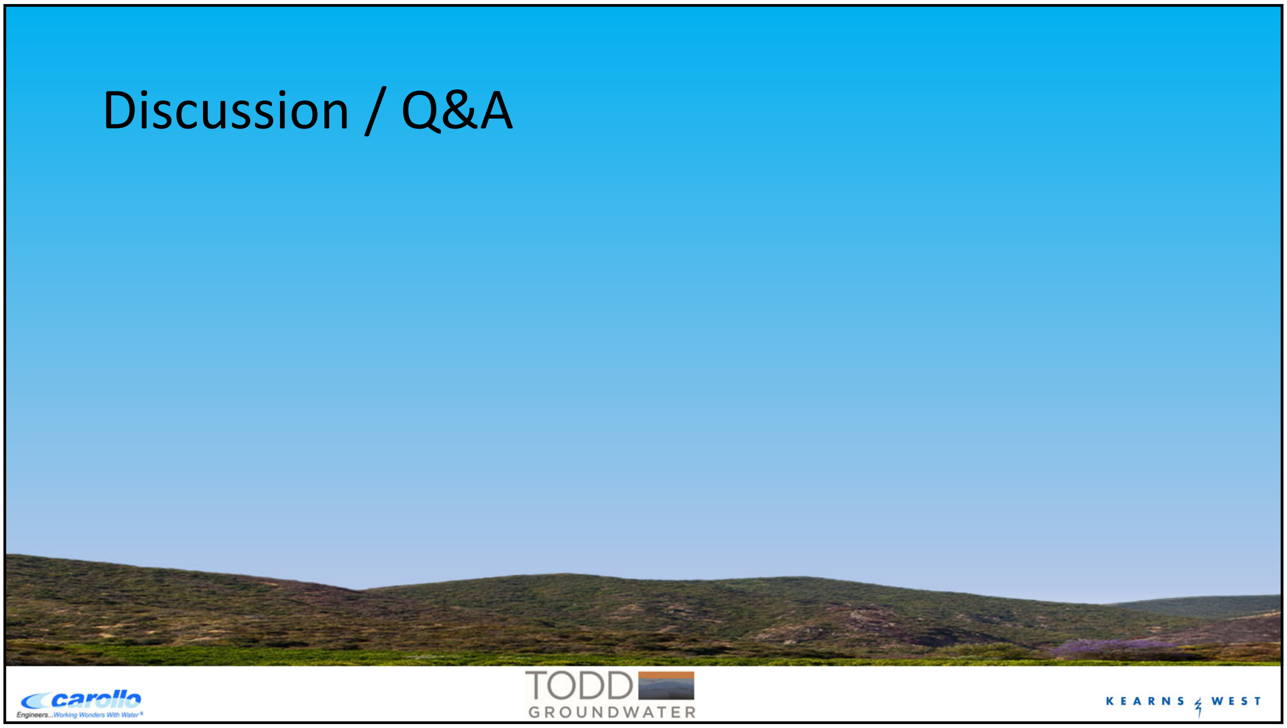
Discussion / Q&A
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Public Comment
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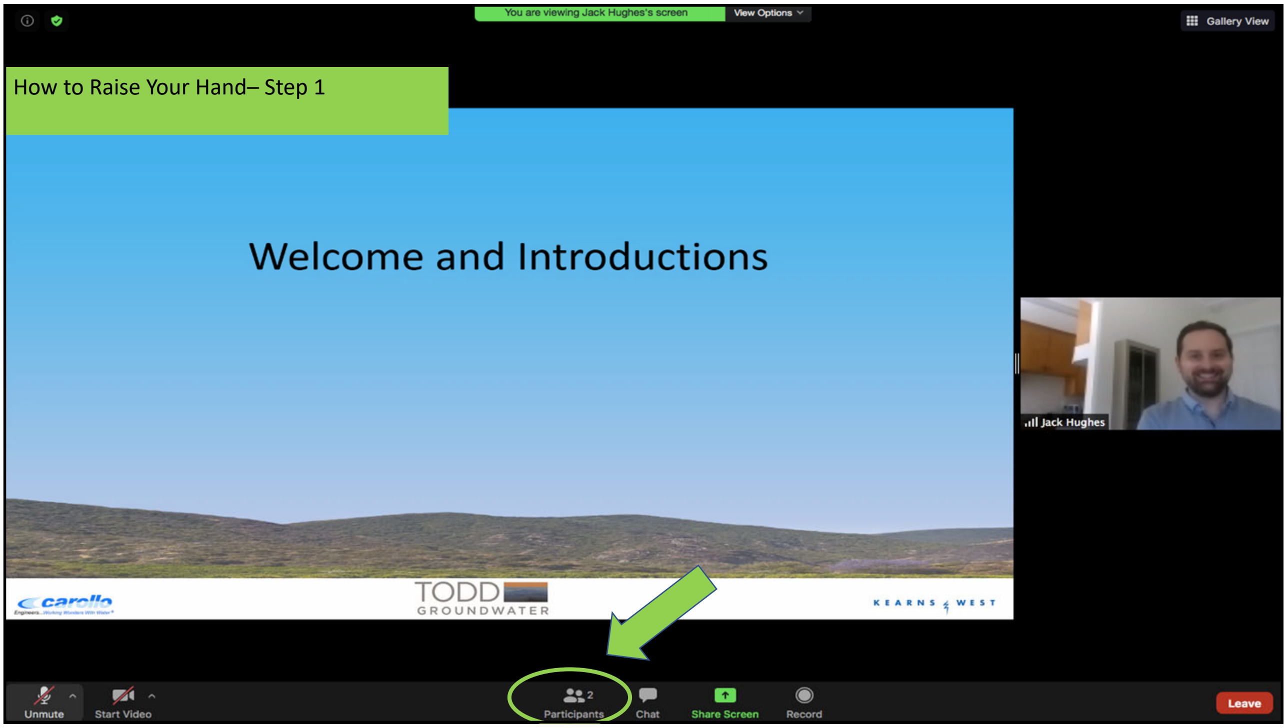
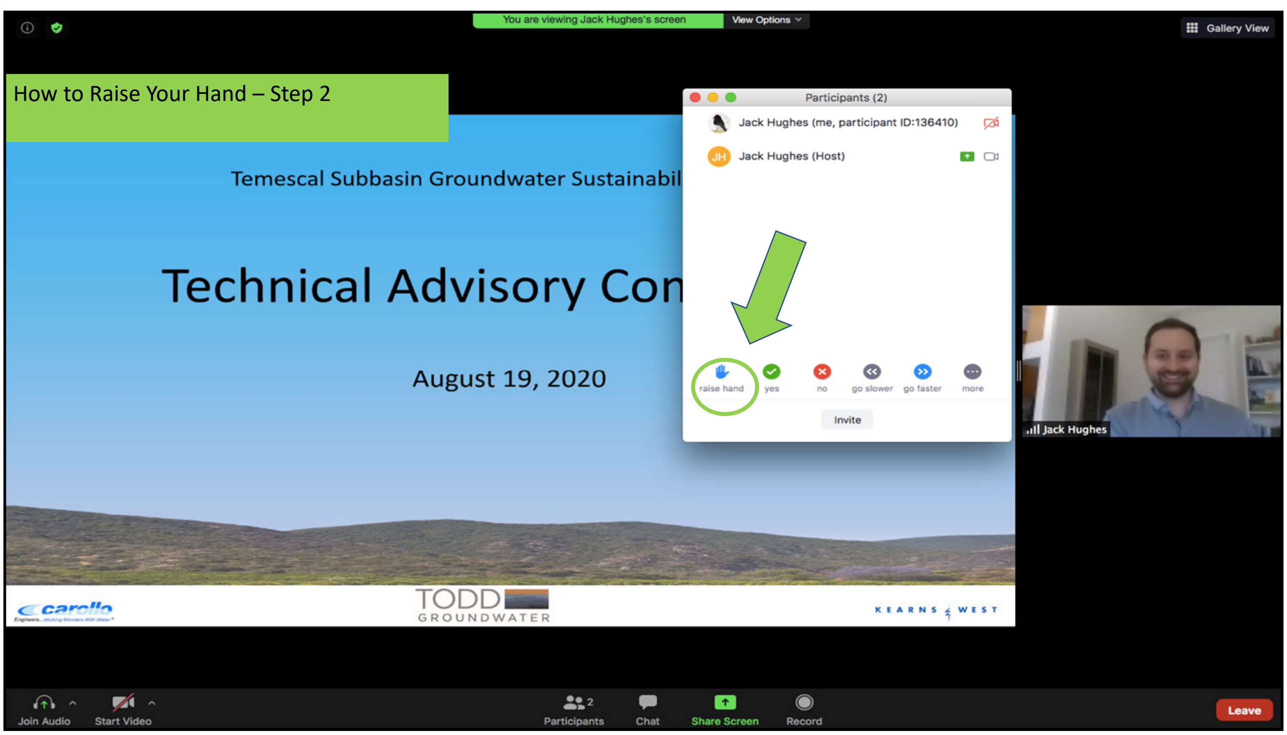

You are viewing Jack Hughes's screen
View Options
Gallery View
How to Raise Your Hand– Step 1
Welcome and Introductions
TODD GROUNDWATER
KEARNS WEST
Jack Hughes
Unmute
Start Video
Participants
Chat
Share Screen
Record
Leave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How to Raise Your Hand – Step 2
Temescal Subbasin Groundwater Sustainabil
Technical Advisory Con
August 19, 2020
Participants (2)
Jack Hughes (me, participant ID:136410)
Jack Hughes (Host)
raise hand
yes
no
go slower
go faster
more
Invite
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Jack Hughes
Join Audio
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Participants
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Share Screen
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Next Steps and Wrap Up

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Next Steps

- Continue Technical Analyses
  - Continue Water Budget calculations
  - Continue numerical model analysis
  - Prepare draft Sustainability Criteria Temescal GSP chapter
  - Begin work on Monitoring Program Temescal GSP chapter
- Prepare for and hold Public Workshop 2 (March 2, 2021)
  - Zoom Link : https://zoom.us/j/93530179115
- Next TAC meeting May 19, 2021
  - Water budget and groundwater model
  - Discussion of Projects and Management Actions
- Questions or comments to groundwater@coronaca.gov

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Thank You!
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Technical Advisory Committee Meeting 4

Meeting Summary

Wednesday, June 16, 2021
1:00 p.m. – 3:00 p.m.
Location: Zoom Virtual Meeting

Attendees

Technical Advisory Committee Members

- Ava Moussavi, Riverside County Flood Control and Water Conservation District
- Eric Lindberg, California Regional Water Quality Control Board – Santa Ana Region
- Jacque Casillas, Mayor, City of Corona
- Katie Hockett, City of Corona Department of Water and Power
- Roberta Reed, 3M Industrial Mineral Products Division
- Tom Moody, City of Corona Department of Water and Power

Additional City of Corona Department of Water and Power Staff

- Kristian Alfelor
- Melissa Estrada-Maravilla

Consultant Team

- Chad Taylor, Todd Groundwater
- Gus Yates, Todd Groundwater
- Phyllis Stanin, Todd Groundwater
- Elisa Garvey, Carollo Engineers
- Inge Wiersema, Carollo Engineers
- Madison Rasmus, Carollo Engineers
- Alyson Scurlock, Kearns & West
- Jack Hughes, Kearns & West
- Joan Isaacson, Kearns & West

Summary

1. Welcome and Introductions

Joan Isaacson, facilitator from Kearns & West, welcomed all to the fourth meeting of the Temescal Groundwater Sustainability Agency (Temescal GSA) Technical Advisory Committee (TAC). She led roundtable introductions for TAC members and the consultants assisting the Temescal GSA with meeting facilitation and preparation of the Temescal Groundwater Sustainability Plan (Temescal GSP).

2. Overview of Meeting Agenda

Isaacson reviewed the meeting agenda (see Appendix A). The focus of the meeting was providing an update on the status of the Temescal GSP and the water budget, presenting the draft projects and management actions and getting input from TAC members, and giving an overview of the third public workshop.

3. Temescal Groundwater Sustainability Plan Status

Chad Taylor, Principal Hydrogeologist at Todd Groundwater, provided a status update on the Temescal GSP. The Monitoring Network (Chapter 7), Projects and Management Actions (Chapter 8), Plan Implementation (Chapter 9), and Introduction (Chapter 1) chapters are currently in review by the Temescal GSA and will be distributed to the TAC for review in late June. The Water Budget (Chapter 5) and Sustainability Criteria (Chapter 6) chapters are in final review by the consultant team and will be distributed to the Temescal GSA in late June and to the TAC in early July. After receiving comments from the Temescal GSA and TAC on the remaining chapters, a draft of the Temescal GSP will be compiled and prepared for public release.

Taylor described the Temescal GSP review period and adoption process. The draft Temescal GSP will be posted in late July or early August and will have a 90-day public review period that will extend to October or November. The revised GSP is estimated to be ready for adoption by the Temescal GSA in November or December 2021 to meet the submittal deadline to the California Department of Water Resources (DWR) by January 31, 2022.

Taylor discussed the role of the TAC moving forward, which includes reviewing and providing comments on the draft chapters and inviting their constituents, communities, and any other interested parties to the upcoming third public workshop that will take place on July 8, 2021. He also asked the TAC to help spread the word when the draft of the Temescal GSP is posted for public review.

After the Temescal GSP is adopted, the TAC may be involved in the implementation phase; any future TAC meetings will be convened on an as-needed basis. The TAC will be informed of other Temescal GSP activities through routine notifications. For more information on the Temescal GSP Status, see pages 4 through 5 in Appendix B.

Discussion/Q&A

There were no questions or comments from the TAC members for this agenda item.

4. Water Budget Presentation

Gus Yates, Senior Hydrogeologist at Todd Groundwater, presented on the water budget, what it is, and how it is being developed. The water budget quantifies the inflows and outflows of the Temescal Basin over time in addition to the change in groundwater storage. Both inflows and outflows vary from year to year depending on hydrology and management. Yates described the process for estimating items in the water budget. Items that can be measured or calculated directly and thus serve as model inputs include dispersed recharge, wastewater percolation, groundwater pumping, and surface water inflows at the model boundary. Other items that are derived from model outputs are stream percolation, groundwater discharge to streams and the Prado Wetlands, subsurface boundary flows, and changes in storage.

Yates reviewed dispersed recharge using a rainfall-runoff-recharge model diagram. He detailed the different ways in which water percolates through land including rainfall recharge, irrigated recharge, and runoff from impervious surfaces that can flow into pipes, the Prado Wetlands, or to pervious surfaces to become focused recharge. He noted that all percolation goes to the shallow groundwater zone, some of which becomes baseflow in streams. In the main part of the Temescal Basin, most deep percolation enters the regional aquifer system. Yates also reviewed a map of the 286 recharge polygons under evaluation, which the consultant team identified based on locations where recharge occurs and specific land uses that contribute to recharge. The recharge polygons extend east and west of the Temescal Basin to cover surface tributaries that drain into the basin. The model extends into the southern Chino Basin to characterize the interaction between basins and the Prado Wetlands.

Yates next described stream recharge in the Temescal Basin. He displayed the natural stream channels where percolation occurs and the cement-lined stream channels or pipelines where no percolation occurs that are included in the model. Stream channels in the Temescal Basin are far above the water table and the depth to groundwater decreases moving towards the northwest portion of the basin. In the Prado Wetlands area, the land surface and water table are close enough together that vegetation roots can reach the groundwater. Overall, percolation is not affected by groundwater levels except in the Prado Wetlands area.

Yates described subsurface inflow and outflow, which includes mountain-front recharge and percolation through fractures in the bedrock. The Temescal Basin was separated into four different zones and water budgets were developed for each. These water budget zones include the channel aquifer in the middle of the basin where most groundwater pumping occurs, the alluvial fan aquifer which makes up the remainder of the basin, the tributary watersheds which contribute inflows to the Temescal Basin, and the Chino Basin. Yates noted that groundwater pumping is concentrated in the channel aquifer.

Yates next discussed the water budget analysis periods that were selected. The Sustainable Groundwater Management Act (SGMA) requires three time periods be analyzed: historical, current, and future. For the historical time period, 1993-2007 was chosen, and for the current time period, 2010-2013 was chosen; both time periods were chosen based on average climate conditions. The future time period is represented by 1993-2017 repeated twice since the required time period was 50 years. In addition, Yates discussed a graph showing the cumulative departure of rainfall, which is how the analysis periods were chosen, noting that there were much bigger wet and dry events in the 1993-2017 portion of graph.

Lastly, Yates presented the surface water and groundwater budgets. The surface water budget looks at inflows and outflows to surface waterways. Since creek channels are mostly concrete-lined and far above the water table in the Temescal Basin, there is little percolation, and the percolation rate is not affected by the groundwater level. The Prado Wetlands is the only area where groundwater and surface water interact. For the groundwater budget, Yates noted that quantitative results are still under review but that some general patterns are emerging. First, the largest sources of recharge in the Temescal Basin are reclaimed water percolation, followed by rain, irrigation, and pipe leaks, and stream percolation and subsurface inflow. Next, the yield of the channel aquifer depends on the inflow from the alluvial fan aquifer area; groundwater pumping is 60-75% of basin outflows. Lastly, the channel aquifer yields approximately the same amount as current pumping. Increasing pumping will not increase yield. For more information on the Water Budget (Chapter 5), see pages 6 through 12 in Appendix B.

Discussion/Q&A

Isaacson opened the floor for questions and discussion. Discussion, comments, and questions are summarized below.

- The first question asked if the general patterns for recharge consider changes in land use over time. A consultant team member replied that the basin was mostly urbanized in the past as it is today.
- Another question asked if there was an estimate of how much of the area was developed and how much runoff increased with urbanization. A consultant team member explained that in the 1990s, about one-third to one-half of the basin was not urbanized and most development occurred in the 1990s and early 2000s. A TAC member added that there was a study conducted in the last few years that estimated a 6,000 acre-feet loss of recharge due to urbanization in the watershed.
- A TAC member asked about the relationship between cumulative deviation from the mean, production, and groundwater levels during the period where the Temescal Basin may be in overdraft. A consultant team member stated that the measured hydrographs are variable with some dating back to the 1990s where large declines in groundwater levels can be seen. In the last 10 years, the level of urban development has been steady but in 2012, wastewater management changed slightly along with continued drought conditions, so there might have been a slight decline in the groundwater levels in wells. The decline in storage in the water budget seen to date is approximately 4 percent of the total outflow, which is within the margin of error for most water budget analyses. The future baseline scenario in the model will provide more information to confirm or disprove that and answer this question.

5. Draft Projects and Management Actions Presentation and Discussion

Elisa Garvey, Engineer at Carollo Engineers, presented the draft projects and management actions for the Temescal GSP. She explained the three groupings of actions: baseline, planned, and potential future. Baseline refers to existing or established commitments to projects or actions. Planned actions are developed and evaluated projects or actions. Potential future actions describe projects or actions to be implemented later to achieve sustainability goals.

Garvey began by describing the baseline projects. The first is groundwater treatment at the Temescal Desalter to reduce nitrates, total suspended solids (TSS), total dissolved solids (TDS), and other contaminants of concern for the drinking water supply. The second project is water reclamation facility (WRF) percolation ponds that discharge from City of Corona-owned WRFs to percolation ponds that recharge the Temescal Basin. The third project includes water-level quality assurance and quality control activities that maintain the reliability of ongoing groundwater elevation data. The final project Garvey presented was the Western Riverside County Regional Authority (WRCRWA) plant that will soon produce recycled water for local irrigation use.

Garvey next reviewed the baseline management actions. These include Water Shortage Contingency Plans, which are plans that detail the stages of water shortage and conservation response based on a city’s available supply and deficit, and Water Conservation Programs, which include response actions to reduce water use in the stages of a water shortage. Additional management actions include the Western

Municipal Water District Integrated Regional Water Management Plan, which is a coordinated, long-range regional water quantity and quality management strategy, and the Temescal GSA's involvement in the Santa Ana Watershed Project, which is a coordinated management group formed to protect the Santa Ana River Basin and associated water resources.

Garvey then reviewed the three projects included in planned actions. First, the Potable Reuse Feasibility Study will look at the possible use of future reclaimed water supply. Second, the mountain runoff capture investigation would explore options for operational changes to allow for additional benefit of groundwater recharge using storm event runoff at the edges of the basin adjacent to the Santa Ana mountains that is collected in Riverside County Flood Control and Water Conservation District basins. Lastly, the interconnected surface water monitoring wells project would include three shallow monitoring wells drilled into the Prado Management Area to allow for groundwater elevation monitoring.

Madison Rasmus, Environmental Engineer at Carollo Engineers, provided more information on the interconnected surface water monitoring wells project since its implementation date is within the first year of Temescal GSP adoption. Wells will be sited in the southern area of the Prado Management Area. There is no active groundwater monitoring in this location so drilling wells will allow the Temescal GSA to better understand the relationship between the basin and interconnected water in the Prado Wetlands. The project will consist of three groundwater wells about 40-60 feet deep that will allow for continuous groundwater elevation data collection in the area. The data will be incorporated in the 5-year GSP update and monitoring wells will inform future management actions in the Santa Ana River Watershed.

Lastly, Garvey presented potential future actions. Data collected from the Prado Management Area monitoring wells will be used as part of monitoring for undesirable results to interconnected surface water in Prado. If this monitoring identifies potential undesirable results to interconnected surface water in the Prado Management Area, then coordination will be needed with upstream Santa Ana River partners as a management action. If groundwater levels in the Prado Management Area are falling, this approach will allow for coordinated solutions. There are two additional future management actions. One is for future groundwater treatment, which would entail implementing advanced treatment for previously detected per- and polyfluoroalkyl substances (PFAS), TDS, nitrate, and trichloropropane (TCP). The other future management actions is for urban stormwater treatment, capture, and recharge, which is an exploration of urban stormwater harvesting to offset water supply and/or provide for groundwater recharge. For more information on the Projects and Management Actions (Chapter 8), see pages 13 through 16 in Appendix B.

Discussion/Q&A

There were no questions or comments from the TAC members for this agenda item.

6. Public Outreach

Jack Hughes, Senior Associate from Kearns & West, provided an overview of upcoming outreach and engagement activities. The third public workshop will be held virtually on July 8, 2021 from 4:00-6:00 p.m. on the Zoom platform. It will be streamed on the City of Corona Facebook page, website, and on Corona TV. Spanish interpretation will be available for those in the Zoom meeting. The third public workshop will focus on the sustainability criteria and projects and management actions. The third fact sheet will accompany the emails sent to interested parties. The fact sheet will also be posted to the Temescal GSP website to provide the public an opportunity to learn about the topics prior to the workshop. Hughes invited TAC members to attend the third public workshop and to help spread the word to others who might be interested.

In addition, the consultant team is preparing for a community leader meeting that will take place prior to the third public workshop to ensure the team is reaching a variety of stakeholders and hearing diverse interests. The purpose of the community leader meeting is to provide information on local water supply and learn about needs and perspectives in vulnerable communities. See pages 17 through 18 in Appendix B for more information.

Discussion/Q&A

There were no questions or comments from the TAC members for this agenda item.

7. Public Comment

No members of the public provided comment.

8. Next Steps and Wrap Up

Isaacson summarized next steps for the consultant team and TAC members. The consultant team will revise Chapters 1, 5, 6, 7, 8, and 9 based on GSA and TAC comments prior to compiling the complete GSP for public release. Additional next steps include the upcoming third public workshop on July 8, 2021 and preparation, finalization, adoption, and submittal of the GSP to DWR.

Discussion/Q&A

The team opened the floor for questions and discussion. Discussion, comments, and questions are summarized below.

- A TAC member expressed excitement for upcoming community leader engagement.
- A TAC member thanked the TAC for providing valuable input throughout the GSP process.

Appendix A

Meeting Agenda

Temescal GSP

Technical Advisory Committee Meeting 4

June 16, 2021

1:00 – 3:00 p.m.
Zoom Meeting: https://zoom.us/j/99711646541

Agenda

1) Welcome and Introductions

2) Overview of Meeting Agenda

3) Temescal GSP Status
    - Draft Chapters
    - GSP Review and Adoption
    - Technical Advisory Committee Look Ahead
    - Discussion/Q&A

4) Water Budget Presentation
    - Discussion/Q&A

5) Draft Projects and Management Actions Presentation and Discussion
    - Discussion/Q&A
        - Are there other potential groundwater related projects we should consider?
        - Do you have ideas for how the volume of groundwater in the Basin could be increased?
        - Do you have ideas for making groundwater more sustainable in the Basin?

6) Public Outreach
    - Virtual Workshop, July 8, 2021
    - Community Leader Meeting
    - Fact Sheet 3
    - Discussion/Q&A

7) Public Comment

8) Next Steps and Wrap Up

Appendix B

Presentation Slides


Temescal Groundwater Sustainability Agency
Technical Advisory Committee
June 16, 2021
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Welcome and Introductions
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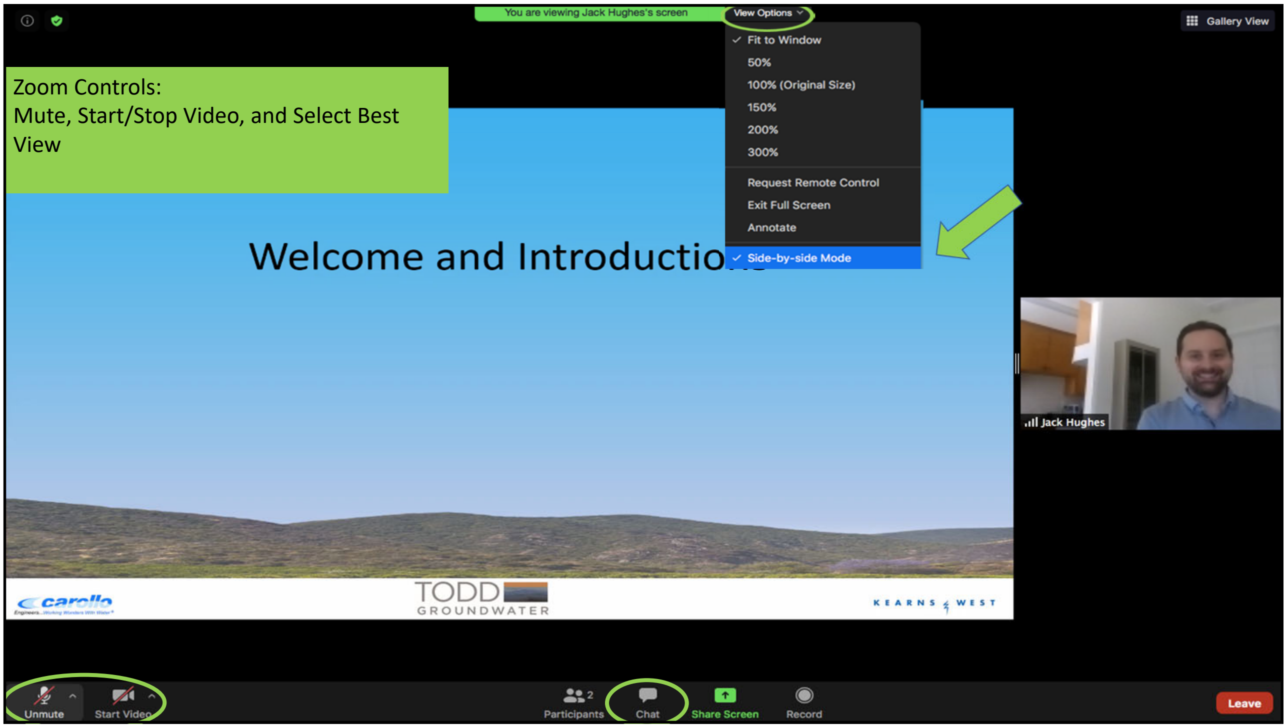

Tips for a Productive Discussion

- Let one person speak at a time
- Help make sure everyone gets equal time to give input
- Keep your input concise so others have time to participate
- Actively listen to others and seek to understand their perspectives
- Offer ideas to address questions and concerns raised by others

Overview of Meeting Agenda

Meeting Agenda

1. Welcome and Introductions
2. Overview of Meeting Agenda
3. Temescal GSP Status
4. Water Budget Presentation
5. Draft Projects and Management Actions Presentation and Discussion

5. Public Outreach
6. Public Comment
7. Next Steps and Wrap Up

Temescal GSP Status

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Where are we in the Temescal GSP process?

- Monitoring Network (7), Projects and Management Actions (8), Plan Implementation (9), and Introduction (1) chapters in review by GSA now and will be distributed to TAC for review in the next two weeks
- Water Budget (5) and Sustainability Criteria (6) chapters are in final review by the consultant team and will be distributed to the GSA later this week with TAC distribution in early July
- This represents all remaining chapters of the GSP
- After receiving comments from the GSA and TAC, the complete GSP will be compiled and prepared for public release

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GSP Review and Adoption Process

- The complete GSP will be posted for public review in late July/early August
- 90-day public review period through October/November
- Revised GSP slated to be ready for GSA adoption November/December 2021
- Submittal deadline to State Department of Water Resources January 31, 2022

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Technical Advisory Committee Look-Ahead

- Review chapters 1, 5, 6, 7, 8, and 9, deadline for comments will be transmitted with chapter distribution
- Spread the word about the upcoming GSP activities
  1. Public workshop July 8th
  2. Fact Sheet 3
  3. Release of the complete GSP
  4. Community leader meeting
- Future TAC meetings during GSP implementation

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Temescal Basin Water Budget

What is a Water Budget?

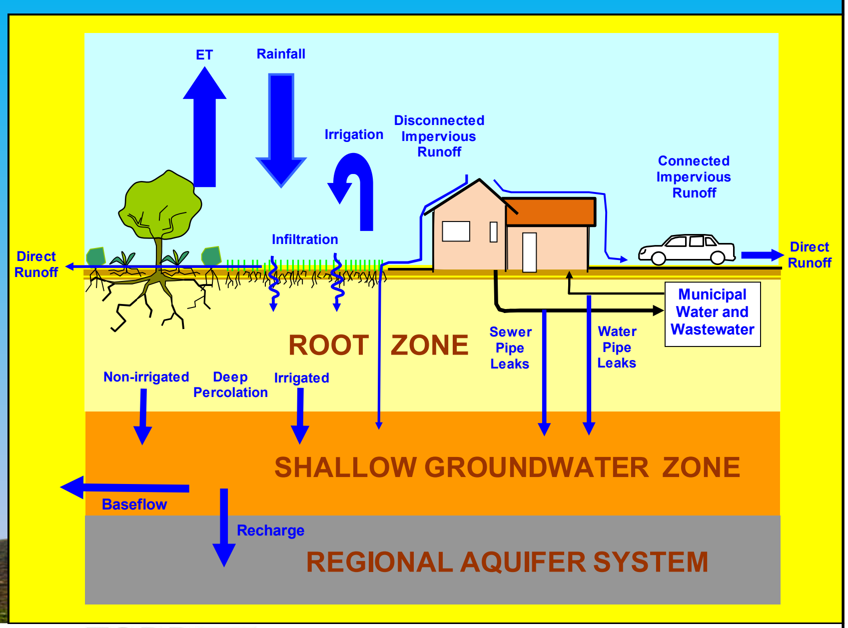
- A water budget quantifies the inflows and outflows of the Temescal Basin over time
- Both inflows and outflows vary from year to year, depending on hydrology or management
- Inflows - Outflows = Change in Storage

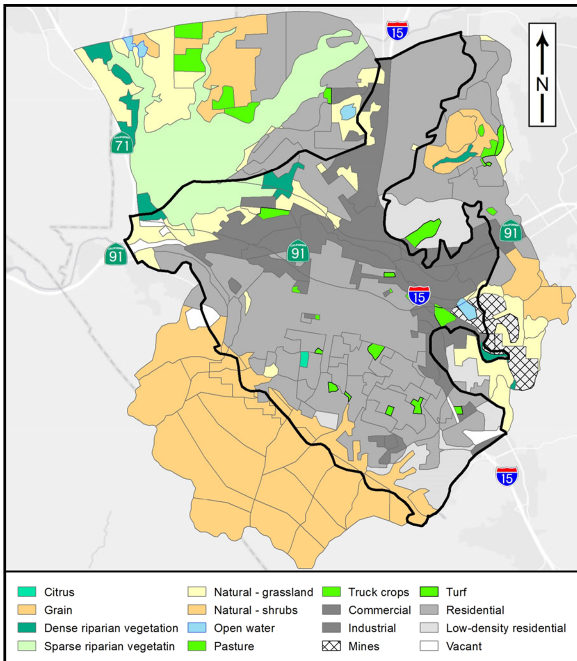
Preliminary Historical Groundwater Budgets

- Water budget items
  - Measured or calculated; input to model
    - Dispersed recharge
    - Wastewater percolation
    - Pumping
    - Surface water inflows at model boundary
  - Head-dependent; ouput from model
    - Stream percolation
    - GW discharge to streams and Prado Wetlands
    - Subsurface boundary flows
    - Storage change

Dispersed Recharge

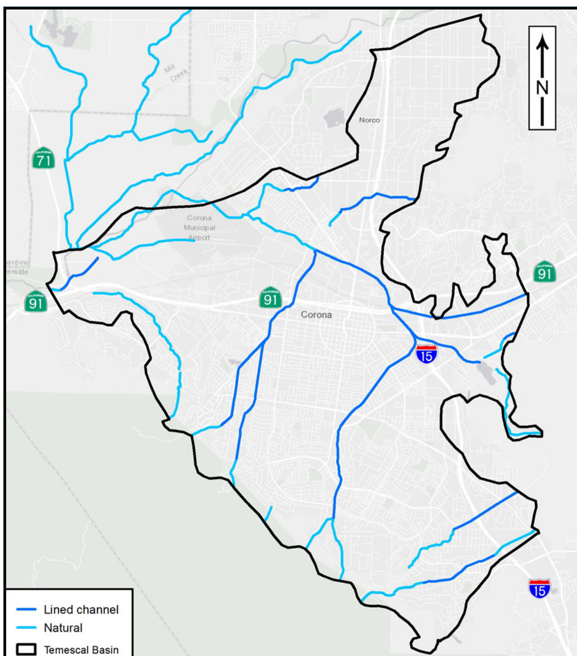
Rainfall-Runoff-Recharge Model





Recharge Polygons

- 286 polygons, which have been identified based on:
  - Areas where recharge occurs
  - Land uses that contribute to recharge
- Evolving land use
- Includes tributary watersheds
- Extends into southern Chino Basin



Stream Recharge

Stream Channel in Model

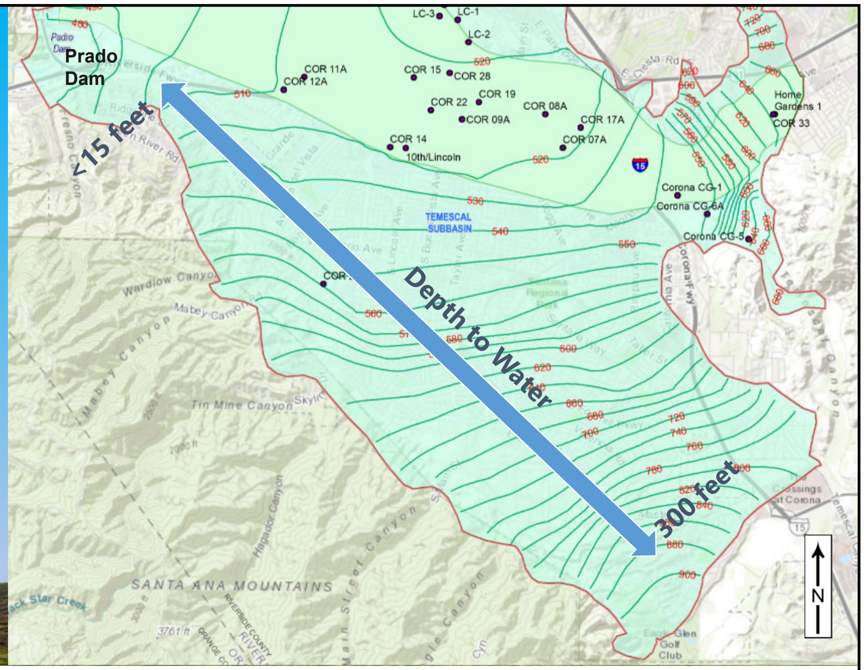
Natural bed

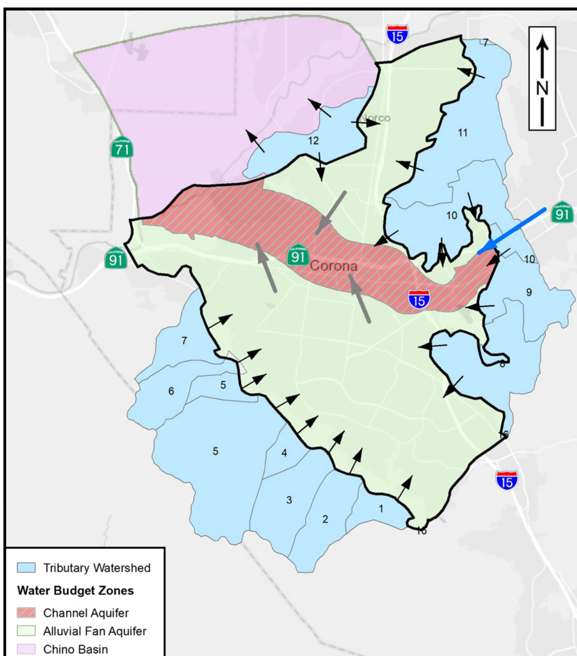
Cement-lined or pipeline

Stream Recharge

Stream channels are far above the water table

Percolation not affected by groundwater level except at Prado

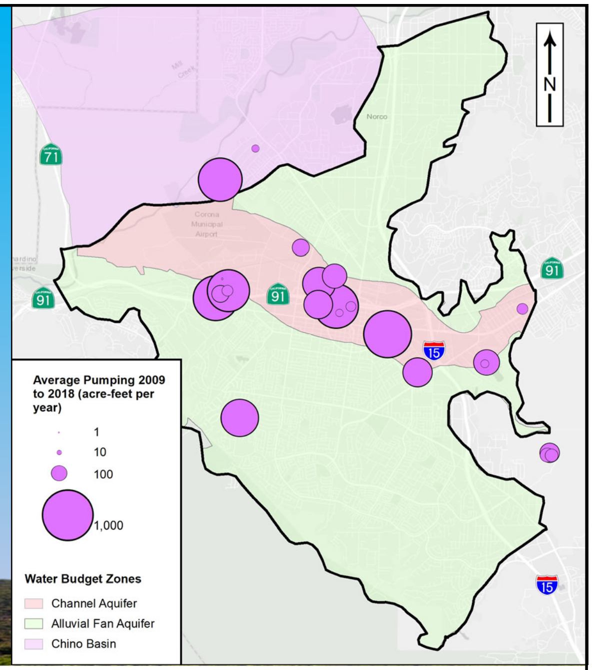




Subsurface Inflow/Outflow

Groundwater Pumping

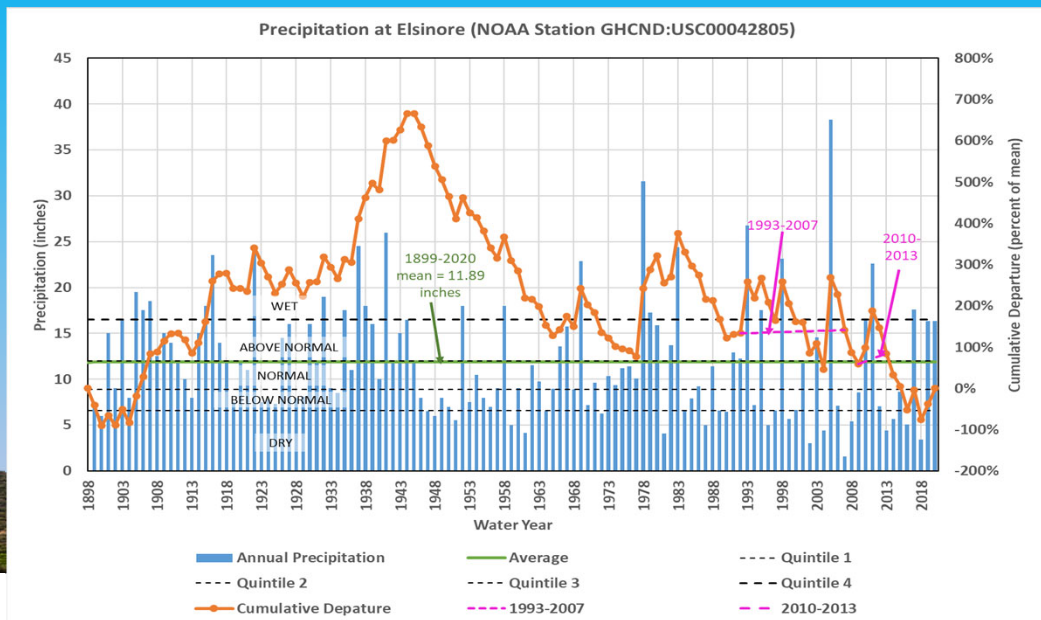
Concentrated in Channel Aquifer



Water Budget Analysis Periods

- Three periods required by SGMA:
  - “Historical” = water years 1993 to 2007
  - “Current” = 2010 to 2013
  - “Future” = 1993 to 2017 (repeated twice)

Water Budget Analysis Periods



Surface Water Budget

- Large volumes of water pass through the basin
- Inflows = outflows. No storage change.
- Creek channels mostly concrete-lined → little percolation
- Creek channels mostly far above water table → percolation rate not affected by groundwater level
- Prado wetlands is only area where groundwater and surface water interact

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Groundwater Budget

- Quantitative results still under review
- General patterns:
  - Sources of recharge in descending order:
    - reclaimed water percolation,
    - Rain, irrigation, and pipe leaks
    - stream percolation, subsurface inflow
  - Yield of channel aquifer depends on inflow from alluvial fan aquifer area
  - Pumping is 60-75% of Basin outflow
  - Channel aquifer yield approximately current pumping. Increasing pumping will not increase yield.

Discussion / Q&A

- What do you think the future of groundwater supply and demand will look like?

Draft Projects and Management Actions

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Project Management/Action Groupings

Group 1 Baseline Actions
Existing or established commitments to projects/ actions

Group 2 Planned Actions
Developed and evaluated projects/ actions

Group 3 Potential Future Actions
Potential projects/ actions to achieve sustainability goals

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Group 1 Projects/ Management Actions

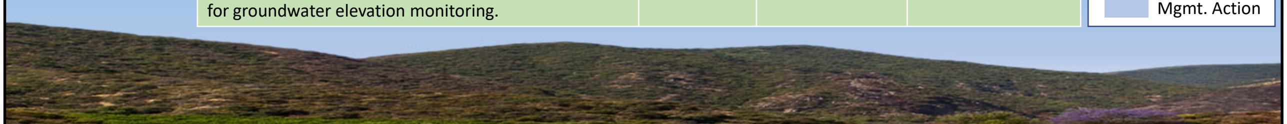
Description	Involved Agencies	Status
Groundwater Treatment: Treatment at the Temescal Desalter to reduce nitrates, TSS and TDS, and other contaminants of concern for the City's drinking water supply.	City of Corona	Ongoing
Water Reclamation Facility (WRF) Percolation Ponds: Discharge from City-owned WRFs to percolation ponds that recharge the Basin.	City of Corona	Ongoing
Water Level QA/QC: Activities to maintain reliability of ongoing groundwater elevation data.	City of Corona	Ongoing
Western Riverside County Regional Wastewater Authority (WRCRWA): This plant will soon produce recycled water for local irrigation use.	GSA, Jurupa CSD, and WMWD	Pending coordination with WRCRWA and partner agencies
Water Shortage Contingency Plans: Stages of water shortage and conservation response based on a City's available supply/deficit.	Cities of Corona and Norco	Ongoing
Water Conservation Programs: Response actions to reduce water use in stages of water shortage.	Cities of Corona and Norco	Ongoing
Western Municipal Water District IRWMP: Coordinated, long-range regional water quantity and quality management strategy.	10 local cities/agencies including the GSA	Ongoing
Santa Ana Watershed Involvement: Coordinated management group to protect the Santa Ana River basin and associated water resources.	GSA and Santa Ana Watershed Project Authority (SAWPA) members	Ongoing

Key
- Project
- Mgmt. Action

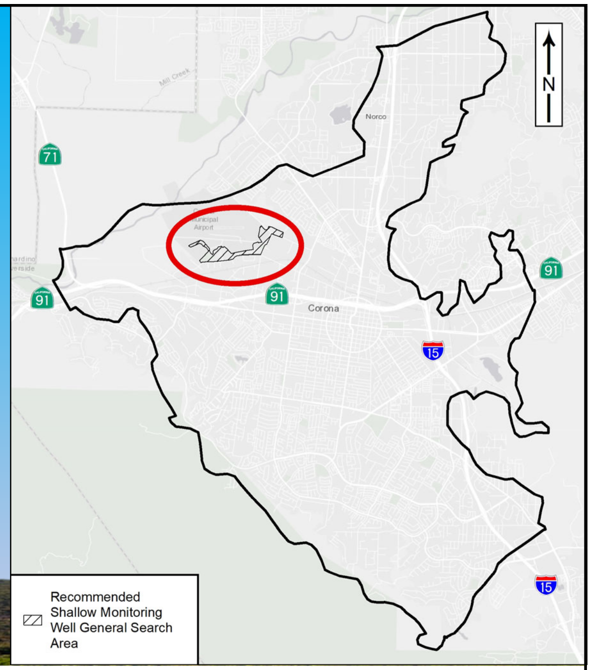
Group 2 Projects/ Management Actions

Description	Involved Agencies	Estimated Cost	Status
Potable Reuse Feasibility Study: Study to look at use potential for near to future reclaimed water supply.	GSA	$150,000 to $200,000	Study initiation within second year of GSP adoption.
Mountain Runoff Capture Investigation: Runoff during storm events is collected into existing RCFCWCD basins to mitigate flooding. This study would explore options for operational changes to allow for additional benefit of groundwater recharge.	GSA and RCFCWCD	$75,000	Study initiation within five years of GSP adoption.
Interconnected Surface Water Monitoring Wells Implementation: Three shallow monitoring wells drilled into the Prado Management Area (MA) to allow for groundwater elevation monitoring.	GSA	$40,000 to $50,000	Implementation within first year of GSP adoption.

Key
- Project
- Mgmt. Action



Group 2 – Monitoring Wells Project



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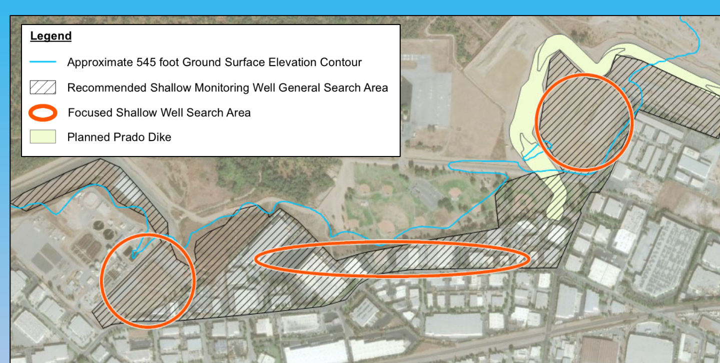
Group 2 – Monitoring Wells Project

- 3 wells, 40-60 feet deep
- Continuous groundwater elevation data collection
- Data to be incorporated in the 5-year GSP update
- Monitoring wells will inform future management actions in the Santa Ana River Watershed



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Group 3 Projects/Management Actions

Description	Involved Agencies	Status
Coordination with Upstream Santa Ana River Partners: Contingent on Prado MA monitoring well installation. If groundwater levels in the MA are falling, this approach will entail coordination with upstream partners for solutions.	GSA and Santa Ana Watershed Project Authority (SAWPA) members	No current anticipated timeline.
Future Groundwater Treatment: Implementation of advanced treatment to treat for previously detected PFAS as well as TDS, nitrate, and TCP.	GSA	No current anticipated timeline.
Urban Stormwater Treatment, Capture, and Recharge: Exploration of urban stormwater harvesting to offset water supply and/or provide for groundwater recharge.	GSA	No current anticipated timeline.

Key
Project
Mgmt. Action

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Discussion / Q&A

- Are there other potential groundwater related projects we should consider?
- Do you have ideas for how the volume of groundwater in the Basin could be increased?
- Do you have ideas for making groundwater more sustainable in the Basin?

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Public Outreach

Public Workshop 3

- July 8, 2021, 4:00-6:00 PM
- Fact Sheet 3
- Please invite others!

TEMESCAL GSA

FACT SHEET 3

GROUNDWATER FOR PEOPLE, THE ENVIRONMENT, AND THE FUTURE

GET INVOLVED! Community input is needed! Visit CoronaCA.gov/Groundwater or send an email to Groundwater@CoronaCA.gov to attend a workshop, review draft chapters, and learn more!

To learn more about background information prepared for the GSP see Fact Sheet 2.

DEFINING SUSTAINABILITY AND TAKING ACTION

Now that the background information and modeling is complete, we will define groundwater sustainability for the Temescal Basin. Then, management actions and projects will keep us on course, so we have enough groundwater for current and future generations. This fact sheet gives more information of these important parts of the Temescal Groundwater Sustainability Plan (GSP).

WHAT IS SUSTAINABILITY IN A GROUNDWATER SUSTAINABILITY PLAN?

The Temescal GSP must include an overall goal that states the desired objectives and conditions for the Temescal Basin. That goal then helps define a sustainability framework to **avoid** lowering groundwater levels, reduction of storage, degraded water quality, surface water depletion, and land subsidence. The framework defines the concepts below, so that we will know if we need to take action to maintain sustainability:

1) **Undesirable results** are conditions we want to avoid in the Temescal Basin
2) **Minimum thresholds** set quantifiable measures for undesirable results
3) **Measurable objectives** establish quantifiable goals to maintain or improve groundwater conditions

Groundwater Dependent Ecosystems

GSPs must protect against surface water depletion. This is because surface water that is connected to groundwater is important for groundwater dependent ecosystems (GDEs). GDEs can include plants or animals that depend on groundwater. The Temescal Basin includes GDEs, primarily in the Prado Basin.

HOW CAN WE MAINTAIN SUSTAINABILITY?

With goals defined, we next turn to how we can meet the standards we have set! Management actions and projects help us maintain sustainability by managing the groundwater resource to avoid undesirable results. Some of the actions and projects that will be included in the GSP are already happening, some are planned and will be implemented within the next few years, and others are potential actions that will be taken in response to changing groundwater conditions in the Temescal Basin in the future.

Examples of Management Actions and Projects

CURRENT	PLANNED	POTENTIAL FUTURE
Groundwater treatment; Water Shortage Contingency Plans; Water Conservation Programs	Interconnected surface water monitoring; Groundwater recharge feasibility studies	Additional groundwater treatment; Stormwater capture, treatment, and recharge

Home Gardens County Water District

TEMESCAL GROUNDWATER SUSTAINABILITY PLAN

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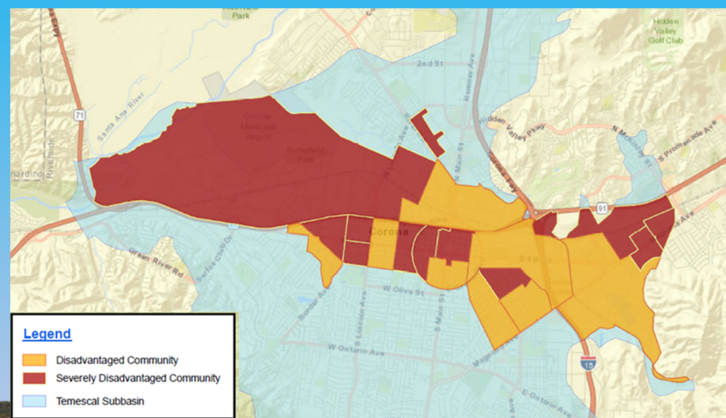
Community Leader Meeting

- Provide information on local water supply and learn about needs and perspectives in vulnerable communities



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Discussion / Q&A

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Public Comment
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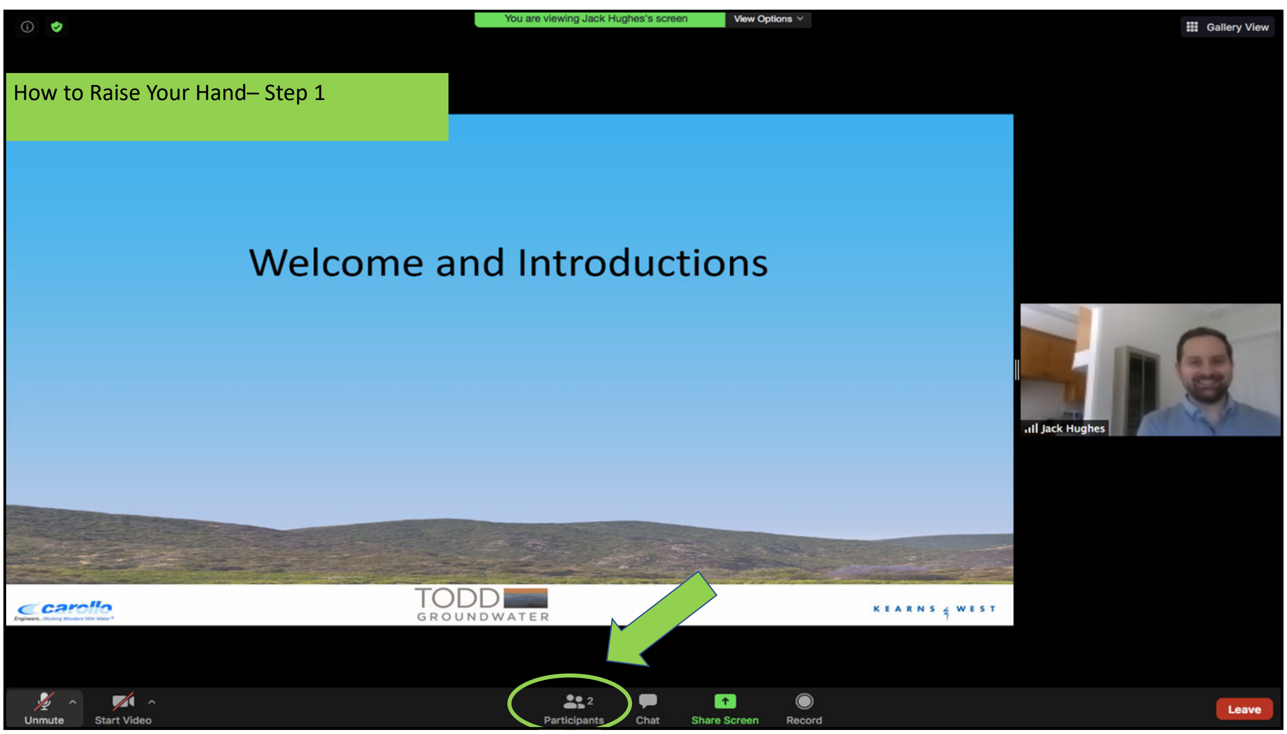
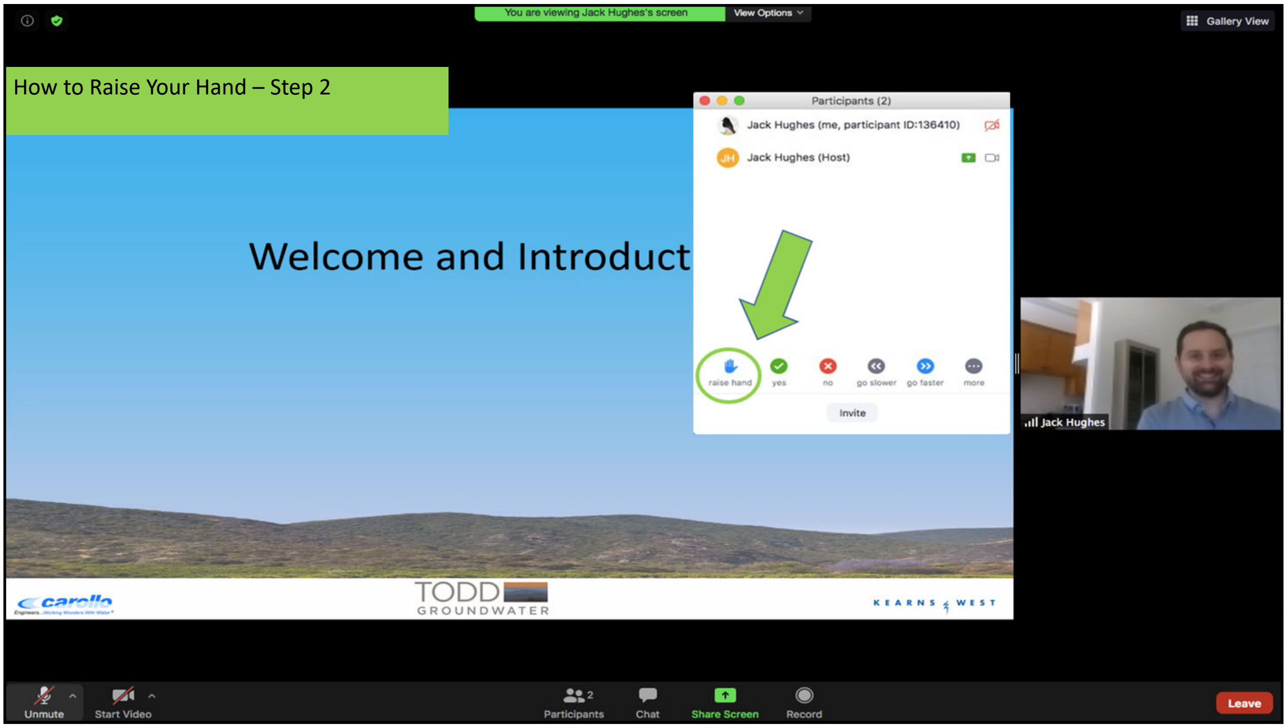

You are viewing Jack Hughes's screen
View Options
Gallery View
How to Raise Your Hand– Step 1
Welcome and Introductions
carollo
TODD GROUNDWATER
KEARNS & WEST
Jack Hughes
Unmute
Start Video
Participants
Chat
Share Screen
Record
Leave


You are viewing Jack Hughes's screen
View Options
Gallery View
How to Raise Your Hand – Step 2
Welcome and Introduct
Participants (2)
Jack Hughes (me, participant ID:136410)
Jack Hughes (Host)
raise hand
yes
no
go slower
go faster
more
Invite
Jack Hughes
TODD
GROUNDWATER
KEARNS WEST
Unmute
Start Video
Participants
Chat
Share Screen
Record
Leave


Next Steps and Wrap Up
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Next Steps

- Revise Chapters 1, 5, 6, 7, 8, and 9 based on GSA and TAC comments
- Compile complete GSP for public release
- Prepare for and hold Public Workshop 3 (July 8, 2021)
  - Zoom Link : https://zoom.us/j/93530179115
- Prepare for GSP finalization, adoption, and submittal to DWR
- Questions or comments to groundwater@coronaca.gov

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Thank You!

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APPENDIX G

Summaries of Public Workshops and Associated Fact Sheets

Temescal Basin Public Workshop 1

Workshop Summary

October 2, 2020

Contents

1. Background

On September 16, 2014, the Governor of California signed into law a legislative package comprised of three bills: Assembly Bill (AB) 1739, Senate Bill (SB) 1168, and SB 1319. These laws are collectively known as the Sustainable Groundwater Management Act (SGMA). SGMA (pronounced sigma) defines sustainable groundwater management as the "management and use of groundwater in a manner that can be maintained without causing undesirable results." This means keeping balanced levels of pumping and recharge of groundwater while assuring reliable water quality. SGMA provides a comprehensive framework for basin sustainability, additional technical analysis, and quantification of many aspects of basin sustainability and management. This includes extensive and detailed descriptions of the basin setting and conditions and more comprehensive monitoring of groundwater use, quality, and levels, including metering of groundwater usage.

SGMA requires the formation of a locally controlled Groundwater Sustainability Agency (GSA), which is responsible for developing and implementing a Groundwater Sustainability Plan (GSP). The GSP outlines how to achieve groundwater sustainability within 20 years of its adoption. The City of Corona, City of Norco, and Home Gardens County Water District have formed the Temescal Subbasin Groundwater Sustainability Agency (Temescal GSA) to create a GSP for the Temescal Basin.

GSAs must consider the interests of all beneficial uses and users of groundwater. The GSA must provide opportunities for public engagement and active involvement of diverse social, cultural, and economic elements of the population. The Temescal GSA recognizes that stakeholder and public engagement is critical to ensuring that the full range of interests of all beneficial uses and users of groundwater are represented during GSP development.

To share information and get input from stakeholders and the public, the Temescal GSA is holding a series of public workshops. The first public workshop, conducted on September 29, 2020, focused on communicating basic information about SGMA, the Temescal Basin, GSP development, and what sustainability means in a GSP. This summary documents the outreach methods, time and location, attendance, and major topics presented and discussed at the workshop.

2. Pre-Workshop Outreach

The Temescal GSA used a variety of methods to inform stakeholders and community members about the workshop and encourage participation, as shown in the table on the next page.

Table 1: Pre-Workshop Outreach Methods

Method	Description
Website	Workshop information was posted on the project website, hosted by the City of Corona's Department of Water and Power, and was included in a calendar post. The City of Norco and Home Gardens County Water District posted workshop information on their websites.
Social Media Posts	The City of Corona posted information about the workshop through a Facebook Event and on its Instagram and Twitter accounts. The City of Norco posted on its Facebook page.
Newsletters	The City of Corona advertised the workshop in its *Inner Circle* newsletter, which is accessible online and distributed via email.
Emails	Invitation emails were sent to those on the interested parties list.
Phone calls	Phone calls were made to community groups and stakeholder organizations to make them aware that the GSP was being prepared and to invite them to the public workshop.

3. When and Where

The workshop was held on September 29, 2020 from 4:00 to 5:30 p.m.

The workshop was held virtually on the Zoom platform. People also had the option to view and participate from the City of Corona Council Chambers. The workshop was streamed on the City of Corona's website, Facebook, and YouTube channels and on Corona TV, viewable on Channel 29 on Time Warner Spectrum and Channel 99 on AT&T.

4. Attendance and Social Media Views

Fifteen participants joined the Zoom meeting. Others viewed workshop on Facebook Live, YouTube, and Corona TV. Post-workshop statistics showed seventeen views on Youtube.

5. Summary

Welcome and Introductions

Jack Hughes, facilitator from Kearns & West, welcomed everyone to the first public workshop for the Temescal GSP. Christian Mendez from Kearns & West gave instructions in Spanish for accessing Spanish interpretation on Zoom. To begin the workshop, participants answered the following poll questions:

1. Where does the water in your tap come from?
    a. Local rivers and lakes
    b. Local groundwater
    c. Imported surface water

2. How much water comes from nearby sources?
    a. 0 to 20 percent
    b. 20 to 40 percent
    c. 40 to 60 percent
    d. 60 to 100 percent

After workshop participants responded to the poll, Chad Taylor, Senior Hydrogeologist at Todd Groundwater, discussed the answers. The water supply for Corona and Norco comes from local groundwater and is also imported. About half of the water delivered to Corona, Norco, and Home Gardens is imported and the rest comes from local groundwater sources. Next, participants watched a short video that showed how the City of Corona treats the groundwater it pumps at the Temescal Desalter and the Corona Ion Exchange Treatment Plant.

Hughes then invited the attendees to make introductions. Melissa Estrada-Maravilla, City of Corona Department of Water and Power Operations Analyst, introduced herself and thanked all for attending. Taylor then introduced the consultant team from Todd Groundwater, Carollo Engineers, and Kearns & West. Hughes next invited the attending stakeholders to introduce themselves in the Zoom chat and thanked them for being there as it is important to involve the many diverse communities and stakeholders of Corona, Norco, and Home Gardens to create a strong GSP for the Temescal Basin.

Introduction to Groundwater

Taylor provided a general introduction to groundwater (presentation slides for this and the following sections can be viewed in Appendix A). In many places, water is present between grains of soil beneath the surface. When there is a lot of space between grains of soil, there can be significant groundwater, also known as a groundwater aquifer. In some areas, there are connections between water on the surface and groundwater. A large area of connected groundwater is called a groundwater basin. Wells are the most common way to access groundwater. Well are used to pump water for different uses such as for city or agricultural uses. Some wells are small and shallow, producing only a few gallons of water per minute, while other wells are large and deep, producing thousands of gallons of water per minute.

Taylor showed a cross-section of an aquifer and described how groundwater gets there. Water enters the ground by soaking into soils from rainfall, streams, lakes, or other surface water. There are unconfined and confined aquifers. Water can enter the upper aquifer, called the unconfined or water table aquifer, from the ground surface or stream. A confined aquifer, however, sits below a layer of impermeable material. Most of the water in the Temescal Basin is in an unconfined aquifer system. Groundwater conditions change over time in response to increased pumping or decreased rainfall. Water level declines can lead to problems with wells not having access to water for pumping and can also cause problems for interconnected surface water, such as potentially reducing flow in streams and affecting plants and animals that rely on water.

Taylor discussed the importance of groundwater as a source of water in California. He compared the storage capacity of surface water reservoirs in California, totaling 50 million acre-feet of water, to a recent assessment of the storage capacity of groundwater basins. This capacity is estimated between 850 million and 1.3 billion acre-feet in the over 500 groundwater basins in California. Groundwater is important locally and statewide.

Discussion/Q&A

Hughes opened the floor for questions and comments. Participants were encouraged to answer the following questions: 1) What interests you about groundwater? and 2) Do you have questions or concerns about groundwater? Questions and comments from participants are summarized below.

- How is water cleaned?
- Why might water taste bad?
- Why does water taste different in different areas?
- Education on water use is important.

Introduction to the Sustainable Groundwater Management Act

Taylor presented the background and purpose of the SGMA. SGMA is California State legislation established in 2014 following a long period of state-wide drought. SGMA has altered how water is managed in California. It established requirements for state agencies to assess groundwater basin priorities and assign them as very low, low, medium, or high priority basins for sustainability planning. The Department of Water Resources (DWR) has designated the Temescal Basin as medium priority basin. SGMA gives local agencies guidance for how to assess sustainability. There is the option for the state to intervene if local agencies are not acting, but that is a last resort. There is also financial assistance in the form of grants available from the state. The Temescal GSA, comprised of the City of Corona, the City of Norco, and Home Gardens County Water District, has received a grant for plan preparation.

Taylor explained that SGMA establishes requirements and specifies deadlines for achieving and maintaining groundwater sustainability. These requirements include forming a GSA and preparing a GSP to facilitate local groundwater management informed by stakeholders. SGMA requires that groundwater basins designated as medium or high priority form GSAs and file GSPs by January 31, 2022. They must then demonstrate sustainable groundwater management by 2042. GSPs outline how to achieve sustainability based on SGMA guidelines. This includes ongoing monitoring and management, annual reporting of groundwater conditions, and updates to the GSP every 5 years.

Introduction to the Temescal Basin

Taylor reviewed the Temescal Basin, which covers most of the City of Corona, about half of the City of Norco, and the western part of the Home Gardens County Water District. The Temescal Basin is bounded by the Chino Subbasin to the north, the Riverside-Arlington Subbasin to the east, the Bedford-Coldwater Subbasin to the south, and the Coastal Plain of Orange County on the west. The Temescal Basin and surrounding basins are one connected hydrologic area that has historically been managed together. DWR has designated the Temescal Basin as medium priority due to significant reliance on groundwater supplies.

Taylor described the organization of the Temescal GSA. The Temescal GSA provides for decision-making, technical support, and outreach to the community. The City of Corona, the City of Norco, and

Home Gardens County Water District formed the Temescal GSA in 2017 through a memorandum of understanding. The City of Corona is leading the GSP effort with support from the Corona Department of Water and Power staff and additional consultants. The Technical Advisory Committee (TAC) provides input during GSP preparation, and TAC members communicate with other agencies and interested parties about GSP development. The GSP process is founded on public engagement and stakeholder outreach, which is the purpose of the public workshops.

Taylor explained that more information on the Temescal Basin and the Temescal GSP can be found in the Draft Plan Area Chapter that has been prepared. It is available for review on the Temescal GSA website (CoronaCA.gov/Groundwater). The Draft Plan Area Chapter includes the location of the Temescal Basin in relation to other basins and local hydrology, the public agencies with jurisdictional authority in the area, the general density of existing wells by type, and the current and historical land uses.

Groundwater Sustainability Plan Development

Taylor next provided a summary of the Temescal GSP workplan and schedule. Major Temescal GSP elements include data compilation; plan area; hydrogeologic conceptual model; groundwater model; sustainability goals and criteria; management actions, projects, and monitoring; and plan development. Data compilation and a Draft Plan Area Chapter are already complete. The next steps are to develop the hydrogeological conceptual model, assess current and historical groundwater conditions, and construct a numerical groundwater model. These will be used to calculate groundwater budgets and sustainable yield, so it is known how much groundwater is available for use. After that comes creation of sustainability goals and criteria, which define sustainability in the Temescal Basin. Management actions to meet sustainability goals will then be identified, and a monitoring program will be established. The Draft Temescal GSP will be made available for public review in Summer 2021 after completion of these steps. The final Temescal GSP will be completed by Fall 2021 prior to submittal to DWR.

Indicators for Sustainability

Taylor provided an overview of the six indicators for evaluating groundwater sustainability in a basin: chronic lowering of groundwater levels, reduction of groundwater storage, degradation of water quality, depletion of interconnected surface water affecting beneficial uses, land subsidence affecting land uses, and seawater intrusion (not applicable in the Temescal Basin). Sustainability is defined as local management and use of groundwater in a way that can be maintained without experiencing undesirable results. Undesirable results will be determined for each of the criteria and minimum thresholds will be developed to avoid those results.

Taylor explained the process for achieving sustainability in the Temescal Basin. First, goals and thresholds will be set for each sustainability indicator in the Temescal GSP. Next, the implementation phase will occur, and a monitoring plan will be established. Monitoring will focus on assessing each indicator and will likely include measures for monitoring groundwater levels, water quality, and land subsidence. In addition, the Temescal GSA will undertake projects, such as ones that increase water supply availability, and management actions, such as reducing water use or demand. All components for achieving sustainability will be revisited every 5 years. Monitoring results will be used to refine the Temescal GSP to help better reflect local conditions and changes so that sustainability can be a dynamic long-term practice for the Temescal GSA and Temescal Basin.

Discussion/Q&A

Hughes opened the floor for questions and discussion. Participants were encouraged to answer the following questions: 1) What water supply and quality goals are important to you? and 2) Is there information the project team should review?

- Are there more workshops scheduled?
- Can you share a bit about the efforts being taken to engage people and any future plans to engage the community in the plan?
- Orange County Water District (OCWD) thanks you for reaching out about the GSP process and will be submitting written comments. In 2017, OCWD submitted an alternative to a GSP for the Orange County Groundwater Basin that was approved in 2019. The Temescal Basin is adjacent to that basin, and coordination with Chino and our basin will be important in moving this item forward.
- OCWD owns and manages a large wetland and riparian habitat behind the Prado Dam. That area is dependent on interconnected surface water, so it will be important for the GSP to invest in groundwater dependent ecosystems.

How to Get Involved

Hughes explained how members of the public could be involved throughout GSP preparation, noting the importance of involving the many diverse communities and stakeholders of Corona, Norco, and Home Gardens to create a strong GSP for the Temescal Basin. There will be three public workshops, including the current one, to allow for people to get information about the GSP and give their feedback on its development. Prior to each workshop there will be several outreach methods to circulate information and boost attendance. These methods include emails, social media posts, and fact sheets. The next workshop will be held in winter of 2021 and will focus on sustainability criteria. Another workshop focused on management actions will be held in the spring of 2021.

Hughes spoke about other opportunities to get information about GSP development and provide comment. In addition to the workshops, TAC meetings are open to the public. The public may listen in on those meetings and speak during the public comment portion. The project team will also be giving periodic updates at City Council and Board Meetings, which the public can also attend and comment on. This will be true as well for the Adoption Hearing for the final GSP. Before the Adoption Hearing, there will be a 90-day public comment period.

In addition to these opportunities, draft chapters and other materials will be posted on the project website hosted by the City of Corona Department of Water and Power: CoronaCA.gov/Groundwater. The public can use the form on the website to make comments. Anyone who wants to be included on the mailing list should email Groundwater@CoronaCA.gov. People on the mailing list will receive updates on upcoming public workshops, meetings open to the public, and the availability of draft chapters for comment on the website.

Discussion/Q&A

Comments and questions are summarized below.

- It would be helpful to send out questions or topics for discussion ahead of the workshops to give people time to think about their responses.

6. Wrap-up and Closing

Hughes thanked everyone for participating and encouraged people to sign up for updates on upcoming workshops by emailing Groundwater@CoronaCA.gov to be added to the mailing list. The next public workshop will be held in winter of 2021.

Appendix A

Presentation Slides

TEMESCAL GSP PUBLIC WORKSHOP 1
TEMESCAL GSP TALLER COMUNITARIO 1

About the GSP

The Sustainable Groundwater Management Act or "SGMA" is a California law that gives local agencies new tools for managing groundwater and planning for the future. The City of Corona, City of Norco, and Home Gardens County Water District have formed the Temescal Groundwater Sustainability Agency (Temescal GSA) in order to make a **Groundwater Sustainability Plan** for the Temescal Basin. Since groundwater is such an important resource for everyone, we need your help!

Sobre el GSP

La Ley de Gestión Sostenible de Aguas Subterráneas o "SGMA", por sus siglas en inglés, es una ley de California que otorga a las agencias locales nuevas herramientas para gestionar las aguas subterráneas y planificar para el futuro. La Ciudad de Corona, la Ciudad de Norco y el Distrito Hídrico del Condado de Home Gardens han formado la Agencia de Sostenibilidad de Aguas Subterráneas de la Cuenca de Temescal (Temescal Groundwater Sustainability Agency) o Temescal GSA a fin de crear un **Plan de Sostenibilidad de Aguas Subterráneas** para la Cuenca de Temescal. Dado que las aguas subterráneas son un recurso muy importante para todos, ¡necesitamos su ayuda!

TEMESCAL GSA

TEMESCAL GROUNDWATER SUSTAINABLY PLAN PUBLIC WORKSHOP 1

TEMESCAL GSP TALLER COMUNITARIO 1

SEPTEMBER 29, 2020 / 29 DE SEPTIEMBRE DE 2020

Home Gardens County Water District
3832 N. Grant St., Corona, Calif. 92879
(951) 737-4741

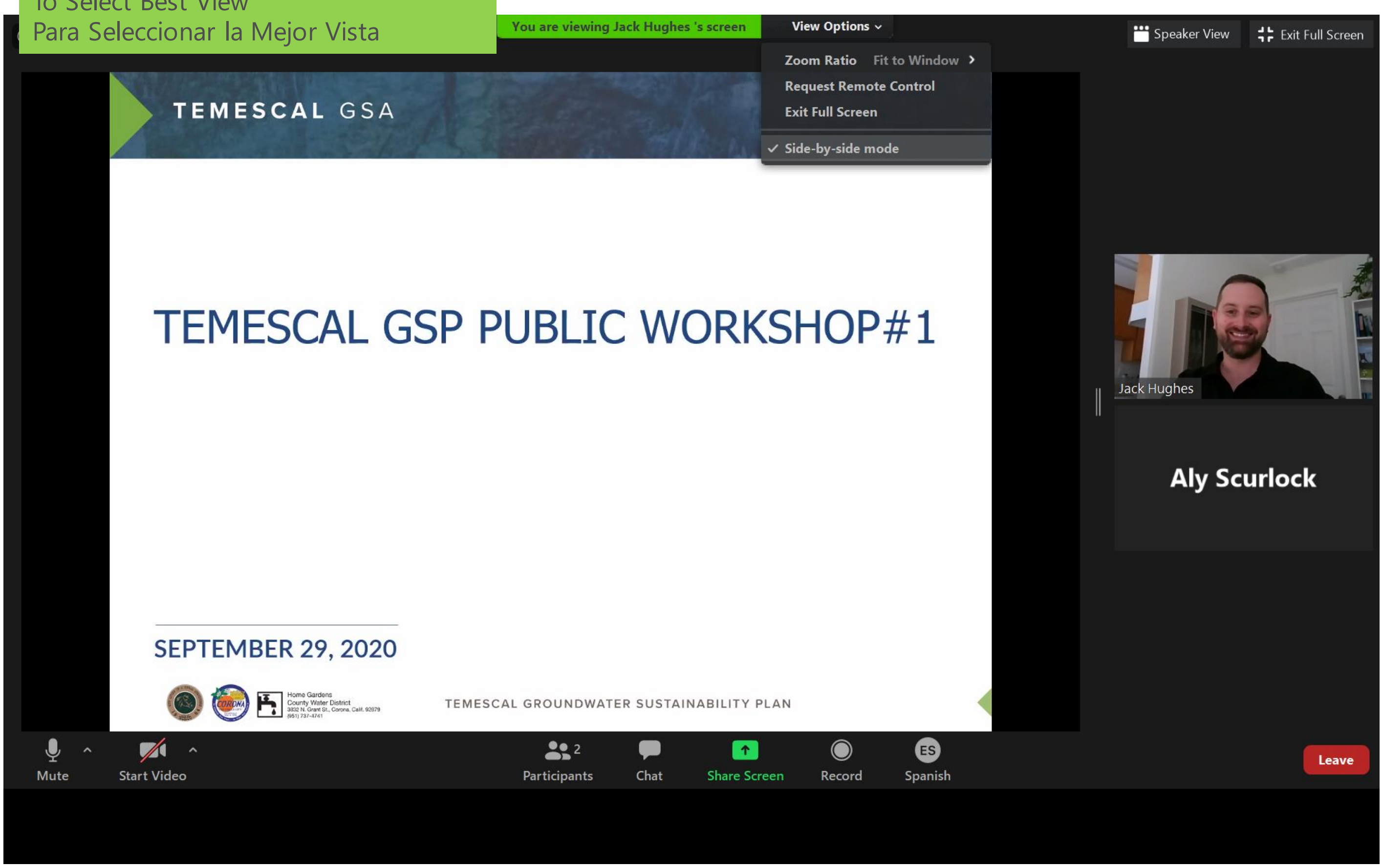
WELCOME

BIENVENIDOS

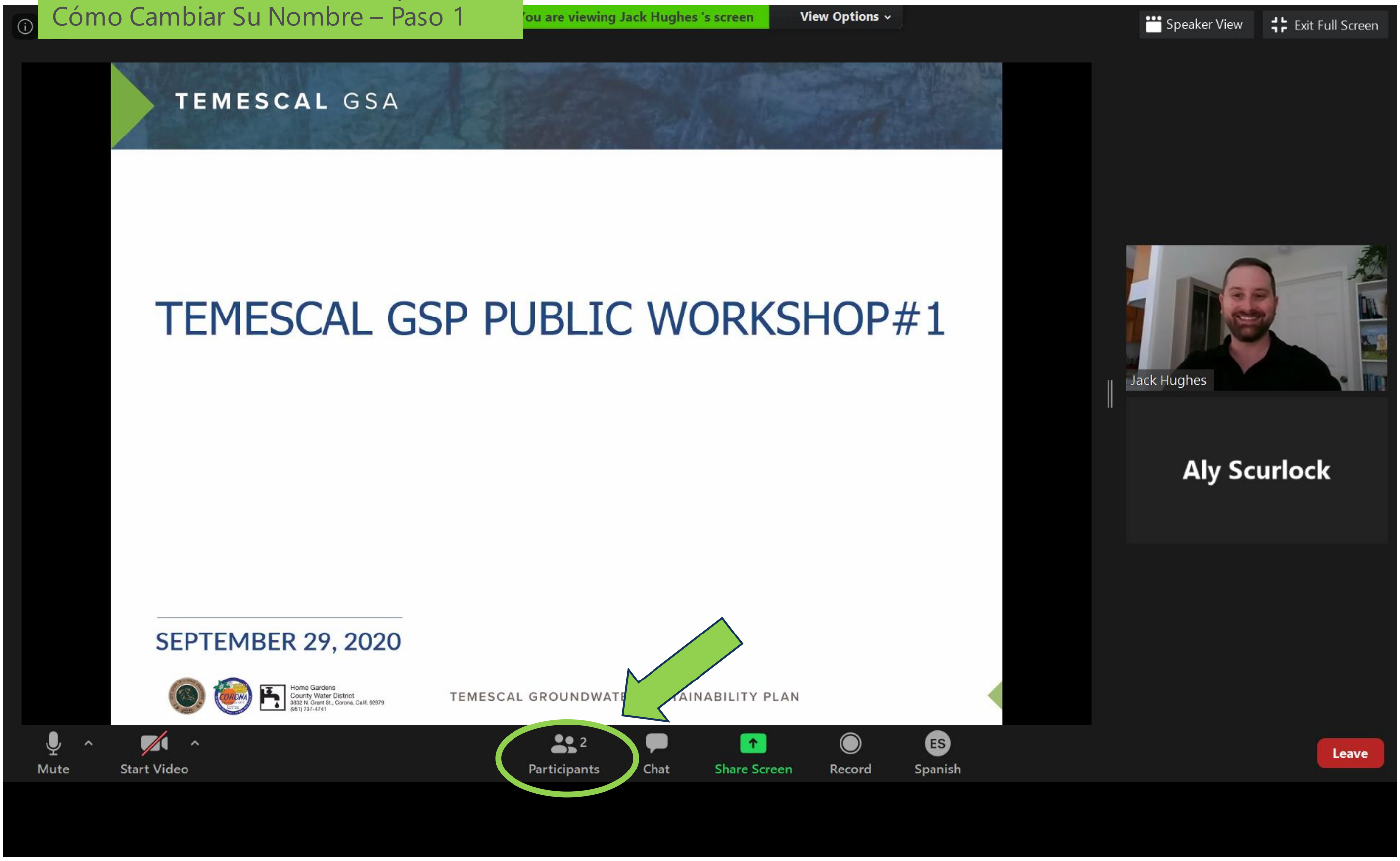
HOW TO USE ZOOM

CÓMO UTILIZAR ZOOM

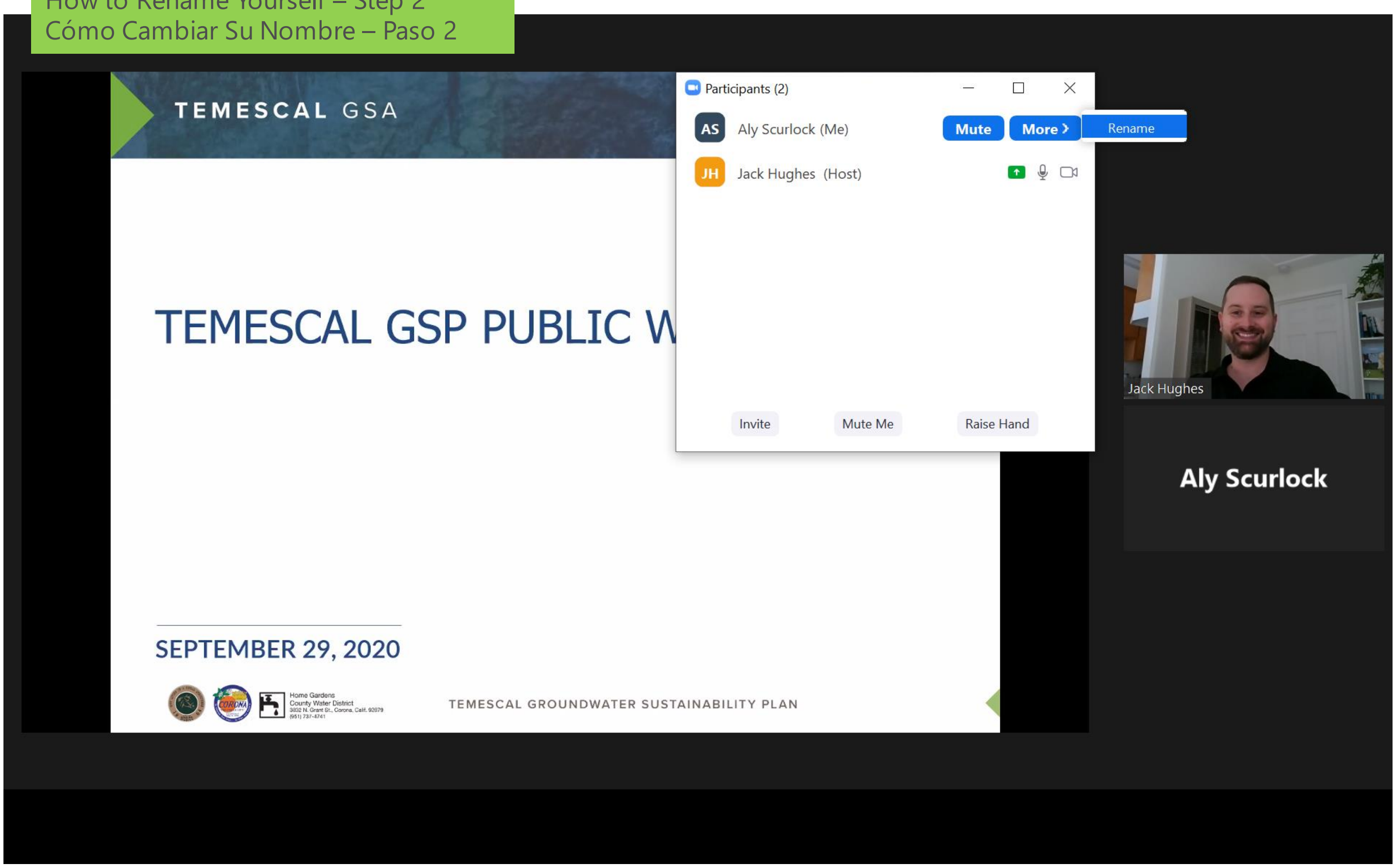
To Select Best View
Para Seleccionar la Mejor Vista



How to Rename Yourself – Step 1
Cómo Cambiar Su Nombre – Paso 1



How to Rename Yourself – Step 2
Cómo Cambiar Su Nombre – Paso 2



WARM UP QUESTIONS
PREGUNTAS DE CALENTAMIENTO

» Where does the water in your tap come from?

» ¿De dónde viene el agua de tu grifo/llave?

a. Local rivers and lakes / Ríos o lagos locales
b. Local groundwater / Aguas subterráneas locales
c. Imported surface water / Agua superficial importada

» How much water comes from nearby sources?

» ¿Cuánta agua proviene de fuentes cercanas?

a. 0 to 20 percent / 0 a 20 por ciento
b. 20 to 40 percent / 20 a 40 por ciento
c. 40 to 60 percent / 40 a 60 por ciento
d. 60 to 100 percent / 60 a 100 por ciento

TEMESCAL GSA

WORKSHOP PURPOSE
PROPÓSITO DEL TALLER

» Give information about groundwater
Dar información sobre las aguas subterráneas.

» Introduce Sustainable Groundwater Management Act, the Temescal Groundwater Sustainability Agency, the Temescal Basin, and Groundwater Sustainability Plans.
Introducir la Ley de Gestión Sostenible de las Aguas Subterráneas, la Agencia de Sostenibilidad de las Aguas Subterráneas Temescal y la Cuenca del Temescal.

» Learn about your groundwater interests and what is important for you for the future of groundwater in the Temescal Basin.
Conocer sus intereses sobre el agua subterránea y lo que es importante para usted para el futuro del agua subterránea en la Cuenca del Temescal.

INTRODUCTIONS
PRESENTACIONES

TEMESCAL GSA

TIPS FOR A PRODUCTIVE DISCUSSION
CONSEJOS PARA UNA DISCUSIÓN PRODUCTIVA

» One speaker at a time
Habla solo una persona la vez

» Keep input concise
Sea conciso

» Actively listen
Escuche activamente

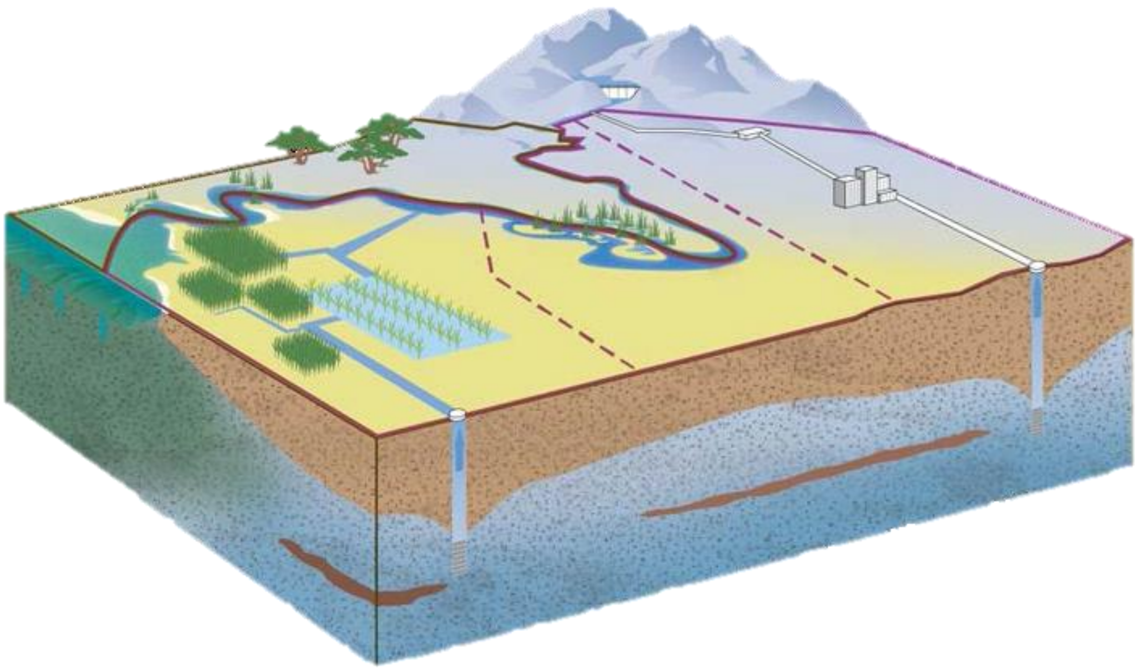
» Offer solutions
Ofrezca soluciones

YOUR INPUT MATTERS
SU OPINIÓN ES IMPORTANTE

- The planning team will consider your comments as they prepare the Groundwater Sustainability Plan.
  El equipo de planificación considerará sus comentarios mientras prepara el Plan de sostenibilidad de aguas subterráneas.
- Your input will be recorded, organized thematically, and presented in a workshop summary on the project website.
  Su aportación será registrada, organizada temáticamente y presentada en un resumen del taller en el sitio web del proyecto.

INTRODUCTION TO GROUNDWATER
INTRODUCCIÓN A LAS AGUAS SUBTERRÁNEAS

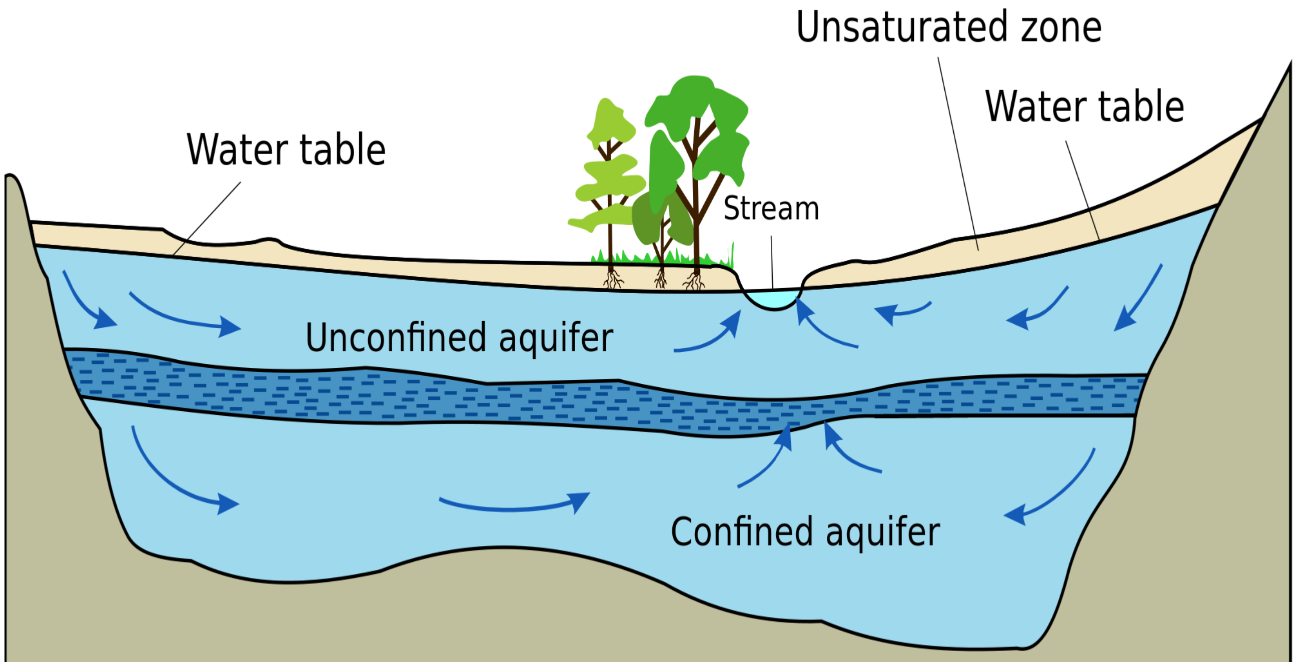
WHAT IS GROUNDWATER?
¿QUÉ SON LAS AGUAS SUBTERRÁNEAS?



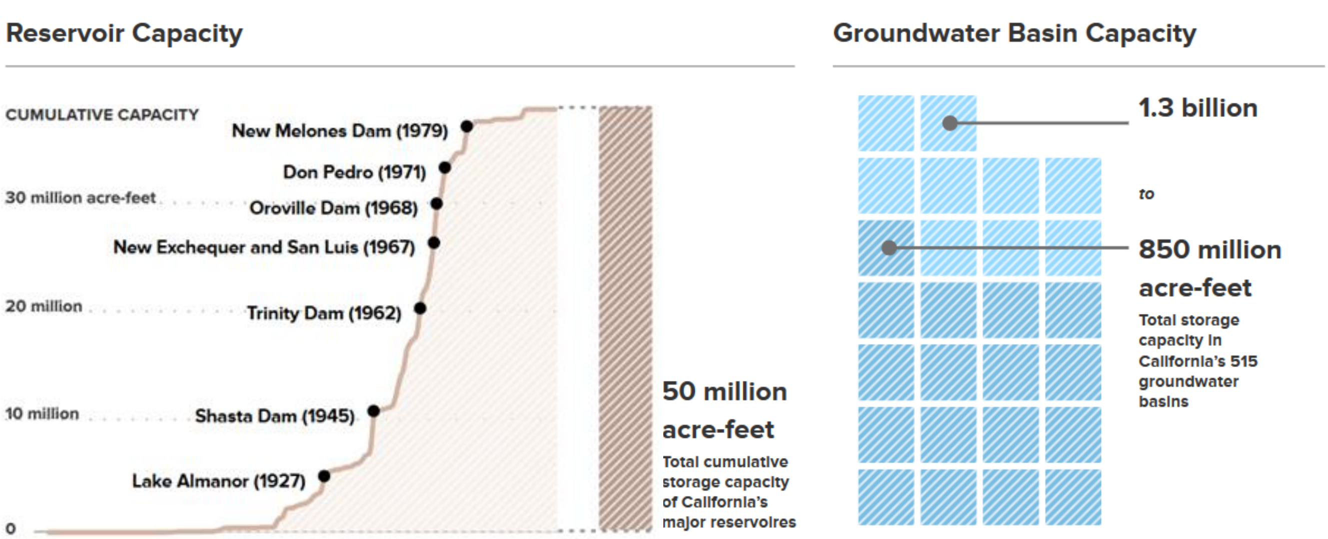
TEMESCAL GSA

HOW IS GROUNDWATER ACCESSED?
¿CÓMO SE ACCEDE A LAS AGUAS SUBTERRÁNEAS?

HOW DOES GROUNDWATER OCCUR?
¿CÓMO SURGEN LAS AGUAS SUBTERRÁNEAS?



GROUNDWATER IS IMPORTANT
LAS AGUAS SUBTERRÁNEAS SON IMPORTANTES



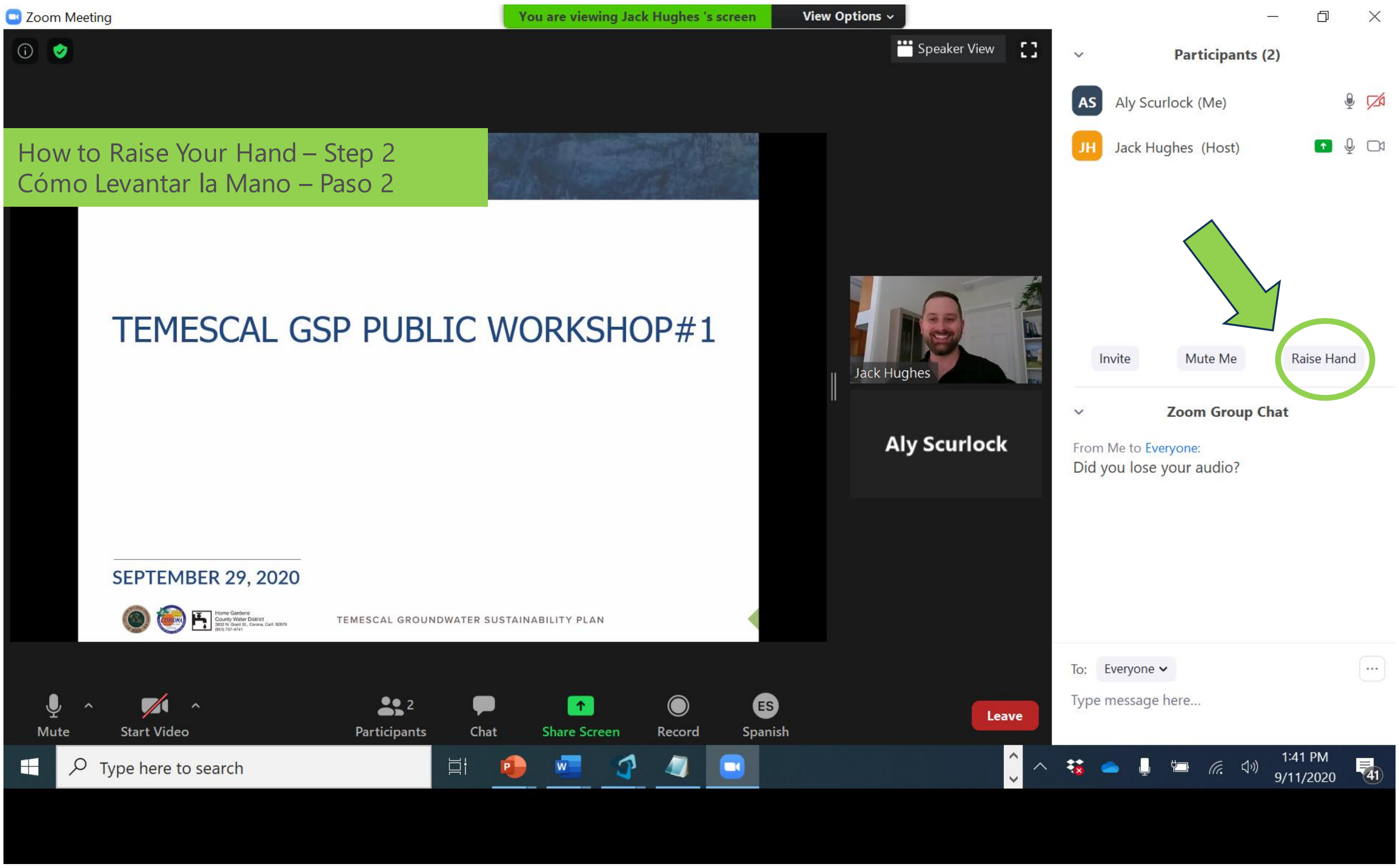
DISCUSSION AND Q&A
DISCUSIÓN / PREGUNTAS Y RESPUESTAS

» What interests you about groundwater?
¿Qué le interesa sobre las aguas subterráneas?

» Do you have questions or concerns about groundwater?
¿Tiene dudas o preocupaciones sobre las aguas subterráneas?

» What else?
¿Qué más?

How to Raise Your Hand– Step 1
Cómo Levantar la Mano – Paso 1



Zoom Meeting
You are viewing Jack Hughes 's screen
View Options
Speaker View
How to Raise Your Hand – Step 2
Cómo Levantar la Mano – Paso 2
TEMESCAL GSP PUBLIC WORKSHOP#1
SEPTEMBER 29, 2020
TEMESCAL GROUNDWATER SUSTAINABILITY PLAN
Jack Hughes
Aly Scurlock
Participants (2)
Aly Scurlock (Me)
Jack Hughes (Host)
Invite
Mute Me
Raise Hand
Zoom Group Chat
From Me to Everyone:
Did you lose your audio?
To: Everyone
Type message here...
Mute
Start Video
Participants
Chat
Share Screen
Record
Spanish
Leave
Type here to search
1:41 PM
9/11/2020

How to Mute and Start/Stop Video
Cómo Silenciar e Iniciar/Detener el Video
View Options
Speaker View
Exit Full Screen
TEMESCAL GSA
TEMESCAL GSP PUBLIC WORKSHOP#1
TEMESCAL GROUNDWATER SUSTAINABILITY PLAN
Jack Hughes
Aly Scurlock
Mute
Start Video
Participants
Chat
Share Screen
Record
Spanish
Leave

DISCUSSION AND Q&A
DISCUSIÓN / PREGUNTAS Y RESPUESTAS

- What interests you about groundwater?
  ¿Qué le interesa sobre las aguas subterráneas?
- Do you have questions or concerns about groundwater?
  ¿Tiene dudas o preocupaciones sobre las aguas subterráneas?
- What else?
  ¿Qué más?

Groundwater@CoronaCA.gov

WHAT IS THE SUSTAINABLE GROUNDWATER MANAGEMENT ACT?
¿QUÉ ES LA LEY DE GESTIÓN SOSTENIBLE DE LAS AGUAS SUBTERRÁNEAS?

SUSTAINABLE GROUNDWATER MANAGEMENT ACT (SGMA)

Landmark legislation in 2014

- Recognizes that groundwater management in California is best accomplished locally
- Includes State intervention if necessary
- State assistance is also available

Legislación histórica en 2014

- Reconoce que la gestión de las aguas subterráneas en California se logra mejor a nivel local
- Incluye intervención estatal si es necesario
- La asistencia estatal también está disponible

TEMESCAL GSA

SUSTAINABLE GROUNDWATER MANAGEMENT ACT (SGMA)

Includes comprehensive requirements for:

- Forming groundwater sustainability agency (GSA)
- Preparing groundwater sustainability plan (GSP)

Incluye diversos requisitos para:

- Agencia de sostenibilidad de las aguas subterráneas (GSA)
- Preparación de un plan de sostenibilidad de las aguas subterráneas (GSP)

SGMA HAS A REQUIRED TIMELINE
SGMA TIENE UN CRONOGRAMA REQUERIDO

TEMESCAL GSA

INTRODUCTION TO THE TEMESCAL BASIN
INTRODUCCIÓN A LA CUENCA DEL TEMESCAL

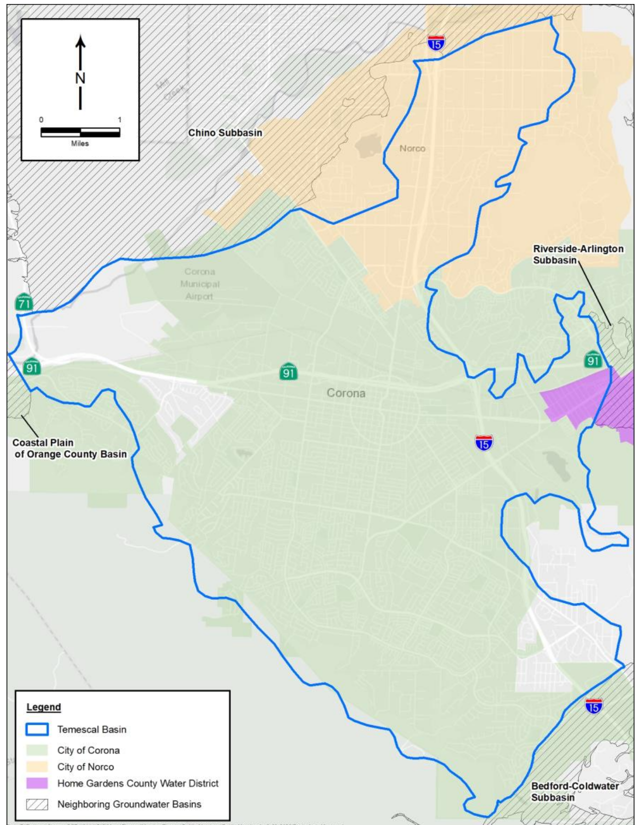
THE TEMESCAL BASIN
LA CUENCA DEL TEMESCAL

» DWR categorized as a Medium Priority Basin

Catalogada por DWR como Cuenca de prioridad media

» Contiguous and connected

Contigua y conectada



TEMESCAL GSA

GSA ORGANIZATION / ORGANIZACÍON

City of Corona

City of Norco

Home Gardens County Water District

Department of Water and Power
Departamento de Aqua y Energía

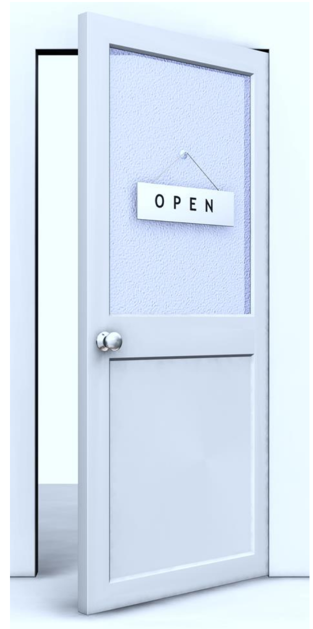
Staff and Consultants
Personal y Consultores
- Corona DWP Staff
- Todd Groundwater
- Carollo Engineers
- Kearns & West

Technical Advisory Committee
Comité Asesor Técnico
- Public agencies/Agencias públicas
- Local businesses/Empresas locales
- Well owners/Propietarios de pozos
- Community interests/Intereses comunitarios

Other agencies and interested parties/Otras agencias y partes interesadas

DRAFT PLAN AREA CHAPTER
ESQUEMA DEL ÁREA DEL PLAN

Description of Plan Area
Descripción del Área de Plan



» Jurisdictional boundaries
Limites jurisdiccionales

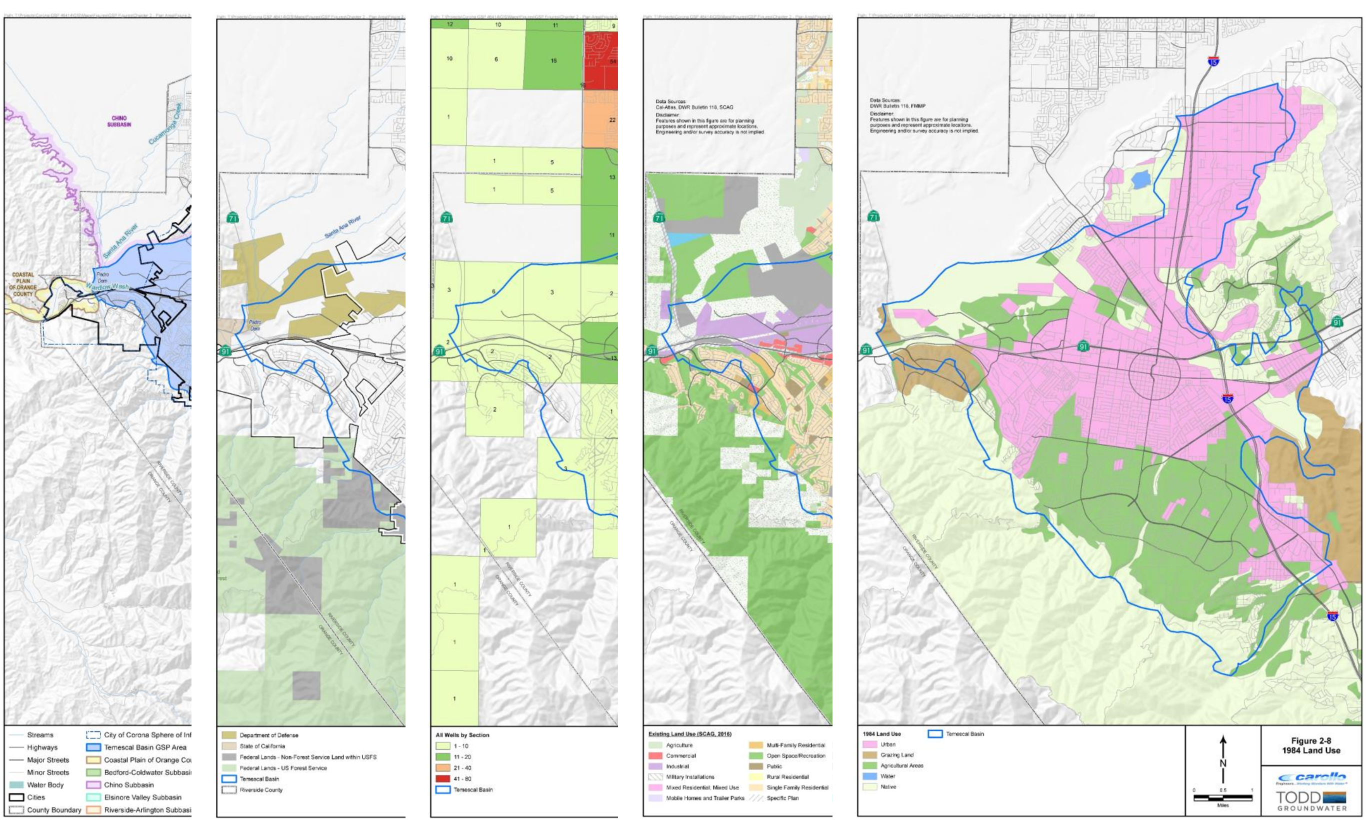
» Existing monitoring and management
Monitoreo y gestión existentes

» Well distribution
Distribución de pozos

» Land use designations and description
Designaciones y descripción del uso de la tierra

TEMESCAL GSA

PLAN AREA / ÁREA DEL PLAN



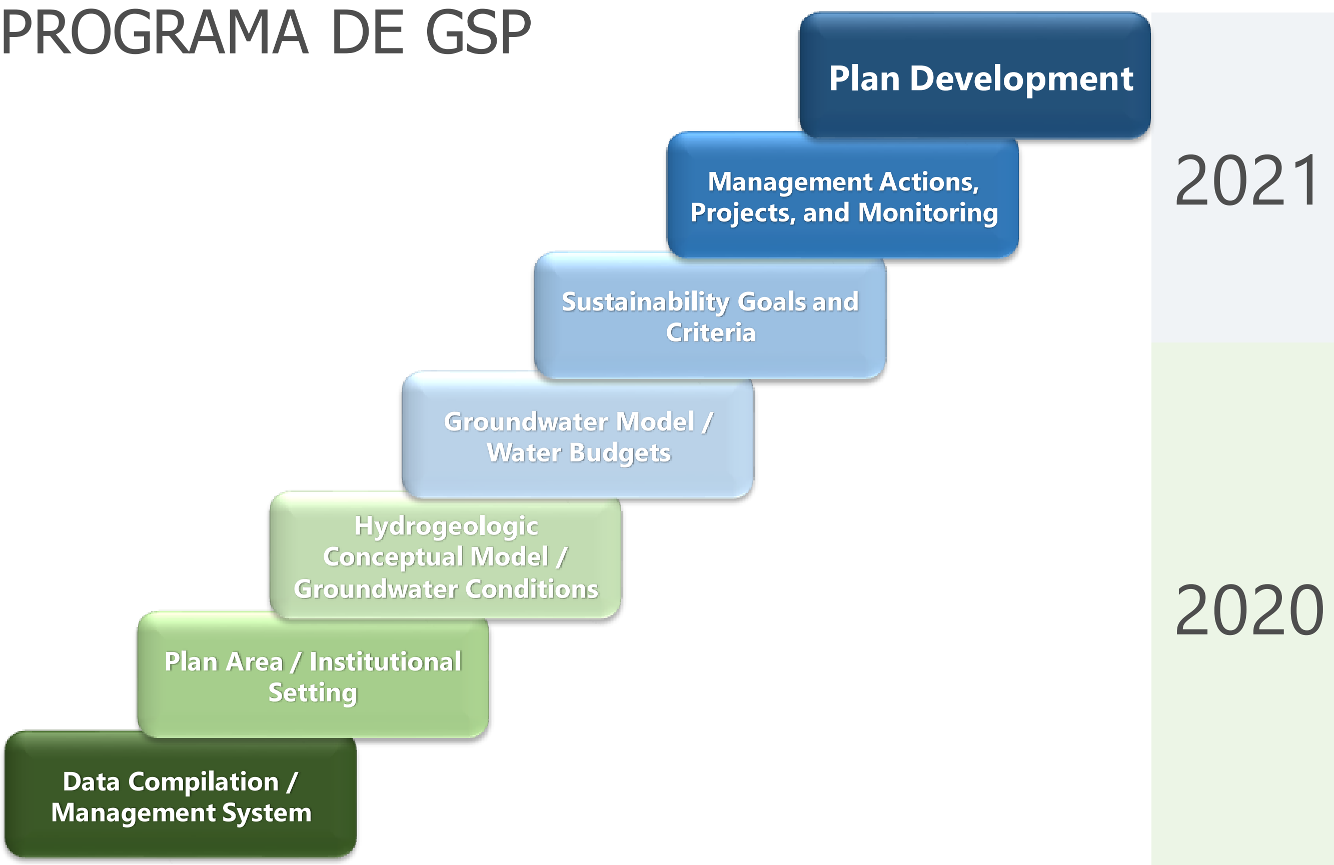
GROUNDWATER SUSTAINABILITY PLAN DEVELOPMENT

DESARROLLO DE PLAN DE SOSTENIBILIDAD DE AGUAS SUBTERRÁNEAS

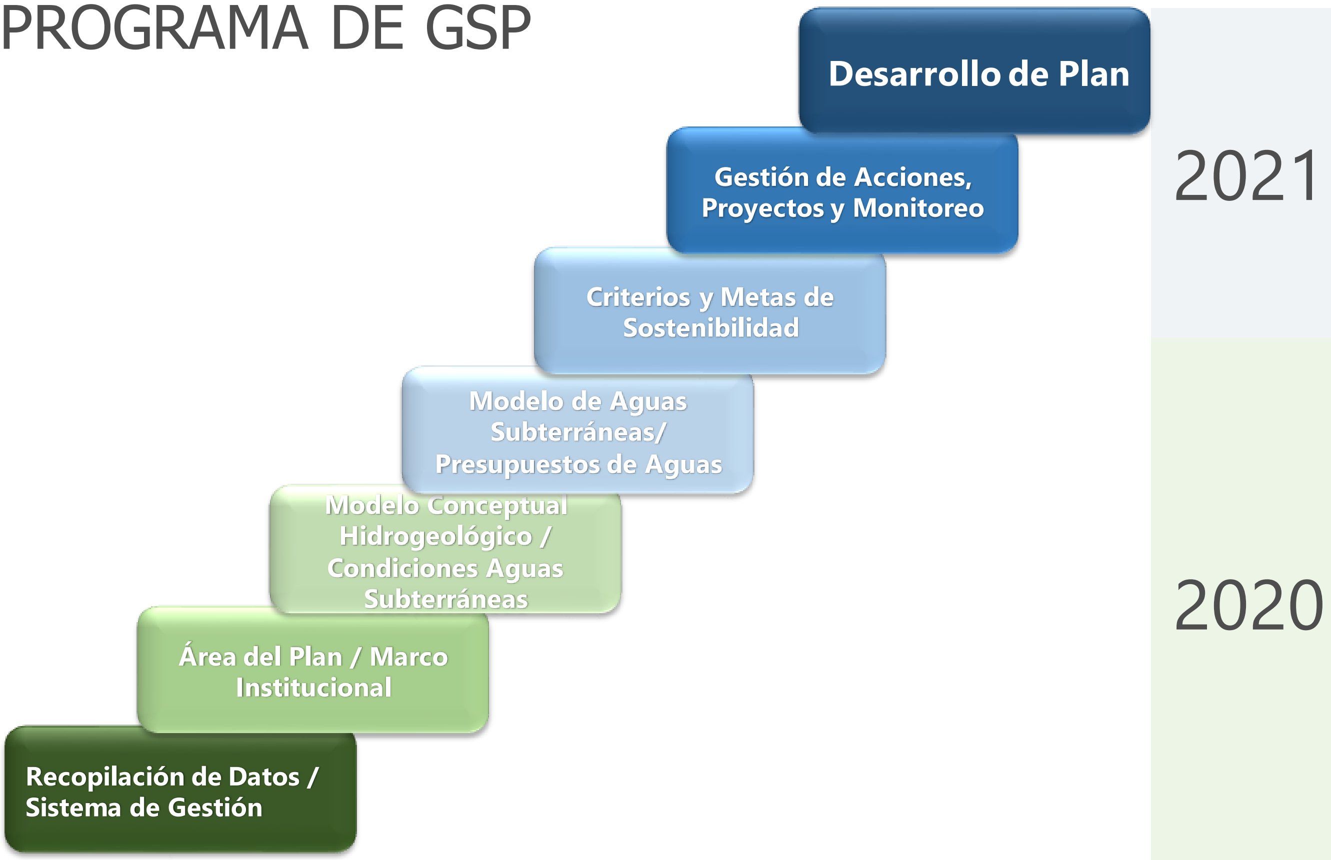
TEMESCAL GSA

GSP SCHEDULE

PROGRAMA DE GSP



GSP SCHEDULE
PROGRAMA DE GSP



TEMESCAL GSA

WHAT IS SUSTAINABILITY?
¿QUÉ ES LA SOSTENIBILIDAD?

SUSTAINABILITY CRITERIA
CRITERIOS DE SOSTENIBILIDAD

Chronic lowering of groundwater levels
Disminución crónica de los niveles de aguas subterráneas

Reduction of groundwater storage
Reducción del almacenamiento de aguas subterráneas

Degradation of water quality
Degradación de la calidad del agua

Depletions of interconnected surface water affecting beneficial uses
Agotamiento de las aguas superficiales interconectadas que afectan a los usos beneficiosos

Land subsidence affecting land uses
El hundimiento de la tierra que afecta a los usos de la tierra

Seawater intrusion (not applicable here)
Intrusión de agua de mar (no aplicable aquí)

TEMESCAL GSA

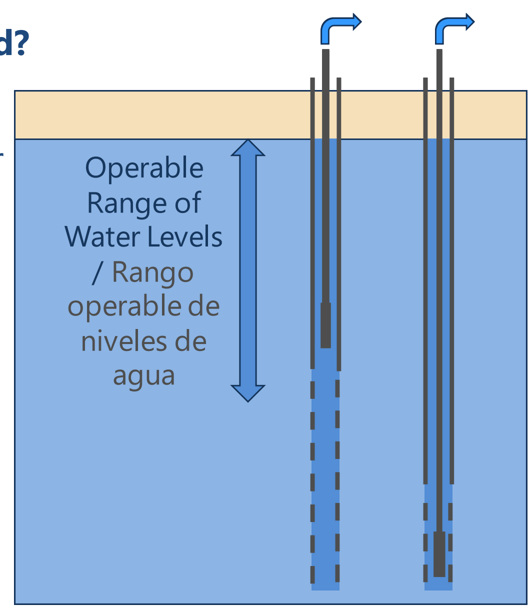
EXAMPLE SUSTAINABILITY CRITERIA: GROUNDWATER LEVELS
EJEMPLO DE CRITERIOS DE SOSTENIBILIDAD: NIVELES DE AGUAS SUBTERRÁNEAS

What undesirable effects do we want to avoid?

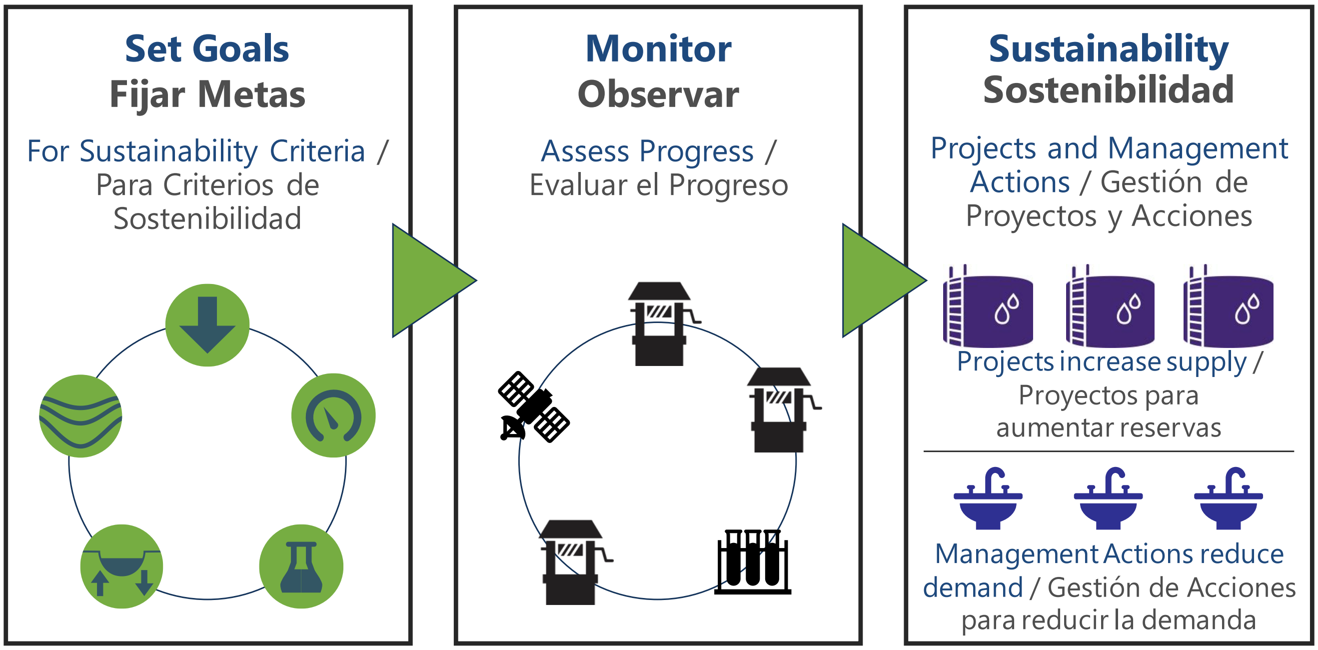
» Impacts to shallow wells?
» Maintenance of municipal and industrial water supply?
» Other?

¿Qué efectos indeseables queremos evitar?

» ¿Impactos en pozos poco profundos?
» ¿Mantenimiento del suministro de agua municipal e industrial?
» ¿Otros?



ACHIEVING SUSTAINABILITY
LOGRAR LA SOSTENIBILIDAD



TEMESCAL GSA

DISCUSSION AND Q&A
DISCUSIÓN / PREGUNTAS Y RESPUESTAS

» What water supply and quality goals are important to you?

¿Qué objetivos de suministro y calidad de agua son importantes para usted?

» Is there information the project team should review?

¿Hay información que el equipo del proyecto debe revisar?

» What else?

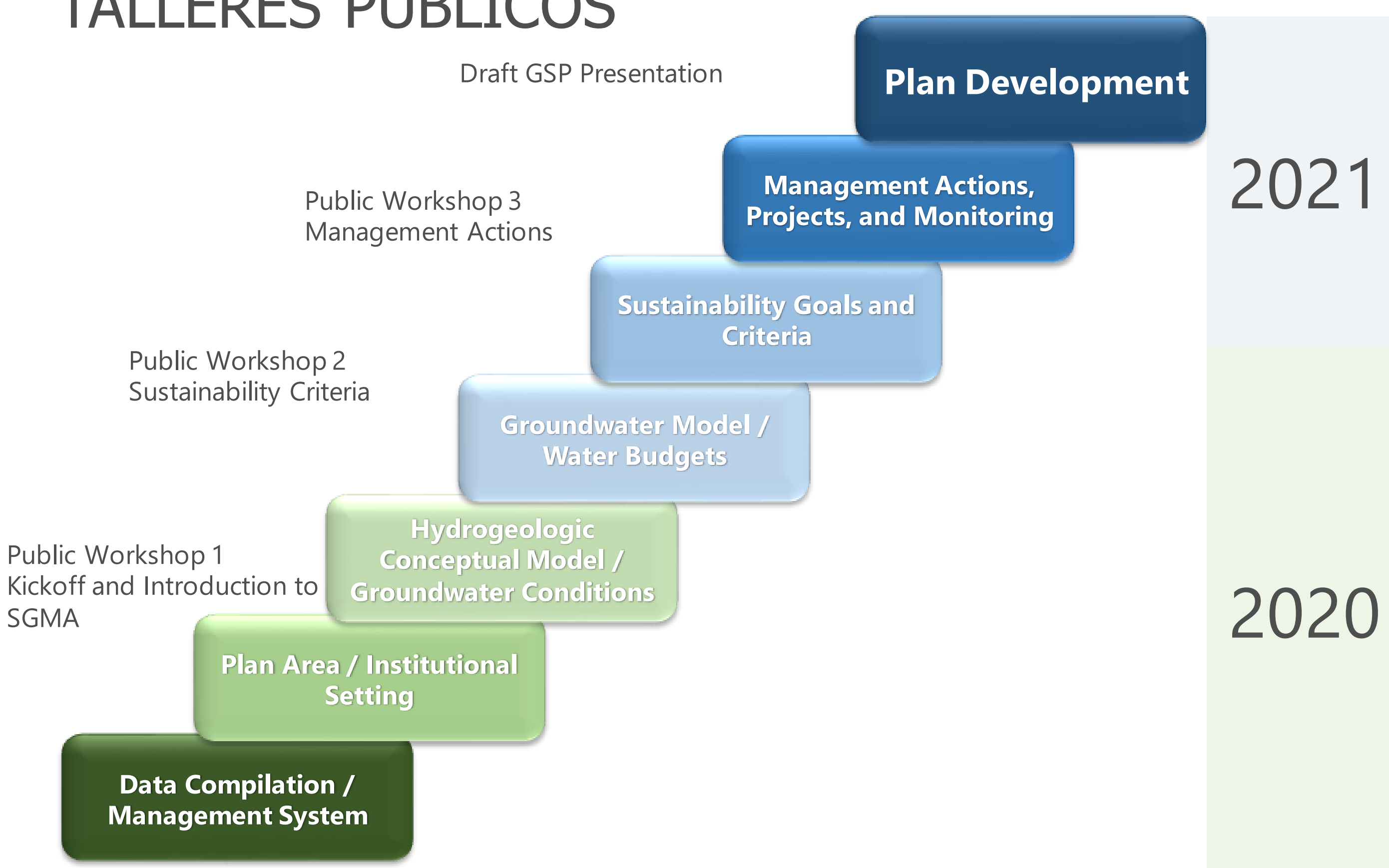
¿Qué más?

Groundwater@CoronaCA.gov

HOW CAN YOU GET INVOLVED?
¿CÓMO PUEDE INVOLUCRARSE?

TEMESCAL GSA

PUBLIC WORKSHOPS
TALLERES PÚBLICOS



PUBLIC WORKSHOPS
TALLERES PÚBLICOS

TEMESCAL GSA

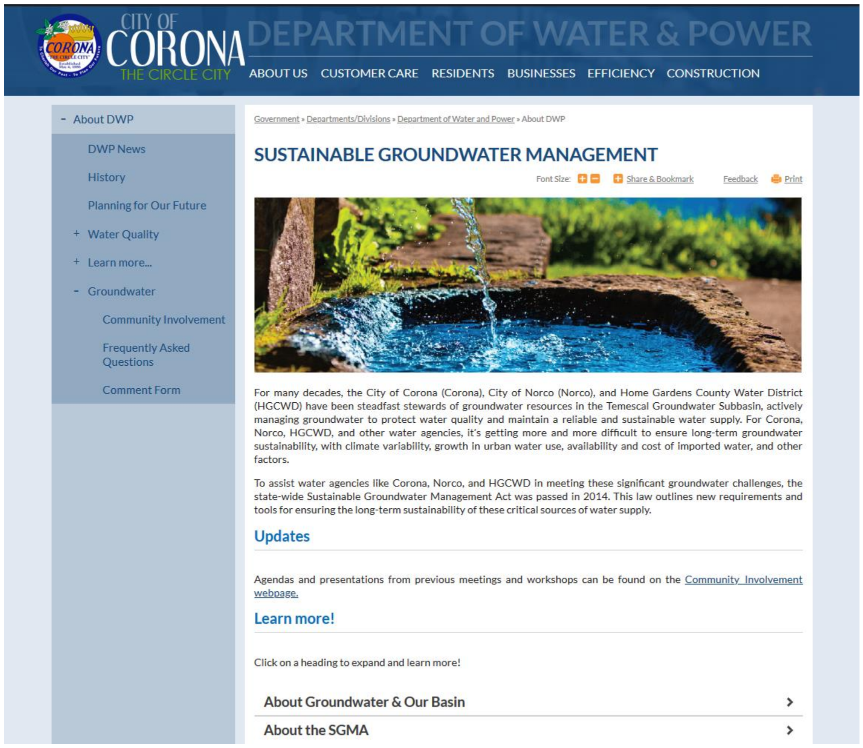
OTHER MEETINGS
OTRAS REUNIONES

» Technical Advisory Committee Meetings
Reuniones del Comité Asesor Técnico

» Updates at City Council and Board Meetings
Actualizaciones en las reuniones del consejo y la junta de la ciudad

» Adoption Hearing for Final GSP
Audiencia de adopción del GSP final

WEBSITE
SITIOS WEB



TEMESCAL GSA

HOW TO KEEP IN TOUCH
CÓMO MANTENERSE EN CONTACTO

» Sign up for the mailing list by emailing Groundwater@CoronaCA.gov
Regístrese en la lista de correo enviando un correo electrónico a Groundwater@CoronaCA.gov

» Visit the website to view information, review draft chapters and other materials, and to submit comments : www.CoronaCA.gov/Groundwater
Visite el sitio web para ver información, revisar borradores de capítulos y otros materiales, y enviar comentarios: www.CoronaCA.gov/Groundwater

THANK YOU

GRACIAS

Temescal Basin Public Workshop 2

Workshop Summary

Contents

Appendix

A. Presentation Slides

1. Background

On September 16, 2014, the Governor of California signed into law a legislative package comprised of three bills: Assembly Bill (AB) 1739, Senate Bill (SB) 1168, and SB 1319. These laws are collectively known as the Sustainable Groundwater Management Act (SGMA). SGMA (pronounced sigma) defines sustainable groundwater management as the "management and use of groundwater in a manner that can be maintained without causing undesirable results." This means keeping balanced levels of pumping and recharge of groundwater while assuring reliable water quality. SGMA provides a comprehensive framework for basin sustainability, additional technical analysis, and quantification of many aspects of basin sustainability and management. This includes extensive and detailed descriptions of the basin setting and conditions and more comprehensive monitoring of groundwater use, quality, and levels, including metering of groundwater usage.

SGMA requires the formation of a locally controlled Groundwater Sustainability Agency (GSA), which is responsible for developing and implementing a Groundwater Sustainability Plan (GSP). The GSP outlines how to achieve groundwater sustainability within 20 years of its adoption. The City of Corona, City of Norco, and Home Gardens County Water District have formed the Temescal Basin Groundwater Sustainability Agency (Temescal GSA) to create a GSP for the Temescal Basin.

GSAs must consider the interests of all beneficial uses and users of groundwater. The GSA must provide opportunities for public engagement and active involvement of diverse social, cultural, and economic elements of the population. The Temescal GSA recognizes that stakeholder and public engagement is critical to ensuring that the full range of interests of all beneficial uses and users of groundwater are represented during GSP development.

To share information and get input from stakeholders and the public, the Temescal GSA is holding a series of public workshops. The first public workshop, conducted on September 29, 2020, focused on communicating basic information about SGMA, the Temescal Basin, GSP development, and what sustainability means in a GSP. The second public workshop, conducted on March 2, 2021, focused on providing updates on the Temescal GSP development and introducing the hydrogeologic conceptual model, groundwater conditions, and water budget. This summary documents the outreach methods, time and location, attendance, and major topics presented and discussed at the second public workshop.

2. Pre-Workshop Outreach

The Temescal GSA used a variety of methods to inform stakeholders and community members about the workshop and encourage participation, as shown in Table 1 on the next page.

Table 1: Pre-Workshop Outreach Methods

Method	Description
Website	Workshop information was posted on the project website, hosted by the City of Corona's Department of Water and Power, and was included in a calendar post.
Social Media Posts	The City of Corona posted information about the workshop through a Facebook Event. The City of Norco posted on its Facebook page.
Newsletters	The City of Corona advertised the workshop in its *Inner Circle* newsletter, which is accessible online and distributed via email.
Emails	Invitation emails were sent to those on the interested parties list.

3. When and Where

The workshop was held on March 2, 2021 from 4:00 to 6:00 p.m.

The workshop was held virtually on the Zoom platform. The workshop was streamed on the City of Corona's website, Facebook, and YouTube channels and on Corona TV, viewable on Channel 29 on Time Warner Spectrum and Channel 99 on AT&T.

4. Attendance and Social Media Views

Approximately 24 people attended the Zoom virtual meeting, including 10 stakeholder participants. Others viewed the workshop on Facebook Live, YouTube, and Corona TV. Post-workshop statistics indicated 17 views on YouTube.

5. Summary

Welcome and Introductions

Jack Hughes, facilitator from Kearns & West, welcomed everyone to the second public workshop for the Temescal GSP. Christian Mendez from Kearns & West gave instructions in Spanish for accessing Spanish interpretation on Zoom. Hughes reviewed the workshop purpose, which was to provide Temescal GSP development updates and introduce the hydrogeologic conceptual model, groundwater conditions, and water budget. Additionally, the consultant team wanted to learn from participants what they thought the most important uses of groundwater were and if they know of any current or historical problems regarding the use of groundwater in the Temescal Basin.

Hughes invited the workshop attendees to make introductions using the Zoom chat and recognized the Temescal GSA representatives and elected officials in attendance. Hughes then introduced the additional workshop presenters: Chad Taylor, Principal Hydrogeologist at Todd Groundwater, and Maureen Reilly, Senior Engineer at Todd Groundwater.

Review of Groundwater Sustainability Plan Development

Taylor first presented the background and purpose of SGMA (see Appendix A for presentation slides for this and the following sections). The State can intervene if local agencies are not acting, but that is a last option. Under SGMA, local agencies are provided guidance for how to assess sustainability, tools for achieving or maintaining sustainability, and financial assistance in the form of grants available from the State. The Temescal GSA, comprised of the City of Corona, the City of Norco, and Home Gardens County Water District, has received a grant to prepare the GSP for the Temescal Basin.

Taylor explained that GSPs are detailed road maps for how groundwater basins will achieve or maintain long-term sustainability. Similar to other state planning requirements that agencies have been undertaking for many years, GSPs have periodic review processes and annual reporting requirements. These include long-term planning components, such as 50-year simulations of future conditions, to ensure long-term sustainability can be maintained.

Taylor described the Temescal Basin area, which covers most of the City of Corona, about half of the City of Norco, and the western part of the Home Gardens County Water District. The Temescal Basin is bounded by the Chino Subbasin to the north, the Riverside-Arlington Subbasin to the east, the Bedford-Coldwater Subbasin to the south, and the Coastal Plain of Orange County on the west. One GSA, Temescal GSA, was formed for the Temescal Basin because the area is hydrologically connected and has historically been managed as one unit. The Department of Water Resources has designated the Temescal Basin as a medium priority basin, which required the Temescal GSA to prepare the Temescal GSP.

Taylor next described the organization of the Temescal GSA. The Temescal GSA provides for decision-making, technical support, and community outreach. The City of Corona, the City of Norco, and Home Gardens County Water District formed the Temescal GSA in 2017 through a memorandum of understanding. The City of Corona is leading the GSP effort with support from Corona Department of Water and Power staff and additional consultants. The Technical Advisory Committee provides input during GSP preparation, and Technical Advisory Committee members communicate with other agencies and interested parties about GSP development. The GSP process is founded on public engagement and stakeholder outreach, which is the purpose of the public workshops.

Participants then answered the following warm up question using a Zoom poll: How many major aquifers are there in the Temescal Basin?

- Two
- Three
- Five
- Ten

Taylor provided and discussed the answer once the poll was closed. There are two major aquifers in the Temescal Basin, depending on how a major aquifer is defined. The section below on the hydrogeologic conceptual model has more information on the aquifers in the basin.

Hydrogeologic Conceptual Model

Taylor presented the hydrogeologic conceptual model. The model is a summary description along with a series of maps and graphics that defines where groundwater is in the Temescal Basin, how it gets there, and how it moves. It considers what areas of the Temescal Basin are made up of coarse or fine materials and includes descriptions of basin boundaries, geology, aquifers and aquitards, aquifer properties, and groundwater use. The model is accompanied by maps and graphics that show topography, surface water features, geology, soils, aquifer locations, basin thickness, and cross-sections.

Taylor reviewed the surficial geology and the location and characteristics of the channel aquifer in the Temescal Basin. The Temescal Basin in primarily made up of young, unconsolidated deposits surrounded by older bedrock on the western and eastern portions of the basin. There are also some older, partially consolidated deposits in the northern portion of the Temescal Basin. Faulting affects groundwater in much of the Temescal Basin and can restrict groundwater flow laterally. Taylor noted that the principal aquifer in the Temescal Basin is the channel aquifer. The channel aquifer is coarser grained and the more productive wells in the basin draw from the channel aquifer. As a result, most of the municipal supply wells are in the channel aquifer and it is an important component of the groundwater system.

Taylor presented one of the three cross-sections that have been prepared for the Temescal Basin that illustrate the underground conditions. Taylor reviewed the A to A' cross-section that extends from the southwest to northeast. The cross-section starts in the Santa Ana mountains. Moving from southwest to northeast in the Temescal Basin, there are alluvial fan aquifers underlaid by sandstone aquifers, which are the secondary aquifers in the basin. Next is the channel aquifer that is adjacent to the Temescal Wash. The channel aquifer and Temescal Wash have similar deposits, so they are considered functionally similar and connected. They are underlaid by granitic bedrock, which is not very conducive to groundwater presence or flow. Many wells draw groundwater only from the channel aquifer, whereas some wells have screens below the channel aquifer. Lastly, Taylor presented a three-dimensional block diagram that shows the relationship between subsurface materials, ground surface, and basin activities in the Temescal Basin.

Discussion/Q&A

Hughes opened the floor for questions and comments. There were no questions or comments from participants after this presentation.

Groundwater Conditions

Taylor presented groundwater conditions in the Temescal Basin, which include current and historical conditions such as groundwater elevations, water quality, interconnected surface water, and subsidence. The Draft Hydrogeologic Conceptual Model and Groundwater Conditions chapters are available for review on the Temescal GSA website (CoronaCA.gov/Groundwater).

Taylor began by describing groundwater elevation as the height of water above sea level and displayed a groundwater elevation contour map. Water levels can mean groundwater elevation or depth to water. Groundwater elevation contours are used to show water levels in an area to determine what flow is like underground. Flows in the Temescal Basin point toward the northwest and turn to the west in Prado. Taylor noted that groundwater flow direction is generally consistent over time in the basin.

Taylor described groundwater conditions over time in the Temescal Basin and displayed a hydrograph of a representative well. Seasonal and larger-scale patterns can be viewed on the hydrograph. These show responses to changes in climate conditions, weather conditions, wet and dry cycles, and pumping. Taylor explained that the highest water levels occurred in the 1980s following heavy rains during the late 1970s. In the 1990s, there were some wet periods where water levels did not recover as much as in the 1980s because of increased pumping. Many wells have had their lowest water levels in the last

10 years because of the drought that occurred between 2013 and 2017. Water levels have been recovering since then, but it is slow process due to limited precipitation.

Taylor next explained groundwater quality in the Temescal Basin. Primary constituents of concern are total dissolved solids and nitrate. Total dissolved solids are a variety of salts that mostly comes from rocks and are elevated in the channel aquifer. Nitrate is also high in some areas and mostly comes from human-caused activities such as historic agriculture and wastewater treatment and disposal. It is important to note that groundwater that is pumped for public consumption in the Temescal Basin is treated and blended before being distributed. The water served to homes and businesses in the Temescal Basin meets federal, state, and county requirements for public health. Other water quality constituents of concern are being tracked and are discussed in the Groundwater Conditions chapter.

Taylor described interconnected surface water, which means that groundwater is shallow enough to be connected to a surface water body. In these areas, high volumes of pumping could lower groundwater elevations. This can become problematic when there are ecosystems that rely on the groundwater, known as groundwater dependent ecosystems. In the Temescal Basin, the primary interconnected surface waters are in the Prado area, which includes wetlands and plants that rely on groundwater. The Temescal GSA does not want to do anything through groundwater management that will damage the wetlands. Taylor mentioned that subsidence, deformation of the ground surface as a result of groundwater pumping or reduction in groundwater levels, is discussed in the Groundwater Conditions chapter and was not included in the presentation for the sake of brevity since it was not a major issue in the Temescal Basin.

Discussion/Q&A

Hughes opened the floor for questions and comments. Participants were encouraged to answer the following question verbally or using the chat: Do you know of any current or historical problems regarding the use of groundwater in the Temescal Basin? No responses were received.

Water Budget

Reilly presented the purpose of the water budget. The water budget quantifies the inflows and outflows of the Temescal Basin, which vary over time and depend on hydrology and/or management. Inflows in the Temescal Basin include recharge from rainfall, stormwater, and streamflow; reclaimed water from percolation ponds; and subsurface flow from neighboring basins. Outflows occur when water leaves the basin due to pumping, flow to the Santa Ana River, and evapotranspiration.

Reilly explained that the water balance can be viewed as a change in storage, or inflows minus outflows. The numerical model uses inflows and outflows to calculate the change in storage and elements of the hydrogeologic conceptual model to simulate the groundwater aquifer. This tool can be used to simulate what has happened historically in the Temescal Basin and to simulate future conditions. It will be used to look at the sustainability of the Temescal Basin over the next 50 years and test different scenarios.

Discussion/Q&A

Hughes opened the floor for questions and comments. The following are the questions and comments received in the chat box from participants:

- How do you use the Santa Ana River for groundwater recharge?
- Can you discuss or explain sustainability in the Temescal GSP?

How to Stay Involved

Prior to learning how to stay involved in the process, participants answered a question using a Zoom poll. Hughes explained that all beneficial uses and users would be considered in the Temescal GSP, but the project team wanted to know the interests of stakeholders. Participants responded to the following question: What do you think are the most important uses of groundwater from the Temescal Basin?

- Groundwater Dependent Ecosystems
- Industrial Water Supply
- Municipal Water Supply
- Rural Residential Water Supply
- Small Commercial Water Supply
- Small Community Water Supply

The most common answers included groundwater dependent ecosystems, municipal water supply, and rural residential water supply.

Hughes explained how members of the public could be involved throughout GSP preparation, which will continue until January 2022. This was the second public workshop for people to get information about the GSP and give feedback on its development. The third public workshop will be held in summer of 2021 and will focus on sustainability criteria and management actions. The draft GSP presentation in the summer of 2021 will present another opportunity for involvement.

Hughes spoke about other opportunities to learn about GSP development and provide comment. In addition to the workshops, the Technical Advisory Committee meetings are open to the public. The public may listen in on those meetings and speak during the public comment portion. Lastly, the public will have the opportunity to attend and comment at the Adoption Hearing for the final GSP in the fall of 2021.

Draft chapters and other materials such as fact sheets can be found on the project website hosted by the City of Corona Department of Water and Power: CoronaCA.gov/Groundwater. Members of the public can use the form on the website to provide comments. Anyone who wants to be included on the mailing list should email Groundwater@CoronaCA.gov. People on the mailing list will receive updates on upcoming public workshops.

6. Wrap Up and Closing

Hughes thanked everyone for participating. The next public workshop will be held during the summer of 2021.

Appendix A

Presentation Slides

TEMESCAL GSA

TEMESCAL GSP PUBLIC WORKSHOP 2
TEMESCAL GSP TALLER COMUNITARIO 2

About the Groundwater Sustainability Plan (GSP)

The Sustainable Groundwater Management Act or "SGMA" is a California law that gives local agencies new tools for managing groundwater and planning for the future. The City of Corona, City of Norco, and Home Gardens County Water District have formed the Temescal Groundwater Sustainability Agency (Temescal GSA) in order to make a **Groundwater Sustainability Plan** for the Temescal Basin. Since groundwater is such an important resource for everyone, we need your help!

Un poco sobre el plan de sostenibilidad de las aguas subterráneas (GSP)

La Ley de Gestión Sostenible de Aguas Subterráneas o "SGMA", por sus siglas en inglés, es una ley de California que otorga a las agencias locales nuevas herramientas para gestionar las aguas subterráneas y planificar para el futuro. La Ciudad de Corona, la Ciudad de Norco y el Distrito Hídrico del Condado de Home Gardens han formado la Agencia de Sostenibilidad de Aguas Subterráneas de la Cuenca de Temescal (Temescal Groundwater Sustainability Agency) o Temescal GSA a fin de crear un **Plan de Sostenibilidad de Aguas Subterráneas** para la Cuenca de Temescal. Dado que las aguas subterráneas son un recurso muy importante para todos, ¡necesitamos su ayuda!

TEMESCAL GSA

TEMESCAL GROUNDWATER SUSTAINABLY PLAN PUBLIC WORKSHOP 2

PLAN DE SOSTENIBILIDAD DE LAS AGUAS SUBTERRÁNEAS (GSP) DE TEMESCAL TALLER COMUNITARIO 2 DE TEMESCAL

MARCH 2, 2021 / 2 DE MARZO DE 2021

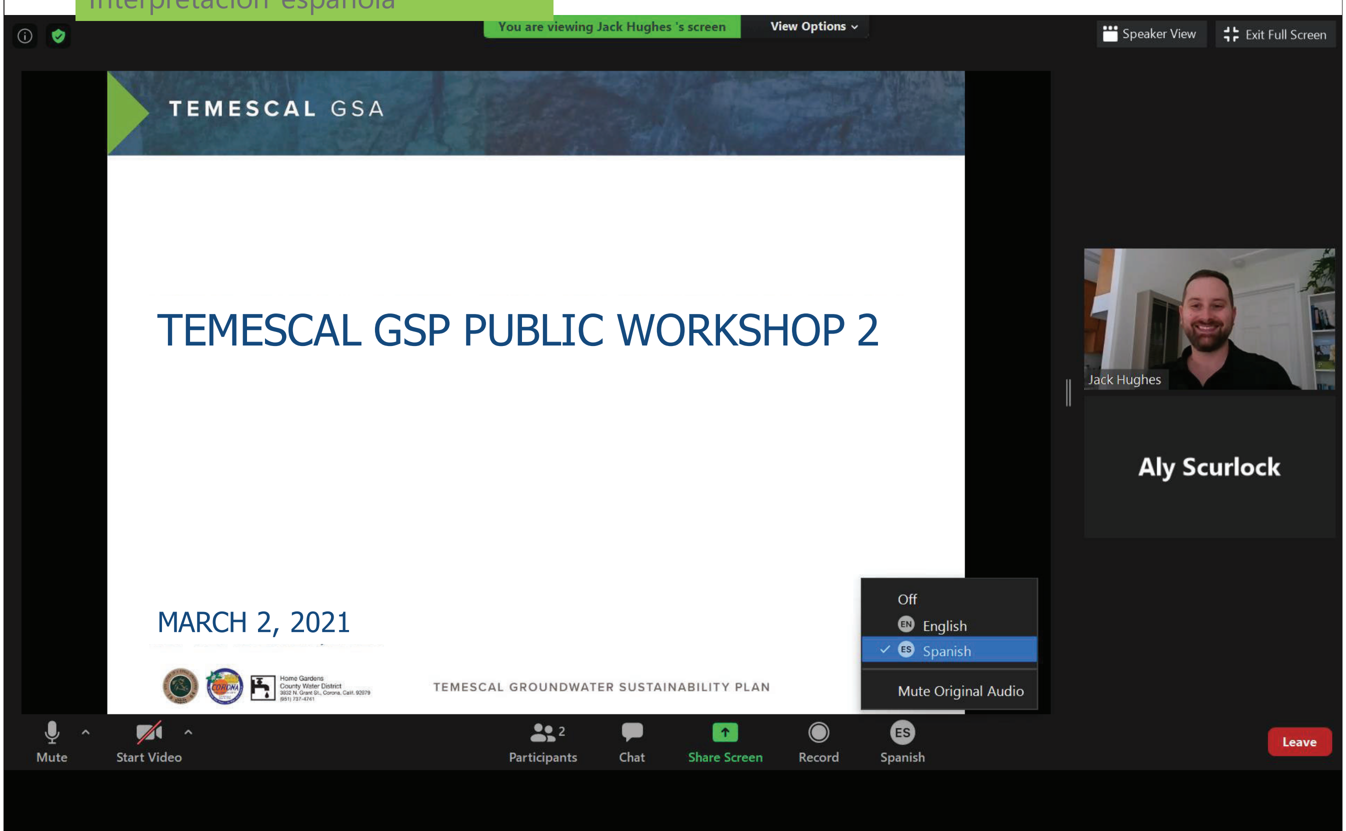
Home Gardens County Water District
3832 N. Grant St., Corona, Calif. 92879
(951) 737-4741

TEMESCAL GSA

WELCOME

BIENVENIDOS

Interpretación española



This public workshop is being recorded and will be posted on the website:

www.CoronaCA.gov/Groundwater

Este taller público sera grabado y se publicará en el sitio web:

www.CoronaCA.gov/Groundwater

TEMESCAL GSA

WORKSHOP PURPOSE
PROPÓSITO DE TALLER COMUNITARIO

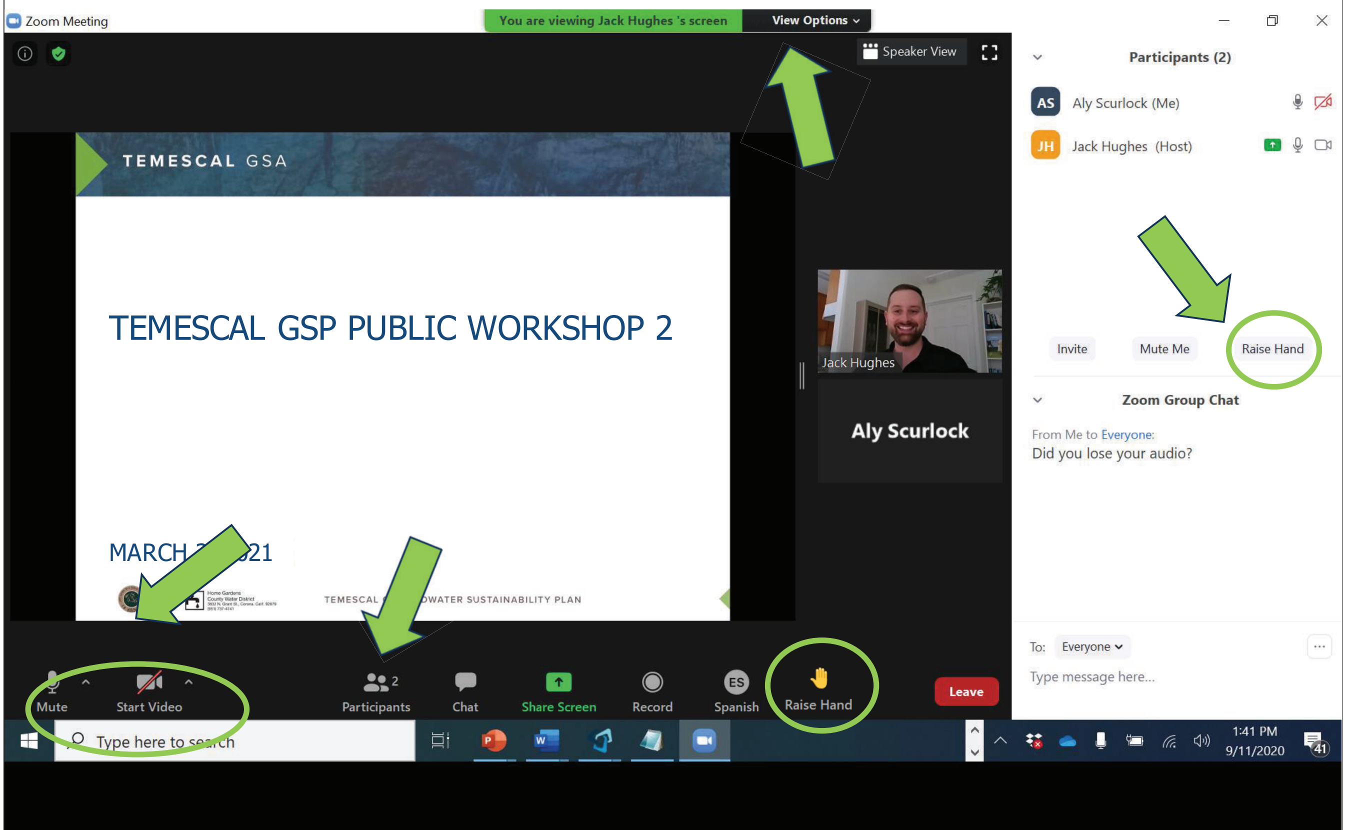
- Give Temescal Groundwater Sustainability Plan development updates.
  Proporcionar actualizaciones del desarrollo del Plan de sostenibilidad de aguas subterráneas de Temescal.
- Introduce the hydrogeologic conceptual model, groundwater conditions, and water budget.
  Introducir el modelo conceptual hidrogeológico, las condiciones del agua subterránea y el presupuesto de agua.

WORKSHOP PURPOSE
PROPÓSITO DE TALLER COMUNITARIO

» Learn what you think the most important uses of groundwater are and if you know of any current or historical problems regarding the use of groundwater in the Temescal Basin.
Conozca cuáles son los usos más importantes de las aguas subterráneas y si conoce algún problema actual o histórico con respecto al uso de las aguas subterráneas en la Cuenca del Temescal.

TEMESCAL GSA

HOW TO USE ZOOM
CÓMO UTILIZAR ZOOM



TEMESCAL GSA

INTRODUCTIONS

INTRODUCCIONES

TEMESCAL GSA

Home Gardens
County Water District
3832 N. Grant St., Corona, Calif. 92879
(951) 737-4741

CONSULTANT TEAM

EQUIPO DE CONSULTORES

Chad Taylor
Todd Groundwater

Maureen Reilly
Todd Groundwater

Jack Hughes
Kearns & West

TIPS FOR A PRODUCTIVE DISCUSSION
CONSEJOS PARA UNA DISCUSIÓN PRODUCTIVA

- One speaker at a time
  Solo una persona habla a la vez
- Keep input concise
  Sea conciso al hablar
- Actively listen
  Escuche activamente
- Offer solutions
  Ofrezca soluciones

YOUR INPUT MATTERS
SU OPINIÓN ES IMPORTANTE

- The planning team will consider your comments as they prepare the Groundwater Sustainability Plan.
  El equipo de planificación considerará sus comentarios mientras preparan el Plan de sostenibilidad de aguas subterráneas.
- Your input will be recorded, organized thematically, and presented in a workshop summary on the project website.
  Sus comentarios serán registrados, organizados temáticamente y presentados en un resumen del taller en el sitio web del proyecto.

REVIEW OF GROUNDWATER SUSTAINABILITY PLAN DEVELOPMENT

REPASO DEL PLAN DE SOSTENIBILIDAD DE LAS AGUAS SUBTERRÁNEAS

SUSTAINABLE GROUNDWATER MANAGEMENT ACT (SGMA)

Landmark legislation in 2014

- » Recognizes that groundwater management in California is best accomplished locally

Legislación histórica en 2014

- » Reconoce que la gestión de las aguas subterráneas en California se logra mejor a nivel local

GROUNDWATER SUSTAINABILITY PLANS
PLANES DE SOSTENIBILIDAD DE LAS AGUAS SUBTERRÁNEAS

» Groundwater sustainability plans are detailed road maps for how groundwater basins will achieve long term sustainability.

» Los planes de sostenibilidad de las aguas subterráneas actuan como mapas que detallan la ruta que hay qe seguir para que cuencas de aguas subterráneas logren la sostenibilidad a largo plazo.

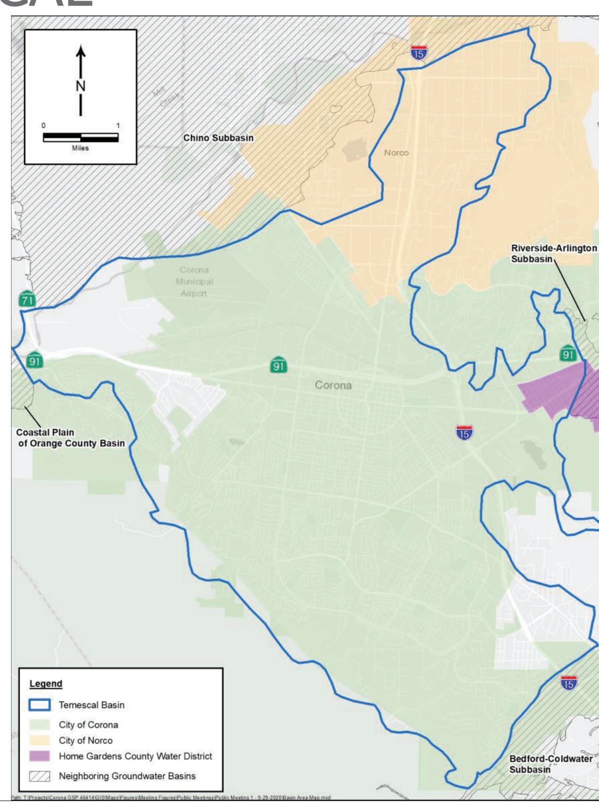
THE TEMESCAL BASIN
LA CUENCA DEL TEMESCAL

» DWR categorized Temescal Basin as a Medium Priority Basin

La Cuenca del Temescal fue desginada por DWR como Cuenca de Prioridad Media

» Contiguous and connected

Contigua y conectada



GSA ORGANIZATION / ORGANIZACÍON

City of Corona

City of Norco

Home Gardens County Water District

Department of Water and Power
Departamento de Aqua y Energía

Staff and Consultants
Personal y Consultores
- Corona DWP Staff
- Todd Groundwater
- Carollo Engineers
- Kearns & West

Technical Advisory Committee
Comité Asesor Técnico
- Public agencies/Agencias públicas
- Local businesses/Empresas locales
- Well owners/Propietarios de pozos
- Community interests/Intereses comunitarios

Other agencies and interested parties/Otras agencias y partes interesadas

WARM UP QUESTION
PREGUNTAS DE CALENTAMIENTO

» How many major aquifers are there in the Temescal Basin?
¿Cuántos acuíferos significantes hay en la Cuenca del Temescal?

- » Two / Dos
- » Three / Tres
- » Five / Cinco
- » Ten / Diez

HYDROGEOLOGIC CONCEPTUAL MODEL
MODELO CONCEPTUAL HYDROGEOLOGICO

HYDROGEOLOGIC CONCEPTUAL MODEL
MODELO CONCEPTUAL HYDROGEOLOGICO

Includes descriptions of:

- Basin boundaries, geology, aquifers and aquitards, aquifer properties, and groundwater use

Maps and Graphics showing:

- Topography, surface water features, geology, soils, aquifer locations, basin thickness, and cross-sections

Incluye descripciones de:

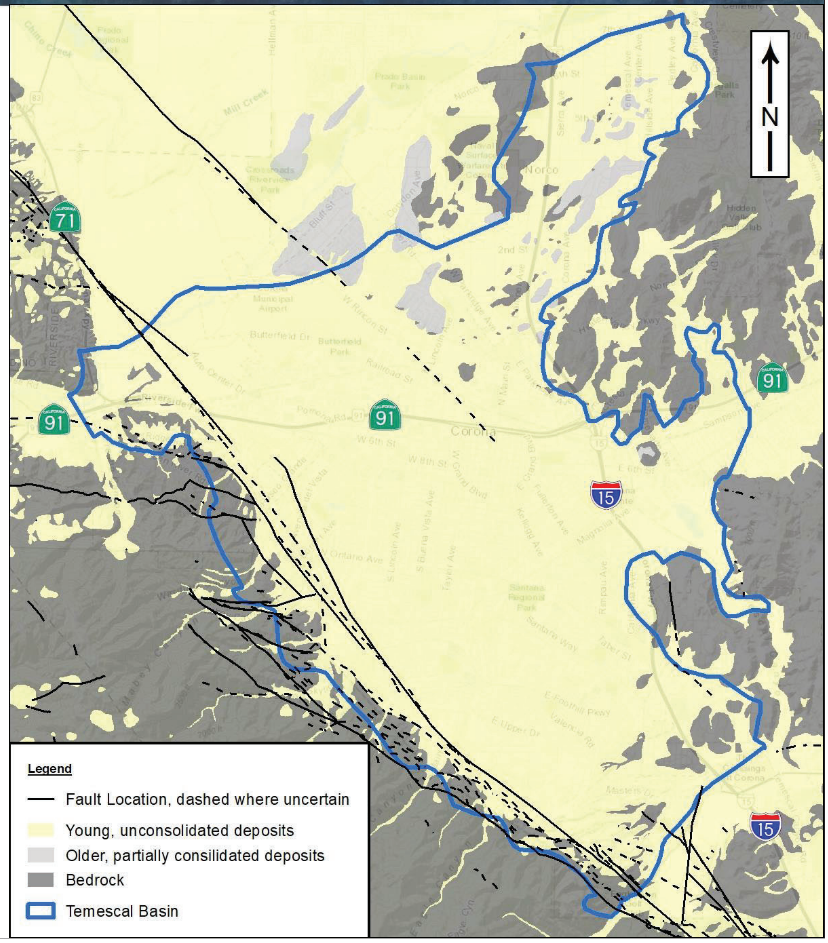
- Límites de cuencas, geología, acuíferos y acuitardos, propiedades de acuíferos, y uso de aguas subterráneas

Mapas y gráficos que muestran:

- Topografía, características de aguas superficiales, geología, tipos de tierra, ubicaciones de acuíferos, espesor de cuenca, secciones transversales

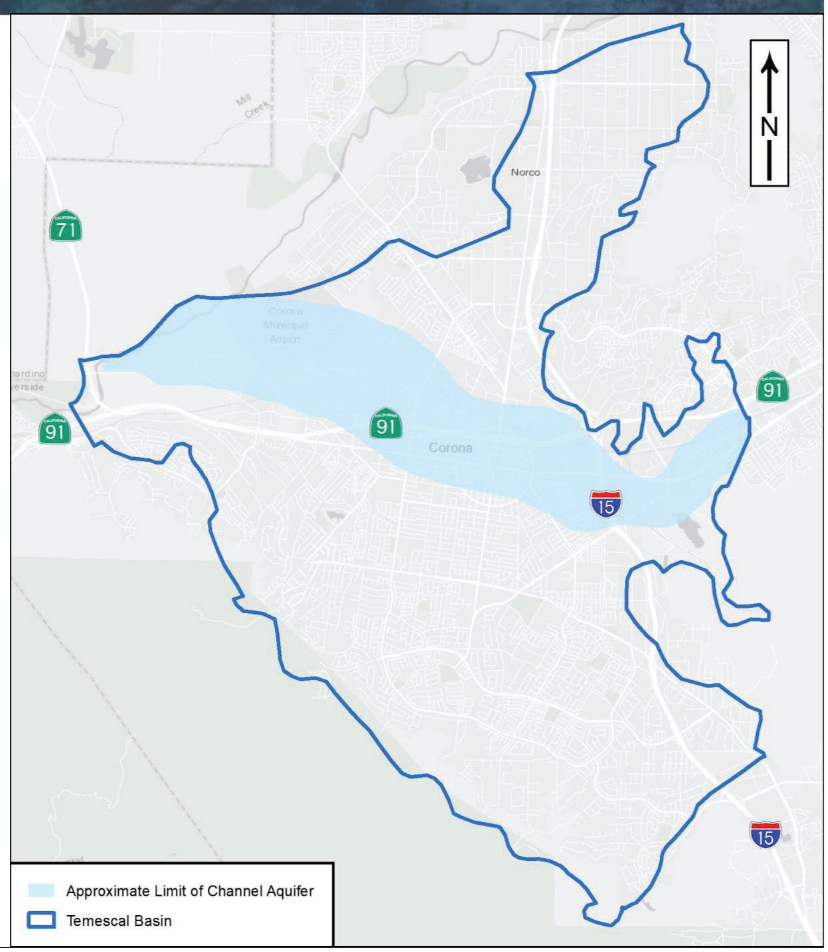
TEMESCAL GSA

SURFICIAL GEOLOGY
GEOLOGÍA SUPERFICIAL

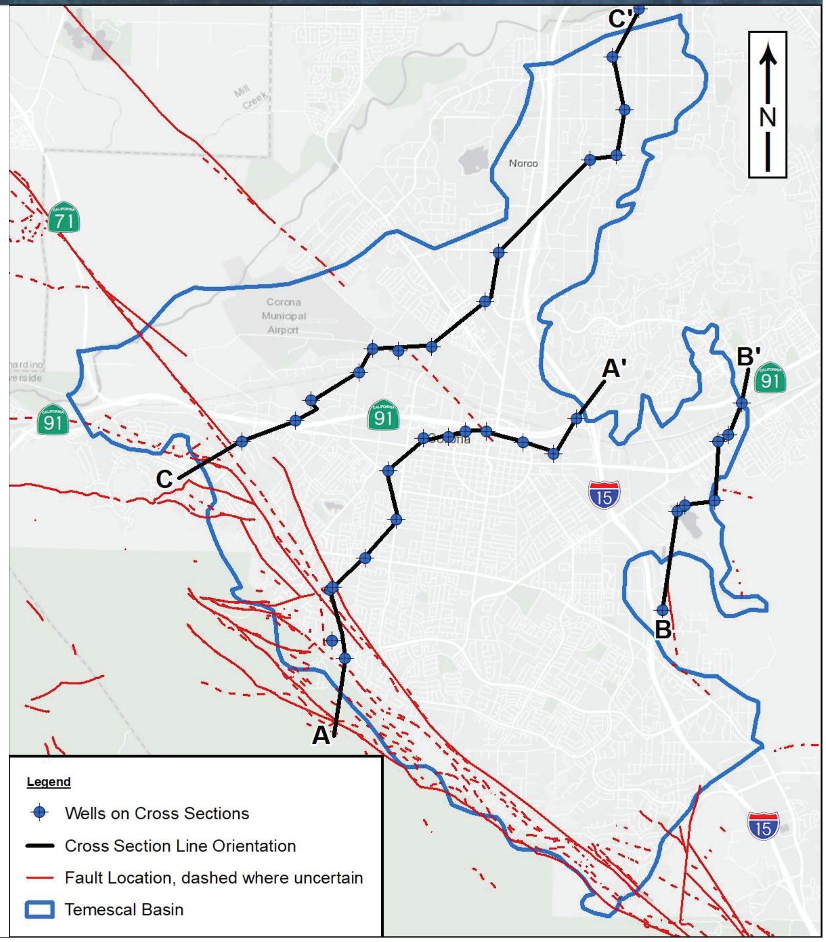


TEMESCAL GSA

CHANNEL AQUIFER
EL ACUÍFERO DEL CANAL



CROSS SECTIONS
SECCIONES TRANSVERSALES

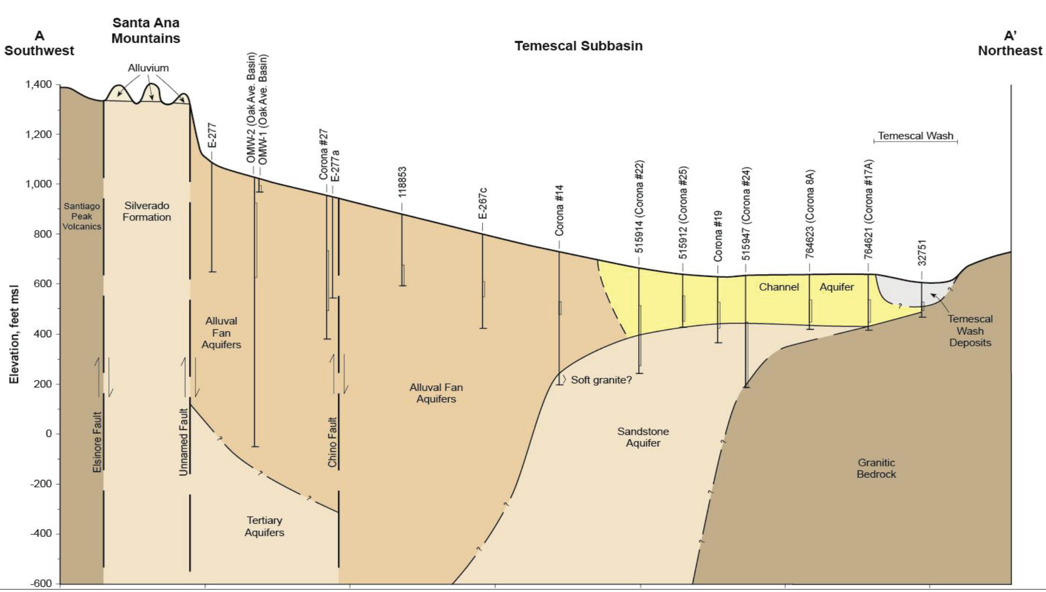


TEMESCAL GSA

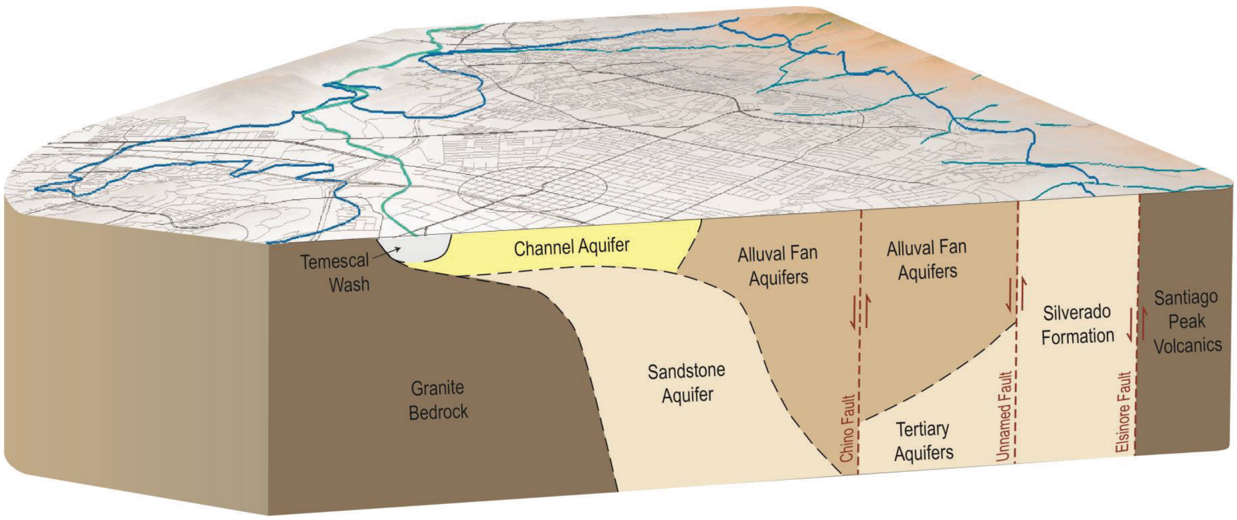
CROSS SECTION A
SECCIÓN TRANSVERSAL - A

Channel Aquifer is the principal aquifer

El Acuífero del Canal es el principal acuífero



HYDROGEOLOGIC CONCEPTUAL MODEL
MODELO CONCEPTUAL HYDROGEOLÓGICO



DISCUSSION AND Q&A
DISCUSIÓN / PREGUNTAS Y RESPUESTAS

GROUNDWATER CONDITIONS

CONDICIONES DE AGUAS SUBTERRÁNEAS

GROUNDWATER CONDITIONS

CONDICIONES DE AGUAS SUBTERRÁNEAS

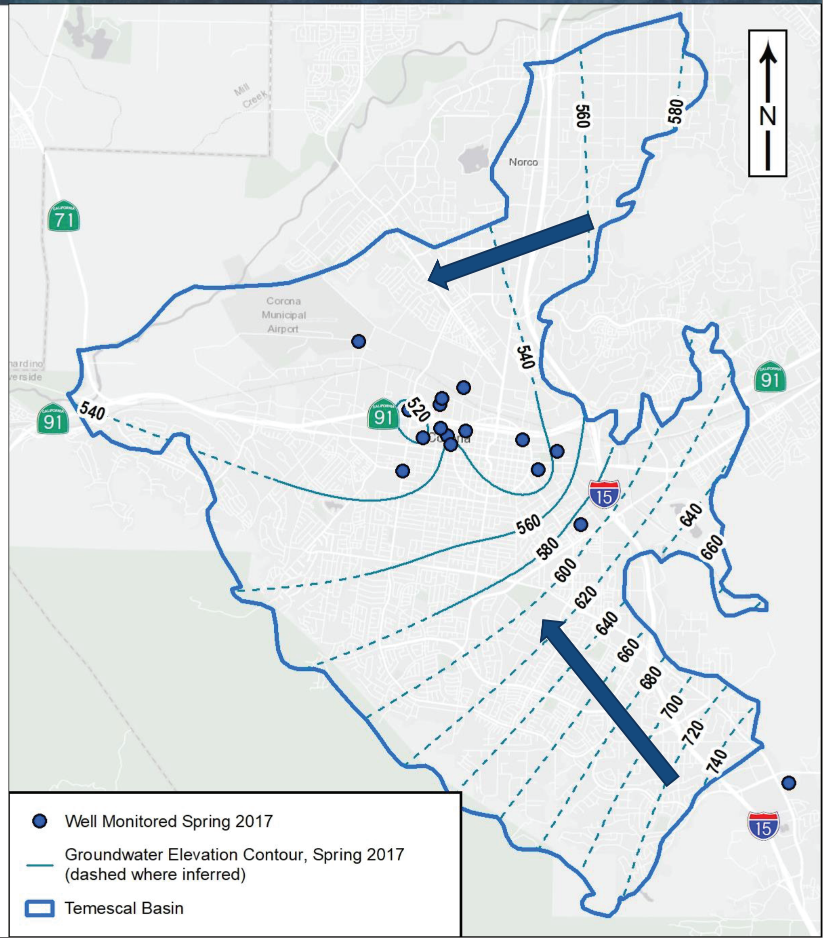
Presentation of current and historical conditions

- » Including groundwater elevations, water quality, interconnected surface water, and subsidence

Presentación de las condiciones actuales e históricas

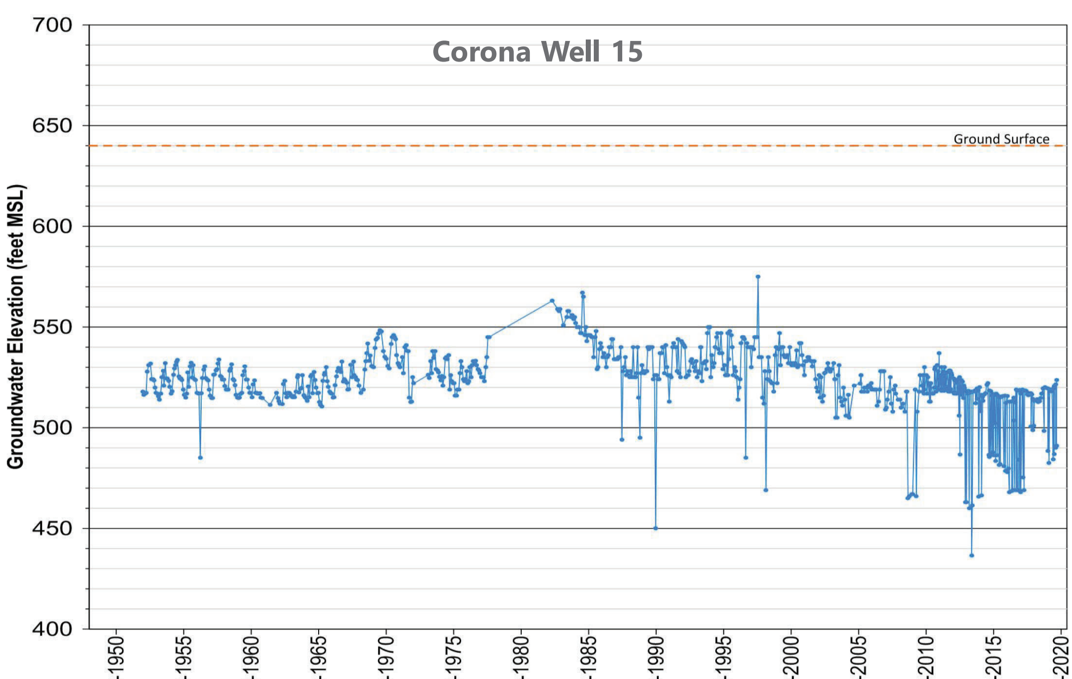
- » Incluyendo las elevaciones de las aguas subterráneas, la calidad del agua, las aguas superficiales interconectadas y el hundimiento

GROUNDWATER ELEVATION CONTOURS
CONTORNOS DE ELEVACIÓN DE AGUA SUBTERRÁNEA



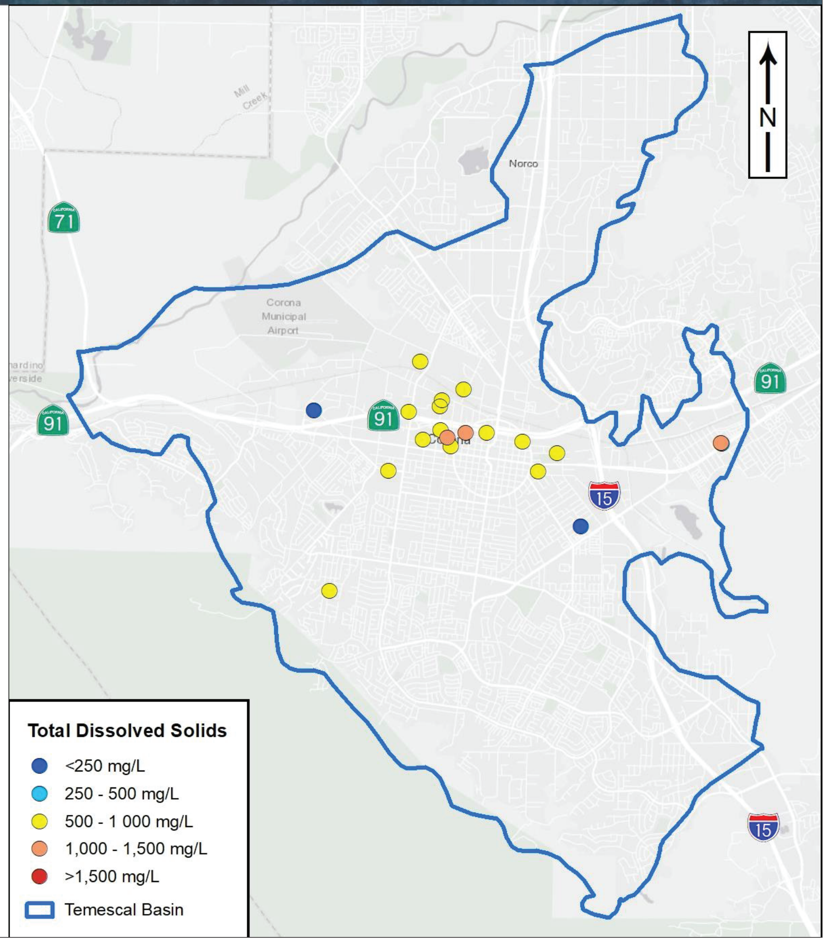
TEMESCAL GSA

HISTORICAL GROUNDWATER ELEVATIONS
ELEVACIONES HISTÓRICAS DE LAS AGUAS SUBTERRÁNEAS



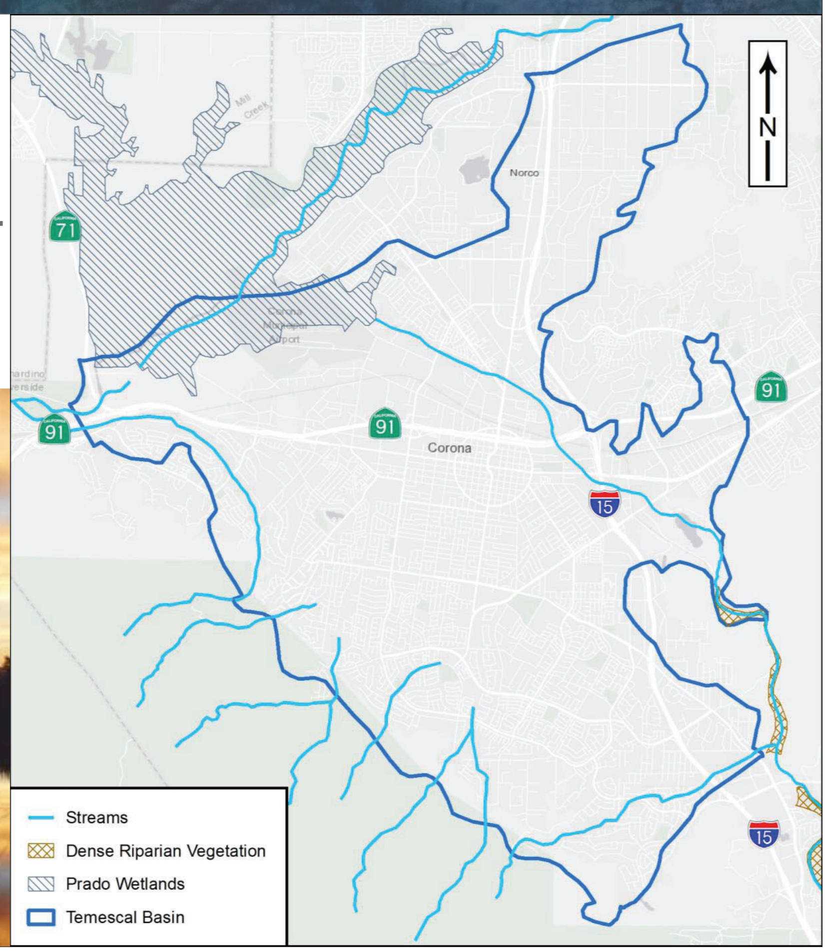
TEMESCAL GSA

GROUNDWATER QUALITY
CALIDAD DEL AGUA SUBTERRÁNEAS



TEMESCAL GSA

INTERCONNECTED SURFACE WATER
AGUA SUPERFICIAL INTERCONECTADA



DISCUSSION AND Q&A
DISCUSIÓN / PREGUNTAS Y RESPUESTAS

» Do you know of any current or historical problems regarding the use of groundwater in the Temescal Basin?

¿Conoce algún problema actual o histórico sobre el uso de aguas subterráneas en la Cuenca del Temescal?

WATER BUDGET
PRESUPUESTOS DE AGUAS

WATER BUDGET PURPOSE
PROPÓSITO DEL PRESUPUESTO DEL AGUA

» A water budget quantifies the inflows and outflows of the Temescal Basin over time

Un presupuesto hídrico cuantifica los flujos de entrada y salida de la Cuenca del Temescal a lo largo del tiempo

» Both inflows and outflows vary from year to year, depending on hydrology or management

Tanto los flujos de entrada como los de salida varían de un año a otro, dependiendo de la hidrología o la gestión

WATER BUDGET – INFLOWS
PRESUPUESTO DEL AGUA – FLUJO DE ENTRADA

Water enters the groundwater basin through:

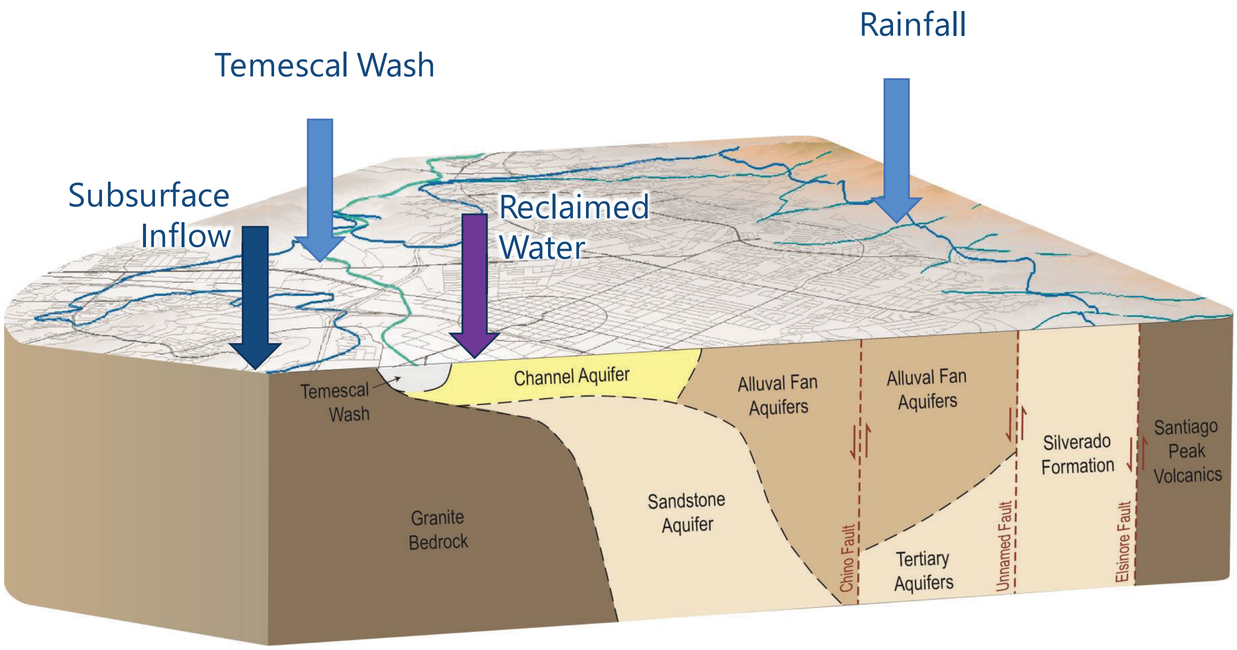
- Recharge from rainfall, stormwater, and streamflow
- Reclaimed Water percolation ponds
- Subsurface flow from neighboring basins

El agua entra en la cuenca de aguas subterráneas a través de:

- Recarga natural por lluvias, aguas pluviales y flujo de arroyos
- Estanques de percolación de agua recuperada
- Flujo subterráneo de las cuencas vecinas

TEMESCAL GSA

WATER BUDGET – INFLOWS
PRESUPUESTO DEL AGUA – FLUJOS DE ENTRADA



TEMESCAL GSA

WATER BUDGET – OUTFLOWS
PRESUPUESTO DEL AGUA – FLUJO DE SALIDA

Water leaves the groundwater basin through:

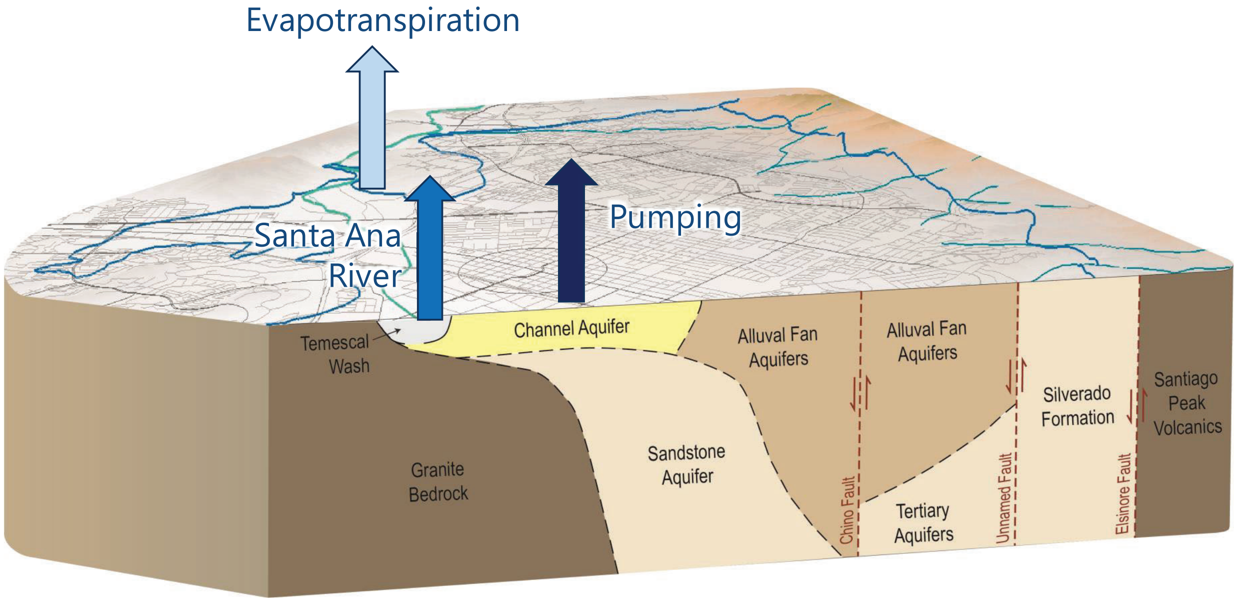
- » Pumping
- » Flow to the Santa Ana River
- » Evapotranspiration

El agua deja la cuenca de agua subterránea a través de:

- » Pozos de Bombeo
- » Flujos al río Santa Ana
- » Evapotranspiración

TEMESCAL GSA

WATER BUDGET – OUTFLOWS
PRESUPUESTO DEL AGUA – FLUJO DE SALIDA



TEMESCAL GSA

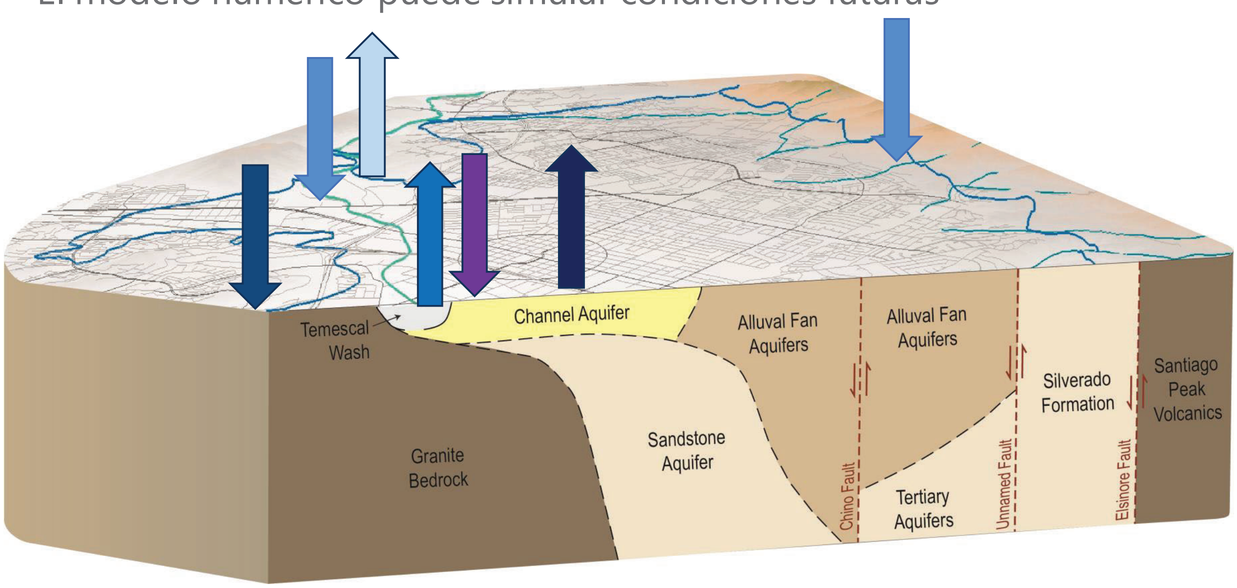
CHANGE IN STORAGE

» Inflows – Outflows = Change in Storage

Flujo de Entrada – Flujo de Salida - Cambio en el almacenamiento

» Numerical model can simulate future conditions

El modelo numérico puede simular condiciones futuras



DISCUSSION AND Q&A
DISCUSIÓN / PREGUNTAS Y RESPUESTAS

WHAT DO YOU THINK?
¿QUÉ PIENSAS?

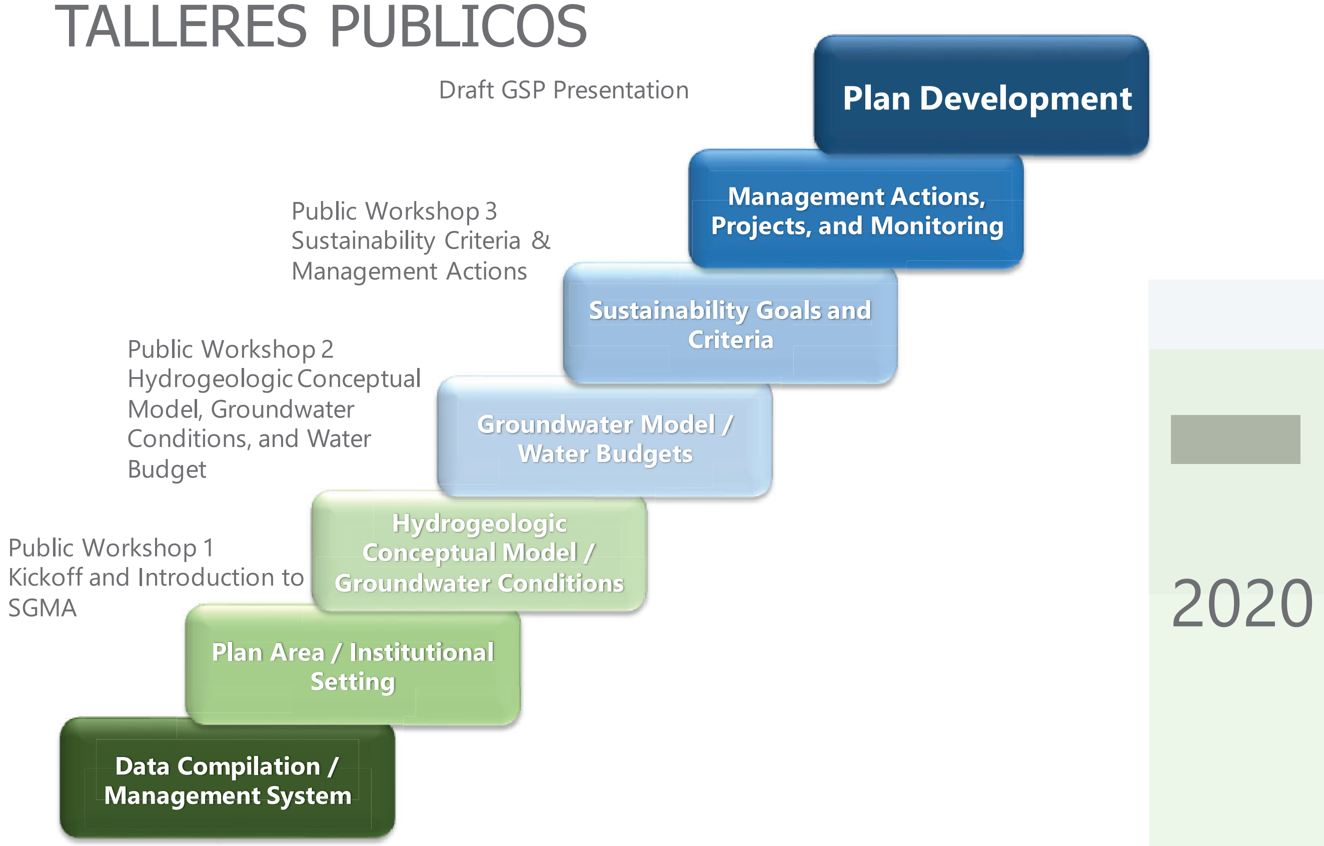
» What do you think are the most important uses of groundwater from the Temescal Basin? (Choose up to three)
¿Cuáles cree usted que son los usos más importantes de las aguas subterráneas de la Cuenca del Temescal? (Elija hasta tres)

  » Groundwater Dependent Ecosystems/Ecosistemas dependientes del agua subterránea
  » Industrial Water Supply/ Suministro de agua industrial
  » Municipal Water Supply/Suministro de agua municipal
  » Rural Residential Water Supply/ Suministro de agua residencial en áreas rurales
  » Small Commercial Water Supply/ Suministro de agua para negocios comerciales pequeños
  » Small Community Water Supply/Suministro de agua para comunidades pequeñas

HOW TO STAY INVOLVED
CÓMO MANTENERSE INVOLUCRADO

TEMESCAL GSA

PUBLIC WORKSHOPS
TALLERES PÚBLICOS



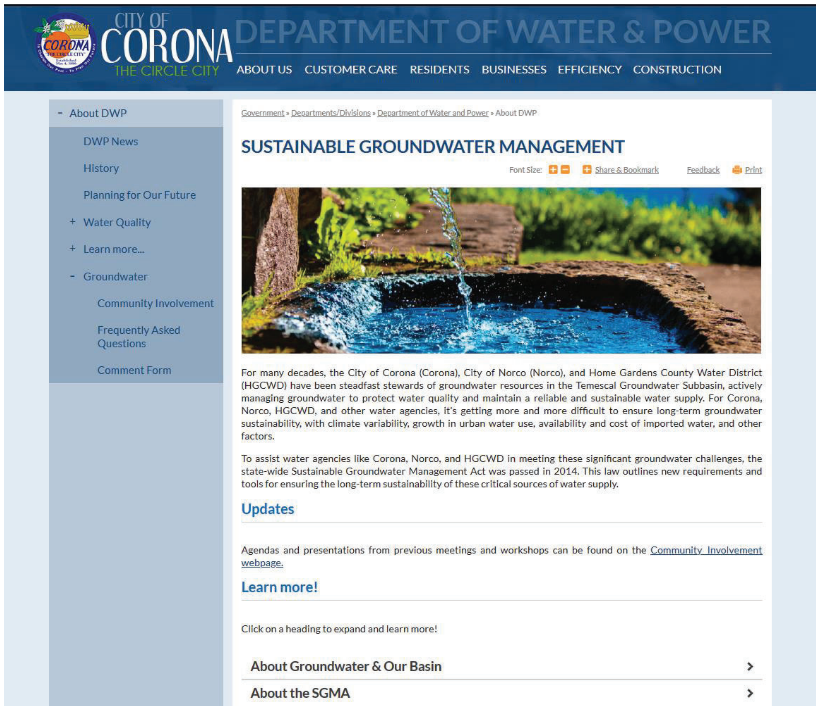
PUBLIC WORKSHOPS
TALLERES PÚBLICOS

TEMESCAL GSA

OTHER MEETINGS
OTRAS REUNIONES

- Technical Advisory Committee Meetings
  Juntas del Comité Asesor Técnico
- Adoption Hearing for Final GSP
  Audiencia de adopción del GSP final

WEBSITE
SITIO WEB



TEMESCAL GSA

HOW TO KEEP IN TOUCH
CÓMO MANTENERSE EN CONTACTO

- Sign up for the mailing list by emailing groundwater@coronaca.gov
  Regístrese en la lista de correo enviando un correo electrónico a groundwater@coronaca.gov

- Visit the website to view information, review draft chapters and other materials, and to submit comments : www.CoronaCA.gov/Groundwater
  Visite el sitio web para ver información, revisar borradores de capítulos y otros materiales, y enviar comentarios: www.CoronaCA.gov/Groundwater

THAT YOU

GRACIAS

Temescal Basin Public Workshop 3

Workshop Summary

Contents

Appendix

1. Background

On September 16, 2014, the Governor of California signed into law a legislative package comprised of three bills: Assembly Bill (AB) 1739, Senate Bill (SB) 1168, and SB 1319. These laws are collectively known as the Sustainable Groundwater Management Act (SGMA). SGMA (pronounced sigma) defines sustainable groundwater management as the "management and use of groundwater in a manner that can be maintained without causing undesirable results." This means keeping balanced levels of pumping and recharge of groundwater while assuring reliable water quality. SGMA provides a comprehensive framework for basin sustainability, additional technical analysis, and quantification of many aspects of basin sustainability and management. This includes extensive and detailed descriptions of the basin setting and conditions and more comprehensive monitoring of groundwater use, quality, and levels, including metering of groundwater usage.

SGMA requires the formation of a locally controlled Groundwater Sustainability Agency (GSA), which is responsible for developing and implementing a Groundwater Sustainability Plan (GSP). The GSP outlines how to achieve groundwater sustainability within 20 years of its adoption. The City of Corona, City of Norco, and Home Gardens County Water District have formed the Temescal Basin Groundwater Sustainability Agency (Temescal GSA) to create a GSP for the Temescal Basin.

GSAs must consider the interests of all beneficial uses and users of groundwater. The GSA must provide opportunities for public engagement and active involvement of diverse social, cultural, and economic elements of the population. The Temescal GSA recognizes that stakeholder and public engagement is critical to ensuring that the full range of interests of all beneficial uses and users of groundwater are represented during GSP development.

To share information and get input from stakeholders and the public, the Temescal GSA has been holding a series of public workshops, of which this is the third. Public Workshop 1, conducted on September 29, 2020, focused on communicating basic information about SGMA, the Temescal Basin, GSP development, and what sustainability means in a GSP. Participants were asked for input about their groundwater interests and what they thought was important for the future of groundwater in the Temescal Basin.

The second Public Workshop, conducted on March 2, 2021, focused on providing updates on the Temescal GSP development and introducing the hydrogeologic conceptual model, groundwater conditions, and water budget. Participants were asked for their input on what they thought the most important uses of groundwater were and if they knew of any current or historical problems regarding the use of groundwater in the Temescal Basin.

Public Workshop 3, conducted on July 8, 2021, focused on providing further updates on the Temescal GSP development and presenting the sustainability management criteria, projects and management actions, and implementation plan. Participants were asked to provide input on the sustainable management criteria, how the volume for groundwater in the Temescal Basin could be increased, and ideas for making groundwater more sustainable.

This summary documents the outreach methods, time and location, attendance, and major topics presented and discussed at this third public workshop.

2. Pre-Workshop Outreach

The Temescal GSA used a variety of methods to inform stakeholders and community members about the workshop and encourage participation, as shown in Table 1.

Table 1: Pre-Workshop Outreach Methods

Method	Description
Social Media Posts	The City of Corona and City of Norco posted information about the workshop on their Facebook pages.
Emails	Invitation emails were sent to those on the interested parties list.
Community Leader Meetings	Two meetings were held on June 29 and July 1. The purpose was to provide information on local water supply to community leaders, learn about needs and perspectives related to the Temescal GSP in vulnerable communities, and get input on what other stakeholders to invite.

3. When and Where

The workshop was held on July 8, 2021 from 4:00 to 6:00 p.m.

The workshop was held virtually on the Zoom platform. People also had the option to view and participate from the City of Corona Council Chambers. The workshop was streamed on the City of Corona's website, Facebook, and YouTube channels and on Corona TV, viewable on Channel 29 on Time Warner Spectrum and Channel 99 on AT&T.

4. Attendance and Social Media Views

Approximately 18 people attended the Zoom virtual meeting, including six stakeholder participants. Spanish interpretation was available for participants to access during the Zoom virtual meeting. Others viewed the workshop on Facebook Live, YouTube, and Corona TV. Post-workshop statistics indicated 18 views on YouTube.

5. Summary

Welcome and Introductions

Jack Hughes, facilitator from Kearns & West, welcomed everyone to the third public workshop for the Temescal GSP. Hughes reviewed the workshop purpose, which was to provide Temescal GSP development updates and present the sustainable management criteria, projects and management actions, and implementation plan. Additionally, the consultant team wanted to hear input from participants on the sustainable management criteria, how the volume for groundwater in the Temescal Basin could be increased, and ideas for making groundwater more sustainable.

Hughes invited the workshop attendees to introduce themselves using the Zoom chat and recognized the Temescal GSA representatives in attendance. Hughes then introduced the additional workshop presenters: Chad Taylor, Principal Hydrogeologist at Todd Groundwater, and Madison Rasmus, Environmental Engineer at Carollo.

Review of Groundwater Sustainability Plan Development

Taylor first reviewed background information on GSP development (see the Appendix for presentation slides for this and the following sections). SGMA is landmark legislation established in 2014 following a long period of statewide drought. SGMA has altered how water is managed in California by providing local agencies with authority and guidance for how to assess sustainability and critical tools to help achieve or maintain sustainability in areas where groundwater is an important water source. Taylor explained that GSPs are detailed road maps for how groundwater basins will achieve or maintain long-term sustainability.

Taylor described the Temescal Basin area, which covers most of the City of Corona, about half of the City of Norco, and the western part of the Home Gardens County Water District. One GSA, the Temescal GSA, was formed for the Temescal Basin because the area is hydrologically connected and has historically been managed as one unit. The California Department of Water Resources has designated the Temescal Basin as a medium priority basin, which required the Temescal GSA to prepare the Temescal GSP.

Taylor next described the organization of the Temescal GSA. The City of Corona, the City of Norco, and Home Gardens County Water District formed the Temescal GSA in 2017 through a memorandum of understanding. The City of Corona is leading the GSP effort with support from Corona Department of Water and Power staff and additional consultants. The Technical Advisory Committee (TAC) has provided input during GSP preparation and includes members that represent public agencies, local businesses, well owners, and community interests. The GSP process is founded on public engagement and stakeholder outreach, which is the purpose of the public workshops.

Groundwater Sustainability Plan Development Update

Taylor provided a status update on the Temescal GSP. The individual chapters that have been prepared are the Introduction, Plan Area, Hydrogeologic Conceptual Model, Groundwater Conditions, Monitoring Network, Projects and Management Actions, and Implementation Plan chapters. Most of these chapters are available online for public review; some chapters are currently being reviewed by the TAC and will be uploaded to the GSA website shortly for public review. The consultant team is finalizing the Water Budget and Sustainability Management Criteria chapters. A draft of the Temescal GSP will be compiled and prepared for public release later in summer 2021.

Discussion/Q&A

Hughes opened the floor for questions and comments. There were no questions or comments from participants after this presentation.

Sustainable Management Criteria

Taylor presented the draft sustainable management criteria for the Temescal Basin. He first defined sustainable management as the management and use of groundwater without causing undesirable results. Taylor explained that the first part of defining sustainability locally is to establish a sustainability goal. The sustainability goal helps to provide a framework for how the sustainability indicators are assessed. The Temescal GSA and TAC worked together to develop the following goal:

To sustain groundwater resources for the current and future beneficial uses of the Temescal Basin in a manner that is adaptive and responsive to the following objectives:

- Provide a long-term, reliable, and efficient groundwater supply for municipal, industrial, and other uses;
- Provide reliable storage for water supply resilience during droughts and shortages;
- Protect groundwater quality;
- Support beneficial uses of interconnected surface waters; and
- Support integrated and cooperative water resource management.

Taylor provided an overview of the six indicators for evaluating groundwater sustainability in a basin: chronic lowering of groundwater levels, reduction of groundwater storage, degradation of water quality, depletion of interconnected surface water affecting beneficial uses, land subsidence affecting land uses, and seawater intrusion, which is not applicable in the Temescal Basin.

Thresholds need to be developed for the five applicable sustainable management criteria for the Temescal Basin. First, undesirable results, or conditions that should be avoided, are defined for each indicator. Once undesirable results are defined, they are used to develop minimum thresholds for assessing each of the sustainability indicators. Next, measurable objectives are set. Beneficial uses in the Temescal Basin also need to be evaluated and considered for each of the sustainability indicators. These include the following:

- Municipal Water Supply
- Industrial Water Supply
- Small Community Water Supply
- Small Commercial Water Supply
- Groundwater Dependent Ecosystems
- Recreational Surface Water Supply

Taylor next explained how the sustainable management criteria were established for each indicator, starting with chronic lowering of groundwater levels. Since there is no record of wells being dry in the Temescal Basin during the range of historic groundwater levels, the assumption was made that historic low groundwater levels could be repeated in the future. The consultant team established a set of representative key wells in the Temescal Basin. These key wells have a long history for monitoring groundwater levels and will continue to be used for monitoring in the future. Taylor explained that the minimum threshold for defining undesirable results relative to chronic lowering of groundwater levels is defined at each key well by the historic minimum static groundwater elevation (or maximum historical depth to groundwater).

Taylor then presented the sustainable management criteria for reduction of groundwater storage, noting that storage is related to groundwater levels. He explained that GSP regulations allow the use of groundwater level minimum thresholds and measurable objectives as a proxy, and that the historic minimum-based groundwater level threshold is well-suited for use as a proxy for groundwater storage. The minimum threshold for groundwater storage is fulfilled by the minimum threshold for groundwater levels (using the historical minimum).

Taylor presented the sustainable management criteria for degradation of water quality. He explained that the Temescal GSA is not responsible for local groundwater quality problems or degradation caused by others. Groundwater quality is under regulatory oversight by state agencies. However, the Temescal GSA is responsible for undesirable results associated with increased concentrations of water quality contaminants of concern due to groundwater management, such as through recharge and changes in pumping patterns related to groundwater management. The primary contaminants of concern in the Temescal Basin (historically and currently) are total dissolved solids (TDS) and nitrate. The minimum threshold is defined as a statistically significant increase in the percentage of wells with averages exceeding the maximum contaminant level for TDS and/or nitrate, relative to current conditions. Statistically significant is defined as more than a 10 percent increase in the number of wells in a 5-year period.

Taylor next presented the sustainable management criteria for depletions of interconnected surface water affecting beneficial uses. He explained that groundwater close to the ground surface can interact with vegetation or stream flows. Vegetation that relies on groundwater as its primary source of water is called riparian vegetation. Ecosystems that rely on groundwater are referred to as groundwater dependent. Impacts associated with reductions of stream flow, which affect groundwater dependent ecosystems, and potential impacts to riparian vegetation are assessed. Taylor displayed a map showing the maximum depth to water of wells in the Temescal Basin. Groundwater levels in all the wells in the main portion of the Temescal Basin have never been less than 40 feet deep. Water levels in wells in and near the Prado Basin area have never been deeper than 15 feet. Because riparian vegetation roots typically reach 20 to 30 feet at most, it is unlikely that the main part of the basin supports any riparian vegetation; however, the Prado Basin area likely supports riparian vegetation with its shallow groundwater levels. Depths in all wells around the Prado Basin and trends for groundwater levels, groundwater pumping, river flow, and rainfall were analyzed to determine if the Prado wetlands were supported by groundwater. The conclusion is that the Prado wetlands are more dependent on surface inflows than groundwater inflow. Changes in surface inflows have much more influence than changes in groundwater pumping or levels to the north or south. More monitoring is needed in the southern Prado Basin between the Prado wetlands and pumping centers in the Temescal Basin. Taylor explained that the minimum threshold for depletion of interconnected surface water is the historical maximum depth to water in shallow monitoring wells in the southern Prado area, correlated with Temescal Basin pumping or groundwater levels.

Finally, Taylor presented the sustainable management criteria for land subsidence affecting land uses, explaining that when water is removed from an aquifer, fine-grain materials can compact and the ground surface can decline. Ground surface elevation changes that may be related to subsidence statewide has been estimated by satellite measurements in data provided by the California Department of Water Resources dating from 2015 to 2019. This includes ground surface elevation changes in the Temescal Basin. This method has a margin of error of approximately 0.1 feet. The satellite data estimates show ground surface change in the Temescal Basin ranging between a rise of 0.08 feet to a fall of 0.08 feet. This is very small and within the margin of error. Taylor presented the minimum threshold for subsidence, defined as a rate of decline equal to or greater than 0.2 feet in any 5-year period. This has been considered in terms of a cumulative decline equal to or greater than 1.0 foot of decline since 2015, which represents current conditions and aligns with the SGMA start date.

Discussion/Q&A

Hughes opened the floor for questions and comments. There were no questions or comments from participants after this presentation.

Projects and Management Actions

Rasmus presented the draft projects and management actions for the Temescal GSP. She explained the three groupings of actions: baseline, planned, and potential future. Baseline refers to existing or established commitments to projects or actions. Planned actions are developed and evaluated projects or actions. Potential future actions describe projects or actions to be implemented later to achieve sustainability goals.

Rasmus began by describing the baseline projects. The first is groundwater treatment at the Temescal Desalter to reduce nitrates, total suspended solids (TSS), TDS, and other contaminants of concern for the drinking water supply. The second project is water reclamation facility (WRF) percolation ponds that discharge from City of Corona-owned WRFs to percolation ponds that recharge the Temescal Basin. The third project includes water-level quality assurance and quality control activities that maintain the reliability of ongoing groundwater elevation data. The final project Rasmus presented was the Western Riverside County Regional Authority (WRCRWA) plant that will soon supply recycled water for local irrigation use.

Rasmus next reviewed the baseline management actions. These include Water Shortage Contingency Plans, which are plans that detail the stages of water shortage and conservation response based on an agency's available supply and deficit, and Water Conservation Programs, which include response actions to reduce water use in the stages of a water shortage. Additional management actions include the Western Municipal Water District Integrated Regional Water Management Plan, which is a coordinated, long-range regional water quantity and quality management strategy, and the Temescal GSA's involvement in the Santa Ana Watershed Project, which is a coordinated management group formed to protect the Santa Ana River Basin and associated water resources.

Rasmus then reviewed the three projects included in planned actions. First, the Potable Reuse Feasibility Study will look at the possible use of future reclaimed water supply. Second, the mountain runoff capture investigation would explore options for operational changes allowing for additional benefit of groundwater recharge by using storm event runoff that is collected in Riverside County Flood Control and Water Conservation District basins. This would be at the edges of the basin adjacent to the Santa Ana mountains. Lastly, the interconnected surface water monitoring wells project would include three shallow monitoring wells drilled into the Prado Management Area to allow for groundwater elevation monitoring.

Rasmus provided more information on the interconnected surface water monitoring wells project since its implementation date is within the first year of Temescal GSP adoption. Wells will be sited in the southern area of the Prado Management Area. There is no active groundwater monitoring in this location so drilling wells will allow the Temescal GSA to better understand the relationship between the basin and interconnected water in the Prado Wetlands. The project will consist of three groundwater wells about 40-60 feet deep that will allow for continuous groundwater elevation data collection in the area. The data will be incorporated in the 5-year GSP update and these monitoring wells will inform future management actions in the Santa Ana River Watershed.

Lastly, Rasmus presented potential future actions. Data collected from the Prado Management Area monitoring wells will be used as part of monitoring for undesirable results to interconnected surface water in Prado. If this monitoring identifies potential undesirable results to interconnected surface water in the Prado Management Area, then coordination will be needed with upstream Santa Ana River partners as a management action. If groundwater levels in the Prado Management Area are falling, this approach will allow for coordinated solutions.

There are two additional future management actions. One is for future groundwater treatment, which would entail implementing advanced treatment for previously detected per- and polyfluoroalkyl substances (PFAS), TDS, nitrate, and trichloropropane (TCP). Other future management actions are for urban stormwater treatment, capture, and recharge, which is an exploration of urban stormwater harvesting to offset water supply and/or provide for groundwater recharge.

Discussion/Q&A

Hughes opened the floor for questions and comments. Participants were encouraged to answer the following question verbally or using the chat:

- Are there other potential groundwater related projects we should consider?
- Do you have ideas for how the volume of groundwater in the Temescal Basin could be increased?
- Do you have ideas for making groundwater more sustainable in the Temescal Basin?

The following are the questions and comments received in the chat box from participants:

- Could you confirm that Western Municipal Water District (WMWD) has an Integrated Regional Water Management Plan (IRWMP)?
- Since the 2008 WMWD IRWMP is a bit dated, I would recommend also citing the 2018 Santa Ana Watershed Project Authority (SAWPA) One Water One Watershed (OWOW) Plan.
- If the GSA is not responsible for impacts to groundwater dependent ecosystems resulting from reductions in surface water flow beyond its control, how does the Temescal GSA intend to determine if reductions in Western Riverside County Regional Wastewater Authority (WRCWRA) flows are impacting groundwater dependent ecosystems in the Prado Basin?
- I would recommend that the groundwater basin planning reflect the storage project called Santa Ana River Conservation and Conjunctive Use Program (SARCCUP) of which WMWD is a member.

Groundwater Sustainability Plan Implementation

Taylor presented for discussion four categories of GSP implementation: monitoring of groundwater conditions and use, annual reports, carrying out of projects and management actions, and periodic evaluations/GSP updates. First, monitoring of groundwater conditions and use will occur often throughout the basin. This includes groundwater levels, water quality, stream flow, subsidence, and water use. Second, the data collected through this monitoring will be compiled into annual reports. Annual reports include groundwater level data, storage change, water use, and sustainability progress. Third, carrying out projects and management actions will be an important part of GSP implementation and will be updated and modified over time. Last, periodic evaluations will occur at least every 5 years and GSP updates can occur based on new information becoming available, new projects being added, or the need to modify sustainable management criteria. All modifications should be made to ensure that the GSP continues to provide a reliable roadmap for sustainability for the groundwater basin.

Discussion/Q&A

Hughes opened the floor for questions and comments. There were no questions or comments from participants after this presentation.

How to Stay Involved

Hughes explained how members of the public could be involved throughout the remainder of the Temescal GSP preparation. Once all chapters are completed later in summer 2021, the draft Temescal GSP will be released for a 90-day period where the public can review and comment on the draft plan. The public will also have the opportunity to attend and make comments at the Adoption Hearing for the final GSP in winter 2021 before the final GSP is sent to the California Department of Water Resources by January 2022.

Draft chapters and other materials such as fact sheets can be found on the project website hosted by the City of Corona Department of Water and Power: CoronaCA.gov/Groundwater. Members of the public can use the form on the website to provide comments. Information on attending the Temescal GSP Adoption Hearing will also be posted on the website. Anyone who wants to be included on the mailing list to receive communication about the Temescal GSP should email Groundwater@CoronaCA.gov.

6. Wrap Up and Closing

Hughes thanked everyone for participating.

Appendix

Presentation Slides

TEMESCAL GSP PUBLIC WORKSHOP 3
TEMESCAL GSP TALLER COMUNITARIO 3

About the Groundwater Sustainability Plan (GSP)

The Sustainable Groundwater Management Act or "SGMA" is a California law that gives local agencies new tools for managing groundwater and planning for the future. The City of Corona, City of Norco, and Home Gardens County Water District have formed the Temescal Groundwater Sustainability Agency (Temescal GSA) in order to make a **Groundwater Sustainability Plan** for the Temescal Basin. Since groundwater is such an important resource for everyone, we need your help!

Un poco sobre el plan de sostenibilidad de las aguas subterráneas (GSP)

La Ley de Gestión Sostenible de Aguas Subterráneas o "SGMA", por sus siglas en inglés, es una ley de California que otorga a las agencias locales nuevas herramientas para gestionar las aguas subterráneas y planificar para el futuro. La Ciudad de Corona, la Ciudad de Norco y el Distrito Hídrico del Condado de Home Gardens han formado la Agencia de Sostenibilidad de Aguas Subterráneas de la Cuenca de Temescal (Temescal Groundwater Sustainability Agency) o Temescal GSA a fin de crear un **Plan de Sostenibilidad de Aguas Subterráneas** para la Cuenca de Temescal. Dado que las aguas subterráneas son un recurso muy importante para todos, ¡necesitamos su ayuda!

TEMESCAL GSA

TEMESCAL GROUNDWATER SUSTAINABLY PLAN (GSP) PUBLIC WORKSHOP 3

PLAN DE SOSTENIBILIDAD DE LAS AGUAS SUBTERRÁNEAS (GSP) DE TEMESCAL
TALLER COMUNITARIO 3 DE TEMESCAL

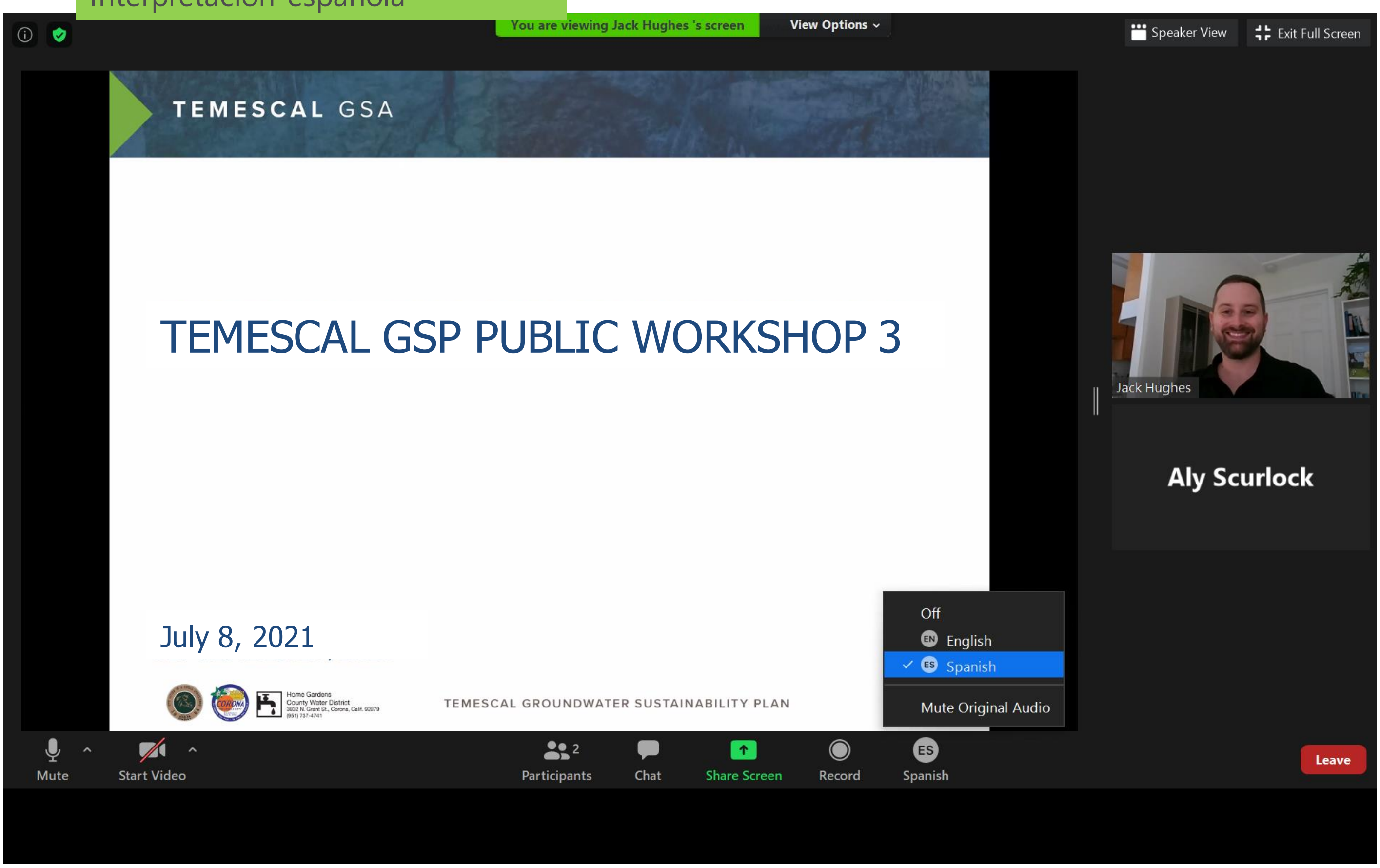
JULY 8, 2021 / 8 DE JULIO DE 2021

Home Gardens County Water District
3832 N. Grant St., Corona, Calif. 92879
(951) 737-4741

WELCOME

BIENVENIDOS

Interpretación española



This public workshop is being recorded and will be posted on the website:

www.CoronaCA.gov/Groundwater

Este taller público sera grabado y sera publicado en el sitio web:

www.CoronaCA.gov/Groundwater

TEMESCAL GSA

WORKSHOP PURPOSE
PROPÓSITO DE TALLER COMUNITARIO

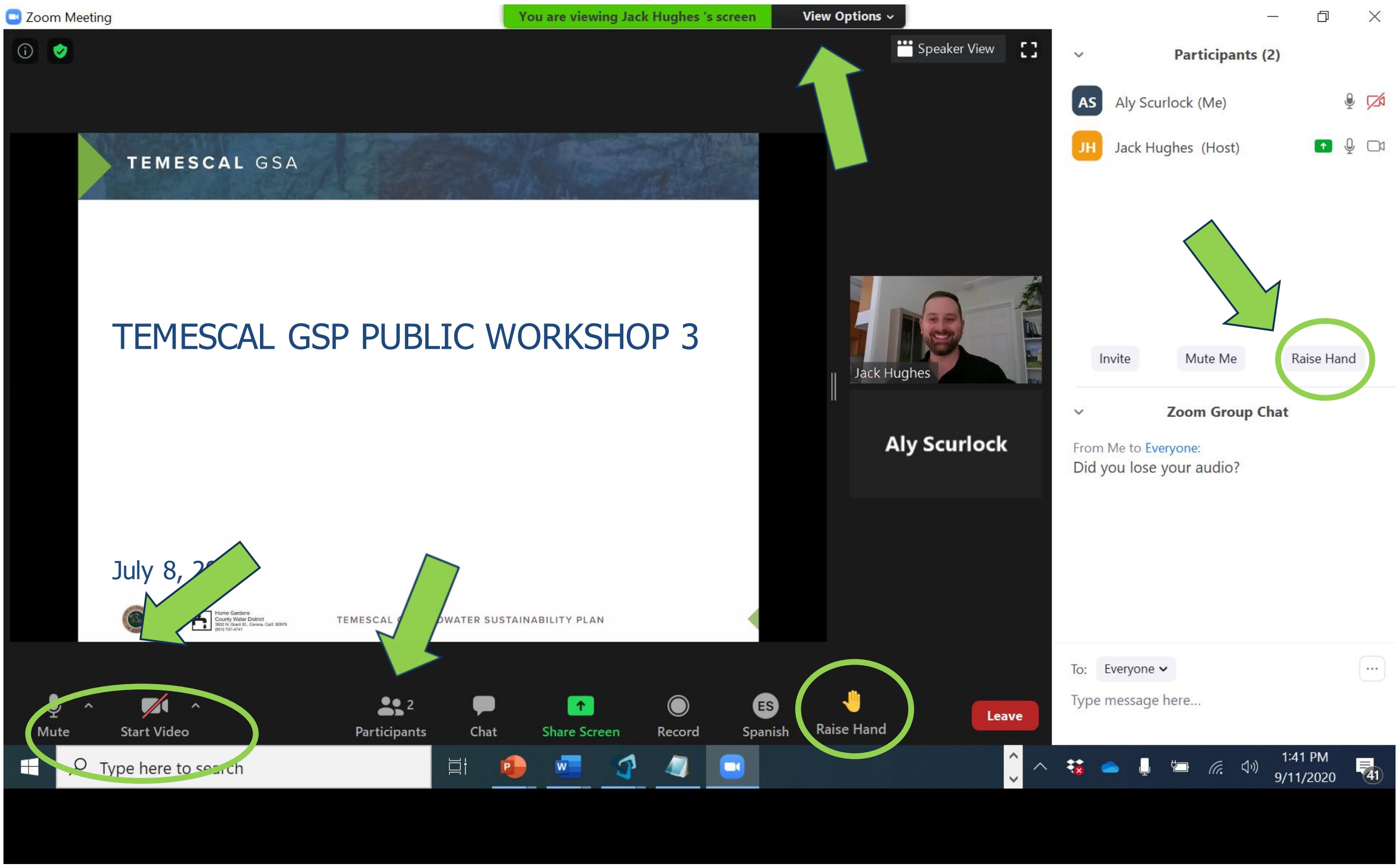
- Give Temescal Groundwater Sustainability Plan development updates.
  Proporcionar actualizaciones del desarrollo del Plan de Sostenibilidad de Aguas Subterráneas de Temescal.
- Present the sustainability criteria, projects and management actions, and implementation plan.
  Presentar los criterios de sostenibilidad, proyectos y acciones de gestión, y plan de implementación.

WORKSHOP PURPOSE
PROPÓSITO DE TALLER COMUNITARIO

» Hear input on sustainability criteria, and how the volume for groundwater in the basin could be increased and ideas for making groundwater more sustainable.
Escuche comentarios sobre criterios de sostenibilidad y cómo se podría aumentar el volumen de agua subterránea en la cuenca e ideas para hacer que el agua subterránea sea más sostenible

TEMESCAL GSA

HOW TO USE ZOOM
CÓMO UTILIZAR ZOOM



TEMESCAL GSA

INTRODUCTIONS
INTRODUCCIONES

TEMESCAL GSA

Home Gardens
County Water District
3832 N. Grant St., Corona, Calif. 92879
(951) 737-4741

TEMESCAL GSA

CONSULTANT TEAM
EQUIPO DE CONSULTORES

Chad Taylor
Todd Groundwater

Madison Rasmus
Carollo Engineers

Jack Hughes
Kearns & West

TIPS FOR A PRODUCTIVE DISCUSSION

CONSEJOS PARA UNA DISCUSIÓN PRODUCTIVA

- One speaker at a time
  Solo una persona habla a la vez
- Keep input concise
  Sea conciso al hablar
- Actively listen
  Escuche activamente
- Offer solutions
  Ofrezca soluciones

YOUR INPUT MATTERS

SU OPINIÓN ES IMPORTANTE

- The planning team will consider your comments as they prepare the Groundwater Sustainability Plan.
  El equipo de planificación considerará sus comentarios mientras preparan el Plan de Sostenibilidad de aguas subterráneas.
- Your input will be recorded, organized thematically, and presented in a workshop summary on the project website.
  Sus comentarios serán registrados, organizados temáticamente y presentados en el resumen del taller en el sitio web del proyecto.

TEMESCAL GSA

REVIEW OF GROUNDWATER SUSTAINABILITY PLAN DEVELOPMENT

REPASO DEL PLAN DE SOSTENIBILIDAD DE LAS AGUAS SUBTERRÁNEAS

TEMESCAL GSA

SUSTAINABLE GROUNDWATER MANAGEMENT ACT (SGMA)

GESTIÓN SOSTENIBLE DE AGUAS SUBTERRÁNEAS (SGMA)

Landmark legislation in 2014

» Recognizes that groundwater management in California is best accomplished locally

Legislación histórica en 2014

» Reconoce que la gestión de las aguas subterráneas en California se logra mejor a nivel local

GROUNDWATER SUSTAINABILITY PLANS
PLANES DE SOSTENIBILIDAD DE LAS AGUAS SUBTERRÁNEAS

- Groundwater sustainability plans are detailed road maps for how groundwater basins will achieve long term sustainability.
- Los planes de sostenibilidad de las aguas subterráneas actuan como mapas que detallan la ruta que hay que seguir para que cuencas de aguas subterráneas logren la sostenibilidad a largo plazo.

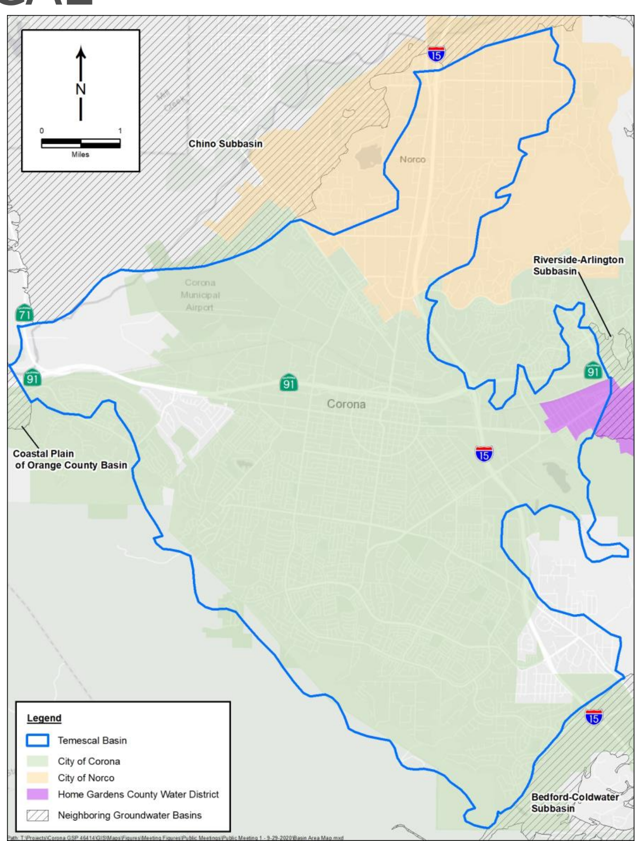
THE TEMESCAL BASIN
LA CUENCA DEL TEMESCAL

- DWR categorized Temescal Basin as a Medium Priority Basin

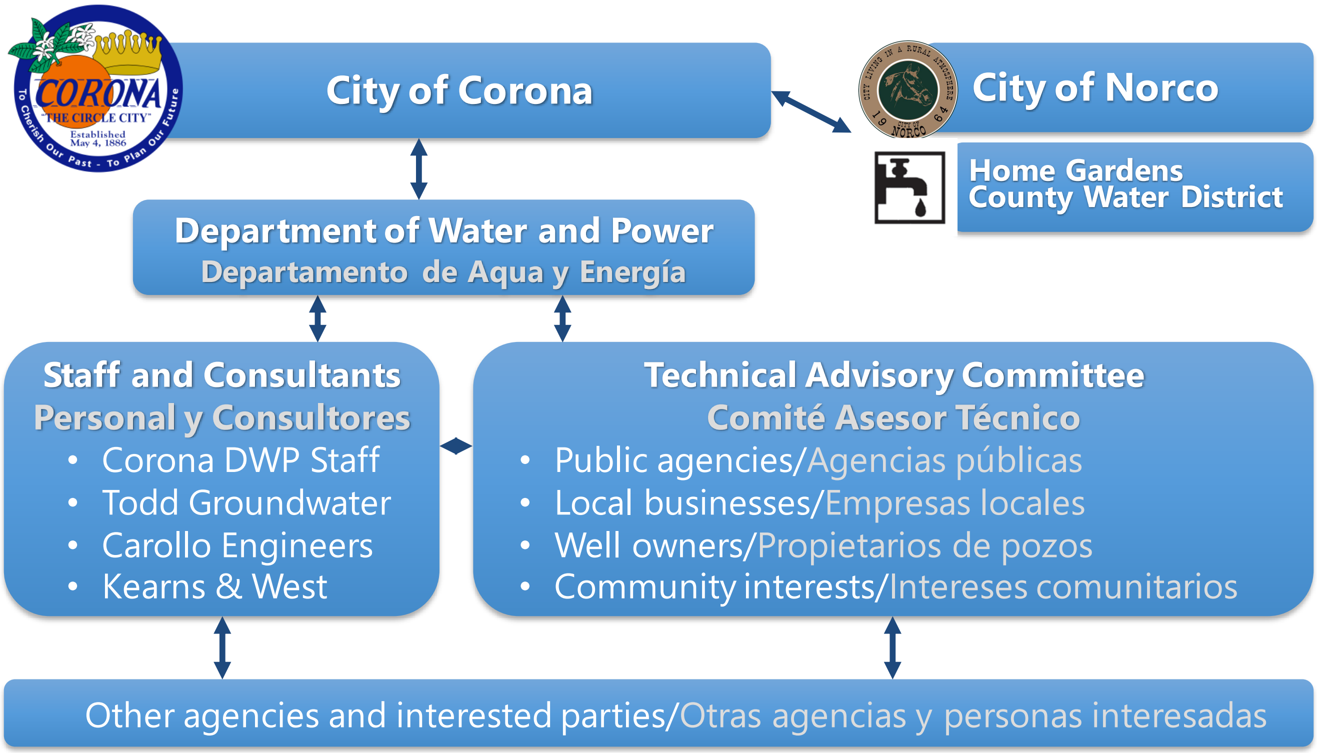
La Cuenca del Temescal fue desginada por DWR como Cuenca de Prioridad Media

- Contiguous and connected

Contigua y conectada



GSA ORGANIZATION / ORGANIZACÍON



TEMESCAL GSA

GSP DEVELOPMENT UPDATE
ACTUALIZACIÓN DE DESARROLLO DEL SGP

GSP STATUS
ESTADO DEL GSP

Individual chapters have been completed:

- Introduction
- Plan Area
- Hydrogeologic Conceptual Model
- Groundwater Conditions
- Monitoring Network
- Projects and Management Actions
- Implementation Plan

Working on finishing drafts of:

- Water Budget
- Sustainability Criteria

Then will be compiling complete GSP for distribution

Se han completado capítulos individuales:

- Introducción
- Área del plan
- Modelo conceptual hidrogeológico
- Condiciones de las aguas subterráneas
- Red de supervisión
- Proyectos y acciones de gestión
- Plan de ejecución

Estamos trabajando en la finalización de borradores de:

- Presupuesto del agua
- Criterios de sostenibilidad

A continuación, se compilará el GSP completo para su distribución

TEMESCAL GSA

DISCUSSION AND Q&A
DISCUSIÓN / PREGUNTAS Y RESPUESTAS

SUSTAINABLE MANAGEMENT CRITERIA

CRITERIOS DE GESTIÓN SOSTENIBLE

TEMESCAL GSA

WHAT IS SUSTAINABLE MANAGEMENT?

¿QUÉ ES LA GESTIÓN SOSTENIBLE?

The management and use of groundwater without causing undesirable results

El gestión y utilización de las aguas subterráneas sin causar resultados indeseables

- Chronic lowering of groundwater levels
  Reducción crónica de los niveles de aguas subterráneas
- Reduction of groundwater storage
  Reducción del almacenamiento de aguas subterráneas
- Degradation of water quality
  Degradación de la calidad del agua
- Depletions of interconnected surface water
  Agotamiento de aguas superficiales interconectadas
- Land subsidence affecting land uses
  Hundimiento de tierras que afectan los usos de las tierras
- Seawater intrusion (not applicable here)
  Inactividad de aguas marinas (no aplicable aquí)

SUSTAINABILITY GOAL
OBJETIVO DE SOSTENIBILIDAD

To sustain groundwater resources for the current and future beneficial uses of the Temescal Basin in a manner that is adaptive and responsive to the following objectives:

- Provide a long-term, reliable and efficient groundwater supply for municipal, industrial, and other uses
- Provide reliable storage for water supply resilience during droughts and shortages
- Protect groundwater quality
- Support beneficial uses of interconnected surface waters, and
- Support integrated and cooperative water resource management.

Sostener los recursos de aguas subterráneas para los usos beneficiosos actuales y futuros de la Cuenca Temescal de manera que sean adaptables y respondan a los siguientes objetivos:

- Proporcionar un suministro de agua subterránea fiable y eficiente a largo plazo para usos municipales, industriales y de otro tipo
- Proporcionar almacenamiento fiable para la resistencia del suministro de agua durante sequías y escaseces
- Proteger la calidad del agua subterránea
- Apoyar los usos beneficiosos de las aguas superficiales interconectadas y
- Apoyar los recursos hídricos integrados y cooperativos

TEMESCAL GSA

HOW DO WE MEASURE SUSTAINABILITY?
¿CÓMO MEDIMOS LA SOSTENIBILIDAD?

Sustainability Criteria
Criterios de sostenibilidad:

- Undesirable results / Resultados no deseados
  - What are undesirable results that we want to avoid?
  - ¿Cuáles son los resultados no deseados que queremos evitar?
- Minimum thresholds (MT) / Umbrales mínimos (MT)
  - How low is too low for water levels?
  - ¿Qué tan bajo es demasiado bajo para los niveles de agua?
- Measurable objectives (MO) / Objetivos mensurables (MO)
  - What is the desired range of water levels?
  - ¿Cuál es el rango deseado de niveles de agua?

BENEFICIAL USES
USOS BENEFICIOSOS

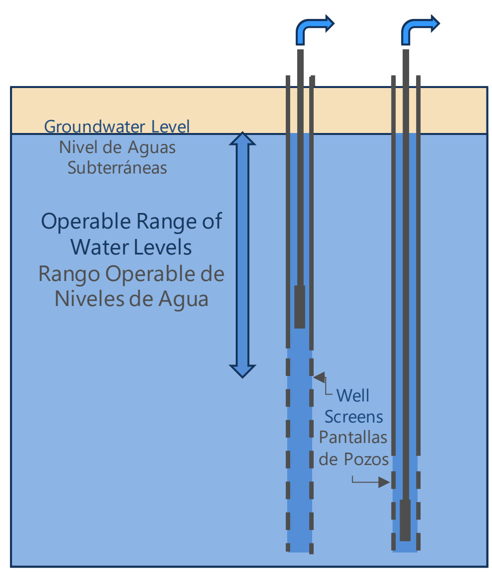
- Municipal water supply
- Industrial water supply
- Small community water systems
- Small commercial water supply
- Groundwater dependent ecosystems
- Recreational surface water use

- Suministro de agua municipal
- Agua para procesos industriales
- Sistemas de agua comunitarios pequeños
- Agua para uso comercial pequeños
- Ecosistemas dependientes del agua subterránea
- Uso de aguas superficiales para fines recreativos

TEMESCAL GSA

GROUNDWATER LEVELS
NIVELES DE AGUA SUBTERRÁNEA

- Define MT as historical low level in Key Wells
  Definir MT como nivel bajo histórico en Key Wells
- Key Wells are a set of representative monitoring wells that will continue to be monitored
  Los pozos clave son un conjunto representativo de pozos de monitoreo que continuarán siendo monitoreados



REDUCTION OF GROUNDWATER STORAGE
REDUCCIÓN DEL ALMACENAMIENTO DE AGUAS SUBTERRÁNEAS

- Groundwater storage is connected to water levels
  El almacenamiento de aguas subterráneas está conectado a los niveles de agua
- GSP regulations allow use of groundwater level Minimum Thresholds and Measurable Objectives as a proxy
  Las regulaciones del GSP permiten el uso de umbrales mínimos de nivel de aguas subterráneas y objetivos mensurables como proxy
- Historical minimum-based water level threshold is well suited to use as a proxy
  El umbral histórico de nivel de agua basado en el mínimo es adecuado para su uso como proxy
- Minimum Threshold for storage is fulfilled by the minimum threshold for groundwater levels
  El umbral mínimo para el almacenamiento se cumple con el umbral mínimo para los niveles de aguas subterráneas

TEMESCAL GSA

WATER QUALITY / CALIDAD DEL AGUA

- GSA is not responsible for local problems or degradation caused by others.
  GSA no es responsable por los problemas locales o la degradación causada por otros.
- Groundwater quality is under regulatory oversight by State Agencies.
  La calidad de las aguas subterráneas está bajo la supervisión reglamentaria de las agencias estatales.
- The GSA is responsible for increased concentrations in water quality due to management (recharge, pumping, etc.).
  La GSA es responsable por el aumento de las concentraciones en la calidad del agua debido a la gestión (recarga, bombeo, etc.).

WATER QUALITY THRESHOLD
UMBRAL DE CALIDAD DEL AGUA

» Minimum Threshold defined as a statistically significant increase in the percentage of wells with averages exceeding the maximum contaminant level (MCL) for total dissolved solids (TDS) and nitrate, relative to current conditions.

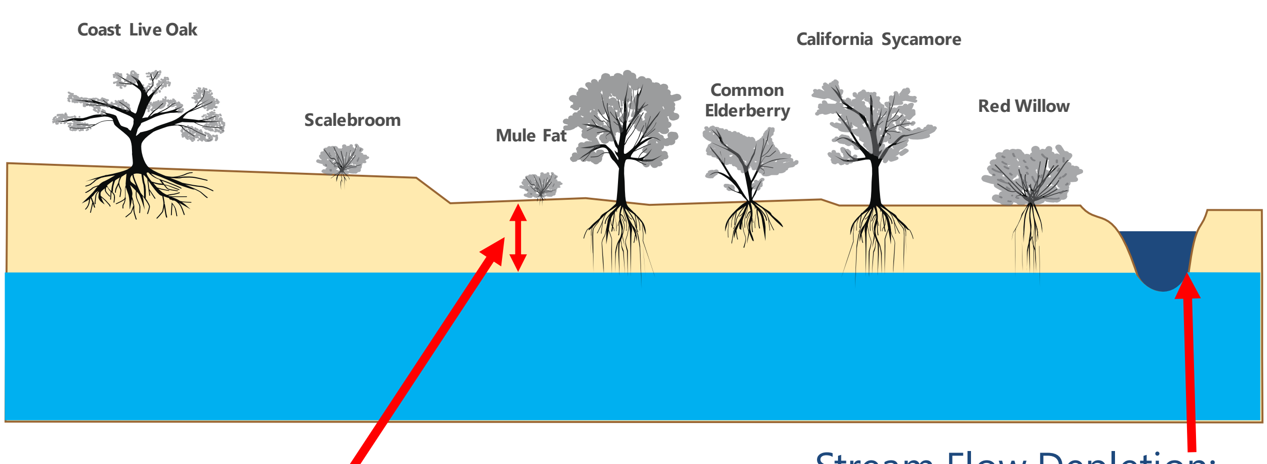
Umbral mínimo definido c omo un aumento estadísticamente significativo en el porcentaje de pocillos con promedios que exceden el nivel máximo de contaminante (MCL) para sólidos disueltos totales (TDS) y nitrato, en relación con las condiciones actuales.

» Statistically significant is defined as more than 10 percent increase in number of wells in 5-year period.

Estadísticamente significativo se define como un aumento de más del 10 por ciento en el número de pozos en un período de 5 años.

TEMESCAL GSA

INTERCONNECTED SURFACE WATER
AGUAS SUPERFICIALES INTERCONECTADAS

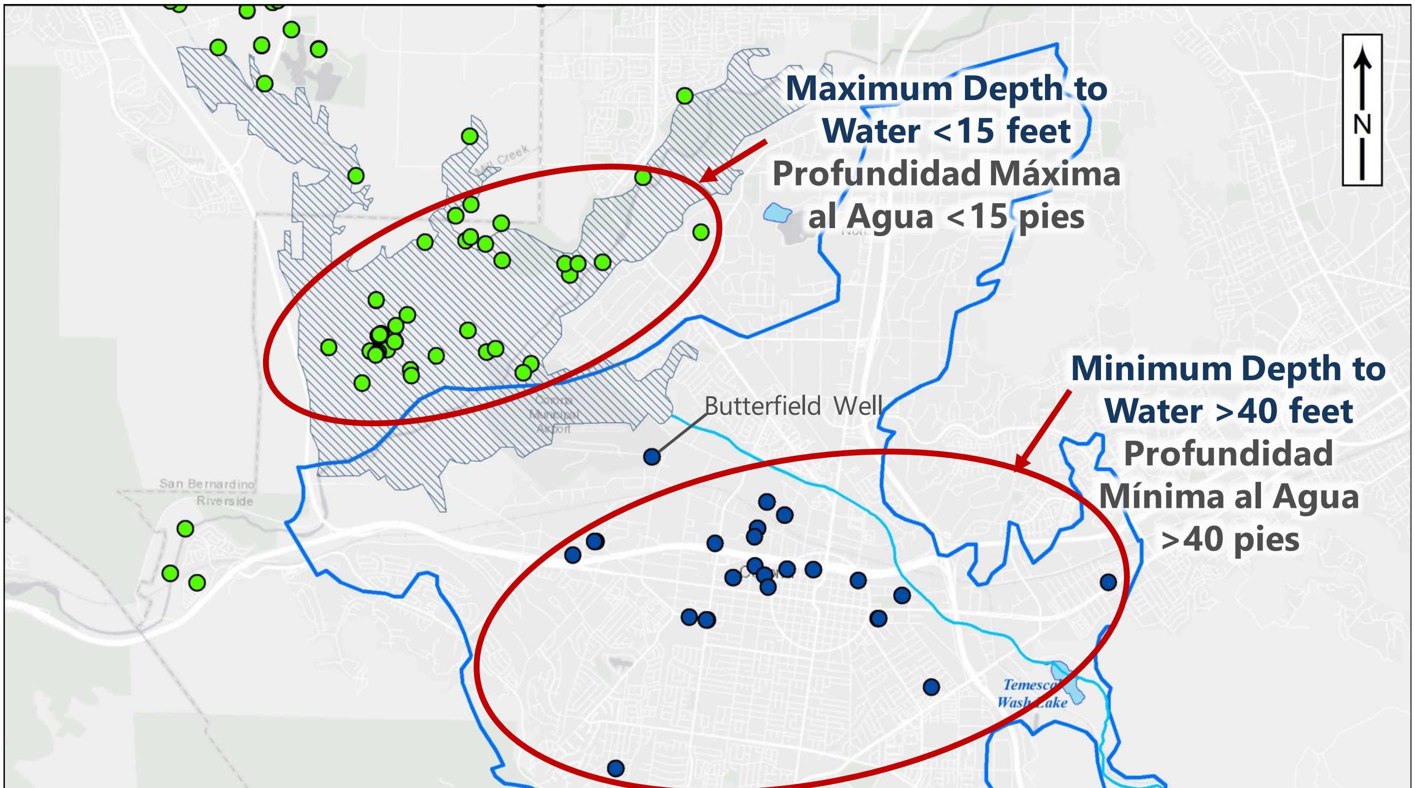


Riparian Vegetation:
About 20 to 30 feet
Riparian Vegetation:
Cerca de 20 a 30 pies

Stream Flow Depletion:
Stream Bed Elevation
Agotamiento del Flujo de la Corriente:
Elevación del Lecho del Arroyo

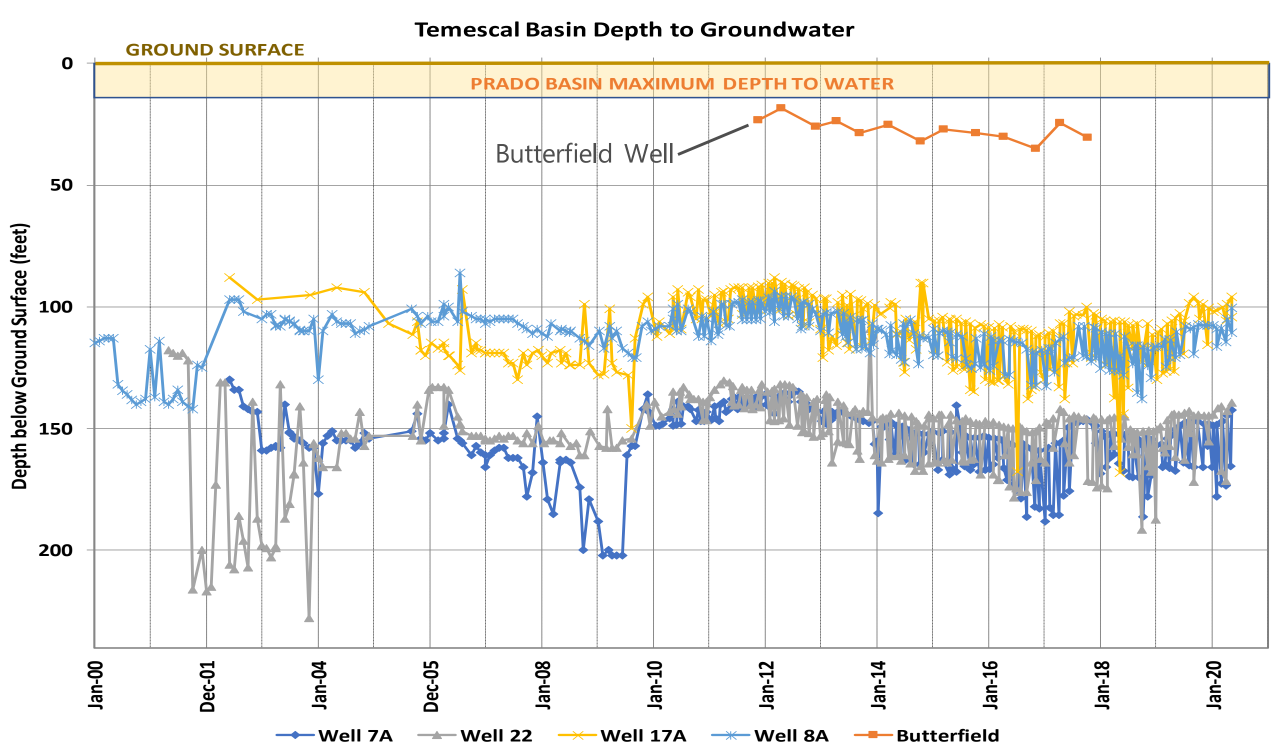
TEMESCAL GSA

DEPTH TO GROUNDWATER
PROFUNDIDAD A LAS AGUAS SUBTERRÁNEAS



TEMESCAL GSA

DEPTH TO GROUNDWATER
PROFUNDIDAD A LAS AGUAS SUBTERRÁNEAS



INTERCONNECTED SURFACE WATER CONCLUSIONS

CONCLUSIONES SOBRE LAS AGUAS SUPERFICIALES INTERCONECTADAS

» Prado wetlands are more dependent on surface inflows than groundwater inflow

Los humedales del Prado dependen más de los flujos de entrada superficiales que los flujos de entrada de aguas subterráneas

» Changes in surface inflows have much more influence than changes in groundwater pumping or levels to the north or south

Los cambios en los flujos de entrada superficiales tienen mucha más influencia que los cambios en el bombeo de aguas subterráneas o los niveles hacia el norte o el sur

» More monitoring is needed in the southern Prado between the wetlands and pumping centers in Temescal Basin

Se necesita más vigilancia en el sur del Prado entre los humedales y los centros de bombeo en la cuenca Temescal

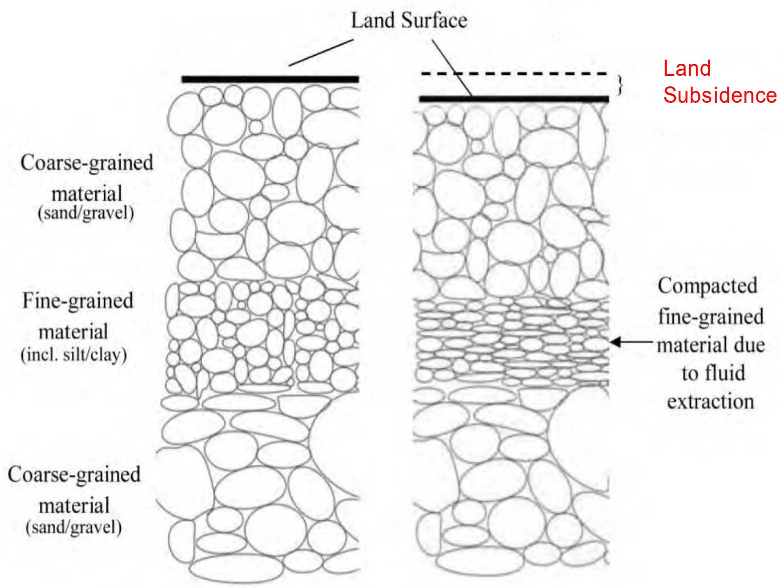
INTERCONNECTED SURFACE WATER THRESHOLD

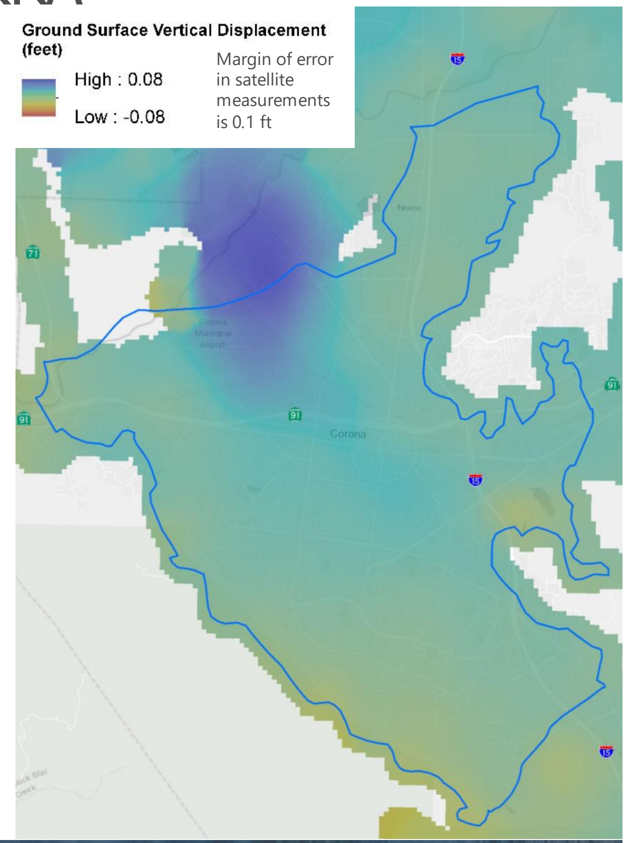
UMBRAL DE AGUAS SUPERFICIALES INTERCONECTADAS

» Minimum Threshold for depletion of interconnected surface water is historical maximum depth to water in shallow monitoring wells in the southern Prado area, correlated with Temescal Basin pumping or water levels

El umbral mínimo para el agotamiento del agua superficial interconectada es el nivel mínimo histórico del agua (profundidad máxima al agua) en pozos de monitoreo poco profundos en el área sur del Prado, correlacionado con el bombeo de la Cuenca Temescal o los niveles del agua

SUBSIDENCE
HUNDIMIENTO DE LA TIERRA





TEMESCAL GSA

SUBSIDENCE THRESHOLD
UMBRAL DE HUNDIMIENTO DE LA TIERRA

- Defined as rate of decline equal to or greater than 0.2 feet in any five-year period

  Definido como una tasa de disminución igual o superior a 0.2 pies en cualquier período de cinco años

- This has been considered in terms of a cumulative decline equal to or greater than one foot of decline since 2015

  Esto se ha considerado en términos de una disminución acumulada igual o mayor a un pie de disminución, desde el 2015

TEMESCAL GSA

DISCUSSION AND Q&A
DISCUSIÓN / PREGUNTAS Y RESPUESTAS

TEMESCAL GSA

PROJECTS AND MANAGEMENT ACTIONS
PROYECTOS Y ACCIONES DE GESTIÓN

PROJECT MANAGEMENT/ACTION GROUPINGS

- Group 1: Baseline Actions

  Grupo 1: Acciones de línea de base
- Group 2: Planned Actions

  Grupo 2: Acciones planeadas
- Group 3: Potential Future Actions

  Grupo 3: Posibles acciones futuras

TEMESCAL GSA

GROUP 1 PROJECTS
PROYECTOS DEL GRUPO 1

- Groundwater Treatment: Treatment at the Temescal desalter to reduce nitrates, TDS, TSS and other contaminants for the City's drinking water supply

  Tratamiento de aguas subterráneas: tratamiento en la desaladora de Temescal para reducir los nitratos, TDS, TSS y otros contaminantes para el suministro de agua potable de la ciudad.
- Water Reclamation Facility Percolation Ponds: Discharge from percolation ponds that recharge the Basin

  Estanques de percolación de instalaciones de recuperación de agua: descarga de estanques de percolación que recargan la cuenca

GROUP 1 PROJECTS
PROYECTOS DEL GRUPO 1

» Water Level QA/QC: Maintaining the reliability of groundwater elevation data

Control de calidad / control de calidad del nivel del agua: mantenimiento de la confiabilidad de los datos de elevación del agua subterránea

» WRCRWA Recycled Water: This plant will soon produce recycled water for local irrigation use

Agua reciclada de WRCRWA: esta planta pronto producirá agua reciclada para uso de riego local.

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GROUP 1 MANAGEMENT ACTIONS
ACCIONES DE GESTIÓN DEL GRUPO 1

» Water Shortage Contingency Plans: Stages of water shortage and conservation response based on available water supply

Planes de contingencia de escasez de agua: Etapas de escasez de agua y respuesta de conservación en función del suministro de agua disponible

» Water Conservation Programs: Response actions to reduce water use in accordance with water shortage

Programas de conservación de agua: acciones de respuesta para reducir el uso de agua de acuerdo con la escasez de agua

GROUP 1 MANAGEMENT ACTIONS
ACCIONES DE GESTIÓN DEL GRUPO 1

» WMWD IRWMP: Coordinated, long-range regional water quality and management strategy

WMWD IRWMP: Estrategia regional coordinada de gestión y calidad del agua a largo plazo

» Santa Ana Watershed Involvement: Coordinated management group to protect the Santa Ana River basin and associated water resources

Participación de la cuenca de Santa Ana: grupo de gestión coordinado para proteger la cuenca del río Santa Ana y los recursos hídricos asociados

GROUP 2 PROJECTS
PROYECTOS DEL GRUPO 2

» Potable Reuse Feasibility Study: Study to look at use potential for near to future reclaimed water supply

Estudio de viabilidad de reutilización de agua potable: estudio para analizar el potencial de uso del suministro de agua recuperada en el futuro cercano

» Mountain Runoff Capture Investigation: Runoff during storm events is collected into existing RCFCWCD basins to mitigate flooding. This study would explore options for operational changes to allow for additional benefit of groundwater recharge.

Investigación de captura de escorrentía de montaña: La escorrentía durante tormentas se recolecta en las cuencas RCFCWCD existentes para mitigar las inundaciones. Este estudio exploraría opciones para cambios operativos que permitan un beneficio adicional de la recarga de agua subterránea.

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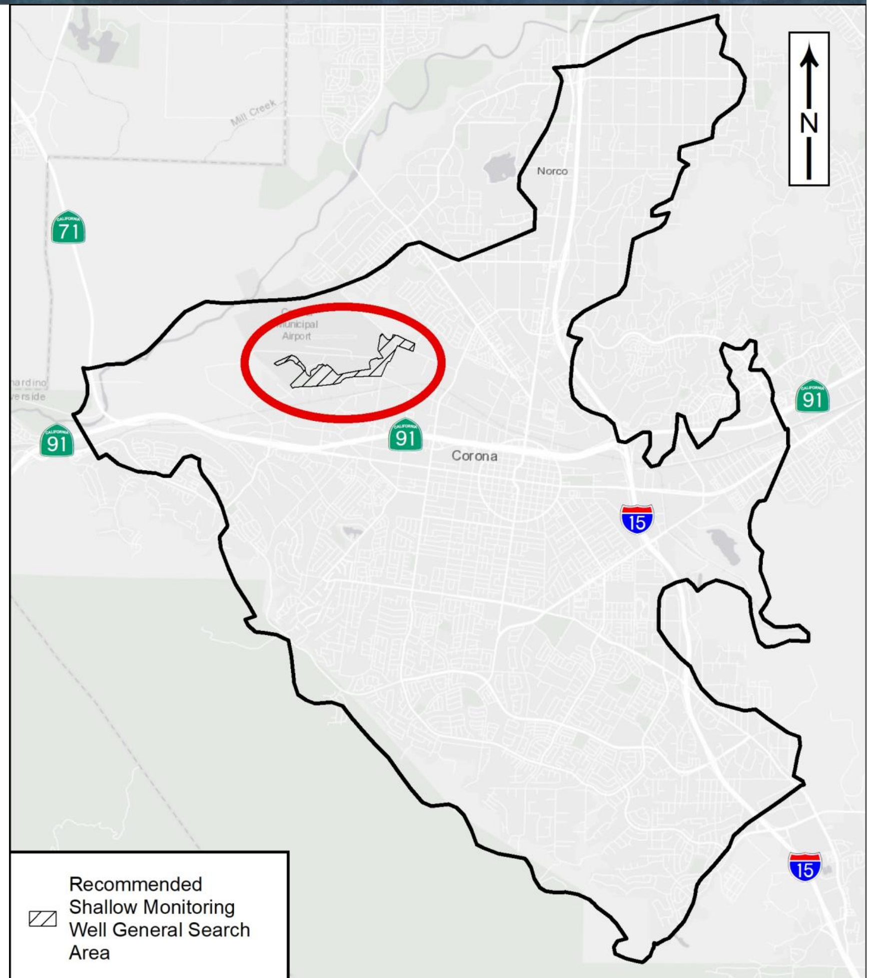
GROUP 2 – MONITORING WELLS PROJECT
GRUPO 2 - PROYECTO DE POZOS DE MONITOREO



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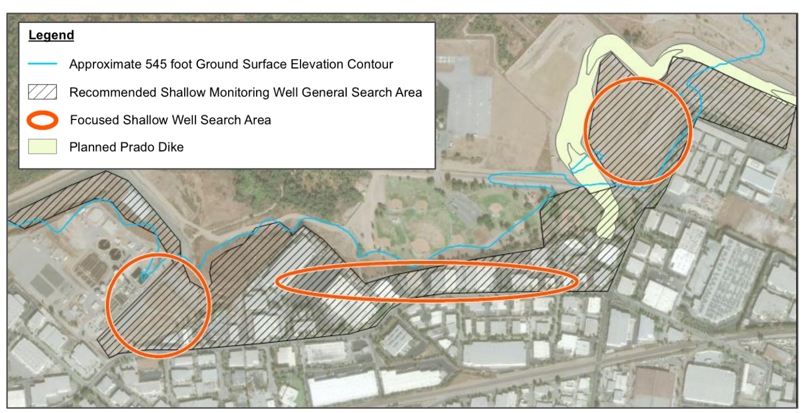
GROUP 2 – MONITORING WELLS PROJECT
GRUPO 2 - PROYECTO DE POZOS DE MONITOREO

- 3 wells, 40-60 feet deep

  3 pozos, de 40 a 60 pies de profundidad
- Continuous groundwater elevation data collection to be used in 5-year GSP update

  Recopilación continua de datos de elevación del agua subterránea que se utilizará en la actualización del GSP en 5 años
- Data will inform future management actions

  Los datos informarán las acciones de gestión futuras



GROUP 3 MANAGEMENT ACTIONS
ACCIONES DE GESTIÓN DEL GRUPO 3

» Santa Ana River Wastewater Discharge Coordination for Shallow Groundwater Conditions: Contingent on Prado monitoring well installation. If groundwater levels in Prado are falling, this approach will entail coordination with upstream partners for solutions

Coordinación de descarga de aguas residuales del río Santa Ana para condiciones de aguas subterráneas poco profundas: depende de la instalación del pozo de monitoreo de Prado. Si los niveles de agua subterránea en Prado están cayendo, este enfoque implicará la coordinación con los socios del alrededor para encontrar soluciones

TEMESCAL GSA

GROUP 3 PROJECTS
PROYECTOS DEL GRUPO 3

» Future Groundwater Treatment: Implementation of advanced treatment to treat for PFAS as well as TDS, nitrate, and TCP

Tratamiento de aguas subterraneas en el futuro: Implementacion de tratamiento avanzado para tratar agua de PFAS al mismo tiempo que TDS, nitrato, y TCP

» Urban Stormwater Treatment, Capture, and Recharge: Exploration of urban stormwater harvesting to offset water supply and/or provide for groundwater recharge

Tratamiento, captura y recarga de aguas pluviales urbanas: exploración de la captación de aguas pluviales urbanas para compensar el suministro de agua y / o proporcionar recarga de aguas subterráneas

DISCUSSION AND Q&A
DISCUSIÓN / PREGUNTAS Y RESPUESTAS

» Are there other potential groundwater related projects we should consider?
¿Hay otros proyectos potenciales relacionados con las aguas subterráneas que deberíamos considerar?

» Do you have ideas for how the volume of groundwater in the Basin could be increased?
¿Tiene ideas sobre cómo se podría aumentar el volumen de aguas subterráneas en la cuenca?

» Do you have ideas for making groundwater more sustainable in the Basin?
¿Tiene ideas para hacer que las aguas subterráneas sean más sostenibles en la cuenca?

TEMESCAL GSA

GSP IMPLEMENTATION
IMPLEMENTACIÓN DEL GSP

WHAT IS GSP IMPLEMENTATION?
¿QUÉ ES LA IMPLEMENTACIÓN DEL GSP?

» Monitoring groundwater conditions and use
Monitoreo de las condiciones y el uso de las aguas subterráneas

» Annual Reports
Reportes Anuales

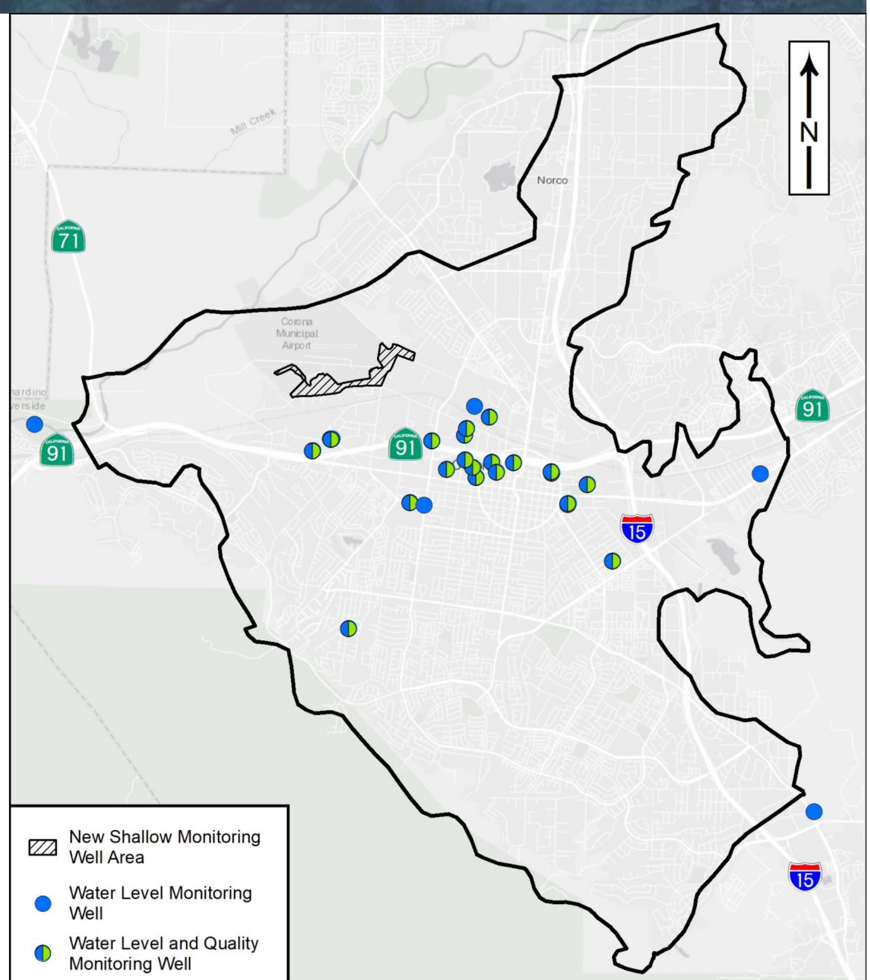
» Carrying out projects and management actions
Realización de proyectos y acciones de gestión

» Periodic Evaluations / GSP Updates
Evaluaciones Periódicas / Actualizaciones del GSP

MONITORING
MONITOREO

Includes:
- » water levels,
- » water quality,
- » streamflow,
- » subsidence, and
- » water use

Incluye:
- » los niveles de agua,
- » la calidad del agua,
- » el flujo de corrientes,
- » el hundimiento y
- » el uso del agua



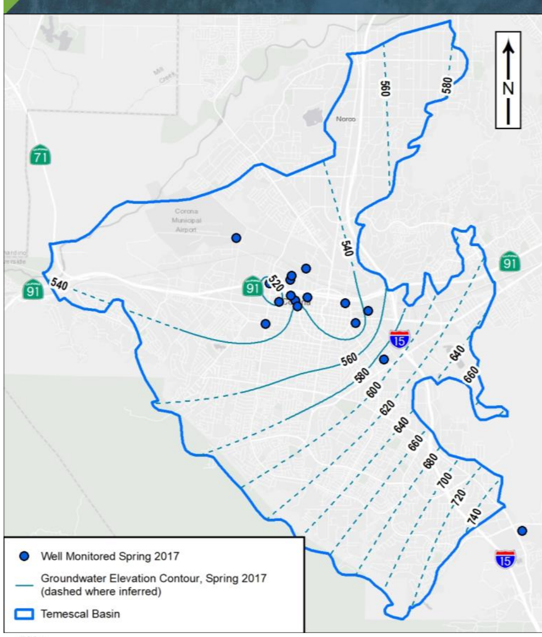
TEMESCAL GSA

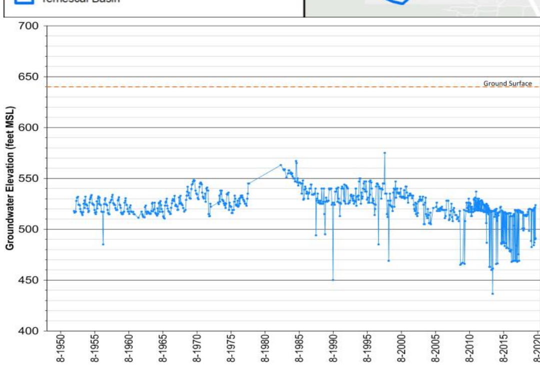
ANNUAL REPORTS
INFORMES ANUALES

Include:
- » water level data,
- » storage change,
- » water use,
- » sustainability progress

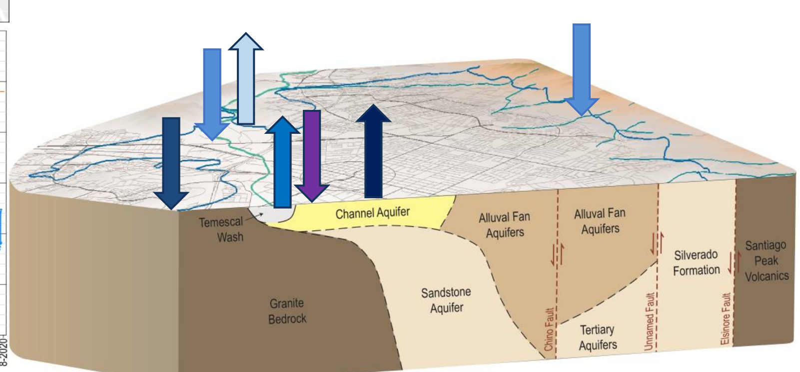
Incluye:
- » dado de nivel de agua,
- » cambio de almacenamiento,
- » el uso agua,
- » progreso de la sostenibilidad

TEMESCAL GSA





PERIODIC EVALUATIONS / GSP UPDATES
EVALUACIONES PERIÓDICAS / ACTUALIZACIONES DEL GSP



DISCUSSION AND Q&A
DISCUSIÓN / PREGUNTAS Y RESPUESTAS

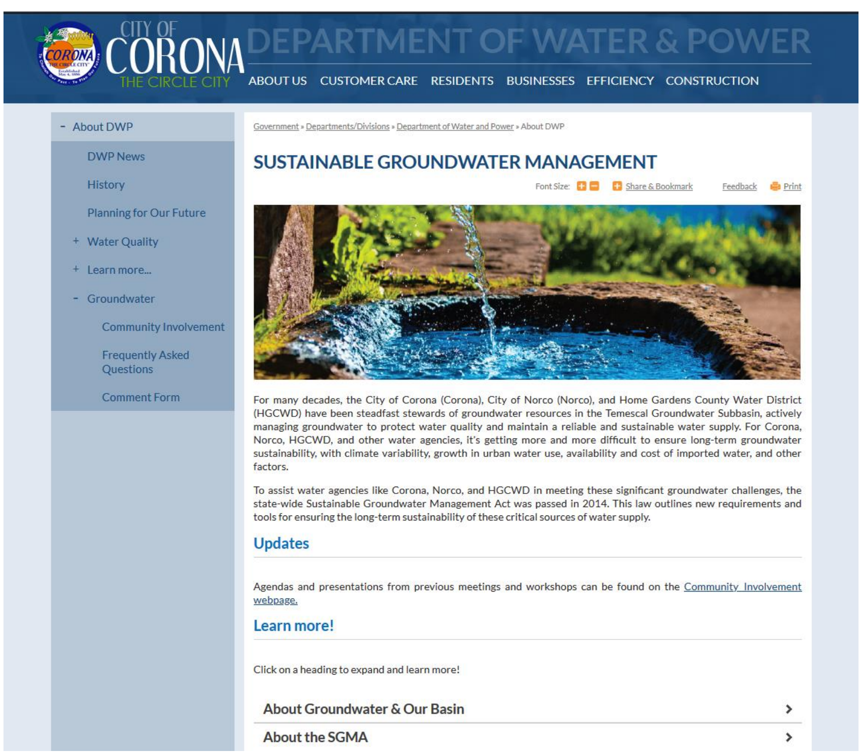
HOW TO STAY INVOLVED
CÓMO MANTENERSE INVOLUCRADO

REVIEW AND ADOPTION
REVISIÓN Y ADOPCIÓN

Draft GSP Released	90 Day Public Review Period	Adoption Hearing	Final GSP Sent to DWR
Publicación del borrador del GSP	90 Dias Período de revisión pública	Audiencia de adopción	GSP final enviado a DWR
Late Summer 2021 Finales del verano de 2021	Fall 2021 Otoño 2021	Winter 2021 Invierno 2021	January 2022 Enero 2022

TEMESCAL GSA

WEBSITE
SITIO WEB



HOW TO KEEP IN TOUCH
CÓMO MANTENERSE EN CONTACTO

» Sign up for the mailing list by emailing groundwater@coronaca.gov
Regístrese en la lista de correo enviando un correo electrónico a groundwater@coronaca.gov

» Visit the website to view information, review draft chapters and other materials, and to submit comments : www.CoronaCA.gov/Groundwater
Visite el sitio web para ver información, revisar borradores de capítulos y otros materiales, y enviar comentarios: www.CoronaCA.gov/Groundwater

THANK YOU
GRACIAS

TEMESCAL GSA

GROUNDWATER FOR PEOPLE, THE ENVIRONMENT, AND THE FUTURE

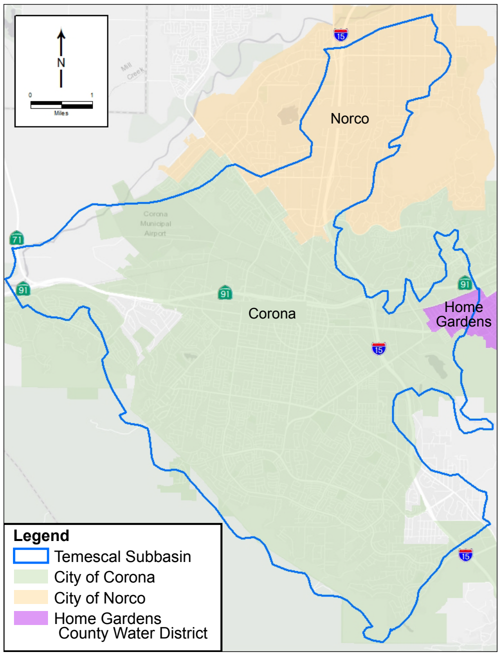
GET INVOLVED!

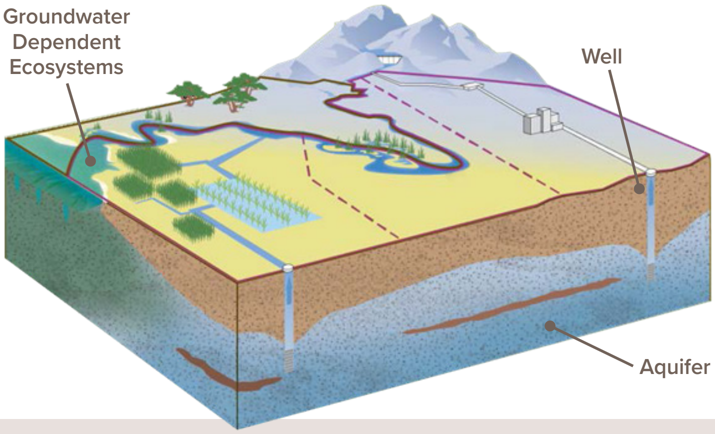
Community input is needed! We want your help to create an effective plan for the future of our groundwater. Visit **CoronaCA.gov/Groundwater** or send an email to **Groundwater@CoronaCA.gov** to attend a workshop or learn more!

THE WATER BENEATH YOUR FEET AND IN YOUR FAUCET

You may not know it, but if you live in Corona, Norco, or Home Gardens, you are likely using groundwater that comes from the **Temescal Basin**. Groundwater from the Temescal Basin and other local groundwater basins, along with water purchased from other areas, is treated and blended together. It then arrives as tap water at your home or business.

The groundwater beneath your feet is an important local resource that will be even more important in the future. On the other side of this factsheet, you can learn more about who manages groundwater in the Temescal Basin and how you can get involved in protecting local groundwater for your community and all who depend on it.





WHAT IS GROUNDWATER?

Groundwater is an important source of water stored in the earth beneath our feet, in spaces between sand, soils, and fractured rock known as an **aquifer**. The areas of the most productive aquifers in California have been defined as **groundwater basins**, which can extend for many miles. The Temescal Basin covers nearly 66 square miles.

WHO USES GROUNDWATER?

Groundwater from aquifers is drawn out by pumps. Cities and water districts pump groundwater from **wells** to supply to businesses and homes. People in rural areas may have their own wells for personal use and/or to water crops. Groundwater also has many uses in manufacturing and industry. It can be used to process, wash, cool, or transport a product.

Groundwater is important to the environment, it flows to and from wetlands, springs, creeks, lakes, and other bodies of water. The plants and animals that live near or in these bodies of water sometimes depend on it for their survival. These areas are called **Groundwater Dependent Ecosystems**.

Home Gardens
County Water District
3832 N. Grant St., Corona, Calif. 92879
(951) 737-4741

TEMESCAL GSA

GROUNDWATER FOR PEOPLE, THE ENVIRONMENT, AND THE FUTURE

GROUNDWATER MANAGEMENT

For many decades, the City of Corona, City of Norco, and Home Gardens County Water District have carefully managed groundwater in the Temescal Basin. They have made sure that there is enough clean and drinkable water for the communities that need it. This has become more of a challenge due to changes in climate, the cost of importing water, and the fact that more water is needed because communities are growing. To help all stewards of groundwater plan for these changes, the state-wide **Sustainable Groundwater Management Act** was passed in 2014.

The Sustainable Groundwater Management Act or "SGMA" is a California law that gives local agencies new tools for managing groundwater and planning for the future. The City of Corona, City of Norco, and Home Gardens County Water District have formed the Temescal Subbasin Groundwater Sustainability Agency (Temescal GSA) in order to make a **Groundwater Sustainability Plan** for the Temescal Basin. Since groundwater is such an important resource for everyone, we need your help!

GROUNDWATER FOR THE FUTURE

Lowering GW Levels | Reduction of Storage | Seawater Intrusion | Degraded Quality | Land Subsidence | Surface Water Depletion

Important factors for groundwater basin management can be seen on the right. By creating a Groundwater Sustainability Plan, we will better manage the groundwater in the Temescal Basin and ensure we have enough for current and future generations. We will seek understanding of past groundwater use and plan for the sustainable use of future groundwater. Whether you own your own well, use water from the tap, irrigate your crops, or pump groundwater for your business, **everyone can participate in making this plan a success!** We want to hear your questions, ideas, and concerns about protecting our groundwater supply and quality in the Temescal Basin. To find out how, please visit the website at **CoronaCA.gov/Groundwater.**

To learn more about the **TEMESCAL GROUNDWATER SUSTAINABILITY PLAN**, including dates of public workshops and other ways to get involved:

Please visit **CoronaCA.gov/Groundwater**

Send an email to **Groundwater@CoronaCA.gov**

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TEMESCAL GSA

GROUNDWATER FOR PEOPLE, THE ENVIRONMENT, AND THE FUTURE

GET INVOLVED!

Community input is needed! Visit CoronaCA.gov/Groundwater or send an email to Groundwater@CoronaCA.gov to attend a workshop, review draft chapters, and learn more!

To learn more about the Temescal GSA, GSPs, and groundwater see Fact Sheet 1.

PREPARING TO DEFINE SUSTAINABILITY

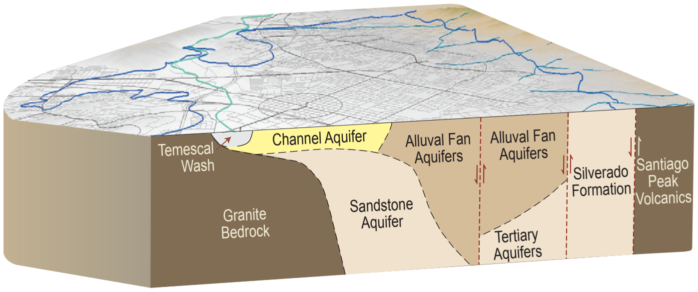
The Temescal GSA is preparing to define groundwater sustainability for the Temescal Basin to ensure we have enough groundwater for current and future generations. First, it is important to understand more about the Basin. This fact sheet explains some important information that will be in the Temescal Groundwater Sustainability Plan to provide that understanding.

HOW WE LEARN ABOUT THE TEMESCAL BASIN

A **hydrogeologic conceptual model** provides a description of the physical features within a groundwater basin. It will summarize information about basin boundaries, soils, geologic structure, and aquifers within the Temescal Basin. It will also illustrate where and how water flows in and through the Basin.

Current and historical groundwater conditions give an understanding of Basin health over time and show patterns of use that are important for understanding current and future sustainability. Groundwater conditions will be described in terms of the six sustainability indicators shown below, which will also be used for planning for sustainability in the Basin.

- Lowering GW Levels
- Reduction of Storage
- Degraded Quality
- Surface Water Depletion
- Land Subsidence
- Saltwater Intrusion



This block diagram shows some important features of the Temescal Basin described in the hydrogeologic conceptual model

A **water budget** quantifies the volumes of ground and surface water moving through a basin. It will also estimate changes in storage, a measure of how much groundwater enters or leaves the Basin in any given period. The water budget and change in storage are important factors in estimating sustainable yield, or how much water can be pumped from the Basin without significant and unreasonable impacts.

This information will provide a framework for defining sustainability in the Temescal Basin in the context of the six sustainability indicators shown to the left. Once sustainability is defined, we will prepare management actions and projects to maintain sustainability into the future.

To learn more about the TEMESCAL GROUNDWATER SUSTAINABILITY PLAN, including dates of public workshops and other ways to get involved:

Please visit CoronaCA.gov/Groundwater

Send an email to Groundwater@CoronaCA.gov

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AGUAS SUBTERRÁNEAS PARA CONSUMO HUMANO, EL MEDIO AMBIENTE Y EL FUTURO

¡PARTICIPE!

¡Necesitamos la opinión de la comunidad! ¡Visite CoronaCA.gov/Groundwater o envíe un correo electrónico a Groundwater@CoronaCA.gov para asistir a un taller, revisar los borradores de los capítulos y aprender más!

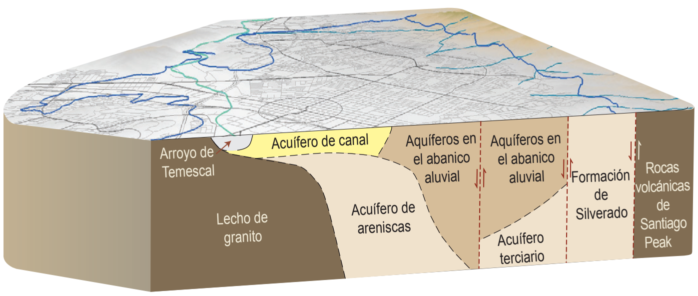
Para obtener más información sobre Temescal GSA, el GSP y el agua subterránea vea la Hoja de datos 1.

PREPARÁNDONOS PARA DEFINIR LA SOSTENIBILIDAD

La Agencia de Sostenibilidad de Aguas Subterráneas de Temescal (Temescal GSA) se está preparando para definir la sostenibilidad de las aguas subterráneas para la cuenca de Temescal a fin de asegurarnos de tener suficiente agua subterránea para las generaciones actuales y futuras. En primer lugar, es importante comprender más sobre la cuenca. Esta hoja de datos explica cierta información importante que se incluirá en el Plan de Sostenibilidad de Aguas Subterráneas de Temescal para ayudar a comprenderla.

CÓMO OBTENEMOS INFORMACIÓN SOBRE LA CUENCA DE TEMESCAL

Un **modelo conceptual hidrogeológico** brindará una descripción de las características físicas en una cuenca de aguas subterráneas. Resumirá la información sobre los límites de la cuenca, los suelos, la estructura geológica y los acuíferos en la cuenca de Temescal. También ilustrará dónde y cómo fluye el agua hacia y a través de la cuenca.



Este diagrama de bloque muestra algunas características importantes de la cuenca de Temescal descritas en el modelo conceptual hidrogeológico

Las condiciones actuales e históricas del agua subterránea ayudan a comprender la salud de la cuenca a lo largo del tiempo y muestran patrones de uso que son importantes para entender la sostenibilidad actual y futura. Las condiciones del agua subterránea se describirán en términos de los seis indicadores de sostenibilidad que se muestran abajo, que también se utilizarán para planificar la sostenibilidad en la cuenca.

- Bajada de los niveles de agua subterránea
- Reducción del almacenamiento
- Degradación de la calidad
- Merma del agua superficial
- Hundimiento de tierras
- Intrusión de agua de mar

Un **balance hídrico** cuantifica los volúmenes de agua subterránea y agua superficial que se desplazan a través de una cuenca. También estima los cambios en el almacenamiento, una medida de cuánta agua subterránea entra a la cuenca o sale de esta en un período determinado. El balance hídrico y el cambio en el almacenamiento son factores importantes en la estimación del rendimiento sostenible, o de cuánta agua se puede bombear desde la cuenca sin producir un impacto significativo y poco razonable.

Esta información proporcionará un marco para definir la sostenibilidad en la cuenca de Temescal en el contexto de los seis indicadores de sostenibilidad que se muestran a la izquierda. Una vez que hayamos definido la sostenibilidad, prepararemos las acciones y los proyectos de gestión para mantener la sostenibilidad en el futuro.

Para obtener más información sobre el **PLAN DE SOSTENIBILIDAD DE AGUAS SUBTERRÁNEAS DE TEMESCAL**, incluidas las fechas de los talleres públicos y otras formas de participar:

Visite CoronaCA.gov/Groundwater

Envíe un correo electrónico a Groundwater@CoronaCA.gov

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GROUNDWATER FOR PEOPLE, THE ENVIRONMENT, AND THE FUTURE

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To learn more about background information prepared for the GSP see Fact Sheet 2.

DEFINING SUSTAINABILITY AND TAKING ACTION

Now that the background information and modeling is complete, we will define groundwater sustainability for the Temescal Basin. Management actions and projects will keep us on course, so we have enough groundwater for current and future generations. This fact sheet gives more information of these important parts of the Temescal Groundwater Sustainability Plan (GSP).

WHAT IS SUSTAINABILITY IN A GROUNDWATER SUSTAINABILITY PLAN?

The Temescal GSP must include an overall goal that states the desired objectives and conditions for the Temescal Basin. That goal then helps define a sustainability framework to **avoid** lowering groundwater levels, reduction of storage, degraded water quality, surface water depletion, and land subsidence. The framework defines the concepts below, so that we will know if action is needed to maintain sustainability:

1) **Undesirable results** are conditions we want to avoid in the Temescal Basin
2) **Minimum thresholds** set quantifiable measures for undesirable results
3) **Measurable objectives** establish quantifiable goals to maintain or improve groundwater conditions

HOW CAN WE MAINTAIN SUSTAINABILITY?

With goals defined, the next step is to meet the standards we have set! Management actions and projects help us maintain sustainability by managing the groundwater resource to avoid undesirable results. Some of the actions and projects that will be included in the GSP are already happening, some are planned and will be implemented within the next few years, and others are potential actions that will be taken in response to future changing groundwater conditions in the Temescal Basin.

Groundwater Dependent Ecosystems

GSPs must protect against surface water depletion. This is because surface water that is connected to groundwater is important for groundwater dependent ecosystems (GDEs). GDEs can include plants or animals that depend on groundwater. The Temescal Basin includes GDEs, primarily in the Prado Basin.

Examples of Management Actions and Projects

CURRENT	PLANNED	POTENTIAL FUTURE
▸ Groundwater treatment ▸ Water Shortage Contingency Plans ▸ Water Conservation Programs	▸ Interconnected surface water monitoring ▸ Groundwater recharge feasibility studies	▸ Additional groundwater treatment ▸ Stormwater capture, treatment, and recharge

AGUA SUBTERRÁNEA PARA CONSUMO HUMANO, EL MEDIO AMBIENTE Y EL FUTURO

¡PARTICIPE!

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Para obtener más información sobre la información de antecedentes preparada para el GSP, consulte la Hoja informativa 2.

DEFINIR LA SOSTENIBILIDAD Y TOMAR ACCIÓN

Ahora que la información de antecedentes y el modelado están completos, definiremos la sostenibilidad del agua subterránea para la Cuenca de Temescal. Las acciones y proyectos de gestión nos mantendrán en el rumbo, por lo que tendremos suficiente agua subterránea para las generaciones actuales y futuras. Esta hoja informativa brinda más información sobre estas partes importantes del Plan de Sostenibilidad de Aguas Subterráneas (GSP) de Temescal.

¿QUÉ ES LA SOSTENIBILIDAD EN UN PLAN DE SOSTENIBILIDAD DE AGUAS SUBTERRÁNEAS?

El GSP de Temescal debe incluir una meta general que establezca los objetivos y condiciones deseados para la Cuenca de Temescal. Luego, esa meta ayuda a definir un marco de sostenibilidad para **evitar** la disminución de los niveles de agua subterránea, la reducción del almacenamiento, la degradación de la calidad del agua, el agotamiento de las aguas superficiales y el hundimiento de la tierra. El marco define los conceptos a continuación, de modo que sepamos si es necesario actuar para mantener la sostenibilidad:

1) **Resultados indeseables** son condiciones que queremos evitar en la Cuenca de Temescal
2) **Umbrales mínimos** establecen medidas cuantificables para resultados no deseados
3) **Objetivos medibles** establecen metas cuantificables para mantener o mejorar las condiciones del agua subterránea

Ecosistemas dependientes del agua subterránea

Los GSP deben proteger contra el agotamiento de las aguas superficiales. Esto se debe a que el agua superficial que está conectada al agua subterránea es importante para los ecosistemas dependientes del agua subterránea (GDE, por sus siglas en inglés). Los GDE pueden incluir plantas o animales que dependen del agua subterránea. La Cuenca de Temescal incluye GDE, principalmente en la Cuenca de Prado.

¿CÓMO PODEMOS MANTENER LA SOSTENIBILIDAD?

Con las metas definidas, el siguiente paso es cumplir con los estándares que hemos establecido. Las acciones y proyectos de gestión nos ayudan a mantener la sostenibilidad mediante la gestión del recurso hídrico subterráneo para evitar resultados indeseables. Algunas de las acciones y proyectos que se incluirán en el GSP ya están en marcha, algunas están planificadas y se implementarán en los próximos años, y otras son acciones potenciales que se tomarán en respuesta a las futuras condiciones cambiantes de las aguas subterráneas en la Cuenca de Temescal.

Ejemplos de acciones y proyectos de gestión

ACTUAL	PLANEADO	FUTURO POTENCIAL
▶ Tratamiento de aguas subterráneas ▶ Planes de contingencia de escasez de agua ▶ Programas de conservación de agua	▶ Monitoreo interconectado de aguas superficiales ▶ Estudios de viabilidad de recarga de aguas subterráneas	▶ Tratamiento adicional de aguas subterráneas ▶ Capturar, tratar, y recargar aguas pluviales

APPENDIX H

Summaries of Neighboring Basin Coordination and Community Leader Outreach Meetings

TODD GROUNDWATER

MEETING NOTES

TEMESCAL BASIN GROUNDWATER SUSTAINABILITY PLAN

CITY OF CORONA

DWR PLANNING GRANT NO. 4600012652

Date:	November 30, 2020	**Time:**	1:00 to 2:00 PM
Location:	Teams Web Conference	**Project No.:**	46414
Subject:	Temescal GSP Coordination with Arlington GSA - Meeting 1		

Attendees: Tom Moody, Katie Hockett, Kristian Alfelor, Melissa Estrada-Maravilla - , Corona DWP, Ryan Shaw – Western / Arlington GSA, Chad Taylor, Gus Yates, and Maureen Reilly – Todd Groundwater

The City of Corona is preparing a GSP for the Temescal Basin and wants to coordinate with Arlington GSA and the work they are doing to prepare a GSP

- Our coordination will largely focus on the water budget and model for Temescal
- We know there is a model for Arlington that includes estimates of outflow to Temescal
- We want to start the coordination process and plan for requesting data and information from the Arlington GSA

Geoscience is Arlington GSAs consultant preparing GSP

- They are a bit overbudget, but we can request data from them as needed.

They're using the Santa Ana River Integrated Model for the GSP and water budget.

Water budget indicates little flow out of Arlington through the Gap in the current and future periods. The flow has decreased in recent years, but not by an amount that is significant in the context of either basin's water budget.

Willing to coordinate on outflows to some extent, but their water budget is ahead of ours and they have a small basin they feel is well defined.

They have no interconnected surface water or GDE concerns.

- There is a small lake in the basin (Hull Lake) that may have some interconnection, but they don’t feel they have any need for criteria to address it.
- Arlington is defining water level SMC’s operationally, with respect to well depths, screened intervals, pump settings, etc.

TODD GROUNDWATER

MEETING NOTES

TEMESCAL BASIN GROUNDWATER SUSTAINABILITY PLAN

CITY OF CORONA

DWR PLANNING GRANT NO. 4600012652

Date:	December 9, 2020	**Time:**	11:00 to 12:00
Location:	Teams Web Conference	**Project No.:**	46414
Subject:	Temescal GSP Coordination with Chino GSA - Meeting 1		

Attendees: Tom Moody, Katie Hockett, Kristian Alfelor, Melissa Estrada-Maravilla - , Corona DWP, Edgar Tellez Foster – Chino Watermaster, Chad Taylor, Gus Yates, and Maureen Reilly – Todd Groundwater

Introductions

The City of Corona is preparing a GSP for the Temescal Basin and wants to coordinate with Chino Watermaster as a neighboring basin.

- Our coordination will largely focus on the water budget and model for Temescal
- We know Chino has a model that includes some of the Temescal Basin
- We want to start the coordination process and plan for requesting data and information from the Watermaster

Chino has an Optimum Basin Management Plan first prepared in 2000 and updated in 2020.

- This is the equivalent of a GSP for Chino
- Uses material physical injury in place of sustainability indicators
- Available on watermaster website

Chino Valley model includes parts of the Temescal Basin and other neighboring basins as well.

- Needs to talk to consultant (Wildermuth, now West Yost) about how Temescal in represented in their model

Currently no plans to increase capture area or volume in their desalter system above the 40,000 AFY. The desalter wells are intended to function more or less the way ag wells functioned historically in terms of groundwater budget and flow patterns.

How does the Watermaster balance their desalter water quality goals with wetlands and other volumetric considerations?

- They have a monitoring and reporting program that includes groundwater elevation and vegetation monitoring in the Prado Basin Habitat Sustainability reporting, most recent in April 2020
- They also have a State of the Basin report that periodically reports on overall basin conditions
    - The last State of the Basin report was through 2018
    - They are working on the current report through 2020 now

It seems like there is some variability in flow dynamics around the boundary between the two basins, how does the Chino model handle the dynamic flow in this area?

- This is a question for Wildermuth / West Yost

Does the Watermaster have any agreements with OCWD?

- No, but they are bound by the Santa Ana River Watershed agreement that requires a certain outflow past Prado Dam.
- They do coordinate with OCWD in some data collection, but no operations commitments

How can we request data efficiently?

- Submit requests to request email from website and copy Edgar
- They have some data sharing limitations for private well data
- Special model runs can be completed, but there would be a passthrough cost
- Can we request output data from existing/past model runs?
    - Yes, make request through the same channels

Does there desalter capture system capture all the water coming from the north, and do they rely on water coming from the Temescal Basin?

- Their desalter wells create a trough that captures water from both directions
- The intent is to keep high TDS water from the former dairy operations from flowing to and entering the Santa Ana River, simulating historical agricultural pumping

Chino Watermaster is interested in engaging with the preparation of the Temescal GSP.

MEETING NOTES

TEMESCAL BASIN GROUNDWATER SUSTAINABILITY PLAN

CITY OF CORONA

DWR PLANNING GRANT NO. 4600012652

Date:	November 30, 2020	**Time:**	2:00 to 3:00 PM
Location:	Teams Web Conference	**Project No.:**	46414
Subject:	Temescal GSP Coordination with OCWD - Meeting 1		
Attendees:	Tom Moody, Katie Hockett, Kristian Alfelor, Melissa Estrada-Maravilla - , Corona DWP Chad Taylor, Gus Yates, and Maureen Reilly – Todd Groundwater, Adam Hutchinson – OCWD		

The City of Corona is preparing a GSP for the Temescal Basin and wants to coordinate with OCWD in their capacity as the GSA for the neighboring Coastal Plain Basin as a neighboring basin with an approved alternative plan.

- Our coordination will largely focus on the water budget and model for Temescal
- We've looked at the Coastal Plain water budget as presented in the alternative plan and want to coordinate our water budget in this area
- We want to start the coordination process and plan for requesting data and information from OCWD
- We also want to make sure we know if OCWD has questions or concerns about the Temescal

Did we receive the comments on the Plan Area chapter of the Temescal GSP?

- Yes
- Adam wanted to make sure that the Temescal GSP note and incorporate management in the upstream Chino and Riverside-Arlington basins
- Pumping for water quality management in these basins captures a large volume of the outflow that would otherwise come into Temescal and then on to Prado and eventually out to the Coastal Plain of OC basin

Geoscience is working on the Santa Ana River Integrated Model

  - OCWD has been working closely with Geoscience on this model
  - The model needs improvement, and OCWD is working with Geoscience on a version focused on the Prado area
- There is a recently published HCP prepared by Valley District that is watershed-wide and applies to the Basin and Prado
  - It is under review now
  - It is an attempt to combine all the HCPs into one framework

Are you refining water budget, specifically inflow across basin boundary?

- No, that term is relatively static because there is virtually no change between Prado dam and the OCWD rubber dam
- They assume the 1,580 AFY is pretty much all surface water flow

What are OCWD's main concerns relating to the Temescal GSP?

- From a water quality perspective, they are focused on PFOS
  - They sampled in Temescal and see some PFOS in and around Temescal Creek and other waterways
  - This included *first flush* sampling of many streams at the beginning of a significant storm
  - Also sampled one of the new monitoring wells in Prado
  - Temescal Wash showed the highest PFOS surface water concentrations
- OCWD is very concerned about maintaining habitat quantity and quality in the Prado wetlands. OCWD owns about 2,000 acres of the wetlands.
  - Least Bell's vireo is a key management species.
  - OCWD recently installed ten new shallow piezometers to measure water table depth in Prado, supplementing information from drive point piezometers installed previously.
  - Adam is interested in having a multi-depth monitoring well near Prado Dam.
  - Water requirements for sustaining Prado habitat might have a secondary effect of increasing flow past Prado Dam.
- Adam wants the Temescal GSP to include a good and complete description of the entire upper Santa Ana River watershed and groundwater basins.

TODD GROUNDWATER

MEETING NOTES

TEMESCAL SUBBASIN GROUNDWATER SUSTAINABILITY PLAN

CITY OF CORONA

DWR PLANNING GRANT NO. 4600012652

Date:	July 13, 2020	**Time:**	9 to 9:30 AM
Location:	City of Corona Dept. of Water and Power	**Project No.:**	46414
Subject:	Initial Meeting with Eileen Navarro, Community Orgainizer		
Attendees:	Melissa Estrada-Maravilla & Kristian Alfelor – Corona DWP,		

Jack Hughes– Kearns & West, Chad Taylor– Todd Groundwater, and Eileen Navarro

1. Brief introduction to SGMA and the GSP process

Chad gives a brief introduction to SGMA legislation

2. Introductions

Eileen recently finished college w/ degree in political science and community outreach. She's recently been working with Vice Mayor Casillas and learning about the Home Gardens community

3. Background information regarding the Home Gardens community

Home Gardens is an unincorporated community with no elected officials or independent governance.

There aren't any formal community groups, but there is active involvement on specific issues and social media engagement.

A large percentage of the community is Latinx with Spanish as their primary language. Lack of Spanish-language outreach has often been an impediment to engagement for the community. There has also been limited engagement due to fear of legal repercussions related to immigration status.

However, the community has come together in the past to lobby for specific items like sidewalks and Policing.

There is a school, Home Gardens Academy, which serves as a local meeting place and information hub and there is also a library where meetings and gatherings are sometimes held

People are currently most engaged in COVID, schools reopening, an increase in car break-ins, policing, and the potential for incorporation.

Active discussion about incorporating into either Corona or Riverside is occurring now.

The Incorporation discussion was started because of policing issues, and Eileen has been involved in information gathering and discussions on this topic.

Melissa asks if there have been any discussions regarding water service from Corona?

> Yes, there has been discussion of water service; approximately half of the community pays to Corona/Home Gardens WD while others pay directly to the City of Riverside. The divide is at McKinley Street.
>
> Eileen is not aware of other water problems or questions from people in Home Gardens.

Melissa asks if Eileen is interested in being involved in the GSP process? And if so, would she like to be on the TAC?

> Eileen indicated that she is interested in being updated during preparation of the GSP as an interested party, but she doesn't think she'll have time to be on the TAC because she is planning to start law school soon.

MEETING AGENDA

TEMESCAL SUBBASIN GROUNDWATER SUSTAINABILITY PLAN

CITY OF CORONA

DWR PLANNING GRANT NO. 4600012652

Date:	August 11, 2020	**Time:**	11AM to 12PM
Location:	Teams Web Conference	**Project No.:**	46414
Subject:	Temescal GSP TAC Outreach Planning with Corona Council Members		
Attendees:	Vice Mayor Jacque Casillas and Council Member Jason Scott – Corona,		

Katie Hockett, Kristian Alfelor, Melissa Estrada-Maravilla – Corona DWP,

Jack Hughes & Joan Isaacson Kearns & West, and Chad Taylor Todd Groundwater

INTRODUCTIONS

PROJECT OVERVIEW

Chad gives a brief summary of SGMA and the GSP process and an introduction to the outreach requirements and plans

PURPOSE OF THE MEETING

Summary of the outreach and engagement we are planning for and to learn what we should know and consider for outreach in the communities Vice Mayor Casillas and Councilmember Scott work with/represent. Particularly on the areas designated as disadvantaged communities by the State of California and called out for inclusion in outreach and engagement by DWR in GSP preparation.

GSP COMMUNICATIONS AND OUTREACH REQUIREMENT SUMMARY

Jack notes that SGMA calls for consideration of all interests of all beneficial uses and users of groundwater. K&W has developed an Outreach and Involvement Plan that includes multiple avenues for public engagement including public workshops, pre workshop outreach, TACs, City Council and Board of Directors Meeting Presentations, plus website, fact sheet, translation, etc.

Focused Outreach (Jack/Joan)

Jack notes that there are areas in the Basin designated as Disadvantaged Communities, which are census block groups with less than 80% of the State's median household income or severely disadvantaged communities where (less than 60% of the State's median household income).

Vice Mayor Casillas notes that we should try to meet people where they are. There are multiple Catholic churches (St Edwards and Corpus Christi) that should be included.

Is there a way to incentive people to attend within the grant?
- Hard to move grant funds toward incentives, and reductions in water bills run up on Prop 218 restrictions
- However, we could potentially coordinate with food distribution by providing fact sheets for distribution.

Council member Scott recommends using simple language in communications, reaching out to YMCA and mobile home parks, two work force housing developments 6th street near armory and near City Hall, and American Legion (Joe Domingus).

Vice Mayor Casillas mentions the Corona Norco Parent Teacher Center

Spanish language radio add-buys

Are community members open to shorter content on alternative platforms?

- Yes, especially younger people.
- Should consider packaging items developed for or during public meetings for alternative platform distribution later.

Discussion of character of districts and/or nearby communities (All)
- Do people have any concerns pertaining to water, water quality, and the environment, and if so, what are they?
    - They have not heard of concerns specific to water, except for questions about water bills from municipal providers.

Community Leader Meetings

Draft Notes

Tuesday, June 29, 2021
1:00 p.m. – 2:00 p.m.
Location: Zoom Virtual Meeting

Attendees

- Marven Norman, Center for Community Action and Environmental Justice (CCAEJ)

City of Corona Department of Water and Power Staff

- Katie Hockett
- Kristian Alfelor
- Melissa Estrada-Maravilla

Consultant Team

- Chad Taylor, Todd Groundwater
- Maureen Reilly, Todd Groundwater
- Christian Mendez, Kearns & West
- Jack Hughes, Kearns & West

Notes

As a local leader, does water come up in a conversations with others in the community?

- CCAEJ's big focus is on air quality and other impacts to communities from warehouses and industrial uses. This has not been an issue near the City of Corona as far as CCAEJ knows. Water is not a major focus for CCAEJ, but they have been asked to be involved in a lawsuit pertaining to impacts to groundwater from warehouse runoff.

What questions do you have about water today and tomorrow?

- What happens if we start having more droughts?
- What are the plans if there need to be reduction in water use?

Thursday, July 1, 2021
1:00 p.m. – 2:00 p.m.
Location: Zoom Virtual Meeting

Attendees

- Alma Marquez, Center for Community Action and Environmental Justice (CCAEJ)
- Fauzia Rizvi, Western Municipal Water District
- Elizabeth Toups, IE Works
- Scott Goodell, IE Works
- Diana Meza, City of Corona Planning and Housing

City of Corona Department of Water and Power Staff

- Katie Hockett
- Kristian Alfelor
- Melissa Estrada-Maravilla

Consultant Team

- Chad Taylor, Todd Groundwater
- Maureen Reilly, Todd Groundwater
- Christian Mendez, Kearns & West
- Jack Hughes, Kearns & West

Notes

As a Local Leader, does water come up in a conversations with others in the community?

- CCAEJ is interested in runoff pollution and its impact to groundwater. They would be interested in exploring this in communities outside the City of Corona. They are looking at initiating conversations on education and policy focusing on the impacts of runoff pollution to groundwater.
- Water is not often spoken about in the City of Corona Planning and Housing Commission. There needs to be more education on water conservation and groundwater.
- The only time people speak about water is when there is something wrong.
- There should be an awareness campaign about water issues like costs, drought, and conservation.

Are you aware of any private wells in your community?

- There is a community in Norco on Bluff Street that has a private well (this well appears to be outside the Temescal Basin boundaries).

What other groups/individuals should we invite to the Public Workshop on July 8?

- Outreach to farmers markets, swap meets, and churches
- CCAEJ can support by posting via social media
- Leela Project
- Local group that works with youth: could focus on job mobility
- Outreach material should include: What's in it for me? Why should I care?
- Include higher education and K-12

Other questions and comments from participants:

- What about future job availability?
- Alma Marquez expressed interest in the desalter tour

APPENDIX I

Draft GSP Comments and Responses

December 14, 2021

Temescal GSA
755 Public Safety Way
Corona, CA 92878

Submitted via email: Groundwater@coronaca.gov

Re: Public Comment Letter for Temescal Basin Draft GSP

Dear Melissa Estrada-Maravilla,

On behalf of the above-listed organizations, we appreciate the opportunity to comment on the Draft Groundwater Sustainability Plan (GSP) for the Temescal Basin being prepared under the Sustainable Groundwater Management Act (SGMA). Our organizations are deeply engaged in and committed to the successful implementation of SGMA because we understand that groundwater is critical for the resilience of California's water portfolio, particularly in light of changing climate. Under the requirements of SGMA, Groundwater Sustainability Agencies (GSAs) must consider the interests of all beneficial uses and users of groundwater, such as domestic well owners, environmental users, surface water users, federal government, California Native American tribes and disadvantaged communities (Water Code 10723.2).

As stakeholder representatives for beneficial users of groundwater, our GSP review focuses on how well disadvantaged communities, drinking water users, tribes, climate change, and the environment were addressed in the GSP. While we appreciate that some basins have consulted us directly via focus groups, workshops, and working groups, we are providing public comment letters to all GSAs as a means to engage in the development of 2022 GSPs across the state. Recognizing that GSPs are complicated and resource intensive to develop, the intention of this letter is to provide constructive stakeholder feedback that can improve the GSP prior to submission to the State.

Based on our review, we have significant concerns regarding the treatment of key beneficial users in the Draft GSP and consider the GSP to be **insufficient** under SGMA. We highlight the following findings:

1. Beneficial uses and users **are not sufficiently** considered in GSP development.
    a. Human Right to Water considerations **are not sufficiently** incorporated.
    b. Public trust resources **are not sufficiently** considered.
    c. Impacts of Minimum Thresholds, Measurable Objectives and Undesirable Results on beneficial uses and users **are not sufficiently** analyzed.
2. Climate change **is not sufficiently** considered.

3. Data gaps **are not sufficiently** identified and the GSP **needs additional plans** to eliminate them.
4. Projects and Management Actions **do not sufficiently consider** potential impacts or benefits to beneficial uses and users.

Our specific comments related to the deficiencies of the Temescal Basin Draft GSP along with recommendations on how to reconcile them, are provided in detail in **Attachment A.**

Please refer to the enclosed list of attachments for additional technical recommendations:

Attachment A	GSP Specific Comments
Attachment B	SGMA Tools to address DAC, drinking water, and environmental beneficial uses and users
Attachment C	Freshwater species located in the basin
Attachment D	The Nature Conservancy's "Identifying GDEs under SGMA: Best Practices for using the NC Dataset"
Attachment E	Maps of representative monitoring sites in relation to key beneficial users

Thank you for fully considering our comments as you finalize your GSP.

Best Regards,

Ngodoo Atume
Water Policy Analyst
Clean Water Action/Clean Water Fund

J. Pablo Ortiz-Partida, Ph.D.
Western States Climate and Water Scientist
Union of Concerned Scientists

Samantha Arthur
Working Lands Program Director
Audubon California

Danielle V. Dolan
Water Program Director
Local Government Commission

E.J. Remson
Senior Project Director, California Water Program
The Nature Conservancy

Melissa M. Rohde
Groundwater Scientist
The Nature Conservancy

Attachment A

Specific Comments on the Temescal Basin Draft Groundwater Sustainability Plan

1. Consideration of Beneficial Uses and Users in GSP development

Consideration of beneficial uses and users in GSP development is contingent upon adequate identification and engagement of the appropriate stakeholders. The (A) identification, (B) engagement, and (C) consideration of disadvantaged communities, drinking water users, tribes,[1] groundwater dependent ecosystems, streams, wetlands, and freshwater species are essential for ensuring the GSP integrates existing state policies on the Human Right to Water and the Public Trust Doctrine.

A. Identification of Key Beneficial Uses and Users

Disadvantaged Communities and Drinking Water Users

The identification of Disadvantaged Communities (DACs) and drinking water users is **incomplete**. The GSP provides information on DACs, including identification by name and location on a map (Figure 2-13). However, the GSP fails to clearly state the population of each DAC.

The GSP provides a density map of domestic wells in the basin (Figure 2-5). However, the plan fails to provide depth of these wells (such as minimum well depth, average well depth, or depth range) within the basin. This information is necessary to understand the distribution of shallow and vulnerable drinking water wells within the basin.

These missing elements are required for the GSAs to fully understand the specific interests and water demands of these beneficial users, and to support the consideration of beneficial users in the development of sustainable management criteria and selection of projects and management actions.

RECOMMENDATIONS
• Provide the population of each identified DAC. • Include a map showing domestic well locations and average well depth across the basin.

Interconnected Surface Waters

The identification of Interconnected Surface Waters (ISWs) is **insufficient**, due to lack of supporting information provided for the ISW analysis. The GSP describes the use of aerial photos to analyze stream reaches and presents analysis of stream gage and groundwater elevation data. The ISW section concludes with the following statement (p. 4-16): *"In spite of these accuracy limitations, contours of depth to water measured in wells—in combination with depth to water data*

[1] Our letter provides a review of the identification and consideration of federally recognized tribes (Data source: SGMA Data viewer) within the GSP from non-tribal members and NGOs. Based on the likely incomplete information available to our organizations for this review, we recommend that the GSA utilize the California Department of Water Resources' "Engagement with Tribal Governments" Guidance Document (https://water.ca.gov/Programs/Groundwater-Management/SGMA-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents) to comprehensively address these important beneficial users in their GSP.

for the downstream end of the Bedford-Coldwater Subbasin (also shown in Figure 4-20)—indicates that there are only two areas in or near the Basin where depth to water is likely shallow enough to be within the root zone of vegetation or possibly discharge into stream channels or wetlands (Figure 4-20). One of the areas is the 2-mile bedrock reach of Temescal Wash between the Bedford-Coldwater Subbasin and Basin, and the other is the Prado Wetlands, where contouring suggests groundwater discharges into the wetlands. Depth to water in spring of 2017 was less than 20 feet downstream of about North Lincoln Avenue." The spring 2017 depth to water data are the only data discussed when referring to depth to water. However, using seasonal groundwater elevation data over multiple water year types is an essential component of identifying ISWs. The use of data from one point in time does not reflect the temporal (seasonal and interannual) variability inherent in California's climate.

On the map of stream reaches in the basin (Figure 4.17 Regional Surface Water Features), the reaches are not labeled as interconnected and disconnected, nor are areas with data gaps noted. Therefore, potential ISWs are not being identified, described, nor managed in the GSP. Until a disconnection can be proven, include all potential ISWs in the GSP. This is necessary to assess whether surface water depletions caused by groundwater use are having an adverse impact on environmental beneficial users of surface water.

RECOMMENDATIONS
• Provide a map showing all the stream reaches in the basin, with reaches clearly labeled as interconnected (gaining/losing) or disconnected. Consider any segments with data gaps as potential ISWs and clearly mark them as such on maps provided in the GSP. • Use seasonal data over multiple water year types to capture the variability in environmental conditions inherent in California's climate, when mapping ISWs. We recommend the 10-year pre-SGMA baseline period of 2005 to 2015. • Provide depth-to-groundwater contour maps using the best practices presented in Attachment D, to aid in the determination of ISWs. Specifically, ensure that the first step is contouring groundwater elevations, and then subtracting this layer from land surface elevations from a digital elevation model (DEM) to estimate depth to groundwater contours across the landscape. This will provide accurate contours of depth-to-groundwater along streams and other land surface depressions where GDEs are commonly found. • Reconcile ISW data gaps with specific measures (shallow monitoring wells, stream gauges, and nested/clustered wells) along surface water features in the Monitoring Network section of the GSP.

<u>Groundwater Dependent Ecosystems</u>
The identification of Groundwater Dependent Ecosystems (GDEs) is **incomplete**. The GSP took initial steps to identify and map GDEs using the Natural Communities Commonly Associated with Groundwater dataset (NC dataset). However, the GDE section of the GSP could be improved by more clearly describing and mapping the basin's GDEs to show the data sources and areas of data gaps. Figure 4-21(Critical Habitat Areas) shows a map layer called "NCCAG riparian vegetation," however based on the description in the text, it is not clear if this is the entire NC dataset or if any screening criteria were used to modify the mapped potential GDEs. The GSP

text (p. 4-17) discusses the corridor of dense riparian trees and shrubs along the bedrock reach of Temescal Wash between the Bedford-Coldwater Subbasin and the Temescal Basin, but does not explicitly state the data source (i.e., field verification) or whether this vegetation is included in the set of potential GDEs. Data gaps are described in the text, but the areas of data gaps are not clearly labeled on the map.

The GSP discusses trends in groundwater elevations over the period 2010 to 2020 and plots a limited set of hydrographs over this period in Figure 4-23. However, the only depth to groundwater contours show are from Spring 2017. The GSP could be improved by mapping depth to groundwater contours over multiple years and seasons to illustrate the temporal (seasonal and interannual) variability inherent in California's climate.

RECOMMENDATIONS
• Provide a comprehensive set of maps for the basin's GDEs. For example, provide a map of the NC Dataset. On the map, label polygons retained, removed, or added to/from the NC dataset (include the removal reason if polygons are not considered potential GDEs, or include the data source if polygons are added). Discuss how local groundwater data was used to verify whether polygons in the NC Dataset are supported by groundwater in an aquifer. Refer to Attachment D of this letter for best practices for using local groundwater data to verify whether polygons in the NC Dataset are supported by groundwater in an aquifer. • Provide depth-to-groundwater contour maps from multiple seasons and water year types (e.g., wet, dry, average, drought), noting the best practices presented in Attachment D. Specifically, ensure that the first step is contouring groundwater elevations, and then subtracting this layer from land surface elevations from a DEM to estimate depth-to-groundwater contours across the landscape. We recommend that a baseline period (10 years from 2005 to 2015) be established to characterize groundwater conditions over multiple water year types. • If insufficient data are available to describe groundwater conditions within or near polygons from the NC dataset, include those polygons as "Potential GDEs" in the GSP until data gaps are reconciled in the monitoring network.

Native Vegetation and Managed Wetlands

Native vegetation and managed wetlands are water use sectors that are required to be included into the water budget.[2,3] The integration of these ecosystems into the water budget is **insufficient**. Appendix I (Temescal Groundwater Sustainability Plan Numerical Groundwater Model Documentation Report) that accompanies the water budget section of the GSP was not included in the published version of the Draft GSP. Without this Appendix of the GSP, which documents the water budgets, we could not evaluate whether the water budget includes the current, historical, and projected demands of native vegetation. Inclusion of the explicit demands for native vegetation is essential so that key environmental uses of groundwater are being accounted for as water supply decisions are made using this budget and considered in project

[2] "'Water use sector' refers to categories of water demand based on the general land uses to which the water is applied, including urban, industrial, agricultural, managed wetlands, managed recharge, and native vegetation." [23 CCR §351(al)]
[3] "The water budget shall quantify the following, either through direct measurements or estimates based on data: (3) Outflows from the groundwater system by water use sector, including evapotranspiration, groundwater extraction, groundwater discharge to surface water sources, and subsurface groundwater outflow." [23 CCR §354.18]

and management actions. Managed wetlands are not mentioned in the GSP, so it is not known whether or not they are present in the basin.

RECOMMENDATIONS
• Quantify and present all water use sector demands in the historical, current, and projected water budgets with individual line items for each water use sector, including native vegetation. • State whether or not there are managed wetlands in the basin. If there are, ensure that their groundwater demands are included as separate line items in the historical, current, and projected water budgets.

B. Engaging Stakeholders

Stakeholder Engagement During GSP Development

Stakeholder engagement during GSP development is **insufficient**. SGMA's requirement for public notice and engagement of stakeholders is not fully met by the description in the Outreach and Stakeholder Involvement Communications Plan (Appendix D).[4]

The GSP documents targeted outreach to DACs, including distribution of SGMA Fact Sheets through local churches and community centers; Spanish translation of materials and interpretation at events; and meetings with community leaders, community action organizations, and elected officials. However, we note the following deficiencies with the overall stakeholder engagement process:

- The GSA's Technical Advisory Committee fails to include representation from DACs and environmental stakeholders in the basin.

- Aside from the details of the Technical Advisory Committee, the GSP documents opportunities for public involvement and engagement in general terms. These include communication and engagement through the GSP webpage, outreach materials, communication through social media, websites, and email, and public workshops. The plan lacks specific details of outreach and engagement targeted to environmental stakeholders.

- The plan fails to document the outcome of the outreach and engagement conducted, nor does it document how information obtained from beneficial users was incorporated into the GSP development process.

- The GSP describes plans for Technical Advisory Committee meetings to continue during the implementation phase of the GSP. However, the GSP does not include a detailed plan for continual opportunities for engagement outside of these meetings through the *implementation* phase of the GSP that is specifically directed to DACs, domestic well owners, and environmental stakeholders within the basin.

[4] "A communication section of the Plan shall include a requirement that the GSP identify how it encourages the active involvement of diverse social, cultural, and economic elements of the population within the basin." [23 CCR §354.10(d)(3)]

RECOMMENDATIONS
● In the Outreach and Stakeholder Involvement Communications Plan, describe active and targeted outreach to engage all stakeholders throughout the GSP development and implementation phases. Refer to Attachment B for specific recommendations on how to actively engage stakeholders during all phases of the GSP process. ● Utilize DWR's tribal engagement guidance to comprehensively identify, involve, and address all tribes and tribal interests that may be present in the basin.[5]

C. Considering Beneficial Uses and Users When Establishing Sustainable Management Criteria and Analyzing Impacts on Beneficial Uses and Users

The consideration of beneficial uses and users when establishing sustainable management criteria (SMC) is **insufficient**. The consideration of potential impacts on all beneficial users of groundwater in the basin are required when defining undesirable results and establishing minimum thresholds.[6,7,8]

Disadvantaged Communities and Drinking Water Users

For chronic lowering of groundwater levels, minimum thresholds are defined at each representative well as historical groundwater low levels. The GSP discounts private domestic wells when establishing SMC, based on the following rationale (6-6): *"There are very few active private wells in the Basin (see Section 2.3.2.1). The owners and operators of those wells are known and they have not reported any adverse effects to those wells in the past; None of the existing private well owners report that their wells went dry or were otherwise affected during the recent drought. Because of this, some flexibility exists for purposes of analysis; Responsibility for potential undesirable results to shallow wells is shared between a GSA and a well owner; there is a reasonable expectation that a well owner would construct, maintain, and operate the well to provide its expected yield over the well's life span, including droughts; As discussed below, MTs are initially set at historical groundwater level lows and then adjusted upward to be protective."* No further details are provided regarding the minimum threshold impacts on domestic wells. The GSP does not sufficiently describe whether minimum thresholds will avoid significant and unreasonable loss of drinking water to domestic well users that are not protected by the minimum threshold. In addition, the GSP does not sufficiently describe or analyze direct or indirect impacts on DACs or drinking water users when defining undesirable results, nor does it describe how the groundwater levels minimum thresholds are consistent with Human Right to Water policy.[9]

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[5] Engagement with Tribal Governments Guidance Document. Available at: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/Guidance-Doc-for-SGM-Engagement-with-Tribal-Govt_ay_19.pdf

[6] "The description of undesirable results shall include [...] potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results." [23 CCR §354.26(b)(3)]

[7] "The description of minimum thresholds shall include [...] how minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests." [23 CCR §354.28(b)(4)]

[8] "The description of minimum thresholds shall include [...] how state, federal, or local standards relate to the relevant sustainability indicator. If the minimum threshold differs from other regulatory standards, the agency shall explain the nature of and the basis for the difference." [23 CCR §354.28(b)(5)]

[9] California Water Code §106.3. Available at: https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=WAT&sectionNum=106.3

For degraded water quality, constituents of concern (COCs) are total dissolved solids (TDS) and nitrate. The minimum threshold for nitrate is defined as the percentage of wells with concentrations exceeding the nitrate MCL (45 mg/L) based on current conditions (2015-2019), which is 50% of wells. The minimum threshold for TDS is defined as the percentage of wells with concentrations exceeding the TDS value of 1,000 mg/L based on current conditions (2015-2019), which is 26 percent of wells. However, according to the state's anti-degradation policy,[10] water quality should be protected and is only allowed to worsen if a finding is made that it is in the best interest of the people of the State of California. No analysis has been done and no such finding has been made.

The GSP states (p. 6-25): *"Other constituents have been documented (see Groundwater Conditions Section 4.8) but occurrences of these are either under regulation by RWQCB (e.g., perchlorate) or are naturally occurring with no recent exceedances of MCLs and limited potential for mobilization due to management actions (e.g., arsenic, chromium, iron, and manganese)."* However, all COCs in the basin that may be impacted or exacerbated by groundwater use and/or management should be included in the SMC, in addition to coordinating with water quality regulatory programs.

RECOMMENDATIONS

Chronic Lowering of Groundwater Levels

- Describe direct and indirect impacts on drinking water users and DACs when describing undesirable results and defining minimum thresholds for chronic lowering of groundwater levels.

- Consider and evaluate the impacts of selected minimum thresholds and measurable objectives on drinking water users and DACs within the basin. Further describe the impact of passing the minimum threshold for these users. For example, provide the number of domestic wells that would be fully or partially de-watered at the minimum threshold.

Degraded Water Quality

- Describe direct and indirect impacts on drinking water users and DACs when defining undesirable results for degraded water quality.[11] For specific guidance on how to consider these users, refer to "Guide to Protecting Water Quality Under the Sustainable Groundwater Management Act."[12]

- Evaluate the cumulative or indirect impacts of proposed minimum thresholds for degraded water quality on drinking water users and DACs.

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[10] Anti-degradation Policy
https://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/1968/rs68_016.pdf

[11] "Degraded Water Quality [...] collect sufficient spatial and temporal data from each applicable principal aquifer to determine groundwater quality trends for water quality indicators, as determined by the Agency, to address known water quality issues." [23 CCR §354.34(c)(4)]

[12] Guide to Protecting Water Quality under the Sustainable Groundwater Management Act
https://d3n8a8pro7vhmx.cloudfront.net/communitywatercenter/pages/293/attachments/original/1559328858/Guide_to_Protecting_Drinking_Water_Quality_Under_the_Sustainable_Groundwater_Management_Act.pdf?1559328858.

- Set minimum thresholds and measurable objectives for all water quality constituents within the basin that can be impacted and/or exacerbated as a result of groundwater use or groundwater management.

- Set minimum thresholds that do not allow water quality to degrade to levels at or above the MCL trigger level.

Groundwater Dependent Ecosystems and Interconnected Surface Waters

Sustainable management criteria for chronic lowering of groundwater levels provided in the GSP do not consider potential impacts to environmental beneficial users. The GSP neither describes nor analyzes direct or indirect impacts on environmental users of groundwater when defining undesirable results. This is problematic because without identifying potential impacts on GDEs, minimum thresholds may compromise, or even destroy, these environmental beneficial users. Since GDEs are present in the basin, they must be considered when developing SMC.

For depletion of interconnected surface waters, SMC are only established for the Prado Wetlands area. Our comments above in the ISW section of this letter note that interconnected surface waters have not been sufficiently identified and mapped in the basin. Therefore, SMC for depletion of interconnected surface waters may disregard some of the ISWs in the basin.

For the Prado Wetlands area, SMC are established as follows (p. 6-34): *"The Minimum Threshold for depletion of interconnected surface water is the amount of depletion that occurs when the depth to the water along the southern edge of the Prado Wetlands is greater than 15 feet for a period exceeding one year. This threshold corresponds approximately to the maximum depth to water measured in shallow monitoring wells in the northern part of the Prado Wetlands."* However, if minimum thresholds are set to historic low groundwater levels and the basin is allowed to operate at or close to those levels over many years, there is a risk of causing catastrophic damage to ecosystems that are more adverse than what was occurring at the height of the 2012-2016 drought. This is because California ecosystems, which are adapted to our Mediterranean climate, have some drought strategies that they can utilize to deal with short-term water stress. However, if the drought conditions are prolonged, the ecosystem can collapse. No analysis or discussion is presented to describe how the SMC will affect beneficial users, and more specifically GDEs, or the impact of these minimum thresholds on GDEs in the basin. Furthermore, the GSP makes no attempt to evaluate how the proposed minimum thresholds and measurable objectives avoid significant and unreasonable effects on surface water beneficial users in the basin (see Attachment C for a list of environmental users in the basin), such as increased mortality and inability to perform key life processes (e.g., reproduction, migration).

RECOMMENDATIONS

- Evaluate impacts on GDEs when establishing SMC for chronic lowering of groundwater levels. When defining undesirable results, provide specifics on what biological responses (e.g., extent of habitat, growth, recruitment rates) would best characterize a significant and unreasonable impact to GDEs. Undesirable results to environmental users occur when 'significant and unreasonable' effects on beneficial users are caused by one of the sustainability indicators (i.e., chronic lowering of groundwater levels, degraded water quality, or depletion of interconnected surface water). Thus, potential impacts on environmental beneficial uses and users need to be considered when defining undesirable results in the basin.[13] Defining undesirable results is the crucial first step before the minimum thresholds can be determined.[14]

- Re-evaluate the extent of ISWs in the basin. When defining undesirable results for depletion of interconnected surface water, include a description of potential impacts on instream habitats within ISWs when minimum thresholds in the basin are reached.[15] The GSP should confirm that minimum thresholds for ISWs avoid adverse impacts on environmental beneficial users of interconnected surface waters as these environmental users could be left unprotected by the GSP. These recommendations apply especially to environmental beneficial users that are already protected under pre-existing state or federal law.[6,16]

- When establishing SMC for the basin, consider that the SGMA statute [Water Code §10727.4(l)] specifically calls out that GSPs shall include "impacts on groundwater dependent ecosystems."

2. Climate Change

The SGMA statute identifies climate change as a significant threat to groundwater resources and one that must be examined and incorporated in the GSPs. The GSP Regulations require integration of climate change into the projected water budget to ensure that projects and management actions sufficiently account for the range of potential climate futures.[17] The effects of climate change will intensify the impacts of water stress on GDEs, making available shallow groundwater resources especially critical to their survival. Condon *et al.* (2020) shows that GDEs are more likely to succumb to water stress and rely more on groundwater during times of drought.[18] When shallow groundwater is unavailable, riparian forests can die off and key life processes (e.g., migration and spawning) for aquatic organisms, such as steelhead, can be impeded.

The integration of climate change into the projected water budget is **insufficient**. The GSP does incorporate climate change into the projected water budget using DWR change factors for 2070. However, the plan does not consider multiple climate scenarios (e.g., the 2070 extremely wet and extremely dry climate scenarios) in the projected water budget. The GSP would benefit from clearly and transparently incorporating the extremely wet and dry scenarios provided by DWR into projected water budgets or select more appropriate extreme scenarios for the basin. While these extreme scenarios may

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[13] "The description of undesirable results shall include [...] potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results". [23 CCR §354.26(b)(3)]

[14] The description of minimum thresholds shall include [...] how minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests." [23 CCR §354.28(b)(4)]

[15] "The minimum threshold for depletions of interconnected surface water shall be the rate or volume of surface water depletions caused by groundwater use that has adverse impacts on beneficial uses of the surface water and may lead to undesirable results." [23 CCR §354.28(c)(6)]

[16] Rohde MM, Seapy B, Rogers R, Castañeda X, editors. 2019. Critical Species LookBook: A compendium of California's threatened and endangered species for sustainable groundwater management. The Nature Conservancy, San Francisco, California. Available at: https://groundwaterresourcehub.org/public/uploads/pdfs/Critical_Species_LookBook_91819.pdf

[17] "Each Plan shall rely on the best available information and best available science to quantify the water budget for the basin in order to provide an understanding of historical and projected hydrology, water demand, water supply, land use, population, climate change, sea level rise, groundwater and surface water interaction, and subsurface groundwater flow." [23 CCR §354.18(e)]

[18] Condon et al. 2020. Evapotranspiration depletes groundwater under warming over the contiguous United States. Nature Communications. Available at: https://www.nature.com/articles/s41467-020-14688-0

have a lower likelihood of occurring, their consequences could be significant and their inclusion can help identify important vulnerabilities in the basin's approach to groundwater management.

The GSP appears to integrate climate change into key inputs (e.g., changes in precipitation and evapotranspiration) of the rainfall-runoff-recharge model. However, this could not be confirmed since the details of the described rainfall-runoff-recharge model included in Appendix I were not included for review in the Draft GSP. Furthermore, water is imported into the basin, but these inputs are not quantified and included in the surface water flow volumes of the water budget tables and it is unclear if these inputs are adjusted for climate change.

The sustainable yield is calculated based on the projected water budget with climate change incorporated. However, if the water budgets are incomplete, including the omission of extreme climate scenarios as well as the omission of projected climate change effects on key inputs (e.g., precipitation, evapotranspiration, imported water flows), then there is increased uncertainty in virtually every subsequent calculation used to plan for projects, derive measurable objectives, and set minimum thresholds. Plans that do not adequately include climate change projections may underestimate future impacts on vulnerable beneficial users of groundwater such as ecosystems, DACs, and domestic well owners.

RECOMMENDATIONS

- Ensure that Appendix I, including a description of the rainfall-runoff-recharge model, is included in the GSP.
- Integrate climate change, including extreme climate scenarios, into all elements of the projected water budget to form the basis for development of sustainable management criteria and projects and management actions.
- Integrate climate change into precipitation and evapotranspiration inputs and include the values in the projected water budget tables.
- Integrate climate change into surface water flow inputs, including imported water, for the projected water budget.
- Incorporate climate change scenarios into projects and management actions.

3. Data Gaps

The consideration of beneficial users when establishing monitoring networks is **insufficient**, due to lack of specific plans to increase the Representative Monitoring Wells (RMWs) in the monitoring network that represent water quality conditions and shallow groundwater elevations around domestic wells, GDEs, and ISWs in the basin. These beneficial users may remain unprotected by the GSP without adequate monitoring and identification of data gaps in the shallow aquifer. The Plan therefore fails to meet SGMA's requirements for the monitoring network.[19]

Figure 7-1 (Groundwater Level Monitoring Wells) shows insufficient representation of GDEs and drinking water users for groundwater elevation monitoring. Figure 7-2 (Water Quality Monitoring Wells) shows

[19] "The monitoring network objectives shall be implemented to accomplish the following: [...] (2) Monitor impacts to the beneficial uses or users of groundwater." [23 CCR §354.34(b)(2)]

insufficient representation of drinking water users for water quality monitoring. Refer to Attachment E for maps of these monitoring sites in relation to key beneficial users of groundwater.

The GSP includes plans to install three shallow monitoring wells near the Prado Wetlands to monitor GDEs in this area. However, our comments above note that since this is the only area of the basin where SMC to protect ecosystems have been established, the GSP disregards other areas of the basin where GDEs and ISW may exist. Additional monitoring may be needed to adequately assess the presence of GDEs and ISWs and to monitor the impact of SMC on these ecosystems.

RECOMMENDATIONS

- Provide maps that overlay current and proposed monitoring well locations with the locations of DACs, domestic wells, and GDEs to clearly identify monitored areas.
- Increase the number of RMWs in the shallow aquifer across the basin as needed to map ISWs and adequately monitor all groundwater condition indicators across the basin and at appropriate depths for *all* beneficial users. Prioritize proximity to DACs, domestic wells, GDEs, and ISWs when identifying new RMWs.
- Ensure groundwater elevation and water quality RMWs are monitoring groundwater conditions spatially and at the correct depth for *all* beneficial users - especially DACs, domestic wells, and GDEs.
- Further describe biological monitoring that can be used to assess the potential for significant and unreasonable impacts to GDEs or ISWs due to groundwater conditions in the basin.

4. Addressing Beneficial Users in Projects and Management Actions

The consideration of beneficial users when developing projects and management actions is **insufficient**, due to the failure to completely identify benefits or impacts of identified projects and management actions, including water quality impacts, to key beneficial users of groundwater such as GDEs, aquatic habitats, surface water users, DACs, and drinking water users. Therefore, potential project and management actions may not protect these beneficial users. Groundwater sustainability under SGMA is defined not just by sustainable yield, but by the avoidance of undesirable results for *all* beneficial users.

RECOMMENDATIONS

- For DACs and domestic well owners, include a drinking water well impact mitigation program to proactively monitor and protect drinking water wells through GSP implementation. Refer to Attachment B for specific recommendations on how to implement a drinking water well mitigation program.
- For DACs and domestic well owners, include a discussion of whether potential impacts to water quality from projects and management actions could occur and how the GSA plans to mitigate such impacts.

- Recharge ponds, reservoirs, and facilities for managed aquifer recharge can be designed as multiple-benefit projects to include elements that act functionally as wetlands and provide a benefit for wildlife and aquatic species. For guidance on how to integrate multi-benefit recharge projects into your GSP, refer to the "Multi-Benefit Recharge Project Methodology Guidance Document."[20]

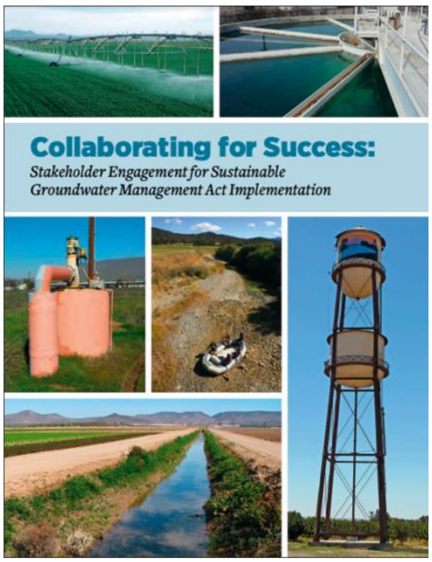
- Develop management actions that incorporate climate and water delivery uncertainties to address future water demand and prevent future undesirable results.

[20] The Nature Conservancy. 2021. Multi-Benefit Recharge Project Methodology for Inclusion in Groundwater Sustainability Plans. Sacramento. Available at: https://groundwaterresourcehub.org/sgma-tools/multi-benefit-recharge-project-methodology-guidance/

Attachment B

SGMA Tools to address DAC, drinking water, and environmental beneficial uses and users

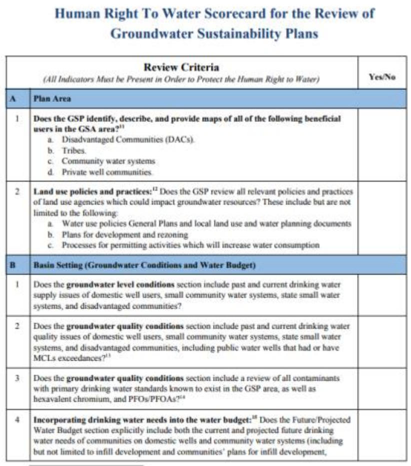
Stakeholder Engagement and Outreach



Clean Water Action, Community Water Center and Union of Concerned Scientists developed a guidance document called Collaborating for success: Stakeholder engagement for Sustainable Groundwater Management Act Implementation. It provides details on how to conduct targeted and broad outreach and engagement during Groundwater Sustainability Plan (GSP) development and implementation. Conducting a targeted outreach involves:

- Developing a robust Stakeholder Communication and Engagement plan that includes outreach at frequented locations (schools, farmers markets, religious settings, events) across the plan area to increase the involvement and participation of disadvantaged communities, drinking water users and the environmental stakeholders.
- Providing translation services during meetings and technical assistance to enable easy participation for non-English speaking stakeholders.
- GSP should adequately describe the process for requesting input from beneficial users and provide details on how input is incorporated into the GSP.

The Human Right to Water

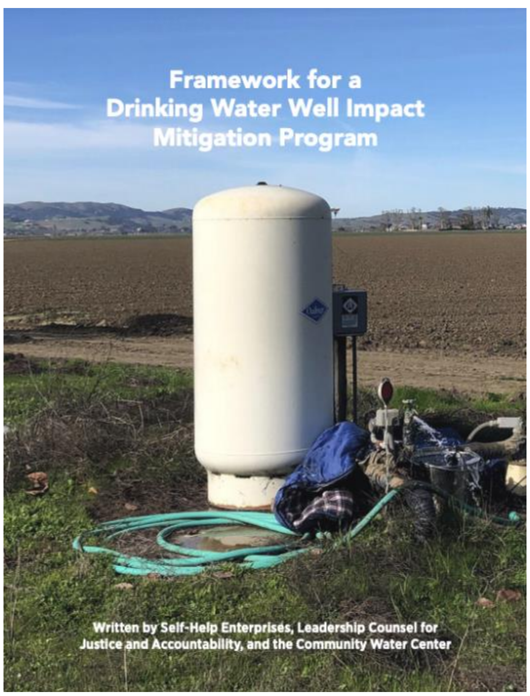


Human Right To Water Scorecard for the Review of Groundwater Sustainability Plans

	Review Criteria *(All Indicators Must be Present in Order to Protect the Human Right to Water)*	**Yes/No**
A	**Plan Area**	
1	**Does the GSP identify, describe, and provide maps of all of the following beneficial users in the GSA area?**[11] a. Disadvantaged Communities (DACs). b. Tribes. c. Community water systems d. Private well communities.	
2	**Land use policies and practices:**[12] Does the GSP review all relevant policies and practices of land use agencies which could impact groundwater resources? These include but are not limited to the following: a. Water use policies General Plans and local land use and water planning documents b. Plans for development and rezoning c. Processes for permitting activities which will increase water consumption	
B	**Basin Setting (Groundwater Conditions and Water Budget)**	
1	Does the **groundwater level conditions** section include past and current drinking water supply issues of domestic well users, small community water systems, state small water systems, and disadvantaged communities?	
2	Does the **groundwater quality conditions** section include past and current drinking water quality issues of domestic well users, small community water systems, state small water systems, and disadvantaged communities, including public water wells that had or have MCLs exceedances?[13]	
3	Does the **groundwater quality conditions** section include a review of all contaminants with primary drinking water standards known to exist in the GSP area, as well as hexavalent chromium, and PFOs/PFOAs?[14]	
4	**Incorporating drinking water needs into the water budget:**[15] Does the Future/Projected Water Budget section explicitly include both the current and projected future drinking water needs of communities on domestic wells and community water systems (including but not limited to infill development and communities' plans for infill development,	

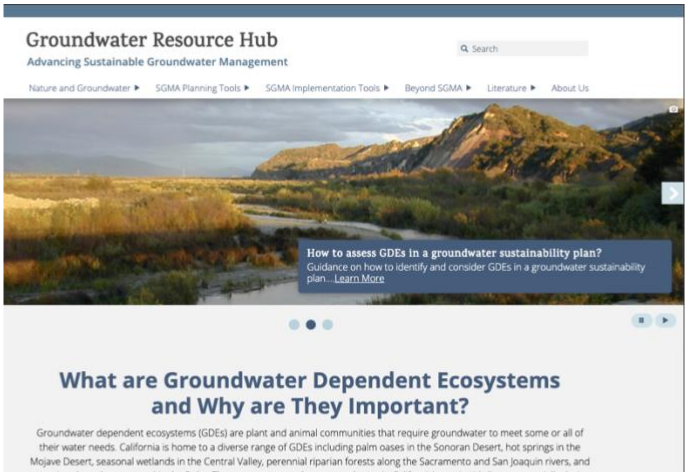
The Human Right to Water Scorecard was developed by Community Water Center, Leadership Counsel for Justice and Accountability and Self Help Enterprises to aid Groundwater Sustainability Agencies (GSAs) in prioritizing drinking water needs in SGMA. The scorecard identifies elements that must exist in GSPs to adequately protect the Human Right to Drinking water.

Drinking Water Well Impact Mitigation Framework



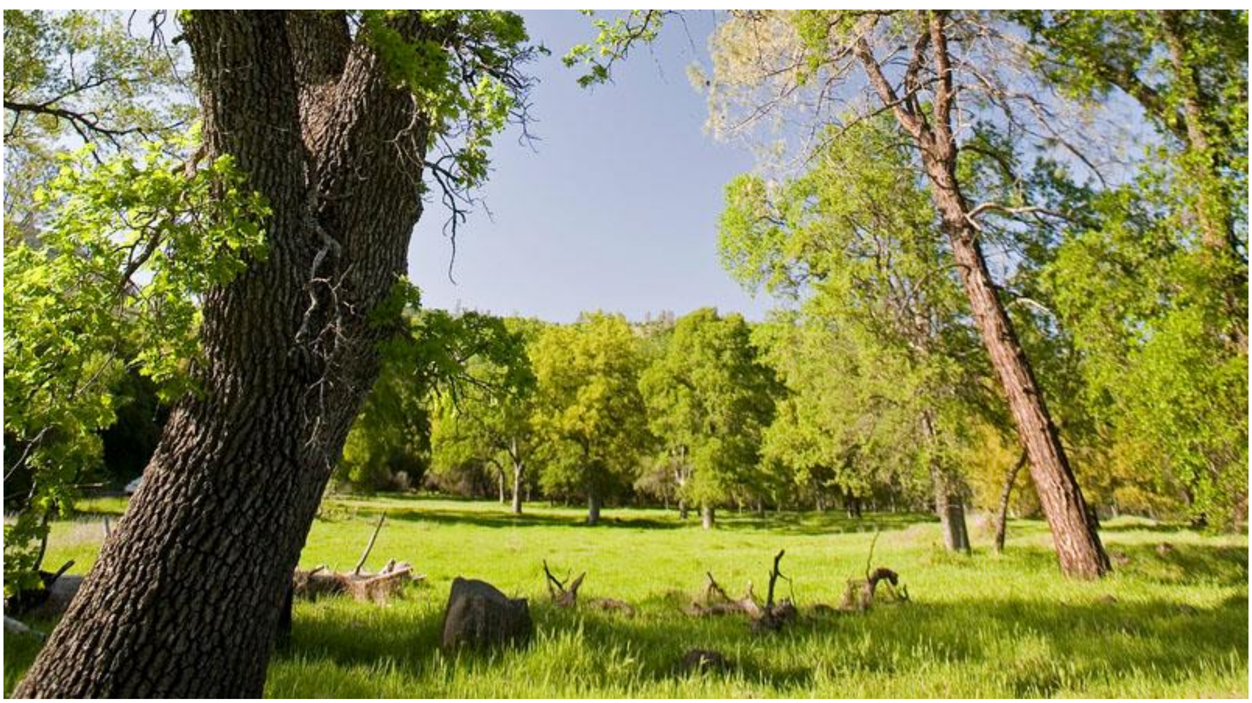
The Drinking Water Well Impact Mitigation Framework was developed by Community Water Center, Leadership Counsel for Justice and Accountability and Self Help Enterprises to aid GSAs in the development and implementation of their GSPs. The framework provides a clear roadmap for how a GSA can best structure its data gathering, monitoring network and management actions to proactively monitor and protect drinking water wells and mitigate impacts should they occur.

Groundwater Resource Hub



The Nature Conservancy has developed a suite of tools based on best available science to help GSAs, consultants, and stakeholders efficiently incorporate nature into GSPs. These tools and resources are available online at GroundwaterResourceHub.org. The Nature Conservancy's tools and resources are intended to reduce costs, shorten timelines, and increase benefits for both people and nature.

Rooting Depth Database



The Plant Rooting Depth Database provides information that can help assess whether groundwater-dependent vegetation are accessing groundwater. Actual rooting depths will depend on the plant species and site-specific conditions, such as soil type and availability of other water sources. Site-specific knowledge of depth to groundwater combined with rooting depths will help provide an understanding of the potential groundwater levels are needed to sustain GDEs.

How to use the database

The maximum rooting depth information in the Plant Rooting Depth Database is useful when verifying whether vegetation in the Natural Communities Commonly Associated with Groundwater (NC Dataset) are connected to groundwater. A 30 ft depth-to-groundwater threshold, which is based on averaged global rooting depth data for phreatophytes[1], is relevant for most plants identified in the NC Dataset since most plants have a max rooting depth of less than 30 feet. However, it is important to note that deeper thresholds are necessary for other plants that have reported maximum root depths that exceed the averaged 30 feet threshold, such as valley oak (*Quercus lobata*), Euphrates poplar (*Populus euphratica*), salt cedar (*Tamarix spp.*), and shadescale (*Atriplex confertifolia*). The Nature Conservancy advises that the reported max rooting depth for these deeper-rooted plants be used. For example, a depth-to groundwater threshold of 80 feet should be used instead of the 30 ft threshold, when verifying whether valley oak polygons from the NC Dataset are connected to groundwater. It is important to re-emphasize that actual rooting depth data are limited and will depend on the plant species and site-specific conditions such as soil and aquifer types, and availability to other water sources.

The Plant Rooting Depth Database is an Excel workbook composed of four worksheets:

1. California phreatophyte rooting depth data (included in the NC Dataset)
2. Global phreatophyte rooting depth data
3. Metadata
4. References

How the database was compiled

The Plant Rooting Depth Database is a compilation of rooting depth information for the groundwater-dependent plant species identified in the NC Dataset. Rooting depth data were compiled from published scientific literature and expert opinion through a crowdsourcing campaign. As more information becomes available, the database of rooting depths will be updated. Please Contact Us if you have additional rooting depth data for California phreatophytes.

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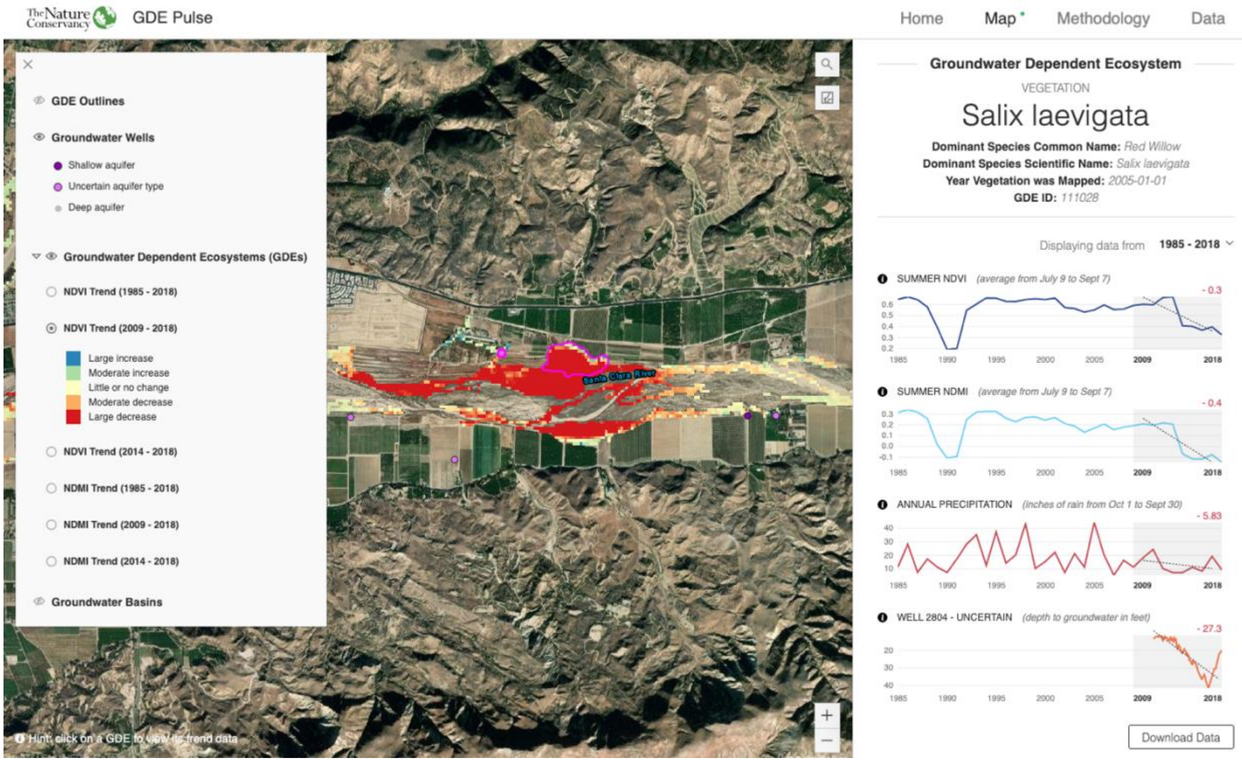
[1] Canadell, J., Jackson, R.B., Ehleringer, J.B. et al. 1996. Maximum rooting depth of vegetation types at the global scale. Oecologia 108, 583–595. https://doi.org/10.1007/BF00329030

GDE Pulse



[GDE Pulse](#) is a free online tool that allows Groundwater Sustainability Agencies to assess changes in groundwater dependent ecosystem (GDE) health using satellite, rainfall, and groundwater data. Remote sensing data from satellites has been used to monitor the health of vegetation all over the planet. GDE pulse has compiled 35 years of satellite imagery from NASA's Landsat mission for every polygon in the Natural Communities Commonly Associated with Groundwater Dataset. The following datasets are available for downloading:

Normalized Difference Vegetation Index (NDVI) is a satellite-derived index that represents the greenness of vegetation. Healthy green vegetation tends to have a higher NDVI, while dead leaves have a lower NDVI. We calculated the average NDVI during the driest part of the year (July - Sept) to estimate vegetation health when the plants are most likely dependent on groundwater.

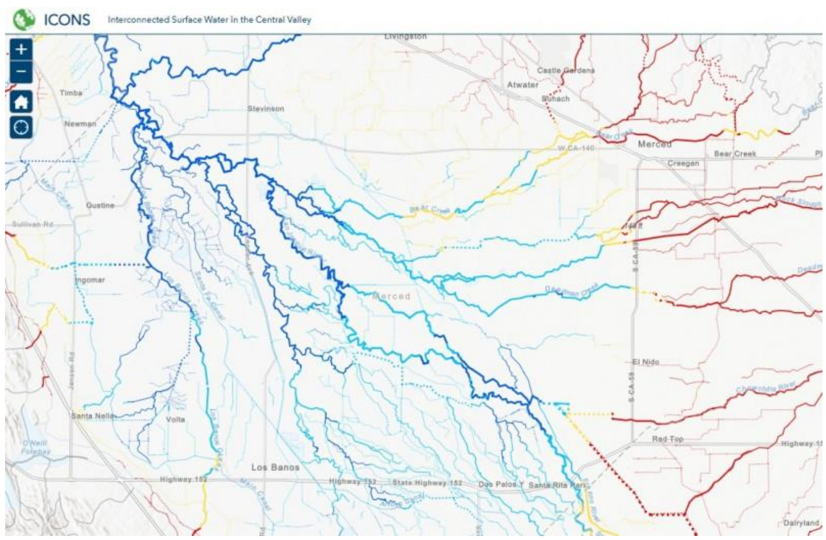
Normalized Difference Moisture Index (NDMI) is a satellite-derived index that represents water content in vegetation. NDMI is derived from the Near-Infrared (NIR) and Short-Wave Infrared (SWIR) channels. Vegetation with adequate access to water tends to have higher NDMI, while vegetation that is water stressed tends to have lower NDMI. We calculated the average NDVI during the driest part of the year (July–September) to estimate vegetation health when the plants are most likely dependent on groundwater.

Annual Precipitation is the total precipitation for the water year (October 1st – September 30th) from the PRISM dataset. The amount of local precipitation can affect vegetation with more precipitation generally leading to higher NDVI and NDMI.

Depth to Groundwater measurements provide an indication of the groundwater levels and changes over time for the surrounding area. We used groundwater well measurements from nearby (<1km) wells to estimate the depth to groundwater below the GDE based on the average elevation of the GDE (using a digital elevation model) minus the measured groundwater surface elevation.

ICONOS Mapper

Interconnected Surface Water in the Central Valley



[ICONS](#) maps the likely presence of interconnected surface water (ISW) in the Central Valley using depth to groundwater data. Using data from 2011-2018, the ISW dataset represents the likely connection between surface water and groundwater for rivers and streams in California's Central Valley. It includes information on the mean, maximum, and minimum depth to groundwater for each stream segment over the years with available data, as well as the likely presence of ISW based on the minimum depth to groundwater. The Nature Conservancy developed this database, with guidance and input from expert academics, consultants, and state agencies.

We developed this dataset using groundwater elevation data available online from the California Department of Water Resources (DWR). DWR only provides this data for the Central Valley. For GSAs outside of the valley, who have groundwater well measurements, we recommend following our methods to determine likely ISW in your region. The Nature Conservancy's ISW dataset should be used as a first step in reviewing ISW and should be supplemented with local or more recent groundwater depth data.

Attachment C

Freshwater Species Located in the Temescal Basin

To assist in identifying the beneficial users of surface water necessary to assess the undesirable result "depletion of interconnected surface waters", Attachment C provides a list of freshwater species located in the Temescal Basin. To produce the freshwater species list, we used ArcGIS to select features within the California Freshwater Species Database version 2.0.9 within the basin boundary. This database contains information on ~4,000 vertebrates, macroinvertebrates and vascular plants that depend on fresh water for at least one stage of their life cycle. The methods used to compile the California Freshwater Species Database can be found in Howard et al. 2015[1]. The spatial database contains locality observations and/or distribution information from ~400 data sources. The database is housed in the California Department of Fish and Wildlife's BIOS[2] as well as on The Nature Conservancy's science website[3].

Scientific Name	Common Name	Legal Protected Status		
		Federal	**State**	**Other**
BIRDS				
Aechmophorus clarkii	Clark's Grebe			
Aix sponsa	Wood Duck			
Anas acuta	Northern Pintail			
Anas americana	American Wigeon			
Anas clypeata	Northern Shoveler			
Anas crecca	Green-winged Teal			
Anas cyanoptera	Cinnamon Teal			
Anas platyrhynchos	Mallard			
Anas strepera	Gadwall			
Ardea alba	Great Egret			
Ardea herodias	Great Blue Heron			
Aythya affinis	Lesser Scaup			
Aythya americana	Redhead		Special Concern	BSSC - Third priority
Bucephala albeola	Bufflehead			
Bucephala clangula	Common Goldeneye			
Butorides virescens	Green Heron			
Calidris mauri	Western Sandpiper			
Calidris minutilla	Least Sandpiper			
Chroicocephalus philadelphia	Bonaparte's Gull			
Cistothorus palustris palustris	Marsh Wren			

[1] Howard, J.K. et al. 2015. Patterns of Freshwater Species Richness, Endemism, and Vulnerability in California. PLoSONE, 11(7). Available at: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0130710

[2] California Department of Fish and Wildlife BIOS: https://www.wildlife.ca.gov/data/BIOS

[3] Science for Conservation: https://www.scienceforconservation.org/products/california-freshwater-species-database

Coccyzus americanus occidentalis	Western Yellow-billed Cuckoo	Candidate - Threatened	Endangered	
Egretta thula	Snowy Egret			
Fulica americana	American Coot			
Gallinago delicata	Wilson's Snipe			
Haliaeetus leucocephalus	Bald Eagle	Bird of Conservation Concern	Endangered	
Himantopus mexicanus	Black-necked Stilt			
Icteria virens	Yellow-breasted Chat		Special Concern	BSSC - Third priority
Limnodromus scolopaceus	Long-billed Dowitcher			
Megaceryle alcyon	Belted Kingfisher			
Nycticorax nycticorax	Black-crowned Night-Heron			
Oxyura jamaicensis	Ruddy Duck			
Phalacrocorax auritus	Double-crested Cormorant			
Plegadis chihi	White-faced Ibis		Watch list	
Podiceps nigricollis	Eared Grebe			
Recurvirostra americana	American Avocet			
Setophaga petechia	Yellow Warbler			BSSC - Second priority
Tachycineta bicolor	Tree Swallow			
Vireo bellii	Bell's Vireo			
Vireo bellii pusillus	Least Bell's Vireo	Endangered	Endangered	
CRUSTACEANS				
Hyalella spp.	Hyalella spp.			
FISH				
Catostomus santaanae	Santa Ana sucker	Threatened	Special Concern	Endangered - Moyle 2013
HERPS				
Actinemys marmorata marmorata	Western Pond Turtle		Special Concern	ARSSC
Anaxyrus boreas boreas	Boreal Toad			
Anaxyrus californicus	Arroyo Toad	Endangered	Special Concern	ARSSC
Pseudacris cadaverina	California Treefrog			ARSSC
Rana draytonii	California Red-legged Frog	Threatened	Special Concern	ARSSC
Spea hammondii	Western Spadefoot	Under Review in the Candidate or Petition Process	Special Concern	ARSSC
Taricha torosa	Coast Range Newt		Special Concern	ARSSC

Thamnophis hammondii hammondii	Two-striped Gartersnake		Special Concern	ARSSC
Thamnophis sirtalis sirtalis	Common Gartersnake			
INSECTS & OTHER INVERTS				
Apedilum spp.	Apedilum spp.			
Chaoboridae fam.	Chaoboridae fam.			
Chironomus spp.	Chironomus spp.			
Corixidae fam.	Corixidae fam.			
Cricotopus spp.	Cricotopus spp.			
Cryptochironomus spp.	Cryptochironomus spp.			
Dicrotendipes spp.	Dicrotendipes spp.			
Ephydridae fam.	Ephydridae fam.			
Fallceon spp.	Fallceon spp.			
Hydroptila spp.	Hydroptila spp.			
Hydroptilidae fam.	Hydroptilidae fam.			
Nanocladius spp.	Nanocladius spp.			
Phaenopsectra spp.	Phaenopsectra spp.			
Polypedilum spp.	Polypedilum spp.			
Pseudochironomus spp.	Pseudochironomus spp.			
Psychodidae fam.	Psychodidae fam.			
Simulium spp.	Simulium spp.			
Thienemannimyia spp.	Thienemannimyia spp.			
MOLLUSKS				
Gyraulus spp.	Gyraulus spp.			
Physa spp.	Physa spp.			
Pisidium spp.	Pisidium spp.			
PLANTS				
Arundo donax	NA			
Baccharis salicina				Not on any status lists
Marsilea vestita vestita	NA			Not on any status lists

Attachment D

July 2019

IDENTIFYING GDEs UNDER SGMA

Best Practices for using the NC Dataset

The Sustainable Groundwater Management Act (SGMA) requires that groundwater dependent ecosystems (GDEs) be identified in Groundwater Sustainability Plans (GSPs). As a starting point, the Department of Water Resources (DWR) is providing the Natural Communities Commonly Associated with Groundwater Dataset (NC Dataset) online[1] to help Groundwater Sustainability Agencies (GSAs), consultants, and stakeholders identify GDEs within individual groundwater basins. To apply information from the NC Dataset to local areas, GSAs should combine it with the best available science on local hydrology, geology, and groundwater levels to verify whether polygons in the NC dataset are likely supported by groundwater in an aquifer (Figure 1)[2]. This document highlights six best practices for using local groundwater data to confirm whether mapped features in the NC dataset are supported by groundwater.

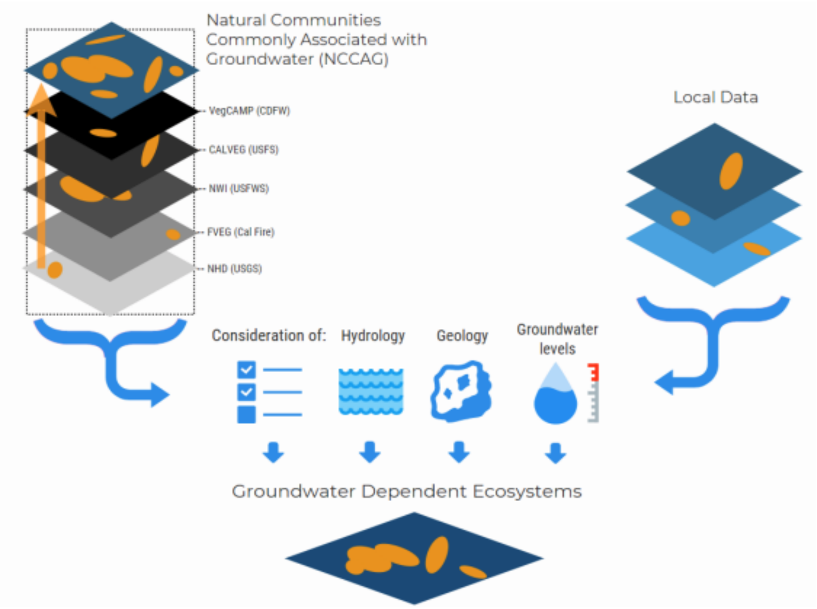


Figure 1. Considerations for GDE identification.
Source: DWR[2]

[1] NC Dataset Online Viewer: https://gis.water.ca.gov/app/NCDatasetViewer/
[2] California Department of Water Resources (DWR). 2018. Summary of the "Natural Communities Commonly Associated with Groundwater" Dataset and Online Web Viewer. Available at: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Data-and-Tools/Files/Statewide-Reports/Natural-Communities-Dataset-Summary-Document.pdf

The NC Dataset identifies vegetation and wetland features that are good indicators of a GDE. The dataset is comprised of 48 publicly available state and federal datasets that map vegetation, wetlands, springs, and seeps commonly associated with groundwater in California[3]. It was developed through a collaboration between DWR, the Department of Fish and Wildlife, and The Nature Conservancy (TNC). TNC has also provided detailed guidance on identifying GDEs from the NC dataset[4] on the Groundwater Resource Hub[5], a website dedicated to GDEs.

BEST PRACTICE #1. Establishing a Connection to Groundwater

Groundwater basins can be comprised of one continuous aquifer (Figure 2a) or multiple aquifers stacked on top of each other (Figure 2b). In unconfined aquifers (Figure 2a), using the depth-to-groundwater and the rooting depth of the vegetation is a reasonable method to infer groundwater dependence for GDEs. If groundwater is well below the rooting (and capillary) zone of the plants and any wetland features, the ecosystem is considered disconnected and groundwater management is not likely to affect the ecosystem (Figure 2d). However, it is important to consider local conditions (e.g., soil type, groundwater flow gradients, and aquifer parameters) and to review groundwater depth data from multiple seasons and water year types (wet and dry) because intermittent periods of high groundwater levels can replenish perched clay lenses that serve as the water source for GDEs (Figure 2c). Maintaining these natural groundwater fluctuations are important to sustaining GDE health.

Basins with a stacked series of aquifers (Figure 2b) may have varying levels of pumping across aquifers in the basin, depending on the production capacity or water quality associated with each aquifer. If pumping is concentrated in deeper aquifers, SGMA still requires GSAs to sustainably manage groundwater resources in shallow aquifers, such as perched aquifers, that support springs, surface water, domestic wells, and GDEs (Figure 2). This is because vertical groundwater gradients across aquifers may result in pumping from deeper aquifers to cause adverse impacts onto beneficial users reliant on shallow aquifers or interconnected surface water. The goal of SGMA is to sustainably manage groundwater resources for current and future social, economic, and environmental benefits. While groundwater pumping may not be currently occurring in a shallower aquifer, use of this water may become more appealing and economically viable in future years as pumping restrictions are placed on the deeper production aquifers in the basin to meet the sustainable yield and criteria. Thus, identifying GDEs in the basin should done irrespective to the amount of current pumping occurring in a particular aquifer, so that future impacts on GDEs due to new production can be avoided. A good rule of thumb to follow is: *if groundwater can be pumped from a well - it's an aquifer*.

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[3] For more details on the mapping methods, refer to: Klausmeyer, K., J. Howard, T. Keeler-Wolf, K. Davis-Fadtke, R. Hull, A. Lyons. 2018. Mapping Indicators of Groundwater Dependent Ecosystems in California: Methods Report. San Francisco, California. Available at: https://groundwaterresourcehub.org/public/uploads/pdfs/iGDE_data_paper_20180423.pdf
[4] "Groundwater Dependent Ecosystems under the Sustainable Groundwater Management Act: Guidance for Preparing Groundwater Sustainability Plans" is available at: https://groundwaterresourcehub.org/gde-tools/gsp-guidance-document/
[5] The Groundwater Resource Hub: www.GroundwaterResourceHub.org

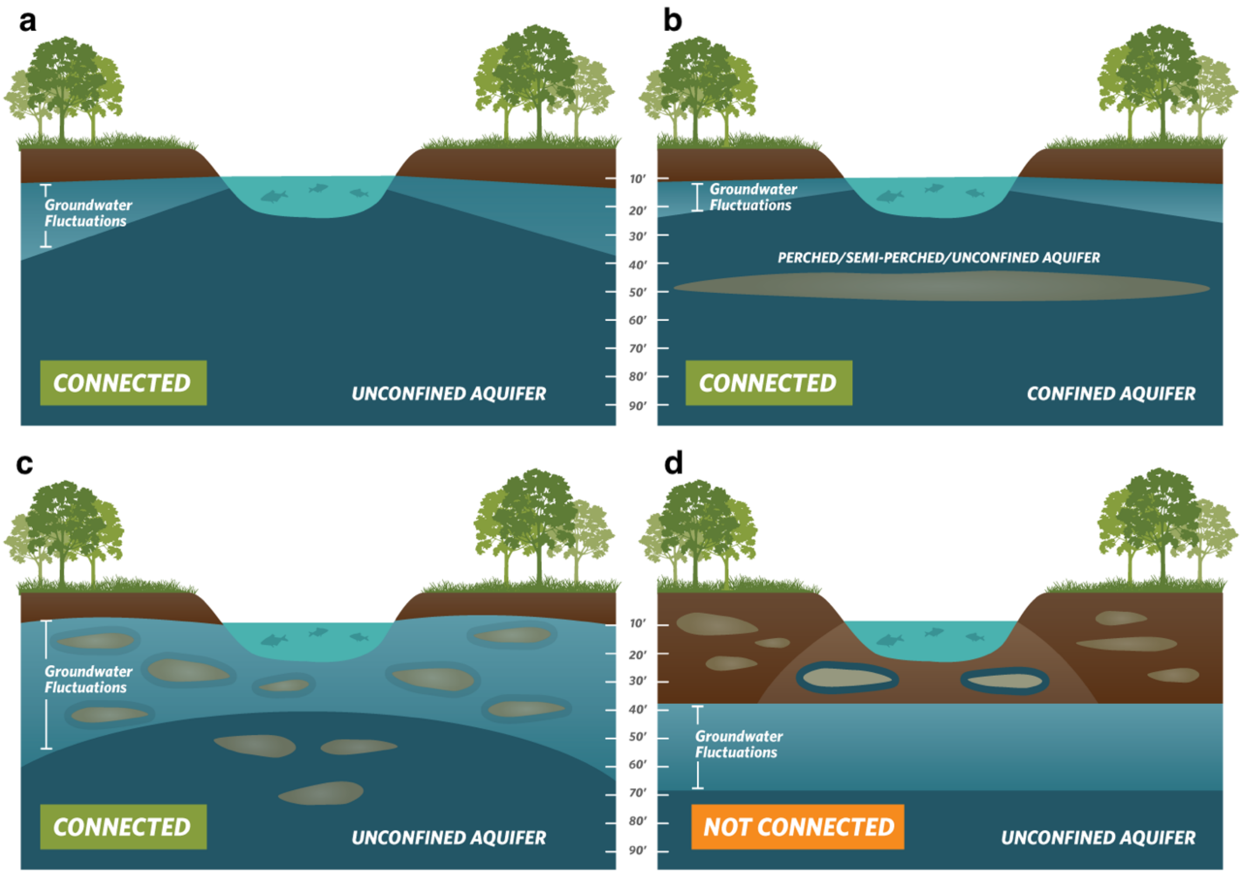

Figure 2. Confirming whether an ecosystem is connected to groundwater. Top: (a) Under the ecosystem is an unconfined aquifer with depth-to-groundwater fluctuating seasonally and interannually within 30 feet from land surface. **(b)** Depth-to-groundwater in the shallow aquifer is connected to overlying ecosystem. Pumping predominately occurs in the confined aquifer, but pumping is possible in the shallow aquifer. **Bottom: (c)** Depth-to-groundwater fluctuations are seasonally and interannually large, however, clay layers in the near surface prolong the ecosystem's connection to groundwater. **(d)** Groundwater is disconnected from surface water, and any water in the vadose (unsaturated) zone is due to direct recharge from precipitation and indirect recharge under the surface water feature. These areas are not connected to groundwater and typically support species that do not require access to groundwater to survive.

BEST PRACTICE #2. Characterize Seasonal and Interannual Groundwater Conditions

SGMA requires GSAs to describe current and historical groundwater conditions when identifying GDEs [23 CCR §354.16(g)]. Relying solely on the SGMA benchmark date (January 1, 2015) or any other single point in time to characterize groundwater conditions (e.g., depth-to-groundwater) is inadequate because managing groundwater conditions with data from one time point fails to capture the seasonal and interannual variability typical of California's climate. DWR's Best Management Practices document on water budgets[6] recommends using 10 years of water supply and water budget information to describe how historical conditions have impacted the operation of the basin within sustainable yield, implying that a baseline[7] could be determined based on data between 2005 and 2015. Using this or a similar time period, depending on data availability, is recommended for determining the depth-to-groundwater.

GDEs depend on groundwater levels being close enough to the land surface to interconnect with surface water systems or plant rooting networks. The most practical approach[8] for a GSA to assess whether polygons in the NC dataset are connected to groundwater is to rely on groundwater elevation data. As detailed in TNC's GDE guidance document[4], one of the key factors to consider when mapping GDEs is to contour depth-to-groundwater in the aquifer that is supporting the ecosystem (see Best Practice #5).

Groundwater levels fluctuate over time and space due to California's Mediterranean climate (dry summers and wet winters), climate change (flood and drought years), and subsurface heterogeneity in the subsurface (Figure 3). Many of California's GDEs have adapted to dealing with intermittent periods of water stress, however if these groundwater conditions are prolonged, adverse impacts to GDEs can result. While depth-to-groundwater levels within 30 feet[4] of the land surface are generally accepted as being a proxy for confirming that polygons in the NC dataset are supported by groundwater, it is highly advised that fluctuations in the groundwater regime be characterized to understand the seasonal and interannual groundwater variability in GDEs. Utilizing groundwater data from one point in time can misrepresent groundwater levels required by GDEs, and inadvertently result in adverse impacts to the GDEs. Time series data on groundwater elevations and depths are available on the SGMA Data Viewer[9]. However, if insufficient data are available to describe groundwater conditions within or near polygons from the NC dataset, include those polygons in the GSP until data gaps are reconciled in the monitoring network (see Best Practice #6).

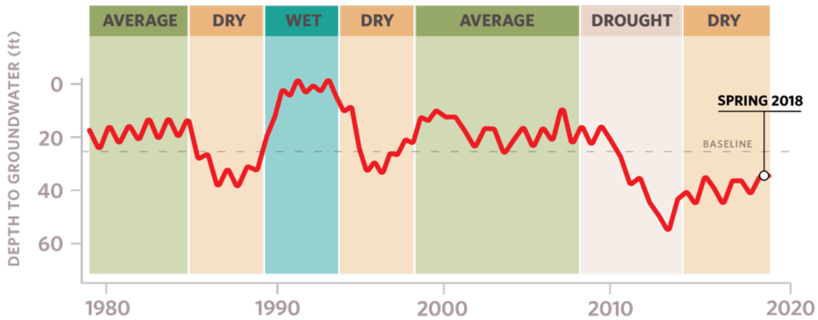

Figure 3. Example seasonality and interannual variability in depth-to-groundwater over time. Selecting one point in time, such as Spring 2018, to characterize groundwater conditions in GDEs fails to capture what groundwater conditions are necessary to maintain the ecosystem status into the future so adverse impacts are avoided.

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[6] DWR. 2016. Water Budget Best Management Practice. Available at: https://water.ca.gov/LegacyFiles/groundwater/sgm/pdfs/BMP_Water_Budget_Final_2016-12-23.pdf

[7] Baseline is defined under the GSP regulations as "historic information used to project future conditions for hydrology, water demand, and availability of surface water and to evaluate potential sustainable management practices of a basin." [23 CCR §351(e)]

[8] Groundwater reliance can also be confirmed via stable isotope analysis and geophysical surveys. For more information see The GDE Assessment Toolbox (Appendix IV, GDE Guidance Document for GSPs[4]).

[9] SGMA Data Viewer: https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer

BEST PRACTICE #3. Ecosystems Often Rely on Both Groundwater and Surface Water

GDEs are plants and animals that rely on groundwater for all or some of its water needs, and thus can be supported by multiple water sources. The presence of non-groundwater sources (e.g., surface water, soil moisture in the vadose zone, applied water, treated wastewater effluent, urban stormwater, irrigated return flow) within and around a GDE does not preclude the possibility that it is supported by groundwater, too. SGMA defines GDEs as "ecological communities and species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface" [23 CCR §351(m)]. Hence, depth-to-groundwater data should be used to identify whether NC polygons are supported by groundwater and should be considered GDEs. In addition, SGMA requires that significant and undesirable adverse impacts to beneficial users of surface water be avoided. Beneficial users of surface water include environmental users such as plants or animals[10], which therefore must be considered when developing minimum thresholds for depletions of interconnected surface water.

GSAs are only responsible for impacts to GDEs resulting from groundwater conditions in the basin, so if adverse impacts to GDEs result from the diversion of applied water, treated wastewater, or irrigation return flow away from the GDE, then those impacts will be evaluated by other permitting requirements (e.g., CEQA) and may not be the responsibility of the GSA. However, if adverse impacts occur to the GDE due to changing groundwater conditions resulting from pumping or groundwater management activities, then the GSA would be responsible (Figure 4).

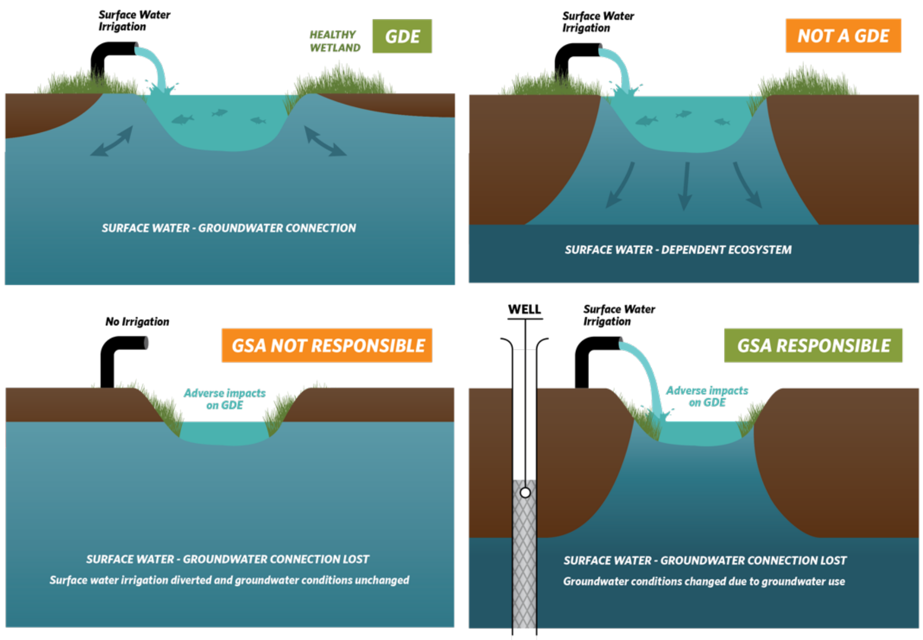

Figure 4. Ecosystems often depend on multiple sources of water. Top: (Left) Surface water and groundwater are interconnected, meaning that the GDE is supported by both groundwater and surface water. **(Right)** Ecosystems that are only reliant on non-groundwater sources are not groundwater-dependent. **Bottom: (Left)** An ecosystem that was once dependent on an interconnected surface water, but loses access to groundwater solely due to surface water diversions may not be the GSA's responsibility. **(Right)** Groundwater dependent ecosystems once dependent on an interconnected surface water system, but loses that access due to groundwater pumping is the GSA's responsibility.

[10] For a list of environmental beneficial users of surface water by basin, visit: https://groundwaterresourcehub.org/gde-tools/environmental-surface-water-beneficiaries/

BEST PRACTICE #4. Select Representative Groundwater Wells

Identifying GDEs in a basin requires that groundwater conditions are characterized to confirm whether polygons in the NC dataset are supported by the underlying aquifer. To do this, proximate groundwater wells should be identified to characterize groundwater conditions (Figure 5). When selecting representative wells, it is particularly important to consider the subsurface heterogeneity around NC polygons, especially near surface water features where groundwater and surface water interactions occur around heterogeneous stratigraphic units or aquitards formed by fluvial deposits. The following selection criteria can help ensure groundwater levels are representative of conditions within the GDE area:

- Choose wells that are within 5 kilometers (3.1 miles) of each NC Dataset polygons because they are more likely to reflect the local conditions relevant to the ecosystem. If there are no wells within 5km of the center of a NC dataset polygon, then there is insufficient information to remove the polygon based on groundwater depth. Instead, it should be retained as a potential GDE until there are sufficient data to determine whether or not the NC Dataset polygon is supported by groundwater.

- Choose wells that are screened within the surficial unconfined aquifer and capable of measuring the true water table.

- Avoid relying on wells that have insufficient information on the screened well depth interval for excluding GDEs because they could be providing data on the wrong aquifer. This type of well data should not be used to remove any NC polygons.

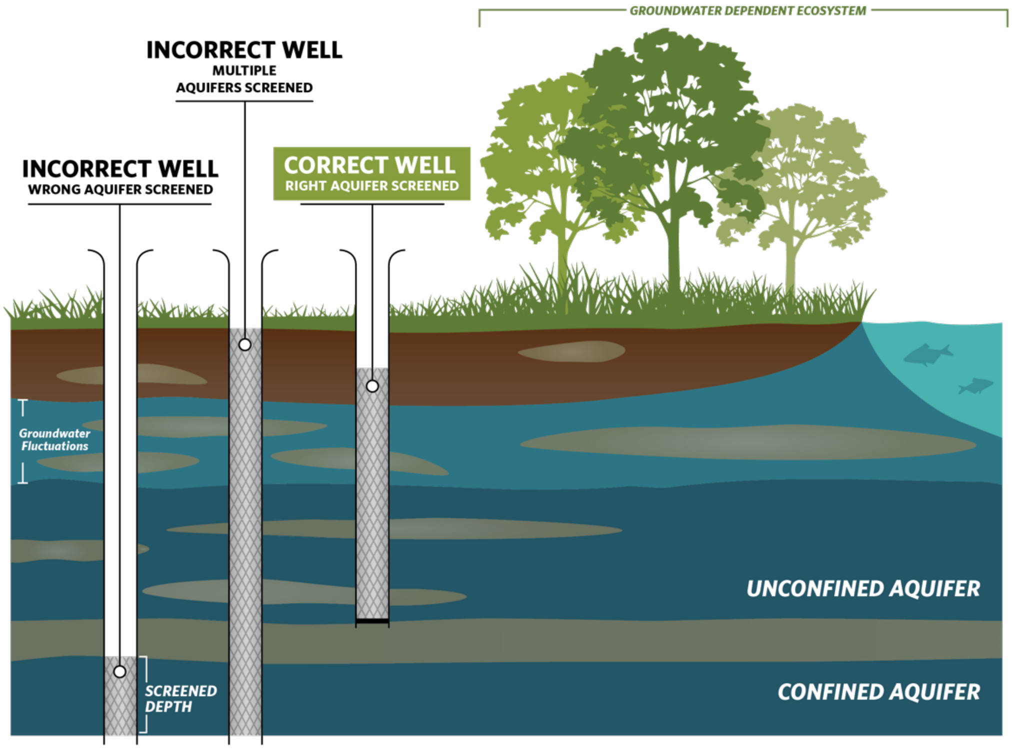

Figure 5. Selecting representative wells to characterize groundwater conditions near GDEs.

BEST PRACTICE #5. Contouring Groundwater Elevations

The common practice to contour depth-to-groundwater over a large area by interpolating measurements at monitoring wells is unsuitable for assessing whether an ecosystem is supported by groundwater. This practice causes errors when the land surface contains features like stream and wetland depressions because it assumes the land surface is constant across the landscape and depth-to-groundwater is constant below these low-lying areas (Figure 6a). A more accurate approach is to interpolate **groundwater elevations** at monitoring wells to get groundwater elevation contours across the landscape. This layer can then be subtracted from land surface elevations from a Digital Elevation Model (DEM)[11] to estimate depth-to-groundwater contours across the landscape (Figure b; Figure 7). This will provide a much more accurate contours of depth-to-groundwater along streams and other land surface depressions where GDEs are commonly found.

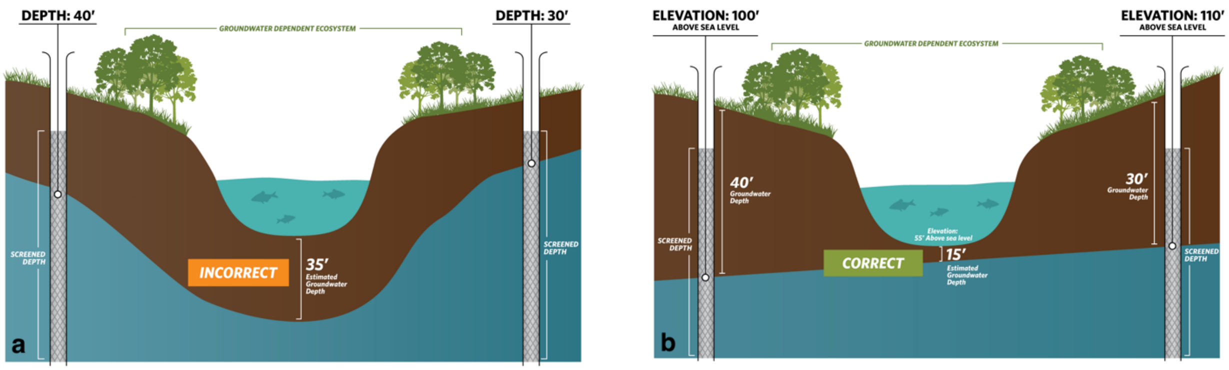

Figure 6. Contouring depth-to-groundwater around surface water features and GDEs. (a) Groundwater level interpolation using depth-to-groundwater data from monitoring wells. **(b)** Groundwater level interpolation using groundwater elevation data from monitoring wells and DEM data.

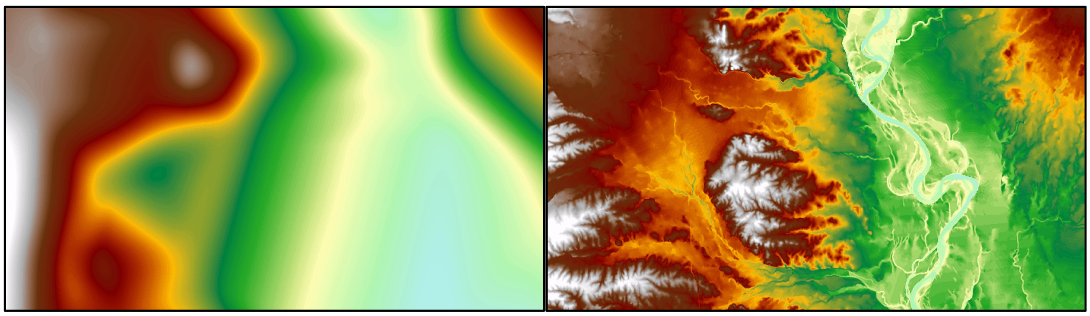

Figure 7. Depth-to-groundwater contours in Northern California. (Left) Contours were interpolated using depth-to-groundwater measurements determined at each well. **(Right)** Contours were determined by interpolating groundwater elevation measurements at each well and superimposing ground surface elevation from DEM spatial data to generate depth-to-groundwater contours. The image on the right shows a more accurate depth-to-groundwater estimate because it takes the local topography and elevation changes into account.

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[11] USGS Digital Elevation Model data products are described at: https://www.usgs.gov/core-science-systems/ngp/3dep/about-3dep-products-services and can be downloaded at: https://iewer.nationalmap.gov/basic/

BEST PRACTICE #6. Best Available Science

Adaptive management is embedded within SGMA and provides a process to work toward sustainability over time by beginning with the best available information to make initial decisions, monitoring the results of those decisions, and using the data collected through monitoring programs to revise decisions in the future. In many situations, the hydrologic connection of NC dataset polygons will not initially be clearly understood if site-specific groundwater monitoring data are not available. If sufficient data are not available in time for the 2020/2022 plan, **The Nature Conservancy strongly advises that questionable polygons from the NC dataset be included in the GSP until data gaps are reconciled in the monitoring network.** Erring on the side of caution will help minimize inadvertent impacts to GDEs as a result of groundwater use and management actions during SGMA implementation.

KEY DEFINITIONS

Groundwater basin is an aquifer or stacked series of aquifers with reasonably well-defined boundaries in a lateral direction, based on features that significantly impede groundwater flow, and a definable bottom. *23 CCR §341(g)(1)*

Groundwater dependent ecosystem (GDE) are ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface. *23 CCR §351(m)*

Interconnected surface water (ISW) surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water is not completely depleted. *23 CCR §351(o)*

Principal aquifers are aquifers or aquifer systems that store, transmit, and yield significant or economic quantities of groundwater to wells, springs, or surface water systems. *23 CCR §351(aa)*

ABOUT US

The Nature Conservancy is a science-based nonprofit organization whose mission is *to conserve the lands and waters on which all life depends*. To support successful SGMA implementation that meets the future needs of people, the economy, and the environment, TNC has developed tools and resources (www.groundwaterresourcehub.org) intended to reduce costs, shorten timelines, and increase benefits for both people and nature.

Attachment E

Maps of representative monitoring sites in relation to key beneficial users

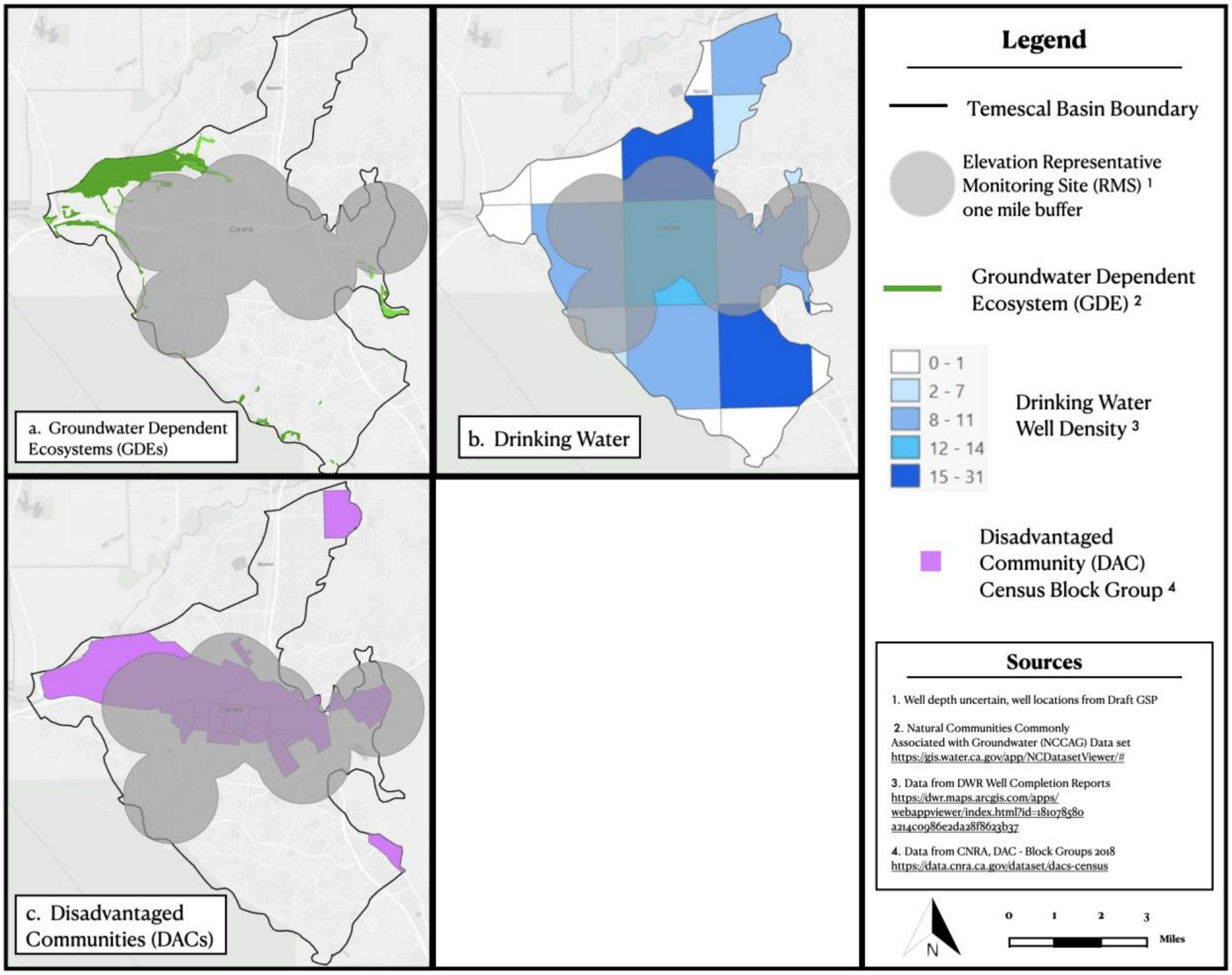


Figure 1. Groundwater elevation representative monitoring sites in relation to key beneficial users: a) Groundwater Dependent Ecosystems (GDEs), b) Drinking Water users, c) Disadvantaged Communities (DACs), and d) Tribes.

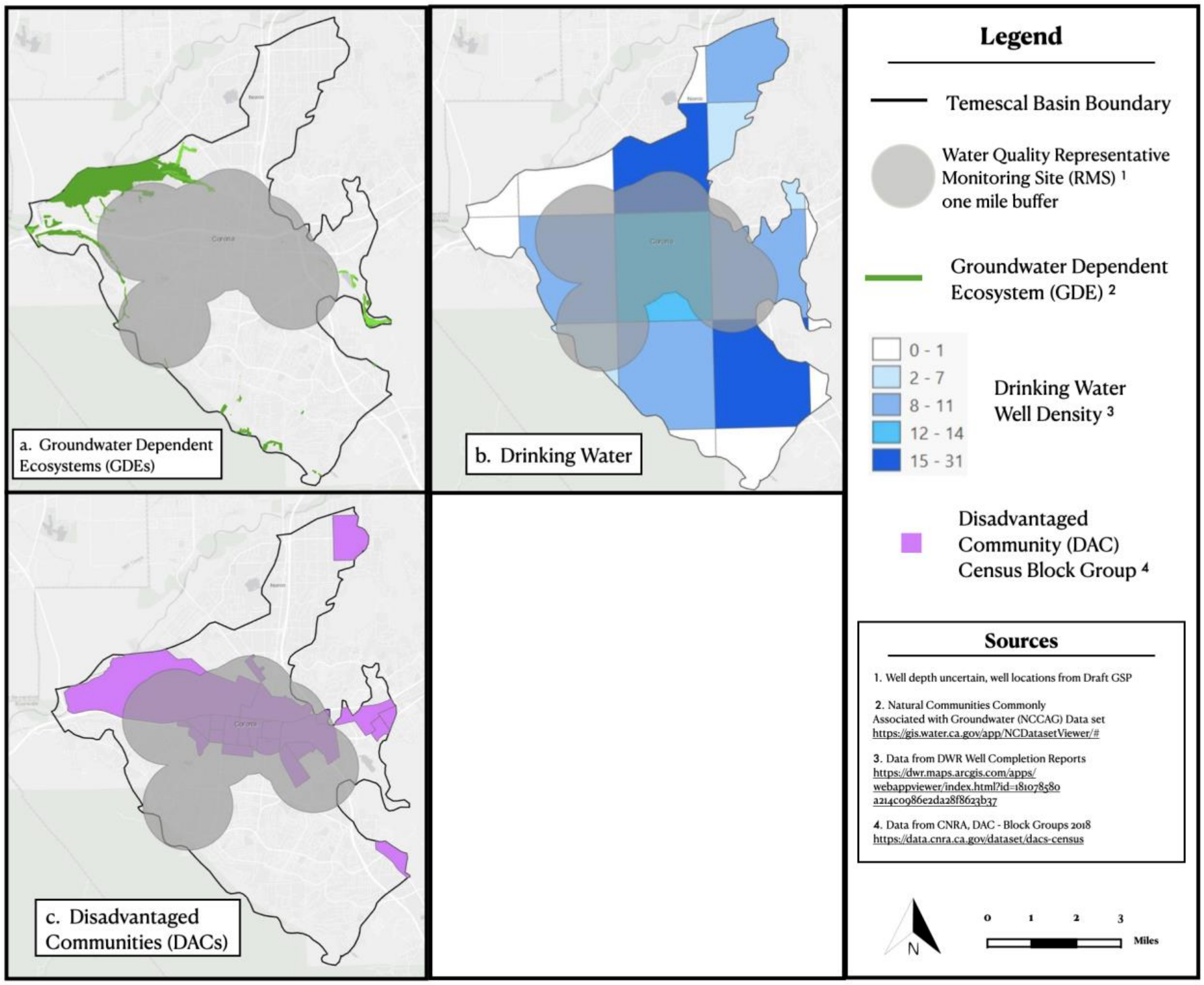


Figure 2. Groundwater quality representative monitoring sites in relation to key beneficial users: a) Groundwater Dependent Ecosystems (GDEs), b) Drinking Water users, c) Disadvantaged Communities (DACs), and d) Tribes.

OCWD Comments on: Draft Temescal Basin Groundwater Sustainability Plan, September 2021.

The Orange County Water District (OCWD) is responsible for managing the Orange County Groundwater Basin, which is part of the Coastal Plain of Orange County Groundwater Basin (DWR Basin 8-1). In 2017, OCWD, along with partner agencies, submitted an Alternative to a Groundwater Sustainability Plan (Alternative) to the Department of Water Resources (DWR) to show that Basin 8-1 had been sustainably managed over the last 10 years. DWR approved the Alternative on July 17, 2019.

OCWD thanks the Temescal Basin Groundwater Sustainability Agency (GSA) for reaching out and including OCWD in the public participation process of developing the Temescal Basin Groundwater Sustainability Plan (GSP or Plan). Not only is the Temescal Basin adjacent to Basin 8-1, Coastal Plain of Orange County Groundwater Basin, OCWD owns and manages wetlands and a large area of riparian habitat behind Prado Dam that is within the Temescal Basin. The health of this riparian habitat is dependent on surface flows of the Santa Ana River (SAR) and its tributaries as well as rising groundwater. There are data gaps within this area that need to be filled, particularly with respect to interconnected surface water. A number of studies are ongoing by multiple agencies to better understand the impacts of increased recycling of SAR water and groundwater pumping on SAR flows and rising groundwater and their potential impacts to interconnected surface water and riparian vegetation.

Our detailed comments are presented below, but in general, our comments can be summarized as follows:

1. Additional data needs to be obtained in the north end of the Temescal Basin and Prado Basin to adequately characterize the interconnection of surface water and groundwater and establish the appropriate sustainability criteria and minimum thresholds.
2. The Temescal Basin GSA needs to closely coordinate with adjacent upstream groundwater basins, such as the Chino Basin, to ensure that their groundwater management activities do not create undesirable results in the Temescal Basin, particularly in the area of interconnected surface water and groundwater.

OCWD provided prior comments on the Temescal Basin GSP, Draft Plan Area, Sept. 2020. These comments are presented in Attachment A for completeness.

OCWD is providing initial comments on the Draft GSP in this letter and may follow up with additional comments during the public review period after the GSP is submitted to DWR.

The Regional Water Quality Control Board's Basin Plan defines the 'Prado Basin Management Zone'. It is defined as follows in the Regional Board's Basin Plan:

> The Prado Basin Management Zone is generally defined by the 566-foot elevation above mean sea level. It extends from Prado Dam up Chino Creek, Reach 1A and 1B to the concrete lined portion near the road crossing at Old Central Avenue, up the channel of Mill Creek (Prado Area) to where Mill Creek becomes named as Cucamonga Creek and the concrete-lined portion near the crossing at Hellman Road, up what was formerly identified as Temescal Creek, Reach 1A (from the confluence with the Santa Ana River upstream of Lincoln Avenue) (this area is indistinguishable because of shifting topography and is now considered a part of the Prado Basin Management Zone), and up the Santa Ana River, Reach 3 to the 566-foot elevation (just west of Hamner Avenue). The Prado Basin Management Zone encompasses the Prado Flood Control

> Basin, which is a created wetlands as defined in this Plan (see the discussion of wetlands elsewhere in this Chapter). Orange County Water District's wetlands ponds are also located within the Prado Basin Management Zone.

OCWD, the Army Corps of Engineers and the United States Fish and Wildlife Service commonly refer to the reservoir area behind Prado Dam, up to elevation 566 feet, as 'Prado Basin'. In these comments, we will refer to the area using the terminology in the Regional Board's Basin Plan – as the 'Prado Basin Management Zone' or PBMZ.

Page ES-8, Sustainable Management Criteria. In this section, "The Minimum Threshold for depletion of interconnected surface water is the amount of depletion that occurs when the depth to the water along the southern edge of the Prado Wetlands is greater than 15 feet for a period exceeding one year." Later in the GSP, it is stated that this is an initial value subject to change as more data is collected. Based on the limited data available, this should be considered a starting point to be refined as the large existing data gaps in the northern part of the Temescal Basin and the PBMZ are filled. Additionally, the minimum threshold should be linked to impacts on interconnected surface water and groundwater, such as adverse impacts on riparian vegetation.

Page 2-25, Section 2.8.5, Neighboring Basin Coordination. We are glad to see that Chino Basin is included in coordination and data sharing. The Chino Basin is adjacent to the Temescal Basin, and thus it is important that the Temescal Basin GSA monitor conditions in the Chino Basin to ensure they do not cause undesirable results in the Temescal Basin, particularly with respect to the interconnection of surface water and groundwater. OCWD provided comments on this issue and others during the public participation process, which are documented on pages 627-628.

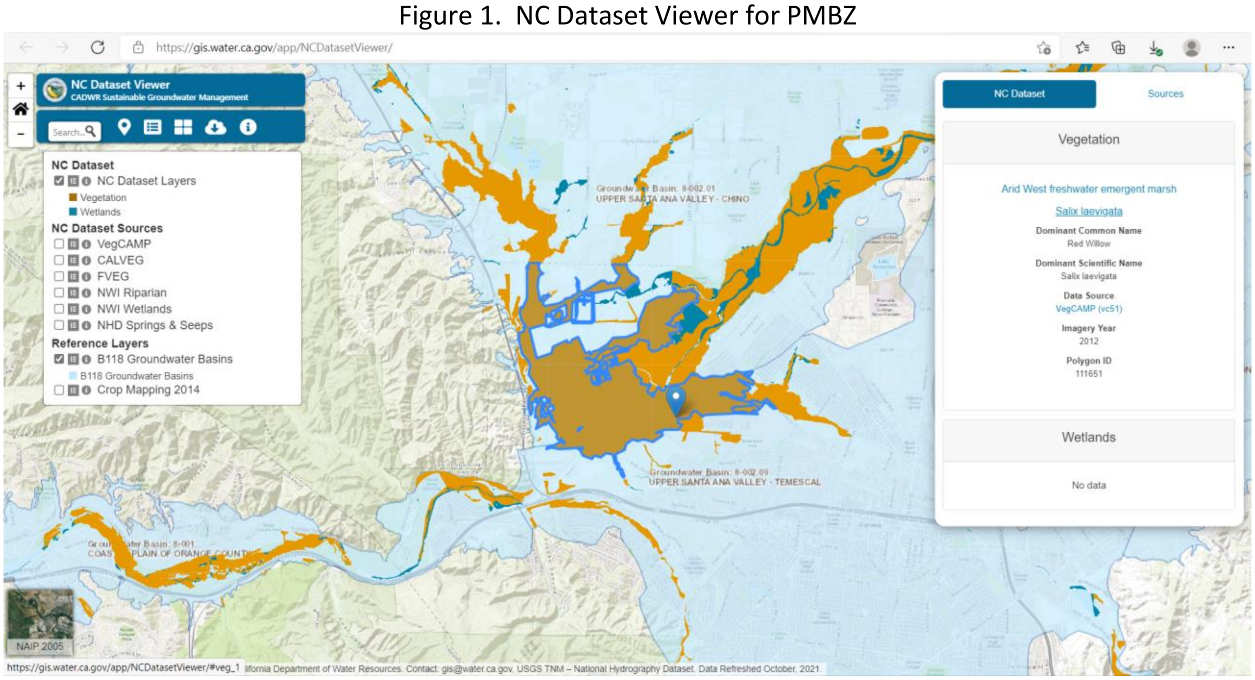
Page 4-12. Section 4.6.4 Monitoring Networks. We suggest that OCWD and other agency wells are included in the PBMZ to the Monitoring Network. OCWD is in the process of installing more than a dozen shallow monitoring wells in the PBMZ to provide more information on shallow groundwater conditions. These wells will be critical in understanding how groundwater management of the Chino and Temescal Basins impacts interconnected surface water and groundwater dependent ecosystems in the PBMZ.

Page 4-15. Section 4.10.1, Stream Flow Measurements. In the discussion of stream flow measurements on Temescal Creek as measured by the USGS gage at Main Street in Corona, CA (Gage No. 11072100), only recent data from 2012 to present is shown (Figure 4-18). In contrast, historical data for the outflow from Prado Dam from 1949 to present is shown. All available historical data from 1980 to present for the Temescal Gage at Main Street is shown in Figure 21 in Attachment B. It is important to note that a noticeable decline in minimum flows is noted in the mid-2000s and has been very low over the past decade. These reductions in flow are due to reduced discharges of treated wastewater and perhaps other factors and has adversely impacted the quantity and quality of riparian habitat in Temescal Creek. OCWD staff biologists reviewed historical aerial photographs and have prepared a summary of the changes noted since 1939, which is presented in Attachment B. This historical summary indicates that the quantity and quality of habitat in the lower reaches of Temescal Creek rapidly declined starting in approximately the mid-2000s. This area remains a good candidate to restore habitat and ecological health provided there was sufficient water supplies.

Page 4-15. Section 4.10.2, Depth to Groundwater. In this section, it is acknowledged that "available data are of limited use for this purpose due to insufficient vertical and geographic coverage." As mentioned above, OCWD has installed multiple new shallow monitoring wells and is the process of constructing additional monitoring wells in the PBMZ that will be critical to understanding interconnected surface water and groundwater in the north end of the Temescal Basin. We look forward to further development by the Temescal Basin GSA of the understanding of the interconnection of surface water and groundwater using data from OCWD wells, wells installed by the Temescal Basin GSA, and well installed by other agencies.

Page 4-17. Section 4.10.3, Riparian Vegetation. This section contains little information about the lower reach of Temescal Creek. This lower reach was very productive until the mid-2000s, when surface flows were reduced. See comments on Section 4.10.1, Stream Flow Measurements and Attachment B for more information on the history of vegetation in the lower reach of Temescal Creek. Section 4.10.3 also needs additional discussion of riparian vegetation in the PBMZ, in the area in and around the Corona Airport. Section 4.10.3 should identify the number of acres of riparian vegetation within the PBMZ (generally speaking the area below ground elevation 566 feet above mean sea level). A key source of data that should be included and shown below (Figure 1) is data from a joint effort of CA DWR and the Nature Conservancy to map areas referred to by DWR as 'natural communities commonly associated with groundwater ([NC Dataset Viewer (ca.gov)](https://gis.water.ca.gov/app/NCDatasetViewer/)).

Figure 1. NC Dataset Viewer for PMBZ



Page 4-18 to-21. Section 4.10.4, Wetlands and Interconnected Surface Water. Surface water can now be temporarily impounded behind Prado Dam up to elevation 505 ft msl during the flood and non-flood seasons. This change was approved by the US Army Corps of Engineers in April 2021. Please make the appropriate changes to the text of this section.

This section addresses the wetlands/riparian habitat and interconnected surface water in the PBMZ and the north end of the Temescal Basin. Within this section, multiple indirect lines of evidence are presented in an attempt to show that the wetlands are sustained by surface flows and not groundwater. Clearly there are critical data gaps that need to be filled to adequately understand the interconnection of surface water and groundwater in the north end of the Temescal Basin and the PBMZ. The additional monitoring wells OCWD has and is installing will provide key data and should be utilized by the Temescal Basin GSA as it becomes available. In addition, the Integrated Santa Ana River Model (ISARM), that was used as part of the Habitat Conservation Plan (HCP), cannot be relied on in its current configuration within the PBMZ. Although the ISARM is a useful tool to evaluate watershed wide conditions, there are data gaps within the PBMZ that need to be filled in order to adequately calibrate the model to make it useful in understanding interconnected surface water and groundwater in the area. This may require the development of a PBMZ Sub-model that would include portions of the Temescal Basin

The draft GSP states:

> "The correlation of precipitation and river flow with Prado groundwater levels and the lack of correlation with groundwater pumping north and south of the wetlands indicates that the wetlands are primarily sustained by surface inflows."

Additionally, the draft GSP states:

> "The low importance of groundwater as a factor in managing Prado Wetlands is also implicit in the Upper Santa Ana River Habitat Conservation Plan (HCP) (ICF 2020)."

OCWD disagrees with these statements. The statement about the perceived lack of correlation with Prado groundwater levels and groundwater pumping north and south of the wetlands should be revised to account for the following factors:

- Historical pumping north of the PBMZ in the Chino Basin may not be of sufficient magnitude to induce observable historic changes in groundwater elevation in the PBMZ. This is particularly the case since there have been some changes in overall pumping in the southern portion of the Chino Basin as agricultural-related groundwater production has declined (see for example the report '2013 Chino Basin Groundwater Model Update and Recalculation of Safe Yield Pursuant to the Peace Agreement', prepared by Wildermuth Environmental Inc for Chino Basin Watermaster, October 2015).
- The ability to observe changes in groundwater elevations in the PBMZ and relate changes to a particular factor like pumping can be obscured or made more complicated to detect due to recharge of groundwater from surface water.
- There is an overall lack of sufficient historical groundwater elevation data on the eastern side of the PBMZ, such as near the Corona Airport; this lack of sufficient data restricts or limits the ability to reach definitive conclusions regarding the impacts of pumping on groundwater levels.
- Surface water and groundwater are connected in the PBMZ and also along the Santa Ana River upstream of the PBMZ. Surface water flow in the SAR and its tributaries upstream of the PBMZ and surface flow into the PBMZ help support groundwater levels as surface water flows recharge the shallow groundwater system.
- The flow rate in the Santa Ana River and its tributaries such as Temescal Creek and Chino Creek are projected to decline in the future due to water recycling, stormwater capture, and other factors. As described in the Draft EIR for the Upper Santa Ana Habitat Conservation Plan (HCP), flows in the SAR reaching the PBMZ are estimated to decline in the low flow period (summer to early Fall) to approximately 35 to 40 cubic feet per second. With decreased flow in the Santa

> Ana River and its tributaries, groundwater levels in the PBMZ are anticipated to decline in the future. Under these future conditions, groundwater pumping may have a greater impact on groundwater levels in the PBMZ.

Regarding the state perceived low importance of groundwater as a factor in managing Prado Wetlands and information in the Upper Santa Ana River HCP, OCWD submitted extensive comments on the draft EIR for the HCP. These comments have not yet been addressed in writing and the EIR for the Upper Santa Ana HCP has not been certified. OCWD's comments on the draft EIR included several issues related to groundwater levels and riparian vegetation in the PBMZ. Additionally, the Upper SAR HCP public review draft document (May 2021) states:

> "The Upper Santa Ana River Sustainable Resources Alliance (Alliance) would create an account within SARCCUP, or other conjunctive use program, to purchase water that would be used to supply environmental flow. Alternatively, additional discharge from the aforementioned WWTPs could be purchased by the Alliance to provide supplemental flow."

Provision for supplemental flows to sustain environmental resources is included in the proposed HCP to account for uncertainty in model projections and potential impacts that may occur. The supplemental flows, if needed, would help recharge groundwater and support groundwater levels. It is not appropriate to state or imply that the HCP contains evidence that groundwater is of low importance in managing environmental resources such as riparian vegetation in the PBMZ.

A portion of the PBMZ is within the Temescal Basin. The GSP should identify the number of acres of the PBMZ that are within the Temescal Basin.

Page 5-19. Section 5.7.2.4, Riparian Evapotranspiration. The draft report says, "These calculations are applied at model cells within the Prado Wetlands where aerial photographs indicate the presence of potential riparian vegetation." The word 'potential' should be removed from this sentence. The number of acres of riparian habitat should be identified. There is clear evidence of riparian habitat in the portion of Temescal Basin within the PBMZ and there is also evidence that the riparian vegetation is dependent on interconnected surface water and groundwater. Attachment B discusses how riparian vegetation was negatively impacted when surface flows declined in the lower portion of Temescal Creek, within the PBMZ.

Page 6-4. Section 6.1, Summary of Sustainable Management Criteria. In this section, "The minimum threshold for depletion of interconnected surface water is defined as the historical minimum water levels (maximum depth to water) in shallow monitoring wells in the southern Prado area, where these shallow water level declines are correlated with Temescal Basin pumping and/or water levels."

First of all, this minimum threshold does not meet the definition established in Section 354.28(c)(6) of the Regulations, which states that "The minimum threshold for depletions of interconnected surface water shall be the rate or volume of surface water depletions caused by groundwater use that has adverse impacts on beneficial uses of the surface water and may lead to undesirable results" (CCR, 2016). Minimum thresholds only apply to the interconnected stream reaches.

The PBMZ has Beneficial Uses identified in the Regional Water Quality Control Board's Basin Plan. The Beneficial Uses identified for the PBMZ include 'WILD' and 'RARE'. 'WILD' is defined in the Regional Board's Basin Plan as:

> Wildlife Habitat (**WILD**) waters support wildlife habitats that may include, but are not limited to, the preservation and enhancement of vegetation and prey species used by waterfowl and other wildlife.

'RARE' is defined as:

> Rare, Threatened or Endangered Species (**RARE**) waters support the habitats necessary for the survival and successful maintenance of plant or animal species designated under state or federal law as rare, threatened or endangered.

The PBMZ contains wildlife habitat for the least Bell's vireo, which is an endangered species identified by the US Fish and Wildlife Service. The US Fish and Wildlife Service has also identified critical habitat for the least Bell's vireo, and the PBMZ includes area with this designated critical habitat. Additionally, the RARE beneficial use occurs in the PBMZ by virtue of nest locations of the least Bell's vireo occurring in the PBMZ. As a result, the minimum threshold needs to consider not only the potential changes in surface water depletions caused by groundwater pumping and or management actions, but also impacts to the beneficial uses in the PBMZ.

Secondly, no data are presented to document what the "historical minimum levels" are. As noted in prior comments, there are data gaps in the northern Temescal Basin and PBMZ that need to be filled. As such, it is not possible to establish a minimum threshold until these data gaps are filled.

Finally, because the Temescal Basin is hydrologically connected to the Chino Basin and other basins, it is not possible to isolate the impacts of pumping in adjacent basins from those in the Temescal Basin. This is why it is critical that the Temescal Basin GSA monitor and coordinate with adjacent basins to ensure that their actions do not cause or contribute to undesirable results in the Temescal Basin.

Page 6-31. Section 6.6.6.1, Description of Measurable Objectives. Measurable objectives are presented for TDS and Nitrate. While we appreciate that the TDS of basin outflows is included, other constituents of concern should also be included. There are some constituents of concern that may have Maximum Contaminant Levels (MCLs) established in the future that may require additional actions to reduce concentrations in outflow to the Orange County Groundwater Basin, including stormwater.

Page 6-32 to 6-33. Section 6.6.2.1, Surface Water Users. Similar to Section 4.10.4, multiple lines of indirect evidence are used to imply that groundwater discharge to the PBMZ is not significant and not expected to decrease significantly in the future. As stated above, additional data needs to be collected and the ISARM needs to be further developed to better understand interconnected surface and groundwater interactions in the north end of the Temescal Basin and the PBMZ.

Page 6-33, Section 6.7.2.3, Riparian Vegetation. The conclusion that the wetlands are primarily sustained by surface water and not groundwater is based on Section 6.6.2.1. See comments on this section above.

Page 6-33. Section 6.7.3, Definition of Undesirable Results. This definition should include potential impacts to groundwater dependent ecosystems or natural communities commonly associated with groundwater. OCWD has been managing riparian vegetation in the PBMZ for many years to support the endangered least Bell's Vireo. Through these actions, the PBMZ has become one of the most heavily populated areas of least Bell's Vireo in California. Any reduction in the quality of riparian habitat caused by impacts to surface/groundwater interactions could also affect least Bell's Vireo habitat.

Page 6-34. Section 6.7.6, Minimum Threshold. We are glad to see that it is acknowledged that there are data gaps and uncertainties regarding establishing the minimum threshold of depth to water exceeding 15 feet for more than one year. This threshold should be refined based on Section 354.28(c)(6) of the Regulations and OCWD comments on Section 6.1 above.

Page 6-35. Section 6.7.6.2, Effect of Minimum Threshold on Sustainability of Adjacent Areas. A key source of water supplies to the Coastal Plain of Orange County Groundwater Basin (Basin 8-1) is the baseflow of the Santa Ana River (SAR). SAR baseflow is a combination of surface flow and rising groundwater within the PBMZ. Any reduction in rising groundwater will result in reduced baseflow to Basin 8-1. It is unclear what evidence would be used to quantify the "historical minimum" of groundwater discharge to the SAR in the PBMZ. As mentioned in prior comments, there are significant data gaps with respect to the interconnection surface water and groundwater that need to be filled.

Page 6-36. Section 6.7.6.5, How the Minimum Threshold will be Monitored. OCWD supports the installation of additional wells and filling data gaps. We look forward to coordinating with the Temescal Basin GSA in this effort and further refining the Minimum Threshold for the interconnection of surface water and groundwater (see prior comments).

Attachment A

OCWD Comments on: Temescal Subbasin Groundwater Sustainability Plan, Draft Plan Area, September 2020.

OCWD Comments on: Temescal Subbasin Groundwater Sustainability Plan, Draft Plan Area, September 2020.

The Orange County Water District (OCWD) is responsible for managing the Orange County Groundwater Basin, which is part of the Coastal Plain of Orange County Groundwater Basin (DWR Basin 8-1). In 2017, OCWD, along with partner agencies, submitted an Alternative to a Groundwater Sustainability Plan (Alternative) to the Department of Water Resources (DWR) to show that Basin 8-1 had been sustainably managed over the last 10 years. DWR approved the Alternative on July 17, 2019.

OCWD thanks the City of Corona for reaching out and including OCWD in the process of developing the Temescal Subbasin Groundwater Sustainability Plan (GSP or Plan). Not only is the Temescal Subbasin adjacent to Basin 8-1, Coastal Plain of Orange County Groundwater Basin, OCWD owns and manages wetlands and a large area of riparian habitat behind Prado Dam. The health of this riparian habitat is dependent on surface flows of the Santa Ana River (SAR) and its tributaries as well as rising groundwater. A number of studies are ongoing by multiple agencies to better understand the impacts of increased recycling of SAR water and groundwater pumping on SAR flows and rising groundwater with respect to potential impacts upon riparian vegetation. We have listed some of these studies in our comments.

Specific Comments on the Temescal Subbasin GSP, Draft Plan Area, Sept. 2020 are as follows:

Page 2-3, Section 2.2.6. Please add a description of the Chino Basin Watermaster and other agencies that manage groundwater in adjacent groundwater basins. Even though they do not have jurisdiction within the Temescal Subbasin, the Chino Basin (Upper Santa Ana Valley Basin 8-002.01) is adjacent and upgradient of the Temescal Subbasin. Groundwater management actions taken by the Chino Basin Watermaster and other agencies upgradient of the Temescal Subbasin can affect groundwater conditions within the subbasin. Although a formal coordination agreement is not required, it is important that these agencies know that they must carefully consider any actions that could affect groundwater conditions in the Temescal Subbasin.

Page 2-6, Table 2-1. It is good to see that native vegetation is shown as a significant user of groundwater (18%). Please include a description of this water use and location as a separate subsection in Section 2.4. Also provide information on how the 18% figure was calculated, including assumptions, acreages, etc.

Page 2-8, Section 2.4, Water Resources Monitoring Programs.

Given the significant water use by native vegetation and significant natural resources present in the Prado Basin, we suggest that you add Natural Resources to the list of water resources monitoring categories.

We suggest that you add the following monitoring programs in the appropriate category. We have put a suggested category (or categories) in parentheses.

1. Groundwater Monitoring in Prado Basin by Western Riverside County Regional Wastewater Authority. (Groundwater Levels)
2. Natural resources and groundwater monitoring in Prado Basin by OCWD. (Groundwater Levels, Groundwater Quality, Surface Water Quality, Natural Resources (new category))

3. Chino Basin Watermaster/Inland Empire Utilities Agency Monitoring as part of Prado Basin Habitat Sustainability Committee. (Groundwater Levels, Groundwater Quality, Natural Resources (new category))
4. Upper Santa Ana River Habitat Conservation Plan (HCP) and associated monitoring plans being managed by the San Bernardino Valley Municipal Water District (Valley District) with participation from multiple other agencies including OCWD. (Groundwater Levels, Surface Water Flow, Surface Water Quality, Natural Resources (new category)). Please note that to support the HCP, an Integrated Santa Ana River Model (ISARM) has been developed.

Page 2-24, Table 2-5. Under L), There is a significant amount of information to indicate there are groundwater dependent ecosystems present in Prado Basin and the Santa Ana River and tributaries to the SAR upstream of Prado Basin. Prado Basin is generally defined as the area behind Prado Dam up to elevation 566 feet mean sea level. The groundwater dependent ecosystems present within Prado Basin and Santa Ana River and its tributaries need to be carefully considered in the Plan.

Attachment B

Temescal Creek Riparian Habitat Timeline

Prepared by David McMichael, Biologist

Orange County Water District

December 2021

Temescal Creek Riparian Habitat Timeline

Prepared by David McMichael, Biologist

Orange County Water District

December 2021

Temescal Creek has long shown a tendency to grow a riparian belt especially as it nears its confluence with the Santa Ana River. Temescal Creek was protected from the scouring effect of the river hidden behind the Norco bluffs, which means riparian habitat would have been allowed to mature creating a perennial haven for wildlife. Aerials taken in 1939 and 1953 clearly show riparian trees growing thick along Temescal Creeks (Figures 1-2).

Figure 1. Temescal Creek and the Prado Basin in 1939

Figure 2. Temescal Creek and the Prado Basin 1953

This timelapse habitat study focuses on a portion of Temescal Creek that is not channelized. This natural setting is confined to a roughly 2 mile stretch from Lincoln Ave. downstream past to where it meets the Santa Ana River. Upstream of Lincoln Ave the creek is channelized. This concrete channel originates at Temescal Canyon Lake in the city of Corona. Two segments will be studied using aerial imaging, and observations from the ground. The first segment begins at Lincoln Ave. and continues down to Auburndale Street. The next segment will be area of the creek immediately upstream and downstream of Rincon St.

The segment immediately downstream of Auburndale St. will not be looked at due to the proximity of an earthen dike project which involved the removal of habitat. Multiple fires in this area also made habitat comparisons difficult. It should be noted that the habitat along this stretch has not regrown following the completion of this project and no recruitment has been noted here.

The area of Temescal Creek which joins with the Santa Ana River flood plain will also not be discussed due to the proximity of water from the river as well as several fire events. The Willow Forest in this area seems to be in optimum health and any alteration of species composition seems to be from the shifting nature of the river. When the river moves away (west) from the creek it's possible to find more Mulefat recruitment, but when the river flows south its common for there to be wetland species' such as Cattails. Water will often form ponds near the end of the Corona Airport runway.

1994

Habitat along Temescal Creek was generally good where water was available. Figure 3 indicates that creek bottom between Lincoln Ave. and Auburndale St. was lined with riparian trees with clumps of Mulefat immediately upslope of the creek. Ground observations from this period indicate that the Mulefat was established right up to the farmed fields on the south side of the creek. The darker clumps were Black Willows, Cottonwoods, and Arroyo Willows. There were and still are a few clumps of Eucalyptus on the site and Arundo donax is also present during this time mixed in the riparian.

The aerial at figure 4 indicates that the thick Willow Forest seen behind the Prado Dam has creeped up to Rincon Street an extended into the Corydon St. corner. Mulefat was common in the upland areas adjacent to and well away from the creek bed. Besides seasonal invasives such as Black Mustard other perennial non-natives such as Tamarisk and Arundo were seen only sporadically. They were not abundant along this segment of the creek.

Figure 3. 1994 Temescal Creek – Lincoln Ave. to Auburndale St.

Figure 4. 1994 Temescal Creek at Rincon St.

2003

Habitat conditions remain relatively unchanged in these 2003 aerials but key invasives such as Tamarisk are beginning to spread in Temescal as well as the entire Prado Basin (Figures 5-6). Tamarisk is a more xeric riparian species with deep root systems able to tap into deeper ground water sources. Mulefat is also becoming more common along the banks of the creek. Mulefat is a transitional riparian species which can exist at different elevational zones often growing alongside sage scrub patches upslope of riparian settings. Mulefat is more tolerant of dry conditions as it can monopolize lower ground water levels than Black Willows.

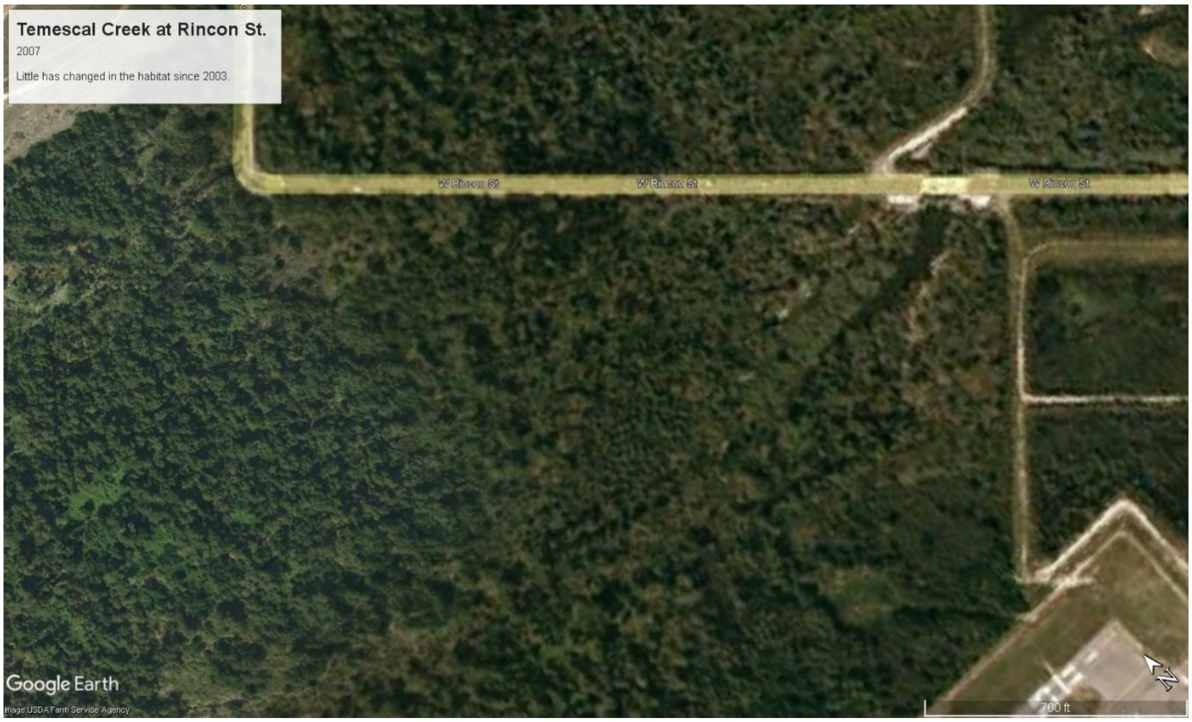
Figure 5. 2003 Temescal Creek – Lincoln Ave to Auburndale St.

Figure 6. 2003 Temescal Creek at Rincon St.

2007

Figure 7 shows that little changed along Temescal from 2003 to the end of 2007. There were some significant weather events in the basin such as the historic flood in 2004-2005 where 33.94” of rain fell over a relatively short period of time. This event caused destructive flooding in Prado Basin and resulted in a long pool retention time behind the dam. The rain year of 2005-2006 was a relatively average rain year with 11.53” of rain but the bulk of this came late in the season resulting in another long inundation period behind the dam. These subsequent inundation events should have had little impact on the habitat along Temescal Creek except in the lowest portion of the creek near the Santa Ana River. The final important weather impact happened in 2006-2007 when the area saw historic low rainfall at 3.37”. Drought conditions can be very damaging to riparian habitat but any sort of impactful damage to the habitat was not seen until 2009.

Figure 7. 2007 Temescal Creek at Rincon St.



2009

The aerials taken in 2009 showed a drastic shift in the disposition of the riparian habitat along Temescal Creek. The segment of Temescal Creek from Lincoln Ave. down to Auburndale St. showed significant loss of both Willow and Mulefat habitat (Figure 8). Much of the creek bottom banks still shows some Black Willows stands but many of the historic patches are now gone. Upslope of the creek where the Mulefat used to reside was also vacant save for some weedy annual species.

Figure 9 indicates that the Rincon St. segment of Temescal Creek is dramatically altered from previous aerials. The Black Willow Forest has retreated downstream and in its place non-native such as Perennial Pepperweed, and Tamarisk has begun to form monocultural stands. Mulefat is still present but competing with pepperweed in the upland sites. Channel scouring is evident as well which could have removed some of the riparian habitat during the previous year’s big rain events.

Figure 8. 2009 Temescal Creek- Lincoln Ave. to Auburndale St.

Figure 9. 2009 Temescal Creek at Rincon St.

2009-2021 Temescal Creek (Lincoln Ave.-Auburndale St.)

These aerials indicated that the habitat downstream of Lincoln Ave. further degraded during the 2009-2021 period. Further Black Willows disappeared and Mulefat continued to be uncommon over the entire site. No recruitment of native riparian species was noted during this period. Some Eucalyptus continue to reside at this site but most of the non-native species' seen further downstream are also absent from this stretch.

Figure 10. 2012 Temescal Creek – Lincoln Ave. to Auburndale St.

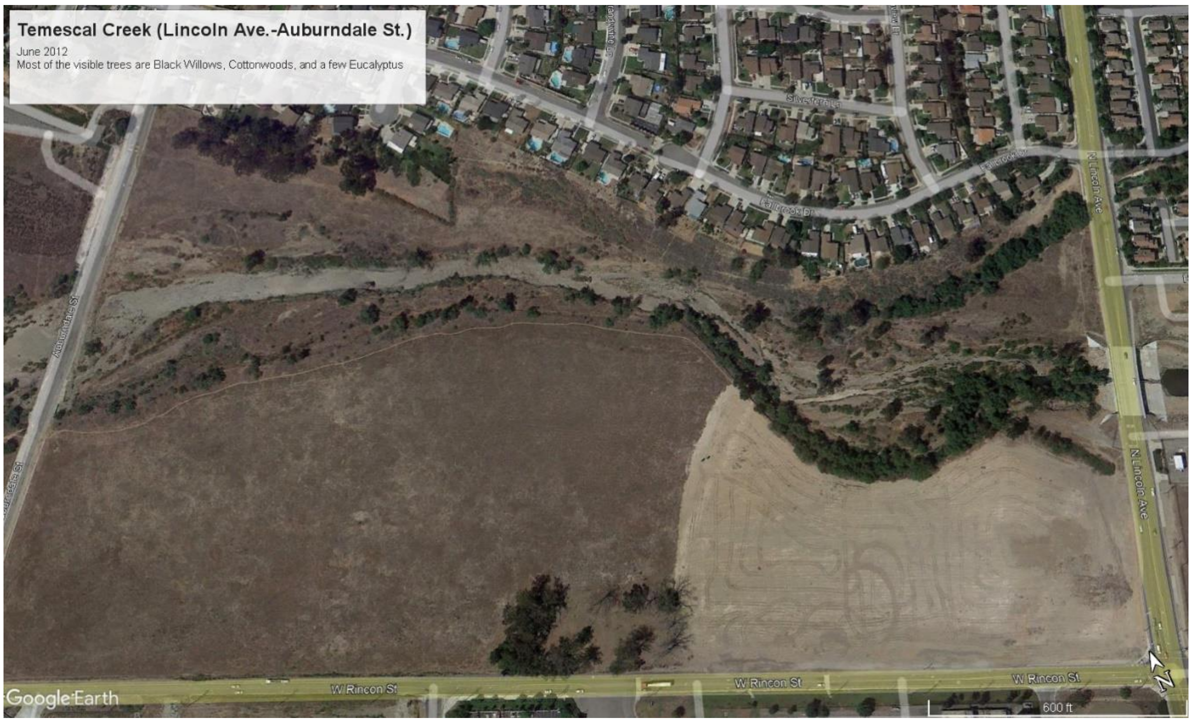
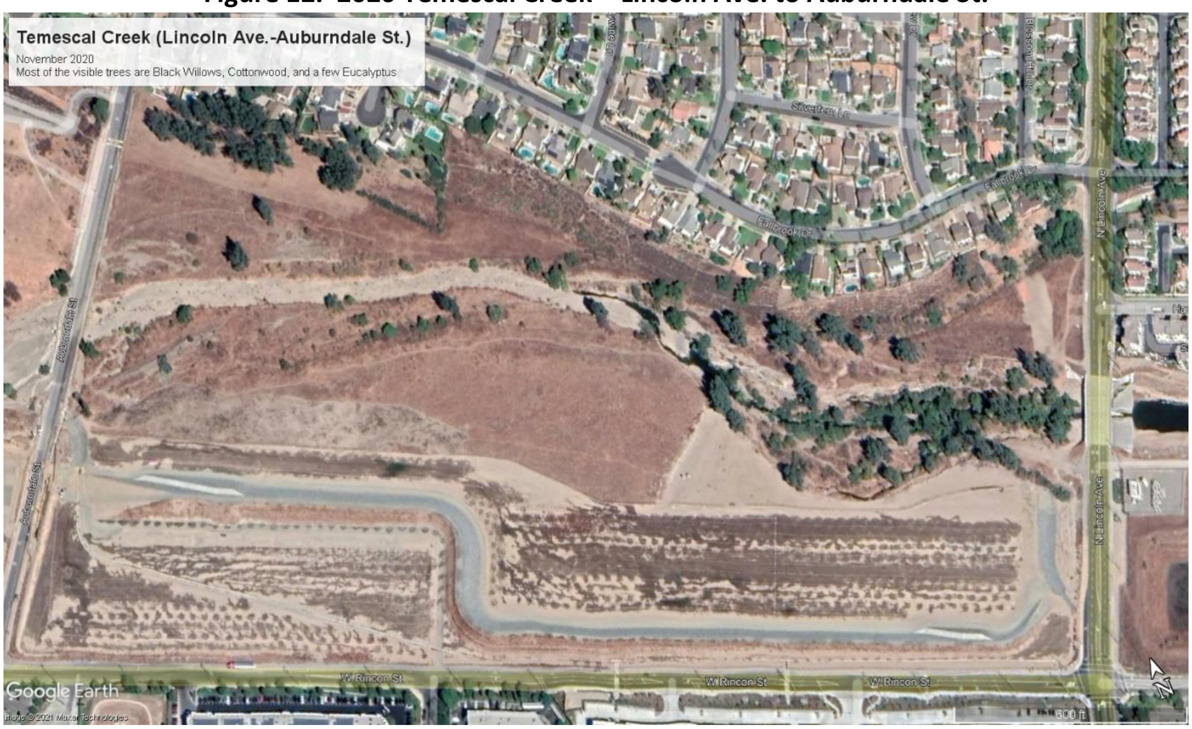


Figure 11. 2018 Temescal Creek – Lincoln to Auburndale St.

Figure 12. 2020 Temescal Creek – Lincoln Ave. to Auburndale St.



<u>**2014 Temescal Creek at Rincon St.**</u>

Figure 13 shows the continual retreat of Black Willows away from the Rincon St. area. Some patches continue to remain around the Corydon -Rincon curve but it's clear the Willows are disappearing from the area. Perennial Pepperweed and Tamarisk continue to plague the site and some of the upland patches of Mulefat appear to be in decline.

Figure 13. 2014 Temescal Creek at Rincon St.

2016-2017 Temescal Creek at Rincon St.

The invasive species were removed from the Rincon St. area in 2015-2016 and treatment continued until 2019. This included the physical removal of Arundo and Tamarisk but also the spraying of Perennial Pepperweed. The removal of the exotics facilitated the recruitment of Mulefat into this area Recruitment was primarily in those areas where Perennial Pepperweed was treated (Figures 14-15). There was little evidence of lasting recruitment by young Willows even during average rainfall years. Mulefat recruitment and habit transition to more xeric riparian species has been seen in other parts of the basin where drought stress and low ground water levels create conditions unfavorable to Black Willow growth. Mulefat have deeper root structure than Black Willows and other water dependent species. Mulefat continued to thin out in those areas that do not get flood irrigated during the winter.

Figure 14. 2016 Temescal Creek at Rincon St.

Figure 15. 2017 Temescal Creek at Rincon St.

<u>**2020-2021 Temescal Creek at Rincon St.**</u>

During 2020 and 2021 the encouraging growth and recruitment of Mulefat in the Rincon St. area has been halted and instead the evidence suggests that many Mulefat plants have begun disappearing and those that remain appear stunted and sporadic. The remaining mature Black Willow trees are persisting but there is still no recruitment of young willows and very little recruitment of Mulefat plants (Figures 16-17). There appears to be an influence from the Santa Ana River on the remaining Willow Forest where the constantly shifting course of the river often favors the Temescal creek area. The larger willows must be able to tap into ground water replenished by the river.

Figure 16. 2020 Temescal Creek at Rincon St.

Figure 17. 2021 Temescal Creek at Rincon St.

Least Bell's Vireo Distribution

Figure 18 suggests that least Bell's Vireo were previously widely distributed below Lincoln Ave, but Figure 19 suggests that in recent years Vireo have not stayed in those areas where the habitat is unsuitable for nesting success. Figure 20 shows the distribution of least Bell's Vireo in 2021. least Bell's Vireo is currently completely absent along Temescal Creek from Lincoln Ave. to Auburndale St.

Figure 18. Least Bell's Vireo Distribution 2007-2021

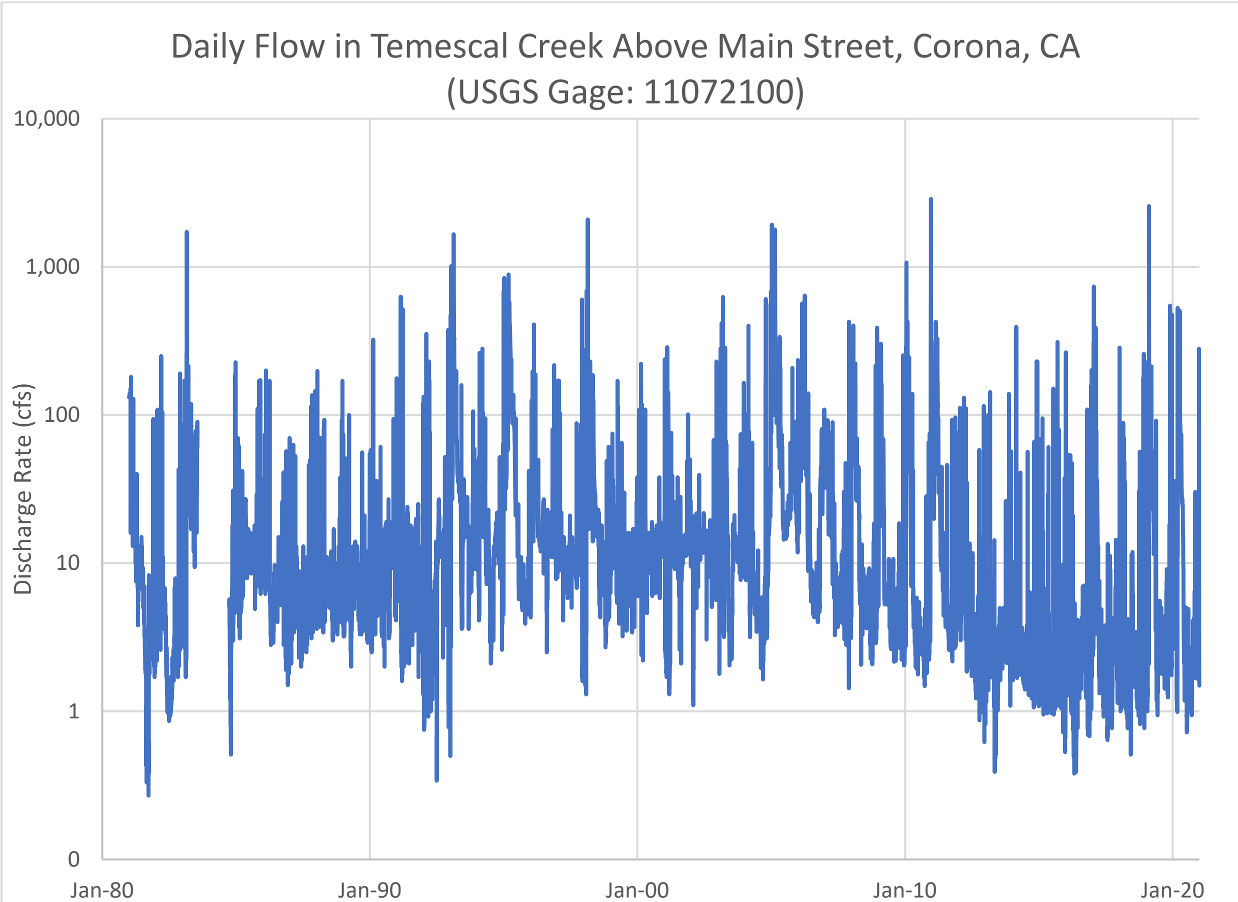
Figure 19. Least Bell's Vireo Territories 2019-2021

Figure 20. Least Bell's Vireo Territories 2021

Stream Flow Measurements

Figure 21 shows all the available daily measurements of streamflow in Temescal Creek at Main Street in Corona, CA, which is USGS Gage 11072100. What is important to note is the decline in the daily minimum flows that started in the mid-2000s and have been persistently at 1 cfs or less since 2012. These changes in flows correlate with the changes in vegetation described above.

Figure 21 Daily Flow in Temescal Creek at Main Street, Corona, CA



Conclusion

Aerial imagery of the downstream portion of Temescal Creek below Lincoln Ave. indicated that this portion of the Santa Ana River Watershed saw many decades of optimum growth and health of its riparian species', mainly Black Willow and Mulefat. These important riparian species provided refuge to many species of birds and wildlife including least Bell's Vireo and Southwestern Willow Flycatcher.

There is evidence that this portion of the watershed saw considerable dieback around 2009 but it's possible that this began earlier with subtle habitat transitional changes noted as early as 2003. The 2009 event is substantial but the inability of the habitat to recover and establish new trees and shrubs in later years shows a shift in the water regime. This condition can no longer sustain water dependent riparian species and may even exclude more xeric species. The further decline of Temescal Creek habitat will eventually exclude riparian nesting bird species entirely if the structure of the habitat cannot repair itself.

APPENDIX J

Temescal Groundwater Sustainability Plan Numerical Groundwater Model Documentation Report

Home Gardens
County Water District

TEMESCAL BASIN GROUNDWATER MODEL DOCUMENTATION REPORT

PREPARED FOR THE TEMESCAL GROUNDWATER SUSTAINABILITY PLAN

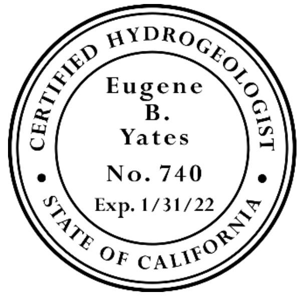
December 2021

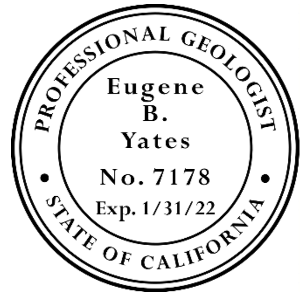
TODD GROUNDWATER

2490 Mariner Square Loop, Suite 215
Alameda, CA 94501
510.747.6920
www.toddgroundwater.com

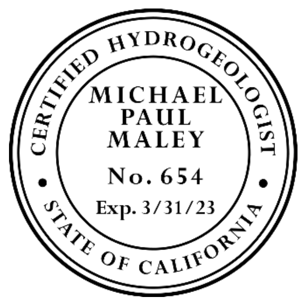
SIGNATURE PAGE

Gus Yates, PG, CHg
Senior Hydrologist
Todd Groundwater, Alameda, CA





Michael P. Maley, PG, CHg, CEG, PE
Principal Hydrogeologist
Todd Groundwater, Alameda, CA



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1. INTRODUCTION

The groundwater model was developed to support the Groundwater Sustainability Plan (GSP) for the Temescal Subbasin (Basin) of the Upper Santa Ana Valley Basin (Department of Water Resource [DWR] Groundwater Basin 8-002.09) and is prepared in accordance with Sustainable Groundwater Management Act (SGMA). For convenience, DWR Basin 8-002.09 (DWR 2016b) will be referred to as the Temescal Basin (Basin) in this memo.

1.1. SCOPE AND OBJECTIVE

SGMA effectively requires that groundwater modeling be used to demonstrate that a GSP will achieve sustainable basin operation. A previous model of the Temescal Basin model was updated and refined to simulate surface water and groundwater conditions for the entire Basin, update key parameters, match the DWR Basin boundary, and improve discretization, geologic layering and aquifer parameter distribution to reflect new information. The resulting model focuses on applicability to SGMA GSP regulations, including consistency with DWR Best Management Practices for surface water and groundwater modeling (DWR 2016a). This comprehensive groundwater model serves as a quantitative tool for computing Basin-wide water budgets and the effects of sustainability criteria and management actions.

1.2. SUMMARY OF PREVIOUS MODELS

A groundwater model of the Temescal Basin was previously developed to support development of the 2008 City of Corona Groundwater Management Plan (Todd and AKM, 2008). That model did not cover the entire extent of the Basin as defined by DWR and simulated the period from 1990 through 2004. However, information regarding bedrock elevations, aquifer characteristics, layering, inflows and outflows served as a starting point for constructing the new model.

The development of the Temescal Basin Model utilized information from groundwater model from adjacent basins. The Model developed for this GSP also includes a portion of the Chino Basin to better simulate the interactions with the adjoining basin and assess conditions in the Prado wetlands area. Information for the northern part of the model flow domain in the Chino Basin was based on documentation of the Chino Basin groundwater model o developed in 2015 and has been updated several times since then (WEI, 2015 2020). In the vicinity of the Arlington Gap, a groundwater model of the Riverside-Arlington Basin, which simulates conditions on the eastern side of the Arlington Gap, was used to help understand groundwater flow through Arlington Gap into the Temescal Basin (Geoscience, 2009, WRIME, 2010, 2011).

2. BASIN GEOLOGY AND STRUCTURE

The following summarizes the hydrogeologic conceptual model (HCM) and groundwater conditions from the main body of the Temescal Basin GSP report. The HCM and groundwater conditions create a foundation for the technical aspects of the Basin's hydrogeology necessary for model development. This section references figures and text from **GSP Sections 3 and 4**.

2.1. TEMESCAL BASIN

The Temescal Basin covers approximately 23,500 acres or 37 square miles of the southwest part of upper Santa Ana Valley in western Riverside County as shown on **Figure 1**. The following summarizes the physical description of the Temescal Basin and surrounding areas as described in the GSP.

2.1.1. Groundwater Basin

The Basin covers approximately 23,500 acres or 37 square miles of the southwest part of upper Santa Ana Valley in western Riverside County (**Figure 1**). The Basin is located between the Santa Ana Mountains to the west and a lower, parallel range of hills to the east.

The Basin has connection four other groundwater basins or subbasins defined by DWR Bulletin 118 (DWR 2016b). The Basin is separated from the Bedford-Coldwater Subbasin of the Elsinore Groundwater Basin (DWR Basin No. 8-004.02) to the south by a groundwater divide Eagle Canyon and Bedford Canyon. The Basin is connected to the east by a narrow body of alluvium through Arlington Gap to the Riverside-Arlington Subbasin of the Santa Ana Valley Groundwater Basin (DWR Basin No. 8-002.03). To the north, the Basin adjoins the Chino Subbasin of the Santa Ana Valley Groundwater Basin (DWR Basin No. 8-002.01) along a line that approximately follows the Santa Ana River. This boundary is permeable, and groundwater can flow in either direction between the two basins depending on their respective groundwater levels. To the west, the Basin has a narrow connection along the Santa Ana River with the Coastal Plain of Orange County Groundwater Basin (DWR Basin No. 8 001).

SGMA allows a groundwater basin to be subdivided into management areas if it facilitates sustainable management in areas within the Basin where groundwater conditions or water use and supplies are distinctly different. The Temescal Basin has not been divided into management areas; the GSP treats it as a single unit.

2.1.2. Physiography

Ground surface elevations at the surface of the Basin slope northward toward the Santa Ana River at a slope of 200-300 feet per mile. Elevations range from approximately 470 feet above mean sea level (msl) at the base of Prado Dam to approximately 1,500 feet above msl to the south (see **GSP Figure 3-1**). The tributary watersheds reach up to approximately 4,000 feet msl at the highest peak in the Santa Ana Mountain watersheds west of the Basin. Watersheds east of the Basin are significantly lower in elevation and rise only to about 1,600 feet.

2.1.3. Hydrology

The Basin covers a portion of the Santa Ana River watershed. **Figure 2** shows the locations of the Santa Ana River, Temescal Wash, Prado wetlands area, minor streams and tributary watersheds to the

Temescal Basin. The Santa Ana River roughly follows the northern edge of the Basin, flowing from east to west. Prado Dam impounds the river near the western edge of the Basin, where the river enters a canyon that passes through the Santa Ana Mountains to the coastal plain in Orange County. The largest surface waterway in the interior of the Basin is Temescal Wash, which originates near Lake Elsinore and flows through the Bedford-Coldwater Subbasin before entering the southern edge of the Temescal Basin. It continues north through the City of Corona and discharges into the Prado wetlands. A number of small streams enter the Basin from watersheds in the Santa Ana Mountains. Flow in all of them is ephemeral, and with the exception of Wardlow Wash at the northwest corner of the Basin, all of the small creek channels are lined beginning 1,500 to 6,100 feet downstream of the point where they enter the Basin. The Temescal Wash channel is also cement lined along about half of its length between the Basin boundary and the Santa Ana River.

2.2. REGIONAL GEOLOGY

The Basin is located within one of the structural blocks of the Peninsular Ranges of Southern California. The Basin occurs in a linear low-lying block, referred to as the Elsinore-Temecula trough, between the Santa Ana Mountains on the west and the Perris Plain on the east (Todd and AKM 2008). The trough extends from Corona southeast approximately 30 miles and was formed along an extensive northwest-southeast trending fault zone including the Elsinore, Chino, and related faults.

2.2.1. Geologic Units

The oldest rocks in the Basin crop out at the foot of the Santa Ana Mountains. These units are composed principally of volcanic (including the Santiago Peak Volcanics) and metamorphic rocks (including the Bedford Canyon Formation) of Jurassic and Cretaceous age. A thin rim of younger sedimentary units of Tertiary age also crops out along the mountain front generally lying between the Elsinore and Chino faults. This zone of sedimentary units broadens to the north and contains numerous mapped formations of Cretaceous and Tertiary age. The northeastern side of the valley is flanked primarily by granitic rocks of Cretaceous age. Erosion of these units has filled in the trough over time resulting in quaternary-age alluvial fan, channel, and other deposits making up the permeable portions of the Basin (USGS 2004, 2006).

The geologic map (see **GSP Figure 3-5**) shows the distribution of these units in the Basin (USGS 2004, 2006). The main surficial deposits on the floor of the Basin include younger and older alluvial fans deposited from the erosion of volcanic rocks and Bedford Canyon Formation to the west. These units prograde across the Basin to the northeast and are truncated by channel deposits along Temescal Wash.

2.2.2. Faults

The Basin was formed along an extensive northwest-southeast trending fault zone including the Elsinore, Chino, and related faults. The Elsinore and Chino fault zones bound the Basin on the west and trend along the mountain fronts. The Elsinore Fault Zone extends approximately 200 km from Baja California north to the Corona area. It passes through the western margin of the Basin. Some fault traces are inside the Basin and may function as partial barriers to groundwater flow (see **GSP Figure 3-5**).

2.2.3. Definable Basin Bottom

The Basin bottom is defined by bedrock, which is shallow around the perimeter and deep in the center. Depth to bedrock ranges in depth from 10 feet to approximately over 1,000 feet (see **GSP Figure 3-11)**.

The greatest Basin thickness is in the central-west part of the Basin (see **GSP Figure 3-7**). The formation of a trough along the Elsinore-Chino Fault zone is indicated by the asymmetric basin geometry.

Bedrock is much shallower in the eastern portion of the Basin, however there is a slight deepening near the Arlington Gap (see **GSP Figure 3-8**). Here, unconsolidated sediments are approximately 250 feet thick. This area is interpreted to have been eroded by a branch of the ancestral Santa Ana River. The Basin is only about 100 feet thick in the Norco area but over 1,000 feet thick beneath the Santa Ana River, where the Basin adjoins the Chino Basin.

2.3. GROUNDWATER CONDITIONS

Understanding the groundwater conditions is important in development of the surface water and groundwater models. A summary of the discussion of the groundwater conditions and water balance based on the model results is provided in **GSP Sections 4 and 5** is provided below.

2.3.1. Basin Aquifer

Three aquifers provide water supply to wells within the Basin. These include the Channel Aquifer, the Alluvial Fan aquifers and the Sandstone Aquifer (Todd and AKM 2008). Of these three aquifers, the Channel Aquifer is the only principal aquifer as it the most productive aquifer and provides most of the groundwater supply in the Basin. The Alluvial Fan and Sandstone Aquifers have historically been used to a lesser extent than the principal aquifer. The combined Alluvial Fan and Sandstone Aquifers are referred to as the Secondary Aquifers within the Basin.

The Channel Aquifer is the principal aquifer in the Basin. This aquifer is a package of relatively homogeneous and highly permeable sands up to 200 feet thick that have been encountered in many of the Corona wells in the northern half of Basin. This sand package is interpreted as channel deposits of an ancestral arm of the Santa Ana River and, as such, has been referred to as the Channel Aquifer (Todd and AKM 2008). The alignment of the aquifer suggests that an ancestral river channel had entered the Basin at Arlington Gap, eroding the sedimentary units and possibly older alluvial fan deposits in the area. Permeable channel sands were deposited in the eroded channel over time. From the Arlington Gap, the Channel Aquifer trends northwest toward Prado Dam.

The Alluvial Fan Aquifer is composed of both older and recent alluvial fans that have been deposited through time along the mountain front on the western edge of the Basin. These fans have prograded across the Basin from west to east (see **GSP Figure 3-5**). Although these deposits are relatively thick, the entire unit is heterogeneous and cannot be considered one single aquifer. Rather, sand lenses within the deposits collectively form the Alluvial Fan Aquifers. Lithologic data from wells are insufficient to map out the extent of the aquifers or characterize the deposits. Limited data indicate relatively fine-grained textures throughout much of the area, especially with depth (Todd and AKM 2008).

The Sandstone Aquifer is composed of the older sedimentary units underlying the alluvial Basin that provide sufficient well yields to categorize them as aquifers. Although generally grouped with other bedrock units, the subsurface sedimentary rocks of Tertiary age in the northeast Basin area contain sandstone layers that are screened in several Corona wells. Due to the limited production, small areal extent, increasing depths, and relatively low permeability in most areas, the Sandstone Aquifer is not considered a primary source of water supply.

2.3.2. Basin Boundaries

The Temescal Basin as defined by DWR is bounded on the west by the Santa Ana Mountains and the east by low-lying El Sobrante de San Jacinto and La Sierra hills. The northeastern arm of the Temescal Basin, referred to as the Norco area, consists of relatively low permeability alluvium and bedrock residuum flanked on the east and west by bedrock outcrops. The Basin is connected to four adjacent groundwater basins (**Figure 1**) defined by DWR Bulletin 118 (DWR 2016b). These include:

- The boundary with the Chino Basin (DWR Basin No. 8-002.01) to the north is generally marked by the Santa Ana River and a series of low-lying hills in the Norco area.
- Groundwater from the Riverside-Arlington Basin (DWR Basin No. 8-002.03) flows into the Basin through the Arlington Gap. The Arlington Gap is a narrow restriction along the eastern side of the Basin north of the Temescal Wash.
- The boundary with the Coastal Plain of Orange County Basin (DWR Basin No. 8-001) is a narrow canyon where the Santa Ana River exits the Temescal Basin to the Coastal Plain of Orange County Basin.
- The southern boundary of the Basin is the Bedford-Coldwater Subbasin of the Elsinore Groundwater Basin (DWR Basin No. 8-004.02). The boundary is located at the Bedford Canyon. Generally, there is little to no groundwater flow along this boundary at the eastern portion where it borders the alluvium along the Temescal Wash.

The remaining lateral boundaries of the Basin are formed by contacts with bedrock units. The entire western Basin boundary and much of the eastern boundary of the Basin are contacts between Basin sedimentary units and upland bedrock outcrops (Todd and AKM 2008).

2.3.3. Recharge and Discharge Areas

Recharge to the Basin occurs primarily from stream percolation, wastewater discharge and deep percolation of rainfall and irrigation water, and to a lesser extent from pipe leaks and subsurface inflow from bedrock areas and other basins, as shown in **GSP Table 5-4**. Recharge from streams occurs along the unlined reach of Temescal Wash above Temescal Lake and the unlined reaches of tributary streams along the western edge of the Basin. Recharge associated with wastewater occurs when treated wastewater is discharged to ponds. Deep percolation from irrigation includes historical agricultural irrigation as well as current urban irrigation.

Large amounts of runoff from the mountains flows into channels and the shallow subsurface at the edges of the Basin and then into and through the Basin. Stream flows are flashy, and during brief high-flow events, the amount of stream recharge is limited by the percolation capacities of the unlined channel reaches upstream of the stormwater detention basins. The creek channels are lined with cement downstream of the detention basins.

Return flows are those portions of applied water (e.g., landscape irrigation) that are not consumed by evapotranspiration and hence return to the groundwater system through deep percolation or infiltration. Return flows associated with urban, industrial, and agricultural water uses all have the potential to contribute to recharge to the Basin (Todd and AKM 2008).

Discharge from the Basin is primarily from groundwater pumping. Smaller outflows are to the Santa Ana River near the Prado wetlands, evapotranspiration in the wetlands, and subsurface outflow to the Chino Basin (see **GSP Table 5-4**).

2.3.4. Primary Groundwater Uses

The primary groundwater uses in the Basin are municipal pumping, with limited private pumping for small water system, commercial, industrial and residential users. Groundwater use estimates are included in **GSP Section 5 (Water Budget)**. The Channel Aquifer is primarily used for municipal water supply. Most of the pumping in this area is from wells owned and operated by the City of Corona, with some additional pumping by small community water system, small commercial users and aggregate mines. Until the 1990s, there was significant agricultural pumping to irrigate citrus orchards.

3. RAINFALL-RUNOFF-RECHARGE MODEL

A rainfall-runoff-recharge model developed by Todd Groundwater was used to prepare estimates of groundwater recharge from rainfall, irrigation, bedrock inflow, and pipe leaks. It also generated the estimates of groundwater use for agricultural irrigation and flows in ungauged streams tributary to or within the basin. Several commercially available software programs were used to prepare model input and evaluate model output, such as Microsoft Excel and ArcGIS. Finally, the rainfall-runoff-recharge model and several pre-processing utility programs were developed in the Fortran 90 programming language by Todd Groundwater.

3.1. APPROACH

The rainfall-runoff-recharge model is built around a soil moisture balance of the root zone, which is simulated continuously using daily time steps for the 29-year calibration period. Numerous variables are involved in the physical processes of rainfall, interception, runoff, infiltration, root zone soil moisture storage, evapotranspiration, irrigation, shallow groundwater storage, recharge of deeper regional aquifers from shallow groundwater, and lateral flow of shallow groundwater into streams. Accordingly, the groundwater basin and tributary watersheds were divided into small recharge zones over which the most influential variables were relatively homogeneous. The daily water balance was then simulated for each zone, and the results aggregated geographically to cells in the groundwater model grid and temporally to the model stress periods.

The rainfall-runoff-recharge model provides several benefits to the groundwater modeling effort:

- It represents the hydrological processes with governing equations that reflect the actual physical processes, at least in a simplified way. This allows sensitivity or suspected errors to be traced to specific assumptions and processes.
- It enforces the principle of conservation of mass on the recharge and stream flow values. Beginning with rainfall, all water mass is accounted for as it moves through the hydrological system.
- It allows additional data sets to be included in model calibration. In tributary watersheds with gauged stream flow data, measured flows can be compared with simulated flows, which consist of the sum of direct runoff and shallow-groundwater seepage to streams. Simulated irrigation frequency can be compared with actual grower practices, and applied irrigation amounts can be compared with water delivery data recorded by the District. Simulated urban irrigation amounts can be compared with seasonal variations in measured urban water use, which are primarily related to urban irrigation.
- It provides estimates of stream flow in ungauged tributary streams, as well as runoff from valley floor areas within the active model domain.
- It provides estimates of inflow from bedrock and/or upland areas adjacent to the active model domain and constrains the amounts of inflow according to the water balance for each tributary watershed.
- It simulates the effects of runoff from impervious surfaces in urban areas, either to storm drainage systems or to adjacent pervious soils.
- It simulates changes in land use over the 29-year calibration period and the resulting changes in recharge and irrigation demand.

- It combines and parses all of these flows—plus estimated recharge from leaky water and sewer pipes—into recharge values by model cell and stress period in the format required by MODFLOW.

The following sections describe the input data sets and the assumptions and governing equations used to simulate each hydrologic process included in the rainfall-runoff-recharge model.

3.2. LAND USE AND RECHARGE ZONES

Recharge zones were developed by intersecting and editing numerous maps in GIS. The starting point was a map of the Temescal Basin and the boundaries of all surrounding watersheds that flow into it. The Basin and tributary watersheds were then divided into numerous polygons reflecting land use as of 1990 and changes in land use since then. Land use was delineated into 13 categories based on DWR land use maps for Riverside County from 1993 and 2000, a statewide crop map developed by LandIQ for DWR in 2014 and Google Earth historical aerial imagery available for 1990-2018. The primary change in land use has been urbanization of undeveloped (natural vegetation) areas. Polygons were delineated to represent the locations of changes in land use so that a single, fixed set of polygons could accurately represent the evolution of land use by changing the use type of a polygon beginning in the year that land use changed. Additional divisions of polygons were made on the basis of soil texture, annual rainfall and watershed. This resulted in a total of 224 polygons ranging in size from 2 to 4,529 acres. A map of the zones and their land uses in 1990 and 2018 is shown in **Figure 3.**

Land use in each zone was assigned to one of sixteen categories (see **GSP Table 5-2**). Each land use category is further divided into irrigated, non-irrigated and impervious subareas. These are not explicitly mapped but are expressed as percentages of total zone area. Citrus orchards irrigated with groundwater were common in the Basin in the early 1990s, but except for one small grove those have all been replaced by urban development. Natural land cover categories are grassland, shrubs/trees, dense riparian, sparse riparian and open water. Developed land uses are residential, low-density residential, turf, commercial, industrial and vacant. The natural and developed land uses were mapped by inspection of Google Earth aerial photography. The categories are listed in **GSP Table 5-2** along with their total acreages in 1990, 2018 and 2068 (estimated) in the groundwater basin management areas and tributary watersheds.

3.3. RAINFALL

The distribution of average annual rainfall over the basin and tributary watersheds was obtained from PRISM climate modeling (http://www.prism.oregonstate.edu/). Annual precipitation varies from 11 inches in the Norco area to about 14 inches at the south end of the Basin. It increases to about 21 inches at the top of the highest tributary watershed in the Santa Ana Mountains to the west. **Figure 4** shows the average annual rainfall distribution across the Temescal Basin and its surrounding watersheds. Each recharge zone was assigned an average annual rainfall value based on its location.

The surface hydrology model requires daily rainfall as one of two transient inputs. Daily rainfall for the Elsinore station was used for this purpose, with missing values supplied by correlation with rainfall at the Riverside Fire Station and Claremont-Pomona Stations, both of which also have long periods of record. Daily rainfall for each recharge zone was calculated as Elsinore daily rainfall multiplied by the ratio of zonal average-annual rainfall to Elsinore average-annual rainfall.

3.4. INTERCEPTION

Plant leaves intercept some of the rain that falls from the sky, and the amount is roughly proportional to the total leaf area of the vegetation canopy. The estimated interception on each day of rain ranged from zero for industrial, idle and vacant land uses, to 0.03 inch for turf and 0.06 inch for trees in full leaf. These estimates were inferred from published results of interception studies (Viessman and others, 1977). For each day of the simulation, rainfall reaching the land surface (throughfall) is calculated as rainfall minus interception. Interception storage is assumed to completely evaporate each day and is not carried over from one day to the next.

3.5. RUNOFF AND INFILTRATION

Most throughfall infiltrates into the soil, but direct runoff occurs when net rainfall exceeds a certain threshold. The threshold at which runoff commences and the percent of additional rainfall that runs off are significantly influenced by a number of variables, including soil texture, soil compaction, leaf litter, ground slope, and antecedent moisture. These factors can be highly variable within a recharge zone, and data are not normally available for them. Also, the intercept and slope of the rainfall-runoff relationship depend on the time increment of analysis. Most analytical equations for infiltration and runoff apply to spatial scales of a few square meters over periods of minutes to hours (Viessman and others, 1977). They are suitable for detailed analysis of individual storm events. The curve number approach to estimating runoff also applies to single, large storm events. It is not suitable for continuous simulation of runoff over the complete range of rainfall intensities (Van Mullen and others, 2002). The approach used in the rainfall-runoff-recharge model is similar but less complex than the approach used in popular watershed models such as HSPF (Bicknell and others, 1997).

In the rainfall-runoff-recharge model, daily infiltration is simulated as a three-segment linear function of throughfall, and throughfall in excess of infiltration is assumed to become runoff. The general shape of the relationship of daily infiltration to daily net rainfall is shown in **Figure 5** (upper graph). Below a specified runoff threshold, all daily throughfall is assumed to infiltrate. Above that amount, a fixed percentage of throughfall is assumed to infiltrate, which is the slope of the second segment of the infiltration function. Finally, an upper limit is imposed that represents the maximum infiltration capacity of the soil. The runoff threshold, the percentage of excess net rainfall that infiltrates, and the maximum daily infiltration capacity were assumed to vary by land use and were among the variables adjusted for model calibration. The runoff threshold ranged from 0.2 inches per day (in/d) for unpaved areas in industrial and commercial zones to 1.0 in/d for turf and natural vegetation areas. The infiltration percentage for excess rainfall ranged from 60 percent in commercial and industrial areas to 94 percent in areas of natural vegetation. The maximum daily infiltration was set to 2.5 in/d in upland tributary areas and 4 in/d for zones overlying the Basin. These values were selected on the basis of calibration, although results were not very sensitive to this parameter.

The above parameter values are for soils that are relatively dry. Infiltration rates decrease as soils become more saturated. This phenomenon led to the development of the Antecedent Runoff Condition adjustment factor for rainfall-runoff equations (Rawls and others, 1993). However, application of the concept has been focused on individual storm events. For the purpose of the rainfall-runoff-recharge model, the adjustment provides a means of simulating empirical observations that a given amount of rainfall produces less runoff at the beginning of the rainy season when soils are relatively dry than at the end of the rainy season when soils are relatively wet. This effect is included in the recharge model as a multiplier that decreases the estimated infiltration as soil saturation increases. This multiplier is applied to the runoff threshold, the infiltration slope and the maximum infiltration rate. The multiplier decreases from 1.0 when the soil is dry to a user-selected value between 1.0 and 0.60 when the soil is fully saturated (lower graph in **Figure 5**). A low value has the effect of decreasing infiltration (and potential groundwater recharge) toward the end of the rainy season or in very wet years, and also to increase simulated peak runoff during large storm events. The multiplier under saturated conditions was assumed to be 0.75 for the Temescal rainfall-runoff-recharge model.

Runoff from impervious surfaces was assumed to equal 100 percent of rainfall. Runoff that flows into a storm drain system (known as "connected impervious runoff") contributes to stream flow but not groundwater recharge. However, runoff from some impervious surfaces flows onto adjacent areas of pervious soils ("disconnected impervious runoff"). The surface hydrology model treats this type of runoff as if it were a large increment of additional rainfall where it flows over or ponds on the pervious soils. The excess water can quickly saturate the soil and initiate deep percolation. The model incorporates this process by means of a variable representing the fraction of impervious runoff that becomes deep percolation. Data and literature values are not available for this variable. It was estimated to be 20 percent in residential, commercial and industrial areas and 80 percent in low-density residential areas.

3.6. ROOT ZONE DEPTH AND MOISTURE CONTENT

The storage capacity of the root zone equals the product of the vegetation root depth and the available water capacity of the soil. The available water capacity for each recharge zone was a depth-weighted average for the dominant soil type, as reported in the soil survey (NRCS, 2015). Root depth is a complex variable. Except for cropland, vegetation cover typically consists of a mix of species with different root depths. At a very local scale, roots are deepest directly beneath a plant and shallower between plants. Root density and water extraction also typically decrease with depth within the root zone. To complicate matters, root depth is somewhat facultative for some plants, which means that roots will tend to grow deeper in soils with low available water capacity, such as sands. Finally, root depth in upland watershed areas can be restricted by shallow bedrock.

The root depth selected for each recharge zone essentially represents an average of all these factors. Simulated recharge and stream base flow are both quite sensitive to vegetation root depth, and values were adjusted during the joint calibration of the rainfall-runoff-recharge model and the groundwater flow model. Separate root depths were specified for irrigated and non-irrigated vegetation in each recharge zone. Root depths for turf and crops were required to be the same in all zones. In upland watersheds root depth can be affected by the depth to bedrock, which is often shallow. Outflow from individual tributaries flowing into the basin is not gaged, and uniform rooting depths for grass and shrubs/trees were used throughout all of the watersheds.

3.7. EVAPOTRANSPIRATION

Evapotranspiration is affected by meteorologic conditions, plant type, plant maturity, and soil moisture availability. All of these factors are included in the rainfall-runoff-recharge model. The evaporative demand created by meteorological conditions is represented by reference evapotranspiration (ETo). Numerous equations have been developed over the years relating ETo to solar radiation, air temperature, relative humidity and wind speed. For the purposes of this study, daily values of ETo were obtained from a microclimate station in Temecula (about 20 miles south of the Basin) that is part of the California Irrigation Management Information System (CIMIS) network.

Vegetation factors are lumped into multipliers called crop coefficients. Reference ET is the amount of water evapotranspired from a broad expanse of turf mowed to a height of 4-6 inches with ample irrigation. ETo is multiplied by a crop coefficient to obtain the actual ET of a different crop or vegetation type at a particular stage in its growth and development. Although primarily used for agricultural crops, crop coefficients can also be applied to urban landscape plants and natural vegetation. The only agricultural crop in the Basin is citrus trees, which have a crop coefficient that ranges from 0.5 in winter to 0.91 in mid-summer (U.N. Food and Agriculture Organization, 2006). Irrigated landscaping was assumed to consist primarily of turf, for which a crop coefficient of 0.8 was used in all months (Snyder and others, 2007). Non-irrigated natural grassland consists of annual grasses that go dormant in summer once soil moisture has been depleted. A crop coefficient of 1.0 was assigned in all months, but actual ET decreases to zero as the grasses lower soil moisture to the wilting point in summer. Natural shrubs/trees were assigned a crop coefficient of 0.8 year-round. Those perennial species have deeper roots and do not tend to fully deplete root zone soil moisture during a single dry season (Blaney and others, 1963). Many riparian phreatophytes are deciduous, and a crop coefficient of 0.75 was assigned for winter months to reflect a reduced leaf area index. Their tall stature and linear distribution within an arid landscape raises the crop coefficient in summer months, and a coefficient of 1.10 was assigned to reflect those factors.

3.8. IRRIGATION

Evapotranspiration gradually depletes soil moisture, and for irrigated areas the rainfall-runoff-recharge model triggers an irrigation event whenever soil moisture falls below a specified threshold. The amount of applied irrigation water is equal to the volume required to refill soil moisture storage to field capacity, divided by the assumed irrigation efficiency. An irrigation threshold equal to 70 percent of maximum soil moisture storage was used for citrus, and a threshold of 0.8 was used for urban landscaping. This variable primarily affects the frequency of irrigation; a higher threshold results in more frequent irrigation but approximately the same total amount of water applied annually. Ten percent of water applied to citrus was assumed to percolate past the root zone, and 15 percent was assumed for urban irrigation. This reflects nonuniformity of applied water, such as uneven overlap of sprinkler spray areas. There are additional sources of irrigation inefficiency, such as evaporation of sprinkler spray mist and sprinkler overspray or runoff onto impervious surfaces in urban areas. Thus, total irrigation efficiency is less than 90 percent for citrus and 85 percent for urban landscaping. Total efficiency was used to estimate applied water, but only the deep percolation component was used to estimate deep percolation. Urban irrigation in the Basin is supplied by municipal water purveyors, and irrigation use is included in their metered deliveries.

The rainfall-runoff-recharge model was only used to estimate groundwater pumping for citrus irrigation. Because irrigation is assumed to completely refill soil moisture storage and is less than 100 percent efficient, simulated soil moisture exceeds capacity immediately following an irrigation event. The excess is assumed to become deep percolation beneath the root zone.

3.9. DEEP PERCOLATION FROM ROOT ZONE TO SHALLOW GROUNDWATER

The surface hydrology model updates soil moisture storage each day to reflect inflows and outflows. Rainfall infiltration and applied irrigation water are added to the ending storage of the previous day, and ET is subtracted. If the resulting soil moisture storage exceeds the root zone storage capacity, all of the excess is assumed to percolate down from the root zone to shallow groundwater on that day. In modeling parlance, this is known as a “bathtub model”; vertical unsaturated flow and preferential flow through cracks and root tubes in the soil are not considered.

3.10. MOVEMENT OF SHALLOW GROUNDWATER TO DEEP RECHARGE AND STREAM BASE FLOW

A shallow groundwater storage component may not be part of all groundwater systems, but its presence is sometimes indicated by groundwater hydrographs and stream base flow. In upland watersheds, for example, the shallow groundwater reservoir is what supplies base flow to streams. Without it, simulated stream flow consists of large flows occurring only on rainy days. Physically, it represents the overall permeability and storage capacity of deep soil horizons and bedrock fractures beneath hillsides bordering a gaining stream. It allows the integration of shallow and deep, fast and slow flow paths between the point of rainfall infiltration and the stream. In valley floor areas with flat terrain and deep deposits of unconsolidated basin fill, the presence of a shallow groundwater system is sometimes evident in a lack of response of deep well hydrographs to rainfall recharge events or even wet versus dry years. The shallow zone in that case attenuates the pulses of recharge percolating beneath the root zone into a relatively steady recharge flux, and there may be little outflow to streams.

In the surface hydrology model, the only inflow to shallow groundwater storage is deep percolation from the root zone. There are two outflows: laterally to a nearby creek and downward to the regional groundwater flow system. Outflow to streams is specified as a certain percentage of current groundwater storage, which results in a first-order logarithmic recession of stream base flow, consistent with gaged stream flows. Outflow to the regional groundwater system is simulated as a constant downward flux. This is consistent with flow across confining layers in which the vertical head gradient is near unity. Both outflows are calculated and subtracted from shallow groundwater storage each day. They continue until the storage has been exhausted, resuming whenever a new influx of deep percolation from the root zone arrives. There is no assumed maximum capacity of shallow groundwater storage.

The two parameters defining shallow groundwater flow are the recession constant for flow to streams and the constant downward flow rate for deep recharge. Both of these are obtained by calibration. The recession constant can generally be calibrated by matching simulated to measured stream base flow in gaged watersheds. The deep recharge rate can be used to adjust the long-term partitioning of shallow groundwater mass into base flow versus recharge.

The shallow groundwater component of the surface hydrology model is simple but adequate to capture the fundamental behaviors of logarithmic stream base flow recession and attenuated deep recharge. Other watershed models invoke more complex systems of storage and flow to simulate these processes. For example, the Precipitation and Runoff Modeling System (PRMS) developed by the U.S. Geological Survey includes a total of seven storage components between the point where a raindrop reaches the ground and the stream into which it ultimately flows (Markstrom and others, 2015). This larger number of components and parameters enables relatively detailed matching of observed stream flow hydrographs but is unnecessarily complex for the purposes of groundwater modeling.

3.11. EVAPOTRANSPIRATION BY RIPARIAN VEGETATION

In locations where the water table is shallow, some plants (phreatophytes) can extract water directly from the water table to meet evaporative demand. The rainfall-runoff-recharge model was used to estimate the amount that would be drawn from the water table if a shallow water table were present.

The potential use of groundwater by phreatophytes was assumed to equal the ET demand of the vegetation minus the amount that could be supplied by soil moisture. In practice, this was accomplished by temporarily simulating the vegetation as if it were irrigated using the rainfall-runoff-recharge model, then using the simulated irrigation rates as the maximum rate of withdrawal by roots from the water table. This rate of groundwater use is thought to decrease with increasing depth to the water table because fewer shrub and tree roots are able to reach the water table and the energetics of withdrawing the water become less favorable. The use of groundwater decreases from the maximum rate when the water table is at the land surface to zero when the water table is 20 feet or more below the ground surface. These calculations are applied at model cells where aerial photographs indicate the presence of dense, lush riparian vegetation, which is a sign of phreatophytic water use. These calculations were also made using the MODFLOW evapotranspiration (EVT) module.

3.12. GROUNDWATER INFLOW

Groundwater inflow into the basin from adjacent uplands—also called mountain front recharge—is difficult to estimate. If the basin is bounded by igneous or metamorphic rocks with very limited groundwater flow through fractures, it can be reasonable to assume that inflow from bedrock is negligibly small. If the bedrock is fractured, the total amount of inflow across the long "no-flow" boundaries on the east and west sides of the Basin can be cumulatively significant. Subsurface inflow across those boundaries was estimated using the rainfall-runoff-model results for the tributary watersheds. By this method, the estimates must be consistent with conservation of mass in the watersheds; that is, with the estimates of rainfall, ET, and surface outflow. The resulting estimates are still highly uncertain, however, because groundwater outflow from the watersheds—and surface outflow, too, for that matter—are both small compared to the two largest flows in the watershed water balances: rainfall and evapotranspiration. Thus, a small error in the estimate of either of those flows can result in a large error in groundwater outflow.

Ultimately, groundwater flows produced by the rainfall-runoff-recharge model were calibrated based on their effects on simulated groundwater levels at nearby wells within the basin and on the simulated amount of stream base flow exiting the watersheds. The initial groundwater inflow estimates were generally too high. The estimates were lowered primarily by increasing the estimated root depth of natural vegetation in the watersheds, which is highly uncertain due to the effects of shallow bedrock on rooting depth.

Groundwater inflow from tributary watersheds was smoothed over time to reflect attenuation of recharge pulses that occur during wet months and wet years as they gradually flow through long, relatively slow flow pathways. Smoothing was accomplished by a moving average of simulated groundwater recharge in the tributary areas over the preceding 2 to 10 years. This range represents local variability that was indicated by rates of recession in stream base flow and groundwater levels near the basin boundary during prolonged droughts. The final estimate of average annual groundwater inflow during the calibration period was 5,400 to 7,200 AFY under normal climatic conditions.

3.13. CALIBRATION OF RAINFALL-RUNOFF-RECHARGE MODEL

Parameters in the rainfall-runoff-recharge model were jointly calibrated with the groundwater model. The total amount of dispersed recharge and annual variations in recharge influence simulated groundwater levels, and parameters in the rainfall-runoff-recharge model were adjusted to improve the fit between measured and simulated groundwater hydrographs. The rainfall-runoff-recharge model was also calibrated based on a comparison of measured and simulated daily stream flow at two stream gages on Temescal Wash, one below Lee Lake at the upstream end of the Bedford-Coldwater Subbasin (Temescal Wash at Corona Lake; USGS 11071900) and one at Main Street downstream of the wastewater treatment plant in Corona (Temescal Creek above Main Street at Corona; USGS 11072100). Characteristics and model parameters for that watershed were assumed to also apply to similar watersheds along the western edge of the Basin. Unfortunately, the gage began operation in 2019, which is after the 1990-2018 model simulation period. Nevertheless, the general pattern of flow peaks and base flow recession simulated in prior years was similar to the gaged pattern in 2019-2020, as shown in **Figure 6**.

4. NUMERICAL GROUNDWATER MODEL DEVELOPMENT

The numerical model incorporated the hydrogeological data from the basin and hydrologic model and is capable of simulating historical and future conditions. The following section describes the development of each of the components in the MODFLOW model.

4.1. GENERAL APPROACH

The Temescal Basin Model is a numerical groundwater model, which is a mathematical description of the hydrogeological conceptual model (Bear and Verruijt, 1987). The advantage of a numerical model is that, once in a mathematical format, the model quantitatively combines data on basin geometry, aquifer properties, recharge, and discharge to simulate changes in groundwater elevations and calculate the water balance over time.

The Temescal Basin Model is setup to represent the physical features that influence groundwater flow including the geology, hydrology and climate. Each of these features is mapped onto a model grid that represents the vertical and horizontal distribution of parameters over the Basin based on the hydrogeological conceptual model. The parameters can also be varied through time over a defined base period to represent seasonal variations in precipitation, streamflow and groundwater pumping. A more detailed discussion of how each of these parameters was developed and entered into the Temescal Basin Model is summarized below.

- Model Setup - representation of the physical groundwater basin
- Boundary Conditions – representation of the inflows and outflows from outside of the model
- Aquifer Properties – representation of the flow characteristics of the aquifer
- Initial Conditions – representation of groundwater conditions prior to the model period

The model development was focused on the HCM, as described in **GSP Sections 3 and 4**, with emphasis on defining boundary conditions and flow paths. Aquifer parameters were assigned on a subregional basis within each model layer to represent reasonable aquifer properties for the aquifer being simulated.

4.2. MODEL SETUP

The model also incorporates spatial distribution of the physical features of the Basin and the temporal distribution of time-varying parameters such as precipitation and recharge. The following describes the basic components required to construct a numerical model.

4.2.1. Model Code Selection

The model setup utilizes the MODFLOW modeling code developed by the United States Geological Survey (USGS). The Temescal Basin Model uses MODFLOW-NWT (Niswonger et. al., 2011), which is a standalone version of MODFLOW-2005 (Harbaugh, 2005) that includes an advanced mathematical solver that provides a more robust solution to complex conditions such as rewetting of dry model cells, unconfined conditions and groundwater-surface water interactions. These features improve the ability of the Model to evaluate complex groundwater-surface water interactions and projects to increase future groundwater levels in the Basin.

4.2.2. Base Period

The Temescal Basin Model is setup using water years that run from October through to the following September to capture the cause and effect relationship on groundwater levels of wintertime rain and subsequent summertime groundwater pumping. The model simulates the 29-year base period from October 1989 through September 2018 to represent Water Years (WY) 1990 through 2018. This retains the starting date of prior models, which coincides with the beginning of some key data sets and also the beginning of the period of rapid land use conversion from agricultural to urban. The ending year is the most recent year for which all necessary model input data were available. The 29-year simulation period is desirable for model calibration purposes because it includes a wide range of hydrologic and water use conditions, including wet periods, droughts, changes in groundwater pumping and implementation of lake management measures.

To simulate this base period, the model is subdivided into time intervals termed stress periods. For each water year, monthly stress periods were defined to provide the ability of the model to evaluate temporal at a monthly scale. For the base period, a total of 348 stress periods were defined. Time-dependent parameters, such as groundwater pumping or precipitation recharge, are assigned to for each stress period.

Conditions during the stress period are constant, but parameters can be varied from stress period to stress period. A stress period can be subdivided into shorter time periods, or timesteps, to allow for more temporal resolution within each stress period to help with model convergence. For the Temescal Basin Model, each stress period was simulated using three (3) timesteps. MODFLOW calculates the groundwater elevations and water balance for each time step. The model results provide the groundwater elevations for the final timestep of each stress period, and the summation of the water balance changes for all timesteps for each stress period.

4.2.3. Model Domain and Grid

MODFLOW requires the application of a rectangular grid that encompasses the entire area, or domain, that will be modeled. The model grid forms the mathematical framework for the model. Each grid cell has to be populated with aquifer properties. Physical features such as streams and wells are mapped onto the model grid. Using this information, the MODFLOW model calculates a groundwater elevation at each model grid cell for each timestep. The density of model grid cells is what defines the resolution of the model in resolving drawdown and other hydrologic effects.

The model domain covers all of the Temescal Basin and a portion of the Chino Area in the Prado area (**Figure 7**). The Temescal Basin occupies about 75 percent, approximately 37 square miles, of the southern model domain. The extent of the model domain for the Temescal Basin Model is shown on **Figure 7**. A portion of the Chino Basin was included in the Temescal Basin Model domain to allow for a more natural boundary along the Santa Ana River and Prado wetlands area. The boundary with the Chino Subbasin (DWR Basin No. 8-2.01) to the north is generally marked by the Santa Ana River and a series of low-lying hills in the Norco area. The northern boundary was set at a distance sufficient far so that the assigned boundary condition would not affect groundwater conditions in the Temescal Basin.

The Temescal Basin Model consists of 568 rows, 480 columns and 3 layers. The rows and columns have a uniform spacing of 100 feet. Each 100-foot square represents a model cell. MODFLOW calculates one groundwater level for the center point of each grid cell for each timestep. The total number of grid cells in the Temescal Basin Model is 817,920 cells, of which 425,304 are active cells where MODFLOW calculates a groundwater levels. The active areas, which represent the area within the groundwater basin where groundwater elevations are simulated, covers approximately 35,526 acres. Areas outside of the Basin are represented as no-flow cells where MODFLOW does not perform calculations.

4.2.4. Model Layers

The model layers represent the geologic units that compose the Principal and Secondary Aquifers of the Basin based on the geology and HCM presented in **GSP Section 3** and summarized in **Section 2**. Model layers provide vertical resolution for the model to simulate variations in groundwater elevation, aquifer stresses, and water quality with depth. The model layers are based on an evaluation of the following data sets:

- Surficial geology,
- Faulting,
- Lithologic borehole logs.
- Well construction logs, and
- Previously completed local hydrogeologic conceptualizations and cross sections.

This information was collected and translated into a unified GIS compatible database structure for cross section construction and geographic evaluation. This approach allows any hydrostratigraphic structures relevant to groundwater flow in the Basin to be easily translated from GIS for use in other formats.

For the Temescal Basin Model, three model layers were defined to simulate hydrogeologic characteristics of the principal and secondary aquifers within the Temescal Basin. The model layers are numbered from 1 through 3 from top to bottom. In the Temescal Basin, three model layers were defined that represent the following geologic units:

- Model Layer 1 – Channel Aquifer (Principal Aquifer)
- Model Layer 2 – Alluvial Fan Aquifer (Secondary Aquifer), and
- Model Layer 3 - Sandstone Aquifer (Secondary Aquifer)

Figure 8 shows the general outline of the Channel Aquifer within the Temescal Basin. The top of Model Layer 1 represents the topography that is based on topographic elevation points every 10 meters were extracted from the National Elevation Dataset (http://ned.usgs.gov) throughout the model domain **Figure 9**.

The model layers represent the aquifers within the Temescal Basin. **Figures 10 through 12** show the areal extent and bottom elevation of each of the model layers over the entire model domain. **Figure 13** shows two cross section help to illustrate the shapes and relative thicknesses of three model layers in the Temescal Basin. These cross sections follow along the model grid with the upper cross section on **Figure 13** located along model-grid row 262 and the lower cross section on **Figure 13** located along model-grid column 322 (**Figure 8)**. These The following discussion provides a summary of the geologic units represented by each model layer in accordance with the HCM.

Model Layer 1 represents the Channel Aquifer in the Temescal Basin, which is the primary water supply unit in the Basin (Todd and AKM 2008) where the larger wells are completed. The alluvial deposits are a mix of interlayered gravels, sands, silts, and clays resulting from alluvial fan and fluvial processes. Model Layer 1 ranges up to 200 feet thick. Alluvial aquifer materials are present in other parts of this hydrologic area, but their extent and production capacity are uncertain. In these areas, Model Layer 1 represents a relatively thin layer that is rarely saturated. The extension of Model Layer 1 is a requirement of MODFLOW to provide for continuity across the model domain. In these areas, Model Layer 1 has a minimum thickness of ten feet, and is conceptualized as the soil and shallow unconsolidated sediments that overlie the older alluvial fan and consolidated sedimentary geologic units.

Model Layer 2 represent the Alluvial Fan Aquifer (Secondary Aquifer) that is composed of heterogeneous sand and fine-grained sediments. Although these deposits are relatively thick, the entire unit is heterogeneous and cannot be considered one single aquifer. Rather, sand lenses within the deposits collectively form the Alluvial Fan Aquifers. Lithologic data from wells are insufficient to map out the extent of the aquifers or characterize the deposits. Limited data indicate relatively fine-grained textures throughout much of the area, especially with depth (Todd and AKM 2008).

Model Layer 3 represents the Sandstone Aquifer (Secondary Aquifer) that consists of sedimentary rocks of Tertiary age containing sandstone layers that are penetrated by several Corona wells (Todd and AKM 2008). Due to the limited production, depth, and relatively low permeability in most areas, the Sandstone Aquifer is not considered a primary source of water supply. The bottom of Model Layer 3, which the lowest model layer in the Model, is a no-flow boundary condition, representing the older bedrock formations that are assumed to be relatively impermeable.

In the Chino Basin, Model Layers 1, 2 and 3 represents the aquifer layer defined in the Chino Basin Model (WEI, 2015, 2020). The definition of the model layers in the Chino Basin were set up to conform as well as possible to the model layers used in the Chino Basin Model (WEI, 2015, 2020). These Chino Basin layers were correlated to the three model layers defined in the Temescal Basin.

4.2.5. Faults

The Elsinore and Chino fault zones bound the Basin on the west and parallel the base of the Santa Ana Mountains. The faults within the Basin were simulated using the Horizontal Flow Boundary (HFB) Package in MODFLOW that allows a conductance parameter to be placed between adjacent model cells to limit groundwater flow. Flow across the faults was based on assigned conductance values that ranged from 0.01 ft^2/d in the alluvial sediments in the Prado area to 0.000002 ft^2/d in the sandstone aquifer in the Temescal Basin. The fault locations within the Temescal Basin model are shown on **Figure 14**. For the model, all faults extended across model Layers 1 through 3. The fault hydraulic conductivities were based on an initial estimate that was refined during model calibration.

The HFB Package was also used to assign a low conductance (0.0000003 ft^2/d) to represent the engineered clay core of the Prado Dam that is designed to limit underflow underneath the dam through the unconsolidated sediments in Model Layer 1.

4.2.6. Aquifer Conditions

Groundwater conditions for each model layer can be defined as unconfined, fully-confined, or convertible between confined and unconfined based on the relation of the simulated groundwater level to the top of the model layer. Unconfined conditions exist when groundwater levels are below the top of the physical aquifer layer whereas confined conditions exist when groundwater levels are above the top of the physical aquifer layer. For the Temescal Basin Model, Model Layer 1 is defined as unconfined throughout the model domain. Model Layers 2 and 3 are defined as convertible between confined and unconfined conditions.

Because of the historical changes in groundwater levels, areas within the Basin can be temporarily unsaturated. Prior MODFLOW versions set a dewatered cell to a no-flow condition for the rest of the simulation if the cell is dewatered. An important advantage of using MODFLOW-NWT compared to previous MODFLOW versions is that unsaturated groundwater heads will be calculated for dry cells, whereas standard MODFLOW excludes these calculations (Niswonger et. al., 2011). This resaturation capability of MODFLOW-NWT was utilized for the Temescal Basin Model.

In MODFLOW-NWT, head is simulated continuously from saturated to unsaturated conditions. MODFLOW-NWT will calculate a head in an unsaturated cell while not allowing water to flow out of that cell, which provides a continuous solution for groundwater flow. Inflow to an unsaturated cell, either from adjacent cells, overlying cells, or an external source simulated by one of the stress packages, automatically flows downward to an underlying saturated cell if there are deeper layers. An unsaturated cell has a head below the cell bottom and is considered to have no water in storage, so changes in storage also are zero for these cells. The model accounts for this situation by setting the storage coefficient for an unsaturated cell to zero. This allows for the continuous solution of head not to affect the overall water balance results (Niswonger et. al., 2011).

Because groundwater heads are calculated for unsaturated cells using this approach, it is necessary for the model user to interpret the head in a cell relative to the cell bottom. If the head in a cell is at or below the cell-bottom altitude, then the water table is not contained within this cell (Niswonger et. al., 2011).

4.3. BOUNDARY CONDITIONS

Model boundary conditions represent the hydrologic budget by simulating where groundwater enters and exits the basin. Boundary condition data must be entered for each stress period at each model grid cell where a boundary condition is defined in the model. MODFLOW NWT provides a number of boundary condition options to numerically represent the different physical processes included in the hydrologic budget. The physical distribution and volumes of groundwater inflow and outflow for each budget component need to be accounted for geographically within the model domain. A discussion of each boundary condition of the groundwater budget is provided below.

4.3.1. Surface Recharge

The rainfall-runoff-recharge model outlined in **Section 3** describes the methodology to define both the spatial distribution and monthly volume of surface recharge to groundwater within the Temescal Basin model. The rainfall-runoff-recharge model calculates the monthly contributions from precipitation and return flows to surficial groundwater recharge. The surface recharge is spatially distributed across the model domain using zones that are defined by a combination of geology and land use. This calculated surface recharge is applied using the MODFLOW recharge package.

4.3.2. Streams

The groundwater model dynamically simulates groundwater recharge from stream percolation and groundwater discharge into streams. Percolation from streams is a function of stream flow and—where the water table is equal to or higher than the stream bed elevation—the difference in water level between the creek and water table.

The MODFLOW stream flow routing (SFR2) package is used to simulate these processes. Each stream in the basin is simulated as a sequence of reaches, each of which is a model grid cell along the alignment of the channel. Flow is specified at the upstream end of each stream segment and routed down the reaches, with flow to or from the aquifer calculated on the basis of wetted channel area, channel bed hydraulic conductivity and the difference in elevation between the stream surface and the simulated groundwater level at that reach. By this means conservation of mass is applied concurrently to the stream and the aquifer. Streams can dry up completely as they cross the basin; and conversely, groundwater discharge can create stream flow in a segment that is dry farther upstream. The stream flow routing module allows for a network of channel segments, with multiple inflows or diversions at the start of each segment.

The Temescal Basin model includes a network of 39 stream segments containing a total of 2,688 stream reaches (**Figure 15**). Seventeen segments are used to simulate eight streams that drain watersheds in the Santa Ana Mountains along the west side of the Basin. Streams that flow across the Temescal Basin to Temescal Wash are divided into multiple segments to represent the natural, concrete-lined and unlined engineered streambed conditions present on these streams. Temescal Wash is composed of seven segments that represent varying lined and unlined conditions along Temescal Wash (**Figure 15**). An additional five segments represent the short sections of four streams that drain watersheds from upland areas east of Temescal Wash.

In general, the upland stream reaches are more than 20 feet above the water table and are not hydraulically coupled to groundwater. Percolation from those reaches is independent of groundwater levels and not affected by pumping. Reaches where groundwater appears to be hydraulically coupled to surface water primarily include most of the length of Temescal Wash, Santa Ana River, and the lower ends of some larger tributaries in the Prado wetland area.

In the Chino Basin, the Santa Ana River is represented by five segments (**Figure 15**). The areas upstream of the Prado wetland area were represented by a single long segment, and the other four segments defined areas within the Prado wetland area and downstream of the Prado Dam. Five other segments simulated streams in the Chino Basin. Stream bed permeability was estimated by model calibration. For unlined streams, calibrated values for the stream bed permeability ranged from 0.1 to 25.0 feet per day (ft/d); whereas for concrete-lined streams, the stream bed permeability ranged from 0.00003 to 0.03 ft/d.

To develop estimates of surface and subsurface inflows from these tributary areas to the groundwater basin, a rainfall-runoff-recharge model (**see Section 3**) is used to simulate the entire watershed tributary to the Basin. This model simulates all near-surface hydrologic processes, including rainfall, runoff, infiltration, evapotranspiration, effects of impervious areas and irrigation, soil moisture storage and percolation to stream base flow and deep groundwater recharge. The calculated runoff is included in the SFR2 Package. Inflows for Temescal Wash are coordinated with output from the Bedford-Coldwater numerical model and USGS gauge data as discussed as part of the rainfall-runoff model documentation in **Section 3**.

The lower Temescal Wash and Butterfield Drain in the Prado area along the northern boundary of the Temescal Basin were simulated using the MODFLOW Drain Package. This is because the Prado Area is primarily a groundwater discharge area (**Figure 15)**. During model calibration, these two stream segments experienced numerical instability due to the interaction of two head-dependent boundaries of groundwater-surface water interactions using SFR2 and the high evapotranspiration applied to the Prado Area. During model calibration, the MODFLOW output showed that these areas were principally areas of groundwater discharge to streams or ET, so converting these areas to drains was appropriate to improve the overall model performance.

Similarly, areas in the Norco area include large storm drain channels for drainage and stormwater management (**Figure 15**). Occasional shallow groundwater conditions during high rainfall periods led to numerical instability that was relieved by converting these drainage channels to the MODFLOW Drain Package.

4.3.3. Mountain Front Recharge

Groundwater inflow into the basin from adjacent uplands—also called mountain front recharge (MFR)—were calculated by the rainfall-runoff-recharge model (see **Section 3**). MFR represents subsurface inflow of groundwater from the low-permeability rocks adjacent from the surrounding watershed to the groundwater Basin. The MODFLOW well package was applied along the basin margin in Model Layer 3 which represents the weathered bedrock. The distribution of the cells assigned to represent MFR are shown on **Figure 16.**

The rainfall-runoff-recharge model (see **Section 3**) was used to calculate a monthly subsurface inflow from each watershed based on precipitation recharge in the upstream watershed, with delays and attenuation due to long travel times through bedrock fractures. A set of cells in the well package were assigned to each watershed and the monthly inflow was distributed evenly to those cells assigned to that watershed. Therefore, the distribution of inflow incorporates the size and rainfall for each of the defined watersheds that contribute flow to the Basin.

4.3.4. Evapotranspiration

Evapotranspiration (ET) represents groundwater outflow from evaporation to the atmosphere and uptake by plants from the saturated zone. This is distinct from ET associated with soil moisture before it reaches the groundwater aquifer that is sustained by the total available precipitation not accounted for by runoff or recharge (see **Section 3**).

The MODFLOW evapotranspiration (EVT) package is used simulate ET directly from the groundwater aquifer. ET is defined over the entire model domain; however, ET only occurs in areas of shallow groundwater. In the Basin, this is generally limited to riparian areas adjacent to streams. ET includes uptake from both phreatophytes (plants that require groundwater) and mesophytes (plants that can utilize groundwater) either directly from the saturated zone or from the overlying capillary fringe (Meinzer, 1927; Robinson, 1958; and Lewis and Burgy, 1964). ET from the capillary fringe is replenished with groundwater from the underlying aquifer, so it is also considered a loss of groundwater (Lubczynski, 2011).

In the MODFLOW EVT package, the ET rate decreases with increasing depth to the water table because fewer shrub and tree roots are able to reach the water table and the energetics of withdrawing the water become less favorable. In the groundwater model, the consumptive use of groundwater due to ET decreases from the maximum rate when the water table is at the land surface and diminishes linearly down to zero when the water table reaches the extinction depth for that location.

In the Temescal Basin Model, three ET zones were defined as shown on **Figure 17**. The first zone represents locations where aerial photographs indicate the presence of dense, lush riparian vegetation indicates areas of shallow groundwater where the plants (phreatophytes) can regularly uptake water directly from the water table to meet evaporative demand. These primarily occur in the Prado wetland area, along the Temescal Wash, Santa Ana River and in some of the upland canyons along the basin margin. The extinction depth for these locations was set at 20 feet below the ground surface. Over most of the remaining model domain, the extinction depth was set at the ground surface. The third area represents areas the Norco area where the extinction depth was set at 1.0 feet below the ground surface to better control periods of high groundwater. ET rates applied in the Temescal Basin Model use the ET data from the rainfall-runoff-recharge model (see **Section 3**).

4.3.5. Groundwater Pumping

Groundwater pumpage is the largest groundwater outflow from the Basin. Corona is the primary producer of groundwater in the Basin. Corona has 18 wells that extract water from the Basin for the purpose of potable water supply (Michael Baker 2021). Norco has four active wells but they are located in the unadjudicated portion of the Chino Subbasin not the Basin. Thirty-eight wells within the Basin produced groundwater in one or more years during 1990-2018, and the reported annual pumping amounts were obtained from WMWD.

A number of private wells were historically installed in the Basin. There are no records of which of these wells are currently active. However, the GSA agencies searched for existing active wells within the Basin. This search included reviewing water use records and contacting owners of large private properties (domestic, commercial, and industrial), inquiring about private wells in discussions with knowledgeable local residents and community leaders, and polling interested parties during public meetings. This effort indicated that the only private pumpers in the Basin are All American Asphalt, Dart Corporation, and 3M. No active private domestic wells were identified in this search. **Figure 18** shows the locations of wells with measured pumping rates in the Basin by Corona, Norco and private pumpers.

Citrus orchards irrigated with groundwater were common in the Basin in the early 1990s, but except for one small grove those have all been replaced by urban development. Agricultural irrigation pumping of the orchards was estimated by the rainfall-runoff-recharge model, with pumping assigned to a hypothetical irrigation well at the center of each irrigated recharge zone. This pumping was phased out over time as urban development occurred. Urban irrigation is supplied by the municipal water system, which uses imported water and local wells. Locations of agricultural pumping are distributed based on the estimated agriculture pumping requirements calculated using the rainfall-runoff model (**Figure 19**).

Municipal well extractions are measured and these data are entered directly into the model. Annual production by municipal wells is shown in **Figure 20**. All pumping wells are included as analytical elements that are simulated by the MODFLOW well package in the model. **Table 1** summarizes the average annual groundwater pumping for each well over the simulation period along with the assigned model layer.

4.3.6. Recycled Water Recharge Ponds

Wastewater is treated at three Corona-owned and operated Water Reclamation Facilities (WRF-1, WRF-2 and WRF-3). The average annual production of treated wastewater (effluent) from these sources is approximately 11.35 mgd, or 12,700 acre-feet per year (AFY). Supply is anticipated to increase incrementally due to population growth by an additional 0.88 mgd through 2040 (about 7.8 percent).

WRF effluent is allocated to three end uses: 1) discharge to Temescal Wash or the Santa Ana River (SWRCB 2021), 2) reuse via the reclaimed water distribution system, and 3) discharge to offsite percolation ponds. WRF-1 and WRF-2 both contribute effluent to all of these end uses while WRF-3 only contributes effluent to the reclaimed water system.

The MODFLOW Well Package was used to simulate recharge at the WRF recharge pond as recharge wells. The volume of flow for each recharge pond was distributed evenly over the area of the ponds. The three offsite percolation ponds overlie the Basin and allow for recharge. One of the ponds is located along Lincoln Avenue and the other two at the end of Rincon Street near Cota Street, as shown in **Figure 21**. Average annual WRF discharge to the recharge ponds from 2016 through 2020 ranged from 1,364 to 5,273 AFY at WRF-1, and 734 to 1,462 AFY at WRF-2.

4.3.7. Subsurface Flow with Adjacent Groundwater Basins

To simulate potential subsurface groundwater and outflow with adjacent groundwater basins, either a specified head or general head boundary was defined using MODFLOW. Constant head boundaries allow sufficient inflow or outflow at that model cell to achieve the specified head. Head boundaries were defined at the locations shown on **Figure 22** at the following areas:

- **Arlington Gap** - The Basin margin with the Upper Santa Ana Valley – Riverside-Arlington Basin at the location known as the Arlington Gap.
- **Santa Ana River Flow Boundary** - The Basin margin with the Coastal Plain of Orange County Groundwater Basin near the outflow of the Santa Ana River from the Temescal Basin.
- **Bedford-Coldwater Flow Boundary** - The basin margin along the far southeastern corner of the Basin to coordinate with a similar boundary condition applied in the groundwater model for the Bedford-Coldwater Basin.
- **Chino Basin Interior Flow Boundary** - The northern model domain boundary located within the Chino Basin.

At the Arlington Gap, a MODFLOW General Head Boundary (GHB) package was applied along the basin margin. The distribution of the GHB cells is shown on **Figure 22.** The MODFLOW general head boundary (GHB) package allows for a more flexible simulation of the groundwater elevation at the cell by calculating the inflow or outflow at that model cell based on a conductance and a specified head at a user-defined distance on the external side of the boundary. The GHB boundary was defined based on an earlier groundwater flux calculation for the Arlington Gap (Todd and AKM 2008). The GHB parameters were varied during calibration to better match measured groundwater levels in the area.

The boundary with the Coastal Plan of Orange County Basin is a narrow canyon where the Santa Ana River exits the Temescal Basin. A MODFLOW constant head boundary was applied at this location. The specified head at this boundary was set at a comparable level with the stage of the Santa Ana River to simulate subsurface flow towards the Coastal Plan of Orange County Basin.

The Bedford-Coldwater Basin boundary is generally considered have little to no groundwater flow except where the alluvium along Temescal Wash thins as the wash leaves the subbasin and traverses northward through bedrock (a reach referred to as Temescal Canyon) before entering Temescal Basin. A MODFLOW constant head was applied at this location at a comparable level with the stage as was applied in the Bedford-Coldwater Basin to allow for groundwater flow through the channel deposits of Temescal Wash.

The Chino Basin interior flow boundary is located along the northern model domain. A portion of the Chino Basin was included in the Temescal Basin Model domain to allow for a more natural boundary along the Santa Ana River and Prado wetlands area. As a result, a boundary condition was defined within the Chino Basin. This northern boundary was set at a distance sufficiently far from the Santa Ana River that the assigned boundary condition would not affect simulated river-aquifer interactions or simulated groundwater conditions in the Temescal Basin. A MODFLOW constant head was applied to represent the general groundwater elevation pattern in the Chino Basin based on available groundwater elevations with some minor adjustments during model calibration. The objective of this boundary condition is to provide a realistic representation of groundwater conditions within the Chino Basin with respect to understanding the water balance for the Temescal Basin.

4.4. AQUIFER PROPERTIES

Aquifer properties represent the physical and hydrogeologic characteristics of the aquifers within the Basin that control groundwater flow. Aquifer properties must be assigned to each active grid cell in the model. The conceptual model provides the framework necessary to define aquifer properties.

4.4.1. Aquifer Characteristics

The groundwater model represents the basin fill materials in terms of their ability to store and transmit groundwater. Horizontal and vertical hydraulic conductivity define the permeability of the aquifer, which is its ability to transmit groundwater flow. The ability to store water consists of two components. At the water table, storage of water associated with filling or draining the empty (air-filled) interstices between mineral grains is represented by the specific yield of the aquifer. In deep aquifers, there is a much smaller ability to store and release groundwater that derives from the compressibility of the water and aquifer materials (specific storativity). Thus, the initial response to pumping from a deep aquifer is a large drop in water level (head) within that aquifer. With sufficient time, however, the decrease in head creates downward movement of groundwater that eventually accesses the storage capacity at the water table. In other words, the storage response of the aquifer depends partly on the duration of pumping and observation. For groundwater management purposes, storage responses over periods of months to decades are usually the most relevant.

Aquifer characteristics can be estimated in two ways. The first is by means of an aquifer test in which one well is pumped while water levels are measured at a nearby well. This approach typically measures horizontal hydraulic conductivity over distances of tens to hundreds of feet and storage responses over periods of 1 to 3 days. The second approach is to calibrate a groundwater flow model such that the aquifer characteristics reproduce measured historical water levels throughout the basin given estimates of historical recharge and pumping. The latter approach produces estimates of aquifer characteristics averaged over spatial scales of thousands to tens of thousands of feet and time scales of months to decades. The estimates account for preferential flow through localized sand and gravel lenses in the basin fill materials and for delayed water-table responses to deep pumping. Also, model calibration provides estimates of vertical hydraulic conductivity across the layers of alluvial deposits, which is rarely measured by aquifer tests. The temporal and spatial scales represented by the model calibration approach are better for addressing most long-term groundwater management questions.

4.4.2. Zone Approach

Because of the limited data for aquifer properties for the Basin, a zoned distribution pattern was used that applied aquifer properties over subregional areas with similar geologic conditions. Although the units are heterogeneous, the approach was to get a representative average value for each aquifer property for limited number of zones around the basin. This was to avoid the patchwork quilt type of aquifer property distribution that does not show any relation to the underlying geologic conditions that define the aquifer property. **Figure 23** shows the distribution of aquifer characteristics after calibration of hydraulic conductivity and specific storage, respectively. The initial estimates of hydraulic conductivity and specific yield were from available local data, which incorporated major geologic features such as relatively permeable sediments in the upper parts of alluvial fans.

4.4.3. Hydraulic Conductivity

Hydraulic conductivity represents the ability of the water to flow through the aquifer, and is defined horizontally within a model layer to represent groundwater flow through the aquifer and vertically between adjacent model layers to represent groundwater exchange between aquifers. The determination of the horizontal hydraulic conductivity is based on an assessment of lithologic description, available aquifer test data and model calibration. Since each model layer represents a thick interval composed of varying lithologies, the horizontal hydraulic conductivity represents an average value over the entire vertical thickness that includes the finer-grained layers in addition to any specific sand and gravel zone. For the Temescal Basin model, horizontal hydraulic conductivity is defined using regionalized blocks based on the geologic character of the unit and refined during calibration. The hydraulic conductivity used in the Temescal Basin model varies within a reasonable value range for the aquifer characteristics for each aquifer to achieve the model calibration. The final simulated horizontal hydraulic conductivities are listed in **Table 2.**

4.4.4. Vertical Conductance

In general, groundwater flow within an aquifer is dominantly horizontal whereas flow between adjacent aquifers is essentially vertical. The application of vertical hydraulic conductivity recognizes the inherent anisotropy present in natural geologic formations. Vertical groundwater flow is equivalent to Ohm's Law for serial electrical flow through different resistivity layers. Based on this analogy, vertical groundwater flow, similar to serial electrical flow, is limited by the lowest conductivity (or highest resistivity) layer encountered. Therefore, vertical groundwater flow is defined by the lowest-permeability, areally extensive layer that controls the exchange of groundwater between aquifer or model layers. MODFLOW requires the input of a vertical hydraulic conductivity (Kz) for each layer. The vertical hydraulic conductivity values used in the model to calculate the VCONT are summarized in **Table 2**.

4.4.5. Specific Yield and Specific Storage

Aquifer storage defines the ability of the aquifer to take in or release water. Under unconfined conditions, water released from or put into aquifer storage represents the physical draining of groundwater from interstitial pore space within the aquifer. Unconfined storage is defined by specific yield. Under confined conditions, water released from or put into aquifer storage is derived from the compressibility of water as a result of changes in the aquifer pressure within the interstitial pore space. MODFLOW NWT requires the use of specific storage, which is in the units of feet^{-1}. Reasonable ranges for the specific yield and specific storage were varied within a reasonable range during the model calibration and the values are listed in **Table 2**, respectively.

4.5. INITIAL CONDITION

The model also requires that groundwater levels be specified at the start of the simulation. They were estimated based on contouring of available water level data. As the initial heads may not be representative of stable initial conditions, the first stress period representing pre-1990 conditions was run as steady-state condition to facilitate the calculation of a stable hydrologic system. In addition, initial conditions for the earlier groundwater model (Todd and AKM 2008), and simulated groundwater conditions for September 1989 from the Chino Model (WEI, 2015, 2020) were included to help guide the contouring. **Figure 24** provides the starting head used to provide a reasonable representation of the September 1989 groundwater conditions for Layers 1, 2 and 3.

5. HISTORICAL MODEL RESULTS

The Temescal Basin model was calibrated to reduce uncertainty by matching model results to observed data. An extensive calibration process was designed to better constrain the range of aquifer properties and boundary conditions for the model, thereby reducing uncertainty in the results.

5.1. CALIBRATION METHODOLOGY

For the Temescal Basin model, the calibration simulation uses a 29-year period that covers water year (WY) 1990 to WY2018. This aspect of the calibration is important to demonstrate that the model has the capability to simulate historical changes in groundwater elevations, and is therefore capable of forecasting future changes in groundwater elevations. This capability is necessary for the model to serve as a useful groundwater management tool.

5.1.1. Approach

The transient calibration is a process that compares the simulated groundwater levels from the model to observed groundwater level measurements. During calibration, boundary condition parameters and aquifer properties are varied within the reasonable range defined by the hydrogeological conceptual model. Different combinations are tested to determine the set of parameters and properties that produce an acceptable correlation between simulated and measured groundwater elevations. Other data sets, such as key water budget components, surface water conditions, or hydrogeological conceptual model, were also used to further constrain the calibration.

There are multiple combinations of aquifer properties and boundary conditions that can be used to match a single set of groundwater elevation data. Calibrating to multiple data sets under differing stresses (i.e. recharge and discharge rates) reduces this “non-uniqueness”, thereby reducing the uncertainty. Performing a comprehensive calibration over a 29-year base period infers the calibration has been performed over wet, dry, and normal years with varying degrees of pumping. To that end, the Temescal Basin model was primarily calibrated using groundwater levels. The measures of calibration are primarily from a statistical analysis along with a visual assessment groundwater level trends from hydrographs. The groundwater elevation maps and water budget data considered during the model calibration are assessed in context with the model results, so are discussed in the next section.

5.1.2. Calibration Methodology

Joint calibration of the rainfall-runoff-recharge model, the surface water budget models and the groundwater flow model applied heuristic methods (i.e. trial-and-error adjustments) to selected variables, as informed by the timing and location of model residuals. In accordance with the principle of parsimony in modeling (DWR 2016a), calibration began with a small number of broad zones for hydraulic conductivity and storage. Zones were subdivided during calibration if a pattern of residuals at multiple wells warranted it. Although storage and hydraulic conductivity are not necessarily correlated, in practice they often are to some degree. Thus, for simplicity, similar zonation patterns were used for both variables.

In practice, most of the calibration effort focused on adjustments to horizontal and vertical hydraulic conductivity, the locations and conductances of faults, stream bed vertical hydraulic conductivity, and several tributary watershed parameters: root depths of natural vegetation, rainfall-runoff thresholds and slopes, and the leakage and recession rates for shallow groundwater. Variables that were not adjusted during calibration include land use, crop root depths, pumping locations, and groundwater pumping.

The model calibration process was also evaluated using a statistical comparison of differences (or residuals) between measured and simulated groundwater elevations. An initial sensitivity analysis was performed using an automated parameter estimation process to provide an initial estimate of hydraulic parameter values and zonation. During the final model calibration, adjustments were made to model inputs and parameters in areas based on the degree and pattern of discrepancies between measured and simulated water levels. Water levels for some wells were easy to reproduce with the model, while others were more difficult. Additionally, a visual inspection of superimposed measured and simulated water-level hydrographs was used to verify consistency with long-term trends. This process of manually calibrating a groundwater model also produced considerable insight into the groundwater flow system and the factors that influence it.

5.2. SENSITIVITY ANALYSIS

The sensitivity analysis was used to determine which model parameters should be calibrated. The model parameters include the hydraulic properties of the aquifer, boundary conditions, as well as any other aspect of the model that can be parameterized. The objective of the sensitivity analysis was to identify those model parameters with a high sensitivity with respect to simulation of groundwater elevations. For the sensitivity analysis, PEST (Doherty, 2004) was selected due to its robust capabilities to automate the parameter estimation and further evaluate the model.

Parameter sensitivity measures the impact of a small parameter change on the calculated system response. If a small model parameter changes results in a large change in the simulated water levels of the model domain, the parameter is regarded as highly sensitive. For the initial sensitivity analysis, all model parameters were included. The purpose was to exclude insensitive parameters from the final adjusted parameter set. During these processes, the covariance matrix from sensitivity analysis was used as the basis for eliminating insensitive parameters from the final test. A total of 21 hydraulic parameters were included in the initial sensitivity analysis. The results indicated that results are relatively sensitive to the hydraulic conductivities and specific yield of layer 1, and also to the hydraulic conductivity of Layer 2 in some areas.

5.3. STATISTICAL CALIBRATION

Model calibration was based on observed groundwater elevations from 3,166 measurements in 29 wells over the 29-year base period from October 1989 through September 2018 (WY1990-2018). The locations of these wells are shown on **Figure 25**.

The statistical calibration consists of a rigorous analysis comparing the difference, or residual, between measured and simulated groundwater elevations. An initial assessment of the model calibration is a comparison of observed versus simulated groundwater elevations of the entire calibration data set using a scatter plot (**Figure 26**). As indicated on **Figure 26**, the scatter along the correlation line is minor in comparison to the range of the data. The correlation coefficient for the data on this graph is 0.934, which indicates a strong correlation between simulated and observed groundwater elevations.

A more detailed tabulation of the statistical analysis for the model calibration is presented in **Table 3**. A summary of the key statistical measures shown on **Table 3** are provided below:

- The residual mean is computed by dividing the sum of the residuals by the number of residual data values. If the mean is significantly higher or lower than zero, it indicates overall model bias toward high or low water levels. The residual mean is -1.7 feet, which is close to zero.
- The absolute residual mean is the arithmetic average for the absolute value of the residual so it provides a measure of the overall error in the model. The absolute residual mean is 11.1 feet.
- The residual standard deviation evaluates the scatter of the data. A lower standard deviation indicates a closer fit between the simulated and observed data. The standard deviation for the calibrated model is 8.7 feet.
- The Root Mean Square (RMS) Error is the square root of the arithmetic mean of the squares of the residuals is provides another measure of the overall error in the model. The RMS Error for the calibrated model is 11.3 feet.
- The scaled absolute residual the ratio of the absolute residual mean is divided by the range of observed groundwater elevations. This ratio helps to put the variation of the residuals into perspective with respect to the scale of the groundwater basin. This ratio for the Temescal Basin Model is 0.024, which puts the statistical variability at less than 2.5 percent of the range. A ratio below 0.10 is generally considered a well calibrated (ESI 2020).

The statistical comparison is also consistent when evaluated by aquifer as shown on **Table 3**, which summarizes the statistical parameters for calibration wells screened primarily in the Channel Aquifer and the Secondary Aquifers (combined Alluvial Fan Aquifer and Sandstone Aquifer). The variability is primarily attributed to the greater number of groundwater levels from active pumping that increases the variability of the observed data over the calibration period. The statistical results are of high quality and are one indication that each aquifer is well calibrated. **Table 4** provides a summary statistics for each of the 29 wells used in the calibration process. The statistical parameters are considered reasonable, indicating that the model is well calibrated.

It should be noted that some degree of difference (or residual) between the observed and simulated groundwater elevations is expected. Residuals may be due in part to localized effects or data quality issues. Therefore, a limited outlier analysis was applied to remove groundwater elevations that did not reflect groundwater conditions in the aquifer. For example, data quality issues, which typically look like isolated spikes along an otherwise consistent long-term trend, were removed. Elevated residuals can result from using groundwater elevations from pumping wells as calibration targets due to excessive drawdown due to a low well efficiency of the pumping well. Pumping well groundwater levels used for the calibration data set except those where the drawdown highly deviated from the long-term trend that were interpreted to be represent well efficiency issues within the pumping well.

5.4. GROUNDWATER LEVEL TRENDS

Hydrographs provide a detailed time history of groundwater elevations for specific wells. This time history data includes the impact of varying climatic and pumping stresses on the groundwater basin. Comparing hydrographs of model results versus observed data provides another measure of model accuracy. For calibration purposes, the hydrographs were inspected to evaluate how well the model results matched the overall magnitude and trend of the observed groundwater elevation data over time. For the transient model, it was considered more important to honor the overall trend of the data. A hydrograph was considered a good match if the model simulated the trend, even if the simulated groundwater elevations were consistently offset from the measured ones.

Groundwater elevation data for 28 hydrographs from different parts of the basin are included on **Figures 27 through 33**. Locations of the wells used for the hydrographs are shown on **Figure 25**. To facilitate a comparison of the relative groundwater trends observed in these wells, a consistent vertical scale of 200 feet is used on **Figures 27 through 33**. The vertical scale on the hydrographs ranges from 450 to 650 feet, except for Corona 27 well, which is located in the upland areas and has groundwater elevations outside of that range.

The majority of the hydrographs are from wells completed in the Channel Aquifer and adjacent Secondary Aquifers located in the northern portion of the Temescal Basin. The hydrographs from wells in this area show several trends that can be summarized as follows:

- From 1990 through 2000, groundwater elevations typically showed a stable to increasing trend with cumulative groundwater changes ranging from near zero to increases of over 20 feet.
- From 2001 through 2009, groundwater elevations showed a general declining trend of 20 to 40 feet of cumulative decline over this period.
- From 2010 through 2018, groundwater levels showed a variable, but overall stable trend, with groundwater levels fluctuating by plus or minus 10 to 20 feet.

During these periods, the average groundwater recharge was roughly similar, with a mixture of wet, normal and dry water year types. From 1990 to 2000, the average annual groundwater pumping in the Channel Aquifer area was at its lowest levels for the simulation period. Groundwater pumping in the Channel Aquifer area peaked during 2001 through 2009, then declined from 2010 to 2018. Based on this, the primary factor affecting the groundwater levels in the Channel Aquifer area is the amount of groundwater pumping.

In summary, trends in simulated groundwater elevations are similar to trends in the measured groundwater level data, indicating good model calibration. As noted above, most of the differences are due to using groundwater level data from active production wells. Groundwater elevations near active production wells can be chronically lower than in nearby surrounding areas due to residual pumping drawdown. MODFLOW calculates the average groundwater elevation over the entire area of each model cell rather than the elevation at the well location itself. It does not simulate localized pumping drawdown around the well.

5.5. EVALUATION OF GROUNDWATER FLOW

The Temescal Basin Model simulates monthly groundwater elevations for 348 months from October 1989 through September 2018. In general, the overall groundwater flow directions remained generally consistent over this period with some variations observed near the major groundwater pumping centers. To evaluate the range of groundwater elevations, we have selected a few key time periods. These include:

- **Figure 34** – September 2018 for Model Layer 1 – End of Historical Simulation Period
- **Figure 35** – September 2018 for Model Layer 3 – End of Historical Simulation Period
- **Figure 36** – January 1997 for Model Layer 1 – Period of consistently high groundwater levels
- **Figure 37** – January 1997 or Model Layer 3 – Period of consistently high groundwater levels
- **Figure 38** – August 2014 for Model Layer 1 – Period of consistently low groundwater levels
- **Figure 39** – August 2014 or Model Layer 3 – Period of consistently low groundwater levels

The high and low conditions represent a combination of climatic conditions and groundwater pumping demands. For the purposes of evaluating groundwater flow directions, we have selected Layers 1 and 3 as representative of the three layers. In general, the groundwater map for Layer 1 is representative of groundwater conditions in the Channel Aquifer, the upper part of the Alluvial Aquifer in the Temescal Basin, and the shallow aquifer in the Chino Basin. The groundwater map for Layer 3 is representative of groundwater conditions in the Secondary Aquifers.

Figure 34 shows the groundwater level contours and flow directions for Layer 1 at the end of the historical simulation period representing September 2018 conditions Groundwater flow in the Channel Aquifer was from east to west, generally following Temescal Wash. In the Norco area, groundwater flow in Layer 1 was localized to internal drainage and downward percolation. In the Chino Basin, groundwater flow was from northeast to southwest generally following the Santa Ana River. For much of the southern Temescal Basin and areas in the Norco area, Layer 1 is unsaturated, shown on the figures by the purple areas.

In the Secondary Aquifers, groundwater flow was generally from the basin margins towards the Santa Ana River and the Prado wetlands area in September 2018 (**Figure 35**). Underneath the Channel Aquifer, groundwater flow in the Secondary Aquifers flowed from southeast to northwest generally parallel to Temescal Wash. In the Norco area, groundwater flow was generally southwest along the long axis of the valley where it then converged with groundwater flowing northwest toward the Santa Ana River. In the Chino Basin, groundwater flow is from northeast to southwest along the Santa Ana River.

In the southern Temescal Basin, the groundwater gradient in September 2018 was steeper due to the geology of the area. The fault zone along the western margin is configured to be a groundwater barrier limiting flow across the fault. This is based on the HCM and groundwater levels from the Corona 27 well. Groundwater flow in the faulted area flowed to the north where it reached the Santa Ana River downstream of Prado Dam. Below Prado Dam, groundwater flow is towards the Coastal Plain of Orange County Groundwater Basin through either discharge to the Santa Ana River or subsurface flow.

Figure 36 shows simulated groundwater elevation contours for January 1997 in Layer 1. During this period, widespread high groundwater levels were observed reflecting a period of high precipitation and below average groundwater pumping rates. In spite of the contrast in hydrologic conditions, the general groundwater flow directions were generally consistent with those in September 2018 (**Figure 34**).

Groundwater elevations in January 1997 in Layer 3 were also generally consistent with September 2018, with groundwater flowing from the basin margins towards the Santa Ana River and the Prado wetlands (**Figure 37**). The most significant difference was lower groundwater elevations with a localized groundwater depression in the southern Temescal Basin as a result of estimated agricultural groundwater pumping at this time.

Figure 38 shows the groundwater elevations in layer 1 for August 2014. During this period, widespread low groundwater levels were observed reflecting several preceding dry years. In general, the groundwater flow directions were similar to those in 1997 and 2018 (**Figures 34 and 36**). The main differences are lower groundwater levels due to groundwater pumping and limited recharge in the Channel Aquifer.

In the Secondary Aquifers (Layer 3), groundwater elevations were also similar to September 2018 and January 1997, with groundwater flowing from the basin margins towards the Santa Ana River and the Prado wetlands area (**Figure 39**). By 2014, agricultural pumping in the Temescal Basin had disappeared due to urbanization. As a result, groundwater pumping in the southern part of Temescal Basin decreased to near zero, and flow was consistently towards the north.

The simulated groundwater flow patterns were consistent with the hydrogeological conceptual model. These maps are included to demonstrate that the model provides reasonable simulation of groundwater elevation and flow direction even during the more extreme climatic periods during the base period. This further demonstrates that the model is well calibrated and can accurately simulate wet and dry weather periods.

5.6. MODEL-BASED HYDROLOGIC BUDGET

GSP regulations (§354.18(c)(2)(B)) indicate a need to identify an average hydrologic study period that cover as least 10 years that includes a range of hydrologic conditions (e.g. wet, normal, dry and critically dry) for purposes of the groundwater analyses in the basin-wide water budgets. In order to select a consistent study period, the Temescal GSA is using a 29-year base period covering the simulation period from WY1990 through WY2018. Water years used for the Temescal Basin Model run from October through to the following September to capture the cause and effect relationship on groundwater levels of wintertime rain and subsequent summertime groundwater pumping. Additional analysis of the historical water budget is provided in **GSP Section 5** ("Water Budget") and tables summarizing the water budget results are presented in **Appendix K**.

6. SIMULATION OF FUTURE CONDITIONS

GSP regulations §354.18(c)(3) require simulation of several future scenarios to determine their effects on water balances, yield and sustainability indicators. The following scenarios to simulate future conditions include:

- **Baseline Scenario** - This represents a continuation of existing land and water use patterns, imported water availability, and climate.
- **Growth Plus Climate Change Scenario** - This scenario implements anticipated changes in land use and associated water use, such as urban expansion, and anticipated effects of future climate change on local hydrology (rainfall recharge and stream percolation) and on the availability of imported water supplies.

The historical period used for model calibration consisted of only 29 years (water years 1990 through 2018). The Sustainable Groundwater Management Act requires that future simulations cover a 50-year period. To obtain 50 years of hydrology, rainfall, reference ET and streamflow were assumed to repeat the 1993 to 2017 sequence twice. Rainfall during that period equaled 99 percent of the long-term average. Surface and subsurface inflows from tributary watersheds simulated using the rainfall-runoff-recharge model were also replicated to obtain 50 years of data. The initial conditions for the future baseline simulation equaled the ending water levels of the calibration simulation, or September 2018. Thus, the future simulation period nominally covers water years 2019 to 2068.

Both of the future simulations assumed that the level of development and related water demand are constant throughout the simulation. That is, development in the growth plus climate change simulation is not phased in over time but rather corresponds to 2068 development throughout the simulation. This is the best way to demonstrate whether 2068 land use is sustainable because it allows for assessment of the effects of variations in climatic conditions (wet and dry cycles) on groundwater conditions, avoids subjective decisions about the concurrent timing of droughts and development, and provides time for the full effect of future conditions on groundwater to become apparent.

Additional details regarding assumptions and inputs for the future scenarios are presented in **GSP Section 5.5.3** “Simulation of Future Conditions”. Water budget results for the two future scenarios are described in Section 5 of the main GSP text. Both scenarios showed essentially no net change in groundwater storage from 2018 to 2068 (see **GSP Figure 5-10**). Contours of simulated groundwater elevations in model layers 1 and 3 were also very similar to those in 2018, consistent with the water budget results and with the SMCs for groundwater elevations and storage, which preclude future declines to levels below minimum historical levels.

The future Baseline Scenario and Growth Plus Climate Change Scenario can serve as reference conditions against which to compare alternative management scenarios. Additional data and assumptions used in the future baseline simulation are described in **GSP Section 5.5.3** (“Simulation of Future Conditions”). Inputs and results of other scenarios related to specific management actions recommended in the GSP are also described in **Section 8** (“Management Actions”) and water budget results are presented in **Appendix K**.

7. SGMA REQUIREMENTS

As noted in the SGMA Modeling Best Management Practices (BMP) guidelines (DWR 2016a), the description of the model application should include detailed information on the model conceptualization, assumptions, data inputs, boundary conditions, calibration, sensitivity and uncertainty analysis, and there applicable modeling elements such as model limitations. A DWR requirement for using model results in future water budget reporting for Annual Reports is to report the model accuracy. The following information addresses these reporting requirements.

7.1. MODEL DATA GAPS

When evaluating model results, it is important to consider the strengths and limitations of the numerical model. The horizontal and vertical resolution used to construct the model dictates the range of scales that the model can evaluate. The Temescal Basin Model is designed as a regional or basin-wide model to evaluate long-term, regional trends and the overall groundwater inflow and outflow to the basin. Within that scale, conditions are averaged. However, this model may not contain the site-specific details necessary to evaluate some localized conditions due to geologic complexity or unique localized effects. For these areas, a more localized model may be required if such a detailed analysis is necessary. The regional model can provide a broader regional context to support the development of these localized models.

The groundwater flow model is an appropriate tool for evaluating groundwater conditions at the basin and subarea scale over periods of months to decades. Given its reasonable calibration under a wide range of historical hydrologic and water management conditions, it should produce reliable results under a similar range of future conditions. However, some aspects of the model and some types of applications may be less reliable. Limitations in model accuracy and in types of applications include the following:

- As with any regional model, the model cannot simulate details of water levels and flow at spatial scales smaller than one model cell. It cannot, for example, simulate drawdown within a pumping well. It can only simulate the average effect of that pumping on the average water level of the cell in which the well is located.
- The monthly stress periods of the model preclude simulation of brief hydrologic stresses. For example, the model cannot simulate the effects of daily pumping cycles on water levels, or the amount of recharge associated with peak stream flow events.
- Surface and subsurface inflows from tributary watersheds around the perimeter of the basin remain uncertain. The rainfall-runoff-recharge model simulates watershed hydrology explicitly but flows from the watersheds to the groundwater basin are small compared to rainfall and ET. Accurate data for those variables within the watershed areas are not available, and a small error in rainfall or ET can result in a large error in simulated watershed outflow.
- Model calibration is better in some parts of the basin than others. Any future model calibration would benefit from additional groundwater elevation data in areas outside of the Channel Aquifer.

7.2. MODEL ACCURACY

A numerical model mathematically describes the conceptual model by solving the mass balance and motion equations that govern groundwater flow and chemical transport (Bear and Verruijt 1987). To solve these equations, an iterative method is used to solve the matrix equations. For these iterative techniques, the procedure is repeated until the convergence criteria are met. The convergence criteria may be groundwater elevation change, mass balance difference, or both. Convergence defines whether the model is mathematically stable and capable of producing reliable results.

For this model, the Newton (NWT) Solver Package was used (Niswonger et. al., 2011). The convergence criteria for NWT included both a maximum change in groundwater elevation and a maximum mass balance differential for a cell. For this model, the convergence parameter for groundwater elevation was set at 0.1 feet and 5,000 cubic feet per day for mass balance differential. Convergence is evaluated at the grid cell level. If a single cell does not meet the requirement, then the solution procedure is repeated. The model was able to successfully converge using the set convergence parameters.

The primary method to check whether the model is numerically stable is to evaluate the differential in mass balance. Iterative techniques provide an approximate solution for the model; therefore, there is always a mass balance differential. This differential should be small, and typically a differential of less than 1.00 percent is considered as a good solution. The mass balance differential for Temescal Basin Model is 0.02 percent. These values further indicate that numerical model that is accurately simulating the flow of groundwater in the Basin.

The model calibration and comparison of the hydrologic budget results demonstrate that the model is consistent with the conceptual model to produce these results. The calibration correlation coefficient of 0.934 demonstrates a strong comparison between measured and simulated groundwater elevations. Other statistical calibration parameters show that the scaled ratio of the calibration residuals to the range of observed groundwater levels is about 2.5 percent.

Based on these parameters, the accuracy of the Temescal Basin Model in developing SGMA water budgets is conservatively considered to range between 10 to 15 percent when also considering total level of uncertainty resulting from input parameter, assumptions, calibration accuracy and numerical stability. Since the calibration accuracy and numerical stability are well below this range, the input parameter assumptions are the main source of uncertainty with the model results.

7.3. LIMITATIONS TO CALIBRATION

All inputs to a model are estimates that are subject to errors or uncertainty, but some are better known than others. Also, some have relatively pronounced effects on simulation results. For example, the amount of water pumped by municipal wells is metered and is considered highly accurate compared to most model inputs. Accordingly, the amount of municipal pumping was not adjusted during calibration.

Variables were selected for adjustment during calibration based on their relative uncertainty, the sensitivity of results to that variable, and whether the variable might logically be connected to an observed pattern of residuals based on hydrologic processes.

The measured water levels that serve as the basis for calibration are themselves subject to uncertainty stemming from wellhead elevation errors, effects of recent pumping at the measured well, and wells that for unknown reasons have water levels inconsistent with water levels at nearby wells. Almost all of the wells used to monitor water levels are active water supply wells located in or adjacent to the Channel Aquifer. If a well was pumping shortly before the water level is measured, the water level will be much lower (by feet to tens of feet) than if the well had been idle for a day or more. In some hydrographs, pumping-affected water levels stand out as obvious anomalies. A number of those points were removed from the calibration data set. In other cases, water levels fluctuate over a wide range seasonally and between measurements, and pumping effects could not be systematically identified and eliminated.

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TABLES

Table 1 - Annual Metered Groundwater Pumping Volumes by Well (acre-feet per year)

Well_Name	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
AA_Asphalt_#1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	25	25	25	25	25	25	25	25	25	25	0	1
AA_Asphalt_#2	0	0	0	0	0	0	0	0	0	0	0	0	374	515	588	378	204	180	288	330	310	357	344	337	366	184	98	212	265	0	0
Butterfield#1	240	240	205	191	190	51	74	100	100	60	12	0	0	0	0	0	0	12	4	0	0	0	0	0	0	0	0	0	0	0	0
Corona_#01	843	979	1,154	1,515	1,264	1,670	1,309	1,223	1,658	362	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	37	207
Corona_#02	0	0	209	1,053	1,049	1,143	1,004	858	1,014	211	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42	202
Corona_#06	372	560	195	325	374	610	427	450	567	525	372	359	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	169	185
Corona_#07	396	544	306	524	254	578	316	421	751	830	845	860	134	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	414	278
Corona_#07A	0	0	0	0	0	0	0	0	0	0	0	0	0	830	1,276	1,244	1,242	1,215	1,262	713	752	720	749	785	1,146	990	1,144	617	1,197	243	380
Corona_#08	1,164	76	2,117	1,603	1,389	1,743	1,352	1,156	1,420	1,333	1,513	1,598	1,307	559	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corona_#08A	0	0	0	0	0	0	0	0	0	0	0	0	0	1,094	2,196	1,542	1,598	1,968	2,102	1,875	2,164	1,886	2,004	2,031	1,919	2,019	1,771	2,047	1,657	0	0
Corona_#09	443	703	552	639	507	459	242	544	531	535	507	755	68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corona_#09A	0	0	0	0	0	0	0	0	0	0	0	0	0	1,162	2,554	2,159	1,266	1,455	1,622	1,487	1,512	1,519	1,612	1,547	1,550	1,495	1,227	1,419	1,327	0	0
Corona_#10thSt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corona_#11	209	456	423	407	153	422	295	361	143	632	490	403	119	297	511	582	589	575	600	243	143	34	0	0	0	0	0	0	0	385	410
Corona_#11A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	511	948	913	811	789	781	417	515	804	0	0
Corona_#12&12A	130	4	0	0	0	0	0	0	0	0	0	0	432	660	607	564	545	359	551	1,087	924	377	619	884	1,228	1,041	458	677	792	354	425
Corona_#13	701	429	3	70	272	1	0	55	334	31	0	0	0	120	278	529	544	772	701	598	574	381	527	498	345	257	0	0	0	324	205
Corona_#14L1	65	59	25	289	386	238	243	427	342	631	495	351	387	578	483	332	626	452	249	360	331	360	360	240	300	360	356	360	360	174	96
Corona_#14L2	10	6	4	62	93	54	50	107	81	153	119	80	92	141	120	83	152	110	604	854	775	798	1,025	455	550	602	431	573	482	0	0
Corona_#15	573	977	1,034	1,331	1,287	1,219	916	145	1,303	1,357	1,595	1,218	586	681	1,543	1,404	1,730	1,099	1,764	1,695	1,713	1,667	1,568	1,242	810	1,423	1,087	1,214	939	0	0
Corona_#17	1,030	211	1,045	1,087	1,223	1,360	995	863	1,003	1,142	976	331	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corona_#17A	0	0	0	0	0	0	0	0	0	0	0	0	304	1,285	706	826	1,518	1,706	1,465	1,215	1,055	1,101	1,191	1,231	1,027	1,212	1,230	1,074	1,019	0	0
Corona_#19	0	0	0	13	12	0	596	2,500	3,009	3,093	2,291	2,686	2,289	1,365	539	1,461	1,794	1,702	1,687	1,373	1,379	1,292	973	1,578	9	0	0	0	1,056	0	0
Corona_#22	0	0	0	0	0	0	0	0	0	0	0	0	4,658	4,044	3,016	2,014	2,362	2,309	1,950	1,269	769	1,450	2,250	2,698	2,570	2,687	1,921	2,272	2,169	178	0
Corona_#23	0	0	0	0	0	0	0	0	0	0	0	0	51	0	0	211	0	0	0	19	201	0	0	0	0	0	0	0	0	0	0
Corona_#24	0	0	0	0	0	0	0	0	0	0	0	191	652	315	200	384	497	283	56	163	0	0	94	109	26	0	0	0	0	0	0
Corona_#25	0	0	0	0	0	0	0	0	0	0	0	0	3,833	2,632	2,408	2,454	2,259	1,425	2,137	1,195	1,268	1,184	981	609	615	769	1,522	1,894	1,110	174	748
Corona_#26	0	0	0	0	0	0	0	0	0	0	0	347	1,419	1,365	1,009	1,055	819	813	317	102	420	109	8	501	603	545	42	0	0	565	522
Corona_#27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	209	408	414	224	658	633	677	684	584	643	565	494	364	306	375	45	45
Corona_#28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	807	2,388	2,270	2,369	2,440	2,009	1,842	1,643	1,703	1,379	1,195	1,115	612	814	1,048	9	8
Corona_#29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	823	831	523	783	793	974	89	7	0	0	0	0
Corona_#31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	915	752	5	0	0	855	0	0
Corona_LINCOLN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corona_Main#3	1,433	1,197	1,194	1,206	542	377	357	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Corona_Main#4	75	491	1,004	1,190	1,195	765	175	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	175
Dairy_New_Industrial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	533	227	329	175	90	105	106	114	119	115	29	0	0	0
Dart#1	84	91	95	114	120	122	123	123	123	129	165	171	159	154	53	128	205	238	224	195	140	124	110	98	99	101	102	102	112	56	57
Dart#2	0	0	0	0	0	0	0	0	0	4	7	11	13	18	146	75	18	4	0	0	0	7	2	0	0	1	1	1	1		
EVWMD-Kampling	411	284	157	40	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
HGCWD_#1	1	1	1	1	2	1	1	1	1	2	2	3	3	2	2	2	1	1	2	1	1	1	2	1	1	1	1	0	0		
HGCWD_#5	0	0	0	88	194	238	242	155	131	163	162	148	156	149	136	137	131	125	128	128	116	116	91	29	3	0	0	0	0		
JoyWC_10thSt	143	137	135	139	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
JoyWC_Lincoln	0	0	0	0	70	97	101	77	72	82	56	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Norch_#5	949	146	22	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Norco_#14	0	0	0	0	0	859	155	1,049	1,219	1,196	1,134	1,126	978	837	1,017	1,060	1,062	992	983	970	699	763	891	880	833	791	559	631	471		
Norco_#15	0	0	0	0	0	0	0	195	746	1,178	932	713	1,115	1,263	875	496	449	300	429	127	24	103	18	0	0	0	0	0	0		
Subtotals																															
Total	9,273	7,589	9,879	11,890	10,614	12,007	8,973	10,905	14,550	13,649	11,672	11,362	19,216	20,066	21,279	21,914	22,294	21,221	22,468	19,816	19,331	18,263	19,532	20,426	18,414	17,104	13,488	14,781	16,063	3,169	3,944

Table 2 - Annual Metered Groundwater Pumping Volumes by Well (acre-feet per year)

Horizontal Hydraulic Conductivity (feet/day)					
Zone	**Name**	**Basin**	**Model Layer 1**	**Model Layer 2**	**Model Layer 3**
1	Outer Channel	Temescal	60	7.5	2
2	Deep Channel	Temescal	125	10	3
3	Channel Margin	Temescal	45	7.5	2
4	South Basin	Temescal	20	2	1
5	Norco	Temescal	10	2	1
6	Fault South	Temescal	10	2	1
7	Fault North	Temescal	10	2	1
8	Upper Santa Ana	Chino	5	0.5	0.5
9	Chino	Chino	5	1	3
10	Prado	Chino	5	1	3
Vertical Hydraulic Conductivity (feet/day)					
Zone	**Name**	**Basin**	**Model Layer 1**	**Model Layer 2**	**Model Layer 3**
1	Outer Channel	Temescal	6	0.75	0.2
2	Deep Channel	Temescal	12.5	1	0.3
3	Channel Margin	Temescal	4.5	0.75	0.2
4	South Basin	Temescal	10	0.2	0.1
5	Norco	Temescal	1	0.2	0.1
6	Fault South	Temescal	10	2	0.1
7	Fault North	Temescal	10	0.2	0.1
8	Upper Santa Ana	Chino	0.5	0.025	0.025
9	Chino	Chino	0.5	0.1	0.3
10	Prado	Chino	0.5	0.1	0.3
Specific Storage (1/feet)					
Zone	**Name**	**Basin**	**Model Layer 1**	**Model Layer 2**	**Model Layer 3**
1	Outer Channel	Temescal	2.0E-04	2.0E-04	1.0E-05
2	Deep Channel	Temescal	1.0E-03	2.0E-04	1.0E-05
3	Channel Margin	Temescal	2.0E-04	2.0E-04	1.0E-05
4	South Basin	Temescal	1.0E-04	2.0E-05	1.0E-05
5	Norco	Temescal	1.0E-04	2.0E-05	5.0E-06
6	Fault South	Temescal	1.0E-04	2.0E-05	5.0E-06
7	Fault North	Temescal	1.0E-04	2.0E-05	5.0E-06
8	Upper Santa Ana	Chino	1.0E-04	2.0E-07	2.0E-07
9	Chino	Chino	1.0E-04	1.0E-06	2.0E-06
10	Prado	Chino	1.0E-04	1.0E-06	2.0E-06
Specific Yield (percentage)					
Zone	**Name**	**Basin**	**Model Layer 1**	**Model Layer 2**	**Model Layer 3**
1	Outer Channel	Temescal	0.10	0.06	0.02
2	Deep Channel	Temescal	0.15	0.08	0.02
3	Channel Margin	Temescal	0.10	0.08	0.02
4	South Basin	Temescal	0.08	0.03	0.02
5	Norco	Temescal	0.08	0.03	0.02
6	Fault South	Temescal	0.08	0.03	0.02
7	Fault North	Temescal	0.08	0.03	0.02
8	Upper Santa Ana	Chino	0.06	0.02	0.03
9	Chino	Chino	0.06	0.02	0.03
10	Prado	Chino	0.06	0.02	0.03

Table 3 - Temescal Model Calibration Statistics

Statistical Measure	Result	Explanation
Residual Mean	-1.73	Average error from residual for each point in calibration data set
Absolute Residual Mean	8.66	Total error from average for the absolute value of the residuals
Residual Standard Deviation	11.12	Average deviation of residual relative to the "residual mean"
Sum of Squares	458,178	Sum of squared value of residual for each calibration data point
RMS Error	11.26	Square root of the "Sum of Squares"
Maximum Residual	51.0	Highest residual during simulation
Minimum Residual	-59.0	Lowest residual during simulation
Number of Observations	3616	Number of GWEL measurements in calibration data set
Range in Observations	367	Difference of highest and lowest observed GWEL
Scaled Residual Mean	-0.0047	Residual Mean divided by "Range of Observations"
Scaled Absolute Residual Mean	0.0236	Absolute Residual Mean divided by "Range of Observations"
Scaled Residual Standard Deviation	0.0303	Residual Std. Deviation divided by "Range of Observations"
Scaled RMS Error	0.0306	RMS Error divided by "Range of Observations"
Correlation Coefficient	93.4%	Strength of relationship between observed and simulated GWEL

Notes: GWEL - groundwater elevation

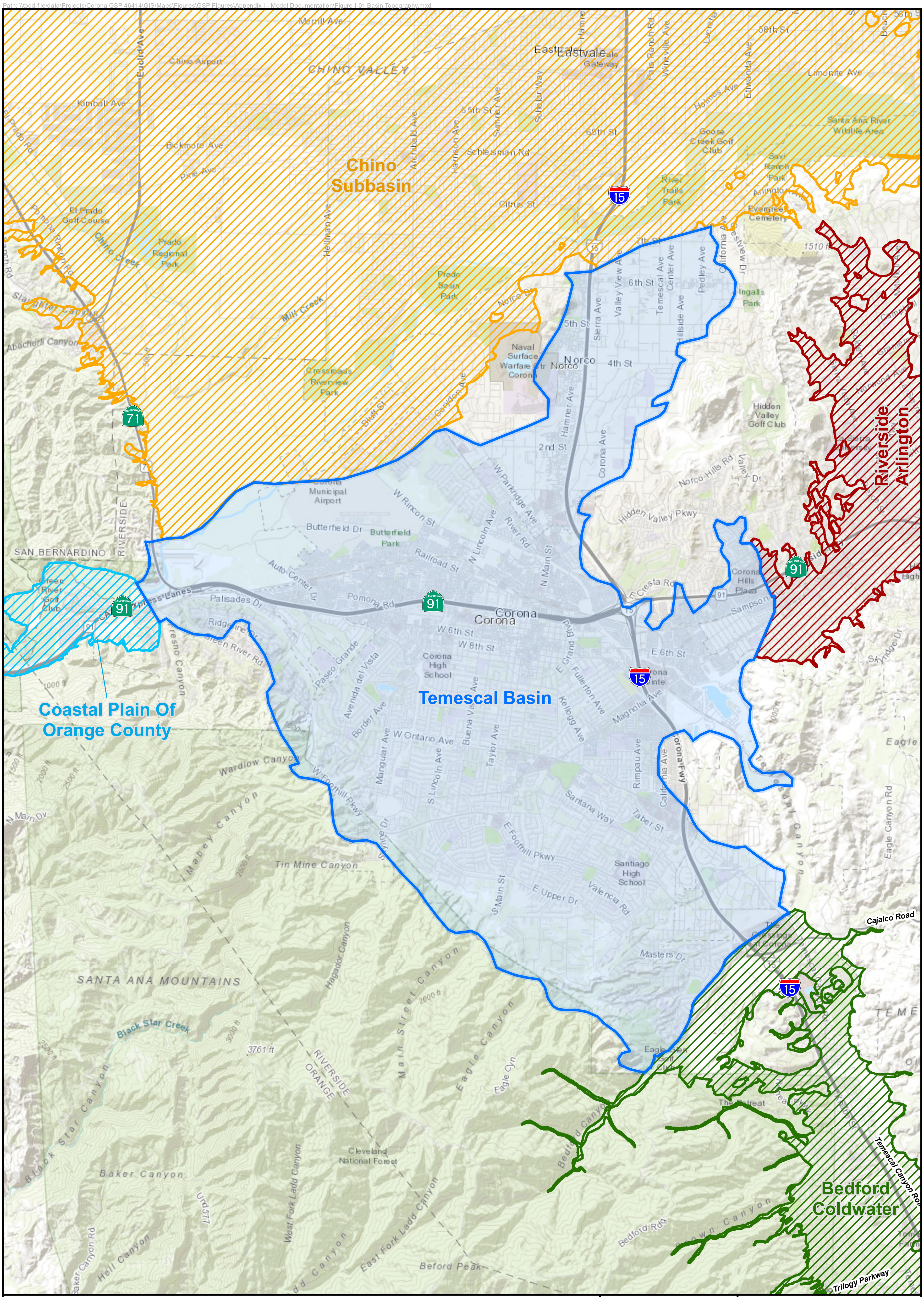
Residual is the observed GWEL minus the simulated GWEL

Table 4 - Statistical Calibration by Well

Well ID	Model Layer	Number of Measured Data	Residual Mean (feet)	Absolute Residual Mean (feet)	Standard Deviation (feet)
3S7W27F6	1	66	-11.7	11.7	4.9
Butterfield	1	51	-0.7	3.3	4.2
Corona_11	1	307	-0.6	4.7	5.9
Corona_12	1	144	-5.3	6.1	5.1
Corona_12A	1	169	4.4	7.8	9.1
Corona_13	1	275	15.7	16.3	8.4
Corona_14	2	191	9.6	10.3	7.4
Corona_15	1	310	-4.8	7.6	8.5
Corona_16	2	112	-8.6	8.6	4.6
Corona_17	1	15	-1.2	1.9	2.4
Corona_17A	1	160	-5.4	9.4	10.6
Corona_19	1	251	-5.6	8.1	9.4
Corona_22	1	180	-1.6	8.1	10.0
Corona_23	1	35	-6.3	6.6	4.3
Corona_24	3	74	-1.9	6.6	8.4
Corona_25	1	134	0.6	5.9	7.3
Corona_26	2	61	-8.7	8.7	4.7
Corona_27	3	15	-13.0	43.2	45.5
Corona_28	1	102	-0.2	5.9	7.1
Corona_29	1	113	-7.9	9.0	6.9
Corona_31	1	97	4.8	6.3	6.3
Corona_6	1	60	-0.7	3.8	5.0
Corona_7	1	59	0.9	4.6	5.9
Corona_7A	1	111	-15.6	15.7	8.2
Corona_8	1	181	-10.7	11.2	9.0
Corona_8A	1	157	-1.0	4.8	6.1
Corona_9	1	147	-8.9	11.6	9.8
HG-01	1	27	3.4	4.8	4.2
Joy-Street	2	12	9.6	14.6	13.6
Grand Total	**3**	**3616**	**-1.73**	**8.7**	**11.12**

FIGURES

Path: \\todd-file\data\Projects\Corona GSP 46414\GIS\Maps\Figures\GSP Figures\Appendix I - Model Documentation\Figure I-01 Basin Topography.mxd



Temescal Basin	
Bedford-Coldwater	
Chino Subbasin	
Coastal Plain Of Orange County	
Riverside-Arlington	

N

0 0.5 1
Miles

Figure 1
Location and Topography of the Temescal Basin

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Path: \\todd-file\data\Projects\Corona GSP 46414\GIS\Maps\Figures\GSP Figures\Appendix I - Model Documentation\Figure I-02 Watersheds.mxd

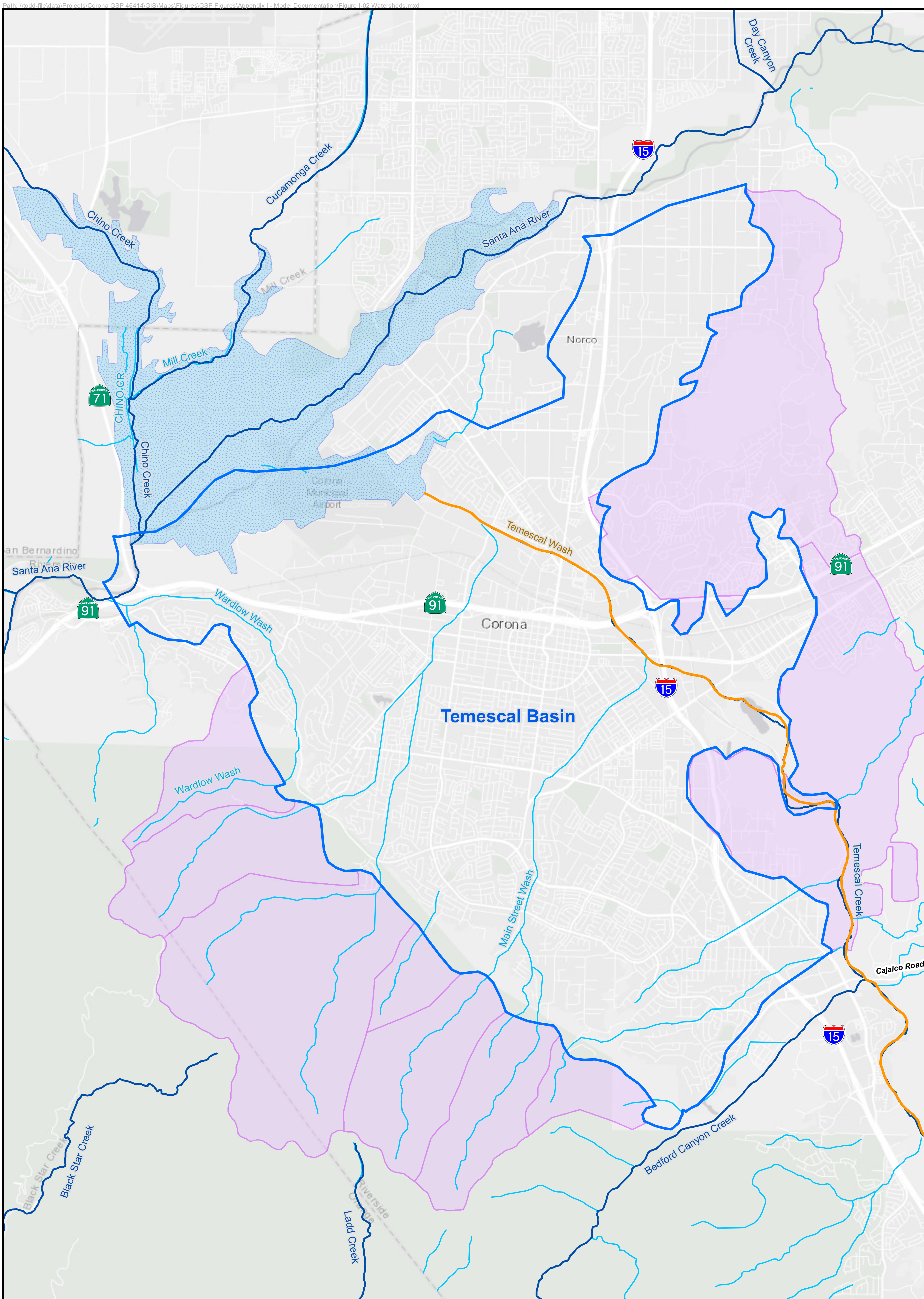

Figure 2
Rivers, Streams, Wetlands and Tributary Watersheds

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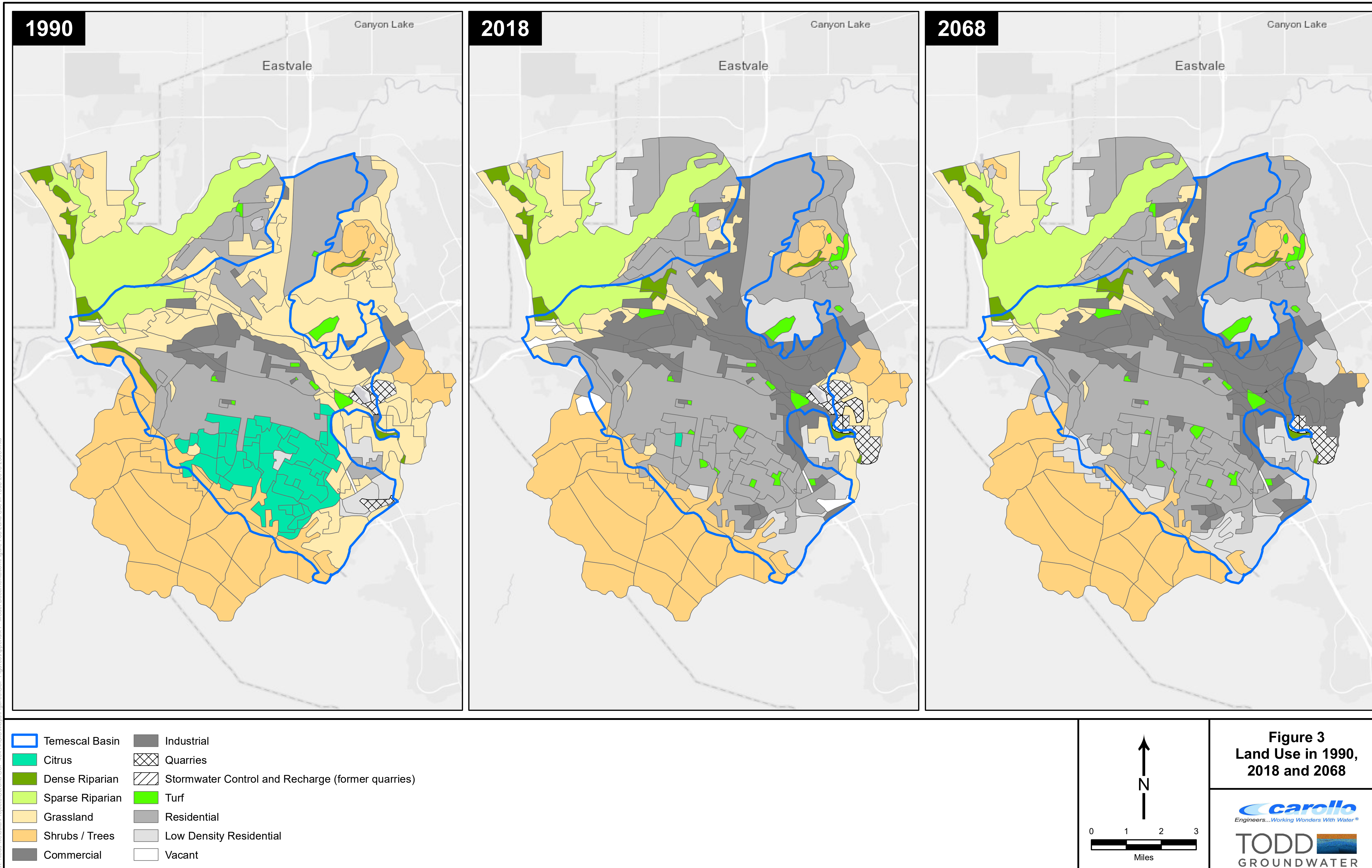

Figure 3
Land Use in 1990, 2018 and 2068

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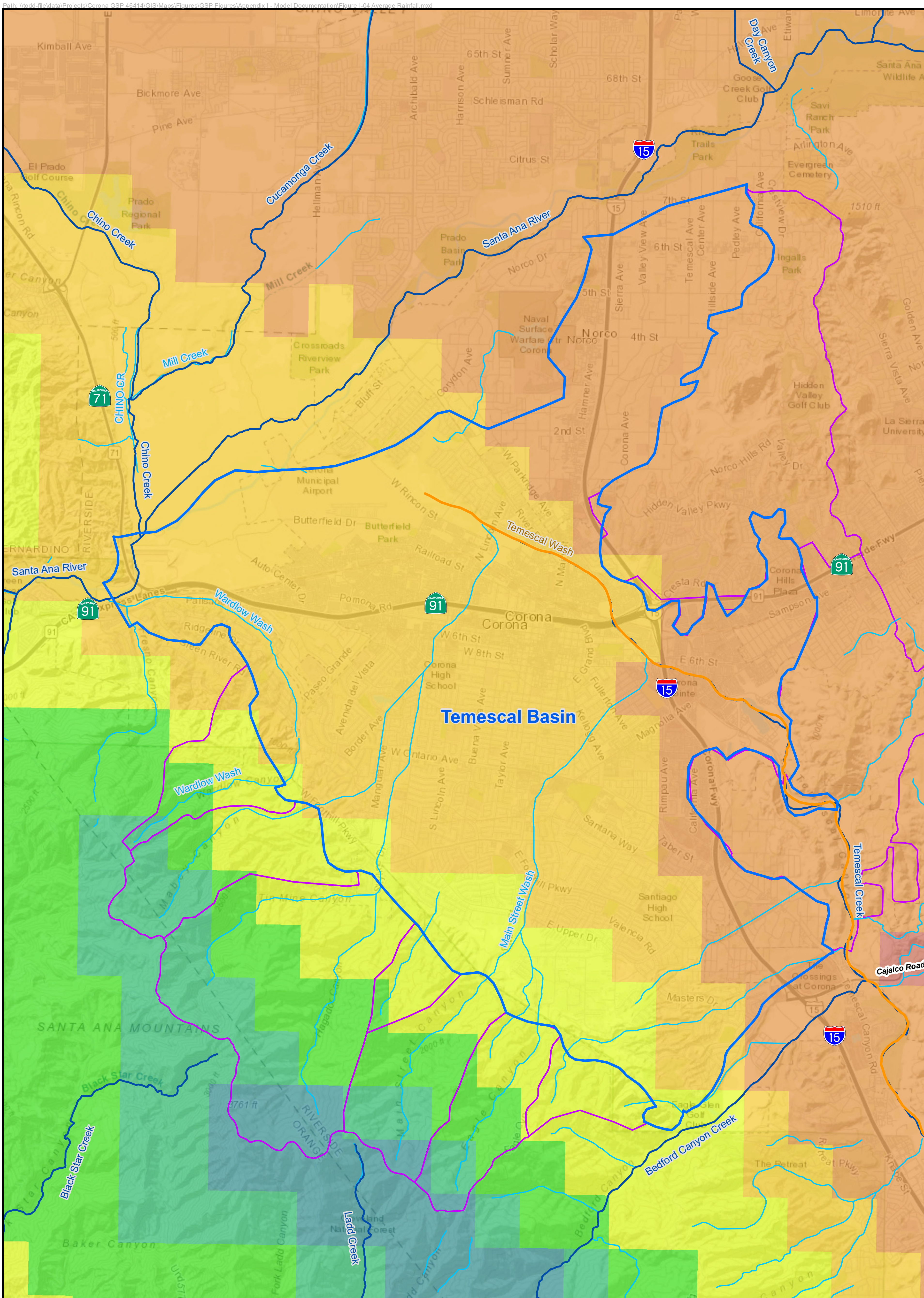

Temesal Basin	
Temescal Wash	
Rivers and Large Streams	
Streams	
Tributary Watersheds	

Average 1981-2010

0 - 10	16 - 18
10 - 12	18 - 20
12 - 14	20 - 22
14 - 16	22 - 24

N

0 0.5 1
Miles

Figure 4
Average Annual Rainfall

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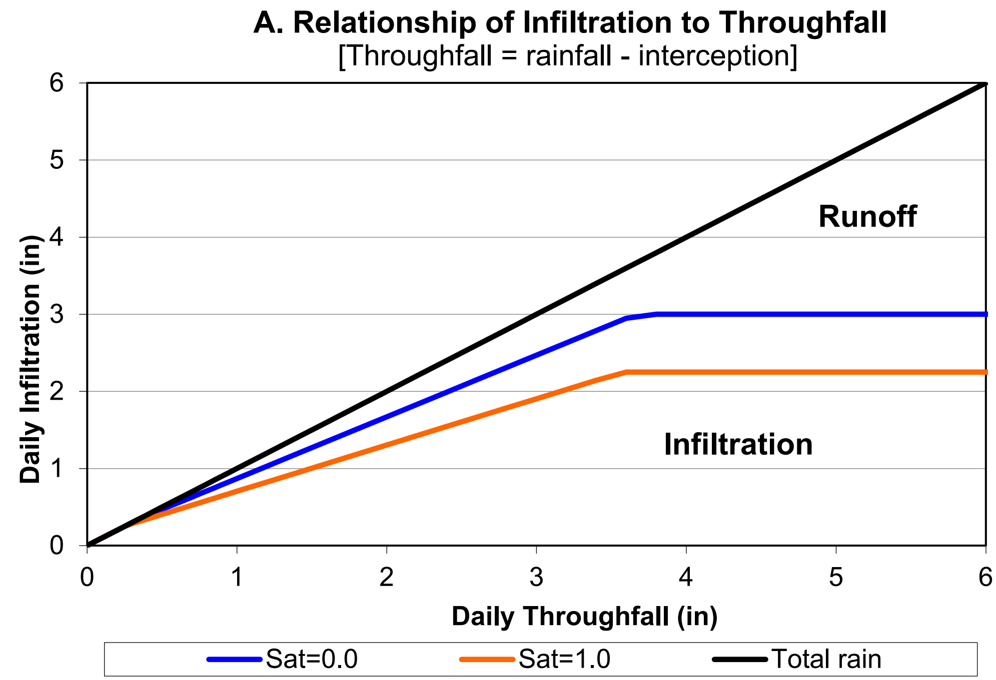

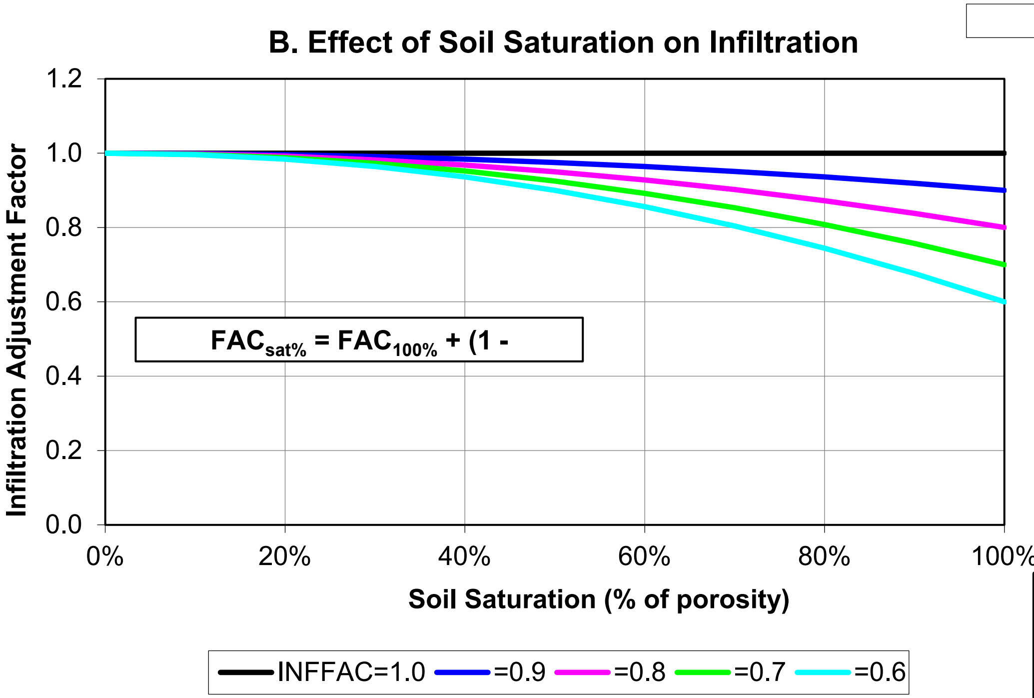

December 2021

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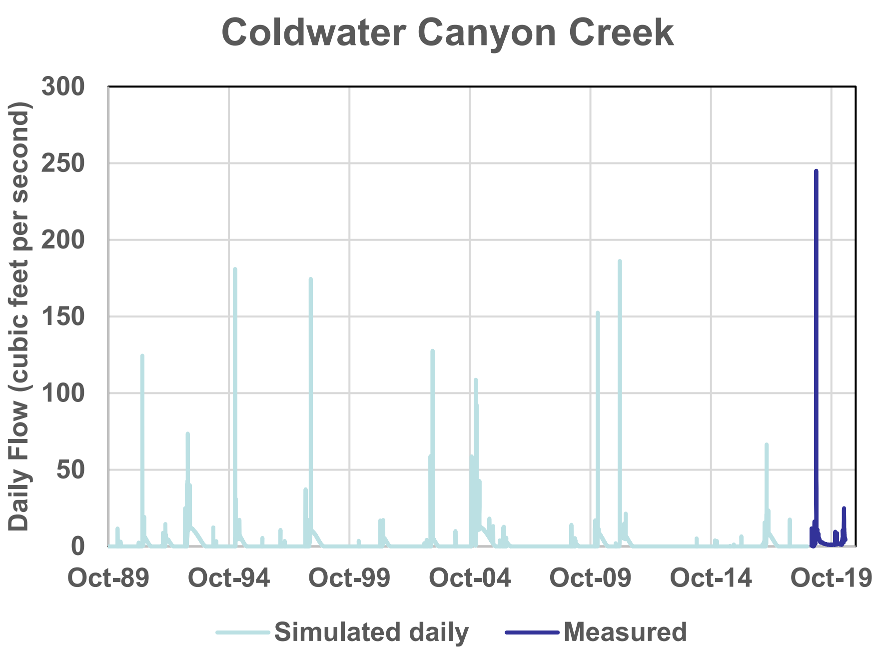
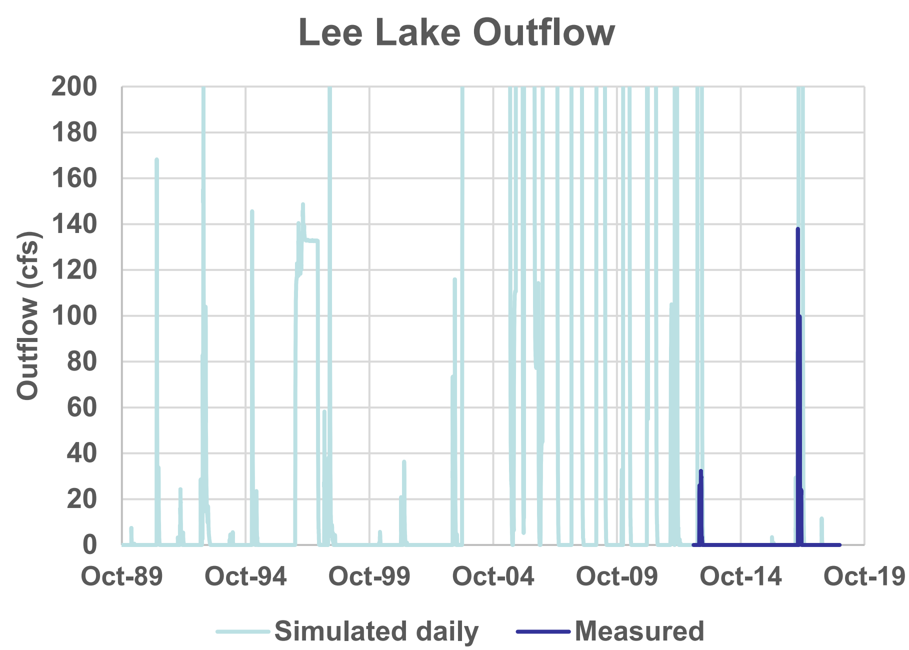
Figure 5
Relationship of Rainfall to Infiltration





December 2021

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Figure 6
Rainfall to Runoff Calibration

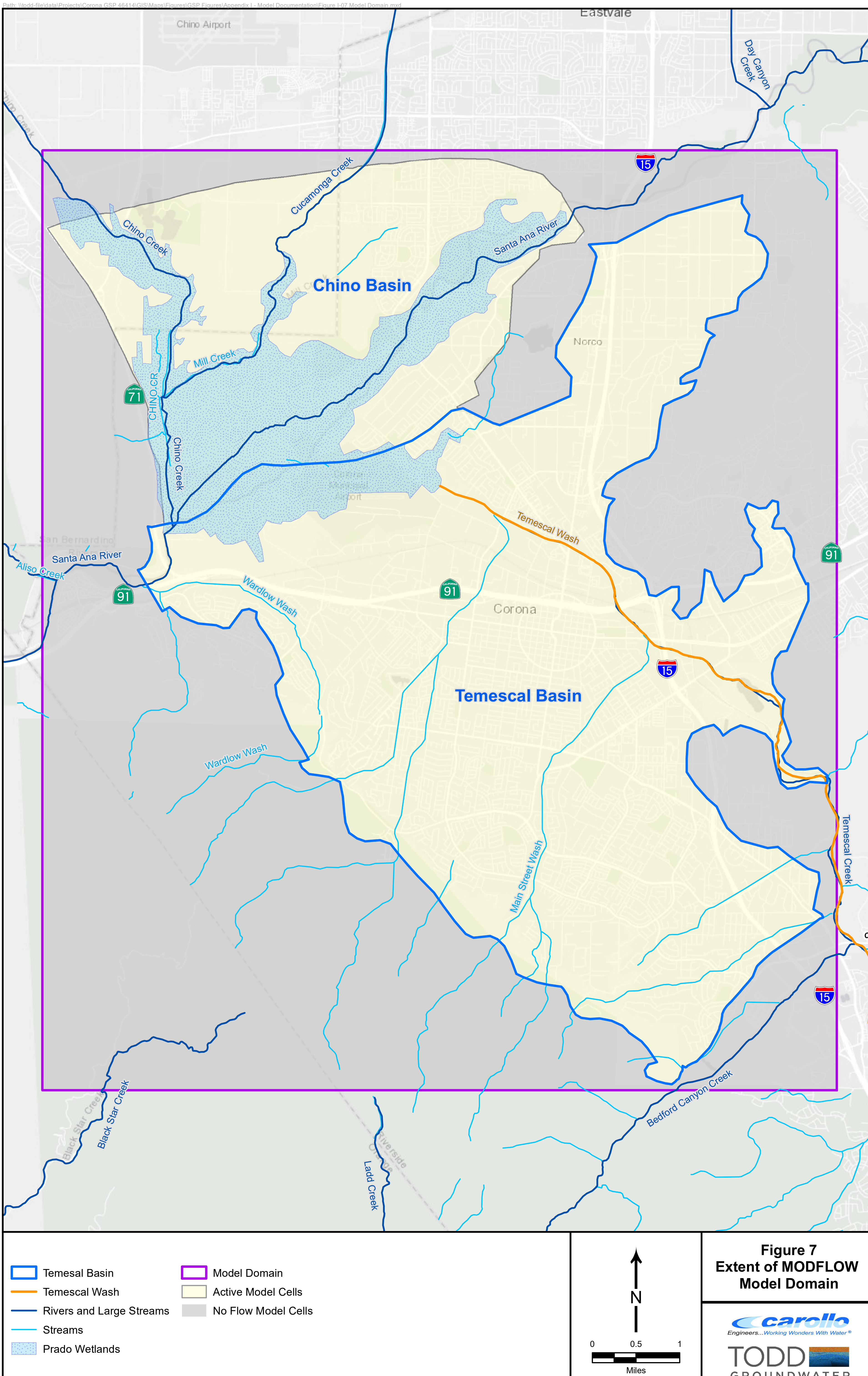

Figure 7
Extent of MODFLOW Model Domain

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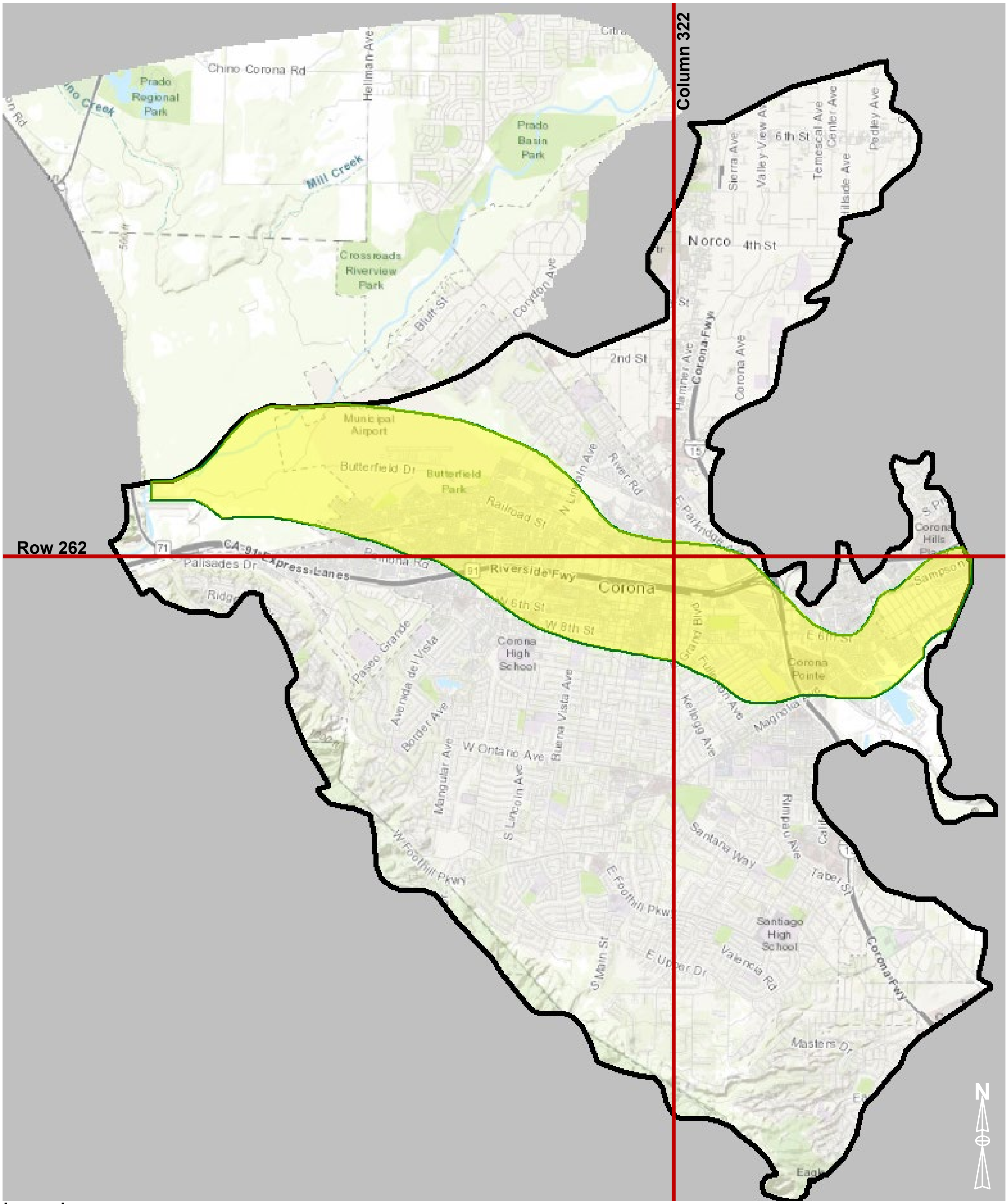


Legend

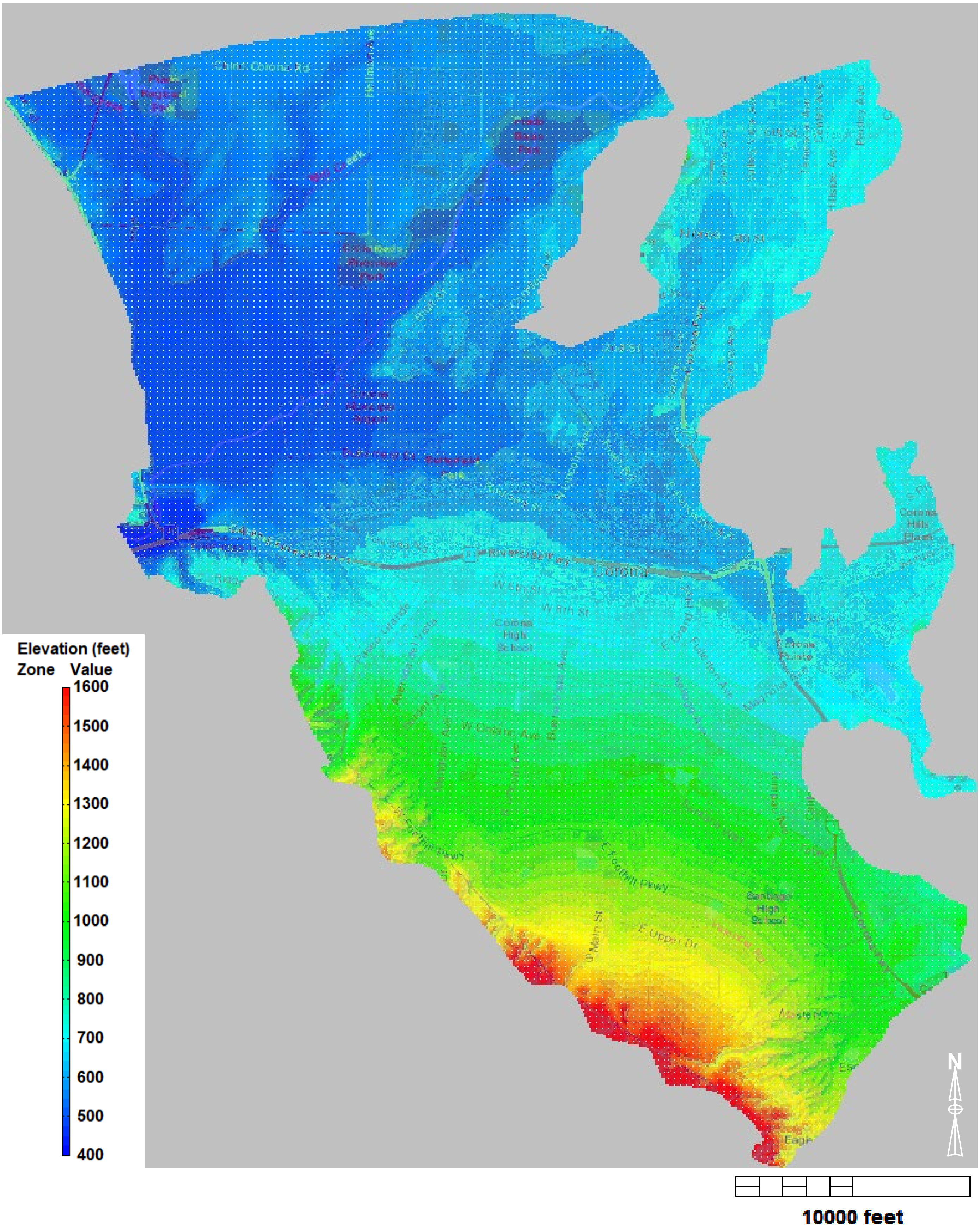
- Temescal Subbasin
- Channel Aquifer Outline
- Figure 13 Cross Section Trace

10000 feet

December 2021

TODD GROUNDWATER

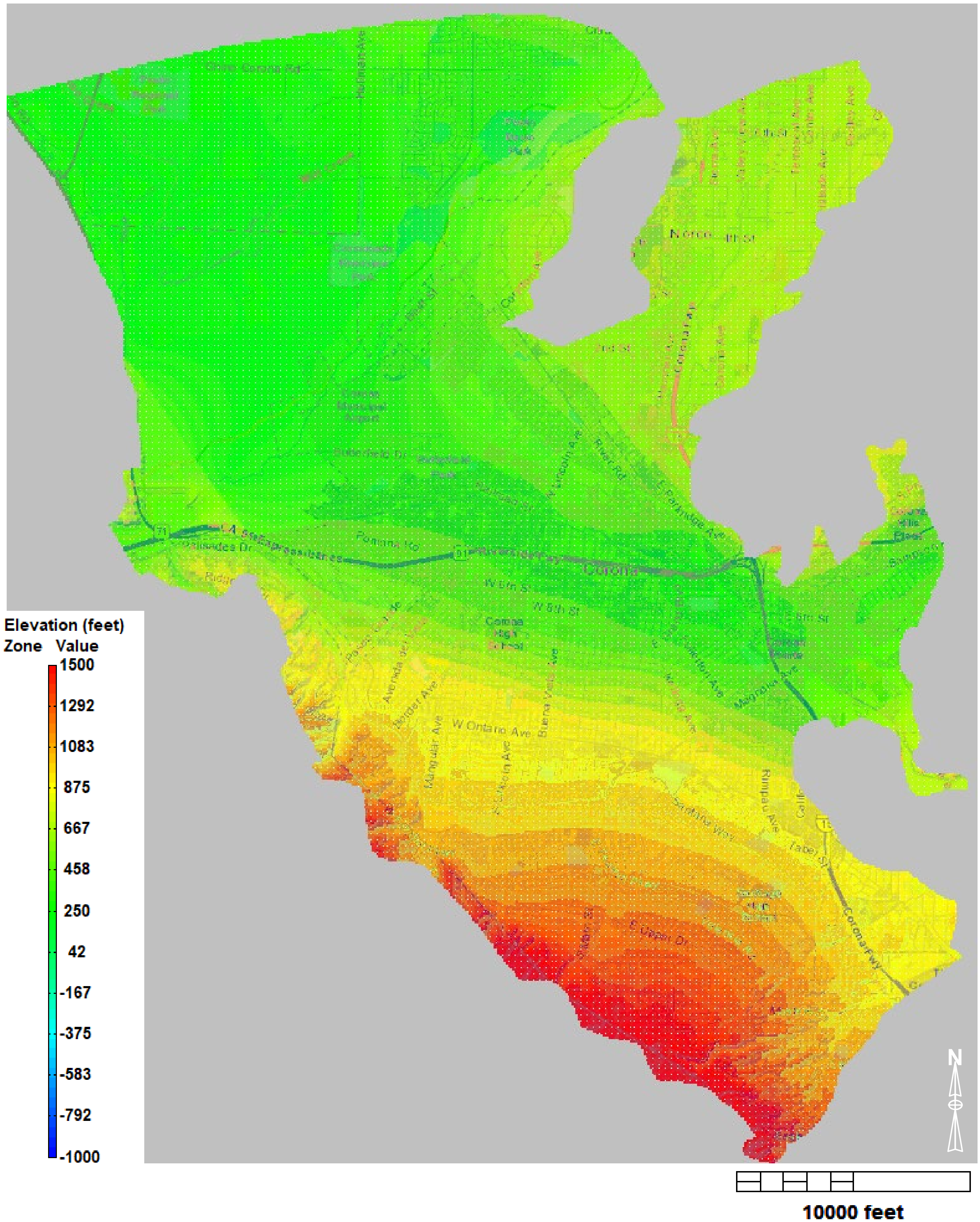
Figure 8
Location of Channel Aquifer



December 2021

TODD GROUNDWATER

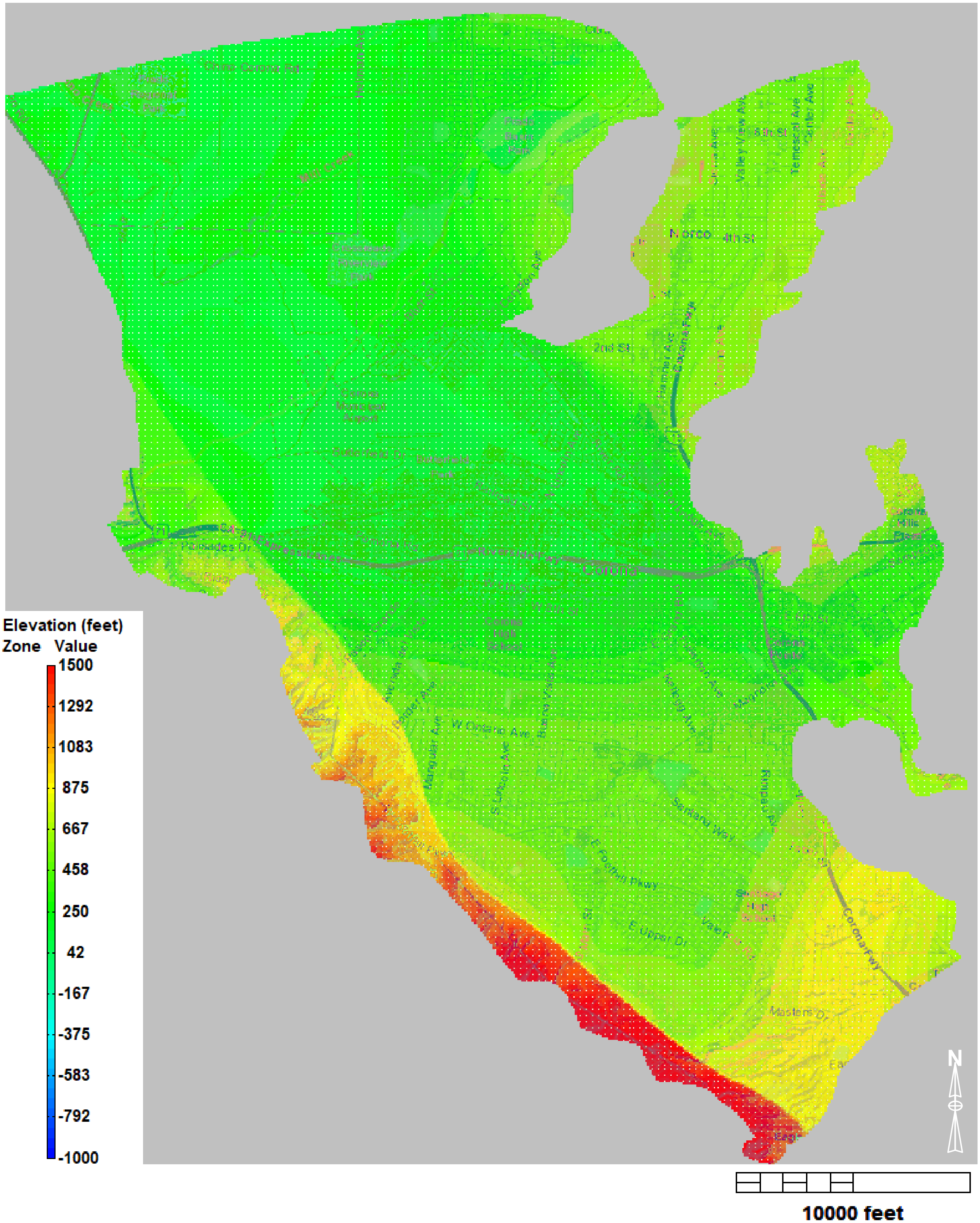
Figure 9
Topographic Elevation of Top of Model Layer 1



December 2021

TODD GROUNDWATER

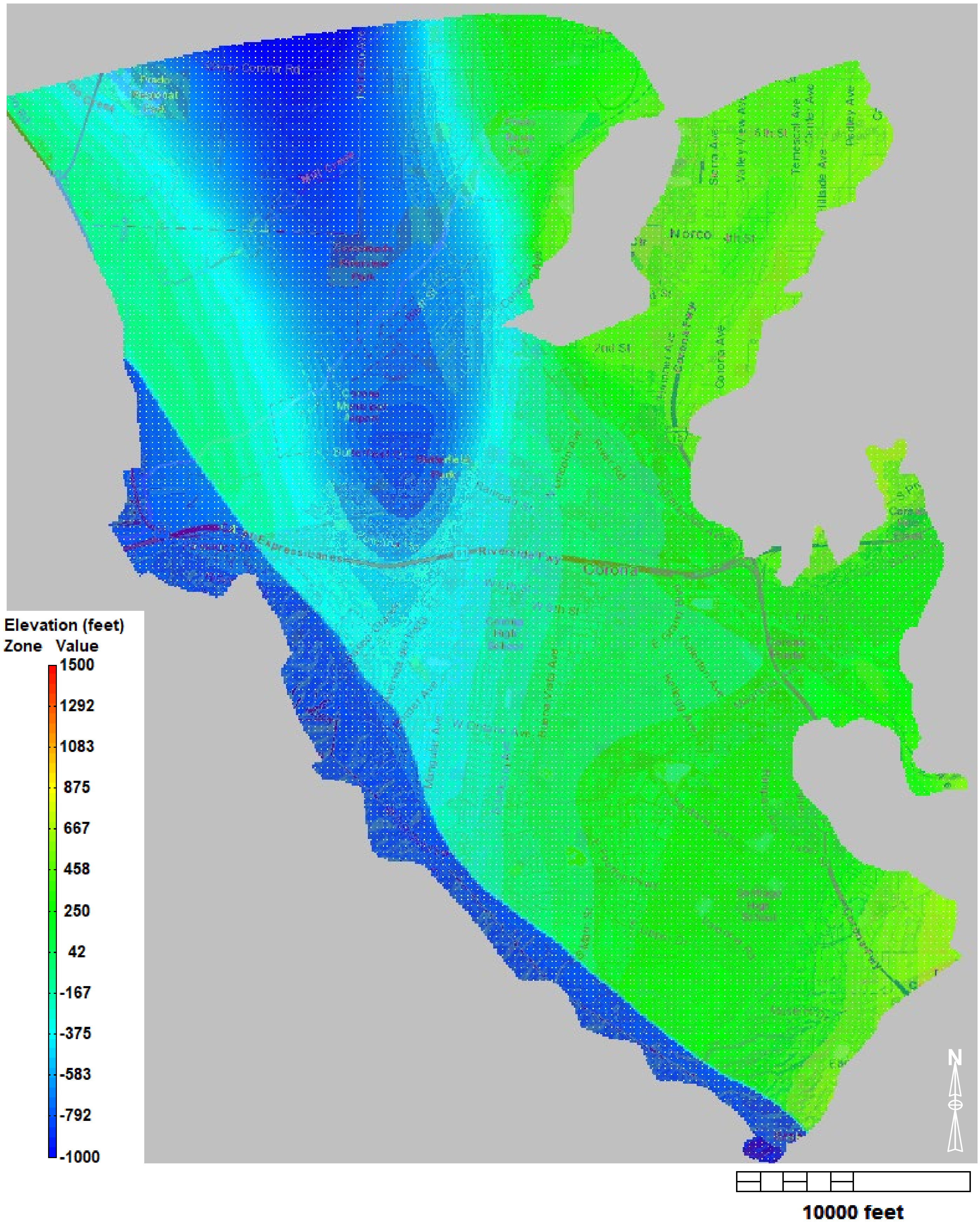
Figure 10
Bottom Elevation Distribution
for Model Layer 1



December 2021

TODD GROUNDWATER

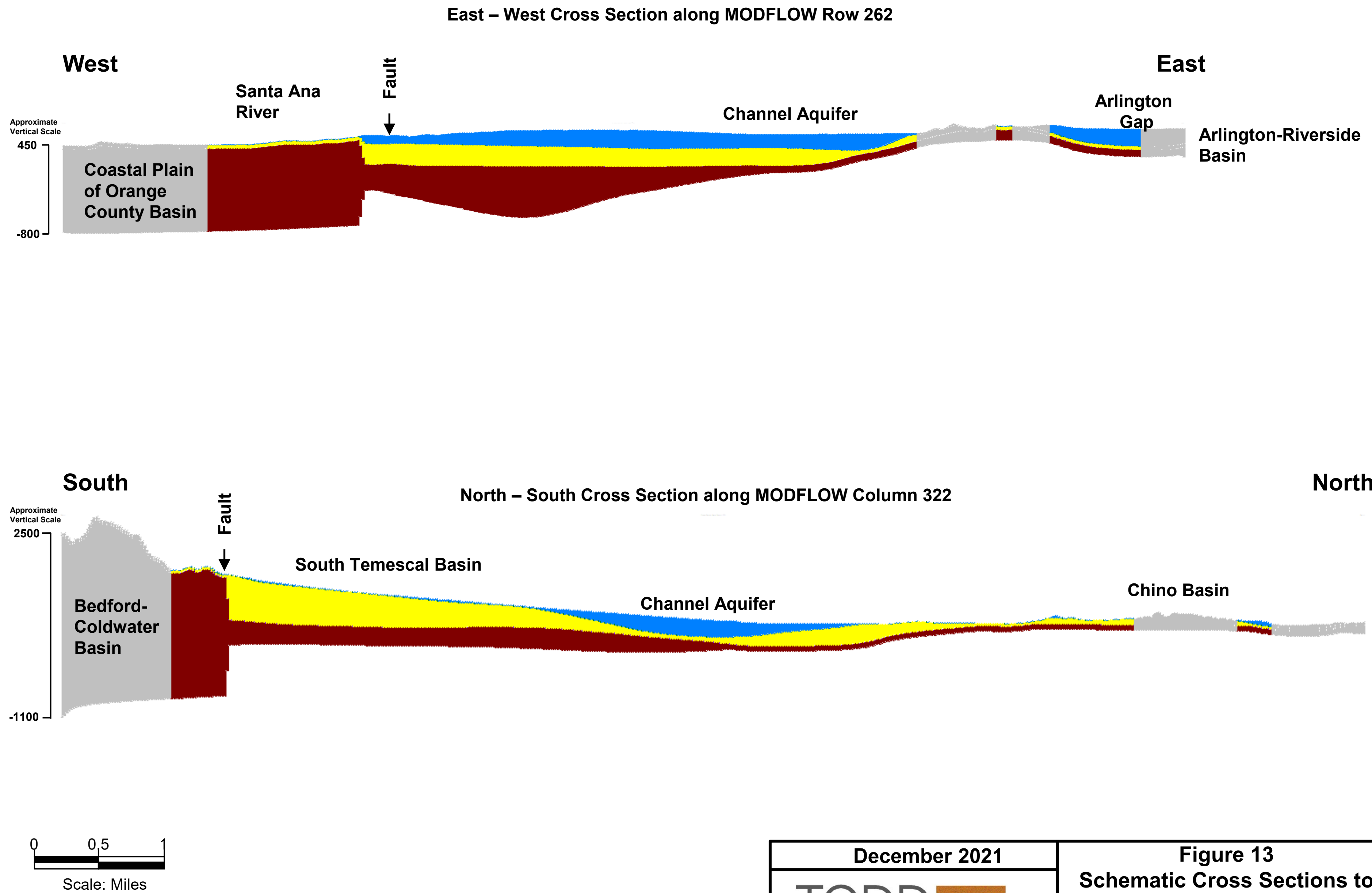
Figure 11
Bottom Elevation Distribution for Model Layer 2



December 2021

TODD GROUNDWATER

Figure 12
Bottom Elevation Distribution for Model Layer 3

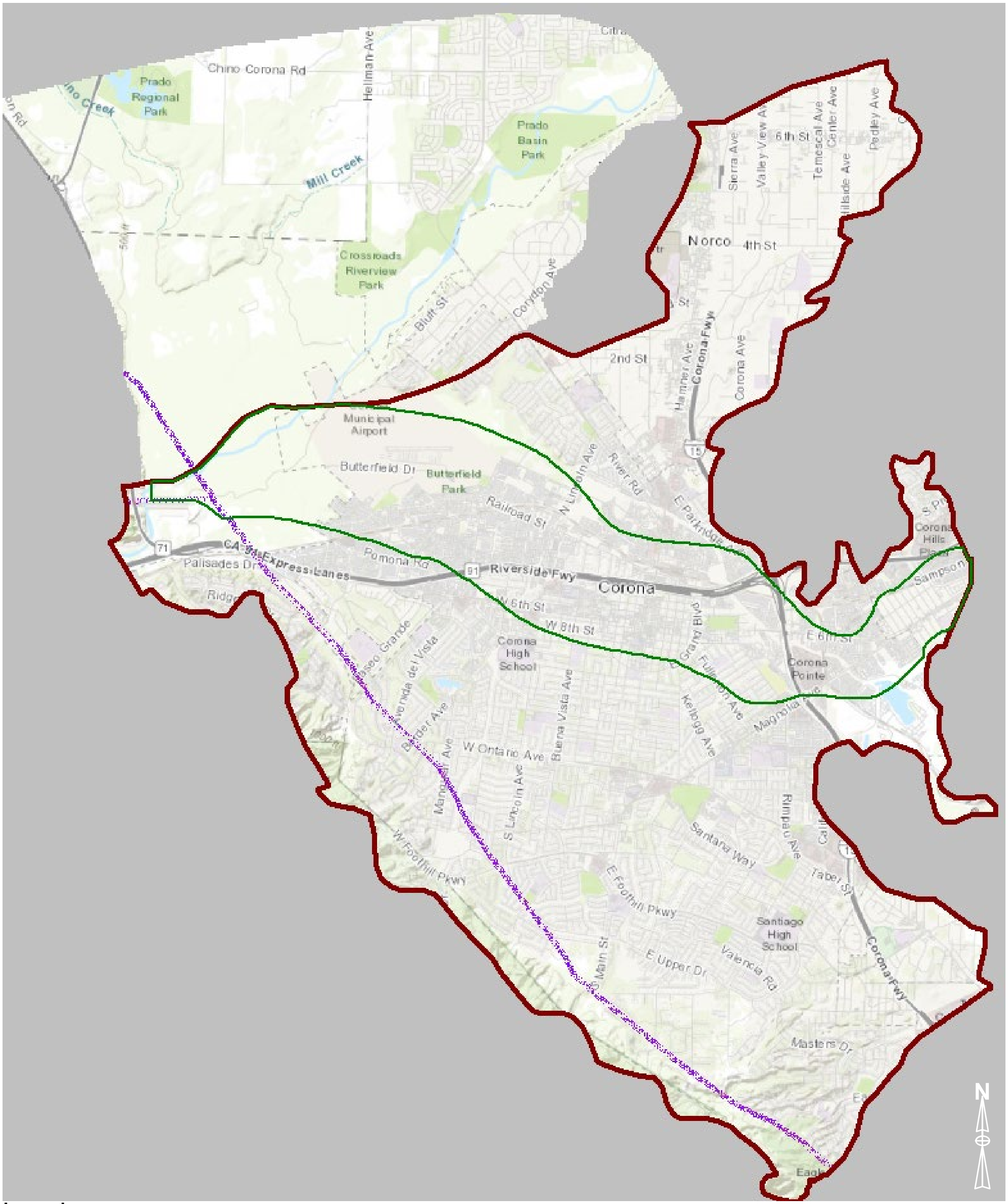


Note: The locations of these schematic cross sections are shown on Figure 8

December 2021

TODD GROUNDWATER

Figure 13
Schematic Cross Sections to Illustrate Relative Model Layer Thicknesses



Legend

Simulated Fault Location

Temescal Subbasin

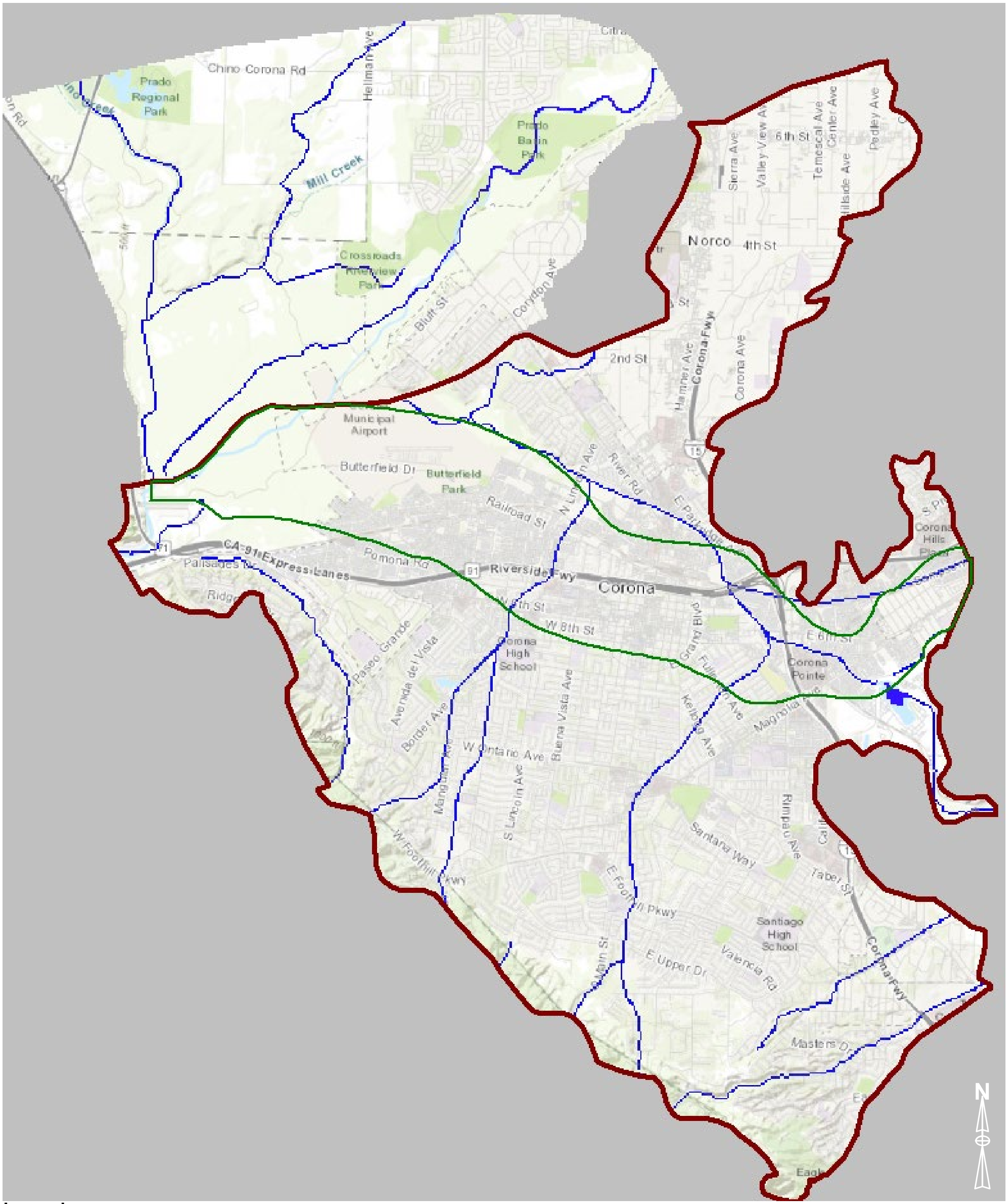
Channel Aquifer Outline

10000 feet

December 2021

TODD GROUNDWATER

Figure 14
Location of Faults Applied in the MODFLOW Model



Legend

Simulated Stream Location

Temescal Subbasin

Channel Aquifer Outline

10000 feet

December 2021

TODD GROUNDWATER

Figure 15
Locations of Streams Applied in the MODFLOW Model

Legend

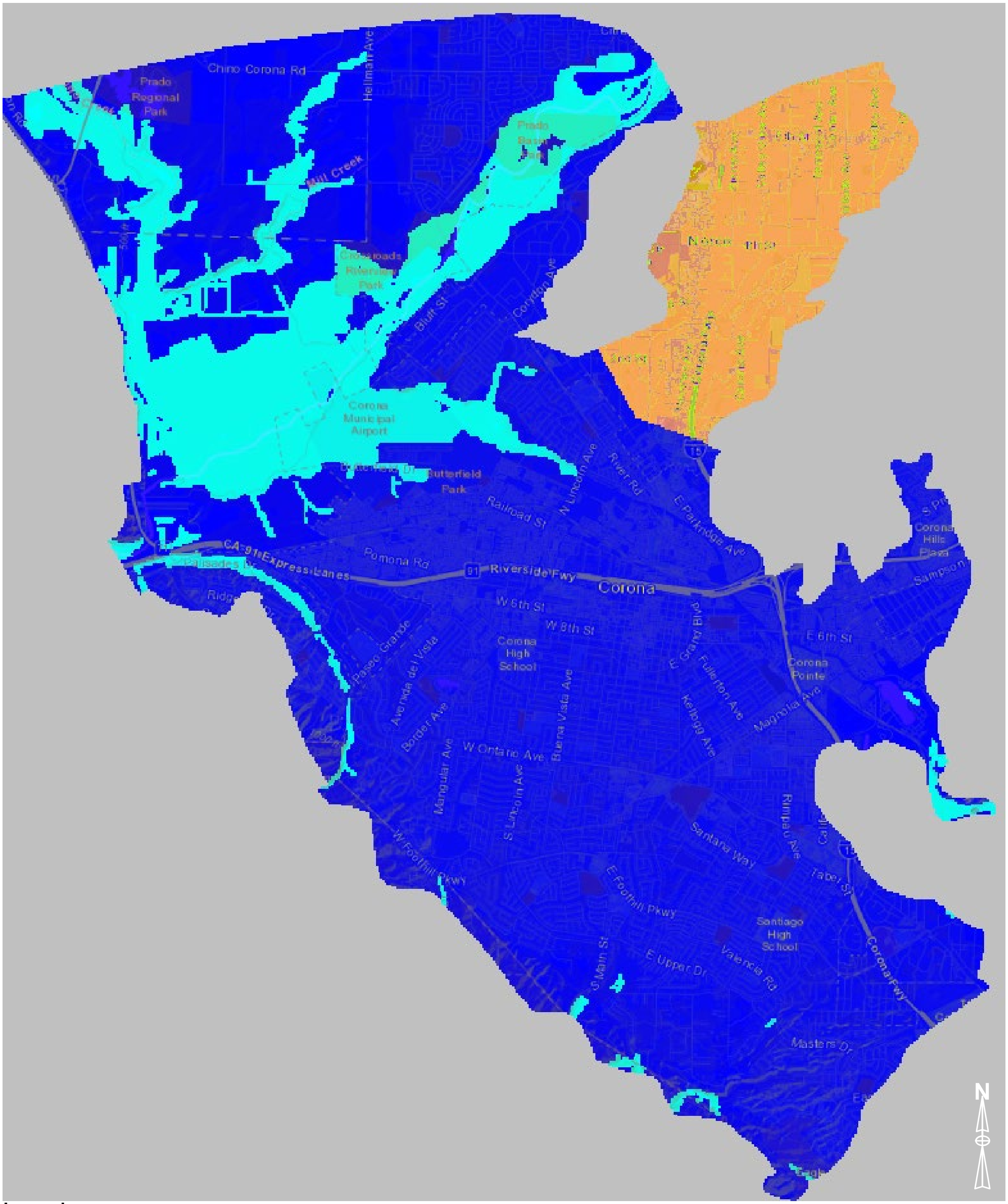
Specified Flux Location

10000 feet

December 2021

TODD GROUNDWATER

Figure 16
Distribution of Specified Flux Boundary for Mountain Front Recharge



Legend

Riparian ET Zone

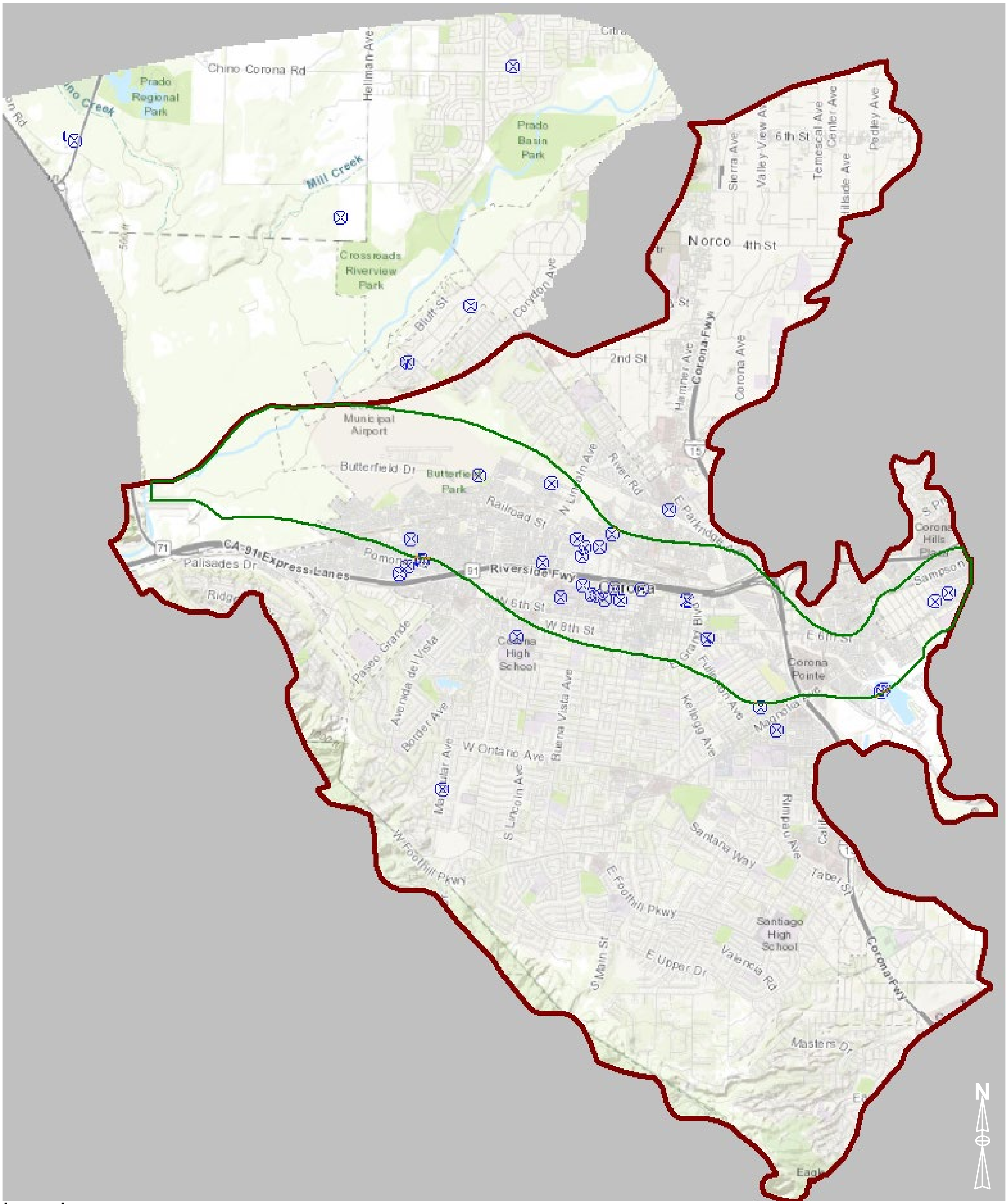
Basin ET Zone

Norco ET Zone

December 2021

TODD GROUNDWATER

Figure 17
Distribution of Evapotranspiration (ET) Zones



Legend

Location of Metered Municipal or Industrial Well

Temescal Subbasin

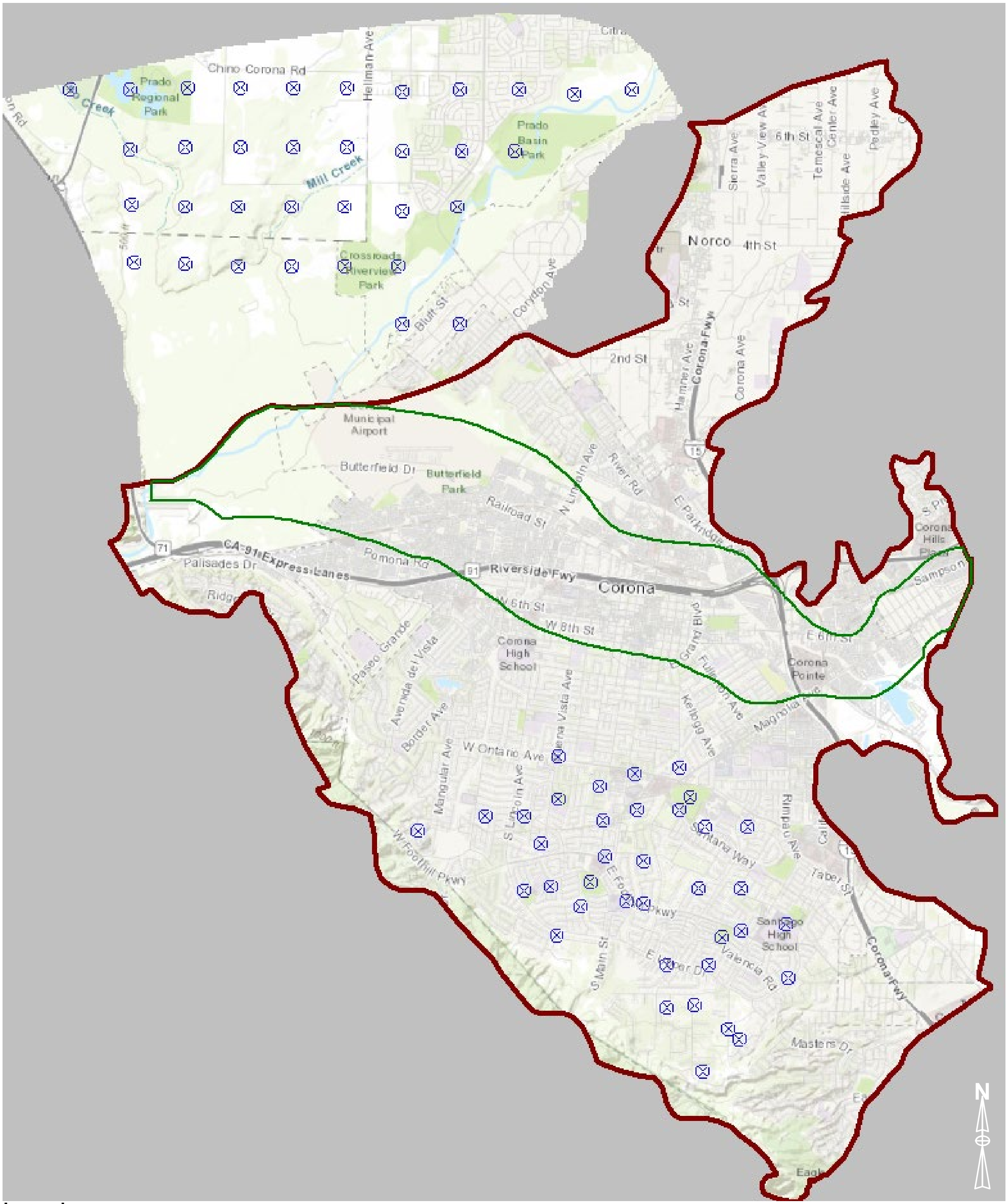
Channel Aquifer Outline

10000 feet

December 2021

TODD GROUNDWATER

Figure 18
Locations of Metered Municipal or Industrial Well Applied in MODFLOW Model



Legend

Location of Estimated Agricultural Pumping

Temescal Subbasin

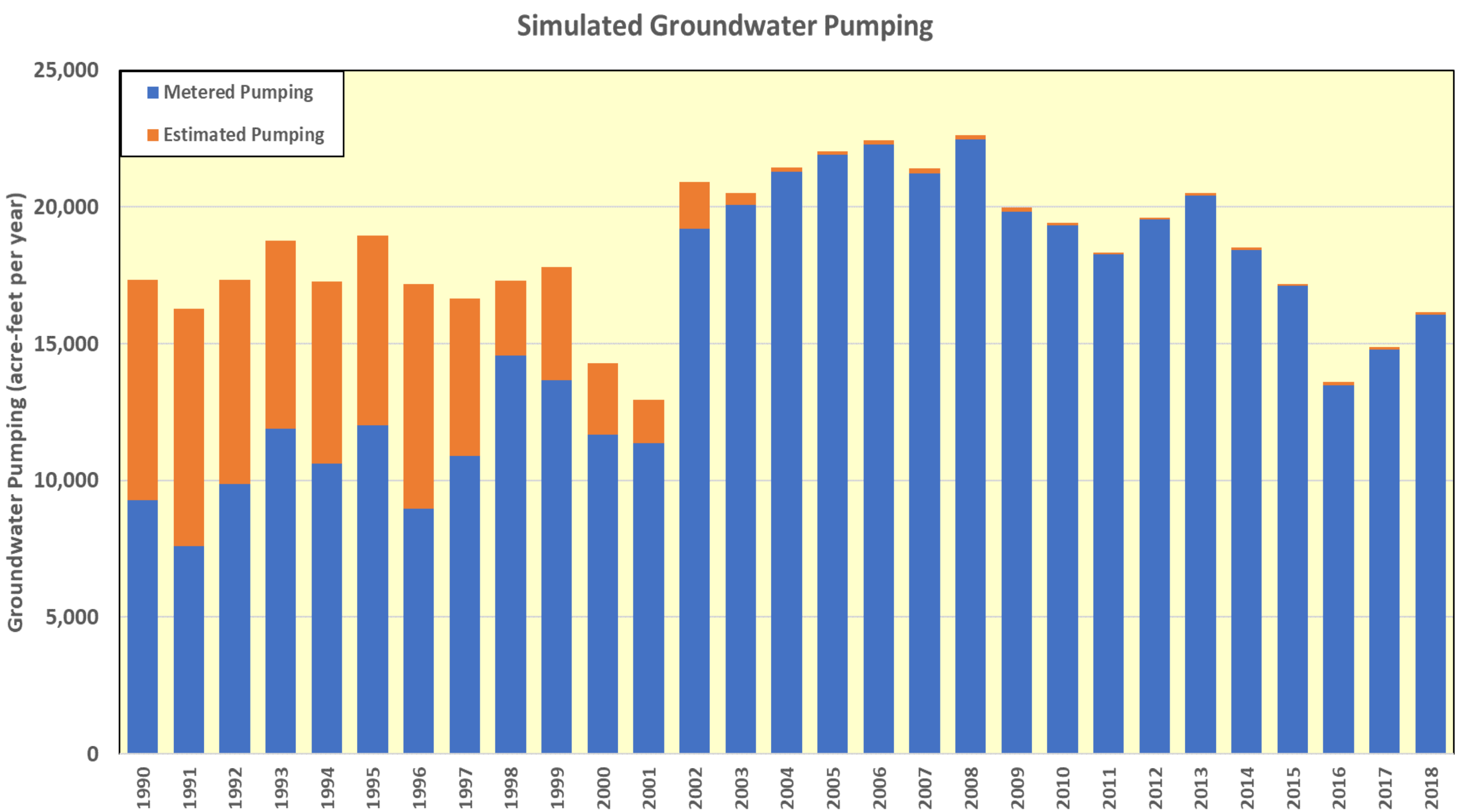
Channel Aquifer Outline

10000 feet

December 2021

TODD GROUNDWATER

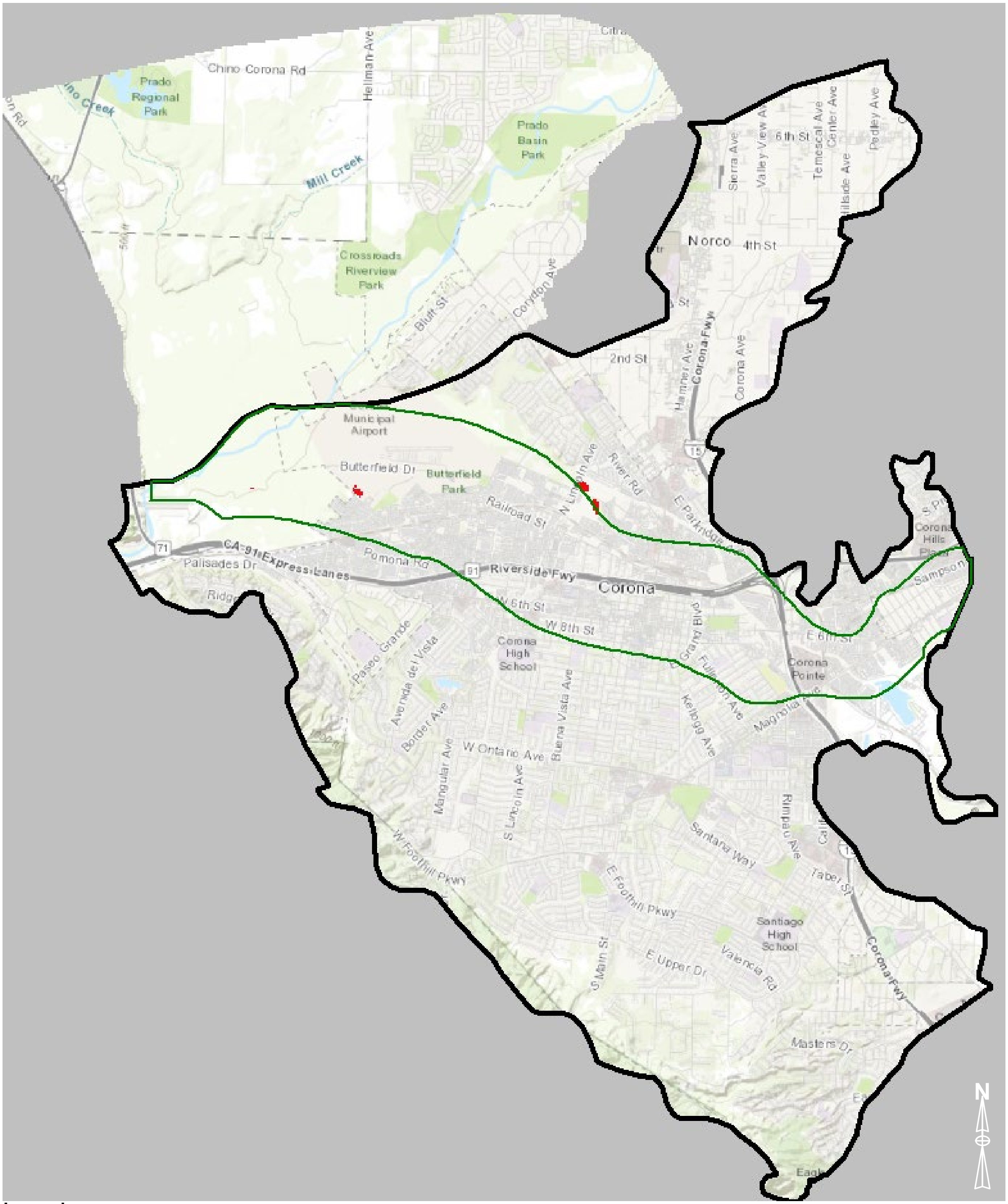
Figure 19
Approximated Locations of Agricultural Pumping Wells Applied in MODFLOW Model



December 2021

TODD GROUNDWATER

Figure 20
Annual Groundwater Pumping Applied in MODFLOW Model



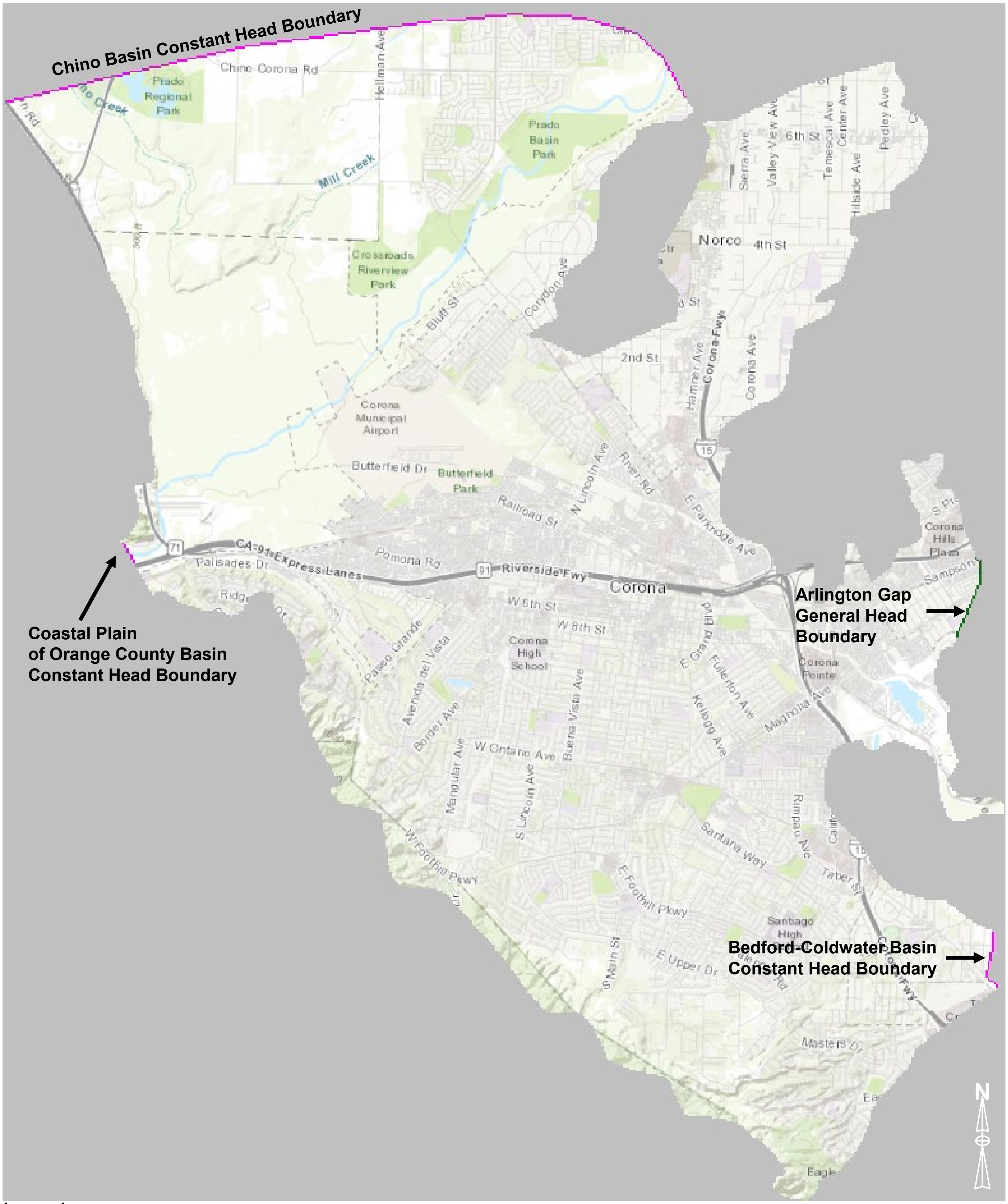
Legend

- Recycled Water Percolation Pond
- Temescal Subbasin
- Channel Aquifer Outline

December 2021

TODD GROUNDWATER

Figure 21
Location of Recycled Water Recharge Ponds



Legend

Simulated Constant Head Boundary

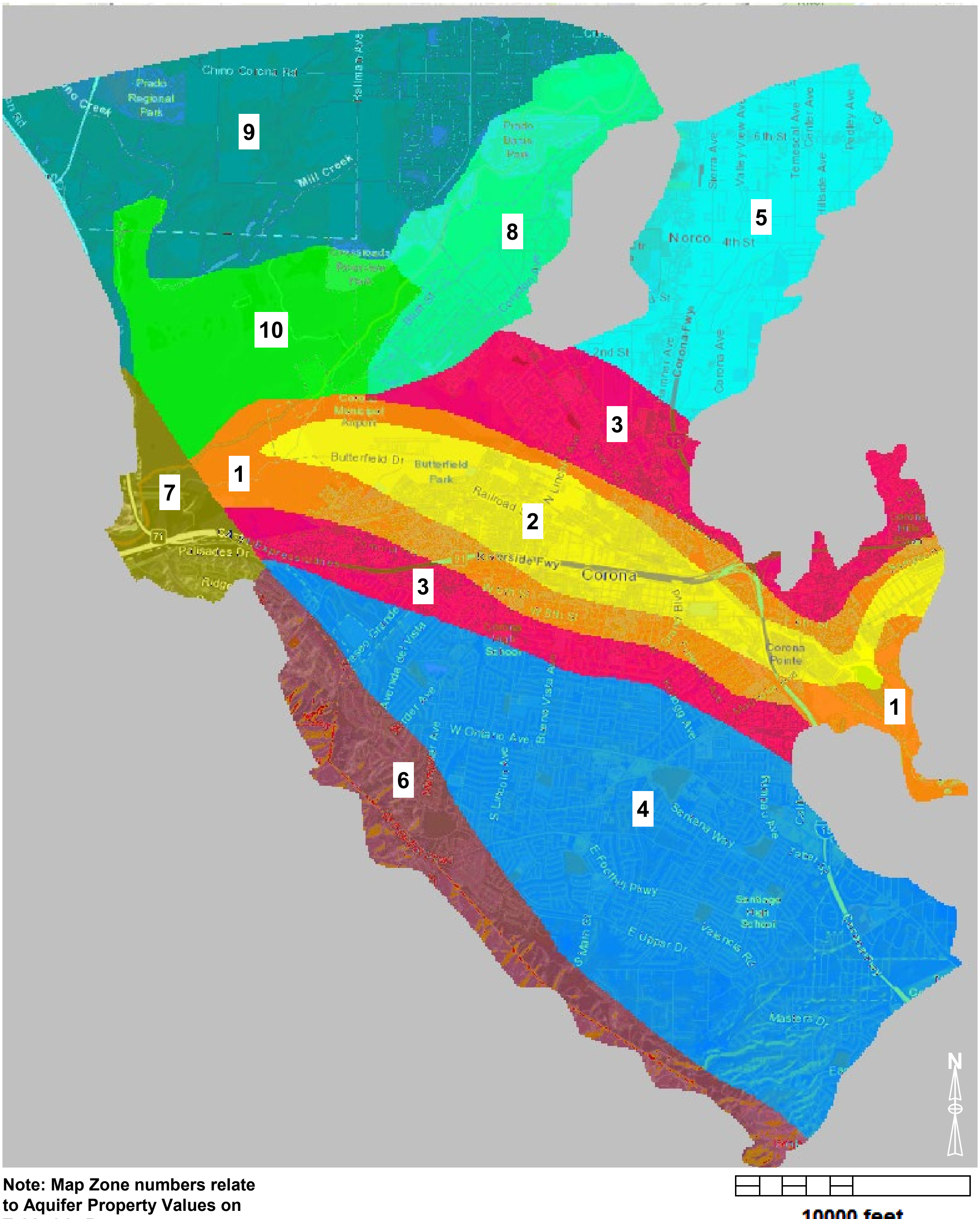
Simulated General Head Boundary

10000 feet

December 2021

TODD GROUNDWATER

Figure 22
Boundary Conditions Applied at the Basin Margins in the MODFLOW Model

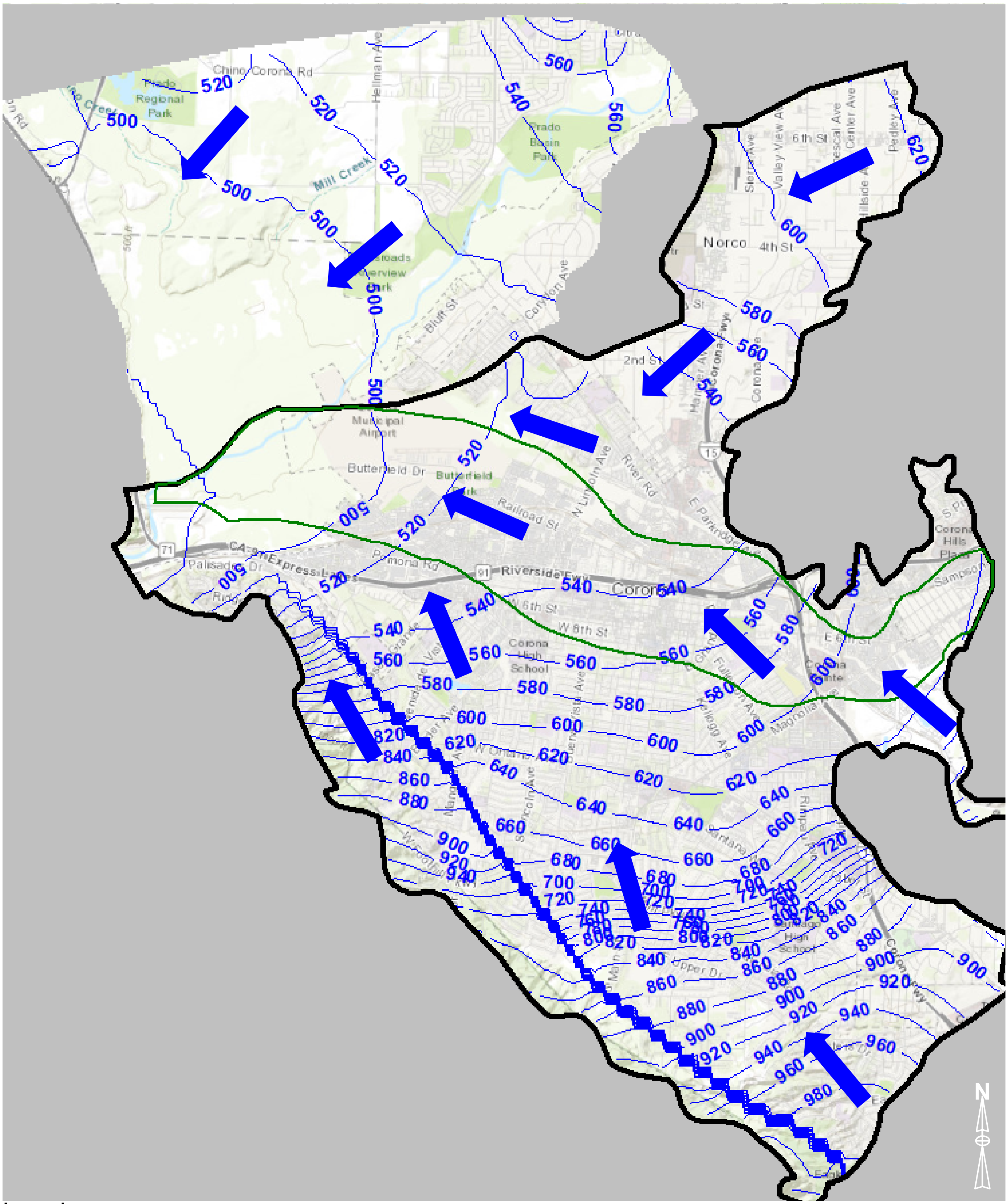


Note: Map Zone numbers relate to Aquifer Property Values on Table 2 in Report

December 2021

TODD GROUNDWATER

Figure 23
Distribution of Aquifer Property Zones for Layers 1, 2 and 3



Legend

Inferred Groundwater Flow Direction

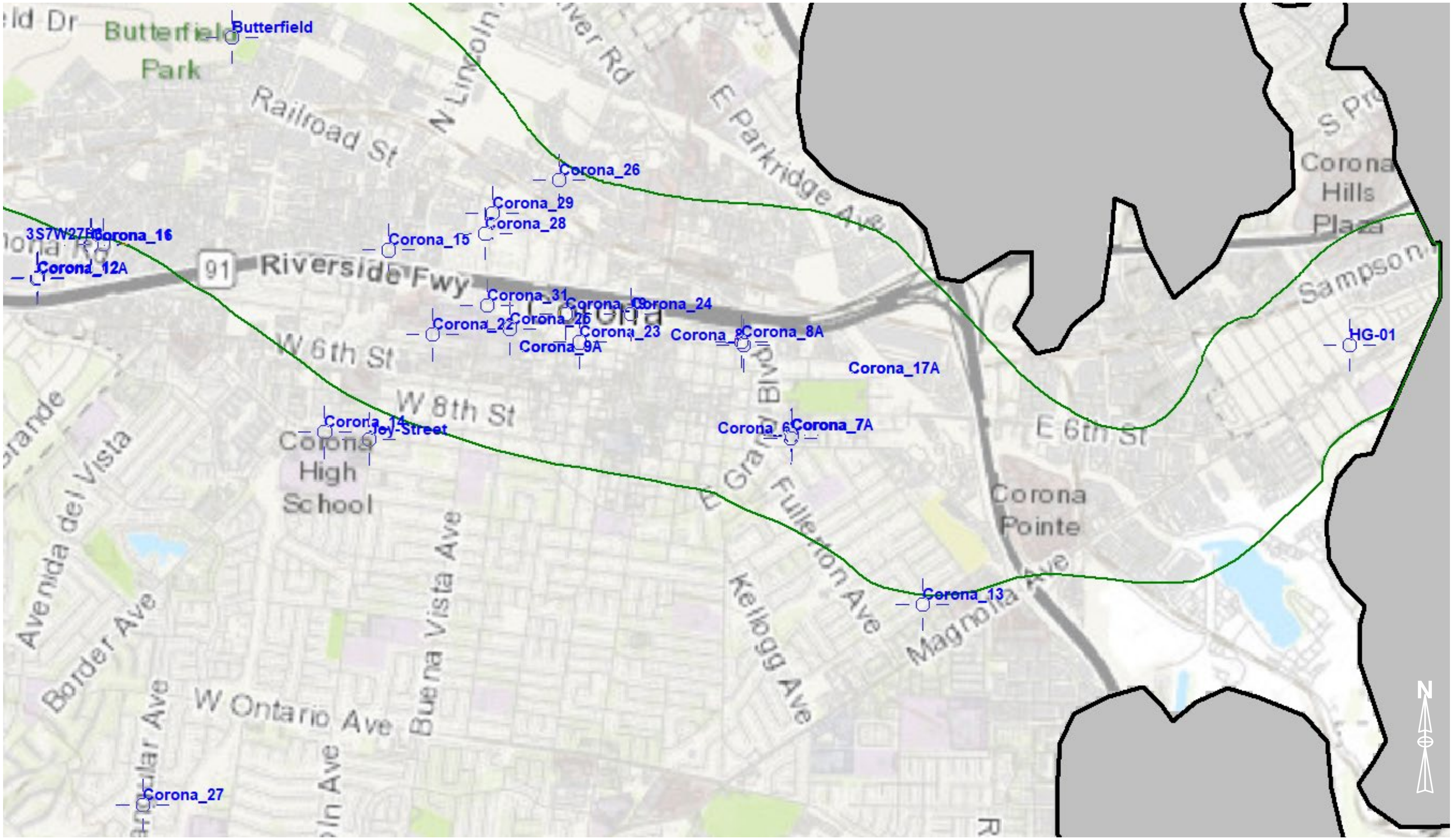
900 Simulated Groundwater Elevation

Temescal Subbasin

Channel Aquifer Outline

10000 feet

December 2021	Figure 24 Initial Groundwater Elevations Applied in the MODFLOW Model
TODD GROUNDWATER	



Legend

Monitoring Well Location

Temescal Subbasin

Channel Aquifer Outline

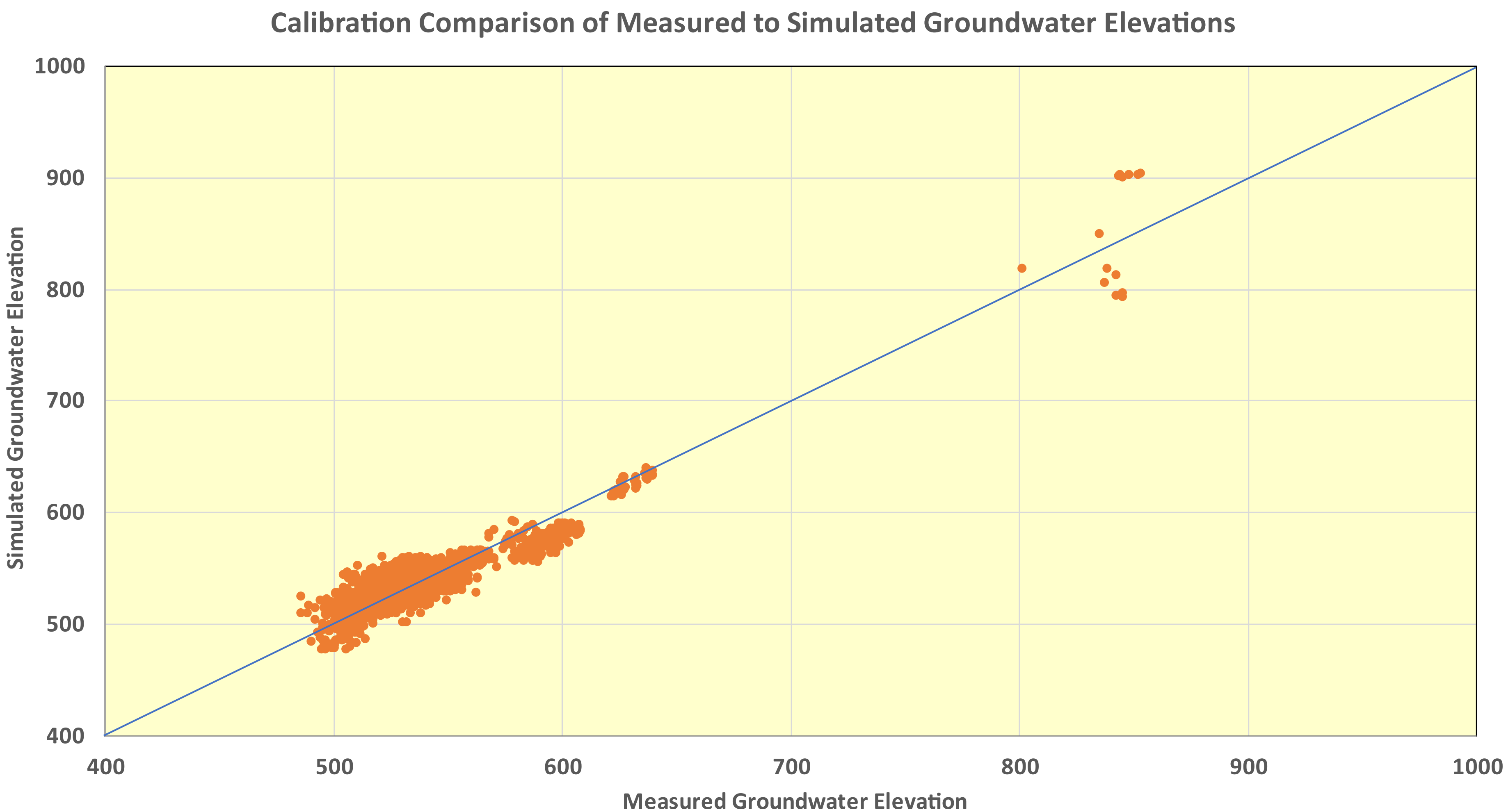
0 0.5 1

Scale: Miles

December 2021

TODD GROUNDWATER

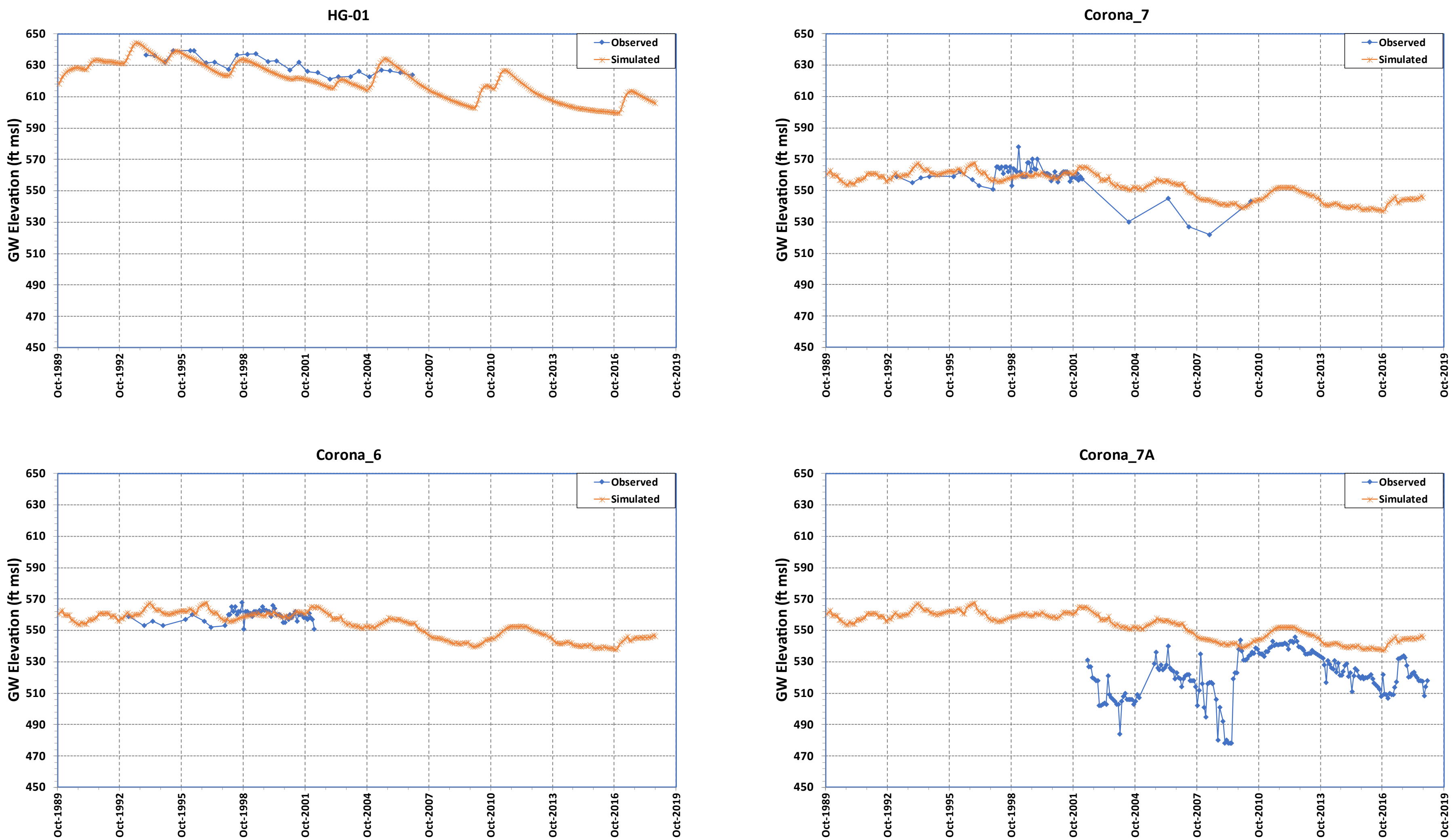
Figure 25
Location of Monitoring Wells Used for Calibration



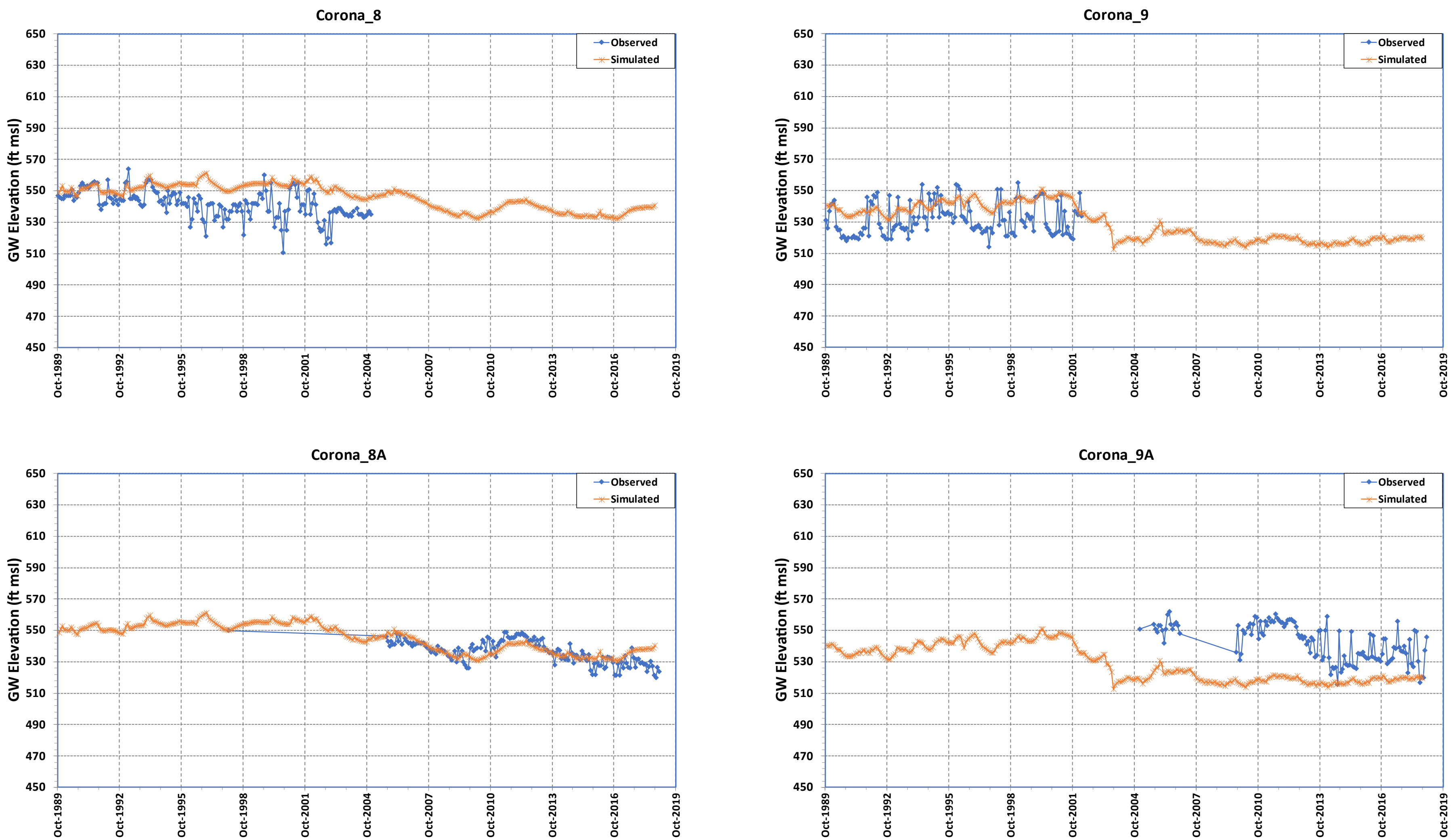
December 2021

TODD GROUNDWATER

Figure 26
Scatter Plot Comparing Simulated to Measured Groundwater Levels

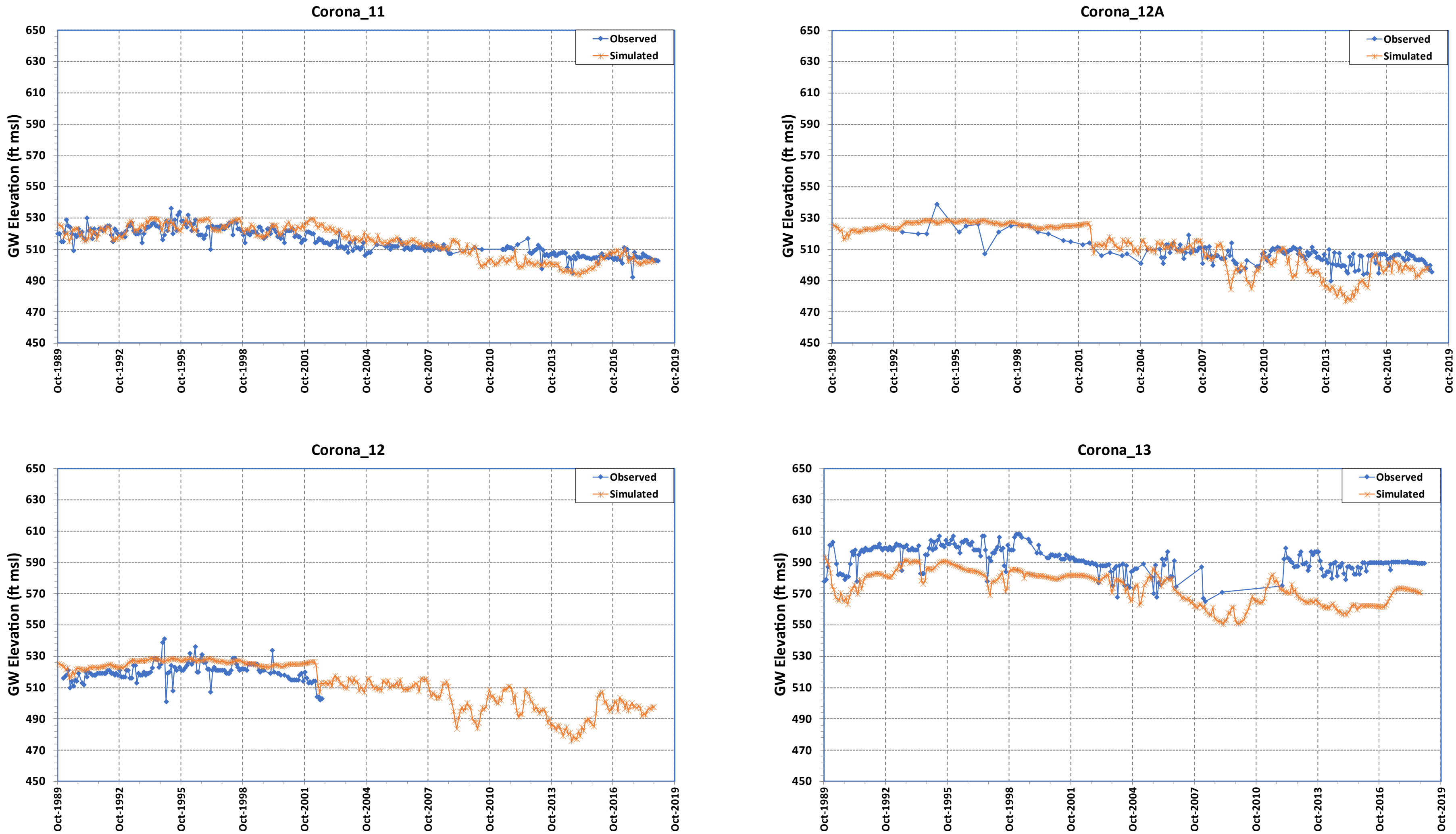


December 2021	Figure 27
TODD GROUNDWATER	Calibration Hydrographs Corona Wells 6, 7 and 7A HG-01



December 2021

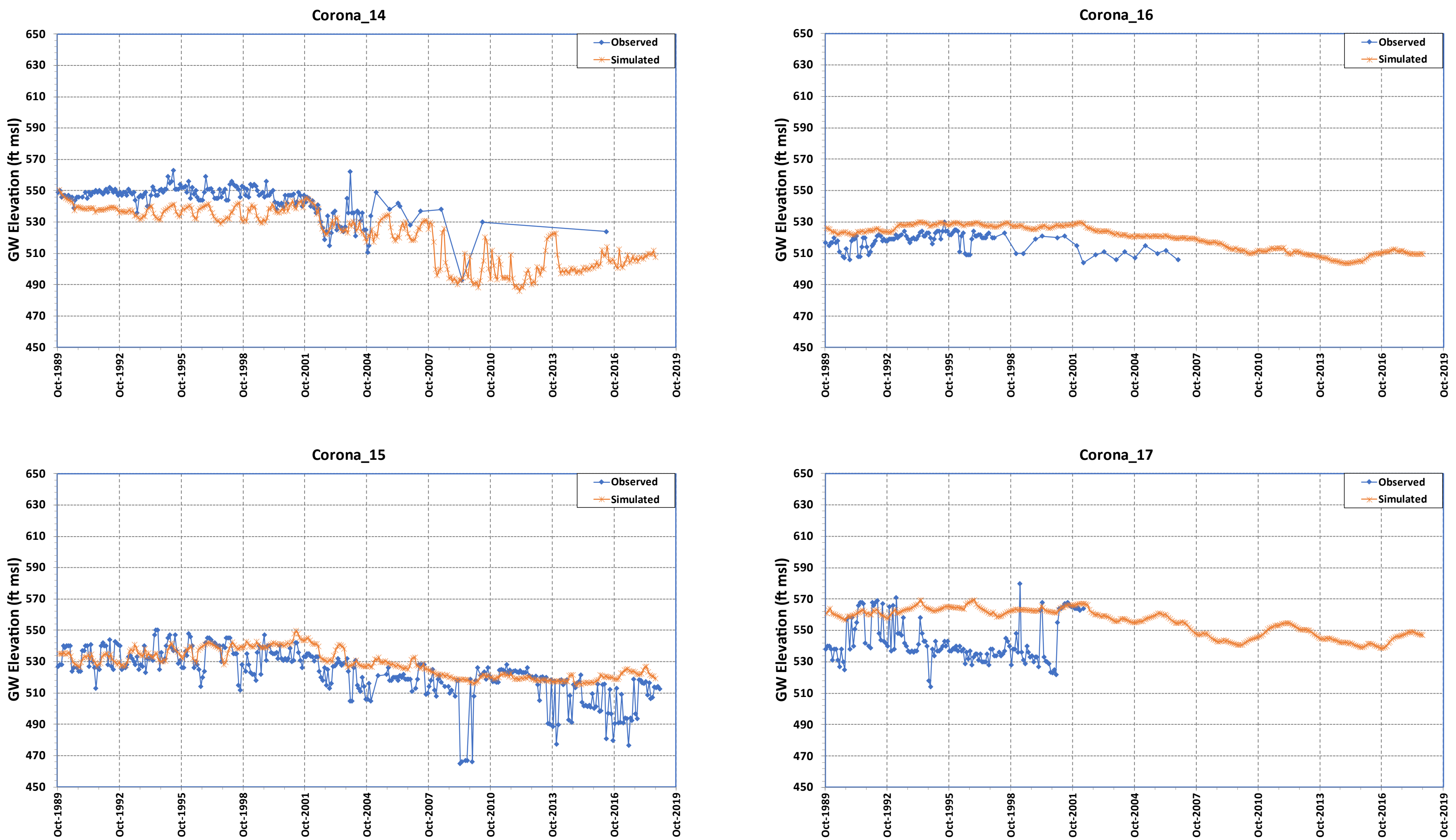
Figure 28
Calibration Hydrographs
Corona Wells 8, 8A, 9, 9A



December 2021

TODD GROUNDWATER

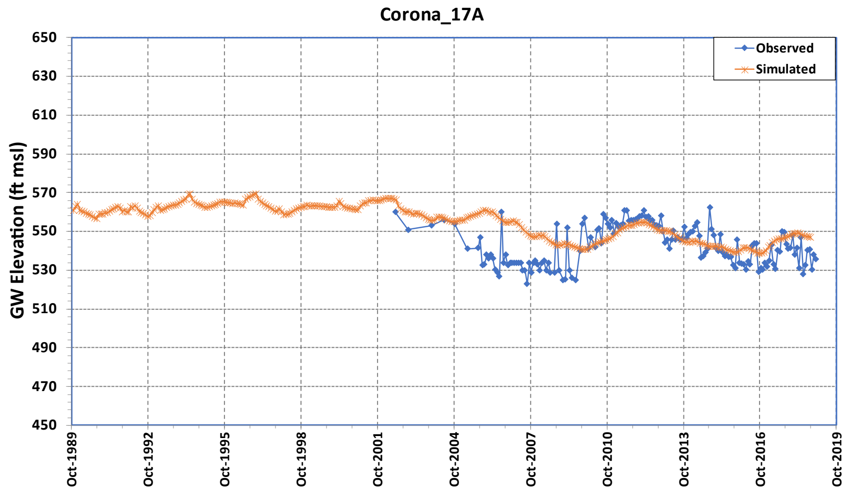
Figure 29
Calibration Hydrographs
Corona Wells 11, 12, 12A and 13

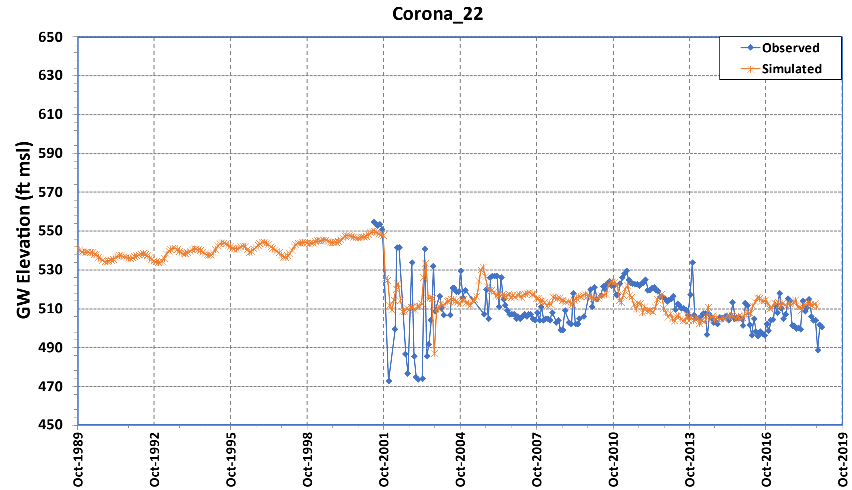


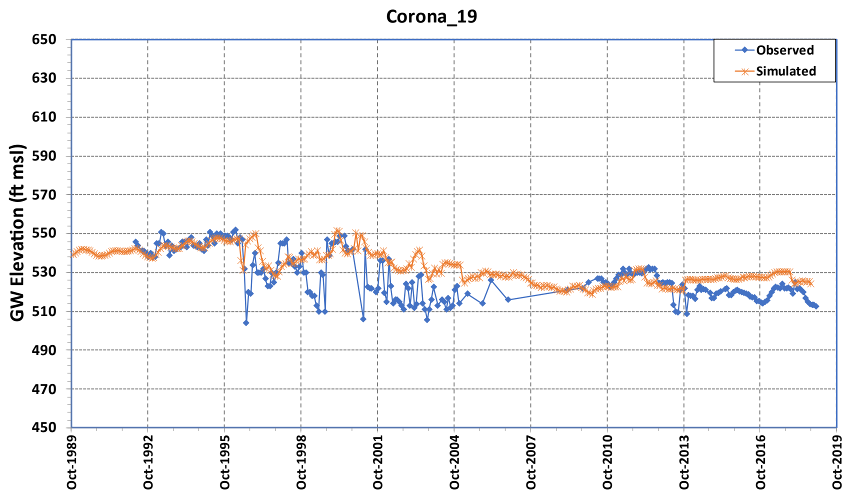
December 2021

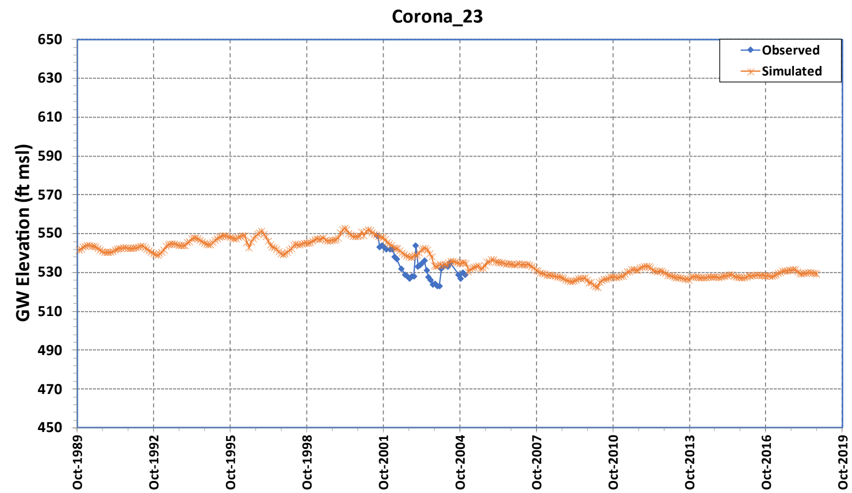
TODD GROUNDWATER

Figure 30
Calibration Hydrographs Corona Wells 14, 15, 16 and 17

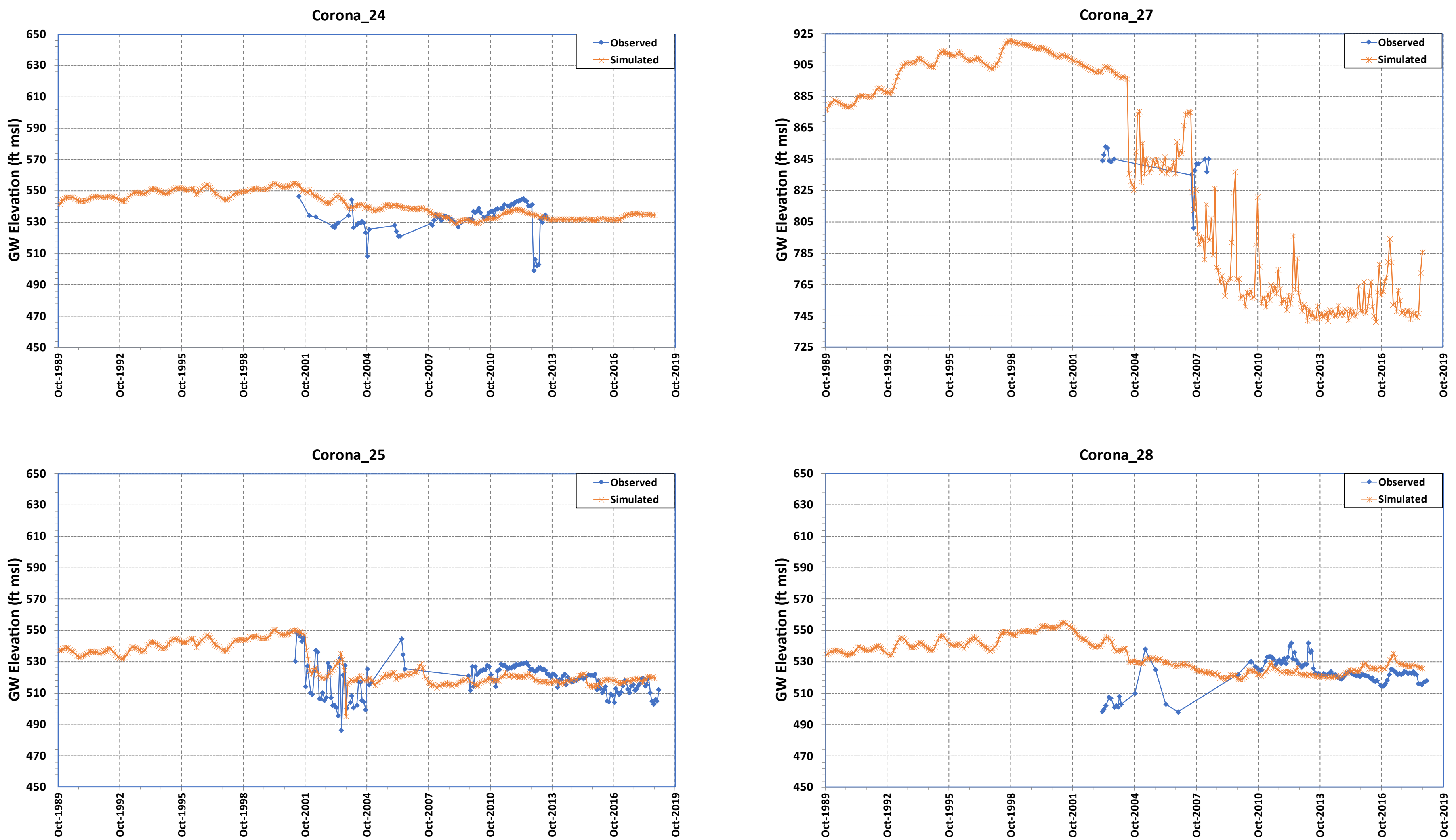








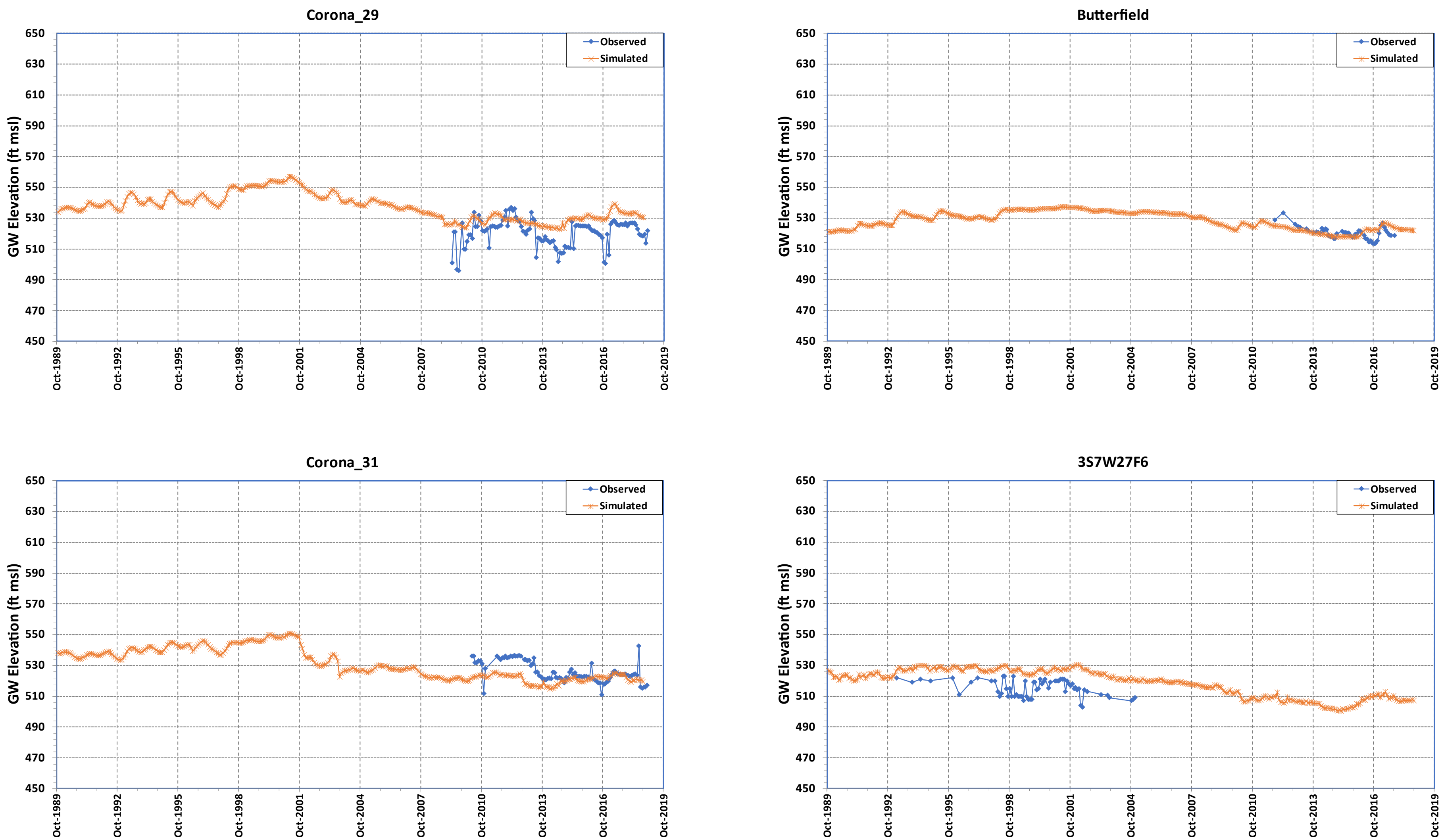
December 2021	Figure 31 Calibration Hydrographs Corona Wells 17A, 19, 22 and 23
TODD GROUNDWATER	



December 2021

TODD GROUNDWATER

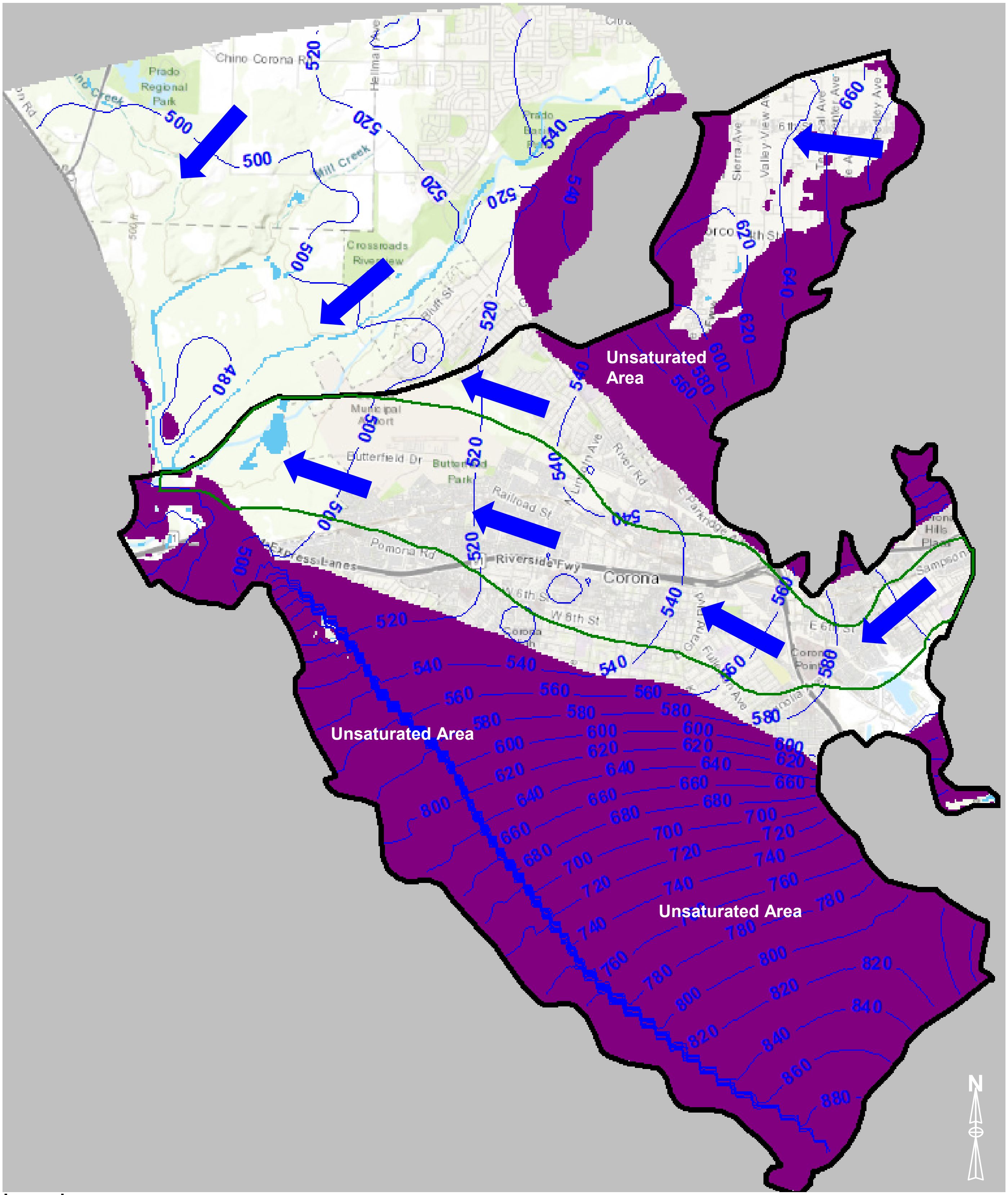
Figure 32
Calibration Hydrographs Corona Wells 24, 25, 27 and 28



December 2021

TODD GROUNDWATER

Figure 33
Calibration Hydrographs
Corona Wells 29 and 31,
Butterfield and 3S7W-27F6



Legend

Inferred Groundwater Flow Direction

900 Simulated Groundwater Elevation

Temescal Subbasin

Channel Aquifer Outline

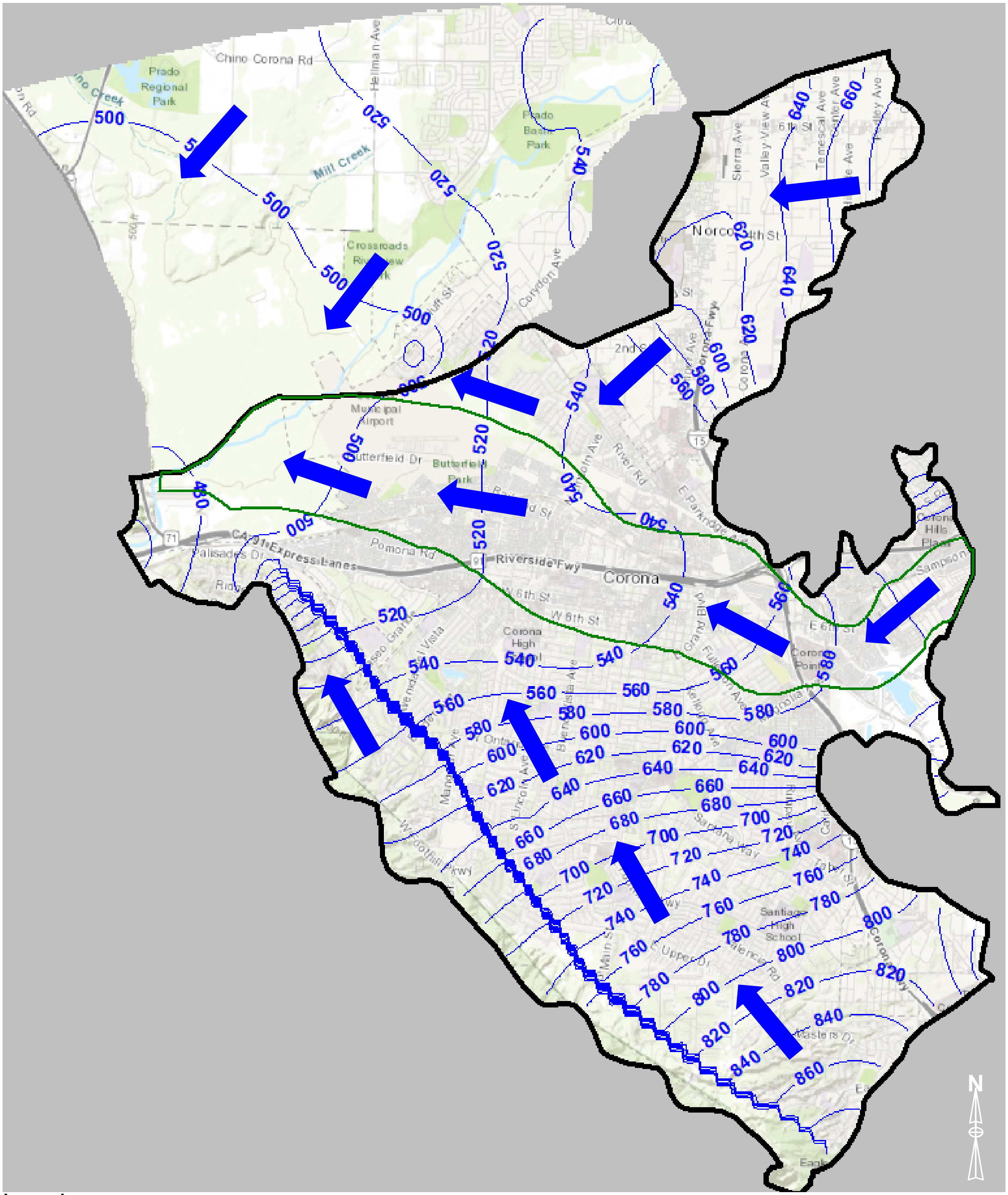
Unsaturated Areas

10000 feet

December 2021

TODD GROUNDWATER

Figure 34
Groundwater Elevations at End of Simulation in Layer 1
September 2018



Legend

Inferred Groundwater Flow Direction

900 Simulated Groundwater Elevation

Temescal Subbasin

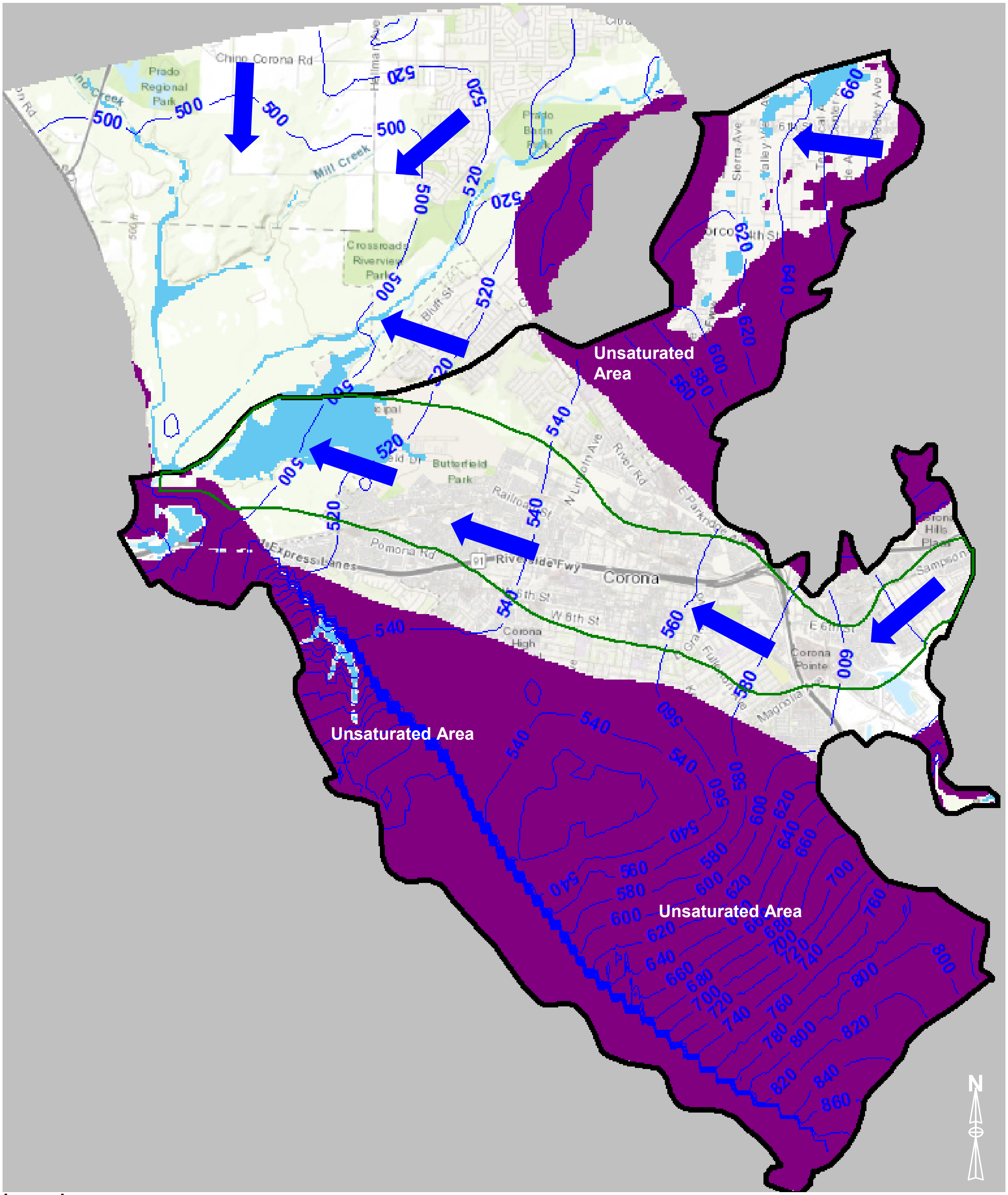
Channel Aquifer Outline

10000 feet

December 2021

TODD GROUNDWATER

Figure 35
Groundwater Elevations at End of Simulation in Layer 3
September 2018



Legend

Inferred Groundwater Flow Direction

900 Simulated Groundwater Elevation

Temescal Subbasin

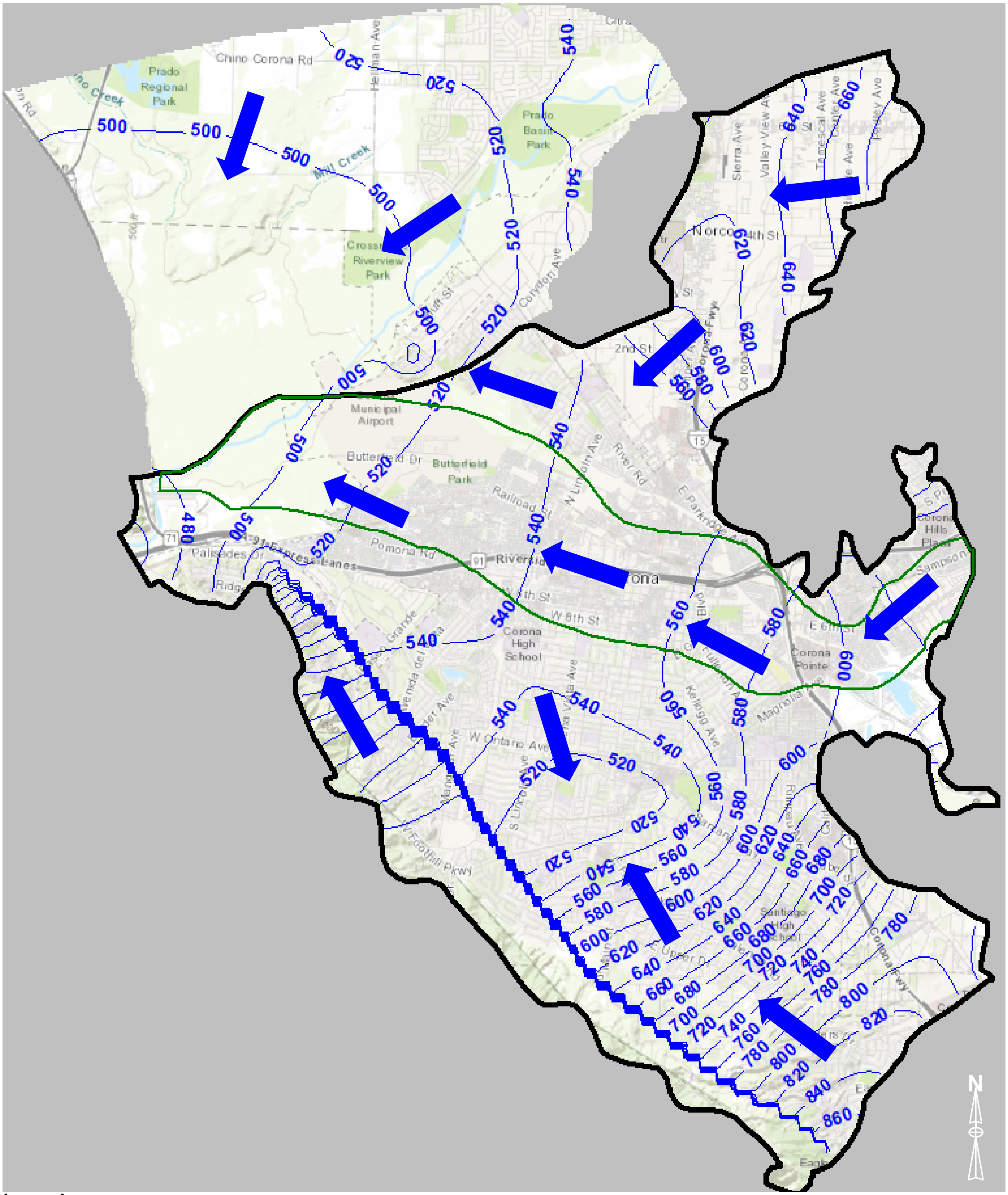
Channel Aquifer Outline

Unsaturated Areas

December 2021

TODD GROUNDWATER

Figure 36
Groundwater Elevations near Highest Levels in Layer 1
January 1997



Legend

Inferred Groundwater Flow Direction

900 Simulated Groundwater Elevation

Temescal Subbasin

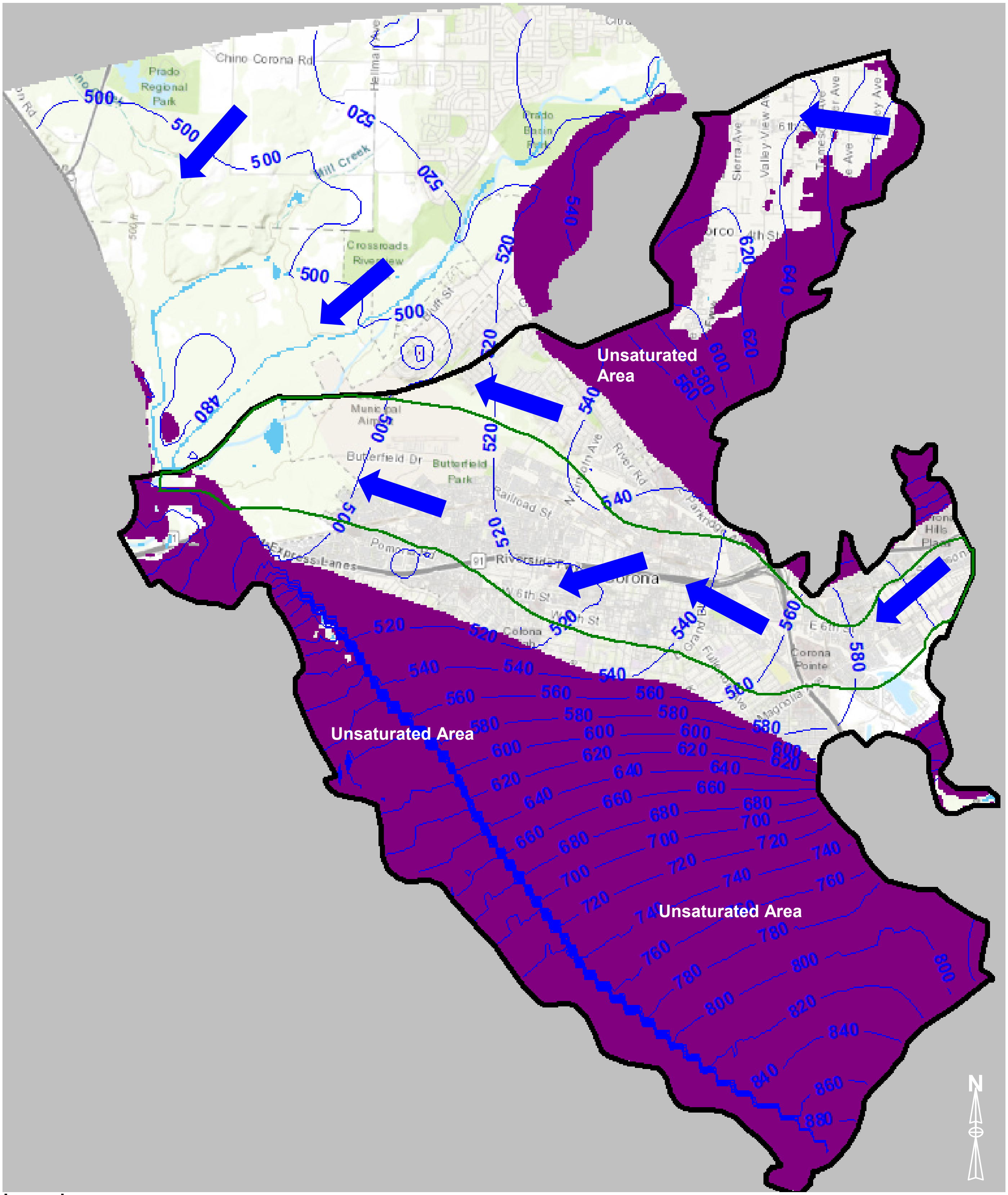
Channel Aquifer Outline

10000 feet

December 2021

TODD GROUNDWATER

Figure 37
Groundwater Elevations near Highest Levels in Layer 3
January 1997



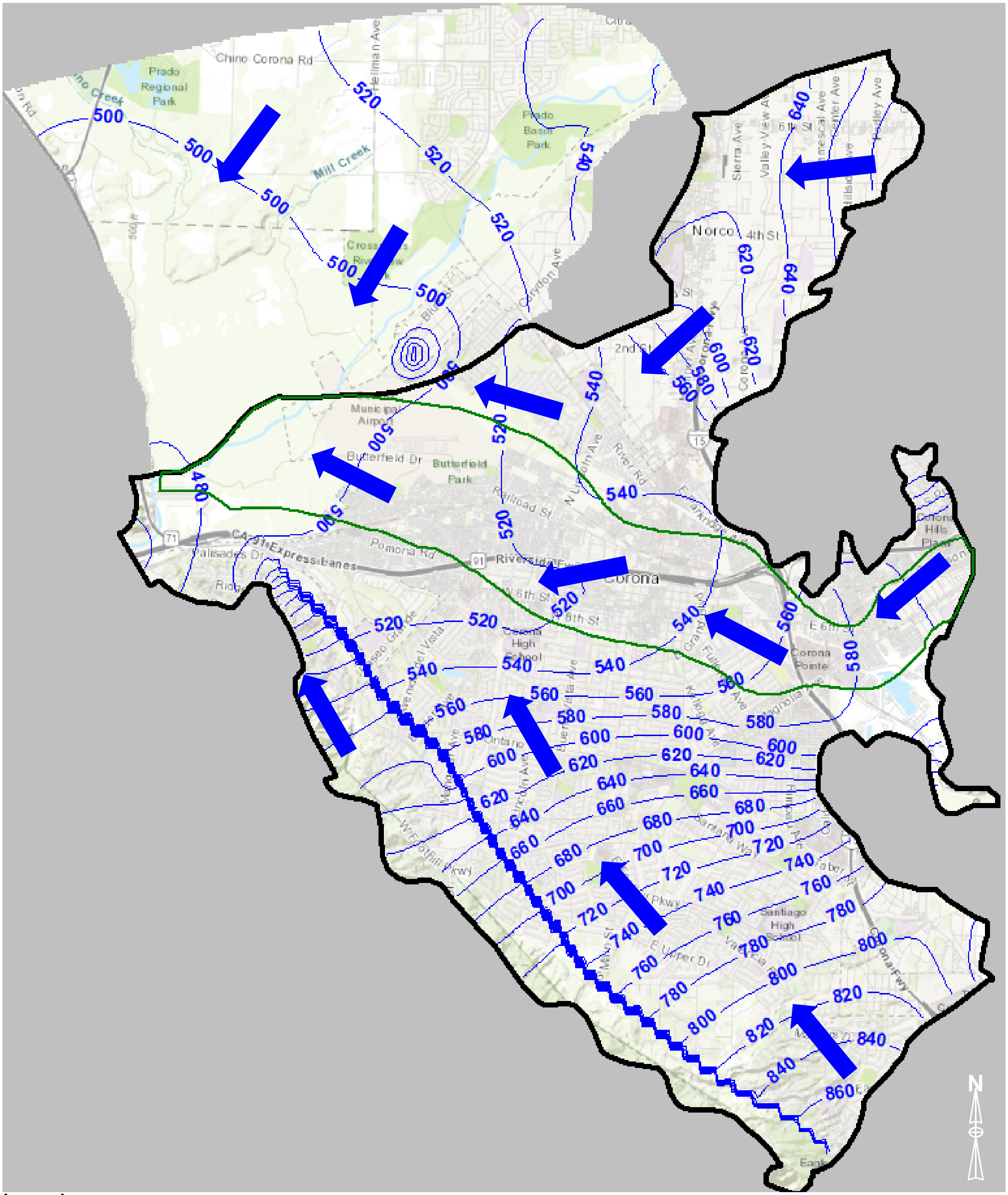
Legend
- Inferred Groundwater Flow Direction
- 900 Simulated Groundwater Elevation
- Temescal Subbasin
- Channel Aquifer Outline
- Unsaturated Areas

10000 feet

December 2021

TODD GROUNDWATER

Figure 38
Groundwater Elevations near Lowest Levels in Layer 1
August 2014



Legend

Inferred Groundwater Flow Direction

900 Simulated Groundwater Elevation

Temescal Subbasin

Channel Aquifer Outline

December 2021

TODD GROUNDWATER

Figure 39
Groundwater Elevations near Lowest Levels in Layer 3
August 2014

APPENDIX K

Detailed Annual Surface and Groundwater Budgets

Temescal Basin Surface Water Budget, Model Calibration Period (1990 to 2018)

Water Year	Temescal Basin (acre-feet per year)						
	Temescal Wash Inflow	Corona WRF-1 Discharge	Tributary and Local Runoff	Stream Percolation to Groundwater	Seepage from Groundwater to Streams	Surface Outflow to Prado Basin	Tributary Runoff below Prado Dam
1990	0	0	26,559	5,247	4,261	25,573	11
1991	10,677	0	13,683	6,480	5,157	23,036	184
1992	989	0	7,589	5,783	5,526	8,321	96
1993	87,158	0	105,205	19,906	6,517	178,974	888
1994	0	0	10,361	7,101	6,682	9,942	23
1995	21,113	0	23,733	11,635	7,247	40,459	515
1996	0	0	5,152	5,225	6,989	6,916	19
1997	0	0	3,779	3,854	7,301	7,226	47
1998	43,113	1,591	41,309	16,326	5,964	75,651	818
1999	0	7,483	7,666	8,330	5,694	12,512	19
2000	0	7,702	4,121	6,155	5,549	11,217	44
2001	2,584	7,091	10,013	9,052	5,718	16,356	120
2002	0	5,756	3,953	6,041	5,490	9,158	18
2003	8,860	5,479	16,787	10,509	5,470	26,087	290
2004	0	4,022	5,825	7,427	5,312	7,732	69
2005	114,670	5,104	101,133	21,715	5,743	204,935	796
2006	895	5,641	30,082	10,472	5,428	31,576	38
2007	0	4,791	15,140	6,947	4,589	17,573	4
2008	0	3,783	11,847	5,713	4,562	14,479	52
2009	0	2,775	10,066	5,237	4,276	11,880	6
2010	28,490	1,975	33,112	13,187	4,561	54,951	401
2011	45,771	3,632	47,065	14,942	5,327	86,853	248
2012	0	3,139	6,884	7,894	5,058	7,188	27
2013	3	2,298	5,003	6,152	4,722	5,874	33
2014	0	1,819	3,504	5,031	4,259	4,551	34
2015	0	1,719	4,129	5,457	4,118	4,510	56
2016	0	6,529	3,526	5,556	4,247	8,746	26
2017	20,353	2,386	25,587	12,611	4,296	40,012	382
2018	0	2,621	4,912	6,294	4,222	5,462	71

Temescal Basin Detailed Annual Water Budget, Model Calibration Period (1990 to 2018)

	Water Year and Type[1]																												
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
	D	AN	AN	W	BN	W	D	D	W	D	D	N	D	AN	W	W	BN	D	D	BN	AN	W	BN	D	D	BN	D	W	D
Inflows (AFY)																													
Percolation from streams	837	7,936	2,734	18,240	1,332	12,096	947	1,103	15,357	5,316	5,447	6,924	4,696	11,344	5,792	21,433	6,269	5,389	5,036	3,302	15,822	16,100	4,338	3,508	2,969	3,385	7,683	15,585	3,581
Bedrock inflow	998	998	994	1,000	998	1,166	1,257	1,165	1,077	1,068	924	874	951	884	766	992	1,137	1,101	1,044	976	901	931	987	990	998	884	681	751	831
Dispersed recharge: non-irrigated land	834	5,076	3,293	16,079	2,128	8,996	1,654	1,843	13,739	647	1,176	3,131	740	6,099	2,275	13,727	1,372	204	1,371	427	6,711	6,909	2,000	1,901	2,224	3,673	2,246	7,012	1,607
Dispersed recharge: irrigated land	2,310	2,297	2,158	2,056	2,069	2,112	2,180	2,077	1,783	2,274	2,296	2,044	2,068	1,900	2,000	1,610	2,034	2,119	1,992	1,844	1,702	1,586	1,749	1,684	1,705	1,454	1,435	1,526	1,603
Pipe leaks	2,153	2,047	1,997	1,951	1,996	1,989	1,826	2,124	2,350	2,696	3,070	3,000	2,941	2,946	3,025	2,588	2,970	3,302	3,166	2,912	2,629	2,407	2,540	2,504	2,496	2,233	2,101	2,244	2,092
Reclaimed water percolation	5,385	6,063	6,714	7,440	8,094	8,772	9,413	10,919	10,806	6,575	7,763	8,452	8,667	8,629	10,032	10,245	9,449	8,462	7,570	6,679	6,679	5,342	5,928	6,851	6,818	7,666	3,839	6,029	5,529
Inflow from Chino Basin	143	123	120	122	115	115	119	123	114	113	122	123	124	122	123	119	121	129	132	131	129	130	132	132	122	119	120	121	126
Total Inflow	12,660	24,538	18,011	46,888	16,732	35,246	17,394	19,354	45,226	18,688	20,797	24,548	20,186	31,923	24,013	50,713	23,352	20,707	20,312	16,270	34,574	33,404	17,674	17,571	17,332	19,414	18,105	33,268	15,369
Outflows (AFY)																													
Wells - M&I and domestic	-9,713	-7,937	-10,103	-11,998	-10,533	-11,119	-8,757	-9,663	-12,538	-11,141	-9,562	-9,554	-15,831	-16,733	-18,289	-19,481	-19,940	-19,322	-19,917	-17,309	-17,283	-16,243	-17,074	-18,357	-16,163	-14,904	-12,029	-12,948	-14,541
Wells - agricultural	-7,588	-8,392	-7,130	-6,801	-6,686	-6,968	-8,199	-5,795	-2,780	-4,230	-2,617	-1,565	-2,979	-1,668	-1,277	-990	-987	-786	-1,284	-1,589	-1,408	-1,227	-1,634	-1,275	-1,527	-1,482	-1,010	-1,289	-1,148
Groundwater discharge to streams	-1,674	-2,707	-3,661	-5,728	-5,849	-6,530	-6,353	-6,793	-5,469	-2,959	-3,445	-4,491	-3,619	-3,357	-3,279	-4,626	-3,302	-2,381	-2,043	-1,530	-1,430	-1,604	-1,200	-948	-656	-523	-464	-889	-879
Riparian evapotranspiration	-3,213	-3,696	-3,912	-5,182	-4,670	-5,136	-4,947	-5,038	-5,450	-5,160	-4,942	-4,587	-4,808	-5,069	-4,966	-5,589	-4,658	-4,501	-3,860	-3,501	-4,087	-4,175	-3,903	-3,522	-3,399	-3,205	-3,498	-4,196	-3,541
Outflow to Chino Basin	-2,413	-2,461	-2,448	-2,544	-2,520	-2,851	-2,563	-2,956	-3,182	-3,631	-3,555	-3,429	-3,357	-2,971	-2,865	-2,764	-2,720	-2,579	-2,416	-2,187	-2,042	-2,140	-2,112	-2,043	-2,281	-2,224	-2,217	-2,444	-2,209
Total Outflow	-24,600	-25,194	-27,254	-32,253	-30,258	-32,604	-30,819	-30,245	-29,419	-27,121	-24,121	-23,626	-30,594	-29,797	-30,677	-33,451	-31,606	-29,570	-29,521	-26,115	-26,251	-25,389	-25,924	-26,144	-24,027	-22,338	-19,218	-21,765	-22,319
Storage Change (AFY)																													
Total Inflows minus Total Outflows	-11,940	-656	-9,243	14,636	-13,526	2,642	-13,425	-10,891	15,808	-8,433	-3,324	922	-10,408	2,126	-6,664	17,262	-8,254	-8,863	-9,209	-9,845	8,323	8,015	-8,250	-8,574	-6,695	-2,924	-1,113	11,503	-6,949

Notes:

[1]: Water year types are described in Section 5 - Water Budget, and shown on Figure 5-1. Water year types are summarized above as follows D = Dry, Below Normal = BN, N = Normal, AN = Above Normal, W = Wet.

Temescal Basin Detailed Annual Water Budget, Baseline Period

	Water Year																
	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Inflows																	
Percolation from streams	22,447	3,505	14,478	3,425	3,469	17,214	3,317	2,697	4,073	7,434	12,046	6,298	22,915	5,447	4,041	5,550	5,665
Bedrock inflow	1,397	1,397	1,397	1,397	1,397	1,363	1,322	1,148	1,049	1,081	982	853	1,060	1,187	1,125	1,038	936
Dispersed recharge: non-irrigated land	14637	1775	5210	1199	1403	8473	986	1155	2004	735	3468	1329	8196	1232	197	973	184
Dispersed recharge: irrigated land	1,650	3,087	4,697	2,833	2,990	5,298	2,216	2,662	3,199	2,006	4,358	2,799	5,650	2,167	1,945	2,320	1,940
Pipe leaks	1,013	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179
Reclaimed water percolation	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122
Inflow from Chino Basin	116	119	116	125	130	117	121	130	127	122	120	121	111	119	133	131	132
Total Inflow	47,382	18,185	34,199	17,281	17,690	40,765	16,263	16,093	18,754	19,680	29,275	19,700	46,234	18,452	15,742	18,314	17,158
Outflows																	
Wells - M&I and domestic	-16,455	-15,599	-15,599	-15,595	-15,595	-15,601	-15,597	-15,597	-15,599	-15,598	-15,599	-15,597	-15,600	-15,600	-15,596	-15,600	-15,597
Wells - agricultural	0	-22	-21	-25	-26	-20	-24	-23	-21	-23	-22	-23	-20	-21	-24	-21	-23
Groundwater discharge to streams	-2,134	-1,470	-1,878	-1,566	-1,338	-2,531	-1,806	-1,525	-1,686	-1,492	-1,825	-1,806	-3,310	-2,305	-1,932	-1,957	-1,822
Riparian evapotranspiration	-4,661	-4,311	-4,827	-4,702	-4,681	-5,111	-4,861	-4,458	-4,009	-4,602	-5,018	-5,031	-5,494	-4,859	-4,616	-4,279	-4,442
Outflow to Chino Basin	-2,739	-2,540	-2,533	-2,347	-2,279	-2,520	-2,469	-2,284	-2,172	-2,361	-2,425	-2,463	-3,035	-2,988	-2,386	-2,312	-2,345
Total Outflow	-25,989	-23,942	-24,859	-24,236	-23,918	-25,782	-24,756	-23,888	-23,488	-24,075	-24,889	-24,921	-27,459	-25,773	-24,554	-24,168	-24,230
Storage change																	
Inflows - outflows	21,393	-5,757	9,341	-6,955	-6,228	14,983	-8,493	-7,795	-4,733	-4,395	4,386	-5,221	18,775	-7,320	-8,812	-5,854	-7,072

	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052
Inflows																	
Percolation from streams	15,593	15,062	3,178	2,420	4,053	3,677	2,640	14,435	20,618	5,754	13,229	3,273	3,481	16,846	3,331	3,418	5,450
Bedrock inflow	855	900	973	980	997	881	666	746	1,052	1,303	1,466	1,607	1,486	1,358	1,322	1,148	1,050
Dispersed recharge: non-irrigated land	3757	3833	1261	1200	1069	1913	1009	4163	8998	1776	5210	1199	1403	8470	986	1155	2004
Dispersed recharge: irrigated land	4,075	4,046	2,444	2,320	2,786	3,244	2,601	3,958	5,651	3,087	4,697	2,833	3,004	5,284	2,216	2,662	3,200
Pipe leaks	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179
Reclaimed water percolation	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122
Inflow from Chino Basin	125	122	134	138	136	136	137	128	119	114	121	129	134	119	123	133	130
Total Inflow	32,706	32,264	16,291	15,360	17,342	18,153	15,354	31,731	44,740	20,336	33,024	17,343	17,808	40,377	16,280	16,817	20,135
Outflows																	
Wells - M&I and domestic	-15,599	-15,601	-15,597	-15,598	-15,594	-15,596	-15,595	-15,597	-15,600	-15,599	-15,599	-15,595	-15,594	-15,601	-15,597	-15,597	-15,599
Wells - agricultural	-22	-20	-23	-23	-27	-24	-26	-24	-21	-22	-21	-25	-26	-19	-24	-23	-21
Groundwater discharge to streams	-1,989	-3,289	-1,603	-1,346	-1,094	-1,072	-953	-1,231	-2,881	-1,752	-2,308	-1,695	-1,412	-2,653	-1,842	-1,528	-1,761
Riparian evapotranspiration	-4,922	-4,756	-4,634	-4,235	-4,380	-4,234	-4,170	-4,509	-5,128	-4,864	-5,099	-4,842	-4,820	-5,145	-4,903	-4,496	-4,137
Outflow to Chino Basin	-2,344	-2,931	-2,409	-2,146	-2,121	-2,074	-2,043	-2,086	-2,789	-2,764	-2,671	-2,374	-2,279	-2,500	-2,456	-2,259	-2,178
Total Outflow	-24,876	-26,596	-24,267	-23,347	-23,216	-23,001	-22,786	-23,446	-26,419	-25,001	-25,698	-24,531	-24,132	-25,918	-24,822	-23,904	-23,696
Storage change																	
Inflows - outflows	7,829	5,668	-7,976	-7,987	-5,874	-4,848	-7,432	8,285	18,322	-4,665	7,326	-7,188	-6,324	14,459	-8,543	-7,087	-3,562

	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068
Inflows																
Percolation from streams	3,194	9,393	3,340	23,342	3,839	3,128	3,277	3,095	15,196	15,665	3,244	3,317	3,293	3,410	3,224	15,460
Bedrock inflow	1,081	982	853	1,061	1,187	1,125	1,038	936	854	900	973	980	996	881	666	747
Dispersed recharge: non-irrigated land	735	3468	1329	8198	1231	197	973	184	3756	3833	1261	1200	1069	1913	1009	4164
Dispersed recharge: irrigated land	2,005	4,358	2,799	5,659	2,158	1,945	2,320	1,955	4,060	4,046	2,444	2,344	2,763	3,244	2,601	3,959
Pipe leaks	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	1,912
Reclaimed water percolation	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122
Inflow from Chino Basin	133	128	130	115	126	135	138	139	128	124	134	137	138	138	137	128
Total Inflow	15,450	26,630	16,751	46,677	16,843	14,831	16,048	14,610	32,295	32,869	16,357	16,280	16,560	17,887	15,938	32,492
Outflows																
Wells - M&I and domestic	-15,598	-15,599	-15,597	-15,600	-15,600	-15,596	-15,600	-15,597	-15,599	-15,601	-15,597	-15,597	-15,594	-15,596	-15,595	-15,597
Wells - agricultural	-23	-22	-23	-20	-21	-24	-21	-23	-22	-20	-23	-23	-26	-24	-26	-24
Groundwater discharge to streams	-1,433	-1,402	-1,273	-2,895	-1,772	-1,462	-1,508	-1,270	-1,393	-3,283	-1,331	-1,161	-969	-949	-846	-1,197
Riparian evapotranspiration	-4,122	-4,335	-4,193	-5,084	-4,330	-4,109	-3,717	-3,701	-4,371	-4,438	-4,356	-4,119	-4,188	-4,060	-4,057	-4,496
Outflow to Chino Basin	-2,156	-2,114	-2,121	-2,836	-2,752	-2,158	-2,067	-2,026	-2,116	-2,762	-2,273	-2,080	-2,049	-2,002	-1,984	-2,072
Total Outflow	-23,331	-23,472	-23,208	-26,436	-24,475	-23,349	-22,913	-22,616	-23,501	-26,103	-23,580	-22,981	-22,826	-22,631	-22,508	-23,385
Storage change																
Inflows - outflows	-7,881	3,159	-6,457	20,241	-7,632	-8,518	-6,865	-8,006	8,794	6,766	-7,223	-6,700	-6,265	-4,744	-6,569	9,108

Temescal Basin Detailed Annual Water Budget, Growth And Climate Change 50-year Period

	Water Year																								
	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043
Inflows																									
Percolation from streams	22,267	5,370	15,234	4,797	4,991	17,003	4,451	4,119	6,464	7,506	13,489	7,242	22,515	6,319	4,322	6,379	5,799	17,021	14,870	4,247	3,354	4,975	5,285	3,866	14,583
Bedrock inflow	1,606	1,606	1,606	1,606	1,606	1,580	1,526	1,371	1,300	1,327	1,225	1,121	1,316	1,414	1,331	1,246	1,132	1,050	1,113	1,198	1,219	1,257	1,160	965	1,034
Dispersed recharge: non-irrigated land	9254	2049	4682	1575	1825	7404	1280	1455	2619	714	3224	1794	7224	1393	309	1113	309	4191	3749	1234	1469	1243	2026	1264	3421
Dispersed recharge: irrigated land	5,701	3,087	4,697	2,833	2,990	5,298	2,216	2,662	3,199	2,006	4,358	2,799	5,650	2,167	1,945	2,320	1,940	4,075	4,046	2,444	2,320	2,786	3,244	2,601	3,958
Pipe leaks	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179
Reclaimed water percolation	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122
Inflow from Chino Basin	114	119	117	125	129	117	122	128	125	121	119	120	112	119	131	129	130	123	119	133	137	134	134	134	126
Total Inflow	47,243	20,532	34,636	19,239	19,842	39,703	17,897	18,037	22,010	19,975	30,716	21,377	45,117	19,712	16,339	19,489	17,610	34,761	32,198	17,558	16,800	18,696	20,149	17,130	31,424
Outflows																									
Wells - M&I and domestic	-16,433	-15,599	-15,599	-15,595	-15,595	-15,601	-15,597	-15,597	-15,599	-15,598	-15,599	-15,597	-15,600	-15,600	-15,596	-15,600	-15,597	-15,599	-15,601	-15,597	-15,598	-15,594	-15,596	-15,595	-15,597
Wells - agricultural	-21	-22	-21	-25	-26	-20	-24	-23	-21	-23	-22	-23	-20	-21	-24	-21	-23	-22	-20	-23	-23	-27	-24	-26	-24
Groundwater discharge to streams	-1,494	-1,292	-1,715	-1,419	-1,213	-2,194	-1,686	-1,436	-1,658	-1,441	-1,716	-1,677	-2,572	-2,154	-1,778	-1,830	-1,664	-1,935	-2,017	-1,445	-1,190	-950	-945	-850	-927
Riparian evapotranspiration	-5,001	-4,770	-5,208	-5,154	-5,212	-5,490	-5,414	-4,956	-4,517	-5,131	-5,470	-5,530	-5,821	-5,269	-4,993	-4,679	-4,808	-5,367	-5,213	-5,133	-4,670	-4,820	-4,709	-4,692	-4,869
Outflow to Chino Basin	-2,308	-2,289	-2,363	-2,376	-2,349	-2,395	-2,453	-2,360	-2,265	-2,449	-2,478	-2,514	-2,498	-2,515	-2,430	-2,366	-2,393	-2,396	-2,393	-2,322	-2,200	-2,181	-2,138	-2,122	-2,154
Total Outflow	-25,258	-23,972	-24,907	-24,569	-24,393	-25,700	-25,174	-24,371	-24,061	-24,642	-25,285	-25,342	-26,512	-25,558	-24,822	-24,496	-24,485	-25,318	-25,244	-24,521	-23,680	-23,572	-23,412	-23,284	-23,570
Storage change																									
Inflows - outflows	21,985	-3,440	9,729	-5,330	-4,551	14,003	-7,277	-6,335	-2,051	-4,667	5,431	-3,965	18,605	-5,846	-8,483	-5,007	-6,875	9,443	6,954	-6,963	-6,880	-4,875	-3,263	-6,154	7,854

	Water Year																								
	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068
Inflows																									
Percolation from streams	20,605	7,307	14,165	4,642	5,011	16,796	4,450	4,834	7,915	3,848	11,820	4,804	22,597	4,949	3,453	4,203	3,312	16,842	15,008	4,302	4,270	4,225	5,024	4,450	15,546
Bedrock inflow	1,295	1,525	1,665	1,768	1,670	1,576	1,526	1,370	1,301	1,326	1,225	1,121	1,317	1,413	1,331	1,246	1,132	1,049	1,113	1,198	1,219	1,258	1,160	965	1,035
Dispersed recharge: non-irrigated land	8987	2044	4682	1575	1815	7390	1282	1455	2632	701	3225	1794	7221	1390	309	1113	295	4203	3749	1234	1488	1265	2026	1264	3423
Dispersed recharge: irrigated land	5,651	3,087	4,697	2,833	3,004	5,284	2,216	2,662	3,200	2,005	4,358	2,799	5,659	2,158	1,945	2,320	1,955	4,060	4,046	2,444	2,344	2,763	3,244	2,601	3,959
Pipe leaks	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	2,179	1,912
Reclaimed water percolation	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122	6,122
Inflow from Chino Basin	117	113	120	127	131	118	123	129	126	131	124	128	115	125	134	135	137	124	120	132	136	135	134	133	126
Total Inflow	44,957	22,377	33,628	19,247	19,933	39,464	17,897	18,752	23,475	16,313	29,053	18,947	45,210	18,337	15,473	17,318	15,132	34,579	32,336	17,612	17,757	17,947	19,889	17,714	32,123
Outflows																									
Wells - M&I and domestic	-15,600	-15,599	-15,599	-15,595	-15,594	-15,601	-15,597	-15,597	-15,599	-15,598	-15,599	-15,597	-15,600	-15,600	-15,596	-15,600	-15,597	-15,599	-15,601	-15,597	-15,597	-15,594	-15,596	-15,595	-15,597
Wells - agricultural	-21	-22	-21	-25	-26	-19	-24	-23	-21	-23	-22	-23	-20	-21	-24	-21	-23	-22	-20	-23	-23	-26	-24	-26	-24
Groundwater discharge to streams	-1,918	-1,578	-2,125	-1,539	-1,287	-2,250	-1,702	-1,430	-1,762	-1,387	-1,368	-1,257	-2,029	-1,706	-1,374	-1,436	-1,191	-1,393	-1,626	-1,217	-1,052	-860	-853	-765	-873
Riparian evapotranspiration	-5,508	-5,344	-5,484	-5,273	-5,326	-5,517	-5,439	-4,980	-4,676	-4,676	-4,955	-4,820	-5,462	-4,805	-4,530	-4,133	-4,055	-4,876	-4,944	-4,887	-4,591	-4,649	-4,548	-4,595	-4,867
Outflow to Chino Basin	-2,255	-2,416	-2,410	-2,361	-2,343	-2,363	-2,430	-2,332	-2,284	-2,256	-2,254	-2,236	-2,334	-2,312	-2,237	-2,143	-2,099	-2,210	-2,285	-2,226	-2,155	-2,124	-2,078	-2,074	-2,147
Total Outflow	-25,301	-24,958	-25,640	-24,793	-24,577	-25,751	-25,191	-24,362	-24,342	-23,939	-24,197	-23,933	-25,445	-24,443	-23,762	-23,333	-22,966	-24,100	-24,475	-23,950	-23,418	-23,253	-23,099	-23,054	-23,507
Storage change																									
Inflows - outflows	19,655	-2,581	7,989	-5,546	-4,644	13,713	-7,294	-5,609	-867	-7,627	4,856	-4,986	19,765	-6,106	-8,289	-6,015	-7,834	10,480	7,861	-6,339	-5,661	-5,307	-3,210	-5,341	8,616

APPENDIX L

Temescal Groundwater Sustainability Plan
Data Management System Description

TODD GROUNDWATER

October 18, 2021

MEMORANDUM

To: Melissa Estrada-Maravilla, City of Corona

From: Maureen Reilly, PE and Chad Taylor, PG, CHG

Re: Temescal Basin Groundwater Sustainability Plan Data Management System

1. INTRODUCTION

The Groundwater Sustainable Agency (GSA)was formed by the City of Corona (Corona), City of Norco (Norco, and Home Gardens County Water District (HGCWD)) to fulfill the role and legal obligations of a GSA for the Temescal Subbasin (Basin) in accordance with the Sustainable Groundwater Management Act (SGMA). Foremost among the responsibilities is to develop, adopt, and implement a Groundwater Sustainability Plan (GSP) for the Basin.

As part of GSP development, the Temescal Basin GSA (TBGSA) retained Todd Groundwater to prepare the GSP and compile all relevant data for the Basin. This compilation is to focus on those data and information that may be required or useful for the preparation of the GSP and for the evaluation and identification of possible gaps in the available data. The purpose of this memorandum is to document the Data Management System (DMS) developed as part of the GSP.

The TBGSA has been collecting and compiling groundwater data annually including water levels, water quality, and water use. These data have been used in the GSP and will be used in future Annual Groundwater Reports. As part of the GSP, the DMS has been designed to be practicable, usable, intuitive, and cost effective. The data compiled for the GSP have been compiled in a set of databases and other related files. This includes an Access database, a GIS geodatabase, and Excel workbooks. The DMS has been prepared to include related tables in the databases other files that can be efficiently updated, reviewed for quality, and queried to produce new data reports and tables. A summary of the data within and the structure of the DMS is presented below.

2. DMS TYPES AND SOURCES

Data collected and compiled for the GSP have been stored in a variety of formats based on the type of data collected. Spatial information such as ArcGIS files, aerial imagery, and or other map sources, is stored in a Geodatabase. Tabular data are stored in subject-specific relational databases. Additional datasets are stored in files best suited for analysis. To be specific, climate data are stored in an Excel workbook to allow for cumulative departure calculations, scanned well documents are stored as images to preserve the detail on the hardcopy forms, and online datasets updated by other agencies are included by reference. Discussed below are the data formats and the type of data available within that format.

3. GEODATABASE

Spatial data are stored in geodatabase that allows spatial files to be easily accessed and transferred with all appropriate spatial information. Within the Temescal Geodatabase, consistent and feature dataset structures have been constructed to group associated data sets and maintain coordinate system assignments.

3.1 Jurisdiction Boundaries

The boundaries for the Basin and neighboring basins are available as spatial coverages in the geodatabase. State, local, and federal boundaries within and surrounding the Basin were compiled from state and federal sources. These boundaries include all water districts and other local agencies near the Basin as well as federally owned land. These boundaries are included in the project geodatabase.

3.2 Surface Water Body Location and Watershed Mapping

Mapping data for surface water features have been provided from publicly available sources. These mapped data include locations of aqueducts, reservoirs, rivers, streams, drainages, lakes, and ponds. These data are presented in the project geodatabase in feature classes. DWR defined watershed coverages are also stored in the geodatabase as a feature class.

3.3 Mapping of Natural Communities Commonly Associated with Groundwater

GSP Regulations require identification of Groundwater Dependent Ecosystems (GDEs), which are defined as ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface. A statewide database and mapping tool, developed by DWR, provides geographic information on Natural Communities Commonly Associated with Groundwater (NCAAG). While these do not necessarily represent GDEs, the dataset is a starting point in identifying GDEs. The mapping data for watersheds surrounding the Basin are included in the project geodatabase

3.4 Ground Surface Elevation Data

Ground surface elevation data are available from the USGS in the form of National Elevation Dataset (NED) GIS grid files (rasters) and raster and vector topographic map datasets. Both datasets have been compiled for the area surrounding and including the Basin. The 10-meter resolution NED data have been combined into a single raster.

3.5 Aerial Photographs

Aerial photographs of the area surrounding the Basin have been downloaded from the USGS National Aerial Imagery Program (NAIP) for 2004, 2005, 2006, 2009, 2010, 2012, 2014, and 2016. These aerial photographs are all rectified GIS raster datasets and included in the project geodatabase. Additional aerial photographs from Google Earth were also reviewed, but these are stored online and accessible through Google Earth.

3.6 Soil Maps

Soil information for the Basin and surrounding areas have been downloaded from the Natural Resources Conservation Service (NRCS). Soil data are mapped and maintained by NRCS in a standardized format that is compatible with tools that NRCS makes freely available to the public. The soils data for the area surrounding the basin have been maintained in the standard NRCS formats to facilitate future use. These raw data are available for preparation of a various soil data presentations and analyses. The hydrologic soil group data from these datasets have been also mapped using the NRCS *Soil Data Development Toolbox.* These data are in the project geodatabase.

3.7 Land Use Maps

Land use map data have been collected from DWR, the California Department of Conservation Farmland Mapping and Monitoring Program (FMMP), and Riverside County. The available land use maps are indicated below:

- DWR: 2014 and 2106 statewide land use mapping specifically developed for SGMA and GSPs.
- FMMP: 1984, 1986, 1988, 1990, 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, and 2016
- Riverside County: 1993 and 2000

3.8 Geologic Mapping of Surficial Geology and Faults

Surficial geology in the area of the Temescal Basin has been mapped by the United States Geological Survey (USGS) in the 2004 *Preliminary Digital Geologic Map of the Santa Ana 30' x 60' Quadrangle* and the 2006 *Geologic Map of the San Bernardino and Santa Ana 30' x 60' Quadrangles*. This mapped geology has been digitized into GIS formats available from the USGS, and these complete datasets are included in the project geodatabase.

3.9 Subsidence - NASA JPL InSAR Dataset

Vertical ground surface displacement rates are derived from Interferometric Synthetic Aperture Radar (InSAR) data collected by the European Space Agency (ESA) Sentinel-1A satellite and processed by the National Aeronautics and Space Administration (NASA) Jet Propulsion Laboratory (JPL), under contract with DWR. Changes in vertical displacement can be viewed through the DWR SGMA mapping tool. Data have been downloaded from the SGMA data viewer and stored in the project geodatabase.

3.10 Water Infrastructure

3.10.1 Imported Water

Available imported water delivery pipelines and tie-in locations available from Corona, Norco, and HGCWD are included in the project geodatabase and relate to imported water delivery data in the project database.

3.10.2 Recycled Water and Wastewater

Corona waste discharge and recycled water distribution and use locations are included in the GIS datasets in the project geodatabase. Corona discharges wastewater to ponds adjacent to their wastewater treatment facility and they provide recycled water within the Basin. Recycled water use and wastewater discharge data are included in the project database.

3.11 Climate Data

The CIMIS stations, NOAA stations, and other climate locations are available in the geodatabase as a point coverage.

3.12 Surface Water Gage Locations

The locations of USGS surface water gages are also stored in the Geodatabase. Three streamflow gage stations near the Temescal Basin that are maintained by the USGS were identified. These stations are located on Temescal Creek at about Main Street in Corona (USGS 11072100), Temescal Creek at Corona Lake (USGS 11071900), and San Jacinto River near Elsinore (USGS 11070500). Up to date surface water measurements are available from the USGS NWIS data repository.

3.13 Well Records

Well location and other records are included in the GIS datasets in the project geodatabases. This includes location and other information as available for known and locatable wells in the Basin.

4. ACCESS DATABASES

Tabular data are linked in relational databases by subject. The DMS include one access database with stand-alone tables that pull together data from all sources for groundwater elevation, groundwater quality, and groundwater pumping. In addition, a table containing all know wells in the Basin links to the subject specific tables. The well table includes locational information as State Plane coordinates.

The types of data stored in the Access database are described below.

4.1 Well Information Table

Well locations and available information were collected from multiple sources, including previous investigations, USGS National Water Information System (NWIS), DWR California Groundwater Elevation Monitoring (CASGEM) program, and others. This data collection effort included available well locations, well construction information, and aquifer parameter information. Data from all the available sources for the Basin and surrounding area were collected and reviewed and then the data were combined into a single unified dataset. The unified dataset retains detailed information from the source files. Well data from individual sources often use agency-specific identification numbers or names. This variation in identification number by source is problematic for organizing, relating, and querying data. A *UniqueID* field was added to the unified well dataset and assigned integer identification numbers for each well to serve as the primary field for joins, relating, and querying data. The unified well dataset includes wells with and without location data. In compiling these data, attempts were made to remove duplicate wells while compiling these data. The unified well information dataset is included in the project database. A separate table with additional information about active Corona wells is included as *Well Corona Information*.

4.2 Groundwater Elevation Table

As with well locations, groundwater elevation records were collected from multiple sources, including previous investigations, the TBGSA agencies, USGS NWIS, DWR CASGEM, and others. Data from these sources were collected, reviewed, and compiled into a single unified groundwater elevation dataset. The dataset includes all information from each source and uses the *UniqueID* field for linking, joining, or relating tables with information from wells. Groundwater elevation data were not calculated for wells without reference elevation data; records for these wells include only depth to water measurements. In addition, there are temporal gaps in some of the data records between the completion of previous investigations and the start of data collection for publicly available records.

Groundwater elevation data has been structured according to the requirements of the CASGEM program in accordance with DWR's grant funding agreement with the TBGSA.

The Groundwater Elevation Database includes relevant information about the wells and elevation data. The database is structured into tables with information on well location, well construction, and monitoring data.

4.3 Groundwater Quality Table

The groundwater quality tables combine water quality data from a variety of sources for a comprehensive repository of regional water quality data. The relational tables include locations for all wells with water quality data, a table of water quality data, a table with information on the water system that was sampled, and a table of constituents monitored with agency codes, reporting levels, and applicable water quality goals. Queries are included to extract data on the key constituents of concern. Data from the TBGSA agencies, regional monitoring (Regional Water Quality Control Board and the Division of Drinking Water), and special studies are included. The wells are linked to the Well Information table by the *UniqueID* field, and the source recorded in the dataset attribute field. Groundwater Pumping Table

Groundwater production in the Basin was compiled from all available sources and includes annual groundwater pumping for all wells is tracked by the Santa Ana River Watermaster, along with production in the rest of the watershed. Western Municipal Water District (WMWD) currently coordinates groundwater use data collection. Complete records of historical groundwater use were requested from and provided by WMWD. The groundwater production data for all wells were reviewed and organized for inclusion in the project database. Monthly pumping totals from the City of Corona wells are included separately. All production records are related to well locations by the *UniqueID* field.

4.4 Imported Water

Imported water delivery data were collected from the TBGSA agencies and are included in the project database.

4.5 Recycled Water and Wastewater

Wastewater information and reclaimed water production from the TBGSA agencies was compiled and included in the database.

5. OTHER FORMATS

5.1 Climate Data (precipitation, evaporation, temperature) - Excel

Climate data are compiled and stored as an Excel file. The workbook also calculates the cumulative departure of precipitation and local water year type by quintiles. This record set includes all available local climate and weather data.

6. DATA MANAGEMENT STORAGE

The DMS will continue to be updated with more recent data for annual reports and the GSP 5-year update. It is expected that new datasets will be added as projects and management actions are undertaken. For example, shallow monitoring wells in the Prado wetlands area may be added to the project database.

The datasets that were created for the groundwater model of the Basin and the simulations of future conditions are documented separately, including model outputs, surface water budgets, and groundwater budgets. While these data are valuable to understanding the basin, they represent simulated conditions and are stored separately from the observed data documented here.

Temescal Basin Groundwater Sustainability Plan

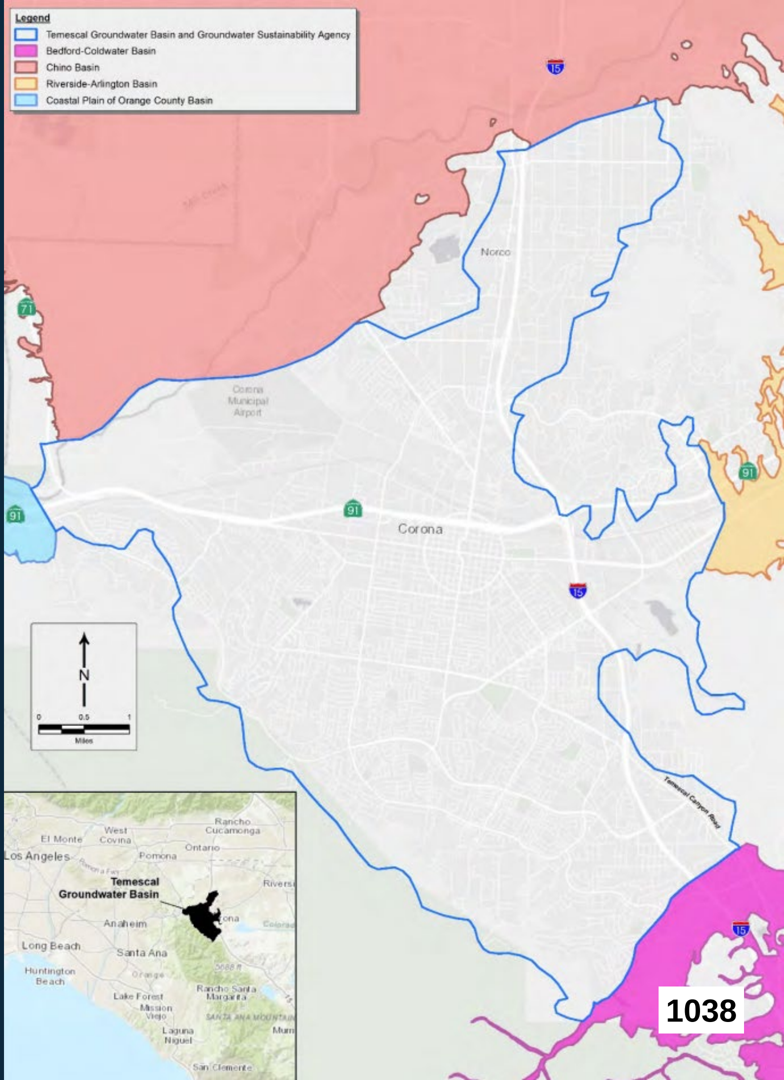
Melissa Estrada-Maravilla

January 5, 2022

Temescal Basin

Medium Priority Basin

GSP due 1/31/2022

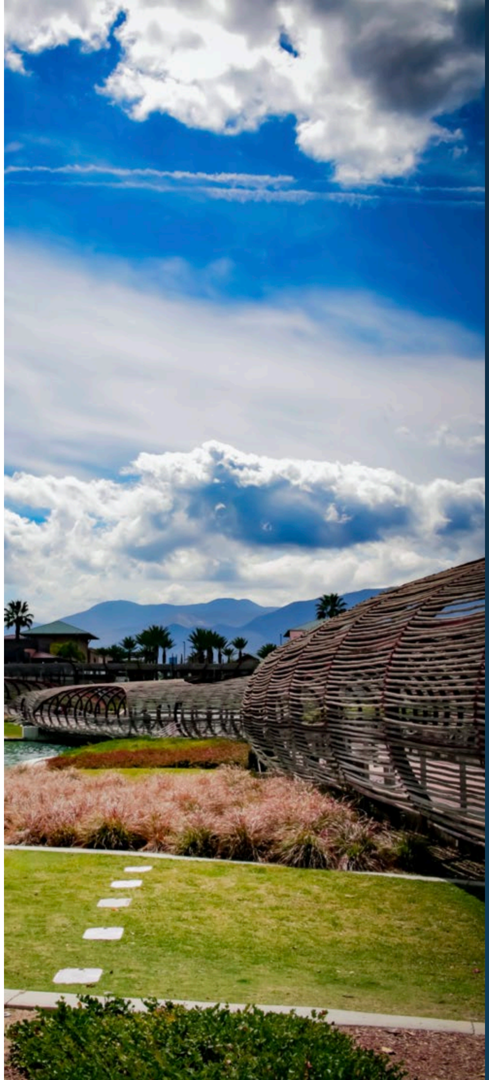


Home Gardens
County Water District
3832 N. Grant St., Corona, Calif. 92879
(951) 737-4741

SGMA

Sustainable Groundwater Management Act (SGMA)

- September 16, 2014
- Law that established a new structure for sustainable groundwater management



Temescal Basin
Groundwater Sustainability Agency (Temescal GSA)

- City of Corona
- City of Norco
- Home Gardens County Water District

Stakeholder Engagement

Technical Advisory Committee
[8 member agencies]

- April 19, 2020
- November 18, 2020
- February 17, 2021
- June 16, 2021

Public Workshops

- September 29, 2020
- March 2, 2021
- July 8, 2021

Community Leader Meetings

- June 29, 2021
- July 1, 2021

Groundwater@coronaCA.gov

Sustainability Indicators for Consideration

1. Groundwater Elevations
2. Groundwater Storage
3. Potential Subsidence
4. Groundwater quality
5. Seawater Intrusion – Not Applicable
6. Interconnected surface and groundwater dependent ecosystems

Projects and Management Actions

Management Actions

- Data collection
- Data Storage
- Reporting of Information
- Data Assessment

Projects – that are or will be under development

- Shallow Monitoring Well Installation
- Potable Reuse Feasibility Study
- Mountain Runoff Capture Feasibility Study

Temescal GSP Implementation

- → 1st Annual Report – due April 1, 2022
- → Implementation of projects and management actions
- → Groundwater website will remain active and updated frequently

QUESTIONS?

951-736-2479

Melissa.Estrada-Maravilla@CoronaCA.gov

www.CoronaCA.gov

CORONA
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Established
May 4, 1886
To Cherish Our Past - To Plan Our Future

www.CoronaCA.gov

File #: 22-0010

REQUEST FOR CITY COUNCIL ACTION

DATE: 01/05/2022

TO: Honorable Mayor and City Council Members

FROM: Planning and Development Department

SUBJECT:
Urgency ordinance and regular ordinance adding Chapter 16.18 to the Corona Municipal Code to implement Senate Bill 9 to allow for two-unit housing developments and urban lot splits in single-family residential zoning districts.

EXECUTIVE SUMMARY:
Senate Bill 9 (SB 9) of 2021 provides new state regulations designed to streamline the process for a homeowner to create a duplex or subdivide an existing lot. Further, SB 9 provides narrow parameters for local agencies regarding the application of such regulations, which they may apply to qualifying two-unit developments. The proposed ordinance considered with this action will establish objective development standards for the City when it comes to processing such urban lot splits and reviewing two-unit housing developments allowed by SB 9. Currently, only the general standards outlined in state law are applicable within the community. In accordance with state law, the ordinance will allow urban lot splits and two-unit housing in single family residential zones to be processed by the City as a ministerial approval.

RECOMMENDED ACTION:
That the City Council:

a. Adopt Urgency Ordinance No. 3341 for immediate consideration of adding Chapter 16.18 to the Corona Municipal Code to implement Senate Bill 9 to allow for two-unit housing developments and urban lot splits in single family residential zoning districts.

b. Introduce by title only and waive the full reading for consideration of Ordinance No. 3342, first reading of an ordinance adding Chapter 16.18 to the Corona Municipal Code to implement Senate Bill 9 to allow for two-unit housing developments and urban lot splits in single family residential zoning districts.

BACKGROUND & HISTORY:

Senate Bill 9 (SB 9) was signed into law by the Governor on September 16, 2021 and becomes effective on January 1, 2022. Pursuant to the law, a local agency is required to process urban lot splits and two-unit developments (also known as two-family dwellings) in urbanized, single-family residential zones as a ministerial approval. Traditionally, a single-family residential zone is for one primary residential dwelling. However, with the recent changes in state law to encourage the production of more housing units, a single-family residential zone can have up to two accessory dwelling units on the same property as the primary dwelling unit without an urban lot split. SB 9 changes the traditional use of a single-family residential zone by allowing a property to be split into two separate parcels and allowing up to two residential units on each parcel. This results in a total of four units being allowed from the urban lot split.

<u>Qualifying Criteria</u>

A local agency must allow the urban lot split if the following criteria prescribed by the law is met.

1. The maximum number of lots does not exceed two.
2. Each new lot size is at least 1,200 square feet and the lot split results in two new lots of approximately equal size provided that one lot shall not be smaller than 40% of the lot area of the original lot proposed for subdivision.
3. The lot split is on property zoned single-family residential.
4. The lot is not a historic landmark or within a designated historic district.
5. The lot is within an urbanized area or urban cluster as identified by the U.S. Census Bureau (an urbanized area is defined as 50,000 or more people and an urban cluster is at least 2,500 people but less than 50,000 people).
6. The lot split does not involve the demolition or alteration of affordable housing, rent-controlled housing, housing that was withdrawn from rent within the last 15 years or housing occupied by a tenant (market-rate or affordable) in the past three years.
7. The original lot for the lot split was not established through a prior SB 9 urban lot split.
8. Neither the owner nor anyone acting in concert with the owner previously subdivided an adjacent parcel through a SB 9 lot split.

In addition to the urban lot split allowed by SB 9, a local agency shall also ministerially approve a two -unit development project on a parcel created by an urban lot split. The qualifying criteria is similar to the criteria for an urban lot split, which includes items 3, 4, 5, and 6 mentioned above. Additionally, the project does not involve the demolition of more than 25% of the existing exterior walls of an existing dwelling unless: a) the local agency chooses to allow otherwise or b) the site has not been occupied by a tenant in the last three years.

<u>Objective Development Standards</u>

SB 9 allows a local agency to impose objective zoning and objective subdivision standards on an urban lot split and two-unit development project. However, the objective development standards shall not conflict with the following allowed by the law.

- No design standard shall physically preclude the construction of two units of at least 800 square feet (example: building setbacks, lot coverage).

- A side and rear yard building setback can be reduced to four feet; however, no setback shall be required for an existing structure, or a structure constructed in the same location and to the same dimensions as an existing structure.
- Adjacent and connected structures shall be allowed provided that the structures meet building code requirements.
- The urban lot split shall not require the dedication of rights-of-way or the construction of offsite improvements.
- Nonconforming zoning conditions are not required to be corrected.
- Parking shall be limited to one off-street parking space per unit; however, if the site is within one-half mile walking distance of either a high-quality transit corridor or major transit stop or there is a car share vehicle located within one block of the parcel, parking is not required.
- The uses allowed on the lots created by an urban lot split shall be for residential uses and short-term rentals shall be prohibited.

SB 9 does require the applicant of the urban lot split to occupy one of the housing units as their principal residence for a minimum of three years from the date of approval of the urban lot split. The applicant would be required to sign an affidavit on a form provided by the local agency. The exception to this is if the applicant is a community land trust or is a qualified nonprofit corporation defined by the Revenue and Taxation Code. A *community land trust* means a nonprofit corporation organized pursuant to Section 501(c)(3) of the Internal Revenue Code that satisfies all of the following:

- Its primary purpose is the creation and maintenance of permanently affordable single-family or multifamily residences.
- All dwellings and units located on the land owned by the nonprofit corporation are sold to a qualified owner to be occupied as the qualified owner's primary residence or rented to persons and families of low or moderate income.
- The land owned by the nonprofit corporation, on which a dwelling or unit sold to a qualified owner is situated, is leased by the nonprofit corporation to the qualified owner for the convenient occupation and use of that dwelling or unit for a renewable term of 99 years.

Aside from the requirements mentioned above no additional owner occupancy standards shall be imposed on an urban lot split.

Although a local agency is required to approve an urban lot split and two-unit development on property in a single-family residential zone that meets the qualifying criteria established by the law, a property regulated by Covenant, Conditions and Restrictions (CC&Rs) in a common interest development would have the authority to not allow the lot split and two-unit development.

ANALYSIS:

The ordinance proposes to add Chapter 16.18 to Title 16 of the Corona Municipal Code (CMC). Title 16 governs the city's subdivision requirements and applicable development impact fees related to development. Chapter 16.18 will establish objective development standards for processing urban lot splits and two-unit housing developments pursuant to SB 9. Below is a summary of the objective development standards proposed by Chapter 16.18.

- Section 16.18.050 covers the general requirements for an urban lot split and two-unit housing development.
- The general requirements included in the ordinance are consistent with the requirements allowed by state law, which include:
  - No non-residential uses, except for home occupations permitted pursuant to Chapter 17.80 of the CMC.
  - Occupancy requirement by the record owner for a period of three years from the date of approval of the urban lot split.
  - No short-term rentals of any unit on an urban lot.
  - No subsequent urban lot splits.
  - Maximum of two dwelling units on a parcel created by an urban lot split.
  - No common ownership of the dwelling units located on a parcel of an urban lot split.

In addition to the above requirements, the city is proposing an affordable housing requirement for at least one of the dwelling units established as part of a two-unit housing development. The proposed ordinance is requiring that if one or both units is rented or leased, then one unit on a parcel of an urban lot split shall have a rental rate affordable for low-income or moderate-income households. Corona's Regional Housing Needs Assessment (RHNA) for planning period 2021-2029 required the planning of housing units for 2,792 low-income housing units and 1,096 moderate-income housing units. The proposed affordable housing requirement will assist the city in meeting its RHNA obligation for low and moderate incomes. The record owner of the subject parcel is also required to provide a copy of the rental or lease agreement to the city annually.

The record owner of an urban lot split will be required to record a deed restriction against the parcel at the time of recordation of the parcel map. The deed restriction will cover all of the above regulations required for the subject parcel.

The proposed regulations for an urban lot split are described in Section 16.18.060 and include:

- Ministerial approval of a parcel map. The parcel map will expire unless it is recorded within 12 months of approval by the City Engineer.
- The parcel map shall create no more than two parcels provided that one parcel shall not be smaller than 40% of the lot area of the original parcel proposed for the subdivision.
- The minimum parcel size shall not be smaller than 1,200 square feet.
- The subject parcel shall be split approximately perpendicular to the longest contiguous property line.
- Each parcel shall adjoin the public right-of-way.
- The minimum lot width of a parcel shall not be less than 75% of the lot width of the original parcel proposed for subdivision.
- A parcel designed as a flag lot is allowed if the subject parcel is not located adjacent to an alley or has access from an alley. The access corridor of a flag lot shall have a width of no less than 12 feet.
- No dedications of rights-of-way and the construction of off-site improvements are associated with the urban lot split.

- Each parcel shall be connected to the city sewer system. A private wastewater system is allowed if the parcel meets the criteria pursuant to Section 17.64.018 of the CMC.
- Nonconforming zoning conditions that exist at the time of the urban lot split are not required to be corrected. However, no new nonconforming conditions shall be created from the urban lot split.

The proposed regulations for a two-unit housing development are described in Section 16.18.070 and include:

- No more than two dwelling units are permitted on a subject parcel.
- Each new dwelling permitted in connection with an urban lot split shall be limited to a floor area of 800 square feet. An attached enclosed garage is not included in the floor area of the dwelling unit.
- An existing dwelling unit established prior to the urban lot split shall not be expanded in size if the existing floor area is at least 800 square feet.
- Compliance with the development standards of the zone in which the subject parcel is located that are not in conflict with the standards set forth in this chapter that would physically preclude either of the two dwelling units from being 800 square feet in floor.
- Separate exterior entrances for each unit.
- Compliance with the city's adopted Residential Design Guidelines and similar design guidelines adopted by a specific plan.
- Compliance with the building setbacks of the zone in which the parcel is located. However, if said setback precludes the construction of a unit with at least 800 square feet in floor area, the rear and side yard setbacks shall be no greater than four feet.
- A minimum separation of five feet shall be maintained between a dwelling unit and detached garage, accessory structure and patio cover or carport.
- One covered parking space shall be provided on the parcel of the dwelling unit that it is required to serve, except when the parcel is within one-half mile walking distance of either a high-quality transit corridor or major transit strop; or there is a car share vehicle located within one block of the subject parcel.
- Adequate on-site vehicular access.
- Affordable housing of one of the dwelling units if more than one dwelling unit is developed and if one or both dwelling units are rented or leased. The rental rate shall be affordable to low or moderate-income households.
- All street frontage improvements immediately adjacent to the subject parcel, as required by Chapters 15.48 and 16.24 of the CMC, shall be completed prior to the issuance of a certificate of occupancy of the new dwelling unit.
- Each dwelling shall have its own direct utility connection.
- Development impact fees pursuant to Chapter 16.21, Chapter 16.23, and Chapter 16.33, shall be paid, as applicable.

FINANCIAL IMPACT:

The processing of this amendment was initiated by the city and has no negative financial impact to the General Fund.

ENVIRONMENTAL ANALYSIS:
Pursuant to California Government Code Sections 65852.21(j) and 66411.7(n), which states that an ordinance adopted to implement the provisions of SB 9 shall not be considered a project under the California Environmental Quality Act (CEQA), this ordinance is statutorily exempt from CEQA in that it implements the new laws enacted by SB 9. Therefore, no environmental analysis is required.

PREPARED BY: JOANNE COLETTA, PLANNING AND DEVELOPMENT DIRECTOR

Attachments:
1. Exhibit 1 - Urgency Ordinance 3341
2. Exhibit 2 - Regular Ordinance 3342

URGENCY ORDINANCE NO. 3341

AN URGENCY ORDINANCE OF THE CITY OF CORONA, CALIFORNIA, ADDING CHAPTER 16.18 TO THE CORONA MUNICIPAL CODE TO IMPLEMENT SENATE BILL NO. 9 TO ALLOW FOR TWO-UNIT HOUSING DEVELOPMENTS AND URBAN LOT SPLITS IN SINGLE-FAMILY RESIDENTIAL ZONING DISTRICTS.

WHEREAS, on September 16, 2021, Governor Newsom signed into law Senate Bill No. 9 (Atkins) ("SB 9"), which amends Section 66452.6 of, and adds Sections 65852.21 and 66411.7 to, the California Government Code and requires that cities and counties to ministerially approve the subdivision of a parcel zoned for single-family residential use into two parcels (urban lot split) and ministerially approve a housing development of no more than two units per parcel in a single-family residential zone (two-unit housing development) if certain statutory criteria are satisfied; and

WHEREAS, SB 9 specifically authorizes local agencies to impose objective zoning, subdivision, and design standards consistent with the bill's provisions, and to adopt an ordinance to implement its provisions; and

WHEREAS, certain standards and permitting procedures in the Corona Municipal Code ("CMC") are inconsistent with the proposed housing developments and urban lot splits authorized by SB 9; and

WHEREAS, the provisions of SB 9 are effective on January 1, 2022, and without locally codified objective design standards and implementation procedures, the law presents a current and immediate threat to the public peace, health, safety, and welfare, in that certain existing standards are in conflict with SB 9 and could create confusion and hinder the development of the additional residential units enabled under SB 9; and

WHEREAS, California Government Code Section 36937(b) authorizes the City Council to adopt by a four-fifths vote, without following the procedures otherwise required for the adoption for an ordinance, an urgency ordinance which is necessary for the immediate protection of the public peace, health and safety; and

WHEREAS, the City has determined that an urgency ordinance is necessary to amend the CMC to immediately bring the CMC into compliance with the State law, in order to properly regulate urban lot splits and two-unit housing developments and to ensure that the City can apply its regulations in a manner consistent with State law; and

WHEREAS, adoption of this Urgency Ordinance is not a project under the California Environmental Quality Act (CEQA) pursuant to California Government Code Section 65852.21(j) and Section 66411.7(n) relating to implementation of SB 9.

EXHIBIT 1

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF CORONA DOES ORDAIN AS FOLLOWS:

SECTION 1. Urgency Findings. In accordance with California Government Code Section 36937(b) and in order to protect the public peace, health and safety, the City Council finds as follows:

A. The Recitals stated above are incorporated herein by reference.

B. The CMC regulates subdivisions of single-family residential parcels and the development of housing.

C. The enactment SB 9, which amends Section 66452.6 of, and adds Sections 65852.21 and 66411.7 to, the California Government Code and will go into effect on January 1, 2022, mandates that the City ministerially approve the subdivision of a parcel zoned for single-family residential use into two parcels and ministerially approve housing developments of no more than two units per parcel in a single-family residential zone.

D. This Urgency Ordinance must take effect immediately upon adoption to provide effective tools and guidance for the regulation of urban lot splits and two-unit housing developments and waiting 30 days from adoption after a first and second reading of the Ordinance would pose a serious risk to the public peace, health and safety in that the City's regulations would be inconsistent with State law.

E. City staff has determined that the revisions to the CMC attached hereto are necessary to better and more properly regulate urban lot splits and two-unit housing developments.

F. The proposed amendments to the CMC attached hereto are consistent with all of the objectives, policies, general land uses, programs and actions of all elements of the Corona General Plan, and none of the proposed regulations conflict with current General Plan.

G. The proposed amendments to the CMC attached hereto are not detrimental to and are instead necessary for the immediate preservation and protection of the public convenience, health, safety and general welfare of the City, its residents and businesses, since the regulations establish reasonable and objective standards that are consistent with the requirements of SB 9 and will result in reasonable regulation of urban lot splits and two-unit housing developments.

H. All legal prerequisites to the adoption of this Urgency Ordinance have occurred.

SECTION 2. CEQA Findings. Pursuant to California Government Code Sections 65852.21(j) and 66411.7(n), which states that an ordinance adopted to implement the provisions of SB 9 shall not be considered a project under the California Environmental Quality Act (CEQA), this Urgency Ordinance is statutorily exempt from CEQA in that it implements the new laws enacted by SB 9. Therefore, no environmental analysis is required.

SECTION 3. Addition of Chapter 16.18. Chapter 16.18 (Urban Lot Splits and Two-Unit Housing Development) is hereby added to Title 16 (Subdivisions) of the Corona Municipal Code to read as provided in Exhibit "A" attached hereto and incorporated herein by reference.

SECTION 4. Severability. If any provision or clause of this Urgency Ordinance or any application of it to any person, firm, organization, partnership or corporation is held invalid, such invalidity shall not affect other provisions of this Urgency Ordinance which can be given effect without the invalid provision or application. To this end, the provisions of this Urgency Ordinance are declared to be severable.

SECTION 5. Conflicting Ordinances. This Urgency Ordinance shall supersede all other previous City Council resolutions and ordinances that may conflict with, or be contrary to, this Urgency Ordinance.

SECTION 6. Effective Date. This Urgency Ordinance shall become effective immediately upon adoption, if adopted by at least a four-fifths (4/5) vote of the City Council.

SECTION 7. Publication. The Mayor shall sign this Urgency Ordinance and the City Clerk shall attest thereto and shall within fifteen (15) days of is adoption cause it, or a summary of it, to be published in the Press Enterprise, a newspaper published and circulated in the City of Corona.

PASSED, APPROVED AND ADOPTED this 5th day of January, 2022

____

Mayor of the City of Corona, California

ATTEST:

____

City Clerk of the City of Corona, California

CERTIFICATION

I, Sylvia Edwards, City Clerk of the City of Corona, California, do hereby certify that the foregoing Urgency Ordinance was regularly introduced and adopted at a regular meeting of the City Council of the City of Corona, California duly held on the 5th day of January, 2022 by the following vote:

AYES:

NOES:

ABSENT:

ABSTAINED:

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of the City of Corona, California, this 5th day of January, 2022

____
City Clerk of the City of Corona, California

[SEAL]

EXHIBIT "A"

CHAPTER 16.18
URBAN LOT SPLITS AND TWO-UNIT HOUSING DEVELOPMENTS

Sections

16.18.010 Purpose.

The purpose of this chapter is to implement Government Code sections 68582.21 and 66411.7, herein referred to as Senate Bill 9, by establishing objective local development standards and regulations for projects covered by Senate Bill 9. The establishment of these regulations will result in the orderly subdivision and development of qualified projects while ensuring that the new units do not create any significant impacts with regards to public infrastructure or public safety. This chapter shall apply only so long as Senate Bill 9 is operative.

16.18.020 Applicability.

This chapter shall apply only to voluntary and intentional applications for two-unit housing developments and/or urban lot splits, as defined in § 16.18.030. Owners of real property or their representatives may continue to exercise rights for property development in conformance with other provisions of this Title 16 or Title 17. Development applications that do not satisfy the definitions for a two-unit housing development or an urban lot split, as defined in § 16.18.030, shall not be subject to this chapter. It is not the intent of this chapter to override any lawful use restrictions as may be set forth in Conditions, Covenants, and Restrictions (CC&Rs) of a common interest development.

16.18.030 Definitions.

Unless the context of a particular provision otherwise requires, the definitions provided in this section shall govern the construction, meaning and application of words and phrases used in this chapter.

"Accessory dwelling unit" means as defined in § 17.85.020 of this code.

"Acting in concert" means persons, as defined by § 82047 of the Government Code as that section existed on the date of the adoption of this chapter, acting jointly to pursue development of real property whether or not pursuant to a written agreement and irrespective of individual financial interest.

“**Car share vehicle facility**” means a facility of fixed location approved by the city to permit the storage, pick-up, and drop-off of a car share vehicle.

“**Car share vehicle**” means a vehicle available for sharing located in a car share vehicle facility approved by the City.

“Conservation Easement” means restrictive covenants that run with the land and bind upon successive owners that protects against future development such as preservation of open space, scenic, riparian, historical, agricultural, forested, or similar conditions.

“Director” means the Planning and Development Director of the City of Corona or his or her designee.

“Existing dwelling unit” means a primary dwelling unit or other dwelling unit on a parcel that exists prior to submittal of an application for an urban lot split or a two-unit housing development where at least 50% of the exterior wall framing will remain intact. Any existing dwelling unit where more than 50% of the exterior wall framing is proposed to be removed is considered a new dwelling unit for purposes of this chapter.

“Junior accessory dwelling unit” means as defined in § 17.85.020 of this code.

“Low income household” shall have the meaning set forth in California Health and Safety Code § 50079.5.

“Moderate income household” shall have the meaning set forth in California Health and Safety Code § 50093.

“New dwelling unit” means either a new, additional dwelling unit that is created or an existing dwelling unit that is expanded, but does not include an accessory dwelling unit or a junior accessory dwelling unit.

“Single-family residential parcel” means a parcel of real property located within a single-family residential zone.

“Single-family residential zone” means the A-14.4, R-1A, R-20.0, R-12.0, R-1-9.6, R-1.8.4, R-1-7.2, R-1-14.4 zone, a single-family residential land use adopted by a specific plan, or an equivalent single-family residential zone.

"Subject parcel" means the parcel of real property that is the subject of an application for an urban lot split or a two-unit housing development.

"Two-unit housing development" means a housing development containing no more than two (2) dwelling units on a single-family residential parcel as permitted pursuant to SB 9.

"Urban lot split" means a parcel map subdivision of a single-family residential parcel as permitted pursuant to SB 9 that creates no more than two (2) parcels of approximately equal lot area.

16.18.040 Eligibility requirements.

An urban lot split and/or a two-unit housing development must satisfy all of the following eligibility requirements. It shall be the responsibility of the applicant to demonstrate to the reasonable satisfaction of the Director that each of these requirements is satisfied.

(A) The subject parcel shall be located within a single-family residential zone.

(B) The applicant shall be the record owner of the subject parcel.

(C) The subject parcel was legally created in compliance with the Subdivision Map Act (Government Code § 66410 *et seq*.) and Title 16 of this code, as applicable at the time the parcel was created. The Director may require a certificate of compliance to verify conformance with this requirement.

(D) The subject parcel shall not be located within an historic district or included on the State Historic Resources Inventory, as defined in Section 5020.1 of the Public Resources Code, or designated or listed on the Corona Register of Historic Resources or the Corona Heritage Inventory.

(E) The demolition or alteration of any of the following types of housing would be prohibited on the subject parcel as part of the urban lot split or two-unit housing development: (1) Housing that is subject to a recorded covenant, ordinance, or law that restricts rents to levels affordable to persons and families of moderate, low, or very low income. (2) Housing that is subject to any form of rent or price control through a public entity's valid exercise of its police power. (3) Housing that has been occupied by a tenant in the last three years.

(F) The subject parcel is not a parcel on which an owner of residential real property has exercised the owner's rights under Government Code § 7060 et seq. to withdraw accommodations from rent or lease within 15 years before the date that the applicant submits an application for an urban lot split and/or a two-unit housing development.

(G) The subject parcel shall not be located within a special flood hazard area, as defined in § 18.08.191 of this code.

(H) The subject parcel shall not be located within a very high fire hazard severity zone pursuant to chapter 15.16 of this code, unless the subject parcel complies with fire hazard mitigation measures adopted pursuant to Title 15 of this code.

(I) The subject parcel is not identified as a hazardous waste site pursuant to Government Code § 65962.5 or a hazardous waste site designated by the Department of Toxic Substances Control pursuant to Health and Safety Code § 25356, unless the State Department of Public Health, State Water Resources Control Board, or Department of Toxic Substances Control has cleared the site for residential use.

(J) The subject parcel is not encumbered by a conservation easement.

(K) In the case of an urban lot split, the subject parcel shall not have been established through a prior urban lot split.

(L) In the case of an urban lot split, the subject parcel is not adjacent to any parcel or lot that was established through an urban lot split by the owner of the subject parcel or by any person acting in concert with the owner of the subject parcel.

16.18.050 General requirements; Deed restriction required.

An urban lot split and/or a two-unit housing development shall be subject to the following general requirements, which shall be accepted and acknowledged by the record owner of the subject parcel by signing a deed restriction, on a form approved by the City Attorney, which the city will record against the subject parcel prior to or concurrently with the recordation of the parcel map. The record owner of the subject parcel shall pay a fee established by resolution of the City Council to cover all recording fees.

(A) **No non-residential uses.** Non-residential uses shall be prohibited on the subject parcel, except for home occupations permitted pursuant to chapter 17.80 of this code.

(B) **Occupancy requirement.** The record owner shall occupy one of the dwelling units on the subject parcel as their principal residence for at least three (3) years from the date of the city's approval of the urban lot split.

(C) **No short term rentals.** Leases or rental agreements for less than thirty (30) days, including short-term rentals, are prohibited.

(D) **No subsequent urban lot splits.** Any subsequent urban lot split of the subject parcel shall be prohibited.

(E) **Maximum of two dwelling units.** No more than two (2) dwelling units of any kind may be constructed or maintained on a parcel created by an urban lot split. Accessory dwelling units and junior accessory dwelling units shall be prohibited on a subject parcel where a two-unit housing development is established.

(F) **Common ownership.** Dwelling units located on the same parcel shall not be owned or conveyed separately from one another. Fee interest in a parcel and all dwelling units located thereon must be held equally and undivided by the record owners of the parcel. Separate conveyance of the two parcels created by an urban lot split is permitted, subject to the requirements of §16.18.050(B) above.

(G) **Affordable housing requirement.** At least one of the dwelling units established as part of a two-unit housing development shall be available at a rental rate affordable to low income or moderate income households if one or both of the units is rented or leased.

16.18.060 Urban lot split regulations.

The following objective standards and regulations shall apply to all urban lot splits:

(A) **Development Plan Review**. Prior to submittal of a parcel map for an urban lot split pursuant to Chapter 16.20 of this code, the parcel map and other development plans shall first be submitted for development plan review (DPR) pursuant to Chapter 17.102 of this code.

(B) **Parcel map required.** An urban lot split shall require approval of a parcel map pursuant to chapter 16.20 of this code; provided that a parcel map for an urban lot split shall expire unless it is recorded within twelve (12) months of approval by the City Engineer. A note shall be included on the parcel map indicating that the parcels were created pursuant to this chapter and that no further subdivision of the parcels is permitted.

(C) **Maximum of two parcels.** The urban lot split shall create no more than two (2) new parcels of approximately equal area provided that one parcel shall not be smaller than forty percent (40%) of the lot area of the original parcel proposed for subdivision.

(D) **Minimum parcel size.** Each parcel created by an urban lot split shall not be smaller than 1,200 square feet in area.

(E) **Perpendicular split.** The subject parcel shall be split approximately perpendicular to the longest contiguous property line.

(F) **Public right-of-way access.** Each parcel created by an urban lot split shall adjoin the public right-of-way.

(G) **Minimum lot width.** The width of any parcel created by an urban lot split shall not be less than 75% of the lot width of the original parcel proposed for subdivision. The lot width is determined pursuant to the definition provided in Chapter 17.04 for "lot width" and "flag lot".

(H) **Flag lots.** No flag lots shall be created as a result of an urban lot split if the subject parcel is located adjacent to an alley or has access from an alley. Flag lots providing an access corridor to the public right-of-way shall have a width of not less than 12 feet.

(I) **Dedications and improvements.** Dedications of rights-of-way and construction of offsite improvements shall not be required as a condition of an urban lot split; however any easements necessary for the provision of public services and facilities shall be required.

(J) **Sewer.** Each parcel created by an urban lot split shall be connected to the city sewer system or shall provide a private wastewater system that is fully contained within the new parcel boundaries provided such private wastewater system is otherwise permitted by this code.

(K) **Nonconforming zoning conditions.** The city shall not require, as a condition of approval of an urban lot split, the correction of nonconforming zoning conditions. However, no new nonconforming conditions may be created from the urban lot split other than reduced side and rear setbacks pursuant to §16.18.070(F).

16.18.070 Two-unit housing development regulations.

The following objective standards and regulations shall apply to all two-unit housing developments:

(A) **Maximum number.** No more than two (2) dwelling units are permitted on a subject parcel.

(B) **Maximum size.** The maximum size of each dwelling unit permitted in connection with a two-unit housing development shall be as follows; provided that a garage attached to either dwelling unit shall not be counted toward the floor area of the dwelling unit:

(1) The total floor area of each new dwelling unit shall not exceed 800 square feet.

(2) An existing dwelling unit that was legally established on the subject parcel prior to the submittal of an application for a two-unit housing development and has a total floor area of at least 800 square feet shall be limited to its current lawful floor area and may not be expanded.

(3) An existing dwelling unit that was legally established on the subject parcel prior to the submittal of an application for a two-unit housing development and has a total floor area less than 800 square feet may be expanded up to 800 square feet.

(C) **Development standards.** The development standards of the single-family residential zone in which the subject parcel is located that are not otherwise in conflict with the standards set forth in this chapter shall apply to a two-unit housing development unless the applicant demonstrates to the satisfaction of the Director that one or more of said development standards would physically preclude either of the two dwelling units from being at least 800 square feet in floor area.

(D) **Separate entrances.** Each dwelling unit created by a two-unit housing development shall have a separate entrance from the exterior of the building.

(E) **Residential development design guidelines.** The Residential Development Design Guidelines, as adopted and amended by resolution of the City Council, and any similar design guidelines adopted by a specific plan, shall apply to a two-unit housing development to the extent not in conflict with the standards set forth in this chapter.

(F) **Setbacks.** The setback requirements of the single-family residential zone in which the subject parcel is located shall apply unless the applicant demonstrates to the satisfaction of the Director that said setback requirements would physically preclude either of the two dwelling units from being at least 800 square feet in floor area, in which case, each dwelling unit shall have a minimum setback of four (4) feet from the side and rear lot lines. Notwithstanding the foregoing, no setback shall be required for an existing dwelling unit or a dwelling unit constructed in the same location and to the same dimensions as an existing dwelling unit.

(G) **Distance between accessory structures.** A minimum separation of five (5) feet shall be maintained between detached garages, accessory structures and patio covers or carports.

(H) **Parking.** One (1) covered, off-street parking space shall be provided for each dwelling unit created by a two-unit housing development. The parking space shall be located on the site of the dwelling unit that it is required to serve. Notwithstanding the foregoing, parking shall not be required if:

(1) The subject parcel is located within one-half mile walking distance of either a high-quality transit corridor, as defined in Public Resources Code §21155(b), or a major transit stop, as defined in Public Resources Code §21064.3; or

(2) There is a car share vehicle located within one block of the subject parcel.

(I) **Access and circulation.** A two-unit housing development shall be designed to provide adequate on-site vehicular access, circulation, back-up, and turn-around areas that comply with all applicable city standards.

(J) **Affordable housing.** If more than one dwelling unit is developed on the subject parcel and if one or both of the dwelling units are rented or leased, at least one of the dwelling units shall be rented or leased at a rental rate affordable to low income or moderate income households. The record owner of the subject parcel shall furnish a copy of the rental or lease agreement for any unit that is rented or leased to the Director, annually.

(K) **Public improvements.** Prior to issuance of a building permit for a two-unit housing development, the applicant shall enter into an agreement and provide adequate security to guarantee construction of all street frontage improvements immediately adjacent to the subject parcel, as required by Chapters 15.48 and 16.24 of this code, and shall complete such improvements prior to the issuance of a certificate of occupancy for the new dwelling units.

(L) **Utilities.** Each dwelling unit created by a two-unit housing development shall have its own direct utility connection to the utility / public service provider.

(M) **Development Impact Fees**. Prior to the issuance of a building permit for a two-unit housing development, the development impact fees pursuant to Chapter 16.23, Chapter 16.21 and Chapter 16.33, shall be paid, as applicable.

16.18.080 Application and review procedures.

(A) **Application.** An applicant for an urban lot split or a two-unit housing development shall submit an application on a form prepared by the city, along with all information and materials prescribed by such form. No application shall be accepted unless it is completed as prescribed and is accompanied by payment for all applicable fees.

(B) **Review.** Consistent with SB 9, the City Engineer will consider and approve or disapprove a complete application for an urban lot split ministerially, without discretionary review or public hearing. The Director will consider and approve or disapprove a complete application for a two-unit housing development ministerially, without discretionary review or public hearing.

(C) **Nonconforming Conditions.** A two-unit housing development may only be approved if all nonconforming zoning conditions are corrected. The correction of legal nonconforming zoning conditions is not a condition for ministerial approval of a parcel map for an urban lot split.

(D) **Effectiveness of Approval.** The ministerial approval of a two-unit housing development or a parcel map for an urban lot split does not take effect until the city has confirmed that all required documents have been recorded.

(E) **Adverse impact findings.** An application for a two-unit housing development or a parcel map for an urban lot split may be denied if, based upon the preponderance of evidence, the urban lot split and/or the two-unit housing development would have a specific, adverse impact (as defined in California Government Code § 65589.5(d)(2)), on either public health and safety or on the physical environment and for which there is no feasible method to satisfactorily mitigate or avoid the specific adverse impact.

ORDINANCE NO. 3342

AN ORDINANCE OF THE CITY OF CORONA, CALIFORNIA, ADDING CHAPTER 16.18 TO THE CORONA MUNICIPAL CODE TO IMPLEMENT SENATE BILL NO. 9 TO ALLOW FOR TWO-UNIT HOUSING DEVELOPMENTS AND URBAN LOT SPLITS IN SINGLE-FAMILY RESIDENTIAL ZONING DISTRICTS.

WHEREAS, on September 16, 2021, Governor Newsom signed into law Senate Bill No. 9 (Atkins) ("SB 9"), which amends Section 66452.6 of, and adds Sections 65852.21 and 66411.7 to, the California Government Code and requires that cities and counties to ministerially approve the subdivision of a parcel zoned for single-family residential use into two parcels (urban lot split) and ministerially approve a housing development of no more than two units per parcel in a single-family residential zone (two-unit housing development) if certain statutory criteria are satisfied; and

WHEREAS, SB 9 specifically authorizes local agencies to impose objective zoning, subdivision, and design standards consistent with the bill's provisions, and to adopt an ordinance to implement its provisions; and

WHEREAS, adoption of this ordinance is not a project under the California Environmental Quality Act (CEQA) pursuant to California Government Code Section 65852.21(j) and Section 66411.7(n) relating to implementation of SB 9.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF CORONA DOES ORDAIN AS FOLLOWS:

SECTION 1. CEQA Findings. Pursuant to California Government Code Sections 65852.21(j) and 66411.7(n), which states that an ordinance adopted to implement the provisions of SB 9 shall not be considered a project under the California Environmental Quality Act (CEQA), this ordinance is statutorily exempt from CEQA in that it implements the new laws enacted by SB 9. Therefore, no environmental analysis is required.

SECTION 2. Addition of Chapter 16.18. Chapter 16.18 (Urban Lot Splits and Two-Unit Housing Development) is hereby added to Title 16 (Subdivisions) of the Corona Municipal Code to read as provided in Exhibit "A" attached hereto and incorporated herein by reference.

SECTION 3. Severability. If any provision or clause of this Ordinance or any application of it to any person, firm, organization, partnership or corporation is held invalid, such invalidity shall not affect other provisions of this Ordinance which can be given effect without the invalid provision or application. To this end, the provisions of this Ordinance are declared to be severable.

EXHIBIT 2

SECTION 4. Conflicting Ordinances. This Ordinance shall supersede all other previous City Council resolutions and ordinances that may conflict with, or be contrary to, this Ordinance.

SECTION 5. Effective Date. The Mayor shall sign this Ordinance and the City Clerk shall attest thereto and shall within fifteen (15) days of its adoption cause it, or a summary of it, to be published in a general circulation newspaper published in the City of Corona. This Ordinance shall take effect and be in force 30 days after its adoption.

PASSED, APPROVED AND ADOPTED this 19th day of January, 2022

____

Mayor of the City of Corona, California

ATTEST:

____

City Clerk of the City of Corona, California

CERTIFICATION

I, Sylvia Edwards, City Clerk of the City of Corona, California, do hereby certify that the foregoing Ordinance was regularly introduced at a regular meeting of the City Council of the City of Corona, California duly held on the 5th day of January, 2022 and thereafter at a regular meeting held on the 19th day of January, 2022, it was duly passed and adopted by the following vote:

AYES:

NOES:

ABSENT:

ABSTAINED:

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of the City of Corona, California, this 19th day of January, 2022.

City Clerk of the City of Corona, California

[SEAL]

EXHIBIT “A”

CHAPTER 16.18
URBAN LOT SPLITS AND TWO-UNIT HOUSING DEVELOPMENTS

Sections

16.18.010 Purpose.

The purpose of this chapter is to implement Government Code sections 68582.21 and 66411.7, herein referred to as Senate Bill 9, by establishing objective local development standards and regulations for projects covered by Senate Bill 9. The establishment of these regulations will result in the orderly subdivision and development of qualified projects while ensuring that the new units do not create any significant impacts with regards to public infrastructure or public safety. This chapter shall apply only so long as Senate Bill 9 is operative.

16.18.020 Applicability.

This chapter shall apply only to voluntary and intentional applications for two-unit housing developments and/or urban lot splits, as defined in § 16.18.030. Owners of real property or their representatives may continue to exercise rights for property development in conformance with other provisions of this Title 16 or Title 17. Development applications that do not satisfy the definitions for a two-unit housing development or an urban lot split, as defined in § 16.18.030, shall not be subject to this chapter. It is not the intent of this chapter to override any lawful use restrictions as may be set forth in Conditions, Covenants, and Restrictions (CC&Rs) of a common interest development.

16.18.030 Definitions.

Unless the context of a particular provision otherwise requires, the definitions provided in this section shall govern the construction, meaning and application of words and phrases used in this chapter.

“Accessory dwelling unit” means as defined in § 17.85.020 of this code.

"Acting in concert" means persons, as defined by § 82047 of the Government Code as that section existed on the date of the adoption of this chapter, acting jointly to pursue development of real property whether or not pursuant to a written agreement and irrespective of individual financial interest.

"**Car share vehicle facility**" means a facility of fixed location approved by the city to permit the storage, pick-up, and drop-off of a car share vehicle.

"**Car share vehicle**" means a vehicle available for sharing located in a car share vehicle facility approved by the City.

"Conservation Easement" means restrictive covenants that run with the land and bind upon successive owners that protects against future development such as preservation of open space, scenic, riparian, historical, agricultural, forested, or similar conditions.

"Director" means the Planning and Development Director of the City of Corona or his or her designee.

"Existing dwelling unit" means a primary dwelling unit or other dwelling unit on a parcel that exists prior to submittal of an application for an urban lot split or a two-unit housing development where at least 50% of the exterior wall framing will remain intact. Any existing dwelling unit where more than 50% of the exterior wall framing is proposed to be removed is considered a new dwelling unit for purposes of this chapter.

"Junior accessory dwelling unit" means as defined in § 17.85.020 of this code.

"Low income household" shall have the meaning set forth in California Health and Safety Code § 50079.5.

"Moderate income household" shall have the meaning set forth in California Health and Safety Code § 50093.

"New dwelling unit" means either a new, additional dwelling unit that is created or an existing dwelling unit that is expanded, but does not include an accessory dwelling unit or a junior accessory dwelling unit.

"Single-family residential parcel" means a parcel of real property located within a single-family residential zone.

"Single-family residential zone" means the A-14.4, R-1A, R-20.0, R-12.0, R-1-9.6, R-1.8.4, R-1-7.2, R-1-14.4 zone, a single-family residential land use adopted by a specific plan, or an equivalent single-family residential zone.

"Subject parcel" means the parcel of real property that is the subject of an application for an urban lot split or a two-unit housing development.

“Two-unit housing development” means a housing development containing no more than two (2) dwelling units on a single-family residential parcel as permitted pursuant to SB 9.

“Urban lot split” means a parcel map subdivision of a single-family residential parcel as permitted pursuant to SB 9 that creates no more than two (2) parcels of approximately equal lot area.

16.18.040 Eligibility requirements.

An urban lot split and/or a two-unit housing development must satisfy all of the following eligibility requirements. It shall be the responsibility of the applicant to demonstrate to the reasonable satisfaction of the Director that each of these requirements is satisfied.

(A) The subject parcel shall be located within a single-family residential zone.

(B) The applicant shall be the record owner of the subject parcel.

(C) The subject parcel was legally created in compliance with the Subdivision Map Act (Government Code § 66410 *et seq*.) and Title 16 of this code, as applicable at the time the parcel was created. The Director may require a certificate of compliance to verify conformance with this requirement.

(D) The subject parcel shall not be located within an historic district or included on the State Historic Resources Inventory, as defined in Section 5020.1 of the Public Resources Code, or designated or listed on the Corona Register of Historic Resources or the Corona Heritage Inventory.

(E) The demolition or alteration of any of the following types of housing would be prohibited on the subject parcel as part of the urban lot split or two-unit housing development: (1) Housing that is subject to a recorded covenant, ordinance, or law that restricts rents to levels affordable to persons and families of moderate, low, or very low income. (2) Housing that is subject to any form of rent or price control through a public entity's valid exercise of its police power. (3) Housing that has been occupied by a tenant in the last three years.

(F) The subject parcel is not a parcel on which an owner of residential real property has exercised the owner's rights under Government Code § 7060 et seq. to withdraw accommodations from rent or lease within 15 years before the date that the applicant submits an application for an urban lot split and/or a two-unit housing development.

(G) The subject parcel shall not be located within a special flood hazard area, as defined in § 18.08.191 of this code.

(H) The subject parcel shall not be located within a very high fire hazard severity zone pursuant to chapter 15.16 of this code, unless the subject parcel complies with fire hazard mitigation measures adopted pursuant to Title 15 of this code.

(I) The subject parcel is not identified as a hazardous waste site pursuant to Government Code § 65962.5 or a hazardous waste site designated by the Department of Toxic Substances Control pursuant to Health and Safety Code § 25356, unless the State Department of Public Health, State Water Resources Control Board, or Department of Toxic Substances Control has cleared the site for residential use.

(J) The subject parcel is not encumbered by a conservation easement.

(K) In the case of an urban lot split, the subject parcel shall not have been established through a prior urban lot split.

(L) In the case of an urban lot split, the subject parcel is not adjacent to any parcel or lot that was established through an urban lot split by the owner of the subject parcel or by any person acting in concert with the owner of the subject parcel.

16.18.050 General requirements; Deed restriction required.

An urban lot split and/or a two-unit housing development shall be subject to the following general requirements, which shall be accepted and acknowledged by the record owner of the subject parcel by signing a deed restriction, on a form approved by the City Attorney, which the city will record against the subject parcel prior to or concurrently with the recordation of the parcel map. The record owner of the subject parcel shall pay a fee established by resolution of the City Council to cover all recording fees.

(A) **No non-residential uses.** Non-residential uses shall be prohibited on the subject parcel, except for home occupations permitted pursuant to chapter 17.80 of this code.

(B) **Occupancy requirement.** The record owner shall occupy one of the dwelling units on the subject parcel as their principal residence for at least three (3) years from the date of the city's approval of the urban lot split.

(C) **No short term rentals.** Leases or rental agreements for less than thirty (30) days, including short-term rentals, are prohibited.

(D) **No subsequent urban lot splits.** Any subsequent urban lot split of the subject parcel shall be prohibited.

(E) **Maximum of two dwelling units.** No more than two (2) dwelling units of any kind may be constructed or maintained on a parcel created by an urban lot split. Accessory dwelling units and junior accessory dwelling units shall be prohibited on a subject parcel where a two-unit housing development is established.

(F) **Common ownership.** Dwelling units located on the same parcel shall not be owned or conveyed separately from one another. Fee interest in a parcel and all dwelling units located thereon must be held equally and undivided by the record owners of the parcel. Separate conveyance of the two parcels created by an urban lot split is permitted, subject to the requirements of §16.18.050(B) above.

(G) **Affordable housing requirement.** At least one of the dwelling units established as part of a two-unit housing development shall be available at a rental rate affordable to low income or moderate income households if one or both of the units is rented or leased.

16.18.060 Urban lot split regulations.

The following objective standards and regulations shall apply to all urban lot splits:

(A) **Development Plan Review**. Prior to submittal of a parcel map for an urban lot split pursuant to Chapter 16.20 of this code, the parcel map and other development plans shall first be submitted for development plan review (DPR) pursuant to Chapter 17.102 of this code.

(B) **Parcel map required.** An urban lot split shall require approval of a parcel map pursuant to chapter 16.20 of this code; provided that a parcel map for an urban lot split shall expire unless it is recorded within twelve (12) months of approval by the City Engineer. A note shall be included on the parcel map indicating that the parcels were created pursuant to this chapter and that no further subdivision of the parcels is permitted.

(C) **Maximum of two parcels.** The urban lot split shall create no more than two (2) new parcels of approximately equal area provided that one parcel shall not be smaller than forty percent (40%) of the lot area of the original parcel proposed for subdivision.

(D) **Minimum parcel size.** Each parcel created by an urban lot split shall not be smaller than 1,200 square feet in area.

(E) **Perpendicular split.** The subject parcel shall be split approximately perpendicular to the longest contiguous property line.

(F) **Public right-of-way access.** Each parcel created by an urban lot split shall adjoin the public right-of-way.

(G) **Minimum lot width.** The width of any parcel created by an urban lot split shall not be less than 75% of the lot width of the original parcel proposed for subdivision. The lot width is determined pursuant to the definition provided in Chapter 17.04 for “lot width” and “flag lot”.

(H) **Flag lots.** No flag lots shall be created as a result of an urban lot split if the subject parcel is located adjacent to an alley or has access from an alley. Flag lots providing an access corridor to the public right-of-way shall have a width of not less than 12 feet.

(I) **Dedications and improvements.** Dedications of rights-of-way and construction of offsite improvements shall not be required as a condition of an urban lot split; however any easements necessary for the provision of public services and facilities shall be required.

(J) **Sewer.** Each parcel created by an urban lot split shall be connected to the city sewer system or shall provide a private wastewater system that is fully contained within the new parcel boundaries provided such private wastewater system is otherwise permitted by this code.

(K) **Nonconforming zoning conditions.** The city shall not require, as a condition of approval of an urban lot split, the correction of nonconforming zoning conditions. However, no new nonconforming conditions may be created from the urban lot split other than reduced side and rear setbacks pursuant to §16.18.070(F).

16.18.070 Two-unit housing development regulations.

The following objective standards and regulations shall apply to all two-unit housing developments:

(A) **Maximum number.** No more than two (2) dwelling units are permitted on a subject parcel.

(B) **Maximum size.** The maximum size of each dwelling unit permitted in connection with a two-unit housing development shall be as follows; provided that a garage attached to either dwelling unit shall not be counted toward the floor area of the dwelling unit:

(1) The total floor area of each new dwelling unit shall not exceed 800 square feet.

(2) An existing dwelling unit that was legally established on the subject parcel prior to the submittal of an application for a two-unit housing development and has a total floor area of at least 800 square feet shall be limited to its current lawful floor area and may not be expanded.

(3) An existing dwelling unit that was legally established on the subject parcel prior to the submittal of an application for a two-unit housing development and has a total floor area less than 800 square feet may be expanded up to 800 square feet.

(C) **Development standards.** The development standards of the single-family residential zone in which the subject parcel is located that are not otherwise in conflict with the standards set forth in this chapter shall apply to a two-unit housing development unless the applicant demonstrates to the satisfaction of the Director that one or more of said development standards would physically preclude either of the two dwelling units from being at least 800 square feet in floor area.

(D) **Separate entrances.** Each dwelling unit created by a two-unit housing development shall have a separate entrance from the exterior of the building.

(E) **Residential development design guidelines.** The Residential Development Design

Guidelines, as adopted and amended by resolution of the City Council, and any similar design guidelines adopted by a specific plan, shall apply to a two-unit housing development to the extent not in conflict with the standards set forth in this chapter.

(F) **Setbacks.** The setback requirements of the single-family residential zone in which the subject parcel is located shall apply unless the applicant demonstrates to the satisfaction of the Director that said setback requirements would physically preclude either of the two dwelling units from being at least 800 square feet in floor area, in which case, each dwelling unit shall have a minimum setback of four (4) feet from the side and rear lot lines. Notwithstanding the foregoing, no setback shall be required for an existing dwelling unit or a dwelling unit constructed in the same location and to the same dimensions as an existing dwelling unit.

(G) **Distance between accessory structures.** A minimum separation of five (5) feet shall be maintained between detached garages, accessory structures and patio covers or carports.

(H) **Parking.** One (1) covered, off-street parking space shall be provided for each dwelling unit created by a two-unit housing development. The parking space shall be located on the site of the dwelling unit that it is required to serve. Notwithstanding the foregoing, parking shall not be required if:

(1) The subject parcel is located within one-half mile walking distance of either a high-quality transit corridor, as defined in Public Resources Code §21155(b), or a major transit stop, as defined in Public Resources Code §21064.3; or

(2) There is a car share vehicle located within one block of the subject parcel.

(I) **Access and circulation.** A two-unit housing development shall be designed to provide adequate on-site vehicular access, circulation, back-up, and turn-around areas that comply with all applicable city standards.

(J) **Affordable housing.** If more than one dwelling unit is developed on the subject parcel and if one or both of the dwelling units are rented or leased, at least one of the dwelling units shall be rented or leased at a rental rate affordable to low income or moderate income households. The record owner of the subject parcel shall furnish a copy of the rental or lease agreement for any unit that is rented or leased to the Director, annually .

(K) **Public improvements.** Prior to issuance of a building permit for a two-unit housing development, the applicant shall enter into an agreement and provide adequate security to guarantee construction of all street frontage improvements immediately adjacent to the subject parcel, as required by Chapters 15.48 and 16.24 of this code, and shall complete such improvements prior to the issuance of a certificate of occupancy for the new dwelling units.

(L) **Utilities.** Each dwelling unit created by a two-unit housing development shall have its own direct utility connection to the utility / public service provider.

(M) **Development Impact Fees**. Prior to the issuance of a building permit for a two-unit housing development, the development impact fees pursuant to Chapter 16.23, Chapter 16.21 and Chapter 16.33, shall be paid, as applicable.

16.18.080 Application and review procedures.

(A) **Application.** An applicant for an urban lot split or a two-unit housing development shall submit an application on a form prepared by the city, along with all information and materials prescribed by such form. No application shall be accepted unless it is completed as prescribed and is accompanied by payment for all applicable fees.

(B) **Review.** Consistent with SB 9, the City Engineer will consider and approve or disapprove a complete application for an urban lot split ministerially, without discretionary review or public hearing. The Director will consider and approve or disapprove a complete application for a two-unit housing development ministerially, without discretionary review or public hearing.

(C) **Nonconforming Conditions.** A two-unit housing development may only be approved if all nonconforming zoning conditions are corrected. The correction of legal nonconforming zoning conditions is not a condition for ministerial approval of a parcel map for an urban lot split.

(D) **Effectiveness of Approval.** The ministerial approval of a two-unit housing development or a parcel map for an urban lot split does not take effect until the city has confirmed that all required documents have been recorded.

(E) **Adverse impact findings.** An application for a two-unit housing development or a parcel map for an urban lot split may be denied if, based upon the preponderance of evidence, the urban lot split and/or the two-unit housing development would have a specific, adverse impact (as defined in California Government Code § 65589.5(d)(2)), on either public health and safety or on the physical environment and for which there is no feasible method to satisfactorily mitigate or avoid the specific adverse impact.

File #: 22-0005

REQUEST FOR CITY COUNCIL ACTION

DATE: 01/05/2022

TO: Honorable Mayor and City Council Members

FROM: Planning & Development Department

SUBJECT:
Tentative Tract Map 37980 to subdivide 4.73 acres into 19 single family residential lots located on the northwest corner of Citron Street and Taylor Street.

EXECUTIVE SUMMARY:
Tentative Tract Map 37980 (TTM 37980) is an application to subdivide 4.73 acres into 19 lots to accommodate future single family residential units. The project site is vacant and zoned R-1-8.4. The R-1-8.4 zone is for single family residential development and requires a minimum lot size of 8,400 square feet.

RECOMMENDED ACTION:
That the City Council approve TTM 37980 subject to the findings and conditions as recommended by the Planning and Housing Commission.

BACKGROUND & HISTORY:
The project site has been vacant for almost 30 years. Over time, the surrounding area developed with residential land uses with this remnant parcel remaining vacant. Due to the infill nature of the project site, the applicant conducted community outreach with the surrounding neighborhood during the initial development phase. The applicant walked the neighborhood on November 24, 2020, November 25, 2020, and December 1, 2020, and hand delivered 158 flyers that included an introduction letter and a copy of the proposed tentative tract map. The residents were informed that the future use of the property was for residential purposes. Most of the comments received from the community centered on past experiences with the property being vacant, which included tumbleweeds, loitering, and illegal dumping.

ANALYSIS:
The project site is a vacant infill parcel located on the northwest corner of Citron Street and Taylor Street. The surrounding land uses are single family residential and have the same zoning as the project site, which is R-1-8.4. The site has a General Plan designation of Low Density Residential

(LDR), which allows a residential density of 3 to 6 dwelling units per acre (du/ac). As proposed by TTM 37980, the 19 lots created on the 4.73 acres results in a density of 4.02 du/ac, which is consistent with the density range allowed by the General Plan.

The R-1-8.4 zone requires the following minimum standards for the creation of new single-family lots.

Lot Area: 8,400 square feet
Lot Width: 70 feet, with an average of 75 feet
Lot Depth: 100 feet

The lots proposed by TTM 37980 comply with the development standards of the zone.

Access and Public Improvements
TTM 37980 is designed to have lots facing Taylor Street and Citron Street. These lots are consistent with the current orientation of the adjacent lots in the surrounding, existing neighborhood. These lots will have driveway access on Taylor Street and Citron Street. Two new internal streets are proposed within the development and are an extension of Lorraine Drive and Susanne Street, which currently dead-end at the project site from the north and west, respectively. Both streets were designed to provide a future connection through the project site. The lots facing these streets will have driveway access that is consistent with the design of the other residential properties in the adjacent neighborhood.

The missing public improvements along the streets adjacent to the project site, such as missing roadway, curbs, gutters, landscaped parkways, and sidewalks will be constructed at the time of development of the project site and are required as a condition of approval to be guaranteed prior to the recordation of the map. Lorraine Drive and Susanne Street are required to have an overall right-of-way width of 60 feet, Taylor Street is required to have an overall right-of way width of 68 feet and Citron Street is required to have an overall right-of-away width of 64 feet.

General Plan Consistency
TTM 37980 does not exceed the maximum density allowed by the General Plan for the LDR designation, which allows up to 6 du/ac. The project will have a density of 4.02 du/ac. Additionally, the subdivision is consistent with General Plan Policy LU-8.1 because it will facilitate the development of an infill site that is consistent with the zoning of the property and the surrounding neighborhood.

FINANCIAL IMPACT:
The applicant paid the application processing fees of $9,891.00 to cover the cost of the Tentative Tract Map.

ENVIRONMENTAL ANALYSIS:
Per Section 15332 of the State Guidelines for implementing the California Environmental Quality Act (CEQA) and Section 3.22 of the City's Local CEQA Guidelines, a Notice of Exemption has been prepared for the project because the project qualifies as a Class 32 (In-Fill Development Projects) categorical exemption. The project is: a) consistent with the site's General Plan designation and

applicable plan policies, b) consistent with the site's zoning designation, c) less than five acres in size, d) surrounded by urban uses, e) void of habitat for endangered, rare or threatened species, and f) adequately served by utilities and public services and does not result in significant impacts to traffic, noise, air quality, or water quality.

PLANNING AND HOUSING COMMISSION ACTION:
At its meeting of December 6, 2021, the Planning and Housing Commission considered the subject matter and took the following action:

Motion was made, seconded (Alexander/Sherman) and carried unanimously, that the Planning and Housing Commission recommend approval of TTM 37980 to the City Council, based on the findings contained in the staff report and subject to the recommended conditions of approval, including an added condition that the application will expire in 24 months if not implemented. The minutes of the Planning and Housing Commission meeting are included as Exhibit 4.

PREPARED BY: JOANNE COLETTA, PLANNING & DEVELOPMENT DIRECTOR

Attachments:
1. Exhibit 1 - Locational and zoning map
2. Exhibit 2 - Site Plan for TTM 37980
3. Exhibit 3 - Planning and Housing Commission staff report
4. Exhibit 4 - Draft Minutes of the Planning and Housing Commission meeting of December 6, 2021

LOCATIONAL & ZONING MAP

Zoning Legend

R1-8.4 - Single Family Residential (8,400 square foot minimum lots)
R1-7.2 - Single Family Residential (7,200 square foot minimum lots)

Date: 11/16/2021

NWC OF CITRON AVE & TAYLOR ST
TTM37980 (TTM2021-0001)

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EXHIBIT 1

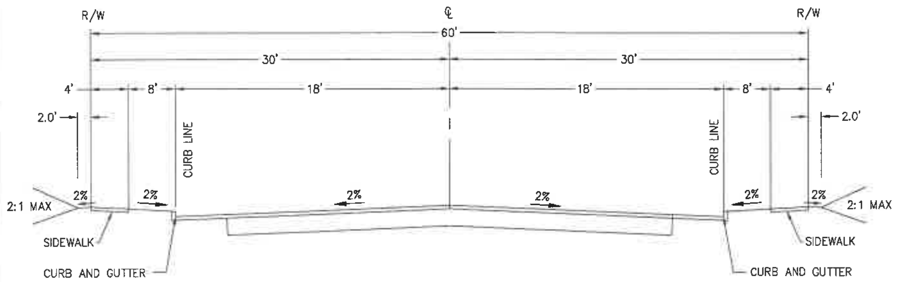
DPR2020-0015

IN THE CITY OF CORONA, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

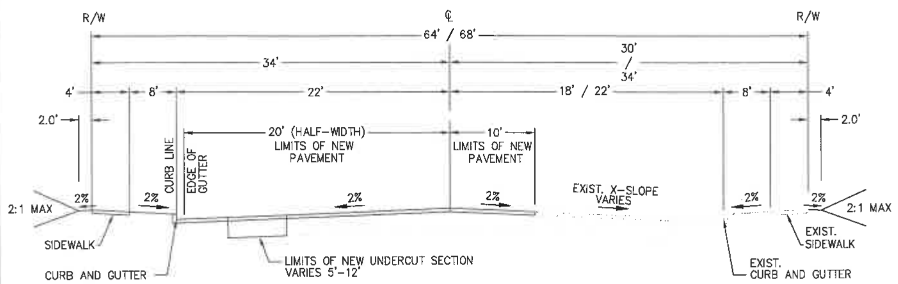
TENTATIVE TRACT NO. 37980

BEING A SURVEY OF THE EASTERLY HALF OF LOT 1 IN BLOCK 52 OF LANDS OF THE SOUTH RIVERSIDE LAND AND WATER COMPANY, AS SHOWN BY MAP FILED IN BOOK 9, PAGE 6 OF MAPS, RECORDS OF THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AND LYING WITHIN SECTION 36, TOWNSHIP 3 SOUTH, RANGE 7 WEST OF THE SAN BERNARDINO BASE AND MERIDIAN.

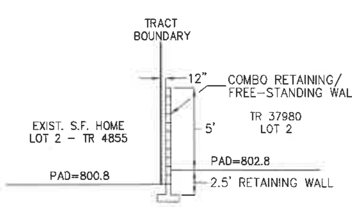
ACS CONSULTING, INC. OCTOBER 2021



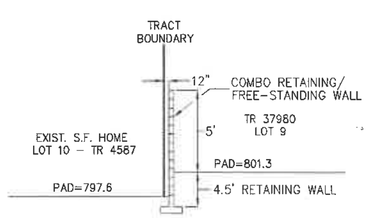
SUSANNE STREET/LORRAINE DRIVE
SCALE: NTS



CITRON STREET/TAYLOR STREET
SCALE: NTS

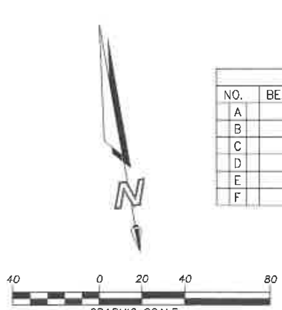


SECTION A-A
SCALE: NTS



SECTION B-B
SCALE: NTS

PAVING NOTE: (*) PAVING TO INCLUDE HALF-WIDTH OF ROAD (BOTH CITRON ST. AND TAYLOR ST.) + 10'



CENTERLINE DATA					
NO.	BEARING/DELTA	RADIUS	LENGTH	TANGENT	REMARKS
A	D=04°14'37"	500.00'	37.02'	18.52'	C/L
B	N03°50'13"E	---	52.82'	---	"
C	D=04°14'37"	500.00'	37.03'	18.53'	"
D	N08°04'50"E	---	63.49'	---	"
E	D=90°01'34"	55.00'	86.42'	55.03'	"
F	N81°53'35"W	---	96.07'	---	"

REVISION BLOCK		
REF.	DESCRIPTION	DATE
1	1st SUBMITTAL TO CITY	1-9-21
2	REVISIONS PER CITY COMMENT	10-7-21

REGISTERED PROFESSIONAL ENGINEER FRANK A. ARTIGA NO. C 61860 EXP. 9/30/23 CIVIL STATE OF CALIFORNIA

ACS CONSULTING, INC.
land planning, engineering, and surveying professionals
PO BOX 2252
TEMECULA CA 92593
TEL: 951-757-5178 e: frank@acsconsultinginc.com
PREPARED BY: FRANK A. ARTIGA R.C.E. NO. 61860
EXP. DATE: 09-30-23
DATE:

TENTATIVE TRACT NO. 37980
SITE PLAN/GRADING PLAN
CITY OF CORONA CA

2 OF 3 SHEETS

EXHIBIT 2

D:\Dropbox\Public\Projects\2020 Corona Houpert\TTM\TM37980 2 100721.dwg

City of Corona

400 S. Vicentia Ave.
Corona, CA 92882

Staff Report

File #: 21-1076

PLANNING AND HOUSING COMMISSION STAFF REPORT

DATE: 12/06/2021

TO: Honorable Chair and Commissioners

FROM: Planning & Development Department

APPLICATION REQUEST:
TTM 37980 (CONTINUED): Tentative tract map application to subdivide 4.73 acres into 19 lots for single family residential purposes located at the northwest corner of Citron Street and Taylor Street in the R1-8.4 (Single Family Residential, minimum lot size 8,400 square feet) zone. (Applicant: Mark Haupert with Priem Properties, LLC., 12012 Knott Avenue #A2, Garden Grove, CA 92841.

RECOMMENDED ACTION:
That the Planning and Housing Commission recommend APPROVAL of TTM 37980 to the City Council based on the findings contained in the staff report and subject to the conditions of approval.

PROJECT SITE SUMMARY:
Area of Property: 4.73 acres
Existing Zoning: R1-8.4 (Single Family Residential, minimum lot size 8,400 square feet)
Existing General Plan: LDR (Low Density Residential, 3-6 du/ac)
Existing Land Use: Undeveloped
Proposed Land Use: Single Family Residential
Surrounding Zoning/Land Uses:
N: R1-8.4/Single family residences
E: R1-8.4/Taylor Street, with single-family residences located beyond
S: R1-8.4/Citron Street, with single-family residences located beyond
W: R1-8.4/Single family residences

BACKGROUND
Tentative Tract Map (TTM) 37980 is a proposal to subdivide 4.73 acres into 19 lots for single-family residential purposes. The project site is a vacant parcel located on the northwest corner of Citron Street and Taylor Street (Exhibit 1). The surrounding land uses are residential. The parcel is zoned R1-8.4, which is a single-family residential zone that requires newly created lots to have a minimum lot size of 8,400 square feet. The site has a General Plan designation of Low Density Residential

(LDR), which supports a residential a density of 3 to 6 dwelling units per acre (du/ac). As proposed, the density of TTM 37980 is 4.02 du/ac.

At this time the applicant is only proposing to subdivide the larger parcel into smaller parcels. The applicant is not currently proposing any construction, as they have not decided if they will sell the approved tract map to a home builder or build the homes themselves. Regardless, the future development of the tract will require the submittal of a Development Plan Review application and a Precise Plan application, which will be subject to the approval of the Planning & Housing Commission at a public hearing.

TTM 37980 received a pre-review by city staff at a Development Plan Review meeting on October 15, 2020. The applicant submitted an official tentative tract map application on February 8, 2021, which was reviewed by the Project and Environmental Review Committee on March 4, 2021. The Committee deemed the application incomplete. The applicant subsequently submitted revisions, and the application was deemed complete on October 25, 2021.

The applicant has conducted community outreach with the surrounding neighborhood. The applicant walked the neighborhood on November 24, 2020, November 25, 2020, and December 1, 2020, and hand delivered 158 flyers that included an introduction letter and a copy of the proposed tentative tract map. Per the applicant, the project was well received by residents, although residents expressed concerns with tumbleweeds, loitering, and years of illegal dumping. Copies of the community outreach documents are attached as Exhibit 2.E.

PROJECT DESCRIPTION

The layout of the lots proposed by TTM 37980 is shown in Exhibit 2.A. The R1-8.4 zone provides the following minimum standards for the creation of new single-family lots.

Lot Area: 8,400 square feet
Lot Width: 70 feet, with an average of 75 feet
Lot Depth: 100 feet

Table 1, below, summarizes the proposed single-family lots. All of the proposed lots meet or exceed the requirements of the R1-8.4 zone regarding size, width, and depth.

Table 1: Lot Summary

LOT NO.	**LOT AREA (SF)**	**WIDTH**	**DEPTH**
1	8,400	72.3	115.9
2	8,461	70.3	120.7
3	8,433	72.2	121.2
4	9,823	90.2	109.9
5	11,432	89.2	106.2
6	14,034	75.5	149.1

7	10,085	81.4	108.3
8	8,821	85.5	116.6
9	10,010	82.6	121.4
10	9,190	82.6	111.3
11	8,402	75.5	111.3
12	8,402	75.5	111.3
13	8,402	75.5	111.3
14	8,400	75.5	111.3
15	8,920	81.8	110.1
16	9,002	81.8	110.1
17	8,999	81.8	110.1
18	8,997	81.8	110
19	8,994	81.7	110
AVERAGE	9,326.8	79.6	114.5

ACCESS AND PUBLIC IMPROVEMENTS

Lots 10-19 border Taylor Street and Citron Street and will take vehicular access from these two streets. Site adjacent curbs, gutters, landscape parkways, and sidewalks are currently missing along both of these streets. The developer is required to construct the missing roadway improvements. Taylor Street is required to have an overall right-of way of 68 feet and Citron Street will have an overall right-of-away of 64 feet, as show on Exhibit 2.C.

Several existing palm trees are located adjacent to the project site within the public right-of-way along Taylor Avenue. The developer may need to remove palm trees in order to accommodate the driveways for lots 10-14. The final location of the driveways and the number of trees to be removed will be determined through the review of a future Precise Plan Application.

Lorraine Drive and Susanne Street currently dead-end into the project site from the north and west, respectively. Both streets are required to be extended into the project to provide vehicular access to proposed lots 1-9. Both roadways must have an overall right-of-way width of 60 feet, and must be improved with curbs, gutters, landscape parkways, and sidewalks.

As part of the Tentative Tract Map, the applicant is also required to make the following public improvements:

- Grind and overlay the west half width of Taylor Street plus ten additional feet beyond the centerline.
- Grind and overlay the north half width of Citron Street plus ten additional feet beyond the centerline.
- Upsize the existing water line on both Taylor and Citron Streets from 6-inches to 8-inches to provide adequate fire flow for the new residences.

RETAINING WALLS

A retaining wall varying in height from 2.5 feet to 4 feet will be constructed along the project's west perimeter, between the existing residences and Lots 1 and 2. Additionally, a retaining wall varying in height from 4 feet to 5 feet will be constructed along the project's north perimeter, between the existing residences and Lots 1, 9, and 10. The retaining walls are shown as cross-sections A-A and B -B on Exhibit 2.C.

Lot 15 is also shown with a retaining wall varying in height from approximately 2.5 feet to 8 feet along the east perimeter of the lot adjacent to Taylor Avenue. Through the precise plan process, the developer will be required to construct 6-foot high block walls along the perimeters of all 19 lots. For lot 15, this will result in a combination retaining/perimeter wall ranging from approximately 8.5 to 14 feet in height that will be visible from Taylor Avenue. In order to minimize the visual impact of the wall from the street, the project is conditioned to work with staff to reduce the height of the retaining wall on lot 15. As an alternative, the applicant may construct a slope along the east perimeter of lot 15, which would eliminate the need for a retaining wall.

EASEMENT

With the recordation of TTM 37980, a public drainage easement will be established along the property's north perimeter on Lots 9 and 10. The easement is 20 feet in width and will contain an underground pipe, which will allow stormwater to drain from Lorraine Drive to Taylor Street.

ENVIRONMENTAL ANALYSIS:

Per Section 15332 of the State Guidelines for implementing the California Environmental Quality Act (CEQA) and Section 3.22 of the City's Local CEQA Guidelines, a Notice of Exemption has been prepared for the project because the project qualifies as a Class 32 (In-Fill Development Projects) categorical exemption. The project is consistent with the site's general plan designation and applicable plan policies; zoning designation; is less than five acres in size; is surrounded by urban uses; has no habitat for endangered, rare or threatened species; the project would not result in significant traffic, noise, air quality or water quality effects; and the site is adequately served by utilities and public services. The Notice of Exemption is attached as Exhibit 3.

FISCAL IMPACT

The applicant has paid the application processing fees to cover the cost of the tentative tract map, as required by City resolution.

PUBLIC NOTICE AND COMMENTS

A 10-day public notice was mailed to all property owners within a 500-foot radius of the project site, as well as advertised in the *Sentinel Weekly News* and posted at the project site. As of the preparation of this report, the Planning & Development Department has not received any inquiries from the public in response to the notice.

STAFF ANALYSIS

TTM 37980 proposes a subdivision that will allow for the seamless completion of a residential neighborhood that shares the same R1-8.4 zone with the project site. The proposed lots are similar in size to the existing neighboring lots, and will be developed in the future with homes that are subject to the same development standards as the existing lots. This results in a residential development that conforms to the scale of the existing neighborhood.

The lots proposed by TTM 37980 complies with the R1-8.4 zone development standards. The project's density of 4.02 du/ac complies with the General Plan's density range of 3 to 6 du/ac. All missing and required public improvements associated with the project will be constructed per city standards and are guaranteed with the tentative tract map. This ensures the orderly development of the site and protects the public health and safety of the general public.

The 19 lots are anticipated to generate 179 daily vehicle trips, 14 of which will occur during the morning peak hour, and 19 of which will occur during the evening peak hour. The city's Traffic Engineer has reviewed the amount of traffic to be generated by the project and determined the traffic to be consistent with City's General Plan projections, and any impacts to the area would be insignificant.

The Planning Division recommends approval of TTM 37980 based on the findings below and staff's recommended conditions of approval.

FINDINGS OF APPROVAL FOR TTM 37980

1. A preliminary exemption assessment has been conducted by the City of Corona and it has shown that this project does not require further environmental assessment because the project qualifies as a Class 32 (In-Fill Development Projects) categorical exemption. The project is consistent with the site's General Plan designation and applicable plan policies; zoning designation; is less than five acres in size; is surrounded by urban uses; has no habitat for endangered, rare or threatened species; the project would not result in significant traffic, noise, air quality or water quality effects; and the site is adequately served by utilities and public services.

2. None of the conditions provided in Section 66474 of the California Government Code exists for the following reasons:

    a. *TTM 37980 will subdivide 4.73 acres into 19 single family residential lots, which does not exceed the maximum density of 6 du/ac established by the General Plan designation of Low Density Residential. In addition, the subdivision is consistent with General Plan Policy LU-8.1 by facilitating the development of an infill site for residential development of the same size and zoning designation as the surrounding neighborhood.*

    b. *The proposed subdivision is designed to meet the city's development standards for newly created lots in accordance with the zoning of the property, the city's subdivision design standards and General Plan.*

    c. *The site is suitable for the type of development proposed under TTM 37980 and provides adequate access from Taylor Street, Citron Street, Lorraine Drive and*

Susanne Street, which will be improved in accordance with City standards.

d. *The site is physically suitable for the proposed density of 4.02 du/ac. The site is capable of accommodating 19 lots that meet the subdivision standards required by the Corona Municipal Code for the R1-8.4 zone.*

e. *The design of the subdivision or the proposed improvements is not likely to cause substantial environmental damage or substantially injure fish or wildlife or their habitat because the project qualifies as a Class 32 (In-Fill Development Projects) categorical exemption. The project is consistent with the site's general plan designation and plan policies; zoning designation; is less than five acres in size; is surrounded by urban uses; has no habitat for endangered, rare or threatened species; the project would not result in significant traffic, noise, air quality or water quality effects; and the site is adequately served by utilities and public services. Furthermore, the project site is completely surrounded by urbanized developments.*

f. *The proposed subdivision will not result in adverse impacts to public health, safety or general welfare because the project is designed in accordance with design standards that are in place to ensure orderly development of the project site and improvements associated with the project.*

g. *The design of the subdivision or the type of improvements will not conflict with easements, acquired by the public at large, for access through or use of property within the proposed subdivision, because no such easements exist on the project site.*

3. Pursuant to California Government Code Section 66473.5, consistency with applicable General Plan or Specific Plan does exist for the following reason:

   a. *The General Plan allows for 3-6 dwelling units per acre for the Low Density Residential designation. The proposed project would result in a density of 4.02 du/ac, which is within the allowable density range.*

4. Pursuant to California Government Code Section 66474.6, the discharge of waste from the proposed subdivision into existing community sewers would not result in violation of existing requirements presented by the Santa Ana Regional Water Quality Control Board pursuant to Division 7 (commencing with Section 13000) of the Water Code for the following reasons:

   a. *The amount of discharge to be produced by the subdivision is not expected to exceed the limit established by the Santa Ana Regional Water Quality Control Board as monitored by the city's Utilities Department.*

5. The proposal is in conformance with the standards of the R1-8.4 zone for the following reason:

   a. *Single-family residential development is permitted in the R1-8.4 zone, and the subdivision design is consistent with the development standards that apply to the site.*

6. The proposal is in conformance with Title 16 (Subdivisions) of the Corona Municipal Code for the following reasons:

   a. The proposed map meets the city's subdivision standards for lot area, width, depth and street access as prescribed by the R1-8.4 zone.

   b. All necessary public improvements to support the proposed project are guaranteed with this subdivision as provided by the Conditions of Approval.

PREPARED BY: LUPITA GARCIA, ASSOCIATE PLANNER

REVIEWED BY: SANDRA YANG, SENIOR PLANNER

REVIEWED BY: JAY EASTMAN, PLANNING MANAGER

SUBMITTED BY: JOANNE COLETTA, PLANNING & DEVELOPMENT DIRECTOR

EXHIBITS
1. Locational and Zoning Map
2.A Tentative Tract Map 37980
2.B Conditions of Approval
2.C Grading Plan
2.D Applicant's letter dated November 15, 2021, regarding the subdivision
2.E Neighborhood Community Outreach Documents
3. Environmental Documentation

Case Planner: Lupita Garcia (951) 736-2262

LOCATIONAL & ZONING MAP

Zoning Legend

R1-8.4 - Single Family Residential (8,400 square foot minimum lots)
R1-7.2 - Single Family Residential (7,200 square foot minimum lots)

Date: 11/16/2021

NWC OF CITRON AVE & TAYLOR ST
TTM37980 (TTM2021-0001)

N
W E
S

EXHIBIT 1

DPR2020-0015

IN THE CITY OF CORONA, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

TENTATIVE TRACT NO. 37980

BEING A SURVEY OF THE EASTERLY HALF OF LOT 1 IN BLOCK 52 OF LANDS OF THE SOUTH RIVERSIDE LAND AND WATER COMPANY, AS SHOWN BY MAP FILED IN BOOK 9, PAGE 6 OF MAPS, RECORDS OF THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AND LYING WITHIN SECTION 36, TOWNSHIP 3 SOUTH, RANGE 7 WEST OF THE SAN BERNARDINO BASE AND MERIDIAN.

ACS CONSULTING, INC. DECEMBER, 2020

VICINITY MAP (N.T.S.)

GENERAL NOTES:

LEGAL DESCRIPTION:

BEING A SURVEY OF THE EASTERLY HALF OF LOT 1 IN BLOCK 52 OF LANDS OF THE SOUTH RIVERSIDE LAND AND WATER COMPANY, AS SHOWN BY MAP FILED IN BOOK 9, PAGE 6 OF MAPS, RECORDS OF THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA,AND LYING WITHIN SECTION 36, TOWNSHIP 3 SOUTH, RANGE 7 WEST OF THE SAN BERNARDINO BASE AND MERIDIAN.

ASSESSOR'S PARCEL NUMBER:

110-342-031

OWNER/APPLICANT:

PRIEM PROPERTIES, LLC
2518 N. SANTIAGO BLVD.
ORANGE, CA 92867
CONTACT: MARK HAUPERT
PHONE: (714) 271-1646

ENGINEER/PREPARER:

ACS CONSULTING, INC.
PO BOX 2252
TEMECULA, CA 92593
CONTACT: FRANK A. ARTIGA, P.E.
PHONE: (951) 757-5178

LAND USE/ZONING:

GENERAL PLAN
EXISTING: LDR - LOW DENSITY RESIDENTIAL (3-6 DU/AC)
EXISTING ZONING: R1-8.4 - SINGLE FAMILY RESIDENTIAL (8,400 SF MIN.)
MAP RECORDATION PHASING: ONE PHASE
PROPOSED DENSITY: 19 PROPOSED D.U. ~ 4.73 AC. = 4.02 DU/AC

SITE ACREAGE:

4.73 ACRES GROSS/NET

SURVEYOR'S STATEMENT

THIS TENTATIVE MAP WAS PREPARED BY ME OR UNDER MY DIRECTION AND IS IN CONFORMANCE WITH THE REQUIREMENTS OF THE SUBDIVISION MAP ACT AND LOCAL ORDINANCE AT THE REQUEST OF PRIEM PROPERTIES, LLC, A CALIFORNIA LIMITED LIABILITY COMPANY.

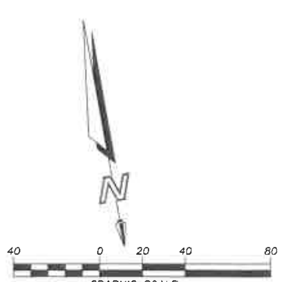
ON OCTOBER 7 2021

FRANK A. ARTIGA, P.L.S. NO. 8716

LICENSED LAND SURVEYOR
FRANK A. ARTIGA
L.S. NO. 8716
EXP. 6/30/22
STATE OF CALIFORNIA

BASIS OF BEARINGS:

THE BASIS OF BEARINGS FOR THIS SURVEY IS THE CALIFORNIA STATE PLANE COORDINATE SYSTEM, CCS83, ZONE 6, BASED LOCALLY ON CONTROL STATIONS "CNPP", "MLFP" AND "NOCO" NAD 83 (NSRS2011) EPOCH 2010.00 AS SHOWN HEREON. ALL BEARINGS SHOWN ON THIS MAP ARE GRID. QUOTED BEARINGS AND DISTANCES FROM REFERENCE MAPS OR DEEDS ARE AS SHOWN PER THAT RECORD REFERENCE. ALL DISTANCES SHOWN ARE GROUND DISTANCES UNLESS SPECIFIED OTHERWISE. GRID DISTANCES, MAY BE OBTAINED BY MULTIPLYING THE GROUND DISTANCE BY A COMBINATION FACTOR OF 0.9999628507. CALCULATIONS ARE MADE AT "2000" WITH COORDINATES OF: N: 2,260,184.528', E: 6,159,268.540', USING AN ELEVATION OF 814.54'.



RESIDENTIAL LOT DATA SUMMARY

LOT NO.	LOT AREA (SF)	LOT AREA (AC)	WIDTH (FT)	DEPTH (FT)
1	8,400	0.19	72.3	115.9
2	8,461	0.19	70.3	120.7
3	8,433	0.19	72.2	121.2
4	9,823	0.23	90.2	109.9
5	11,432	0.26	89.2	106.2
6	14,034	0.32	75.5	149.1
7	10,085	0.23	81.4	108.3
8	8,821	0.20	85.5	116.6
9	10,010	0.23	82.6	121.4
10	9,190	0.21	82.6	111.3
11	8,402	0.19	75.5	111.3
12	8,402	0.19	75.5	111.3
13	8,402	0.19	75.5	111.3
14	8,400	0.19	75.5	111.3
15	8,920	0.20	81.8	110.1
16	9,002	0.21	81.8	110.1
17	8,999	0.21	81.8	110.1
18	8,997	0.21	81.8	110
19	8,994	0.21	81.7	110
AVERAGE	9,326.8	0.21	79.6	114.5

LEGEND:

INDICATES TREE
INDICATES PALM TREE
INDICATES WATER VALVE
INDICATES AIR RELEASE VALVE
INDICATES WATER METER
INDICATES ELECTRICAL PULLBOX
INDICATES UTILITY BOX
INDICATES STORM DRAIN MANHOLE
INDICATES SEWER MANHOLE
INDICATES TELCO. RISER
INDICATES CABLE BOX
INDICATES ELECTRICAL CABINET
INDICATES STREET LIGHT
INDICATES FIRE-HYDRANT
INDICATES STREET LIGHT BOX
INDICATES MAILBOX
INDICATES POWER POLE

EXISTING CONTOURS
PROPOSED PAD ELEVATION (1466)
TRACT BOUNDARY
LOT NUMBER 1 - 20 - BEGIN & END LOT NO.
PROPOSED STREET LIGHT
PROPOSED 2:1 SLOPE
PROPOSED EASEMENT
PROPOSED UTILITY
DRAINAGE DIRECTION

RCFCD - RIVERSIDE COUNTY FLOOD CONTROL DISTRICT
RCTD - RIVERSIDE COUNTY TRANSPORTATION DEPARTMENT
PP - POWER POLE
FL - FLOW LINE
SF - SQUARE FEET
HP - HIGH POINT
LP - LOW POINT
TOC - TOP OF CONCRETE
FS - FINISHED SURFACE
HGL - HYDRAULIC GRADE LINE
CFS - CUBIC FEET PER SECOND
P/L - PROPERTY LINE
O.S. - OPEN SPACE
EX - EXISTING
R/W or ROW - RIGHT-OF-WAY

SERVICE PROVIDERS:

CITY OF CORONA DEPARTMENT OF WATER (951) 736-2263
CITY OF CORONA DEPARTMENT OF POWER (951) 736-2263
SOUTHERN CALIFORNIA EDISON COMPANY (800) 422-4133
SOUTHERN CALIFORNIA GAS COMPANY (800) 442-4950
PACIFIC BELL (800) 422-4133
AMERICAN TELEPHONE AND TELEGRAPH (951) 381-7380

STREET LINEAL FOOTAGE

SUSANNE STREET / LORRAINE DRIVE 374 L.F.

SHEET INDEX

REVISION BLOCK		
1	1st SUBMITTAL TO CITY	1-9-21
2	REVISIONS PER CITY COMMENT	10-7-21
REF.	DESCRIPTION	DATE

REGISTERED PROFESSIONAL ENGINEER
FRANK A. ARTIGA
NO. C 61860
EXP. 9/30/23
CIVIL
STATE OF CALIFORNIA

ACS CONSULTING, INC.
land planning, engineering, and surveying professionals
PO BOX 2252
TEMECULA CA 92593
TEL: 951-757-5178 e: frank@acsconsultinginc.com
PREPARED BY: FRANK A. ARTIGA R.C.E. NO. 61860
EXP. DATE: 09-30-23
DATE:

TENTATIVE TRACT NO. 37980
TITLE SHEET
CITY OF CORONA CA

1 OF 3 SHEETS

EXHIBIT 2.A

Project Conditions
City of Corona

Project Number: TTM2021-0001

Description: **TTM 37980 TO SUBDIVIDE 4.73ACRES INTO 19 SFR LOTS.**

Applied: **2/8/2021**

Approved:

Closed:

Expired:

Status: **RECEIVED**

Parent Project:

Site Address: **NWC of Taylor St & Citron St CORONA, CA 0**

Applicant: **MARK HAUPERT PRIEM PROPERTIES, LLC**
12012 KNOTT AVE #A2 GARDEN GROVE CA, 92841

Details: **TTM 37980 TO SUBDIVIDE 4.73ACRES INTO 19 SFR LOTS LOCATED ON THE NWC OF TAYLOR ST AND CITRON ST.**

LIST OF CONDITIONS

DEPARTMENT	CONTACT
BUILDING	**Dana Andrews**

1. At time of plan submittal, construction documents shall be prepared in accordance with current applicable Codes & Standards.

FIRE	**Cindi Schmitz**

1. Place Fire Department DPR comments on plans as general notes.
2. Any revised site plan shall be submitted to the Fire Department for screen check approval prior to building plan submittal.
3. Show two (2) all weather surface access ways to be approved by the Fire Marshal and construct the access way(s) to accommodate 70,000 lbs. gross vehicle weight during all phases of construction.
4. All projects shall comply with the City of Corona Fire Department Site Construction Standard. A copy of which is available at the coronaca.gov. Projects shall have approved all weather access from two (2) directions and fire hydrants providing the required fire flow tested and accepted prior to combustible construction.
5. Street and drive grades shall not exceed 10% unless approved by the Fire Chief and City Engineer.
6. A minimum fire flow of 1500 gallons per minute at 20 psi shall be provided for one- and two-family dwellings.
7. Fire hydrants are to be spaced a maximum 300 feet apart, one- and two-family dwellings only.
8. Groves and weed abatement shall be maintained so as not to pose a fire hazard until time of development.
9. A specific address, assigned by the City of Corona, Public Works Department, shall be provided for each building as specified by the fire department address standard which can be obtained at coronaca.gov/fire. Addresses must be illuminated during all hours of darkness.

PLANNING	**Lupita Garcia**

1. To the fullest extent permitted by law, the applicant shall defend, indemnify and hold the City of Corona and its directors, officials, officers, employees, volunteers and agents free and harmless from any and all claims, demands, causes of action, proceedings, costs, expenses, liabilities, losses, damages or injuries of any kind, in law or equity, in any manner arising out of, pertaining to, or incident to any attack against or attempt to challenge, set aside, void or annul any approval, decision or other action of the City of Corona, whether such approval, decision or other action was by its City Council, Planning and Housing Commission or other board, director, official, officer, employee, volunteer or agent. To the extent that Government Code Section 66474.9 applies, the City will promptly notify the applicant of any claim, action or proceeding made known to the City to which Government Code Section 66474.9 applies and the City will fully cooperate in the defense. The Applicant's obligations hereunder shall include, without limitation, the payment of any and all damages, consultant and expert fees, and attorney's fees and other related costs and expenses. The City shall have the right to retain such legal counsel as the City deems necessary and appropriate.

EXHIBIT 2.B

PLANNING	Lupita Garcia

2. Nothing herein shall be construed to require City to defend any attack against or attempt to challenge, set aside, void or annul any such City approval, decision or other action. If at any time Applicant chooses not to defend (or continue to defend) any attack against or attempt to challenge, set aside, void or annul any such City approval, decision or other action, the City may choose, in its sole discretion, to defend or not defend any such action. In the event that the City decides not to defend or continue the defense, Applicant shall be obligated to reimburse City for any and all costs, fees, penalties or damages associated with dismissing the action or proceeding. If at any time both the Applicant and the City choose not to defend (or continue to defend) any action noted herein, all subject City approvals, decisions or other actions shall be null and void. The Applicant shall be required to enter into any reimbursement agreement deemed necessary by the City to effectuate the terms of this condition.
3. TTM 37980 shall be recorded prior to the issuance of any building permit for production units.
4. The project shall comply with all applicable requirements of the Corona Municipal Code (CMC) and ordinances and the relevant Specific Plan, if any, including the payment of all required fees.
5. The applicant or his successor in interest shall comply with the conditions of approval for TTM 37980.
6. The submittal of a Development Plan Review and a Precise Plan application are required for the development of the homes.
7. With the construction of the homes, the applicant shall construct decorative block walls along the perimeters of the tract, including the perimeters between the existing residences and the new residences within TTM 37980.
8. Per recommendations in the Biological Technical Report prepared by ECORP Consulting, Inc. (March 24, 2021 Revised July 22, 2021), to the extent possible, the applicant shall not remove the palm trees located in the Taylor Avenue right-of-way during the breeding season of nesting birds. Breeding season is defined as February 1st through August 31st. Should the project phasing result in the potential removal of trees during the breeding season, the applicant shall submit to the Planning & Development Department a pre-construction bird survey prepared by the project biologist prior to the removal of trees. The pre-construction survey shall identify if, how and when the trees may be removed. If the survey indicates the presence or potential presence of nesting, the trees shall only be removed as recommended by the biologist.
9. Per recommendations in the Biological Technical Report prepared by ECORP Consulting, Inc. (March 24, 2021, Revised July 22, 2021), to the extend possible, the applicant shall not conduct grading during the breeding season of nesting birds. Breeding season is defined as February 1st through August 31st. Should the project phasing result in the potential for grading during the breeding season, the applicant shall submit to the Planning & Development Department a pre-construction bird survey prepared by the project biologist prior to any grading. The pre-construction survey shall identify if, how and when grading may occur. If the survey indicates the presence or potential presence of nesting, the grading shall only occur when recommended by the biologist.
10. Prior to issuance of a grading permit, the developer shall provide advance notification of grading activities to the residents located in proximity to the project site. The notification shall be a flyer containing the name and contact phone number for the project manager, developer or superintendent on site. A sign shall also be placed on the project site during grading and construction with all contact information for the project.
11. The applicant shall install a temporary chain link fence with a dust tamer screen along the perimeters of the project site. The fence shall be in place prior to on-site grading activities.
12. Prior to issuance of a grading permit, the applicant shall submit for review and implement a vector control program. The program shall also provide for continued monitoring and relocation of vector during the grading and construction process. A final report upon completion shall be submitted to the Planning & Development Department.
13. Construction traffic shall not access existing residential streets (Lorraine Drive and Susanne Street) and all construction parking shall be on site.

PUBLIC WORKS	Steven Strapac

1. The Public Works Department, Utilities Department, and Planning and Development Department Conditions of Approval for the subject application shall be completed at no cost to any government agency. All questions regarding the intent of the conditions shall be referred to Development Services in the Planning and Development Department. Should a conflict arise between City of Corona standards and design criteria and any other standards and design criteria, City of Corona standards and design criteria shall prevail.

 (Continued on next page)

PUBLIC WORKS	Steven Strapac

2. All conditions of approval shall be satisfied and the Tentative Tract Map prepared and accepted by the City for recordation within 24 months of its approval, unless an extension is granted by the City Council. [ADDED BY THE PLANNING AND HOUSING COMMISSION ON DECEMBER 6, 2021.]
3. The developer shall comply with the State of California Subdivision Map Act and all applicable City ordinances and resolutions.
4. Prior to map recordation or issuance of grading permit, the applicant shall demonstrate that the proposed subdivision will not unreasonably interfere with the use of any easement holder of the property.
5. All improvement and grading plans shall be drawn on twenty-four (24) inch by thirty-six (36) inch Mylar and signed by a registered civil engineer or other registered/licensed professional as required.
6. The submitted tentative tract map shall correctly show all existing easements, traveled ways, and drainage courses. Any omission or misrepresentation of these documents may require said tentative tract map to be resubmitted for further consideration.
7. The tentative tract shall be recorded as one final tract map, and shall be developed as one tract. Financial security shall be provided for all improvements within the tract prior to final tract map approval.
8. In the event that off-site right-of-way or easements are required for the City of Corona master plan facilities to comply with these conditions of approval, the developer is required to secure such right-of-way or easements at no cost to the City.
9. All existing and new utilities adjacent to and on-site shall be placed underground in accordance with City of Corona ordinances.
10. Prior to issuance of a Certificate of Occupancy, the developer shall cause the engineer of record to submit project base line work for all layers in AutoCAD DXF format on Compact Disc (CD) to Development Services. If the required files are unavailable, the developer shall pay a scanning fee to cover the cost of scanning the as-built plans.
11. The developer shall monitor, supervise and control all construction and construction related activities to prevent them from causing a public nuisance including, but not limited to, insuring strict adherence to the following:
    (a) Removal of dirt, debris or other construction material deposited on any public street no later than the end of each working day.
    (b) Construction operations, including building related activities and deliveries, shall be restricted to Monday through Saturday from 7:00 a.m. to 8:00 p.m., excluding holidays, and from 10:00 a.m. to 6:00 p.m. on Sundays and holidays, in accordance with City Municipal Code 15.04.060, unless otherwise extended or shortened by the Public Works Director or Building Official.
    (c) The construction site shall accommodate the parking of all motor vehicles used by persons working at or providing deliveries to the site.
    Violation of any condition or restriction or prohibition set forth in these conditions shall subject the owner, applicant, developer or contractor(s) to remedies as noted in the City Municipal Code. In addition, the Public Works Director or Building Official may suspend all construction related activities for violation of any condition, restriction or prohibition set forth in these conditions until such time as it has been determined that all operations and activities are in conformance with these conditions.
12. Prior to map recordation or issuance of a building permit, whichever occurs first, the developer shall finish the construction or post security guaranteeing the construction of all public improvements. Said improvements shall include, but are not limited to, the following:
    a) All missing and deficient street facilities on Citron Street and Taylor Avenue including asphalt resurfacing 1/2 width +10' and opposing curb ramps, and all new street facilities on Susanne Street and Lorraine Avenue.
    b) All required grading, including erosion control.
    c) All required sewer and water facilities, including construction of new facilities to serve the proposed lots and the upsizing of water mains on Citron Street and Taylor Avenue to 8 inch ductile iron pipe.
    d) All required public landscaping and irrigation facilities including a separate water service and meter for CFD maintained areas.
    e) All under grounding of overhead utilities, except for cables greater than 32k volts.
    f) Street lights, located per Standard 500, including a new service point if an existing circuit is not available.
13. All the grading design criteria shall be per City of Corona standards, Corona Municipal Code Title 15 Chapter 15.36 and City Council Ordinance Number 2568, unless otherwise approved by the Public Works Director.

 (Continued on next page)

PUBLIC WORKS	Steven Strapac

14. Prior to approval of grading plans, the applicant shall submit two (2) copies of a soils and geologic report prepared by a Registered Engineer to Development Services. The report shall address the soil's stability and geological conditions of the site. If applicable, the report shall also address: deep seated and surficial stability of existing natural slopes; modified natural slopes which are subject to fuel zones; manufactured slopes and stability along proposed daylight lines; minimum required setbacks from structures; locations and length of proposed bench drains, sub-drains or french drains; and any other applicable data necessary to adequately analyze the proposed development.
15. Prior to approval of grading plans, erosion control plans and notes shall be submitted and approved by the city's registered engineer.
16. Prior to map recordation or issuance of a grading permit, the developer shall ensure that the proposed perimeter walls will not be located at the bottom of any slopes. Prior to issuance of a permit, the applicant shall work with the Planning and Development Services Divisions to reduce the height of the retaining wall along the east perimeter of Lot 15. Alternatively, the applicant may eliminate the retaining wall by placing the perimeter wall at the top of the slope with a CFD easement dedicated over the slope.
17. Prior to approval of grading plans, the applicant shall obtain a General Construction Activity Storm Water Permit from the State Water Resources Control Board in compliance with National Pollutant Discharge Elimination System (NPDES) requirements. Proof of filing a Notice of Intent (NOI) will be required by the City. The WDID # shall be displayed on the title sheet of the grading plans.
18. Prior to approval of grading plans, the applicant shall comply with the Federal Clean Water Act and shall prepare a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP shall be available at the project site for review.
19. Prior to issuance of grading permit or construction of any improvements, a letter will be required from a qualified botanist, plant taxonomist or field biologist specializing in native plants, stating that an investigation and/or eradication of scale broom weed (Lepidospartum Squamatum) has been completed.
20. Prior to the issuance of a grading permit the developer shall submit recorded slope easements or written letters of permission from adjacent landowners in all areas where grading is proposed to take place outside of the project boundaries.
21. Prior to issuance of building permits, the developer shall cause the civil engineer of record and soils engineer of record for the approved grading plans to submit pad certifications and compaction test reports for the subject lots where building permits are requested.
22. Prior to release of grading security, the developer shall cause the civil engineer of record for the approved grading plans to submit a set of as-built grading plans.
23. Prior to issuance of any grading permit, any environmental Phase I and Phase II findings and recommended actions to remove contamination resulting from previous use of the subject site shall be implemented.
24. All City of Corona NPDES permit requirements for NPDES and Water Quality Management Plans (WQMP) shall be met per Corona Municipal Code Title 13 Chapter 13.27 and City Council Ordinance Numbers 2291 and 2828 unless otherwise approved by the Development Services Manager.
25. Prior to the issuance of a grading permit, a Final WQMP, prepared in substantial conformance with the approved Preliminary WQMP, shall be submitted to the Development Services for approval. Upon its final approval, the applicant shall submit one copy on a CD-ROM in PDF format.
26. Prior to the issuance of the first Certificate of Occupancy, the applicant shall enter into an acceptable maintenance agreement with the City to inform future property owners to implement the approved WQMP.
27. Prior to issuance of the first Certificate of Occupancy, the applicant shall provide proof of notification to the future homeowners of all non-structural BMPs and educational and training requirements for said BMPs as directed in the approved WQMP.
28. Prior to issuance of Certificate of Occupancy, the applicant shall ensure all structural post construction BMPs identified in the approved project specific Final WQMP are constructed and operational.
29. All the drainage design criteria shall be per City of Corona standards and the Riverside County Flood Control and Water Conservation District standards unless otherwise approved by the Development Services Manager.

 (Continued on next page)

PUBLIC WORKS	Steven Strapac

30. Prior to recordation or approval of any improvement plans, the applicant shall submit a detailed hydrology study. Said study shall include the existing, interim and the ultimate proposed hydrologic conditions including key elevations, drainage patterns and proposed locations and sizes of all existing and proposed drainage devices. The hydrology study shall present a full breakdown of all the runoff generated on- and off-site.
31. Prior to recordation or approval of improvement plans, the improvement plans submitted by the applicant shall address the following: The project drainage design shall be designed to accept and properly convey all on- and off-site drainage flowing on or through the site. The project drainage system design shall protect downstream properties from any damage caused by alteration of drainage patterns such as concentration or diversion of flow. All residential lots shall drain toward the street. Lot drainage to the street shall be by side yard swales independent of adjacent lots or by an underground piping system with through curb drains.
32. Street design criteria and cross sections shall be per City of Corona standards, approved Specific Plan design guidelines and the State of California Department of Transportation Highway Design Manual unless otherwise approved by the Public Works Director.
33. Prior to map recordation or issuance of a building permit, whichever comes first, the applicant shall offer for dedication all required street rights-of-way for Citron Street and Taylor Avenue (68 feet full-width/ 34 feet half-width), and Susanne Street and Lorraine Avenue (60 feet full-width/ 30 feet half-width). Said dedication shall continue in force until the City accepts or abandons such offers. All dedications shall be free of all encumbrances and approved by the Public Works Director.
34. Prior to recordation or approval of improvement plans, the improvement plans submitted by the applicant shall include the following:
    a) All driveways shall conform to the applicable City of Corona standards and shall be shown on the street improvement plans.
    b) Under grounding of existing and proposed utility lines.
    c) Street lights shall be included per City Standards.
    d) Ramps meeting ADA requirements at the intersection of Citron Street and Taylor Avenue.
    e) Yellow crosswalks per City Standards at the intersection of Citron Street and Taylor Avenue.
    f) All other public improvements shall conform to City of Corona standards.
35. Prior to approval of improvement plans, the improvement plans shall show all the streets to be improved to half width plus ten (10) additional feet unless otherwise approved by the Public Works Director. At the discretion of the applicant, the existing pavement maybe cored to confirm adequate section and R values during the design process and any findings shall be incorporated into the project design. Therefore improvements may include full pavement reconstruction, grind and overlay, or slurry seal. All striping shall be replaced in kind.
36. Prior to release of public improvement security, the developer shall cause the civil engineer of record for the approved improvement plans to submit a set of as-built plans for review and approval by Development Services.
37. Prior to acceptance of improvements, the Public Works Director may determine that aggregate slurry, as defined in the Standard Specifications for Public Works Construction, may be required one year after acceptance of street(s) by the City if the condition of the street(s) warrant its application. All striping shall be replaced in kind. The applicant is the sole responsible party for the maintenance of all the improvements until said acceptance takes place.
38. Prior to map recordation the applicant shall annex this project into a City of Corona Community Facilities District (CFD) 2016-1 (Public Services) and 2016-3 (Maintenance Services). All assessable parcels therein shall be subject to annual CFD charges (special taxes or assessments). The developer shall be responsible for all costs incurred during annexation into the CFDs.
39. Prior to map recordation the applicant shall prepare a disclosure statement indicating that the property is within a Community Facilities District and/or Landscape Maintenance District and will be subject to an annual levy. The statement shall also disclose any covenants or easements, including drainage easements, that limit the use of the properties. The disclosure statement is subject to review and approval and shall be recorded concurrently with the final map.
40. Prior to issuance of a Certificate of Occupancy, all proposed parkway landscaping specified in the tentative map or in these Conditions of Approval shall be constructed.
41. Prior to the issuance of a Certificate of Occupancy, any damage to existing landscape easement areas due to project construction shall be repaired or replaced by the developer, or developer's successors in interest, at no cost to the City of Corona.

 (Continued on next page)

PUBLIC WORKS	Steven Strapac

42. Prior to map recordation, issuance of a building permit and/or issuance of a Certificate of Occupancy, the applicant shall pay all development fees, including but not limited to Development Impact Fees (DIF) per City Municipal Code 16.23 and Transportation Uniform Mitigation Fees (TUMF) per City Municipal Code 16.21. Said fees shall be collected at the rate in effect at the time of fee collection as specified by the current City Council fee resolutions and ordinances.
43. All the potable water and sewer design criteria shall be per the City of Corona Utilities Department standards and Riverside County Department of Health Services standards unless otherwise approved by the Public Works and Utilities Department Directors.
44. Prior to issuance of any building permits, including model home permits, a domestic water and fire flow system shall be approved by the Public Works Department and constructed by the developer, to the satisfaction of the Public Works Director and Fire Chief.
45. Prior to map recordation, the developer shall construct or guarantee the construction of 8 inch ductile iron water mains on Citron Street and Taylor Street where water mains are less than 8 inches, including abandonments and connections to adjacent services, hydrants, and mains. All water improvements shall be designed and constructed per the Utility Department Standard Plans and Design Policy.
46. Prior to improvement plans approval, the applicant shall ensure that all water meters, fire hydrants or other water appurtenances shall not be located within a drive aisle or path of travel.
47. Prior to issuance of any building permits, the developer shall pay all water and sewer fees, including but not limited to connection fees, wastewater treatment fees, sewer capacity fees and all other appropriate water and sewer fees.
48. Prior to building permit issuance, the applicant shall construct or guarantee the construction of all required public improvements including but not limited to, the potable water line, sewer line, potable water services, sewer laterals, irrigation water services and reduced pressure principle assemblies within the public right of way and-or easements.
49. Prior to map recordation or building permit issuance, whichever comes first, the applicant shall construct or guarantee the construction of an 8 inch ductile iron water main and an 8 inch sewer on Susanne St and Lorraine Ave to serve the proposed development. All water improvements shall be designed and constructed per the Utility Department Standard Plans and Design Policy.
50. The applicant shall dedicate easements for all public water, reclaimed water, sewer and electric facilities needed to serve the project in accordance the Department of Water and Power standards. The minimum easement width shall be 20 feet for one utility and 30 feet for more than one public utility facility. All public water and sewer facilities shall be provided a minimum 20 foot wide paved access road unless otherwise approved by the General Manager. Structures and trees shall not be constructed or installed within a public utility easement.
51. Fire Hydrants shall be a maximum 250-300 feet apart or as directed by the Fire Department.
52. Reclaimed water shall be used for any construction activity unless otherwise approved by the Utilities Department. Prior to obtaining a reclaimed construction meter from the City, a Reclaimed Water Application shall be submitted for the contractor to receive certification to handle reclaimed water.
53. The applicant shall provide a separate irrigation water service for all CFD landscaped lots or easements.
54. The landscape plans of all parkway and Community Facilities District (CFD) lots and easements shall be prepared by a licensed Landscape Architect and shall be submitted to Development Services for review and approval.
55. The developer shall install automatic irrigation to all street trees separated from adjacent residences by a fence or wall prior to the issuance of a Certificate of Occupancy.

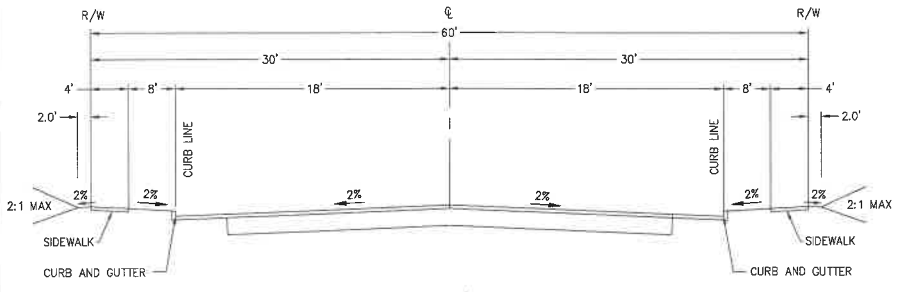
DPR2020-0015

IN THE CITY OF CORONA, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

TENTATIVE TRACT NO. 37980

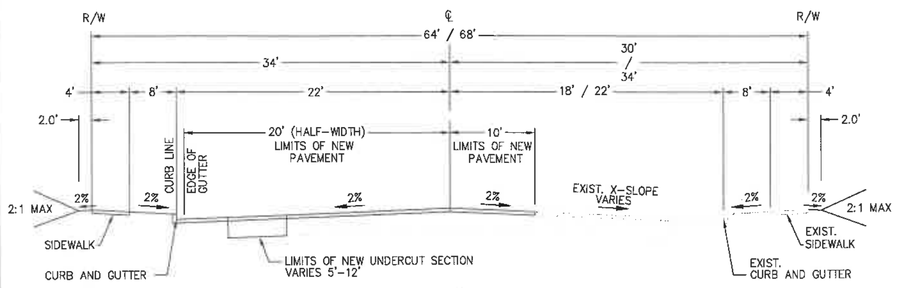
BEING A SURVEY OF THE EASTERLY HALF OF LOT 1 IN BLOCK 52 OF LANDS OF THE SOUTH RIVERSIDE LAND AND WATER COMPANY, AS SHOWN BY MAP FILED IN BOOK 9, PAGE 6 OF MAPS, RECORDS OF THE COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA, AND LYING WITHIN SECTION 36, TOWNSHIP 3 SOUTH, RANGE 7 WEST OF THE SAN BERNARDINO BASE AND MERIDIAN.

ACS CONSULTING, INC. OCTOBER 2021



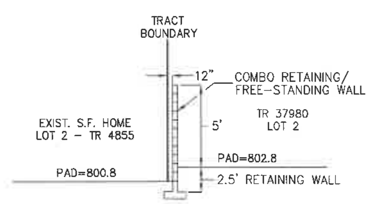
SUSANNE STREET/LORRAINE DRIVE

SCALE: NTS



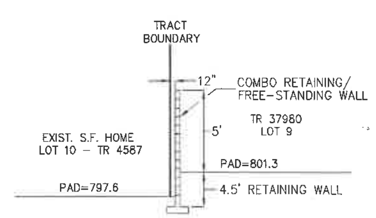
CITRON STREET/TAYLOR STREET

SCALE: NTS



SECTION A-A

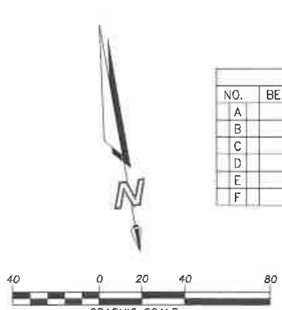
SCALE: NTS



SECTION B-B

SCALE: NTS

PAVING NOTE: (*) PAVING TO INCLUDE HALF-WIDTH OF ROAD (BOTH CITRON ST. AND TAYLOR ST.) + 10'



CENTERLINE DATA					
NO.	BEARING/DELTA	RADIUS	LENGTH	TANGENT	REMARKS
A	D=04°14'37"	500.00'	37.02'	18.52'	C/L
B	N03°50'13"E	---	52.82'	---	"
C	D=04°14'37"	500.00'	37.03'	18.53'	"
D	N08°04'50"E	---	63.49'	---	"
E	D=90°01'34"	55.00'	86.42'	55.03'	"
F	N81°53'35"W	---	96.07'	---	"

REVISION BLOCK		
1	1st SUBMITTAL TO CITY	1-9-21
2	REVISIONS PER CITY COMMENT	10-7-21
REF.	DESCRIPTION	DATE

REGISTERED PROFESSIONAL ENGINEER FRANK A. ARTIGA NO. C 61860 EXP. 9/30/23 CIVIL STATE OF CALIFORNIA

ACS CONSULTING, INC.
land planning, engineering, and surveying professionals
PO BOX 2252
TEMECULA CA 92593
TEL: 951-757-5178 e: frank@acsconsultinginc.com
PREPARED BY: FRANK A. ARTIGA R.C.E. NO. 61860
EXP. DATE: 09-30-23
DATE:

TENTATIVE TRACT NO. 37980

SITE PLAN/GRADING PLAN

CITY OF CORONA CA

2 OF 3 SHEETS

D:\Dropbox\Public\Projects\2020 Corona Houpert\TTM\TTM37980 2 100721.dwg

EXHIBIT 2.C

A C S
C O N S U L T I N G

November 15, 2021

City of Corona Planning Department
Attention: Lupita Garcia
400 S. Vicentia Ave.
Corona CA 92882

RE: TTM 37980 SUBDIVISION INFORMATIONAL LETTER

PROJECT DESCRIPTION

To whom it may concern, the above mentioned project (TTM 37980) is being submitted to acquire City approval for a tentative tract map. The project is located at the northwest corner of Citron Street and Taylor Avenue, and is surrounded by existing residential single tract homes. The development plan for this map is to subdivide the property into 19 residential detached lots.

The project water source is taken off the existing 6-inch waterline source within Citron and Taylor, which will be removed and replaced with a proposed 8-inch water main. Additionally, the existing water mains along Susanne Street and Lorraine Drive will be extended to connect, providing a dual connection source for the project. The project will also replace pavement along the northerly side of Citron and Taylor and extend to ultimate curb and gutter standard city width requirements. New pavement will be constructed along the extension of Susanne Street and Lorraine Drive, including extending power through the newly constructed roads.

Sewer will be provided by extending a sewer main along Lorraine Drive to the south and by direct connection to the new homes along Citron and Taylor. Each lot will consist of a new sewer lateral connection to the sewer main within Citron/Taylor and Lorraine.

Drainage for the project will consist of allowing surface flow to drain to a proposed catch basin at the northwest corner of Citron / Taylor and at northeast corner of the tract, connecting to the existing storm drain along Taylor. Additionally, flow along Lorraine Drive will be captured at the northerly tract boundary and treated with bio-treatment within the road right of way. drainage will extend along the northerly boundary in a proposed drainage easement to connect to the existing storm drain along Taylor Avenue.

The project owner will process covenants, conditions and restrictions at the final engineering stage.

Should you have any questions, please do not hesitate to call me at 951-757-5178.

Signed: Frank Artiga

Frank A Artiga, P.E.
ACS Consulting, Inc.

PO BOX 2252 TEMECULA CALIFORNIA 92593
OFC: 951.757.5178

EXHIBIT 2.D

City Of Corona-Planning Division 12/3/2020

Lupita Garcia

On November 24th,25th, and December 1st, my son Tanner Haupert hand delivered 158 of the attached Introduction Letter and Proposed Tentative Tract Map (Aprox a 500ft radius of site) on my wife and I's behalf. In respect of current Covid-19 protocol, he wore a mask and distanced himself from the neighbors. He introduced himself and explained the proposal to the neighbors who were interested in speaking with him. The feedback was mostly positive as most felt a development of the site is long overdue, and some had complaints of tumbleweeds, loitering, and dumping at the site over the years.

We felt with the current pandemic this method of community outreach was more respectful than asking the neighbors to attend a meeting at the site.

Sincerely,

Mark Haupert/Priem Properties

EXHIBIT 2.E

Hello Neighbors !

October 22 , 2020

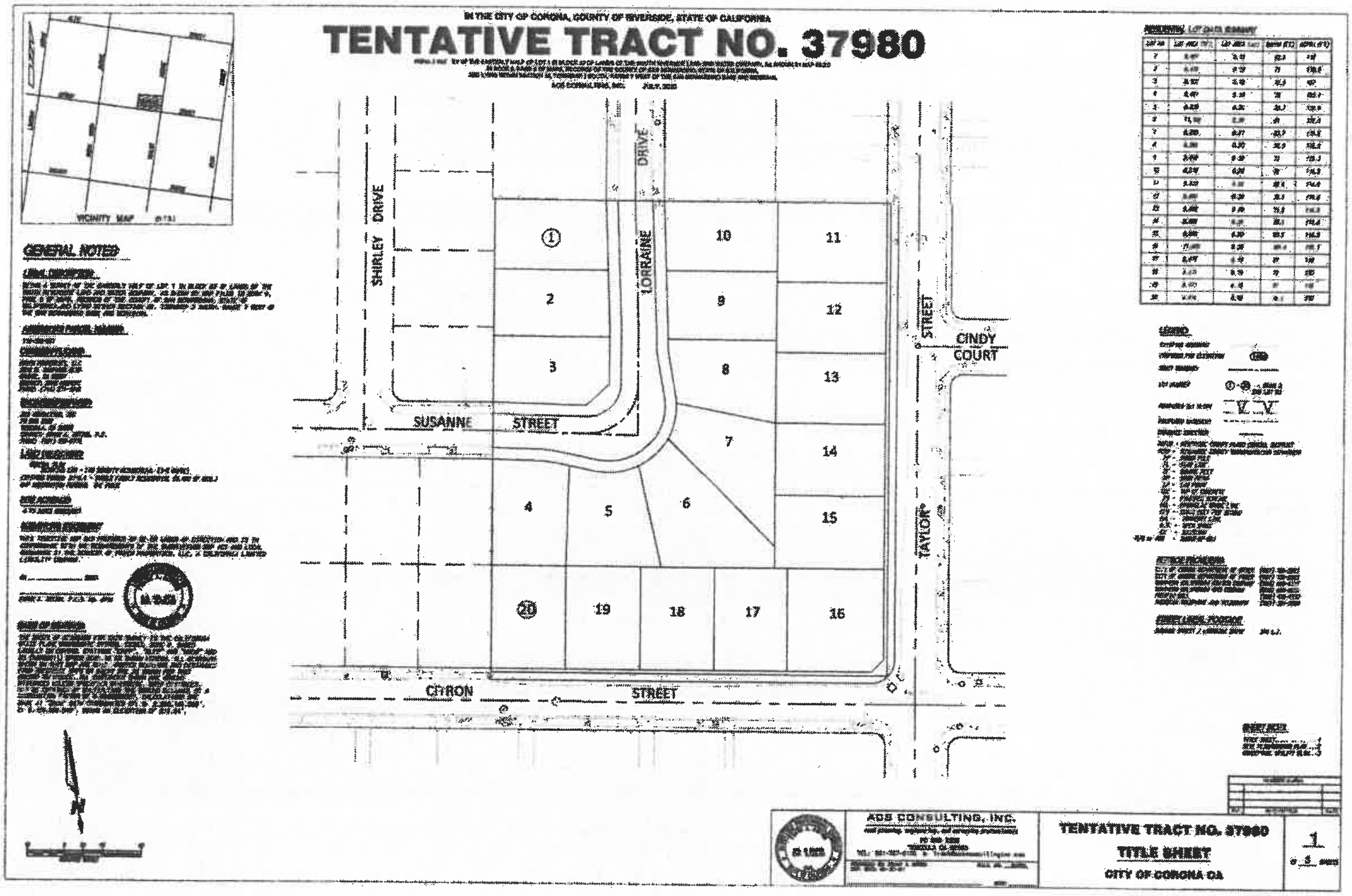
My wife Rhonda and I own the vacant lot on the corner of Citron & Taylor. With the help of a civil engineer (ACS Consulting), we will be submitting a Tentative Tract Map to the City of Corona for approval of 20 single family home sites. The lot sizes will be a minimum of 8,400 square feet and consistent with both the surrounding homes, as well as city code (R-1-8.4). As part of this proposed tentative tract map, there will be a continuation of both Susanne St and Lorraine Dr. After the city approval of the tentative tract map, we intend to sell the site to a small homebuilder. At this point we don't yet have any formal elevations, as a homebuilder has yet to be determined. Once ownership of the site passes to a homebuilder they will proceed with the submittal of specific plans (architectural elevations, etc.) for city approval. The timeline for actual construction to begin is somewhat unknown, but our best guess is a year or so.

We believe development of this vacant land is long overdue, and will only improve upon an already wonderful part of the city of Corona.

If you have any questions or concerns regarding the proposed plan you can reach me on my cell at (714) 271-1646, or you can call our planner at the City of Corona, Lupita at (951) 736-2293

Thank you !

Mark Haupert


IN THE CITY OF CORONA, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA
TENTATIVE TRACT NO. 37980
VICINITY MAP
GENERAL NOTES
SHIRLEY DRIVE
LORRAINE DRIVE
SUSANNE STREET
CITRON STREET
TAYLOR STREET
CINDY COURT
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2
3
4
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ADS CONSULTING, INC.
TENTATIVE TRACT NO. 37980
TITLE SHEET
CITY OF CORONA CA
1

APN	OWNER-OCCUPANT	ADDRESS	CITY	STATE	ZIP
109-091-001	Granado Elena Angelina	1613 Taylor Ave	Corona	CA	92882
109-091-002	Abdelmoneim Wael G	1625 Taylor Ave	Corona	CA	92882
109-091-003	Occupant	525 W Crestview St	Corona	CA	92882
109-091-003	Delarosa Cesar	Po Box 6768	Buena Park	CA	90622-6768
109-091-004	Borgen Troy E	513 W Crestview St	Corona	CA	92882
109-091-005	Maag John L	501 W Crestview St	Corona	CA	92882
109-091-006	Sandoval Jose A Oliva	1626 S Merrill St	Corona	CA	92882
109-091-007	Cuevas Jose	1604 S Merrill St	Corona	CA	92882
109-092-015	Stafford David	401 W Crestview St	Corona	CA	92882
109-092-016	Deniker Gloria E	413 W Crestview St	Corona	CA	92882
109-093-001	Hoopii Ryan K	1685 Taylor Ave	Corona	CA	92882
109-093-002	Penners Bonnie S	1673 Taylor Ave	Corona	CA	92882
109-093-003	Balandran Robert A	1661 Taylor Ave	Corona	CA	92882
109-093-004	Tristan Alfredo Morales	1649 Taylor Ave	Corona	CA	92882
109-093-005	Pedraza Jose	1650 Merrill Cir	Corona	CA	92882
109-093-006	Delacerda Joseph	1662 Merrill Cir	Corona	CA	92882
109-093-007	Occupant	1674 Merrill Cir	Corona	CA	92882
109-093-007	Stone Patricia O	Po Box 1093	Lake City	CO	81235-1093
109-093-008	Castillo Guillermo	1685 Merrill Cir	Corona	CA	92882
109-093-009	Fowler Suzanne L	1673 Merrill Cir	Corona	CA	92882
109-093-010	Meyer David Edward	412 W Crestview St	Corona	CA	92882
109-093-011	Bryson Charles L	402 W Crestview St	Corona	CA	92882
109-093-012	Occupant	390 W Crestview St	Corona	CA	92882
109-093-012	Valenzuela Bernadina	24348 Postal Ave #3	Moreno Valley	CA	92553-7744
109-093-013	Hansen V Lee	1674 Sheridan Cir	Corona	CA	92882
109-121-001	Hernandez Eli M	1739 Taylor Ave	Corona	CA	92882
109-121-002	Linares Humberto	1757 Taylor Ave	Corona	CA	92882
109-121-003	Hendrickson Michael	1775 Taylor Ave	Corona	CA	92882
109-121-004	Caloca Refugio	1793 Taylor Ave	Corona	CA	92882
109-121-005	Occupant	1790 Cook St	Corona	CA	92882
109-121-005	Nakakihara Yuriko	2580 S Bundy Dr	Los Angeles	CA	90064-2720
109-121-006	Mckee Daniel W	1776 Cook St	Corona	CA	92882
109-121-007	Nelson Joshua L	1762 Cook St	Corona	CA	92882
109-121-008	Duncan Marvin L	1748 Cook St	Corona	CA	92882
109-122-001	Nelson Mona Lee	1747 Cook St	Corona	CA	92882
109-122-002	Hernandez Eddie J	1761 Cook St	Corona	CA	92882
109-122-003	Esposito Family Trust	1775 Cook St	Corona	CA	92882
109-122-004	Alvarado Carlos	1789 Cook St	Corona	CA	92882
109-122-005	Cervantes Yadia	1788 Cindy Ct	Corona	CA	92882
109-122-006	Occupant	1774 Cindy Ct	Corona	CA	92882
109-122-006	Jones Denise A	14110 Descanso Dr	Perris	CA	92570-9470
109-122-007	Kelly William G	1760 Cindy Ct	Corona	CA	92882
109-122-008	Occupant	1746 Cindy Ct	Corona	CA	92882
109-122-008	Mechling John C	397 Cindy Ct	Corona	CA	92882-4811
109-123-015	Casanas Richard	385 Cindy Ct	Corona	CA	92882
109-123-016	Mechling John C	397 Cindy Ct	Corona	CA	92882
109-123-017	Haughey Carol	403 Cindy Ct	Corona	CA	92882
109-123-018	Baires Sara	415 Cindy Ct	Corona	CA	92882
109-123-019	Eldredge Cynthia J	503 Cindy Ct	Corona	CA	92882
109-123-020	Guillen Richard A	515 Cindy Ct	Corona	CA	92882
109-123-021	Manestar Rick	527 Cindy Ct	Corona	CA	92882
109-171-009	Nohavec Larry Edward	712 W Citron St	Corona	CA	92882
109-171-010	Sanchez Guillermo Flores	711 Alta Vista Ave	Corona	CA	92882
109-172-001	Richie Lynne	708 W Citron St	Corona	CA	92882
109-172-002	Almasy Joseph A	704 W Citron St	Corona	CA	92882
109-172-003	Mejia Armandina Zarate	680 W Citron St	Corona	CA	92882
109-172-004	Day Tina Yun	656 W Citron St	Corona	CA	92882
109-172-005	Frias Edgar T	659 Alta Vista Ave	Corona	CA	92882
109-172-006	Robinson Pamela	669 Alta Vista Ave	Corona	CA	92882
109-172-007	Occupant	701 Alta Vista Ave	Corona	CA	92882
109-172-007	Valencia Bennie A	750 Avenida Terrazo	Corona	CA	92882-5892
109-172-008	Druhora Daniel	705 Alta Vista Ave	Corona	CA	92882
109-172-009	Hernandez Sergio	709 Alta Vista Ave	Corona	CA	92882
109-174-001	Olguin Ashley	708 Alta Vista Ave	Corona	CA	92882

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109-174-002	Evans Evan George	704 Alta Vista Ave	Corona	CA	92882
109-174-003	Abdelsamia Mohamed A	702 Alta Vista Ave	Corona	CA	92882
109-174-004	Garibay Christian	668 Alta Vista Ave	Corona	CA	92882
109-174-005	Salle Vincent L	658 Alta Vista Ave	Corona	CA	92882
109-221-001	Occupant	646 W Citron St	Corona	CA	92882
109-221-001	Khattab Mostafa	807 W Grand Blvd B	Corona	CA	92882-3272
109-221-002	Perry Paulette Rose	636 W Citron St	Corona	CA	92882
109-221-003	Martinez Omar Tenorio	626 W Citron St	Corona	CA	92882
109-221-004	Fay Charles David	616 W Citron St	Corona	CA	92882
109-221-005	Welton Todd E	606 W Citron St	Corona	CA	92882
109-221-006	Occupant	605 Alta Vista Ave	Corona	CA	92882
109-221-006	Bensiek Tacy J	3820 Reposa Ave	Santa Cruz	CA	95062-3271
109-221-007	Cook Doris L	619 Alta Vista Ave	Corona	CA	92882
109-221-008	German Elizabeth B	629 Alta Vista Ave	Corona	CA	92882
109-221-009	Bastida Raul V	639 Alta Vista Ave	Corona	CA	92882
109-221-010	Occupant	649 Alta Vista Ave	Corona	CA	92882
109-221-010	Wahid Rehman	18601 Arline Ave	Artesia	CA	90701-5810
109-222-001	Gosser James R	648 Alta Vista Ave	Corona	CA	92882
109-222-002	Uhles John E	638 Alta Vista Ave	Corona	CA	92882
109-222-003	Hart James J	628 Alta Vista Ave	Corona	CA	92882
109-222-004	Mccarthy Family Trust Dtd /2008	618 Alta Vista Ave	Corona	CA	92882
109-222-005	Martinez Freddie J	606 Alta Vista Ave	Corona	CA	92882
109-223-001	Barrera Arnold	1897 Taylor Ave	Corona	CA	92882
109-223-002	Razo Julian	1881 Taylor Ave	Corona	CA	92882
109-223-003	Chase Lewis E	1865 Taylor Ave	Corona	CA	92882
109-223-004	Herrera Francisco	1849 Taylor Ave	Corona	CA	92882
109-223-005	Campos Mauro R	1833 Taylor Ave	Corona	CA	92882
109-223-006	Guyett Lenny Ray	1817 Taylor Ave	Corona	CA	92882
109-223-007	Byers Marina B	1801 Taylor Ave	Corona	CA	92882
109-223-008	Magana Hilarion	1802 Cook Cir	Corona	CA	92882
109-223-009	Secured Futures Pooled Special Needs Trust	1818 Cook Cir	Corona	CA	92882
109-223-010	Lantry Jeffrey	1834 Cook Cir	Corona	CA	92882
109-223-011	Mozqueda Jose Ramon	1850 Cook Cir	Corona	CA	92882
109-223-012	Anderson Cory E	1866 Cook Cir	Corona	CA	92882
109-223-013	Trovato Edward	1882 Cook Cir	Corona	CA	92882
109-223-016	Argote Giovanna	1865 Cook Cir	Corona	CA	92882
109-223-017	Escamilla Jesus Antonio	1849 Cook Cir	Corona	CA	92882
109-223-018	Mason Anthony W	1833 Cook Cir	Corona	CA	92882
109-223-019	Bowman Kenneth E	1817 Cook Cir	Corona	CA	92882
109-223-020	Ayala Chris Anthony	1801 Cook Cir	Corona	CA	92882
109-223-021	Segura Martin	1802 Cindy Cir	Corona	CA	92882
109-223-022	Chemello Donald R	1818 Cindy Cir	Corona	CA	92882
109-223-023	Occupant	1834 Cindy Cir	Corona	CA	92882
109-223-023	Nunez Sergio	2698 Cherrybark Ln	Corona	CA	92881-3529
110-341-002	Esparza Jose Refugio	749 W Crestview St	Corona	CA	92882
110-341-003	Ocampo Antelma E	733 W Crestview St	Corona	CA	92882
110-341-004	Ramirez Ricardo T	717 W Crestview St	Corona	CA	92882
110-341-005	Lyman Damon Kawika	701 W Crestview St	Corona	CA	92882
110-341-006	Hauser Jeffrey A	685 W Crestview St	Corona	CA	92882
110-341-007	Ortiz David A	669 W Crestview St	Corona	CA	92882
110-341-008	Stanfill Gilbert W	653 W Crestview St	Corona	CA	92882
110-341-009	Guerrero Guadalupe	637 W Crestview St	Corona	CA	92882
110-341-010	Occupant	621 W Crestview St	Corona	CA	92882
110-341-010	Laitinen Richard J	1502 Arbor Rd NE	Arab	AL	35016-1627
110-341-011	Cruz Jose M	605 W Crestview St	Corona	CA	92882
110-342-001	Heipley Trust	1692 Taylor Ave	Corona	CA	92882
110-342-002	Ballesteros Jerome P	1680 Taylor Ave	Corona	CA	92882
110-342-003	Kinser John P	1668 Taylor Ave	Corona	CA	92882
110-342-004	Medina Jose S	1656 Taylor Ave	Corona	CA	92882
110-342-005	Martell Stoney	1644 Taylor Ave	Corona	CA	92882
110-342-006	Occupant	1641 Lorraine Ave	Corona	CA	92882
110-342-006	Colas Joseph Wilfrid	1614 Lorraine Ave	Corona	CA	92882-4228
110-342-007	Hurley Bryce A	1653 Lorraine Ave	Corona	CA	92882
110-342-008	Pischke Jerome D	1665 Lorraine Ave	Corona	CA	92882
110-342-009	Cervantes Martha	1677 Lorraine Ave	Corona	CA	92882

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110-342-010	Howerton Jerome V	1689 Lorraine Ave	Corona	CA	92882
110-342-011	Garcia Javier	1688 Lorraine Ave	Corona	CA	92882
110-342-012	Hernandez Cesar	1676 Lorraine Ave	Corona	CA	92882
110-342-013	Cox Mary Margaret	1664 Lorraine Ave	Corona	CA	92882
110-342-014	Paul Lawrence R	1652 Lorraine Ave	Corona	CA	92882
110-342-015	Marron George C	1640 Lorraine Ave	Corona	CA	92882
110-342-016	Mueller Jeffrey D	1645 Shirley Dr	Corona	CA	92882
110-342-017	Buskirk Dereck F	1657 Shirley Dr	Corona	CA	92882
110-342-018	Schuman Victor W	1669 Shirley Dr	Corona	CA	92882
110-342-019	Occupant	1681 Shirley Dr	Corona	CA	92882
110-342-019	Fobaire Robert	8425 Polaris Dr	Buena Park	CA	90620-3355
110-342-031	Priem Prop	12012 Knott St A-2	Garden Grove	CA	92841-2823
110-342-032	Estrada Carlos	1701 Shirley Dr	Corona	CA	92882
110-342-033	Collette James W	1717 Shirley Dr	Corona	CA	92882
110-342-034	Enciso Margarito	1733 Shirley Dr	Corona	CA	92882
110-342-035	Segura Ignacio	698 Susanne St	Corona	CA	92882
110-342-036	Doty Jonathan S	716 Susanne St	Corona	CA	92882
110-342-037	Arcos Graciela	734 Susanne St	Corona	CA	92882
110-342-038	Occupant	752 Susanne St	Corona	CA	92882
110-342-038	Stewart Marie Peacock	17060 Sage Ave	Riverside	CA	92504-5932
110-342-039	Mendoza Antonio G	770 Susanne St	Corona	CA	92882
110-342-040	Leon Araceli Moyotl	711 W Citron St	Corona	CA	92882
110-342-041	Occupant	707 W Citron St	Corona	CA	92882
110-342-041	Quintard Jennifer L	4791 Winvale Ave	Irvine	CA	92604-2476
110-342-042	Rodriguez Dolores	669 W Citron St	Corona	CA	92882
110-342-043	Occupant	659 W Citron St	Corona	CA	92882
110-342-043	Ibarra Ruben	12305 Falena St	Victorville	CA	92392-8342
110-342-044	Rossi Annette	649 W Citron St	Corona	CA	92882
110-343-001	Perez Heriberto	1734 Shirley Dr	Corona	CA	92882
110-343-002	Kneubuhler Michelle Ann	1718 Shirley Dr	Corona	CA	92882
110-343-003	Occupant	1702 Shirley Dr	Corona	CA	92882
110-343-003	Roncor Prop	38672 Camino Aguacero	Indio	CA	92203-4427
110-343-004	Occupant	1678 Shirley Dr	Corona	CA	92882
110-343-004	Hansma Joel F	13381 Magnolia Ave #166	Corona	CA	92879-1946
110-343-005	Baray Manuel S	1666 Shirley Dr	Corona	CA	92882
110-343-006	Occupant	1654 Shirley Dr	Corona	CA	92882
110-343-006	Casias Larry Raymond	1054 Shirley Dr	Corona	CA	92882
110-343-007	Quezada Isaac	1642 Shirley Dr	Corona	CA	92882
110-343-008	Alvarado Faustino	1643 S Vicentia Ave	Corona	CA	92882
110-343-009	Bargas Noe	1655 S Vicentia Ave	Corona	CA	92882
110-343-010	Occupant	1667 S Vicentia Ave	Corona	CA	92882
110-343-010	Medina Maria C	7790 Hillside St	Corona	CA	92881-3773
110-343-011	Watts William J	1679 S Vicentia Ave	Corona	CA	92882
110-343-012	Romanski Anthony	1703 S Vicentia Ave	Corona	CA	92882
110-343-013	Ponce Celso	1719 S Vicentia Ave	Corona	CA	92882
110-343-014	Cleveland Rickey	1735 S Vicentia Ave	Corona	CA	92882
110-353-016	Arbanas Patrick	1634 S Vicentia Ave	Corona	CA	92882
110-353-017	Mendez Juan J	1650 S Vicentia Ave	Corona	CA	92882
110-353-018	Hansen Christina H	1662 S Vicentia Ave	Corona	CA	92882
110-353-019	Occupant	801 Lorna St	Corona	CA	92882
110-353-019	Reda Richard W & Reda Marsha E Revocable Trust Dtd 0/0	600 N Ohio St	Anaheim	CA	92805-2422
110-353-020	Diaz Adalberto	809 Lorna St	Corona	CA	92882
110-362-002	Villamil Romulo	1768 S Vicentia Ave	Corona	CA	92882
110-362-034	Adams Randall	807 W Citron St	Corona	CA	92882
110-362-035	Sencak John F	1784 S Vicentia Ave	Corona	CA	92882
110-362-036	York Robert E	1752 S Vicentia Ave	Corona	CA	92882
110-362-037	Hanna Abanoub	1736 S Vicentia Ave	Corona	CA	92882
110-362-038	Castellon Edder Zobek	1720 S Vicentia Ave	Corona	CA	92882
110-362-039	Gonzalez David	1704 S Vicentia Ave	Corona	CA	92882

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CITY OF CORONA

PRELIMINARY EXEMPTION ASSESSMENT

(Certificate of Determination When attached to Notice of Exemption)

Name, Description and Location of Project: TTM 37980

Tentative Tract Map application to subdivide 4.73 acres into 19 lots for single family residential purposes, located at the northwest corner of Citron Street and Taylor Street in the R1-8.4 (Single Family Residential, minimum lot size 8,400 square feet) zone. (APN: 110-342-031)

Entity or Person Undertaking Project:

___ A. Public Agency:

_X_ B. Other (private):

Name: Mark Haupert with Priem Properties, LLC.
Address: 12012 Knott Avenue #A2, Garden Grove, CA 92841
Telephone No.: (714) 271-1646

Staff Determination:

The City's staff, having undertaken and completed a preliminary review of this project in accordance with the City's Resolution entitled "Local Guidelines of the City of Corona Implementing the California Environmental Quality Act (CEQA)" has concluded that this project does not require further environmental assessment because:

___A. The proposed action does not constitute a project under CEQA.
___B. The project is a Ministerial Project.
___C. The project is an Emergency Project.
___D. The project constitutes a feasibility or planning study.
_X_E. The project is categorically exempt: **Per Section 15332 of the State Guidelines for the California Environmental Quality Act (CEQA), the project qualifies as a Class 32 (In-Fill Development Projects) categorical exemption. The project is consistent with the site's general plan designation and applicable plan policies; zoning designation and regulations; is less than five acres in size; is surrounded by urban uses; has no habitat for endangered, rare or threatened species; the project would not result in significant traffic, noise, air quality or water quality effects; and the site is adequately served by utilities and public services.**
___F. The project is a statutory exemption. Code section number:
___G. The project is otherwise exempt on the following basis:
___H. The project involves another public agency, which constitutes the lead agency. Name of Lead Agency:

Date:______________________

____
Lupita Garcia, Associate Planner
Lead Agency Representative

NOTICE OF EXEMPTION

TO: CLERK OF THE BOARD OF SUPERVISORS COUNTY OF RIVERSIDE

FROM: CITY OF CORONA
PLANNING & DEVELOPMENT DEPARTMENT
400 S. VICENTIA AVE, SUITE 120
CORONA, CA 92882

1. Project title: TTM 37980

2. Project location (specific): Northwest corner of Taylor Street and Citron Street (APN: 110-342-031).

3. a. Project location - City of Corona
   b. Project location - County of Riverside

4. Description of nature, purpose and beneficiaries of project:

   A tentative tract map application to subdivide 4.73 acres into 19 lots for single family residential purposes, located at the northwest corner of Citron Street and Taylor Street in the R1-8.4 (Single Family Residential, minimum lot size 8,400 square feet) zone.

5. Name of public agency approving project: ***City of Corona***

6. Name of Person or Agency undertaking the project, including any person undertaking an activity that receives financial assistance from the Public Agency as part of the activity or the person receiving a lease, permit, license, certificate, or other entitlement of use from the Public Agency as part of the activity: ***Mark Haupert with Priem Properties, LLC., 12012 Knott Avenue #A2, Garden Grove, CA 92841.***

7. Exempt Status (check one):
   a. ____ Ministerial Project
   b. ____ Not a project
   c. ____ Emergency project
   d. _X_ Categorical Exemption. State type and class number: **Per Section 15332 of the State Guidelines for the California Environmental Quality Act (CEQA), the project qualifies as a Class 32 (In-Fill Development Projects) categorical exemption.**
   e. ____ Declared Emergency
   f. ____ Statutory Exemption. State code section number:
   g. ____ Other: Explain:

8. Reasons why the project is exempt:
   Per Section 15332 of the State Guidelines for the California Environmental Quality Act (CEQA), the project qualifies as a Class 32 (In-Fill Development Projects) categorical exemption. The project is consistent with the site's general plan designation and applicable plan policies; zoning designation and regulations; is less than five acres in size; is surrounded by urban uses; has no habitat for endangered, rare or threatened species; the project would not result in significant traffic, noise, air quality or water quality effects; and the site is adequately served by utilities and public services.

9. Contact Person/Telephone No.: Lupita Garcia, Associate Planner (951) 736-2293

10. Attach Preliminary Exemption Assessment (Form "A") before filing.

Date received for filing:______________

Signature:________________________________
Lupita Garcia, Associate Planner
Lead Agency Representative

City of Corona

400 S. Vicentia Ave.
Corona, CA 92882

Planning and Housing Commission Minutes - Draft

Monday, December 6, 2021

Council Chambers

Craig Siqueland, Chair
Karen Alexander, Vice Chair
Diana Meza, Commissioner
Bridget Sherman, Commissioner
Matt Woody, Commissioner

ROLL CALL

Present 5 - Chair Craig Siqueland, Commissioner Bridget Sherman, Vice Chair Karen Alexander, Commissioner Diana Meza, and Commissioner Matt Woody

CALL TO ORDER

Chair Siqueland called the meeting to order.

PLEDGE OF ALLEGIANCE

Commissioner Woody led the Pledge of Allegiance.

COMMUNICATIONS FROM THE PUBLIC

None.

ELECTION OF CHAIR / VICE CHAIR

Motion was made by Vice Chair Alexander, seconded by Commissioner Meza, to re-elect Craig Siqueland as Chair for the 2022 calendar year. The motion carried by all members.

Motion was made by Vice Chair Alexander, seconded by Commissioner Woody, to elect Bridget Sherman as Vice Chair for the 2022 calendar year. The motion carried by all members.

MEETING MINUTES

These minutes were approved.

1. 21-1127 Approval of minutes for the Planning and Housing Commission meeting of November 22, 2021.

Attachments: 11222021 - Planning and Housing Commission minutes - DRAFT

A motion was made by Commissioner Sherman, seconded by Commissioner Meza, that these Minutes be approved. The motion carried by the following vote:

Aye: 5 - Vice Chair Alexander, Chair Siqueland, Commissioner Meza, Commissioner Sherman, and Commissioner Woody

CONSENT ITEMS

None.

PUBLIC HEARINGS

2. 21-1076 TTM 37980 (CONTINUED): Tentative tract map application to subdivide 4.73 acres into 19 lots for single family residential purposes located at the northwest corner of Citron Street and Taylor Street in the R1-8.4 (Single Family Residential, minimum lot size 8,400 square feet) zone. (Applicant: Mark Haupert with Priem Properties, LLC.)

Attachments: Staff Report

Exhibit 1 - Locational and zoning map

Exhibit 2.A - Tentative Tract Map 37980

Exhibit 2.B - Conditions of Approval

Exhibit 2.C - Grading plan

Exhibit 2.D - Applicant's letter dated November 15, 2021

Exhibit 2.E - Neighborhood Community Outreach Documents

Exhibit 3 - Environmental Documentation

TTM 37980 Power Point Presentation

Lupita Garcia, Associate Planner, reviewed the staff report and exhibits for TTM 37980.

Discussion ensued between the Commissioners, city staff, applicant Mark Haupert and speakers. Topics presented or discussed included a condition that grading and tree removal not be done during the breeding season of nesting birds, public notification regarding the number of lots, the expiration date of the Tentative Tract Map application, the compatibility of the lot with the neighborhood, the speed and safety of traffic, existing drainage problems, construction traffic and dirt control, crime if Lorraine and Susanne are connected, paving of existing streets, construction access from only Citron and Taylor, construction of perimeter block walls adjacent to an existing neighbor's wall, temporary chain link security fencing, hours of construction and construction noise, future subdivision of 19 proposed lots due to SB 9, ADUs, increase in traffic, and whether the future homes will be built as single or two story homes.

A motion was made by Vice Chair Alexander, seconded by Commissioner Sherman, that the Planning and Housing Commission recommend approval of TTM 37980 to the City Council based on the findings contained in the staff report and subject to the recommended conditions of approval, including an added condition that the application will expire in 24 months if not implemented. The motion carried by the following vote:

Aye: 5 - Vice Chair Alexander, Chair Siqueland, Commissioner Meza, Commissioner Sherman, and Commissioner Woody

WRITTEN COMMUNICATIONS

None.

ADMINISTRATIVE REPORTS

None.

PLANNING AND HOUSING COMMISSIONERS' REPORTS AND COMMENTS

Vice Chair Alexander commented that she would like to request that all

Commissioners make their document requests in advance of the Planning Commission meeting.

ADJOURNMENT

Chair Siqueland adjourned the meeting at 7:02 p.m. to the Planning and Housing Commission meeting of Monday, January 10, 2022, commencing at 6:00 p.m. in the City Hall Council Chambers.

City of Corona
400 S. Vicentia Ave.
Corona, CA 92882

Staff Report

File #: 22-0047

REQUEST FOR CITY COUNCIL ACTION

DATE: 1/5/2022

TO: Honorable Mayor and City Council Members

FROM: Vice Mayor Tony Daddario

SUBJECT: Appointment to the Parks and Recreation Commission.

Vacancy to the Parks and Recreation Commission was posted pursuant to Section 54972 of the Government Code. I will announce my appointment at the January 5, 2022, City Council meeting. The appointment will become effective after the live scan clearance and the Oath is administered by the City Clerk.

2022 CITY COUNCIL MEETINGS

Meetings begin at 6:30 pm
First & Third Wednesday of the month

City Hall, Council Chambers
400 S. Vicentia Avenue, Corona

January 5, 2022
January 19, 2022

February 2, 2022
February 16, 2022

March 2, 2022
March 16, 2022

April 6, 2022
April 20, 2022

May 4, 2022
May 18, 2022

June 1, 2022
June 15, 2022

July 6, 2022
July 20, 2022 - CANCELLED

August 3, 2022
August 17, 2022

September 7, 2022
September 21, 2022

October 5, 2022
October 19, 2022

November 2, 2022
November 16, 2022

December 7, 2022
December 21, 2022 – TENTATIVELY CANCELLED