City of Ridgecrest Kern County Inyo County San Bernardino County Indian Wells Valley Water District

INDIAN WELLS VALLEY GROUNDWATER AUTHORITY

Ridgecrest City Hall 100 W California Ave., Ridgecrest, CA 93555 760-499-5002

BOARD OF DIRECTORS
A G E N D A

Wednesday, March 13, 2024
Closed Session – 10:00 a.m.
Open Session – No earlier than 11:00 a.m.

Pursuant to California Government Code 54953(b)(1) two additional call-in locations have been established for Board Members who will attend this meeting via teleconference at 14955 Dale Evans Parkway Apple Valley, CA. 92307.

NOTICE: ***In accordance with the evolving public health declarations, we will continue to provide live stream video for those wishing to participate virtually. Please see the Public Comment Notice below for detailed instructions on submitting public comment as well as websites for livestream broadcasting.***

In compliance with the Americans with Disabilities Act, if you are a disabled person and you need a disability-related modification or accommodation to participate in this meeting, please contact April Keigwin at (805) 764-5452. Requests must be made as early as possible and at least one full business day before the start of the meeting. Documents and material relating to an open session agenda items that are provided to the IWVGA Board of Directors prior to a regular meeting will be available for public inspection and copying at Ridgecrest City Hall, 100 W California Ave, Ridgecrest, CA 93555, or online at https://iwvga.org/.

Statements from the Public
The public will be allowed to address the Board during Public Comments about subjects within the jurisdiction of the IWVGA Board and that are NOT on the agenda. No action may be taken on off-agenda items unless authorized by law. Questions posed to the Board may be answered after the meeting or at future meeting. Dialog or extended discussion between the public and the Board or staff will be limited in accordance with the Brown Act. All Public Comment portions of the meeting shall be limited to three (3) minutes per speaker. Each person is limited to one comment during Public Comments.

1. **CALL TO ORDER**

2. **ADOPTION OF AGENDA**

3. **PUBLIC COMMENT ON CLOSED SESSION**

4. **CLOSED SESSION**

   - CONFERENCE WITH REAL PROPERTY NEGOTIATIONS –
     (Government Code Section 54956.8) - Property: Purchase of Water Rights; Agency Negotiator: Jeff Simonetti; Negotiating Parties: Palmdale Municipal Water District; Under Negotiation: Price and terms of payment.

- CONFERENCE WITH LEGAL COUNSEL – EXISTING LITIGATION
  (Government Code Section 54956.9(d)(1)): IWVGA v. Inyokern CSD – Kern County Superior Court BCV-22-100281

- CONFERENCE WITH LEGAL COUNSEL – EXISTING LITIGATION
  (Government Code Section 54956.9(d)(1) - Name of case: Searles Valley Minerals Inc v. Indian Wells Valley Groundwater Authority, et. al. - Orange County Superior Court 30-2022-01239487-CU-MC-CJC

- CONFERENCE WITH LEGAL COUNSEL- EXISTING LITIGATION
  (Government Code Section 54956.9(d)(1) - Name of case: Mojave Pistachios, LLC, a California limited liability company, et.al. v. Indian Wells Valley Groundwater Authority, a California Joint Powers Authority, et. al. - Orange County Superior Court 30-2022-0139479-CU-MC-CJC

5. OPEN SESSION – No earlier than **11:00 a.m.**

a. Report on Closed Session
b. Pledge of Allegiance
c. Roll Call

6. PUBLIC COMMENT

This time is reserved for the public to address the Board about matters NOT on the agenda. No action will be taken on non-agenda items unless authorized by law. Comments are limited to three minutes per person.

7. BOARD MEMBER COMMENTS

This time is reserved for comments by Board members and/or staff and to identify matters for future Board business.

8. CONSENT AGENDA

a. Approve Minutes of Board Meeting February 14, 2024
b. Approve Expenditures
   **To view itemized invoices please visit https://iwvga.org/iwvga-meetings*
   i. $128,404.96 – Stetson Engineers
   ii. $22,085.56 – Regional Government Services – (Replenishment / Extraction)
   iii. $19,787.50 – Capitol Core Group – (Replenishment)
   iv. $110,689.29 – Provost & Pritchard – (SGMA IP Grant)
   v. $150.00 – TranSystems – (SGMA IP Grant)
   vi. $1,573.20 – Wellntell – (Extraction)

9. BOARD TO RECEIVE AND FILE WATER YEAR 2023 ANNUAL REPORT

10. CONSOLIDATION GRANT PRESENTATION

11. SHALLOW WELL MITIGATION FUNDING REQUEST

a. Halpin
b. Byerly

12. CONTRACT CHANGE ORDER REQUEST FOR PROVOST & PRITCHARD IMPORTED PIPELINE ENVIRONMENTAL IMPACT STUDY

13. WATER RESOURCES MANAGER REPORT

a. Grant Funding
b. GSP Implementation Projects/Management Action Updates
    i. Imported Water Project
    ii. Shallow Well Mitigation Program
    iii. GSP Update
c. Miscellaneous Items
    i. Data Collection and Monitoring
    ii. IWVGA Basin Model Configuration Management Plan
    iii. Rose Valley Subflow Update7

14. GENERAL MANAGER'S REPORT

a. Monthly Financial Report
b. C&E Plan Update
c. Report on IWVGA's Water Marketer (Capitol Core Group)

15. DATE OF NEXT MEETING – APRIL 10, 2024

16. ADJOURN

PUBLIC COMMENT NOTICE

IWVGA meetings will be open to the public for physical attendance; However, for those who wish to continue using virtual alternatives please follow the directions below for access to live stream video as ,well as ways to submit public comment.

- **Watch meetings on-line:**
  All of our meetings are streamed live at https://ridgecrest-ca.gov/369/Watch (4 second streaming delay) or on YouTube at https://www.youtube.com/cityofridgecrest/live (22 second streaming delay) and are also available for playback after the meeting.

- **Call in for public comments:**
  If you wish to make verbal comment, ***please call (760) 499-5010.*** This phone line will allow only one caller at a time, so if the line is busy, please continue to dial. We will be allowing a 20-30 second pause between callers to give time for media delays and callers to dial in. Due to media delays, please mute your streaming device while making public comment. If you wish to comment on multiple items, you will need to call in as each item is presented.
  *Please Note – This process will be a learning curve for all, *please be patient.*

- **Submit written comments:**
  We encourage submittal of written comments supporting, opposing, or otherwise commenting on an agenda item, for distribution to the Board prior to the meeting. Send emails to akeigwin@rgs.ca.gov written correspondence may be sent to April Keigwin, Clerk of the Board, 100 W. California Ave., Ridgecrest, CA 93555. Please specify to which agenda item your comment relates.

- **Large Groups:**
  If you are part of a large group that would like to comment on an agenda item, please consider commenting in writing. This will be as impactful to the Board as having a large group in attendance.

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INDIAN WELLS VALLEY GROUNDWATER AUTHORITY

City of Ridgecrest, Indian Wells Valley Water District, Inyo County, Kern County, San Bernardino County

BOARD OF DIRECTORS MEETING MINUTES

Wednesday, January 10, 2024

IWVGA Members Present:

Chairman Phillip Peters, Kern County	Carol Thomas-Keefer, IWVGA General Manager
Scott Hayman, City of Ridgecrest	Keith Lemieux, Legal Counsel
Chuck Griffin, IWVWD	Steve Johnson, Stetson Engineers
John Vallejo, Inyo County	John Kersey, US Navy, DoD Liaison
Emma Lynch, Bureau of Land Management	April Keigwin, Clerk of the Board

Attending via teleconference is John Vallejo, Carol Thomas-Keefer, and Steve Johnson.

Meeting recording, public comment letters submitted, and all board meeting related documents are made available at:
https://iwvga.org/iwvga-meetings/

1. CALL TO ORDER:

Chairman Peters calls the meeting to order at 10:05 a.m.

2. ADOPTION OF AGENDA:

The Board hears public comment from Renee Westa-Lusk.

Motion made by Scott Hayman and seconded by Chuck Griffin to approve adoption of the agenda. Motion carries by the following roll call vote:

Chairman Peters	Aye
Vice Chair Hayman	Aye
Director Itnyre	Absent
Director Griffin	Aye
Director Vallejo	Aye

3. PUBLIC COMMENT ON CLOSED SESSION:

None.

Chairman Peters calls the meeting into Closed Session at 10:05 a.m.

4. CLOSED SESSION:

- CONFERENCE WITH REAL PROPERTY NEGOTIATIONS –
  (Government Code Section 54956.8) - Property: Purchase of Water Rights; Agency Negotiator: Jeff Simonetti; Negotiating Parties: Palmdale Municipal Water District; Under Negotiation: Price and terms of payment.

- CONFERENCE WITH LEGAL COUNSEL – EXISTING LITIGATION
  (Government Code Section 54956.9(c)): IWVGA v. Inyokern CSD

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Closed Session adjourns at 11:29 a.m.

5. OPEN SESSION – No earlier than 11:00 a.m.

Meeting reconvenes into Open Session at 11:37 a.m.

a. Report on Closed Session – Counsel Hall reports no reportable action was taken that would require disclosure under The Brown Act. Counsel Hall reports the Court of Appeals for the Fourth Appellate District denied the petition filed by Mojave Pistachios which was seeking to overturn the replenishment fee as well as seeking $255,000,000.00 in damages. Mojave Pistachios was found to not have a takings claim and was unable to challenge the fee due to the "Pay First Litigate Later" rule.
b. Pledge of Allegiance is led by Chairman Peters
c. Roll Call

Chairman Peters	Present
Vice Chair Hayman	Present
Director Griffin	Present
Director Itnyre	Absent
Director Vallejo	Present

6. PUBLIC COMMENT:

The Board hears public comment from Renee Westa-Lusk

7. BOARD MEMBER COMMENTS:

8. CONSENT AGENDA:

a. Approve Minutes of Board Meeting January 10, 2024
b. Approve Expenditures

**To view itemized invoices please visit https://iwvga.org/iwvga-meetings*

i. $122,793.47 – Stetson Engineers
ii. $26,572.50 – Regional Government Services – (Replenishment / Extraction)
iii. $16,387.50 – Capitol Core Group – (Replenishment)
iv. $284,502.09 – Provost & Pritchard – (SGMA IP Grant)
v. $745.00 – TranSystems – (SGMA IP Grant)

Motion made by Chuck Griffin and seconded by Scott Hayman to approve Minutes of Board Meeting January 10 with edits to sections 1 and 3 changing Chairman Hayman to Chairman Peters, and the following expenditures in the amount of, $122,793.47 to Stetson Engineers, $26,572.50 to Regional Government Services, $16,387.50 to Capitol Core Group, $284,502.09 to Provost & Pritchard, and $745.00 to TranSystems.
Motion carries by the following roll call vote:

Chairman Peters	Aye
Vice Chair Hayman	Aye
Director Itnyre	Absent
Director Griffin	Aye
Director Vallejo	Aye

9. RESOLUTION 02-24 AUTHORIZING A REIMBURSEMENT AGREEMENT WITH ANTELOPE VALLEY EAST KERN:

Jeff Helsley provides staff report and presentation.

Motion made by Scott Hayman and seconded by John Vallejo to approve Resolution 02-24 authorizing reimbursement agreement with Antelope Valley East Kern.
Motion carries by the following roll call vote:

Chairman Peters	Aye
Vice Chair Hayman	Aye
Director Itnyre	Absent
Director Griffin	Nay
Director Vallejo	Aye

-

10. WATER RESOURCES MANAGER REPORT:

a. Grant Funding
b. GSP Implementation Projects/Management Action Updates
    i. Imported Water Project
    ii. Shallow Well Mitigation Program
    iii. GSP Update
    iv. 2023 Annual Report
c. Miscellaneous Items
    i. Data Collection and Monitoring
    ii. IWVGA Basin Model Configuration Management Plan
    iii. Rose Valley Subflow Update

The Board hears public comment from Judie Decker and West Katzenstein.

11. GENERAL MANAGER'S REPORT:

Carol Thomas-Keefer provides Monthly Financial Report and C&E update. Michael McKinney of Capitol Core Group presents Technical Memorandum, Legislative Agenda and WRDA funding request.

The Board hears public comment from Judie Decker and Renne Westa-Lusk.

12. DATE OF NEXT MEETING – MARCH 13, 2024

13. ADJOURN:

Chairman Hayman adjourns the meeting at 12:21 p.m. on February 14, 2024.

Respectfully submitted,

April Keigwin
Clerk of the Board
Indian Wells Valley Groundwater Authority

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STETSON ENGINEERS INC.
2171 E. Francisco Blvd., Suite K • San Rafael, California 94901
Phone: (415) 457-0701 • FAX: (415) 457-1638 • Website: www.stetsonengineers.com
Northern California • Southern California • Arizona • Colorado • Oregon

Invoice

Indian Wells Valley Groundwater Authority
Ms. Carol Thomas-Keefer
100 W. California Ave.
Ridgecrest, CA 93555

Invoice Number: **2652-78**
Invoice Date: **03/07/24**

Project #: 2652 **Indian Wells Valley Groundwater Authority**

Professional Services through 1/31/2024

Water Resources Management 2024

01 - Meetings & Prep

Professional Services

	Bill Hours	Bill Rate	Charge
Principal	9.00	$244.00	$2,196.00
Special Project Director	1.25	$244.00	$305.00
Supervisor I	11.50	$212.00	$2,438.00
Senior III	6.50	$138.00	$897.00
Associate III	3.75	$114.00	$427.50
Assistant I	53.75	$101.00	$5,428.75
Assistant II	10.00	$96.00	$960.00
		Professional Services Subtotal:	*$12,652.25*

Reimbursables

	Charge
Reproduction (Color)	$0.89
Reproduction	$0.15
Reimbursables Subtotal:	*$1.04*
Meetings & Prep Subtotal:	*$12,653.29*

02 - Prop 1 / Prop 68 Grant Administration

Professional Services

	Bill Hours	Bill Rate	Charge
Senior III	2.25	$138.00	$310.50
		Professional Services Subtotal:	*$310.50*
		Prop 1 / Prop 68 Grant Administration Subtotal:	*$310.50*

02.01 - SGMA IP Grant Administration

Professional Services

	Bill Hours	Bill Rate	Charge
Senior III	14.00	$138.00	$1,932.00
Assistant I	13.00	$101.00	$1,313.00
Administrative I	2.00	$74.00	$148.00
		Professional Services Subtotal:	*$3,393.00*
		SGMA IP Grant Administration Subtotal:	*$3,393.00*

02.02 - Urban Community Drought Relief Funding Administration

Professional Services

	Bill Hours	Bill Rate	Charge
Senior III	0.50	$138.00	$69.00
Assistant I	3.00	$101.00	$303.00
		Professional Services Subtotal:	*$372.00*
		Urban Community Drought Relief Funding Administration Subtotal:	*$372.00*

03 - Grant Review & Application Preparation

03 - Grant Review & Application Preparation

Professional Services	Bill Hours	Bill Rate	Charge
Supervisor I	0.75	$212.00	$159.00
Supervisor II	2.00	$197.00	$394.00
	Professional Services Subtotal:		*$553.00*
	Grant Review & Application Preparation Subtotal:		*$553.00*

04 - Data Mgmt System Support

Professional Services	Bill Hours	Bill Rate	Charge
Special Project Director	0.25	$244.00	$61.00
Senior III	3.25	$138.00	$448.50
Senior Associate	2.25	$132.00	$297.00
	Professional Services Subtotal:		*$806.50*
	Data Mgmt System Support Subtotal:		*$806.50*

05 - General Project Mgmt

Professional Services	Bill Hours	Bill Rate	Charge
Supervisor II	3.00	$197.00	$591.00
Senior III	1.25	$138.00	$172.50
Senior Associate	0.25	$132.00	$33.00
	Professional Services Subtotal:		*$796.50*
	General Project Mgmt Subtotal:		*$796.50*

06 - Model Transfer & Upgrade

Professional Services	Bill Hours	Bill Rate	Charge
Special Project Director	5.00	$244.00	$1,220.00
Supervisor I	5.00	$212.00	$1,060.00
Supervisor II	26.00	$197.00	$5,122.00
Senior III	1.25	$138.00	$172.50
GIS Manager	15.00	$126.00	$1,890.00
Assistant II	4.50	$96.00	$432.00
	Professional Services Subtotal:		*$9,896.50*

Sub-Contractors			Charge
Board of Regents			$13,918.00
		Sub-Contractors Subtotal:	*$13,918.00*
		Model Transfer & Upgrade Subtotal:	*$23,814.50*

07.01 - Imported Water: Planning/Design/Environmental

Professional Services	Bill Hours	Bill Rate	Charge
Principal	21.00	$244.00	$5,124.00
Supervisor I	37.25	$212.00	$7,897.00
Associate III	1.25	$114.00	$142.50
Assistant I	103.00	$101.00	$10,403.00
	Professional Services Subtotal:		*$23,566.50*

Reimbursables			Charge
Data			$575.00
		Reimbursables Subtotal:	*$575.00*
		Imported Water: Planning/Design/Environmental Subtotal:	*$24,141.50*

08 - Imported Water: Negotiations & Coordination

Professional Services	Bill Hours	Bill Rate	Charge

08 - Imported Water: Negotiations & Coordination

Professional Services	Bill Hours	Bill Rate	Charge
Supervisor I	1.25	$212.00	$265.00
Professional Services Subtotal:			*$265.00*
Imported Water: Negotiations & Coordination Subtotal:			*$265.00*

09 - Recycled Water

Professional Services	Bill Hours	Bill Rate	Charge
Assistant II	8.50	$96.00	$816.00
Professional Services Subtotal:			*$816.00*
Recycled Water Subtotal:			*$816.00*

11 - Data Collection, Monitoring & Data Gaps

Professional Services	Bill Hours	Bill Rate	Charge
Special Project Director	0.50	$244.00	$122.00
Supervisor I	0.25	$212.00	$53.00
Supervisor II	5.00	$197.00	$985.00
Senior Associate	19.50	$132.00	$2,574.00
Associate I	1.50	$129.00	$193.50
Senior Associate	3.00	$128.00	$384.00
Associate I	3.00	$126.00	$378.00
Associate III	25.50	$114.00	$2,907.00
Professional Services Subtotal:			*$7,596.50*

Reimbursables	Charge
Equipment Purchase	$319.37
Mileage	$7.30
Other Expenses	$47.00
Reimbursables Subtotal:	*$373.67*
Data Collection, Monitoring & Data Gaps Subtotal:	*$7,970.17*

14 - Production Reporting, Transient Pool & Fee Support

Professional Services	Bill Hours	Bill Rate	Charge
Principal	3.50	$244.00	$854.00
Professional Services Subtotal:			*$854.00*
Production Reporting, Transient Pool & Fee Support Subtotal:			*$854.00*

18.1 - Navy/Coso Cooperative Agreement

Professional Services	Bill Hours	Bill Rate	Charge
Special Project Director	1.25	$244.00	$305.00
Professional Services Subtotal:			*$305.00*
Navy/Coso Cooperative Agreement Subtotal:			*$305.00*

20 - Shallow Well Mitigation Program: Outreach & Impacts Evaluation

Professional Services	Bill Hours	Bill Rate	Charge
Principal	6.50	$244.00	$1,586.00
Supervisor I	5.75	$212.00	$1,219.00
GIS Manager	0.75	$126.00	$94.50
Assistant I	10.00	$101.00	$1,010.00
Professional Services Subtotal:			*$3,909.50*
Shallow Well Mitigation Program: Outreach & Impacts Evaluation Subtotal:			*$3,909.50*

21 - General Engineering

21 - General Engineering

Professional Services	Bill Hours	Bill Rate	Charge
Special Project Director	7.00	$244.00	$1,708.00
Supervisor I	3.25	$212.00	$689.00
Senior III	1.75	$138.00	$241.50
GIS Manager	0.50	$126.00	$63.00
Associate III	1.25	$114.00	$142.50
Assistant II	3.00	$96.00	$288.00
	Professional Services Subtotal:		*$3,132.00*
	General Engineering Subtotal:		*$3,132.00*

22 - GSP 5-Year Update

Professional Services	Bill Hours	Bill Rate	Charge
Principal	1.50	$244.00	$366.00
Special Project Director	1.00	$244.00	$244.00
Supervisor I	8.25	$212.00	$1,749.00
Supervisor II	121.00	$197.00	$23,837.00
Senior III	16.50	$138.00	$2,277.00
Senior Associate	3.00	$132.00	$396.00
Associate III	9.25	$114.00	$1,054.50
Assistant II	57.00	$96.00	$5,472.00
Technical Illustrator	12.00	$91.00	$1,092.00
	Professional Services Subtotal:		*$36,487.50*
	GSP 5-Year Update Subtotal:		*$36,487.50*

23 - Annual Report Preparation

Professional Services	Bill Hours	Bill Rate	Charge
Principal	1.50	$244.00	$366.00
Supervisor I	0.50	$212.00	$106.00
Senior III	5.00	$138.00	$690.00
GIS Manager	7.50	$126.00	$945.00
Associate III	1.00	$114.00	$114.00
	Professional Services Subtotal:		*$2,221.00*
	Annual Report Preparation Subtotal:		*$2,221.00*

26 - Budget Support

Professional Services	Bill Hours	Bill Rate	Charge
Senior III	1.50	$138.00	$207.00
	Professional Services Subtotal:		*$207.00*
	Budget Support Subtotal:		*$207.00*

27 - Litigation Support

Professional Services	Bill Hours	Bill Rate	Charge
Principal	19.00	$244.00	$4,636.00
Special Project Director	2.25	$244.00	$549.00
Supervisor I	1.00	$212.00	$212.00
	Professional Services Subtotal:		*$5,397.00*
	Litigation Support Subtotal:		*$5,397.00*
	Water Resources Management 2024 Subtotal:		***$128,404.96***

***** Invoice Total ***** **$128,404.96**

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REGIONAL GOVERNMENT SERVICES
SERVING PUBLIC AGENCIES SINCE 2002

PO Box 1350
Carmel Valley, CA 93924

Invoice

Date	Invoice #
1/31/2024	16285

Bill To:

Indian Wells Valley Groundwater Authority
100 W California Ave
Ridgecrest, CA 93555

P.O. No.	Due Date	Inv Sent
	3/1/2024	2/15/2024

Date	Description	Amount
1/31/2024	Contract Services for January - please see attached	21,500.25

Electronic Payment Information:Five Star Bank
Routing:121143037 Account:003528782

Total **$21,500.25**

Indian Wells Valley

Month: **January, 2024**

	Hours and Rates by Pay Period				
	1st -15th		16th - EOM		Monthly
Advisor	Reg Hrs	Bill Rate	Reg Hrs	Bill Rate	Total Billed
CT	15.50	$ 134.00	11.00	$ 134.00	$ 3,551.00
AK	70.50	$ 105.00	81.20	$ 105.00	$ 15,928.50
JK	0.00	$ -	0.00	$ -	$ -
GL	0.00	$ -	0.00	$ -	$ -
AM	0.00	$ -	0.00	$ -	$ -
GS	10.50	$ 137.00	4.25	$ 137.00	$ 2,020.75
EF	0.00	$ -	0.00	$ -	$ -
RM	0.00	$ -	0.00	$ -	$ -
Totals	**96.50**		**96.45**		**$ 21,500.25**

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REGIONAL GOVERNMENT SERVICES
SERVING PUBLIC AGENCIES SINCE 2002

PO Box 1350
Carmel Valley, CA 93924

Invoice

Date	Invoice #
1/31/2024	16286

Bill To:

IWVGA Web Design

P.O. No.	Due Date	Inv Sent
	3/1/2024	2/15/2024

Date	Description	Amount
1/31/2024	Contract Services for January - please see attached	112.50

Electronic Payment Information:Five Star Bank
Routing:121143037 Account:003528782

Total **$112.50**

IWVGA Web Design

Month: **January, 2024**

	Hours and Rates by Pay Period				
	1st -15th		16th - EOM		Monthly
Advisor	**Reg Hrs**	**Bill Rate**	**Reg Hrs**	**Bill Rate**	**Total Billed**
CD	0.50	$ 150.00	0.25	$ 150.00	$ 112.50
AM	0.00	$ -	0.00	$ -	$ -
	0.00	$ -	0.00	$ -	$ -
Totals	**0.50**		**0.25**		**$ 112.50**

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REGIONAL GOVERNMENT SERVICES
SERVING PUBLIC AGENCIES SINCE 2002

PO Box 1350
Carmel Valley, CA 93924

Invoice

Date	Invoice #
1/31/2024	16402

Bill To:

Indian Wells Valley Groundwater Authority
100 W California Ave
Ridgecrest, CA 93555

P.O. No.	Due Date	Inv Sent
	3/15/2024	2/28/2024

Date	Description	Amount
1/31/2024	Reimbursable Expenses for City of Ridegecrest Monthly Rent and Buraglio ($300+92.81+80.00) - please see attached	472.81

Electronic Payment Information:Five Star Bank
Routing:121143037 Account:003528782

Total **$472.81**

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Capitol Core Group, Inc.
205 Cartwheel Bend (Operations Dept.)
Austin, TX 78738 US
512.568.3084
operations@capitolcore.com
www.capitolcore.com

BILL TO
Indian Wells Valley Groundwater Authority
500 West Ridgecrest Blvd.
Ridgecrest, California 93555
USA

SHIP TO
Indian Wells Valley Groundwater Authority
500 West Ridgecrest Blvd.
Ridgecrest, California 93555
USA

INVOICE 2024-024

DATE 03/01/2024 **TERMS** Net 45

DUE DATE 04/15/2024

DATE	ACCOUNT SUMMARY	AMOUNT
02/02/2024	Balance Forward	16,387.50
	Other payments and credits after 02/02/2024 through 02/29/2024	0.00
03/01/2024	Other invoices from this date	0.00
	New charges (details below)	16,787.50
	Total Amount Due	33,175.00

ACTIVITY	HOURS	RATE	AMOUNT
Charges			
Project 1: Imported Water Supplies			
P1-A: Ongoing Supply Negotiations:			
Government Relations:Intergovernmental Affairs Ongoing Negotiations with Public Agency #2 {Tatum}	3	275.00	825.00
Government Relations:Intergovernmental Affairs Ongoing Negotiations with Public Agency Seller #4 {Tatum}	4.50	275.00	1,237.50
Government Relations:Intergovernmental Affairs Negotiations: Public Agency Seller #2	1.50	250.00	375.00
P1-B: Other Required Agreements:			
Government Relations:Intergovernmental Affairs Interconnection Agreement: Internal discussions re: Water District connection, AVEK interconnection requirements and discussion w/ AVEK {Tatum}	2	275.00	550.00
P1-C: Required Regulatory Approvals:			
Government Relations:Intergovernmental Affairs Negotiation Call Update, SGMA-IP Research and client strategy call {Simonetti}	2.50	250.00	625.00
P1-D: 2024 Water Marketing Activities			
Government Relations:Intergovernmental Affairs 2024 Water Supply Discussions with sellers {Tatum}	3	275.00	825.00
Government Relations:Intergovernmental Affairs Water Supplies Memorandum and 2024 Calls	4	250.00	1,000.00

ACTIVITY	HOURS	RATE	AMOUNT
Government Relations:Intergovernmental Affairs Negotiations w/ Public Agency Seller #4 {Simonetti}	1	250.00	250.00
Invoice Total Project 1: $5,687.50			
Project 2: Interconnection Pipeline Project			
Government Relations:California Legislative: Revision of State Budget Request and Completion of Packet for Submittal {McKinney}	2.75	275.00	756.25
Government Relations:Federal Congressional: House Transportation & Infrastructure Committee/Senate Environment & Public Works Committee, follow-up with Senator Padilla, Rep. Garcia: HR 7065 Rep. Napolitano WRDA-24 Senate Hearing and internal calls {McKinney}	3.50	275.00	962.50
Government Relations:California Legislative: State Budget Request Review {Simonetti}	1	250.00	250.00
Government Relations:Federal Congressional: DC Briefing Documents; meeting scheduling and initial office briefings	3.25	250.00	812.50
Invoice Total Project 2: $2,781.25			
Project 3: Other Projects Supporting the GSP			
P3-A: Water Recycling			
P3-B: Wastewater Treatment			
P3-C: Well Mitigation, Consolidation, and Repurposing			
P3-D: Government Affairs			
Government Relations:Federal Congressional: Completion of FY2025 E&WD Community Project Funding Request Packet {McKinney}	1.50	275.00	412.50
Government Relations:California Legislative: Legislative Proposal Development	2.25	275.00	618.75
Government Relations:California Legislative: AB 560, AB 1827, AB 2079, AB 2799, AB 2962, SB 1156, SB 1210 analysis and direct advocacy {McKinney}	3.50	275.00	962.50
Government Relations:California Legislative: Identification, Tracking and Analysis -- February Deadline {McKinney}	3	275.00	825.00
Government Relations:Federal Congressional: Internal strategy discussion March legislative visit {McKinney}	1.50	275.00	412.50
Government Relations:Federal Congressional: FY2025 E&WD Community Project Funding Request review {Simonetti}	1	250.00	250.00
Government Relations:Federal Congressional: Direct Advocacy House -- FY2025 E&WD	2	250.00	500.00
Government Relations:California Legislative: Pending Legislative Call {Simonetti}	1.50	250.00	375.00
Government Relations:California Legislative: Direct Advocacy Multiple Bills {Simonetti}	2.75	250.00	687.50
Invoice Total Project 3: $5,043.75			
Project Administration			

ACTIVITY	HOURS	RATE	AMOUNT
General Business Items:Project Administration Board Meeting: February Board Meeting and Preparation {McKinney}	3	275.00	825.00
General Business Items:Project Administration Board Meeting: February Board Meeting {Tatum}	3	275.00	825.00
General Business Items:Project Administration Ad Hoc: Ridgecrest local presentation {Simonetti}	2	250.00	500.00
General Business Items:Project Administration Ad Hoc: Various Reports and Memoranda {Simonetti}	1.50	250.00	375.00
General Business Items:Project Administration Board Meetings: February Board Meeting	3	250.00	750.00
Invoice Total Project Administration: $3,275.00			
**********			
Regulatory Compliance Notes:			
Invoice Total Federal: $3,350.00			
Invoice Total State: $4,475.00			
**********			

Thank you for your business. Please make checks payable to Capitol Core Group, Inc.

SUBTOTAL	16,787.50
TAX	0.00
TOTAL	16,787.50
TOTAL OF NEW CHARGES	16,787.50
TOTAL DUE	**$33,175.00**

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April Keigwin
Indian Wells Valley Groundwater Authority
100 West California Avenue
Ridgecrest, CA 93555

February 28, 2024
Project: No: 04101-23-001
Invoice No: 107836

Project Name: **Indian Wells Valley Groundwater Authority-CEQA/NEPA Documents and Permit Documentation**

Client Project #:

TSK 1 Initial Coordination: Continued Coordination tasks with staff, client, and agencies to keep project schedule on track. Administrative tasks for overall project progression. Weekly coordination meetings and tasks for project progression. Coordination meetings with sub consultants. Internal management meetings for project progression discussions, staff changes, and all related project status updates. Internal staff coordination based on agency feedback and updates from meetings. Follow up on amendments and notice to proceed. Assistance with meeting notes preparations. Process sub consultant invoices, reimbursable expenses and timesheets for approval.
TSK 2 Geotechnical Studies: Continued email correspondence with CDFW to discuss boring sites and mitigation measures. Review and discuss boring locations and edits to all prepared maps based on discussions. Submit resumes for qualified staff to BLM for approval. Review mitigation measures for geotechnical work and revise based on meetings with BLM and CDFW. Map updates for geotechnical locations. Meeting with BLM to review and edits to POD for geotechnical work and resolved questions/comments on prepared document. Check in with CDFW and email correspondence. Review revegetation plan for geotechnical work.
TSK 3 Technical Studies: Biological Resources – Surveys areas updated in alignment. Updates to biological technical reports based on comments/feedback from BLM and CDFW. Reimbursable Expenses – rental car and lodging for surveys. Cultural Resources - Coordination and check-in meetings with cultural sub consultant for status of survey, necessary permits to perform work, and test pits status. Record Search results from CHRIS and NAHC. Field Work on cultural resources.
TSK 4 Public Outreach: Updates to scoping report per meetings with BLM.
TSK 5 Regulatory Compliance and Permitting: Follow up on submittal of permits for geotechnical work to CDFW, RWQCB, and USACE waivers. Review CDFW LSA Incomplete application letter. Compiling ARD comments for permit packages.
TSK 6 CEQA/NEPA Documentation: Detailed coordination meetings and review of IS/EIR documents based on comments received and input from senior staff QAQC review. Revisions to each section of the documents to provide resource analysis support for project. Updates to maps for environmental document.

Professional Services from January 01, 2024 to January 31, 2024

Phase: TSK1 Initial Coordination (Kick Off Meetings)

Labor

	Hours	Rate	Amount
Principal Engineer	1.00	240.00	240.00
Principal Planner	13.80	198.00	2,732.40

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Senior Project Administrator	14.40	122.00	1,756.80	
Totals	29.20		4,729.20	
Total Labor				**4,729.20**

Consultants

Consultants			805.00	
Total Consultants			**805.00**	**805.00**

Reimbursable Expenses

Postage/Shipping/Delivery			40.48	
Total Reimbursables			**40.48**	**40.48**
		Total this Phase:		**$5,574.68**

Phase: TSK2 Geotechnical Studies

Labor

	Hours	Rate	Amount	
Associate Biologist	19.70	136.00	2,679.20	
Principal Biologist	2.60	180.00	468.00	
Totals	22.30		3,147.20	
Total Labor				**3,147.20**
		Total this Phase:		**$3,147.20**

Phase: TSK3 Technical Studies

Labor

	Hours	Rate	Amount	
Travel Time	5.80	90.00	522.00	
Principal Planner	5.00	198.00	990.00	
Associate Biologist	25.40	136.00	3,454.40	
Senior Project Administrator	1.50	122.00	183.00	
Totals	37.70		5,149.40	
Total Labor				**5,149.40**

Reimbursable Expenses

Travel & Mileage			140.56	
Total Reimbursables			**140.56**	**140.56**
		Total this Phase:		**$5,289.96**

Phase: TSK4 Public Outreach

Consultants

Consultants			1,437.50	
Total Consultants			**1,437.50**	**1,437.50**
		Total this Phase:		**$1,437.50**

Phase: TSK5 Regulatory Compliance and Permitting

Labor

	Hours	Rate	Amount
Associate Specialist	10.50	127.00	1,333.50
Principal Planner	1.00	198.00	198.00
Associate Biologist	16.90	136.00	2,298.40
Principal Biologist	1.40	180.00	252.00

Senior Project Administrator	.50	122.00	61.00	
Totals	30.30		4,142.90	
Total Labor				**4,142.90**

Reimbursable Expenses

Postage/Shipping/Delivery			0.00	
Total Reimbursables			**0.00**	**0.00**
		Total this Phase:		**$4,142.90**

Phase: TSK6 CEQA/NEPA Documentation

Labor

	Hours	**Rate**	**Amount**	
Senior Specialist	2.40	157.00	376.80	
Project Administrator	5.60	114.00	638.40	
Associate Planner	18.60	124.00	2,306.40	
Assistant Planner	17.70	103.00	1,823.10	
Senior Planner	.30	152.00	45.60	
Principal Planner	2.90	198.00	574.20	
Associate Biologist	.20	122.00	24.40	
Associate Biologist	3.30	136.00	448.80	
Totals	51.00		6,237.70	
Total Labor				**6,237.70**
		Total this Phase:		**$6,237.70**
		Total this Invoice		**$25,829.94**

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April Keigwin
Indian Wells Valley Groundwater Authority
100 West California Avenue
Ridgecrest, CA 93555

March 07, 2024
Project: No: 04101-23-002
Invoice No: 107994

Project Name: **IWVGA Imported Water Conveyance Design Services**

Client Project #:

See Monthly Progress Report attached to the front of this invoice.

Professional Services from February 01, 2024 to February 29, 2024

Phase: 121P Coordination Meetings

Labor

	Hours	Rate	Amount	
Senior Engineer	3.70	195.00	721.50	
Senior Project Administrator	1.50	115.00	172.50	
Totals	5.20		894.00	
Total Labor				**894.00**
			Total this Phase:	**$894.00**

Phase: 122S Stantec Coordination Meetings

Consultants

Consultants			34.50	
Total Consultants			**34.50**	**34.50**
			Total this Phase:	**$34.50**

Phase: 132S Stantec General Project Management

Consultants

Consultants			402.50	
Total Consultants			**402.50**	**402.50**
			Total this Phase:	**$402.50**

Phase: 221P Environmental & ROW Consultant Coordination

Labor

	Hours	Rate	Amount	
Senior Engineer	1.50	195.00	292.50	
Associate Engineer	5.00	133.00	665.00	
Totals	6.50		957.50	
Total Labor				**957.50**
			Total this Phase:	**$957.50**

Phase: 271P BLM Special Use Permit

Labor

	Hours	Rate	Amount
Senior Engineer	18.20	195.00	3,549.00

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Associate Engineer	7.50	133.00	997.50
Associate Specialist	.30	126.00	37.80
Senior Specialist	12.00	165.00	1,980.00
Principal Engineer	6.80	248.00	1,686.40
Associate Biologist	9.20	130.00	1,196.00
Senior Project Administrator	.80	115.00	92.00
Totals	54.80		9,538.70
Total Labor			**9,538.70**

Total this Phase: **$9,538.70**

Phase: 275P SCE Encroachment Permit (Transmission Line Under Crossing)

Labor

	Hours	Rate	Amount
Senior Engineer	4.50	178.00	801.00
Senior Engineer	1.30	195.00	253.50
Associate Technician	2.50	125.00	312.50
Totals	8.30		1,367.00
Total Labor			**1,367.00**

Total this Phase: **$1,367.00**

Phase: 313S Stantec 30% Submittal

Consultants

Consultants	26,036.00	
Total Consultants	**26,036.00**	**26,036.00**

Total this Phase: **$26,036.00**

Phase: 31T6 Electrical System Requirements TM

Labor

	Hours	Rate	Amount
Senior Engineer	1.50	171.00	256.50
Totals	1.50		256.50
Total Labor			**256.50**

Total this Phase: **$256.50**

Phase: 31T7 Instrumentation and Controls TM

Consultants

Consultants	2,277.00	
Total Consultants	**2,277.00**	**2,277.00**

Total this Phase: **$2,277.00**

Phase: 31T9 Preliminary Permitting Requirements TM 30% Design

Labor

	Hours	Rate	Amount
Associate Engineer	5.50	133.00	731.50
Project Administrator	.30	101.00	30.30
Totals	5.80		761.80
Total Labor			**761.80**

Total this Phase: **$761.80**

Phase: 321P P&P 60% Submittal

Labor

	Hours	Rate	Amount	
Senior Engineer	10.00	178.00	1,780.00	
Senior Engineer	2.40	164.00	393.60	
Senior Engineer	3.20	195.00	624.00	
Principal Engineer	1.30	207.00	269.10	
Principal Engineer	1.40	227.00	317.80	
Senior Technician	6.00	150.00	900.00	
Totals	24.30		4,284.50	
Total Labor				**4,284.50**
		Total this Phase:		**$4,284.50**

Phase: 323S Stantec 60% Pumping Facility Design and Specs

Consultants

Consultants		9,326.50	
Total Consultants		**9,326.50**	**9,326.50**
	Total this Phase:		**$9,326.50**

Phase: 324T 60% Bennett Trenchless Consultants

Consultants

Consultants		1,081.00	
Total Consultants		**1,081.00**	**1,081.00**
	Total this Phase:		**$1,081.00**

Phase: 421P P&P Water Quality Bench Testing

Labor

	Hours	Rate	Amount	
Senior Engineer	.50	164.00	82.00	
Assistant Engineer	6.90	105.00	724.50	
Totals	7.40		806.50	
Total Labor				**806.50**
		Total this Phase:		**$806.50**

Phase: 422L Water Quality Laboratory Testing

Consultants

Consultants		1,518.00	
Total Consultants		**1,518.00**	**1,518.00**
	Total this Phase:		**$1,518.00**

Billing Limits	**Current**	**Prior**	**To-Date**	
Total Billings	59,542.00	2,154,961.16	2,214,503.16	
Budget			3,770,969.00	
Budget Remaining			1,556,465.84	
		Total this Invoice		**$59,542.00**

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April Keigwin
Indian Wells Valley Groundwater Authority
100 West California Avenue
Ridgecrest, CA 93555

July 12, 2023
Project: No: 04101-23-002
Invoice No: 101905

Project Name: **IWVGA Imported Water Conveyance Design Services**

Client Project #:

See Monthly Progress Report for June included in this folder. Attach to front of invoice.

Professional Services from June 1, 2023 to June 30, 2023

Phase: 121P Coordination Meetings

Labor

	Hours	Rate	Amount	
Senior Engineer	20.30	195.00	3,958.50	
Associate Engineer	.50	156.00	78.00	
Principal Engineer	.50	227.00	113.50	
Principal Engineer	3.50	238.00	833.00	
Senior Technician	.30	150.00	45.00	
Totals	25.10		5,028.00	
Total Labor				**5,028.00**
		Total this Phase:		**$5,028.00**

Phase: 131P P&P General PM

Labor

	Hours	Rate	Amount	
Senior Engineer	56.10	195.00	10,939.50	
Principal Engineer	3.10	217.00	672.70	
Principal Engineer	.60	227.00	136.20	
Principal Engineer	26.00	238.00	6,188.00	
Project Administrator	.50	94.00	47.00	
Project Administrator	21.30	101.00	2,151.30	
Totals	107.60		20,134.70	
Total Labor				**20,134.70**

Reimbursable Expenses

Travel & Mileage			86.63	
Total Reimbursables			**86.63**	**86.63**
		Total this Phase:		**$20,221.33**

Phase: 211P Preliminary Design Coordination

Labor

	Hours	Rate	Amount	
Associate GIS Specialist	10.10	105.00	1,060.50	
Totals	10.10		1,060.50	
Total Labor				**1,060.50**

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Total this Phase: **$1,060.50**

Phase: 221P Env & ROW Consultant Coord

Labor

	Hours	Rate	Amount	
Senior Engineer	8.10	195.00	1,579.50	
Totals	8.10		1,579.50	
Total Labor				**1,579.50**

Total this Phase: **$1,579.50**

Phase: 231P Surveying

Labor

	Hours	Rate	Amount	
Senior Technician	6.00	130.00	780.00	
Licensed Surveyor	42.50	180.00	7,650.00	
Totals	48.50		8,430.00	
Total Labor				**8,430.00**

Reimbursable Expenses

Travel & Mileage			1,108.40	
Total Reimbursables			**1,108.40**	**1,108.40**

Total this Phase: **$9,538.40**

Phase: 241P Utility Research/Coordination

Labor

	Hours	Rate	Amount	
Assistant Engineer	35.80	126.00	4,510.80	
Associate Engineer	1.00	156.00	156.00	
Project Administrator	1.30	94.00	122.20	
Totals	38.10		4,789.00	
Total Labor				**4,789.00**

Total this Phase: **$4,789.00**

Phase: 251P P&P Coord Geotechnical Services

Labor

	Hours	Rate	Amount	
Senior Engineer	.70	195.00	136.50	
Totals	.70		136.50	
Total Labor				**136.50**

Total this Phase: **$136.50**

Phase: 252G SEI Geotechnical Services

Consultants

Consultants			70,952.13	
Total Consultants			**70,952.13**	**70,952.13**

Total this Phase: **$70,952.13**

Phase: 271P BLM Special Use Permit

Labor

	Hours	Rate	Amount	
Senior Engineer	23.10	195.00	4,504.50	
Assistant Engineer	3.00	126.00	378.00	
Principal Engineer	6.10	238.00	1,451.80	
Senior GIS Specialist	35.80	147.00	5,262.60	
Senior GIS Specialist	.30	175.00	52.50	
Totals	68.30		11,649.40	
Total Labor				**11,649.40**

Total this Phase: $11,649.40

Phase: 273P City of California City Permit

Labor

	Hours	Rate	Amount	
Senior Engineer	1.20	195.00	234.00	
Principal Engineer	1.00	238.00	238.00	
Totals	2.20		472.00	
Total Labor				**472.00**

Total this Phase: $472.00

Phase: 274P Kern Roads Agreement/Encroachment Permit

Labor

	Hours	Rate	Amount	
Senior Engineer	9.50	178.00	1,691.00	
Senior Engineer	4.00	195.00	780.00	
Assistant Engineer	9.00	126.00	1,134.00	
Principal Engineer	11.50	207.00	2,380.50	
Totals	34.00		5,985.50	
Total Labor				**5,985.50**

Total this Phase: $5,985.50

Phase: 275P SCE Encroachment Permit

Labor

	Hours	Rate	Amount	
Principal Engineer	10.70	207.00	2,214.90	
Totals	10.70		2,214.90	
Total Labor				**2,214.90**

Total this Phase: $2,214.90

Phase: 281P P&P Preliminary Design Report

Labor

	Hours	Rate	Amount
Senior Engineer	32.50	178.00	5,785.00
Senior Engineer	100.40	195.00	19,578.00
Associate Engineer	5.90	140.00	826.00
Assistant Engineer	26.70	112.00	2,990.40
Assistant Engineer	19.10	105.00	2,005.50
Assistant Engineer	15.60	126.00	1,965.60
Associate Engineer	40.50	156.00	6,318.00
Principal Engineer	4.60	217.00	998.20
Principal Engineer	3.50	207.00	724.50

Principal Engineer	36.70	227.00	8,330.90
Principal Engineer	10.80	238.00	2,570.40
Principal Engineer	7.50	248.00	1,860.00
Project Administrator	1.00	94.00	94.00
Assistant Engineer	.50	133.00	66.50
Principal Const. Manager	1.00	215.00	215.00
Totals	306.30		54,328.00
Total Labor			**54,328.00**

Total this Phase: **$54,328.00**

Phase: 282D P&P Drafting Preliminary Design

Labor

	Hours	Rate	Amount
Senior Engineer	13.00	186.00	2,418.00
Senior Engineer	41.50	178.00	7,387.00
Senior Engineer	30.40	195.00	5,928.00
Associate Engineer	4.40	140.00	616.00
Assistant Engineer	7.00	112.00	784.00
Assistant Engineer	11.60	105.00	1,218.00
Senior Technician	17.80	143.00	2,545.40
Assistant Engineer	93.10	126.00	11,730.60
Associate Engineer	10.00	156.00	1,560.00
Principal Engineer	.50	217.00	108.50
Principal Engineer	8.00	207.00	1,656.00
Principal Engineer	3.50	227.00	794.50
Principal Engineer	1.00	248.00	248.00
Project Administrator	.40	88.00	35.20
Senior Technician	27.70	158.00	4,376.60
Senior Technician	86.60	150.00	12,990.00
Senior GIS Specialist	11.30	147.00	1,661.10
Associate Technician	74.60	119.00	8,877.40
Associate GIS Specialist	.40	105.00	42.00
Totals	442.80		64,976.30
Total Labor			**64,976.30**

Total this Phase: **$64,976.30**

Phase: 286Q Dahl Preliminary Design Report

Consultants

Consultants	1,104.00	
Total Consultants	**1,104.00**	**1,104.00**

Total this Phase: **$1,104.00**

Phase: 28T1 Preliminary System Hydraulics TM Stantec

Labor

	Hours	Rate	Amount
Principal Engineer	1.00	238.00	238.00
Totals	1.00		238.00
Total Labor			**238.00**

Total this Phase: **$238.00**

Phase: 28T2 Pipe Optimizations TM

Labor

	Hours	Rate	Amount	
Principal Engineer	3.70	217.00	802.90	
Principal Engineer	1.50	238.00	357.00	
Totals	5.20		1,159.90	
Total Labor				**1,159.90**
			Total this Phase:	**$1,159.90**

Billing Limits	**Current**	**Prior**	**To-Date**	
Total Billings	255,433.36	653,491.18	908,924.54	
Budget			3,770,969.00	
Budget Remaining			2,862,044.46	
			Total this Invoice	**$255,433.36**

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April Keigwin
Indian Wells Valley Groundwater Authority
100 West California Avenue
Ridgecrest, CA 93555

July 13, 2023
Project: No: 04101-23-001
Invoice No: 102004

Project Name: **Indian Wells Valley Groundwater Authority-CEQA/NEPA Documents and Permit Documentation**

Client Project #:

TSK 1 Initial Coordination: Initial Coordination tasks with staff and agencies to keep project schedule on track. Weekly coordination meetings and tasks for project progression and MOU. Process contract amendment for sub consultant and project reallocated tasks. Update budget tracker spreadsheet with latest received information. Email correspondence.

TSK 2 Geotechnical Studies: Email correspondence regarding scheduling of geotechnical monitoring work. Draft SF-299 language and send to subconsultant. Updates from BLM on CatEx document review and next steps in process. Review and process draft invoice for phase tasks. WEAP presentation by biological field staff for Geotech construction work. Reimbursable expenses – travel time to California City for field surveys and site construction monitoring on geotechnical investigation work, rental car expense and gas, mileage for additional company vehicle, meals.

TSK 3 Technical Studies: Biological - Preparation and research for additional technical reports and agency coordination. Biological staff coordination for surveys and fieldwork. Prepare, draft, review and revisions for Wildlife Report and Mitigation Memo. Discussion and coordination with CDFW and USFWS for surveys and avoidance measures. Collect biological field data, import and export data for staff. Prepare Geotech maps for biological field surveys. Cultural - Meeting with cultural sub about extended buffer for survey. Scope amendment discussion with subs. Coordination and discussion with BLM regarding project description for cultural work. Prepare spreadsheet of APNs for bio and cultural surveys, included and excluded. Air Quality/Greenhouse Gas/Noise – Email correspondence with sub consultant on needs and status of reports for project.

TSK 4 Public Outreach: Coordination meeting with Stantec to discuss details and timelines for Scoping Meeting in California City and Ridgecrest. Add items to agenda for Stetson and Authority to approve for Scoping Meetings, including list of information needed for meeting execution. Stantec subconsultant tasks for scoping meeting preparation. Email correspondence.

TSK 5 Regulatory Compliance and Permitting: Meeting with BLM to discuss permitting needs. Questions and coordination regarding Aquatic Resources Delineation. Email correspondence between staff, BLM, and subconsultant. Process subconsultant invoices for phase tasks.

TSK 6 CEQA/NEPA Documentation: Weekly check-in meeting for CEQA & NEPA tasks and coordination. Continue research and continue drafting Project Description and Alternatives analysis needed for environmental documentation. Drafting sections for CEQA and NEPA reports. Drafting and revising exhibits for reports. Email correspondence and coordination amongst staff.

Professional Services from June 1, 2023 to June 30, 2023

Phase: TSK1 Initial Coordination

Labor

	Hours	Rate	Amount	
Principal Engineer	2.80	217.00	607.60	
Project Administrator	12.60	108.00	1,360.80	
Principal Planner	18.50	188.00	3,478.00	
Associate Biologist	.50	130.00	65.00	
Totals	34.40		5,511.40	
Total Labor				**5,511.40**

Consultants

Consultants			2,062.81	
Total Consultants			**2,062.81**	**2,062.81**
		Total this Phase:		**$7,574.21**

*** Please make checks payable to Provost & Pritchard Consulting Group ***
For billing inquiries, please email BillingInquiries@ppeng.com.

Phase: TSK2 Geotechnical Studies

Labor

	Hours	Rate	Amount	
Project Administrator	1.80	108.00	194.40	
Assistant Envir. Spec.	.30	120.00	36.00	
Principal Planner	7.90	188.00	1,485.20	
Associate Biologist	4.20	116.00	487.20	
Associate Biologist	37.30	130.00	4,849.00	
Assistant Biologist	9.20	100.00	920.00	
Principal Biologist	2.40	165.00	396.00	
Travel Time	11.00	80.00	880.00	
Totals	74.10		9,247.80	
Total Labor				**9,247.80**

Consultants

Consultants		1,725.00	
Total Consultants		**1,725.00**	**1,725.00**

Reimbursable Expenses

Travel & Mileage		1,101.78	
Other Direct Reimb Expenses		122.92	
Total Reimbursables		**1,224.70**	**1,224.70**
	Total this Phase:		**$12,197.50**

Phase: TSK3 Technical Studies

Labor

	Hours	Rate	Amount	
Assistant Engineer	5.00	126.00	630.00	
Project Administrator	.30	94.00	28.20	
Project Administrator	8.70	108.00	939.60	
Senior GIS Specialist	45.30	147.00	6,659.10	
Principal Planner	15.60	188.00	2,932.80	
Associate GIS Specialist	2.20	105.00	231.00	
Associate Biologist	45.60	116.00	5,289.60	
Associate Biologist	82.70	130.00	10,751.00	
Principal Biologist	28.60	165.00	4,719.00	
Totals	234.00		32,180.30	
Total Labor				**32,180.30**

Consultants

Consultants		7,693.87	
Total Consultants		**7,693.87**	**7,693.87**

Reimbursable Expenses

Travel & Mileage		1,537.31	
Total Reimbursables		**1,537.31**	**1,537.31**
	Total this Phase:		**$41,411.48**

Phase: TSK4 Public Outreach

Labor

	Hours	Rate	Amount
Project Administrator	1.70	108.00	183.60
Principal Planner	4.70	188.00	883.60

Senior Planner	3.00	173.00	519.00	
Totals	9.40		1,586.20	
Total Labor				**1,586.20**

Consultants

Consultants			1,196.00	
Total Consultants			**1,196.00**	**1,196.00**
		Total this Phase:		**$2,782.20**

Phase: TSK5 Regulatory Compliance and Permitting

Labor

	Hours	**Rate**	**Amount**	
Project Administrator	.50	108.00	54.00	
Principal Planner	7.60	188.00	1,428.80	
Totals	8.10		1,482.80	
Total Labor				**1,482.80**

Consultants

Consultants			49,338.09	
Total Consultants			**49,338.09**	**49,338.09**
		Total this Phase:		**$50,820.89**

Phase: TSK6 CEQA/NEPA Documentation

Labor

	Hours	**Rate**	**Amount**	
Project Administrator	.60	94.00	56.40	
Project Administrator	2.30	108.00	248.40	
Assistant Planner	37.40	110.00	4,114.00	
Assistant Planner	20.00	90.00	1,800.00	
Principal Planner	21.20	188.00	3,985.60	
Associate Planner	1.80	138.00	248.40	
Associate GIS Specialist	1.20	105.00	126.00	
Associate GIS Specialist	2.80	125.00	350.00	
Assistant Biologist	4.00	100.00	400.00	
Totals	91.30		11,328.80	
Total Labor				**11,328.80**
		Total this Phase:		**$11,328.80**
		Total this Invoice		**$126,115.08**

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Invoice

TranSystems Corporation

www.transystems.com

Please remit payment to:
P.O. Box 71368
Chicago, IL 60694-1368

If you have any questions, please call:
(562) 304-2000

Client:

Indian Wells Valley Groundwater Authorit
Attn: April Keigwin - Clerk of the Board
100 W California Ave.
Ridgecrest, CA 93555

Reference:

Invoice Date: 2/29/2024
Project No: P601230025
Invoice No: INV-0004412328

Project Name: IWV-Imported Water Pipeline

For professional services rendered through February 29, 2024 for the above referenced project.

Staff Type	Name	Rate	Hours	Amount
Labor				
Project Consultant 3	Donald M. Anderson	150.00	1.00	$150.00
Total Labor			1.00	$150.00
Invoice Total				$150.00

TranSystems Corporation

Donald M. Anderson, SR/WA
Senior Project Manager

TERMS: PAYABLE UPON RECEIPT

1 1/2% INTEREST CHARGE PER MONTH WILL BE ADDED TO ALL PAST DUE INVOICES OLDER THAN 45 DAYS IF INDICATED IN THE CONTRACT TERMS

Hours Charged by Project

For Timesheet Period: 2/1/2024 - 2/29/2024

Project	Name	Time By Day	Entered Hours	Daily Comments
P601230025				
	Donald M. Anderson			
		2/5/2024	0.80	Bi-Weekly PDT meeting.
		2/7/2024	0.20	Reviewed Jan 24 invoice.
P601230025			1.00	
Grand Total			1.00	

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WellIntel Inc.

906 E. Hamilton St.
Milwaukee, WI 53202 US
844-935-5426
accounting@wellintel.com

INVOICE

BILL TO
April Keigwin
Indian Wells Valley Groundwater Authority
500 W. Ridgecrest Blvd.
Ridgecrest, CA 93555 USA

SHIP TO
April Keigwin
Indian Wells Valley Groundwater Authority
500 W RIDGECREST BLVD
RIDGECREST, CA 93555-4017 US

INVOICE	2889
DATE	02/27/2024
TERMS	Net 30
DUE DATE	03/28/2024

P.O. NUMBER
2024 WellIntel Data Service

EMAIL
akeigwin@rgs.ca.gov

ITEM	DESCRIPTION	QTY	RATE	AMOUNT
2DSNN12 - Annual	Analytics Dashboard Data Services (annual) BC's Well MS's Well GH's Well GC's Well SZ's Well CH's	6	240.00	1,440.00T
Sales Tax	Sales Tax calculated by AvaTax on Wed 28 Feb 01:11:53 UTC 2024	1	133.20	133.20

SUBTOTAL	1,573.20
TAX (0)	0.00
TOTAL	1,573.20
BALANCE DUE	**$1,573.20**

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IWVGA ADMINISTRATIVE OFFICE

STAFF REPORT

TO: IWVGA Board Members **DATE: March 13, 2024**

FROM: IWVGA Staff

SUBJECT: Agenda Item 9 – Receive and File Water Year 2023 Annual Report

BACKGROUND AND DISCUSSION

The Indian Wells Valley Groundwater Authority (IWVGA) has prepared the Water Year (WY) 2023 Annual Report for the Indian Wells Valley Groundwater Basin (IWVGB), Basin 6-054, to be submitted to the California Department of Water Resources (DWR) in compliance with the Sustainable Groundwater Management Act (SGMA). The Annual Report presents required data for WY 2023 (October 1, 2022-September 30, 2023) and includes an update on Basin conditions and Basin projects and management activities. The Draft WY 2023 Annual Report was provided for review on January 5, 2024. Comments that were received from Mojave Pistachios, LLC and Searles Valley Minerals Inc. were reviewed and considered for incorporation. No substantial revisions were required or have been made to the original January Draft Report. The WY 2023 Annual Report has been finalized and is required to be submitted to DWR by April 1, 2024.

ACTION(S) REQUIRED BY THE BOARD

Staff recommends the Board receive and file WY 2023 Annual Report.

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INDIAN WELLS VALLEY GROUNDWATER BASIN

FINAL DRAFT

GSP Annual Report

Water Year 2023

(October 1, 2022 to September 30, 2023)

March 2023

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Chapter 1 Executive Summary

The Indian Wells Valley Groundwater Authority (IWVGA) has prepared this Annual Report for the Indian Wells Valley Groundwater Basin (IWVGB or Basin), Basin 6-054, to be submitted to the California Department of Water Resources (DWR) in compliance with the Sustainable Groundwater Management Act (SGMA). This Annual Report presents required data for Water Year (WY) 2023 (October 1, 2022-September 30, 2023).

DWR has designated the IWVGB as a basin in critical overdraft. Overdraft in the IWVGB has been shown through several undesirable results, primarily the chronic lowering of groundwater levels, the degradation of water quality, and the reduction of groundwater in storage in the IWVGB. Consequently, under SGMA, the IWVGA must implement projects and management actions to mitigate and avoid undesirable results and reach sustainability by 2040. The sustainability goal is to manage and preserve the IWVGB groundwater resource as a sustainable water supply. To the greatest extent possible, the goal is to preserve the character of the community, preserve the quality of life of IWV residents, and sustain the mission at the U.S. Navy Naval Air Weapon Station (NAWS) China Lake.

The Groundwater Sustainability Plan (GSP) for the IWVGB (Stetson, 2020a) was adopted by the IWVGA Board of Directors on January 16, 2020 and submitted to DWR on January 31, 2020. DWR approved the IWV GSP in January 2022. The sustainable yield is estimated to be 7,650 acre-feet per year (AFY) based on measured groundwater levels and computer modeling, and the recommendation of the IWVGA Technical Advisory Committee (TAC). The GSP recommended projects and management actions to achieve Basin sustainability that are intended to culminate in managing the IWVGB within the sustainable yield without undesirable and unsustainable groundwater conditions in the IWVGB. Sustainable management criteria were established for determining undesirable results and measuring progress towards groundwater sustainability.

During WY 2023, no minimum thresholds were exceeded at the representative monitoring sites. The IWVGA continued developing and implementing projects and management actions proposed in the GSP and tracking sustainability using the sustainable management criteria. Significant achievements include the following:

- Improvements in collecting observation data

- Completion of the Imported Water Pipeline Alignment Study
- Initiation of Design of the Imported Water Interconnection Project
- Implementation of the Shallow Well Mitigation Program
- Revisions to the groundwater flow model that will incorporate new data that has been obtained
- Incorporation of Recommended Corrective Actions

These projects and management actions will ultimately reduce overdraft conditions in the Basin and reduce undesirable results.

During WY 2023, litigation continued along with adjudication actions. As a result, the current litigation has brought into question the accuracy of some self-reported groundwater production data due to inconsistencies with reported groundwater production and documented and stated water use.

During WY 2023, the Indian Wells Valley received approximately 8.27 inches of rain, classifying the year as a Wet year. In WY 2023, depth to groundwater (DTW) was measured at 147 wells in Fall 2022 and 151 wells in Spring 2023, a greater total number of data points than collected in WY 2022. Hydrographs have been developed for all wells in the monitoring program and are posted on the Data Management System (DMS) website (www.iwvgsp.com). Groundwater levels have historically declined in many parts of the IWVGB and continued during the period from Spring 2022 through Spring 2023.

Groundwater production during WY 2023 is estimated to be 19,150 AF and recycled water use is estimated to be 1,300 AF. Accordingly, total water use in the IWVGB in WY 2023 is estimated to be 20,450 AF.

This Annual Report provides an update on Basin conditions and Basin management activities organized into the following chapters:

- General information (including Basin location)
- Progress towards GSP implementation and sustainability
- Hydrologic conditions
- Groundwater elevation data (including contours and hydrographs)
- Groundwater storage data
- Water supply data (including groundwater extraction data)
- Other Data Collection and Basin Management Tasks

The IWVGA was made aware of a new DWR guidance document pertaining to Annual Reports, Periodic Evaluations, and Plan Amendments on October 30, 2023 (DWR, 2023a). After review of the guidance document, IWVGA Staff found that the current IWVGA GSP Annual Report format substantially and functionally complied with DWR's new guidance, due to being based on the Annual Report requirements provided in the GSP regulations (CCR, Title 23, Division 2. Chapter 1.5. Sections 351 and 356.2). Since the current IWVGA GSP Annual Report format substantially complies with DWR's new guidance, and also considering the short timeline before a draft Annual Report would be released to the public, it was decided that a reformat of the Annual Report was not necessary. However, in order to fully address the recommendations provided in the guidance document, two new subsections were added to this Annual Report: "Progress Made on Addressing Recommended Corrective Actions" and "Outreach and Engagement". DWR's Annual Report submittal spreadsheets are provided in Attachment A.

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Chapter 2 General Information

The IWVGB is located in the northwestern part of the Mojave Desert and underlies approximately 382,000 acres or approximately 600 square miles of land area in portions of the Counties of Kern, Inyo, and San Bernardino. The IWVGB is bordered on the west by the Sierra Nevada Mountain Range, on the north by the Coso Range, on the east by the Argus Range, and on the south by the El Paso Mountains. Intermittent surface water (following larger storm events) flows from the surrounding mountain ranges and drains to China Lake, a large normally dry lake, or playa, located in the central north-east part of the Basin.

The land overlying the IWVGB encompasses portions of Kern, Inyo, and San Bernardino Counties, with the majority (approximately 73%) being in Kern County. Approximately 79% of land overlying the IWVGB comprises of either the NAWS China Lake or public lands managed by the United States Bureau of Land Management (BLM). The City of Ridgecrest (Ridgecrest or City) is the only incorporated community in the Indian Wells Valley and covers an area of approximately 20 square miles with a population of approximately 29,000 people. The Indian Wells Valley Water District (IWVWD) serves potable water to approximately 35,800 people in Ridgecrest and certain areas outside of Ridgecrest's jurisdiction. Unincorporated communities in the Indian Wells Valley include the communities of Inyokern in Kern County and Pearsonville in Inyo County, along with other smaller communities. Additionally, there are communities outside of the Indian Wells Valley that are served by groundwater produced in the Basin, including Trona.

Kern County, Inyo County, San Bernardino County, Ridgecrest, and the IWVWD entered into a joint exercise of powers agreement to form the IWVGA and serve as General Members on the IWVGA Board of Directors, which governs the IWVGA as a whole. The U.S. Navy and BLM serve as Associate Members (non-voting) on the IWVGA Board of Directors. Figure 2-1 provides the location of the IWVGB and the extents of the IWVGA boundaries.

In its 2016 Bulletin 118 interim update, DWR identified the IWVGB as a critically overdrafted basin of medium priority[1]. As such, in compliance with SGMA, the associated groundwater sustainability agency (GSA) was required to submit a GSP by January 31, 2020 to achieve local sustainable management of groundwater resources. The IWVGA Board of Directors adopted Resolution No. 02-16 on December 8,

[1] The IWVGB has since been identified as a critically overdrafted basin of **high** priority as of the *Sustainable Groundwater Management Act 2018 Basin Prioritization: Process and Results*, published by DWR in January 2019.

2016, to establish the IWVGA as the exclusive GSA for the entirety of the IWVGB. The GSP for the IWVGB (Stetson, 2020a) was adopted by the IWVGA Board of Directors on January 16, 2020 and was submitted to DWR on January 31, 2020. DWR approved the IWV GSP on January 13, 2022 and provided recommended corrective actions that are strongly recommended to be addressed prior to the first Periodic Evaluation due to DWR in January 2025.

The IWVGB serves as the sole supply of potable water for the Indian Wells Valley. Residents of the Indian Wells Valley are served groundwater through private domestic wells, small cooperative groups sharing wells, small mutual water companies, the Inyokern Community Services District (Inyokern CSD), and the IWVWD. The U.S. Navy produces and distributes groundwater for on-station water uses at the NAWS China Lake. Searles Valley Minerals Inc. produces groundwater from the IWVGB for use in its minerals recovery and processing operations in Searles Valley (located east of the IWVGB) and for potable use in the small communities of Trona, Westend, Argus, and Pioneer Point in the Searles Valley. In addition, a number of farms located in the Indian Wells Valley rely on the IWVGB's water supplies for their agricultural operations. Overdraft conditions in the IWVGB have existed since at least the 1960s (Dutcher and Moyle, 1973). Results of overdraft have manifested themselves through various undesirable results, primarily the chronic lowering of groundwater levels, degradation of water quality, and reduction of groundwater storage within the IWVGB.

Chapter 3 Progress Towards GSP Implementation and Sustainability

The IWVGB is characterized as a critically overdraft basin by DWR. The sustainable yield is estimated to be 7,650 AFY, while groundwater production has been and continues to be greater than the sustainable yield. This condition accounts for the occurrence of undesirable results for the following sustainability indicators:

- Chronic lowering of groundwater levels
- Reduction of groundwater in storage
- Degraded water quality
- Potential for land subsidence

After extensive public outreach and collaboration, the IWVGA Board of Directors adopted the IWVG GSP on January 16, 2020. In compliance with SGMA, the GSP provides Basin management strategies that are intended to culminate in managing the IWVGB within the sustainable yield and the absence of undesirable and unsustainable groundwater conditions in the IWVGB. The GSP recommends projects and management actions that are intended to achieve Basin sustainability while considering the unique geologic and hydrogeologic conditions of the IWVGB. Sustainable management criteria were established for measuring progress towards groundwater sustainability. Recommendations of the GSP are intended to provide for long-term sustainable groundwater management in the IWVGB within 20 years (WY 2040) of GSP implementation.

During WY 2023, the IWVGA continued developing projects and management actions proposed in the GSP and continued tracking sustainability using the proposed sustainable management criteria, discussed further in the subsections below. Significant progress was made toward implementing the Imported Water Project, implementing the Shallow Well Mitigation Program, and addressing DWR's Recommended Corrective Actions (RCAs) on the IWVGA GSP. In addition, the IWVGA continued significant data collection efforts to fill data gaps. These data collection efforts are documented in Chapter 7.

3.1 Projects and Management Actions

The following subsections document progress made towards implementation of projects and management actions proposed in the GSP. Additional information regarding projects and management actions can be found in the GSP.

3.1.1 Management Action 1: Annual Pumping Allocation Plan, Transient Pool, and Fallowing Program

During WY 2023, the IWVGA continued to implement Management Action 1 with the intent to fund an imported water supply and to provide economic incentives to reduce groundwater pumping.

On July 16, 2020, the IWVGA Board of Directors adopted Resolution Number 06-20 to adopt a report documenting the estimated sustainable yield of the IWVGB as 7,650 AFY. The purpose of determining the sustainable yield allotment is to determine the estimated volume of the sustainable yield available for the pumpers to produce without incurring Replenishment Fees in calendar year 2023. IWVWD continued to pay replenishment fees in WY 2023 based on the initial allotments presented in the 2020 report on the estimated sustainable yield of the Basin. Other producers subject to the replenishment fee, Mojave Pistachios and Searles Valley Minerals, did not pay the replenishment fee in WY 2023 and continue to not pay the fee. The nonpayment of fees by these major groundwater producers is one subject of current litigation. This litigation has impeded the implementation of the GSP and has called into the question of the accuracy of some self-reported groundwater production data.

The IWVGA has developed a Transient Pool Program to facilitate transitional reduced agricultural pumping to an interim acceptable and manageable level of basin overdraft until augmented supplies are available. In WY 2023, Transient Pool members produced groundwater within their allocations. One Transient Pool producer sold its ranch and transferred its full Transient Pool allocation to the new property owners.

Currently, there is no funding for the Fallowing Program, so it is not available at this time. The IWVGA is pursuing grant funding opportunities to fund fallowing projects.

3.1.2 Project 1: Develop Imported Water Supply

Due to overdraft conditions in the Indian Wells Valley and anticipated future water demands significantly in excess of the Basin sustainable yield, securing imported water supplies is a priority for the Basin. Conservation measures alone cannot bring the Basin into sustainability. The IWVGA has retained Capitol Core Group, Inc (Capitol Core) for the following general tasks:

- Identify and Procure Imported Water Supplies
- Develop and Secure Transfer Partners
- Identify and Secure Funding Sources

During WY 2022, Capitol Core identified potential permanent water supplies and actively pursued transfer deals with those water supply holders. In August 2022, the IWVGA executed a letter of intent between the IWVGA and a seller of water rights in the Dudley Ridge Water District. Proposals to finance the purchase of the water rights were received by the IWVGA in September 2022. In WY 2023, work continued on the permitting and transfer discussions with the relevant districts and regulatory authorities; however, ultimately, the transfer terms were not agreed upon. Capitol Core is continuously pursuing permanent water supplies and is in discussion with other entities for the sale and transfer of water rights.

Capitol Core continued discussions with Antelope Valley East Kern Water Agency (AVEK) concerning transfer agreements associated with the interconnection pipeline. The IWVGA is considering the option of joining AVEK with annexation into the AVEK service area.

In WY 2022, the IWVGA and the California Department of Water Resources (DWR) entered into an agreement for the award of $7.6 million in grant funding from the California Budget Act of 2021 Sustainable Groundwater Management Grant Program SGMA Implementation Round 1 grant solicitation (SGMA-IP). The grant funding is being used for the planning, design, environmental compliance, right-of-way acquisition, and other permitting and coordination with partnering agencies for the imported water interconnection project with AVEK.

In WY 2022, Provost and Pritchard Consulting Group (P&P) began the preparation of an Imported Water Pipeline Alignment Study to evaluate potential imported water pipeline routes and recommend a final alignment for design. The scope of work includes the following:

- Determine Capacity at Pipeline Inlet
- Determine Water Demands through 2070 for the Imported Water Pipeline
- Evaluate Potential Delivery and Connection Points
- Develop Preliminary Pipeline Alignments
- Analyze Alternative Pipeline Alignments
- Recommend a Preferred Pipeline Alignment

The Alignment Study was completed in WY 2023. It identified the three best alignments for the imported water pipeline, used a set of weighted screening criteria to identify the preferred alignment, and identified the AVEK tie-in point and the IWVWD connection point, among other tasks. In December 2022, the IWVGA

Board of Directors approved the Central Alignment as defined in the Alignment Study as the preferred alignment to proceed with further Environmental Evaluation.

In February 2023, the IWVGA contracted with P&P for the Preliminary and Final Design of the imported water pipeline and to develop the appropriate California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) environmental documentation for the project. The IWVGA also contracted with OPC Services (since renamed Transystems) to provide Right-of-Way (ROW) services for the Project which includes a pipeline approximately 50.6 miles in length and up to 24-inches in diameter, three pump stations, two forebay tanks, and one regulating tank.

In August 2023, P&P submitted the draft Preliminary Design Report (PDR), the first major deliverable associated with the preliminary and final design services contract. The purpose of the PDR is to set forth the key assumptions and recommendations that will be incorporated into the final design of the pipeline and appurtenant facilities. The Final PDR was submitted early WY 2024. The 30% Design submittal, which will include 30% Design Drawings, Engineer's Opinion of Probable Construction Costs, and Construction Schedule, is projected to be completed by January 2024. The 60% Design submittal is projected to be completed in March 2024.

P&P completed a preliminary CEQA Initial Study in July 2023. An Administrative Draft Environmental Impact Report (EIR)/Environmental Assessment (EA) is anticipated to be completed in March 2024. A final EIR/EA is anticipated to be completed in WY 2024. Additionally, several geotechnical and biological monitoring and surveys were completed in WY 2023. IWVGA Staff have reviewed and approved drafts of the Noise & Groundborne Vibration Impact Analysis and Air Quality & Greenhouse Gas Impact Analysis Technical Studies. Coordination with California Department of Fish and Wildlife, United States Army Corps of Engineers, and State Water Resources Control Boards is ongoing and applications for permits have been submitted. Public scoping meetings for CEQA were held in Ridgecrest and California City on August 23, 2023 and August 24, 2023, respectively. The BLM held a NEPA 30-Day Scoping Period in WY 2024 which began on October 5, 2023 and ended on November 4, 2023. Additional public outreach and scoping meetings will take place in WY 2024.

In WY 2023, Transystems began ROW services and obtained 50 Right-of-Entry agreements from property owners for 48 parcels along the alignment to allow performance of biological/technical studies and geotechnical borings. Transystems is coordinating with California Fish and Wildlife and the County

regarding ROW requirements for the project. A Right-of-Way Acquisition Plan will be completed in WY 2024.

In WY 2023, the Phase 1 Surface Percolation Replenishment Study Technical Memorandum was completed. The study identified locations for potential recharge basins for further investigation with the goal of ultimately assessing feasibility to develop a surface spreading project. The IWVGA staff and TAC concluded that surface percolation would not be feasible in the IWVGB due to the hydrogeology and depth to water. Consequently, a treated imported water project to deliver water directly to water users in the Indian Wells Valley was determined to be the most feasible imported water project.

3.1.3 Project 2: Optimize Recycled Water

The IWVGA Board of Directors adopted Resolution Number 02-20 on November 19, 2020, formally creating the Recycled Water Program. The IWVGA Board of Directors also approved an option agreement for purchase of recycled water from the City of Ridgecrest at the November 2020 meeting.

On July 11, 2022, Capital Core conducted a preliminary scoping meeting with Bureau of Reclamation (BOR) staff regarding the BOR's Title XVI programs which provide funding for planning, design, and construction of water recycling and reuse projects. The preliminary scoping meeting determined that the IWVGA's recycled water project is eligible for funding under the Title XVI Reclaim and Reuse Program. In July 2022, the IWVGA Board of Directors authorized Staff to prepare a Title XVI Feasibility Study to submit to the Bureau of Reclamation (BOR) for funding under the Title XVI Reclaim and Reuse Program. The Feasibility Study was completed in WY 2023 and submitted to BOR in March 2023. It consists of the following:

- Project Description and Study Area
- Statement of Problem and Need
- Water Recycling Opportunity
- Description of Alternatives
- Economic Analysis of the Project
- Justification of the Recycling Project
- Environmental Considerations and Effects (NEPA)
- Legal and Institutional Requirements
- Research Needs for the BOR

BOR granted final approval of the Title XVI Feasibility Study in early WY 2024.

In January 2023, the IWVGA applied for funding through the DWR Urban Community Drought Relief Grant Program for Recycled Water Project planning costs. DWR did not award the IWVGA with grant funding for this project in part due to concerns that the overall cost per-acre foot of water produced was prohibitive. Due to a lack of funding for Recycled Water Project, as currently envisioned, the IWVGA Board of Directors directed Staff to halt work on the Project. In WY 2024, alternative uses for recycled water will continue to be considered.

3.1.4 Project 3: Conservation Efforts

Through Proposition 1 funding, the IWVGA completed a pilot water conservation program in early WY 2023 targeting groundwater users located in severely disadvantaged communities (SDAC). The program consisted of a rebate program for installation of water conservation devices, water audits and leak detection surveys, and the preparation of drought management and water conservation plans.

Water audit and leak detection surveys, initiated in WY 2022 and finalized in WY 2023, were performed for the following SDAC communities:

- Eastern Inyokern Mutual Water Company
- China Lake Acres Mutual Water Company
- Searles Domestic Water Company
- South Desert Mutual Water Company & West Valley Mutual Water Company

The reporting for these surveys was finalized in WY 2023. The water audit and leak detection survey for Inyokern Community Services District was completed in WY 2021.

During WY 2022, work began on developing Water Shortage Contingency Plans the following SDAC Communities:

- China Lake Acres Mutual Water Company
- Eastern Inyokern Mutual Water Company
- Inyokern Community Services District
- West Valley Mutual Water Company

The purpose of these plans is to provide strategies to protect the water supply during various events including a water shortage that would require mandatory conservation measures. These plans were completed in WY 2023.

The above-mentioned surveys and plans can be found on the DMS at the following site: www.iwvgsp.com.

Indirectly, the IWVGA extraction fees encourage and incentivize individual water saving and conservation practices. Additionally, the IWVWD has continued its conservations efforts for its customers, independent of the IWVGA, as described in IWVWD's 2020 Urban Water Management Plan. The IWVGA intends to cooperatively work with the IWVWD in WY 2024 to develop new conservation projects.

3.1.5 Project 4: Shallow Well Mitigation Program

Continued impacts at shallow wells (declining water levels and degraded water quality) are anticipated while management actions and GSP projects are being implemented due to poor or degraded water quality and overdraft conditions. Predictive modeling results and hydrographs of measured data indicate declining water levels suggest some shallow wells are likely to be impacted before sustainability is reached. The IWVGA continued development of the Shallow Well Mitigation Program in WY 2023. Funding for shallow well mitigation is through the adopted mitigation fee (Ordinance 03-20). The Shallow Well Mitigation Program is structured such that the IWVGA Board of Directors, along with appropriate technical Staff, conduct evaluations of submitted wells on a case-by-case basis to determine the appropriate mitigation measures and financial assistance. The Shallow Well Impact Report Form and Emergency Assistance Report Form can be found on the IWVGA website: https://iwvga.org/reports.

In WY 2023, the Water Resources Manager (WRM) evaluated applications to the IWVGA for shallow well mitigation funding. Based on the recommendations of the WRM and staff, the IWVGA Board has approved one application for partial funding to replace a well impacted by declining groundwater levels. One application was declined due to not meeting the criteria for funding. Two applications are currently being reviewed. Lastly, one application has been redirected to a more appropriate potential funding source.

In addition to implementing the Shallow Well Program to address individual well impacts, the IWVGA submitted an application to DWR under the Urban Community Drought Relief Grant Program to receive grant funding to consolidate small, vulnerable, well systems in disadvantaged areas into the IWVWD. DWR awarded the IWVGA $3,345,000 in June 2023. The grant agreement is anticipated to be finalized in early

WY 2024. Implementation of this project would mitigate impacts to shallow wells and could reduce the number of applicants for the Shallow Well Program.

3.1.6 Project 5: Dust Control Mitigation Program

Implementation of the Fallowing Program and voluntary cessations of agricultural operations could potentially result in loss of vegetation and an increase in windblown dust and sand, due to the climate of the Indian Wells Valley which would require mitigation in order to eliminate undesirable results. Significant groundwater production reductions and cessation of agricultural operations have not yet occurred. Additionally, the IWVGA does not have a funding source to implement the program at this time. Consequently, no work on this project was completed in WY 2023.

3.1.7 Project 6: Pumping Optimization Project

Evaluation of modeling results generated during development of the GSP for the proposed groundwater management and project scenarios showed that some current groundwater pumping may need to be redistributed in the IWVGB to reduce concentrated pumping centers that would lead to continuing localized declining groundwater levels and corresponding continuing impacts to shallow domestic wells.

Pumping throughout the Basin is influenced by the implementation of the other projects and management actions. This project will need to be evaluated after other projects and management actions are implemented and the basin impacts of said projects are evaluated. Consequently, no work on this project was completed in WY 2023.

3.2 Progress Towards Sustainable Management Criteria

As discussed previously, the IWVGA has identified four sustainability indicators with documented historical and/or current undesirable results in the IWVGB:

- Chronic lowering of groundwater levels
- Reduction of groundwater in storage
- Degraded water quality
- Potential for groundwater pumping related land subsidence

Quantifiable sustainable management criteria have been established for sustainability indicators with current or historical impacts to numerically define when undesirable results are occurring and to define achievable targets for reaching and maintaining sustainability. These sustainable management criteria

include minimum thresholds, measurable objectives, and interim milestones. Development of these criteria relied upon information about the IWVGB developed in the hydrogeologic conceptual model, current and historical groundwater conditions, and the water budget. Additional information regarding the development of sustainable management criteria can be found in the GSP.

As an interim indicator of progress towards achieving sustainability, the applicable sustainability indicators are evaluated by the interim milestones at 5-year increments. The measurable objectives for the applicable sustainability indicators are desired benchmarks to be reached by year 2040, although it is acceptable for conditions to be managed in the range between the minimum threshold and measurable objective (operating range). If conditions fall below the minimum threshold after year 2040, undesirable results are occurring and sustainability has not been reached.

The IWVGA selected representative monitoring sites to be used to specifically measure and monitor groundwater conditions caused by the sustainability indicators, and to evaluate the efficacy of proposed projects and management actions achieving sustainability. These sites were selected based on evaluation of the best available data. As more data become available through monitoring and data collection, the representative sites will be reevaluated for effectiveness at representing basin-wide conditions. This reevaluation process will occur prior to the five-year GSP update.

In general, the IWVGA anticipates the continuation of groundwater level declines until projects and management actions are fully implemented and the basin has stabilized. Sustainability is not required to be reached until 2040. The first interim milestones will be evaluated in 2025.

Sustainable management criteria established for the IWVGB can be monitored on the public data DMS at the following site: www.iwvgsp.com. A summary of data is provided in the subsections below.

3.2.1 Chronic Lowering of Groundwater Levels

Currently, ten representative monitoring sites have been selected in the IWV GSP[2] to monitor the chronic lowering of groundwater levels throughout the IWVGB. These wells were selected to have good spatial distribution throughout the IWVGB and across the pumping centers and good predictive ability to monitor

[2] Section 4.4.2.6 (Representative Monitoring Sites) on the IWV GSP outlines how and why wells were selected as representative monitoring sites for the chronic lowering of groundwater levels.

the effectiveness of projects and management actions that will be implemented to limit the decline of groundwater levels. The ten well locations are shown in Figure 3-1.

Among the ten representative monitoring wells, three of them do not have established sustainable management criteria at this point in time. Sustainable management criteria will be established during the reevaluation process of all representative monitoring sites which will occur as part of the five-year GSP update. Representative monitoring sites and their respective sustainable management criteria can be found on the IWV DMS (https://iwvgsp.com/GSP-Dashboard/map.php). At present, groundwater levels at six of the representative sites are above the measurable objectives, the target level in 2040 when sustainability is reached. Groundwater levels at one representative site is within the operating range between the measurable objective and the minimum threshold. Accordingly, undesirable results have not been observed.

Table 3-1: Representative Monitoring Sites for Chronic Lowering of Groundwater Levels

Monitoring Site	Screen Interval	Spring 2023 Measurement (ft msl) [1]	Minimum Thresholds (ft msl)	Measurable Objective (ft msl)	Note
USBR-01	1,750-1,770	2,668	2,659	2,664	Above measurable objective
USBR-03	1,850-1,870	2,165	-	-	Criteria not determined yet
USBR-04	1,190-1,200	2,130	2,110	2,125	Above measurable objective
USBR-05	850-870	2,159	2,151	2,156	Above measurable objective
USBR-06	330-350	2,170	2,166	2,171	Within operating range
MW 32	1,900-1,920	2,140	2,119	2,134	Above measurable objective
Kerr McGee	681-881	2,148	2,138	2,145	Above measurable objective
Sandquist Spa	135-191	2,170	2,162	2,167	Above measurable objective
Inyo	457-477	<2142/Dry	-	-	Criteria not determined yet
George Air Corridor	320-380	2,159	-	-	Criteria not determined yet

[1] *ft msl = feet mean sea level*

Except approximately 5 feet of water level decline at Inyo well, water level measurement at other representative monitoring sites fluctuated less than 1 foot in WY 2023, which indicates that the first interim milestones will be met in 2025 because groundwater level declines are anticipated to continue until projects and management actions are fully implemented. Groundwater elevation data are discussed more thoroughly in Chapter 5.

3.2.2 Reduction of Groundwater in Storage

Groundwater in storage will continue to be reduced until the IWVGB is operated within the sustainable yield. The 2025 interim milestone for change of groundwater in storage is a loss of approximately 82,000 AF since 2020. The cumulative change in storage from WY 2020 to WY 2023 is approximately 58,000 AF. According, no undesirable results has been observed. The annual change of groundwater in storage within the measured study area of the IWB Basin from Spring 2022 to Spring 2023 is estimated to be a loss of 12,370 AF in the IWV main basin and 5,513 AF in the El Paso Subarea based on changes to groundwater levels at 77 wells (see Table 5-1). Estimated change in groundwater storage is discussed in Chapter 5.3.

3.2.3 Degraded Water Quality

Currently, ten representative monitoring sites have been designated to monitor water quality, as represented by total dissolved solids (TDS) concentrations. These representative monitoring sites are shown in Figure 3-2. Groundwater water quality data was limited at the time of developing the GSP and establishing sustainable management criteria. Since the GSP adoption, water quality data has been collected to establish baseline conditions. Sustainable management criteria will be established during the reevaluation process of all representative monitoring sites which will occur prior to the next GSP Periodic Evaluation. The status of TDS concentrations at the current representative monitoring sites are summarized in Table 3-2 below.

Table 3-2: Representative Monitoring Sites for Degraded Water Quality

Well	Screen Interval	Fall 2022 / Most Recent Measurement (mg/l)	Minimum Thresholds (mg/l)	Measurable Objective (mg/l)	Note
AB 303-5	905-1,005	160	-	-	Criteria not determined yet
IWVWD Well 33	TD=1,020	280[1]	500	310	Below measurable objective
Owens Peak South 01		290[1]	500	300	Below measurable objective
IWVWD Well 30	TD=1,200	200[1]	500	240	Below measurable objective
Hometown Water Well 01		370[1]	500	370	At measurable objective
IWVWD Well 11	TD=620	580[1]	600	530	Within operating range
Sandquist Spa	135-191	340	-	-	Criteria not determined yet
West Valley Mutual 01		500[1]	600	500	At measurable objective
26S/38E-01M05	299-359	530	-	-	Criteria not determined yet
26S/39E-06P01		500[1]	-	-	Criteria not determined yet

[1] *mg/L = milligram per liter. Measurement dates range from 2019 to 2021 due to monitoring schedule.*

TDS concentrations at five of the representative sites are at or below the Measurable Objectives. TDS concentrations at one representative site are within the operating range between the Minimum Threshold and Measurable Objective. Four representative monitoring well sites do not have established sustainable management criteria due to lack of data at the time of selection. No undesirable results have been observed.

As discussed previously, the representative monitoring sites will be reevaluated for effectiveness at representing basin-wide conditions prior to the next GSP evaluation. Sustainable management criteria will be established for the remaining representative wells during the reevaluation process which will address DWR's recommended corrective action.

See Section 7.1 for additional data on TDS concentrations.

3.2.4 Land Subsidence Related to Groundwater Pumping

Due to implementation of projects and management actions that will result in stabilization of groundwater levels, land subsidence is not anticipated to occur. Accordingly, the Measurable Objective and interim milestones are set at the long-term historical rate of subsidence, 0.04 inches/year. (See the GSP for additional information.) No representative monitoring sites to measure land subsidence off of the NAWS China Lake have been selected at this time. The IWVGA intends to periodically monitor land subsidence conditions throughout the IWVGB as datasets become available and as necessary to ensure no undesirable groundwater conditions are occurring. Periodically and at least every five years, the IWVGA will request any available land subsidence data from the U.S. Navy at their Supersonic Naval Ordinance Research Track (SNORT) alignment. No land subsidence data was collected by the U.S. Navy during WY 2023.

The U.S. Geologic Survey (USGS) does not identify the IWVGB as a region which has experienced historical land subsidence due to groundwater production, peat loss, or oil production (USGS, 2021). Interferometric Synthetic Aperture Radar (InSAR) data measuring vertical displacement is available on the SGMA Data Viewer (DWR, 2023b). The data indicate the IWVGB (including El Paso) experienced a displacement between -0.1 and 0.1 feet in WY 2023. Accordingly, no significant land subsidence has occurred during WY 2022. No additional land subsidence data has been published in WY 2023.

3.3 Progress Made on Addressing Recommended Corrective Actions

In its GSP Assessment Staff Report for the IWV GSP, DWR provided seven RCAs to be considered by the IWVGA prior to the first Periodic Evaluation of the GSP. The following table documents each RCA and the current progress and plan to address DWR's recommendations.

Table 3-3: Recommended Corrective Actions Summary

Recommended Corrective Action Summary	Current Progress and Next Steps
RCA 1 • Provide additional information on the required, ongoing communications elements required in the GSP Regulations. • Address Communication & Engagement Plan.	• The Communication & Engagement Plan was amended in WY 2023. • Ongoing communication with the public occurs regarding relevant and important GSP implementation topics.
RCA 2 • Investigate the hydraulic connectivity of the vertical and lateral relationships between the three hydrogeologic zones. • Provide a timeline and discuss the steps that will be taken to fill the data gap identified in the Plan related to groundwater monitoring. • Reassess the groundwater level and groundwater quality monitoring networks.	• Hydrogeologic zones have been investigated and data is being incorporated into the GSP model. • Data gaps are continuously being evaluated and filled. A comprehensive list and discussion of data gaps will be provided in the next GSP Plan Amendment. • The groundwater level and groundwater quality monitoring networks, particularly representative monitoring sites, were re-evaluated in WY 2024 and will be updated in the next GSP Plan Amendment.
RCA 3 • Update water budget • Revise climate change projections based on data obtained from addressing data gaps, as needed.	• GSP model is currently being updated with additional data. • Updated water budgets will be determined in WY 2024. • Climate change model runs will be performed in WY 2024.
RCA 4 • Update the Plan to include projects and management actions sufficient to eliminate perpetual overdraft currently projected beyond the fifty-year planning and implementation horizon. • Develop a contingency plan for if imported water is not secured. • Provide updates related to the negotiated details and implementation of the imported water project options.	• All Projects and Management Actions are currently being re-evaluated. • Additional modeling runs will be performed in WY 2024. • A contingency plan is being developed and will be provided in the next GSP Plan Amendment. • Updates on the imported water project are provided in each Annual Report.
RCA 5 • Identify and clarify groundwater conditions that would produce undesirable results. • Identify minimum thresholds to prevent conditions in the Basin from causing those undesirable results.	• Groundwater conditions and undesirable results will be re-evaluated and updated in the next GSP Plan Amendment. • Sustainable Management criteria, including minimum thresholds, will be established at sites not yet with criteria in WY 2024 after additional modeling runs are completed.
RCA 6 • Establish sustainable management criteria at all representative monitoring locations.	• Sustainable Management criteria will be established at sites not yet with criteria in WY 2024 after additional modeling runs are completed.

Recommended Corrective Action Summary	Current Progress and Next Steps
RCA 7 • Update the data management system to reflect correct, current, and complete information. • Describe rationale for management area boundaries, if applicable.	• The DMS is continuously updated as new data is collected. • Management areas have been evaluated with the El Paso management area to be proposed to DWR in the next GSP Plan Amendment.

3.4 Outreach and Engagement

A guidance document on communication and engagement (C&E Plan) was developed by the IWVGA in 2018 and revised in WY 2023. According to the C&E Plan, the IWVGA will use individual mailings and newsletters, website updates, potential use of social media, public notices and display advertisements in newspapers, focused workshops, board meetings, and provide hard copy materials along with CDs to public libraries as outreach methods to inform the public regarding important GSP implementation tasks.

The IWVGA conducts regular monthly Board meetings to support the implementation of projects and management actions that support Basin sustainability, and to receive input from the public. The IWVGA Policy Advisory Committee (PAC) meets regularly to advise the IWVGA on policy matters related to GSP implementation. The IWVGA Technical Advisory Committee (TAC) advises the IWVGA Board and IWVGA Water Resources Manager on technical matters, as needed.

In WY 2023, IWVGA staff began implementing some of the revisions to the C&E plan including developing Frequently Asked Questions (FAQ) sheets and other outreach materials. This work will continue into WY 2024.

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Chapter 4 Hydrologic Conditions

The California Code of Regulations (CCR) requires that GSP Annual Reports contain information on current and historical water year types (23 CCR § 356.2). DWR issues water year classifications for some areas of the state, including the Sacramento River and San Joaquin River basins. The DWR historical data set covers the period from WY 1931 to 2022; the classification for WY 2023 is still not yet available.

GSAs have the option to (1) develop their own water year types based on best available information (23 CCR Section 354.18d), or (2) use the data recently developed by DWR for the water budget. The suitability of the DWR water year type index will be assessed for future reports; at this time, a classification for the most recent water year is not yet available from DWR. A water year type index (Attachment B), based on local precipitation data in the IWVGB, was developed previously for the baseline groundwater model (GSP Appendix 3-H, Stetson 2020a) and the GSP Annual Reports for WYs 2019-2022 (Stetson, 2020b, 2021, 2022a, 2023). Use of that index is continued in this annual report.

The IWVGB water year type index is based on historical precipitation data from 1945-2023 at the China Lake NAF station and has five hydrologic categories. The categories are illustrated in the annual precipitation exceedance curve in Figure 4-1. The five types are Wet, Above Normal, Normal, Below Normal, and Dry. Table 4-1 shows the thresholds for determining water year type. The thresholds correspond to the vertical lines dividing the categories in Figure 4-1. WY 2023 was a Wet year, with 8.27 inches of rain at the index station. Table 4-2 and Attachment B lists the water year type since 2015 and the historical classifications of water year type since WY 1945, respectively. WY 2023 is a historical wet year, with only three years having higher amounts of rainfall since 1945. WY 1992, over thirty years ago, was the last time rainfall was more than WY 2023. The basin had been experiencing an historical drought (2012-2022) prior to the WY 2023 wet year. The precipitation in WY2023 broke this latest drought trend, with only 4% of years (1945-2023) having more precipitation than this Wet year that had 234% of the average rainfall (3.53 inches). Included in the annual total of 8.27 inches of rainfall is a very wet August 2023 with 4.33 inches of precipitation at the index station due to monsoon weather. A nearby precipitation gage at Trona (ID No. 49035) also experienced over four inches of rainfall during the month of August 2023. Even without this wet August, WY 2023 would have been close to Above Normal rainfall for the entire year.

Table 4-1: Percent Exceedance Ranges and Dividing Thresholds for Five Water Year Types

Year Type	Percent Exceedance Range (%)	Threshold Between Year Type (in/yr) [1]	Number of Years in Historical Record (WY 1945-2023)
Wet	0% - 10%	6.0	8
Above Normal	>10% - 33%	4.1	18
Normal	>33% - 67%	2.1	27
Below Normal	>67% - 90%	1.3	18
Dry	>90% - 100%	n/a	8
		Total years	***79***

1 Thresholds based on Percent Exceedance Ranges for 1945-2023 period.

Table 4-2: Water Year Types based on Precipitation at China Lake NAF Station (No. 041733)

WY	Annual Precipitation (in/yr)	Percentage of Average	Percent Exceedance Rank	Water Year Type
2015	3.67	104%	45%	N
2016	1.38	39%	87%	BN
2017	4.61	130%	26%	AN
2018	1.43	40%	86%	BN
2019	6.13	173%	8%	W
2020	5.57	158%	15%	AN
2021	0.58	16%	96%	D
2022	1.87	53%	73%	BN
2023	8.27	234%	4%	W

Notes: W = Wet, AN = Above Normal; N = Normal; BN = Below Normal; D = Dry.
Percentage of average and percent exceedance range calculated based on the 1945-2023 period of record.

Chapter 5 Groundwater Elevation Data

Since 1946, groundwater data have been collected in the IWVGB for studies conducted by the U.S. Navy, USGS, DWR, U.S. Bureau of Reclamation (USBR), and other agencies. In 1995, a groundwater monitoring program (GWMP) was established between Kern County Water Agency (KCWA) and the U.S. Navy collecting groundwater levels throughout the IWVGB during the wet (spring) and dry (fall) seasons from approximately 100 to 150 wells. Since 2020, the Indian Wells Valley Groundwater Authority (IWVGA) coordinates with KCWA and the Navy for the semi-annual monitoring collection of groundwater levels. Since WY 2022, the IWVGA's Water Resource Manager has been required to supply most of the field staff needed to measure groundwater levels. This additional support for KCWA and the Navy allowed for major improvements in collecting observation data during WY 2022 and has continued into WY 2023.

The GWMP included 176 monitoring sites during WY 2023 (See Attachment C for all wells in the GWMP). Depths to water (DTW) measurements were collected at 147 sites in Fall 2022 and 151 sites in Spring 2023. Three wells were added to the GWMP from Fall 2022 to Spring 2023 to fill data gaps and provide new groundwater levels[3] (Figure 5-2 shows these well locations). Attachment D contains measured DTW data, Land Surface Datum (LSD) and resulting groundwater elevations (feet, mean sea level) for WY 2023. These data were filed on DWR's SGMA portal and appended to DMS website (*iwvgsp.com)*. Groundwater elevation data were used to produce equipotential contour maps and hydrographs and are discussed below in this section of the annual report.

Due to the record snow and rainfall experienced in California during the winter months in WY 2023, DWR requested GSAs, including the IWVGA, to increase the frequency of groundwater level collection from the required biannual measurements. The purpose of this increase was to allow basins to better understand the response to groundwater levels associated with wet years and better understand the best time to capture the occurrence of seasonal high groundwater levels. Consequently, supplemental monitoring was conducted during may, August, and December 2023 to supplement the regular October and March bi-annual monitoring. All groundwater level data is posted on the DMS website (iwvgsp.com) and on DWR's SGMA data portal.

[3] New wells in the GWMP: 25S/39E-29N01, 26S/38E-17C01, 26S/39E-25K01, 26S/39E-27C01, 26S/39E-35B

5.1 Groundwater Elevation Contour Maps

KCWA's Geologist[4] produced Fall 2022 and Spring 2023 groundwater elevation and depth to water contours for this WY 2023 Annual Report. Figures 5-1 and 5-2 show the Fall 2022 and Spring 2023 groundwater elevation contours, respectively. Both figures also include the location of measured groundwater level monitoring wells used in the analysis, the groundwater basin boundary, and the watershed extents for Indian Wells Valley. Contours are dashed to show the uncertainty where there are limited data available.

The groundwater elevation contour maps show the general flow of groundwater from the surrounding mountains towards China Lake playa. Groundwater flows from Rose Valley in the northwest (about 2,250 feet, msl), the Sierra Mountain front fan deposits (about 2,190 feet, msl) along the west, the Argus Range Mountain front fan deposits from the east (about 2,180 feet, msl) and from the El Paso Subarea (2,800 feet, msl) in the southwest towards the playa at the center of the basin. Pumping centers form depressions near discharge areas in the northwest (about 2,170 feet, msl), southwest (about 2,150 feet, msl), and southeast (about 2,120 feet, msl). Groundwater mounding can also be observed near the wastewater treatment plant on the NAWS China Lake (2,190 feet, msl). There is a fault zone causing steep groundwater level contours from the El Paso Subarea towards the main IWVGB.

Figures 5-3 and 5-4 show contours of the depth to groundwater below land surface. These contours indicate the depth that would need to be drilled to intercept the groundwater table and produce water from a well. In general, depth to groundwater below land surface appears to be greatest in areas with the highest elevations along the Sierra Nevada and the El Paso Mountains. Depth to groundwater levels decrease at lower elevations at the playa and towards Salt Wells Valley.

5.2 Hydrographs

Hydrographs have been developed for all wells in the IWV Groundwater Monitoring Program (GWMP) and are posted on the DMS website (www.iwvgsp.com). Hydrographs for 14 selected well sites are provided in Attachment E (see also Figure 5-5), which include the designated representative monitoring wells for chronic lowering of groundwater specified in the GSP used to track Basin management. The selected wells include seven nested multi-level piezometers (note: data for nested multi-level

[4] Michelle Anderson, PG; Kern County Water Agency (KCWA) geologist.

piezometers appear on the same hydrograph), for a total of 30 groundwater level measurements. Groundwater level data collected by KCWA, the Navy, IWVWD and other agencies (Historical data collected in IWV from DWR, USGS, and USBR are also included on the hydrographs) were used to produce these hydrographs. Groundwater level data for the majority of the hydrographs begin in the late 1980s and early 1990s when the wells were installed, with the exception of the Inyo Well. The Inyo Well (27S/39E-07R01), located in the southwest of the IWV main basin has the longest period of record for groundwater level data in the basin dating back to 1946.

The hydrographs in Attachment E show historical changes of groundwater levels throughout the IWVGB. The most recent changes of groundwater levels at the 14 selected well locations shown on Figure 5-5 are summarized below.

- USBR-10 nested piezometers (Attachment E, page 1, upper graph)
  These nested wells are located in the northwest near Nine Mile Canyon Road (mountain front recharge) and south of Little Lake (Rose Valley subsurface flow). Historically there were four piezometers at USBR-10, but now only 3 of the piezometers are able to be measured[5]. Rising groundwater levels were observed at the three measured piezometers from Spring 2021 to Spring 2022. Groundwater levels in the shallow, shallow-mid and deep piezometers declined 2.88, 2.80, and 2.78 feet, respectively.

- USBR-6 nested piezometers (Attachment E, page 1, lower graph)
  These nested wells are located on the Navy Base just inside the Navy fence line in the northwest adjacent to alfalfa fields, and near fan deposits from Sand Canyon. While the mid and deep piezometers saw a water level decline of 0.84 and 0.73 foot, respectively, the shallow piezometer saw an increase of 0.78 foot from Spring 2022 to Spring 2023.

- USBR-5 nested piezometers (Attachment E, page 2, upper graph)
  These wells are located in the northwest at the base of Indian Wells Canyon (mountain front recharge) and approximately 0.5 mile from the agricultural pumping center. There was a water level decline in all three piezometers from Spring 2022 to Spring 2023 at 0.75 foot (shallow), 0.53 foot (mid) and 0.53 foot (deep).

- NR-2 nested piezometers (Attachment E, page 2, lower graph)
  These wells are located in the northwest about one mile east of USBR-5 and near the agricultural pumping center. None of the three piezometers (shallow and deep) was measured during the Fall 2022 and Spring 2023 measuring events.

- Sandquist Spa Well (Attachment E, page 3, upper graph)

[5] Since Fall 2005 the mid-deep piezometer at USBR-10 has not been able to be measured (well collapsed, these data are posted for historical reference only).

This well is located on the Navy Base between the agricultural pumping centers and the playa (discharge area). The observed groundwater level decline was 0.71 foot from Spring 2022 to Spring 2023.

- Kerr McGee 17 (Attachment E, page 3, lower graph)
  This well is located on the Navy Base east of Highway 395 about 3 miles southeast of NR-2 just inside the Navy fence line. From Spring 2021 to Spring 2022, groundwater level in this well declined 0.29 foot.

- MW-32 nested wells (Attachment E, page 4, upper graph)
  These wells are located along Business Highway 395 to the east of Inyokern, in the vicinity of IWVWD pumping wells. From Spring 2022 to Spring 2023, water level rose 18.36 feet, 6.92 feet and 0.34 foot in the shallow, mid and deep piezometers, respectively.

- USBR-4 well (Attachment E, page 4, lower graph)
  This well is also located along Business Highway 395, about 2 miles east of MW-32. A groundwater level increase of 9.65 feet was observed at this well from Spring 2022 to Spring 2023.

- 26S/39E-32L1 (Attachment E, page 5, upper graph)
  This well is located about 2 miles south of the junction of U.S. Highway 395 and California State Route 178. Groundwater levels have shown a steady decline since monitoring began in 2007. Groundwater levels dropped 0.79 foot from Spring 2022 to Spring 2023 at this well.

- George Air Corridor Well (Attachment E, page 5, lower graph)
  This well is located on the Navy Base in the southeast area on the basin. Groundwater levels have shown a steady decline since monitoring began in 1989. However, a slight water level increase (0.04 foot) was observed from March 2022 to March 2023.

- USBR-3 nested piezometers (Attachment E, page 6, upper graph)
  This nested well is located to the west of Ridgecrest near the new IWVWD production wells. From Spring 2022 to Spring 2023, groundwater level increased 0.98 foot and 0.14 foot at the shallow and deep piezometers, respectively. At the mid piezometer, a water level decline of 1.64 feet was observed during that same one-year period.

- Inyo well (Attachment E, page 6, lower graph)
  This well has the longest period of monitoring data, since 1946, and is located in the southwest area of the IWVWD new production wells. This well was deepened once and was dry during spring 2023 groundwater level measurements (425 feet depth). Groundwater levels have shown a steady decline since the early 1950s. This well is in poor condition and may be dry. Funding is being investigated for well replacement.

- AB303-05 well (Attachment E, page 7, upper graph)
  This well is located in the El Paso subarea to the southwest of the main IWVGB where there isn't any significant pumping. Stable groundwater levels have been observed at this well since 2007,

with a slight rise in recent years. Groundwater level declined 2.50 feet from Spring 2022 to Spring 2023 at this well.

- USBR-1 nested piezometers (Attachment E, page 7, lower graph)
  This nested well is also located in the El Paso subarea of the IWVGB where there isn't any significant pumping, southwest of a fault that separates this subarea from the main IWV groundwater basin. Steady groundwater levels have been observed at all four piezometers since about 1995, with a slight rise in recent years. There was no water level measurement at the deep piezometer after May 2020. From Spring 2022 to Spring 2023, water level at the shallow piezometer increased 0.20 foot, while the shallow-mid piezometer saw a water level decline of 2.03 feet.

5.3 Estimated Change in Groundwater Storage

Groundwater levels have declined in many parts of the IWVGB during WY 2023. There are some areas that show little change, or even an increase in groundwater levels, primarily in the El Paso subarea, where there is little or no groundwater production. Two different methods were used to evaluate the changes in groundwater levels from Spring 2022 through Spring 2023: (1) map color coded comparison of measured groundwater level change, and (2) modified Thiessen polygon method using 77 monitoring wells distributed throughout the basin to estimate storage changes.

5.3.1 Groundwater Level Change from Spring 2022 to Spring 2023

Groundwater levels were measured at 117 wells during both Spring 2022 and Spring 2023. These measurements were compared to evaluate the annual groundwater level change across the basin. Figure 5-6 shows the annual groundwater elevation change from Spring 2022 to Spring 2023 displayed as gradational colors on a map for each of these monitoring wells. This visual method of representing the available data on a map shows the distribution of lowered groundwater levels and where no change or an increase in groundwater levels occurred during the last year. Orange and red dots at 17 wells represent observations with a 1-foot to 6.3-foot drop in groundwater levels; and yellow and light orange dots at 51 wells display groundwater levels dropping up to 1 foot. The highest levels of groundwater elevation change observed (red dots) typically appear to correlate with pumping and discharge areas. The largest decline in groundwater levels was observed at IWV-MW-02, located near the southwest pumping center.

From Spring 2022 to Spring 2023, there were a total of 6 monitoring wells that saw a water level drop of more than 1-foot (red and orange dots) to the southwest of Inyokern, where an increase or no change in groundwater levels were observed during the previous 3-year period from Spring 2019 to Spring 2022.

The cause of this drop in groundwater levels is not fully understood. These monitoring wells are located to the west of the surface expression of the Freeman fault (shown as a red NW/SE line on Figure 5-6). IWVWD pumps groundwater to the east of Freeman fault and at a distance from these wells located in the alluvial fans of the Sierra Nevada. Further investigation is warranted to determine what these WY 2023 dropping groundwater levels indicate.

An increase or no change in groundwater levels (no loss of groundwater storage) are observed in the wells shown as green and blue dots in Figure 5-6. This condition seems to occur mostly outside of the Inyokern area. The cause of these increases to the groundwater levels in these areas is not fully understood .

5.3.2 Estimating Storage Change Using Modified Thiessen Polygon Method

Changes to groundwater in storage are estimated each year for the Annual Report and to be used for managing IWV's water resources. In this Section, changes to groundwater in storage for WY 2023 have been calculated for a portion of the aquifer where groundwater levels are measured for the GWMP. The distribution of measured data from GWMP monitoring wells are shown on the groundwater elevation and groundwater depth contour maps (Figures 5-1 through 5-4) and listed in Attachment D. This area (188,971 acres), where available groundwater level data exists and the major pumping occurs, represents about half of the total GSA Basin (381,746 acres). Groundwater modeling would be required to calculate how basin overdraft and the decline of groundwater in storage extends beyond this area to the edges of the GSA basin. Supplemental modeling using a partially updated GSP model is underway, but not complete for this Annual Report. Modeling methods will be reviewed for the 5-year GSP Report. Spring 2023 groundwater level measurements were compared with Spring 2022 measurements using a modified Thiessen Polygon Method.

5.3.2.1 Modified Thiessen Polygon Method

The Thiessen polygon method is a standard approach (Thiessen, 1911; Dunne et al., 1978) of averaging point rainfall values according to an areal distribution and can be applied to other datasets. This method distributes data collected at discrete points to the basin area by forming polygons, with each polygon containing one station with measured data. Applying this method to a groundwater aquifer assumes that the groundwater level data at the monitoring well represents the average groundwater level throughout the area represented by that particular polygon. The volume of groundwater change within each polygon

is the product of (1) area, (2) specific yield (Sy[6]), and (3) measured water level change during a given period of time. This calculation for each polygon is then summed up to calculate the total volume of groundwater change within the specified study area of the basin.

Modifications were made to the Thiessen Polygon Method based on comments received from the TAC to earlier annual reports (WY 2019 and WY 2020) using this method. These modifications were first used in the WY 2022 Annual Report and carried forward in this and subsequent Annual Reports. These modifications provide an estimate of changes to groundwater in storage within a subarea of the full basin with limitations. This estimate does not consider the changes in storage outside of the study area of the modified Thiessen Polygon Method where there aren't measurements, but it does provide an indication of whether the basin is gaining or losing groundwater in storage. It would require numerical modeling to estimate how the basin overdraft extends to the edges of the basin[7]. See the WY 2022 Annual Report for a thorough description of the modifications to the Thiessen Polygon Method used here and the limitations of the approach (Stetson, 2022).

The outer boundary of the study area for applying the modified Thiessen Polygon Method generally follows the extents of groundwater level contour maps developed by KCWA. Figure 5-7 shows the full extents of the GSA boundary and the study area where groundwater measurements exist. The study area was first discretized into Thiessen polygons using perpendicular bisectors and GIS. These polygons were then modified using Angster et al. (2020) surface rupture and fault maps. The resulting polygons and surface faults are shown on Figure 5-7. Attachment F summarizes the resulting areas for each of the 77 polygons developed for this analysis.

Monitoring wells used for this analysis were considered using the following criteria: (1) long and continuous spring water level record; (2) monitoring well's condition and access assuring that the groundwater level measurement will continue for the foreseeable future; (3) spatial distribution throughout the basin; (4) selecting the shallowest piezometer for nested monitoring wells. Based on these criteria, a total of 77 monitoring wells were selected for the Thiessen polygon discretization. These monitoring wells are shown on Figure 5-7 and labeled with name and database ID[8] in parentheses.

[6] Specific yield is the amount of groundwater that a unit volume of aquifer will yield when drained by gravity. This is related to the pore space where water occurs between the gravel/sand/silt/clay grains within the aquifer.
[7] These modeling analyses will be considered for the 5-year report.
[8] The well database ID can be used to browse the IWV DMS website to view available groundwater data and reports (iwvgsp.com).

5.3.2.2 Estimated Changes to Groundwater in Storage: Spring 2016 to Spring 2023

Changes to groundwater in storage are estimated each year for the Annual Report and to be used for managing IWV's water resources. These changes over time are most notable in the areas of the basin where declining groundwater levels are being observed. Though measuring of groundwater levels had been interrupted for a couple of years, Spring 2022's comprehensive measurements showed a continuing decline in groundwater levels in the IWV basin and in groundwater in storage (Table 5-1). These changes in groundwater levels represent about half of the overall delineated GSA Boundary where there are available groundwater level data and the major pumping occurs.

Table 5-1: Estimated Annual Change to Groundwater in Storage, Spring 2022 to Spring 2023

	Polygon Area (acres)	Spring 2022 to Spring 2023 (AF)
IWV Main Basin	154,960	-12,370
El Paso Subarea	34,010	-5,513
Total Study Area	188,971	-17,883
Total GSA Basin	381,746	*n/a*
% of GSA Basin	*49.5%*	*not estimated*

The annual change of groundwater in storage within the measured study area of the IWB Basin from Spring 2022 to Spring 2023 is estimated to be a loss of 12,370 AF in the IWV main basin and a loss of 5,513 AF in the El Paso Subarea based on changes to groundwater levels at 77 wells. The change in storage estimate will be expanded to account for the whole IWV GSA as data gaps are addressed and the model is updated for the 2025 GSP Plan Amendment.

Figure 5-8 provides a plot of the estimated groundwater storage change from WY 2016 to WY 2023 along with the recent estimated groundwater pumping. See Chapter 6.1 for the discussion of groundwater pumping. The modified Thiessen Polygon method estimates a continued decrease of groundwater in storage for the main IWV Basin, and although there was a decrease of groundwater in storage in the El Paso subarea in WY 2023, there has been an overall increase in groundwater storage in the El Paso subarea where there is very limited domestic pumping (and limited groundwater level data). Sustainable

Management Criteria for monitoring loss of groundwater in storage is measured as a cumulative total since WY 2020 (see Table 5-2).

Table 5-2: WY 2020 to WY 2023 Estimated Groundwater Storage Change, Modified Thiessen Polygon Method

	Thiessen Area (acres)	Average Annual AFY			**WY 2023** (AF)	**4-Year Cumulative Change** (AF)
		WY 2020 (AF)	**WY 2021** (AF)	**WY 2022** (AF)		
IWV Main Basin	154,960	-15,883	-15,883	-15,883	-12,370	-60,019
El Paso Subarea	34,010	2,390	2,390	2,390	-5,513	1,657
Total	188,971	-13,492	-13,492	-13,492	-17,883	-58,359
Hydrologic Condition		AN	D	BN	W	

Note: Storage Change is based on the measured study area, approximately 49.5% of the 381,746 acres of the Total IWV Basin.

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Chapter 6 Water Supply Data

6.1 Groundwater Extraction Data

Groundwater from the IWVGB is the sole source of potable water in the Indian Wells Valley. Groundwater is produced from approximately 970 wells. Figure 6-1 provides the location of the production wells in the IWVGB[9]. Since 2018, the IWVGA has been actively engaged in efforts to determine annual groundwater production in the IWVGB and improve the accuracy of production estimates. These efforts are summarized below with the years the work was conducted in parenthesis.

- Baseline Pumping Conditions (2018-2019): The most recent available pumping data at the time (2018) were compiled from known and cooperative individual groundwater producers in order to develop the numerical flow model. Through stakeholder outreach efforts, major pumpers provided estimates to use for future conditions (2020 through 2070) that reflected their projected water demands. Prior studies were used to estimate pumping for years 1975-2017 for groundwater producers where little data were available nor provided by stakeholder outreach.

- Well Registration and Reporting (2018-Current): The IWVGA implemented well registration and well production reporting requirements in 2018 for the purpose of collecting volumetric pumping fees. All groundwater producers subject to the fees established by the IWVGA are required to register their groundwater production wells and report monthly groundwater production.

- Sustainable Yield Allocation (2020-Current): The IWVGA requested historical pumping records from all non-*de minimis* pumpers (excluding federal entities) for the purpose of allocating the sustainable yield of the IWVGB. This allocation is used to determine a pumping allotment that is not subject to the Basin Replenishment Fee.

- Flow Meter Requirements (2020): The IWVGA adopted Ordinance 01-20 requiring the installation and testing of IWVGA-approved flow and hour metering equipment on all non-de minimis and non-federal wells in the Basin, with the purpose of increasing accuracy of groundwater production records.

- Transient Pool (2020-Current): The IWVGA developed a Transient Pool program (see Section 3.1.1) which requires reporting of groundwater production to the IWVGA. This groundwater production is not subject to certain IWVGA established fees and is accounted for separately than other groundwater production.

[9] There is insufficient data by well to display the volume of each production well on Figure 6-1; however, the figure shows the location of wells by well use category.

- Legal Action and Settlements (2020 through Current): The IWVGA has taken legal action against non-compliant pumpers and has entered into settlements regarding the payment of fees and reporting of groundwater production.

- Pumping Verification (2023 through Current): In WY 2023, the IWVGA began a review and verification process of all production records for the years 2018 to current to update the numerical model production values. This task will continue into WY 2024.

Despite these efforts, data gaps in groundwater production within the IWVGB still exist. These gaps are partially due to inaccuracies of self-reporting, non-compliant groundwater producers who do not report production data, groundwater producers who have not installed water meters on their wells, and groundwater producers present in the IWVGB that are not subject to reporting (i.e. de minimis extractors). Additionally, current litigation has brought into question the accuracy of some self-reported groundwater production data due to inconsistencies with reported groundwater production and documented and stated water use.

The methods that groundwater producers use to report their production include the following:

- Water meters
- Electrical meters
- Estimates based on land use
- Estimates based on population served by groundwater production well

The best engineering estimate of WY 2023 pumping is derived from the combination of all pumping records and sources available to the IWVGA and is presented in the final column in Table 6-1, below. Attachment G provides a more detailed breakdown of pumping categories and the data source for each value. The IWVGA is continually working to improve its estimate of groundwater production in the IWVGB because these data are critical components of the water budget and essential for managing sustainability.

Table 6-1: IWVGB Groundwater Production Estimates

Water Use Sector	Estimated No Action Projections WY 2023 (AF)	WY 2023 Reported Pumping (incomplete) [3]	WY 2023 Total Estimated Pumping (AF) [4, 5]
Urban	7,050	4,300	5,620
Industrial	2,910	2,510	2,570
Agriculture	22,530[2]	7,700	8,110
Other – Federal [1]	2,040	1,380	1,380
Other – Domestic/ Mutuals/Co-Ops/ Community Services District	1,380	150	1,470
TOTAL	**35,910**	(incomplete)	**19,150**

1 Federal groundwater use is for NAWS China Lake and are provided by the U.S. Navy. Federal entities are not required to report monthly production to the IWVGA for the purpose of paying fees established by the IWVGA; however, though not required, the U.S Navy provided monthly production to the IWVGA for the Annual Report.

2 This value includes planned agricultural projections provided by pumpers and probably overestimates future agricultural groundwater production.

3 These values underestimate actual groundwater production in WY 2023 because not all non-de minimis groundwater producers submit data regularly to the IWVGA and because *De minimis* users (those that produce less than 2 acre-feet per year (AFY) or those that have four or fewer connections) are not required to report monthly production to the IWVGA for the purpose of paying fees established by the IWVGA.

4 See Attachment G for a more detailed table.

5 Actual pumping may be higher than estimated.

Table 6-2 below shows annual groundwater production estimates. Groundwater production within the IWVGB has been estimated to decrease since WY 2019 (the first year an Annual Report was prepared). This is due to the implementation of projects and management actions. The decrease in production that occurred in WY 2023 could also be due to the increased precipitation that year. In WY 2023, the estimated total groundwater production was 2.5 times the estimated sustainable yield of 7,650 indicating overdraft conditions have continued in the IWV.

Table 6-2: Total Estimated Pumping by Water Year

Water Year	Total Estimated Pumping (AF)
WY 2019	22,800
WY 2020	21,990
WY 2021	20,800
WY 2022	21,160
WY 2023	19,150

6.2 Surface Water Supply

Natural surface waters are not used as a drinking water supply source in the IWVGB. Approximately 2,540 acre-feet of recycled water was produced at the City of Ridgecrest's wastewater treatment plant during WY 2023 and was used for the following:

- Landscape irrigation (golf course)
- Agricultural irrigation (alfalfa)
- Partial maintenance of the Mojave Tui Chub habitat (environmental water)
- Discharge to evaporation/percolation ponds

Table 6-3 below provides the estimated breakdown of beneficial recycled water use in WY 2023.

Table 6-3: WY 2023 Recycled Water Use.

Recycled Water Use Sector	WY 2023 Estimated Use[1] (AF)
Urban[2]	270
Agriculture[3]	200
Other[4]	830
TOTAL	**1,300**

1 Data provided in email by the City of Ridgecrest to Stetson Engineers Inc on October 18, 2023.

2 Used for irrigation of golf course on NAWS China Lake.

3 Used for irrigation of alfalfa fields for beneficial re-use.

4 Recycled water not used for urban and agricultural irrigation is disposed of in evaporation/percolation ponds. Approximately 2,060 AF was discharged to the ponds in WY 2023. It is estimated approximately 60 percent of the recycled water discharged to the ponds evaporates, with the remaining 830 AF percolating to the groundwater (Provost and Pritchard Consulting Group, 2015). In addition, these ponds partially support the Mojave Tui Chub habitat on NAWS China Lake.

6.3 Total Water Use

Total water use in the IWVGB during WY 2023 is comprised of groundwater supplies and recycled water supplies. See Chapters 6.1 and 6.2 above for additional detail on these supplies.

Table 6-4: WY 2023 Estimated Total Water Use in the IWVGB.

Use Category	WY 2023 Estimated Total Water Use (AF)
Groundwater Production	19,150
Recycled Water	1,300
TOTAL	**20,450**

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Chapter 7 Other Data Collection and Basin Management Tasks

In WY 2023, the IWVGA has continued its data collection efforts and basin management tasks to improve Basin understanding and monitor groundwater sustainability, in addition to the regular groundwater level monitoring discussed in Chapter 5. These efforts help address the data gaps outlined in the GSP and are listed below:

- Data gaps associated with groundwater monitoring in the El Paso subarea
- Data gaps associated with streamflow and mountain front recharge
- Data gaps associated with the subsurface flow from Rose Valley into IWVGB
- Data gaps associated with the subsurface flow out of IWVGB to Salt Wells Valley
- Data gaps associated with groundwater dependent ecosystems (GDEs)
- Data gaps associated with aquifer properties

Summaries of key tasks are provided below.

7.1 Annual Groundwater Quality Sampling

Twenty-four groundwater quality samples were collected and sent to a laboratory for analysis in October 2022 from twenty monitoring wells and 4 domestic wells within the IWVGB. The purpose of this annual sampling was to obtain representative data to compare to the interim milestones for the sustainable management criteria, augment data in the existing water quality database, and address some data gaps for sustainable management of the IWVGB. Results from this sampling, provided in Attachment H, will be used to refine the existing IWVGB monitoring network (GSP § 354.34), validate the hydrogeologic conceptual model (HCM) (GSP § 354.14), and update the numerical groundwater model (GSP § 354.16) for the 2025 GSP Evaluation.

7.1.1 TDS Results

Salinity, represented by total dissolved solids (TDS), is one of two main groundwater quality constituents of concern in the IWVGB. The lowest observed TDS concentration collected in Fall 2022 was 160 mg/L at monitoring well AB303-05 (952-955 feet depth) and at monitoring well AB303-03 (497-500 feet depth) in the El Paso Subarea. The highest observed TDS concentration collected in Fall 2022 was 19,000 mg/L (572-

575 feet depth) from the deep screen interval of monitoring well 26S/39E-05K01 near the southwest fence line on the Navy Base.

The areal distribution of TDS concentrations from the October 2022 sampling event are displayed on Figure 7-1. Five of the twenty-four wells sampled had TDS concentrations equal to or greater than 1,000 mg/L: 26S/39E-05L01(S) and 26S/39E-05K01(D) near the southwestern Navy fence line, 26S/40E-22E1 and -22E2 near Navy administration buildings, and 27S/40E-01K02 (George Air Corridor) east of Ridgecrest. TDS concentrations above the Secondary Maximum Contaminant Level (SMCL) (500 mg/L) were also present in the northwest, while lower TDS concentrations (<500 mg/L) occurred in the El Paso subarea and along the Sierra Nevada Mountain front. Results from the October 2022 water quality samples are consistent with historical data presented in the January 2020 GSP.

Historical TDS trends are plotted in Figure 7-2 for 11 wells with three or more TDS measurements. TDS results at IWVGB monitoring wells are summarized below.

- Monitoring well 25S/38E-03B is located in the northwest of IWV basin near U.S. Highway 395 by Pearsonville and is screened from 300 to 360 feet below ground surface (bgs). Five TDS samples have been collected from 2007 to 2022. The TDS concentration taken in Fall 2022 was 580 mg/L. This was a decrease of 10 mg/L from Fall 2021 (570 mg/L).

- Domestic well 25S/38E-14A is located in the northwest of IWV basin, southeast of well 03B. Four TDS samples have been collected from 2019 to 2022. TDS concentrations at 25S/38E-14A ranged from 400 mg/L (2020) to 450 mg/L (2021), and then decreased to 430 mg/L in October 2022.

- Domestic well 25S/38E-34A01 is also located in the northwest of IWV near U.S. Highway 395 directly south of 03B. This well is screened from 418.5 to 478.5 ft bgs. Five TDS samples have been collected from this well from 2006 to 2022 with TDS concentrations ranging from 260 mg/L (2006) to 530 mg/L (2019). TDS in 25S/38E-34A01 increased 70 mg/L from 2021 (450 mg/L) to 2022 (520 mg/L).

- Navy monitoring well 25S/39E-03R01 (Baker Range) is located on the northern range of the Navy base, and is screened from 65 to 165 ft bgs. Four TDS samples have been collected from this well from 2019 to 2022. TDS concentrations range from 660 mg/L (2019) to 590 mg/L (2021). TDS in the Baker Range well increased 20 mg/L from 2021 (590 mg/L) to 2022 (610 mg/L).

- Navy monitoring well 25S/39E-12R (Charley Tower) is located near the northern playa on NAWS China Lake. This well is screened from 60 to 140 ft bgs. Twenty-six TDS samples have been

collected from this well from 1953 to 2022. TDS concentrations range from 650 mg/L (July 1978) to 780 mg/L (October 1961). The 2022 TDS concentration of 690 mg/L was a decrease of 30 mg/L from the previous year.

- Domestic well 26S/38E-01M05 is located north of Inyokern. This well is screened from 299 to 359 ft bgs. Water quality samples have been collected from this well during the last three annual sampling events and ranged from 520 mg/L (November 2020) to 570 mg/L (October 2021). The 2022 TDS concentration at 26S/38E-01M05 was measured at 530 mg/L showing a decrease in concentration of 40 mg/L from the previous year.

- Monitoring well 27S/38E-13A02 (AB303-01) is located in the southwest area of the IWVGB just south of Bowman Road and east of Red Rock Canyon Road. This well is screened from 232 to 272 ft bgs, 372 to 472 ft bgs, and 632 to 690 ft bgs. Two TDS samples were collected from this well in 2007 and 2021. TDS concentrations range from 300 mg/L (August 2007) to 340 mg/L (October 2021). The 2022 TDS sample was collected from the mid-level screen with a concentration of 300 mg/L.

- Navy monitoring well 27S/40E-01K02 (George Air Corridor) is east of Ridgecrest on Navy property. This well is screened from 320 to 380 ft bgs. Five TDS samples have been collected from this well from 1953 to 2022. TDS concentrations range from 1,000 mg/L (October 2022) to 1,510 mg/L (June 1972). The 2022 TDS concentration was measured at 1,000 mg/L showing a decrease in concentration of 200 mg/L from the previous year.

El Paso Subarea Monitoring Wells

- Monitoring well 27S/38E-09C01 (AB303-04) is located in the El Paso subarea of the IWVGB near Highway 14. This well is screened from 501 to 581 ft bgs. Four TDS samples have been collected from this well from 2007 to 2022. TDS concentrations range from 290 mg/L (November 2020) to 460 mg/L (August 2007). The current TDS concentration was measured at 290 mg/L,a decrease in concentration of 60 mg/L from 2021 to 2022.

- Monitoring well 27S/38E-21L01 (AB303-05) is located in the El Paso subarea and screened from 905 to 1,005 ft bgs. Five TDS samples have been collected from this well from 2007 to 2022. TDS concentrations range from 160 mg/L (November 2020) to 510 mg/L (August 2007). The 2022 TDS concentration was measured at 160 mg/L, a decrease in concentration of 40 mg/L from 2021 to 2022.

7.1.2 Arsenic Results

Arsenic is the other defined contaminant of concern in the IWVGB. The maximum contaminate level for arsenic in drinking water is 10 µg/L. Figure 7-3 shows the areal distribution of arsenic in groundwater

concentrations from October 2022. The lowest observed arsenic concentrations collected during October 2022 was 1.3 µg/L observed in wells AB303-01 (397-400 ft bgs) and AB303-04 (557-560 ft bgs). The highest observed arsenic concentration was 330 µg/L at Navy monitoring well 26S/40E-22E02 (557-600 ft bgs). These samples will provide a baseline for future arsenic samples collected.

7.2 Los Angeles Department of Water and Power Water Releases

In March 2023, the Los Angeles Department of Water and Power (LADWP) began releasing water from the Los Angeles Aqueduct into the Indian Wells Valley at the following locations: Freeman Wash, Bouder Draw, Indian Wells, Sage Canyon, and Bird Springs. Flow paths indicate that released water from Boulder Draw and Indian Wells Canyon flows into northern IWV stream channels, while water released from Freeman Wash, Sage Canyon and Bird Springs flows into the El Paso subarea. During the Spring 2023 water level measurement, seven (7) dataloggers at monitoring wells along potential flow paths were installed to measure groundwater level changes. In addition, water quality samples of the released water were collected. A report presenting the collected data will be released in WY 2024.

7.3 Rose Valley Subsurface Flow Monitoring and Evaluation

Permitting with the United States Bureau of Land Management (BLM), California State Lands (CSL), and Inyo County was completed during WY 2022 for drilling two new monitoring wells and evaluating a capped former sawmill well south of Little Lake. Drilling of RVS-MID was funded by a Cooperative Agreement with the U.S. Navy. The well was installed in Spring 2023. Since July 6, 2023, a datalogger has been installed in RVS-MID and two manual measurements have been taken. In WY 2023, permitting was pursued for an alternative well site for the second Rose Valley subsurface flow monitoring well. This well is anticipated to be drilled in WY 2024. Groundwater levels from these wells will be used to fill a data gap for estimating subsurface flow from Rose Valley into Indian Wells Valley. In WY 2023, a draft report was prepared to summarize the results of a hydrogeologic analysis of the Rose Valley groundwater Basin and an estimate of the underflow from Rose Valley Groundwater Basin into the IWVGB. This report will be finalized in WY 2024.

7.4 El Paso Monitoring and Evaluation

On January 26, 2021, the IWVGA entered into an agreement with DWR for Technical Support Services to drill and construct one triple-nested monitoring well (EP-01) in the El Paso Subbasin. The well and monitoring equipment was installed in WY 2021. Beginning in 2021, the IWVGA has monitored EP-01 and maintained the data records consistent with other groundwater monitoring program wells; reporting EP-01 groundwater levels to the DMS as well as uploading this data to the DWR SGMA data portal. The IWVGA has continued to work with DWR to obtain telemetry equipment for this well in 2023. This monitoring well is important for filling in groundwater level data gaps in the El Paso Subbasin and defining hydrogeologic characteristics in the Basin.

In WY 2023, a draft report reviewing the hydrogeologic features and groundwater chemistry of the El Paso Subarea was prepared. This report will be finalized in WY 2024.

7.5 Brackish Water Investigation

Brackish water groundwater resources in the IWV have been the subject of ongoing study by the IWVWD and funding partners for several years with the goal of determining feasibility of developing brackish resources as an alternative water supply.

In WY 2023, work continued on preparing the first phase of the Feasibility Study to be submitted to DWR in WY 2024. Most of the brackish water in the IWVGB is believed to be underlying federal property at NAWS China Lake. To date, the U.S. Navy has not permitted drilling or sampling of brackish water on NAWS China Lake in conjunction with this Feasibility Study. Consequently, additional project phases are unlikely to be pursued by the IWVWD.

7.6 Numerical Model

The numerical groundwater model developed for the Indian Wells Valley (IWV) Groundwater Sustainability Plan (GSP), GSP Model, is the primary tool used by the IWVGA TAC and Staff to quantify the occurrence and movement of groundwater, and to develop planning scenarios for managing the water resources of the IWVGB. In 2021, a Configuration Management Plan (CMP) was developed for determining the process of technical review of new data, making recommendations to the GA Board for model updates, and documenting any model revisions. A key component of this plan is the establishment of a

Technical Modeling Group (TMG). At the end of 2022, the TMG prepared a list of groundwater model configuration items (CIs) that was recommended to the GA Board for model updates.

The TMG conducted 25 meetings to implement the Configuration Management Plan during WY 2023. These meetings are summarized in Attachment I. Tasks and subtasks completed in WY 2023 include:

- Task 1 Model Domain Boundary
  - Subtask 1a. Define base of model domain
  - Subtask 1b. Define aerial extent of groundwater basin boundary
- Task 2 Hydrogeologic Conceptual Model
  - Subtask 2a. Inclusion of faults
  - Subtask 2b. Hydrogeologic framework
  - Subtask 2c. Aquifer properties
- Task 3 Hydrologic Budget
  - Subtask 3a. Spatial distribution of mountain-front recharge
  - Subtask 3b. Spatial distribution of bare soil evaporation and evapotranspiration

This work will be used as part of the GSP Plan Amendment in 2025.

7.7 Data Management System

The IWVGA maintains a data management system (DMS) to support SGMA implementation. The SGMA regulations require having a DMS to support a GSA. This DMS consists of both a database part to store data and a public website to present data. Examples of stored data include monitoring data, management criteria, and other supporting documentation. Server logs show the public have been accessing and using DMS. IWVGA has used the DMS website to help inform meetings and improve basin management.

As a software system, operation of the DMS requires periodic maintenance and updates. During WY 2023, IWVGSP spent funding and time to update databases, as well as update software. Database updates included the addition of new groundwater and surface water monitoring data. Other work included more review of existing entries for accuracy. Software updates included security updates and functionality improvements. Additional updates to the DMS will be made, as necessary, to address DWR's RCAs.

7.8 Precipitation Station and Stream Gage Data Collection

The IWVGA collects precipitation and stream flow data from precipitation stations and stream gages installed throughout the IWV. In 2020 IWVGA installed two precipitation stations and two stream gage stations to augment historical and current monitoring location data. During WY 2023, the IWVGA continued to operate these stations and gages, utilizing telemetry to transmit provisional data to the DMS. Various issues were encountered during WY 2023 including issues with flooding and issues with damage and theft of equipment. Data records are posted to the DMS annually concurrent with this Report, and presented in the summary reports in Attachment J.

Various data sets will be used to refine the existing IWV groundwater basin monitoring network (GSP § 354.34), validate the hydrogeologic conceptual model (HCM) (GSP § 354.14), and update the numerical groundwater model (GSP § 354.16) for the GSP Plan Amendment in 2025.

7.9 Groundwater Dependent Ecosystems

Three[10] groundwater dependent ecosystem (GDE) sites were identified by a Navy biologist based on vegetation type during WY 2022. The GDE monitoring program will evolve through the next few years as data are collected and more vegetation surveys are completed. In WY 2023, the U.S. Navy conducted biological surveys at GDE monitoring sites. A report on these surveys is anticipated for WY 2024.

[10] Nine potential groundwater dependent ecosystem (GDE) sites were investigated during August 11, 2021 and June/July 2022 field visits.

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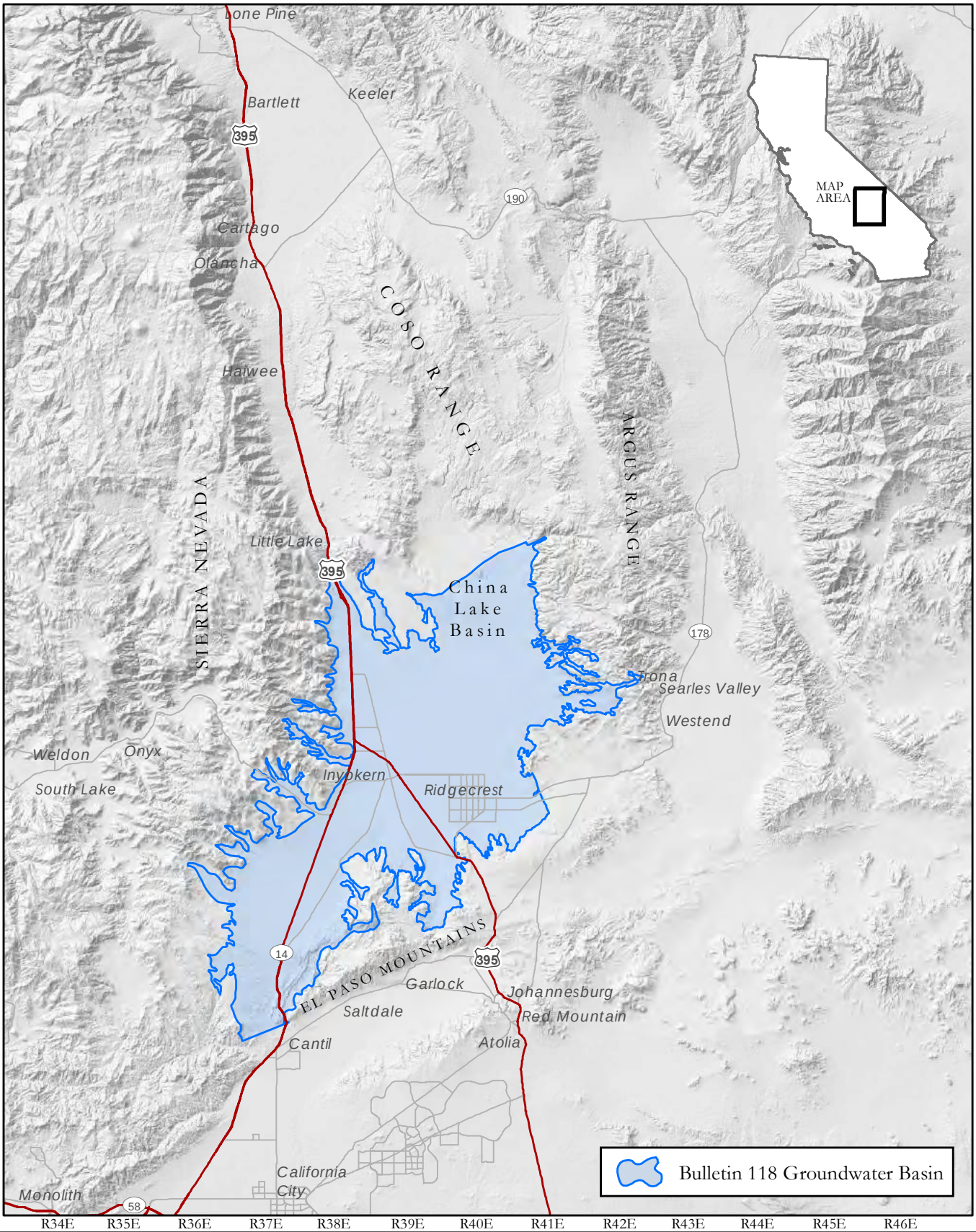
FIGURES



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INDIAN WELLS VALLEY GROUNDWATER BASIN AND INDIAN WELLS VALLEY GROUNDWATER AUTHORITY BOUNDARIES

(DWR BULLETIN 118 BASIN NO. 6-054)

N

0 5 10 Miles

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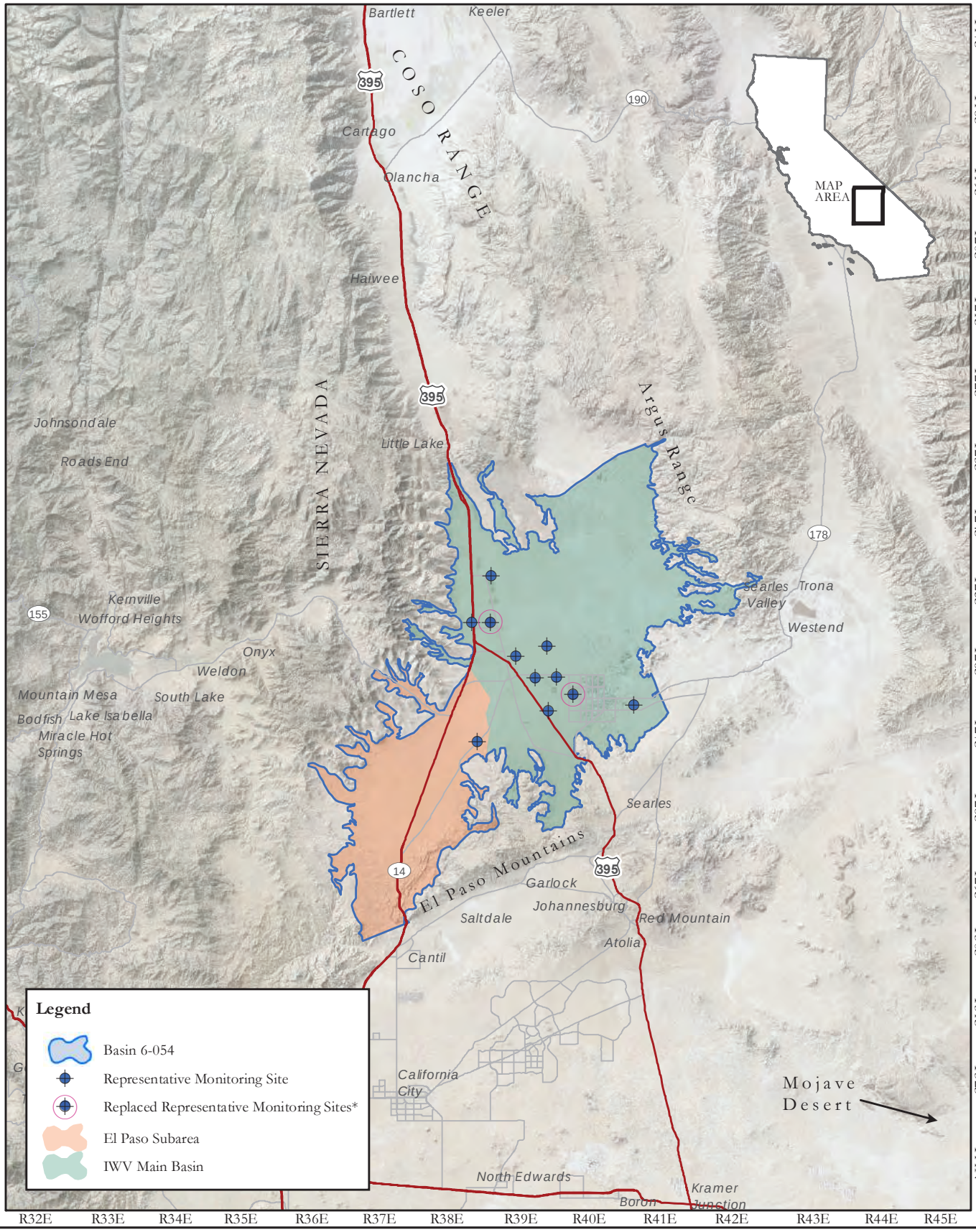

REPRESENTATIVE MONITORING SITES FOR THE CHRONIC LOWERING OF GROUNDWATER LEVELS

INDIAN WELLS VALLEY GROUNDWATER BASIN

*These wells were originally listed as representative monitoring sites in the GSP, but were replaced due to accessing issues.

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N

0 5 10 Miles

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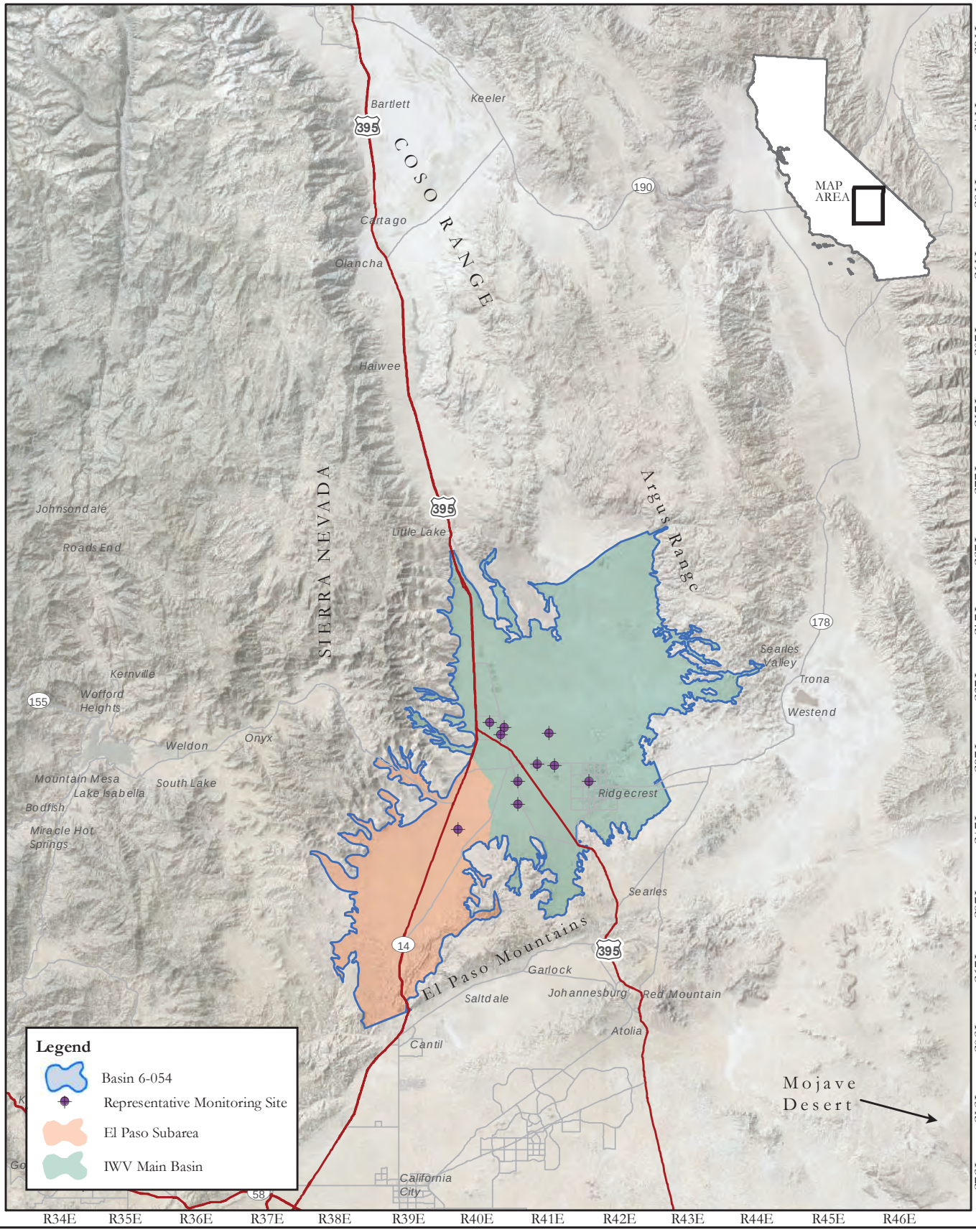

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WATER QUALITY DEGRADATION, REPRESENTATIVE MONITORING SITES
INDIAN WELLS VALLEY

N

0 5 10 Miles

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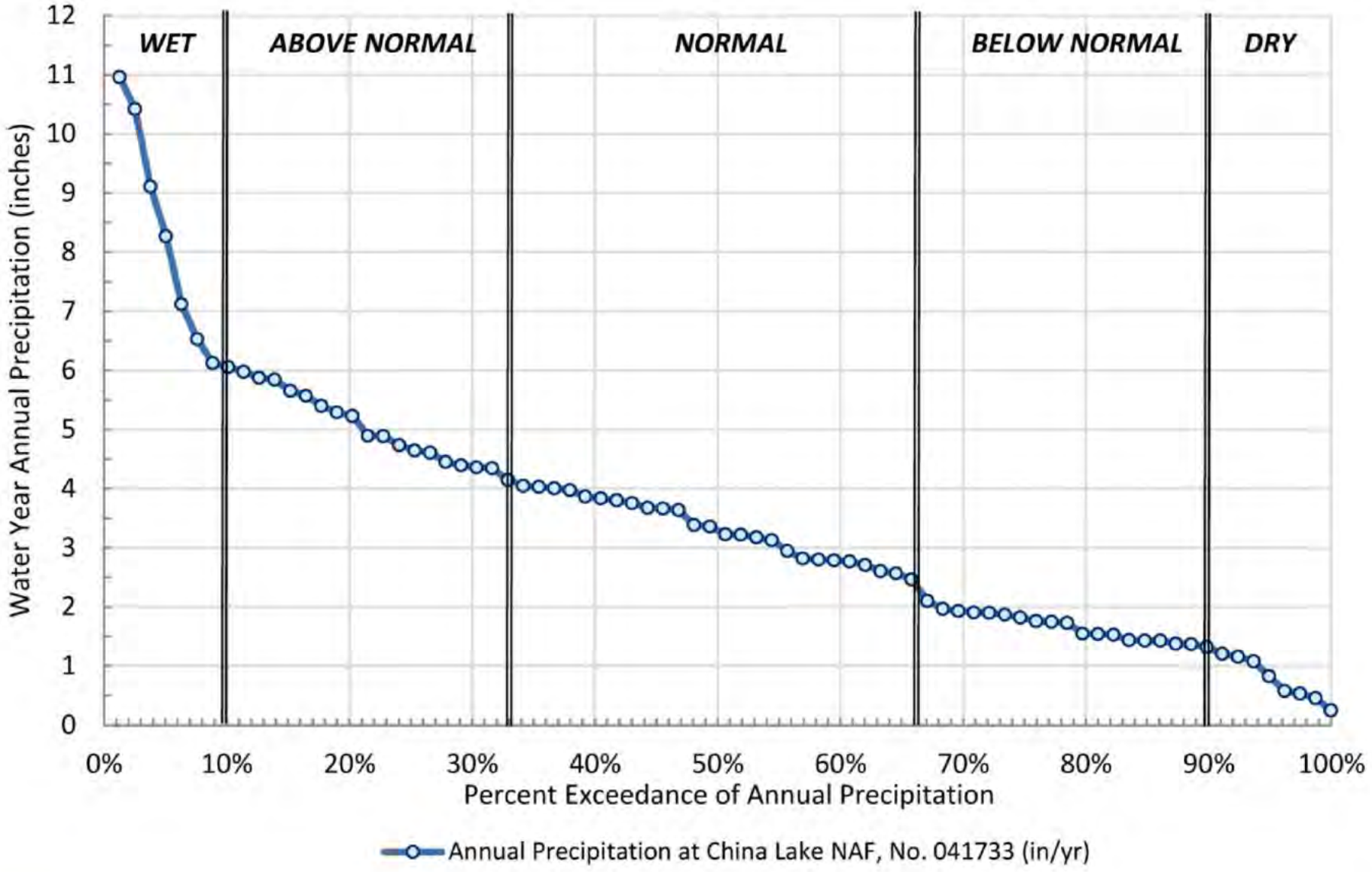
Path: J:\jn2652\IWV_AnnualReport2023.aprx Figure 4-1



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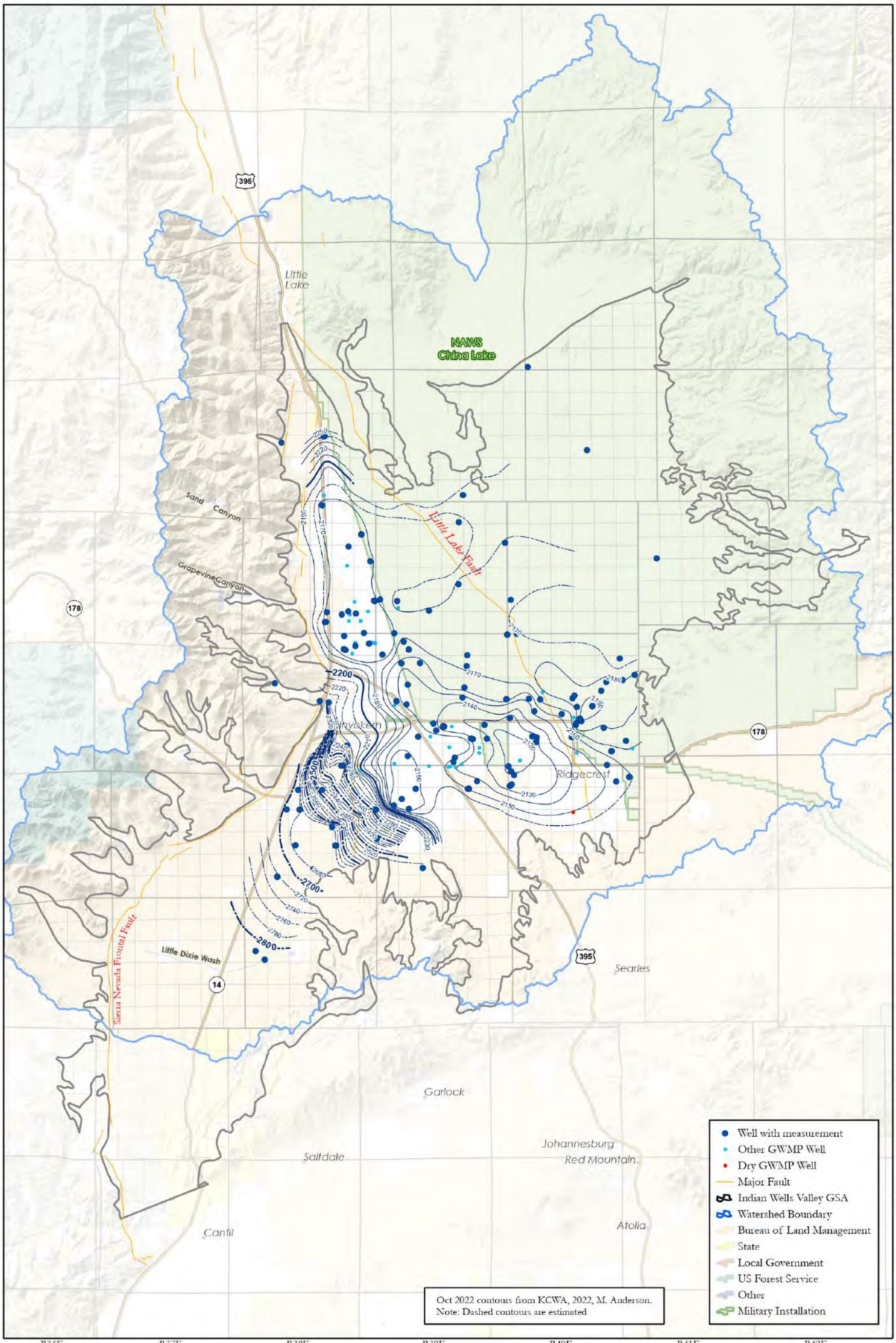
ANNUAL PRECIPITATION EXCEEDANCE IN IWVGB
HYDROLOGIC INDEX WATER YEARS 1945-2023
INDIAN WELLS VALLEY, CA

FIGURE 4-1

Document Path: J:\jn2652\IWVGroundwaterContours.aprx



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ESTIMATED OCTOBER 2022 GROUNDWATER ELEVATION CONTOURS

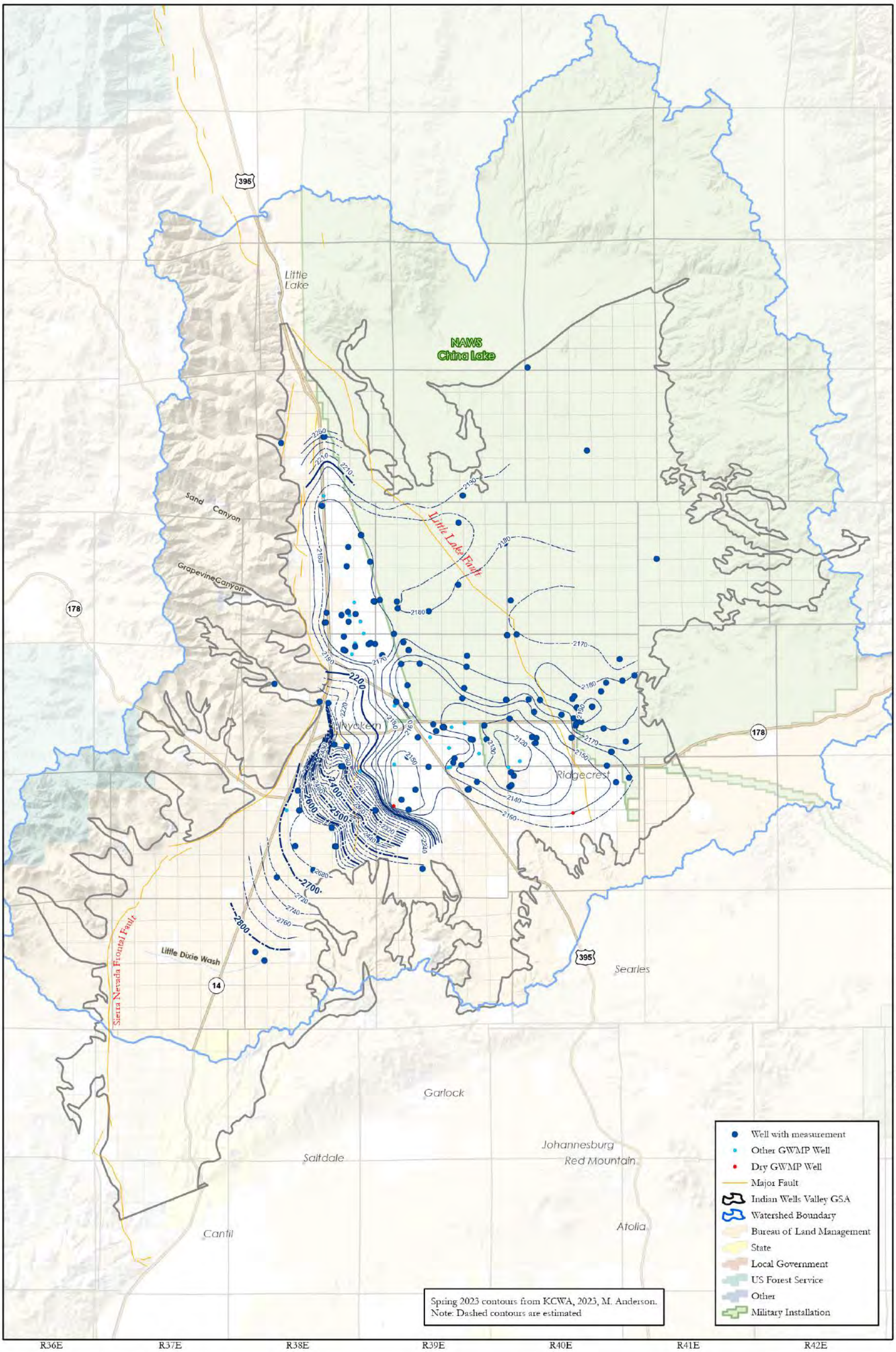
INDIAN WELLS VALLEY

0 2 4 Miles

N

FIGURE 5-1

Document Path: J:\jn2652\IWVGroundwaterContours aprx GWLevel_Elev_Spr2023



STETSON ENGINEERS INC.

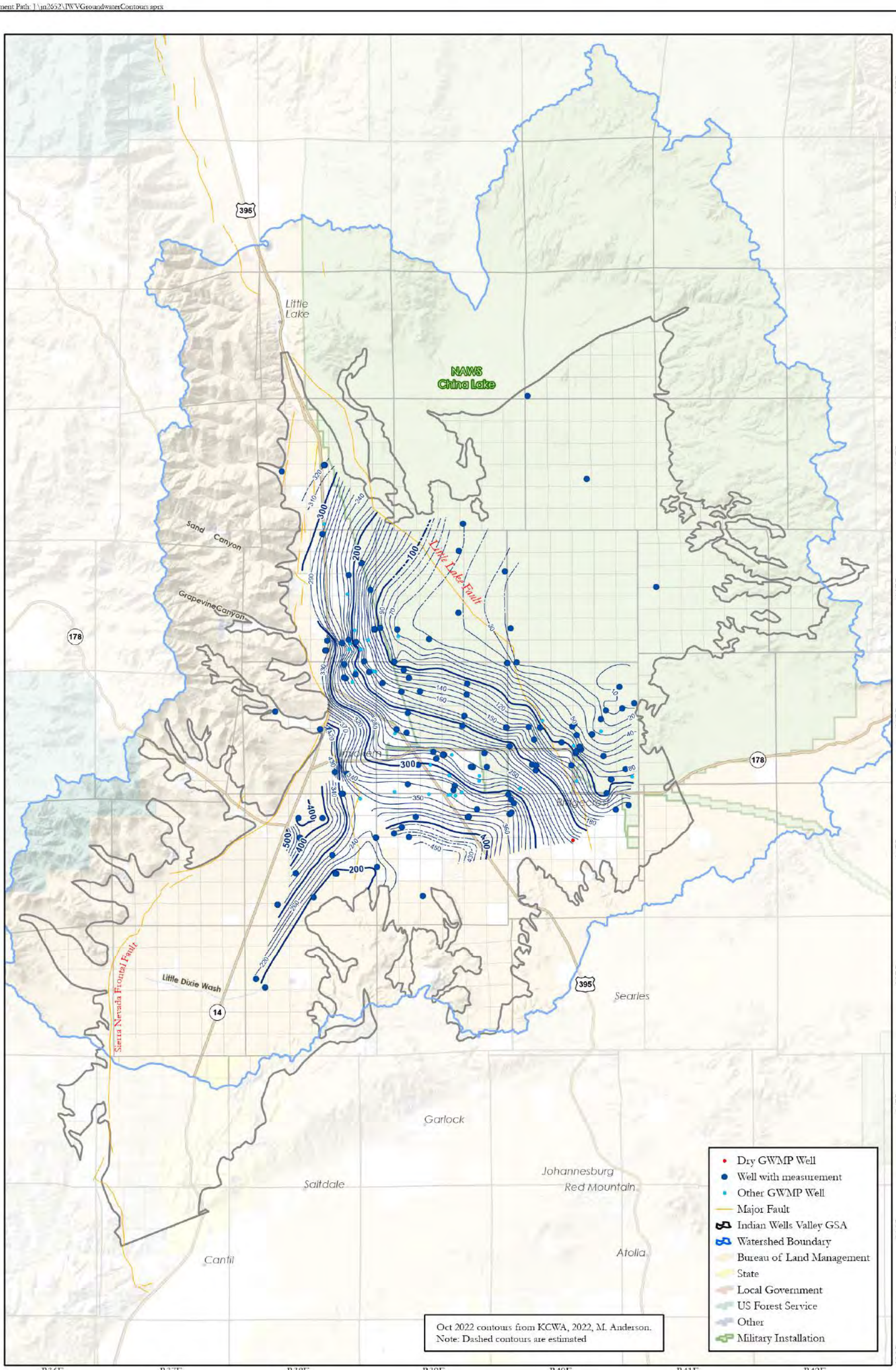
ESTIMATED SPRING 2023
GROUNDWATER ELEVATION CONTOURS
INDIAN WELLS VALLEY

0 2 4 Miles

N

FIGURE 5-2

Document Path: J:\jn2652\IWVGroundwaterContours.aprx



STETSON ENGINEERS INC.

ESTIMATED FALL 2022
GROUNDWATER DEPTH CONTOURS
INDIAN WELLS VALLEY

0 2 4 Miles

N

FIGURE 5-3

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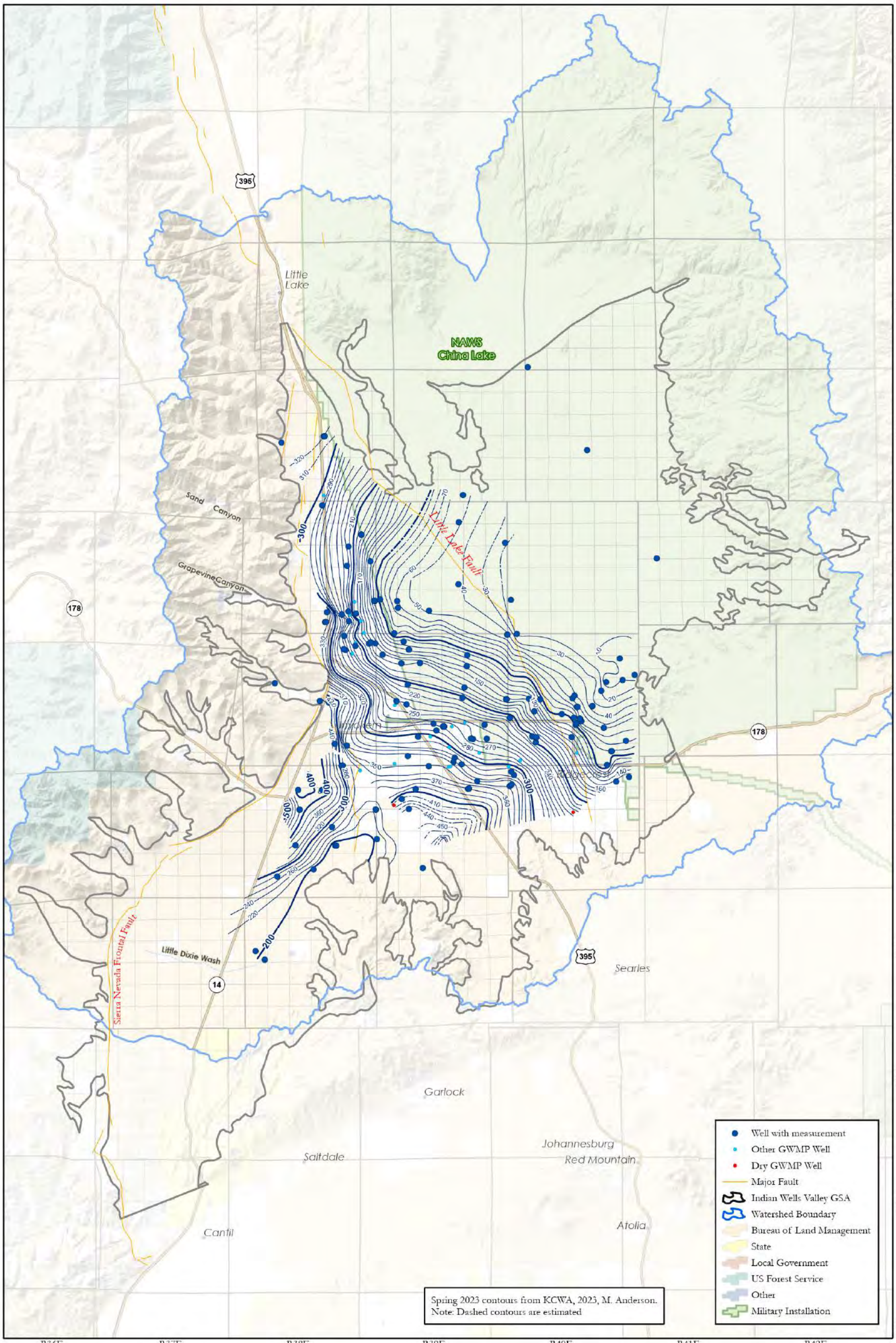

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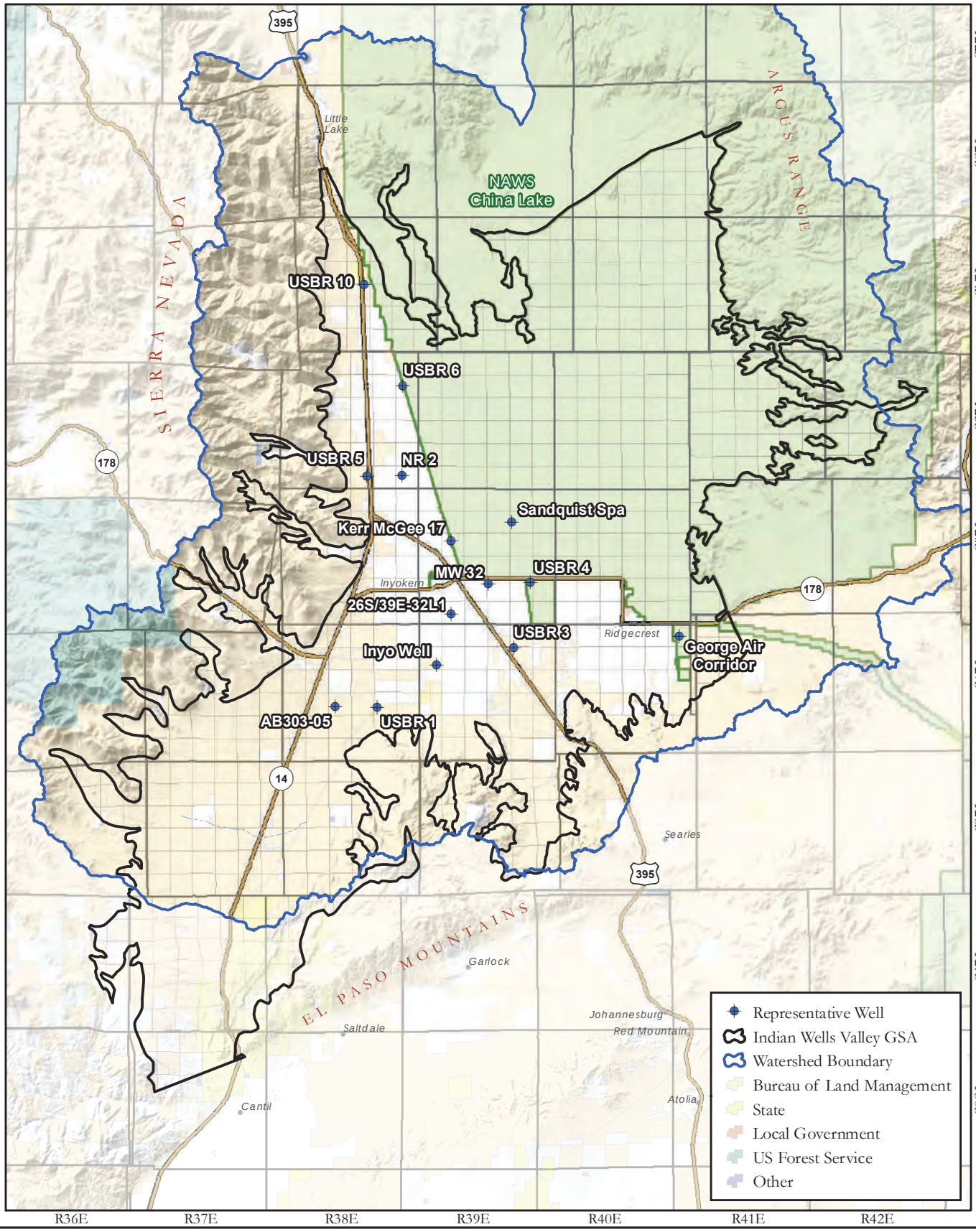
ESTIMATED SPRING 2023
GROUNDWATER DEPTH TO WATER CONTOURS
INDIAN WELLS VALLEY

0 2 4 Miles

N

FIGURE 5-4



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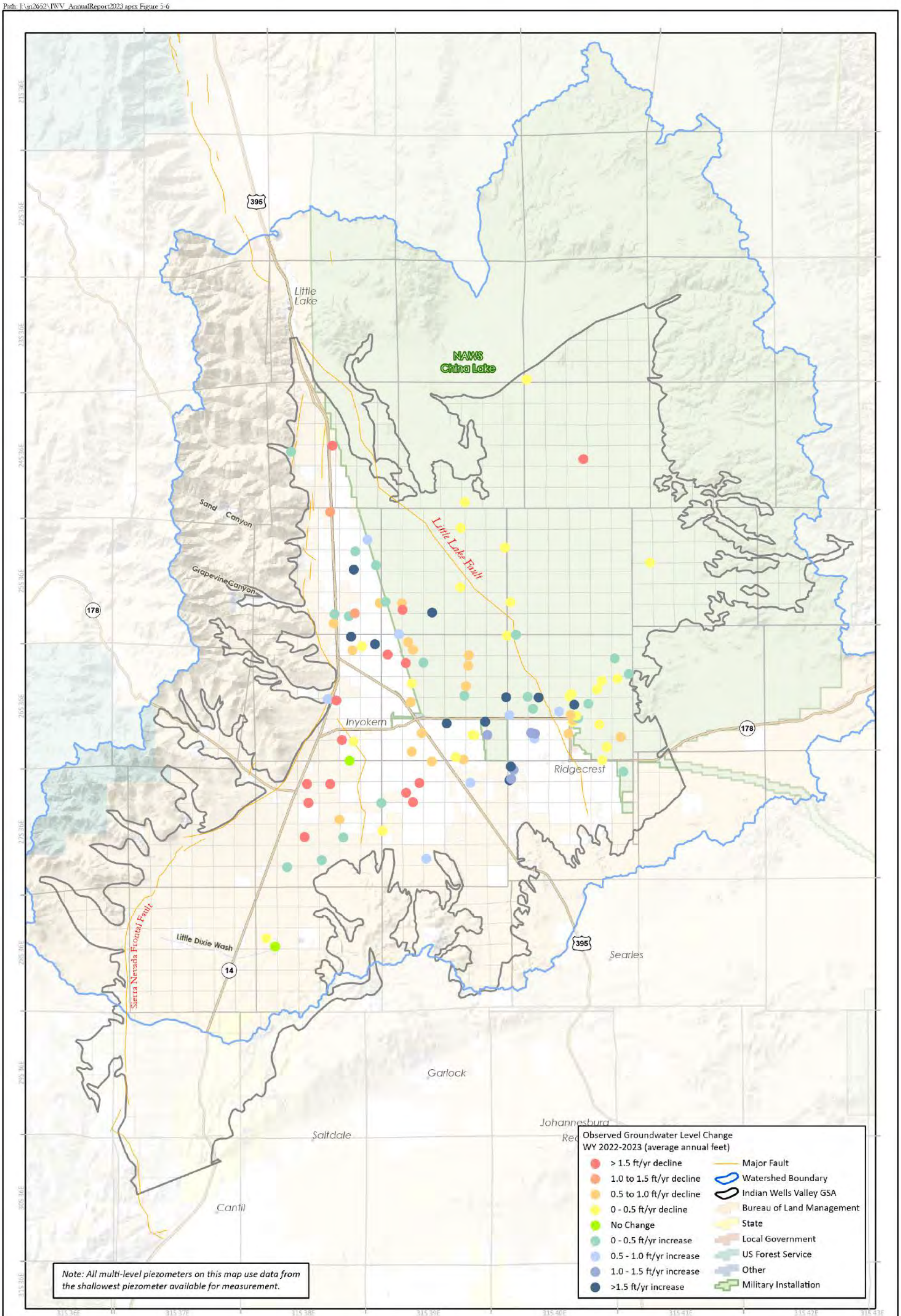
MONITORING WELLS WITH HYDROGRAPHS IN ATTACHMENT E

INDIAN WELLS VALLEY, CA

N

0 3 6 Miles

Path: J:\jn2652\IWV_AnnualReport2023 aprx Figure 5-6



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AVERAGE ANNUAL GROUNDWATER LEVEL CHANGE WY 2022 TO 2023
INDIAN WELLS VALLEY, CA

FIGURE 5-6

Document Path: J:\jn2652\AnnualReport2022_ThiessenPolygons.mxd

T21S
T22S
T23S
T24S
T25S
T26S
T27S
T28S
T29S
T30S
T31S

R36E
R37E
R38E
R39E
R40E
R41E
R42E

- Monitoring Well (DBID)
- Model Fault

Combined Faults (2022)
- California Geological Survey 2010
- USGS 2019 surface fault
- USGS Quaternary fault and fold database 2020

- Thiessen Polygon (2023)
- 12 Polygon Number, Attachment F
- Model Domain
- Watershed Boundary
- Indian Wells Valley GSA
- El Paso Basin
- Main Basin

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DBID: Database ID used in Data Management System (DMS) website iwvgsp.com

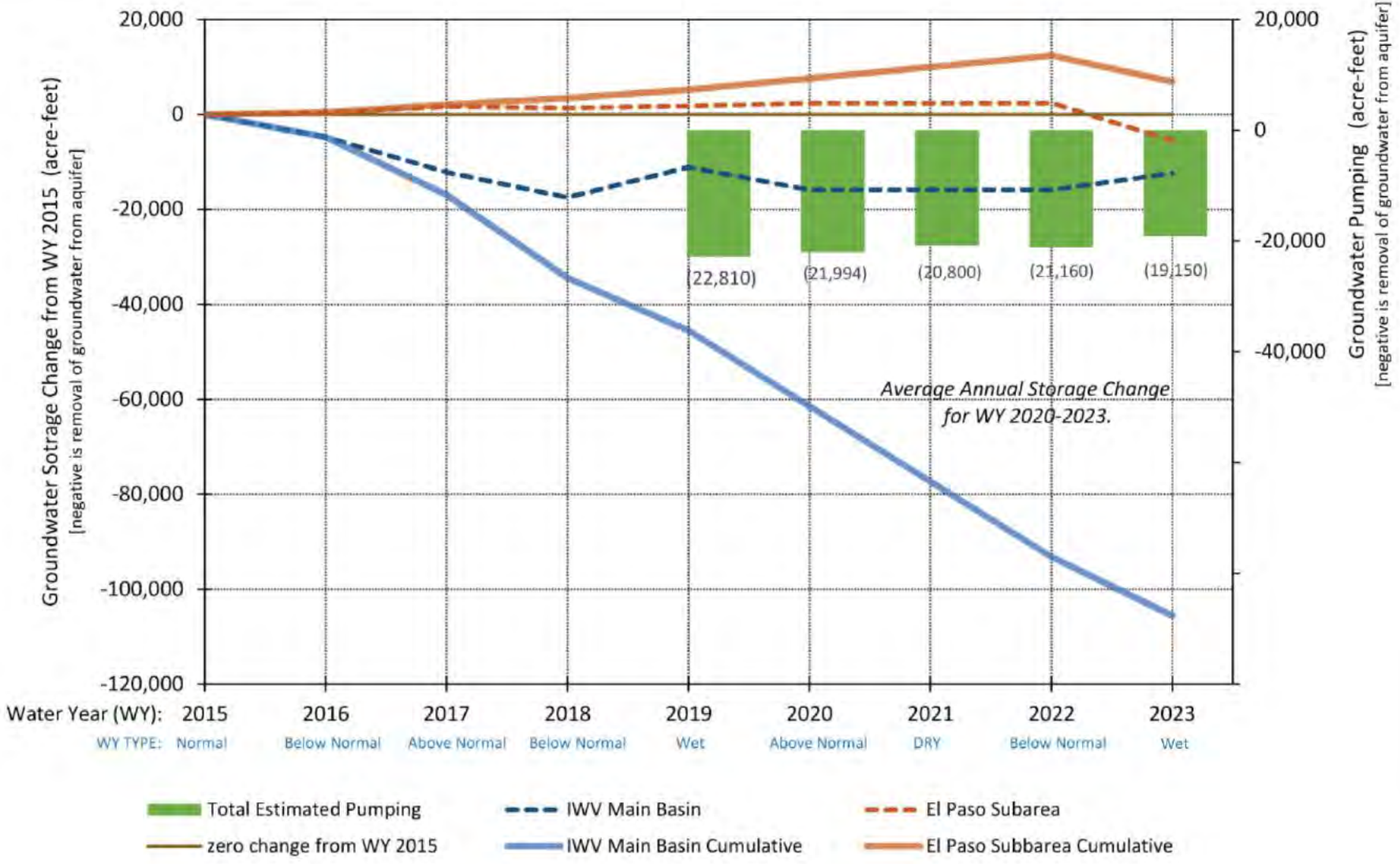
MODIFIED THIESSEN POLYGON METHOD
ESTIMATING CHANGES TO GROUNDWATER IN STORAGE
INDIAN WELLS VALLEY, CA

N

0 2 4 Miles

FIGURE 5-7

Path: J:\jn2652\IWV_AnnualReport2023.aprx Figure 5-8



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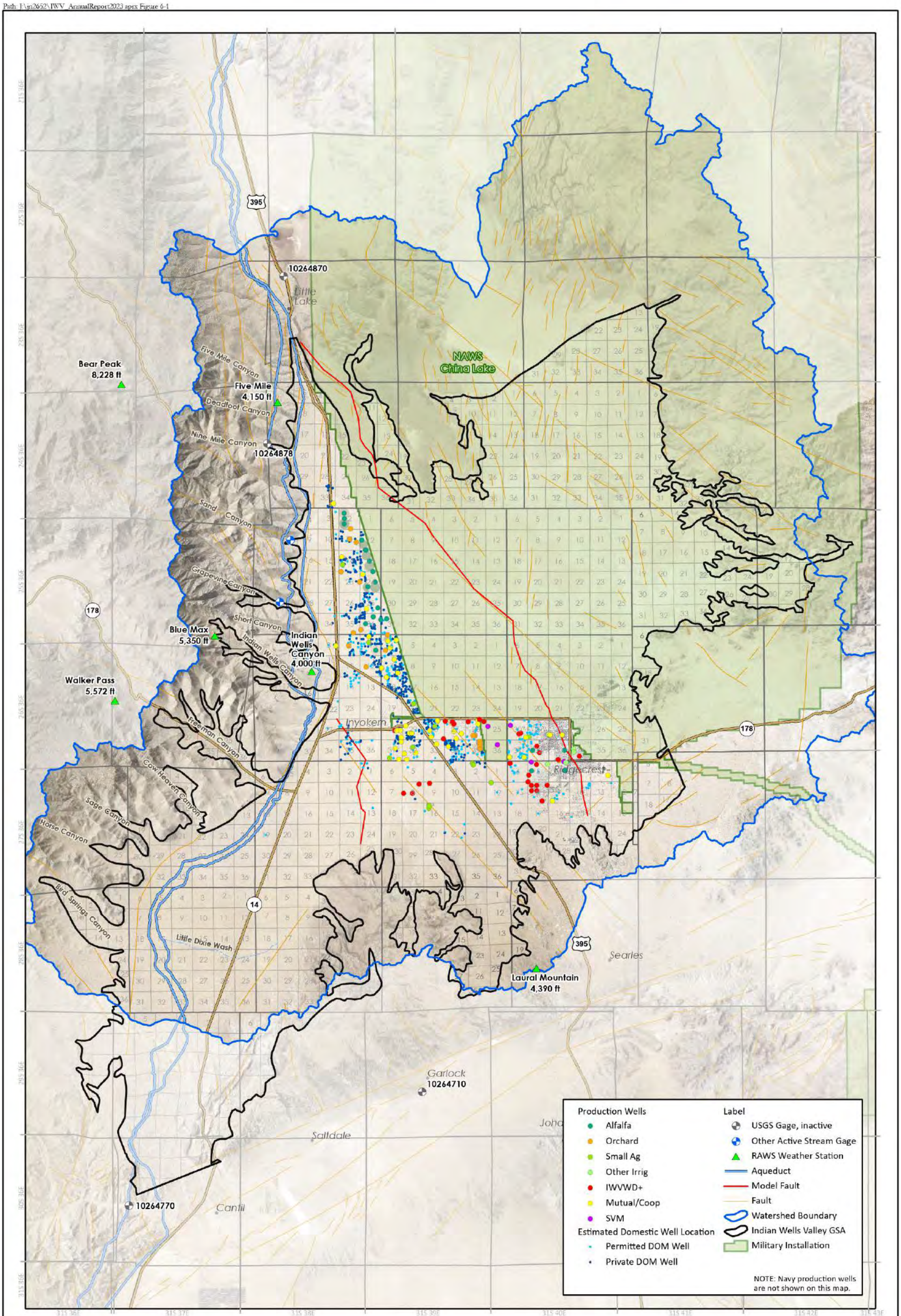
ESTIMATED GROUNDWATER STORAGE CHANGE WY 2016-2023
WITH RECENT GROUNDWATER PUMPING
INDIAN WELLS VALLEY, CA

Note: Groundwater storage change is estimated based on the Thiessen polygon method for measured area of basin (see IWV Annual Report).

FIGURE 5-8

Path: J:\jn2652\IWV_AnnualReport2023 aprx Figure 6-1



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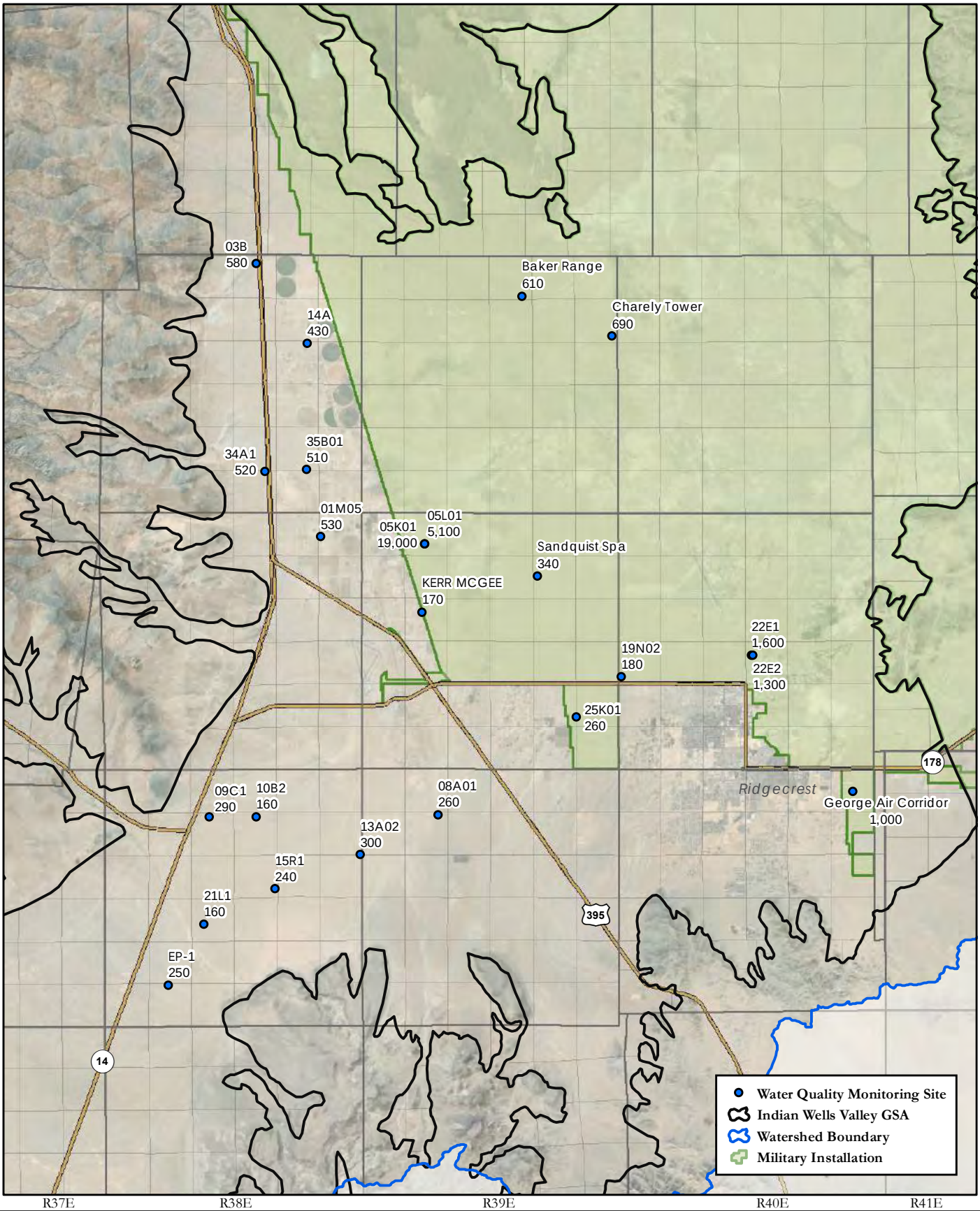
PUMPING WELL LOCATION MAP
INDIAN WELLS VALLEY, CA

FIGURE 6-1



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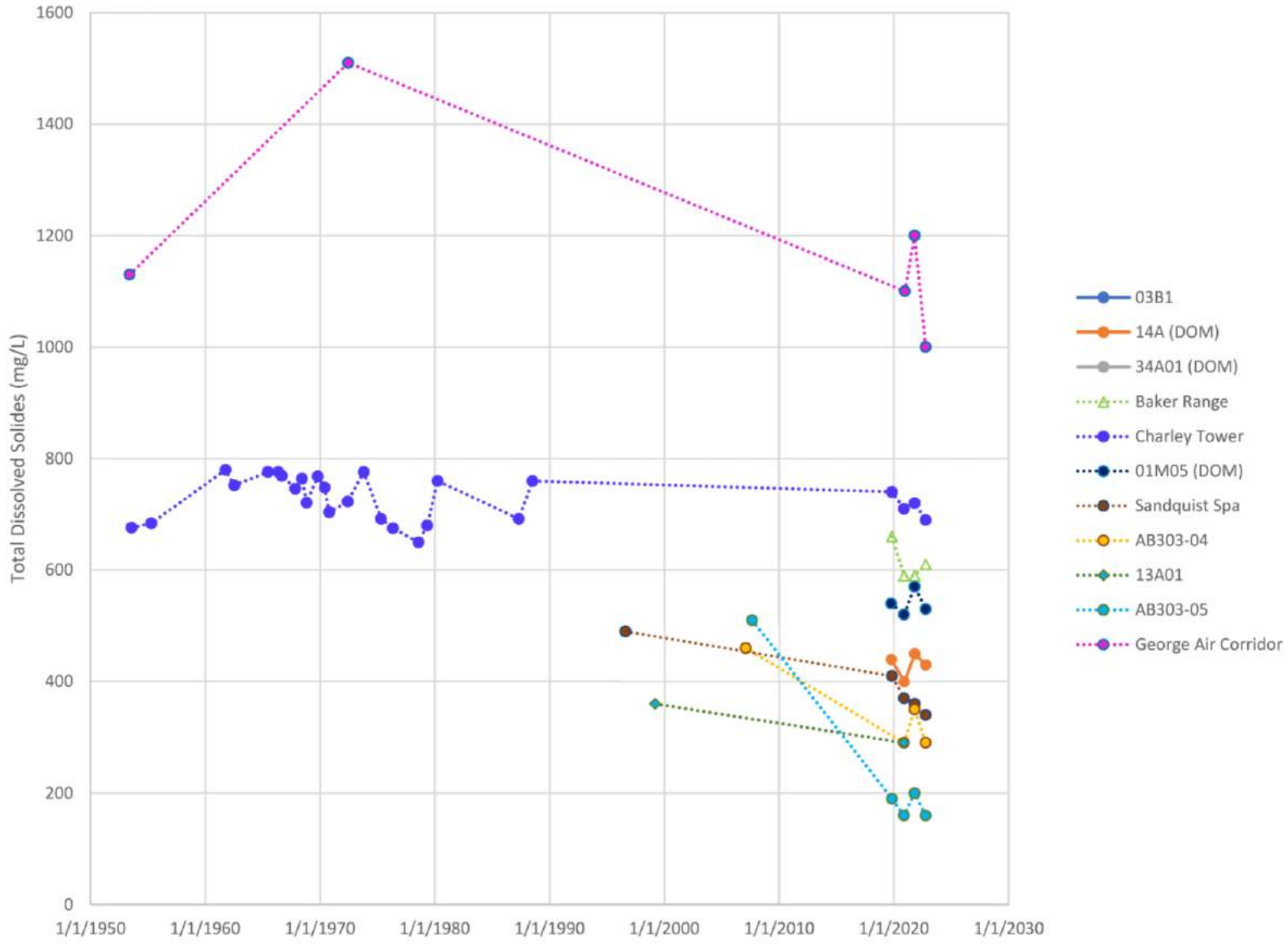
GROUNDWATER QUALITY - TDS
OCTOBER 2022
INDIAN WELLS VALLEY, CA

TDS concentrations are in (mg/L)

N

0 1.5 3 Miles

Path: J:\jn2652\IWV_AnnualReport2023.aprx Figure 7-2



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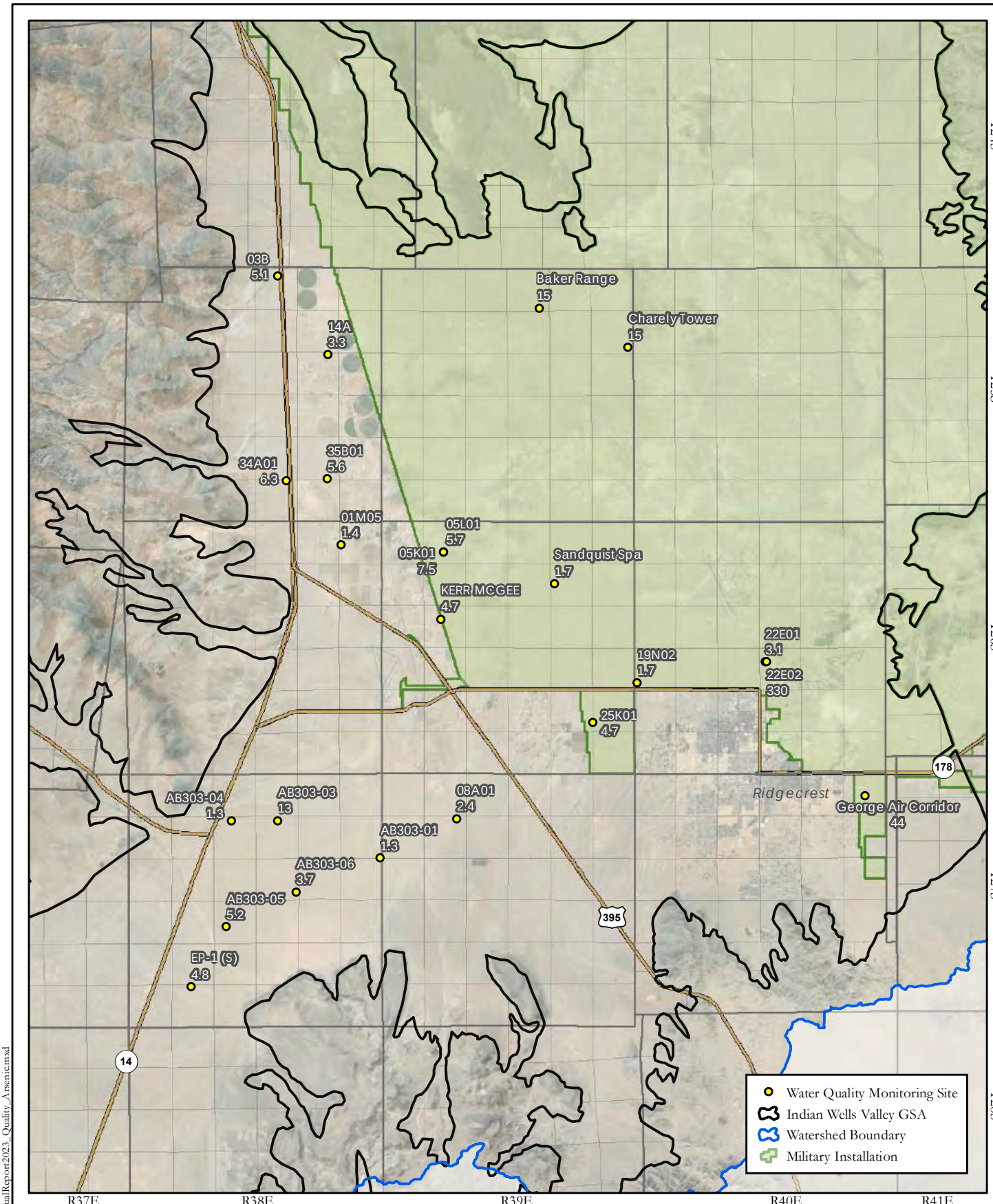
HISTORICAL TDS CONCENTRATIONS
INDIAN WELLS VALLEY, CA

FIGURE 7-2



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GROUNDWATER QUALITY - ARSENIC
OCTOBER 2022
INDIAN WELLS VALLEY, CA

Arsenic concentrations are in (µg/L)

N

0 1.5 3 Miles

Document Path: J:\jn2652\AnnualReport2023_Quality_Arsenic.mxd

ATTACHMENTS

Attachment A

DWR Annual Report Submittal Tables

PART A: GROUNDWATER EXTRACTIONS

Basin Number	Water Year	Total Groundwater Extractions (AF)	Water Use Sector Urban (AF)	Water Use Sector Industrial (AF)	Water Use Sector Agricultural (AF)	Water Use Sector Managed Wetlands (AF)	Water Use Sector Managed Recharge (AF)	Water Use Sector Native Vegetation (AF)	Water Use Sector Other (AF)	Water Use Sector Other Description
6-054	2023 (Oct. 2022 - Sept. 2023)	19150	5620	2570	8110	0	0	0	2850	Other includes Federal Use: (1,380 AF) and Domestic/Mutual/Co-Ops: (1,470 AF)

PART B: GROUNDWATER MODEL ACCURACY DESCRIPTION

Groundwater Model Accuracy Description	Other Method(s) Volume (AF)	Other Method(s) Description	Other Method(s) Type	Other Method(s) Accuracy (%)	Other Method(s) Accuracy Description
	19150	Compilation of data from multiple sources and self-reported data (estimated using various methods) acquired through stakeholder outreach efforts and reporting efforts.			Accuracy is unknown due to data compiled from multiple sources and multiple methods including water meters, electrical meters, population estimates, and land use estimates.

PART C: SURFACE WATER SUPPLY

Basin Number	Water Year	Methods Used To Determine	Water Source Type Central Valley Project (AF)	Water Source Type State Water Project (AF)	Water Source Type Colorado River Project (AF)	Water Source Type Local Supplies (AF)	Water Source Type Local Imported Supplies (AF)	Water Source Type Recycled Water (AF)	Water Source Type Desalination (AF)	Water Source Type Other (AF)	Water Source Type Other Description
6-054	2023 (Oct. 2022 - Sept. 2023)	Methods include meters and estimates based on total treatment plant influent.	0	0	0	0	0	1300	0	0	

PART D: TOTAL WATER USE

Total Water Use (AF)	Methods Used To Determine	Water Source Type Groundwater (AF)	Water Source Type Surface Water (AF)	Water Source Type Recycled Water (AF)	Water Source Type Reused Water (AF)	Water Source Type Other (AF)	Water Source Type Other Description	Water Use Sector Urban (AF)	Water Use Sector Industrial (AF)	Water Use Sector Agricultural (AF)	Water Use Sector Managed Wetlands (AF)	Water Use Sector Managed Recharge (AF)	Water Use Sector Native Vegetation (AF)	Water Use Sector Other (AF)	Water Use Sector Other Description
20450		19150	0	1300	0	0		5890	2570	8310	0	0	0	3680	Other includes Federal Use: (1,380 AF), Domestic/Mutual/Co-Ops: (1,470 AF), and recycled water percolation/habitat support (830 AF).

Attachment B

Historical Water Year Types Based on Precipitation at China Lake NAF

(No. 041733)

WY	Annual Precipitation at China Lake NAF, No. 041733 (in/yr)	Water Year Type	WY	Annual Precipitation at China Lake NAF, No. 041733 (in/yr)	Water Year Type
1945	4.90	AN	1985	2.79	N
1946	2.77	N	1986	4.15	AN
1947	3.81	N	1987	2.82	N
1948	1.97	BN	1988	5.40	AN
1949	1.21	D	1989	1.37	BN
1950	1.90	BN	1990	1.43	BN
1951	0.25	D	1991	3.84	N
1952	4.89	AN	1992	9.11	W
1953	1.75	BN	1993	7.12	W
1954	2.80	N	1994	1.08	D
1955	1.93	BN	1995	5.23	AN
1956	1.73	BN	1996	1.91	BN
1957	2.10	N	1997	2.71	N
1958	4.45	AN	1998	6.06	W
1959	2.47	N	1999	1.53	BN
1960	3.13	N	2000	1.76	BN
1961	1.82	BN	2001	4.36	AN
1962	3.87	N	2002	0.54	D
1963	4.03	N	2003	4.35	AN
1964	1.54	BN	2004	3.22	N
1965	4.74	AN	2005	5.88	AN
1966	5.85	AN	2006	2.61	N
1967	2.57	N	2007	0.46	D
1968	4.65	AN	2008	3.18	N
1969	5.29	AN	2009	1.16	D
1970	3.68	N	2010	3.36	N
1971	2.95	N	2011	3.98	N
1972	1.55	BN	2012	1.32	BN
1973	3.76	N	2013	0.83	D
1974	5.98	AN	2014	1.44	BN
1975	3.39	N	2015	3.67	N
1976	3.64	N	2016	1.38	BN
1977	4.01	N	2017	4.61	AN
1978	10.96	W	2018	1.43	BN
1979	6.53	W	2019	6.13	W
1980	5.66	AN	2020	5.57	AN
1981	3.23	N	2021	0.58	D
1982	4.40	AN	2022	1.87	BN
1983	10.42	W	2023	8.27	W
1984	4.05	N			

Attachment C

Groundwater Monitoring Program Updates

STETSON ENGINEERS INC.

TECHNICAL NOTE

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Phone: (760) 730-0701 FAX: (415) 457-1638 Web site: www.stetsonengineers.com

November 2023

GROUNDWATER MONITORING PROGRAM UPDATES

Groundwater levels have been measured in IWV groundwater basin since the 1920's. Starting in 1989, the Kern County Water Agency (KCWA), the Naval Air Weapons Station (NAWS), and multiple other entities (USGS, BLM, USBR, and IWVWD) collected depth to water (DTW) measurements within the basin. In 1995, the IWV Cooperative Groundwater Management Group was formed to coordinate monitoring and management efforts of groundwater level data across IWV. The management of this program was taken over by the Indian Wells Valley Groundwater Authority (IWVGA) in 2018.

At the time the program was taken over by the IWVGA, KCWA measured 198 DTW levels in 171 groundwater wells and 9 multi-level groundwater wells (27 piezometers)[1]. Wells monitored consists of private and public water production wells and monitoring wells. These data provide a strong foundation for understanding the trends and state of water resources within the Basin.

Since 2018, updates have been made to the monitoring program to assure that the GWMP is representative of current basin monitoring. Depth to water is measured at accessible monitoring wells during Spring (March) and Fall (October) to observe seasonal changes in groundwater levels. The existing WY 2023 program contains 176 monitoring wells throughout the basin including 10 multi-level monitoring wells (30 piezometers), 47 domestic wells, and 60 wells on the Navy base. The wells in the existing WY 2023 GWMP have varying supporting data, with limited well log and construction data. Table 1 summarizes existing wells monitored for groundwater levels by different areas within the IWVGB.

The Water Resource Manager continues an ongoing effort to fill in data gaps and update the monitoring wells included in the GWMP. Table 2 and Table 3 detail wells added to and removed from the GWMP, respectively. Figure 1 shows the current GWMP and changes made since the Water Year 2022 Indian Wells Valley GSP Annual Report.

- *Removal of 5 Wells from the GWMP* – Five wells were removed from the GWMP during the WY 2023 review. Wells removed from the GWMP are listed below.
    1. **25S/38E-35A (Domestic)** – Well 35A is a domestic well monitored by KCWA. KCWA has encountered issues accessing this well dating back to 2002. Both KCWA and the

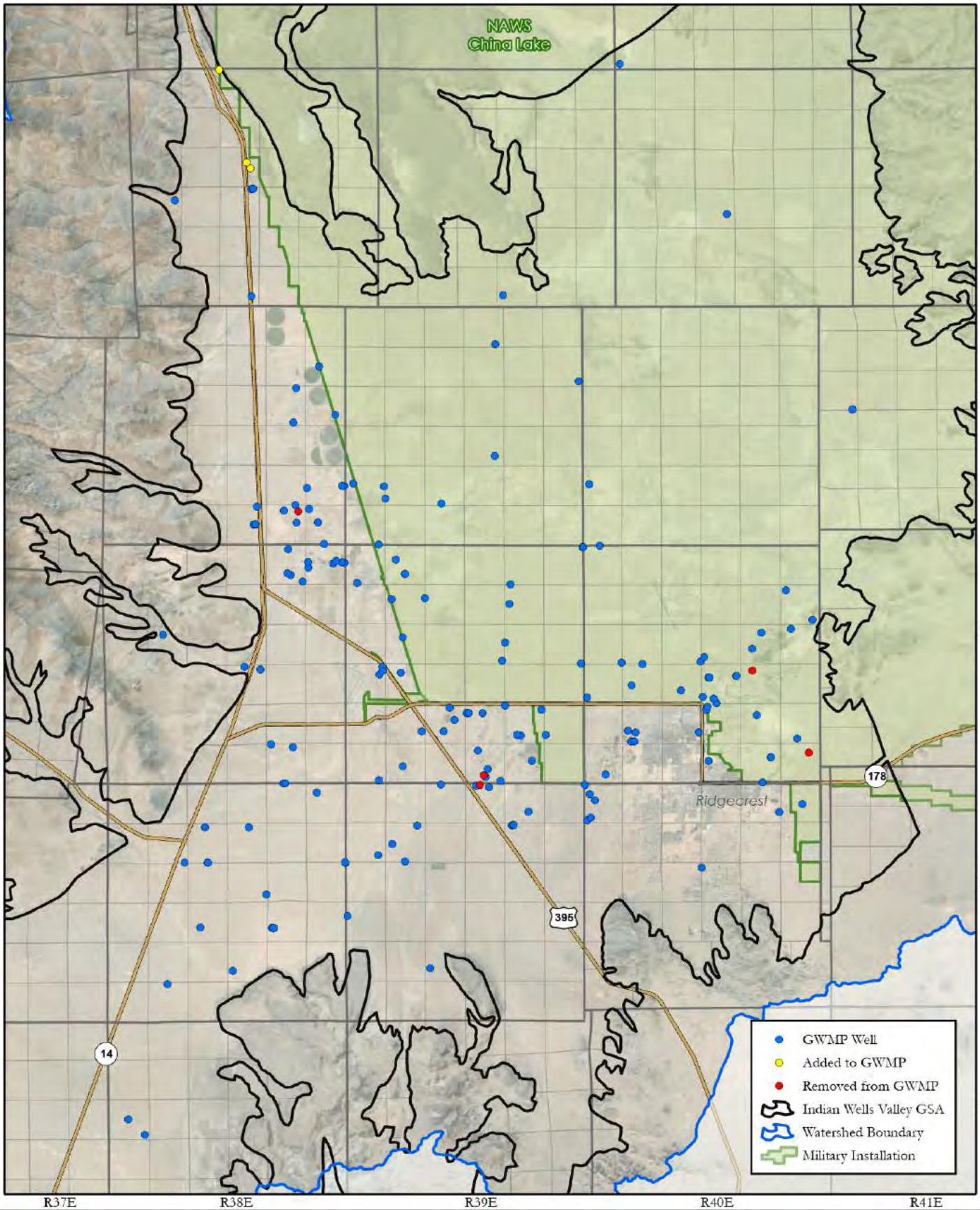
[1] These wells are described in Section 3.6 of the Groundwater Sustainability Plan (GSP, 2020).

IWVGA have been unable to re-establish contact with the owner of this well, and as a result DTW measurements have been discontinued. The last DTW measurement at this well was in October 2018.

2. **26S/39E-34P04 (Domestic)** – Well 34P04 is a domestic well monitored by KCWA. KCWA has been locked out of this well since 2019. Both KCWA and the IWVGA have been unable to reestablish contact with the owner of this well, and as a result DTW measurements have been discontinued. The last DTW measurement at this well was in October 2018.
3. **26S/40E-23C01 (Navy)** – Well 23C01 is a monitoring well monitored located on NAWS China Lake and monitored by Navy personnel. Well 23C01 has been dry since 2006, and as such, Navy personnel have requested measurements at this well be discontinued.
4. **26S/40E-36A01 (Navy)** – Well 36A01 is a monitoring well monitored located on NAWS China Lake and monitored by Navy personnel. Well 36A01 has been dry since 2010, and as such, Navy personnel have requested it be measurements at this well be discontinued.
5. **27S/39E-03C02 (Domestic)** – Well 03C02 is a domestic well monitored by KCWA. KCWA has encountered issues accessing this well dating back to 2014. Both KCWA and the IWVGA have been unable to re-establish contact with the owner of this well, and as a result DTW measurements have been discontinued. The last DTW measurement at this well was in March 2019.

- *Addition of 3 Wells to the GWMP* – Three wells were added to the GWMP since WY 2022. Wells were added to fill data gaps and provide new groundwater levels. Wells added to the GWMP are detailed below.
    1. **24S/38E-16J (Sawmill Well 1)** – Well Sawmill Well 1 was added to the GWMP in Spring 2023. This well was an existing monitoring well added to fill groundwater level data gaps in the northern basin. A Solinst levelogger has been installed in this well. Groundwater level data and DTW levels in this well will be collected biannually by the IWVGA.
    2. **24S/38E-16 (Sawmill Well 4)** – Sawmill Well 4 was a monitoring well added to the GWMP in Spring 2023. This well was an existing monitoring well added to fill groundwater level data gaps in the northern basin. Groundwater level data and DTW levels in this well will be collected biannually by the IWVGA.
    3. **24S/38E-04D01 (RVS-Mid)** – RVS-Mid was drilled in 2023 in the northern basin area to monitor Rose Valley subflow. A Solinst levelogger has been installed in this well. DTW levels in this well will be collected biannually by the IWVGA.

In WY 2023, 9 domestic wells and 11 monitoring, stock, cathode, or irrigation wells were unable to be accessed in both Fall 2022 and Spring 2023. The IWVGA, with assistance from KCWA, are investigating the possibility of re-establishing access to these wells. In Fall 2022 and Spring 2023, the IWVGA has 1) been unable to contact current well owners; or 2) property ownership has changed, and the IWVGA is attempting to contact new well owners. Changes and updates to the GWMP will continue as new wells are added or removed from the program.



STETSON ENGINEERS INC.

WY 2023
GROUNDWATER MONITORING PROGRAM UPDATES
INDIAN WELLS VALLEY, CA

N

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Table 1: Indian Wells Valley Groundwater Monitoring Program (GWMP

Blue Text *indicates a column count*

176						60
DBID	State ID	Alternate Well Name	Latitude (NAD83)	Longitude (NAD83)	Well Type	NAVY
1	28S/38E-18R	Black Hills Well	35.49364	-117.92094	Stock	
2	28S/38E-18F01		35.49928	-117.92844	Stock	
5	27S/38E-27M01	USNS-03	35.55387	-117.88132	MW	
6	27S/39E-28L01	Rock Quarry	35.55472	-117.79253	Dom	
7	27S/38E-23F01	USBR 1-S	35.56959	-117.86289	MW	
8	27S/38E-23F02	USBR 1-SM	35.56968	-117.86369	MW	
10	27S/38E-23F04	USBR 1-D	35.56968	-117.86369	MW	
11	27S/38E-21L01	AB303-05	35.56985	-117.89592	MW	
12	27S/39E-19E01	IWV MW #3	35.57400	-117.82969	Stock	
13	27S/38E-15R01	AB303-06	35.58195	-117.86617	MW	
15	27S/40E-15D01	Bucket Well	35.59143	-117.67011	Dom	
16	27S/38E-13A01	Sea Bee Well	35.59345	-117.83060	MW	
17	27S/38E-09Q02	AB303-02	35.59362	-117.89262	MW	
18	27S/38E-09P01	Father Crowley	35.59363	-117.89246	MW	
19	27S/38E-08R01		35.59367	-117.90300	MW	
20	27S/38E-13A02	AB303-01	35.59369	-117.83070	MW	
21	27S/39E-08P02	IWV MW # 2	35.59393	-117.80371	MW	
22	27S/39E-07R01	Inyo	35.59634	-117.81589	MW	
23	27S/39E-08M02	IWV MW #1	35.60045	-117.80947	MW	
24	27S/38E-10B02	AB303-03	35.60662	-117.87407	MW	
25	27S/38E-09C01	AB303-04	35.60665	-117.89378	MW	
26	27S/39E-11D01	USBR 3-S	35.60731	-117.75485	MW	
27	27S/39E-11D02	USBR 3-M	35.60718	-117.75563	MW	
28	27S/39E-11D03	USBR 3-D	35.60718	-117.75563	MW	
30	27S/40E-06D01	Dist. Well 12	35.62198	-117.72253	MW	
31	27S/40E-06N02		35.60898	-117.72155	Dom	
32	27S/40E-06N01		35.60996	-117.72005	Dom	
36	27S/40E-01K02	George Air Corridor	35.61470	-117.62469	MW	
37	27S/40E-06F01		35.61629	-117.71810	Dom	
40	27S/40E-06E01		35.61855	-117.72040	Dom	
41	27S/39E-03B01		35.62127	-117.76580	Dom	
43	27S/39E-03C01		35.62174	-117.77157	Dom	
44	27S/39E-04C01		35.62224	-117.78752	Dom	
46	27S/38E-02C01	USBR 2-S	35.62280	-117.85761	Stock	
47	27S/38E-02C02	USBR 2-M	35.62274	-117.85841	Stock	
48	27S/38E-02C03	USBR 2-D	35.62274	-117.85841	Stock	
50	26S/40E-35Q02	S.E. Line	35.62274	-117.64257	Stock	✓
51	26S/39E-34R02		35.62351	-117.76068	Dom	
53	26S/40E-31K01		35.62580	-117.71330	Dom	
56	26S/39E-34K03		35.62791	-117.76635	Dom	
57	26S/39E-32L01		35.62902	-117.80461	Dom	

Table 1: Indian Wells Valley Groundwater Monitoring Program (GWMP

Blue Text *indicates a column count*

176						60
DBID	State ID	Alternate Well Name	Latitude (NAD83)	Longitude (NAD83)	Well Type	NAVY
58	26S/39E-35G01		35.63079	-117.74730	Irr	
59	26S/39E-31R03	Donna Sue Water Co.	35.62389	-117.81543	Dom	
63	26S/40E-35H01	Satellite Lake 1 (west)	35.63191	-117.63896	Stock	✓
64	26S/40E-35H02	Satellite Lake 2 (east)	35.63191	-117.63869	Stock	✓
72	26S/40E-29N01		35.63792	-117.70175	Dom	
73	26S/40E-29P01		35.63791	-117.70032	Dom	
75	26S/39E-26P01		35.64024	-117.75147	Irr	
76	26S/39E-26P02		35.64052	-117.75313	Irr	
77	26S/39E-29J02		35.64181	-117.79611	Dom	
78	26S/39E-28L02		35.64182	-117.78619	Dom	
80	26S/39E-28G02		35.64601	-117.78135	Dom	
82	26S/40E-26F01		35.64746	-117.64508	Stock	✓
84	26S/39E-27D02	MW 32-SM	35.64852	-117.77493	MW	
85	26S/39E-27D03	MW 32-DM	35.64857	-117.77591	MW	
86	26S/39E-27D04	MW 32-D	35.64857	-117.77591	MW	
87	26S/40E-27D02		35.64941	-117.66785	Stock	✓
88	26S/39E-26A03	USBR 4-SM	35.64966	-117.74213	MW	
90	26S/39E-28B03		35.65050	-117.78352	Dom	
92	26S/40E-27D01		35.65052	-117.66730	Stock	✓
94	26S/39E-20L		35.66560	-117.81374	Stock	
95	26S/40E-22P02	PW Substation 3	35.65191	-117.66313	Stock	✓
97	26S/40E-22P03	PW Substation 1	35.65357	-117.66452	MW	✓
98	26S/40E-22P04	PW Substation 2	35.65357	-117.66452	MW	✓
100	26S/40E-19N02		35.65413	-117.72147	MW	✓
101	26S/40E-22N01		35.65423	-117.66940	Stock	✓
103	26S/40E-21K03		35.65663	-117.67924	Stock	✓
104	26S/40E-20L01		35.65857	-117.70147	Stock	✓
105	26S/40E-22H01		35.66190	-117.65424	Stock	✓
106	26S/40E-22H02		35.66190	-117.65424	Stock	✓
107	26S/40E-22H03		35.66190	-117.65424	Stock	✓
108	26S/39E-20N01	ICSD MW #2	35.66274	-117.81508	MW	
109	26S/39E-20C02		35.66337	-117.80541	Dom	
112	26S/39E-20N02	ICSD MW #3	35.66413	-117.81369	MW	
114	26S/38E-22D		35.66566	-117.87597	MW	
115	26S/39E-13R03	USNS-01	35.66663	-117.72424	Stock	✓
116	26S/39E-13R04		35.66663	-117.72424	MW	✓
117	26S/40E-17N01		35.66690	-117.70591	Stock	✓
118	26S/40E-15N01		35.66718	-117.67035	Stock	✓
119	26S/39E-15J		35.66774	-117.75980	Stock	✓
120	26S/40E-15N02		35.66885	-117.66869	Stock	✓
122	26S/40E-14L01		35.67190	-117.64702	Stock	✓

Table 1: Indian Wells Valley Groundwater Monitoring Program (GWMP

Blue Text *indicates a column count*

176						60
DBID	State ID	Alternate Well Name	Latitude (NAD83)	Longitude (NAD83)	Well Type	NAVY
124	26S/39E-14E01		35.67440	-117.75841	Stock	✓
126	26S/39E-17G02	Kerr McGee	35.67635	-117.80452	MW	✓
127	26S/40E-14B01		35.67774	-117.64285	Stock	✓
129	26S/40E-13C02		35.67913	-117.62952	MW	✓
131	26S/40E-12R01	Chub Med	35.68246	-117.61980	Stock	✓
134	26S/39E-11E02	Sandquist Spa	35.68857	-117.75647	MW	✓
136	26S/39E-08F		35.69051	-117.80952	Stock	✓
137	26S/39E-09E		35.69079	-117.79452	Stock	✓
138	26S/40E-12C		35.69329	-117.63174	Stock	✓
139	26S/39E-02N01		35.69579	-117.75591	Stock	✓
140	26S/39E-06P01		35.69639	-117.82502	Dom	
141	26S/38E-02R01		35.69703	-117.84962	MW	
144	26S/38E-02Q02		35.69941	-117.85503	Dom	
145	26S/38E-02Q01		35.70000	-117.85645	Dom	
146	26S/38E-01M05		35.70215	-117.84707	Dom	
147	26S/38E-01G02		35.70363	-117.83580	Dom	
148	26S/38E-01H03		35.70384	-117.83079	Dom	
149	26S/39E-05F01	Well 23	35.70496	-117.80758	Unk	✓
151	26S/38E-02B01		35.70886	-117.85615	Dom	
152	26S/39E-01A01		35.70940	-117.72341	Stock	✓
153	26S/39E-01A02		35.70940	-117.72313	Stock	✓
154	25S/40E-31P		35.70996	-117.71563	Stock	✓
155	25S/39E-31R01		35.71051	-117.81536	MW	✓
156	25S/38E-36P		35.71076	-117.83996	Dom	
157	25S/38E-34G01	USBR 5-S	35.71813	-117.87090	MW	
158	25S/38E-34G02	USBR 5-M	35.71801	-117.87175	MW	
159	25S/38E-34G03	USBR 05-D	35.71801	-117.87175	Mun	
160	25S/38E-35H		35.71860	-117.85238	Dom	
161	25S/38E-36G01	NR-2 (Shallow)	35.71868	-117.84271	MW	
162	25S/38E-36G02	NR-2 (Middle)	35.71868	-117.84271	MW	
163	25S/38E-36G03	NR-2 (Deep)	35.71868	-117.84271	MW	
165	25S/38E-35C		35.72307	-117.85805	Dom	
166	25S/38E-36D		35.72366	-117.84667	Dom	
168	25S/38E-34A01		35.72453	-117.87024	Dom	
169	25S/38E-35B01		35.72509	-117.85286	MW	
171	25S/39E-28P01	Baker 4-NE	35.72551	-117.78701	Stock	✓
172	25S/39E-29M01		35.73190	-117.81286	Stock	✓
173	25S/38E-25J01	NR 1-S	35.73218	-117.83175	Stock	
174	25S/38E-25J02	NR 1-M	35.73208	-117.83087	Stock	
175	25S/38E-25J03	NR 1-D	35.73218	-117.83175	MW	
176	25S/39E-30E01		35.73301	-117.82675	Stock	✓

Table 1: Indian Wells Valley Groundwater Monitoring Program (GWMP

Blue Text *indicates a column count*

176						60
DBID	State ID	Alternate Well Name	Latitude (NAD83)	Longitude (NAD83)	Well Type	NAVY
183	25S/38E-14Q01		35.75542	-117.85372	Dom	
184	25S/38E-13J01		35.75829	-117.83480	Stock	✓
187	25S/39E-12R01	Charely Tower; Well 22	35.77039	-117.72496	Dom	✓
191	25S/38E-12L01	USBR 6-S	35.77607	-117.84203	MW	✓
192	25S/38E-12L02	USBR 6-M	35.77607	-117.84203	MW	✓
193	25S/38E-12L03	USBR 6-D	35.77607	-117.84203	MW	✓
195	25S/39E-03R01	Baker Range	35.78412	-117.76257	MW	✓
199	24S/39E-34D01	Baker-North	35.80213	-117.75901	MW	✓
202	24S/38E-21A01	USBR 10-S	35.84143	-117.87176	MW	
203	24S/38E-21A02	USBR 10-SM	35.84134	-117.87258	MW	
205	24S/38E-21A04	USBR 10-D	35.84134	-117.87258	MW	
208	25S/38E-25M		35.73135	-117.84767	Dom	
210	25S/40E-30E01	TTBK MW14	35.73254	-117.72033	MW	✓
211	25S/41E-18R01	TTBK MW12	35.75969	-117.60148	MW	✓
212	26S/38E-01E03		35.70417	-117.84716	Dom	
215	26S/38E-01H05		35.70406	-117.83200	Dom	
216	26S/38E-01H06		35.70453	-117.83447	Dom	
218	26S/38E-22B		35.66466	-117.86875	Dom	
219	26S/38E-35B		35.63608	-117.85408	Dom	
220	26S/38E-35D		35.63714	-117.86398	Unk	
223	26S/39E-27C01		35.64849	-117.76864	Unk	
224	26S/39E-34C01		35.63472	-117.77080	Dom	
227	26S/39E-34Q01		35.62502	-117.76733	Dom	
229	26S/40E-28J01	Hospital	35.64121	-117.67128	Mun	
230	26S/40E-29M01		35.64186	-117.70314	Dom	
231	26S/40E-29M02		35.64125	-117.69973	Dom	
233	27S/38E-01C		35.61944	-117.84342	Dom	
234	27S/39E-02K	Asphalt Construction Co.	35.61218	-117.74813	Ind/DC	
235	27S/39E-08A01		35.60721	-117.79818	MW	
237	24S/38E-33J02		35.80190	-117.87258	MW	
238	25S/39E-22J01	S. Baker Ranch	35.74300	-117.76290	MW	✓
239	26S/40E-34F01	City of Ridgecrest	35.63070	-117.66690	Cath	
240	27S/40E-02J01	DMP Cemetery	35.61176	-117.63510	Irr	
241	26S/40E-17Q01	S. Hangar 5; 96030-1	35.66638	-117.69659	MW	✓
244	24S/40E-21K02	TTIWV-MW15	35.83168	-117.65779	MW	✓
245	26S/40E-25P	MK22-MW10	35.63875	-117.62699	MW	✓
246	23S/40E-31N	E. Airport Lake Well	35.887	-117.706	MW	✓
247	24S/38E-19H	Ninemile Well	35.83719	-117.90704	MW	
248	25S/38E-14A01		35.76809	-117.85244	Dom	
249	26S/39E-05L01		35.69973	-117.80355	MW	✓
250	26S/39E-05K01		35.69973	-117.80339	MW	✓

Table 1: Indian Wells Valley Groundwater Monitoring Program (GWMP

Blue Text *indicates a column count*

176						60
DBID	**State ID**	**Alternate Well Name**	**Latitude (NAD83)**	**Longitude (NAD83)**	**Well Type**	**NAVY**
251	26S/40E-22E01	CB Camp Well #1	35.66135	-117.66687	MW	✓
254	25S/39E-29N01		35.72744	-117.81227	MW	✓
255	26S/40E-22E02	CB Camp Well #2	35.66132	-117.66633	MW	✓
301	27S/38E-32C01	EP-01 S	35.54904	-117.91071	MW	
302	27S/38E-32C02	EP-01 M	35.54904	-117.91071	MW	
303	27S/38E-32C03	EP-01 D	35.54904	-117.91071	MW	

Table 2: Wells Added to Indian Wells Valley GWMP

Well additions that occurred from Fall 2022 to Spring 2023

Blue Text *indicates a column count*

3

DBID	State ID	Alternative Well Name	Latitude (NAD83)	Longitude (NAD83)	Well Type	Notes
308	24S/38E-16J	Sawmill Well 1	35.84887	-117.87292	MW	Added to fill groundwater level data gaps in the northern basin
309	24S/38E-16	Sawmill Well 4	35.85113	-117.87469	MW	Added to fill groundwater level data gaps in the northern basin
311	24S/38E-04D01	RVS-Mid	35.88517	-117.88699	MW	Drilled in WY 2023 to monitoring Rose Valley Subflow

Table 3: Wells Removed from Indian Wells Valley GWMP

Measurments discontinued & removed from GWMP in WY 2023

Blue Text *indicates a column count*

5

DBID	State ID	Alternative Well Name	Latitude (NAD83)	Longitude (NAD83)	Well Type	Date First Measured	Date Last Measured	Notes
164	25S/38E-35A		35.72272	-117.85156	Dom	4/16/1998	10/15/2018	Access issues dating back to 2002.
52	26S/39E-34P04		35.62565	-117.76819	Dom	3/23/2010	10/16/2018	Locked out of this well since 2019.
113	26S/40E-23C01		35.66385	-117.64702	Stock	3/23/1995	10/17/2017	Well has been dry since 2006.
66	26S/40E-36A01		35.63357	-117.62174	Stock	3/13/1989	10/15/2018	Well has been dry since 2010.
45	27S/39E-03C02		35.62206	-117.76995	Dom	10/11/2011	3/12/2019	Access issues dating back to 2014.

Attachment D

WY 2023 Groundwater Level Data

						Fall 2022			Spring 2023		
182			33			142			149		
DBID	State ID	Alternate Well Name	CASGEM	(NAD83)	(NAD83)	Date	(ft, bgs)	(ft, amsl)	Date	(ft, bgs)	(ft, amsl)
1	28S/38E-18R	Black Hills Well	X	35.49364	-117.92094	10/3/2022	197.70	2819.30	3/7/2023	193.80	2819.90
2	28S/38E-18F01			35.49928	-117.92844	10/3/2022	213.22	2813.55	3/7/2023	214.50	2815.15
5	27S/38E-27M01	USNS-03	X	35.55387	-117.88132	10/3/2022	193.60	2679.59	3/8/2023	196.28	2680.61
6	27S/39E-28L01	Rock Quarry		35.55472	-117.79253	10/3/2022	287.60	2532.40	3/7/2023	287.70	2532.30
7	27S/38E-23F01	USBR 1-S	X	35.56959	-117.86289	10/4/2022	182.24	2668.26	3/8/2023	185.61	2668.35
8	27S/38E-23F02	USBR 1-SM	X	35.56968	-117.86369	10/4/2022	179.85	2670.65	3/8/2023	185.27	2668.61
10	27S/38E-23F04	USBR 1-D		35.56968	-117.86369	10/4/2022	182.25	2668.25	3/8/2023	185.27	2668.44
11	27S/38E-21L01	AB303-05	X	35.56985	-117.89592	10/3/2022	358.78	2665.38	3/9/2023	360.60	2665.27
12	27S/39E-19E01	IWV MW #3		35.57400	-117.82969	10/3/2022	204.00	2435.49	3/7/2023	207.60	2434.89
13	27S/38E-15R01	AB303-06		35.58195	-117.86617	10/3/2022	273.32	2658.67	3/7/2023	277.30	2658.29
15	27S/40E-15D01	Bucket Well		35.59143	-117.67011				3/7/2023	Dry	
16	27S/38E-13A01	Sea Bee Well		35.59345	-117.83060	10/4/2022	224.93	2429.06	3/8/2023	227.49	2428.95
17	27S/38E-09Q02	AB303-02		35.59362	-117.89262	10/3/2022	419.20	2685.80	3/9/2023	422.54	2686.06
18	27S/38E-09P01	Father Crowley		35.59363	-117.89246	10/3/2022	417.80	2694.32	3/9/2023	423.83	2691.29
19	27S/38E-08R01			35.59367	-117.90300	10/3/2022	505.80	2697.54			
20	27S/38E-13A02	AB303-01		35.59369	-117.83070	10/3/2022	223.31	2426.69	3/8/2023	226.81	2425.69
21	27S/39E-08P02	IWV MW # 2		35.59393	-117.80371	10/3/2022	440.80	2140.16	3/7/2023	445.30	2138.66
22	27S/39E-07R01	Inyo		35.59634	-117.81589	10/3/2022	425.80	2138.30	3/8/2023	Dry	
23	27S/39E-08M02	IWV MW #1		35.60045	-117.80947	10/3/2022	415.60	2137.83	3/7/2023	418.40	2136.03
24	27S/38E-10B02	AB303-03		35.60662	-117.87407	10/4/2022	427.84	2467.16	3/7/2023	429.00	2469.60
25	27S/38E-09C01	AB303-04		35.60665	-117.89378	10/3/2022	282.85	2787.15	3/7/2023	385.30	2688.50
26	27S/39E-11D01	USBR 3-S	X	35.60731	-117.75485	10/4/2022	371.91	2138.49	3/8/2023	371.60	2141.76
27	27S/39E-11D02	USBR 3-M	X	35.60718	-117.75563	10/4/2022	363.56	2146.84	3/8/2023	366.46	2146.86
28	27S/39E-11D03	USBR 3-D	X	35.60718	-117.75563	10/4/2022	346.72	2163.68	3/8/2023	347.98	2165.13
30	27S/40E-06D01	Dist. Well 12		35.62198	-117.72253	10/4/2022	284.55	2122.45			
31	27S/40E-06N02			35.60898	-117.72155	10/4/2022	352.00	2121.73	3/7/2023	348.80	2124.93
32	27S/40E-06N01			35.60996	-117.72005	10/4/2022	350.10	2121.49	3/7/2023	348.70	2122.89
36	27S/40E-01K02	George Air Corridor	X	35.61470	-117.62469	10/3/2022	163.51	2159.13	3/9/2023	164.76	2159.38
37	27S/40E-06F01			35.61629	-117.71810	10/4/2022	318.70	2120.86	3/9/2023	318.29	2122.27
40	27S/40E-06E01			35.61855	-117.72040	10/4/2022	313.90	2118.99	3/7/2023	311.30	2121.59
41	27S/39E-03B01			35.62127	-117.76580						
43	27S/39E-03C01			35.62174	-117.77157						
44	27S/39E-04C01			35.62224	-117.78752				3/7/2023	351.70	2149.40
45	27S/39E-03C02			35.62206	-117.76995						
46	27S/38E-02C01	USBR 2-S	X	35.62280	-117.85761	10/3/2022	281.76	2373.19	3/7/2023	284.30	2373.19
47	27S/38E-02C02	USBR 2-M	X	35.62274	-117.85841	10/3/2022	273.82	2381.13	3/7/2023	276.10	2381.23
48	27S/38E-02C03	USBR 2-D	X	35.62274	-117.85841	10/3/2022	281.87	2373.08	3/7/2023	283.90	2373.38
50	26S/40E-35Q02	S.E. Line		35.62274	-117.64257	10/4/2022	94.63	2158.20	3/7/2023	98.32	2158.01
51	26S/39E-34R02			35.62351	-117.76068				3/9/2023	324.50	2127.21
52	26S/39E-34P04			35.62565	-117.76819						
53	26S/40E-31K01			35.62580	-117.71330						
56	26S/39E-34K03			35.62791	-117.76635	10/4/2022	329.50	2146.12	3/7/2023	329.80	2146.82
57	26S/39E-32L01			35.62902	-117.80461	10/3/2022	342.60	2149.44	3/7/2023	346.00	2147.04
58	26S/39E-35G01			35.63089	-117.74645						
59	26S/39E-31R03			35.62389	-117.81543						
63	26S/40E-35H01	Satellite Lake 1 (west)		35.63191	-117.63896	10/4/2022	90.73	2161.62	3/7/2023	92.14	2161.41
64	26S/40E-35H02	Satellite Lake 2 (east)		35.63191	-117.63869	10/4/2022	98.52	2153.51	3/7/2023	100.89	2153.54
66	26S/40E-36A01			35.63357	-117.62174						
72	26S/40E-29N01			35.63792	-117.70175						
73	26S/40E-29P01			35.63791	-117.70032	10/4/2022	208.10	2122.59	3/8/2023	198.50	2133.19

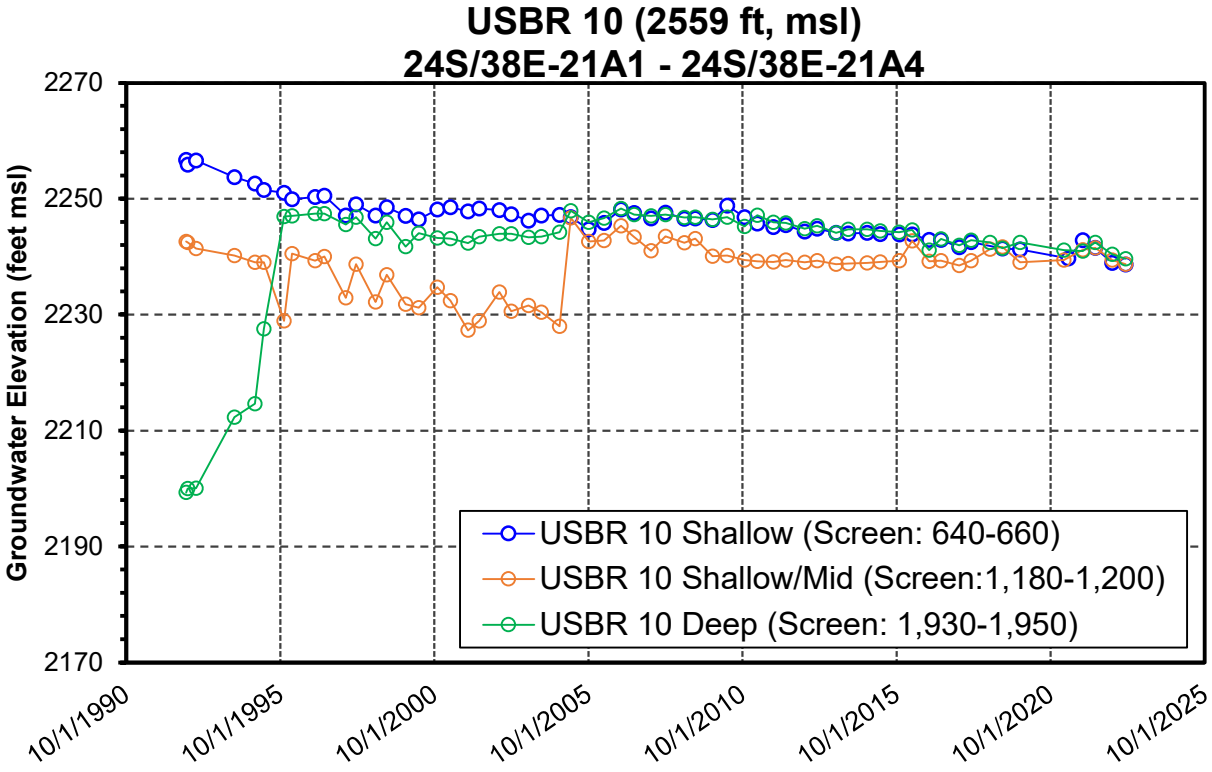
75	26S/39E-26P01			35.64024	-117.75147	10/3/2022	266.70	2136.63	3/7/2023	264.10	2140.23
76	26S/39E-26P02			35.64052	-117.75313	10/3/2022	269.60	2136.66	3/7/2023	267.30	2139.96
77	26S/39E-29J02			35.64181	-117.79611	10/3/2022	304.70	2124.30	3/7/2023	304.10	2124.90
78	26S/39E-28L02			35.64182	-117.78619						
80	26S/39E-28G02			35.64601	-117.78135	10/4/2022	286.40	2146.62	3/7/2023	287.20	2146.82
82	26S/40E-26F01			35.64746	-117.64508	10/4/2022	59.37	2173.43	3/7/2023	62.68	2173.12
84	26S/39E-27D02	MW 32-SM	X	35.64852	-117.77493	10/4/2022	301.22	2117.31	3/7/2023	280.51	2141.06
85	26S/39E-27D03	MW 32-DM	X	35.64857	-117.77591	10/4/2022	291.88	2126.65	3/7/2023	280.73	2140.84
86	26S/39E-27D04	MW 32-D	X	35.64857	-117.77591	10/4/2022	280.57	2137.96	3/7/2023	280.76	2140.42
87	26S/40E-27D02			35.64941	-117.66785	10/4/2022	45.92	2220.83	3/7/2023	46.98	2220.67
88	26S/39E-26A03	USBR 4	X	35.64966	-117.74213	10/3/2022	252.25	2124.84	3/9/2023	248.55	2130.39
90	26S/39E-28B03			35.65050	-117.78352	10/3/2022	250.30	2176.35	3/7/2023	251.20	2176.45
92	26S/40E-27D01			35.65052	-117.66730	10/4/2022	72.22	2195.82	3/7/2023	71.52	2195.52
94	26S/39E-20L			35.66560	-117.81374	10/3/2022	241.10	2186.89	3/7/2023	242.70	2187.19
95	26S/40E-22P02	PW Substation 3		35.65191	-117.66313	10/4/2022	65.64	2201.58	3/7/2023	69.32	2201.60
97	26S/40E-22P03	PW Substation 1		35.65357	-117.66452	10/4/2022	113.38	2145.50	3/7/2023	112.40	2147.48
98	26S/40E-22P04	PW Substation 2		35.65357	-117.66452	10/4/2022	53.37	2205.38	3/7/2023	53.83	2205.92
100	26S/40E-19N02			35.65413	-117.72147	10/3/2022	209.00	2128.43	3/7/2023	208.92	2129.51
101	26S/40E-22N01			35.65423	-117.66940				3/7/2023	92.98	2171.38
103	26S/40E-21K03			35.65663	-117.67924	10/4/2022	100.28	2166.51	3/7/2023	102.06	2167.53
104	26S/40E-20L01			35.65857	-117.70147	10/4/2022	145.92	2150.93	3/7/2023	149.71	2150.74
105	26S/40E-22H01			35.66190	-117.65424	10/4/2022	33.03	2195.12	3/7/2023	35.51	2195.54
106	26S/40E-22H02			35.66190	-117.65424	10/4/2022	33.01	2195.37	3/7/2023	36.12	2195.56
107	26S/40E-22H03			35.66190	-117.65424	10/4/2022	33.06	2194.68	3/7/2023	35.65	2195.09
108	26S/39E-20N01	ICSD MW #2		35.66274	-117.81508						
109	26S/39E-20C02			35.66337	-117.80541	10/3/2022	241.50	2149.36	3/7/2023	242.30	2149.56
112	26S/39E-20N02	ICSD MW #3		35.66413	-117.81369						
113	26S/40E-23C01			35.66385	-117.64702						
114	26S/38E-22D			35.66566	-117.87597	10/3/2022	57.50	2790.75	3/7/2023	58.30	2790.95
115	26S/39E-13R03	USNS-01		35.66663	-117.72424	10/4/2022	152.74	2166.61	3/7/2023	154.25	2166.40
116	26S/39E-13R04			35.66663	-117.72424	10/4/2022	197.63	2122.18	3/7/2023	193.71	2127.60
117	26S/40E-17N01			35.66690	-117.70591	10/4/2022	142.82	2152.26	3/7/2023	144.62	2152.26
118	26S/40E-15N01			35.66718	-117.67035	10/4/2022	58.20	2186.58	3/7/2023	60.94	2186.44
119	26S/39E-15J			35.66774	-117.75980	10/4/2022	203.80	2143.99	3/6/2023	210.45	2144.34
120	26S/40E-15N02			35.66885	-117.66869	10/4/2022	51.23	2185.14	3/7/2023	54.43	2185.14
121	26S/40E-17J01			35.67107	-117.69480						
122	26S/40E-14L01			35.67190	-117.64702	10/4/2022	21.72	2183.95	3/7/2023	23.11	2185.46
124	26S/39E-14E01			35.67440	-117.75841	10/4/2022	170.39	2164.94	3/6/2023	171.75	2164.58
126	26S/39E-17G02	Kerr McGee		35.67635	-117.80452	10/3/2022	210.10	2146.44	3/6/2023	209.95	2148.09
127	26S/40E-14B01			35.67774	-117.64285	10/4/2022	9.68	2181.37	3/7/2023	10.64	2182.41
129	26S/40E-13C02			35.67913	-117.62952	10/4/2022	10.07	2178.29	3/7/2023	10.74	2178.62
131	26S/40E-12R01	Chub Med		35.68246	-117.61980	10/4/2022	2.77	2182.56	3/7/2023	4.88	2182.35
134	26S/39E-11E02	Sandquist Spa	X	35.68857	-117.75647	10/3/2022	136.51	2170.79	3/6/2023	138.05	2170.25
136	26S/39E-08F			35.69051	-117.80952	10/4/2022	168.40	2150.92	3/6/2023	169.96	2150.36
137	26S/39E-09E			35.69079	-117.79452	10/4/2022	173.13	2139.38	3/6/2023	172.60	2142.41
138	26S/40E-12C			35.69329	-117.63174	10/4/2022	5.48	2160.65	3/6/2023	6.92	2160.71
139	26S/39E-02N01			35.69579	-117.75591	10/3/2022	114.40	2172.23	3/6/2023	115.65	2171.98
140	26S/39E-06P01			35.69639	-117.82502	10/3/2022	163.00	2157.00	3/7/2023	164.40	2157.00
141	26S/38E-02R01			35.69703	-117.84962						
144	26S/38E-02Q02			35.69941	-117.85503	10/3/2022	275.00	2134.50	3/7/2023	253.00	2158.60
145	26S/38E-02Q01			35.70000	-117.85645	10/3/2022	255.80	2153.44	3/7/2023	254.30	2155.94
146	26S/38E-01M05			35.70215	-117.84707	10/5/2022	215.41	2158.02	3/7/2023	214.40	2160.03
147	26S/38E-01G02			35.70363	-117.83580	10/3/2022	180.70	2157.81	3/7/2023	179.50	2160.01
148	26S/38E-01H03			35.70384	-117.83079				3/7/2023	184.00	2135.82
149	26S/39E-05F01			35.70496	-117.80758	10/4/2022	113.62	2163.98	3/6/2023	113.32	2164.28
151	26S/38E-02B01			35.70886	-117.85615	10/3/2022	215.10	2157.76	3/7/2023	214.90	2159.16

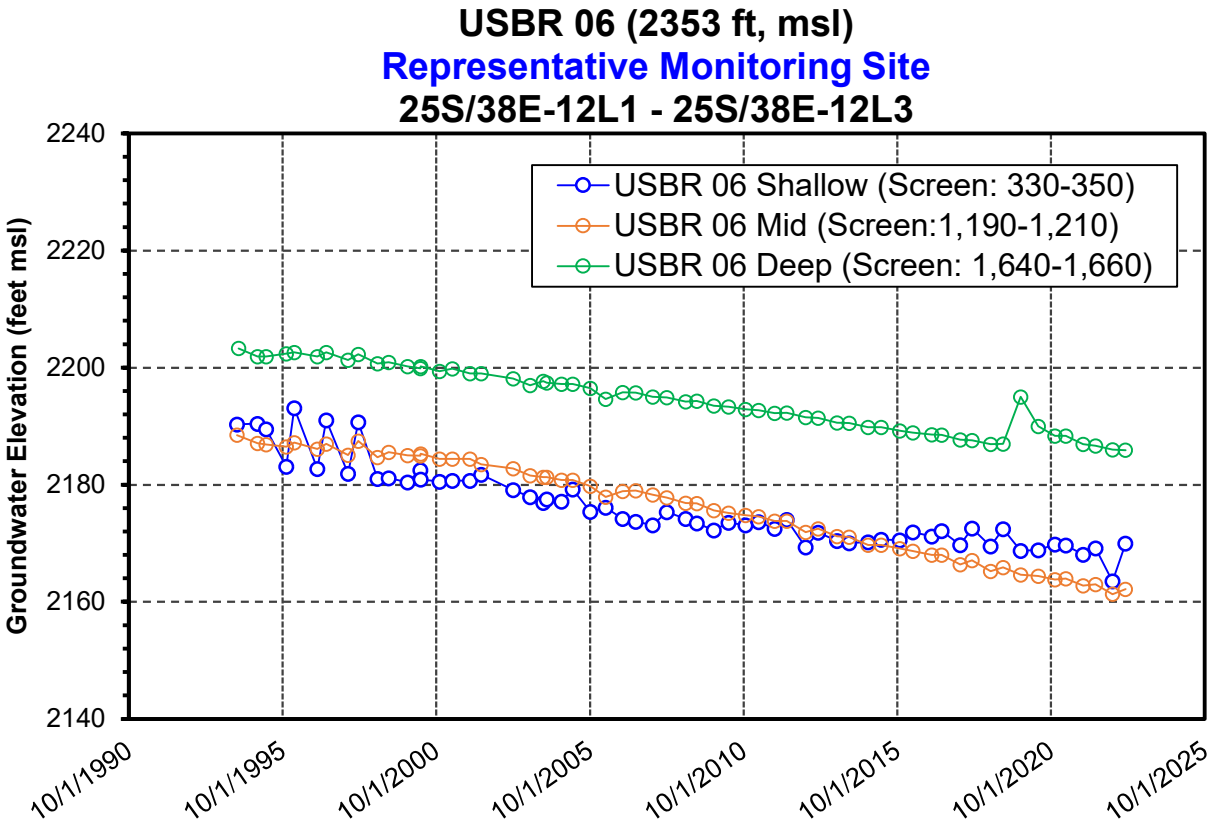
152	26S/39E-01A01			35.70940	-117.72341	10/3/2022	42.12	2175.52	3/6/2023	43.90	2175.34
153	26S/39E-01A02			35.70940	-117.72313	10/3/2022	43.16	2174.77	3/6/2023	45.83	2174.60
154	25S/40E-31P			35.70996	-117.71563	10/3/2022	18.93	2172.81	3/6/2023	21.05	2172.99
155	25S/39E-31R01			35.71051	-117.81536	10/4/2022	92.13	2169.72	3/6/2023	94.64	2169.71
156	25S/38E-36P			35.71076	-117.83996	10/3/2022	170.20	2158.80			
157	25S/38E-34G01	USBR 5-S	X	35.71813	-117.87090	10/3/2022	361.02	2159.40	3/7/2023	363.94	2159.06
158	25S/38E-34G02	USBR 5-M	X	35.71801	-117.87175	10/3/2022	368.52	2151.90	3/7/2023	371.05	2151.75
159	25S/38E-34G03	USBR 05-D	X	35.71801	-117.87175	10/3/2022	372.17	2148.25	3/7/2023	372.26	2150.29
160	25S/38E-35H			35.71860	-117.85238				3/7/2023	199.40	2158.36
161	25S/38E-36G01	NR-2 (Shallow)	X	35.71868	-117.84271						
162	25S/38E-36G02	NR-2 (Middle)	X	35.71868	-117.84271						
163	25S/38E-36G03	NR-2 (Deep)	X	35.71868	-117.84271						
164	25S/38E-35A			35.72272	-117.85156						
165	25S/38E-35C			35.72307	-117.85805	10/3/2022	265.00	2158.52	3/7/2023	264.50	2160.02
166	25S/38E-36D			35.72366	-117.84667	10/3/2022	187.00	2156.72	3/7/2023	184.70	2159.52
168	25S/38E-34A01			35.72453	-117.87024	10/3/2022	364.83	2163.95	3/7/2023	364.00	2165.78
169	25S/38E-35B01			35.72509	-117.85286	10/4/2022	239.09	2157.15	3/7/2023	239.94	2158.16
170	25S/38E-36B01	WELL 27		35.72496	-117.83675						
171	25S/39E-28P01	Baker 4-NE		35.72551	-117.78701	10/4/2022	54.08	2174.96	3/6/2023	50.48	2179.56
172	25S/39E-29M01			35.73190	-117.81286	10/4/2022	49.56	2182.74	3/6/2023	60.76	2172.54
173	25S/38E-25J01	NR 1-S		35.73218	-117.83175	10/3/2022	114.60	2162.35	3/7/2023	117.30	2162.45
174	25S/38E-25J02	NR 1-M		35.73208	-117.83087	10/3/2022	117.40	2158.30	3/7/2023	120.70	2157.80
175	25S/38E-25J03	NR 1-D		35.73218	-117.83175	10/3/2022	134.70	2141.00	3/7/2023	136.10	2142.40
176	25S/39E-30E01			35.73301	-117.82675	10/4/2022	54.48	2194.13	3/6/2023	55.55	2195.26
183	25S/38E-14Q01			35.75542	-117.85372				3/7/2023	227.50	2165.00
184	25S/38E-13J01			35.75829	-117.83480	10/4/2022	127.96	2164.01	3/6/2023	129.69	2166.08
187	25S/39E-12R01	Charely Tower; Well 22		35.77039	-117.72496	10/3/2022	25.01	2177.36	3/6/2023	26.13	2177.24
191	25S/38E-12L01	USBR 6-S	X	35.77607	-117.84203	10/4/2022	189.41	2163.51	3/6/2023	184.75	2169.96
192	25S/38E-12L02	USBR 6-M	X	35.77607	-117.84203	10/4/2022	191.59	2161.33	3/6/2023	192.22	2162.16
193	25S/38E-12L03	USBR 6-D	X	35.77607	-117.84203	10/4/2022	166.95	2185.97	3/6/2023	168.09	2185.91
195	25S/39E-03R01	Baker Range	X	35.78412	-117.76257	10/3/2022	51.42	2174.85	3/6/2023	52.68	2174.59
199	24S/39E-34D01	Baker-North		35.80213	-117.75901	10/3/2022	47.42	2179.61	3/6/2023	49.21	2179.42
202	24S/38E-21A01	USBR 10-S	X	35.84143	-117.87176	10/3/2022	320.49	2238.90	3/9/2023	325.68	2238.63
203	24S/38E-21A02	USBR 10-SM	X	35.84134	-117.87258	10/3/2022	319.95	2239.44	3/9/2023	325.50	2238.70
205	24S/38E-21A04	USBR 10-D	X	35.84134	-117.87258	10/3/2022	318.96	2240.43	3/9/2023	324.28	2239.65
207	25S/38E-03B			35.79546	-117.87382	10/4/2022	291.46	2164.89	3/8/2023	293.58	2164.37
208	25S/38E-25M			35.73135	-117.84767						
210	25S/40E-30E01	TTBK MW14	X	35.73254	-117.72033	10/3/2022	14.89	2176.15	3/6/2023	18.25	2176.00
211	25S/41E-18R01	TTBK MW12	X	35.75969	-117.60148	10/3/2022	22.16	1981.06	3/6/2023	25.35	1981.12
212	26S/38E-01E03			35.70417	-117.84716						
215	26S/38E-01H05			35.70406	-117.83200						
216	26S/38E-01H06			35.70453	-117.83447				3/7/2023	172.00	2148.20
218	26S/38E-22B	Ostrich Ranch		35.66466	-117.86875	10/3/2022	432.20	2234.08	3/7/2023	434.00	2233.28
219	26S/38E-35B			35.63608	-117.85408	10/3/2022	343.40	2231.15	3/7/2023	343.00	2231.55
220	26S/38E-35D			35.63714	-117.86398	10/3/2022	449.20	2236.03	3/7/2023	451.10	2235.53
223	26S/39E-27C01			35.64849	-117.76864						
224	26S/39E-34C01			35.63472	-117.77080						
227	26S/39E-34Q01			35.62502	-117.76733	10/4/2022	338.61	2134.49	3/8/2023	338.10	2134.90
229	26S/40E-28J01	Hospital		35.64121	-117.67128	10/3/2022	136.60	2154.32	3/7/2023	136.10	2155.82
230	26S/40E-29M01			35.64186	-117.70314	10/4/2022	207.60	2123.04	3/8/2023	206.80	2124.84
231	26S/40E-29M02			35.64125	-117.69973	10/4/2022	197.60	2127.04	3/8/2023	196.20	2129.44
233	27S/38E-01C			35.61944	-117.84342						
234	27S/39E-02K	Asphalt Construction Co.		35.61218	-117.74813	10/4/2022	316.60	2141.82	3/8/2023	316.40	2142.02
235	27S/39E-08A01			35.60721	-117.79818	10/4/2022	396.68	2137.51	3/8/2023	398.85	2136.64
237	24S/38E-33J02			35.80190	-117.87258						
238	25S/39E-22J01	S. Baker Ranch		35.74300	-117.76290	10/4/2022	42.53	2176.24	3/6/2023	43.73	2176.04

239	26S/40E-34F01	City of Ridgecrest		35.63070	-117.66690							
240	27S/40E-02J01	DMP Cemetery		35.61176	-117.63510	10/3/2022	154.50	2150.55	3/7/2023	155.00	2150.55
241	26S/40E-17Q01	S. Hangar 5; 96030-1	X	35.66638	-117.69659	10/4/2022	144.46	2132.64	3/7/2023	143.31	2136.04
244	24S/40E-21K02	TTIWV-MW15		35.83168	-117.65779	10/3/2022	50.58	2192.42	3/6/2023	52.68	2188.62
245	26S/40E-25P	MK22-MW10		35.63875	-117.62699	10/4/2022	87.05	2155.65	3/7/2023	89.52	2155.15
246	23S/40E-31N	E. Airport Lake Well		35.88700	-117.70600	10/3/2022	105.97	2192.13	3/6/2023	109.47	2191.96
247	24S/38E-19H	Ninemile Well		35.83719	-117.90704	10/4/2022	14.09	2957.16	3/7/2023	8.06	2963.21
248	25S/38E-14A01			35.76809	-117.85244	10/3/2022	234.91	2140.09	3/8/2023	232.00	2162.10
249	26S/39E-05L01			35.69973	-117.80355	10/3/2022	131.38	2162.48	3/6/2023	133.18	2162.54
250	26S/39E-05K01			35.69973	-117.80339	10/3/2022	129.39	2164.36	3/6/2023	131.37	2164.13
251	26S/40E-22E01	CB Camp Well #1		35.66135	-117.66687	10/3/2022	98.87	2144.81	3/7/2023	101.51	2144.95
254	25S/39E-29N01			35.72740	-117.81212				3/6/2023	66.89	2174.21
255	26S/40E-22E02	CB Camp Well #2		35.66132	-117.66633				3/7/2023	92.46	2154.19
301	27S/38E-32C01	EP-01 S		35.54904	-117.91071	10/4/2022	272.82	2689.84	3/8/2023	275.13	2689.99
302	27S/38E-32C02	EP-01 M		35.54904	-117.91071	10/4/2022	279.38	2683.28	3/8/2023	281.61	2683.41
303	27S/38E-32C03	EP-01 D		35.54904	-117.91071	10/4/2022	273.88	2688.78	3/8/2023	275.83	2689.04
304	26S/39E-35B01			35.63444	-117.74635						
305	26S/38E-17C01	Indian Wells Canyon		35.67749	-117.91262	10/5/2022	79.36	3389.14	3/7/2023	81.19	3386.63
306	26S/39E-27C01			35.65120	-117.78538						
307	26S/39E-25K01			35.64041	-117.74023	10/4/2022	267.74	2120.96	3/9/2023	265.07	2123.93
		Lumbermill Well #4							3/9/2023	343.64	
	25S/40E-32	TTBKMW05							3/6/2023	13.3	

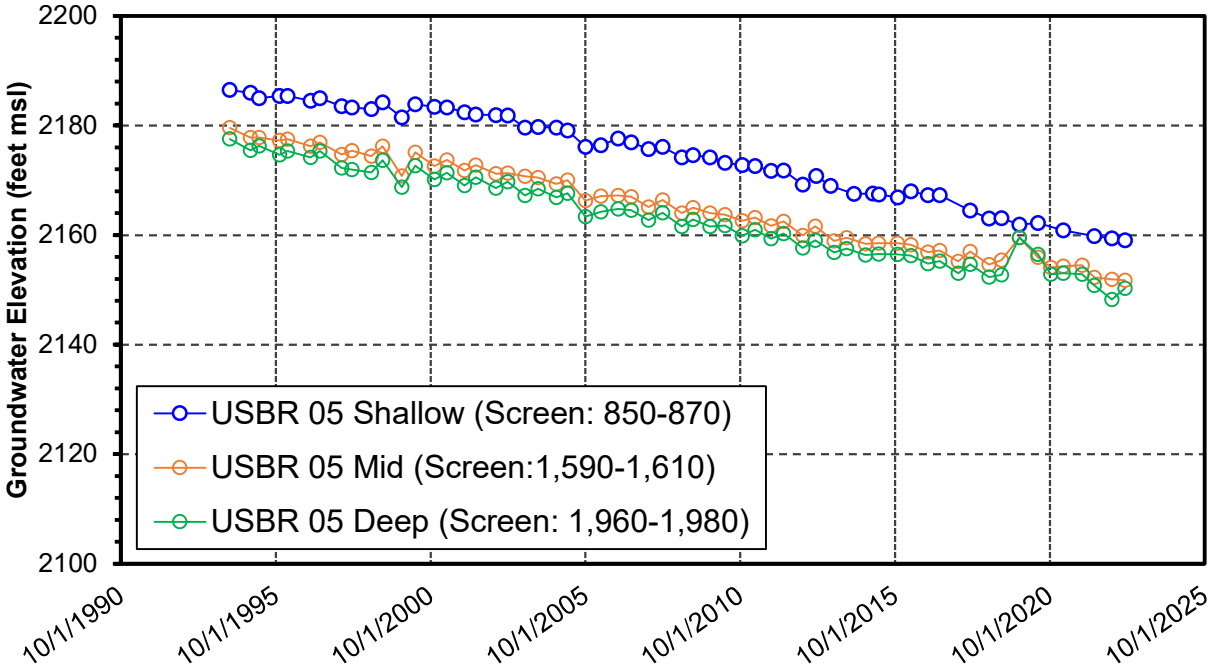
Attachment E

Hydrographs for Select Monitoring Wells

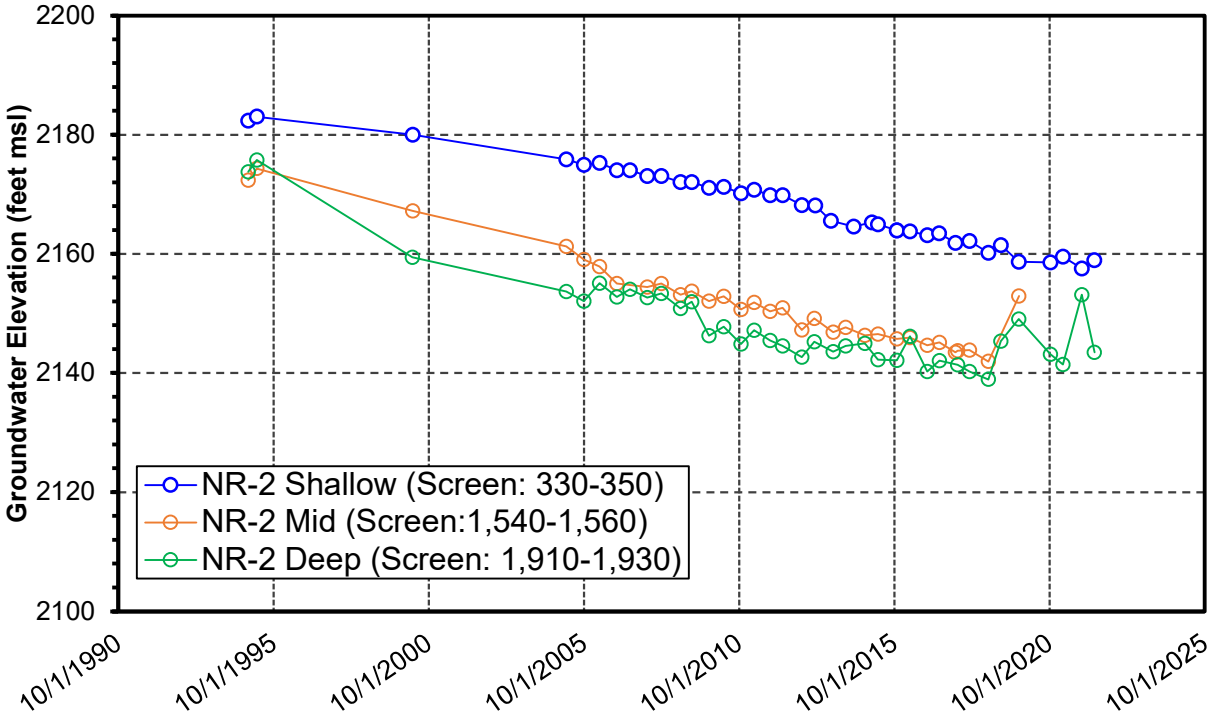

USBR 10 (2559 ft, msl)
24S/38E-21A1 - 24S/38E-21A4
Groundwater Elevation (feet msl)
2270
2250
2230
2210
2190
2170
10/1/1990
10/1/1995
10/1/2000
10/1/2005
10/1/2010
10/1/2015
10/1/2020
10/1/2025
USBR 10 Shallow (Screen: 640-660)
USBR 10 Shallow/Mid (Screen:1,180-1,200)
USBR 10 Deep (Screen: 1,930-1,950)


USBR 06 (2353 ft, msl)
Representative Monitoring Site
25S/38E-12L1 - 25S/38E-12L3
Groundwater Elevation (feet msl)
2240
2220
2200
2180
2160
2140
10/1/1990
10/1/1995
10/1/2000
10/1/2005
10/1/2010
10/1/2015
10/1/2020
10/1/2025
USBR 06 Shallow (Screen: 330-350)
USBR 06 Mid (Screen:1,190-1,210)
USBR 06 Deep (Screen: 1,640-1,660)

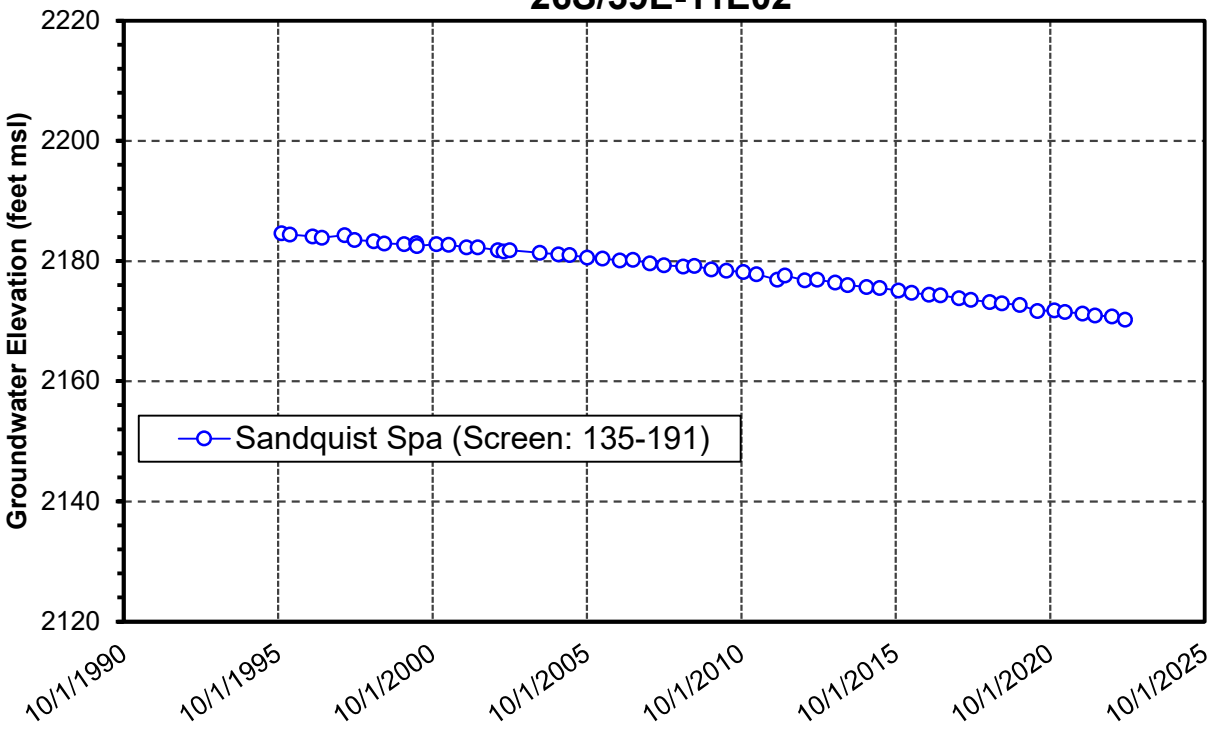
USBR 05 (2520 ft, msl)
Representative Monitoring Site
25S/38E-34G1 - 25S/38E-34G3



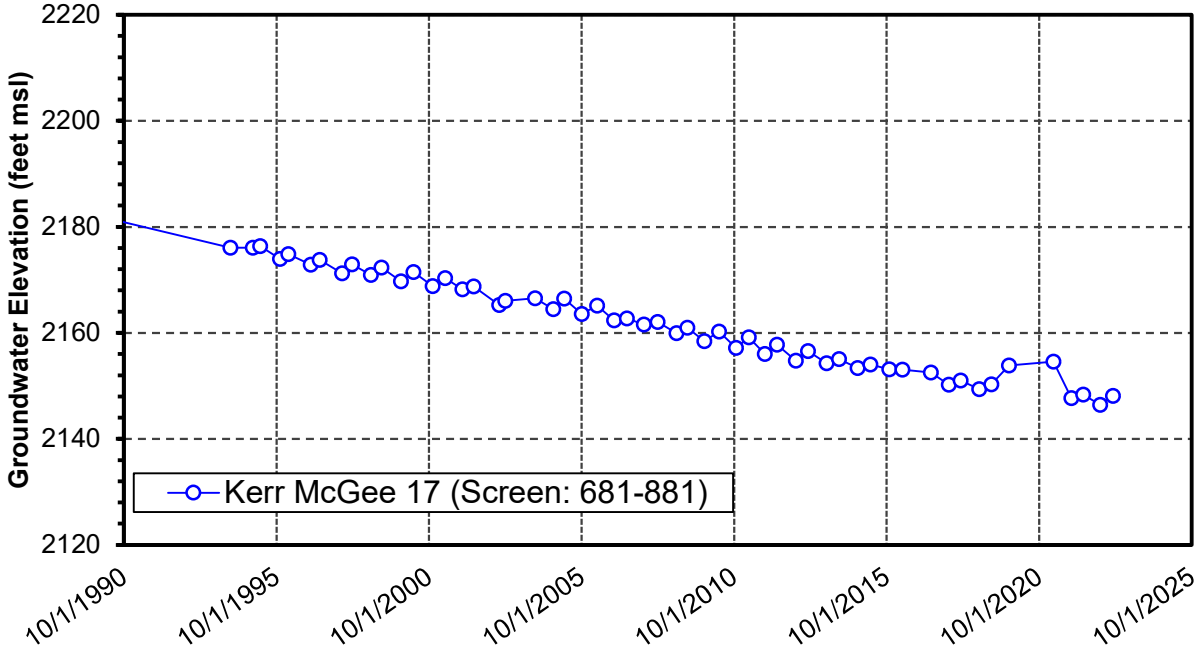
NR-2 (2315 ft, msl)
25S/38E-36G1 - 25S/38E-36G3



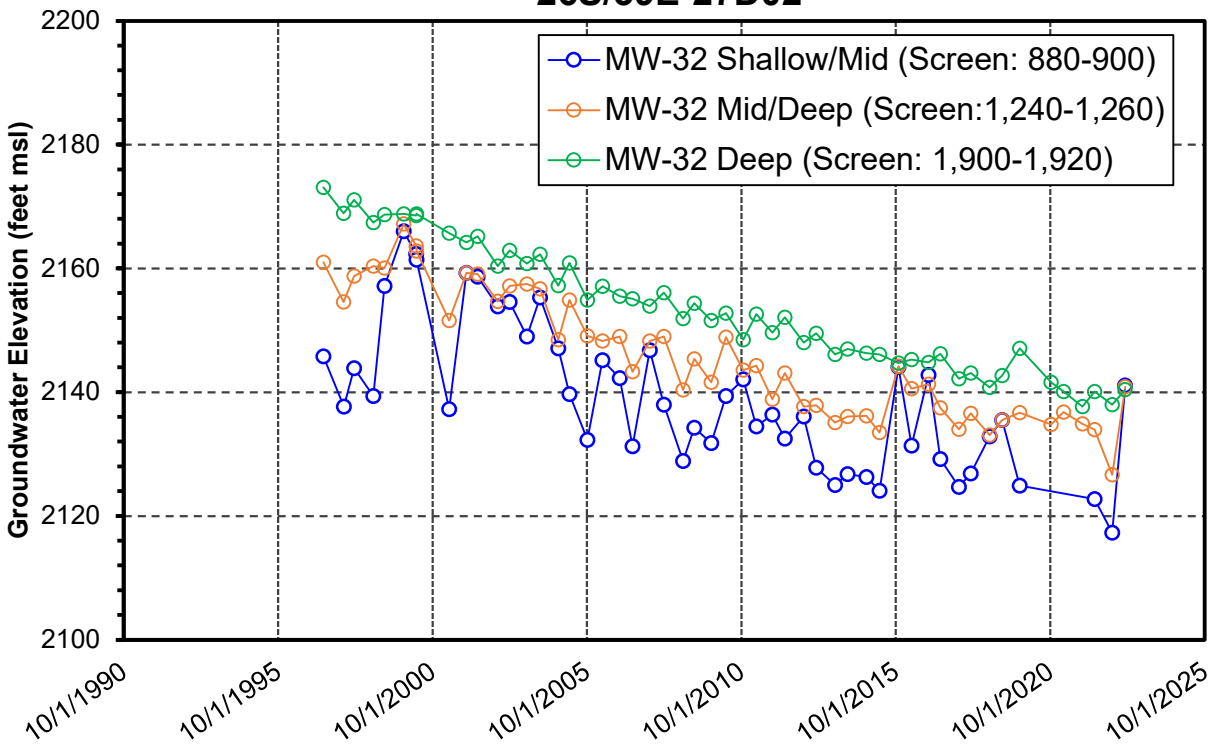
Sandquist Spa (2307 ft, msl)
Representative Monitoring Site
26S/39E-11E02



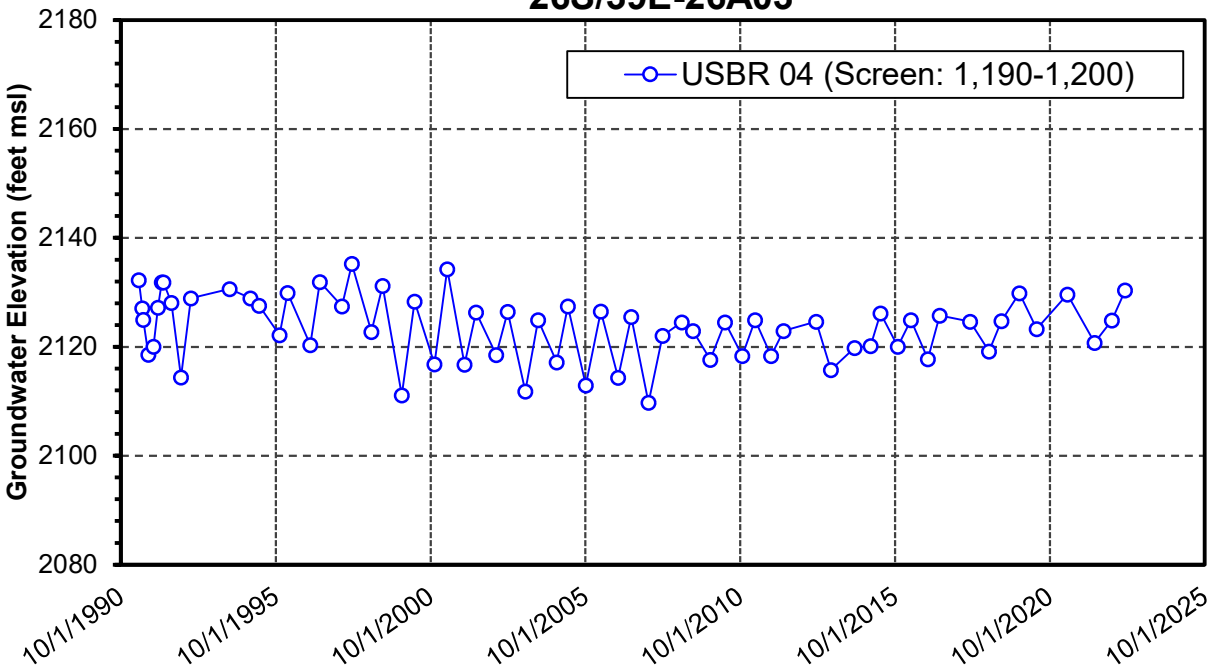
Kerr McGee 17 (2357 ft, msl)
Representative Monitoring Site
26S/39E-17G02



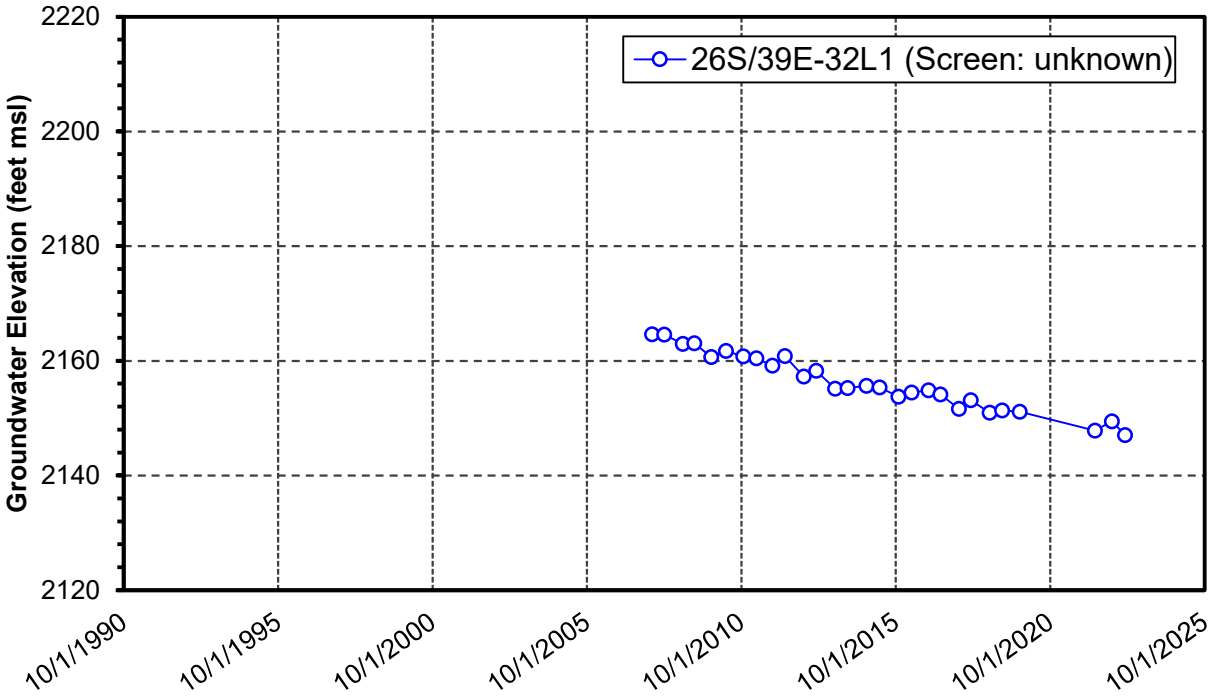
MW-32 (2419 ft, msl)
Representative Monitoring Site
26S/39E-27D02



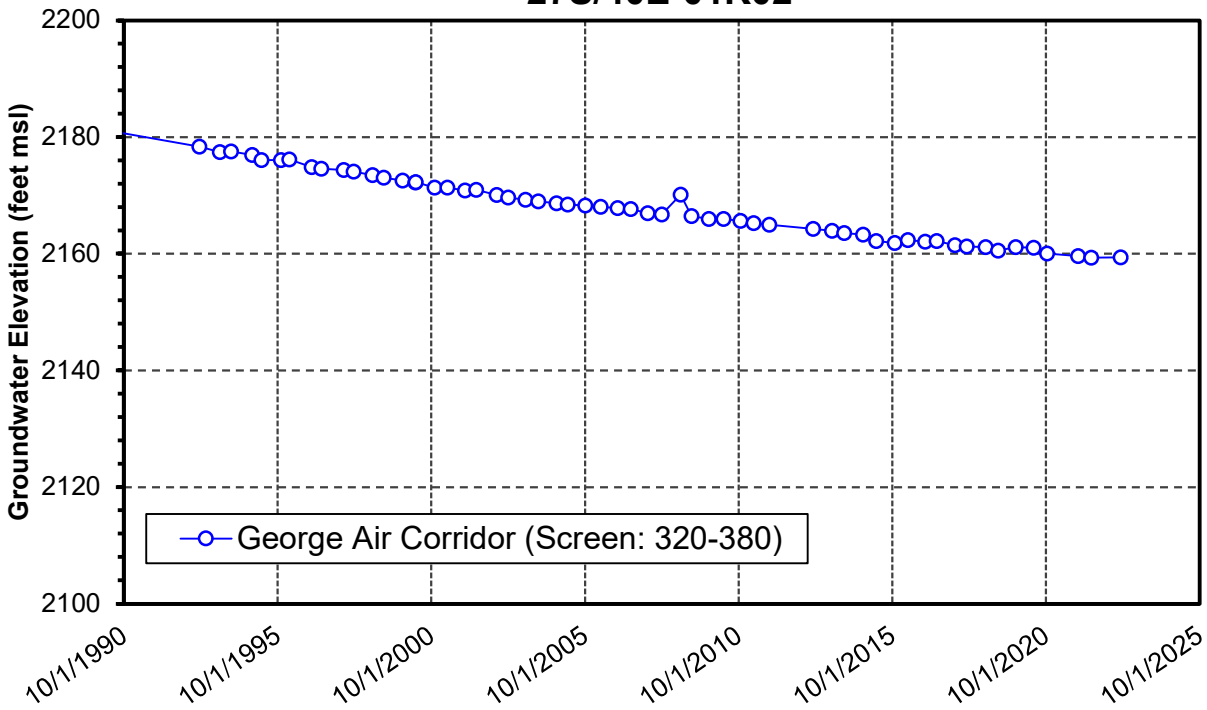
USBR 04 (2377 ft, msl)
Representative Monitoring Site
26S/39E-26A03



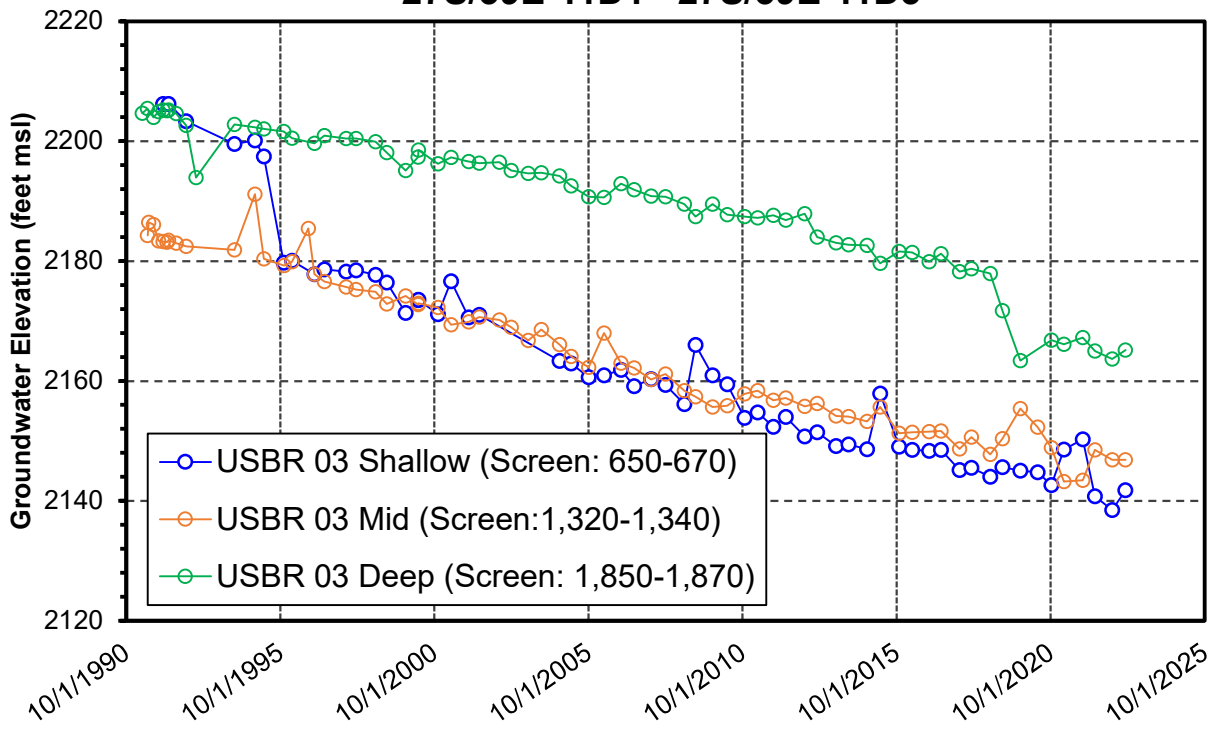
26S/39E-32L1 (2492 ft, msl)



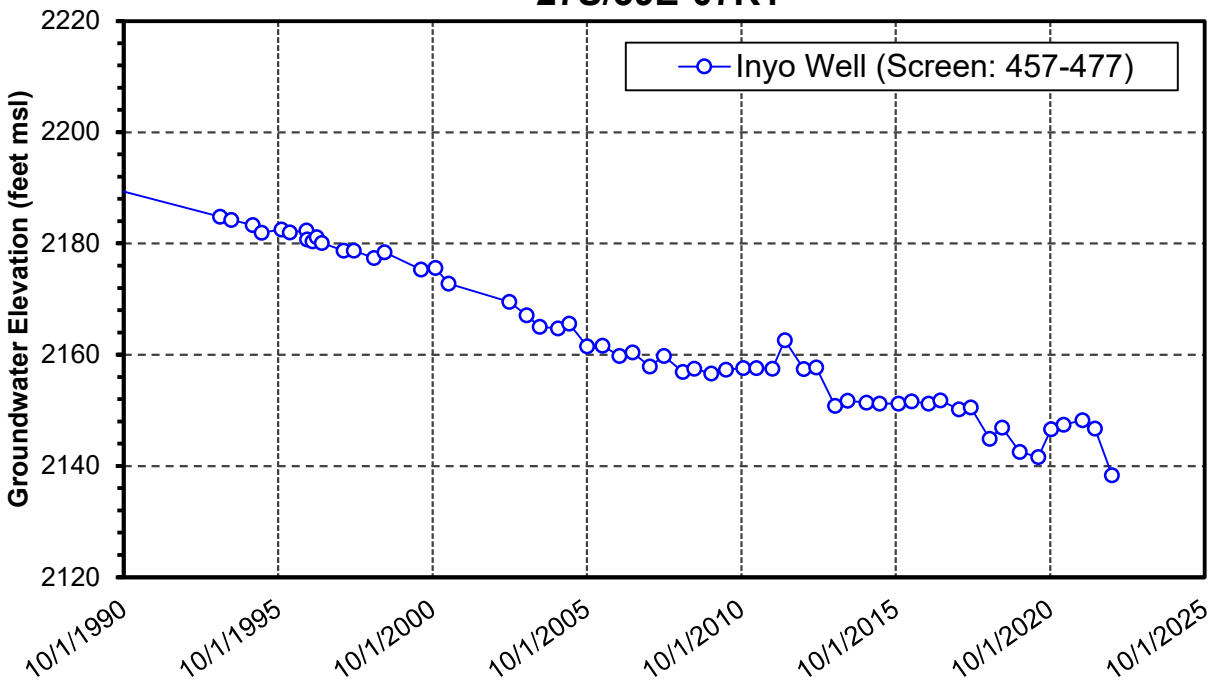
George Air Corridor (2322.64 ft, msl)
Representative Monitoring Site
27S/40E-01K02

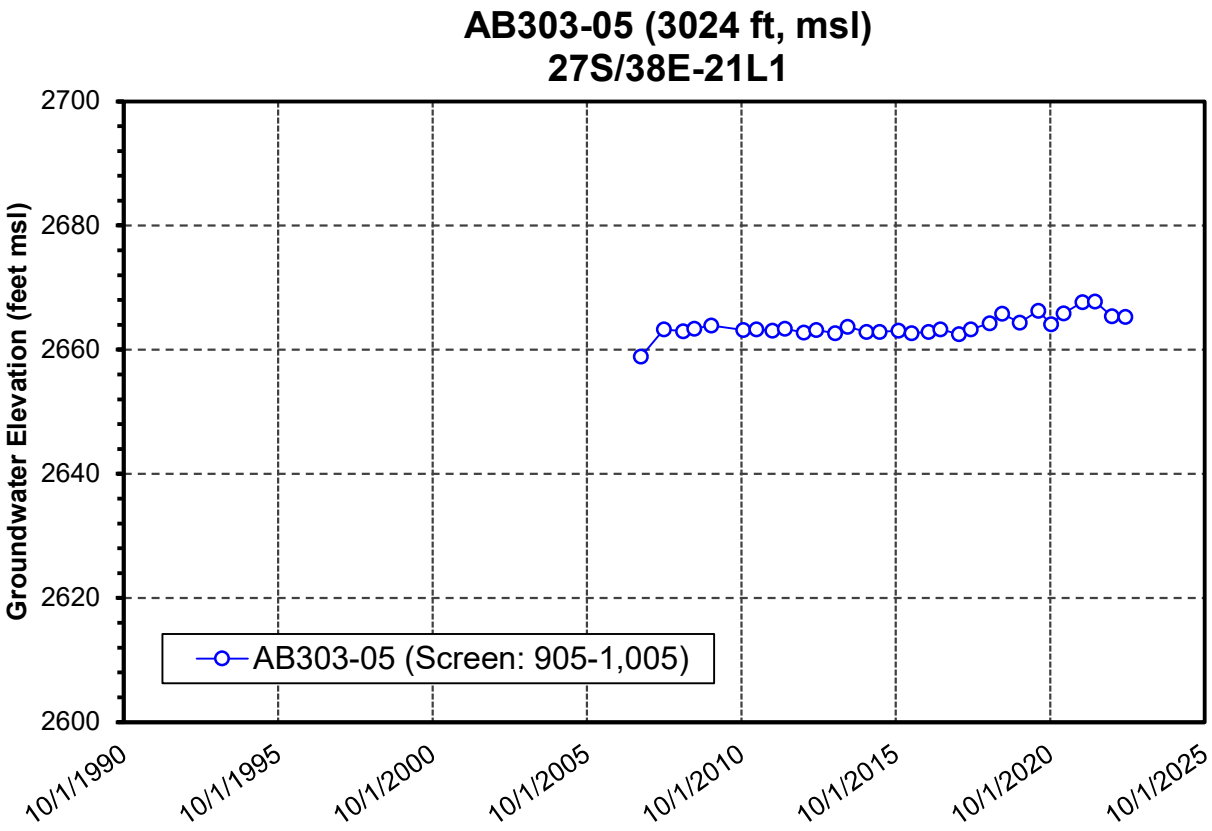


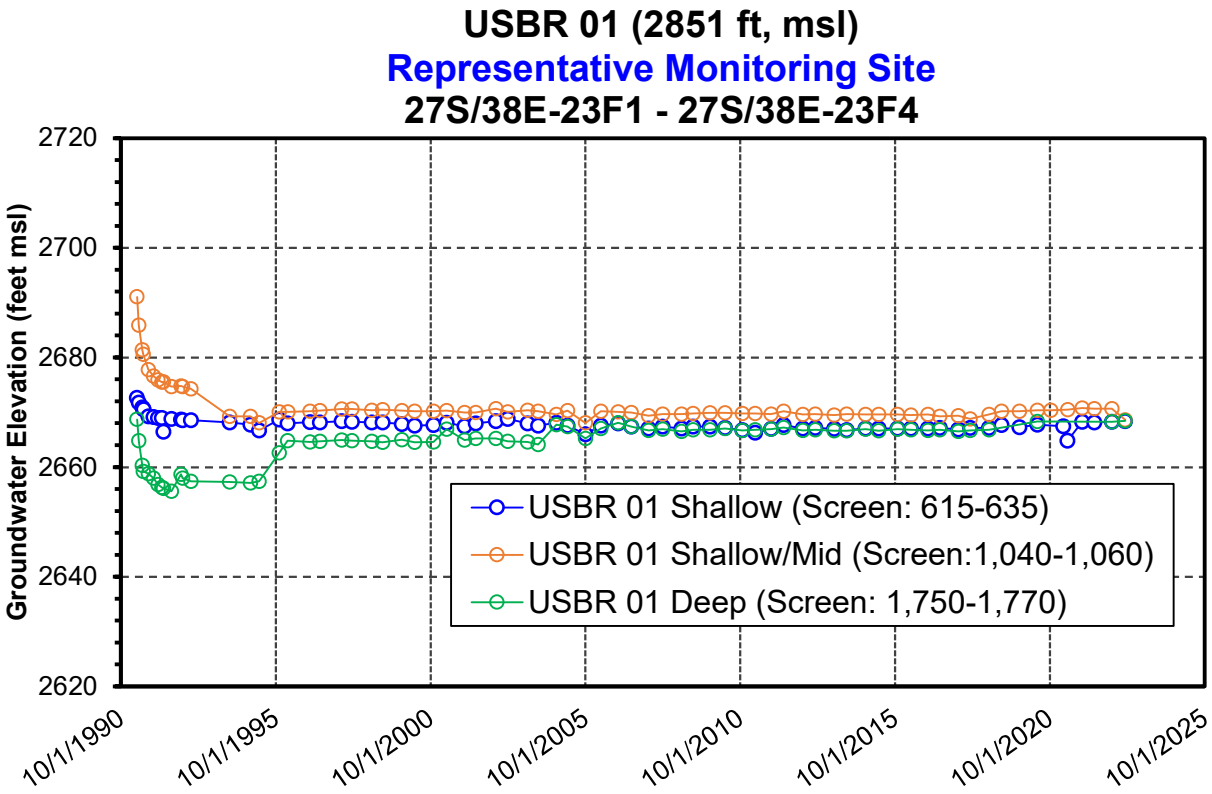
USBR 03 (2510 ft, msl)
Representative Monitoring Site
27S/39E-11D1 - 27S/39E-11D3



Inyo Well (2564 ft, msl)
Representative Monitoring Site
27S/39E-07R1




AB303-05 (3024 ft, msl)
27S/38E-21L1
Groundwater Elevation (feet msl)
2700
2680
2660
2640
2620
2600
10/1/1990
10/1/1995
10/1/2000
10/1/2005
10/1/2010
10/1/2015
10/1/2020
10/1/2025
AB303-05 (Screen: 905-1,005)


USBR 01 (2851 ft, msl)
Representative Monitoring Site
27S/38E-23F1 - 27S/38E-23F4
Groundwater Elevation (feet msl)
2720
2700
2680
2660
2640
2620
10/1/1990
10/1/1995
10/1/2000
10/1/2005
10/1/2010
10/1/2015
10/1/2020
10/1/2025
USBR 01 Shallow (Screen: 615-635)
USBR 01 Shallow/Mid (Screen:1,040-1,060)
USBR 01 Deep (Screen: 1,750-1,770)

Attachment F

Storage Change Estimate Using Thiessen Polygon Method

INDIAN WELLS VALLEY GROUNDWATER BASIN

ESTIMATED GROUNDWATER STORAGE CHANGE

Note: This Storage Change Calculation is for Measured Areas of the IWV Basin

Polygon	State ID T/R-S	Common Name	Basin Area	Specific Yield	Surface Area (acres)	Groundwater Level (Feet, msl) 2015	2016	2017	2018	2019	2022	2023	Change (feet) 2015-2016	2016-2017	2017-2018	2018-2019	2019-2022	2022-2023	*Storage Change (AF) for Measured Area of IWV Basin* WY 2016	WY 2017	WY 2018	WY 2019	2020 to 2022 3-year	2022 Avg Anl	WY 2023	4-Yr Cumm
1	28S/38E-18R	Black Hills Well	EP	0.21	14,609	2,820	2,820	2,820	2,821	2,820	2,820	2,820	0.1	0.2	0.6	-0.4	-0.3	0.0	307	614	1,841	-1,227	-918	-306	0	-918
2	27S/38E-27M01	USNS-03	EP	0.21	2,987	2,679	2,679	2,679	2,679	2,680	2,680	2,681	-0.1	0.2	-0.2	1.2	0.6	0.2	-63	126	-126	753	376	125	138	514
3	27S/38E-23F01	USBR 1-S	EP	0.08	1,967	2,667	2,667	2,667	2,667	2,668	2,668	2,668	0.0	0.1	0.0	0.5	0.5	0.2	0	16	0	79	77	26	32	109
4	27S/38E-21L01	AB303-05	EP	0.21	5,344	2,663	2,663	2,663	2,663	2,666	2,668	2,665	-0.2	0.6	0.0	2.5	2.0	-2.5	-225	673	0	2,806	2,245	748	-2,806	-561
5	27S/38E-15R01	AB303-06	EP	0.21	1,497	2,659	2,658	2,658	2,659	2,659	2,659	2,658	-0.6	-0.1	0.6	0.6	-0.2	-0.8	-189	-31	189	189	-63	-21	-251	-314
6	27S/38E-09P01	Father Crowley	EP	0.21	849	2,694	2,694	2,695	2,695	2,694	2,697	2,691	0.3	0.2	0.1	-0.7	2.5	-5.2	54	36	18	-125	446	149	-933	-487
7	27S/38E-08R01		EP	0.21	3,525	2,697	2,697	2,697	2,697	2,696	2,701	2,701	0.3	0.0	0.0	-1.0	4.3	0.2	222	0	0	-740	3,183	1,061	170	3,354
8	27S/38E-10B02	AB303-03	EP	0.21	1,588	2,469	2,470	2,470	2,469	2,469	2,473	2,470	0.5	0.6	-1.0	-0.1	3.4	-3.1	167	200	-333	-33	1,134	378	-1,034	100
9	27S/38E-09C01	AB303-04	EP	0.21	1,645	2,689	2,689	2,689	2,689	2,689	2,691	2,689	0.4	0.1	-0.6	0.2	2.0	-2.4	138	35	-207	69	691	230	-829	-138
10	27S/39E-19E01	IWV MW #3	IWV	0.08	2,275	2,436	2,435	2,436	2,435	2,435	2,435	2,435	-0.2	0.1	-0.4	0.2	-0.4	-0.1	-36	18	-73	36	-72	-24	-18	-91
11	27S/38E-13A01	Sea Bee Well	IWV	0.08	1,517	2,430	2,430	2,430	2,430	2,430	2,429	2,429	0.0	-0.2	-0.2	0.2	-0.9	0.1	0	-24	-24	24	-107	-36	11	-96
12	27S/39E-08P02	IWV MW # 2	IWV	0.21	3,341	2,150	2,149	2,149	2,147	2,146	2,145	2,139	-0.8	-0.2	-1.5	-1.0	-1.2	-6.3	-561	-140	-1,053	-702	-845	-282	-4,420	-5,265
13	27S/39E-07R01	Inyo	IWV	0.21	631	2,151	2,152	2,152	2,151	2,147	2,147	2,145	0.4	0.2	-1.3	-3.6	-0.2	-1.5	53	27	-172	-477	-27	-9	-199	-225
14	27S/39E-08M02	IWV MW #1	IWV	0.21	468	2,148	2,147	2,146	2,146	2,144	2,140	2,136	-0.7	-0.7	-0.7	-1.9	-3.4	-4.4	-69	-69	-69	-187	-334	-111	-433	-767
15	27S/39E-11D01	USBR 3-S	IWV	0.08	5,027	2,158	2,149	2,149	2,146	2,146	2,141	2,142	1.8	-0.2	-2.5	-7.0	-4.8	1.0	724	-80	-1,005	-2,815	-1,947	-649	394	-1,552
16	27S/40E-06N02		IWV	0.08	4,727	2,119	2,121	2,119	2,122	2,121	2,123	2,125	2.1	-1.6	2.7	-1.4	2.6	1.8	794	-605	1,021	-530	997	332	666	1,663
17	27S/40E-01K02	George Air Corr.	IWV	0.21	1,001	2,162	2,162	2,162	2,161	2,161	2,159	2,159	0.2	-0.2	-0.9	-0.7	-1.2	0.0	42	-42	-189	-147	-253	-84	8	-245
18	27S/40E-06E01		IWV	0.08	975	2,114	2,116	2,115	2,115	2,116	2,119	2,122	1.7	-1.1	0.9	0.4	3.6	2.1	133	-86	70	31	279	93	166	445
19	27S/39E-04C01		IWV	0.21	1,116	2,158	2,157	2,157	2,157	2,154	2,150	2,149	-0.7	-0.5	-0.2	-2.4	-4.3	-0.5	-164	-117	-47	-563	-1,003	-334	-122	-1,125
20	27S/38E-02C01	USBR 2-S	IWV	0.21	1,109	2,373	2,373	2,373	2,372	2,372	2,373	2,373	-0.2	0.5	-1.0	0.0	1.1	0.0	-47	117	-233	0	256	85	-1	256
21	26S/39E-34R02		IWV	0.21	1,379	2,136	2,135	2,134	2,133	2,132	2,128	2,127	-0.8	-1.1	-1.1	-1.1	-3.7	-0.7	-232	-319	-319	-319	-1,074	-358	-200	-1,274
22	26S/40E-31K01		IWV	0.21	1,791	2,113	2,115	2,114	2,115	2,118	2,119	2,119	2.2	-0.7	0.4	2.9	1.4	0.0	828	-263	151	1,091	530	177	1	530
23	26S/39E-32L01		IWV	0.21	3,171	2,155	2,154	2,154	2,153	2,151	2,148	2,147	-0.9	-0.3	-1.0	-1.8	-3.5	-0.8	-599	-200	-666	-1,199	-2,338	-779	-526	-2,864
24	26S/39E-31R03		IWV	0.21	1,376	2,144	2,144	2,144	2,142	2,141	2,138	2,136	-0.5	-0.4	-1.2	-1.4	-3.1	-1.1	-130	-130	-347	-404	-893	-298	-315	-1,208
25	26S/40E-35H02	Satellite Lake2(e)	IWV	0.21	2,609	2,155	2,154	2,154	2,153	2,153	2,154	2,154	-0.4	-0.3	-0.7	-0.3	0.8	-0.4	-219	-164	-384	-164	449	150	-225	224
26	26S/39E-26P02		IWV	0.18	1,070	2,146	2,146	2,145	2,144	2,143	2,140	2,140	-0.6	-0.6	-0.9	-1.4	-2.7	-0.2	-116	-116	-173	-270	-514	-171	-44	-558
27	26S/39E-27D04	MW 32-D	IWV	0.18	1,459	2,146	2,145	2,146	2,143	2,143	2,140	2,140	-0.8	0.9	-3.1	-0.4	-2.6	0.3	-210	236	-814	-105	-684	-228	89	-594
28	26S/39E-26A03	USBR 4	IWV	0.18	1,694	2,126	2,125	2,126	2,125	2,125	2,121	2,130	-1.2	0.8	-1.1	0.1	-4.0	9.6	-366	244	-336	31	-1,219	-406	2,943	1,724
29	26S/40E-22P04	PW Substation 2	IWV	0.21	705	2,187	2,195	2,192	2,191	2,193	2,206	2,206	7.5	-2.5	-0.8	1.2	13.3	0.0	1,110	-370	-118	178	1,970	657	-6	1,964
30	26S/40E-19N02		IWV	0.21	448	2,129	2,129	2,129	2,130	2,132	2,129	2,130	-0.3	0.2	1.4	1.4	-2.8	0.8	-28	19	132	132	-266	-89	75	-191
31	26S/40E-21K03		IWV	0.21	706	2,164	2,165	2,166	2,164	2,165	2,167	2,168	1.1	0.5	-1.9	1.2	2.0	0.6	163	74	-274	174	295	98	94	388
32	26S/40E-20L01		IWV	0.21	812	2,151	2,150	2,151	2,151	2,151	2,151	2,151	-0.1	0.4	-0.1	0.1	-0.2	0.1	-17	68	-14	21	-36	-12	10	-25
33	26S/40E-22H03		IWV	0.21	2,397	2,197	2,196	2,196	2,195	2,195	2,195	2,195	-0.6	-0.3	-0.7	-0.4	0.3	0.3	-302	-151	-337	-222	150	50	131	281
34	26S/39E-20C02		IWV	0.18	1,025	2,157	2,156	2,156	2,154	2,153	2,150	2,150	-0.8	-0.5	-1.5	-1.0	-3.2	-0.7	-148	-92	-277	-185	-591	-197	-129	-720
35	26S/39E-13R04		IWV	0.21	1,793	2,129	2,126	2,126	2,128	2,130	2,125	2,128	-3.4	0.3	1.8	2.0	-5.1	2.9	-1,280	113	689	738	-1,911	-637	1,085	-827
36	26S/40E-17N01		IWV	0.21	1,039	2,151	2,151	2,152	2,152	2,152	2,152	2,152	0.0	0.4	0.1	0.2	0.1	0.0	0	87	31	52	13	4	9	22
37	26S/40E-15N01		IWV	0.21	2,894	2,187	2,187	2,187	2,187	2,187	2,187	2,186	-0.3	0.3	-0.3	0.0	-0.2	-0.2	-182	182	-176	24	-104	-35	-134	-238
38	26S/39E-15J		IWV	0.18	1,688	2,148	2,146	2,147	2,145	2,145	2,144	2,144	-1.9	0.5	-1.2	-0.4	-0.8	0.2	-577	152	-365	-137	-231	-77	49	-182
39	26S/39E-14E01		IWV	0.21	864	2,169	2,169	2,168	2,168	2,167	2,165	2,165	-0.4	-0.9	-0.2	-0.6	-1.9	-0.6	-73	-163	-38	-103	-346	-115	-102	-448
40	26S/39E-17G02	Kerr McGee	IWV	0.18	1,957	2,154	2,153	2,153	2,151	2,150	2,148	2,148	-1.0	-0.5	-1.6	-0.7	-1.9	-0.3	-352	-176	-546	-247	-673	-224	-102	-775
41	26S/39E-11E02	Sandquist Spa	IWV	0.21	987	2,176	2,175	2,174	2,174	2,173	2,171	2,170	-0.8	-0.4	-0.8	-0.6	-2.0	-0.7	-166	-83	-158	-122	-413	-138	-147	-560
42	26S/39E-09E		IWV	0.21	1,733	2,146	2,145	2,145	2,143	2,143	2,142	2,142	-0.5	-0.4	-1.4	-0.4	-0.6	0.2	-182	-146	-521	-157	-234	-78	73	-161
43	26S/40E-12C		IWV	0.21	8,284	2,162	2,162	2,162	2,161	2,162	2,160	2,161	-0.3	0.5	-0.6	0.4	-1.5	0.4	-522	870	-1,096	783	-2,644	-881	659	-1,986
44	26S/39E-02N01		IWV	0.21	2,103	2,176	2,175	2,175	2,174	2,173	2,173	2,172	-0.7	-0.6	-0.6	-0.7	-0.8	-0.5	-309	-265	-269	-292	-333	-111	-234	-567
45	26S/38E-02Q01		IWV	0.21	1,509	2,164	2,164	2,163	2,162	2,160	2,158	2,156	-0.6	-1.1	-0.9	-2.0	-3.6	-2.2	-190	-349	-285	-634	-1,141	-380	-689	-1,830
46	26S/38E-01M05		IWV	0.21	1,520	2,167	2,166	2,165	2,164	2,163	2,161	2,160	-0.6	-0.6	-1.2	-1.2	-2.5	-0.5	-192	-192	-383	-383	-808	-269	-150	-958
47	26S/39E-05F01		IWV	0.21	1,247	2,171	2,170	2,169	2,168	2,166	2,165	2,164	-1.0	-0.5	-0.9	-1.7	-1.5	-0.7	-262	-131	-236	-439	-384	-128	-178	-562
48	26S/38E-02B01		IWV	0.21	519	2,166	2,166	2,165	2,164	2,162	2,157	2,159	-0.8	-0.6	-1.1	-2.2	-4.6	2.0	-87	-65	-120	-240	-497	-166	214	-284
49	26S/39E-01A01		IWV	0.21	2,482	2,170	2,170	2,170	2,170	2,169	2,176	2,175	-0.5	0.0	-0.4	-0.1	6.1	-0.3	-261	0	-203	-37	3,196	1,065	-141	3,055
50	25S/40E-31P		IWV	0.21	3,817	2,171	2,171	2,172	2,171	2,171	2,173	2,173	0.0	0.3	-0.5	0.1	1.6	0.2	0	241	-433	48	1,247	416	136	1,383
51	25S/39E-31R01		IWV	0.21	1,139	2,178	2,178	2,176	2,174	2,173	2,169	2,170	-0.1	-2.2	-2.2	-0.9	-3.7	0.6	-24	-532	-532	-215	-878	-293	139	-739
52	25S/38E-34G03	USBR 05-S	IWV	0.21	983	2,167	2,168	2,167	2,165	2,163	2,160	2,159	0.6	-0.7	-2.8	-1.4	-3.3	-0.8	124	-145	-578	-289	-679	-226	-155	-834
53	25S/38E-36G03	NR-2 (Deep)	IWV	0.21	766	2,142	2,146	2,142	2,140	2,145	2,143	2,143	3.9	-4.1	-1.8	5.1	-1.9	-0.8	627	-659	-290	820	-306	-102	-137	-442
54	25S/38E-34A01		IWV	0.21	1,973	2,183	2,173	2,172	2,171	2,169	2,166	2,166	-10.5	-0.7	-0.6	-2.1	-3.7	0.1	-4,351	-290	-249	-870	-1,521	-507	29	-1,492
55	25S/38E-35B01		IWV	0.21	907	2,166	2,165	2,165	2,163	2,162	2,159	2,158	-1.0	-0.4	-1.3	-1.5	-2.5	-1.0	-191	-76	-248	-286	-478	-159	-196	-674

WY 2023

IWV Modified Thiessen Polygon Method

Note: This Storage Change Calculation is for Measured Areas of the IWV Basin

Polygon	State ID T/R-S	Common Name	Basin Area	Specific Yield	Surface Area (acres)	Groundwater Level (Feet, msl) 2015	2016	2017	2018	2019	2022	2023	Change (feet) 2015-2016	2016-2017	2017-2018	2018-2019	2019-2022	2022-2023	*Storage Change (AF) for Measured Area of IWV Basin* WY 2016	WY 2017	WY 2018	WY 2019	2020 to 2022 3-year Avg Anl	WY 2023	4-Yr Cumm
56	25S/39E-28P01	Baker 4-NE	IWV	0.21	2,504	2,185	2,187	2,189	2,188	2,190	2,175	2,180	1.9	1.9	-0.2	1.3	-14.3	4.2	1,015	1,015	-89	673	-7,537	-2,512	2,224	-5,313
57	25S/39E-29M01		IWV	0.21	2,556	2,177	2,177	2,176	2,176	2,175	2,173	2,173	-0.6	-0.5	-0.5	-0.6	-1.8	-0.5	-295	-268	-263	-333	-985	-328	-279	-1,264
58	25S/38E-25J03	NR 1-D	IWV	0.21	1,475	2,158	2,158	2,157	2,156	2,155	2,143	2,142	-0.5	-0.7	-1.4	-0.8	-11.9	-0.5	-155	-217	-434	-248	-3,687	-1,229	-155	-3,842
59	25S/38E-14Q01		IWV	0.21	3,621	2,163	2,168	2,167	2,166	2,165	2,163	2,165	4.8	-0.9	-0.9	-0.9	-2.5	2.5	3,650	-684	-684	-684	-1,878	-626	1,878	0
60	25S/39E-12R01	Charely Tower	IWV	0.21	12,232	2,179	2,179	2,179	2,178	2,178	2,177	2,177	-0.2	-0.2	-0.2	-0.3	-0.7	-0.2	-591	-591	-591	-642	-1,923	-641	-514	-2,436
61	25S/38E-12L03	USBR 6-D	IWV	0.21	6,289	2,190	2,189	2,189	2,188	2,187	2,187	2,186	-0.9	-0.4	-0.9	-0.6	-0.4	-0.7	-1,189	-528	-1,228	-753	-475	-158	-964	-1,440
62	25S/39E-03R01	Baker Range	IWV	0.21	6,159	2,177	2,177	2,177	2,176	2,176	2,175	2,175	-0.4	-0.4	-0.3	-0.4	-1.0	-0.4	-474	-474	-414	-492	-1,304	-435	-466	-1,769
63	24S/38E-21A04	USBR 10-D	IWV	0.21	4,060	2,244	2,244	2,243	2,243	2,241	2,242	2,240	-0.1	-0.9	-0.4	-1.1	0.1	-1.9	-85	-767	-341	-938	85	28	-1,586	-1,500
64	25S/38E-03B		IWV	0.21	2,291	2,172	2,171	2,170	2,170	2,168	2,166	2,164	-0.9	-0.6	-0.4	-1.4	-2.5	-1.4	-433	-289	-193	-674	-1,202	-401	-664	-1,866
65	25S/40E-30E01	TTBK MW14	IWV	0.21	6,169	2,177	2,177	2,177	2,177	2,177	2,176	2,176	-0.1	-0.1	-0.3	-0.2	-0.7	-0.2	-71	-71	-337	-259	-868	-289	-233	-1,101
66	26S/38E-22B	Ostrich Ranch	IWV	0.21	2,465	2,240	2,240	2,236	2,236	2,240	2,237	2,233	-0.2	-4.0	-0.1	4.0	-2.6	-3.8	-104	-2,071	-52	2,071	-1,339	-446	-1,972	-3,311
67	26S/38E-35B		IWV	0.21	1,714	2,233	2,231	2,232	2,233	2,232	2,232	2,232	-1.6	1.5	0.7	-1.0	-0.3	-0.3	-576	540	252	-360	-101	-34	-115	-216
68	26S/38E-35D		IWV	0.21	1,869	2,238	2,238	2,238	2,238	2,237	2,239	2,236	0.1	0.1	-0.3	-0.5	1.7	-3.6	39	39	-118	-196	666	222	-1,413	-747
69	26S/40E-28J01	Hospital	IWV	0.21	569	2,157	2,157	2,156	2,156	2,156	2,157	2,156	0.1	-0.7	-0.1	-0.6	1.0	-0.8	12	-84	-12	-72	120	40	-96	24
70	26S/40E-29M01		IWV	0.21	2,837	2,124	2,130	2,130	2,127	2,131	2,124	2,125	6.4	0.0	-3.2	4.2	-7.7	1.1	3,813	0	-1,907	2,503	-4,562	-1,521	632	-3,930
71	27S/38E-01C		IWV	0.08	1,268	2,200	2,199	2,199	2,199	2,199	2,196	2,195	-0.5	-0.3	-0.3	-0.3	-2.9	-0.6	-51	-30	-30	-30	-294	-98	-61	-355
72	27S/39E-02K	Asphalt Constr	IWV	0.21	2,387	2,151	2,149	2,148	2,147	2,146	2,144	2,142	-1.4	-1.4	-1.4	-0.3	-0.9	-1.5	-711	-711	-711	-150	-451	-150	-750	-1,201
73	27S/39E-08A01		IWV	0.21	1,190	2,148	2,148	2,147	2,147	2,145	2,139	2,137	0.2	-1.1	-0.5	-1.8	-5.7	-2.7	50	-275	-125	-450	-1,423	-474	-665	-2,088
74	24S/38E-33J02		IWV	0.21	3,435	2,175	2,174	2,170	2,173	2,172	2,169	2,169	-1.0	-3.4	2.9	-1.1	-3.3	-0.9	-721	-2,453	2,092	-794	-2,381	-794	-632	-3,012
75	25S/39E-22J01	S. Baker Ranch	IWV	0.21	3,600	2,179	2,178	2,178	2,178	2,177	2,176	2,176	-0.3	-0.3	-0.3	-0.4	-1.1	-0.3	-263	-263	-204	-280	-805	-268	-242	-1,047
76	26S/40E-34F01	City of Ridgecrest	IWV	0.21	926	2,146	2,147	2,147	2,146	2,145	2,145	2,145	0.5	-0.4	-0.6	-0.5	-1.7	-0.1	97	-78	-107	-107	-321	-107	-17	-338
77	27S/40E-02J01	DMP Cemetery	IWV	0.21	2,308	2,162	2,162	2,162	2,161	2,161	2,159	2,151	0.2	-0.2	-0.9	-0.7	-1.2	-8.8	97	-97	-436	-339	-584	-195	-4,259	-4,842
			IWV Main Basin		154,960													IWV Main Basin	-4,791	-12,149	-17,486	-11,107	-47,648	-15,883	-12,370	-60,018
			El Paso Subarea		34,011													El Paso Subarea	412	1,667	1,381	1,770	7,171	2,390	-5,513	1,658
					188,971													Total for measured Area	-4,380	-10,482	-16,105	-9,338	-40,477	-13,492	-17,883	-58,360
																			BN	*AN*	*BN*	*W*	*AN__D__BN*		*W*	

Notes:

Specific Yield values from Appendix 3-H GSP Model Documentation

red: field measurement not available, estimated from hydrograph

Attachment G

Estimated WY 2023 Groundwater Production

Attachment G: WY 2023 Groundwater Production Estimate

Water Use Sector (DWR)	Water User	No Action Baseline WY 2023		Reported Groundwater Pumping WY 2023		Estimated Groundwater Pumping WY 2023	
		note	(AFY)	note	(AFY)	note	(AFY)
Urban	IWVWD	2	6,628	1	4,266	3	5,443
Urban	City/County	2	425	1	35	3	173
Industrial	Searles Valley Minerals	2	2,907	1	2,514	3	2,575
Other - Federal	U.S. Navy	2	2,041	4	1,377	4	1,377
Agriculture	Meadowbrook Farms	2	12,303	1	3,642	1	3,642
Agriculture	Mojave Pistachio	2	6,891	1	3,523	1	3,523
Agriculture	Simmons Farm	2	931	1	0	1	0
Agriculture	Sierra Shadows	2	765	1	114	3	244
Agriculture	Quist Farms	2	685	1	272	3	489
Agriculture	Other Small Ag	2	957	1	151	3	211
Other - Co-Ops/Mutuals/Community Services District	Other - Co-Ops/Mutuals/Community Services District	2	544	1	150	3	634
Other - Domestic	Domestic	2	832		0	2	832
			35,909				19,141

Notes:

1 Production reported to IWVGA for volumetric production fees and/or transient pool records. (Not all required pumpers report production.)

2 Estimated from GSP 'No Action' Baseline analysis.

3 Missing data estimated from best available data sources.

4 Data provided by Navy to the IWVGA via letter on November 7, 2023.

Attachment H

WY 2023 Water Quality Data

Table 1 Well Information, Sampling Methods, & Depth to Water Levels

State ID	Other Name	Latitude	Longitude	Well Type	Total Depth (ft, bgs)	Screen Interval (ft, bgs)	Sampling Method	Date	DTW	Sample Time
25S/38E-14A	Bork	35.76809	-117.85244	DOM	unk	unk	Owner purged	10/3/2022	234.91	10/3/2022 9:35
25S/38E-34A01	Means	35.72453	-117.87024	DOM	480	418.5-479.5	Owner purged	10/3/2022	365.83	10/3/2022 12:30
27S/38E-09C01	AB303-04	35.60665	-117.89378	MW	601	501-581	Hydrasleeve	10/3/2022	386.66	10/4/2022 8:22
27S/38E-13A02	AB303-01	35.59369	-117.8307	MW	690	232-272, 372-472, 630-690	Hydrasleeve	10/3/2022	225.81	10/4/2022 9:20
27S/38E-15R01	AB303-06	35.58195	-117.86617	MW	380	280-340	Hydrasleeve	10/3/2022	276.92	10/4/2022 9:45
27S/38E-21L01	AB303-05	35.56985	-117.89592	MW	1045	905-1005	Hydrasleeve	10/3/2022	360.49	10/4/2022 11:11
27S/39E-08A01	08A01	35.60721	-117.79818	MW	955	550-865, 895-935	Hydrasleeve	10/3/2022	397.98	10/4/2022 11:55
27S/40E-01K02	George Air Corridor	35.6147	-117.62469	MW	400	320-380	Hydrasleeve	10/3/2022	165.01	10/4/2022 12:45
27S/38E-32C01	EP-1-S	35.54904179	-117.9107061	MW	0	450-470	Hydrasleeve	10/4/2022	275.28	10/5/2022 17:50
27S/38E-10B02	AB303-03	35.60662	-117.87407	MW	872	452-552	Hydrasleeve	10/4/2022	431.44	10/5/2022 18:22
25S/38E-35B01	35B01	35.72509	-117.85286	MW	unk	200-298	Hydrasleeve	10/4/2022	240.95	10/5/2022 19:00
25S/38E-03B	03B1	35.79546	-117.87382	MW	360	300-360	Hydrasleeve	10/4/2022	294.11	10/5/2022 19:20
26S/39E-25K01	25K1	35.64041	-117.74023	MW	580	440-540	Hydrasleeve	10/4/2022	267.71	10/5/2022 20:00
26S/38E-01M05	Fields	35.70215	-117.84707	DOM	360	299-359	Owner purged	10/5/2022	216.41	10/5/2022 10:40
26S/38E-01L01	Well G	35.702013	-117.841337	DOM	unk	unk	Owner purged			10/5/2022 8:35
25S/39E-03R01	Baker Range	35.78412	-117.76257	MW,C	185	65-165	Hydrasleeve	10/3/2022	51.42	10/5/2022 7:50
25S/39E-12R01	Charley Tower	35.77039	-117.72496	MW	150	60-140	Hydrasleeve	10/3/2022	25.01	10/5/2022 8:25
26S/39E-05L01	05L01(S)	35.69973	-117.80355	MW	600	160-240	Hydrasleeve	10/3/2022	131.38	10/5/2022 9:50
26S/39E-17G02	Kerr McGee	35.67635	-117.80452	MW	881	681-881	Hydrasleeve	10/3/2022	210.1	10/5/2022 10:35
26S/39E-11E02	Sandquist Spa	35.68857	-117.75647	MW,C	191	135-191	Hydrasleeve	10/3/2022	136.51	10/5/2022 11:15
26S/39E-05K01	05K01(D)	35.69973	-117.80339	MW	605	565-585	Hydrasleeve	10/3/2022	129.39	10/5/2022 14:15
26S/40E-19N02	19N02	35.65413	-117.72147	MW	267	245-265	Hydrasleeve	10/3/2022	209	10/5/2022 14:50
26S/40E-22E01	26S/40E-22E01	35.66135	-117.66687	MW	651.5	531-631	Hydrasleeve	10/3/2022	98.87	10/5/2022 15:30
26S/40E-22E02	26S/40E-22E02	35.66132	-117.66633	MW	650	570-630	Hydrasleeve			10/5/2022 16:00

Well Type

MW: Monitoring Well
C: CASGEM Well
DOM: Domestic

Table 2 Water Quality Summary

Sample ID	State ID	Sample Date	Sample Depth (ft bgs)	Specific Conductance (EC) (µmhos/cm)	Total Filterable Residue/TDS (mg/L)	Calculated TDS/EC (multiplier)	Total Hardness (as $CaCO_3$) (mg/L)	Total Anions (meq/L)	Total Cations (meq/L)	% difference	Odor Threshold (TON)	Turbidity (NTU)	Total Alkalinity ($CaCO_3$) (mg/L)	Bicarbonate HCO_3 (mg/L)	Carbonate CO_3 (mg/L)	pH (Lab) (pH Units)
Maximum Contaminant Level (MCL)				*1,600*	*1,000*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*3*	*5*	*n/a*	*n/a*	*n/a*	*n/a*
14A01	25S/38E-14A	10/3/2022	*ubknown*	700	430	0.61	250	7.6	7.75	2.0	1	0.57	250	300	ND	7.7
34A01	25S/38E-34A01	10/3/2022	418.5-478.5	870	520	0.60	300	10	10	2.1	1	0.59	420	510	ND	7.2
AB303-04	27S/38E-09C01	10/4/2022	557-560	490	290	0.59	65	4.78	5.20	8.4	1	33	100	120	ND	8.0
AB303-01	27S/38E-13A02	10/4/2022	397-400	460	300	0.65	110	4.53	4.56	0.63	1	0.33	130	160	ND	7.7
AB303-06	27S/38E-15R01	10/4/2022	297-300	390	240	0.62	56	3.64	4.16	13	1	0.2	100	120	ND	8.0
AB303-05	27S/38E-21L01	10/4/2022	952-955	260	160	0.62	ND	2.78	2.7	3.1	1	0.44	120	150	ND	9.0
08A01	27S/39E-08A01	10/4/2022	572-575	410	260	0.63	100	3.95	3.92	0.88	1	0.48	110	140	ND	7.5
George Air Corridor	27S/40E-01K02	10/4/2022	247-250	1900	1000	0.53	150	17.3	16.2	6.3	1	0.24	120	140	ND	8.0
EP-1-S	27S/38E-32C01	10/5/2022	457-460	390	250	0.64	69	4.09	4.19	2.4	1	0.22	160	190	ND	7.5
AB303-03	27S/38E-10B02	10/5/2022	497-500	250	160	0.64	190	2.57	6.41	**85**	1	41	97	35	41	9.5
35B01	25S/38E-35B01	10/5/2022	247-250	880	510	0.58	160	9.88	9.5	3.9	1	31	370	450	ND	7.7
03B1	25S/38E-03B	10/5/2022	347-350	930	580	0.62	370	10.6	10.2	3.2	1	1.3	370	450	ND	7.0
25K1	26S/39E-25K01	10/5/2022	497-500	420	260	0.62	110	3.93	4.3	9	1	0.18	110	130	ND	7.8
01M05	26S/38E-01M05	10/5/2022	299-359	880	530	0.60	190	8.94	8.81	1.4	1	0.33	160	190	ND	7.6
Well G	26S/38E-01L01	10/5/2022	*ubknown*	850	520	0.61	170	8.89	8.24	7.6	1	0.2	160	200	ND	7.7
Baker Range	25S/39E-03R01	10/5/2022	97-100	960	610	0.64	260	10.6	10.8	2.1	1	0.17	310	380	ND	7.6
Charley Tower	25S/39E-12R01	10/5/2022	117-120	1100	690	0.63	190	12.30	11.6	5.7	1	1.6	310	380	ND	7.5
05L01(S)	26S/39E-05L01	10/5/2022	197-200	8000	5100	0.64	ND	114	105	8.6	1	0.31	4500	1700	1900	9.8
Kerr McGee	26S/39E-17G02	10/5/2022	697-700	260	170	0.65	18	3.53	2.72	**26**	1	2.7	160	140	26	8.6
Sandquist Spa	26S/39E-11E02	10/5/2022	157-160	580	340	0.59	190	5.98	5.98	0.056	1	ND	140	170	ND	7.7
05K01(D)	26S/39E-05K01	10/5/2022	572-575	31000	19000	0.61	ND	497	523	5.2	5	0.48	20000	6700	8900	9.9
19N02	26S/40E-19N02	10/5/2022	252-255	250	180	0.72	30	2.68	2.79	3.8	2	1.2	120	150	ND	7.4
22E01	26S/40E-22E01	10/5/2022	557-560	2600	1600	0.62	ND	33	28.6	14	3	1.6	1200	1200	140	8.7
22E02	26S/40E-22E02	10/5/2022	597-600	1800	1300	0.72	400	20.7	20.4	1.2	2	0.26	400	480	ND	7.6

n/a - Non applicable to dataset

ND - Analyte not detected at or above the reporting limit

J - Detected below the Reporting Limit; reported concentration is estimated

Table 2 Water Quality Summary

Sample ID	State ID	Sample Date	Sample Depth (ft bgs)	Chloride (mg/L)	Fluoride (mg/L)	Hydroxide (mg/L)	MBAS (LAS Mole. Wt 340.0) (mg/L)	Nitrate as N (mg/L)	Sulfate (mg/L)	Arsenic (µg/L)	Boron (µg/L)	Calcium (mg/L)	Copper (µg/L)	Iron (µg/L)	Magnesium (mg/L)	Manganese (µg/L)	Potassium (mg/L)	Sodium (mg/L)	Zinc (µg/L)
Maximum Contaminant Level (MCL)				*500*	*2*	*n/a*	*0.5*	*10*	*500*	*10*	*n/a*	*n/a*	*1,000*	*300*	*n/a*	*50*	*n/a*	*n/a*	*5,000*
14A01	25S/38E-14A	10/3/2022	*ubknown*	28	0.80	ND	0.048[J]	1.9	89	3.3	250	64	12[J]	200	21	ND	8.4	60	57
34A01	25S/38E-34A01	10/3/2022	418.5-478.5	14	0.61	ND	ND	0.39[J]	63	6.3	480	77	36[J]	21[J]	27	0.83[J]	6.6	84	59
AB303-04	27S/38E-09C01	10/4/2022	557-560	18	0.29	ND	ND	1.8	110	1.3[J]	120	21	8.4[J]	830	3	35	2.8	88	ND
AB303-01	27S/38E-13A02	10/4/2022	397-400	24	0.88	ND	ND	2.3	57	1.9[J]	270	37	ND	ND	4.9	ND	1.8	52	ND
AB303-06	27S/38E-15R01	10/4/2022	297-300	11	0.27	ND	0.054[J]	2.7	65	3.7	110	19	ND	ND	1.9	ND	2	69	ND
AB303-05	27S/38E-21L01	10/4/2022	952-955	2.6	0.40	ND	ND	0.13[J]	11	5.2	100	1.5	ND	ND	ND	2.8[J]	0.56[J]	60	ND
08A01	27S/39E-08A01	10/4/2022	572-575	24	0.81	ND	ND	1.7	45	2.4	330	32	ND	120	5.3	21	2.1	42	ND
George Air Corridor	27S/40E-01K02	10/4/2022	247-250	490	1.9	ND	0.053[J]	0.29[J]	51	44	2800	50	ND	44[J]	5.2	5.3	9.5	300	ND
EP-1-S	27S/38E-32C01	10/5/2022	457-460	15	0.64	ND	0.048[J]	0.74	25	4.8	280	22	ND	ND	3.1	9.8[J]	2.1	64	ND
AB303-03	27S/38E-10B02	10/5/2022	497-500	4.9	0.36	ND	ND	0.15[J]	23	13	110	76	9.1[J]	670	0.72[J]	300	1	58	ND
35B01	25S/38E-35B01	10/5/2022	247-250	44	0.57	ND	ND	0.14[J]	59	5.6	1100	44	ND	3600	13	180	5.3	140	ND
03B1	25S/38E-03B	10/5/2022	347-350	23	0.76	ND	ND	1.2	120	5.1	180	87	7.0[J]	ND	36	ND	7.1	63	ND
25K1	26S/39E-25K01	10/5/2022	497-500	29	0.45	ND	0.051[J]	3.0	46	4.7	250	34	ND	ND	4.8	ND	2.9	49	ND
01M05	26S/38E-01M05	10/5/2022	299-359	80	0.57	ND	ND	0.59	170	1.4[J]	700	57	15[J]	ND	13	1.1[J]	4.1	110	ND
Well G	26S/38E-01L01	10/5/2022	*ubknown*	80	0.42	ND	ND	0.30[J]	160	1.4[J]	820	49	ND	23[J]	11	0.99[J]	3.8	110	ND
Baker Range	25S/39E-03R01	10/5/2022	97-100	50	0.73	ND	0.049[J]	1.10	140	15	1400	45	7.6[J]	ND	36	ND	15	120	ND
Charley Tower	25S/39E-12R01	10/5/2022	117-120	110	0.77	ND	0.065[J]	0.29[J]	140	15	2900	37	ND	180	24	24	15	170	ND
05L01(S)	26S/39E-05L01	10/5/2022	197-200	760	6.2	ND	0.24	ND	75	5.7	89000	4.1[J]	ND	ND	ND	ND	15[J]	2400	ND
Kerr McGee	26S/39E-17G02	10/5/2022	697-700	6	2.60	ND	ND	ND	3	4.7	560	5.7	ND	310	0.94[J]	24	3.8	52	ND
Sandquist Spa	26S/39E-11E02	10/5/2022	157-160	62	0.55	ND	ND	1.9	68	1.7[J]	310	61	ND	ND	8.9	ND	2.7	49	ND
05K01(D)	26S/39E-05K01	10/5/2022	572-575	3200	ND	ND	0.85	0.15[J]	0.74	7.5	500000	ND	ND	ND	ND	ND	42[J]	12000	ND
19N02	26S/40E-19N02	10/5/2022	252-255	6.0	0.77	ND	0.070[J]	ND	0.72	1.7[J]	220	9.5	ND	14[J]	1.6	6.0[J]	8.8	45	ND
22E01	26S/40E-22E01	10/5/2022	557-560	280	7.1	ND	0.070[J]	0.15[J]	21	3.1	23000	3.0[J]	ND	ND	ND	9.4[J]	7.8[J]	650	ND
22E02	26S/40E-22E02	10/5/2022	597-600	19	3.8	ND	0.083[J]	ND	580	330	2300	70	8.8[J]	ND	54	24	29	270	ND

n/a - Non applicable to dataset

ND - Analyte not detected at or above the reporting limit

J - Detected below the Reporting Limit; reported concentration is estimated

Attachment I
IWV Model Configuration Item List

IWV-Model Configuration Item (CI) List

CI Request Number	CI Request Date	CI Summary	Importance Rank 1 (low) 5 (high)	Priority 1 (low) 5 (high)	Origin of CI (IWVGA, TAC, Navy, etc.)	Date Complete review order
1	10/27/22	Discussing changes to groundwater in storage and compare the model results to a Thiessen Polygon method.			TMG	TMG 12/15/22 Group discussion
2	1/19/23	Dr. Ryan Smith a. Discussion of how to approach AEM data analysis (SkyTEM Survey Data Report) b. Additional data to provide for AEM interpretation			TMG	TMG 2/14/23 Group discussion
3	3/23/23	DRI to present the first proposed GSP Model changes: a. Simulation period: October 1, 1920 through September 30, 2022. b. Stress period: annual stress period from October 1, 1920 to September 30, 1995; monthly stress period from October 1, 1995 to September 30, 2022. c. Six model layers d. Depth and thickness of each model layer based on Monasttero et al. (2002); Shah et al. (2018) and AEM data (2019) e. Hydraulic conductivity f. Pumping g. Recharge	5	5	TMG	TMG 8/17/23 Group discussion
4	5/24/23	Group meeting a. Seismic depth to basement analysis b. Clay plug analysis			TMG	TMG 5/24/23 Group discussion
5	6/14/23	Group meeting a. Depth to basement analysis b. Sedimentary thickness analysis			TMG	TMG 6/14/23 Group discussion
6	6/30/23	Group meeting a. Preliminary model layer delineation			TMG	TMG 6/30/23 Group discussion
7	7/21/23	a. Discussed methodology for discretizing model grid in basalt flow area below Rose Valley, and planned to delineate an aquifer property zone for the White Hills formation. b. DRI will continue work on model grid discretization using SkyTEM and well log data. DRI will complete the preliminary model discretization, define faults to be simulated, and analyze clay fraction in the clay plug to present at the next modeling group meeting.			TMG	TMG 7/21/23 Group discussion
8	9/25/23	Steve Bacon, September 25, 2023. Development of a Tectonic Block Model in Support of the Hydrogeology Conceptual Framework of IWV (2025 GSP Update)	5	5	TMG	TMG 9/25/23 Plan outside AEM review

Attachment J

WY 2023 Precipitation and Stream Gage Data

DRAFT MEMORANDUM

785 Grand Avenue, Suite 202 • Carlsbad, California • 94901
TEL: (760) 730-0701 FAX: (415) 457-1638 e-mail: stever@stetsonengineers.com

TO:	File	DATE:	November 22, 2023
FROM:	Stetson Engineers Inc.	JOB NO:	2652
RE:	Chimney Peak Weather Station – Annual Report of Precipitation, Water Year 2023		

This memorandum serves as an annual summary of station operation and reporting of approved data records associated with the Chimney Peak Weather Station. IWVGA operation of this station is done under legal agreement with the Bureau of Land Management to occupy and operate the station inside of the BLM Chimney Peak Fire Station property boundary.

SUMMARY OF STATION OPERATIONS AND DATA – WY 2023

During WY 2023, three site visits were made to conduct maintenance of the station, October 2022, March 2023, and September 2023. During the March 2023 site visit significant snow accumulation prevented visiting the site, however a visual inspection from outside the fire station was possible to determine that no adverse impacts had occurred as a result of snow accumulation. The September visit further verified that the station had operated without issue throughout the year.

Over the course of the water year 22.19 inches of precipitation was recorded at this station. Total precipitation may have been greater than this as much of the winter time precipitation was as snowfall. Tipping bucket rain gages as are employed at many of the weather station in the area will experience inefficiencies in capturing of precipitation as snowfall due to the design. The following graph shows the accumulated precipitation for Water Year 2023.

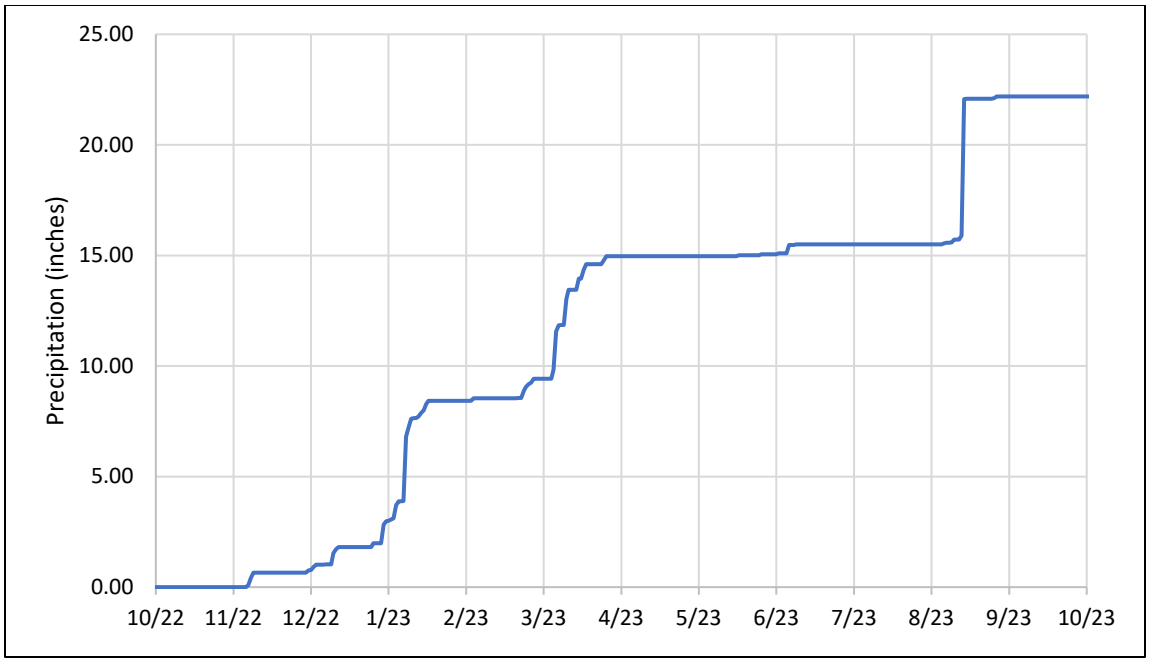


FIGURE 1. CUMULATIVE PRECIPITATION AT CHIMNEY PEAK WEATHER STATION WATER YEAR 2023

The following tables summarize the daily recorded precipitation totals, December 2020 through October 2023, by Water Year. Other parameter data is available on the IWVGSP.com website.

Daily Precipitation Data
Chimney Peak Fire Station, Water Year 2021

Water year	2021
Station Name	Chimney Peak Fire Station
Operating Agency	IWVGA Agent - Stetson Engineers Inc.
Latitude	35°52'08.5" N
Longitude	118°00'42.6" W

	Daily Precipitation (inches)											
	2020			2021								
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	0	0	0	0	0	0	0	0	0
2	---	---	---	0	0	0	0	0	0	0	0	0
3	---	---	---	0	0	0	0	0	0	0	0	0
4	---	---	---	0	0	0	0	0	0	0	0	0
5	---	---	---	0	0	0	0	0	0	0	0	0
6	---	---	---	0	0	0	0	0	0	0	0	0
7	---	---	---	0	0	0	0	0	0	0	0	0
8	---	---	---	0	0	0	0	0	0	0	0	0
9	---	---	---	0	0	0	0	0	0	0	0	0
10	---	---	---	0	0	0.05	0	0	0	0	0	0.27
11	---	---	---	0	0	0	0	0	0	0.25	0	0
12	---	---	---	0	0.16	0.03	0	0	0	0.13	0	0
13	---	---	---	0	0	0	0	0	0	0.01	0	0
14	---	---	***0.03***	0	0	0	0	0	0	0	0	0
15	---	---	0	0	0	0.01	0	0	0	0	0	0
16	---	---	0	0	0	0	0	0.01	0	0	0	0
17	---	---	0	0	0	0	0	0	0	0	0	0
18	---	---	0	0	0	0	0	0	0.02	0.01	0	0
19	---	---	0	0	0	0	0	0	0	0.18	0	0
20	---	---	0	0	0	0.01	0	0	0	0	0	0
21	---	---	0	0	0	0	0	0	0	0	0	0
22	---	---	0	0	0	0	0.08	0	0	0	0	0
23	---	---	0	0.12	0	0.01	0.01	0	0	0	0	0
24	---	---	0	0	0	0	0	0	0	0	0	0
25	---	---	0	0	0	0	0	0	0	0	0	0
26	---	---	0	0	0	0	0	0	0	0.19	0	0
27	---	---	0.14	0.01	0	0	0	0	0	0	0	0
28	---	---	0.24	0.22	0	0	0	0	0	0	0	0
29	---	---	0.03	0.26		0	0	0	0	0	0	0
30	---	---	0	0.01		0	0	0	0	0	0	0
31	---		0	0		0		0		0.06	0	
Mean	---	---	***0.02***	0.02	0.01	0.00	0.00	0.00	0.00	0.03	0.00	0.01
Max	---	---	***0.24***	0.26	0.16	0.05	0.08	0.01	0.02	0.25	0.00	0.27
Min	---	---	***0.00***	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	---	---	***0.44***	0.62	0.16	0.11	0.09	0.01	0.02	0.83	0.00	0.27

Data Source: IWVGA, Stetson Engineers Inc. Data Management System; via NOAA DCS, DCP - BE100E74

Bold-Italicized data values represent values based on incomplete data sets.

Daily Precipitation Data
Chimney Peak Fire Station, Water Year 2022

Water year	2022
Station Name	Chimney Peak Fire Station
Operating Agency	IWVGA Agent - Stetson Engineers Inc.
Latitude	35°52'08.5" N
Longitude	118°00'42.6" W

	Daily Precipitation (inches)											
	2021			2022								
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0.03	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0.05
4	0	0	0	0	0	0	0	0	0	0	0.03	0
5	0	0	0	0	0	0	0	0	0	0	0.38	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0.01	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0.51
11	0	0	0	0	0	0	0	0	0	0	0	0.08
12	0	0	0	0	0	0	0	0	0	0	0	0.55
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0.31	0	0.01	0	0	0	0	0	0	0
16	0	0	0.52	0	0	0	0	0	0	0	0	0
17	0	0	0.03	0	0	0	0	0	0	0.01	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0.15	0	0	0	0	0	0.42	0	0	0
23	0	0	2.11	0	0	0	0	0	0	0	0	0
24	0	0	0.04	0	0.12	0	0	0	0	0	0	0
25	0.35	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0.06	0	0	0	0	0	0	0	0	0
27	0	0	0.01	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0.09	0	0	0	0	0	0
29	0	0	0.06	0		0.01	0	0	0	0.08	0	0
30	0	0	0.58	0		0	0	0	0	0.27	0	0
31	0		0.07	0		0		0		1.09	0	
Mean	0.01	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.01	0.04
Max	0.35	0.00	2.11	0.03	0.12	0.09	0.00	0.00	0.42	1.09	0.38	0.55
Min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.35	0.00	3.95	0.03	0.13	0.10	0.00	0.00	0.42	1.45	0.41	1.19

Data Source: IWVGA, Stetson Engineers Inc. Data Management System; via NOAA DCS, DCP - BE100E74

Bold-Italicized data values represent values based on incomplete data sets.

Daily Precipitation Data
Chimney Peak Fire Station, Water Year 2023

Water year	2023
Station Name	Chimney Peak Fire Station
Operating Agency	IWVGA Agent - Stetson Engineers Inc.
Latitude	35°52'08.5" N
Longitude	118°00'42.6" W

	Daily Precipitation (inches)											
	2022			2023								
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0.1	0.16	0	0.17	0	0	0	0	0	0.04
2	0	0	0.01	0.01	0	0	0	0	0	0	0	0.07
3	0	0	0.14	0.06	0	0	0	0	0	0	0	0
4	0	0	0.11	0.06	0	0	0	0.01	0	0	0	0
5	0	0	0	0.59	0.11	0	0	0	0	0	0	0
6	0	0	0	0.17	0	0	0	0	0	0	0	0
7	0	0.09	0	0	0	0	0	0	0.03	0	0	0
8	0	0.32	0.01	0.02	0	0	0	0	0	0	0	0
9	0	0.25	0	2.9	0	0.43	0	0	0	0	0	0
10	0	0	0	0.43	0	1.72	0	0	0	0	0	0
11	0	0	0.51	0.39	0	0.27	0	0	0.38	0	0	0
12	0	0	0.17	0.02	0	0.01	0	0	0.01	0	0.04	0
13	0	0	0.1	0	0	0	0	0	0	0	0.03	0
14	0	0	0	0.08	0	1.17	0	0	0.02	0	0	0
15	0	0	0	0.15	0	0.42	0	0	0	0	0.02	0
16	0	0	0	0.12	0	0	0	0	0	0	0.13	0
17	0	0	0	0.29	0	0	0	0	0	0	0	0
18	0	0	0	0.15	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0.51	0	0	0	0	0.17	0
20	0	0	0	0	0	0	0	0	0	0	6.18	0
21	0	0	0	0	0	0.39	0	0	0	0	0.01	0
22	0	0	0	0	0	0.26	0	0.04	0	0	0	0
23	0	0	0	0	0.02	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0.32	0.01	0	0	0	0	0	0
26	0	0	0	0	0.18	0	0	0	0	0	0	0
27	0	0	0.17	0	0.12	0	0	0	0	0	0	0
28	0	0	0	0	0.07	0	0	0	0	0	0	0
29	0	0	0	0		0.17	0	0	0	0	0	0
30	0	0	0.01	0		0.18	0	0	0	0	0	0
31	0		0.84	0		0		0.05		0	0	
Mean	0.00	0.02	0.07	0.18	0.03	0.18	0.00	0.00	0.01	0.00	0.21	0.00
Max	0.00	0.32	0.84	2.90	0.32	1.72	0.00	0.05	0.38	0.00	6.18	0.07
Min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.66	2.17	5.60	0.82	5.71	0.00	0.10	0.44	0.00	6.58	0.11

Data Source: IWVGA, Stetson Engineers Inc. Data Management System; via NOAA DCS, DCP - BE100E74

Bold-Italicized data values represent values based on incomplete data sets.

CHIMNEY PEAK PRECIPITATION STATION OVERVIEW

Stetson Engineers (Stetson) as acting agent for IWVGA, established this weather station December 2020, with the purpose of collecting regional precipitation data in an area where precipitation data collection has been missing. On December 14th, 2020, Stetson completed the installation of the Chimney Peak Precipitation Station at the Chimney Peak Bureau of Land Management (BLM) Fire Station. The installation was approved and permitted by the BLM with Communications Lease Agreement CACA 058717 and Categorical Exclusion Documentation DOI-BLM-CA-C060-2020-0015-CX. The station was installed inside the Chimney Peak BLM Fire Station facility, in the proposed location, at coordinate position, 35.86902, -118.01185.

The installation is comprised of components to measure and record precipitation, air temperature, and relative humidity measurements, and transmit this data through the NOAA GOES Data Collection System (DCS). The monitoring and telemetry equipment consist of the following listed component parts:

FTS Equipment List:

FTS Serial Number	Manufacture Serial Number	Model Number	Description
NA	NA	GPS-ANTENNA-WP	GPS Antenna
080028	52015405	1032-018	GOES Antenna EON2 Kit2, 401MHz, 6.0dBic
NA	NA	NA	EON2 Amiable Mount
NA	NA	20180	SMA Male to N Female Adapter
NA	NA	20514	Cable, N-Type Bulkhead to SMA M, 10”
118428	NA	LT1-GOES	LT1 Logger/Transceiver 1 GOES
119783	870470.008	21032	Lambrecht Temperature / Humidity Sensor
118802	NA	RG-T-FL	Rain Gage, Pedestal mount, 20 ft armored cable
118884	TS200528030	WS20G6M	20 Watt Solar Panel; SPS-20W-ASC
118884	NA	NA	ASC Battery Charge Regulator, Specialty Concepts, Inc.
NA	NA	12841-3	Charge Regulator to Battery Cable Assembly; MTL 2020-05-06
12220	NA	IT45-12-H	Battery – 12 Volt / 45 Ah
NA	NA	CBL-UC-JB-PWR	Battery to Terminal Cable Assembly; MTL 2020-06-15
1197784	NA	SDI-THPS-LB	Temperature/Humidity Sensor Radiation Shield
NA	NA	WP-ENCL-MINI	Weatherproof Equipment Enclosure, Mini Size
20385	CM106B	Tripod	7-10 ft Tripod with Grounding Kit

Photograph of Installation:

FIGURE 2. CHIMNEY PEAK WEATHER STATION FACING SOUTH-WEST

FIGURE 3. CHIMNEY PEAK WEATHER STATION, FACING SOUTH-WEST

Measurement & Telemetry Programming:

The datalogger / GOES transmitter (LT1) are programmed with the following NOAA DCS settings for data transmission through the NOAA GOES DCS.

Data Collection Platform:	BE100E74
Measurement Interval:	15 minutes
Transmission interval:	One hour
Transmission Offset:	34 minutes, 10 seconds
Parameter Encoding:	SHEF
Measurement Parameters:	VB – Battery Voltage; Volts
	PC – Accumulated Precipitation; Inches
	TA – Instantaneous Air Temperature, Celsius
	RH – Instantaneous Relative Humidity; Percent
	DP – Instantaneous Dew Point; Celsius
	BP – Instantaneous Barometric Pressure; Hectopascal

Stetson has implemented a data retrieval program to collect all environmental monitoring data for the Indian Wells Valley regions, transmitted through NOAA GOES DCS, including this Chimney Peak Precipitation Station. This data is collected and hosted on Indian Wells Valley Groundwater Sustainability Plan website, IWVGSP.com.

DRAFT MEMORANDUM

785 Grand Avenue, Suite 202 • Carlsbad, California • 94901
TEL: (760) 730-0701 FAX: (415) 457-1638 e-mail: stever@stetsonengineers.com

TO:	File	DATE:	November 22, 2023
FROM:	Stetson Engineers Inc.	JOB NO:	2652
RE:	Walker Pass East Weather Station – Annual Report of Precipitation, Water Year 2023		

This memorandum serves as an annual summary of station operation and reporting of approved data records associated with the Walker Pass East Weather Station. IWVGA operation of this station is done under legal agreement with the Bureau of Land Management to occupy and operate the precipitation and telemetry equipment installed on the defunct Walker Pass East BLM RAWS weather station structure.

SUMMARY OF STATION OPERATIONS AND DATA – WY 2023

During WY 2023, in November 2022, this station was inadvertently demobilized by the Bureau of Land Management Southwest RAWS Field Group located in Phoenix Arizona. Subsequently the station equipment was stolen from the Arizona BLM equipment yard. As a result of this data for WY 2023 ends on November 9th, 2022. This loss of equipment and station operation was reported to the IWVGA Board once observed. This station has not been restored.

The following tables summarize the daily recorded precipitation totals, August 2020 through November 2022, by Water Year.

Daily Precipitation Data
Walker Pass East, Water Year 2020

Water year	2020
Station Name	Walker Pass East
Operating Agency	IWVGA Agent - Stetson Engineers Inc.
Latitude	35°39'45.4" N
Longitude	118°01'31.7" W

	Daily Precipitation (inches)											
	2019			2020								
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	---	---	---	---	---	0
2	---	---	---	---	---	---	---	---	---	---	---	0
3	---	---	---	---	---	---	---	---	---	---	---	0
4	---	---	---	---	---	---	---	---	---	---	---	0
5	---	---	---	---	---	---	---	---	---	---	---	0
6	---	---	---	---	---	---	---	---	---	---	---	0
7	---	---	---	---	---	---	---	---	---	---	---	0
8	---	---	---	---	---	---	---	---	---	---	---	0
9	---	---	---	---	---	---	---	---	---	---	---	0
10	---	---	---	---	---	---	---	---	---	---	---	0
11	---	---	---	---	---	---	---	---	---	---	---	0
12	---	---	---	---	---	---	---	---	---	---	---	0
13	---	---	---	---	---	---	---	---	---	---	---	0
14	---	---	---	---	---	---	---	---	---	---	---	0
15	---	---	---	---	---	---	---	---	---	---	---	0
16	---	---	---	---	---	---	---	---	---	---	---	0
17	---	---	---	---	---	---	---	---	---	---	---	0
18	---	---	---	---	---	---	---	---	---	---	---	0
19	---	---	---	---	---	---	---	---	---	---	---	0
20	---	---	---	---	---	---	---	---	---	---	---	0
21	---	---	---	---	---	---	---	---	---	---	---	0
22	---	---	---	---	---	---	---	---	---	---	---	0
23	---	---	---	---	---	---	---	---	---	---	---	0
24	---	---	---	---	---	---	---	---	---	---	---	0
25	---	---	---	---	---	---	---	---	---	---	---	0
26	---	---	---	---	---	---	---	---	---	---	0	0
27	---	---	---	---	---	---	---	---	---	---	0	0
28	---	---	---	---	---	---	---	---	---	---	0	0
29	---	---	---	---	---	---	---	---	---	---	0	0
30	---	---	---	---	---	---	---	---	---	---	0	0
31	---		---	---		---		---		---	0	
Mean	---	---	---	---	---	---	---	---	---	---	---	0.00
Max	---	---	---	---	---	---	---	---	---	---	---	0.00
Min	---	---	---	---	---	---	---	---	---	---	---	0.00
Total	---	---	---	---	---	---	---	---	---	---	---	0.00

Data Source: IWVGA, Stetson Engineers Inc. Data Management System; via In-Situ HydroVu data platform

Daily Precipitation Data
Walker Pass East, Water Year 2021

Water year	2021
Station Name	Walker Pass East
Operating Agency	IWVGA Agent - Stetson Engineers Inc.
Latitude	35°39'45.4" N
Longitude	118°01'31.7" W

	Daily Precipitation (inches)											
	2020			2021								
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0.12	0	0	0	0	0	0	0	0	0
8	0	0	0.06	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0.02	0	0	0	0	0
10	0	0	0	0	0	0	0.04	0	0	0	0	0
11	0	0	0	0	0	0	0.03	0	0	0	0	0
12	0	0	0	0	0	0	0.01	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0.16	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0.06	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0.06	0
18	0	0	0	0	0.01	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0.04	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0.12	0	0	0	0	0	0	0
23	0	0	0	0	0.04	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0.02	0
26	0	0	0	0.16	0.05	0	0	0	0	0	0	0
27	0	0	0	0.16	0.02	0	0	0	0	0	0	0
28	0	0	0	0	0.35	0	0	0	0	0	0	0
29	0	0	0	0		0	0	0	0	0	0.06	0
30	0	0	0	0		0	0	0	0	0	0.35	0
31	0		0	0		0		0		0	0	
Mean	0.00	0.00	0.01	0.01	0.02	0.01	0.00	0.00	0.00	0.00	0.02	0.00
Max	0.00	0.00	0.12	0.16	0.35	0.16	0.04	0.00	0.00	0.00	0.35	0.00
Min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.18	0.38	0.59	0.16	0.14	0.00	0.00	0.00	0.49	0.00

Data Source: IWVGA, Stetson Engineers Inc. Data Management System; via In-Situ HydroVu data platform

Daily Precipitation Data
Walker Pass East, Water Year 2022

Water year	2022
Station Name	Walker Pass East
Operating Agency	IWVGA Agent - Stetson Engineers Inc.
Latitude	35°39'45.4" N
Longitude	118°01'31.7" W

	Daily Precipitation (inches)											
	2021			2022								
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0	0	0.01	0	0	0	0	0	0	0.21	0
2	0	0	0	0	0	0	0	0	0	0	1.11	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0.01	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0.7	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0.02	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0.06	0	0	0	0	0	0	0	0	0
11	0	0	0.01	0	0	0	0	0	0	0	0	0.01
12	0	0	0	0	0	0	0	0	0	0	0	0.01
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0.02	0	0	0	0	0	0	0	0	0
15	0	0	0.4	0	0	0	0	0	0	0	0	0
16	0	0	0.03	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0.06	0	0.01	0	0.08	0	0.68	0	0	0
23	0	0	1.63	0	0	0	0	0	0.08	0	0	0
24	0	0	0.38	0	0	0	0	0	0	0	0	0
25	0.35	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	0	0	0
27	0	0	0.06	0	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0.15	0	0	0	0	0	0
29	0	0	0.1	0		0	0	0	0	0	0	0
30	0	0	0.55	0		0	0	0	0	0.38	0	0
31	0		0	0		0		0		1.08	0	
Mean	0.01	0.00	0.11	0.00	0.00	0.01	0.00	0.00	0.03	0.05	0.07	0.00
Max	0.35	0.02	1.63	0.01	0.01	0.15	0.08	0.00	0.68	1.08	1.11	0.01
Min	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.35	0.02	3.30	0.01	0.01	0.16	0.08	0.00	0.76	1.46	2.02	0.02

Data Source: IWVGA, Stetson Engineers Inc. Data Management System; via In-Situ HydroVu data platform

Daily Precipitation Data
Walker Pass East, Water Year 2023

Water year	2023
Station Name	Walker Pass East
Operating Agency	IWVGA Agent - Stetson Engineers Inc.
Latitude	35°39'45.4" N
Longitude	118°01'31.7" W

	Daily Precipitation (inches)											
	2022			2023								
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0	0.024	---	---	---	---	---	---	---	---	---	---
2	0	0.157	---	---	---	---	---	---	---	---	---	---
3	0	0	---	---	---	---	---	---	---	---	---	---
4	0	0	---	---	---	---	---	---	---	---	---	---
5	0	0	---	---	---	---	---	---	---	---	---	---
6	0	0	---	---	---	---	---	---	---	---	---	---
7	0	0.134	---	---	---	---	---	---	---	---	---	---
8	0	0	---	---	---	---	---	---	---	---	---	---
9	0	***0.094***	---	---	---	---	---	---	---	---	---	---
10	0	---	---	---	---	---	---	---	---	---	---	---
11	0	---	---	---	---	---	---	---	---	---	---	---
12	0	---	---	---	---	---	---	---	---	---	---	---
13	0	---	---	---	---	---	---	---	---	---	---	---
14	0	---	---	---	---	---	---	---	---	---	---	---
15	0	---	---	---	---	---	---	---	---	---	---	---
16	0	---	---	---	---	---	---	---	---	---	---	---
17	0	---	---	---	---	---	---	---	---	---	---	---
18	0	---	---	---	---	---	---	---	---	---	---	---
19	0	---	---	---	---	---	---	---	---	---	---	---
20	0	---	---	---	---	---	---	---	---	---	---	---
21	0	---	---	---	---	---	---	---	---	---	---	---
22	0	---	---	---	---	---	---	---	---	---	---	---
23	0	---	---	---	---	---	---	---	---	---	---	---
24	0	---	---	---	---	---	---	---	---	---	---	---
25	0	---	---	---	---	---	---	---	---	---	---	---
26	0	---	---	---	---	---	---	---	---	---	---	---
27	0	---	---	---	---	---	---	---	---	---	---	---
28	0	---	---	---	---	---	---	---	---	---	---	---
29	0	---	---	---		---	---	---	---	---	---	---
30	0	---	---	---		---	---	---	---	---	---	---
31	0		---	---		---		---		---	---	
Mean	0.00	---	---	---	---	---	---	---	---	---	---	---
Max	0.00	---	---	---	---	---	---	---	---	---	---	---
Min	0.00	---	---	---	---	---	---	---	---	---	---	---
Total	0.00	***0.41***	---	---	---	---	---	---	---	---	---	---

Data Source: IWVGA, Stetson Engineers Inc. Data Management System; via In-Situ HydroVu data platform

WALKER PASS EAST PRECIPITATION STATION OVERVIEW

Stetson Engineers (Stetson) as acting agent for IWVGA, re-established precipitation monitoring at the defunct BLM Walker Pass East RAWS station. The existing RAWS weather station had become obsolete and is no longer operable when the NOAA DCP platform expired. The installation was approved and permitted by the BLM with Lease Agreement CACA 058727 and Categorical Exclusion Documentation DOI-BLM-CA-D050-2020-0008-CX. Stetson installed a new tipping bucket rain gage and data telemetry system retrofitted to the existing in place RAWS tripod structure, at coordinate position, 35.66261, -118.02548. The monitoring and telemetry equipment consist of the following listed component parts:

Equipment List:

Part Number	**Description**
HSA: TB4/0.01/T	Tipping bucket rain gauge, 0.2 mm resolution, dual reed switch outputs, measurement range 0-700mm/hr
In Situ: ISR-0000000-VL	VuLink Cellular Telemetry, 4G LTE, Antenna, GPS, 1.5-3.6V Li-MnO2 Battery, built in barometric sensor; HTTPS, FTP, SFTP, SMS, CSV file format

Photograph of Installation:

FIGURE 1.TIPPING BUCKET RAIN GAUGE INSTALLATION AT WALKER PASS EAST RAWS

Measurement & Telemetry Programming:

The datalogger and telemetry device is programmed to record observed rainfall in increments of 0.2 millimeters, with counting interval of 15 minutes. Using the software provided by In-Situ, the telemetry device was programmed to retrieve recorded water level readings from the Level TROLL 400 sensor every 15 minutes. The 15-minute time interval is based on the USGS stream gage standard. Additionally, the telemetry device was programmed to upload the 15-minute readings to In-Situ's FTP server every 24 hours, or 96 readings. The data is then collected from the In-Situ server and hosted on Indian Wells Valley Groundwater Sustainability Plan website, IWVGSP.com.

DRAFT MEMORANDUM

785 Grand Avenue, Suite 202 • Carlsbad, California • 94901
TEL: (760) 730-0701 FAX: (415) 457-1638 e-mail: stever@stetsonengineers.com

TO:	File	DATE:	December 12, 2023
FROM:	Stetson Engineers Inc.	JOB NO:	2652
RE:	Grapevine Canyon Stream Gaging Station – Annual Report of Stream Flows, Water Year 2023		

This memorandum serves as an annual summary of station operation and reporting of approved data records associated with this monitoring station for Water Year (WY) 2023, October 2022 through September 2023. Due to issues with flooding, calculation of rated flows was only possible for a portion of the year. However due to the significance and magnitude of the runoff this year, estimates of flow have been made based on the correlation with the Sand Canyon Gage. With these estimates, the estimated total flow for WY2023 was 1,625 acre-feet. Figure 1 shows the annual streamflow measured at Grapevine Canyon over the period of record of operation.

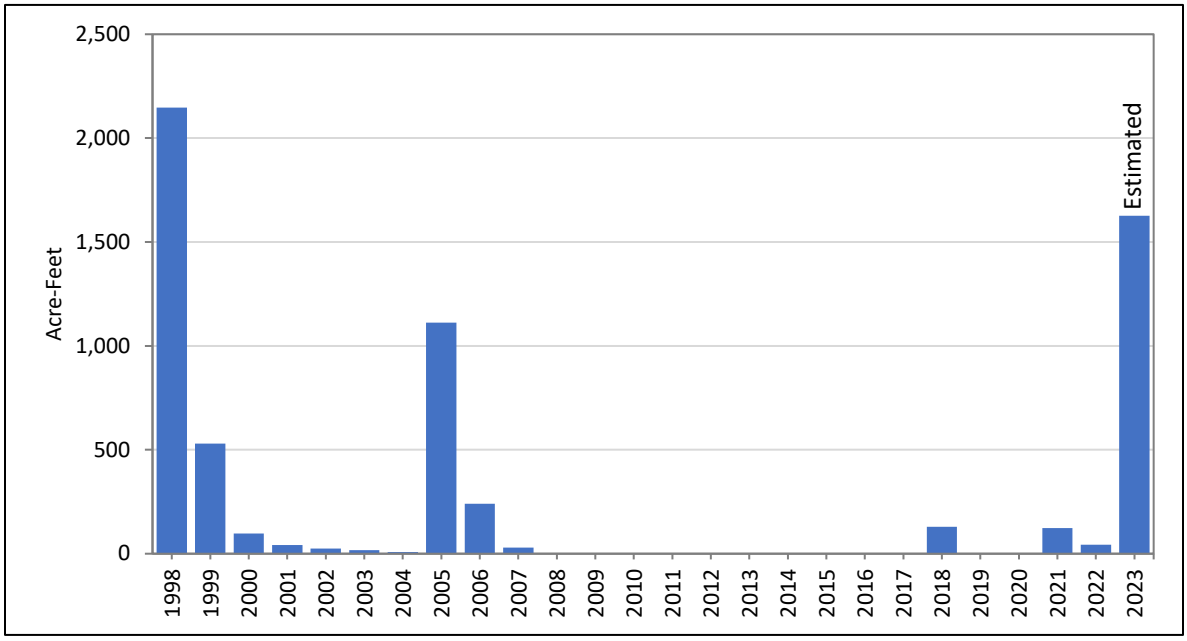


FIGURE 1. GRAPEVINE CANYON ANNUAL FLOW – PERIOD OF RECORD

SUMMARY OF GAGE OPERATIONS AND DATA – WY 2023

During WY 2023, three storm events, in March and August, resulted in significant flows in Grapevine Canyon exceeding the rating of the stream gage and overtopping the channel road crossing on which the station is located. These events resulted in damage to the property of the landowner on which the gage is located. During the flow events the gage weir plates were removed by the property owner to prevent obstruction of culvert structures and allow for maximum flow through the culverts. Stetson, in agreement with the property owner, decided to not pursue maintaining the weir plates in the channel out of an abundance of caution of future flood events causing property damage. At this time the creek channel at the gaging site has no gage equipment in place which would lead to channel obstruction. Monitoring of the stream gage height has continued. Figure 2 is a photograph of the gage location taken by the landowner during the event on March 15th.

FIGURE 2. GRAPEVINE CANYON GAGE STATION – MARCH 15, 2023, FLOW EVENT

The result of these weir operations, as well as the exceedance of the gage rating, is that calculating rated flow for this gage is not possible for WY 2023. This will remain the case until a new rating method is established for this gage location. After initial assessment of the gage location without the weir plates, suggest that developing a rating for this location with open channel flows will be challenging. 1) At the time of inspection, September 2023, significant sediment load was present actively traveling through the culvert creating a dynamic partial obstruction to the channel. 2) The intake pipe of for the stilling well in the channel is located at an elevation partially above the invert elevation of the culverts. During low flows there is potential that water stage height will not be translated from the channel to the stilling well.

In WY 2023 total annual streamflow could not be fully calculated due to the limitations on operations stated above. However, because of the significance of the events of the year, estimated flows have been calculated based on a flow correlation between Grapevine and Sad Canyon gage stations. Figure 3 shows the total monthly flows for WY 2023 with estimated values indicated.

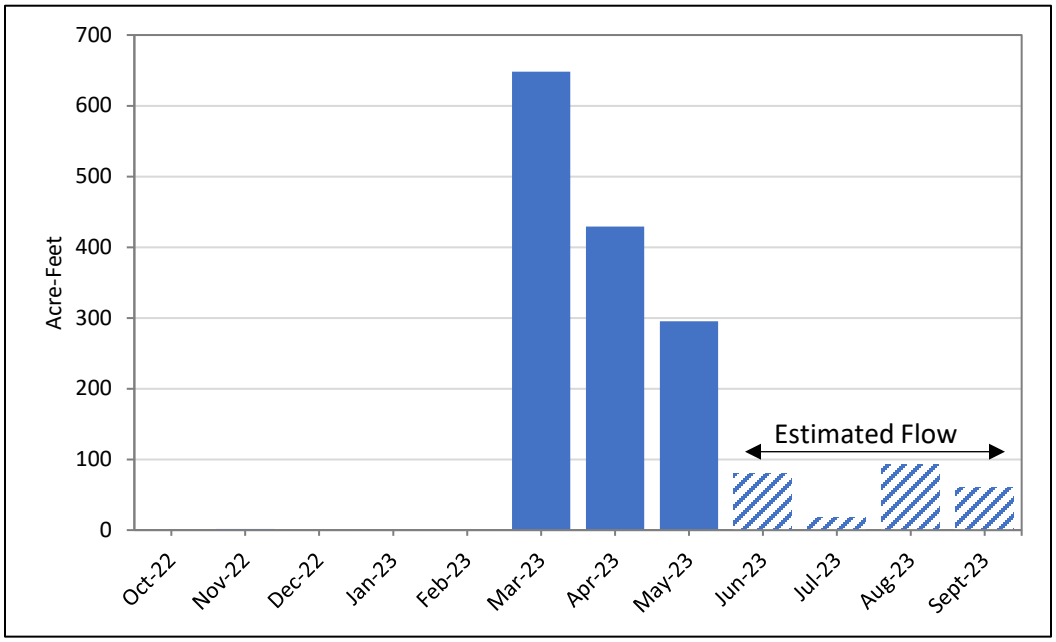


FIGURE 3. GRAPEVINE CANYON MONTHLY FLOW – WATER YEAR 2023

The following tables are provided to serve as reporting of approved daily values of data collected at the Grapevine Canyon gaging station. The tables reflect daily average stream flow rate in cubic feet per second, and total daily flows in acre-feet, by water year. Flows estimated based on Sand Canyon data are not included.

Daily Streamflow Data, Flow Rate
Grapevine Canyon, Water Year 2023

Water year	2023
Station Name	Grapevine Canyon
Operating Agency	IWVGA Agent - Stetson Engineers Inc.
Latitude	35°43'59.4"N
Longitude	117°55'00.4"N

	Daily streamflow (cfs)											
	2022			2023								
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.02	0.01	0.03	0.01	0.00	0.02	5.72	8.05	---	---	---	---
2	0.02	0.02	0.03	0.01	0.00	0.01	5.65	8.05	---	---	---	---
3	0.01	0.02	0.02	0.01	0.00	0.01	5.69	7.68	---	---	---	---
4	0.02	0.03	0.02	0.01	0.00	0.01	5.47	7.24	---	---	---	---
5	0.01	0.03	0.03	0.01	0.00	0.01	5.29	6.98	---	---	---	---
6	0.01	0.02	0.02	0.01	0.00	0.01	5.19	6.70	---	---	---	---
7	0.01	0.02	0.01	0.01	0.00	0.01	4.97	6.32	---	---	---	---
8	0.01	0.03	0.01	0.01	0.00	0.01	4.95	6.01	---	---	---	---
9	0.01	0.02	0.01	0.02	0.00	0.01	5.15	5.82	---	---	---	---
10	0.01	0.02	0.01	0.02	0.00	0.05	5.47	5.57	---	---	---	---
11	0.01	0.02	0.02	0.01	0.00	**44.99**	6.06	5.38	---	---	---	---
12	0.01	0.02	0.02	0.01	0.00	**27.78**	8.06	5.10	---	---	---	---
13	0.01	0.02	0.02	0.01	0.00	9.42	9.13	4.89	---	---	---	---
14	0.01	0.02	0.02	0.01	0.00	**11.49**	7.81	4.77	---	---	---	---
15	0.01	0.02	0.02	0.02	0.00	**49.54**	7.10	4.61	---	---	---	---
16	0.02	0.02	0.02	0.01	0.00	**38.28**	7.11	4.52	---	---	---	---
17	0.01	0.02	0.02	0.01	0.00	**20.93**	7.93	4.38	---	---	---	---
18	0.01	0.03	0.02	0.01	0.00	15.18	8.53	4.26	---	---	---	---
19	0.01	0.03	0.02	0.01	0.00	14.58	8.17	4.07	---	---	---	---
20	0.01	0.03	0.01	0.01	0.00	11.07	7.92	3.87	---	---	---	---
21	0.01	0.03	0.01	0.01	0.00	10.78	8.24	3.87	---	---	---	---
22	0.01	0.03	0.01	0.01	0.00	9.66	8.32	3.78	---	---	---	---
23	0.01	0.03	0.01	0.01	0.00	8.73	8.48	3.77	---	---	---	---
24	0.02	0.04	0.01	0.01	0.02	8.02	9.50	3.65	---	---	---	---
25	0.01	0.04	0.01	0.01	0.03	7.55	9.48	3.64	---	---	---	---
26	0.01	0.04	0.01	0.01	0.02	7.09	8.95	3.53	---	---	---	---
27	0.01	0.04	0.01	0.01	0.02	6.61	8.22	3.40	---	---	---	---
28	0.02	0.03	0.01	0.01	0.02	6.44	7.96	***3.24***	---	---	---	---
29	0.01	0.03	0.01	0.01		6.44	8.01	---	---	---	---	---
30	0.01	0.03	0.01	0.00		6.16	7.87	---	---	---	---	---
31	0.01		0.01	0.00		5.84		---		---	---	
Mean (cfs)	0.01	0.03	0.02	0.01	0.00	10.54	7.21	***5.11***	---	---	---	---
Max (cfs)	0.02	0.04	0.03	0.02	0.03	49.54	9.50	***8.05***	---	---	---	---
Min (cfs)	0.01	0.01	0.01	0.00	0.00	0.01	4.95	***3.24***	---	---	---	---
Total (ac-ft)	1	2	1	1	0	648	429	***284***	---	---	---	---

Data Source: IWVGA, Stetson Engineers Inc. Data Management System; via NOAA DCS, DCP - BE1000A6

Bold underlined - Values are estimates due to flow exceedance of the stream gage rating table

Italicized - Values are based on incomplete data records

Daily Streamflow Data, Total Flow Volume
Grapevine Canyon, Water Year 2023

Water year	2023
Station Name	Grapevine Canyon
Operating Agency	IWVGA Agent - Stetson Engineers Inc.
Latitude	35°43'59.4"N
Longitude	117°55'00.4"N

	Daily streamflow (AF)											
	2022			2023								
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.03	0.03	0.06	0.02	0.01	0.03	11.35	15.97	---	---	---	---
2	0.03	0.04	0.05	0.02	0.01	0.02	11.21	15.97	---	---	---	---
3	0.02	0.05	0.05	0.02	0.01	0.01	11.28	15.24	---	---	---	---
4	0.03	0.05	0.04	0.02	0.00	0.02	10.86	14.36	---	---	---	---
5	0.03	0.06	0.05	0.02	0.00	0.02	10.49	13.84	---	---	---	---
6	0.02	0.04	0.04	0.02	0.00	0.02	10.30	13.29	---	---	---	---
7	0.02	0.04	0.02	0.02	0.00	0.02	9.85	12.53	---	---	---	---
8	0.03	0.06	0.02	0.02	0.00	0.02	9.82	11.93	---	---	---	---
9	0.03	0.04	0.02	0.03	0.00	0.02	10.22	11.54	---	---	---	---
10	0.02	0.04	0.02	0.03	0.00	0.09	10.85	11.04	---	---	---	---
11	0.02	0.04	0.04	0.02	0.00	**89.24**	12.02	10.67	---	---	---	---
12	0.02	0.04	0.03	0.01	0.00	**55.10**	15.98	10.11	---	---	---	---
13	0.02	0.04	0.03	0.01	0.00	18.69	18.10	9.70	---	---	---	---
14	0.02	0.04	0.03	0.02	0.00	**22.79**	15.49	9.46	---	---	---	---
15	0.03	0.04	0.03	0.03	0.00	**98.26**	14.08	9.15	---	---	---	---
16	0.04	0.05	0.03	0.03	0.00	**75.92**	14.11	8.97	---	---	---	---
17	0.03	0.05	0.03	0.01	0.00	**41.51**	15.74	8.69	---	---	---	---
18	0.02	0.05	0.03	0.01	0.00	30.10	16.93	8.45	---	---	---	---
19	0.02	0.05	0.03	0.01	0.00	28.92	16.20	8.06	---	---	---	---
20	0.02	0.05	0.03	0.01	0.00	21.95	15.71	7.68	---	---	---	---
21	0.02	0.05	0.03	0.01	0.00	21.38	16.34	7.68	---	---	---	---
22	0.02	0.06	0.03	0.01	0.00	19.16	16.50	7.49	---	---	---	---
23	0.03	0.07	0.03	0.01	0.00	17.32	16.82	7.47	---	---	---	---
24	0.03	0.07	0.03	0.01	0.04	15.90	18.83	7.24	---	---	---	---
25	0.03	0.07	0.03	0.01	0.07	14.98	18.80	7.21	---	---	---	---
26	0.02	0.07	0.03	0.01	0.03	14.06	17.75	7.00	---	---	---	---
27	0.02	0.07	0.02	0.01	0.04	13.11	16.30	6.75	---	---	---	---
28	0.03	0.06	0.02	0.01	0.04	12.78	15.80	***6.42***	---	---	---	---
29	0.02	0.06	0.02	0.01		12.76	15.90	---	---	---	---	---
30	0.02	0.06	0.02	0.01		12.21	15.60	---	---	---	---	---
31	0.02		0.03	0.01		11.59		---		---	---	
Mean (ac-ft)	0.02	0.05	0.03	0.02	0.01	20.90	14.31	***10.14***	---	---	---	---
Max (ac-ft)	0.04	0.07	0.06	0.03	0.07	98.26	18.83	***15.97***	---	---	---	---
Min (ac-ft)	0.02	0.03	0.02	0.01	0.00	0.01	9.82	***6.42***	---	---	---	---
Total (ac-ft)	1	2	1	1	0	648	429	***284***	---	---	---	---

Data Source: IWVGA, Stetson Engineers Inc. Data Management System; via NOAA DCS, DCP - BE1000A6

Bold underlined - Values are estimates due to flow exceedance of the stream gage rating table

Italicized - Values are based on incomplete data records

GRAPEVINE CANYON STREAM GAGING STATION OVERVIEW

Stetson Engineers (Stetson) as acting agent for IWVGA, re-established monitoring activities at the Grapevine Canyon Stream Gaging Station, on August 26, 2020. Prior to this the Station had been in a defunct state following the cessation of Kern County Water Agency monitoring activities in 2019. Kern County Water Agency (KCWA) previously operated this gaging station with permission of the private property owner where the gage is located. Stetson established an operational agreement with the property owner on behalf of the IWVGA, in order to install and operate the stream gaging and telemetry equipment. To re-establish the monitoring station Stetson, rehabilitated the weir structure and installed new monitoring and satellite telemetry components inside the stilling well. This work planning and installation work is summarized as a Memorandum submitted to the State Department of Water Resources, dated August 28, 2020.

The gaging facility consists of a channel spanning split flow weir. The weir is composed of a V-notched weir and a sharp crested rectangular weir. There was no automatic datalogging or telemetry equipment previously installed at this site. Measurement of upstream pool height is accomplished utilizing an existing staff gage and through a stilling well with a mounted steel box for housing gaging instrumentation. The monitoring and telemetry equipment consist of the following listed component parts:

Equipment List:

Part Number	**Description**
Stevens Water Part No. 93876	SatComm GOES Transmitter
Stevens Water Part No. 51108	GPS Antenna
Stevens Water Part No. 70018	V2TH Satellite Antenna
Stevens Water Part No. 93750-100	DLight Datalogger
Stevens Water Part No. 70217-100	SOLO Solar Charge Regulator
Stevens Water Part No. 93720-135	SDX Pressure Sensor
Stevens Water Part No. 93030-001	Desiccant Cartridge
Third Party Vendor	25 Watt / 12 Volt Solar Panel
Third Party Vendor	12 Volt / 20 Amp-hour Rechargeable Battery

Photographs of Installation:

FIGURE 4. STILLING WELL AND ENCLOSURE WITH MOUNTED SOLAR PANEL AND SATELLITE ANTENNA

FIGURE 5. REHABILITATED SHARP CRESTED WEIR ON THE LEFT CULVERT OPENING.

Data Resolution & Telemetry Programming:

The Stevens datalogger is programmed to measure and record water level readings every 15 minutes. This 15-minute time interval is based on the USGS stream gage standard. From there the Stevens GOES transmitter is programmed with a NOAA assigned satellite transmission assignment (Data Collection Platform: BE1000A6) to transmit data on an hourly basis to the NOAA GOES Data Collection System (DCS). Utilizing DCS data collection scripts Stetson retrieves monitoring data from the DCS daily to integrate into the IWVGSP Data Management System.

Staff Gauge vs. Weir Stage:

During installation it was observed that the existing staff gauge is installed with 1.00 feet equaling the crest of the V-notch Weir. Staff gage readings reported here are reflective of this 1 foot difference, and calculations of weir discharge utilize stage values 1-foot less than the staff readings.

Calculation of Discharge:

Calculation of stream discharge utilizes corrected stage measurements, recorded with the stilling well monitoring equipment, and the following equations (Francis Equation) utilized by Kern County Water Agency. Adjustments have been made reflecting the stage height differences between activation of the two weirs, using elevation measurements obtained after the installation of the rehabilitated weir, Stetson established the stage-discharge relationship which can be seen in Figure 6.

Discharge Equation(s) for Grapevine Canyon Weir Structure

The discharge equation is the sum of the water passing through the v-notch and rectangular weirs as described by the following equations.

***90º V-Notch Weir Component Discharge*:** $Q = 2.49 \times H^{2.48}$

***Rectangular Weir Component Discharge*:** $Q = 3.33 \times (H - 0.35)^{3/2} \times (L - 0.02 \times H)$

Where:

Q = Discharge in cubic feet per second

L = Width of rectangular weir (24 inches)

H = water stage height weir crests (crest height difference of two weirs is 0.47 ft)

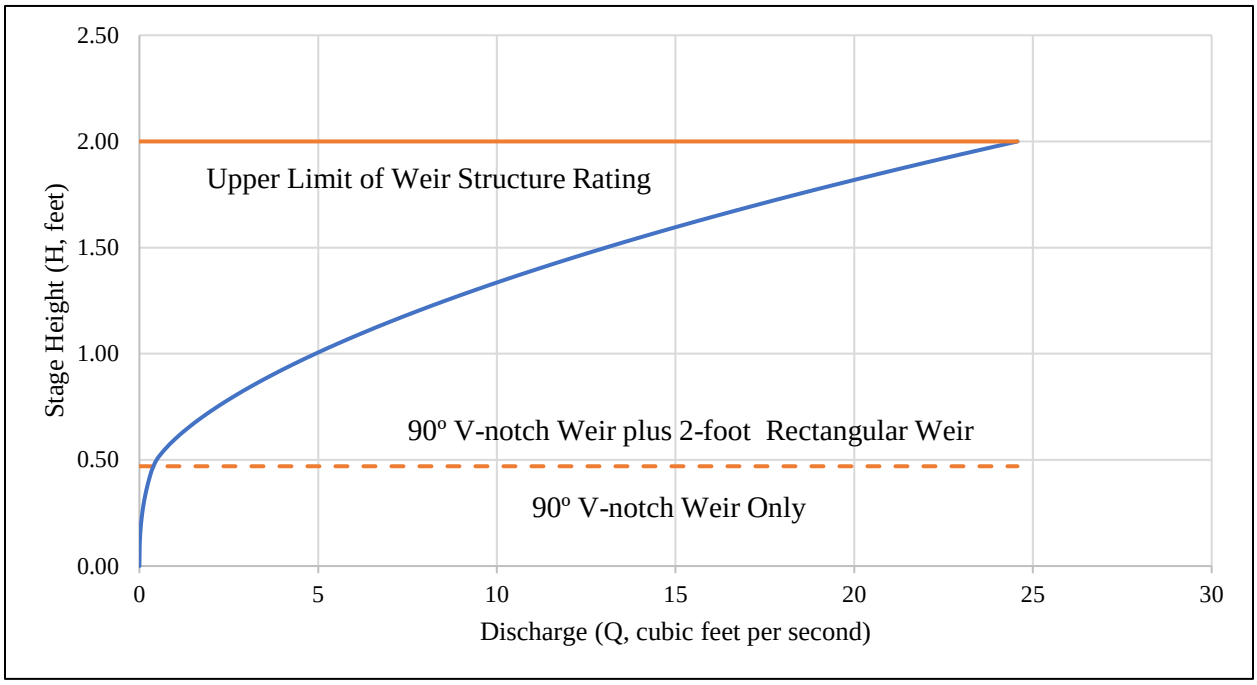


FIGURE 6. RATING CURVE FOR GRAPEVINE CANYON WEIR STRUCTURE

DRAFT MEMORANDUM

785 Grand Avenue, Suite 202 • Carlsbad, California • 94901
TEL: (760) 730-0701 FAX: (415) 457-1638 e-mail: stever@stetsonengineers.com

TO:	File	DATE:	November 22, 2023
FROM:	Stetson Engineers Inc.	JOB NO:	2652
RE:	Sand Canyon Stream Gaging Station – Annual Report of Stream Flows, Water Year 2023		

This memorandum serves as an annual summary of station operation and reporting of approved data records associated with the Sand Canyon Stream Gage monitoring station for Water Year (WY) 2023, October 2022 through September 2023. Water measured during WY 2023 was the second highest recorded volume at this location, equaling 2,529 acre-feet. Figure 1 shows the annual streamflow measured at Sand Canyon over the period of record of operation for this location.

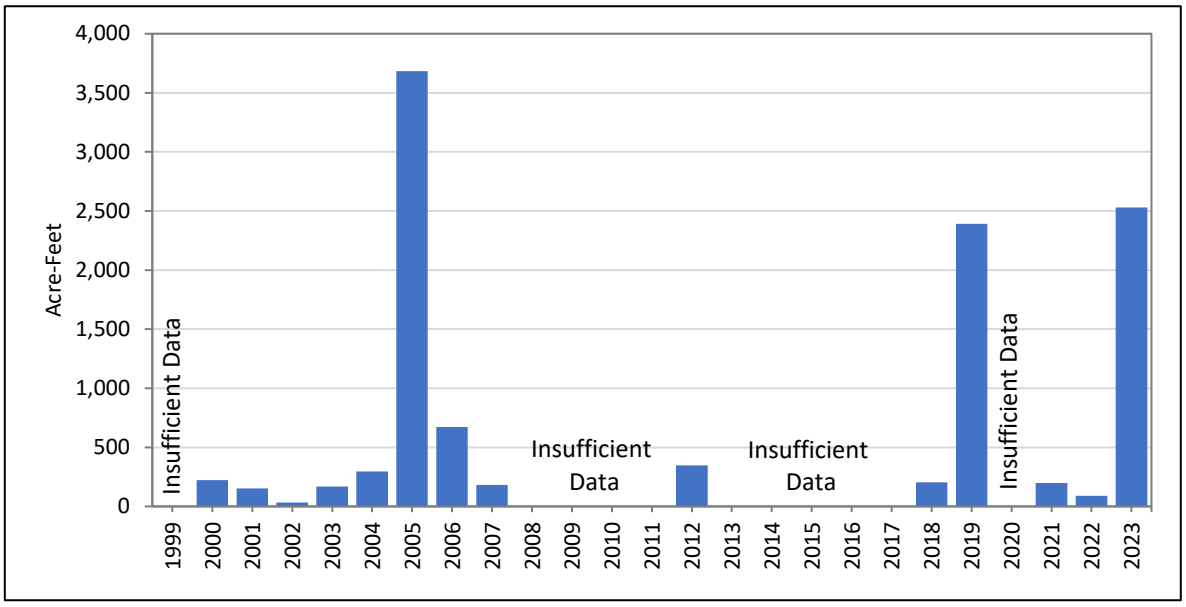


FIGURE 1. SAND CANYON ANNUAL FLOW – PERIOD OF RECORD

SUMMARY OF GAGE OPERATIONS AND DATA – WY 2023

During WY 2023, three site visits were made to conduct manual measurements and maintenance of the gage, October 2022, March 2023, and September 2023. During the October

2022 site visit the stream channel was dry and only maintenance to the monitoring telemetry equipment was conducted. The March 2023 site visit was conducted during low water conditions prior to the major storm runoff events of March. The September 2023 site visit was done at the end of the water year after all runoff events. Standard measurements and maintenance was conducted including the clearing of the weir of vegetation impacting weir operation.

During WY 2023 this gage experienced three storm-runoff events which resulted in stream stage heights exceeding the rated height of the weir. The dates of these occurrences were; March 10th – 12th, March 15th – 16th, and August 20th – 21st. For these periods discharge calculations were based on an extrapolation of the current rating. Measured flow for these dates are recognized as estimates. The following figure shows the total monthly flows for Water Year 2023.

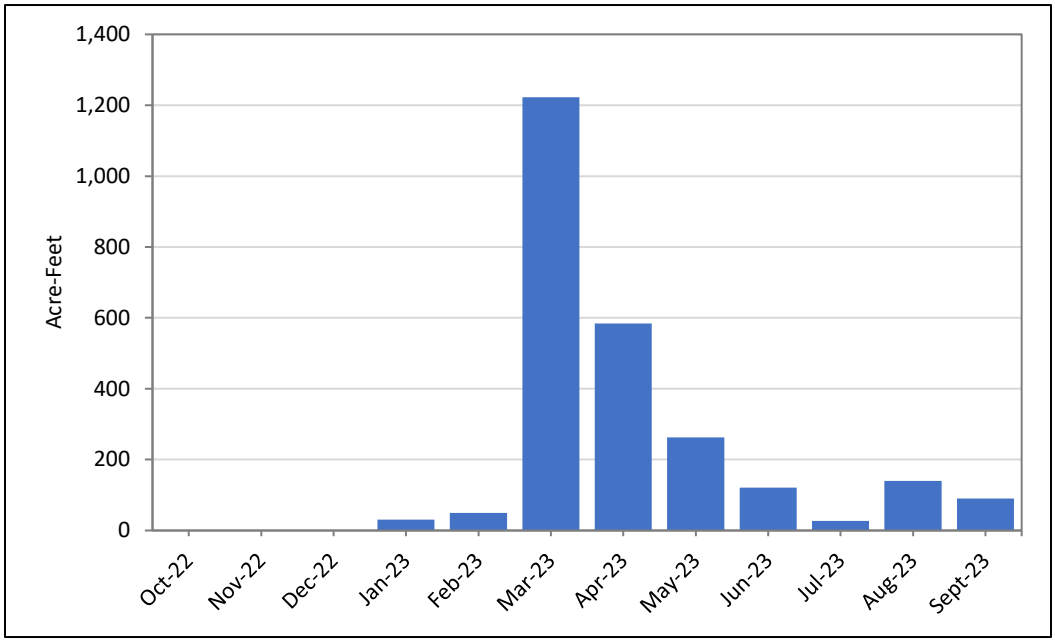


FIGURE 2. SAND CANYON MONTHLY FLOW – WATER YEAR 2023

Since its establishment in August 2020, the Sand Canyon stream gage has experienced seasonal flow, with the channel drying during the summer dry months. During WY2023 the channel remained wetted throughout these normally dry months, which permitted vegetation growth throughout the year, partially impairing the operation of the weir. Minor correction of the stage data was completed to address this influence of the vegetation on the data.

Daily Streamflow Data, Staff Gauge Reading
Sand Canyon, Water Year 2023

Water year	2023
Station Name	Sand Canyon
Operating Agency	IWVGA Agent - Stetson Engineers Inc.
Latitude	35°46'33.6"N
Longitude	117°54'27.4"N

	Average Daily Staff Gauge Reading (Feet)											
	2022			2023								
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.01	0.19	0.65	1.04	0.93	0.58	0.29	0.10	0.37
2	0.00	0.00	0.00	0.00	0.19	0.56	1.04	0.92	0.56	0.27	0.09	0.41
3	0.00	0.00	0.00	0.00	0.20	0.57	1.03	0.90	0.54	0.25	0.09	0.41
4	0.00	0.00	0.00	0.00	0.21	0.59	1.00	0.90	0.53	0.26	0.09	0.40
5	0.00	0.00	0.00	0.01	0.23	0.59	0.99	0.88	0.53	0.26	0.08	0.39
6	0.00	0.00	0.00	0.00	0.21	0.58	0.98	0.87	0.55	0.26	0.08	0.38
7	0.00	0.00	0.00	0.00	0.21	0.57	0.98	0.85	0.61	0.26	0.09	0.37
8	0.00	0.00	0.00	0.00	0.21	0.58	0.97	0.85	0.58	0.25	0.08	0.36
9	0.00	0.00	0.00	0.02	0.21	0.57	0.97	0.84	0.54	0.25	0.10	0.34
10	0.00	0.00	0.00	0.39	0.22	1.50	0.98	0.83	0.54	0.24	0.10	0.37
11	0.00	0.00	0.00	0.34	0.23	2.02	1.05	0.82	0.58	0.23	0.10	0.42
12	0.00	0.00	0.00	0.02	0.23	1.70	1.15	0.80	0.57	0.21	0.10	0.44
13	0.00	0.00	0.00	0.01	0.23	1.47	1.17	0.79	0.53	0.20	0.11	0.44
14	0.00	0.00	0.00	0.00	0.23	1.53	1.12	0.78	0.52	0.19	0.11	0.43
15	0.00	0.00	0.00	0.58	0.21	2.16	1.08	0.76	0.51	0.17	0.10	0.43
16	0.00	0.00	0.00	0.43	0.20	1.75	1.06	0.75	0.49	0.16	0.10	0.42
17	0.00	0.00	0.00	0.35	0.20	1.56	1.05	0.73	0.47	0.16	0.10	0.42
18	0.00	0.00	0.00	0.26	0.20	1.44	1.05	0.71	0.45	0.15	0.09	0.42
19	0.00	0.00	0.00	0.24	0.21	1.41	1.03	0.69	0.47	0.14	0.16	0.41
20	0.00	0.00	0.00	0.21	0.21	1.32	1.00	0.68	0.46	0.14	0.71	0.43
21	0.00	0.00	0.00	0.19	0.24	1.34	0.99	0.69	0.45	0.13	1.44	0.42
22	0.00	0.00	0.00	0.20	0.23	1.31	0.98	0.69	0.44	0.13	0.90	0.42
23	0.00	0.00	0.00	0.18	0.21	1.23	0.98	0.67	0.43	0.13	0.81	0.43
24	0.00	0.00	0.00	0.17	0.27	1.19	0.98	0.66	0.43	0.13	0.71	0.41
25	0.00	0.00	0.00	0.17	0.78	1.16	0.98	0.65	0.42	0.11	0.62	0.42
26	0.00	0.00	0.00	0.17	0.52	1.13	0.97	0.65	0.41	0.12	0.55	0.39
27	0.00	0.00	0.00	0.19	0.52	1.10	0.96	0.63	0.40	0.10	0.49	0.40
28	0.00	0.00	0.00	0.19	0.61	1.09	0.94	0.62	0.38	0.09	0.45	0.40
29	0.00	0.00	0.00	0.21		1.11	0.93	0.62	0.35	0.09	0.42	0.41
30	0.00	0.00	0.00	0.20		1.09	0.93	0.63	0.33	0.08	0.40	0.43
31	0.00		0.00	0.19		1.05		0.61		0.09	0.39	
Mean (ft)	0.00	0.00	0.00	0.16	0.27	1.16	1.01	0.75	0.49	0.18	0.32	0.41

Data Source: IWVGA, Stetson Engineers Inc. Data Management System; via In-Situ HydroVu data platform

Daily Streamflow Data, Flow Rate
Sand Canyon, Water Year 2023

Water year	2023
Station Name	Sand Canyon
Operating Agency	IWVGA Agent - Stetson Engineers Inc.
Latitude	35°46'33.6"N
Longitude	117°54'27.4"N

	Daily streamflow (cfs)											
	2022			2023								
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.44	3.08	10.64	7.35	2.61	0.89	0.13	1.32
2	0.00	0.00	0.00	0.00	0.44	2.47	10.51	6.99	2.51	0.83	0.13	1.53
3	0.00	0.00	0.00	0.00	0.48	2.52	10.25	6.55	2.35	0.74	0.12	1.57
4	0.00	0.00	0.00	0.00	0.52	2.70	9.35	6.35	2.28	0.76	0.12	1.51
5	0.00	0.00	0.00	0.00	0.60	2.68	9.00	5.84	2.29	0.78	0.11	1.42
6	0.00	0.00	0.00	0.00	0.54	2.61	8.76	5.64	2.44	0.76	0.10	1.37
7	0.00	0.00	0.00	0.00	0.51	2.55	8.68	5.28	2.82	0.76	0.10	1.30
8	0.00	0.00	0.00	0.00	0.53	2.58	8.39	5.21	2.59	0.72	0.10	1.25
9	0.00	0.00	0.00	0.02	0.54	2.55	8.34	5.12	2.35	0.73	0.14	1.17
10	0.00	0.00	0.00	2.16	0.57	**39.20**	8.79	4.92	2.37	0.69	0.15	1.32
11	0.00	0.00	0.00	1.31	0.62	**60.17**	10.87	4.70	2.59	0.64	0.15	1.62
12	0.00	0.00	0.00	0.01	0.59	**40.99**	14.56	4.49	2.57	0.55	0.15	1.69
13	0.00	0.00	0.00	0.00	0.60	28.98	15.45	4.30	2.29	0.49	0.17	1.69
14	0.00	0.00	0.00	0.00	0.61	32.34	13.50	4.21	2.21	0.46	0.16	1.66
15	0.00	0.00	0.00	2.69	0.51	**69.88**	12.03	3.99	2.17	0.41	0.15	1.66
16	0.00	0.00	0.00	1.65	0.48	**43.92**	11.20	3.90	2.03	0.35	0.15	1.62
17	0.00	0.00	0.00	1.20	0.49	33.37	10.98	3.74	1.89	0.35	0.13	1.58
18	0.00	0.00	0.00	0.76	0.48	27.23	11.05	3.53	1.81	0.33	0.12	1.57
19	0.00	0.00	0.00	0.64	0.51	26.11	10.24	3.37	1.92	0.28	0.34	1.53
20	0.00	0.00	0.00	0.51	0.54	21.89	9.43	3.34	1.83	0.28	**8.25**	1.66
21	0.00	0.00	0.00	0.44	0.64	22.83	8.99	3.37	1.79	0.26	**30.75**	1.60
22	0.00	0.00	0.00	0.47	0.62	21.42	8.77	3.36	1.75	0.24	6.68	1.59
23	0.00	0.00	0.00	0.41	0.51	17.83	8.72	3.27	1.64	0.24	4.67	1.62
24	0.00	0.00	0.00	0.36	0.81	16.04	8.64	3.17	1.66	0.23	3.66	1.54
25	0.00	0.00	0.00	0.36	4.45	14.90	8.67	3.13	1.61	0.20	2.92	1.60
26	0.00	0.00	0.00	0.37	2.19	13.80	8.49	3.09	1.56	0.20	2.45	1.41
27	0.00	0.00	0.00	0.43	2.18	12.93	8.14	2.94	1.50	0.15	2.05	1.48
28	0.00	0.00	0.00	0.46	2.84	12.41	7.57	2.86	1.41	0.14	1.82	1.49
29	0.00	0.00	0.00	0.52		12.99	7.27	2.86	1.24	0.13	1.63	1.54
30	0.00	0.00	0.00	0.47		12.41	7.26	2.93	1.11	0.11	1.51	1.66
31	0.00		0.00	0.43		11.03		2.83		0.12	1.42	
Mean (cfs)	0.00	0.00	0.00	0.51	0.89	19.88	9.82	4.28	2.04	0.45	2.28	1.52
Max (cfs)	0.00	0.00	0.00	2.69	4.45	69.88	15.45	7.35	2.82	0.89	30.75	1.69
Min (cfs)	0.00	0.00	0.00	0.00	0.44	2.47	7.26	2.83	1.11	0.11	0.10	1.17
Total (ac-ft)	0	0	0	31	49	1,223	584	263	121	27	140	90

Data Source: IWVGA, Stetson Engineers Inc. Data Management System; via In-Situ HydroVu data platform

Bold underlined - Values are estimates due to flow exedance of the stream gage rating table

Daily Streamflow Data, Total Flow Volume
Sand Canyon, Water Year 2023

Water year	2023
Station Name	Sand Canyon
Operating Agency	IWVGA Agent - Stetson Engineers Inc.
Latitude	35°46'33.6"N
Longitude	117°54'27.4"N

	Daily streamflow (AF)											
	2022			2023								
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	0.00	0.00	0.00	0.00	0.87	6.11	21.11	14.59	5.19	1.77	0.26	2.62
2	0.00	0.00	0.00	0.00	0.87	4.90	20.85	13.86	4.98	1.64	0.25	3.04
3	0.00	0.00	0.00	0.00	0.95	5.00	20.33	13.00	4.67	1.46	0.24	3.11
4	0.00	0.00	0.00	0.00	1.03	5.36	18.55	12.59	4.52	1.51	0.25	2.99
5	0.00	0.00	0.00	0.00	1.18	5.31	17.85	11.59	4.54	1.55	0.23	2.81
6	0.00	0.00	0.00	0.00	1.06	5.18	17.38	11.18	4.84	1.50	0.20	2.72
7	0.00	0.00	0.00	0.00	1.02	5.05	17.21	10.47	5.58	1.51	0.21	2.58
8	0.00	0.00	0.00	0.00	1.05	5.13	16.64	10.33	5.13	1.43	0.19	2.47
9	0.00	0.00	0.00	0.03	1.07	5.05	16.54	10.15	4.67	1.44	0.27	2.31
10	0.00	0.00	0.00	4.29	1.13	**77.75**	17.44	9.76	4.71	1.38	0.30	2.62
11	0.00	0.00	0.00	2.61	1.24	**119.35**	21.57	9.32	5.14	1.27	0.30	3.21
12	0.00	0.00	0.00	0.02	1.17	**81.30**	28.88	8.90	5.09	1.10	0.29	3.35
13	0.00	0.00	0.00	0.00	1.19	57.48	30.64	8.54	4.55	0.97	0.34	3.35
14	0.00	0.00	0.00	0.00	1.21	64.14	26.78	8.35	4.38	0.91	0.32	3.29
15	0.00	0.00	0.00	5.33	1.02	**138.60**	23.86	7.92	4.30	0.81	0.29	3.30
16	0.00	0.00	0.00	3.27	0.95	**87.12**	22.21	7.73	4.03	0.70	0.29	3.21
17	0.00	0.00	0.00	2.38	0.97	66.18	21.78	7.42	3.76	0.70	0.27	3.13
18	0.00	0.00	0.00	1.50	0.95	54.01	21.91	7.00	3.58	0.65	0.25	3.11
19	0.00	0.00	0.00	1.26	1.02	51.78	20.30	6.69	3.81	0.56	0.68	3.04
20	0.00	0.00	0.00	1.01	1.06	43.42	18.70	6.62	3.63	0.55	**16.37**	3.29
21	0.00	0.00	0.00	0.87	1.26	45.28	17.83	6.69	3.55	0.52	**60.98**	3.18
22	0.00	0.00	0.00	0.94	1.23	42.49	17.40	6.66	3.47	0.48	13.24	3.15
23	0.00	0.00	0.00	0.81	1.01	35.37	17.30	6.49	3.26	0.48	9.26	3.22
24	0.00	0.00	0.00	0.72	1.61	31.82	17.15	6.28	3.30	0.46	7.27	3.05
25	0.00	0.00	0.00	0.72	8.82	29.56	17.20	6.21	3.19	0.39	5.79	3.18
26	0.00	0.00	0.00	0.74	4.34	27.37	16.84	6.13	3.10	0.41	4.86	2.79
27	0.00	0.00	0.00	0.85	4.33	25.64	16.15	5.84	2.98	0.31	4.06	2.93
28	0.00	0.00	0.00	0.91	5.63	24.61	15.02	5.67	2.79	0.28	3.61	2.97
29	0.00	0.00	0.00	1.02		25.76	14.42	5.67	2.46	0.25	3.23	3.06
30	0.00	0.00	0.00	0.93		24.62	14.40	5.81	2.20	0.22	2.99	3.29
31	0.00		0.00	0.85		21.89		5.61		0.25	2.82	
Mean (ac-ft)	0.00	0.00	0.00	1.00	1.76	39.44	19.47	8.49	4.05	0.89	4.51	3.01
Max (ac-ft)	0.00	0.00	0.00	5.33	8.82	138.60	30.64	14.59	5.58	1.77	60.98	3.35
Min (ac-ft)	0.00	0.00	0.00	0.00	0.87	4.90	14.40	5.61	2.20	0.22	0.19	2.31
Total (ac-ft)	0	0	0	31	49	1,223	584	263	121	27	140	90

Data Source: IWVGA, Stetson Engineers Inc. Data Management System; via In-Situ HydroVu data platform

Bold underlined - Values are estimates due to flow exedance of the stream gage rating table

The following attached tables are provided to serve as reporting of approved daily values of data collected at the Sand Canyon gaging station during WY 2023. The tables reflect; daily average staff gauge readings, daily average stream flow rate in cubic feet per second, and total daily flows in acre-feet; by water year.

SAND CANYON STREAM GAGING STATION OVERVIEW

IWVGA operation of this station is done under legal agreement with the Bureau of Land Management to occupy and operate the stream gage location. Stetson Engineers (Stetson) as acting agent for IWVGA, re-established monitoring activities at the Sand Canyon Stream Gaging Station, on August 25, 2020. Prior to this the Station was in a semi-defunct state following the cessation of Kern County Water Agency monitoring activities in 2019. As of the time of installation the station and associated stage measuring equipment was maintained by the Meadowbrook Dairy. The existing equipment being any antiquated paper chart recorder with float and pulley. To re-establish the monitoring station Stetson installed new monitoring and cellular telemetry components inside the stilling well. This work is summarized as a Memorandum submitted to the State Department of Water Resources, dated August 28, 2020.

The gaging station consists of a channel spanning compound rectangular weir. Upstream of the weirs a metal staff gauge is installed to measure weir stage height. Additionally, a perforated intake pipe is installed leading to an off-channel stilling well where the paper chart recorder and new monitoring equipment is installed. The monitoring and telemetry equipment consist of the following listed component parts:

Equipment List:

Part Number	**Description**
In-Situ 0099240	Level TROLL 400, Level Sensor Range – 11m, 35ft,(30 Psia)
In-Situ 0052000-05-01-08-00	Rugged Twist Lock Cable, Non-vented
In-Situ ISR-0000000-VL	VuLink Cellular Telemetry, 4G LTE, Antenna, GPS, 1.5-3.6V Li-MnO2 Battery, built in barometric sensor; HTTPS, FTP, SFTP, SMS, CSV file format
Proxicast ANT-121-002	Omni Antenna, 3G/4G/LTE, 3-5dBi

Photographs of Installation:

FIGURE 3. SAND CANYON STREAM GAGE SITE

Data Resolution & Telemetry Programming:

The In-Situ monitoring equipment, Level Troll 400 and Vulink device are programmed to record measured pressure (water and barometric pressure) values every 15-minutes, with barometric compensation made at the Vulink. The 15-minute time interval is based on the USGS stream gage standard. From there the Vulink cellular telemetry is programmed to upload the 15-minute readings to In-Situ's FTP server every 24 hours, or 96 readings. Stetson then retrieves the data from the FTP server for hosting on the IWVGSP.com web server.

Staff Gauge vs. Weir Stage:

During a December 2020 field visit where a level survey, and other verification measurements were completed, a 0.02-foot difference was recognized between the steel staff gauge and the actual weir crest. The staff gauge is installed with 0.02 feet reading equaling the

weir crest. Staff gage readings reported here are reflective of this 0.02-foot difference, and calculations of weir discharge utilize stage values 0.02 feet less than the staff readings.

Calculation of Discharge:

Calculation of stream discharge utilizes corrected stage measurements, recorded with the stilling well monitoring equipment, and the following equations (Francis Equation) to calculate discharge. These equations have been updated to reflect weir verification measurements taken during installation. The associated stage-discharge rating curve is shown below in Figure 4.

Discharge Equation(s) for Sand Canyon Compound Weir Structure

The discharge equation for the Sand Canyon stream gage includes the sum of the flow through the 2-foot and 12-foot weirs as described below.

***2-foot Weir Component Discharge*:** $Q = 3.33 \times (L_1 - 0.02H_1) \times \left({H_1}^{3/2}\right)$

***12-foot Weir Component Discharge*:** $Q = 3.33 \times \left(L_2 - 0.02(H_2 - 1)\right) \times \left((H_2 - 1)^{3/2}\right)$

Where:

Q = Discharge in cubic feet per second

L_1 = 2 feet; width of 2-foot weir

L_2 = 12 feet; width of 12-foot weir

H_1 = water stage height above 2-foot weir crest, in feet

H_2 = water stage height above 2-foot weir crest, when H is greater than 0.75, in feet

H_{max} = 2.25 feet, height of top of 12-foot high-flow weir

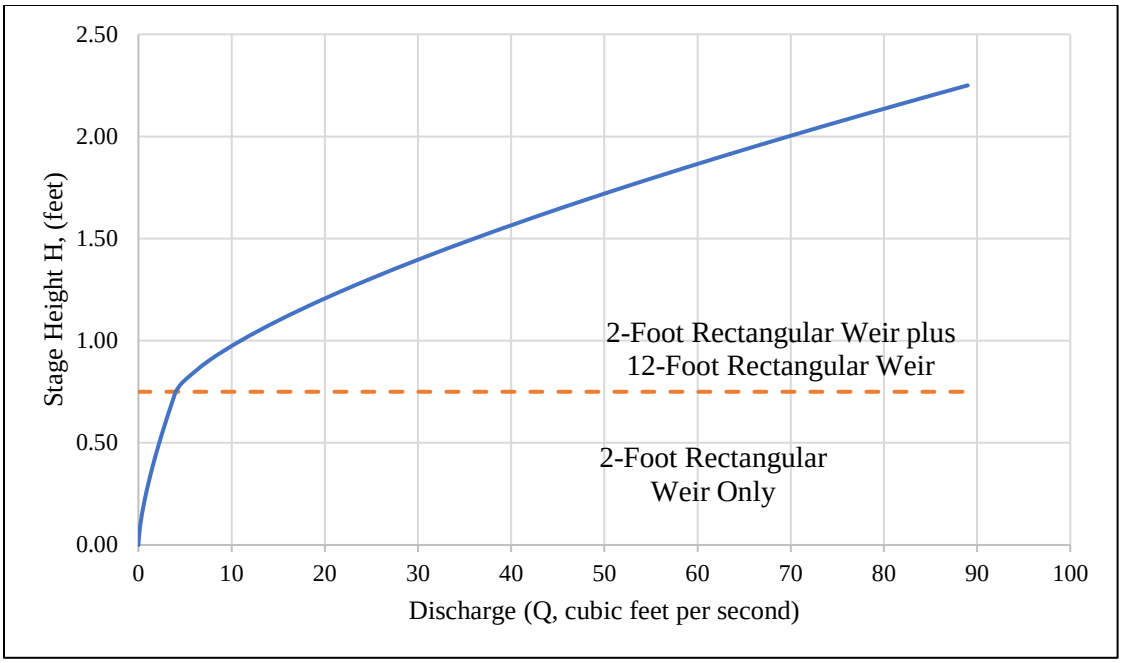


FIGURE 1. STAGE-DISCHARGE RATING CURVE FOR SAND CANYON WEIR STRUCTURE

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TO: IWVGA Board Members **DATE: March 13, 2024**

FROM: IWVGA Staff

SUBJECT: Agenda Item 10 – CONSOLIDATION GRANT AND POTENTIAL PROJECTS

BACKGROUND AND DISCUSSION

On October 12, 2022, the Indian Wells Valley Groundwater Authority (IWVGA) Board adopted Resolution 08-22, authorizing preparation and submittal of a grant application for the Shallow Well Consolidation Project under the Urban Community Drought Relief Grant (UCDRG) through the California Department of Water Resources. The UCDRG is intended to address impacts on communities that face the loss or contamination of their water supplies and address immediate impacts on human health and safety.

The IWVGA Shallow Well Consolidation Project was selected for funding and the UCDRG is providing $3.3 million for planning, design, and construction for the Shallow Well Consolidation Project to consolidate shallow wells that may be impacted by declining groundwater levels into the Indian Wells Valley Water District's (IWVWD) water distribution system.

On January 16, 2024, the Indian Wells Valley Groundwater Authority (IWVGA) entered into a Grant Agreement, to a work completion date of December 31, 2026. Staff has performed preliminary investigations into potential consolidation areas near currently impacted wells that have already applied for Shallow Well Mitigation Assistance. Staff has initiated discussions with the IWVWD, which currently has their own consolidation project underway for the Dune III Water System. Staff will continue to work with the IWVWD and investigate specific systems and shallow wells feasible for consolidation as well as preliminary designs for extension of the IWVWD distribution system. Impacted shallow wells that have already been replaced with new wells will not be considered for consolidation. Progress Reports are due 60 days after each Calendar Quarter with the first Progress Report due May 30, 2024.

An overview of the grant conditions and preliminary work on projects will be presented during the Board meeting. The presentation is included with this report.

ACTION(S) REQUIRED BY THE BOARD

This is an informational item. No Board Action is required.

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Urban Community Drought Relief Grant

IWVGA Shallow Well System Consolidation Project

IWVGA Board Meeting: 3/13/24

General Grant Info

- Purpose
  - Mitigate impacts to shallow wells caused by the chronic lowering of groundwater levels, degraded water quality, and reduction of groundwater in storage by consolidating small water systems with shallow wells into the larger public water system.
  - Provide more secure water source for residents with wells at risk
- Term of Agreement:7/1/2022 (start of cost accounting)
- Execution Date: 1/16/2024
- Work Completion Date: 12/31/2026
- Grant Amount: $3,345,000

Grant Budget Categories and Schedule

CATEGORY	Budget	Start Date	End Date
CATEGORY A – PROJECT ADMINISTRATION Task 1 – Project Management Task 2 - Reporting	$445,000.00	7/1/2022	12/31/2026
CATEGORY B – LAND PURCHASE/EASEMENT Task 3 – Land Purchase	$100,000.00	7/1/2023	9/1/2026
CATEGORY C – PLANNING/ DESIGN/ ENGINEERING/ ENVIRONMENTAL DOCUMENTATION Task 4 –Feasibility Studies Task 5 – CEQA Documentation Task 6 - Permitting Task 7 - Design Task 8 – Project Monitoring Plan	$500,000.00	7/1/2022	6/30/2026
CATEGORY D – CONSTRUCTION/IMPLENTATION Task 9 – Contract Service Task 10 – Construction Administration Task 11 - Construction	$2,300,000.00	1/1/2024	10/31/2026
TOTAL COSTS	**$3,345,000.00**		

Deliverables

CATEGORY	Deliverables
CATEGORY A – PROJECT ADMINISTRATION	
Task 1 – Project Management	Invoice and associated backup documentation
Task 2 - Reporting	Quarterly Progress Reports, grant completion report, documentation
CATEGORY B – LAND PURCHASE/EASEMENT	
Task 3 – Land Purchase	All relevant documentation regarding acquisition of easement.
CATEGORY C – PLANNING/ DESIGN/ ENGINEERING/ ENVIRONMENTAL DOCUMENTATION	
Task 4 –Feasibility Studies	Feasibility Studies
Task 5 – CEQA Documentation	All completed CEQA documents
Task 6 - Permitting	Permits Required
Task 7 - Design	100% Design Plans and Specification
Task 8 – Project Monitoring Plan	Project Monitoring Plan
CATEGORY D – CONSTRUCTION/IMPLENTATION	
Task 9 – Contract Service	Bid Doc, Proof of Ad, Award of Contract, NTP
Task 10 – Construction Administration	DWR Certification of Project Completion and Record Drawings
Task 11 - Construction	Photographic Documentation of Progress

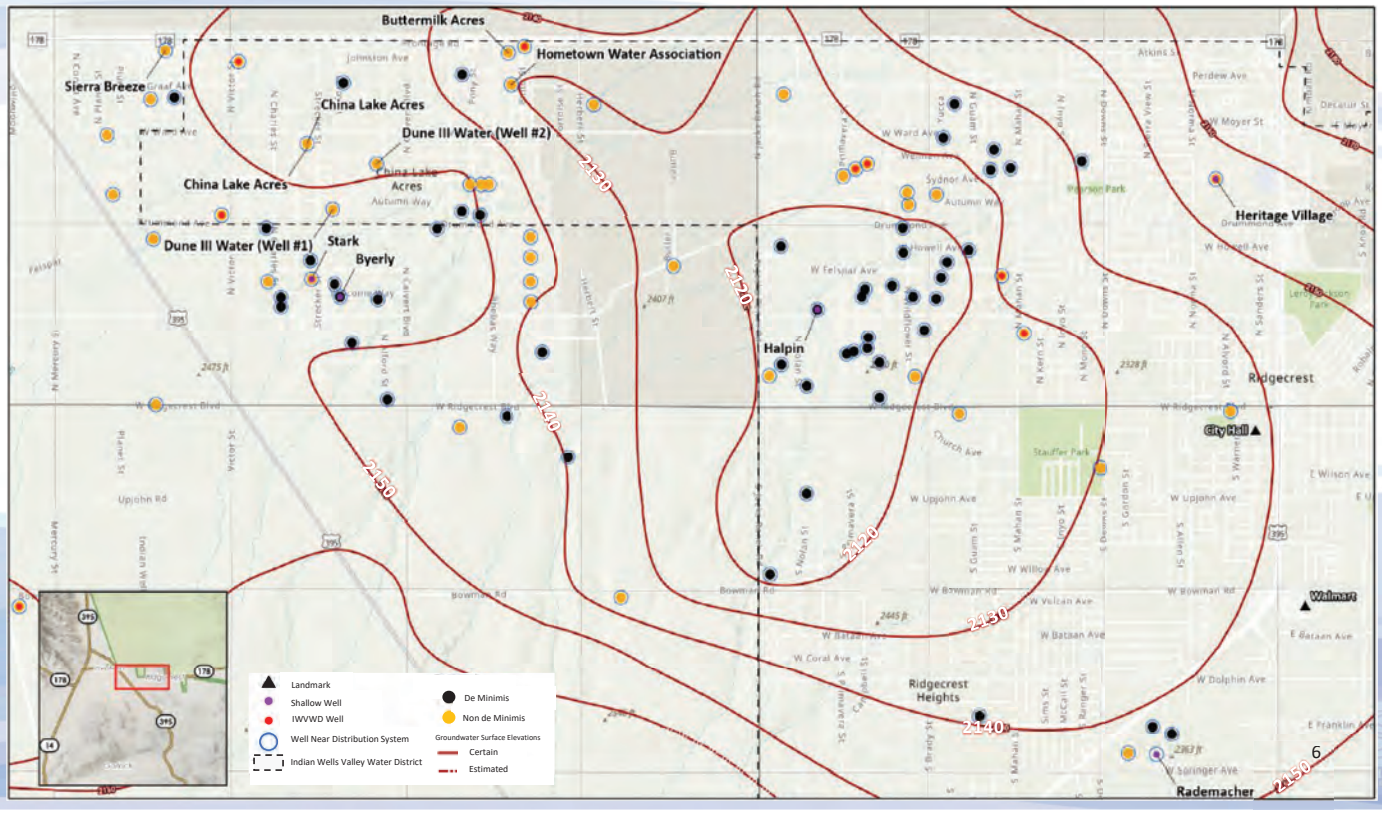
Potential Consolidations

- State Water Resources Control Board Division of Drinking Water (DDW) Recommended Consolidations*
  - Dune III Mutual Water Company
    - Already in the process of consolidation
      - ~$3 million project cost
  - China Lake Acres Mutual Water Company
  - Buttermilk Acres Water System
  - Hometown Water Association
  - Sierra Breeze Mutual Water Company

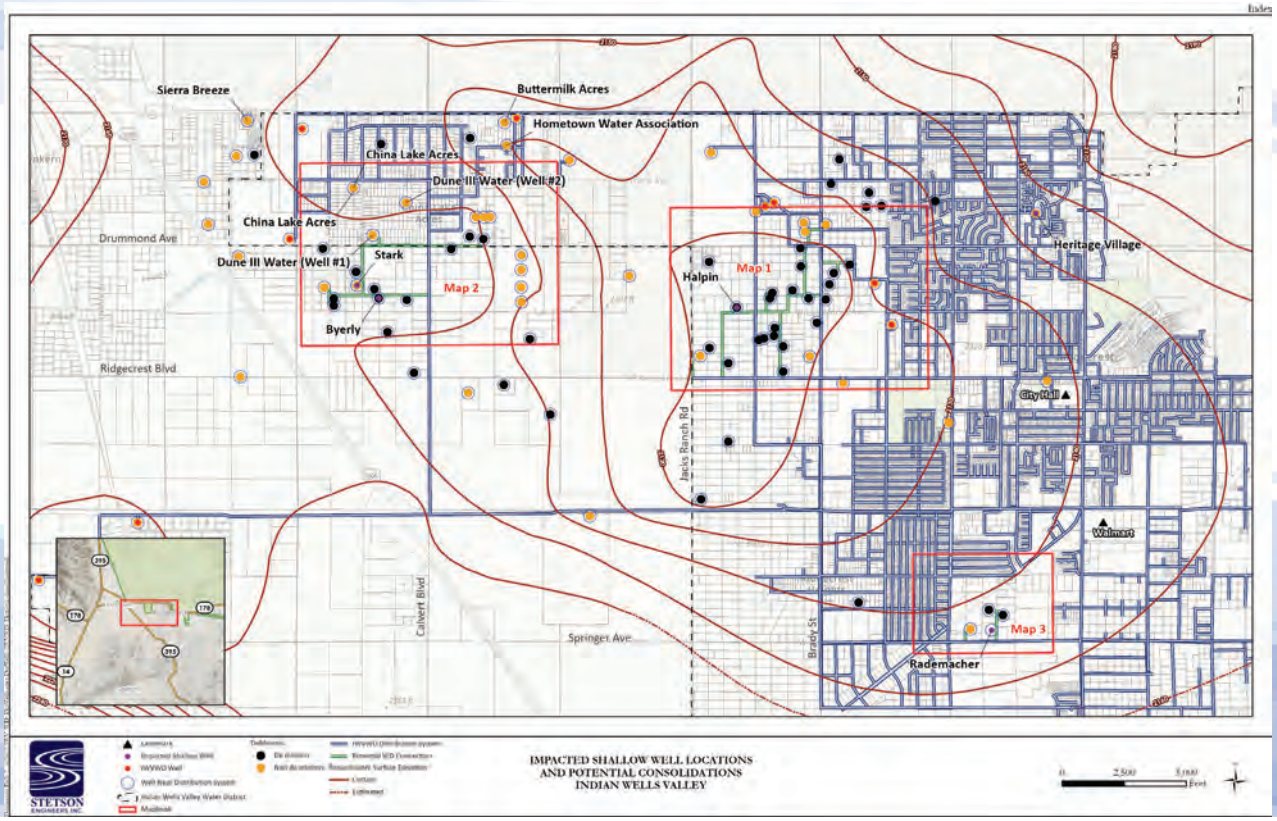
*Listed as systems DDW would like to see annexed by Indian Wells Valley Water District (IWVWD) in the IWVWD Domestic Water System 2020 Water General Plan

- Shallow Wells
  - Stark
    - Well failure due to low groundwater levels
  - Byerly
    - Well failure due to low groundwater levels
  - Halpin
    - Well failure due to low groundwater levels
  - Rademacher
    - Water quality issues
  - Heritage Village
    - Well failure due to low groundwater levels

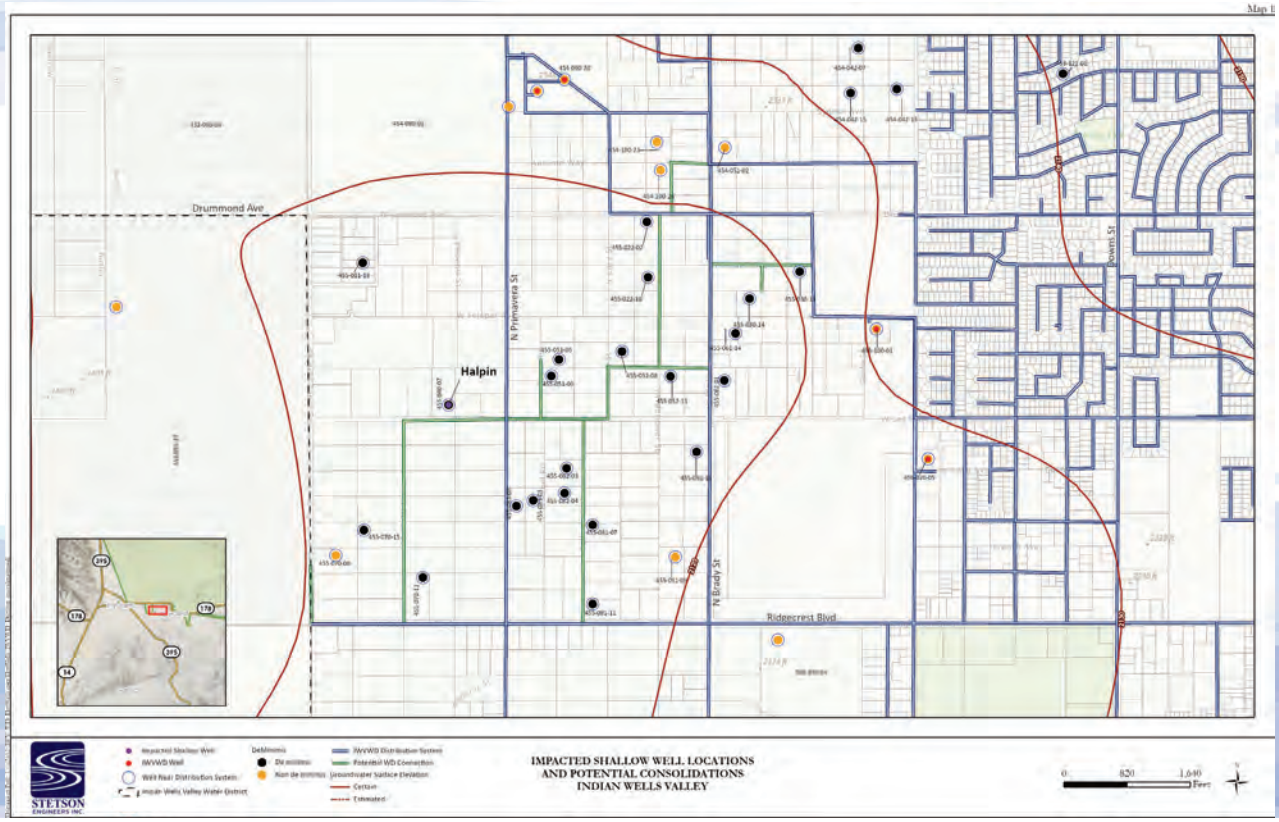
Potential Consolidations



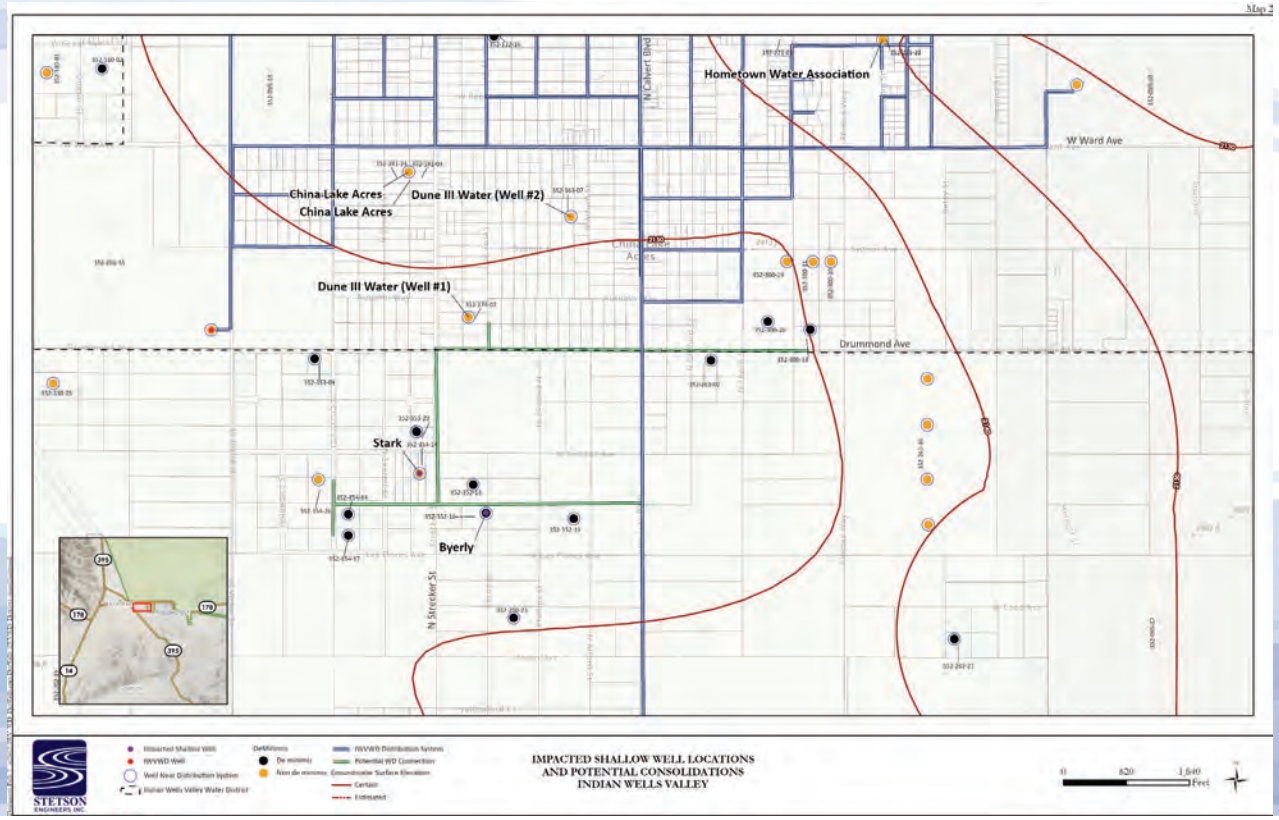
Potential Consolidations



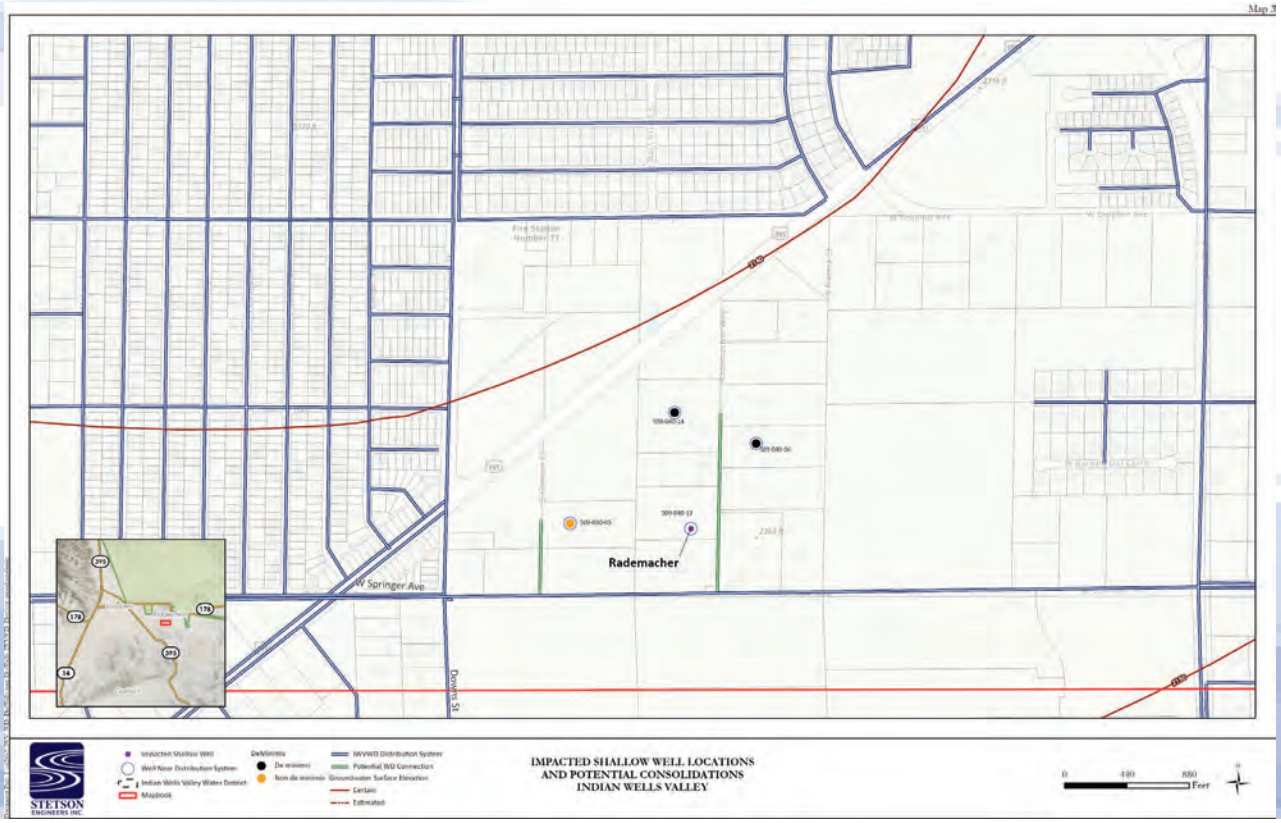
Potential Consolidations



Potential Consolidations



Potential Consolidations



FAQs

- What are the next steps?

  A coordination meeting has been scheduled and held with the IWVWD. We are working on actual and potential projects identifications and prioritization.

- Can the Grant funds be used to help fund the Water District's current consolidation projects?

  It appears the Grant funds are intended for "reimbursement" of GA actual costs. GA staff is getting clarification from Department of Water Resources (DWR).

- Is this Grant only for "reimbursement" of costs?

  There are provisions for "advanced Grant funding", however, a demonstration must be provided showing "cash flow" issues and a clearly defined project.

- How will the GA consolidation projects be identified and prioritized?

  The GA staff will preliminarily identify and prioritize consolidation projects. These potential projects will be reviewed by the TAC before being acted on, by the GA Board.

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IWVGA ADMINISTRATIVE OFFICE

STAFF REPORT

TO: IWVGA Board of Directors **DATE: March 13, 2024**

FROM: IWVGA Staff

SUBJECT: Application for Shallow Well Mitigation Funding - Halpin

BACKGROUND

The Indian Wells Valley Groundwater Authority (IWVGA) has received a request for Shallow Well Mitigation Assistance from Sean Halpin. Mr. Halpin reports that the well for his residence on West Las Flores Avenue failed on September 7, 2023. Mr. Halpin is requesting funding assistance for the cost of a new well, which was installed in October 2023.

Under the Sustainable Groundwater Management Act (SGMA), Basin sustainability must be achieved by 2040. Groundwater levels will continue to decline until the management actions and projects in the California Department of Water Resources approved Groundwater Sustainability Plan (GSP) for the Basin are fully implemented. The GSP includes a program to help mitigate impacts to shallow wells during implementation of the GSP.

The Shallow Well Mitigation Program (Program) was approved by the Indian Wells Valley Groundwater Authority (IWVGA) Board at its February 10, 2021 meeting. The Program is implemented and managed by the Authority staff, under the direction of the Authority Board, on a "case-by-case" basis. The Program is essentially an "evaluation and potential mitigation reimbursement" process. The Program is dependent upon well owners voluntarily submitting information on their impacted wells for Authority consideration.

IWVGA has received four applications since the start of the program. One application was authorized funding of $31,821 based on the "market value" of the original well plus the incremental cost of drilling a deeper well. IWVGA has recently approved an application for up $6,000 for Emergency Assistance.

This Report addresses Mr. Halpin's application for the Primary Shallow Well Mitigation Program.

DISCUSSION

Mr. Halpin submitted an application to the IWVGA for the Program which was considered complete on December 1, 2023 (see attachment). The well was registered with IWVGA in 2019. The well is located on West Las Flores Avenue in Ridgecrest. The well was drilled in July 1972 to a depth of 300 feet and had a water level of 190 feet below ground surface (bgs). The well log indicates a perforated casing length of 90 feet which, assuming a 5-foot blank casing sump at the

bottom of the well, would mean the top of the perforated casing would be 205 feet bgs and the bottom of the perforated casing would be 295 feet bgs. The Halpin Well is currently 52 years old. Figure 1, attached, shows the well location. Mr. Halpin provided maintenance and well repair records.

In 2016, the well had trouble producing water due to a hole in the down hole drop pipe. Garrison Brothers Well Service measured only a few feet of water remaining in the bottom of the Well. Mr. Halpin opted not to rehabilitate but instead, to use the well for as long as possible. In 2019, Mr. Halpin experienced issues with the well and had it serviced by Boetsch Well Drilling & Pump Service. It was reported that the depth of the well was 267 feet and only had about 15 feet of water to the bottom of the well. The bottom 33 feet of the well apparently collapsed during the Ridgecrest earthquake. The drop in groundwater levels exposed the perforations in the well to the air for many years, which in the presence of water can induce rusting, which would have reduced the well's ability to withstand the earthquake. The pump was removed and replaced with a lower producing well pump to continue using the well. This enabled the well to continue producing water until September 2023.

Mr. Halpin reported the well stopped producing water on September 7, 2023. Garrison Brothers Well Service extracted the pump and found it operational but not pumping water and found the well had only 7 feet of water remaining. It is reported that the well had a water level of 252 feet bgs and a depth of 259 feet. The groundwater level declined by 62 feet since the well was constructed in 1972. Garrison Brothers Well Service determined the failure to be the lowering of the water table below the well pump resulting in the pump motor overheating.

Historical groundwater level data from the area is available from Well 26S/40E-31D02 and Well 26S/40E-31K01, located approximately 0.4 miles north and south, respectively, of the Halpin Well. The groundwater level data from Well 26S/40E-31D02 and Well 26S/40E-31K01, shown in Figure 2, indicates historically declining groundwater levels, although there has been some recovery in groundwater levels in recent years. On average, Well 26S/40E-31K01 and Well 26S/40E-31D02 have shown a decline of about 0.5 ft and 0.4 ft per year, respectively. The locations of Well 26S/40E-31D02, Well 26S/40E-31K01, and Mr. Halpin's well, along with contours of the groundwater surface elevations from the Spring of 2023 for the area are shown in Figure 3. The groundwater surface elevation contours demonstrate a depression in the area of the Halpin Well. There are about 21 other known de minimis wells and 2 non de minimis wells that are pumping from the same pumping hole.

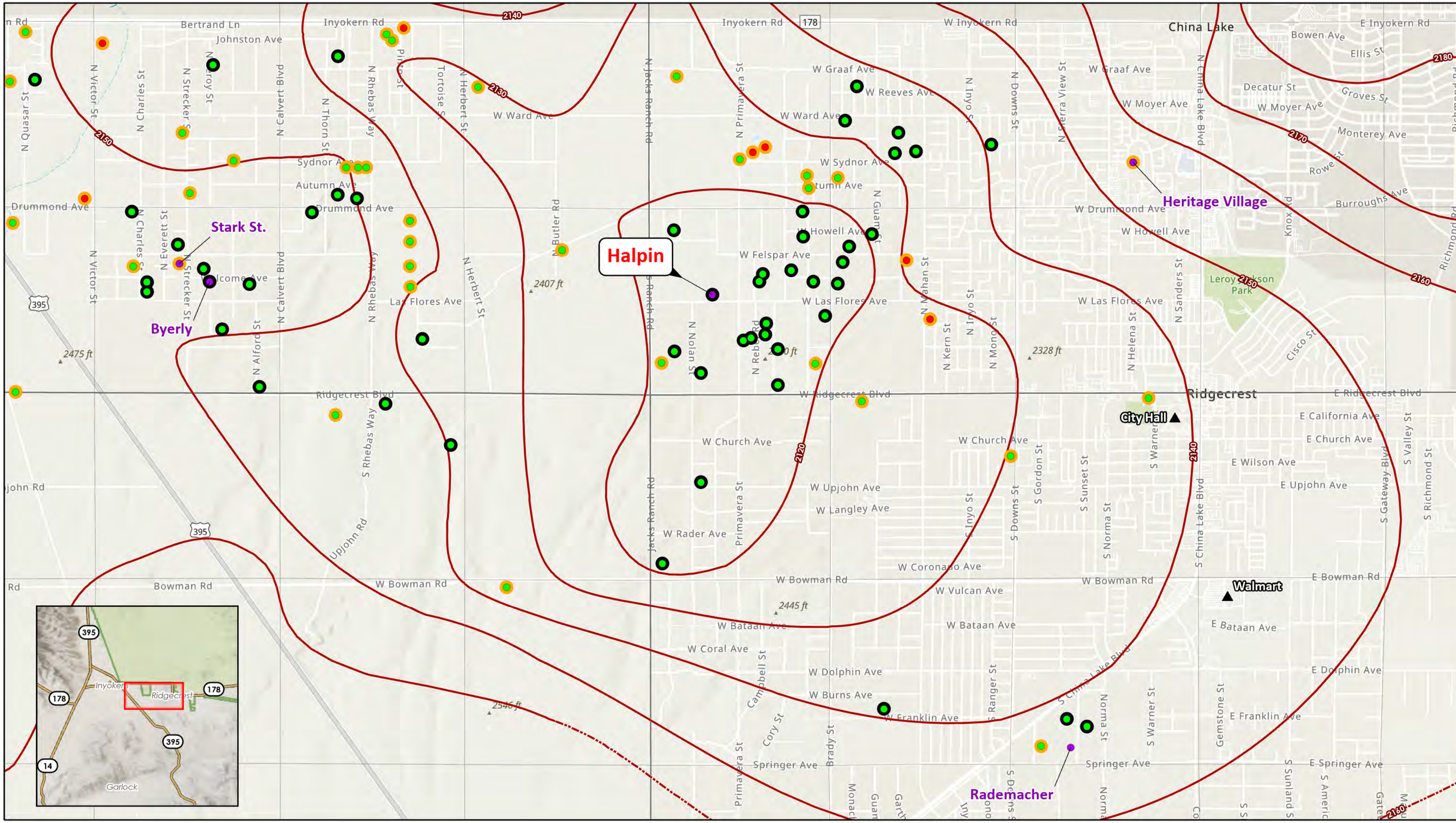
An alternative to replacing the shallow well such as a potential new service connection to the Indian Wells Valley Water District (IWVWD) was investigated. The well lies within the IWVWD "service area" and its sphere of influence, as shown in Figure 4. IWVWD could connect to Mr. Halpin's property by running a line from Primavera Street to Las Flores Avenue. However, a replacement well has already been built which would not made this well a high priority for consolidation. There are other known wells within that area that are being considered for consolidation.

The Halpin Well was built 52 years ago, however a new pump was installed in 2019. Well owners are responsible for replacing a well when a well reaches the end of its useful life and no longer

produces water, due to corrosion, well collapse due to corrosion or other factors. If a well no longer produces water due to declining water levels, the IWVGA can consider paying a prorated cost based on the calculated life of the well. The Reproduction Cost New Less Accrued Depreciation (RCNLD) valuation method can be used to estimate the current value of water facilities, including wells. The estimated current "market value" of the Halpin Well is about $10,012. The estimated incremental cost to drill a replacement "deeper" well (from the depth of the original well, 300 feet, to the depth of the new well, 500 feet) is about $27,984. The IWVGA's potential contribution to replace the Halpin Well with a deeper well (due to WL decline), based upon current market value of the Halpin Well is about $37,996 ($10,012 RCNLD + $27,984 cost for deepening).

RECOMMENDED ACTION

Staff recommends approval of reimbursement of $37,996 from the Shallow Well Mitigation Program to Mr. Halpin for well replacement due to declining groundwater levels.



Landmark
Shallow Well
Well Near Distribution System
IWVWD Well
De minimis
Non de minimis

STETSON ENGINEERS INC.

HALPIN WELL LOCATION
INDIAN WELLS VALLEY

0 2,000 4,000 Feet

N

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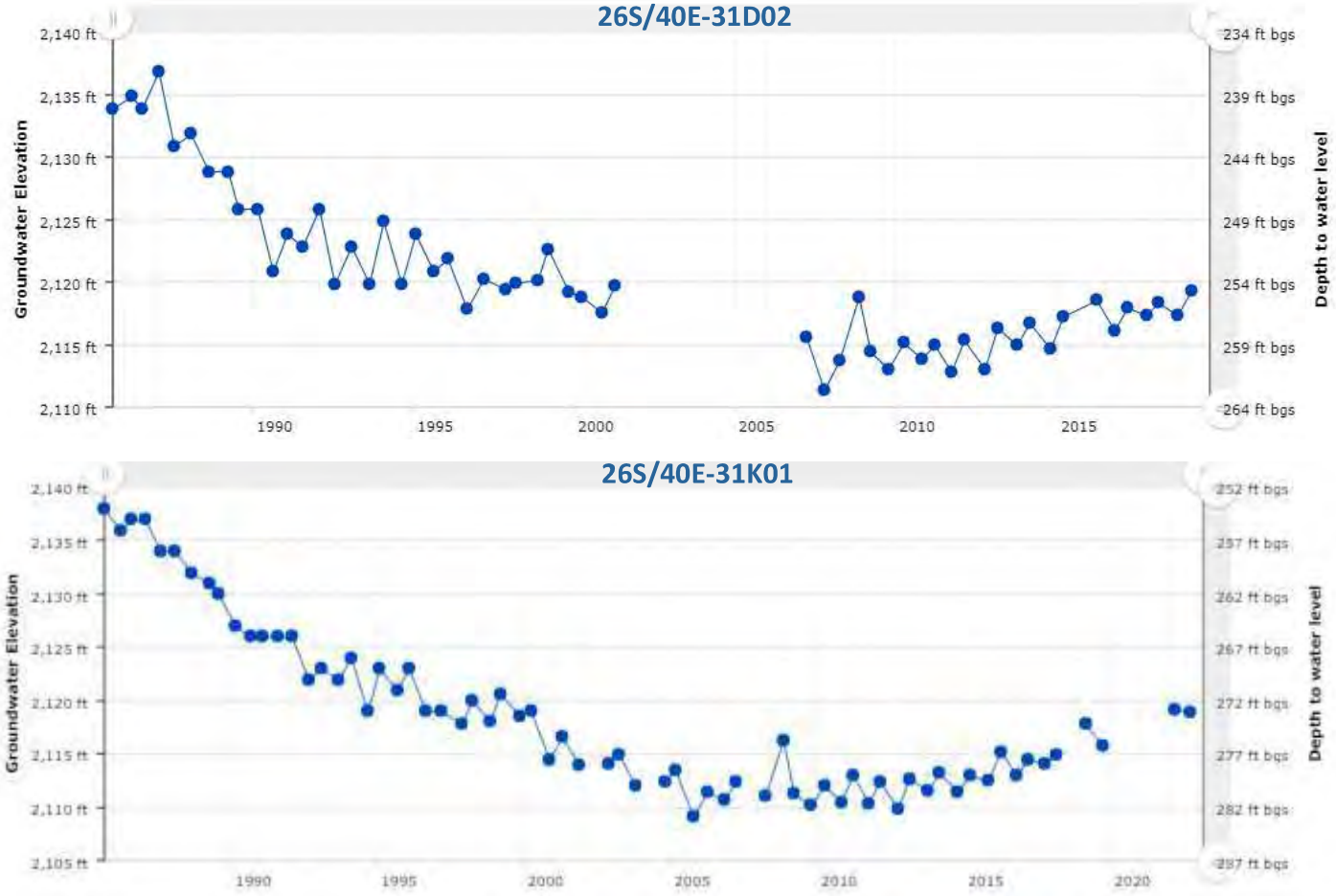
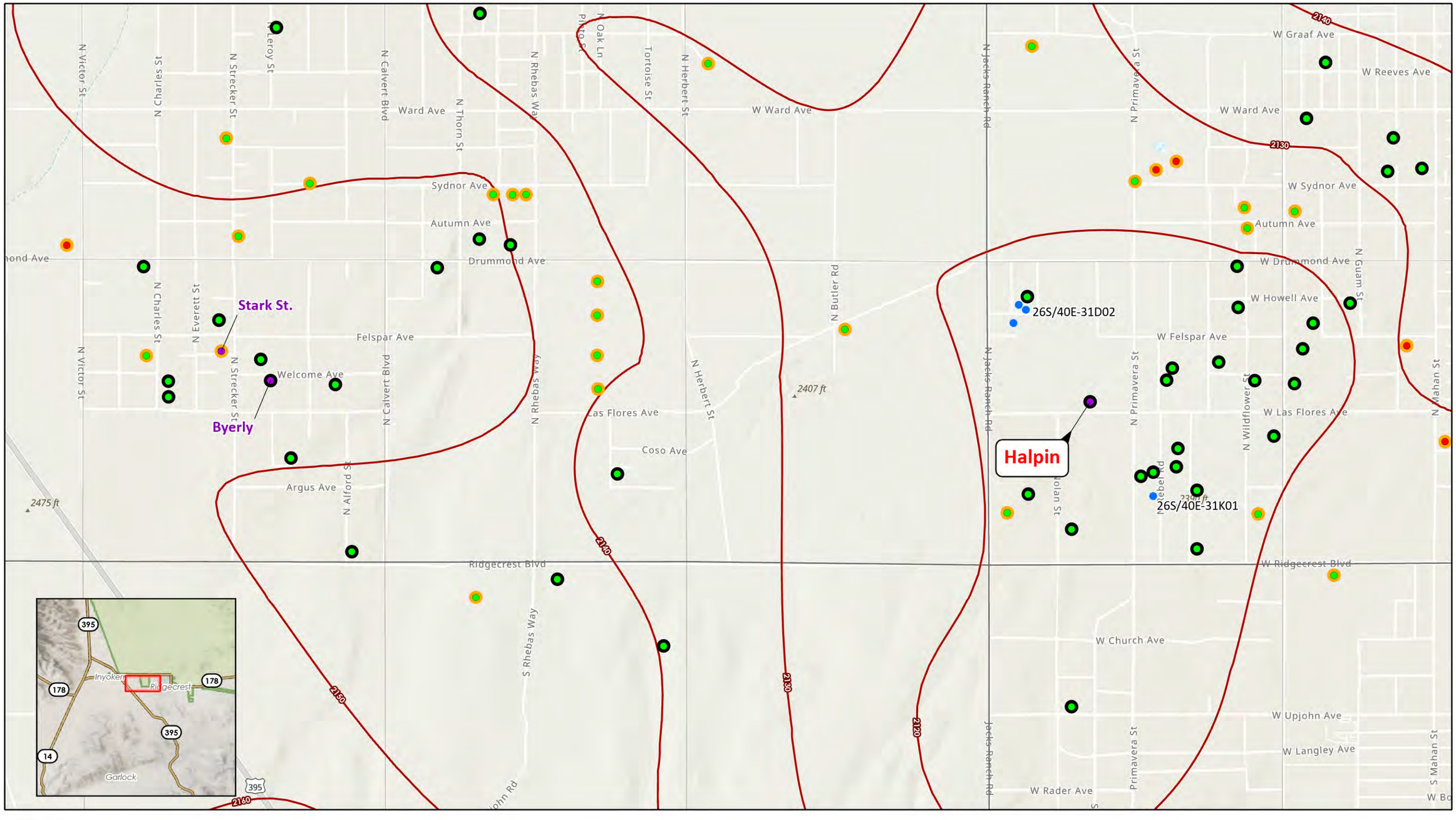


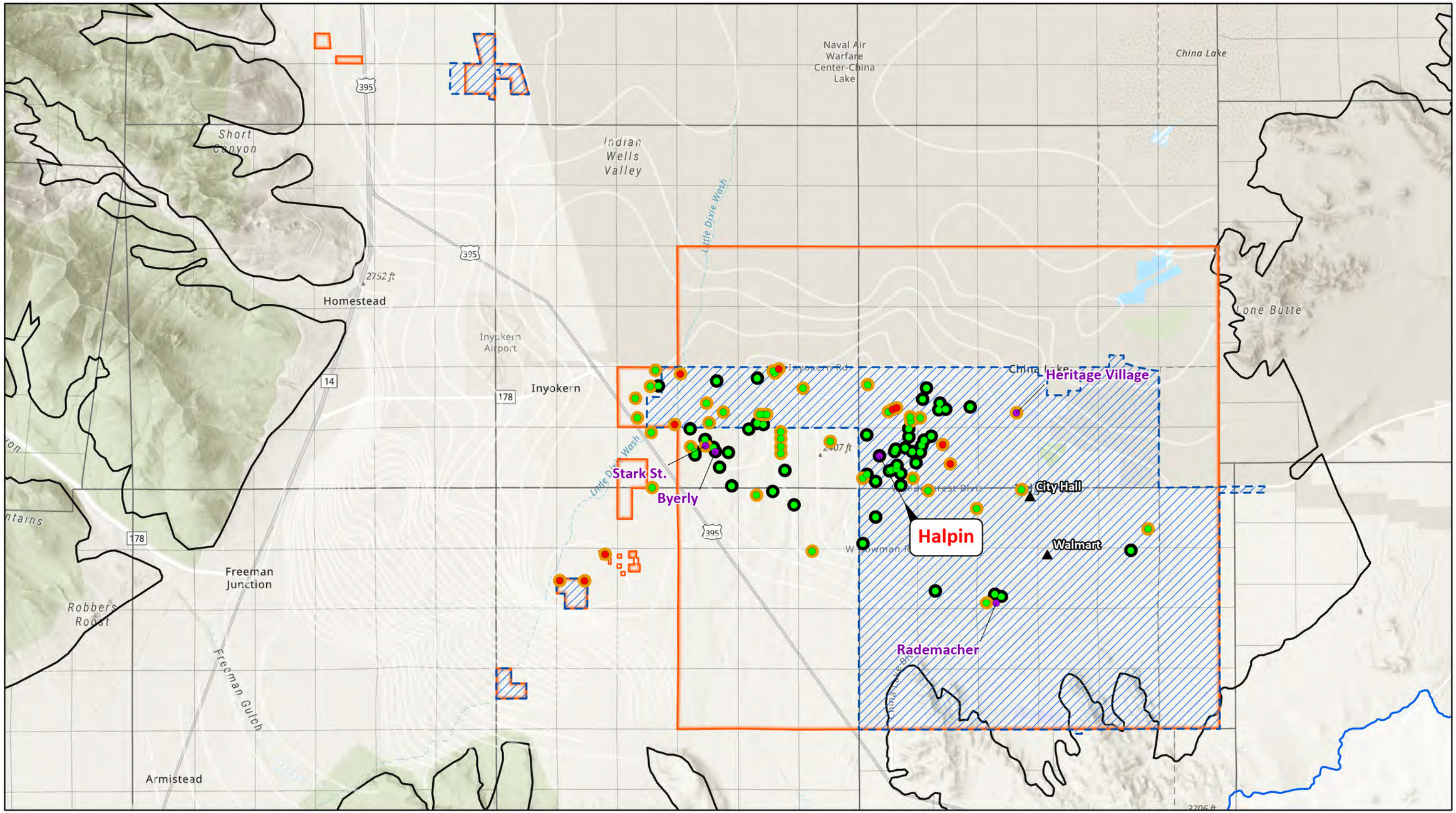
Land Surface Elevation = 2,288 feet above mean sea level.
Source: Indian Wells Valley Groundwater Authority Data Management System.

STETSON ENGINEERS INC.
Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

HYDROGRAPH FOR THE 26S/40E-31D02 AND 26S/40E-31K01 WELL

FIGURE 2


Stark St.
Byerly
Halpin
26S/40E-31D02
26S/40E-31K01
2407 ft
2475 ft
2340 ft
2140
2130
2120
2110
N Victor St
N Charles St
N Everett St
N Strecker St
N Leroy St
N Calvert Blvd
N Thorn St
N Rhebas Way
N Oak Ln
Tortoise St
N Herbert St
N Butler Rd
N Jacks Ranch Rd
N Primavera St
N Wildflower St
N Guam St
N Mahan St
N Alford St
S Rhebas Way
Ward Ave
W Ward Ave
Sydnor Ave
W Sydnor Ave
Autumn Ave
Drummond Ave
W Drummond Ave
Felspar Ave
W Felspar Ave
Welcome Ave
Las Flores Ave
W Las Flores Ave
W Graaf Ave
W Reeves Ave
W Howell Ave
Coso Ave
Argus Ave
Ridgecrest Blvd
W Ridgecrest Blvd
W Church Ave
W Upjohn Ave
W Langley Ave
W Rader Ave
Jacks Ranch Rd
Primavera St
Upjohn Rd
Inyokern
Ridgecrest
Garlock
395
178
14
Landmark
Well Near Distribution System
IWVWD Well
Shallow Well
Monitoring Well
De minimis
Non de minimis
STETSON ENGINEERS INC.
GROUNDWATER LEVEL CONTOURS
INDIAN WELLS VALLEY
0
1,000
2,000
Feet
N
Document Path: I:\n\2652\IWV_WD_DetWells and HalpinWell_GW Contours Detail



Landmark
Shallow Well
Well Near Distribution System
IWVWD Well
De minimis
Non de minimis

Watershed Boundary
Indian Wells Valley GSA
IWVWD Sphere of Influence
IWVWD Boundary

STETSON ENGINEERS INC.

INDIAN WELLS VALLEY WATER DISTRICT AND SPHERE OF INFLUENCE INDIAN WELLS VALLEY, CA

0 1 2 Miles

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IWVGA ADMINISTRATIVE OFFICE

STAFF REPORT

TO: IWVGA Board of Directors **DATE: March 13, 2024**

FROM: IWVGA Staff

SUBJECT: Application for Shallow Well Mitigation Funding - Byerly

BACKGROUND

The Indian Wells Valley Groundwater Basin (Basin) has been in overdraft for several decades, resulting in a significant lowering of groundwater levels and reduction in the amount of useable groundwater in storage. Most of the wells impacted by the chronic decline in groundwater levels have been shallow wells (domestic and rural).

Under the Sustainable Groundwater Management Act (SGMA), Basin sustainability must be achieved by 2040. Groundwater levels will continue to decline until the management actions and projects in the California Department of Water Resources approved Groundwater Sustainability Plan (GSP) for the Basin are fully implemented. The GSP includes a program to help mitigate impacts to shallow wells during implementation of the GSP.

The Shallow Well Mitigation Program (Program) was approved by the Indian Wells Valley Groundwater Authority (IWVGA) Board at its February 10, 2021 meeting. The Program is implemented and managed by the Authority staff, under the direction of the Authority Board, on a "case-by-case" basis. The Program is essentially an "evaluation and potential mitigation reimbursement" process. The Program is dependent upon well owners voluntarily submitting information on their impacted wells for Authority consideration.

IWVGA has received four applications since the start of the program. One application was authorized funding of $31,821 based on the "market value" of the original well plus the incremental cost of drilling a deeper well. IWVGA has recently approved an application for up $6,000 for Emergency Assistance.

This Report addresses Mr. Byerly's application for the Primary Shallow Well Mitigation Program.

DISCUSSION

Mr. Byerly submitted an application to the IWVGA for the Program which was considered complete as of November 15, 2023 (see attachment). Mr. Byerly has applied for financial assistance through the Program to construct a new well, due to his existing well going dry in July 2023. The well, located on Welcome Avenue, is de minimis and is registered with the IWVGA. Figure 1, attached, shows the well location. Mr. Byerly doesn't have any information on the well prior to purchasing the property in March of 2004 so the age of the well is unknown. However,

based on the fact that Kern County public property records indicate the house on the property was constructed in 1972, the age of well is assumed to be around 50 years old. The depth of the well is reported to be 343 feet below ground surface (bgs) based on prior well maintenance documents. A new pump and casing were installed in the well in March 2004 along with new wiring. At that time, the water level was at a depth of 294 feet bgs and the pump was set at 320 feet bgs.

When the well stopped producing water in July 2023, the static water level in the well was found to be 321 feet bgs, which was a decline of 27 feet since 2004. Mr. Byerly reported that the pump was replaced and lowered 15 feet. The cost for replacing and lowering the pump was $8,788.97, which also included a flow restrictor and a pump saver controller. The well pump continued to break suction at the lower pump setting so a low flow restrictor was installed in line with the well pump in an attempt to lengthen the useful life of the well. A new pump saver controller was also installed to protect the well pump from overheating. The well produced 1 to 3 gallons per minute, but the pump continued to break suction. Garrison Brothers Well Services (License # 673398) recommended that the existing well be replaced in their report on the well dated November 2023. A permit for replacing the well was filed and the new well was finished in October 2023 at a cost of $64,615.53. The new well was drilled to a depth of 515 feet bgs. The top and bottom of the perforated interval are 375 and 515 feet bgs, respectively. The static level was measured to be 321 feet bgs.

Historical groundwater level data from the area is available from Well 26S/39E-34D01, located approximately 3,900 feet northeast of Mr. Byerly's well. The groundwater level data from Well 26S/39E-34D01, shown in Figure 2, indicates historically declining groundwater levels. Another shallow well recently impacted by declining groundwater levels, the Stark Street Well, is located approximately 700 feet northeast of Mr. Byerly's well. The locations of Well 26S/39E-34D01, the Stark Street Well, and Mr. Byerly's well, along with groundwater surface elevation contours from the Spring of 2023 for the area, are shown in Figure 3.

Available water quality data for wells within the area indicated that there are no known water quality issues detected. The Stark Steet Well, about 700 feet northwest from the Byerly Well, was tested for Nitrates, Total Coliform, and E.coli in 2022 and results for those constituents did not exceed the Maximum Contaminant Level.

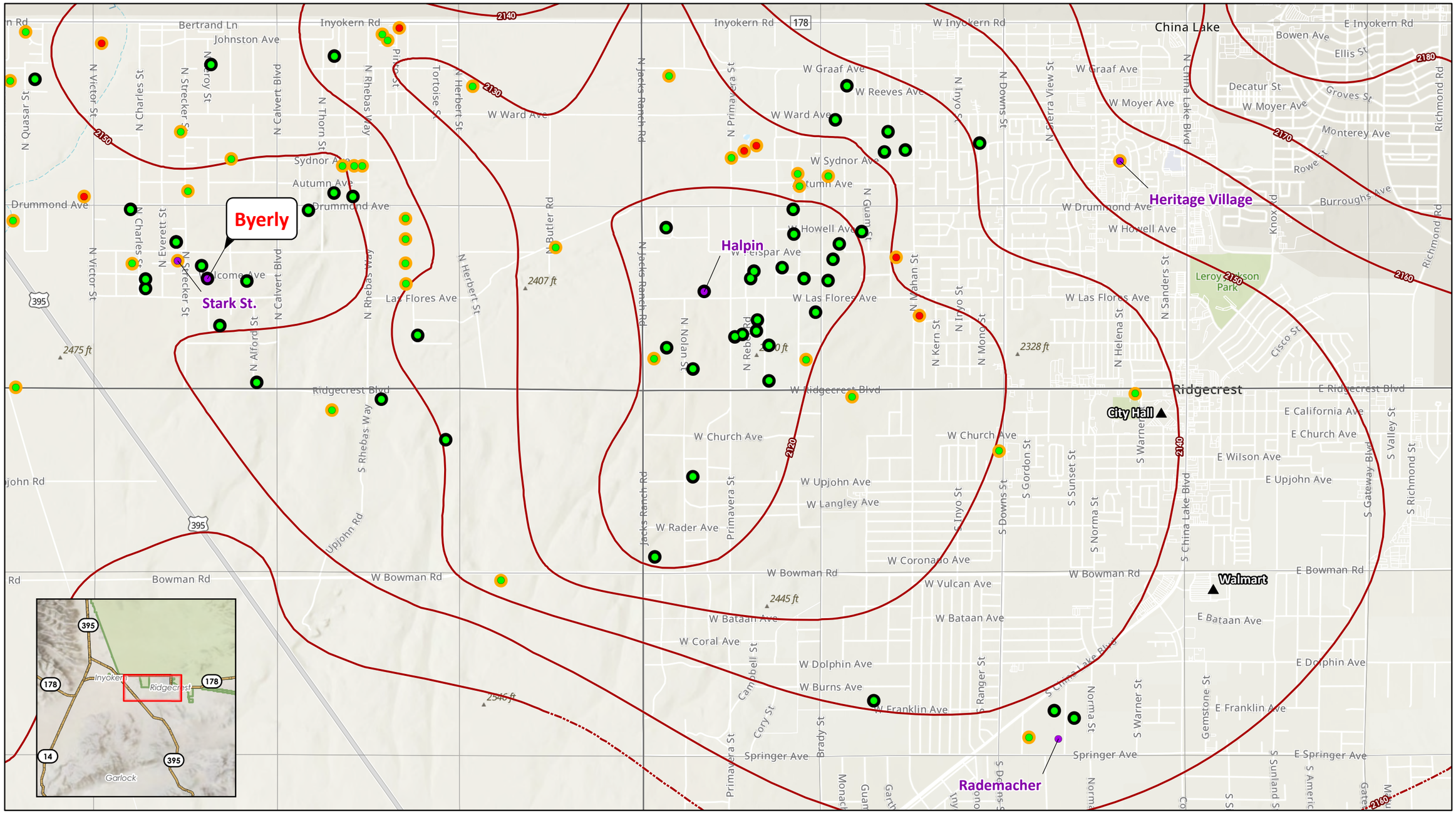
An alternative to replacing the shallow well such as a potential new service connection to the Indian Wells Valley Water District (IWVWD) was investigated. The IWVWD "service area" is close by but does not include the Byerly Well. The Byerly well is located within the District's sphere of influence but lies less than half a mile outside of the District's service area, as shown in Figure 4. A replacement well has already been built which would not make this well a high priority for consolidation with IWVWD. Potentially consolidating other shallow wells in this area into the IWVWD is being reviewed. IWVWD previously indicated that providing service to the area near the Byerly Well outside of its service area would require some time based on the ongoing process for the IWVWD to start providing water to the Dune 3 system. Once the Dune 3 system is integrated into the Water District, IWVWD could connect to the potential wells in the area by running a line from Strecker and Drummond to the well.

The Byerly Well is assumed to have been built around 50 years ago, however a new well casing was placed in the well in 2004 and the pump was replaced this year. Well owners are responsible for replacing a well when a well reaches the end of its useful life and no longer produces water, due to corrosion, well collapse due to corrosion or other factors. If a well no longer produces water due to declining water levels, the IWVGA can consider paying a prorated cost based on the calculated life of the well. The Reproduction Cost New Less Accrued Depreciation (RCNLD) valuation method can be used to estimate the current value of water facilities, including wells. The estimated current "market value" of the Byerly Well is about $10,793. The estimated incremental cost to drill a replacement "deeper" well (from the depth of the original well, 343 feet, to the depth of the new well, 515 feet) is about $20,289. The IWVGA's potential contribution to replace the Byerly Well with a deeper well (due to WL decline), based upon current market value of the Byerly Well is about $31,082 ($10,793 RCNLD + $20,289 cost for deepening).

RECOMMENDED ACTION

Staff recommends the approval of reimbursement of $31,082 from the Shallow Well Mitigation Program to Mr. Byerly for well replacement due to declining groundwater levels.

FIGURE 1



Landmark
Shallow Well
Well Near Distribution System
IWVWD Well
De minimis
Non de minimis

STETSON ENGINEERS INC.

BYERLY WELL LOCATION
INDIAN WELLS VALLEY

0 2,000 4,000 Feet

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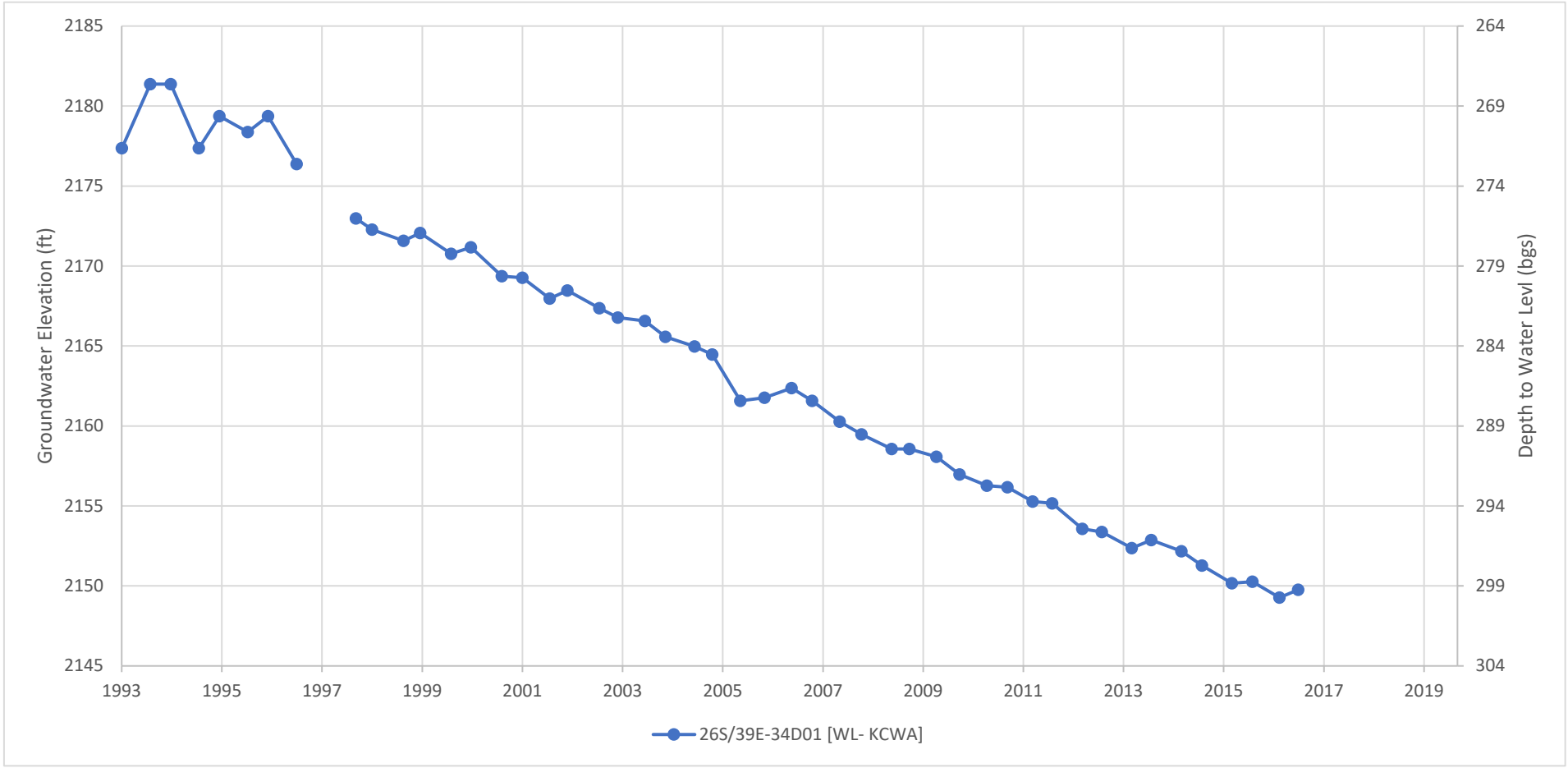


Land Surface Elevation = 2,448 feet above mean sea level.
Source: Indian Wells Valley Groundwater Authority Data Management System.

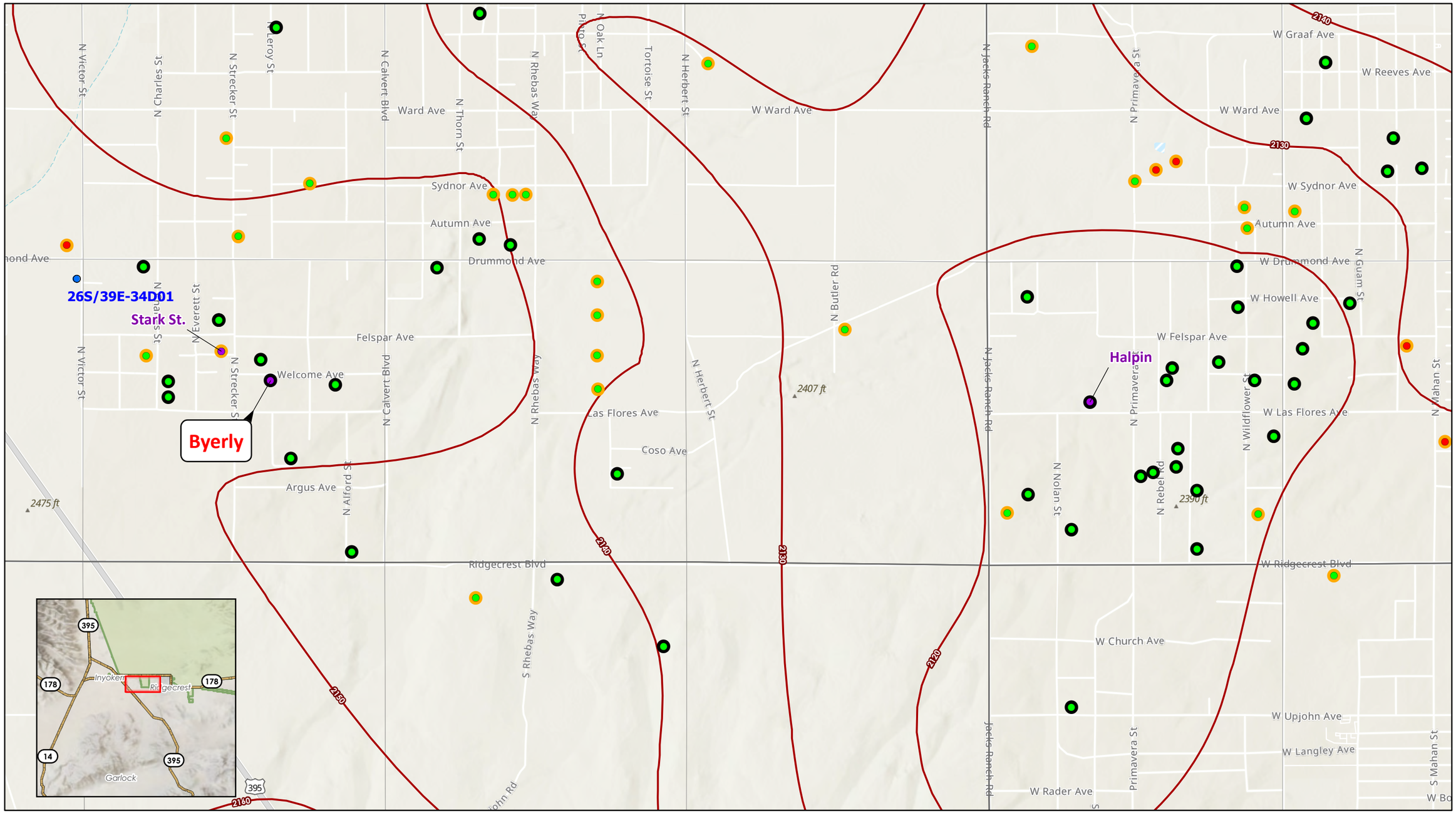
STETSON ENGINEERS INC.
Covina San Rafael Mesa, Arizona
WATER RESOURCE ENGINEERS

HYDROGRAPH FOR THE 26S/39E-34D01 WELL

FIGURE 2

\\server4\data\Jobs\2652 IWVGA\20 - Shallow Well Mititgation\2023\T Byerly\Figure 2

FIGURE 3



Landmark
Well Near Distribution System
IWVWD Well
Monitoring Well
Shallow Well
De minimis
Non de minimis

STETSON ENGINEERS INC.

GROUNDWATER LEVEL CONTOURS
INDIAN WELLS VALLEY

0 1,000 2,000 Feet

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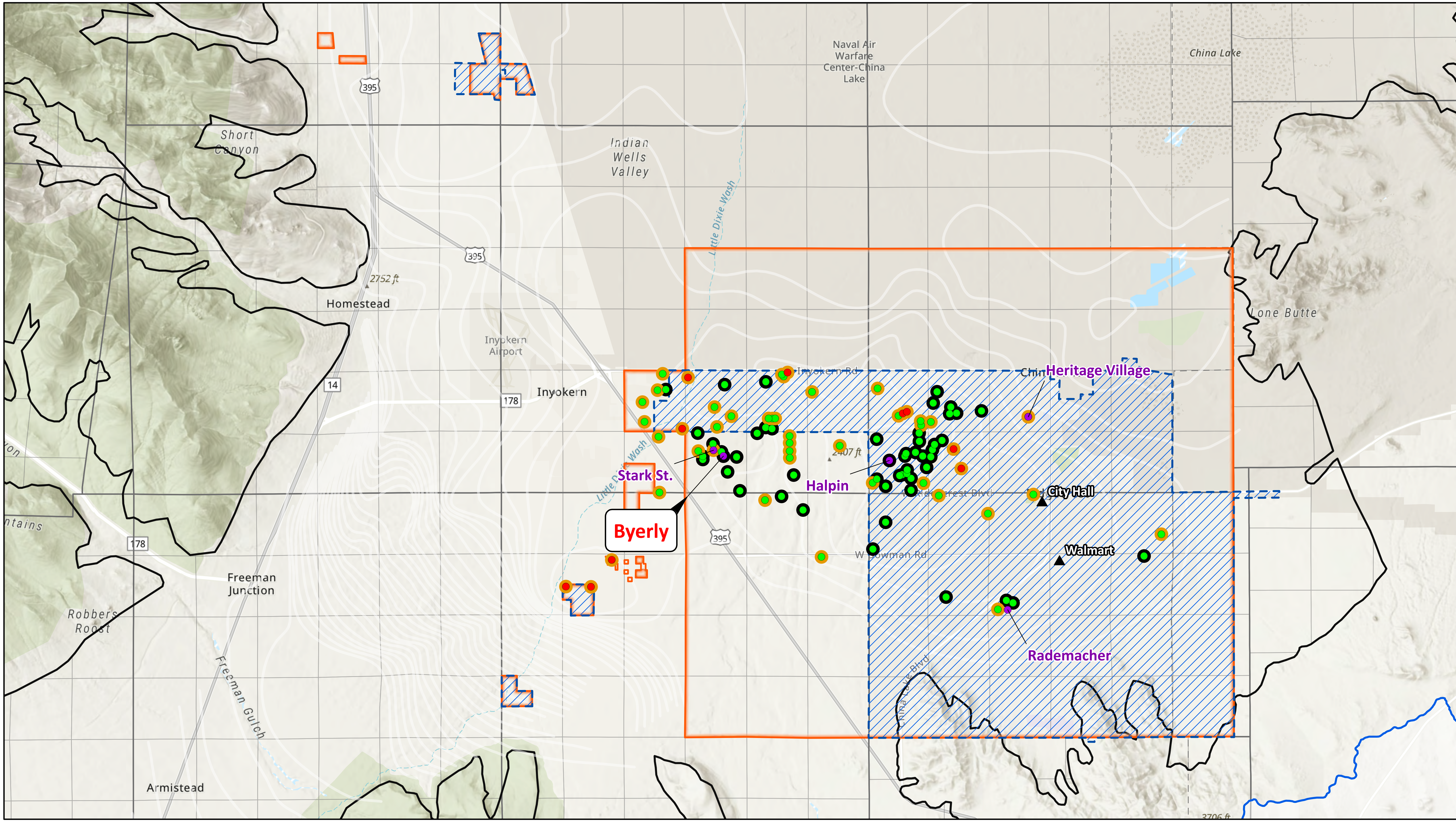
FIGURE 4



Landmark
Shallow Well
Well Near Distribution System
IWVWD Well
De minimis
Non de minimis
Watershed Boundary
Indian Wells Valley GSA
IWVWD Sphere of Influence
IWVWD Boundary

**INDIAN WELLS VALLEY WATER DISTRICT
AND SPHERE OF INFLUENCE
INDIAN WELLS VALLEY, CA**

0 1 2 Miles

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STETSON ENGINEERS INC.

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IWVGA ADMINISTRATIVE OFFICE

STAFF REPORT

TO: IWVGA Board Members **DATE:** March 13, 2024

FROM: IWVGA Water Resources Manager

SUBJECT: AGENDA ITEM 13 – WATER RESOURCES MANAGER'S REPORT

AGENDA ITEM 13a – GRANT FUNDING UPDATE

Proposition 1 Update

- Invoice #16a
  - Covers July 2022 through September 2022
  - Total requested payment after retention: $20,806.59
  - Status: Payment Received
- Invoice #17a:
  - Covers October 2022 through December 2022
  - Total requested payment after retention: $7,817.63
  - Status: Payment Received.

Proposition 1/68 Grant Closeout

- Retention invoices for Proposition 1 and Prop 68 in the amount of $187,678.87 and $32,941.39, respectively, were submitted to DWR on February 28, 2023. The Proposition 1 retention invoice was revised and resubmitted on May 18 per DWR's request.

SGMA Implementation Round 1 Update

- Invoice #3
  - Covers January 2023 through March 2023
  - Total requested payment: $435,887.19
  - Comments received from DWR on initial submittal
  - Status: Revised invoice resubmitted on February 5, 2024
- Invoice #4
  - Covers April 2023 to June 2023
  - Total requested payment: $1,062,552.46
  - Comments received from DWR on initial submittal
  - Status: Revised invoice resubmitted on February 27, 2024
- Invoice #5
  - Covers July 2023 to September 2023
  - Total requested payment: $848,164.75
  - Comments received from DWR on initial submittal
  - Status: Revised invoice resubmitted on February 27, 2024

- Invoice # 6
    - Covers October 2023 to December 2023
    - Total requested payment: $626,069.10
    - Status: Submitted on February 28, 2024

Urban Community Drought Relief Program Update

- The IWVGA has been awarded $3,345,000 to consolidate shallow well system(s) into a public water system.
- DWR has executed the grant agreement.
- Preliminary meeting with IWVWD on potential consolidation areas occurred on Feb 23.
- Preliminary potential consolidation area maps were provided to IWVWD.
- Potential systems/wells for consolidation are being further investigated.
- First Invoice and Progress Report will be due 5/30/24

2023 Drinking Water System Infrastructure Resilience and Sustainability Program

Staff submitted an application for federal funding on November 6, 2023 for approximately $2.8 million to fund planning, design, environmental, and right-of-way tasks for the Imported Water Project. Funding awards are anticipated to be announced in Spring 2024.

AGENDA ITEM 13b – GSP IMPLEMENTATION PROJECTS/MANAGEMENT ACTION UPDATES

Imported Water Project

- Imported Water Pipeline Design Services
    - Coordination Meetings:
        - Bi-weekly meetings with BLM
            - Updating SF-299 Application per BLM comments
            - Draft Plan of Design in compliance with the BLM's Desert Renewable Energy Conservation Plan being revised
        - Ongoing coordination with State Water Resources Control Board Division of Drinking Water (DDW), Caltrans, United Pacific Rail Road (UPRR), and Southern California Edison (SCE)
            - SCE reviewing Customer/ Project Information Sheet (CPIS) application
            - GA Staff processing the California State Parks Right of Entry Application to prepare an Encroachment Permit and a check for the initial fee of $500
                - Future fees include an analysis fee of $10,000 and a final easement fee of approximately $25,000
            - UPRR reviewing application for trenchless crossing at Neuralia Road and Cantil Road
            - Submitted response to comments from DDW on the Preliminary Design Report
    - Continuing soils borings in California City and Kern County right-of-way
        - Will focus on locations not adjacent to aquatic features until the California Department of Fish and Wildlife approves the Lake and Streambed Alteration Agreement

- Continuing utility research and trenchless crossing identification
    - Working on scour analysis for the Cantil and Redrock Canyon drainage washes, in non-BLM land near Neuralia Rd and Redrock Randsburg Road
- The General Manager approved a No-Cost Change Order on February 29, 2024 to adjust monies between project tasks
- Provided the Preliminary Permitting Requirements TM and now incorporating Staff comments
- Next Steps:
    - Start geotechnical borings in BLM land after cultural surveys are completed
    - Finalize the 30% Design Submittal
    - Provide the System Hydraulics and Transient Mitigation Analysis TM
    - Provide 60% Design Submittal by August
    - Next Milestones
        - Provide 90% Design Submittal by September 2024
        - Provide Final Design Submittal by April 2025

- Imported Water Pipeline Environmental Services
    - Coordination Meetings
        - Weekly meetings with BLM
            - Provided BLM with additional requested mitigation measures, the Biological Mitigation TM, and revegetation plan for geotechnical investigation
            - Received additional biological survey requirements from BLM
                - BLM approved a qualified biologist to perform the Botany Survey in March
                - Will provide candidates for a qualified Mojave Ground Squirrel and Desert Tortoise biologist for BLM review and approval
        - Submitted the USACE Permit Package
    - Completed cultural surveys on BLM land, to be followed by geotechnical surveys
        - Final Draft Cultural Report being prepared
    - BLM Reviewing NEPA Public Scoping Period Summary Report
    - Next Steps:
        - Begin geotechnical and biological monitoring on BLM lands
        - Finalize draft Environmental Impact Report, and BLM Environmental Assessment
            - Provide draft EA for Public Comment by mid-April
        - Next Milestones:
            - Finalize NEPA compliance for geotechnical borings and environmental surveys/ studies within BLM property
            - Conduct technical analyses/ Special Studies within BLM land

- Imported Water Pipeline Right-of-Way Services
    - Continue obtaining Rights of Entry from property owners along the pipeline alignment to allow performance of biological/technical studies and geotechnical borings
    - Next Milestone:
        - Provide a Right of Way Acquisition Plan by June 2024

- Submittals to DWR

- Submitted the final Preliminary Design Report on February 29, 2024, before the due date of March 31, 2024
- Submit Initial Study due September 1, 2024

- US Army Corps of Engineers Planning Assistance to States (PAS) Program
  - USACE Staff reviewing final proposed project list to start the development of an agreement with Army Corps
  - Next Steps:
    - Execute an agreement with Army Corps

Shallow Well Mitigation Program

- Updated Report Form and Fact Sheet
  - An updated Report Form and Facts Sheet incorporating comments from the PAC will be uploaded to the IWVGA website to provide additional information to well owners who may be interested in the Shallow Well Mitigation Program.
  - The Final Form and Facts Sheet were sent to the PAC Chair and PAC members for final review and no further comments were provided.
- Current Applications
  - Byerly Well
    - Received application from Mr. Byerly for the Primary Program.
    - Requesting financial assistance due to reduced water levels.
    - Staff provided draft staff report to applicant for review. The applicant indicated he had no comments on the staff report.
  - Halpin Well
    - Approved for $6,000 for emergency assistance.
    - Received application from Mr. Halpin for the Primary Program
    - Received Well Driller's Report in December and working on Staff Report
    - Staff provided a draft staff report to applicant for review. The applicant indicated he had no comments on the staff report.

Impacted Shallow Wells	**Evaluation Status**
Stark Street	Application approved for partially funding. Completed
Heritage	Application Declined. Completed
Byerly	Staff recommendation in Board package
Halpin	Staff recommendation in Board package
Rademacher	Water Quality. Directed to the Shallow Well Mitigation Program and Capital Core. Kern County researching funding. Possible use of new DWR Consolidation Grant.

GSP Update

Revised Periodic Evaluation Schedule of Draft Releases

New Information Collected	March 2024
GSA Authorities and Enforcement Actions	April 2024
Monitoring Networks	April 2024
Outreach, Engagement, and Coordination	April 2024
Groundwater Conditions Relative to Sustainable Management Criteria	June 2024
Basin Setting Based on New Information/Changes in Water Use	July 2024
Status of Projects and Management Actions	August 2024
Summary of Proposed/Completed Revisions to Plan Elements	August 2024

Revised Submittal Process Schedule

Complete Draft Periodic Evaluation Released	September 2, 2024
Complete Draft Plan Amendment Released	September 30, 2024
Periodic Evaluation Comment Period	September 3, 2024 – October 7, 2024
Plan Amendment Comment Period	October 1, 2024 – November 4, 2024
Final Periodic Evaluation for Board Approval	November 13, 2024
Final Plan Amendment for Board Approval	January 8, 2025
Submittal to DWR	January 31, 2025

2023 Annual Report

WY 2023 Annual Report

- Comments on the draft WY 2023 Annual Report were due to the WRM by February 2, 2024.
    - Comments were provided by Mohave Pistachio, LLC and Searles Valley Minerals Inc.
- The draft WY 2023 Annual Report and comments are available on the IWVGA website.
- The final WY 2023 Annual Report will be provided at the IWVGA March Board Meeting and is due to DWR on April 1, 2024.

AGENDA ITEM 13c – MISCELLANEOUS ITEMS

Data Collection and Monitoring

- March 4-8, 2024
    - Spring 2024 bi-annual basin-wide groundwater level measurements and datalogger downloads.
    - Wellhead survey of a subset of monitoring wells.

GSP Model Configuration Management Plan (CMP)

- Technical Model Group (TMG)
    - TMG includes the Navy, TAC representatives, DRI, and Stetson
    - Dec 6, 2023, DRI/Stetson working call to review model updates
    - Dec 18, 2023, TMG meeting/call reviewed and finalized structural model components: faults, model boundaries, clay extents, discussed aquifer properties, evapotranspiration, and groundwater pumping
    - Jan 12, 2024, TMG meeting/call discussed mountain front recharge distribution and aquifer connectivity
    - Jan 30, 2024 TMG meeting/call reviewed modeling progress with recharge distribution, hydraulic conductivity zones, and calibration
    - Mar 5, 2024, TMG meeting/call to review LADWP Releases Data and modelling progress
- Spring 2024 Schedule
    - Model Calibration, sensitivity analysis
    - Development of GSP model scenarios and water budgets
    - Biweekly TMG meetings to be scheduled to monitor modeling progress

Subflow from Rose Valley to IWV

- GA Reimbursement is being processed for first monitoring well (April)
- Executed Cooperative Agreement Modification for time extension requested through 2024 to complete permitting and drilling second monitoring well
- Ongoing work with BLM regarding Cultural Survey and Permitting for second monitoring well

ACTION(S) REQUIRED BY THE BOARD

There are no actions required by the Board.

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(DRAFT DATE MARCH 3, 2021)
(REDRAFT DATE FEBRUARY 27, 2024)

INDIAN WELLS VALLEY GROUNDWATER AUTHORITY (IWVGA)

DE MINIMIS SHALLOW WATER SUPPLY WELL NEGATIVELY IMPACTED BY CHRONIC OVERDRAFTING OF GROUNDWATER IN THE IWV BASIN INTRODUCTION AND DISCLAIMER

The IWVGA approved the first phase of the "Shallow Well (Impacts) Mitigation Program", Project No. 4 of the Authority's Groundwater Sustainability Plan (GSP), January 2020. Phase one included development of the "Program" and initial "Outreach, Identification and Evaluation."

This "Report Form" is part of the "Outreach, Identification and Evaluation" for potentially negatively impacted shallow wells, occurring "after February 1, 2020", per the GSP. This Mitigation program is intended to apply only to a qualified well failure due to negative impacts related to the Basin overdraft including declining groundwater levels and specific water quality contaminant levels. A well is declared to be in a human health failure condition, if the well has water that reaches a Primary Standard level found in Title 22 of the California Code of Regulations. Funds for the Mitigation program are provided by a portion of the Basin Replenishment Fee approved by the GA Board in Ordinance 03-20 on August 21, 2020.This program will not provide funds or other support for the routine maintenance of a well, such as pump motor, drop pipe or drop wire replacement. All of the surface-related pumps, controllers, and storage tanks remain the sole responsibility of the owner. A prorated cost of IWVGA financial

contribution will be based on the calculated life of the well and other factors (present value evaluation).

DISCLAIMER: The Board has the sole discretion, based on the GSP, to fund the restoration of any well in the Indian Wells Valley Basin. The IWVGA may request additional information to supplement your completed Report Form, if it is not deemed complete. All information and data submitted to the IWVGA, related to this Report Form will remain confidential as permitted pursuant to the California Public Records Act, unless release is authorized, or the IWVGA addresses potential mitigation at a public meeting. Any shallow well mitigation plans addressed by the IWVGA will be held at a public meeting and will require public release of information and data related to your completed Report Form. The information requested below is consistent with the Notice of Groundwater Extraction Reporting for Pumping Verification – Questionnaire 1, which can be found under the forms and information section on the IWVGA website. In addition, the DWR Dry Well Reporting System Form was used (https://mydrywell.water.ca.gov/report/reports/new).

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Summary of IWV GA Shallow "de minimis" Groundwater Well Failure Due to Declining Water Levels and/or Declining Water Quality Occurring as a Result of Declining Water Levels

Subcommittee Recommendation Approved by Full Policy Advisory Committee September 28, 2023

Revised 1/9/24

1. **The definition of a "shallow well" and a "de minimis shallow well" are provided in this section, which would be incorporated into the IWVGA declining water level, failed well mitigation program.**
   * The "de minimis shallow well" is a shallow well that is designed to produce a specific limited amount of groundwater. This well can have up to four separate de minimis connections, each using no more than 2 ac-ft per year. **It is this well type that is the subject of this document, as id defined in California SGMA (Sustainable Groundwater Management Act). Over 90+ % of the IWV wells are de minimis.**
   * A "shallow well" is defined as a well typically designed to produce a larger water quantity per year, as in a co-op or mutual water system. **The details of such a system often are more complicated technically and legally than a de minimis system and will be described separately from this document.** The mitigation of such a system at failure could involve a system redesign and reconstruction to enable combining with a neighboring system or joining a public water system.
   * **No financial or legal discrimination is intended or implied in the separation into "de minimis shallow well" and "shallow well" types.**
2. **Typical de minimis shallow well casing design and depth.**
   * A de minimis well is nearly always constructed with 6 inch *mild steel casing*, sometimes 8 inches, for shared wells. The well is usually 100 feet deeper than the *local* water table **based on the American Water Works Association (AWWA) A-100 guidelines. It is advisable in area of seriously declining water levels to drill deeper, perhaps providing 140' or even more of standing water in a *new well.***
3. **Typical screen design for a de minimis shallow well.**
   * A de minimis well is typically provided with 40 feet of perforated section (the screen) at the bottom of the well casing. **Wells are often found in this Valley with a longer screen section but the additional screen usually served no good purpose. In fact, it directly reduces the life of the well (see Sec.5).**
4. **Typical pump and motor design for a de minimis shallow well.**
   * A 1 or 1½ horsepower well pump and motor are sufficient for de minimis purpose with present day water depths**.** Somewhat larger pumps and motor are required for shared wells, up to 5 horsepower.
5. **De minimis shallow well failure. The IWV Groundwater Authority (GA) has authorized monetary compensation** for failure of shallow de minimis wells which are *directly related* to declining groundwater levels or *associated TDS (total dissolved solids) or* specific EPA contaminant level increases in the pumped water (see further down in this section). **The GA compensation might involve redrilling and sleeving the existing well or drilling a new deeper well.**
   * **Assumed failure.** The groundwater level related well failures are commonly thought to be a *direct* result of the well groundwater level declining and *drying out the well.* **This virtually never happens in a *water producing well* as other failures will *precede* this point.**
   * **The *processes of mechanical failure*** take a huge negative step when the pump is lowered (to stay covered as the water table declines) to the point that the *pump intake is within the casing perforations.* Depending upon the composition of the fines of the alluvial material outside of the casing (opposite the pump intake) the pump intake suction will draw in more or less sand and similar abrasive materials.

This sand can cause erosion and clogging of the perforations and pump intake screen and the pump itself and can cause pump failure in a relatively short time. ***This is a very serious well issue and often is the cause of immediate well failure.***

* **The next potential *corrosion* failure step.** If the well water level continues to drop, it will eventually reach the top of the screen. At this point, exposure of the screen to the air will result in a *substantially accelerated* corrosion (rusting) of the perforated section of the well. **This step can result in casing failure.**
* **The *corrosion* failure from increasing TDS (total dissolved solids)** are more subtle and often involve corrosion pitting and even casing failure. Most wells are completed with a mild steel casing**. The failure of such a well commonly progresses from corrosion which is eating away the casing wall, to the point of casing collapse.** In this Valley, the causes are primarily due to i) high chloride and/or sulfate ion concentrations present in the groundwater at some locations or ii) the high iron/manganese in some groundwater that encourages growth of an iron bacteria that creates thick coatings of ferrous hydroxide. The coating is not uniform in thickness and the holes of the perforation section and the casing itself are weakened.
* **Well water chemistry and *human health*.** The TDS of the water pumped in most wells in the IWV is slowly increasing as the water table declines. **However, most IWV wells will ultimately fail from water level declines, not from increasing in TDS. Even if the increase in TDS does not cause casing corrosion failure, it may ultimately become a health issue.** Well owners who have a well which is producing high TDS water, should be vigilant in getting regular water chemistry analyses, especially if the water is high in iron, manganese or arsenic.
* **A well is declared in a *human health* failure condition, if the well water reaches the Primary Standards level of an Title 22 of the California Code of Regulations. If the well at a previous time was producing water at a lower contaminant level, it may be approved for GA mitigation. For more guidance see the Title 22 of the California Code of Regulations.** (The IWV Water District may provide sample containers and coordination of samples with a licensed laboratory they are using.)

6. **Well maintenance.** Much concern has been made of the maintenance that a well received. **It is very important for the well owner to have *knowledge and understanding* of his well, and its history.**
   * **It is the sole responsibility of the well owner to maintain the equipment in his well.** For a shallow de minimis well the *only* maintenance usually made (or necessary) is to replace the pump and motor when a failure occurs in those components and to add a length of drop pipe and wire to the motor when it is replaced to keep up with declining water levels,
7. **Apportioning the cost of well repair.** Not all of the cost of well repair would be borne by the GA in their mitigation program. A prorated cost based on the calculated life of the well and other factors discussed above would be used to determine the GA financial contribution. **This is a complicated calculation and is often imperfect.**
   * **The physical life of a well** as actually observed can vary by a factor of nearly *ten* with the complex IWV Basin groundwater chemistries. If a well owner is willing to do a simple *video examination* of the subject failed well, much conjecture (and argument) can be eliminated. **Ultimately, the well owner still has the primary responsibility for the well.**
8. **A Report Form** that uses the factors described in this Committee Report would provide an accurate assessment of a failed well and should be a topic for the 2025 revisions to the GSP.

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REPORT FORM

How to Submit a Mitigation Request to the IWV GA for a Shallow "de minimis" Groundwater Well Failure Due to Declining Water Levels and/or Declining Water Quality Occurring as a Result of Declining Water Levels

Subcomittee Recommendation Approved by Full Policy Advisory Committee September 28, 2023

(Subcommittee Members: Judie Decker, Lyle Fisher, West Katzenstein and Don Decker)

1. The Mitigation Request starting point is the submission of a recent report by a licensed well driller or well maintenance company for the subject failed well. This report should contain:

* Date of Report and identity of the preparer including license number
* Measured depth of the groundwater in the subject well
* Measured depth of the well pump intake
* Measured depth of the well
* Summary of the well failure cause(s)

2. Also submit, *as available,* all earlier well reports provided to the owner at the time of completion of the well and subsequent maintenance including replacement(s) of the well pump and/or motor and drop pipe and wiring as was necessary to keep up with a declining groundwater situation. The completion report will contain the information requested in no. 1 at the time of well drilling and further details of the well. It would also be potentially useful to submit well water Chemistry Report(s) from a licensed firm. Here is a list of suggested items:

* Length of the perforated section
* Depth of the completed well
* Depth to groundwater
* Casing type and diameter
* Size of the well pump and motor
* General Mineral well water chemistry report
* Report on the video examination of the failed well, including frames of damaged areas

3. Submit known history of the well, including estimates of rate of water pumped and total water pumped. In addition, include history concerning groundwater level declines.

* In this well or nearby wells

4. If the well has failed due to water quality issues, water chemistry reports should be submitted. Especially important are reports that *span the period of time* the well has been pumped.

* General Mineral well water chemistry reports from a licensed firm that document the declining water quality

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Client Memorandum

To:	Carol Thomas-Keefer, General Manager – Indian Wells Valley Groundwater Authority
From:	Michael W. McKinney, Capitol Core Group
cc:	Keith Lemieux, Counsel IWVGA Phillip Hall, Counsel, IWVGA Steve Johnson, Stetson Engineers Jeff Simonetti, Capitol Core Group Todd Tatum, Capitol Core Group
Date:	March 13, 2024
Subject:	February 2024 Project Update

The following will provide activities and updates for February 2024.

Task 1: Imported Water Supplies

For Task 1, Capitol Core staff continued to work with two potential water suppliers on providing imported water supplies. In addition, staff assisted the engineering teams at Provost & Pritchard and Stetson on pipeline-related items. In March, we plan to continue to engage with the Antelope Valley – East Kern Water Agency to coordinate planning activities for the interconnection pipeline.

Task 2: Interconnection Pipeline Project

Note for Items Below: The two items below discuss state and federal budget requests to secure the funding needed for the final planning for the imported water pipeline. Capitol Core anticipates that these monies, should our efforts be successful, will complement each other and help provide the final monies necessary to complete the planning and monitoring tasks required for the project.

UPDATE: *State Budget Act for Fiscal Year 2024-2025*

Capitol Core continues to look for opportunities in the State budget to secure further planning grants for the interconnection project to finalize its engineering and related studies. As discussed below, the Legislative Analyst's Office increased the projected State budget deficit on February 28th from $58 billion to $73 billion. While this increased budget deficit may hamper the consideration of supplemental budget requests, we are working through our local delegation to determine opportunities where we may secure these funds.

Task 3: Other Projects Supporting the GSP

UPDATE: *Energy & Water Development Act for Fiscal Year 2025*

In January, Capitol Core made a request for Representative Jay Obernolte (R-CA 23rd) to consider submitting a Community Project Funding Request ("earmark") in the amount of $1.6 million under Section 22 ("Planning Assistance") of the *Water Resources Development Act of 1974*. The earmark would be included in the annual *Energy & Water Development Act* as a Fiscal Year 2025 request. If granted, the earmark would fund U.S. Army Corps of Engineers (USACE) assistance for watershed management planning ("GSP Updates"), validation of specific studies, including basin percolation and GSP findings validation, and water resource planning. The request replaces the Planning Assistance to States application for USACE assistance for interconnection pipeline planning activities that were not permitted due to SGMA-IP funding timelines required by DWR.

FY2025 requests are likely due to Members of Congress in March. FY2025 Appropriations are expected to be delayed as a result of ongoing Congressional activity for FY2024. Congressional leaders have given no timeline for when they will open FY 2025 appropriations requests for consideration. **Regarding the FY 2024 deadlines** – As of the time we wrote this memo, the Congress agreed to a short-term Continuing Resolution that funds the government until either **March 8th or March 22nd** depending on the departments and associated appropriations bills. The Congress must agree to the following appropriations bills by the deadlines below to avert a government shutdown:

March 8th Deadline Bills:

- Agriculture-FDA
- Commerce, Justice and Science
- Energy and Water Development
- Interior
- Military Construction-Veterans Affairs
- Transportation-Housing and Urban Development

March 22nd Deadline Bills:

- Defense
- Financial Services and General Government
- Homeland Security
- Labor-Health and Human Services
- Legislative Branch
- State and Foreign Operations

Federal Legislative Updates

UPDATED REPORT/Priority Bill: *Low Income Household Water Assistance Program (LIHWAP) -Senator Padilla*

In January, we flagged a bill from Senator Padilla's office entitled the Low-Income Household Water Assistance Program. The bill would create a permanent, nationwide water assistance program that would help low-income households afford their water bills. The program would extend a COVID-19 era program that provided assistance to families across the country struggling to pay their water bills. The program in California has funding through March 2024. However, without further appropriation, the program will end. Senator Padilla introduced the bill to extend this program. You can view the press release with links to the bill text and summaries here.

State Legislative Updates

UPDATED REPORT/Priority Bill: *State Budget Act for Fiscal Year 2024-2025*

Since our February monthly memo, the California Legislative Analyst's Office (LAO) updated the budget deficit projections. While the Newsom Administration initially anticipated a $58 billion budget deficit, the LAO's February 20th update now anticipates a $73 billion deficit, one of the highest ever in the State. You can view the updated projections here. The LAO report recommends that the Legislature consider one-time spending reductions as the first option to address the budget situation the state faces. If the Legislature considers this option, it could hamper our efforts to secure funding for the increased planning costs necessary to complete the interconnection project tasks.

The Assembly Budget Committee No. 4 on Climate Crisis, Resources, Energy and Transportation also plans to hold an informational hearing on March 6th to discuss how the budget challenges will affect the departments related to water and natural resources. You can view the agenda here. Please see Pages 13-14 for a discussion on the "solutions" (the term that the Budget Committee uses for budget cuts) to the Drought and Water Resilience portions of the budget. The committee is proposing a reduction of $810.3 million in FY 24-25 spending on water and drought programs.

Bill Tracking Report:

February 16th was the deadline for legislators to submit bills. Capitol Core listed a series of bills in our tracking report last month that we are monitoring for the IWVGA. We have initial text for bills that we are monitoring with the exception of the final "spot bills" that were submitted. "Spot bills" are essentially placeholder bills that provide a general area of law where legislators may want to amend but provide specifics on code at a later date. The specifics of "spot bills" were due to Legislative Counsel at the end of February. Capitol Core is still reviewing the final spot bill submissions and will provide updates on these bills and hearing dates for priority bills in March.

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INDIAN WELLS VALLEY GROUNDWATER AUTHORITY
Legislative Tracking Report

118th Congressional Session
2023-2024 California State Session

Updated to 29 February 2024

CAPITOL CORE GROUP

PRIORITY BILLS

Legislation of significant impact on operations or interests. Legislation where a public position may be taken with the legislative body. Updates are provided to staff as they occur, potentially requiring action, and reported herein.

Positions Taken:

Indicating a public position of support for the legislation.

Indicating a public position of opposition for the legislation

Indicating a neutral position on the legislation. Public position or no-public position taken.

Indicating a position of "Amend" and presenting amendments that would change the public position to support.

Indicating a position of oppose unless amended.

Federal – the 118th Congressional Session

HR 7065 (Napolitano, D-CA, 31st): Priority for Water Supply and Conservation Act of 2024

Introduced 01/22/2024.

Amends the Water Resources Development Act of 1974 to add water supply and conservation to the list of "primary mission" projects of the U.S. Army Corps of Engineers Civil Engineering Programs.

House Committee on Transportation & Infrastructure
Current Text

S. 2166 (Padilla, D-CA) – The Voluntary Land Re-Purposing Act of 2023

Introduced on 06/22/2023

A bill to amend the Reclamation States Emergency Drought Relief Act of 1991 and the Omnibus Public Land Management Act of 2009 to provide grants to States and Indian Tribes for programs to repurpose agricultural land to reduce consumptive water use voluntarily and for other purposes.

Referred to the Senate Committee on Energy & Natural Resources, Subcommittee on Water
Current Text

Draft Legislation (Padilla, D-CA) – The Low-Income Household Water Assistance Program Act of 2024

A bill to establish a permanent Low-Income Household Water Assistance Program. Similar to LIHEAP.

Draft

Not referred
Current Text (not available electronically)

State of California – 2023-2024 California Session

AB 560 (Bennett, D-38th) – Groundwater Adjudications

Requires parties in an adjudication to seek a nonbinding advisory opinion from the SWRCB in conjunction with DWR on the impacts of a proposed settlement agreement to small farmers and the GSP.

As Amended 06/26/2023.

Senate Committee on Appropriations – Held on Suspense File (two-year bill)
Current Text

MOVED TO PRIORITY: AB 1827 (Papin, D-21st): Local Government Finance: Water: Higher Consumptive Water Parcels

As Introduced 01/12/2024

This bill would provide that the fees or charges for property-related water service imposed or increased, as specified, may include the incrementally higher costs of water service due to specified factors, including the higher water usage demand of parcels. The bill would provide that the costs associated with higher water usage demands, the maximum potential water use, or a projected peak water usage demand may be allocated using any method that reasonably assesses the water service provider's cost of serving those parcels that are increasing potential water usage demand, maximum potential water use, or project peak water use demand. The bill would declare that these provisions are declaratory of existing law. Moved to Priority List at request of Counsel.

Assembly Committee on Local Government (pending hearing schedule)
Current Text

AB 2079 (Bennett, D-38th): Sustainable Groundwater Management Act: Groundwater Basins

"Spot" bill making non-substantive changes to SGMA. Awaiting Amendments.

As Introduced 02/06/2024

Assembly Desk (awaiting referral)
Current Text

AB 2614 (Ramos, D-45th): Water

As Introduced 02/14/2024.

"Spot" bill makes non-substantive changes to reasonable and beneficial use conservation standards. Awaiting Amendments

Assembly Desk (awaiting referral)
Current Text

AB 2799 (Fong, R-32nd): Sustainable Groundwater Management Act: Groundwater Sustainability Agencies.

As Introduced 02/16/2024

"Spot Bill" making non-substantive changes to SGMA regarding GSAs. Awaiting Amendments. Expected amendments to provide for a "fee credit" for agriculture and district groundwater replenishment.

Assembly Desk (awaiting referral)
Current Text

AB 2962 (Papin, D-21st): Water Rights

As Introduced 02/16/2024

"Spot Bill" making non-substantive changes to Section 1250 of the Water Code. Awaiting Amendments.

Assembly Desk (awaiting referral)
Current Text

NEW ACTION: SB 1156 (Hurtado, D-16th): Groundwater Sustainability Agencies: Financial Disclosure Reports

As Introduced 02/15/2024

Requires a groundwater sustainability agency's board and executive staff members to provide annual financial disclosure reports (Form 700). Requires the FPPC to develop implementing regulations. The legislation will create additional regulatory requirements on staff.

Senate Committee on Natural Resources and Water (pending hearing schedule)
Senate Committee on Elections and Constitutional Amendments (sequentially referred)
Current Text

SB 1210 (Skinner, D-9th): Water Connection Charges

As Introduced 02/15/2024

Limits the ability of the Water District and the City to charge a connection charge that exceeds one percent of the reported building permit value for new residential construction.

Senate Committee on Rules (awaiting referral)
Current Text

WATCH BILL LIST

Legislation of interest to the Authority. No public position is taken, or the Authority may adopt a "neutral" position. Updates are provided monthly unless the amendment warrants immediate notification to staff.

Federal – the 118th Congressional Session

HR 186 (McClintock, R-CA, 5th) – The Water Supply Permitting Coordination Act of 2023

Authorizes the Secretary of the Interior to coordinate Federal and State permitting processes related to the construction of new surface water storage projects on lands under the jurisdiction of the Secretary of the Interior and the Secretary of Agriculture and to designate the Bureau of Reclamation as the lead agency for permit processing.

As Introduced
House Committee on Natural Resources

NEW ACTION: HR 215 (Valadao, R-CA 22nd) – Water for California Act of 2023

Authorizes several federal (CVP) and State Water Project authorizations. Designates the USBR as the lead agency for federal permitting requirements. To provide long-term water supply and regulatory reliability to drought-stricken California. The introduced version was incorporated into HR 1 and HR 2811.

CBO Budget Estimate Provided to Rules Committee 02/22/2024. Scored at a financial impact of $264 million over the life of the bill 2024-2033.

As Amended in the Nature of a Substitute
Ordered Reported (passed) House Committee on Natural Resources,
To the Committee on Rules

HR 1152 (Rouzer, R-NC 7th) – Water Quality Certification and Energy Project Improvement Act

This bill revises the water quality certification process under Section 401 of the Clean Water Act (CWA) for any activity that requires a federal license or permit and may result in a discharge of pollutants into the waters of the United States. Activities requiring federal licenses or permits include hydropower, natural gas pipeline, or mining projects.

Under the existing Section 401, an applicant for a federal license or permit to conduct such activities must provide the federal licensing or permitting agency with a certification. The certification must attest that the discharge will comply with enumerated sections of the CWA (i.e., Sections 301, 302, 303, 306, and 307) and with any other appropriate requirement of state law outlined in the certification. The certifying authority—usually the state where the discharge

originates, but sometimes an Indian tribe or the Environmental Protection Agency (EPA)—may grant with conditions, deny, or waive certification of a proposed federal license or permit.
This bill limits the scope of the certification process by eliminating the requirement that the discharge comply with appropriate state law outlined in the certification. It also requires decisions to grant or deny a request for certification based only on the enumerated sections of the CWA and provisions of state law that implement water quality criteria under Section 303. In addition, it also limits the certification process to activities that may directly result in a discharge into waters of the United States.

In addition, the bill requires certifying authorities to identify all materials or information necessary to grant or deny the request within 90 days of receiving a request for certification. They must also publish requirements for their water quality certifications.

HR 1152: Ordered Reported House Committee on Transportation and Infrastructure
Incorporated in HR 1
Incorporated into HR 2811

HR 1430 (Valadao, R-CA 22nd) – NEPA Permit Streamlining Act of 2023

The bill directs the Secretary of the Interior and the Secretary of Agriculture to use certain previously completed environmental assessments and environmental impact statements to satisfy the review requirements of NEPA.

As Introduced
Incorporated into HR 1
House Committee on Natural Resources

HR 1556 (Miller, R-IL, 15th) and S. 1022 (Braun, R-IN) – The Define the WOTUS Act of 2023

Provides a statutory definition of Waters of the United States.

HR 1556:
House Floor – To Union Calendar
House Subcommittee on Water Resources and Environment
S. 1022:
Senate Committee on Environment and Public Works

HR 1740 (Bost, R-IL): WIFIA – State and Local Performance Requirements

WIFIA loan holders must provide a performance or payment obligation bond of 50% for the projects.

As Introduced
House Committee on Transportation and Infrastructure, Subcommittee on Water Resources and Environment

May move this bill to the priority list if moving through the process.

HR 3809 (Davis, D-NC, 1st) – The Cybersecurity for Rural Water Systems Act of 2023

To include cybersecurity technical assistance in the national rural water and wastewater circuit rider program of the Department of Agriculture.

As Introduced
House Committee on Agriculture

Consider Support if moves.

HR 4877 (Lee, D-PA, 12th) – Abandoned Well Remediation and Research Act of 2023

Amends the Energy Policy Act of 2005 to direct the Secretary of Energy to conduct a research, development, and demonstration program concerning abandoned wells.

As Amended during markup.
Reported by the House Science, Space, and Technology Committee (35-0)
To House Committee on Rules

AMENDED IN: HR 4540 (Cuellar, D-TX 28th) – Water Infrastructure Enhancement Act of 2023

Amends the Safe Drinking Water to enact a grant program to provide for the construction of water infrastructure in rural, small, and poverty-stricken communities. Redefines "poverty-stricken" to include communities where 20% of the population has lived in poverty as defined by the Census Bureau. Infrastructure grants include water pipelines, well upgrades, water tanks, water recycling, and wastewater treatment. Authorizes $800 million in grant opportunities from FY2024 through FY2029.

As Amended during markup.
House Subcommittee on Environment, Manufacturing, and Critical Materials
House Committee on Energy and Commerce.

Move to Priority List if Reported by the Subcommittee (SUPPORT).

S. 660 (Markey, D-MA) – Water System Threat Resiliency and Preparedness Act of 2023

This bill would require the USEPA to develop and implement guidelines for a public water system (anything with a pipe that might become drinking water or wastewater treatment) for cyber and physical threats.

As Introduced
Senate Committee on Environment and Public Works

S. 802 (Braun, R-IN and Padilla, D-CA) – The Plant Bio-stimulant Act of 2023

This bill would amend the Federal Insecticide, Fungicide, and Rodenticide Act standards to include plant bio-stimulants under the regulations and require soil-health tests to determine the impacts on groundwater. The bill would establish limitations on using plant bio-stimulants based on soil type and impacts on groundwater supplies. The bill would further subject bio-stimulant manufacturers to the certification and labeling requirements under FIFRA at the USEPA.

As Introduced
Senate Committee on Agriculture, Nutrition and Forestry.

S. 806 (Baldwin, D-WI) – The Healthy H2O Act

The bill provides financial assistance to property owners (and non-profits assisting small water systems) for water filtration of contaminant found in groundwater supplies utilized for drinking water purposes. These contaminants include arsenic, nitrates, PFAS/PFOA, VOX and Chrome-6. The program is monitored through the Rural Decentralized Water Systems program at the U.S. Department of Agriculture under the *Consolidated Farm and Rural Development Act*. We have added the bill for tracking ("Watch Bill") as it may have application/benefits to the de-minimus end-users or small water systems in the IWV Basin. Potential inclusion into the 2023 Farm Bill reauthorization.

As Introduced
Senate Committee on Agriculture, Nutrition and Forestry

S. 2102 (Wyden, D-OR) – Water for Conservation and Farming Act of 2023

A bill to provide for drought preparedness and improved water supply reliability.

As Introduced
Senate Committee on Energy and Natural Resources

S. 2162 (Feinstein, D-CA) – The STREAM Act

A bill to support water infrastructure in Reclamation States.

As Introduced
Senate Committee and Energy and Natural Resources

S. 2169 (Wyden, D-OR) – The Watershed Results Act of 2023

Authorizes the Secretary of the Interior to carry out watershed pilots.

As Introduced
Senate Committee on Energy and Natural Resources

S. 2202 (Feinstein, D-CA) – The RAIN Act

A bill to amend the Omnibus Public Land Management Act of 2009 to authorize the modification of transferred works to increase public benefits and other project benefits as part of extraordinary operation and maintenance work.

As Introduced
Senate Committee on Energy and Natural Resources

S. 2250 (Bennett, D-CO) and HR 4902 (Caraveo, D-CO 8th) – The Voluntary Groundwater Conservation Act of 2023

To amend the Food Security Act of 1985 to establish a groundwater conservation easement program.

S. 2250:
As Introduced
Senate Committee on Agriculture, Nutrition and Forestry
HR 4902:
As Introduced
House Committee on Agriculture

S. 2928 (Kelly, D-AZ): Water Infrastructure Subcontractor and Taxpayer Protection Act of 2024

As Introduced 01/22/2024

Adds performance bonding requirements to WIFIA loan programs. Similar legislation to HR 1740. The issue should be considered if sustainability infrastructure requires a WIFIA loan.

Senate Committee on Environment and Public Works

S. 3147 (Ricketts, D-NE): Flood Protection and Infrastructure Resilience Act of 2024

As Introduced 01/22/2024

The bill adds regional conservation programs and infrastructure to eligible projects under the Watershed Protection and Flood Prevention Act.

Senate Committee on Agriculture, Nutrition and Forestry.

State of California – 2023-2024 California Session

AB 828 (Connolly, D-12th): SGMA: Managed Wetlands and CSDs

As Amended 01/11/2024

The bill exempts groundwater uses by managed wetlands and small community water systems serving disadvantaged communities (DAC) from specified authorities of groundwater sustainability agencies (GSA) to regulate groundwater pumping under the Sustainable Groundwater Management Act (SGMA). The amendments remove the 10% annual increase in allocation and establish a 2028 sunset date. Consistent with SGMA and current Authority practices. No public position, remain as "Watch."

Passed Assembly (47-15)
Senate Committee on Rules (awaiting referral)

AB 1205 (Bauer-Kahan, D-16th): Water Rights Transfers – Study Bill

As Amended 07/13/2023

AB 1205 would require the SWRCB to conduct a three-year study on the potential profiteering in the sale, transfer, or lease of an interest in any water right for profit on or below agricultural lands. The bill is a two-year bill. Opposition was removed, and the bill was downgraded to "Watch." No public position.

Senate Floor – To Inactive File (two-year bill)

AB 2715 (Boerner-Horvath, D-77th): Brown Act: Public Agencies

As Introduced 02/15/2024

Authorize closed sessions to consider or evaluate matters related to cybersecurity, as specified, provided that any action taken on those matters is done in an open session.

Assembly Desk (awaiting referral)

AB 3121 (Hart, D-37th): Urban Water Suppliers: Conservations Orders

As Introduced 02/16/2024

Extends Water Resources Control Board's required "Conservation Orders" to Urban Water Suppliers by one year. From 2026 to 2027.

Assembly Desk (awaiting referral)

DOWNGRADED: AB 3084 (Soria, D-27th): Sustainable Groundwater Management Act: Basin Management

"Spot Bill" making non-substantive changes to SGMA (no section identified) regarding groundwater sustainability plans. The author indicates this was a true placeholder bill and does not have any pending amendments. Holding the bill on the "Watch List" until the pending deadline.

Assembly Desk (awaiting referral)

AB 3090 (Maienschein, D-76th): Drinking Water Standards: Non-Compliance

As Introduced 02/16/2024

Requires the Water District to develop a methodology to notify customers by wireless communication through the federal Wireless Emergency Alert System in the event of a non-compliance issue [Notification of a boil-notice by "Amber Alert"].

Assembly Desk (awaiting referral)

NEW: HR 75 (Soria, D-27th): Groundwater Awareness Week

As Introduced 02/26/2024

House Resolution providing specific findings, declarations, and designating the week of March 10th-March 16th as "Groundwater Awareness Week" in the State of California. Resolutions have no force of law and establish a "sense of the Assembly."

Discharged to the Assembly Floor for Consideration

NEW ACTION: SB 1110 (Ashby, D-8th): Urban Retail Water Suppliers

As Introduced 02/15/2024

Amends the Water Resources Control Board requirements relative to urban retail suppliers that have not met their urban water management plant to "consider lower cost actions to achieve resiliency."

Senate Committee on Natural Resources and Water (pending hearing schedule)

DOWNGRADED: SB 1185 (Niello, R-6th): Water Use Efficiency Standards

As Introduced 02/15/2024

"Spot" bill making non-substantive changes related to water use efficiency standards. Awaiting Amendments. *From the Senator's staff:* This bill is a cleanup/implementation bill for the "Make Conservation a California Way of Life" framework. The Legislative Analyst's Office released a detailed report on the framework earlier this year, which you can view here. Implementing this bill is complicated because multiple agencies are working on policy directives. So, this bill is looking to address some of those implementation issues. **Specifically, it will pertain to landscape efficiency standards**. Senator Niello is apparently concerned that the water-efficient landscaping

guidelines that the Department of Water Resources is contemplating (I am wondering if these are the CEC guidelines we spoke about yesterday) are already pretty strict, so he wants to ban local governments from implementing water-efficient landscape ordinances that are stricter than the DWR guidelines. Likely to be removed from the list upon amendment.

Senate Committee on Rules (awaiting referral)

NEW ACTION: SB 1218 (Newman, D-29th): Emergency Water Supplies

As Introduced 02/15/2024

Encourages and incentivizes the development of emergency water supplies by "providers." While the bill amends the Urban Water Management Plan requirements, it does not limit the development of emergency water supplies to retailers.

Senate Committee on Natural Resources and Water (awaiting hearing scheduled)

NEW ACTION: SB 1255 (Durazo, D-26th): Public Water Systems: Needs Analysis

As Introduced 02/15/2024

Requires the Water Resources Control Board to update needs analysis requirements and perform a needs analysis annually (rather than on a three-year basis). Increases regulatory requirements on the water district to update needs analysis annually.

Senate Committee on Environmental Quality (pending hearing schedule)

SB 1330 (Archuleta, D-30th): Urban Retail Water Plans

As Introduced 02/16/2024

Requires the State Board to develop an eligible variance list for items that would impact an urban water use management plan. Require urban retail suppliers to apply for such variance and report them annually to the board.

Senate Committee on Rules (awaiting referral)

DOWNGRADED: SB 1360 (Alvarado-Gil, D-4th): Water Rights

As Introduced 02/16/2024

"Spot" bill making non-substantive changes to Section 1005 of the Water Code relating to the appropriation of water rights. Awaiting Amendments. In speaking with the Senator, the bill pertains to a particular water project in the Amador/Calaveras County area that is having trouble with getting permits from the State Water Resources Control Board. The Senator's office is hoping that they can come to an agreement on these permits without legislation. However, if the counties and the SWRCB remain at an impasse on how to move forward, she will drop the bill. The bill does not impact IWVGA and will be removed from the list when amended.

Senate Committee on Rules (awaiting referral)

NEW ACTION: SB 1366 (Hurtado, D-16th): Real Estate Disclosures: Water Tank Assistance

02/16/2024

Requires the sale of real property to include disclosures if the property received water tank assistance. May impact or discourage emergency provision of water tank assistance provided under the shallow well mitigation or State-provided program.

Senate Committee on the Judiciary (pending hearing schedule)

NEW ACTION: SB 1390 (Caballero, D-14th): Groundwater Recharge: Flood Flow Diversions

As Introduced 02/16/2024

Amends 1242.1 of the Water Code extending the current water rights established for flood flow diversion for the purpose of capture and groundwater recharge to 2034.

Senate Committee Natural Resources and Water (pending hearing schedule)

CALIFORNIA "SPOT" BILLS BEING WATCHED

Bills introduced as placeholders making technical and non-substantive changes are known as "spot" bills. These bills are typically held under a specific subject matter to allow for maintenance of the germane rules.

AB 2000 (Mathis, R-CA 33rd): State Water Project: Permits and Licenses Conditions

As Introduced 01/30/2024

Non-substantive modification. Awaiting Amendments.

Assembly Desk (awaiting referral)

AB 2214 (Bauer-Kahan, D-16th): Resource Conservation Districts

As Introduced 02/07/2024

Makes non-substantive changes. Awaiting Amendments

Assembly Desk (awaiting referral)

AB 2517 (Fong, R-32nd): Water Districts and Irrigation Districts: Debris Removal

As Introduced 02/13/2024

Makes technical and non-substantive changes to the ability of Water Districts and Irrigation Districts to remove debris from ditches and channels. Awaiting Amendments

Assembly Desk (awaiting referral)

AB 2894 (Gallagher, D-3rd): Urban Water Use Targets: Indoor Water Utilization

As Introduced 02/15/2024

Makes non-substantive changes to 10608.2 of the Water Code. Awaiting Amendments

Assembly Desk (awaiting referral)

AB 3012 (Grayson, D-15th): Local Government: Water Supply

As Introduced 02/16/2024

Makes non-substantive changes to Section 38742 of the Government Code related to the ability of a local government to provide retail water supply. Awaiting Amendments

Assembly Desk (awaiting referral)

AB 3187 (Carrillo, D-39th): Safe Drinking Water Act

As Introduced 02/16/2024

Makes non-substantive changes to the California Safe Drinking Water Act. Awaiting Amendments

Assembly Desk (awaiting referral)

FY2024-2025 CALIFORNIA STATE BUDGET

State Budget Act for Fiscal Year 2024-2025

The California State Budget includes several pieces of Legislation ranging from the main State Budget (required by the State Constitution to be passed before midnight 06.30.2024) to several "trailing" pieces of legislation. The details of the California State Budget can be found here.

AB 1812/SB 917: State Budget Act of 2024-2025

As Introduced 01/10/2024

Governor's Budget Proposal – "at the request" legislation. See the summary here.

Assembly Committee and Senate Committee on Budget, respectively.

NEW ACTION: LEGISLATIVE ANALYST OFFICE (LAO): The updated fiscal analysis for February 20, 2024, can be found here. The analysis shows a $78 billion State Budget Deficit.

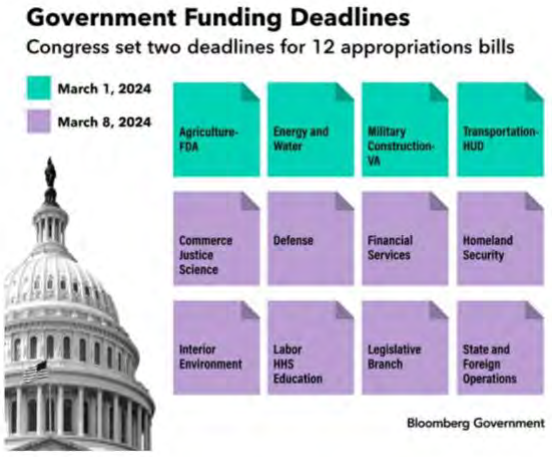
UPCOMING CALIFORNIA LEGISLATIVE DEADLINES OF IMPORTANCE

- April 26, 2024 – Policy Committee Deadline for 2024 bills.

FISCAL YEAR 2025 FEDERAL APPROPRIATIONS

None on File.

FISCAL YEAR 2024 FEDERAL APPROPRIATIONS



HR 4394 (Fleischman, R-TN 3rd) and **S. 2443** (Feinstein, D-CA) **–** The Energy & Water Development Act for Fiscal Year 2024

Making appropriations for energy and water projects for Fiscal Year 2024. No provisions of specific interest to the Authority. Monitor for appropriated amounts to WaterSMART, Environmental Infrastructure, and Planning Assistance. No public position.

HR 4393:
Ordered Reported by the Committee on Appropriations
To House Committee on Rules
S. 2443:
Ordered Reported by the Committee on Appropriations
To Senate Floor

FEDERAL REGULATIONS BEING TRACKED

None at this time.

STATE REGULATIONS BEING TRACKED

None at this time.

BILLS TO BE REMOVED FROM THE REPORT

None at this time.

 # EOR #

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