MAMMOTH COMMUNITY WATER DISTRICT

Post Office Box 597
Mammoth Lakes, California 93546-0597

759th Regular Meeting of the
Mammoth Community Water District
Board of Directors

Thursday, July 18, 2019

Please Note:
Members of the public will have the opportunity to directly address the District Board of Directors concerning any item listed on the Agenda below before or during consideration of that item.

AGENDA

5:30 P.M.

Roll Call

Directors Cage, Creasy, Domaille, Smith, and Thompson

Pledge of Allegiance

Public Forum

Any member of the public may address the Board relating to any matter within the Board's jurisdiction. This need not be related to any item on the agenda, and presentation should be limited to five (5) minutes. No formal action by the Board will be taken on these items.

Consent Agenda A

All matters listed are considered to be routine by the Board and may be enacted on by one motion. There will be no separate discussion on these items unless requested by the Board. If discussion is requested, that item will be moved and considered separately after adoption of the consent agenda.

A-1 Approval of June 2019 Check Disbursements (Springbrook #'s 56235 – 56364)

A-2 Adoption of Resolution No. 07-18-19-13 Setting a Public Hearing on the Report of Delinquent Water and Sewer Charges as of June 30, 2019

Consent Agenda B — Staff Reports

All matters listed are considered to be routine by the Board and may be acted on by one motion. There will be no separate discussion on these items unless requested by the Board. If discussion is requested, that item will be moved and considered separately after adoption of the consent agenda.

B-1 Operations Department Report
B-2 Maintenance Department Report
B-3 Finance Department Report
B-4 Engineering Department Report
B-5 Information Services Report
B-6 Personnel Services Report
B-7 Regulatory Support Services Report
B-8 General Manager's Report

Current Business

C-1 Discussion and Possible Adoption of Ordinance No. 07-18-19-14 Amending MCWD Chapter 11, Sewer Code and Chapter 12, Water Code Pertaining to Connection Fees

C-2 Discussion and Possible Adoption of an Amended Master Fee Schedule

C-3 Discussion and Possible Approval of Draft Agreements Between the District and Employees Entering into the Amended Employee Housing Purchase Assistance Program

C-4 Quarterly Water Supply Update

C-5 Discussion and Possible Direction to Staff Regarding the USGS Open-File Report Titled "Hydraulic, Geochemical and Thermal Monitoring of an Aquifer System in the Vicinity of Mammoth Lakes, Mono County, California"

C-6 Discussion of the Status of the Administration Building Needs Assessment and Possible Direction to Staff Regarding Continuation of that Study

Board Member's Committee Reports

Committee Meetings Held:

Ad Hoc Committee – Connection and Rate Fee Study – *June 25, 2019*
Technical Services Committee – *July 17, 2019*
Investment Committee – *July 17, 2019*
Finance Committee – *July 17, 2019*

Attorney's Report

Closed Session

D-1 Conference with Real Property Negotiators
Involving the Acquisition of an Easement on Ranch Road for Access to the Site of Proposed District Well 32, Town of Mammoth Lakes; Mark Busby and John Pedersen, District Negotiators, will negotiate with Representatives of the Snowcreek VI Condominium Owner's Association. Instructions by the Board to the District's Negotiators may include Price, Terms of Payment, or both. (See Government Code sections 54954.5(b) and 54956.8.)

D-2 Conference with Legal Counsel
Existing Litigation – Pursuant to Government Code section 54956.9(a); International Union of Operating Engineers, Local 12 v. Mammoth Community Water District; Public Employment Relations Board

D-3 Conference with Legal Counsel
Anticipated litigation; Government Code sections 54954.5(c) and 54956.9(a) and (d)(2) and (3); significant exposure to litigation involving one case.

D-4 Public Employee Performance Evaluation – General Manager
Pursuant to Government Code Section 54954.5(e) and 54957

Adjournment

NOTE: Items listed on the agenda may be reviewed or acted upon by the Board in any order or sequence. The items are listed for identification purposes only.

The meeting will be held in the conference room at the District facility located one mile east of Old Mammoth Road on Meridian Boulevard, just off Highway 203, Mammoth Lakes, California.

MARK BUSBY
Interim General Manager

Date of Issuance: Friday, July 12, 2019

Posted: MCWD Office
MCWD Website: www.mcwd.dst.ca.us
cc: Members, Board of Directors
Town of Mammoth Lakes
KMMT, KIBS, KSRW Radio

In compliance with the Americans with Disabilities Act, if you need a disability related modification or accommodation to participate in this meeting please call Stephanie Hake at (760) 934-2596 at least one full day before the meeting.

Documents and material relating to an open session agenda item that are provided to the Mammoth Community Water District Board of Directors less than 72 hours prior to a regular meeting will be available for public inspection and copying at the District facility located at 1315 Meridian Boulevard, Mammoth Lakes, California.

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Post Office Box 597
Mammoth Lakes, California 93546-0597

NOTICE OF A TECHNICAL SERVICES COMMITTEE MEETING

NOTICE IS HEREBY GIVEN that the Technical Services Committee of the Board of Directors of the Mammoth Community Water District will hold a **TECHNICAL SERVICES COMMITTEE MEETING** to be held **WEDNESDAY, JULY 17, 2019** at **8:00 A.M.**

Please Note:
Members of the public will have the opportunity to directly address the District Board of Directors concerning any item listed on the Agenda below before or during consideration of that item.

The agenda items are:

1. Review of the Operations Department Report (B-1)
2. Review of the Maintenance Department Report (B-2)
3. Review of the Engineering Department Report (B-4)
4. Review of the Information Services Report (B-5)
5. Discussion Regarding the Possible Amendment to MCWD Chapter 11, Sewer Code and Chapter 12, Water Code Pertaining to Connection Fees (C-1)
6. Discussion Regarding the USGS Open-File Report Titled "Hydraulic, Geochemical and Thermal Monitoring of an Aquifer System in the Vicinity of Mammoth Lakes, California" (C-5)
7. Discussion of the Status of the Administration Building Needs Assessment (C-6)
8. Discussion / Questions Regarding Other Staff Reports
   - B-3 Finance Department Report
   - B-6 Personnel Services Report
   - B-7 Regulatory Support Services Report
   - B-8 General Manager's Report

The meeting will be held in the conference room at the District facility located one mile east of Old Mammoth Road on Meridian Boulevard, just off Highway 203, Mammoth Lakes, California.

MARK BUSBY
Interim General Manager

Date of Issuance: Friday, July 12, 2019

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NOTICE OF A FINANCE COMMITTEE MEETING

NOTICE IS HEREBY GIVEN that the Finance Committee of the Board of Directors of the Mammoth Community Water District will hold a **FINANCE COMMITTEE MEETING** on **WEDNESDAY, JULY 17, 2019** at **1:00 P.M.**

Please Note:
Members of the public will have the opportunity to directly address the District Board of Directors concerning any item listed on the Agenda below before or during consideration of that item.

The agenda items are:

1. Review and Approval of Board of Director Payment Requests for June 2019
2. Review and Approval of Accounts Payable Payment Vouchers for June 2019
3. Discussion and Review of June 2019 Check Register (A-1)
4. Discussion of Finance Department Report (B-3)
5. Discussion Regarding the Possible Amendment to MCWD Chapter 11, Sewer Code and Chapter 12, Water Code Pertaining to Connection Fees (C-1)
6. Discussion Regarding Proposed Draft Agreements Between the District and Employees Entering into the Amended Employee Housing Purchase Assistance Program (C-3)
7. Discussion Regarding the USGS Open-File Report Titled "Hydraulic, Geochemical and Thermal Monitoring of an Aquifer System in the Vicinity of Mammoth Lakes, California" (C-5)
8. Discussion of the Status of the Administration Building Needs Assessment (C-6)
9. Discussion / Questions Regarding Other Staff Reports

    B-1 Operations Department Report
    B-2 Maintenance Department Report
    B-4 Engineering Department Report
    B-5 Information Services Report
    B-6 Personnel Services Report

B-7 Regulatory Support Services Report
B-8 General Manager's Report

The meeting will be held in the conference room at the District facility located one mile east of Old Mammoth Road on Meridian Boulevard, just off Highway 203, Mammoth Lakes, California.

MARK BUSBY
Interim General Manager

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NOTICE OF AN INVESTMENT COMMITTEE MEETING

NOTICE IS HEREBY GIVEN that the Investment Committee of the Board of Directors of the Mammoth Community Water District will hold an **INVESTMENT COMMITTEE MEETING** on **WEDNESDAY, JULY 17, 2019** at **12:00 P.M.**

Please Note:
Members of the public will have the opportunity to directly address the District Board of Directors concerning any item listed on the Agenda below before or during consideration of that item.

The agenda items are:

1. Review Management of Investment Accounts with Advisors from Chandler Asset Management, Inc. (CAM) (CAM advisors will participate by teleconference)

2. Provide Direction to Interim General Manager to Maintain or Change Current Allocation of Investments, Maintain or Change Specific Investments, or Make a Combination of Changes to Allocations or Investments to Meet Cash Flow Objectives

The Meeting will be held in the Conference Room at the District facility located at 1315 Meridian Boulevard, just off Highway 203, Mammoth Lakes, California

MARK BUSBY
Interim General Manager

Date of Issuance: Friday, July 12, 2019

Posted: MCWD Office
MCWD Website: www.mcwd.dst.ca.us
cc: Members, Board of Directors
Town of Mammoth Lakes
KMMT, KIBS, KSRW Radio

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Check Register for the Month of June 2019

Springbrook Software Report

(Check #56235 - #56364)

MCWD Accounts Payable
Check Register Notes

June 2019

Check #	Amount	Vendor	Notes
56237	$9,359.71	Berchtold Equipment Company	Jackhammer Attachment for Bobcat
56249	$432,792.95	Inyo-Mono Title Company	Condo Purchase - 140 Sierra Park Road
56261	$19,590.00	Tesco Controls	Lift Station Pump Control Panel
56276	$9,100.00	Gillis & Panichapan Architects, Inc.	Administration Building Needs Assessment
56291	$135,000.00	Tesco Controls	WWTP Main PLC Upgrade
56292	$32,238.00	WaterSmart Software, Inc.	3-Year Software License
56351	$8,151.25	Raftelis Financial Consultants, Inc.	Professional Services -Wastewater Cost of Service Study ($2,201.25) -Connection Fee Study ($5,950.00)

Rebates

15 customers purchased 22 high efficiency toilets and received rebates totalling $4,160.73

1 customer purchased a high efficiency washing machine and received a rebate of $400

Payroll Expenses

Employee Gross Payroll:	$290,854.18
Board Gross Payroll:	$764.75
Net Payroll:	$199,034.15
Employer Paid Payroll Taxes:	$4,305.76
Employer Paid 401a:	$58,170.79 (20% of Gross)
Employer Paid 457b Match:	$5,668.25 (1.95 % of Gross)
Employee Paid 457b:	$36,906.05 (12.7% of Gross)
Other Employer Paid Benefits:	$83,879.77

Accounts Payable

Checks by Date - Detail by Check Number

User: mmckenzie
Printed: 7/8/2019 11:49 AM

Check No	Vendor No / Invoice No	Vendor Name / Description	Check Date / Reference	Void Checks	Check Amount
ACH	PR*AFLAC	AFLAC	06/12/2019		
		PR Batch 00012.06.2019 Aflac After Tax	PR Batch 00012.06.2019 Afla		42.25
		PR Batch 00012.06.2019 Aflac After Tax	PR Batch 00012.06.2019 Afla		1.46
		PR Batch 00012.06.2019 Aflac After Tax	PR Batch 00012.06.2019 Afla		12.08
		PR Batch 00012.06.2019 Aflac Pre-Tax	PR Batch 00012.06.2019 Afla		121.24
		PR Batch 00012.06.2019 Aflac Pre-Tax	PR Batch 00012.06.2019 Afla		11.05
		PR Batch 00012.06.2019 Aflac Pre-Tax	PR Batch 00012.06.2019 Afla		20.78
			Total for this ACH Check for Vendor PR*AFLAC:	0.00	208.86
ACH	PR*CATAX	CA Tax Payment ACH	06/12/2019		
		PR Batch 00012.06.2019 Ca. State Disability	PR Batch 00012.06.2019 Ca.		462.33
		PR Batch 00012.06.2019 Ca. State Disability	PR Batch 00012.06.2019 Ca.		467.86
		PR Batch 00012.06.2019 Ca. State Disability	PR Batch 00012.06.2019 Ca.		106.72
		PR Batch 00012.06.2019 Ca. State Disability	PR Batch 00012.06.2019 Ca.		89.44
		PR Batch 00012.06.2019 Ca. State Disability	PR Batch 00012.06.2019 Ca.		292.37
		PR Batch 00012.06.2019 State Income Tax	PR Batch 00012.06.2019 Stat		1,963.67
		PR Batch 00012.06.2019 State Income Tax	PR Batch 00012.06.2019 Stat		1,730.15
		PR Batch 00012.06.2019 State Income Tax	PR Batch 00012.06.2019 Stat		454.14
		PR Batch 00012.06.2019 State Income Tax	PR Batch 00012.06.2019 Stat		416.82
		PR Batch 00012.06.2019 State Income Tax	PR Batch 00012.06.2019 Stat		1,119.63
			Total for this ACH Check for Vendor PR*CATAX:	0.00	7,103.13
ACH	PR*FEDTX	Federal Tax Payment ACH	06/12/2019		
		PR Batch 00012.06.2019 Federal Income Tax	PR Batch 00012.06.2019 Fed		5,441.90
		PR Batch 00012.06.2019 Federal Income Tax	PR Batch 00012.06.2019 Fed		5,037.59
		PR Batch 00012.06.2019 Federal Income Tax	PR Batch 00012.06.2019 Fed		1,179.92
		PR Batch 00012.06.2019 Federal Income Tax	PR Batch 00012.06.2019 Fed		1,276.83
		PR Batch 00012.06.2019 Federal Income Tax	PR Batch 00012.06.2019 Fed		2,998.33
		PR Batch 00012.06.2019 Medicare Employee Po	PR Batch 00012.06.2019 Med		673.37
		PR Batch 00012.06.2019 Medicare Employee Po	PR Batch 00012.06.2019 Med		684.38
		PR Batch 00012.06.2019 Medicare Employee Po	PR Batch 00012.06.2019 Med		155.41
		PR Batch 00012.06.2019 Medicare Employee Po	PR Batch 00012.06.2019 Med		129.85
		PR Batch 00012.06.2019 Medicare Employee Po	PR Batch 00012.06.2019 Med		426.22
		PR Batch 00012.06.2019 Medicare Employer Po	PR Batch 00012.06.2019 Med		673.37
		PR Batch 00012.06.2019 Medicare Employer Po	PR Batch 00012.06.2019 Med		684.38
		PR Batch 00012.06.2019 Medicare Employer Po	PR Batch 00012.06.2019 Med		155.41
		PR Batch 00012.06.2019 Medicare Employer Po	PR Batch 00012.06.2019 Med		129.85
		PR Batch 00012.06.2019 Medicare Employer Po	PR Batch 00012.06.2019 Med		426.22
			Total for this ACH Check for Vendor PR*FEDTX:	0.00	20,073.03
ACH	PR*FTJ	FTJ Fund Choice	06/12/2019		
		PR Batch 00012.06.2019 Deferred Comp. Match	PR Batch 00012.06.2019 Def		889.03
		PR Batch 00012.06.2019 Deferred Comp. Match	PR Batch 00012.06.2019 Def		915.26
		PR Batch 00012.06.2019 Deferred Comp. Match	PR Batch 00012.06.2019 Def		213.39
		PR Batch 00012.06.2019 Deferred Comp. Match	PR Batch 00012.06.2019 Def		178.91
		PR Batch 00012.06.2019 Deferred Comp. Match	PR Batch 00012.06.2019 Def		568.89
		PR Batch 00012.06.2019 FTJ Deferred Comp	PR Batch 00012.06.2019 FTJ		7,923.93

Check No	Vendor No Invoice No	Vendor Name Description	Check Date Reference	Void Checks	Check Amount
		PR Batch 00012.06.2019 FTJ Deferred Comp	PR Batch 00012.06.2019 FTJ		5,025.42
		PR Batch 00012.06.2019 FTJ Deferred Comp	PR Batch 00012.06.2019 FTJ		1,469.90
		PR Batch 00012.06.2019 FTJ Deferred Comp	PR Batch 00012.06.2019 FTJ		952.46
		PR Batch 00012.06.2019 FTJ Deferred Comp	PR Batch 00012.06.2019 FTJ		3,117.59
		PR Batch 00012.06.2019 FTJ Pension	PR Batch 00012.06.2019 FTJ		9,246.73
		PR Batch 00012.06.2019 FTJ Pension	PR Batch 00012.06.2019 FTJ		9,357.78
		PR Batch 00012.06.2019 FTJ Pension	PR Batch 00012.06.2019 FTJ		2,134.00
		PR Batch 00012.06.2019 FTJ Pension	PR Batch 00012.06.2019 FTJ		1,789.22
		PR Batch 00012.06.2019 FTJ Pension	PR Batch 00012.06.2019 FTJ		5,846.66
			Total for this ACH Check for Vendor PR*FTJ:	0.00	49,629.17
ACH	PR*NATWD	Nationwide Retirement Solution	06/12/2019		
		PR Batch 00012.06.2019 Nationwide Retirement	PR Batch 00012.06.2019 Nati		25.85
			Total for this ACH Check for Vendor PR*NATWD:	0.00	25.85
ACH	PR*STERL	Sterling Health Service Administration	06/12/2019		
		PR Batch 00012.06.2019 Health Savings Acct. E	PR Batch 00012.06.2019 Hea		250.00
		PR Batch 00012.06.2019 Health Savings Acct. E	PR Batch 00012.06.2019 Hea		61.29
		PR Batch 00012.06.2019 Health Savings Acct. E	PR Batch 00012.06.2019 Hea		127.45
		PR Batch 00012.06.2019 Health Savings Acct. E	PR Batch 00012.06.2019 Hea		61.28
		PR Batch 00012.06.2019 Health Savings Acct. E	PR Batch 00012.06.2019 Hea		61.28
		PR Batch 00012.06.2019 Health Savings Acct. E	PR Batch 00012.06.2019 Hea		22.03
		PR Batch 00012.06.2019 Health Savings Acct. E	PR Batch 00012.06.2019 Hea		4.34
		PR Batch 00012.06.2019 Health Savings Acct. E	PR Batch 00012.06.2019 Hea		9.02
		PR Batch 00012.06.2019 Health Savings Acct. E	PR Batch 00012.06.2019 Hea		4.33
		PR Batch 00012.06.2019 Health Savings Acct. E	PR Batch 00012.06.2019 Hea		4.34
			Total for this ACH Check for Vendor PR*STERL:	0.00	605.36
ACH	PR*CATAX	CA Tax Payment ACH	06/18/2019		
		PR Batch 00020.06.2019 State Income Tax	PR Batch 00020.06.2019 State		50.00
			Total for this ACH Check for Vendor PR*CATAX:	0.00	50.00
ACH	PR*FEDTX	Federal Tax Payment ACH	06/18/2019		
		PR Batch 00020.06.2019 Federal Income Tax	PR Batch 00020.06.2019 Fede		200.00
		PR Batch 00020.06.2019 FICA Employee Portio	PR Batch 00020.06.2019 FICA		47.41
		PR Batch 00020.06.2019 FICA Employer Portio	PR Batch 00020.06.2019 FICA		47.41
		PR Batch 00020.06.2019 Medicare Employee Po	PR Batch 00020.06.2019 Med		11.09
		PR Batch 00020.06.2019 Medicare Employer Po	PR Batch 00020.06.2019 Med		11.09
			Total for this ACH Check for Vendor PR*FEDTX:	0.00	317.00
ACH	094	Glenn VanOrsdol	06/19/2019		
	GVanOrsdol	Water Treatment Test - Ventura	Personal Vehicle Expense		199.52
	GVanOrsdol	Water Treatment Test - Ventura	Personal Vehicle Expense		199.52
			Total for this ACH Check for Vendor 094:	0.00	399.04
ACH	AT7100	AT&T Data	06/24/2019		
	52019	Clay's iPad Data Plan	Clay's iPad Data Plan		35.00
			Total for this ACH Check for Vendor AT7100:	0.00	35.00
ACH	DI7200	DirectTV	06/24/2019		
	36225725558	April	Eng. Bldg. Satellite Service		114.98
			Total for this ACH Check for Vendor DI7200:	0.00	114.98
ACH	UN5000	UPS	06/24/2019		

Check No	Vendor No Invoice No	Vendor Name Description	Check Date Reference	Void Checks	Check Amount
	May	Shipping and Service Charges	Shipping and Service Charges		99.44
	May	Shipping and Service Charges	Shipping and Service Charges		86.55
	May	Shipping and Service Charges	Shipping and Service Charges		59.26
	May	Shipping and Service Charges	Shipping and Service Charges		310.56
	May	Shipping and Service Charges	Shipping and Service Charges		18.25
	May	Shipping and Service Charges	Shipping and Service Charges		9.54
	May	Shipping and Service Charges	Shipping and Service Charges		222.21
			Total for this ACH Check for Vendor UN5000:	0.00	805.81
ACH	WF0100	Wells Fargo VISA	06/24/2019		
	May	Staff BBQ	May Visa		409.80
	May	Adobe - SH	May Visa		14.99
	May	Fuel - Personal Miles - PH	May Visa		143.62
	May	Washing Machine - Engineering Bldg.	May Visa		823.08
	May	Heater Filter	May Visa		43.95
	May	IT Security Box	May Visa		117.60
	May	Janatorial Supplies	May Visa		54.19
	May	Kitchen Supplies	May Visa		29.39
	May	Office Supplies	May Visa		599.25
	May	WSJ & LA Times - PH	May Visa		54.95
	May	Harrassment Prevention Webinar - G. Thompson	May Visa		65.00
	May	Online Training - BH and IY	May Visa		50.00
	May	Lodging, Meals, Fuel - ACWA Conference - PH	May Visa		835.97
	May	Adobe - MM	May Visa		14.99
	May	Leaf Blower	May Visa		96.94
	May	Printer Toner	May Visa		34.36
	May	Credit for Error	May Visa		-26.00
	May	Lodging, Meals, Fuel - GFOA Conference - JB	May Visa		1,257.38
	May	Website Calendar	May Visa		8.08
	May	Food for Training Classes	May Visa		77.28
	May	Office Supplies	May Visa		32.89
	May	Appreciation Lunch	May Visa		83.37
	May	Office Supplies	May Visa		55.28
	May	ISA Job Postings	May Visa		250.00
	May	Flagger Training	May Visa		330.00
	May	June and July Raffle	May Visa		150.00
	May	Conf. Call	May Visa		6.82
	May	Utility Management Cert. - CM	May Visa		125.00
	May	Work Boots - MB, KW, RM	May Visa		632.10
	May	Adobe - RM, KB	May Visa		29.98
	May	Tie Wrap Cutters	May Visa		127.77
	May	Oil Test Kit for Generators	May Visa		113.68
	May	CWEA Membership Renewals - HW, KW	May Visa		174.00
	May	Cert. Renewals - RM	May Visa		565.00
	May	Operating Supplies	May Visa		193.67
	May	Cell Phone Data Storage	May Visa		0.99
	May	Lodging, Meals, Fuel - Training - KB	May Visa		168.30
	May	Work Boots - JP	May Visa		50.00
	May	Water Modeling Training Registration	May Visa		895.00
	May	Trailer for Polaris	May Visa		1,000.00
	May	Tools and Tie Downs for Polaris	May Visa		69.76
	May	New Light for Plant 2 MCC	May Visa		187.06
	May	Canvas Cover for Polaris	May Visa		191.05
	May	Operating Supplies	May Visa		22.59
	May	Error - Will be Credited	May Visa		182.00
	May	Meals - T4 Test - GV	May Visa		30.93
	May	Lodging, Meals, Fuel - Training - GV	May Visa		442.29
	May	Trailer for Polaris	May Visa		1,000.00
	May	Tools and Tie Downs for Polaris	May Visa		110.98

Check No	Vendor No Invoice No	Vendor Name Description	Check Date Reference	Void Checks	Check Amount
	May	Canvas Cover for Polaris	May Visa		191.05
	May	Operating Supplies	May Visa		22.60
	May	Lodging, Meals, Fuel - Training - GV	May Visa		665.76
	May	Lodging, Meals - T4 Test - GV	May Visa		288.03
	May	Lodging, Meal, Fuel - Pick-Up Polaris - GV	May Visa		178.14
	May	Lodging, Meal, Fuel - Pick-Up Polaris - RC	May Visa		133.78
	May	Clothing - JS and Work Boots - PR	May Visa		478.87
	May	Self-Tapping Screws	May Visa		7.15
	May	Valve Stem for Service Truck	May Visa		42.00
	May	Fiber Optic Connectors and Fan-Out Kits	May Visa		523.28
	May	Nitrile Gloves	May Visa		179.50
	May	Work Boots - JP	May Visa		42.44
	May	Adobe - TN, SS	May Visa		25.98
	May	CM Tank Sprayer	May Visa		48.48
	May	Poly Tube Assembly	May Visa		147.19
	May	Brushes for Algae Control	May Visa		136.74
	May	Thermostats	May Visa		109.94
	May	Air Filters for WWTP	May Visa		311.76
	May	Cartridges for Urinals	May Visa		364.03
	May	Air Fresheners for Mice Problem in Explorer	May Visa		7.53
	May	Operating Supplies	May Visa		85.08
	May	Nitrile Gloves	May Visa		403.50
	May	Lodging, Meals, Fuel, Parking - Conference - TN	May Visa		1,576.60
	May	Hand-Held Jetter	May Visa		329.00
	May	Grade 2 Cert. - JS	May Visa		280.00
	May	Oil Hose for Lift Station Pump	May Visa		7.24
	May	Error - Will Be Credited	May Visa		343.67
	May	Housing Supplies	May Visa		3.99
	May	Dishwasher - L'Abri #9	May Visa		398.65
			Total for this ACH Check for Vendor WF0100:	0.00	19,257.31
ACH	PR*AFLAC	AFLAC	06/25/2019		
		PR Batch 00026.06.2019 Aflac After Tax	PR Batch 00026.06.2019 Afla		42.23
		PR Batch 00026.06.2019 Aflac After Tax	PR Batch 00026.06.2019 Afla		1.47
		PR Batch 00026.06.2019 Aflac After Tax	PR Batch 00026.06.2019 Afla		12.09
		PR Batch 00026.06.2019 Aflac Pre-Tax	PR Batch 00026.06.2019 Afla		121.24
		PR Batch 00026.06.2019 Aflac Pre-Tax	PR Batch 00026.06.2019 Afla		11.03
		PR Batch 00026.06.2019 Aflac Pre-Tax	PR Batch 00026.06.2019 Afla		20.80
			Total for this ACH Check for Vendor PR*AFLAC:	0.00	208.86
ACH	PR*CATAX	CA Tax Payment ACH	06/25/2019		
		PR Batch 00026.06.2019 Ca. State Disability	PR Batch 00026.06.2019 Ca.		544.94
		PR Batch 00026.06.2019 Ca. State Disability	PR Batch 00026.06.2019 Ca.		474.92
		PR Batch 00026.06.2019 Ca. State Disability	PR Batch 00026.06.2019 Ca.		116.20
		PR Batch 00026.06.2019 Ca. State Disability	PR Batch 00026.06.2019 Ca.		53.68
		PR Batch 00026.06.2019 Ca. State Disability	PR Batch 00026.06.2019 Ca.		300.07
		PR Batch 00026.06.2019 State Income Tax	PR Batch 00026.06.2019 State		2,284.61
		PR Batch 00026.06.2019 State Income Tax	PR Batch 00026.06.2019 State		1,652.46
		PR Batch 00026.06.2019 State Income Tax	PR Batch 00026.06.2019 State		459.81
		PR Batch 00026.06.2019 State Income Tax	PR Batch 00026.06.2019 State		206.48
		PR Batch 00026.06.2019 State Income Tax	PR Batch 00026.06.2019 State		1,014.28
			Total for this ACH Check for Vendor PR*CATAX:	0.00	7,107.45
ACH	PR*FEDTX	Federal Tax Payment ACH	06/25/2019		
		PR Batch 00026.06.2019 Federal Income Tax	PR Batch 00026.06.2019 Fede		7,147.66
		PR Batch 00026.06.2019 Federal Income Tax	PR Batch 00026.06.2019 Fede		5,088.54
		PR Batch 00026.06.2019 Federal Income Tax	PR Batch 00026.06.2019 Fede		1,360.31

Check No	Vendor No Invoice No	Vendor Name Description	Check Date Reference	Void Checks	Check Amount
		PR Batch 00026.06.2019 Federal Income Tax	PR Batch 00026.06.2019 Fed		713.20
		PR Batch 00026.06.2019 Federal Income Tax	PR Batch 00026.06.2019 Fed		3,149.67
		PR Batch 00026.06.2019 Medicare Employee Pc	PR Batch 00026.06.2019 Mec		796.15
		PR Batch 00026.06.2019 Medicare Employee Pc	PR Batch 00026.06.2019 Mec		694.44
		PR Batch 00026.06.2019 Medicare Employee Pc	PR Batch 00026.06.2019 Mec		168.69
		PR Batch 00026.06.2019 Medicare Employee Pc	PR Batch 00026.06.2019 Mec		78.43
		PR Batch 00026.06.2019 Medicare Employee Pc	PR Batch 00026.06.2019 Mec		440.32
		PR Batch 00026.06.2019 Medicare Employer Po	PR Batch 00026.06.2019 Mec		796.15
		PR Batch 00026.06.2019 Medicare Employer Po	PR Batch 00026.06.2019 Mec		694.44
		PR Batch 00026.06.2019 Medicare Employer Po	PR Batch 00026.06.2019 Mec		168.69
		PR Batch 00026.06.2019 Medicare Employer Po	PR Batch 00026.06.2019 Mec		78.43
		PR Batch 00026.06.2019 Medicare Employer Po	PR Batch 00026.06.2019 Mec		440.32
			Total for this ACH Check for Vendor PR*FEDTX:	0.00	21,815.44
ACH	PR*FTJ	FTJ Fund Choice	06/25/2019		
		PR Batch 00026.06.2019 Deferred Comp. Match	PR Batch 00026.06.2019 Def		1,047.63
		PR Batch 00026.06.2019 Deferred Comp. Match	PR Batch 00026.06.2019 Def		927.53
		PR Batch 00026.06.2019 Deferred Comp. Match	PR Batch 00026.06.2019 Def		239.19
		PR Batch 00026.06.2019 Deferred Comp. Match	PR Batch 00026.06.2019 Def		105.09
		PR Batch 00026.06.2019 Deferred Comp. Match	PR Batch 00026.06.2019 Def		583.33
		PR Batch 00026.06.2019 FTJ Deferred Comp	PR Batch 00026.06.2019 FTJ		7,923.93
		PR Batch 00026.06.2019 FTJ Deferred Comp	PR Batch 00026.06.2019 FTJ		5,106.42
		PR Batch 00026.06.2019 FTJ Deferred Comp	PR Batch 00026.06.2019 FTJ		1,504.52
		PR Batch 00026.06.2019 FTJ Deferred Comp	PR Batch 00026.06.2019 FTJ		678.30
		PR Batch 00026.06.2019 FTJ Deferred Comp	PR Batch 00026.06.2019 FTJ		3,151.88
		PR Batch 00026.06.2019 FTJ Pension	PR Batch 00026.06.2019 FTJ		10,899.10
		PR Batch 00026.06.2019 FTJ Pension	PR Batch 00026.06.2019 FTJ		9,499.45
		PR Batch 00026.06.2019 FTJ Pension	PR Batch 00026.06.2019 FTJ		2,322.42
		PR Batch 00026.06.2019 FTJ Pension	PR Batch 00026.06.2019 FTJ		1,073.98
		PR Batch 00026.06.2019 FTJ Pension	PR Batch 00026.06.2019 FTJ		6,001.45
			Total for this ACH Check for Vendor PR*FTJ:	0.00	51,064.22
ACH	PR*NATWD	Nationwide Retirement Solution	06/25/2019		
		PR Batch 00026.06.2019 Nationwide Retirement	PR Batch 00026.06.2019 Nati		25.85
			Total for this ACH Check for Vendor PR*NATWD:	0.00	25.85
ACH	PR*STERL	Sterling Health Service Administration	06/25/2019		
		PR Batch 00026.06.2019 Health Savings Acct. E	PR Batch 00026.06.2019 Hea		250.00
		PR Batch 00026.06.2019 Health Savings Acct. E	PR Batch 00026.06.2019 Hea		60.30
		PR Batch 00026.06.2019 Health Savings Acct. E	PR Batch 00026.06.2019 Hea		130.36
		PR Batch 00026.06.2019 Health Savings Acct. E	PR Batch 00026.06.2019 Hea		60.32
		PR Batch 00026.06.2019 Health Savings Acct. E	PR Batch 00026.06.2019 Hea		60.32
		PR Batch 00026.06.2019 Health Savings Acct. E	PR Batch 00026.06.2019 Hea		22.03
		PR Batch 00026.06.2019 Health Savings Acct. E	PR Batch 00026.06.2019 Hea		4.28
		PR Batch 00026.06.2019 Health Savings Acct. E	PR Batch 00026.06.2019 Hea		9.23
		PR Batch 00026.06.2019 Health Savings Acct. E	PR Batch 00026.06.2019 Hea		4.26
		PR Batch 00026.06.2019 Health Savings Acct. E	PR Batch 00026.06.2019 Hea		4.26
			Total for this ACH Check for Vendor PR*STERL:	0.00	605.36
ACH	PR*VSP	Vision Service Plan - CA	06/27/2019		
	5-1-19	Staff Vision Insurance Premium	Staff Vision Insurance Premiu		286.80
	5-1-19	Staff Vision Insurance Premium	Staff Vision Insurance Premiu		321.78
	5-1-19	Staff Vision Insurance Premium	Staff Vision Insurance Premiu		47.51
	5-1-19	Staff Vision Insurance Premium	Staff Vision Insurance Premiu		49.24
	5-1-19	Staff Vision Insurance Premium	Staff Vision Insurance Premiu		202.87
	5-1-19	Staff Vision Insurance Premium	Staff Vision Insurance Premiu		23.90
	5-23-19	Board Vision Insurance Premium	Board Vision Insurance Premi		119.50

Check No	Vendor No Invoice No	Vendor Name Description	Check Date Reference	Void Checks	Check Amount
			Total for this ACH Check for Vendor PR*VSP:	0.00	1,051.60
ACH	PR*VSP	Vision Service Plan - CA	06/27/2019		
	6-12-19	Staff Vision Insurance Premium	Staff Vision Insurance Premiu		286.80
	6-12-19	Staff Vision Insurance Premium	Staff Vision Insurance Premiu		336.27
	6-12-19	Staff Vision Insurance Premium	Staff Vision Insurance Premiu		61.23
	6-12-19	Staff Vision Insurance Premium	Staff Vision Insurance Premiu		44.75
	6-12-19	Staff Vision Insurance Premium	Staff Vision Insurance Premiu		203.05
	6-20-19	Board Vision Insurance Premium	Board Vision Insurance Premi		71.70
	6-20-19	Board Vision Insurance Premium	Board Vision Insurance Premi		47.80
			Total for this ACH Check for Vendor PR*VSP:	0.00	1,051.60
56235	AM4202	Amerigas	06/05/2019		
	3092793161	District Offices	Propane		709.61
			Total for Check Number 56235:	0.00	709.61
56236	AM4203	Amerigas	06/05/2019		
	3092793165	WWTP/Lab	Propane		649.58
			Total for Check Number 56236:	0.00	649.58
56237	BE8000	Berchtold Equipment Company	06/05/2019		
	BW12847	Fixed Asset	Jackhammer Attachment for E		9,359.71
			Total for Check Number 56237:	0.00	9,359.71
56238	BI6000	Bishop Welding Supply	06/05/2019		
	00000106	Tank Rental	Tank Rental		20.83
	00000106	Tank Rental	Tank Rental		20.83
	00000106	Tank Rental	Tank Rental		20.84
	00000107	Tank Rental	Tank Rental		25.00
	00000107	Tank Rental	Tank Rental		25.00
	00000108	Tank Rental	Tank Rental		37.50
			Total for Check Number 56238:	0.00	150.00
56239	CO3000	Codale Electric Supply, Inc.	06/05/2019		
	S6711710.001	Motor Drive	Motor Drive		3,420.00
			Total for Check Number 56239:	0.00	3,420.00
56240	CO5500	Community Printing & Publishing	06/05/2019		
	51355	Chlorine Gas OSHA Manuals	Chlorine Gas OSHA Manuals		362.04
			Total for Check Number 56240:	0.00	362.04
56241	CO5800	Conriquez Cleaning	06/05/2019		
	3018	May	Janatorial Services		2,200.00
			Total for Check Number 56241:	0.00	2,200.00
56242	DE7500	Designs Unlimited	06/05/2019		
	22543	Work Shirts (60)	Warehouse Inventory		727.50
			Total for Check Number 56242:	0.00	727.50
56243	FR6000	Frontier	06/05/2019		
	31619	Bill Date 3/16/19 760-924-1177	Land Lines		78.81
	51619	Bill Date 5/16/19 760-924-1177	Land Lines		79.03

Check No	Vendor No Invoice No	Vendor Name Description	Check Date Reference	Void Checks	Check Amount
	March	Bill Date 3/16/19 209-190-0158	Land Lines		180.05
	March	Bill Date 3/16/19 209-190-0158	Land Lines		41.54
	March	Bill Date 3/16/19 209-190-0158	Land Lines		47.65
	March	Bill Date 3/16/19 209-190-0158	Land Lines		41.54
	May	Bill Date 5/16/19 209-190-0158	Land Lines		179.56
	May	Bill Date 5/16/19 209-190-0158	Land Lines		41.40
	May	Bill Date 5/16/19 209-190-0158	Land Lines		47.52
	May	Bill Date 5/16/19 209-190-0158	Land Lines		41.40
	Reversal	Late Fee Reversal	Land Lines		-27.55
			Total for Check Number 56243:	0.00	750.95
56244	GR1000	Grainger, Inc.	06/05/2019		
	9183952218	P100 Cartridges	Department Supplies		209.21
	9183952218	Half Mask Respirator	Department Supplies		72.20
	9183952226	Overalls (1)	Rain Gear for Construction Cı		172.83
	9184456763	Jackets (6) & Overalls (1)	Rain Gear for Construction Cı		363.88
	9189582258	TP, Paper Towels, etc.	Janatorial Supplies		509.80
	9189695977	Kleen-ex	Janatorial Supplies		167.02
	9189698955	Distribution System Improvements FY20	Construction Supplies		622.03
	9190795212	Tone Generator and Probe Kit	Department Tool		133.45
	9190961467	Aluminum Step Stool	Department Tool		213.04
			Total for Check Number 56244:	0.00	2,463.46
56245	HA1000	Haaker Equipment Company	06/05/2019		
	W55372	Veh #77 - Vactor	Vehicle Maintenance		5,160.15
	W55373	Veh #51 - Vactor	Vehicle Maintenance		1,512.30
			Total for Check Number 56245:	0.00	6,672.45
56246	HA3000	Hach Company	06/05/2019		
	11408035	Standard Cell Solution (Concentrated pH B)uffe	Department Supplies		100.58
			Total for Check Number 56246:	0.00	100.58
56247	IN4000	Infosend, Inc.	06/05/2019		
	153962	April Bills	UB Statement Processing		1,795.67
			Total for Check Number 56247:	0.00	1,795.67
56248	IN7900	Intermountain Supply Co.	06/05/2019		
	54102	Cutting Blades for Snow Removal Equipment	Vehicle Maintenance		1,807.81
			Total for Check Number 56248:	0.00	1,807.81
56249	IN8500	Inyo-Mono Title Company	06/05/2019		
	TNelson	140 Sierra Park Road	Condo Purchase		432,792.95
			Total for Check Number 56249:	0.00	432,792.95
56250	JA2500	Jack Henry & Associates, Inc.	06/05/2019		
	3125720	7/1/19 - 6/30/20	RemitPlus Check Scanning Sc		2,225.00
			Total for Check Number 56250:	0.00	2,225.00
56251	KA4000	Kadesh & Associates, LLC	06/05/2019		
	6-19	May	Professional Services		9,000.00
			Total for Check Number 56251:	0.00	9,000.00
56252	MA3000	Mammoth Disposal	06/05/2019		

Check No	Vendor No Invoice No	Vendor Name Description	Check Date Reference	Void Checks	Check Amount
	962851	May	Trash Removal Services		1,313.50
			Total for Check Number 56252:	0.00	1,313.50
56253	MC5000	McMaster-Carr Supply Co.	06/05/2019		
	95578024	Masonry Drill Bits	Department Supplies		28.38
	95660049	Funnels (3)	Department Supplies		33.74
			Total for Check Number 56253:	0.00	62.12
56254	PR*STAND	Standard Insurance Company	06/05/2019		
	5-1-19	Staff Standard Long Term Disb.	Staff Disability Premium		274.52
	5-1-19	Staff Standard Long Term Disb.	Staff Disability Premium		263.35
	5-1-19	Staff Standard Long Term Disb.	Staff Disability Premium		49.42
	5-1-19	Staff Standard Long Term Disb.	Staff Disability Premium		47.44
	5-1-19	Staff Standard Long Term Disb.	Staff Disability Premium		162.53
	5-1-19	Staff Standard Shrt Term Disb	Staff Disability Premium		36.61
	5-1-19	Staff Standard Shrt Term Disb	Staff Disability Premium		35.17
	5-1-19	Staff Standard Shrt Term Disb	Staff Disability Premium		6.55
	5-1-19	Staff Standard Shrt Term Disb	Staff Disability Premium		6.30
	5-1-19	Staff Standard Shrt Term Disb	Staff Disability Premium		21.68
	5-15-19	Staff Standard Long Term Disb.	Staff Disability Premium		274.52
	5-15-19	Staff Standard Long Term Disb.	Staff Disability Premium		264.86
	5-15-19	Staff Standard Long Term Disb.	Staff Disability Premium		44.62
	5-15-19	Staff Standard Long Term Disb.	Staff Disability Premium		55.52
	5-15-19	Staff Standard Long Term Disb.	Staff Disability Premium		162.76
	5-15-19	Staff Standard Shrt Term Disb	Staff Disability Premium		36.61
	5-15-19	Staff Standard Shrt Term Disb	Staff Disability Premium		35.40
	5-15-19	Staff Standard Shrt Term Disb	Staff Disability Premium		5.88
	5-15-19	Staff Standard Shrt Term Disb	Staff Disability Premium		7.40
	5-15-19	Staff Standard Shrt Term Disb	Staff Disability Premium		21.67
	5-29-19	Staff Standard Long Term Disb.	Staff Disability Insurance Prei		274.52
	5-29-19	Staff Standard Long Term Disb.	Staff Disability Insurance Prei		267.88
	5-29-19	Staff Standard Long Term Disb.	Staff Disability Insurance Prei		63.07
	5-29-19	Staff Standard Long Term Disb.	Staff Disability Insurance Prei		37.95
	5-29-19	Staff Standard Long Term Disb.	Staff Disability Insurance Prei		165.82
	5-29-19	Staff Standard Shrt Term Disb	Staff Disability Insurance Prei		36.61
	5-29-19	Staff Standard Shrt Term Disb	Staff Disability Insurance Prei		35.65
	5-29-19	Staff Standard Shrt Term Disb	Staff Disability Insurance Prei		8.45
	5-29-19	Staff Standard Shrt Term Disb	Staff Disability Insurance Prei		5.06
	5-29-19	Staff Standard Shrt Term Disb	Staff Disability Insurance Prei		22.14
	5-29-19	Disability Premium w/Adjustment	Disability Premium w/Adjusti		0.04
			Total for Check Number 56254:	0.00	2,730.00
56255	RP*200	Richard Chun	06/05/2019		
	HET 1	Tennis Village Condos, #12	Tennis Village Condos, #12		200.00
			Total for Check Number 56255:	0.00	200.00
56256	RP1548	MMSA - Staff Accommodations	06/05/2019		
	HET 2	Forest Meadows Condos, #16	Forest Meadows Condos, #16		400.00
			Total for Check Number 56256:	0.00	400.00
56257	RP1549	Richard Kelman	06/05/2019		
	HET 2	Snowcreek V Condos, #901	Snowcreek V Condos, #901		400.00
			Total for Check Number 56257:	0.00	400.00
56258	SI3300	Sierra Employment Services, Inc.	06/05/2019		

Check No	Vendor No Invoice No	Vendor Name Description	Check Date Reference	Void Checks	Check Amount
	28217	Week Ending 5/26/19	Temp Services		2,308.24
	28217	Week Ending 5/26/19	Temp Services		977.36
	28217	Week Ending 5/26/19	Temp Services		17,509.32
			Total for Check Number 56258:	0.00	20,794.92
56259	SO8001	Southern California Edison	06/05/2019		
	April	WWTP	Electricity		2,225.39
			Total for Check Number 56259:	0.00	2,225.39
56260	SW6100	SWRCB-DWOCP	06/05/2019		
	KWeiland	Keith Weiland	Distribution Operator 3 Cert. I		140.00
			Total for Check Number 56260:	0.00	140.00
56261	TE7000	Tesco Controls, Inc.	06/05/2019		
	0067609-IN	Shady Rest and Rainbow Lift Station Rehab	Lift Station Pump Control Par		19,590.00
			Total for Check Number 56261:	0.00	19,590.00
56262	TE7010	Telstar Instruments	06/05/2019		
	99254	Gas Sensor Test Kit	Department Supplies		214.12
			Total for Check Number 56262:	0.00	214.12
56263	US1500	USA Blue Book	06/05/2019		
	896974	Manhole Cover Pullers 5/8" x 30" (2)	Department Tools		103.75
			Total for Check Number 56263:	0.00	103.75
56264	US6600	US Postal Service	06/05/2019		
	2117	Box 2117	Annual PO Box Renewal		120.00
	597	Box 597	Annual PO Box Renewal		120.00
			Total for Check Number 56264:	0.00	240.00
56265	VE6150	Verizon Wireless	06/05/2019		
	9830572839	5/22/19 - 6/21/19	iPad Data Plans		41.61
	9830572839	5/22/19 - 6/21/19	iPad Data Plans		41.61
	9830572839	5/22/19 - 6/21/19	iPad Data Plans		104.02
	9830572839	5/22/19 - 6/21/19	iPad Data Plans		62.41
	9830572839	5/22/19 - 6/21/19	iPad Data Plans		10.40
	9830572839	5/22/19 - 6/21/19	iPad Data Plans		20.80
	9830572839	5/22/19 - 6/21/19	iPad Data Plans		62.41
	9830572839	5/22/19 - 6/21/19	iPad Data Plans		10.40
			Total for Check Number 56265:	0.00	353.66
56266	WE5500	Western Nevada Supply	06/05/2019		
	17875597	6" Field Lok Gaskets	Construction Supplies		775.09
	17875597	Chlorine 5 lb.	Construction Supplies		53.08
	57834014	Distribution System Improvements FY20	Construction Supplies		2,679.20
			Total for Check Number 56266:	0.00	3,507.37
56267	WI5300	The Window Fair	06/05/2019		
	2383	Payment 2 of 2	Blinds - Kay's Office		547.14
			Total for Check Number 56267:	0.00	547.14
56268	AL6400	Alpine Paint	06/12/2019		

Check No	Vendor No / Invoice No	Vendor Name / Description	Check Date / Reference	Void Checks	Check Amount
	M0207041	Sample Paint - Plant 2	Building Maintenance		50.63
	M0207215	Paint Supplies - Plant 2	Building Maintenance		45.31
	M0207246	Paint - Plant 2	Building Maintenance		592.85
			Total for Check Number 56268:	0.00	688.79
56269	AM4203	Amerigas	06/12/2019		
	3092999256	WWTP/Lab	Propane		1,137.16
			Total for Check Number 56269:	0.00	1,137.16
56270	AR1000	Aguirre Remodeling, Inc.	06/12/2019		
	740	Window Coverings/Trim, Paint, Labor	Condo Rehab - L'Abri		5,598.58
			Total for Check Number 56270:	0.00	5,598.58
56271	BR1800	Bravo Gardens, Inc.	06/12/2019		
	12801	Spring Clean-Up	Landscaping Services		315.00
			Total for Check Number 56271:	0.00	315.00
56272	CB1000	California Broadband Cooperative	06/12/2019		
	94000120195	June	Monthly Internet Agreement		1,050.00
			Total for Check Number 56272:	0.00	1,050.00
56273	DE8000	Dewey Pest Control	06/12/2019		
	12691587	5/30/19	Pest Control Service		190.00
			Total for Check Number 56273:	0.00	190.00
56274	DO4000	Do-It Center	06/12/2019		
	710734	Well 6 Sump Repair	Department Supplies		37.80
	712519	Department Supplies	Department Supplies		9.68
	712727	Replacement Saw Blades	Department Supplies		14.51
	712846	Lighting - T2 Pump House	Building Maintenance		15.97
	712897	Wire Nuts	Department Supplies		19.83
	713074	HVAC Air Filters - Warehouse	Department Supplies		75.58
	713605	WWTP Main PLC Upgrade	Construction Supplies		57.58
	713884	WWTP Clarifier Conduit Repair	Department Supplies		10.93
	714314	OMR Breaker Box & Door Lock	Department Supplies		9.59
	714548	Dist. System Improvements FY20	Construction Supplies		47.49
			Total for Check Number 56274:	0.00	298.96
56275	EH8100	EH Wachs	06/12/2019		
	INV164223	Vacuum Wand & Spray-Down Wand	Department Tools		460.59
			Total for Check Number 56275:	0.00	460.59
56276	GP1000	Gillis & Panichapan Architects, Inc.	06/12/2019		
	107405J	Admin. Bldg. Assessment	Professional Services		6,097.00
	107405J	Admin. Bldg. Assessment	Professional Services		3,003.00
			Total for Check Number 56276:	0.00	9,100.00
56277	GR1000	Grainger, Inc.	06/12/2019		
	813529799	Trailer Ball	Department Supplies		14.83
			Total for Check Number 56277:	0.00	14.83
56278	GR2000	The Grasshopper	06/12/2019		

Check No	Vendor No Invoice No	Vendor Name Description	Check Date Reference	Void Checks	Check Amount
	4099	May	Landscaping Services - Gatew		450.00
			Total for Check Number 56278:	0.00	450.00
56279	HI4000	High Country Lumber, Inc.	06/12/2019		
	90267	Trim Repair - Plant 2	Building Maintenance		9.22
			Total for Check Number 56279:	0.00	9.22
56280	MC5000	McMaster-Carr Supply Co.	06/12/2019		
	96631604	Suction Water Hose	Department Supplies		250.44
			Total for Check Number 56280:	0.00	250.44
56281	MI6000	Mission Uniform & Linen	06/12/2019		
	May	Linen and Uniform Service	Linen and Uniform Service		956.45
	May	Linen and Uniform Service	Linen and Uniform Service		97.14
	May	Linen and Uniform Service	Linen and Uniform Service		55.15
	May	Linen and Uniform Service	Linen and Uniform Service		27.58
	May	Linen and Uniform Service	Linen and Uniform Service		27.58
	May	Linen and Uniform Service	Linen and Uniform Service		71.06
	May	Linen and Uniform Service	Linen and Uniform Service		167.00
			Total for Check Number 56281:	0.00	1,401.96
56282	PI8500	Pitney Bowes Global	06/12/2019		
	3103173931	3/30/19 - 6/29/19	Postage Meter Lease		176.72
			Total for Check Number 56282:	0.00	176.72
56283	PR*ACHBA	ACWA - Joint Powers Ins Authority	06/12/2019		
	5-23-19	Board Dental Insurance Premium	Board Health Insurance Premi		680.73
	5-23-19	Board Life Insurance Premium	Board Health Insurance Premi		35.65
	5-23-19	Board Medical Insurance Premium	Board Health Insurance Premi		9,536.11
	6-12-19	Staff Dental Insurance Premium	Staff Health Insurance Premiu		1,313.80
	6-12-19	Staff Dental Insurance Premium	Staff Health Insurance Premiu		1,637.22
	6-12-19	Staff Dental Insurance Premium	Staff Health Insurance Premiu		240.46
	6-12-19	Staff Dental Insurance Premium	Staff Health Insurance Premiu		213.48
	6-12-19	Staff Dental Insurance Premium	Staff Health Insurance Premiu		953.72
	6-12-19	Staff Life Insurance Premium	Staff Health Insurance Premiu		848.34
	6-12-19	Staff Life Insurance Premium	Staff Health Insurance Premiu		479.61
	6-12-19	Staff Life Insurance Premium	Staff Health Insurance Premiu		87.01
	6-12-19	Staff Life Insurance Premium	Staff Health Insurance Premiu		65.83
	6-12-19	Staff Life Insurance Premium	Staff Health Insurance Premiu		376.46
	6-12-19	Staff Medical Insurance Premium	Staff Health Insurance Premiu		19,644.95
	6-12-19	Staff Medical Insurance Premium	Staff Health Insurance Premiu		23,348.41
	6-12-19	Staff Medical Insurance Premium	Staff Health Insurance Premiu		3,404.53
	6-12-19	Staff Medical Insurance Premium	Staff Health Insurance Premiu		2,870.31
	6-12-19	Staff Medical Insurance Premium	Staff Health Insurance Premiu		13,972.48
	6-12-19	Staff Health Insurance Premium w/ Adjustment	Staff Health Insurance Premiu		797.16
	6-12-19	Staff Health Insurance Premium w/ Adjustment	Staff Health Insurance Premiu		285.26
			Total for Check Number 56283:	0.00	80,791.52
56284	PR*IUOE	Int'l Union of Op. Engineers	06/12/2019		
	6-12-19	Union Dues	June Union Dues		66.00
	6-12-19	Union Dues	June Union Dues		186.05
	6-12-19	Union Dues	June Union Dues		4.39
	6-12-19	Union Dues	June Union Dues		6.10
	6-12-19	Union Dues	June Union Dues		155.46

Check No	Vendor No Invoice No	Vendor Name Description	Check Date Reference	Void Checks	Check Amount
			Total for Check Number 56284:	0.00	418.00
56285	RI2400	Rich Environmental Services	06/12/2019		
	77570	May	Monthly Tank Inspections		100.00
			Total for Check Number 56285:	0.00	100.00
56286	SI3000	Sierra Conservation Project, Inc.	06/12/2019		
	16147-75	May	Recycling Services		246.00
			Total for Check Number 56286:	0.00	246.00
56287	SI3300	Sierra Employment Services, Inc.	06/12/2019		
	28274	Week Ending 6/9/19	Temp. Services		2,300.78
	28274	Week Ending 6/9/19	Temp. Services		995.53
	28274	Week Ending 6/9/19	Temp. Services		18,826.53
			Total for Check Number 56287:	0.00	22,122.84
56288	SI3900	Sierra Wave Media	06/12/2019		
	2931-1	May	District Advertising		399.00
			Total for Check Number 56288:	0.00	399.00
56289	ST3000	Steves Auto & Truck Parts	06/12/2019		
	964628	Fuse - Veh #70	Vehicle Maintenance		5.38
	965598	Dist. System Improvements FY 20	Construction Supplies		19.41
	965697	Dist. System Improvements FY 20	Construction Supplies		113.56
			Total for Check Number 56289:	0.00	138.35
56290	SW6100	SWRCB-DWOCP	06/12/2019		
	RLarson	Robert Larson	D2 Examination		65.00
			Total for Check Number 56290:	0.00	65.00
56291	TE7000	Tesco Controls, Inc.	06/12/2019		
	0067604-IN	WWTP Main PLC Upgrade	Progress Payment 1 of 2		135,000.00
			Total for Check Number 56291:	0.00	135,000.00
56292	WA7850	Watersmart Software, Inc.	06/12/2019		
	00000274	Year 1	WaterSmart Software Agreem		10,746.00
	00000274	Years 2 & 3	WaterSmart Software Agreem		21,492.00
			Total for Check Number 56292:	0.00	32,238.00
56293	WI3000	Wienhoff Drug Testing	06/12/2019		
	84245	Pre-Employment Lab Testing	Pre-Employment Lab Testing		140.00
			Total for Check Number 56293:	0.00	140.00
56294	BA7200	Bartkiewicz, Kronick & Shanahan	06/19/2019		
	May	ORMAT	Legal Services - May		150.00
	May	Well 32	Legal Services - May		1,280.00
	May	General	Legal Services - May		5,250.00
			Total for Check Number 56294:	0.00	6,680.00
56295	CH9000	Chuck Villar Construction	06/19/2019		
	17743	Distribution System Improvements FY20	Construction Hauling		537.60
	17749	Distribution System Improvements FY20	Construction Hauling		945.20

Check No	Vendor No / Invoice No	Vendor Name / Description	Check Date / Reference	Void Checks	Check Amount
	17750	Distribution System Improvements FY20	Pavement Grinding Services		2,255.00
	17756	Distribution System Improvements FY20	Construction Hauling		836.40
			Total for Check Number 56295:	0.00	4,574.20
56296	CO6600	Corona Environmental Consulting, LLC	06/19/2019		
	U-3859	May	Consulting Services		2,432.58
			Total for Check Number 56296:	0.00	2,432.58
56297	DO4000	Do-It Center	06/19/2019		
	715575	Distribution System Improvements FY20	Construction Supplies		83.94
	715976	Distribution System Improvements FY20	Construction Supplies		9.68
			Total for Check Number 56297:	0.00	93.62
56298	GO8500	Government Finance Officers Association	06/19/2019		
	0120796	Melissa McKenzie	GFOA Membership Renewal		150.00
			Total for Check Number 56298:	0.00	150.00
56299	GR1000	Grainger, Inc.	06/19/2019		
	9200879642	Splinter Out	First Aid Supplies		39.39
	9200879642	Fabric Knuckle Bandages	First Aid Supplies		19.06
			Total for Check Number 56299:	0.00	58.45
56300	GR1500	Granite Construction	06/19/2019		
	1594870	Distribution System Improvements FY20	Construction Materials		5,398.28
	1595790	Distribution System Improvements FY20	Construction Materials		2,878.01
			Total for Check Number 56300:	0.00	8,276.29
56301	HI4000	High Country Lumber, Inc.	06/19/2019		
	91831	Distribution System Improvements FY20	Construction Supplies		58.14
			Total for Check Number 56301:	0.00	58.14
56302	IN4000	Infosend, Inc.	06/19/2019		
	155039	May	UB eBill Processing		423.10
			Total for Check Number 56302:	0.00	423.10
56303	KI2000	KIBS-FM	06/19/2019		
	0441190541557	May	District Advertising		250.00
			Total for Check Number 56303:	0.00	250.00
56304	KM5000	KMMT-FM	06/19/2019		
	1326-00002-0011	May	District Advertising		160.00
			Total for Check Number 56304:	0.00	160.00
56305	LI4200	Liebert Cassidy Whitmore	06/19/2019		
	1478948	Annual Subscription	Employment Relations Conso		2,495.00
			Total for Check Number 56305:	0.00	2,495.00
56306	MA3000	Mammoth Disposal	06/19/2019		
	963172	Distribution System Improvements FY20	Toilet Rental		156.38
			Total for Check Number 56306:	0.00	156.38

Check No	Vendor No / Invoice No	Vendor Name / Description	Check Date / Reference	Void Checks	Check Amount
56307	MA6000	Mammoth Ready Mix	06/19/2019		
	24684	Distribution System Improvements FY20	Construction Materials		1,998.76
	24697	Distribution System Improvements FY20	Construction Materials		1,206.80
	24701	Distribution System Improvements FY20	Construction Materials		883.55
	24712	Distribution System Improvements FY20	Construction Materials		1,648.58
			Total for Check Number 56307:	0.00	5,737.69
56308	MO6400	Mono County Public Works	06/19/2019		
	0519	May	Sludge Processing		19,839.70
			Total for Check Number 56308:	0.00	19,839.70
56309	MO6800	Mono Works	06/19/2019		
	9605	May	Landscaping Services		270.00
			Total for Check Number 56309:	0.00	270.00
56310	NO6000	Norco Service Center	06/19/2019		
	11259	Veh #30 - Spare Tire and Mount	Vehicle Maintenance		248.98
			Total for Check Number 56310:	0.00	248.98
56311	RP*748	George McNee	06/19/2019		
	HET 1	Sierra Park Villas, #6	Sierra Park Villas, #6		200.00
			Total for Check Number 56311:	0.00	200.00
56312	RP*749	Francis X. Canning	06/19/2019		
	HET 1	Mammoth Ski & Racket, #H77	Mammoth Ski & Racket, #H7		188.00
			Total for Check Number 56312:	0.00	188.00
56313	RP1348	James Kalember	06/19/2019 VOID		
	HET 1	Snowcreek V, #813	Snowcreek V, #813	200.00	
	HET 3	Snowcreek V, #813	Snowcreek V, #813	500.00	
			Total for Check Number 56313:	700.00	0.00
56314	RP1473	Edelweiss Motel, LLC	06/19/2019		
	HECW 1	Spa Area	Edelweiss Motel		400.00
	HET 1	Spa Area	Edelweiss Motel		200.00
			Total for Check Number 56314:	0.00	600.00
56315	RP1550	Mark Williams	06/19/2019		
	HECW 1	La Vista Blanc, #2	La Vista Blanc, #2		400.00
			Total for Check Number 56315:	0.00	400.00
56316	RP1551	Keegan Walsh	06/19/2019		
	HET 1	Horizons 4, #155	Horizons 4, #155		200.00
			Total for Check Number 56316:	0.00	200.00
56317	RP1552	Mark Benardo	06/19/2019		
	HET 2	1849 Condos, #552	1849 Condos, #552		400.00
			Total for Check Number 56317:	0.00	400.00
56318	RP1553	Robert Lee	06/19/2019		
	HET 1	Discovery 4, #147	Discovery 4, #147		141.22

Check No	Vendor No Invoice No	Vendor Name Description	Check Date Reference	Void Checks	Check Amount
			Total for Check Number 56318:	0.00	141.22
56319	RP1554	Kyle Riddle	06/19/2019		
	HET 2	Tyrolean Village, #203	Tyrolean Village, #203		400.00
			Total for Check Number 56319:	0.00	400.00
56320	RP1555	Naomi Archer	06/19/2019		
	HET 1	Sunflower Condos, #74	Sunflower Condos, #74		152.52
			Total for Check Number 56320:	0.00	152.52
56321	RP1556	William R. Todd	06/19/2019		
	HET 1	3241 Main St., #2	3241 Main St., #2		178.99
			Total for Check Number 56321:	0.00	178.99
56322	RP1557	Laurence Fakinos	06/19/2019		
	HET 2	The Pointe Condos, #6	The Pointe Condos, #6		400.00
			Total for Check Number 56322:	0.00	400.00
56323	SE3000	Schneider Electric Systems, Inc.	06/19/2019		
	1589346	Field Laptop	Telepace Ladder Logic Softwa		730.55
			Total for Check Number 56323:	0.00	730.55
56324	SH2800	The Sheet	06/19/2019		
	6981	May - 1/4 pg. Color Ad	District Advertising		612.00
			Total for Check Number 56324:	0.00	612.00
56325	SO8002	Southern California Edison	06/19/2019		
	10158	L'Abri	Electricity		101.58
			Total for Check Number 56325:	0.00	101.58
56326	SW6100	SWRCB-DWOCP	06/19/2019		
	SSornono	Steven Sornoso	D2 Exam		45.00
			Total for Check Number 56326:	0.00	45.00
56327	VE6151	Verizon Wireless	06/19/2019		
	9831373908	5/4/19 - 6/3/19	Land Lines		100.40
			Total for Check Number 56327:	0.00	100.40
56328	WI3000	Wienhoff Drug Testing	06/20/2019		
	83103	Re-Issue of Lost Check	Pre-Employment Drug Screen		140.00
			Total for Check Number 56328:	0.00	140.00
56329	AM3000	American Business Machines Co.	06/26/2019		
	459120	6/24/19 - 7/23/19	Ops. Bldg. Copier/Printer Mai		36.84
			Total for Check Number 56329:	0.00	36.84
56330	AT7400	AT&T Mobility	06/26/2019		
	15065962	May	District Cell Phones		184.19
	15065962	May	District Cell Phones		52.45
	15065962	May	District Cell Phones		27.25
	15065962	May	District Cell Phones		38.39

Check No	Vendor No Invoice No	Vendor Name Description	Check Date Reference	Void Checks	Check Amount
	15065962	May	District Cell Phones		27.25
	15065962	May	District Cell Phones		38.39
			Total for Check Number 56330:	0.00	367.92
56331	BA1000	Babcock Laboratories, Inc.	06/26/2019		
	BE92329	Lab Services	Lab Services		288.00
	BF90250	Lab Services	Lab Services		551.00
	BF90962	Lab Services	Lab Services		480.00
			Total for Check Number 56331:	0.00	1,319.00
56332	CA4000	Cannon	06/26/2019		
	69279	WTP Arc Flash Study	Professional Services - May		1,237.50
			Total for Check Number 56332:	0.00	1,237.50
56333	CA41000	California Dept. of Tax and Fee Administra	06/26/2019		
	0-006-772-912	Not Charged on Vendor Invoice	CA Sales Tax		17.29
	0-006-772-912	Not Charged on Vendor Invoice	CA Sales Tax		73.71
	0-006-774-960	Not Charged on Vendor Invoice	CA Sales Tax		653.57
	0-006-774-960	Not Charged on Vendor Invoice	CA Sales Tax		217.86
	0-006-774-960	Not Charged on Vendor Invoice	CA Sales Tax		560.20
	0-006-774-960	Not Charged on Vendor Invoice	CA Sales Tax		1,680.62
			Total for Check Number 56333:	0.00	3,203.25
56334	CA7000	Carmichael Business Technology	06/26/2019		
	32228	July	Monthly Cloud Back-Up Agr		250.00
	32354	July	Monthly VOIP Phone Agreem		631.87
	MSP32215	July	Monthly IT Agreement		2,500.00
			Total for Check Number 56334:	0.00	3,381.87
56335	CH9000	Chuck Villar Construction	06/26/2019		
	17762	Distribution System Improvements FY20	Construction Hauling		147.00
			Total for Check Number 56335:	0.00	147.00
56336	DO4000	Do-It Center	06/26/2019		
	715807	Distribution System Improvements FY20	Construction Supplies		49.08
			Total for Check Number 56336:	0.00	49.08
56337	FO1000	FogBusters	06/26/2019		
	1307	Goslyn Trap for New Restaurant	Warehouse Inventory		2,559.33
			Total for Check Number 56337:	0.00	2,559.33
56338	FR6000	Frontier	06/26/2019		
	61619	6/16/19 - 7/15/19	Land Line		70.20
	June	6/16/19 - 7/15/19	Land Line		179.97
	June	6/16/19 - 7/15/19	Land Line		41.40
	June	6/16/19 - 7/15/19	Land Line		47.52
	June	6/16/19 - 7/15/19	Land Line		41.39
			Total for Check Number 56338:	0.00	380.48
56339	GR1500	Granite Construction	06/26/2019		
	1599021	Distribution System Improvements FY20	Construction Materials		1,092.26
			Total for Check Number 56339:	0.00	1,092.26

Check No	Vendor No Invoice No	Vendor Name Description	Check Date Reference	Void Checks	Check Amount
56340	HA1000	Haaker Equipment Company	06/26/2019		
	C52993	Water Pump Repair	Vehicle Maintenance		53.95
			Total for Check Number 56340:	0.00	53.95
56341	HA3000	Hach Company	06/26/2019		
	11500855	Lab Supplies	Lab Supplies		58.89
	11500855	Lab Supplies	Lab Supplies		285.17
	11500855	Lab Supplies	Lab Supplies		133.07
	11500855	Lab Supplies	Lab Supplies		250.39
	11500855	Lab Supplies	Lab Supplies		60.57
	11500855	Lab Supplies	Lab Supplies		43.29
	11500855	Lab Supplies	Lab Supplies		32.52
	11504202				48.59
			Total for Check Number 56341:	0.00	912.49
56342	HI4000	High Country Lumber, Inc.	06/26/2019		
	91948	Distribution System Improvements FY20	Construction Supplies - Conc		199.65
			Total for Check Number 56342:	0.00	199.65
56343	IN6000	In-Situ, Inc.	06/26/2019		
	00127268	Monitor	Monitoring Equipment		1,867.74
	00127268	Cable	Monitoring Equipment		1,454.62
			Total for Check Number 56343:	0.00	3,322.36
56344	KH1000	Kimley-Horn and Associates. Inc.	06/26/2019		
	13930707	May Progress Payment	WWTP Backup Power Prelim		2,510.00
			Total for Check Number 56344:	0.00	2,510.00
56345	LA1200	L'Abri H.O.A.	06/26/2019		
	Unit 10	Unit 10	HOA Dues		350.00
	Unit 6	Unit 6	HOA Dues		350.00
	Unit 9	Unit 9	HOA Dues		350.00
			Total for Check Number 56345:	0.00	1,050.00
56346	MA4900	Mammoth Lock & Key	06/26/2019		
	52039	File Cabinet Lock-Out Service	File Cabinet Lock-Out Servic		65.00
			Total for Check Number 56346:	0.00	65.00
56347	MO8000	Mountain Motors Auto Repair	06/26/2019		
	2134	Veh #53 (Flatbed)	Vehicle Maintenance		660.26
			Total for Check Number 56347:	0.00	660.26
56348	PR*ACJPI	ACWA / JPIA	06/26/2019		
	0005748	7/1/19 - 6/30/20	Property Insurance Renewal		57,628.13
			Total for Check Number 56348:	0.00	57,628.13
56349	PR*SNWCK	Snowcreek Athletic Club	06/26/2019		
	6-26-19	Snowcreek Dues	July Snowcreek Dues		95.00
	6-26-19	Snowcreek Dues	July Snowcreek Dues		445.04
	6-26-19	Snowcreek Dues	July Snowcreek Dues		78.02
	6-26-19	Snowcreek Dues	July Snowcreek Dues		25.97
	6-26-19	Snowcreek Dues	July Snowcreek Dues		168.97

Check No	Vendor No Invoice No	Vendor Name Description	Check Date Reference	Void Checks	Check Amount
			Total for Check Number 56349:	0.00	813.00
56350	PU6300	Purcell Tire	06/26/2019		
	26127147	Veh #30 (Loader) - Tire and Labor	Vehicle Maintenance		2,167.21
	26127148	Tires - Veh #52	Vehicle Maintenance		909.03
			Total for Check Number 56350:	0.00	3,076.24
56351	RA2000	Raftelis Financial Consultants, Inc.	06/26/2019		
	12178	Wastewater Cost of Service Study	Professional Services - May		2,201.25
	12178	Connection Fee Study	Professional Services - May		2,975.00
	12178	Connection Fee Study	Professional Services - May		2,975.00
			Total for Check Number 56351:	0.00	8,151.25
56352	RP1348	James Kalember	06/26/2019		
	HET 1	Snowcreek IV, #637	Snowcreek IV, #637		200.00
			Total for Check Number 56352:	0.00	200.00
56353	RP1558	Theodore Stern	06/26/2019		
	HET 3	Snowcreek V, #813	Snowcreek V, #813		500.00
			Total for Check Number 56353:	0.00	500.00
56354	SI2000	Sierra Carpet Cleaning	06/26/2019		
	61519	Admin. Bldg.	Carpet Cleaning Services		750.00
			Total for Check Number 56354:	0.00	750.00
56355	SI3300	Sierra Employment Services, Inc.	06/26/2019		
	28342	Temp. Services - Week Ending 6/23/19	Temp. Services - Week Endin		2,237.22
	28342	Temp. Services - Week Ending 6/23/19	Temp. Services - Week Endin		977.43
	28342	Distribution System Improvements FY20	Temp. Services - Week Endin		18,505.96
			Total for Check Number 56355:	0.00	21,720.61
56356	SO8000	Southern California Edison	06/26/2019		
	61519	Electricity	Electricity		2,810.94
	61519	Electricity	Electricity		6,364.52
	61519	Electricity	Electricity		4,403.46
	61519	Electricity	Electricity		1,022.80
			Total for Check Number 56356:	0.00	14,601.72
56357	SO8001	Southern California Edison	06/26/2019		
	061819	WWTP/Lab	Electricity		2,083.58
			Total for Check Number 56357:	0.00	2,083.58
56358	ST1500	Staples Advantage	06/26/2019		
	8054640005	Irene's Office	Office Furniture		2,400.65
			Total for Check Number 56358:	0.00	2,400.65
56359	SW6100	SWRCB-DWOCP	06/26/2019		
	RLarson	Robert Larson	D2 Exam		65.00
			Total for Check Number 56359:	0.00	65.00
56360	SW6101	SWRCB-DWOCP	06/26/2019		
	TNelson	Tyler Nelson	T3 Cert. Renewal		55.00

Check No	Vendor No Invoice No	Vendor Name Description	Check Date Reference	Void Checks	Check Amount
			Total for Check Number 56360:	0.00	55.00
56361	SW6102	SWRCB-DWOCP	06/26/2019		
	GVanOrsdol	Glenn Van Orsdol	T4 Certification		52.50
	GVanOrsdol	Glenn Van Orsdol	T4 Certification		52.50
			Total for Check Number 56361:	0.00	105.00
56362	VW6000	VWR International	06/26/2019		
	8086544467	Lab Supplies	Lab Supplies		120.14
	8086547961	Lab Supplies	Lab Supplies		250.97
			Total for Check Number 56362:	0.00	371.11
56363	WE5500	Western Nevada Supply	06/26/2019		
	17895242	Parts to Build Hydrant Meters	Warehouse Inventory		2,688.06
	57899056	Meter Pit Extenders (5)	Warehouse Inventory		439.26
	57900538	Toilets (2)	Building Maintenance		770.78
	57901293	Manhole Sealant	Warehouse Inventory		336.96
			Total for Check Number 56363:	0.00	4,235.06
56364	WI3800	Wildermuth Environmental	06/26/2019		
	2019165	CD-IV Expansion CEQA/NEPA	Professional Services - May		974.50
	2019166	Update Shallow Groundwater Model	Professional Services - May		1,342.25
			Total for Check Number 56364:	0.00	2,316.75
			Report Total (151 checks):	700.00	1,200,880.89

Merchant Name	Fund GL Acct	Cardholder	Trans. Date	Amount	Description
GROCERY OUTLET	10-110-6023	B. SULESKI	5/4	22.53	Ee lunch bbq
VONS #1753	10-110-6023	B. SULESKI	5/13	90.08	Ee lunch bbq
SMART AND FINAL	10-110-6023	B. SULESKI	5/19	35.97	Ee lunch bbq
GROCERY OUTLET	10-110-6023	B. SULESKI	5/19	60.38	Ee lunch bbq
VONS #1753	10-110-6023	B. SULESKI	5/19	82.67	Ee lunch bbq
GROCERY OUTLET	10-110-6023	B. SULESKI	5/21	25.22	Ee lunch bbq
RITE AID STORE -	10-110-6023	B. SULESKI	5/21	38.00	Ee lunch bbq
VONS #2400	10-110-6023	B. SULESKI	5/22	37.51	Ee lunch bbq
VONS #2400	10-110-6023	B. SULESKI	5/22	17.44	Ee lunch bbq
	10-110-6023 Total			**409.80**	
ADOBE	10-110-6105	S. HAKE	5/27	14.99	Adobe
	10-110-6105 Total			**14.99**	
CHEVRON	10-110-6125	P. HAYES	5/1	70.12	Fuel for Veh. 84
CHEVRON	10-110-6125	P. HAYES	5/4	73.50	Fuel for Veh. 84
	10-110-6125 Total			**143.62**	
SEARS.COM	10-110-6145	M. LOGAN	5/29	823.08	Washer - Eng. Bldg.
	10-110-6145 Total			**823.08**	
AMZN MKTP	10-110-6150	M. LOGAN	5/24	43.95	16x20x1 heater filter
CDW GOVT	10-110-6150	C. WEIBERT	5/6	117.60	Security IT Box
	10-110-6150 Total			**161.55**	
DIY HOME CENTER	10-110-6180	C. WEIBERT	5/14	54.19	Janitorial Supplies
AMAZON.COM	10-110-6180	C. WEIBERT	5/27	90.79	Office Supplies
STAPLS	10-110-6180	S. HAKE	5/7	271.64	Office Supplies
STAPLS	10-110-6180	S. HAKE	5/8	8.61	Office Supplies
SMART AND FINAL	10-110-6180	S. HAKE	5/9	15.39	Kitchen Supplies
STAPLS	10-110-6180	S. HAKE	5/9	47.59	Office Supplies
SMART AND FINAL	10-110-6180	S. HAKE	5/11	14.00	Kitchen Supplies
STAPLS	10-110-6180	S. HAKE	5/15	95.85	Office Supplies
STAPLS	10-110-6180	S. HAKE	5/17	69.70	Office Supplies
STAPLS	10-110-6180	S. HAKE	5/24	15.07	Office Supplies
	10-110-6180 Total			**682.83**	
WSJ	10-110-6192	P. HAYES	5/6	38.99	Monthly Subscription
SUBSCRIPTION	10-110-6192	S. HAKE	5/21	15.96	Monthly Subscription
	10-110-6192 Total			**54.95**	
LYNDA.COM, INC.	10-110-6215	I. YAMASHITA	5/27	25.00	online training - BH
LYNDA.COM, INC.	10-110-6215	I. YAMASHITA	5/28	25.00	online training - IY
CSDA	10-110-6215	S. HAKE	5/23	65.00	Harassment Webinar
	10-110-6215 Total			**115.00**	
PETRA CAFE	10-110-6220	P. HAYES	5/7	13.32	Meal - ACWA Conference
EXXONMOBIL	10-110-6220	P. HAYES	5/7	63.78	Fuel Veh. 84 - ACWA Conf.
GROTTO	10-110-6220	P. HAYES	5/8	35.19	Meal - ACWA Conference
HOTEL ABREGO	10-110-6220	P. HAYES	5/10	657.02	Lodging - ACWA Conf.
SHELL OIL	10-110-6220	P. HAYES	5/12	66.66	Fuel - ACWA Conference
	10-110-6220 Total			**835.97**	
ADOBE	10-120-6105	M. MCKENZIE	5/28	14.99	Adobe Subscription
	10-120-6105 Total			**14.99**	
HOMEDEPOT.COM	10-120-6120	M. LOGAN	5/22	96.94	Leaf Blower

Merchant Name	Fund GL Acct	Cardholder	Trans. Date	Amount	Description
	10-120-6120 Total			**96.94**	
AMZN MKTP	10-120-6180	M. MCKENZIE	5/30	34.36	Printer Toner
	10-120-6180 Total			**34.36**	
CONSUMER REPORTS	10-120-6192	M. LOGAN	5/3	(26.00)	Credit for error
	10-120-6192 Total			**(26.00)**	
SUBWAY	10-120-6220	J. BEATTY	5/19	4.37	Meals - GFOA conference
TST ROCK N FISH	10-120-6220	J. BEATTY	5/19	23.66	Meals - GFOA conference
CHEVRON	10-120-6220	J. BEATTY	5/19	46.19	Fuel - GFOA conference
CASEYS GRILL	10-120-6220	J. BEATTY	5/20	20.73	Meals - GFOA conference
DENNY'S9	10-120-6220	J. BEATTY	5/21	18.78	Meals - GFOA conference
STARBUCKS	10-120-6220	J. BEATTY	5/20	5.90	Meals - GFOA conference
CALI PIZZA KITC	10-120-6220	J. BEATTY	5/21	19.23	Meals - GFOA conference
PRAWN -	10-120-6220	J. BEATTY	5/21	11.66	Meals - GFOA conference
CORNER BAKERY	10-120-6220	J. BEATTY	5/22	15.96	Meals - GFOA conference
WESTIN HOTEL	10-120-6220	J. BEATTY	5/23	1,052.16	Motel - GFOA conference
SHELL OIL	10-120-6220	J. BEATTY	5/22	38.74	Fuel - GFOA conference
	10-120-6220 Total			**1,257.38**	
TRANS FEE	10-130-6105	J. MULBAY	5/18	0.08	Web Calendar
TOCKIFY	10-130-6105	J. MULBAY	5/18	8.00	Web Calendar
	10-130-6105 Total			**8.08**	
STARBUCKS	10-160-6180	C. WEIBERT	4/30	16.95	Training Food
VONS #2400	10-160-6180	C. WEIBERT	4/30	14.57	Training Food
VONS #2400	10-160-6180	C. WEIBERT	4/30	45.76	Training Food
AMZN MKTP	10-160-6180	C. WEIBERT	5/9	32.89	Office Supplies
GOOD LIFE CAFE	10-160-6180	C. WEIBERT	5/9	83.37	Appreciation Lunch
AMZN MKTP	10-160-6180	C. WEIBERT	5/13	45.05	Office Supplies
DIY HOME CENTER	10-160-6180	C. WEIBERT	5/14	10.23	Office Supplies
	10-160-6180 Total			**248.82**	
CSDA	10-160-6190	C. WEIBERT	5/6	105.00	ISA Job Posting
TRANSITTALENT	10-160-6190	C. WEIBERT	5/14	145.00	ISA Job Posting
	10-160-6190 Total			**250.00**	
CLICKSAFETY	10-160-6200	C. WEIBERT	4/30	275.00	Flagger Training
VONS #2400	10-160-6200	C. WEIBERT	5/9	150.00	June and July Raffle
CLICKSAFETY	10-160-6200	C. WEIBERT	5/13	55.00	Flagger Training
	10-160-6200 Total			**480.00**	
CONFCALLSERVICES	20-110-6210	S. HAKE	5/21	6.82	Conference Call
	20-110-6210 Total			**6.82**	
PAYPAL NRWA	20-150-6160	C. MURRAY	5/1	125.00	Utility Mgmnt Cert
	20-150-6160 Total			**125.00**	
WWW.EMS.COM	20-170-6024	M. BUSBY	5/30	157.99	Work boots
DANNER-LACROSSE	20-170-6024	K. WEILAND	5/16	290.93	Boot Purchase
TIMBERLAND	20-170-6024	R. MOTLEY	5/8	183.18	new boots
	20-170-6024 Total			**632.10**	
ADOBE	20-170-6105	R. MOTLEY	5/13	14.99	Adobe subscription
ADOBE	20-170-6105	K. BEDOW	5/28	14.99	Adobe subscription
	20-170-6105 Total			**29.98**	
AMZN MKTP	20-170-6120	R. MOTLEY	5/27	127.77	tie wrap cutters

Merchant Name	Fund GL Acct	Cardholder	Trans. Date	Amount	Description
	20-170-6120 Total			**127.77**	
AMSOIL	20-170-6145	R. MOTLEY	5/23	113.68	oil test kit for generators
	20-170-6145 Total			**113.68**	
CWEA	20-170-6160	H. WALDEN	5/7	87.00	Membership renewal.
CWEA	20-170-6160	K. WEILAND	5/9	87.00	Electrical Inst. renewal
CWEA	20-170-6160	R. MOTLEY	5/2	565.00	cert. renewal
	20-170-6160 Total			**739.00**	
AMZN MKTP	20-170-6180	M. LOGAN	5/23	20.98	Safety Glasses
AMZN MKTP	20-170-6180	M. LOGAN	5/23	20.98	Safety Glasses
E REPAIR CENTER	20-170-6180	K. WEILAND	5/23	37.12	Filter for paint sprayer
AMZN MKTP	20-170-6180	R. MOTLEY	5/24	18.48	shrink wrap
AMZN MKTP	20-170-6180	R. MOTLEY	5/27	96.11	tie wraps
	20-170-6180 Total			**193.67**	
APL ITUNES.COM	20-170-6210	M. BUSBY	5/20	0.99	Cell Phone data storage
	20-170-6210 Total			**0.99**	
GREAT FULL GARDENS	20-170-6220	K. BEDOW	5/9	20.16	Training meal
PLAZA RESTAURANT	20-170-6220	K. BEDOW	5/10	13.74	Training meal
COMFORT INN	20-170-6220	K. BEDOW	5/10	109.34	Training lodging
MAVERIK #460	20-170-6220	K. BEDOW	5/10	25.06	Training fuel for Escape
	20-170-6220 Total			**168.30**	
KEEN INC	20-210-6024	J. PEDERSEN	5/4	50.00	Work Boots
	20-210-6024 Total			**50.00**	
GRAC.ORG	20-210-6215	J. PEDERSEN	5/21	895.00	Training Registration
	20-210-6215 Total			**895.00**	
HIGH COUNTRY	20-220-6120	G. VANORSDOL	5/14	20.99	Tie downs for new Polaris
HIGH COUNTRY	20-220-6120	R. CONBOY	5/20	3.76	Tools for #95 Polaris
DIY HOME CENTER	20-220-6120	R. CONBOY	5/20	45.01	Tools for #95 Polaris
CARSON TRAILER	20-220-6120	R. MOTLEY	5/21	1,000.00	Trailer
	20-220-6120 Total			**1,069.76**	
PRO LIGHTING	20-220-6145	R. MOTLEY	5/15	187.06	new light for plant 2 mcc
	20-220-6145 Total			**187.06**	
PLACERVILLE POLARIS	20-220-6155	G. VANORSDOL	5/15	191.05	Canvas cover for Polaris
	20-220-6155 Total			**191.05**	
GROCERY OUTLET	20-220-6180	R. CONBOY	5/7	9.99	Coffee for ops bldg.
NAPA	20-220-6180	R. CONBOY	5/20	12.60	safety emblem- Polaris
	20-220-6180 Total			**22.59**	
HENRY'S SEAFOOD	20-220-6220	G. VANORSDOL	5/5	17.78	Dinner while at Training
SHELL OIL	20-220-6220	G. VANORSDOL	5/4	32.91	Travel to training
HARBOR DELI	20-220-6220	G. VANORSDOL	5/7	12.31	Lunch while at training
JIMMY'S AMERICAN	20-220-6220	G. VANORSDOL	5/6	15.62	Dinner while at training
EL TORITO	20-220-6220	G. VANORSDOL	5/7	10.37	Lunch while at training
DANA POINT INN	20-220-6220	G. VANORSDOL	5/5	182.00	Erroneous charge
EL TORITO	20-220-6220	G. VANORSDOL	5/8	14.20	Dinner while at training
JON'S FISH MARKET	20-220-6220	G. VANORSDOL	5/8	7.94	Lunch while at training
JON'S FISH MARKET	20-220-6220	G. VANORSDOL	5/8	2.83	Lunch while at training
CHEVRON 0373173	20-220-6220	G. VANORSDOL	5/9	24.24	Gasoline - training
DANA POINT INN	20-220-6220	G. VANORSDOL	5/9	295.25	Lodging for training

Merchant Name	Fund GL Acct	Cardholder	Trans. Date	Amount	Description
DENNY'S #7840	20-220-6220	G. VANORSDOL	5/9	8.84	Breakfast - training
SNAPPER JACKS	20-220-6220	G. VANORSDOL	5/18	6.22	Lunch treatment exam
SQ TACOS	20-220-6220	G. VANORSDOL	5/17	14.25	Dinner while at T-4 test
AUSTEN'S RESTAUR	20-220-6220	G. VANORSDOL	5/19	10.46	Breakfast - T-4 test
	20-220-6220 Total			**655.22**	
HIGH COUNTRY	20-230-6120	G. VANORSDOL	5/14	21.00	Tie downs for Polaris
DIY HOME CENTER	20-230-6120	G. VANORSDOL	5/22	41.19	Trailer hitch for truck
HIGH COUNTRY	20-230-6120	R. CONBOY	5/20	3.77	Tools for #95 Polaris
DIY HOME CENTER	20-230-6120	R. CONBOY	5/20	45.02	Tools for #95 Polaris
CARSON TRAILER	20-230-6120	R. MOTLEY	5/21	1,000.00	Trailer
	20-230-6120 Total			**1,110.98**	
PLACERVILLE POLARIS	20-230-6155	G. VANORSDOL	5/15	191.05	Canvas cover for Polaris
	20-230-6155 Total			**191.05**	
GROCERY OUTLET	20-230-6180	R. CONBOY	5/7	10.00	Coffee for ops bldg.
NAPA	20-230-6180	R. CONBOY	5/20	12.60	safety emblem-Polaris
	20-230-6180 Total			**22.60**	
PIERPONT INN	20-230-6220	G. VANORSDOL	5/17	223.40	Hotel - training
HENRY'S SEAFOOD	20-230-6220	G. VANORSDOL	5/5	17.78	Dinner while at training
SHELL OIL	20-230-6220	G. VANORSDOL	5/4	32.91	Travel to training
HARBOR DELI	20-230-6220	G. VANORSDOL	5/7	12.32	Lunch while at training
JIMMY'S AMERICAN	20-230-6220	G. VANORSDOL	5/6	15.63	Dinner while at training
EL TORITO	20-230-6220	G. VANORSDOL	5/7	10.38	Lunch while at training
EL TORITO	20-230-6220	G. VANORSDOL	5/8	14.21	Dinner while at training
JON'S FISH MARKET	20-230-6220	G. VANORSDOL	5/8	7.95	Lunch while at training
JON'S FISH MARKET	20-230-6220	G. VANORSDOL	5/8	2.83	Lunch while at training
CHEVRON 0373173	20-230-6220	G. VANORSDOL	5/9	24.25	Gasoline - training
DANA POINT INN	20-230-6220	G. VANORSDOL	5/9	295.25	Lodging for training
DENNY'S #7840	20-230-6220	G. VANORSDOL	5/9	8.85	Breakfast - training
CHEVRON 0376810	20-230-6220	G. VANORSDOL	5/15	31.38	Fuel to pickup Polaris
CHEVRON 0376810	20-230-6220	G. VANORSDOL	5/15	31.39	fuel to pick up Polaris
TOPAZ LODGE	20-230-6220	G. VANORSDOL	5/15	14.80	Dinner-picking up Polaris
TOPAZ LODGE	20-230-6220	G. VANORSDOL	5/16	100.57	Lodging-picking up Polaris
SNAPPER JACKS	20-230-6220	G. VANORSDOL	5/18	6.23	Lunch treatment exam
SQ TACOS	20-230-6220	G. VANORSDOL	5/17	14.25	Dinner while at T-4 test
AUSTEN'S RESTAUR	20-230-6220	G. VANORSDOL	5/19	10.47	Breakfast while at T-4 test
THE PIERPONT INN	20-230-6220	G. VANORSDOL	5/19	257.08	Hotel - treatment exam
ROUND TABLE	20-230-6220	R. CONBOY	5/15	20.55	Lunch for 2 - Polaris
TOPAZ LODGE	20-230-6220	R. CONBOY	5/15	12.66	Dinner - Polaris
TOPAZ LODGE	20-230-6220	R. CONBOY	5/16	100.57	Dinner - Polaris
	20-230-6220 Total			**1,265.71**	
CARHARTT	20-245-6024	J. SLOVER	5/12	366.26	clothing for J Slover
KEEN INC	20-245-6024	P. ROSS	5/21	112.61	Work Boots For P Ross
	20-245-6024 Total			**478.87**	
DIY HOME CENTER	20-255-6145	B. SULESKI	5/15	7.15	Self tap screws
	20-255-6145 Total			**7.15**	
NAPA	20-255-6155	B. SULESKI	5/17	42.00	Valve stem for service truck
	20-255-6155 Total			**42.00**	

Merchant Name	Fund GL Acct	Cardholder	Trans. Date	Amount	Description
ANIXTER	23-000-1410	H. WALDEN	5/7	424.58	Fiber optic connectors
ANIXTER	23-000-1410	H. WALDEN	5/10	98.70	Fiber optic fan-out kits
	23-000-1410 Total			**523.28**	
NITRILEGLOVES	30-140-6180	R. MEDHURST	5/23	179.50	Nitrile safety gloves
	30-140-6180 Total			**179.50**	
KEEN INC	30-310-6024	J. PEDERSEN	5/4	42.44	Work Boots
	30-310-6024 Total			**42.44**	
ADOBE	30-320-6105	T. NELSON	5/15	12.99	Adobe subscription
ADOBE	30-320-6105	S. SORNOSO	5/2	12.99	Adobe Subscription
	30-320-6105 Total			**25.98**	
HIGH COUNTRY	30-320-6120	S. SORNOSO	5/16	48.48	CM Tank Sprayer
	30-320-6120 Total			**48.48**	
BLUE-WHITE IND	30-320-6145	S. SORNOSO	5/25	147.19	Poly Tube ASSY
ANIMART INC	30-320-6145	K. WEILAND	5/24	136.74	brushes for algae control
MOR ELECTRIC	30-320-6145	R. MOTLEY	5/22	109.94	thermostats
	30-320-6145 Total			**393.87**	
ISC SALES	30-320-6150	M. LOGAN	5/23	311.76	Air Filters for WWTP
AMZN MKTP	30-320-6150	R. MOTLEY	5/17	167.92	cartridges for urinals
AMZN MKTP	30-320-6150	R. MOTLEY	5/18	196.11	cartridges for urinals
	30-320-6150 Total			**675.79**	
CHEVRON	30-320-6155	T. NELSON	5/11	7.53	Air fresheners
	30-320-6155 Total			**7.53**	
NITRILEGLOVES	30-320-6180	S. SORNOSO	5/14	403.50	Nitrile Gloves
RITE AID STORE	30-320-6180	T. NELSON	4/30	6.49	Glycerin-pressure gauges
BLUE-WHITE IND	30-320-6180	T. NELSON	5/23	78.59	Chem pump tube assy
	30-320-6180 Total			**488.58**	
NOODLES RESTAU	30-320-6220	T. NELSON	5/5	18.51	Lunch for conference
17TH THAI SUSHI	30-320-6220	T. NELSON	5/6	28.95	Lunch for conference
RENAISSANCE HOTELS	30-320-6220	T. NELSON	5/7	213.27	Lodging for conference
TAXI SVC	30-320-6220	T. NELSON	5/6	17.95	Cab ride
THE KITCHEN	30-320-6220	T. NELSON	5/6	18.56	Breakfast for conference
BLUE MARTINI	30-320-6220	T. NELSON	5/7	50.94	dinner for 2 at Conference
EINSTEIN BROS	30-320-6220	T. NELSON	5/8	10.03	breakfast at conference
EINSTEIN BROS	30-320-6220	T. NELSON	5/9	9.82	breakfast at conference
ANTEA	30-320-6220	T. NELSON	5/7	10.17	breakfast at conference
TSUKURO	30-320-6220	T. NELSON	5/9	43.38	dinner at conference for 2
RENAISSANCE	30-320-6220	T. NELSON	5/11	92.40	airport parking
JETBLUE	30-320-6220	T. NELSON	5/11	30.00	Baggage fee for flight
76	30-320-6220	T. NELSON	5/11	67.26	fuel for explorer
FL AIRPORT	30-320-6220	T. NELSON	5/11	15.94	breakfast at conference
HILTON HOTELS	30-320-6220	T. NELSON	5/11	920.55	lodging at conference
ANTEA	30-320-6220	T. NELSON	5/10	28.87	Breakfast/lunch-conf.
	30-320-6220 Total			**1,576.60**	
TOOL EXPERTS	30-345-6145	P. ROSS	5/30	329.00	Hand Held Jetter
	30-345-6145 Total			**329.00**	
CWEA	30-345-6160	J. SLOVER	5/20	280.00	Grade 2 cert. - J Slover
	30-345-6160 Total			**280.00**	

Merchant Name	Fund GL Acct	Cardholder	Trans. Date	Amount	Description
DIY HOME CENTER	30-355-6145	B. SULESKI	5/8	7.24	oil hose - lift station pump
	30-355-6145 Total			**7.24**	
SEARS.COM	96-000-6115	M. LOGAN	5/13	343.67	Error - will credit
VONS #2400	96-000-6115	C. WEIBERT	5/9	3.99	Rental Housing Supplies
SEARS.COM	96-000-6115	M. LOGAN	5/16	398.65	Dishwasher for La`bri # 9
	96-000-6115 Total			**746.31**	
	Total Staff Transactions			**19,257.31**	
DIRECTV	10-110-6023	M. VENDORS	43588	114.98	Eng. Bldg. Satellite Svc.
	10-110-6023 Total			**114.98**	
UPS	10-110-6185	M. VENDORS	43591	18.50	Service Fee
UPS	10-110-6185	M. VENDORS	43598	29.00	Service Fee
UPS	10-110-6185	M. VENDORS	43605	14.50	Service Fee
UPS	10-110-6185	M. VENDORS	43612	37.44	Service Fee/Shipping
	10-110-6185 Total			**99.44**	
JASPEN CORP	10-130-6106	M. VENDORS	43600	725.00	Website Overhaul
	10-130-6106 Total			**725.00**	
AT&T DATA	20-150-6210	M. VENDORS	43605	35.00	Clays iPad Data Plan
	20-150-6210 Total			**35.00**	
UPS	20-250-6185	M. VENDORS	43605	9.54	Shipping Charge
	20-250-6185 Total			**9.54**	
UPS	20-255-6185	M. VENDORS	43598	18.25	Shipping Charge
	20-255-6185 Total			**18.25**	
UPS	23-000-1410	M. VENDORS	43605	222.21	Shipping Charge
	23-000-1410 Total			**222.21**	
UPS	30-140-6185	M. VENDORS	43591	154.68	Shipping Charge
UPS	30-140-6185	M. VENDORS	43598	39.91	Shipping Charge
UPS	30-140-6185	M. VENDORS	43605	89.29	Shipping Charge
UPS	30-140-6185	M. VENDORS	43612	26.68	Shipping Charge
	30-140-6185 Total			**310.56**	
UPS	30-320-6185	M. VENDORS	43591	59.26	Shipping Charge
	30-320-6185 Total			**59.26**	
UPS	30-345-6185	M. VENDORS	43591	86.55	Shipping Charge
	30-345-6185 Total			**86.55**	
	Total Vendor Card Transactions			**1,680.79**	
	TOTAL MAY VISA TRANSACTIONS			**20,938.10**	

RESOLUTION NO. 07-18-19-13

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE MAMMOTH COMMUNITY WATER DISTRICT SETTING A PUBLIC HEARING ON THE REPORT OF DELINQUENT WATER AND SEWER CHARGES AS OF JUNE 30, 2019

WHEREAS, staff of the Mammoth Community Water District ("District") has prepared the Report on Delinquent Water and Sewer Service Charges as of June 30, 2019, containing a description of each parcel of real property within the District for which water and sewer service charges are delinquent, along with the amount of such delinquent charges, together with interest and penalties thereon; and

WHEREAS, the Report on Delinquent Water and Sewer Service Charges is attached hereto as Exhibit "A".

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of the Mammoth Community Water District that a public hearing is set for August 15, 2019, at 5:30 p.m. at the District office located at 1315 Meridian Boulevard in Mammoth Lakes, California, on the Report of Delinquent Water and Sewer Service Charges. At said public hearing, the Board of Directors will hear and consider all objections and protests to said written report. If the Board of Directors adopts said report, or revises, changes, reduces, or modifies any charge thereon, the delinquent charges, together with penalties and interest thereon, as stated in the adopted report, shall be added to the Mono County tax roll for the purpose of collecting such delinquent charges, shall constitute a lien against the respective parcels of real property described in the adopted report, and shall be included by the County Tax Collector in bills for taxes levied against the respective parcels of real property and be collected in the same manner, at the same time, and by the same person as taxes for the Mammoth Community Water District.

BE IT FURTHER RESOLVED that the Secretary of the Board of Directors is hereby directed to publish this Resolution in a newspaper of general circulation within the boundaries of the District. Such publication shall be for not less than once a week for two weeks prior to the date set for the hearing with the first publication at least fifteen (15) days prior to the public hearing. A notice of the public hearing shall be sent to each person listed on the Report.

PASSED AND ADOPTED by the Board of Directors of the Mammoth Community Water District at its regular meeting held on July 18, 2019, by the following vote:

AYES:

NAYS:

ABSENT:

ABSTAIN:

MAMMOTH COMMUNITY WATER DISTRICT

____
Thomas R. Smith, President
Board of Directors

ATTEST:

____
Mark Busby, Interim Secretary
Board of Directors

MAMMOTH COMMUNITY WATER DISTRICT
EXHIBIT A

DELINQUENT WATER AND SEWER ACCOUNTS THROUGH JUNE 30, 2019
FOR PLACEMENT ON MONO COUNTY TAX ROLL

ASSESSMENT NUMBER	NAME	DELINQUENT AMOUNT
022-370-012-000	West / Hindman Trust	$417.17
022-263-010-000	P. Delaney	$307.89
031-180-042-000	M & L Educational Trust	$454.54
031-180-043-000	M & L Educational Trust	$454.54
033-301-096-000	C. Samuels	$449.33
033-390-006-000	CRE Mammoth LLC	$492.78
035-041-022-000	M. Paulson	$312.08
035-181-030-000	L. Izraelev	$343.92
035-181-033-000	J. Palacios	$344.38
035-181-045-000	B. Weston	$635.47
035-182-088-000	H. Ryall	$499.56
035-251-109-000	D. Peck	$283.09
035-252-128-000	P. Allen	$534.47
040-013-001-000	Remax of Mammoth	$237.56
040-013-025-000	C. Robinson	$543.97

MAMMOTH COMMUNITY WATER DISTRICT

Agenda Item: B-1

Operations Department Report

07-18-2019

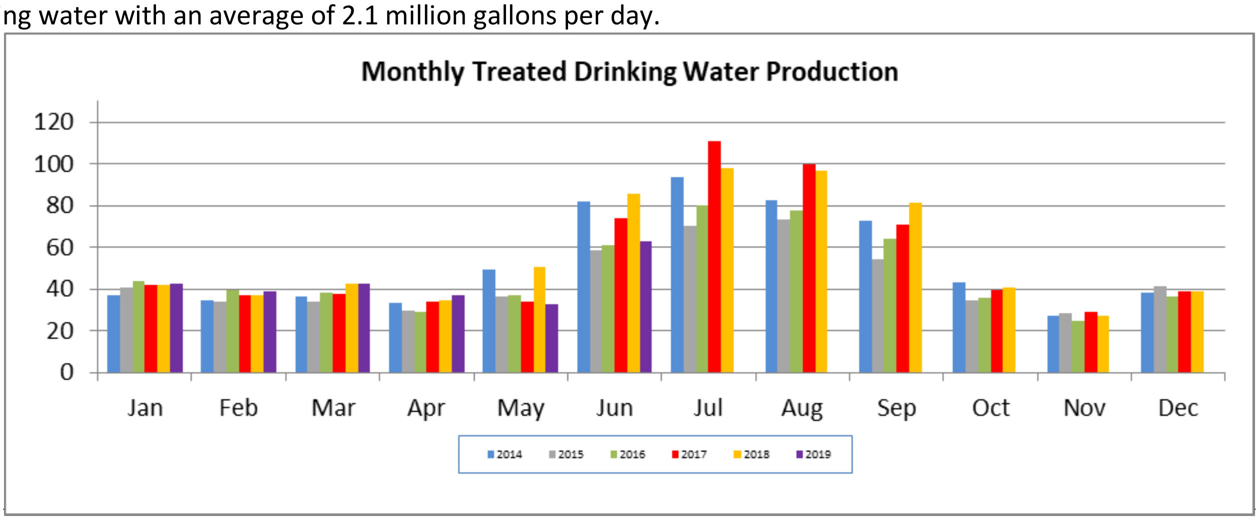
July 2019

Report Summary			
June Production Data *(In Million Gallons)*	2013	2018	**2019**
Treated Surface Water	43.9	78.1	**62.9**
Treated Groundwater	53.2	7.3	**0.3**
Untreated Groundwater	13.8	10.0	**5.6**
Reclaimed Wastewater	5.7	3.8	**2.0**
Totals	116.5	99.2	**70.8**
Non-Revenue Water	9.8	5.3	**2.9**
Treated Wastewater	31.6	40.2	**44.3**
Photovoltaic Power Produced (kWh)	226,290	263,900	**232,510**
Photovoltaic Solar Irradiance (kW/m²)	1,321	1,360	**1,151**

Monthly - Water Treatment, Production & Supply Management

- **Drinking Water Treatment**

Routine samples for clarity, chlorine residual, and bacteriological analysis of the District's drinking water were conducted during the month. The results of all sampling for the month were in compliance with the standards set by the State Water Resources Control Board Drinking Water Division. A total of 63,217,000 gallons were treated for drinking water with an average of 2.1 million gallons per day.



- **Water Supply Production and Management**

The total volume of water distributed to the community during the month of June was 70,781,000 gallons. This amounts to an average demand rate of 2.36 million gallons per day. Drinking water provided to the community was produced from the District's surface water (99%) and groundwater (1%) treatment plants. Sierra Star purchased a total of 7,564,000 gallons of water for golf course irrigation produced by untreated groundwater (74%) and recycled wastewater (26%). Snowcreek golf course is currently not in need of irrigation water.

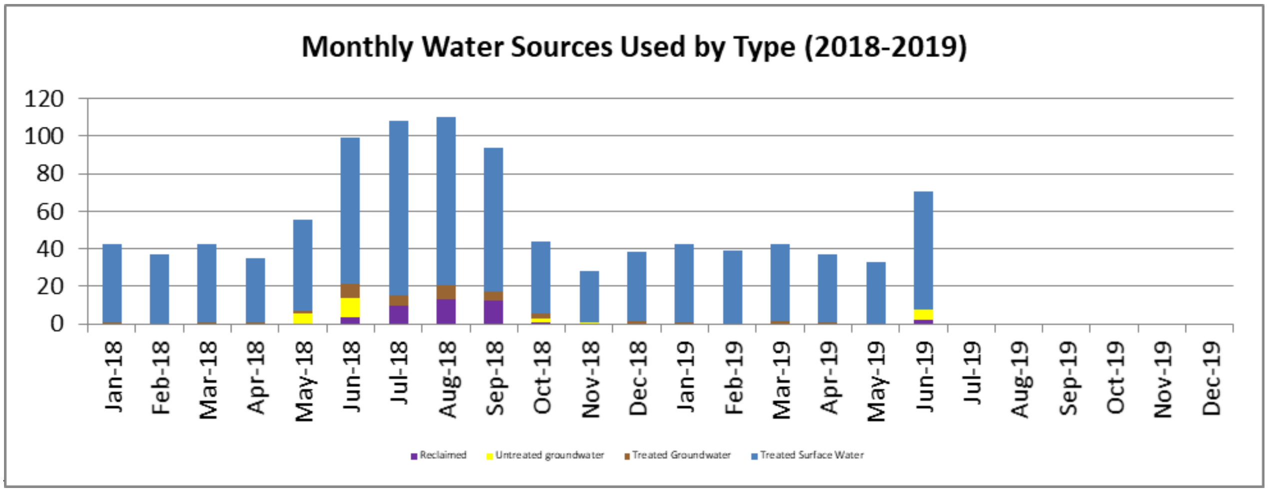
MAMMOTH COMMUNITY WATER DISTRICT

Agenda Item: B-1

Operations Department Report

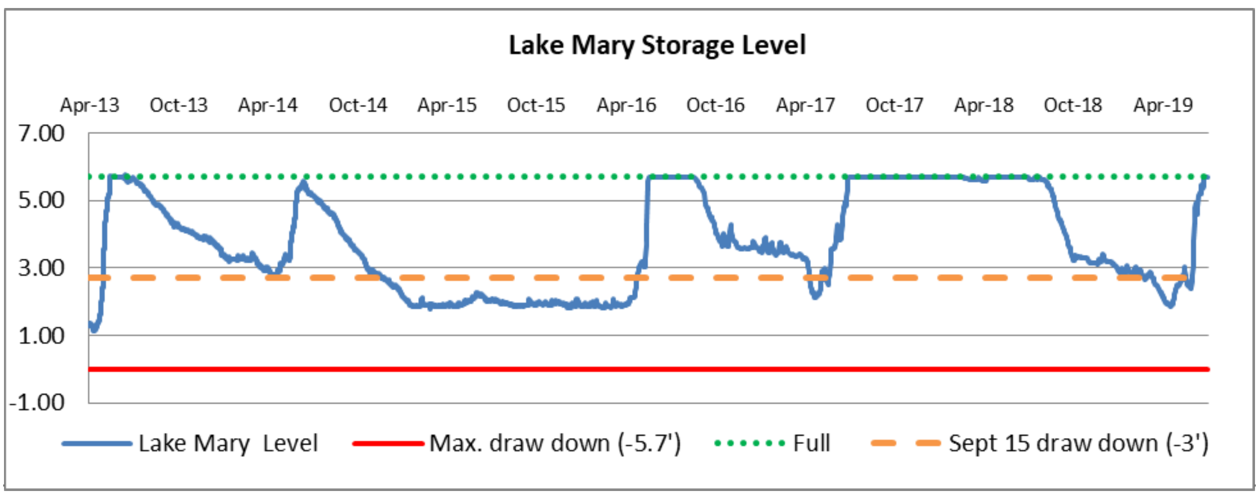
07-18-2019

July 2019



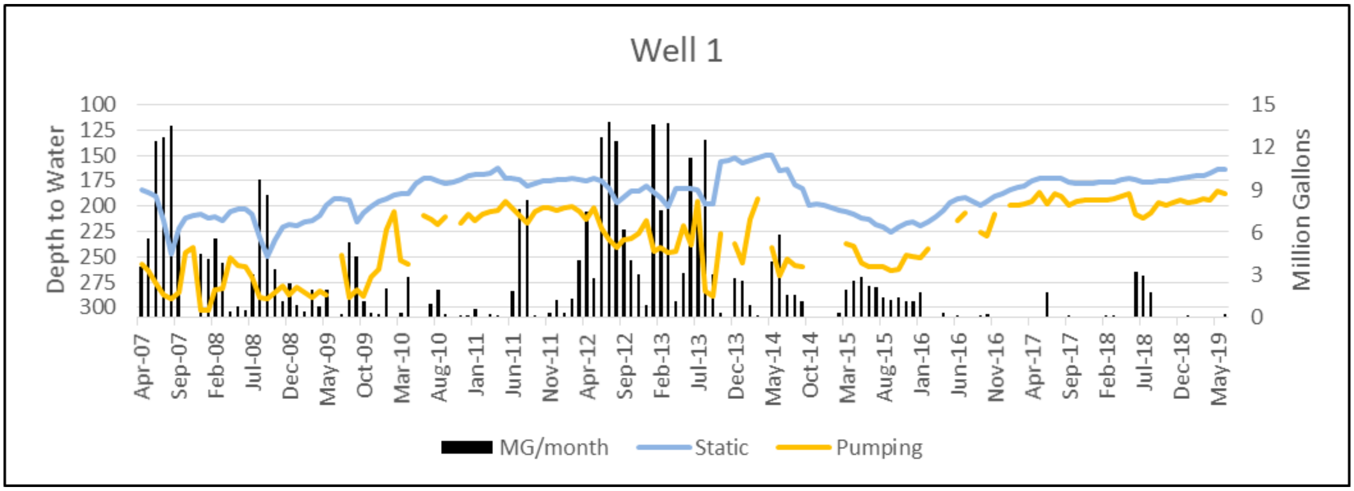
- **Surface Water**

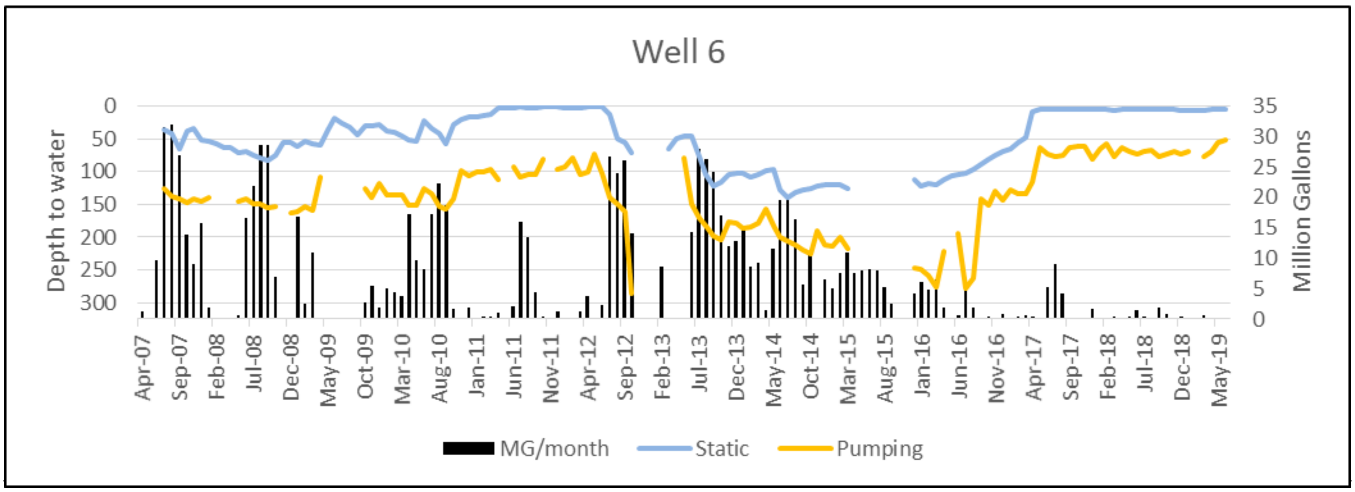
The minimum daily stream flow requirement for the month of June was 20.8*cfs* for Mammoth Creek, as measured at Old Mammoth Road. Flow rates in the creek ranged from 38.7*cfs* to 202*cfs* with an average flow of 130*cfs.* The average flow for June 2018 was 40.6*cfs*. The flow requirement for July decreases to 9.9*cfs* and current flows are above this requirement. Storing water in Lake Mary is allowed from April 1st through June 30th and the lake is currently full with a balance in storage of 606*ac/ft.*

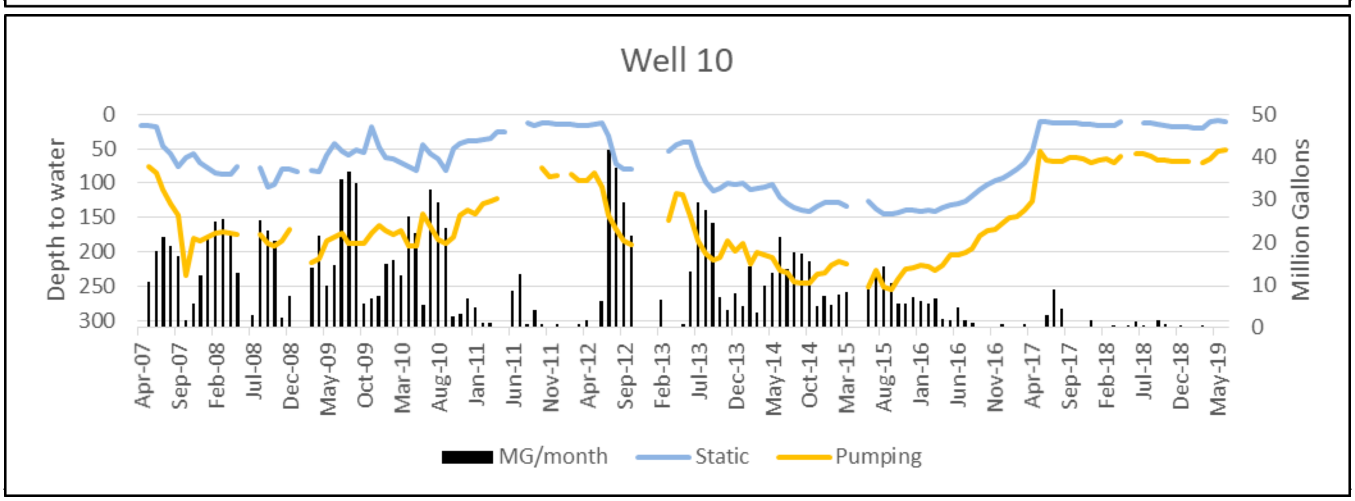


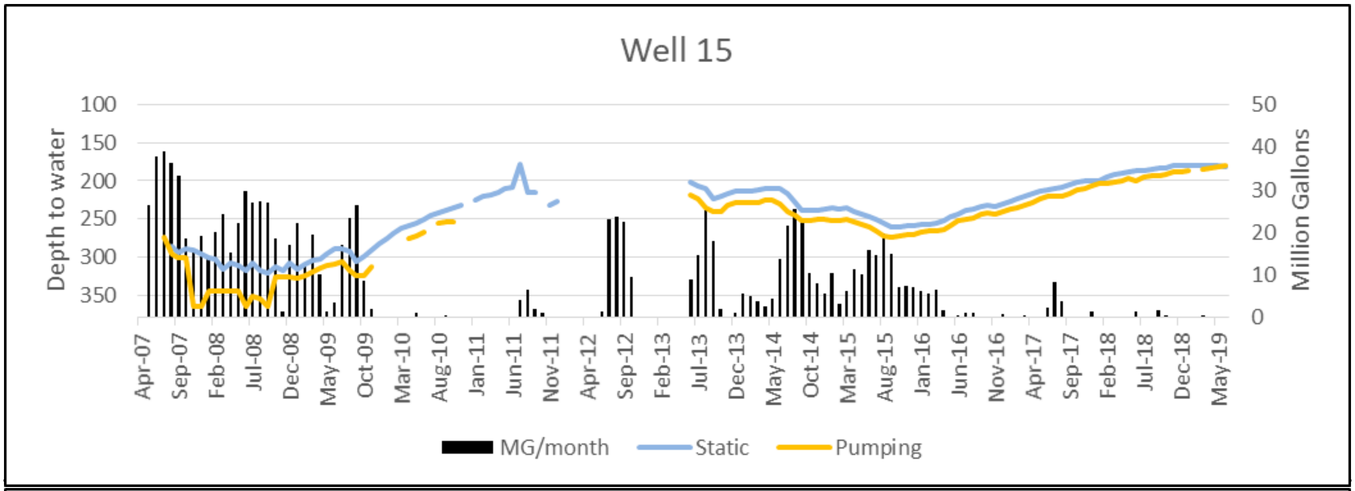
Groundwater

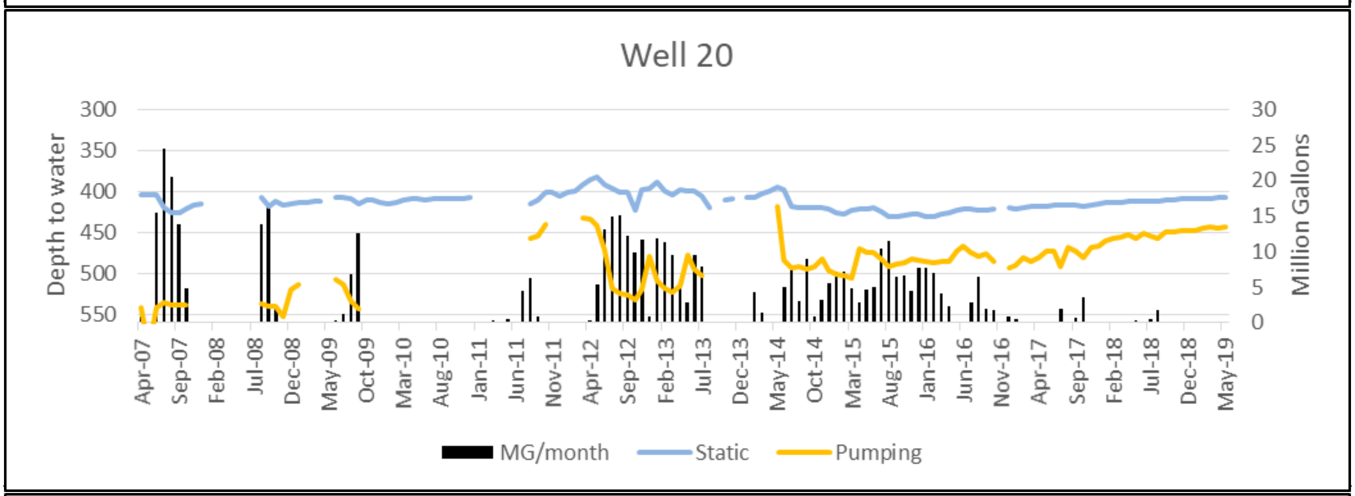
Approximately 325,000 gallons or one percent (1%) of the drinking water produced was from the District's groundwater sources during the month of June. Sierra Star golf course purchased 5,569,000 gallons of raw well water for golf course irrigation and Snowcreek golf course is currently not in need of water. Groundwater production Wells 1, 6, 10, 15, 16, 17, 18, 20, and 25 are operating as expected and available for service. Flowing artesian sources include Wells 6 and 10, both wells will likely continue to flow to the surface until later in the summer when they are utilized for production. All wells continue to be monitored daily and the currently available wells are adequate to meet current demand.

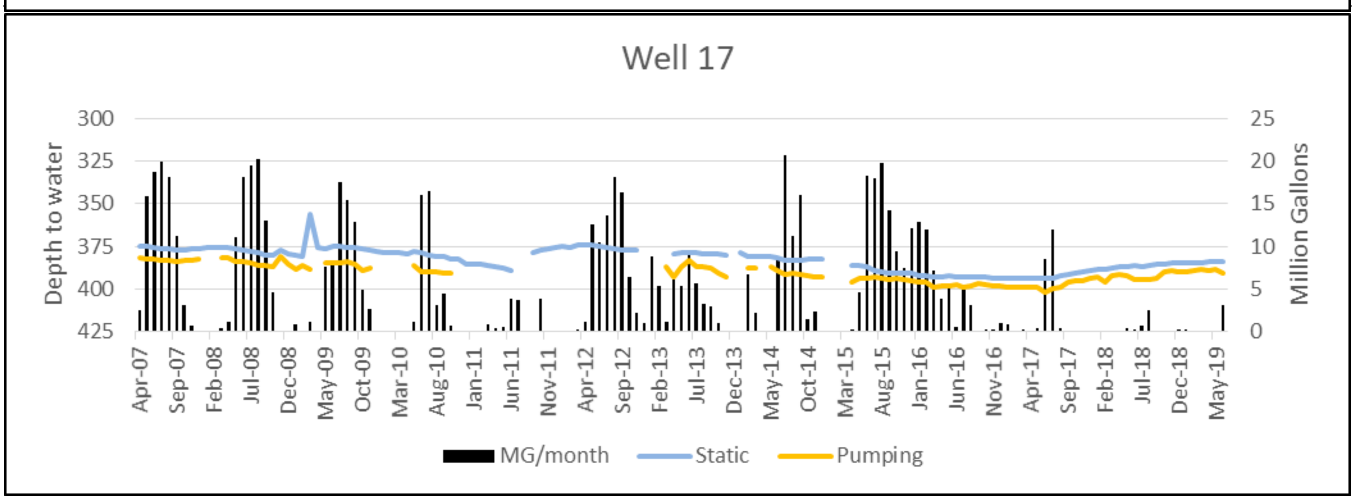

Well 1
Depth to Water
Million Gallons
MG/month
Static
Pumping


Well 6
Depth to water
Million Gallons
MG/month
Static
Pumping


Well 10
Depth to water
Million Gallons
MG/month
Static
Pumping

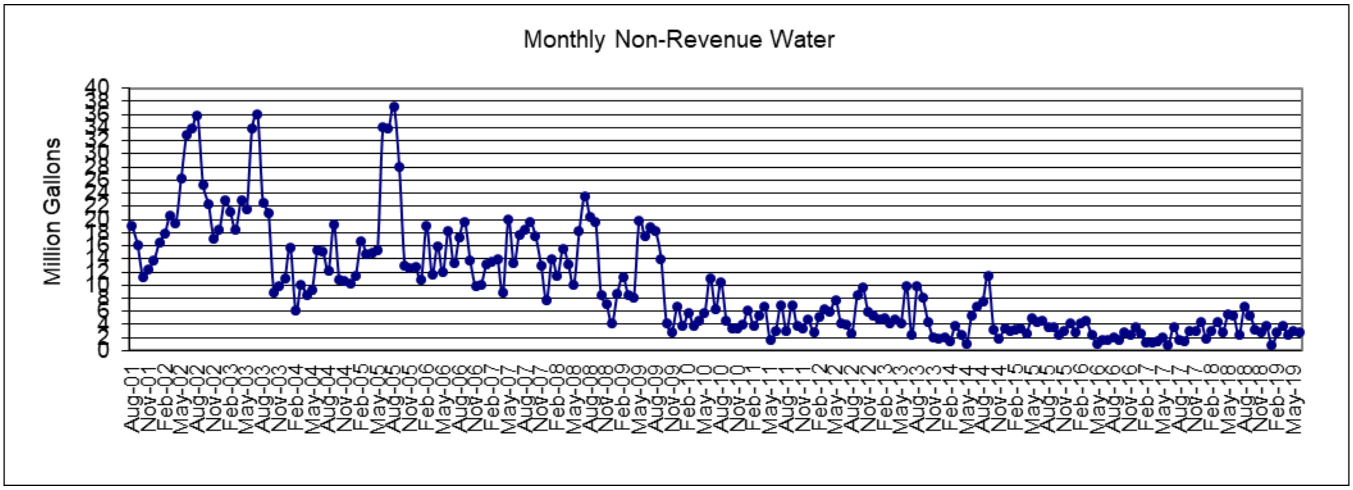

Well 15
Depth to water
100
150
200
250
300
350
Million Gallons
50
40
30
20
10
0
Apr-07 Sep-07 Feb-08 Jul-08 Dec-08 May-09 Oct-09 Mar-10 Aug-10 Jan-11 Jun-11 Nov-11 Apr-12 Sep-12 Feb-13 Jul-13 Dec-13 May-14 Oct-14 Mar-15 Aug-15 Jan-16 Jun-16 Nov-16 Apr-17 Sep-17 Feb-18 Jul-18 Dec-18 May-19
MG/month
Static
Pumping


Well 20
Depth to water
300
350
400
450
500
550
Million Gallons
30
25
20
15
10
5
0
Apr-07 Sep-07 Feb-08 Jul-08 Dec-08 May-09 Oct-09 Mar-10 Aug-10 Jan-11 Jun-11 Nov-11 Apr-12 Sep-12 Feb-13 Jul-13 Dec-13 May-14 Oct-14 Mar-15 Aug-15 Jan-16 Jun-16 Nov-16 Apr-17 Sep-17 Feb-18 Jul-18 Dec-18 May-19
MG/month
Static
Pumping


Well 17
Depth to water
300
325
350
375
400
425
Million Gallons
25
20
15
10
5
0
Apr-07 Sep-07 Feb-08 Jul-08 Dec-08 May-09 Oct-09 Mar-10 Aug-10 Jan-11 Jun-11 Nov-11 Apr-12 Sep-12 Feb-13 Jul-13 Dec-13 May-14 Oct-14 Mar-15 Aug-15 Jan-16 Jun-16 Nov-16 Apr-17 Sep-17 Feb-18 Jul-18 Dec-18 May-19
MG/month
Static
Pumping

- **Water Audit Information**

The water audit for this billing period shows a total of five percent (5%) or 2.873 million gallons of non-revenue water.



Wastewater – Treatment & Flow

- **Wastewater Treatment**

Treated wastewater discharged from the facility met all water quality standards for the month as established by the State Water Quality Control Board. Wastewater staff is currently in the process of evaluating sludge dewatering processes to increase operational efficiencies and reduce sludge handling costs. Staff is in the process of evaluating the handling and disposal costs to determine the economic benefits of investing in a more efficient dewatering technology.

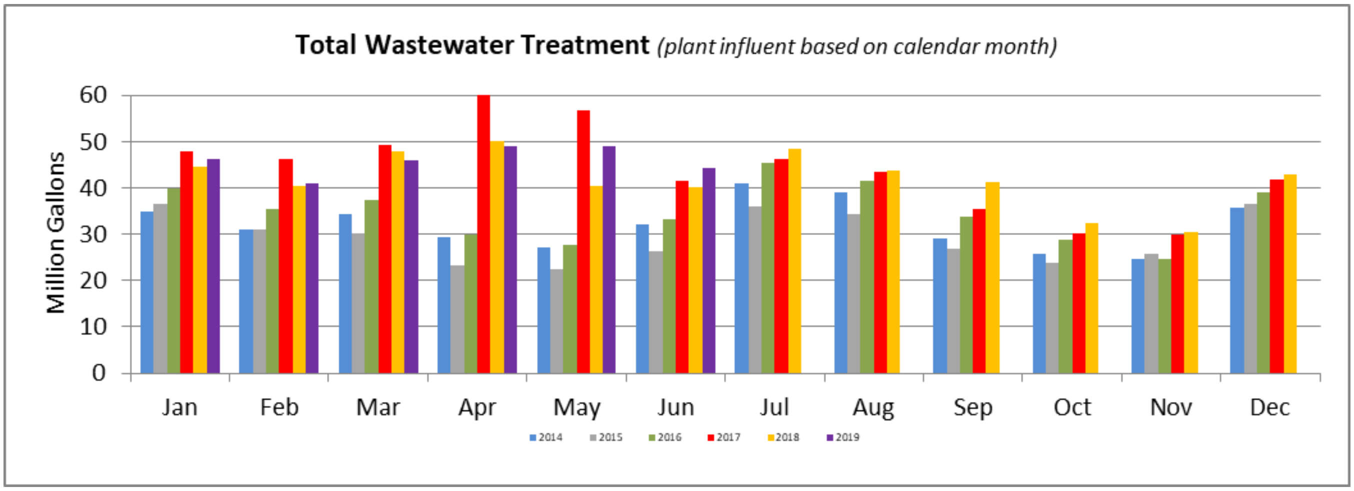
The Wastewater treatment plant staff is currently exploring technologies for the replacement of the tertiary filter. A pilot study of one of these technologies is currently in operation and will be conducted through July and August providing a longer than typical analysis of the filter efficacy. This longer pilot provides a more comprehensive study during the majority of the recycled water season.

- **Wastewater Flows**

The total volume of wastewater treated during the month of June was 44,265,000 gallons. This results in an average volume of 1.48 million gallons per day of wastewater influent.

- **Recycled Water**

Sierra Star golf course purchased 1,995,000 gallons of recycled wastewater for irrigation and Snowcreek golf course has not requested any water as of this report.



- **Industrial Users**

Currently the Wastewater and Engineering staff are working on identifying potential industrial users and bring current industrial users into compliance with our requirements.

Mammoth Brewing Company has not crossed the threshold and qualified as an industrial user since August 2018.

Laboratory Management

- **Regulatory Compliance**

Laboratory personnel are currently updating processes and record keeping practices to meet the forthcoming regulation changes from state to federal standards. A routine bi-annual assessment of the laboratory will be conducted by the Environmental Laboratory Accrediting Program assessors in July. The assessment will provide feedback to the lab and ensure compliance with current state standards.

MAMMOTH COMMUNITY WATER DISTRICT

Agenda Item: B-1

Operations Department Report

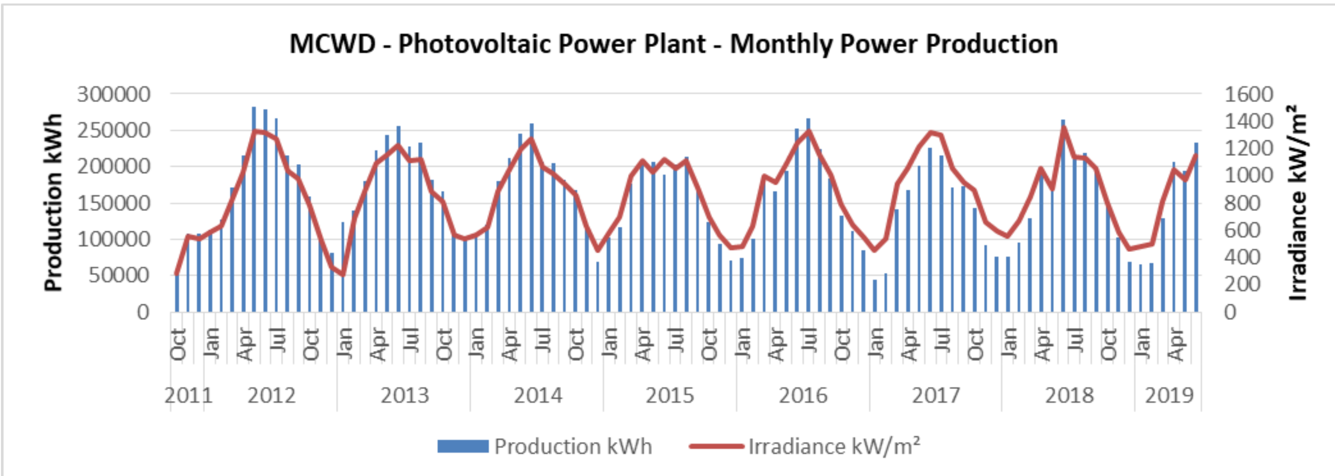
07-18-2019

July 2019

Photovoltaic Power Plant Operations & Total District Electrical Usage

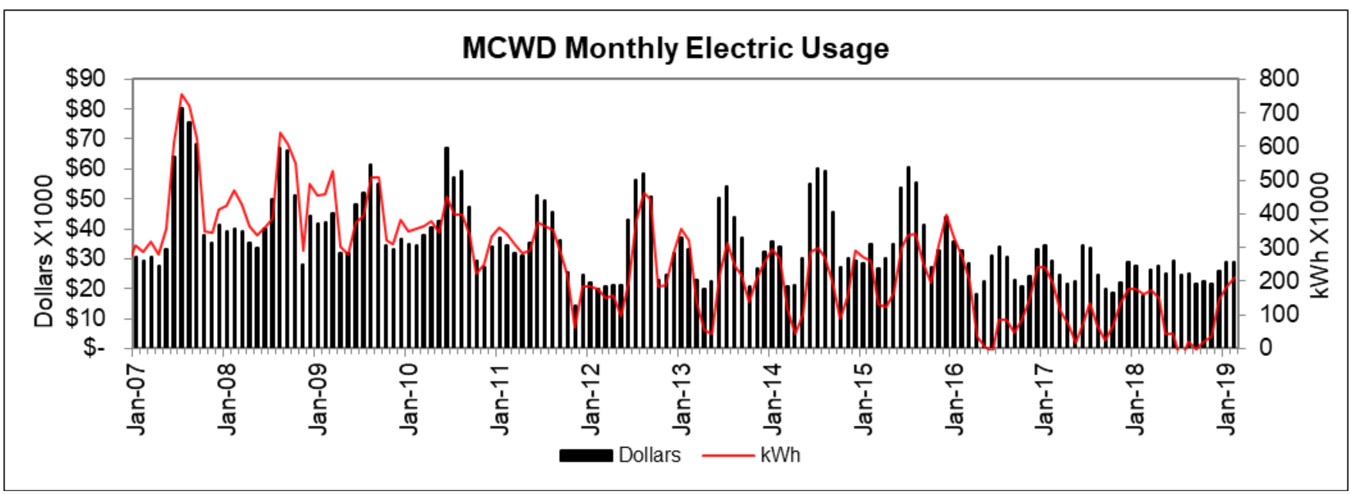
- **Solar plant production**

The total kilowatt hours of energy produced for the month of June was 232,510 kWh. The irradiance for June was 15% less than June 2018 however the solar energy production only decreased by 12%.



- **Total electrical energy use**

Monthly energy usage chart for the past 12 years through February 2019. The monthly total includes all District facilities (34 electric meters) for all water, wastewater, and administrative uses.



MAMMOTH COMMUNITY WATER DISTRICT

Maintenance Department Report

July 2019

Report Summary

The Maintenance Department's main focus for the month of June was annual inspections on pressure reducing valves, valve exercising, sewer cleaning and TV inspections.

Wastewater Treatment Plant and Recycled Water Maintenance

- Performed daily and weekly preventive maintenance inspections
- Replaced belt press feed pump VFD
- Weed control and removal
- Rebuilt belt press feed pump
- Replaced digester blower VFD
- Maintenance staff continued working with Operations and Engineering, looking at new ideas for sludge dewatering systems

Solar Power Plant Maintenance

- Performed general visual inspections and repairs

Surface Water Treatment Plant and Related Facilities Maintenance

- Performed preventive maintenance inspections
- Repaired emergency generator fuel line at LMWTP

Groundwater Treatment Plant and Related Facilities Maintenance

- Performed daily and weekly preventive maintenance inspections
- Repaired the fence at GWTP #1
- Began painting of the exterior of GWTP #2

Water Distribution System Operations & Maintenance

- Performed weekly inspections at the pressure reducing stations
- Valve exercising continued with 195 valves being exercised in 2019. This brought maintenance crews to 55% of their annual goal for 2019. The District has 1,919 valves which are on a five year exercising rotation with 30 critical valves being exercised annually.
- Air relief valve inspections continued with 13 valves being inspected in 2019. This brings maintenance crews to 62% of their annual goal. The District has 109 air relief valves which are inspected on a five year rotating basis.
- Fire hydrant inspections continued with 128 hydrants inspected in 2019. This brought maintenance crews to 46% of their annual goal for 2019. There are 559 fire hydrants in the system, which are inspected on a two year rotating basis.
- Quarterly water mainline flushing for 44 areas within the Water Distribution System, where crews have identified dead end lines, continued for 2019. The Line Maintenance department is at 50% of their annual goal for 2019.

- Maintenance crews installed a 4" tap on Majestic Pines as part of the Water System Improvement Project
- Replaced in-tank mixer and sump pump at the clear well (Tank T-6)
- Performed annual inspections and maintenance on the hydraulic control valves at Old Mammoth, College and Knolls pressure reducing stations (38hrs)
- Moved meter out of parking lot at 930 Forest Trail
- Performed 1 no-water usage investigation which resulted in 1 meter replacement
- Performed 37 metering system repairs and 3 new hookups (46hrs)
- There was 1 waterline leak requiring repair in the month of June (13hrs)
- Adjusted control valves as needed for area specific water usage changes and surface/groundwater distribution system balance, and pumped out vaults (45hrs)
- Delivered 6 - 48hr disconnect notices for non-payment and turned 3 meters off (3hrs)
- Backflow mailings for annual testing continued as follows: sent first notices for July which included 202 sites and 372 hazards, sent second notices for June which included 107 sites and 288 hazards, and sent third notices for June which included 50 sites and 148 hazards (9hrs)
- Cross Connection Control Program work continues in 2019 which includes site surveys, new backflow prevention assembly tests, data entry, and customer service phone calls. The District presently tracks 887 sites with 1,710 assemblies (10hrs).
- Maintenance crews responded to 5 customer service calls to assist customers with no water and leak detection

Wastewater Collection System Operations & Maintenance

- Performed weekly inspections of the lift stations and force mains
- Sewer five year rotating scheduled cleanings and inspections continued with 41,699' of pipe cleaned in 2019. This brought Line Maintenance crews to 58% of their annual goal for 2019. There are 361,627' of sewer lines on this schedule.
- Sewer quarterly and bi-annual rotating scheduled cleanings and inspections continued with 19,015' of pipe cleaned in 2019. This brought Line Maintenance crews to 50% of their annual goal for 2019. There are 38,030' of sewer lines on this schedule. This schedule includes identified sewer lines that are in need of enhanced maintenance. Sewer lines on this schedule get cleaned two to four times a year. Some lines also have minimizer pumps that inject a grease emulsifier several times a day to help keep grease in suspension. These are monitored on an as-needed basis.
- Installed new controls at Rainbow lift station. This is part of a scheduled rehab project for two lift stations.
- Cleaned Rainbow and Tamarack wet wells
- Maintenance crews responded to a sewer problem at Base Camp Café and worked with the owner to resolve the issues

Special Projects/Programs

Summer Construction: The crew is presently working of Lower Majestic Pines water system improvements. Progress for planned in-house construction projects for FY20 is as follows:

- **Grit Removal Improvement Project at the WWTP**
  Project involves installing by-pass piping, rebuilding the existing grit trap and installing new grit removal equipment

Progress: Work started as scheduled on 4/30 for Phase 1, the bypass piping system, which was completed in mid-May. Construction of Phases 2 and 3, grit trap modifications and equipment installations, are scheduled for mid- August.

- **Water Facilities Relocation Project South side of HWY 203**
  Project involves relocating fire hydrants and meters on the South side of HWY 203 between Center Street and Liberty Bar ahead of the TOML sidewalk project
  Progress: Work started in mid-May and with the exception of the fire hydrant located next to Liberty Bar, was completed in early June. The hydrant by Liberty Bar was removed and will be reinstalled in its new location when work on the new sidewalk project is completed by the TOML contractor. Meter and backflow prevention assembly have been relocated by Basecamp Café and both water lines running across Hwy 203 have been abandoned and capped.
- **Waterline improvements and facility relocations on the North side of HWY 203**
  Project involves installing 400' of water mainline, connecting water service laterals and meter relocations on the North side of HWY 203 frontage road between the Post Office and Chevron
  Progress: The project has been completed as of 6/18/2019.
- **Collection System Improvements**
  Raise two manholes on Meridian Boulevard
  Progress: The project has been completed as of 6/21/2019. The construction crew raised two manholes to District specifications while following all Town of Mammoth Lakes traffic control.
- **Collection System Improvements on Rainbow Lane**
  Project involves replacing approximately 20' of 8" sewer line
  Progress: The project has been completed as of 6/25/2019. The construction crew repaired the damaged sewer main line in a safe and timely manner using all safety precautions.
- **Water System Improvements on Lower Majestic Pines**
  Project Involves installing 2 new mainline valves and replacing steel fire hydrant laterals on lower Majestic Pines Rd. Also scheduled for this project is replacing an old galvanized line that services two vacant lots and a service lateral to properties on Creekview Place.
  Progress: As of 6/28/2019 Creekveiw Place has been connected and only minor cleanup is left. The crew is on schedule to complete the remainder of this project by the end of July.
  Water Service Lateral replacements
  Project involves replacing water service laterals on Mill Street, Lower Majestic Pines, and at LMWTP
  Progress: Scheduled 7/22 – 8/30/2019
- **Grit Removal Improvement Project at the WWTP (continued)**
  Upgrades to rock trap and equipment installation.
  Progress: Scheduled 9/4 – 9/13/2019
- **Water Service Lateral replacements (continued)**
  Finish replacing water service laterals on Mill Street, Lower Majestic Pines, and at LMWTP
  Progress: Scheduled 9/16 – 10/4/2019

- **Well #32 Piping**
  Project involves installing 120' of drain line and 60' of water transmission line across Snowcreek Golf course in preparation drilling Well #32
  Progress: Scheduled 10/7 – 10/18/2019
- **Meter Pit Improvements**
  Project involves replacing and relocating identified habitual problem meter pits
  Progress: Scheduled date is to be determined
- **Raise valve and manhole risers after TOML paving projects**
  Possibility of Minaret Road overlay to be determined by TOML
  Progress: Scheduled date is to be determined

Fats, Oil and Grease (FOG) Program: The main focus for the month of June was permit application review and communications with FSEs. One new FSE purchased a Goslyn grease trap through the District's Goslyn purchase assistance program.

	Total # FSEs	Permitted FSEs	Exempted FSEs	Goslyn Traps	Conventional Grease Traps	Interceptors	Garbage Disposals	Violations
2018 Totals	77	77	17	13	30	7	2	7
2019 Totals	80	80	20	21	26	7	2	3

Meter Testing Program: Meter testing resumed in June. Staff tested twelve meters ranging from 5/8" to 2" with all meters passing AWWA standards for flow accuracy testing.

Sewer Line and Manhole Rehab Project 2019: All data has been gathered for 6300' for CIPP lining and 20 manholes for improvements. RFPs went out to contractors and bids are due by July 19th.

Departmental

- Departments held weekly safety meetings
- Performed weekly vehicle maintenance
- Performed general maintenance on District buildings and grounds
- Maintenance departments continued to assist the Operations Departments with stand-by duties
- Removed snow at Lake Mary Treatment Plant and Tank T-6

General

- Marked water and sewer lines in response to USA calls

Financial Update

Water revenue remains below budget as cooler temperatures have delayed the irrigation season. Interest revenue is above budget primarily as a result of unrealized gains in the market value of the portfolio. Unrealized gains are not available as cash unless the securities in the portfolio are sold.

The District purchased a condominium unit at 140 Sierra Park Road on June 14. The condo was purchased by an employee in 2016 using the Employee Home Purchase Assistance Program who is now moving to a larger home. The unit was appraised at $430,000 in May 2019, but because the District shared in the increase in value of the condo between 2016 and 2019, the total acquisition cost to the District was $385,216. The condo unit will be offered for sale to all permanent employees. If no employees are interested in purchasing the condo, it will be available to rent as part of the District's employee housing program.

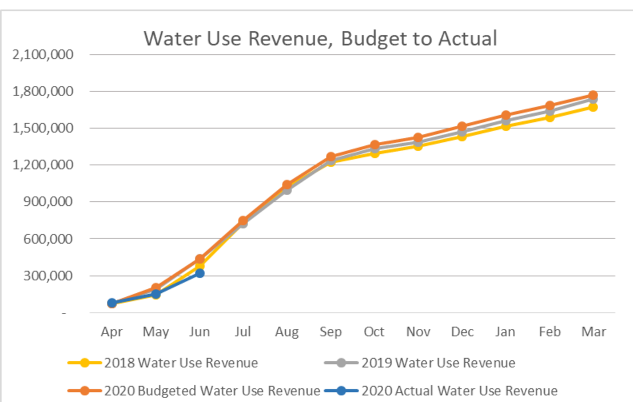
Teaman Ramirez & Smith, the District's independent financial auditor, completed their field work during the first week of June, and will present their final report to the Board at the August or September meeting.

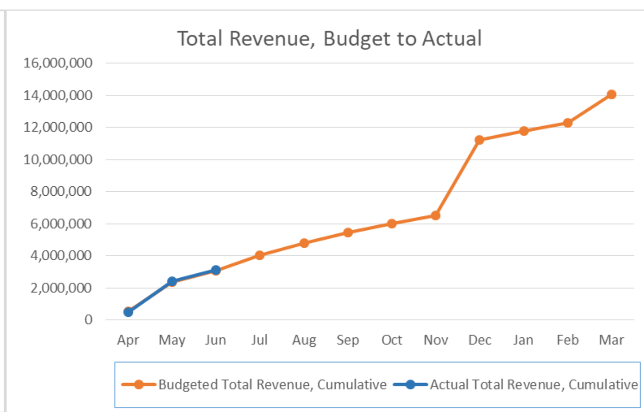
Significant expenditures during the month include:

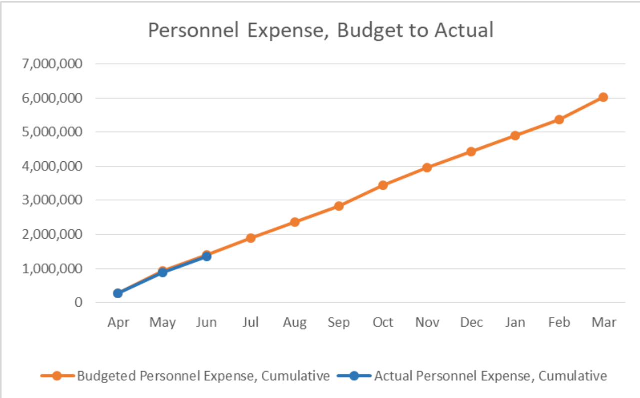
- $ 135,000.00 to Tesco Controls for work on the WWTP main PLC upgrade
- $ 19,590.00 to Tesco Controls for the Rainbow and Shady Rest lift station control panels
- $ 32,238.00 to Watersmart Software for a three-year software license
- $ 9,359.71 to Berchtold Equipment for a Bobcat jackhammer attachment

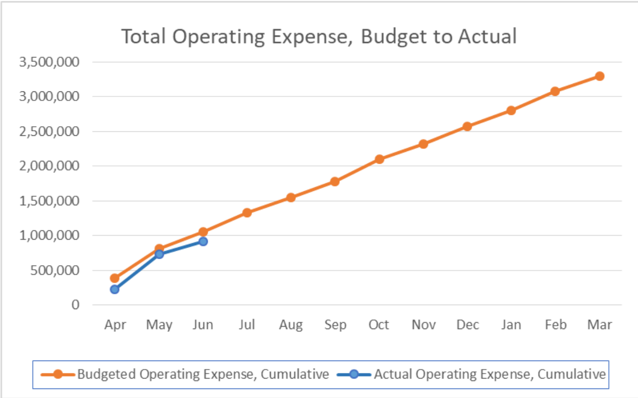
Details on capital expenditures are listed in Table A, operation expenses in Table B, fund balances in Table C, utility bill aging in Table D, and cash balance projection in Table E, followed by a summary of the District's investment portfolio.

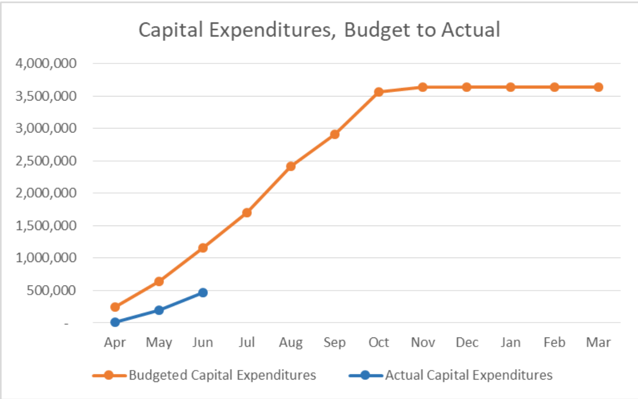
Summary graphs of revenue and expenses are presented immediately below.

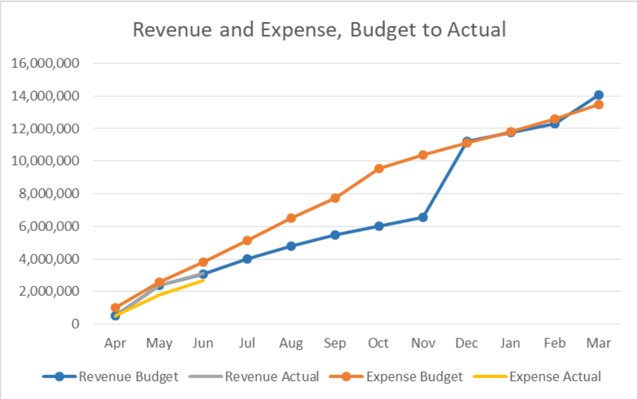





Personnel Expense, Budget to Actual
7,000,000
6,000,000
5,000,000
4,000,000
3,000,000
2,000,000
1,000,000
0
Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar
Budgeted Personnel Expense, Cumulative
Actual Personnel Expense, Cumulative


Total Operating Expense, Budget to Actual
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar
Budgeted Operating Expense, Cumulative
Actual Operating Expense, Cumulative


Capital Expenditures, Budget to Actual
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
-
Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar
Budgeted Capital Expenditures
Actual Capital Expenditures


Revenue and Expense, Budget to Actual
16,000,000
14,000,000
12,000,000
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
0
Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar
Revenue Budget
Revenue Actual
Expense Budget
Expense Actual

Financial Reports

Table A Capital Project Management

	Capital Funds Project Summary			
	Fiscal Year: 2020			
	Spending through June 2019			
FUND	**PROJECT DESCRIPTION**	**BRE**	**FY 2020 Budget**	**FY 2020 YTD Expenditure**
23	East Lk Mary Lift Station Rehab	22	67,697	-
23	Laurel Pond Monitoring Wells	21	165,108	932
23	WWTP Main PLC Upgrade	21	183,880	144,650
21	WWTP Back-up Power and battery UPS	21	297,518	4,096
22	Well 32	21	1,679,089	10,078
23	Rehab Primary Clarifier #2	20	39,574	-
23	Sewer Line Rehab FY 2020	18	345,982	-
22	WTP Arc Flash Study	17	95,000	2,708
22	Distribution System Improvements FY 2020	17	315,499	139,293
23	Tamarack Lift Station Rehab	13	67,697	1,237
23	WWTP Grit removal	13	205,550	54,578
23	Shady Rest/Rainbow Lift Stations Rehab			25,176
22	LMTP Improvements		10,000	-
22	Update Groundwater Model		150,000	6,081
23	Wastewater Cost of Service Study		25,000	10,411
32/33	Connection Fee/Permit Fee Study		40,000	8,451
21/31	Rehab/Replace Admin Bldg		50,000	15,428
22	Tank 5 Rehab		270,000	-
22	Replacement Well Site Eval/Land			4,284
	Capital Equipment			
21	Fuel dispenser replacements		20,000	
22	Tracked side-by-side snow vehicle		35,000	31,478
23	LIMS		40,000	3,714
22/23	Jackhammer attachment		9,360	9,360
22	T-6 Control Valves		21,000	
	Total Capital Projects and Equipment		**4,132,953**	**471,955**

BRE = Business Risk Exposure

Table B Revenue and Expenses

Account	YTD Actual	YTD Budget	Better/Worse	% Diff
Billing - Water Usage	318,832	437,662	(118,830)	-27%
Water Base Rates	453,167	451,250	1,917	0%
Wastewater Base Rates	733,523	735,750	(2,227)	0%
Engineering Revenue	8,932	11,575	(2,643)	-23%
Miscellaneous Revenue	41,092	48,175	(7,083)	-15%
Permits - Connection Fees	20,650	59,350	(38,700)	-65%
Taxes and Assessments	1,292,259	1,213,620	78,639	6%
Interest Income	270,503	114,000	156,503	137%
Total Revenue	**3,138,959**	**3,071,382**	67,577	**2%**
Salaries & Wages	824,468	868,660	44,192	5%
Salaries & Wages - Board Members	4,916	6,250	1,334	21%
Salaries & Wages - Capital	52,997	47,696	(5,302)	-11%
Employee Benefits - Group Insu	264,745	254,037	(10,709)	-4%
Employee Benefits - Pension	183,459	199,337	15,878	8%
Employee Benefits - Workers Co	19,157	23,098	3,941	17%
Employer Paid Taxes	12,817	13,580	763	6%
Total Personnel Expense	**1,362,560**	**1,412,657**	**50,098**	**4%**
Employee Engagement	684	4,575	3,891	85%
Ee Ben. PPE Unif Other	3,122	4,025	903	22%
Outside Services/Contractual	9,199	20,906	11,708	56%
Property Tax Admin. Fee	210,040	188,000	(22,040)	-12%
Sludge Disposal	40,899	52,500	11,601	22%
Software Licenses	66,166	46,926	(19,240)	-41%
IT Services	14,605	14,600	(5)	0%
Banking Fees	7,537	9,725	2,188	22%
Professional Services	70,803	62,200	(8,603)	-14%
Outside Services/Contractual	3,403	12,563	9,160	73%
Employee Housing Expenses	13,499	24,265	10,766	44%
Operating Tools	24,525	7,400	(17,125)	-231%
Gasoline	9,815	8,625	(1,190)	-14%
Diesel Fuel	7,708	3,400	(4,308)	-127%
Insurance	43,297	45,000	1,703	4%
Legal Services	18,539	30,750	12,211	40%
M & R - Line Repair/Equipment	36,023	58,290	22,267	38%
M & R - Buildings	12,664	20,912	8,248	39%
M & R - Vehicles	25,241	18,488	(6,753)	-37%
Memberships/Certifications	7,506	7,519	13	0%
Permit Materials	985	7,500	6,515	87%
Operating Chemicals	22,577	40,573	17,996	44%
Operating Supplies	18,476	29,025	10,549	36%
Computer Systems/Equipment	10,526	8,350	(2,176)	-26%
Postage/Freight	1,261	2,330	1,069	46%
Advertising Publications & PR	2,671	5,813	3,141	54%
Books & Subscriptions	75	809	734	91%
Safety	11,940	5,628	(6,313)	-112%
Permits & Licensing	4,073	11,263	7,190	64%
Settlement Costs	150,000	150,000	-	0%
Telephone	5,224	10,225	5,001	49%
Training & Meetings	3,540	13,294	9,754	73%
Travel Expenses	12,691	15,556	2,866	18%
Bank Reconciliation over/short	14	N/A		
Utilities-Electric	30,852	71,875	41,023	57%
Utilities-Propane	4,452	13,500	9,048	67%
Water Conservation	9,324	26,250	16,926	64%
Total Operating Expense	**913,956**	**1,052,658**	**138,715**	**13%**

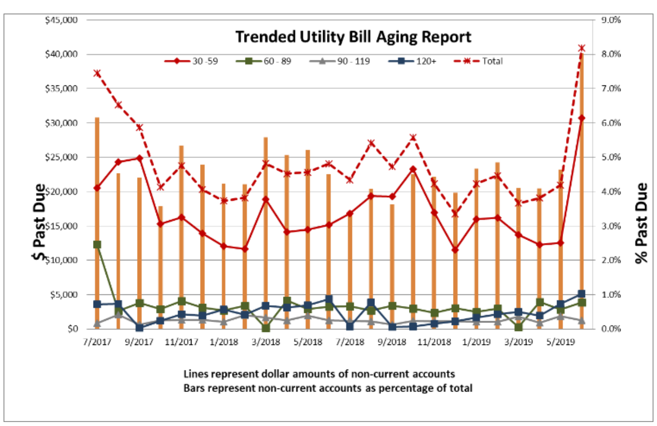
Table C Fund Balance

	Operating Funds			Capital R&R Funds		
	10	20	30	21	22	23
	Admin	Water	Wastewater	Admin	Water	Wastewater
Cash Total	371,961	900,521	1,431,644	3,004,421	7,784,898	4,449,123
Current Assets	529,854	384,981	193,820	-	794,764	(761,873)
Non-current Assets	-	-	-	-	-	-
Capital Assets	108	-	-	2,031,090	33,693,868	14,763,267
Total Assets	901,923	1,285,502	1,625,465	5,035,511	42,273,530	18,450,517
Current Liabilities	(156,076)	(22,128)	(19,037)	-	(71,038)	(2,291)
Non-current Liabilities	(336,860)	(197,454)	(217,675)	-	-	-
Assets - Liabilities	408,987	1,065,921	1,388,753	5,035,511	42,202,492	18,448,226
Available Fund Balance	215,886	878,393	1,412,608	3,004,421	7,713,860	4,446,832
Target Fund Balance	190,000	1,160,000	1,260,000	3,000,000	5,964,000	3,348,000

	Capital Expansion Funds			Other Funds		
	31	32	33	96	98	
	Admin	Water	Wastewater	Enterprise	LADWP	Total
Cash Total	1,509,694	913,864	171,260	784,351	313,934	21,697,146
Current Assets	-	(24)	-	4,712	-	1,146,234
Non-current Assets	-	-	-	2,443,298	-	2,443,298
Capital Assets	5,091	10,554,922	4,901,012	928,214	-	66,877,572
Total Assets	1,514,785	11,468,762	5,072,272	4,160,576	313,934	92,164,251
Current Liabilities	-	12	248	(5,110)	-	(275,419)
Non-current Liabilities	-	-	-	-	-	(751,988)
Assets - Liabilities	1,514,785	11,468,773	5,072,520	4,155,466	313,934	91,136,843
Available Fund Balance	1,509,694	913,876	171,508	779,241	313,934	21,421,726
Target Fund Balance	1,500,000	870,000	163,000	1,000,000	220,000	18,748,101

Available fund balance equals cash – current liabilities.

Table D Trended Utility Bill Aging Report



The total amount past due is $40,939 as of June 30, 2019.

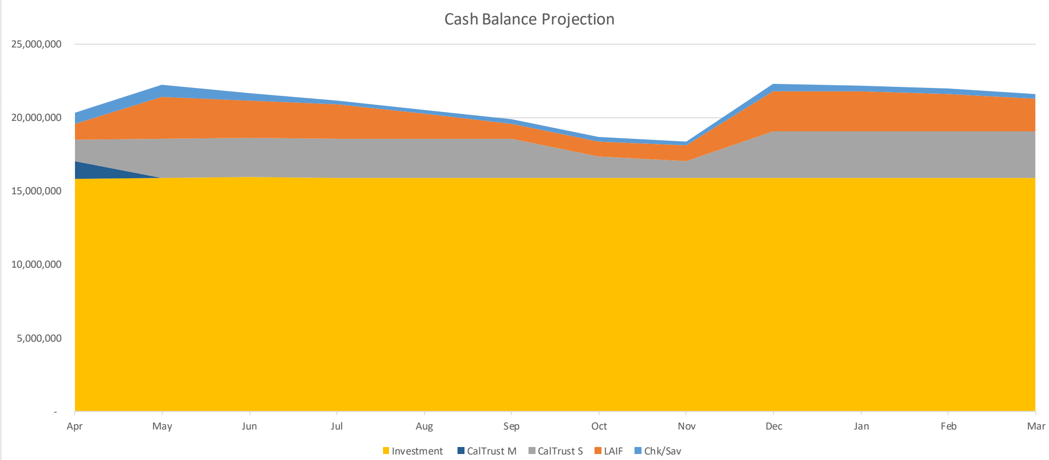
MAMMOTH COMMUNITY WATER DISTRICT

Finance Department Report
July 2019

Agenda Item: B-3
07-18-2019

Table E Cash Balance Projection

				(Estimated)								
	Apr	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**
Chk/Sav	773,550	856,870	497,249	255,380	245,175	276,027	292,898	270,223	539,681	386,257	375,483	339,917
LAIF	1,044,222	2,844,222	2,544,222	2,344,222	1,744,222	1,044,222	1,044,222	1,044,222	2,744,222	2,744,222	2,544,222	2,244,222
CalTrust S	1,506,850	2,664,619	2,673,096	2,673,096	2,673,096	2,673,096	1,473,096	1,173,096	3,173,096	3,173,096	3,173,096	3,173,096
CalTrust M	1,154,475	-	-	-	-	-	-	-	-	-	-	-
Investment	15,851,660	15,875,292	15,968,302	15,875,292	15,875,292	15,875,292	15,875,292	15,875,292	15,875,292	15,875,292	15,875,292	15,875,292
Total	20,330,757	21,883,884	21,465,436	21,147,990	20,537,785	19,868,637	18,685,508	18,362,833	22,332,291	22,178,867	21,968,093	21,632,527



Mammoth Community Water District
Account #10652

Portfolio Summary
As of June 30, 2019

PORTFOLIO CHARACTERISTICS

Average Modified Duration	2.05
Average Coupon	2.23%
Average Purchase YTM	2.19%
Average Market YTM	2.13%
Average S&P/Moody Rating	AA/Aa2
Average Final Maturity	3.43 yrs
Average Life	2.13 yrs

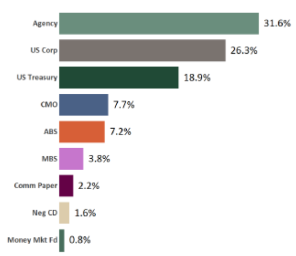
ACCOUNT SUMMARY

	Beg. Values as of 5/31/19	End Values as of 6/30/19
Market Value	15,963,510	16,011,921
Accrued Interest	65,901	75,199
Total Market Value	16,029,411	16,087,120
Income Earned	29,840	30,225
Cont/WD		-32,885
Par	15,917,194	15,877,563
Book Value	15,921,895	15,911,516
Cost Value	15,948,282	15,939,550

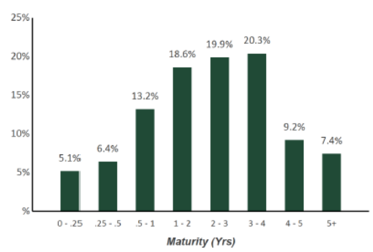
TOP ISSUERS

Federal National Mortgage Assoc	19.8%
Government of United States	18.9%
Federal Home Loan Bank	12.5%
Federal Home Loan Mortgage Corp	7.1%
Toyota ABS	2.6%
MUFG Bank Ltd/NY	2.2%
Goldman Sachs Inc.	1.8%
PNC Financial Services Group	1.6%
Total	66.5%

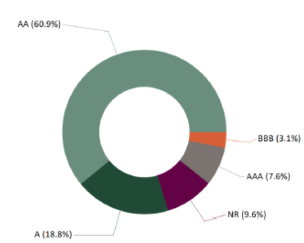
SECTOR ALLOCATION



MATURITY DISTRIBUTION



CREDIT QUALITY (S&P)



PERFORMANCE REVIEW

					Annualized				
TOTAL RATE OF RETURN	**1M**	**3M**	**YTD**	**1YR**	**2YRS**	**3YRS**	**5YRS**	**10YRS**	**1/31/2019**
Mammoth Community Water District	0.57%	1.43%	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ICE BAML 0-5 Yr US Treasury Index	0.58%	1.60%	N/A	N/A	N/A	N/A	N/A	N/A	N/A

MAMMOTH COMMUNITY WATER DISTRICT

Agenda Item: B-4

Engineering Department Report

07-18-2019

July 2019

Construction Permits

Construction activity on projects with Construction Permits is now in full force with good weather in Town for construction. A Construction Permit application for the 540 mixed use commercial and residential project has been received and review comments have been provided. This project provides for the construction of planned unit development residential units with street level commercial space fronting Old Mammoth Road at the intersection of Oak Tree Place. New water and sewer facilities are needed to serve the new buildings including a new sewer main in Old Mammoth Road.

District Projects

The District projects with work continuing include:

- *An exploratory borehole at the Snowcreek Golf Course near Ranch Road (Well 32 site).* The borehole drilling and testing have been delayed to acquire additional access rights to the site. With this suspension, borehole drilling, testing and completion of the well based on borehole test results will commence when additional access rights have been obtained. Negotiations with the Ranches at Snowcreek Owners Association have resulted in an agreement that includes additional well access rights on property owned by the association. Negotiations continue with the Snowcreek VI Owners Association for additional well access rights. MCWD has provided a temporary license agreement form to the Snowcreek VI Board president and requested that this be approved by the Board for temporary well access across Ranch Road to start drilling this fall. This request is in parallel with our request to have the Board initiate a membership vote to approve the agreement and permanent easement for permanent well access. The parallel process is required to start work this fall because the membership vote is expected to be a long process based on past experience of the Snowcreek VI Board. Borehole testing will verify how this well can be utilized, either as a production well or a monitoring well.
- *Well 32 production well*. If the results from the exploratory borehole drilling and testing are positive, a production well including well head, equipment structure and final site grading and landscaping will be constructed at this site. If results are less than anticipated, then a monitoring well or abandoned well bore will be completed along with the same site restoration.
- *Arc Flash hazard study for water production facilities*. A continuation of the Arc Flash hazard reduction program, several water production facilities with large electrical motors for pumping are being evaluated and recommendations for hazard reduction will be implemented. District records have been compiled and delivered to the consultant for the groundwater treatment plants. As part of the work, the consultant has visited the facilities to verify conditions. Southern California Edison has verified transformer information and has provided needed performance data on the equipment for the consultant to complete the study. The identified hazards will be posted in the facilities as warnings in accordance with guidelines provided by our insurance carrier.
- *Laurel Pond Monitoring Well replacements*. Four shallow groundwater water quality monitoring wells used for regulatory compliance have been evaluated for replacement near Laurel Pond. The 34 year old existing wells are no longer viable due to shallow depth and inundation or poor access caused by pond area enlargement. The replacement wells will be located on higher ground with improved access and drilled deeper for more reliable sampling. The United States Forest Service (USFS) has toured the new well locations with District staff and has received a more detailed project proposal for environmental documentation. A cost reimbursement contract prepared by the USFS for staff work on the project has

been executed and returned to the USFS. The USFS has provided the information to staff resource specialists for review and it has confirmed that their work is programed into this year's projects. Recent inquiries about when the USFS work will be done have not received a response. The USFS contact we have been working with has been invited to attend a field tour with State regulators on July 11, who are reviewing our Waste Discharge Permit conditions including monitoring at Laurel Ponds.

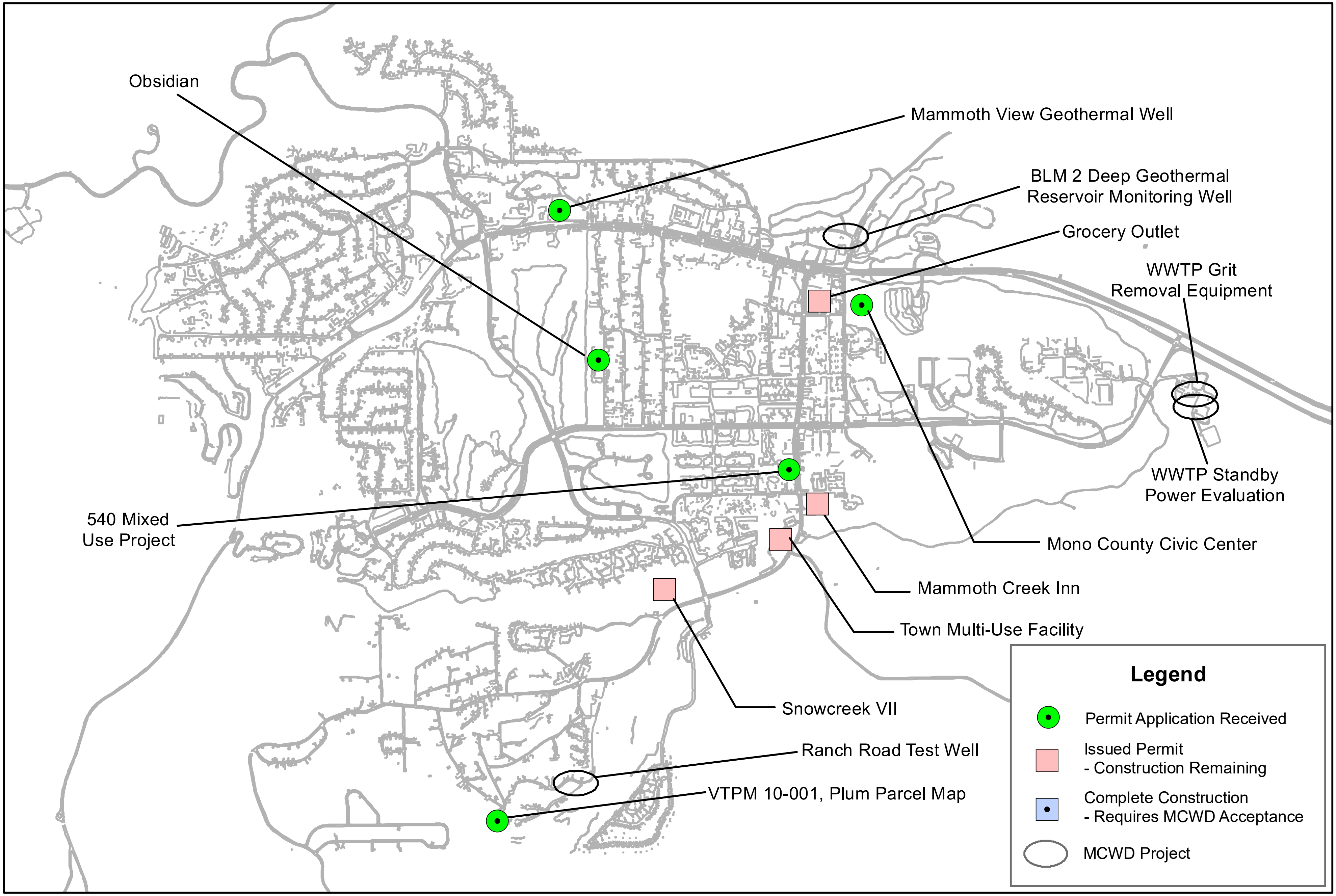
- *Monitoring Well BLM2*. The Bureau of Land Management (BLM) obtained a Special Use Permit from the USFS for two wells on the North East corner of the Mammoth Mountain RV Park, BLM1 and BLM2. BLM1, a shallow, dual nested groundwater monitoring well has been constructed and baseline monitoring began after completing instrumentation of the well in June 2018. A design and drilling plan for BLM2 by the BLM with consultation with the District was partially completed when BLM1 was drilled. After seeing the drill logs from BLM1, BLM conducted research on past drilling of geothermal wells including two wells a half mile apart on the north and south side of SR 203 near Hwy. 395. The research indicated high variability of temperatures and geology in each of these existing wells. Based on their research of the geology in the area and the results from drilling BLM1, BLM staff concluded that drilling BLM2 at the RV Park site may not reach the geothermal reservoir at the permitted depth. A search for an alternate site was initiated to increase the probability of reaching the geothermal reservoir in BLM2. A field meeting for permitting BLM2 at another location on USFS land on the north side of SR 203 was attended in October 2018 by USFS, BLM, and MCWD staff and an alternate location was identified for the USFS to consider permitting for siting BLM2. Since the permitting process requires an alternative site to be considered, BLM continues to evaluate alternative sites for BLM2. MCWD also agrees with the United States Geologic Survey (USGS) recommendation that a shallow, dual nested groundwater monitoring well also be located near the deep well at the alternate site to monitor the vertical hydraulic gradient in that location. At the May 15th Groundwater Monitoring and Response Plan (GMRP) meeting, the BLM stated that they would continue working with the USFS on the process of obtaining permits at an alternate site for both the shallow and deep monitoring wells. Alternate sites now include the site identified in October 2018 as well as other sites the BLM has reviewed recently. The next steps once a site has been selected by the BLM are to develop final well designs and drilling programs to be permitted by the BLM and an operations plan to be permitted by the USFS. In May, the BLM staff requested from MCWD comments and additions on a draft USFS application they had prepared and the draft was returned to BLM with minor revisions. Recent inquiries about the status of the work had the response that "we are working on this, but we want to do this in the best possible way."

Connection Permits

The June 2019 Connection Permit Summary Report is attached. Five permits were issued in June, three for new single family residential projects and two for projects that did not require additional capacity to the existing water and sewer connections. Water conservation rebate applications continue to be processed by the Permit Official, eighteen rebates were issued in June.

Department Activities

Staff and district legal counsel continue to work with Mono County staff and their design build consultants to develop a Facilities Transfer Agreement and a Construction Permit for the approval of plans for new water and sewer facilities to serve the new Mono County Civic Center project. The agreement provides for the facilities constructed under the Construction Permit to be accepted and transferred to the District along with necessary easements for expansion of the MCWD water distribution and sewer collection systems. Mono County staff has provided final plans for the improvements and the agreement will be finalized this month.



Mammoth Community Water District
P.O. Box 597, Mammoth Lakes, CA 93546
(760) 934-2596 FAX: (760) 934-2143

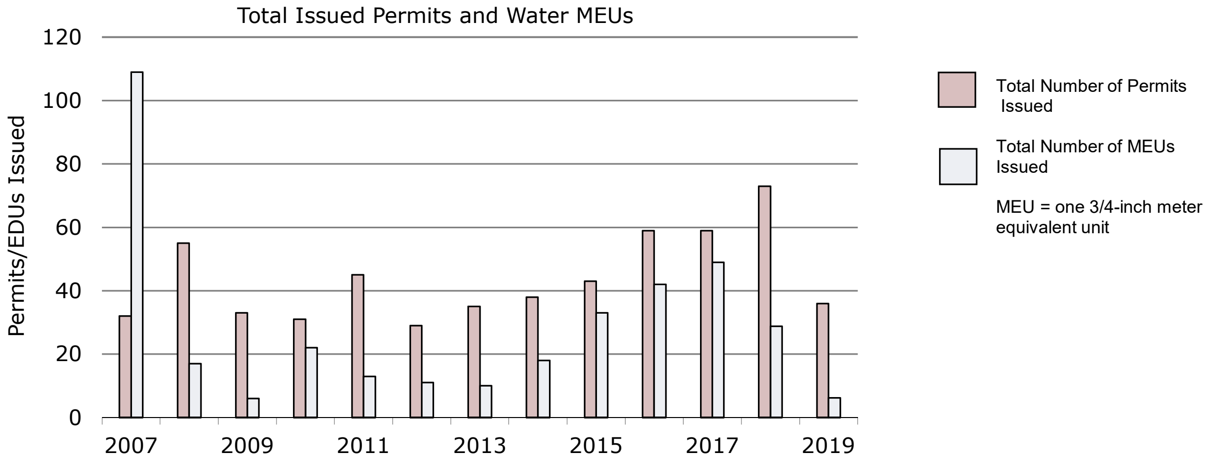
Construction Permits and Projects - June 2019

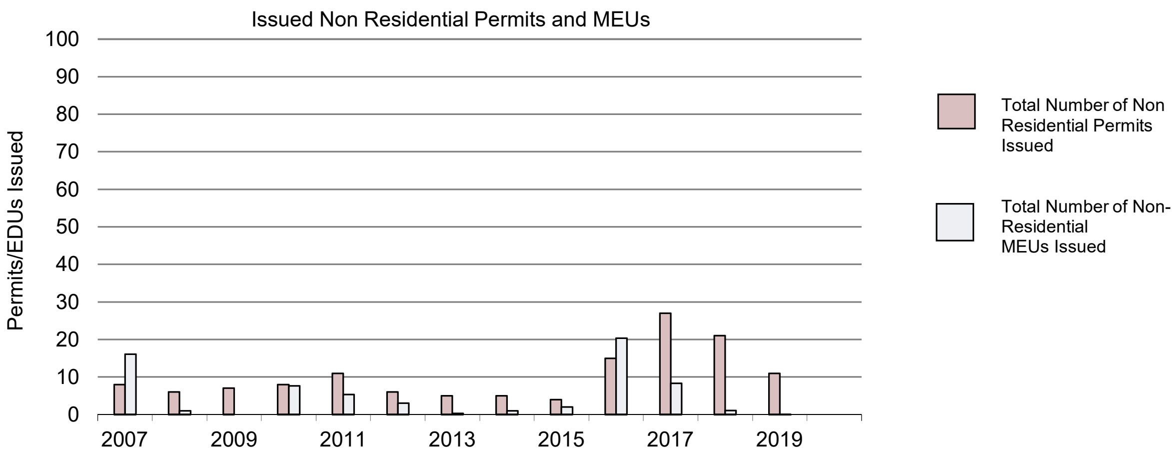
Engineering Department Report

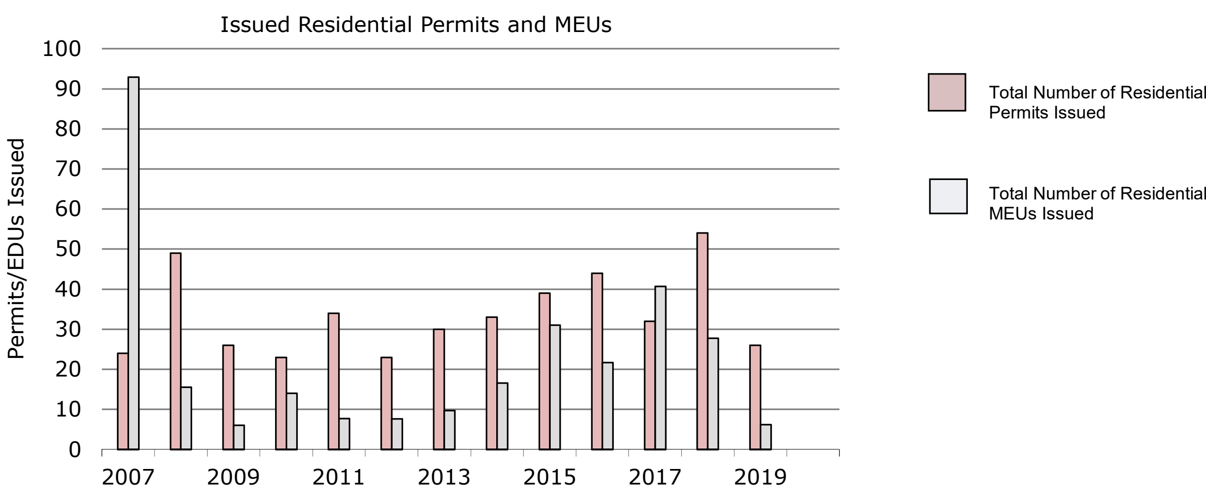
0 500 1,000 2,000 Feet

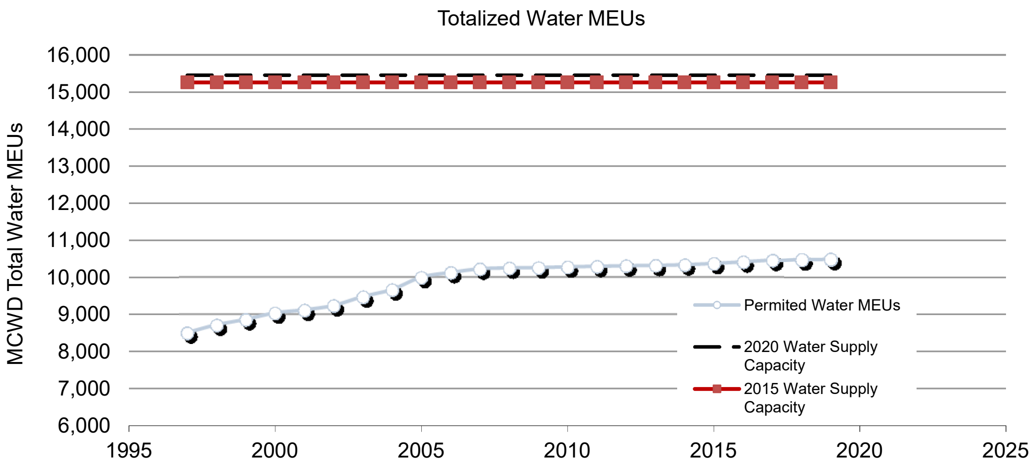
2019 Permit Summary Report

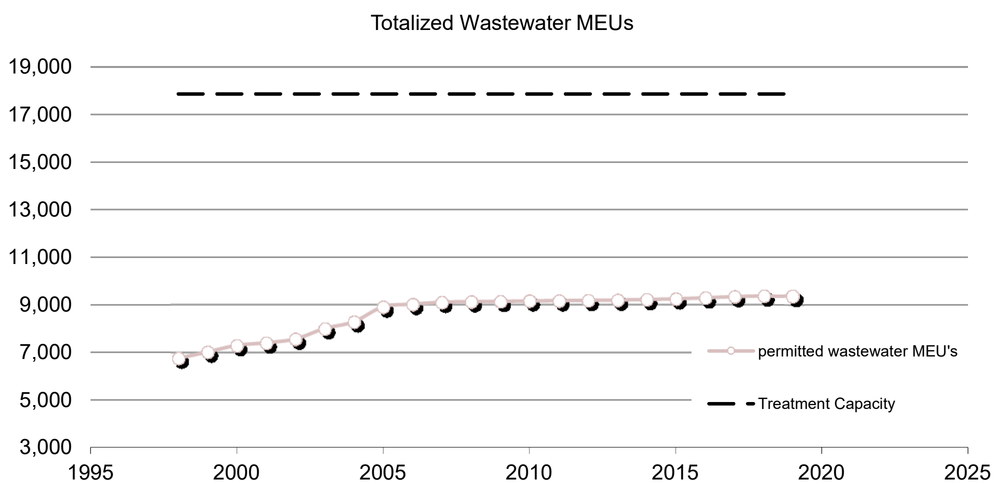
Project Details													Metric Summaries				
Date	**Permit Number**	**Project Address**	**Billing Class**	**Water**	**WW**	**Meter Size**	**Credit**	**Water MEU**	**Wastewater MEU**	**Water Connection Fee**	**WW Connection Fee**	**Total Connection Fee**	**2019 Connection Fee Revenue**	**2019 Water MEU**	**2019 WW MEU**	**Total Water MEU**	**Total WW MEU**
1/1/2019																10,478	9,354
	5294	Pending						0.00	0.00	$ -	$ -	$ -	$ -	0.0	0.00	10,478	9,354
3/20/2019	5292	1528 Forest Trail	SGL	Yes	Yes	Existing	-	0.00	0.00	$ -	$ -	$ -	$ -	0.0	0.00	10,478	9,354
3/25/2019	5353	127 Red Fir Rd	SGL	Yes	Yes	3/4-inch	-	1.00	1.00	$ 6,927	$ 3,085	$ 10,012	$ 10,012	1.0	1.00	10,479	9,355
5/9/2019	5373	413 Rainbow Lane	CDO	Yes	Yes	Existing	-	0.00	0.00	$ -	$ -	$ -	$ 10,012	1.0	1.00	10,479	9,355
5/9/2019	5374	413 Rainbow Lane	CDO	Yes	Yes	Existing	-	0.00	0.00	$ -	$ -	$ -	$ 10,012	1.0	1.00	10,479	9,355
5/9/2019	5375	413 Rainbow Lane	CDO	Yes	Yes	Existing	-	0.00	0.00	$ -	$ -	$ -	$ 10,012	1.0	1.00	10,479	9,355
5/9/2019	5376	413 Rainbow Lane	CDO	Yes	Yes	Existing	-	0.00	0.00	$ -	$ -	$ -	$ 10,012	1.0	1.00	10,479	9,355
5/9/2019	5377	413 Rainbow Lane	CDO	Yes	Yes	Existing	-	0.00	0.00	$ -	$ -	$ -	$ 10,012	1.0	1.00	10,479	9,355
	5380	Pending						0.00	0.00	$ -	$ -	$ -	$ 10,012	1.0	1.00	10,479	9,355
1/30/2019	5381	549 Old Mammoth Road	COM	Yes	Yes	Existing	-	0.00	0.00	$ -	$ -	$ -	$ 10,012	1.0	1.00	10,479	9,355
1/31/2019	5382	305 Azimuth Drive	CDO	Yes	Yes	Existing	-	0.00	0.00	$ -	$ -	$ -	$ 10,012	1.0	1.00	10,479	9,355
2/22/2019	5383	128 Pinehurst Dr	SGL	Yes	Yes	Existing	-	0.00	0.00	$ -	$ -	$ -	$ 10,012	1.0	1.00	10,479	9,355
2/7/2019	5384	148 Mountian Blvd	COM	Yes	Yes	Existing	-	0.00	0.00	$ -	$ -	$ -	$ 10,012	1.0	1.00	10,479	9,355
6/3/2019	5385	849 Majestic Pines	SGL	Yes	Yes	3/4-inch	-	1.00	1.00	$ 7,126	$ 3,174	$ 10,300	$ 20,312	2.0	2.00	10,480	9,356
2/28/2019	5386	189 Forest Trail	SGL	Yes	Yes	Existing	-	0.00	0.00	$ -	$ -	$ -	$ 20,312	2.0	2.00	10,480	9,356
4/1/2019	5387	568 Old Mammoth Rd	COM	Yes	Yes	Existing	-	0.00	0.00	$ -	$ -	$ -	$ 20,312	2.0	2.00	10,480	9,356
3/28/2019	5388	258 Tamarack Street	SGL	Yes	Yes	Existing	-	0.00	0.00	$ -	$ -	$ -	$ 20,312	2.0	2.00	10,480	9,356
3/28/2019	5389	160 LeVerne	SGL	Yes	Yes	3/4-inch	-	1.00	1.00	$ 7,126	$ 3,174	$ 10,300	$ 30,612	3.0	3.00	10,481	9,357
	5390	Pending						0.00	0.00	$ -	$ -	$ -	$ 30,612	3.0	3.00	10,481	9,357
2/26/2019	5391	126 Old Mammoth Road	COM	Yes	Yes	Existing	-	0.00	0.00	$ -	$ -	$ -	$ 30,612	3.0	3.00	10,481	9,357
3/25/2019	5325	598 Golden Creek	CDO	Yes	Yes	Existing	-	0.00	0.00	$ -	$ -	$ -	$ 30,612	3.0	3.00	10,481	9,357
3/27/2019	5392	35 Starwood	SGL	Yes	Yes	1-inch	-	2.17	2.59	$ 15,461	$ 8,224	$ 23,685	$ 54,297	5.2	5.59	10,483	9,360
4/2/2019	5393	132 Mammoth Slopes Dr	CDO	Yes	Yes	Existing	-	0.00	0.00	$ -	$ -	$ -	$ 54,297	5.2	5.59	10,483	9,360
	5394	Pending						0.00	0.00	$ -	$ -	$ -	$ 54,297	5.2	5.59	10,483	9,360
4/16/2019	5395	1474 Old Mammoth Rd	CDO	Yes	Yes	Existing	-	0.00	0.00	$ -	$ -	$ -	$ 54,297	5.2	5.59	10,483	9,360
6/17/2019	5396	1000 Canyon Blvd	COM	Yes	Yes	Existing	-	0.00	0.00	$ -	$ -	$ -	$ 54,297	5.2	5.59	10,483	9,360
5/2/2019	5397	4 Oak Tree Way	COM	Yes	Yes	Existing	-	0.00	0.00	$ -	$ -	$ -	$ 54,297	5.2	5.59	10,483	9,360
	5398	Pending						0.00	0.00	$ -	$ -	$ -	$ 54,297	5.2	5.59	10,483	9,360
4/24/2019	5399	415 Commerce Circle	COM	Yes	Yes	Existing	-	0.00	0.00	$ -	$ -	$ -	$ 54,297	5.2	5.59	10,483	9,360
	5400	Pending						0.00	0.00	$ -	$ -	$ -	$ 54,297	5.2	5.59	10,483	9,360
5/2/2019	5401	2251 Meridian Blvd	CDO	Yes	Yes	Existing	-	0.00	0.00	$ -	$ -	$ -	$ 54,297	5.2	5.59	10,483	9,360
5/13/2019	5402	201 Lakeview Blvd	CDO	Yes	Yes	Existing	-	0.00	0.00	$ -	$ -	$ -	$ 54,297	5.2	5.59	10,483	9,360
	5403	Pending						0.00	0.00	$ -	$ -	$ -	$ 54,297	5.2	5.59	10,483	9,360
5/13/2019	5404	808 Canyon Blvd	CDO	Yes	Yes	Existing	-	0.00	0.00	$ -	$ -	$ -	$ 54,297	5.2	5.59	10,483	9,360
5/8/2019	5405	167 Meadow Lane	CDO	Yes	Yes	Existing	-	0.00	0.00	$ -	$ -	$ -	$ 54,297	5.2	5.59	10,483	9,360
	5406							0.00	0.00	$ -	$ -	$ -	$ 54,297	5.2	5.59	10,483	9,360
	5407							0.00	0.00	$ -	$ -	$ -	$ 54,297	5.2	5.59	10,483	9,360
5/9/2019	5408	436 Old Mammoth Rd	COM	Yes	Yes	Existing	-	0.00	0.00	$ -	$ -	$ -	$ 54,297	5.2	5.59	10,483	9,360
5/9/2019	5409	1671 Forest Trail	SGL	Yes	Yes	Existing	-	0.00	0.00	$ -	$ -	$ -	$ 54,297	5.2	5.59	10,483	9,360
5/8/2019	5410	44 Tyrol Ln	CDO	Yes	Yes	Existing	-	0.00	0.00	$ -	$ -	$ -	$ 54,297	5.2	5.59	10,483	9,360
5/16/2019	5411	3789 Main St	COM	Yes	Yes	Existing	-	0.00	0.00	$ -	$ -	$ -	$ 54,297	5.2	5.59	10,483	9,360
	5412	Pending						0.00	0.00	$ -	$ -	$ -	$ 54,297	5.2	5.59	10,483	9,360
	5413	Pending						0.00	0.00	$ -	$ -	$ -	$ 54,297	5.2	5.59	10,483	9,360
6/5/2019	5414	122 Mountain Blvd	SGL	Yes	Yes	Existing	-	0.00	0.00	$ -	$ -	$ -	$ 54,297	5.2	5.59	10,483	9,360
6/17/2019	5415	2560 Old Mammoth Rd	SGL	Yes	Yes	3/4-inch	-	1.00	1.00	$ 7,126	$ 3,174	$ 10,300	$ 64,597	6.2	6.59	10,484	9,361
	5416	Pending						0.00	0.00	$ -	$ -	$ -	$ 64,597	6.2	6.59	10,484	9,361
6/11/2019	5417	201 Lakeview Blvd	CDO	Yes	Yes	Existing	-	0.00	0.00	$ -	$ -	$ -	$ 64,597	6.2	6.59	10,484	9,361
	5418	Pending						0.00	0.00	$ -	$ -	$ -	$ 64,597	6.2	6.59	10,484	9,361
	5419	Pending						0.00	0.00	$ -	$ -	$ -	$ 64,597	6.2	6.59	10,484	9,361
	5420	Pending						0.00	0.00	$ -	$ -	$ -	$ 64,597	6.2	6.59	10,484	9,361
	5421	Pending						0.00	0.00	$ -	$ -	$ -	$ 64,597	6.2	6.59	10,484	9,361


Total Issued Permits and Water MEUs
Permits/EDUs Issued
120
100
80
60
40
20
0
2007
2009
2011
2013
2015
2017
2019
Total Number of Permits Issued
Total Number of MEUs Issued
MEU = one 3/4-inch meter equivalent unit


Issued Non Residential Permits and MEUs
Permits/EDUs Issued
100
90
80
70
60
50
40
30
20
10
0
2007
2009
2011
2013
2015
2017
2019
Total Number of Non Residential Permits Issued
Total Number of Non-Residential MEUs Issued


Issued Residential Permits and MEUs
Permits/EDUs Issued
100
90
80
70
60
50
40
30
20
10
0
2007
2009
2011
2013
2015
2017
2019
Total Number of Residential Permits Issued
Total Number of Residential MEUs Issued


Totalized Water MEUs
MCWD Total Water MEUs
16,000
15,000
14,000
13,000
12,000
11,000
10,000
9,000
8,000
7,000
6,000
1995
2000
2005
2010
2015
2020
2025
Permited Water MEUs
2020 Water Supply Capacity
2015 Water Supply Capacity


Totalized Wastewater MEUs
19,000
17,000
15,000
13,000
11,000
9,000
7,000
5,000
3,000
1995
2000
2005
2010
2015
2020
2025
permitted wastewater MEU's
Treatment Capacity

MAMMOTH COMMUNITY WATER DISTRICT

Agenda Item: B-5

Information Systems Report

07-18-2019

July 2019

Hardware Systems

- Fourteen user PCs, five iPads, and one Server on current Workstation Replacement Schedule, five desktop PCs have been purchased and received this past month and are awaiting setup and deployment
- Ongoing hardware support, maintenance and updates

Software Systems

- Troubleshot infraMap database replication issue with support, re-appended Hydrant and Valve activity tables to SQL database backup to resolve issue, field reset Toughbooks
- Tokay Backflow software data sync finalized to include missing Property Manager and Mailing Two fields, updated instruction sheet documentation and trained Backflow staff on sync process
- Ongoing software support, maintenance and updates

Administrative

- Ongoing discussions between MCWD and Mono County Search and Rescue regarding potential high-speed fiber easement across MCWD Property
- Recovered mistakenly deleted file by PSD, restored file to MCWDUB10 Personnel server directory from nightly backup
- User directory, hardware, phone, email and web update items related to transition of General Managers

Network

- Applied CBT High Security Package across MCWD network; more robust monitoring and anti-malware software designed to prevent and stop ransomware and malware attacks, reduce phishing attempts, improve IT auditing and logging, and increase overall system stability and productivity
- Designing new Phone Tree for MCWD VoIP Phone System in collaboration with other departments, will be recording new audio and implementing system-wide changes
- Re-programmed current Finance phones for MCWD Direct Billing Line transfer option
- Re-provisioned all MCWD Phones with two new firmware updates and applied customized BLF field updates for each user as requested
- All network systems secure, no data loss or intrusions

GIS

- Created attachment and relationship tables for all water and sewer lateral and main line types, valves, manholes, FOG permits, re-published services and added to MCWD GIS Portal
- Finalized Recycled Water Line GIS and As-built work, published new Recycled dataset containing Lines, Valves, Appurtenances and Blowoff/Air Release Valves, and created and published Recycled attachments through MCWD GIS Portal
- Developed instructions for Portal Attachments to SDE, creating tables and publishing to Portal

- Downloaded and applied ArcGIS Engine 10.5 to run on Line Maintenance Field Toughbooks due to crash issue with infraMap software when running latest version of ArcGIS Engine, issue resolved
- Continued training and implementation of new Trimble TDC100 Collector, Trimble InSphere web portal and TerraFlex software
- Granted GIS Portal access for MCWD Finance Staff and conducting training on use of Portal
- Continued training on ESRI Data Collector Application with Mono County staff, will soon be developing mobile applications through Portal to test in the field for editing and querying GIS data with field devices
- Added three manholes and four main line sewer segments to master SDE at Season IV Condos per Line Maintenance field map
- Added three manholes and three main line sewer segments to master SDE at Juniper Springs Lodge per Line Maintenance field map
- June and July Monthly Permits and Projects Maps for Engineering Department

Websites

- Mammoth Creek Streamflow Data ending 5-31-19 and 6-30-19 to Surface Water page
- MCWD Water and Wastewater Connection Fee Study 2019 by Raftelis to Other Projects and Current Info pages
- 06-12-2019 Press Release Wipes Clog Pipes to News page
- 2019 MCWD Summer Construction Schedule updated under Current Info
- New CAPTCHA Forms finalized and tested for Board Member PHP Email Forms to reduce spam
- All materials related to June Board activities
- Continued maintenance and security for all three MCWD Web Platforms: MCWD Internet, MCWD Intranet and MCWD GIS Portal

MAMMOTH COMMUNITY WATER DISTRICT

Agenda Item: B-6

Personnel Services Department Report

07-18-2019

July 2019

Administration

- Continuous and ongoing activities associated with day-to-day administration, including but not limited to
  - Administrative, organizational and operational policy development, guidelines, implementation and related day-to-day projects
  - Non-personnel and personnel-based legal matters, e.g., ADA/FEHA, COBRA/CalCOBRA, Unfair Labor Practice Charges, etc.
  - Attend and participate in monthly Mammoth Lakes Personnel Network meeting, Mammoth Area Governments (MAG) appears to be experiencing a very long term hiatus
- Ongoing activities associated with classification maintenance plan and associated organizational changes and implementation
- Legislative/Client Update 07/2019 (provided by LCW/CSDA):
  - Effective 01/01/2020, California workplace (Government Code Section 12926) and school nondiscrimination laws are amended to extend discrimination protections to prohibit discrimination based on any trait "historically associated with race", including but not limited to, hair texture and protective hairstyles such as braids, locks, and twists. (SB 188)

Workforce Planning

- Ongoing administration for contract extra help needs (Maintenance Department) filled by Sierra Employment Services
- Ongoing monitoring of FMLA/CFRA determinations processed for statutorily protected leave and ADA/FEHA accommodation for some departments

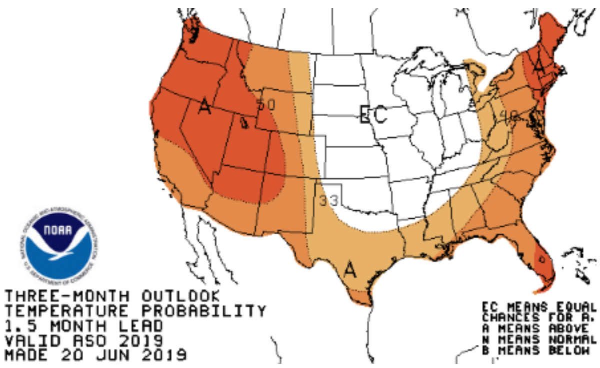
Risk/Safety/Training

- Risk/Safety:
  - Process safety tailgate and wellness activity logs for 07/2019 safety incentive program
  - Monthly restock of Cal/OSHA compliant first aid safety kits at all locations
  - Continuous and ongoing activities associated with the Injury & Illness Prevention Program policy development and guidelines
  - Continuous and ongoing activities associated with manual to electronic conversion of Cal/OSHA required Hazard Communication Safety Data Sheets (SDS)
  - Claims received and/or processed:
    - None received or submitted

- Training:
  - Webcasts/onsite/offsite training processed, provided, attended and/or proctored this month
    - None to report

Conservation

Water Supply Outlook

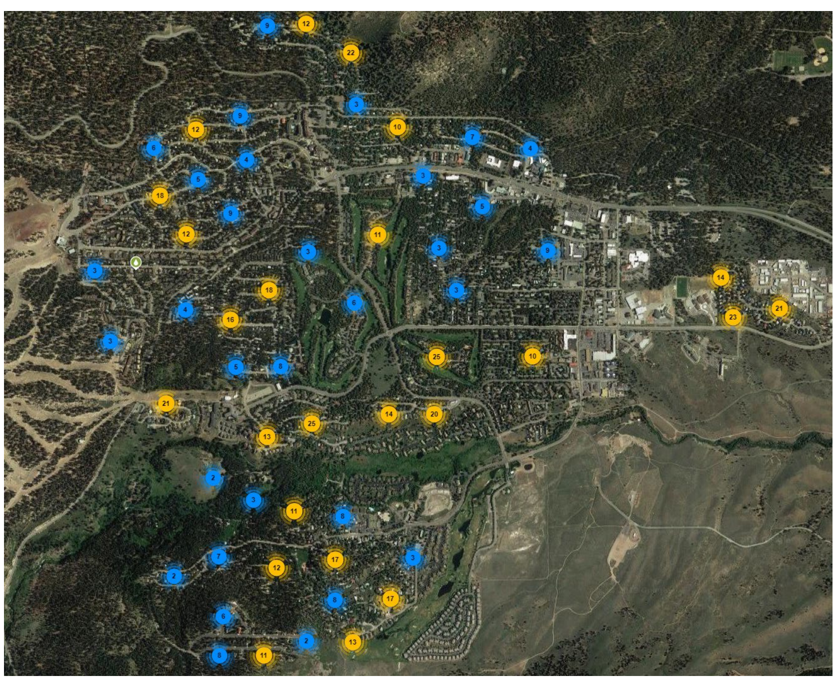


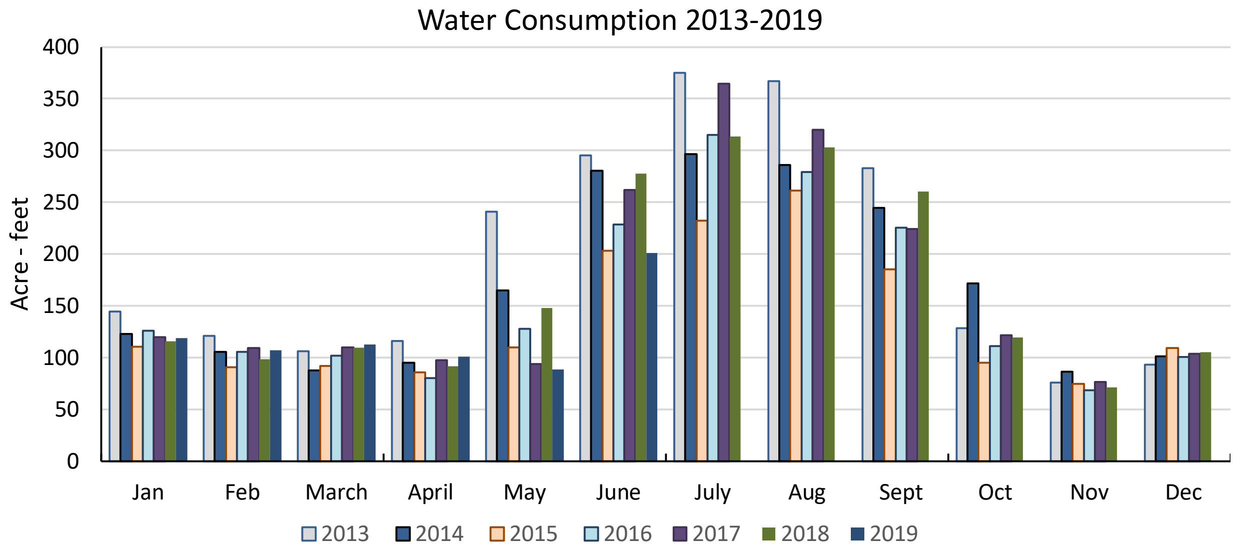
A high probability for above normal temperatures during August through October continues according to NOAA modeling, see map to the left. Precipitation probabilities for the same months indicate equal chances for below, normal, or above normal conditions.

LADWP stopped updating their snow pillow graphs on June 5. However, the watershed appears to contain generous amounts of snow that will continue to feed our surface water resources this summer.

MCWD Customer Water Consumption

Warm weather and longer days prompted customers to start irrigating their landscapes throughout town in late June. The map below depicts single-family homes irrigating their landscapes the last week of June based on an algorithm developed by WaterSmart. Permanent conservation restrictions are in effect and customers are being reminded about the correct hours and days for irrigation. The irrigation schedule and additional restrictions are available from the MCWD webpage. Irrigation account holders have all received notification about their irrigation allowances and this year's regulations.





Compared to 2013, consumption was about 31 million gallons lower this June and about 25 million gallons less than June 2018. However, shoulder season water consumption is driven by irrigation demand. Cooler temperatures in early June kept irrigation demand low until temperatures started to rise. In early June about 80 single-family accounts, or 3 percent, and about 20 irrigation-only accounts, or 24 percent, were irrigating.

In June, 62 contacts with customers regarding leaks and irrigation issues were made. Also, 20 first-violation notices were issued; the majority of these were for irrigation on a prohibited day. All violations were to single-family homes. However, seven irrigation accounts were flagged for exceeding MAWA based on June meter reads and staff will contact those customers. WaterSmart reports are used to find leaks and irrigation violations. In addition, 11 variances from irrigation restrictions were issued in June for establishment of new landscape plants.

WaterSmart account registrations continue to increase. Currently 619, or 18 percent, of eligible accounts are registered. The number of MCWD's registered accounts is higher than WaterSmart's average client base.

Rebate Program

The FY 2020 rebate program processed 18 applications in June. This year the program resulted in the installation of 44 high-efficiency toilets and 4 clothes washers that will save 326,000 gallons annually or 1.0 acre-feet. Rebates total $10,200 this fiscal year. The US EPA WaterSense program is certifying flushometer toilets. Staff is investigating the costs and specifications for potential inclusion into the rebate program.

Public Affairs and Outreach

Casa Diablo Geothermal Plant Expansion (CD IV)

On June 20, 2019 the US Senate Committee on Energy and Natural Resources held a hearing on geothermal energy. The last hearing on geothermal energy was in 2006. Paul Thomsen, Vice President of Business Development for Ormat Technologies as well as the State Director for BLM were present to address the Senate committee and answer questions. The hearing indicated strong support for geothermal energy development and frequent references to a Department of Energy Report, *GeoVision: Harnessing the Heat Beneath Our Feet* were made. This report was released on May 30, 2019 and describes a 26-fold increase potential for geothermal energy development and a roadmap to speed-up project development timelines and technological improvements. The hearing asked the witness panel for recommendations to reduce development obstacles and for potential incentives that would support geothermal energy expansion.

On June 27, the USGS released a report on the geothermal monitoring data, *Hydraulic, Geochemical, and Thermal Monitoring of an Aquifer System in the Vicinity of Mammoth Lakes, Mono County, CA, 2015-2017*. The report was distributed to MCWD's CD IV team and a meeting to discuss the report was convened. The report supports the finding of WEI that some communication between the geothermal reservoir and the cooler shallow aquifer exists. The USGS report abstract, in part, reads,

> The digitally filtered water-level data indicated that some hydraulic communication exists between the deep geothermal aquifer and shallow groundwater aquifer at the location of the flow test [14-25], northeast of Mammoth Lakes. Groundwater-chemistry data from three wells indicated that shallow groundwater naturally mixes with a small component of geothermal water along the northern periphery of the shallow aquifer system at Mammoth Lakes.

MCWD received BLM's meeting notes from the May 15, 2019 GMRP meeting. Revised meeting notes from the March 5 meeting have not been sent. MCWD staff requested the following revisions:

- Include BLM's commitment to improve future Long-term flow testing reports from Ormat;
- Delete BLM's opinions about MCWD's data analysis indicating potential communication between the geothermal reservoir and the cold aquifer;
- Include a statement that MCWD remains uncomfortable with the lack of a deep geothermal monitoring well after BLM's statement that they are unconvinced that the well is necessary;
- Add horizontal impacts to the purpose of a deep monitoring well;
- Delete information from a meeting that occurred after the GMRP meeting; and
- Include the USGS's opinion that the well site preferred by MCWD is a good location if a dual nested well is also constructed adjacent to the deep well.

Mammoth Lakes Fire Safe Council (MLFSC) Grant for Fuels Reduction in the Lakes Basin (Fuels Project)

MCWD has committed to providing in-kind administrative services to MLFSC for the Fuels Project. An administrative services agreement between the MLFSC and MCWD is currently under review. Staff provided assistance in selecting and contracting with a logging company; communicated with several entities to seek financial support to bridge a timing gap between receiving an invoice from the contractor and receipt of reimbursement funds from the grantor to pay the invoice (about 3 months); conducted outreach for additional funds to complete fuels reduction on the entire project area (the grant is approximately $100,000 short); and gave presentations at the Fire Town Hall meeting and Sierra Nevada Research Lab: Wilder than Wild talk.

Town of Mammoth Lakes

Staff reviewed and submitted comments on four draft documents related to the Town's planning process to address climate change impacts. Comments focused on correcting errors in descriptions related to MCWD infrastructure and explanations of drought impacts to the water supply resources.

Staff also provided annual water usage data to the Town for their annual Community Indicators Report

Eastern Sierra Public Information Officers (PIO)

A meeting of regional PIOs was convened to review safety and communication issues that occurred over the winter and discuss potential improvements for heavy snow years and discuss the availability and content of agency webpages for fire and smoke information. The Sheriff's Office reminded participants to sign up for Code Red notifications.

Public Outreach

A press release was distributed in June regarding "flushable" wipes. This press release was in support of the CA Association of Sanitation Agencies campaign to require correct labeling of wipe products through Assembly Bill 1572. The press release emphasized the damage wipes cause in MCWD's wastewater treatment system. The press release was also posted on MCWD's Facebook page.

Two new radio ads were recorded last month regarding the construction season and the rebate program. These ads will join the currently running ads on keeping wipes out of the wastewater system, the irrigation schedule, and tuning-up irrigation systems to perform effectively.

Newsprint ads will continue through October. The Water Hog ad will be added to the rotating ad schedule.

MAMMOTH COMMUNITY WATER DISTRICT

General Manager's Report
July 2019

The General Manager's report is designed to summarize important District activities and to highlight developments that may require Board action in the future.

In this transitional period as Interim General Manager the first objective was to meet with Department managers to ensure immediate needs are being met. Discussions also focused on how the District is presently organized, and whether the current organizational structure effectively supports each Department's strategic objectives and goals.

Departmental

Staff Resources and Management

After reviewing the District's organizational structure with the Personnel Services and other department managers the following changes have been implemented:

- The recruitment for an IT Administrator has been suspended. Further meetings with the IT and Personnel Services Department Managers will determine the level of support required for a future recruitment.
- After a productive meeting with the District Engineer, the Regulatory Support Services Division and the Principal Analyst position are being transferred to the Engineering Department. The Principal Analyst position will report directly to the District Engineer. Additionally, the Department's Administrative Services and Compliance Division is being retitled to Regulatory Support Services Division. The District Engineer is familiar with a great majority of regulatory services work and has two pending projects which will benefit from specific expertise of the Principal Analyst.
- Following discussions with the Operations Superintendent, the Regulatory Support Services Division Administrative Analyst position is being transferred to the Operations Department Administration and will report directly to the Operations Superintendent. Conservation duties will continue to be performed out of this department.

Water Supply, Conservation, Power Production & Forecasting

Total water produced in June was 71 million gallons, up from 33 million gallons in May 2019, and below the 99 million gallons in June last year. The average daily demand was 2.36 million gallons, with 99% coming from surface water and 1% from groundwater. Wells were run mainly to keep them fresh and available.

June stream flow requirements for Mammoth Creek were 20.8*cfs*. Actual flows averaged 130*cfs*, which ranged from 38.7 to 202*cfs.* Melt rates peaked in mid-June. Stream flows should meet minimum requirements well into the summer season due to the above average snow pack remaining in the upper elevations. As of July 1st Lake Mary is full to its 606 acre foot capacity.

Irrigation season is now in full flow. Recycled water production has also begun with water demand coming from Sierra Star Golf Course.

Non-revenue water represents leakage in the distribution system, under-recording meters and other losses of water. The June water audit shows a total of 2.9 million gallons of non-revenue water, down from 5.3 in June 2018. This amounted to 5% which is below the AWWA standard of 10%.

June average daily wastewater flows were 1.48 mgd for a total of 44.3 million gallons.

The 1 megawatt-rated solar power facility produced 232,510 kWh for the month of June. The irradiance for June was 15% less than June 2018 however the solar energy production only decreased by 12%. This is a result of the excellent work done by the District's maintenance team.

Financial Management

Revenue from rates remains below budgeted projections due to cooler temperatures, which delayed irrigation season.

District auditors, Teaman, Ramirez & Smith, Inc., completed their field work during the first week of June, and will present their final report to the Board at the August or September Board meeting.

The connection fee study is wrapping up with our consultant, Raftelis. The proposed changes to the connection fees are on the July 18th regular Board meeting agenda for discussion and possible adoption.

An Ad Hoc Board committee consisting of Directors Cage and Creasy worked with staff to revise the Employee Home Purchase Assistance Policy. The revised policy was adopted at the June 20th Board meeting. The updated agreement template will be up for review and possible approval at the July 18th Board meeting. Management is also reviewing information provided by an employee who has expressed interest in buying out the District's interest from the original shared ownership housing assistance plan.

Other Departmental Activities

- The Maintenance Department is on schedule to meet its annual maintenance goals
- The Operations Department staff have kept water and wastewater production in compliance with all regulations
- The Engineering Department has been working hard to support the many new construction projects planned throughout the community. The District Engineer has also been reviewing an application for the drilling of a private well within the District's boundaries.
- The Information Services Department continues with scheduled PC replacements, and is doing an excellent job of keeping the District up to date from a technology point of view.
- Seasonal construction projects are progressing well with guidance from the Line Maintenance Division Supervisor and Engineering Department staff
- With the pending closure of the Benton land fill in 2023, staff have developed several viable options for disposal of the District's sludge in Nevada. The likely disposal location is in Fallon NV. An in-house team from several departments have collaborated in vetting technology options for reducing water content in the processing of sludge, which will result in reduced hauling and disposal costs. To date, a screw press has been the most successful in trials. For sludge transport, the District will likely purchase trailers and contract out for the hauling services.
- The Operations Department is presently testing a new filter system at the WWTP. The goal is to identify a system that can provide a more consistent result than the membrane filters we presently use.

Project Related

Administration Building Needs Assessment

Work on the Administration Building needs assessment has been placed on hold. The contract with Gillis+Panichapan Architects (GPa) is for $52,800. Currently, MCWD has paid $16,435 with a balance due for work conducted to date of $10,145. To complete stage 1 task of the contract, an assessment of the condition of the existing building, is estimated to be an additional $6,000.

Geothermal/Groundwater Monitoring

BLM indicated that they are looking at possible alternate locations for the relocated BLM2 well. The MCWD District Engineer is working with BLM in evaluating possible well sites.

A USGS report requested by Senator Feinstein was posted at the end of June. The report supports findings in Wildermuth's report that based on both water chemistry analysis and well flow tests there is some hydraulic connection between the deep geothermal aquifer and the shallow-aquifer system.

Well 32

Staff has been working to obtain agreements from the two HOAs over easements along Ranch Road to accomplish drilling of an exploratory well known as Well 32 and, if successful, a production well on the adjacent Snowcreek Golf Course land where the District has an easement. An agreement and easement has been secured with the Ranches HOA. Snowcreek VI Board will receive a very similar settlement agreement. They will then conduct a vote amongst the 31 HOA members. More than 50% of the 31 members will need to vote "aye" for the agreement to pass. The ballots went out the week of June 10 with a 30 day deadline. With the possibility of the ballot process stretching out for some time, the District is also working on a temporary access agreement with Snowcreek VI Board members. This would allow access to the well site and construction work to begin this fall.

AGENDA ITEM

Subject: Discussion and Possible Adoption of Ordinance No. 07-18-19-14 Amending MCWD Chapter 11, Sewer Code and Chapter 12, Water Code Pertaining to Connection Fees

Information Provided By: Jeff Beatty, Finance Manager

Background

Periodically, the District conducts a study to evaluate whether the connection (capacity) fees charged for new or expanded water and sewer service properly reflect the cost of the service provided and adequately prepare for future infrastructure required to meet the needs of growth.

This study was most recently done in 2007, with the rates established by that study adjusted annually for inflation. In 2018, the District engaged the services of Raftelis Financial Consultants to evaluate any changes to conditions since 2007 and make recommendations for appropriate changes to our connection fee structure.

Discussion

In the broadest perspective, the cost of a new service connection should be the total cost of infrastructure divided by the total base of customers. Each new connection pays the proportional cost of the benefit they receive from the infrastructure. A more detailed perspective determines the method of calculating the cost of the infrastructure, and establishing a method for measuring the base of customers.

In order to achieve the most accurate connection fees, Raftelis has recommended we change the method used to measure the customer base. The method used in the 2007 study was to calculate meter equivalent units (MEUs) for each class of customer based on historical water use for each meter size. Changes to the patterns of water use over the years indicate that the capacity of the meter is a more equitable and best practice method of measurement as opposed to historical water use.

This change in the method of calculating MEUs results in a reduction in the connection fee for larger meters. Over the last 20 years, 92% of the new connections were ¾” or 1” meters, therefore the reduced revenue from the connection of larger meters is not expected to have a significant impact on projected revenue.

Attached to this staff report are redline copies of the affected divisions within the MCWD Code, Chapters 11 and 12. The proposed changes can be found in Chapter. 11, Sections 5.06, 6.03.B, and 6.03.E. and Chapter 12, Sections 5.06, 6.03.B, 6.03.E, and 6.24.

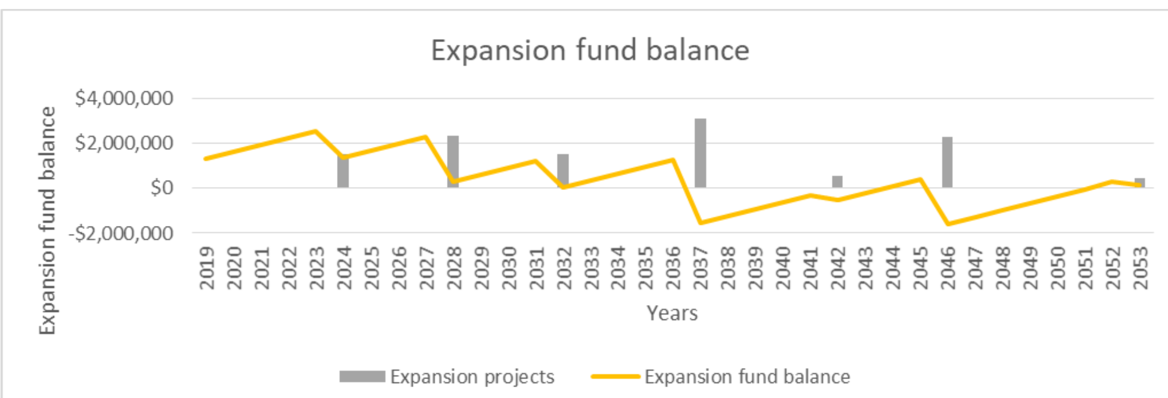
The following table compares the combined current fees and the proposed fees.

Meter Size	Combined Fee (Proposed)	Combined Fee (Current)	$ Change	% Change
3/4”	$10,350	$10,300	$50	0%
1”	$20,258	$23,685	($3,427)	-14%
1 ½”	$40,091	$55,771	($15,681)	-28%
2”	$68,535	$94,723	($26,188)	-28%
3”	$147,278	$220,501	($73,222)	-33%
4”	$279,663	$356,735	($77,072)	-22%
6”	$560,962	$706,142	($145,180)	-21%

Financial Impact

The purpose of connection fees is to provide sufficient revenue to pay the cost of developing the water and wastewater infrastructure required to serve all future customers. The projected cost in current dollars of future infrastructure is approximately 12 million dollars and the projected revenue with the new fee structure is expected to fully fund all required infrastructure projects.

The graph below projects the expansion fund balance through the completion of all required infrastructure. The timing of future projects is unknown and dependent on the rate of growth of the Town. The projection is based on the addition of 30 MEUs per year, approximating the historical average. If the rate of growth increases or decreases, both the collection of revenue and the construction of infrastructure adjusts accordingly.



Requested Action

Accept the Connection Fee study as presented by Raftelis and adopt the changes to Chapter 11, Sewer Code and Chapter 12, Water Code, updating the wastewater and water connection fees.

CHAPTER 11

MCWD SEWER CODE

Division V and VI only

DIVISION V PERMITS

Section 5.01 Permit Request

No person other than the persons specifically excluded by this chapter, shall commence, do or cause to be done, construct or cause to be constructed, use or cause to be used, alter or cause to be altered, or connect to any public sewer, mainline sewer, house lateral, sewage pumping plant, or other similar appurtenance in the Mammoth Community Water District without first obtaining a Sewer Permit from the District Manager and paying the appropriate fees as set forth in this chapter.

Section 5.02 When Permit Not Required

The provisions of this chapter requiring permits shall not apply to contractors constructing public sewers and appurtenances under contracts awarded by the Board and entered into under proceedings pursuant to any of the special procedure statutes of this State providing for the construction of sewers and the assessing of the expense thereof against the lands benefited thereby, or under contracts between the contractor and the District.

Section 5.03 Validity of Permits

A. 1. (a) is hereby repealed

A. 1. (b) The usage of a permit for a lot or premises other than the lot or premises for which the permit was issued shall be considered an unauthorized usage and is prohibited.

A. 1. (c) The usage of a permit for a lot or premises, which has an increased number of units, hook-ups or taps, than that for which the permit was issued shall be considered an unauthorized usage and is prohibited.

A. 1. (d) The usage of a permit for a lot or premises which has more fixture units or facilities than that for which the permit was issued shall be considered an unauthorized usage and is prohibited until and unless fees are paid for the additional fixture units/facilities at the rates set forth in Section 6.03.G. and for any additional plan checking at the rates set forth in Section 6.01.

A. 1. (e) (1) The usage of a permit for any lot or premises which has a different design as to its distribution system, fixture units, or facilities from that shown on the plans for which the permit was issued, shall be unauthorized unless the permittee first provides the District with a revised set of plans showing the different design and the permittee pays all administrative fees the District incurs in reviewing and inspecting the revised plans, including, but not limited to, pre-plan check fees and inspection fees. This requirement is in addition to other requirements or limitations imposed upon the usage of permits as set forth in this Code.

A. 1. (e) (2) is hereby repealed.

A. 2. is hereby repealed.

A. 2. (a) The unauthorized usage of a permit in a manner prohibited by Section 5.03.A.1. imposes a different or greater demand upon the District's sewer system. Therefore, the owner shall apply to the District for a new permit to authorize the increase in the number of hook-up units, fixture units or taps from that specified in the existing permit. The owner applying for a new permit shall comply with the District's then existing ordinances, rules, and regulations concerning permits, including, but not limited to, the payment of the appropriate fees and charges, and compliance with the District's water saving and water conservation device requirements set forth in Section 2.38 and 3.22 of Chapter 12 of the District Code. Such compliance shall fully occur within sixty (60) days of written notice from the District of the unauthorized usage. In the event that the owner fails to timely comply, the District may revoke the permit and the permittee shall be subject to the provisions of Section 5.03.A.3. below.

A. 2. (b) is hereby repealed

A. 3. When the District determines that an unauthorized usage of a permit has occurred, the District shall, in addition to all other enforcement devices set forth in this code, have the option of declaring part, or all, of the unauthorized usage to be void and demand that the unauthorized acts cease until such time as appropriate permits have been applied for and obtained, if available, and/or all appropriate fees and charges have been paid.

A. 4. The terms "unit", "hook-ups", "taps", "Fixture Units" and "Facilities", as used in this Section, shall refer to those terms as specified in Section 6.03.

B. is hereby repealed.

C. Any assurance of sewer service issued by the District, in any form, in addition to the conditions as ordained heretofore, shall also be issued on the provision that the assurance is given on the state of facts existing on the date of that issuance, and that such facts may change subsequent to the date of issuance.

D. 1. is hereby repealed.
D. 2. is hereby repealed.
D. 2. (a) is hereby repealed.
D. 2. (b) Repealed by Ord. 02-28-91-06.
D. 2. (c) is hereby repealed.
D. 3. Repealed.
D. 4. is hereby repealed.
D. 5. is hereby repealed.
D. 5. (a) is hereby repealed.
D. 5. (b) is hereby repealed.
D. 5. (c) is hereby repealed.
D. 5. (d) is hereby repealed.

D. 6. (a) Notwithstanding any other section of the District Code, no permit shall be issued for any development for which the Town of Mammoth Lakes requires approval of a final tract map except upon the following conditions:

D. 6. (a) The application for issuance of a permit shall be accompanied by a certified copy of documentation from the Town of Mammoth Lakes indicating the Town's approval of a tentative map for the proposed development; and

D. 6. (b) Any permits so issued shall automatically become void upon the expiration or invalidation of the tentative map, unless a valid final map has been approved and issued in place thereof. This provision shall be in addition to any other section of the District Code pertaining to the issuance, vesting or invalidation of permits, including, but not limited to the provisions of Section 5.03. H.

E. Repealed
F. Repealed

G. A letter of sewer availability for a single family residential unimproved lot subdivision or other development shall, in addition to all other terms and conditions required by District rules, regulations and ordinances, provide that said letter does not unconditionally guarantee any priority or reservation of capacity but that the developer or subsequent purchaser must acquire a sewer permit prior to construction of any improvements. Said letter shall further provide that such permits will be issued by the District solely on a first-come, first served basis and only to the extent there is then remaining available capacity in the physical facilities for conveyance and treatment. The letter shall also indicate that such permits will be issued only upon payment of all then applicable fees and charges and in accordance with and subject to all then applicable District rules, regulations and ordinances.

H. {Subsection H: Ord No. 10-20-05-15 repealed and superseded by Ord No. 11-02-05-15, as follows}

H.1. There shall be a permit for each hook-up unit or portion thereof, as defined in Section 6.03 of Division VI of this Chapter 11.

H.2. Any permit or assurance of sewer service shall be issued on a first-come, first-served basis. To maintain the validity of a permit and to keep a permit in full force and effect, the following conditions must be met within 3 years from the date of the issuance of the permit, except that the General Manager may extend an un-expired permit for a period not to exceed one year upon written request by the permittee made prior to the expiration of the permit:

H.2.a. Those portions of the project's collection system which are to be constructed by the permittee, shall be inspected and approved by the District and dedicated to the District.

H.2.b. The permittee has timely complied with the requirements of Section 5.03.I. of Division V of Chapter 12 of the District Code, regarding water service to the same premises described in the permit for sewer service; and

H.2.c. The permittee has paid all applicable fees and charges required by this Chapter 11, and has otherwise complied with all applicable provisions of this Chapter 11 in connection with the issuance of permits and the initiation of sewer service.

H.3. A permit shall become null and void if the permittee fails to comply with the provisions of this Section 5.03.H., or if a building permit from the Town of Mammoth Lakes is not obtained within one year from the date of issuance of the District's permit. If sewer service has commenced pursuant to the provisions of Section 6.04 of Chapter 11 of the District Code, such service shall terminate as of the date that the permit becomes null and void. If any permit becomes null and void and the connection charges paid for such permit are not refunded, then the amount of such charges shall be credited against any connection charges due on a subsequent application for sewer service for the same premises described in the void permit.

I. Repealed Ord. 09-15-88-24

J. Repealed Ord. 09-15-88-24

K. Repealed Ord 11-02-05-15

Section 5.04 Application for Sewer Permit

Any person requiring a Sewer Permit shall make written application to the District Manager.

The District Manager shall provide printed application forms of the permits provided for by this chapter, indicating thereon the information to be furnished by the applicant. The District Manager may require in addition to the information furnished by the printed form, any additional information from the applicant that will enable the District Manager to determine that the proposed work or use complies with the provisions of this chapter.

Section 5.05

Added by Ord. No. 03-07-84-04, repealed by Ord. No. 06-16-94-26

Section 5.06 Refunds

The permittee shall be entitled to a refund of all moneys paid pursuant to Sections 6.02, 6.03, and 6.14, less any costs incurred by the District in connection with the permit and a refund processing fee of twenty-five ($25.00). In order to be entitled to such a refund, the permittee must request the refund in writing and not have commenced water service. The written request must be delivered to the District or postmarked by the United States Postal Service within one (1) year of the date of issuance of the permit. No refunds will be made if such request is not made in a timely manner.

Section 5.07 Sewers in Public Ways

Before granting any permit for the construction, installation, repair or removal of any sewer, or appurtenances thereto, which will necessitate any excavation of fill, in, upon, or under any public street, highway or right-of-way under the jurisdiction of another public agency, the District Manager shall require the applicant to fill out the necessary forms of the agency having jurisdiction and pay the required fee. The District will obtain the encroachment permit required.

Section 5.08 Plan Approval Required

No sewer Construction Permit shall be issued until the District Manager has checked and approved the plans in accordance with the other applicable provisions of this chapter.

Section 5.09 Pumping Plants

Before granting a permit for the construction of any sewage pumping plant the District Manager shall check and approve the plans or required modification thereof as to their compliance with county, state, and other governmental laws or ordinances and shall require that the facilities be adequate in every respect for the use intended.

Section 5.10 Excessive Discharge of Sewage

Any person proposing to have sewage discharged from any property to a public sewer in quantities or at a rate greater than the capacity for which the sewer was designed, when such additional quantities will immediately overload the sewer, shall be denied a permit to connect any facilities to the sewer which will discharge more than the proportionate share allotted to the property. However, if such additional discharge will not immediately but may in the future overload the sewer, a conditional permit to connect to the sewer may be issued after the owner of the property agrees by a covenant satisfactory to the District Manager recorded against the land to construct or to share in the cost of construction of additional sewer capacity at such future time as the District Manager determines that an overload situation exists or is imminent. The owner of the property shall supply a faithful performance bond guaranteeing compliance with the terms of the covenant, in a penal sum that, in the opinion of the District Manager, equals the future cost of construction of sewer facilities to carry such additional discharge.

The faithful performance bond shall be kept in full force and effect until such additional discharge is discontinued or until such additional sewer facilities are completed, and this obligation shall pass to succeeding owners of the property.

If any owner fails to supply and keep in effect the required faithful performance bond or fails to comply with the terms of the covenant, the conditional permit allowing such additional discharge may be revoked, and the continuing of such additional discharge thereafter will constitute a violation of this chapter.

The provisions of this section shall also apply to any property previously connected to a public sewer, the discharge from which is later proposed to be increased or is found to have been increased substantially beyond the proportionate share of public sewer capacity allotted to the property.

Section 5.11 Pre-Plan Check Policy

Prior to the issuance of a permit, the permittee shall submit two (2) sets of plans to the District for pre-plan check. The plans shall be checked for compliance with all District specifications, rules, and regulations. Prior to the District performing the pre-plan check, the applicant shall pay a fee to the District as specified in Section 6.17 of this code. Such a pre-plan check is not an assurance of sewer service, nor a sewer permit for the particular project. The submittal of plans and/or documents for pre-plan check shall not constitute nor be considered an application for a sewer permit.

Section 5.12 Inspections for Transfer of Permits

A. Is hereby repealed
B. Is hereby repealed
1. Is hereby repealed
2. Is hereby repealed
3. Is hereby repealed
4. Is hereby repealed
(Added by Ord. 02-28-91-06, amended by Ord. 10-17-91-26, 05-21-92-13, and 08-19-93-23)
(Added by Ord. No. 01-15-98-01)

Section 5.13 Underutilization of Hook-Up Units

A. Except as otherwise provided in the District Code, when land uses at a premises no longer exist for which hook-up unit fees were paid, and the owner of the subject premises desires that the permit for the unused hook-up units remain in effect, the District shall impose only its base charge for such non-used hook-up units and, where applicable, discontinue service. Unless the owner provides the written notice specified in Subsection B. below, the District will impose its base charges for non-uses hook-up units.

B. When land uses at a premises no longer exist for which hook-up unit fees were paid, the owner of such premises may relinquish such unused hook-up units, and, where applicable, have service discontinued. The owner of the premises must give the District written notice thereof. Upon receipt of such written notice, the District shall discontinue any sewer service charges, including base charges, imposed respecting such relinquished units, and, where applicable, discontinue service. Such discontinuation shall occur in the month during which such written notice is received, and any charges for the month shall be imposed according to the number of days in the month for which the hook-up units remained in effect. There shall be no refund of hook-up unit fees paid on the relinquished units. If after relinquishment of the unused units, the owner of the subject premises later desires to renew service or increase the number of authorized hook-up units at such premises, the owner shall apply for such renewed service or additional units in accordance with the ordinances, rules and regulations of the District regarding applications for sewer service, except that the amount of any capacity fees (hook-up unit fees) previously paid for the relinquished units shall be deducted from the amount of capacity fees due pursuant to the application.

DIVISIION VI FEES AND CHARGES

Section 6.01 Plan Checking Fees

Any person required by this chapter to have plans checked should pay to the Mammoth Community Water District the fee or fees required by this section.

Main Line Sewer	Fee
1000' or less	$75.00
1001' – 2000'	$75.00 plus $0.05/ft over 1000 ft.
2001' – 3000'	$125.00 plus $0.05/ft over 2000 ft.
3001' – 4000'	$175.00 plus $0.04/ft over 3000 ft.
4001' – 5000'	$215.00 plus $0.04/ft over 4000 ft.
5001' – 6000'	$255.00 plus$0.03/ft over 5000 ft.
6001' – 7000'	$285.00 plus$0.03/ft over 6000 ft.
7001' – and up	$315.00 plus$20.00/1000' or portion thereof
Pumping Plants	$75.00
Interceptors	$20.00
Other Facilities	$1.50 for each $100.00 or fraction thereof of the total valuation of the work

If any portion of the plans, after having been checked, are required to be redrawn or rechecked, as a result of additional footage of main line sewer, the applicant shall pay a rechecking fee based on $0.05 per foot of additional main line sewer. However, there will be a minimum rechecking fee of $10.00. No plan checking will be done until the required rechecking fee is paid.

Applications are available in the District office and are to be filled out by the Engineer submitting the plan.

Section 6.02 Sewer Construction Permit Fee

A. Before granting any permit for the construction of a main line sewer, house lateral sewer, sewage pumping plant, and whenever a permit for any waste treatment or disposal facility is required by the District, the District Manager shall collect fees shown in Table I from the applicant to cover the cost of field and structure inspection of the proposed construction procuring or preparing record plans, automobile mileage and all overhead and indirect costs.

TABLE I – INSPECTION AND RECORD PLAN FEES

Main Line Sewer	Fees
50' or less	$40.00
50' – 350'	$40.00 plus $0.40/ft over 50 ft
350' – 1351'	$160.00 plus $0.30/ft over 350 ft
Over 1350'	$460.00 plus $0.15/ft over 1350 ft
Manhole Reconstruction	$25.00
Pumping Stations	$25.00
Pre-Treatment Facilities	$25.00
Interceptors	$25.00
House laterals in street	$40.00
House Connection at Property Line	$25.00
Structure Inspection	$25.00 Per Building

{Table Amended by Ordinance No. 03-21-13-07}

B. For other items of construction, not identified above, which relate to the District's water system, the applicant shall pay, in addition to the fees specified above, a fee of $1.50 for each $100.00 or fractional part thereof, of the total valuation of the items subject to this subsection.

Section 6.03 Sewer Connection Charges

A. All sewer connection charges shall be paid to the District upon approval of an application and prior to issuance of a permit.

B. Sewer connection charges shall be imposed based on the water meter size serving the premises in accordance with the schedule set forth in Section 6.03.E. An automatic annual escalator shall be added to the sewer connection charges at the beginning of each District fiscal year beginning April 1, ~~2007~~2020. The escalator will be based on the "ENR 20-city construction cost index" as shown in the Engineering News Record (ENR). The sewer connection charges shall be increased by the percent change of the cost index for the previous year ending December 31.

C. If there is an adequate, existing house lateral to which a premises shall be connected, no -tap is required. If there is an existing house lateral which is not adequate for the premises to be served or if there is not an existing house lateral to which the premises to be served may be connected, then the customer will be billed for the District's costs for any work completed by the District in relation to tapping the mainline.
{Amended by Ord. No. 03-21-13-07}

D. Connections of house laterals or of a force main into the District's existing force main shall be charged the applicable sewer connection charge for each related water meter installed, except for meters installed for irrigated landscaped areas. The District shall bill the property owner for its costs to perform any tap required under these circumstances.
{Amended by Ord. No. 03-21-2013}

E. The sewer connection charge schedule is as follows:

Meter Size	Sewer Connection Charge
¾ - inch	~~$2,171~~$3,125
1 - inch	~~$5,624~~$8216
1 ½ - inch	~~$11,552~~$16,006
2 - inch	~~$16,047~~$29,999
3 - inch	~~$24,971~~$62,981
4 - inch	~~$47,378~~$127,928
6 - inch	~~$89,892~~$223,773

F. Section deleted by Ordinance 03-21-13-07

Section 6.04 Billing for Sewer Services

The District shall begin billing for sewer service when the private sewer line is connected to the house lateral, and such connection has been inspected and approved by the District. The commencement of sewer service shall not relieve a permittee from timely compliance with the requirements of Subsection 5.03 H of Division V of this Chapter 11; and the permit is subject to revocation and service is subject to termination if such timely compliance does not occur.
{Ordinance No. 10-20-05-15 repealed and superseded by Ordinance No. 11-02-05-15}

Section 6.05 Fees for Processing Sewer Easements

For each private contract requiring the processing of sewer easements, the District Manager shall collect from the applicant a fee of forty dollars ($40.00) for the first parcel description and thirty dollars ($30.00) for each additional parcel description through which a sewer easement is required. In addition, a policy of title insurance insuring the easement in favor of the District shall be furnished at the sole cost of the applicant.

In the event it is necessary to rewrite the description because of the realignment or revision, the District Manager shall collect an additional fee of thirty dollars ($30.00) for each new parcel description necessary.

Section 6.06 (Repealed)

Adopted by Ord. No. 02-03-72-1; repealed by Ord. No. 04-15-82-11

Section 6.07 Fees for Preparing or Checking Special Studies

Before proceeding with the preparation of any special study, the District Manager shall collect from the person making the request for the study, as determined by the District Manager. This fee shall not be less than $100.00. If, after the fee is paid, a change in the study is requested which will increase the cost of preparing the study, supplemental fees shall be collected in the amount of the estimated additional cost.

Studies prepared by others and submitted for checking by the District shall be subject to the fee requirements stated above, except that the minimum fee shall be $50.00.

Section 6.08 Cesspool Truck Disposal

Operators of septic pump trucks required to discharge the contents of their tanks into the District's wastewater treatment facility may do so upon payment of a disposal fee of $1.70 per 100 gallons of sewage. Approval from the District shall be required prior to discharge.

Section 6.09 Collection of Fees Charged

All fees and charges set forth in Sections 6.01, 6.02, 6.03, 6.14, 6.15, and 6.17 shall be paid prior to issuance of any permit.

Section 6.10 Stand-by or Sewer Availability Charge

A yearly stand-by or sewer availability charge shall be levied on undeveloped land within the District to which sewer is made available whether the sewer is used or not. The charge shall be ten dollars ($10.00) per year for each acre of land or parcel of land of less than one acre in area and the charge shall be added to and become a part of the annual tax levied upon the land.

In the event that the sewer stand-by charge remains unpaid on the first day of the month before the month in which the Board of Supervisors of Mono County is required to levy the taxes for county purposes, a six (6) percent penalty shall accrue thereon. The amount of the unpaid stand-by charge plus the amount of the penalty shall be added to and become a part of the annual tax levied upon the land and shall constitute a lien on that land.

Section 6.11 Rates and Charges for Sewer Service

A. For the purpose of this section only, the specified terms shall have the following definitions

1. "Domestic users" shall mean all residential users, including single family residences, condominium units, apartment units, mobile homes and motel

2. “Commercial users” shall mean all business or other similar users, including RV spaces, commercial units, motels, ski dormitories, laundries, laundromats, service stations, car washes, restaurants, bars, theaters, hospitals, schools, and public buildings, and unoccupied storage/warehouses, swimming pools (semi-public), spa/hot tubs (semi-public).

3. “Industrial user” shall mean:

(a) Any non-governmental, nonresidential user of a publicly owned treatment works:

(i) identified in the Standard Industrial Classification Manual, 1972, Office of Management and Budget, as amended; and

(ii) which discharges more than 25,000 gallons per day (gpd) of sanitary wastes, or which discharges, after exclusion of domestic wastes or discharges from sanitary conveniences, the weight of biochemical oxygen demand (BOD) or suspended solids (SS) equivalent to that weight found in 25,000 gpd of sanitary waste; or

(b) any non-governmental user of a publicly owned treatment works which discharges wastewater to the treatment works which contains toxic pollutants or poisonous solids, liquids, or gases in sufficient quantity, either singly or by interaction with other wastes, to contaminate the sludge of any municipal systems, or to injure or interfere with any sewage treatment process, or which constitutes a hazard to humans or animals, creates a public nuisance, or creates any hazard in or has an adverse effect on the waters receiving any discharge from the treatment works.

4. “Commercial unit” shall mean each office, store, or other separately owned or operated commercial space or structure, including any commercial user which is not otherwise specifically identified.

5. “Mobile home” shall mean a trailer or other similar vehicle, which is located more or less permanently on a lot and is used as a residence.

6. “RV space” shall mean any short-term parking and/or service space for transitory trailers, campers or other recreational vehicle.

7. “Laundry” shall mean a commercial laundering facility.

8. “Laundromat” shall mean a self-service laundry utilized by the public.

9. “Public building” shall mean any public service building, including a police station or fire station or any other publicly owned building not otherwise specifically identified.

B. Each lot or premises which is connected to, and each owner receiving sewer service from, the District's collection system shall pay a monthly sewer charge, as identified in Section 6.11.C. {Amended by Ord 02-21-08-04}

1. In addition to the monthly sewer charge, an industrial user shall pay a monthly waste quality surcharge which shall be computed by the District in accordance with the following formula:

C= V {a(SS – 200) + (BOD – 250)} K

C=Monthly quality discharge fee in dollars

V=Average daily volume of waste discharged in gallons determined by the District

SS=Suspended solids in the waste discharge expressed in milligrams/liter

BOD=Five day biochemical oxygen demand of the waste expressed in milligrams/liter

a & b = Costs assessed for each pound of suspended solids and biochemical oxygen demand

K=Constant to convert the formula to a monthly fee in dollars

K=(365 x 8.34)/(12 x 1,000,000)

In the event that the average waste discharge characteristic and surcharge factor is disputed, the discharger shall submit a request for an analysis and flow measurement to the District and bear all expenses associated with measurement and sampling.

2. For each industrial user, the District may require the installation, at the expense of the industrial user, of District approved recording and sampling devices or sewage meters on the user's premises for use by the District. Such devices or meters shall be available for inspection by District personnel at any reasonable time. The industrial user shall be responsible for the maintenance, repair and replacement of all sampling or recording devices, sewage meters, and related equipment. The industrial user shall be responsible for any damage or expense involved in the repair or replacement for which the industrial user, its agents, officers or employees is or are responsible.

3. At its sole option and as an alternative to the industrial user charge, the District may require an industrial user to pre-treat the user's sewage flow so that the flow, after exclusion of domestic wastes or discharges from sanitary conveniences, is less than the equivalent weight in BOD and SS found in 25,000 gpd of sanitary waste.

{Section 6.11.C. of Chapter 11 of the District Code is hereby amended by Ordinance 06-11-12-08}
{Section 6.11.C. of Chapter 11 of the District Code is hereby amended by Ordinance 01-21-16-02}

C. The total per unit monthly sewer charge shall be:

Beginning:	4/1/16	4/1/17	4/1/18	4/1/19	4/1/20
Single Family	$20.31	$20.52	$20.73	$20.94	$21.15
Multi Family*	$17.48	$17.66	$17.84	$18.02	$18.21
RV Space	$2.95	$2.98	$3.01	$3.05	$3.09
Motel Units*	$9.23	$9.33	$9.43	$9.53	$9.63
Ski Dorm/Bed	$2.95	$2.98	$3.01	$3.05	$3.09
Commercial Unit	$13.08	$13.22	$13.36	$13.50	$13.64
Laundry - Commercial	$782.51	$790.34	$798.25	$806.24	$814.31
Laundromat - Public Use	$479.95	$484.75	$489.60	$494.50	$499.45
Service Station	$23.98	$24.22	$24.47	$24.72	$24.97
Car Wash	$60.02	$60.63	$61.24	$61.86	$62.48
Restaurant Seat	$2.43	$2.46	$2.49	$2.52	$2.55
Bar Seat	$1.26	$1.28	$1.30	$1.32	$1.34
Theater Seat	$0.61	$0.62	$0.63	$0.64	$0.65
Public Building	$40.07	$40.48	$40.89	$41.30	$41.72
Elem School/Student*	$0.90	$0.91	$0.92	$0.93	$0.94
High School/Student*	$1.07	$1.09	$1.11	$1.13	$1.15
Storage or Warehouse*	$18.06	$18.25	$18.44	$18.63	$18.82
Swimming Pool (semi-pub)	$11.96	$12.08	$12.21	$12.34	$12.47
Spa or Hot Tub (semi-pub)	$6.10	$6.17	$6.24	$6.31	$6.38
Hospital Bed	$27.58	$27.86	$28.14	$28.43	$28.72
Juniper	$13.15	$13.29	$13.43	$13.57	$13.71
Mill Cabins	$20.30	$20.51	$20.72	$20.93	$21.14

*Multi Family includes condominium units, apartment units and mobile units
*Motel Units include all motel rooms and motel manager's units.
*Schools are based on average daily attendance.
*Storage or Warehouses are unoccupied.

The rate increase effective on April 1 of each year will be applied beginning with the April billing cycle.

D. Each common space or area for a condominium, apartment, or similar structure shall constitute one unit for purposes of determining sewer charges.

E.1. No sewer service shall be furnished to any premises or persons except through a service connection in compliance with the District's rules and regulations.

F. The District shall not charge its monthly sewer charge as identified in Section 6.11.C. with respect to any lot or premises which is connected to the District's collection system during the period that, as determined by the General Manager, such lot or premises has been rendered unusable due to circumstances beyond the control of the permittee, his/her officers, directors, employees, agents, tenants, or independent contractors; provided that such period of relief from the monthly sewer charge shall not extend beyond three years except that the General Manager may extend the period for one additional year. Circumstances beyond the permittee's control may include, but are not limited to, fire, earthquake, explosion or other natural disaster. In the case of a lot or premises occupied by multiple commercial and/or domestic users where one or more, but not all, of the premises of such commercial and/or domestic users on such lot or premises has or have been rendered unusable as described above, the reduction in the monthly sewer charges shall be equal to the total of such charges for those domestic and commercial users whose premises have been rendered unusable.

G. The sewer service rates and charges set forth in this Section 6.11 shall be adjusted April 1 of each year by the percentage change in the Los Angeles – Riverside – Orange County Consumer Price Index (All Urban Consumers) for the prior April 1 to March 31 period, except that the Board of Directors of the District may determine to reduce or eliminate any such adjustment for any fiscal year depending on circumstances existing at such time; provided that for the April 1, 2003 to March 31, 2004 fiscal year, the sewer service rates and charges shall be adjusted on July 1, 2003, according to the percentage change in such index for the April 1, 2002, to March 31, 2003 period. The Los Angeles – Riverside – Orange County Consumer Price Index (All Urban Consumers) has been selected because it changes in it most reflect changes experienced in the District's cost to operate, maintain and repair its sewer system.
{Ordinance 06-19-03-04}

2. No sewer service shall be furnished to any premise or persons free of charge.

Section 6.12 Collection of Sewer Use and Service Charges and Rates

All sewer use and service charges and rates may be billed on the same bill as and collected together with rates and charges for any other District services. If all or any part of such a bill is not paid for any service, the District may discontinue any or all of the service for which the bill is rendered.

A. All services shall be billed on a monthly basis. The monthly billing statement will be for service rendered during the preceding month. A statement shall become delinquent on the twentieth (20^{th}) day of the month following the month in which the statement is mailed.
{Date change amended by Ordinance No. 01-10-08-01}

B. A one-time basic penalty of ten percent (10%) of the charge or rate for a month shall be added to each delinquent charge for the first month the charge is delinquent. Thereafter, an additional penalty of one-half (1/2) of one percent (1%) per month shall be added to all delinquent charges and basic penalties until such time as, pursuant to subsection (e) hereof, the Board may request the County Auditor to include the amount of delinquencies on the bills for taxes against the respective lot or parcel. Prior to the collection of delinquent amounts pursuant to subsection (d) hereof, monies paid where any portion of an account is delinquent shall first be credited to the delinquent portion and then to the current billing. Once the transfer of delinquent amounts have been turned over the County Auditor's office for collection, no payment shall be received by the District on said delinquent amounts except as collected by the County Auditor's office.

C. The District shall include a statement on its bill to each customer, or shall provide such statement to each customer by any other means, that any charges remaining delinquent for a period of sixty (60) days shall constitute a lien against the lot or parcel of land against which the charges were imposed. {Amended by Ord 02-21-08-04}

D. All rates, charges, penalties, and interest which remain delinquent as of June 30th each year shall be collected in the same manner as the general taxes for the District for the forthcoming fiscal year provided that the District shall give notice as provided by law.

E. In the event that any customer fails to make such payment as provided above, the customer, shall be deemed to be in default and, in such cases, the District is required to bring action to collect any sum in default under District ordinance terms, the customer shall pay, as an additional penalty, any and all attorney's fees and/or court and legal costs incurred by the District to bring such action. The District shall not be limited to any one remedy in the event of default, but may avail itself of any remedy or legal procedure available to it in such event.
{Amended by Ord 02-21-08-04}

Section 6.13   Billing Procedures

A. Except as otherwise specified herein, the District shall directly bill each customer receiving sewer service, and each lot or premises connected to the District's collection system. The monthly sewer charge shall be payable by each customer. Each customer shall be liable to the District for payment of the monthly sewer charge regardless of whether service is provided through an individual lateral or multi-customer lateral. {Amended by Ord 02-21-08-04}

B. Where owners of premises in a multi-unit structure are billed individually and belong to a homeowners or similar association, the association shall provide to the District current and up-dated lists of the owners of each premises. The association shall inform the District in timely fashion of any change in ownership in its members.

C. Notwithstanding Section 6.13A, the District may elect to send a composite bill to groups of customers when each of the following conditions are met:

1. The owners to be billed as a group own lots or premises in a multi-unit living structure;

2. The owners have formally organized in writing into a homeowners or similar association;

3. The homeowners or similar association, through properly executed covenants, conditions, articles of incorporation or by-laws, has the power to act as the sole agent for the owners concerning water and sewer charges in a manner which binds individual owners; and

4. The association enters into a written agreement with the District which provides, among other matters, that;

a) The association shall be responsible for and guarantee payment of all such charges within the time required by the District's rules and regulations, regardless of whether any single owner has paid the owner's share of such charges to the association:

b) The District shall bill to and the association shall pay all delinquent penalty and interest charges on the composite bills;

c) The District's bill or other notices to the association shall constitute a bill or other notice to each individual owner who shall agree that no other notice or bill to individual owners shall be necessary for, or a prerequisite to, the District's exercise of its powers to terminate service, or place liens on each owner's property or exercise other legal remedies necessary to preserve the collection of and collect delinquent bills and charges; and {Amended by Ord 02-21-08-04}

d) The bill shall consist of the sum of the total monthly sewer charges for each owner represented by the association. Service to a common area shall be treated as service to a single unit. {Amended by Ord 02-21-08-04}

D. All applications for service shall constitute a written agreement to pay for all service rendered pursuant to the application and to be bound by all applicable District rules and regulations. An application shall be signed by the owner who shall be responsible for the bills for sewer service provided. {Amended by Ord 02-21-08-04}

Section 6.14 Fee for District Installation of House Laterals.

The permittee shall pay all fees and charges associated with the installation of the house lateral. The permittee shall pay the appropriate fee for installation of the lateral to the District prior to the time of issuance of a permit by the District. The amount of the fee shall be as follows:

SEWER LATERAL INSTALLATION CHARGES
As Performed by District Forces For:
Case I and Case II

Cost estimates as shown are for District forces to install the required 6" sewer house laterals from the main sewer line to a point on the right of way line and/or property line (assume nominal 30' run) for Case I* and Case II* conditions. Case III* conditions or excavation in excess of 7 feet will be performed by a licensed sewer contractor.

HOUSE LATERAL INSTALLATION – CASE I – CASE II

	Quantity:	Unit:	Unit Cost:	Item Total:
Excavation	22	C.Y.	$5.00	$110.00
Pipe Material & Installation	30	L.F.	$7.00	$210.00
Bedding	4	C.Y.	$9.50	$38.00
Backfill	18	C.Y.	$6.50	$117.00
A.C. Pavmt. Repair	60	Sq.Ft	$1.50	$90.00
TOTAL COST:				$565.00
TOTAL AMOUNT – DEPOSIT:				$565.00

*See Exhibits C, D, and E concerning Case I, Case II, and Case III conditions, respectively.

Section 6.15 Application Fee

A. When a person applies for a permit, the applicant shall pay to the District an application fee of $50 per application submitted. The District shall not accept an application until it receives the application fee.

B. If a permit is issued, the application fee paid pursuant to this section and the pre-plan check fees paid pursuant to Section 6.17 shall be applied to the overall fees required under this Division for the issuance of a permit.

C. Any person who has paid an application fee pursuant to this section and/or pre-plan check fees pursuant to Section 6.17 and whose application is canceled or withdrawn shall not be entitled to a refund or credit respecting such paid fees.

D. An application shall be deemed canceled if the applicant does not pay the applicable sewer connection charges within one year from the date of the application.

{Section 6.15 Amended by Ordinance No. 10-16-08-14}

Section 6.16 Deposit

a) Prior to receiving sewer service, an applicant for sewer service shall deposit with the District a sum equal to three (3) months of the meter inoperative rate for sewer service.

b) A deposit shall be required for each lot or premises when any of the following conditions occur:

1. Whenever an owner of property receiving sewer service from the District transfers the property to a new owner, the new property owner shall pay a deposit to the District as identified in Section 6.16 (a).

2. Whenever there is a change in the customer receiving sewer service, the new customer shall pay a deposit to the District as specified in Section 6.16 (a).

3. Any District customer whose sewer service is disconnected due to non-payment of District charges shall pay a deposit, as specified in Section 6.16 (a), as a prerequisite for resumption of sewer service. {Amended by Ord 02-21-08-04}

c. Notwithstanding Section 6.16 (a), (b) (1), or (b) (2), an existing customer within the District who has not incurred any penalties or late charges on any sewer account with the District for nine (9) months of the immediately preceding twelve (12) months, shall not be required to deposit with the District an amount as identified in Section 6.16 (a). {Amended by Ord 02-21-08-04, eff: 5/1/2008}

d. Notwithstanding Section 6.16 (a) and (b), the District shall not retain as a deposit a sum greater than three (3) months of the meter inoperative rate for sewer service for any single lot or premises.

e. The District may use the deposit to pay any sewer bill, and penalties thereon, which are otherwise unpaid by the customer. The District may also use the deposit for its costs of collecting the unpaid sewer bill and penalties. If the District uses part or all of a customer's deposit, that

customer shall pay the District a sum adequate to maintain a deposit equal to three (3) months of the meter inoperative rate as a condition of continued sewer service.
{Amended by Ord 02-21-08-04}

f. The amount of deposit not used by the District shall be refunded to the customer when the customer voluntarily terminates sewer service with the District. {Amended by Ord 02-21-08-04}

g. The amount of the deposit not used by the District may be credited to the account of the customer at such time as the District determines a deposit is no longer required, provided the District has held the deposit for a minimum of twelve (12) months.
{Amended by Ord 02-21-08-04}

Section 6.17 Pre-Plan Check Fee

At the time an application is made to the District for a sewer permit, the applicant shall pay to the District a pre-plan check fee in accordance with the following table:

Water Meter Size	Plan Check Fee
3/4 INCH METER	$25
1 INCH METER	$65
1 1/2 INCH METER	$117
2 INCH METER	$142
3 INCH METER	$194
4 INCH METER	$323
6 INCH METER	$568

{Amended by Ordinance No. 03-21-13-07}

Section 6.18 Additional Sewer Connection Charges

In addition to the payment of the sewer connection charges existing as of November 2, 2005, in accordance with and as set forth in Section 6.03 of Division VI of Chapter 11 of the District Code, all persons submitting applications for sewer service ("Applicant" or "Applicants") on and after December 2, 2005, shall also be subject to the sewer connection charges that may be adopted by the District pursuant to the connection fee study presently underway by the District. In the event that the adopted sewer connection charges are higher than those existing as of November 2, 2005, then the difference between the connection charges paid by the Applicant and what the Applicant would be required to pay pursuant to the increased connection charges shall be paid by the Applicant. The District shall provide the Applicant with written notice of the amount due. The amount due shall be paid within 45 days after the date of the notice. If the new sewer connection charges are less than those existing on November 2, 2005, then the District shall refund the difference to the Applicant within 15 days after the effective date of the new connection charges. Connection charges due hereunder shall be subject to the provisions of Section 6.12 of Division VI of Chapter 11 of the District Code regarding the enforcement and collection of water charges. The District may disconnect service if connection charges due hereunder are not timely paid.

If, prior to the Applicant's payment of any additional connection charges required by this Section 6.18, an Applicant transfers ownership of the premises for which an application for sewer service was submitted on or after December 2, 2005, the Applicant shall notify the buyer of the premises of the potential for payment of such additional connection charges.

All applications received on or after December 2, 2005, and until the effective date of the water and sewer connection charges that may be adopted pursuant to the connection fee study presently underway shall contain the following:

> "By signing this Application, the undersigned, in accordance with Section 6.18 of Division VI of Chapter 11 of the District Code, agrees to pay, in addition to the water and sewer connection charges in effect as of November 2, 2005, the difference between the amount paid and the amount which the Applicant would be required to pay pursuant to the charges adopted by the District pursuant to the connection fee study currently underway."

This Section 6.18 shall apply only to applications for sewer service received on and after December 2, 2005, to the effective date of any new sewer connections charges adopted by the District pursuant to the connection fee study referenced herein.
{Ordinance No. 10-20-05-16 repealed and replaced by No. 11-02-05-16}

Section 6.19 New Connection Charges Resulting From Remodel or Redevelopment

If a larger water meter size is required in accordance with Section 6.25 of Division VI of Chapter 12, then the permittee also shall pay additional sewer connection charges reflecting the difference in the prevailing connection charge for the required larger meter and the prevailing connection charge for the existing meter to be replaced. There shall be no cash credits or refunds for meter down-sizing. {Ordinance No. 07-20-06-21}

Section 6.21 Supplemental Water Connection Charges for Minaret Road Property Owners

In addition to the payment of the water connection charges in accordance with and as set forth in Section 6.03 of Division VI of Chapter 12 of the District Code, all property owners along Minaret Road submitting applications for water service that will be provided through connection to the water mainline installed in Minaret Road by Stonegate Mammoth, LLC shall be subject to a supplemental water connection charge in accordance with and as set forth in Exhibit A attached hereto and incorporated herein by this reference. Interest shall be added to each supplemental water connection charge at the rate of 9% per annum, simple interest, based on the number of months, or portions thereof, from January 26, 2006, to the date that a property owner along Minaret Road files an application with the District to connect to the above-mentioned water mainline and the District's water system, but in no event shall interest be charged for a period of more than 24 months. The supplemental water connection charge and interest shall be paid at the same time as the water connection charges set forth in Section 6.13 are paid. The supplemental water connection charge and the interest thereon shall be subject to the same rules

and regulations governing the Section 6.03 water connection charges, including but not limited to those rules and regulations respecting refunds, and collection and enforcement.
{Ordinance No. 12-21-05-19} {Amended by Ordinance No. 01-26-06-01}

Section 6.22 Charges for Customer Requested Service Call

For any customer requested service call, there shall be a $50 per hour charge with a minimum one hour charge.
{Added by Ordinance No. 07-19-12-09}

CHAPTER 12

MCWD WATER CODE

Division V and VI

DIVISION V PERMITS

Section 5.01 Permit Request

Permit Request No person other than the persons specifically excluded by this Chapter, shall commence, do or cause to be done, construct or cause to be constructed, use or cause to be altered, or connect to any public water main, valve, pressure reducing station, pumping plant, service connection or other similar appurtenance in the Mammoth Community Water District without first obtaining a permit from the District Manager and paying the appropriate fees as set forth in this Chapter.

Section 5.02 When Permit Is Not Required

The provisions of this chapter requiring permits shall not apply to contractors constructing water facility improvements under contracts awarded by the Board and entered into under proceedings pursuant to any of the special procedure statutes of this State providing for the construction of water facilities and the assessing of the expense thereof against the lands benefited hereby, or under contracts between the contractor and the Board.

Section 5.03 Validity of Permits

A. 1. (a) Is hereby repealed

A. 1. (b) The usage of a permit for a lot or premises other than the lot or premises for which the permit was issued shall be considered an unauthorized usage and is prohibited.

A. 1. (c) The usage of a permit for a lot or premises which has an increased number of units, hook-ups or taps, than that for which the permit was issued shall be considered an unauthorized usage and is prohibited.

A. 1. (d) The usage of a permit for a lot or premises which has more fixture units or facilities than that for which the permit was issued shall be considered an unauthorized usage and is prohibited until and unless fees are paid for the additional fixture units/facilities at the rates set forth in Section 6.03.G. and for any additional plan checking at the rates set forth in Section 6.01.

A. 1. (e) (1) The usage of a permit for any lot or premises which has a different design as to its distribution system, fixture units, or facilities from that shown on the plans for which the permit was issued, shall be unauthorized unless the permittee first provides the District with a revised set of plans showing the different design and the permittee pays all administrative fees the District incurs in reviewing and inspecting the revised plans, including, but not limited to, pre-plan check fees and inspection fees. This requirement is in addition to other requirements or limitations imposed upon the usage of permits as set forth in this Code.

A. 1. (e) (2) Is hereby repealed

A. 2. Is hereby repealed

A. 2. (a) The unauthorized usage of a permit in a manner prohibited by Section 5.03. A. 1. imposes a different or greater demand upon the District's water system. Therefore, the owner shall apply to the District for a new permit to authorize the increase in the number of hook-up units, fixture units or taps from that specified in the existing permit. The owner applying for a new permit shall comply with the District's then existing ordinances, rules and regulations concerning permits, including, ordinances, rules and regulations concerning permits, including, but not limited to, the payment of the appropriate fees and charges, and compliance with the District's water saving and water conservation device requirements set forth in Sections 2.38 and 3.22 of Chapter 12 of the District Code. Such compliance shall fully occur within sixty (60) days of written notice from the District of the unauthorized usage. In the event that the owner fails to timely comply, the District may revoke the permit and the permittee shall be subject to the provisions of Section 5.03. A. 3.

A. 2. (b) Is hereby repealed

A. 2. (c) Is hereby repealed

A. 3. When the District determines that an unauthorized usage of a permit has occurred, the District shall, in addition to all other enforcement devices set forth in this code, have the option of declaring part, or all, of the unauthorized usage to be void and demand that the unauthorized acts cease until such time as appropriate permits have been applied for and obtained, if available, and/or all appropriate fees and charges have been paid.

A. 4. The terms "unit", "hook-ups", "taps", "fixture units" and "facilities", as used in this Section, shall refer to those terms as specified in Section 6.03.

B. Is hereby repealed

B. 1. Is hereby repealed

B. 2. Is hereby repealed

C. Is hereby repealed

D. Any assurance of water service issued by the District in any form, in addition to the conditions as ordained heretofore, shall also be issued on the provision that the assurance is given on the state of facts existing on the date of that issuance, and that such facts may change subsequent to the date of the assurance.

E. 1. Is hereby repealed

E. 2. Is hereby repealed

E. 2. a. Is hereby repealed

E. 2. b. Repealed by Ord. 02-28-91-06.

E. 2. c. Is hereby repealed

E. 3. Is hereby repealed

E. 4. Is hereby repealed

E. 5. Is hereby repealed

E. 5. a. Is hereby repealed

E. 5. b. Is hereby repealed

E. 5. c. Is hereby repealed

E. 5. d. Is hereby repealed

E. 6. Notwithstanding any other section of the District Code, no permit shall be issued for any development for which the Town of Mammoth Lakes requires approval of a final tract map except upon the following conditions:

E. 6. a. The application for issuance of a permit shall be accompanied by a certified copy of documentation from the Town of Mammoth Lakes indicating the Town's approval of a tentative tract map for the proposed development; and

E. 6. b. Any permit so issued shall automatically become void upon the expiration or invalidation of the tentative map, unless a valid final map has been approved and issued in place thereof. This provision shall be in addition to any other section of the District Code pertaining to the issuance, vesting or invalidation of permits, including, but not limited to, the provisions of Section 5.03. I.

F. The charge for each and every water meter, meter interface unit, drop wire and other meter installed on any proposed construction shall be included as a Permit Connection Fee and shall be payable as regulated by this chapter and amendments thereto.

G. A letter of water availability for a single family residential unimproved lot subdivision or other development shall, in addition to all other terms and conditions required by District rules, regulations and ordinances, provide that said letter does not unconditionally guarantee any priority or reservation of capacity but that the developer or subsequent purchaser must acquire a water permit prior to construction of any improvements. Said letter shall further provide that such permits will be issued by the District solely on a first-come, first-served basis and only to the extent there is then remaining available water supply and capacity in the physical facilities for conveyance and treatment. The letter shall also indicate that such permits will be issued only upon payment of all then applicable fees and charges and in accordance with and subject to all then applicable District rules, regulations and ordinances.

H. 1. Is hereby repealed

H. 2. Is hereby repealed

H. 2. a. Is hereby repealed

H. 2. b. Is hereby repealed

H. 2. c. Is hereby repealed

H. 2. d. Is hereby repealed

H. 2. e. Is hereby repealed

H. 3. Is hereby repealed

I. 1. There shall be a permit for each hook-up unit or portion thereof, as defined in Section 6.03 of Division VI of this Chapter 12.

I. 2. Any permit or assurance of water service shall be issued on a first-come, first-served basis. To maintain the validity of a permit and to keep a permit in full force and effect, the following conditions must be met within 3 years from the date of the issuance of the permit, except that the General Manager may extend an un-expired permit for a period not to exceed one year upon written request by the permittee made prior to the expiration of the permit:

I. 2.a. Those portions of the project's distribution system which are to be constructed by the permittee, shall be inspected and approved by the District, and dedicated to the District.

I. 2.b. The meter, meter interface unit and the drop wire between the meter and the meter interface unit shall be installed by the permittee, and inspected and approved by the District.

I. 2.c. The permittee has timely complied with the requirements of Section 5.03.H. of Division V of Chapter 11 of the District Code, regarding sewer service to the same premises described in the permit for water service; and

I. 2.d. The permittee has paid all applicable fees and charges required by this Chapter 12, and has otherwise complied with all applicable provisions of this Chapter 12 in connection with the issuance of permits and the initiation of water service.

I. 3. A permit shall become null and void if the permittee fails to comply with the provisions of this Section 5.03.I., or if a building permit from the Town of Mammoth Lakes is not obtained within one year from the date of issuance of the District's permit. If water service has commended pursuant to the provisions of Section 6.04 of Division VI of Chapter 12 of the District Code, such service shall terminate as of the date that the permit becomes null and void. If any permit becomes null and void and the connection charges paid for such permit are not refunded, then the amount of such charges shall be credited against any connection charges due on a subsequent application for water service for the same premises described in the void permit.
{Subsection I: Ordinance No. 10-20-05-15 repealed and superseded by Ordinance No. 11-02-05-15}

J. {Subsection J repealed by Ordinance No. 11-02-05-15}

Section 5.04 Application for Permit

Any person requiring a Permit shall make written application to the District Manager.

The District Manager shall provide printed application forms of the permits provided for by this chapter, indicating thereon the information to be furnished by the applicant. The District Manager may require in addition to the information furnished by the printed form, any additional information from the applicant, which will enable the District Manager to determine that the proposed work or use complies with the provisions of this chapter.

Section 5.05 Refunds

Added by Ord. No. 03-07-84-05, amended by Ord. No. 12-04-86-26, repealed by Ord. 06-16-94-26.

Section 5.06 Refunds

The permittee shall be entitled to a refund of all moneys paid pursuant to Section 6.02, 6.03 and 6.16 less any costs incurred by the District in connection with the permit and a refund processing fee of twenty-five ($25.00). In order to be entitled to such a refund, the permittee must request the refund in writing and not have commenced water service. The written request must be delivered to the District or postmarked by the United States Postal Service within one (1) year of the date of issuance of the permit. No refunds will be made if such request is not timely made.

Section 5.07 Water Mains in Public Ways

Before granting any permit for construction, installation, repair or removal of any water main or appurtenances thereto, which will necessitate any excavation of fill, in, upon, or under any public street, highway or right-of-way under the jurisdiction of another public agency, the District Manager shall require the applicant to fill out the necessary forms of the agency having jurisdiction of another public agency, the District Manager shall require the applicant to fill out the necessary forms of the agency having jurisdiction and pay the required fee. The District will obtain the encroachment permit required.

Section 5.08 Plan Approval Required

No permit shall be issued until the District Manager has checked and approved the plans in accordance with other applicable provisions of this chapter.

Section 5.09 Pumping Plants and Other Water Facilities

Before granting a permit for the construction of any water pumping plant, hydro-pneumatic system, or other water facility to be operated by the District, the District Manager shall check and approve the plans or required modification thereof as to their compliance with county, state, and other governmental laws or ordinances and shall require that the facilities be adequate in every respect for the use intended.

Section 5.10

Added by Ord. No. 07-05-78-18; amended by Ord. No. 07-05-78-18; amended by Ord. No. 02-07-79-01; repealed by Ord. No. 04-15-82-12.

Section 5.11 Pre-Plan Check Policy

Prior to the issuance of a permit, the permittee shall submit two (2) sets of plans to the District for pre-plan check. The plans shall be checked for compliance with all District specifications, rules, and regulations. Prior to the District performing the pre-plan check, the applicant shall pay a fee to the District as specified in Section 6.17 of this Code. Such pre-plan check is not an assurance of water service nor a water permit for the particular project. The submittal of plans and/or documents for pre-plan check shall not constitute nor be considered an application for a water permit.

Section 5.12 Inspections for Transfer of Permits

A. Is hereby repealed

B. Is hereby repealed

Section 5.13 Underutilization of Hook-Up Units

A. Except as otherwise provided in the District Code, when land uses at a premises no longer exist for which hook-up unit fees were paid, and the owner of the subject premises desires that the permit for the unused hook-up units remain in effect, the District shall impose only its base charge for such non-used hook up units and, where applicable, discontinue service. Unless the owner provides the written notice specified in Subsection B. below, the District will impose its base charges for non-used hook-up units.

B. When land uses at a premises no longer exist for which hook-up unit fees were paid, the owner of such premises may relinquish such unused hook-up units, and, where applicable, have service discontinued. The owner of the premises must give the District written notice thereof. Upon receipt of such written notice, the District shall discontinue any water service charges, including base charges, imposed respecting such relinquished units, and, where applicable, discontinue service. Such discontinuation shall occur in the month during which such written notice is received and any charges for the month shall be imposed according to the number of days in the month for which the hook-up units remain in effect. There shall be no refund of the hook-up unit fees paid on the relinquished units. If, after relinquishment of the unused units, the owner of the subject premises later desires to renew service or increase the number of authorized hook-up units at such premises, the owner shall apply for such renewed service or additional units in accordance with the ordinances, rules and regulations of the District regarding applications for water service, except that the amount of any capacity fees (hook-up unit fees) previously paid for the relinquished units shall be deducted from the amount of capacity fees due pursuant to the application.

DIVISION VI FEES AND CHARGES

Section 6.01 Plan Checking Fees

Any person required by this chapter to have plans checked shall pay to the Mammoth Community Water District the fee or fees required by this section.

Water Mains	Fees
1000' or less	$75.00
More than 1000'	$75.00 plus .05/ft. over 1000
Hydro-pneumatic systems	$50.00 each
Pressure reducing systems	$50.00
Other Water Facilities	$1.50 for each $100 or fractional part thereof the total valuation of the work

There will be a minimum re-checking fee of $10.00. No plan checking will be done until the required re-checking fee is paid.

Applications are available in the District Office and are to be filled out by the Engineer submitting the plan.

Section 6.02 Water Construction Permit Fee

A. Before granting any permit for construction of a water main, water connection or tap, pressure reducing station, pumping plan or other appurtenances, and whenever a permit is required by the District, the District Manager shall collect the following fees from the applicant to cover cost of field and structure inspection of the proposed construction, procuring or preparing record plans, automobile mileage and all overhead and indirect costs. The applicant shall pay the cost of all labor and material required.

TABLE I – INSPECTION AND RECORD PLAN FEES

Water Mains	Fees
50' or less	$40.00
50' to 3500'	$40.00 plus $0.30/ft. over 50 ft.
350' to 1350'	$130.00 plus $0.20/ft. over 350 ft
Over 1350'	$330.00 plus $0.15/ft Over 1350 ft
Pressure reading stations	$40.00
Pumping Plant	$50.00
Hydro-pneumatic system	$50.00 each
Water connection at property line	$25.00 each
Water tap to main	$40.00 each Structure
Inspection	$25.00 per building

B. For other items of construction, not identified above, which relate to the District's water system, the applicant shall pay, in addition to the fees specified above, a fee of $1.50 for each

$100 or fractional part thereof, of the total valuation of the items subject to this subsection.

Section 6.03 Water Connection Charges

A. All water connection charges shall be paid to the District upon approval of an application and prior to issuance of a permit.

B. Water connection charges shall be imposed based on the water meter size needed to serve the premises, as determined by the District in accordance with the application and the schedule set forth in Section 6.03.E. An automatic annual escalator shall be added to the water connection charges at the beginning of each District fiscal year beginning April 1, ~~2008~~2020. The escalator will be based on the "ENR 20-city construction cost index" as shown in the Engineering News Record (ENR). The water connection charges shall be increased by the percent change of the cost index for the previous year ending December 31. {Section B Amended by Ordinance 04-19-07-07}

C. If there is an adequate, existing house lateral to which a premises shall be connected, no tap is required. If there is an existing house lateral which is not adequate for the premises to be served or if there is not an existing house lateral to which the premises to be served may be connected, then the customer will be billed for the District's costs for any work completed by the District in relation to tapping the mainline.

D. Connections of house laterals or of a force main into the District's existing force main shall be charged the applicable water connection charge for each related water meter installed, except for meters installed for irrigated landscaped areas. The District shall bill the property owner for its costs to perform any tap required under these circumstances.

E. The water connection charge schedule is as follows:

Meter Size	Water Connection Charge
3/4- inch	~~$5,026~~$7,225
1 - inch	~~$10,906~~$12,042
1 1/2 - inch	~~$27,442~~$24,085
2 - inch	~~$50,260~~$38,536
3 - inch	~~$129,771~~$84,297
4 - inch	~~$202,749~~$151,735
6 - inch	~~$405,347~~$337,189
8 - inch	~~$574,684~~ $578,038

~~{Section E Amended by Ord 04-19-07-07}~~

F. {Deleted by Ordinance No. 03-21-13-07}

G. Connection Charges for Landscaping

All single-family residences and all other premises with less than 5,000 square-feet of irrigated landscaped area shall be exempt from connection charges for landscaping. Except as provided

above, all premises with an irrigated landscaped area of 5,000 square-feet or more shall have a separate meter for such irrigation and pay the applicable connection fee for such meter based on the schedule set forth in Section 6.03. E. above.
{Section 6.03 Amended by Ord. 06-15-06-17}

Section 6.04 Billing for Water Service

The District shall begin billing for water service when the private water line is connected to the service connection and the meter, meter interface, and the drop wire between the meter and meter interface unit have been installed by the permittee, and inspected and approved by the District. The commencement of water service shall not relieve a permittee from timely compliance with the requirements of Subsection 5.03 I of Division V of this Chapter 12; and the permit is subject to revocation and service is subject to termination if such timely compliance does not occur.
{Ordinance No. 10-15-05-15 repealed and superseded by Ordinance No. 11-02-05-15}

Section 6.05 Fees for Processing Water Line Easements

For each private contract requiring the processing of water line easements, the District Manager shall collect from the applicant a fee of Forty Dollars ($40) for the first parcel description and Thirty Dollars ($30) for each additional parcel description through which a water line easement is required. In addition, a policy of title insurance insuring the easement in favor of the District shall be furnished at the sole cost of the applicant.

In the event it is necessary to rewrite the description because of a realignment or revision, the District Manager shall collect an additional fee of Thirty Dollars ($30) for each new parcel description necessary.

Section 6.06 Application Fee

A. When a person applies for a permit, the applicant shall pay to the District an application fee of $50 per application submitted. The District shall not accept an application until it receives the application fee.

B. If a permit is issued, the application fee paid pursuant to this section and/or the pre-plan check fees paid pursuant to Section 6.17 shall be applied to the overall fees required under this Division for the issuance of a permit.

C. Any person who has paid an application fee pursuant to this section and/or pre- plan check fees pursuant to Section 6.17 and whose application is canceled or withdrawn shall not be entitled to a refund or credit respecting such paid fees.

D. An application shall be deemed canceled if the applicant does not pay the applicable water connection charges within one year from the date of the application.

{Section 6.06 Amended by Ordinance No. 10-16-08-14}

Section 6.07 Fees for Preparing or Checking Special Studies

Before proceeding with the preparation of any special study, the District Manager shall collect from the person making the request for the study a fee in the amount of the estimated cost of preparing the study, as determined by the District Manager. This fee shall not be less than $100.00. If, after the fee is paid, a change in the study is requested which will increase the cost of preparing the study, supplemental fees shall be collected in the amount of the estimated additional cost. Studies prepared by others and submitted for checking by the District shall be subject to the fee requirement stated above, except that the minimum fee shall be $50.00.

Section 6.08 Contractor's Water Fee

Contractors desiring connection to a fire hydrant or other system appurtenance shall first apply to the District for permission to connect and shall comply with Section 3.14 of this chapter. The District will supply a water meter and charge the contractor at the rate of $1.00 per 1000 gallons used and the fees described in Section 3.14.

Section 6.09

Added by Ord. No. 12-05-73-02; repealed by Ord. No. 04-15-82-12

Section 6.10 Collection of Fees Charged

All fees and charges set forth in Sections 6.01, 6.02, 6.036.6, 6.16, 6.17 shall be paid prior to issuance of any permit.

Section 6.11 Stand-by or Water Availability Charge

A yearly stand-by or water availability charge shall be levied on undeveloped land within the District to which water is made available whether the water is used or not. The charge shall be ten dollars ($10.00) per year for each acre of land or parcel of land of less than one acre in area and the charge shall be added to and become a part of the annual tax levied upon the land.

In the event that the water stand-by charge remains unpaid on the first day of the month before the month in which the Board of Supervisors of Mono County is required to levy the taxes for county purposes, a six (6) percent penalty shall accrue thereon. The amount of the unpaid stand-by charge plus the amount of the penalty shall be added to and become a part of the annual tax levied upon the land and shall constitute a lien on that land.

Section 6.12 Rates and Charges for Water Service

{Subsections 6.12.B.1.(a), (b) and (c), subsections 6.12.B.2.(a) and (b), and subsection 6.12.B.3. of Chapter 12 are amended by Ordinance 05-19-05-06} {Subsections 6.12.B.1.(a) and (b), subsection 6.12.B.2.(a) and (b), subsection 6.12.B.3., and subsection 6.12.B.5. OF Chapter 12 of the District Code are hereby amended, and subsection 6.12.B.1.(c) of Chapter 12 of the District Code is hereby repealed by Ordinance No. 06-11-12-08} {Subsections 6.12.B.1.(a) and (b), subsection 6.12.B.2.(a) and (b), subsection 6.12.B.3., and subsection 6.12.B.5. of Chapter 12 of the District Code are hereby amended, and new Subsection 6.12.B.6, and B12.B7. is added by Ordinance No. 01-21-16-02}

A. For the purposes of this section only, the specified terms shall have the following definitions:

1. “Domestic Users” shall mean all residential users, including single family residences, condominiums, apartments, mobile homes and motel manager’s quarters.

2. “Commercial Users” shall mean all business or other similar users, including RV spaces, commercial units, motels, ski dormitories, laundries, Laundromats, service stations, public buildings, and unoccupied storage/warehouses, swimming pools (semi-public), spa/hot tubs (semi-public).

3. “Commercial Unit” shall mean each office, store, or other separately owned or operated commercial space or structure, including any commercial user which is not otherwise specifically identified.

4. “Mobile Home” shall mean a trailer or other similar vehicle, which is located more or less permanently on a lot and is used as a residence.

5. “RV Space” shall mean any short-term parking and/or service space for transitory trailers, campers or other recreational vehicle.

6. “Laundry” shall mean a commercial laundering facility.

7. “Laundromat” shall mean a self-service laundry utilized by the public.

8. “Public Building” shall mean any public service building, including a police station or fire station, or any other publicly owned building not otherwise specifically identified.

B. Each lot or premises which is connected to, and each customer receiving water from, the District’s distribution system shall pay a monthly water charge, which shall consist of the sum of a minimum service charge and a quantity rate charge. {Amended by Ord 02-21-08-04, eff: 5/01/2008}

B.1. The minimum service charge per month:

(a) For each multifamily user, the charge shall be the following per Dwelling Unit regardless of size:

Beginning:	4/1/16	4/1/17	4/1/18	4/1/19	4/1/20
MFR Base Charge	$13.89	$14.17	$14.46	$14.75	$15.05

The rate increase effective on April 1 of each year will be applied beginning with the April billing cycle.

(b) For each single family and commercial customer, the charge shall be the following per Meter Size:

Beginning:	4/1/16	4/1/17	4/1/18	4/1/19	4/1/20
5/8 | 3/4 inch meter	$13.89	$14.17	$14.46	$14.75	$15.05
1 inch meter	$21.04	$21.47	$21.90	$22.34	$22.79
1 ½ inch meter	$38.93	$39.71	$40.51	$41.33	$42.16
2 inch meter	$60.39	$61.60	$62.84	$64.10	$65.39
3 inch meter	$128.35	$130.92	$133.54	$136.22	$138.95
4 inch meter	$228.52	$233.10	$237.77	$242.53	$247.39
6 inch meter	$503.96	$514.04	$524.33	$534.82	$545.52
8 inch meter	$861.68	$878.92	$896.50	$914.43	$932.72

The rate increase effective on April 1 of each year will be applied beginning with the April billing cycle.

c) Repealed by Ordinance No. 06-11-12-08

d) The District shall not charge its minimum monthly service charge with respect to any lot or premises which is connected to the District's distribution system during the period that, as determined by the General Manager, such lot or premises has been rendered unusable due to circumstances beyond the control of the permittee, his/her officers, directors, employees, agents, tenants or independent contractors; provided that such period of relief from the minimum monthly service charge shall not extend beyond three years except that the General Manger may extend the period for one year. Circumstances beyond the permittee's control may include, but are not limited to, fire, earthquake, explosion or other natural disaster. In the case of a lot or premises occupied by commercial users or a combination of commercial and domestic users where one or more but not all, of the premises of such commercial and/or domestic users on such lot or premises has or have been rendered unusable as described above, the General Manager shall determine the appropriate proportionate reduction in the minimum monthly service charge. In the case of a lot or premises occupied by multiple domestic users only where one or more, but not all, of the premises of such users on such lot or premises has or have been rendered unusable as described above, the reduction in the minimum monthly service charges shall be equal to the total of such charges for those domestic users whose premises have been rendered unusable.

B.2.(a) The quantity rate charge for single family residences shall be the following per 1,000 gallons:

Beginning:	4/1/16	4/1/17	4/1/18	4/1/19	4/1/20
Tier 1 (First 4,000 gal.)	$0.91	$0.93	$0.95	$0.97	$0.99
Tier 2 (Next 4,000 gal.)	$2.12	$2.17	$2.22	$2.27	$2.32
Tier 3 (Over 8,000 gal.)	$4.66	$4.76	$4.86	$4.96	$5.06

(b) The quantity rate charge for multiple family residences (MFR) will be a uniform charge per 1,000 gallons as follows:

Beginning:	4/1/16	4/1/17	4/1/18	4/1/19	4/1/20
MFR	$2.16	$2.21	$2.26	$2.31	$2.36

The rate increase effective on April 1 of each year will be applied beginning with the April billing cycle.

B.3. The quantity rate charge for commercial users shall equal the total monthly water use per 1,000 gallons as measured through the customer's meter multiplied by the following uniform rate:

Beginning:	4/1/16	4/1/17	4/1/18	4/1/19	4/1/20
Commercial	$2.88	$2.94	$3.00	$3.06	$3.13

The rate increase effective on April 1 of each year will be applied beginning with the April billing cycle.

B.4.(a) The monthly water charge for customers served by multi-customer meters shall be the total of the service charge (s) for the customers, lots or premises served through the multi- customer meter plus the total quantity rate charge for all serviced through that meter divided by the number of customers, lots or premises served by the meter.

b) The District shall not be responsible for any disparity among customers served by multi-customer meters for the amounts of water used or for the size of the premises served. Any adjustment for such disparity in water use of the quantity rate among customers served by multi-customer meters shall be the responsibility of the customers served. {Amended by Ord 02-21-08- 04}

B.5. The quantity rate charge for all irrigation users on a separate irrigation meter shall be based on the total monthly water use measured through the customer's meter, the square footage of irrigated area and the maximum applied water allowance (MAWA) as determined by the District from the California Department of Water Resources Model Landscape Ordinance. The rates listed below shall be multiplied by each 1,000 gallons of metered usage as follows:

Beginning:	4/1/16	4/1/17	4/1/18	4/1/19	4/1/20
Tier 1 (Gallons Within MAWA)	$2.53	$2.59	$2.65	$2.71	$2.77
Tier 2 (Gals. Over 100% to 200% of MAWA)	$5.70	$5.82	$5.94	$6.06	$6.19
Tier 3 (Gallons Over 200% of MAWA)	$8.44	$8.61	$8.79	$8.97	$9.15

The rate increase effective on April 1 of each year will be applied beginning with the April billing cycle.

B.6. The quantity rate charge for recycled water made available by the District will be a uniform charge per 1,000 gallons as follows:

Beginning:	4/1/16	4/1/17	4/1/18	4/1/19	4/1/20
Recycled	$1.67	$1.71	$1.75	$1.79	$1.83

The rate increase effective on April 1 of each year will be applied beginning with the April billing cycle.

B.7. Water Shortage Surcharge

Water conservation mandated by the State of California or required as a result of local water supply shortage conditions can have significant impacts on the District's financial stability, staffing, and planning by causing decreases in revenues from water sales. The vast majority of the District's Operations and Maintenance (O&M) costs are fixed and therefore unavoidable. This means that the District is sensitive to reductions in water sales that result in decreases in rate revenue because net revenue declines at a faster rate than the decline in District expenses for producing, treating and distributing water supplies to its customers. When the District declares a water shortage level, it sees a measurable decline in net revenues from water sales. The goal of the water shortage surcharge is to maintain approximately the same net revenues as the District would collect in non-shortage conditions. Because of the District's cost structure for producing, treating and distributing water, the District determined that a surcharge based on meter capacity was most reflective of District customer characteristics and policies and therefore most equitable to all water users.

It is the District's intention to impose water shortage surcharges only when there is an actual water shortage condition as declared by the Board of Directors, whether resulting from state-mandated conservation or local water shortages, which is expected to be of significant duration. Water shortage surcharges will assist the District with promoting water conservation while maintaining revenue stability and ensuring that the District meets any debt coverage requirements it is obligated to meet. The amount of the surcharge is directly related to the declared water conservation level and the expected percentage conservation at each level. The Board would impose the surcharge when it makes the determination that a water shortage condition exists which is likely to cause a significant decrease in District water service revenues, and would remove the surcharge when it determines that a change in shortage conditions allows. The Board will impose or lift the surcharge only after considering the proposed action during a noticed public meeting.

The maximum water shortage surcharge that the Board may impose at each declared water shortage level is as follows:

Meter Size	Level 1	Level 2	Level 3	Level 4
5/8" | 3/4"	$1.31	$2.62	$3.93	$6.55
1"	$2.19	$4.37	$6.55	$10.91
1 1/2"	$4.37	$8.73	$13.09	$21.82
2"	$6.99	$13.97	$20.95	$34.91
3"	$15.27	$30.54	$45.81	$76.35
4"	$27.49	$54.98	$82.46	$137.43
6"	$61.08	$122.16	$183.24	$305.40
MFR	$1.31	$2.62	$3.93	$6.55

When the Board imposes a water shortage surcharge, it may take effect immediately or at such other time that the Board determines in accordance with the declared water shortage level and other considerations.

C. Whenever reasonably possible, the monthly water charge shall be determined as set forth in Section 6.12B. However, when a meter fails it cannot be reasonably read, the quantity rate component of the monthly water charge shall be based on the average quantity of water supplied for comparable service during the preceding year. When there is no record of water supplied for comparable service, the total monthly water charge shall be:

Single Family	$14.72
Condominium Unit	$12.62
Apartment Unit	$12.62
Mobile Home	$12.62
Motel Manager's Quarters	$12.62
RV Space	$2.05
Commercial Unit	$9.15
Motel Room (with laundry facilities)	$8.52
Motel Room (with kitchenette)	$7.94
Motel Room (except as otherwise indicated)	$5.47
Ski Dorm/Bed	$2.05
Laundry, Commercial	$547.88
Laundromat, Public Use	$336.04
Serve Station	$16.78
Car Wash	$42.01
Restaurant Seat	$1.21
Bar Seat	$0.73
Theater Seat	$0.37
Public Building	$28.03
Hospital (per bed)	$20.72
Elementary School (per student)	$0.63
High School (per student)	$0.73
Unoccupied Storage/Warehouse	$12.62
Swimming Pool (semi-public)	$8.36
Spa/Hot Tub (semi-public)	$4.26
Hospital Bed	$20.72

{Amended by Ordinance: 06-19-03-04}
*Number of students based upon Average Daily Attendance

D. Each common space or area for a condominium, apartment, or similar structure shall constitute one unit for purposes of determining monthly water charges.

E. 1. No water shall be furnished to any premises or persons except through a service connection in compliance with the District's rules and regulations.

E.2. No water service or facility shall be furnished to any premises or persons free of charge.

E.3. Whenever possible, all water supplied by the District shall be measured by means of water meters.

E.4. The minimum meter size shall be 5/8-inch meter.

F. The water service rates and charges set forth in this Section 6.12 shall be adjusted April 1 of each year by the percentage change in the Los Angeles – Riverside – Orange County Consumer Price Index (All Urban Consumers) for the prior April 1 to March 31 period, except that the Board of Directors of the District may determine to reduce or eliminate any such adjustment for any fiscal year depending on circumstances existing at such time; provided that for the April 1, 2003 to March 31, 2004 fiscal year, the water service rates and charges shall be adjusted on July 1, 2003, according to the percentage change in such index for the April 1, 2002, to March 31, 2003 period. The Los Angeles – Riverside – Orange County Consumer Price Index (All Urban Consumers) has been selected because changes in it most reflect changes experienced in the District's costs to operate, maintain and repair its water system. {Ordinance No. 06-19-03-04}

Section 6.13 Billing Procedures and Meter Testing

A. Except as otherwise specified herein, the District shall directly bill each individual customer receiving water service, and each lot or premises connected to the District's distribution system. The monthly water charge shall be payable by each customer. Each customer shall be liable to the District for payment of the monthly water charge regardless of whether service is provided through an individual meter or multi-customer meter. {Amended by Ord 02-21-08-04, eff: 5/01/2008}

B. Where individual customers are located in a multi-unit structure not served by a water meter connected to each individual unit, the customers will be billed individually only in those instances when the homeowner's or similar association guarantees payment of all charges for service to the customers. {Amended by Ord 02-21-08-04}

C. Where owners of premises in a multi-unit structure served through a multi-customer meter are billed individually and belong to a homeowner or similar association, the association shall provide to the District current and up-dated lists of the owners of each premises. The association shall inform the District in timely fashion of any change in ownership in its members.

D. Notwithstanding Section 6.13A, the District may elect to send a composite bill to groups of customers served by multi-customer meters when each of the following conditions are met:

1. The owners to be billed as a group own lots or premises in a multi-unit living structure;

2. The owners are served through one or more multi-customer meters;

3. The owners have formally organized in writing into as homeowner's or similar association;

4. The homeowner's or similar association, through properly executed covenants, conditions, articles of incorporation or by-laws, has the power to act as the sole agent for the owners concerning water and sewer charges in a manner which binds individual owners; and

5. The association enters into a written agreement with the District which provides, among other matters, that:

a) The association shall be responsible for and guarantee payment of all such charges within the time required by the District's rules and regulations, regardless of whether any single owner has paid the owner's share of such charges to the association;
b) The District shall bill to and the association shall pay all delinquent penalty and interest charges on the composite bills;

c) The District's bill or other notices to the association shall constitute a bill or other notice to each individual owner, who shall agree that no other notice or bill to individual owners shall be necessary for, or a prerequisite to, the District's exercise of its powers to terminate service, or place liens on each owner's property or exercise other legal remedies necessary to preserve the collection of and collect delinquent bills and charges: and {Amended by Ord 02-21-08-04}

d) The bill shall consist of the sum of the total monthly water charges for each owner represented by the association, which shall be the sum of the service charge for each owner, plus the total quantity rate charge for all service through the multi-customer meter. Service to a common area shall be treated as service to a single unit. The District shall not be responsible for any disparity among such owners for the amounts of water used for the size of premises served. Any adjustment for such disparity in water use or in the quantity rate charge shall be the responsibility of the owners served. {Amended by Ord 02-21-08-04}

E. All applications for service shall constitute a written agreement to pay for all service rendered pursuant to the application and to be bound by all applicable District rules and regulations. An application shall be signed by the owner who shall be responsible for the bills for water service provided through that meter, regardless of whether the meter is a single customer or multi-customer meter. {Amended by Ord 02-21-08-04}

F. 1. Whenever possible, meters shall be read on a monthly or bi-monthly basis.

2. At its discretion, the District may test a meter at any time. The District shall test a meter upon the request of a customer, provided the customer first deposits $25.00 with the District. If the District's test shows the meter is registering within 5% of accuracy the amount of water actually passing through the meter, the $25.00 shall be retained by the District to cover its cost of testing. If the test shows that the meter is in error by at least 5%, the $25.00 deposit shall be refunded and the meter replaced or repaired.

3. If, after testing a meter, the meter is found to register 5% more water than the amount of water actually passing through the meter, the District shall replace or repair the meter and refund to the customer the overcharge that may have been made during the preceding three months due to the meter's inaccuracy. If, after testing the meter, the meter is found to register less than 95% of the amount of water actually passing through the meter, the District shall repair or replace the meter and issue a supplemental bill to the customer. The amount of the supplemental bill shall be equal to the difference of the customer's average bill for comparable service and his/her actual bills for the preceding three months. If there is no record of comparable service, the rates set forth in Section 6.12C supplemental bill.

Section 6.14 Manual Reading Charge

In the event that any customer refuses to grant written permission to the District for the express purpose of the installation of a meter reading cable line across or upon his or her property, an additional flat rate per monthly charge of twenty-five ($25.00) dollars shall be included on the monthly billing to reimburse the District for additional operating costs of manual reading in accordance with the procedures to be established by the District Board of Directors. {Amended by Ord 02-21-08-04, eff: 5/01/2008}

Section 6.15 Collection of Water Use and Service Charges and Rates

All water use and service charges and rates may be billed on the same bill as and collected together with rates and charges for any other District services. If all or any part of such a bill is not paid for any service, the District may discontinue any or all of the services for which the bill is rendered.

A. All services shall be billed on a monthly basis. The monthly billing statement will be for service rendered during the preceding month. A statement shall become delinquent on the twentieth (20^{th}) day of the month following the month in which the statement is mailed. {Date change amended by Ordinance No. 01-10-08-01}

B. A one-time basic penalty of ten percent (10%) of the charge or rate for a month shall be added to each delinquent charge for the first month the charge is delinquent. Thereafter, an additional penalty of one-half (1/2) of one percent (1%) per month shall be added to all delinquent charges and basic penalties until such time as, pursuant to subsection (e) hereof, the Board may request the County Auditor to include the amount of delinquencies on the bills for taxes against the respective lot or parcel. Prior to the collection of delinquent amounts pursuant to subsection (d) hereof, monies paid where any portion of an account is delinquent shall first be credited to the delinquent portion and then to the current billing. Once the transfer of delinquent amounts has been turned over to the County Auditor's office for collection, no payment shall be received by the District on said delinquent amounts except as collected by the County Auditor's office.

C. In the event that any customer fails to make such payment as provided above, the customer shall be deemed to be in default and in such cases, the District may declare the balance or remaining balances due and payable. In the event the District is required to bring action to collect any sum in default under District ordinance terms, the customer shall pay, as an additional penalty, any and all attorney's fees and / or court and legal costs incurred by the District to bring such action. The District shall not be limited to any one remedy in the event of default, but may avail itself of any remedy or legal procedure available to it in such event. {Amended by Ord 02-21-08-04, eff: 5/01/2008}

D. The District shall include a statement on its bill to each customer, or shall provide such statement to each customer by any other means, that any charges remaining delinquent for a period of sixty (60) days shall constitute a lien against the lot or parcel of land against which the charges were imposed. {Amended by Ord 02-21-08-04}

E. All rates, charges, penalties, and interest, which remain delinquent as of June 30th of each year, shall be collected in the same manner as the general taxes for the District for the forthcoming fiscal year provided that the District shall have given prior notice to the owner of the lots or parcels affected as follows: {Amended by Ord 02-21-08-04}

1. On June 30th of each year the District staff shall prepare a written report for the Board of Directors containing a description of each parcel or real property receiving a specific service and the amount of delinquent charges, penalties, and interest due against that parcel on June 30th. The report of delinquent water charges may be combined with a report for any other delinquent charges.

2. The staff shall publish a notice of the filing of the report and of the time and place of hearing by the Board of Directors on the report. Such publications shall be for not less than once a week for two weeks prior to the date set for the hearing. The same notice shall be mailed to the owner of each parcel listed on the report as that owner appears on the last equalized assessment roll.

3. At the time of the hearing stated in the notice, the Board of Directors shall hear and consider all objections or protest to the delinquency report. Thereafter, the Board may adopt, reverse, change, reduce or modify any charge, overrule any or all objections, and make its determination upon the propriety of each charge and delinquency described in the report. The Board's determination shall be final. Thereafter, the Board may adopt a resolution approving the delinquency charge report, as modified if appropriate, and request the County Auditor to include the amount of delinquencies on the bills for taxes levied against the respective lots and parcels. The resolution and report will be transmitted to the County Auditor not later than August 1st of each year.

Section 6.16 Charges for Installation of Service Connection and Meter

The permittee shall pay all fees and charges associated with the installation of the service connection (where required) and the meter, meter box, line fittings and setting equipment. The permittee shall deposit with the District a sum of money equal to the District's estimated cost of the installation, including materials and labor, if applicable, prior to the issuance of any permit. However, if the District's cost of installing the service connection, meter or related equipment increases prior to the actual time of installation. If the cost of the installation exceeds the amount of the deposit, the permittee shall pay such additional sum prior to receiving water service from the District. If the cost of the installation is less than the amount of the deposit, the District shall refund the difference to the permittee.

Section 6.17 Pre-Plan Check Fee

At the time an application is made to the District for a water permit, the applicant shall pay to the District a pre-plan check fee in accordance with the following table:

Water Meter Size	Plan Check Fee
3/4 INCH METER	$25
1 INCH METER	$54
1 1/2 INCH METER	$118
2 INCH METER	$175
3 INCH METER	$373
4 INCH METER	$554
6 INCH METER	$1,058

{Amended by Ordinance No. 03-21-13-07}

Section 6.18 Temporary Water Service Reconnection for Inspection of Individual Water Facilities

Any person buying and/or selling property within Mammoth Community Water District boundaries, or their agent, may apply to the District to have water service reconnected temporarily by District personnel for the purpose of inspecting the water facilities of said property. The buyer and/or seller, or their designated agent, shall (1) apply to the District twenty- four (24) hours in advance of the date the services are to be reconnected and inspected, week- ends and holidays excluded, (2) complete a request form as provided for by the District, and (3) shall pay the sum of $25.00 to the District prior to the scheduling of an appointment to complete the temporary water reconnection and inspection of facilities.

A. The District shall not perform the temporary reconnection and inspection unless the buyer and/or seller, or their designated agent, is present during the reconnection period. Any person requesting a water reconnection for inspection purposes who does not keep a scheduled appointment shall comply with Section 6.18, items (1), (2) and (3) prior to having a new reconnection completed.

B. The District shall retain the $25.00 as referred to in item (3) above to cover the administrative costs of the District regardless if the buyer and/or seller, or designated agent, was present for the reconnection.

C. The buyer and/or seller of the property requesting this service of the District shall assume all liability as a result of the request for water reconnection and inspection procedures as described herein.

Section 6.19 Deposit

a) Prior to receiving water service, an applicant for water service shall deposit with the District a sum equal to three (3) months of the meter inoperative rate for water service.

b) A deposit shall be required for each lot or premises when any of the following conditions occur:

1. Whenever an owner of property receiving water service from the District transfers the property to a new owner, the new property owner shall pay a deposit to the District as identified in Section 6.19 (a).

2. Whenever there is a change in the customer receiving water service, the new customer shall pay a deposit to the District as identified in Section 6.19 (a).

3. Any District customer, whose water service is disconnected due to non-payment of District charges shall pay a deposit, as specified in Section 6.19 (a), as a prerequisite for resumption of water service. {Amended by Ord 02-21-08-04}

c) Notwithstanding Section 6.19 (a), (b) 1 or (b) 2, an existing customer within the District who has not incurred any penalties or late charges on any water account with the District for nine (9) months of the immediately preceding twelve (12) months, shall not be required to deposit with the District an amount as identified in Section 6.19 (a). {Amended by Ord 02-21-08-04}

d) Notwithstanding Section 6.19 (a) and (b), the District shall not retain as a deposit a sum greater than three (3) months of the meter inoperative rate for water service for any single lot or premises.

e) The District may use the deposit to pay any water bill, and penalties thereon, which are otherwise unpaid by the customer. The District may also use the deposit for its costs of collecting the unpaid water bill and penalties. If the District uses part or all of a customer's deposit, that customer shall pay the District a sum adequate to maintain a deposit equal to three (3) months of the meter inoperative rate as a condition of continued water service.
{Amended by Ord 02-21-08-04}

f) The amount of deposit not used by the District shall be refunded to the customer when the customer voluntarily terminates water service with the District.
{Amended by Ord 02-21-08-04}

g) The amount of the deposit not used by the District may be credited to the account of the customer at such time as the District determines a deposit is no longer required, provided the District has held the deposit for a minimum of twelve (12) months.
{Amended by Ord 02-21-08- 04}

Section 6.20 Additional Water Connection Charges

In addition to the payment of the water connection charges existing as of November 2, 2005, in accordance with and as set forth in Section 6.03 of Division VI of Chapter 12 of the District Code, all persons submitting applications for water service ("Applicant" or "Applicants") on and after December 2, 2005, shall also be subject to the water connection charges that may be adopted by the District pursuant to the connection fee study presently underway by the District. In the event that the adopted water connection charges are higher than those existing as of November 2, 2005, then the difference between the connection charges paid by the Applicant and what the Applicant would be required to pay pursuant to the increased connection charges shall be paid by the Applicant. The District shall provide the Applicant with written notice of the amount due. The amount due shall be paid within 45 days after the date of the notice. If the new water connection charges are less than those existing on November 2, 2005, then the District shall refund the difference to the Applicant within 15 days after the effective date of the new connection charges. Connection charges due hereunder shall be subject to the provisions of Section 6.15 of Division VI of Chapter 12 of the District Code regarding the enforcement and collection of water charges. The District may disconnect service if connection charges due hereunder are not timely paid.

If, prior to the Applicant's payment of any additional water connection as required by this Section 6.20 an Applicant transfers ownership of the premises for which an application for water service was submitted on or after December 2, 2005, the Applicant shall notify the buyer of the premises of the potential for payment of such additional connection charges.

All applications received on or after December 2, 2005, and until the effective date of the water and sewer connection charges that may be adopted pursuant to the connection fee study presently underway shall contain the following:

> *"By signing this Application, the undersigned, in accordance with Section 6.20 of Division VI of Chapter 12 of the District Code, agrees to pay, in addition to the water and sewer connection charges in effect as of November 2, 2005, the difference between the amount paid and the amount which the Applicant would be required to pay pursuant to the charges adopted by the District pursuant to the connection fee study currently underway."*

This Section 6.20 shall apply only to applications for water service received on and after December 2, 2005, to the effective date of any new water connections charges adopted by the District pursuant to the connection fee study referenced herein.
{Ordinance No. 10-20-05-16 repealed and replaced by No. 11-02-05-16}

Section 6.21 Supplemental Water Connection Charges for Minaret Road Property Owners

In addition to the payment of the water connection charges in accordance with and as set forth in Section 6.03 of Division VI of Chapter 12 of the District Code, all property owners along Minaret Road submitting applications for water service that will be provided through connection to the water mainline installed in Minaret Road by Stonegate Mammoth , LLC shall be subject to a supplemental water connection charge in accordance with and as set forth in Exhibit A attached hereto and incorporated herein by this reference. Interest shall be added to each supplemental water connection charge at the rate of 9% per annum, simple interest, based on the number of months, or portions thereof, from January 26, 2006, to the date that a property owner along Minaret Road files an application with the District to connect to the above-mentioned water mainline and the District's water system, but in no event shall interest be charged for a period of more than 24 months. The supplemental water connection charge and interest shall be paid at the same time as the water connection charges set forth in Section 6.13 are paid. The supplemental water connection charge and the interest thereon shall be subject to the same rules and regulations governing the Section 6.03 water connection charges, including but not limited to those rules and regulations respecting refunds, and collection and enforcement.

Exhibit A

Other Minaret Road Parcels

APN Number

33-100-14
33-330-47
33-100-26
33-100-39
33-100-40
33-100-37
33-100-32
33-100-31

{Ordinance No. 12-21-05-19 and amended by No. 01-26-06-01}

Section 6.22 Basis of Meter Sizing

A. Water fixture units determine the estimated flow to a structure or building. This flow is used to determine the required meter size. Meters will be sized for a given flow based on the plans submitted and verified at final inspection and in accordance with the most recent effective American Water Works Association (AWWA) meter standards, as well as the California Plumbing Code.

B. Structures or buildings that except for sinks, fully comply with the most recent effective California Green Building Standards Code, including but not limited to irrigation provisions and pressure reducing valves on irrigation systems installed in accordance with Section 2.38 I, will be entitled to a reduced fixture unit value commensurate with the reduction in water demand resulting from such compliance. The reduced fixture unit value will be used to determine the size of water meter as determined pursuant to Subsection A above.

{Added by Ordinance No. 07-20-06-21}
{Amended by Ordinance No. 03-21-13-07}

Section 6.23 Redevelopment and Connection Charge Credits

Connection charges are one-time fees imposed for any new connection or for a larger meter at an existing connection. If a larger water meter is required for any premises, the connection charge owed shall be the difference between the prevailing charge for the existing meter and the prevailing charge for the larger meter.

The District no longer issues 5/8-inch meters for service. For credit purposes, all existing 5/8-inch meters within the District water system shall be considered ¾-inch for credit purposes. There shall be no cash credits or refunds for meter down-sizing.
{Added by Ordinance No. 07-20-06-21}

Section 6.24 Fire Supply Connections

A connection for fire supply purposes shall include a detector assembly backflow prevention device to measure any leakage or unauthorized use on the fire supply connection.

~~When a meter is sized for fire flows and non-fire flows, the connection charge shall be the difference between the charge for the size of the installed meter and the charge for the meter size that would be needed for fire flows only. For example, if a six inch meter is installed for fire flows and non-fire flows and a four inch meter is required for fire flows only, then the connection charge would be calculated as follows:~~

~~Connection Charge = six inch meter connection charge – four inch meter connection charge.~~

~~{Added by Ordinance No. 07-20-06-21}~~

Section 6.25 Remodel and Redevelopment Permitting

Any permittee contemplating a remodel or redevelopment of his/her premises shall consult with the District before undertaking any such remodel or redevelopment to determine whether the existing water meter is adequate and whether or not a new permit is needed.

Inquiries regarding remodels or redevelopment will be reviewed to determine if the existing meter size and lateral are acceptable based on the new total fixture unit count. New meter sizes will be determined based on the California Plumbing Code size for a given number of fixture units. If the remodel or redevelopment complies with the California Green Building Standards Code, the number of fixture units will be determined consistent with the provisions of Subsection B of Section 6.22 above. For each remodel or redevelopment inquiry, a form shall be completed by the permittee to collect the following information:

- Contractor contact information
- Owner's name, mailing address, permanent address and phone number
- A set of proposed plans (including existing configuration)
- Existing fixture units
- Proposed total fixture units
- Existing meter size
- Meter size per proposed fixture units and CPC
- Compliance forms and worksheets from the California Green Building Standards Code showing compliance with Chapter 4, Residential Mandatory Measures, will be provided if the applicant would like to be considered for reduced fixture unit values.
- Signature: By signing the form, the owner shall acknowledge that if the number of fixture units actually installed, as determined at the time of final inspection, changes from that stated in the form, thereby affecting the meter size based on the CPC, the owner may be required to install a larger service connection and meter, and pay additional connection charges in order to secure a valid permit.

If it is determined that the existing meter is acceptable, a new permit will not be required. An update to the original permit may be required if any fixtures are added or amended in such a way that may affect the total fixture count. If no additional fixtures are added and the fixture count does not change, no further action will be taken. If it is determined that the meter must be upgraded, a new permit will be required, along with payment of the applicable connection charges.

A backflow questionnaire shall be completed at the same time as a remodel or redevelopment inquiry. Based on the responses on the backflow questionnaire, a backflow inspection and backflow prevention device may be required, even if a new permit is not.

{Added by Ordinance No. 07-20-06-21}
{Amended by Ordinance No. 03-21-13-07}

MAMMOTH
COMMUNITY WATER DISTRICT

Water & Wastewater Capacity Fee Study

Report / July 3, 2019

RAFTELIS

RAFTELIS

July 3, 2019

Mr. Mark Busby
General Manager (Interim)
Mammoth Community Water District
1315 Meridian Blvd
Mammoth Lakes CA 93546

Subject: Water and Wastewater Capacity Fee Study

Dear Mr. Busby,

Raftelis is pleased to provide this Water and Wastewater Capacity Fee Study Report (Report) to the Mammoth Community Water District (District or MCWD). This report details the methodology used to update the District's capacity fees and summarizes the key findings and recommended fees.

It has been a pleasure working with you. We thank you, Jeff Beatty, John Pedersen, and other District staff for the support provided during this study.

Sincerely,

RAFTELIS FINANCIAL CONSULTANTS, INC.

Sanjay Gaur
Vice President

Kevin Kostiuk
Senior Consultant

445 S Figueroa St, Suite 2270
Los Angeles, CA 90071
www.raftelis.com

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1. Executive Summary

1.1. Background of the Study

In 2018, Mammoth Community Water District (District or MCWD) engaged Raftelis to conduct a Water and Wastewater Capacity Fee Study (Study). This report describes how Raftelis calculated updated capacity fees in accordance with the rules and regulations of California State Government Code Section 66013. This report is the formal technical documentation in support of modifications to the capacity fees within the District's service area.

1.2. Capacity Fees

Capacity fees are also commonly known as developer fees, development impact fees, connection fees, tap fees, and system development charges, among others. All are one-time capital charges, assessed against a new development, to recover the proportional share of capital facility investment, previously constructed by a utility (or will be constructed), to accommodate growth. Capacity fees are codified in the California Government Code Sections 66000-60025. Capacity fees must reflect the link between the fee imposed on, and the benefit received by, a new connection to the system. The fee charged may not exceed the proportional share of costs associated with providing the service. There are broadly three different methodologies to calculate capacity fees: Buy-In, Incremental, and Hybrid; with variations of each dictated by local community and system characteristics, as well as policy objectives. Utilities have broad latitude in the method and approach used to calculate fees provided the fees reflect the benefit and do not exceed the proportional share of costs for providing service to the connection.

1.3. Existing Capacity Fees

The methodology for calculating the existing water capacity fee of $7,126 per Meter Equivalency Unit (MEU) and wastewater capacity fee of $3,174 per MEU was last updated in 2006. The current water MEU is based on the average summer demand by meter size in gallons per day (gpd). The current wastewater MEU is based on the average winter demand by meter size in gpd. The water MEU is approximately 397 gpd and the wastewater MEU is approximately 131 gpd. The existing fee structure was adopted in April of 2007 with a report prepared by FCS Group and Collins Engineering Consulting. Fees have been updated annually in subsequent years based on Engineering News-Record (ENR) Construction Cost Index (CCI).

The existing methodology uses a Hybrid approach to calculate fees. The water capacity fees have a small Buy-In component and a large Incremental component. Wastewater capacity fees have a large Buy-In component and a small Incremental component. Both fees utilize District calculated demand ratios, by meter size, to estimate the ratios used to derive total MEUs and fee differentials. Both fees value the utilities at Original Cost less tax funded facilities and facilities serving existing development.

1.4. Proposed Capacity Fees

The Town of Mammoth Lakes (TOML) anticipates significant growth within its jurisdictional boundaries with a mixture of residential and commercial development and increased residential and hospitality densities. However, the degree of growth, timing of development, and effect on the District's water and sewer systems facilities is uncertain. Most of the infrastructure required to serve future customers is already built, with the projected cost of additional infrastructure expected to be approximately 10% of the value of the existing infrastructure. Based on this information, it is reasonable and appropriate to determine capacity fees based on the Buy-In method. Raftelis worked closely with the District to determine the value of the existing systems. Raftelis and the District agreed that the valuation method should reflect Replacement Cost less Depreciation (RCLD) to value the system in today's dollars. This mirrors the cost of future investment in repair and replacement (R&R). The value of each system was then spread over the existing system demand to determine proposed capacity fees.

The analysis herein utilizes the Buy-In methodology to justify the proposed water capacity fee of $7,225 per MEU and wastewater capacity fee of $3,125 per MEU. Following adoption of updated capacity fees, Raftelis recommends that the District continue the policy of updating fees each year to keep pace with inflation by applying the annual increase in ENR CCI. We recommend the District conduct a comprehensive review of its capacity charges in three to five years to capture any major changes to the utilities or growth in the service area to ensure capacity fees are equitable.

Table 1-1 shows the schedule of proposed water and wastewater capacity fees for the remainder of fiscal year (FY) 2019-2020. Fees will be updated annually based on ENR CCI beginning April 1, 2020. The fees for any connections greater than 6" will be the discretion of the District based on an understanding of the type of development, building use, and other water use and wastewater generation considerations.

Table 1-1: Proposed Capacity Fees

Connection Size	Proposed Water Capacity Fee	Proposed Wastewater Capacity Fee
3/4"	$7,225	$3,125
1"	$12,042	$8,216
1-1/2"	$24,085	$16,006
2"	$38,536	$29,999
3"	$84,297	$62,981
4"	$151,735	$127,928
6"	$337,189	$223,773

2. Overview

The District provides water and wastewater services to the Town of Mammoth Lakes in Mono County, California. The District serves the resort town and surrounding communities with a permanent population of over 8,000 and a peak transient visitor population of 35,000. In total the District serves approximately 3,700 water connections and 3,600 sewer connections.

The District's primary drinking water source is surface water from Lake Mary. Surface water is treated at the Lake Mary Treatment Plant (WTP) with design capacity of 3.1 million gallons per day (MGD). When surface water supply is insufficient, groundwater is used to supplement supply. The District maintains nine production wells and 30 monitoring wells throughout the basin as well as two groundwater treatment plants. Average water demand in the six months from October to April is 1.33 MGD and from May to September is 3 to 5 MGD depending on irrigation demands. The water distribution system consists of 80 miles of pipe. The District operates one wastewater treatment plant (WWTP) with average daily influent of 1.14 MGD. The wastewater collection system consists of 75 miles of pipe. The District also maintains a Recycled Water Facility which is excluded from this analysis.

The District most recently revised its water and wastewater capacity fees in a September 2006 report, with new fees implemented April 2007. The District engaged Raftelis in 2018 to conduct a comprehensive water and wastewater capacity fee study to examine the existing approach against alternatives that may better reflect current community conditions, system characteristics, and policy objectives. This report documents the resultant findings, analyses, and proposed changes to the District's water and wastewater capacity fees.

Capacity fees are one-time fees, collected as a condition of establishing a new connection to the District's systems. The purpose of these fees is to pay for development's share of the costs of existing and/or new facilities. These fees are designed to be proportional to the demand placed on the systems by the new connections. The recommended capacity fees for the District do not exceed the estimated reasonable costs of providing the facilities for which they are collected and are of proportional benefit to the property being charged. This report documents the data, methodology, and results of the Capacity Fees Study.

2.1. Economic and Legal Framework

For publicly owned systems, most of the assets are typically paid for by the contributions of existing customers through rates, charges, securing debt, and taxes. In service areas that incorporate new customers, the infrastructure developed by previous customers is generally extended towards the service of new customers. Existing customers' investment in the existing system capacity allows newly connecting customers to take advantage of unused surplus capacity. To further economic equality among new and existing customers, new connectors will typically "buy-In" to the existing and pre-funded facilities based on the existing assets, effectively putting them on par with existing customers. In other words, the new users are buying into the existing system based on the replacement costs of existing assets to continue to provide the same level of service to new customers through repairs, expansions, and upgrades to the system.

The basic economic philosophy behind capacity fees is that the costs of providing service should be paid for by those that receive utility from the product. To effect fair distribution of the value of the system, the charge should reflect a reasonable estimate of the cost of providing capacity to new users and not unduly burden existing users through a comparable rate increase. Accordingly, many utilities make this philosophy one of their primary guiding principles when developing their capacity fee structure.

The philosophy that service should be paid for by those that receive utility from the product is often referred to as "growth-should-pay-for-growth." The principal is summarized in the American Water Works Association (AWWA) Manual M26: *Water Rates and Related Charges*:

> *"The purpose of designing customer-contributed-capital system charges is to prevent or reduce the inequity to existing customers that results when these customers must pay the increase in water rates that are needed to pay for added plant costs for new customers. Contributed capital reduces the need for new outside sources of capital, which ordinarily has been serviced from the revenue stream. Under a system of contributed capital, many water utilities are able to finance required facilities by use of a 'growth-pays-for-growth' policy."*

This principle, in general, applies to water, wastewater, and storm drainage systems. In the excerpt above, customer-contributed-capital system charges are equivalent to capacity fees.

2.2. Legal Framework and California Requirements

In establishing capacity fees, it is important to understand and comply with local laws and regulations governing the establishment, calculation, and implementation of capacity fees. The following sections summarize the regulations applicable to the development of capacity fees for the District.

Capacity fees must be established based on a reasonable relationship to the needs and benefits brought about by the development or expansion. Courts have long used a standard of reasonableness to evaluate the legality of development charges. The basic statutory standards governing capacity fees are embodied by California Government Code Sections 66013, 66016, 66022 and 66023. Government Code Section 66013 contains requirements specific to determining utility development charges:

> *"Notwithstanding any other provision of law, when a local agency imposes fees for water connections or sewer connections, or imposes capacity charges, those fees or charges shall not exceed the estimated reasonable cost of providing the service for which the fee or charge is imposed, unless a question regarding the amount the fee or charge in excess of the estimated reasonable cost of providing the services or materials is submitted to, and approved by, a popular vote of two-thirds of those electors voting on the issue."*

Section 66013 also includes the following general requirements:

- Local agencies must follow a process set forth in the law, making certain determinations regarding the purpose and use of the charge; they must establish a nexus or relationship between a development project and the public improvement being financed with the charge.
- The capacity charge revenue must be segregated from the general fund in order to avoid commingling of capacity fees and the General Fund.

3. Methodologies

There are two primary steps in calculating capacity fees: (1) determining the value and/or cost of capital required to serve new connections or accommodate an increase in density generated by in-fill projects, and (2) allocating those values and/or future costs equitably to various types of connections based on the demand placed on the utilities' systems.

There are two primary methodologies for calculating capacity fees. The two methodologies generate three general approaches that are widely accepted for capacity fees. These are the "Buy-In Method", the "Incremental-Cost Method", and the "Hybrid Method" that accounts for a portion of both a Buy-In component and an Incremental component.

3.1. Asset Valuation Approaches

There are various methods employed to estimate the asset value of existing facilities and derive an updated capacity fee based on the existing asset value. The principal methods commonly used to value a utility's existing assets are Original Cost (OC), Replacement Cost (RC), Original Cost Less Depreciation (OCLD), and Replacement Cost Less Depreciation (RCLD).

3.1.1. ORIGINAL COST

The principal advantages of OC valuation are relative simplicity and stability since the recorded costs of fixed assets are held constant. The major criticism levied against OC is the disregard of changes in the time value of money, and future capital costs, which are attributable to inflation and other factors. As evidenced by history, prices tend to increase rather than to remain constant or decrease. This situation may be exacerbated since most water and sewer systems are developed over time on a piecemeal basis as demanded by the customer base and service area growth. Consequently, each asset addition is paid for with dollars of different purchasing power. When these outlays are added together to obtain a plant value, the result can be misleading. Additionally, OC does not account for the depreciation of facilities and other assets as they age which may not be representative of the state of the systems. We discuss depreciation in further detail below.

3.1.2. REPLACEMENT COST

Changes in the value of the dollar over time, represented by general inflation, is recognized by RC valuation. The replacement cost represents the cost of duplicating the existing water and sewer facilities (or duplicating their functions) at current dollars. Unlike the OC approach, the RC approach recognizes price level changes that have occurred since plant construction and subsequent investments. The most accurate replacement cost valuation requires a physical inventory and appraisal of plant components in terms of their replacement costs at the time of valuation. However, with original cost records available, a reasonable approximation of replacement cost plant value can be easily derived by trending historical original costs. This approach employs the use of cost indices to express actual capital investment by the utility in current dollars. An obvious advantage of the RC approach is that it accounts for changes in the value of money over time. However, just like OC it does not account for the depreciation of facilities and system assets.

3.1.3. ORIGINAL COST LESS DEPRECIATION

The current value of water and wastewater facilities is also materially affected by the effects of age. All assets have estimated useful lives, which vary by type. For example, pumps may have a 20-year life, buildings of 50 years, and pipeline of 80 years. Each year an asset is devalued by the fraction of its useful life to original cost. This is referred to as *straight line* or linear depreciation. At the end of an asset's useful life it is worth zero dollars on paper, though it may still be in service. Depreciation accounts for estimated devaluation in system assets caused by wear and tear, decay, inadequacy, and obsolescence. To provide appropriate recognition of the effects of depreciation on existing water and sewer systems, the OC valuation can be expressed net of depreciation to yield OCLD. Accumulated depreciation is computed for each asset and deducts losses in valuation based on age or condition, from the respective total original cost.

3.1.4. REPLACEMENT COST LESS DEPRECIATION

RCLD is identical to the OCLD valuation method, with the exception that asset cost and asset depreciation is in today's dollars rather than the value of the dollar when the asset was placed in service. Original cost and depreciation are inflated using historical indices to reflect today's dollars. Replacement cost depreciation is then subtracted from the replacement cost of the asset to yield replacement cost, less depreciation. RCLD allows for an accounting of system assets in present value, while also accounting for proportional devaluation via depreciation.

3.2. Capacity Fee Methodologies

3.2.1. BUY-IN METHOD

The "Buy-In Method" is based on the premise that new customers are entitled to service at the same price as existing customers. Under this approach, new customers pay only an amount equal to the current system value, either using the original cost or replacement cost as the valuation basis and either netting the value of depreciation or not. This net investment, or value of the system, is then divided by the current demand of the system to determine the Buy-In cost per equivalent unit.

For example, if the existing system has 100 units of average usage and the new connector uses an equivalent unit, then the new customer would pay 1/100 of the total value of the existing system. By contributing this capacity fee, the new connector has bought into the existing system. The user has effectively acquired a financial position on par with existing customers and will face future capital re-investment on equal financial footing with those customers. This approach is suitable when: (1) agencies have built most of their facilities and only a small portion of future facilities are needed for build-out, (2) agencies do not have a detailed adopted long-term capital improvement plan, or (3) the "build-out" date is so far out in the future that it is difficult to accurately project growth and required facilities with precision. Figure 1 shows the framework for calculating the Buy-In capacity fee.

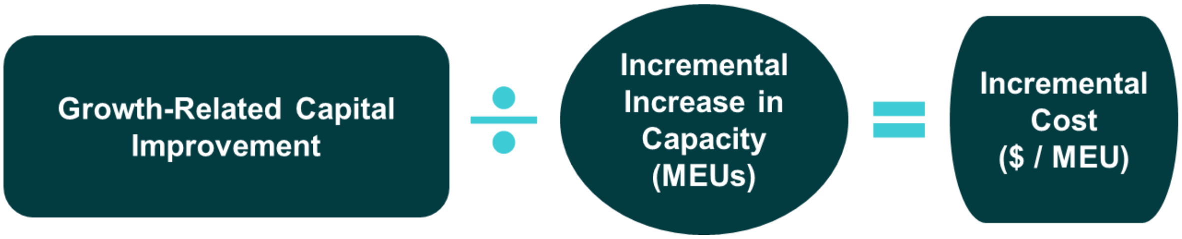
Figure 1: Formula for Buy-In Approach

3.2.2. INCREMENTAL-COST METHOD

The Incremental-Cost Method states that new development (new users) should pay for the additional capacity and expansions necessary to accommodate them. This method is typically used when there are specific capital improvements needed to furnish growth for development. Under the Incremental-Cost Method, growth-related capital improvements are allocated to new development based on their estimated usage or capacity requirements, irrespective of the value of past investments made by existing customers.

For instance, if it costs X dollars ($X) to provide 100 additional equivalent units of capacity for average usage and a new connector uses one of those equivalent units, then the new user would pay $X/100 to connect to the system. In other words, new customers pay the incremental cost of capacity. Incorporating the use of this method is generally included when detailed facilities are identified for the capacity required to serve new customers. Figure 2 shows the framework for calculating the incremental cost capacity fee.

Figure 2: Formula for Incremental-Cost Approach



3.2.3. HYBRID METHOD

The Hybrid Method is typically used where some capacity is available to serve new growth, but additional expansion is still necessary to accommodate new development. Under the Hybrid Method, the capacity fee is based on the summation of the existing capacity and any necessary expansions.

In utilizing this methodology, it is important that system capacity costs are not double-counted when combining costs of the existing system with future costs from the Capital Improvement Program (CIP). CIP costs associated with repair and replacement of the existing system should not be included in the calculation unless specific existing facilities which will be replaced through the CIP can be isolated and removed from the existing asset inventory and cost basis. In this case, the rehabilitative costs of the CIP essentially replace the cost of the relevant existing assets in the existing cost basis. Capital improvements that expand system capacity to serve future customers may be included proportionally to the percentage of the cost specifically required for expansion of the system. Figure 3 summarizes the framework for calculating the Hybrid capacity fee.

Figure 3: Formula for Hybrid Approach

3.3. Proposed Method: Buy-In Approach

The Town of Mammoth Lakes anticipates significant growth within its jurisdictional boundaries with a mixture of residential and commercial development and increased residential and hospitality densities. However, the degree of growth, timing of development, and effect on the District's water and sewer systems facilities is uncertain. Most of the infrastructure required to serve future customers is already built, with the projected cost of additional infrastructure expected to be approximately 10% of the value of the existing infrastructure. Based on this information, it is reasonable and appropriate to determine capacity fees based on the Buy-In method.

3.4. Proposed Valuation: Replacement Cost Less Depreciation

The first step in determining the Buy-In capacity fee is to determine the value of the existing system. As mentioned above, there are several methods of determining the current value of assets. However, for the purposes of this Study, RCLD was used to account for today's replacement cost for system improvements, while acknowledging the remaining useful life of system facilities. The District provided fixed asset records as of FY 2018 on the original cost of the system. Replacement cost is estimated by adjusting the original costs to reflect what might be expected if a similar asset were constructed today. This is achieved by escalating the original construction costs by a construction cost index.

Raftelis utilizes ENR average CCI) for 20-cities which reflects the average costs of a particular basket of construction goods. Raftelis used a CCI value of 11,028 for 2018 to estimate the replacement costs. Accumulated replacement cost depreciation was determined by escalating the accumulated depreciation for each asset by the appropriate CCI. The accumulated depreciation was subtracted from the replacement cost to determine the current value of the assets using the RCLD methodology and appropriately reflects the use of the system by the existing customers. Table 3-1 shows the District's assets at original cost, accumulated depreciation, original cost less depreciation (also known as book value), replacement cost, replacement cost accumulated depreciation, and RCLD (replacement book value). The value of the existing systems was cross-checked with the District's 2018 Consolidated Annual Financial Statements (CAFR) and are materially the same, with minor differences possibly due to data timing and disagreement in the data. The difference, however, is still well within a reasonable margin of error. A detailed assets listing can be found in Appendix B.

Table 3-1: District Assets

Fund Description	Original Cost (A)	Accumulated Depreciation (B)	Book Value (A-B)	Replacement Cost (RC)	RC Accumulated Depreciation (D)	RCLD (C-D)
Admin Replacement	$4,309,569	$2,159,520	$2,185,049	$7,287,836	$3,464,235	$3,823,601
Water Replacement	$66,336,748	$30,064,617	$34,957,275	$148,765,240	$103,555,916	$45,209,324
Wastewater Replacement	$23,340,468	$12,468,855	$11,109,546	$83,817,444	$60,393,354	$23,424,089
Admin Expansion Fund	$7,248	$7,248	$0	$15,341	$15,341	$0
Water Expansion	$23,404,328	$12,151,040	$11,260,746	$38,210,253	$22,605,140	$15,605,113
Wastewater Expansion	$22,421,140	$14,198,318	$8,222,822	$39,105,598	$26,138,968	$12,966,630
New Enterprise	$1,308,137	$784,221	$523,916	$1,977,786	$1,154,144	$823,643
Total District Assets	**$141,127,637**	**$71,833,818**	**$68,259,354**	**$319,179,498**	**$217,327,099**	**$101,852,400**

4. Proposed Water Capacity Fees

To calculate water capacity fees for FY 2019 and beyond, we incorporate data on existing MEUs in the system and system valuation in RCLD dollars. The District provided consumption data across three fiscal years ending 2016, 2017, and 2018. Each FY begins on April 1 and ends on March 31. Raftelis utilized the water use data to determine average summer water use[1], by meter size, to compare against existing MEU ratio calculations and AWWA capacity ratios. Raftelis worked with District finance and engineering staff to determine the appropriate ratios to use for purposes of calculating existing MEUs. District staff briefed an internal committee on the proposed change in MEU calculation from District calculated ratios based on summer water use to AWWA capacity ratios based on the safe maximum flow rates of each meter size in gallons per minute (gpm). RCLD system valuation is divided by the total existing MEUs to determine the cost per MEU. The following sub-sections detail calculations of the proposed water capacity fees.

4.1. System Demand

The denominator in calculating the water capacity fees uses the Buy-In approach. The Buy-In determines the demand placed on the water system by existing users. To derive water system demand the number of service connections at each meter size is multiplied by a ratio relative to the base meter, which in this Study is the 3/4" meter. While the existing water capacity fees utilize the demand ratios derived from District water demand data, Raftelis recommends MCWD derive demand ratios based on American Water Works Association hydraulic capacity ratios for water capacity fees for the following reasons.

The water ratios calculated using District summer water demand and meter size represents an average daily flow rate by District customers. However, the fee charged to a new user to connect to the existing system allows them to use water up to the safe operating maximum flow rate of their respective meter. It is appropriate that the MEUs for water be based on AWWA meter capacity ratios to capture potential instantaneous demand. The water system, and particularly, the water distribution system has been sized accordingly and so costs should be recovered using the same approach. Relying on AWWA meter ratios as a basis for capacity fees is a common practice.

4.1. Existing MEUs

Table 4-1 shows the maximum safe operating flow rates and corresponding hydraulic capacity ratios at each meter size as given in the AWWA Manual M22 *Sizing Water Service Lines and Meters, Third Edition*. For example, the maximum flow rate of a 3/4" meter is 30 gpm while a 2” meter is 160 gpm. Dividing 160 by 30 yields a ratio of 5.33. The ratios relative to the base 3/4" meter are shown in the right most column of Table 4-1.

[1] Summer is defined as the months of July, August, and September.

Table 4-1: AWWA Capacity Ratios (3/4" Base Meter)

Connection Size	Flow Rate (gpm)	AWWA Ratio
3/4"	30	1.00
1"	50	1.67
1-1/2"	100	3.33
2"	160	5.33
3"	350	11.67
4"	630	21.00
6"	1400	46.67
8"	2400	80.00

Table 4-2 shows the District's total potable water meters at each meter size. The majority of the District's meters are 3/4" in size. The total connections in the water system are equal to 3,693 meters.

Table 4-2: Existing Water Connections, by Meter Size

Connection Size	Meter Count
3/4"	2,221
1"	779
1-1/2"	356
2"	258
3"	20
4"	28
6"	29
8"	2
Total	3,693

Having derived the capacity ratios and knowing the total number of metered connections in the water system, we can calculate the total number of existing MEUs. The count of meters at each size is multiplied by the respective ratio to determine the total MEUs at each meter size. The MEUs at each size are summed to yield the total existing (or current) MEUs in the water system. The District has 8,417 MEUs as of April 2018. Existing water MEU detail is shown in Table 4-3.

Table 4-3: Existing Water MEUs

Connection Size	Meter Count	AWWA Ratio	MEUs
3/4"	2,221	1.00	2,221
1"	779	1.67	1,298
1-1/2"	356	3.33	1,187
2"	258	5.33	1,376
3"	20	11.67	233
4"	28	21.00	588
6"	29	46.67	1353
8"	2	80.00	160
Total	**3,693**		**8,417**

4.2. System Valuation

The water system consists of the water replacement and water expansion fund assets from Table 3-1. The RCLD valuation estimate of the water utility is $60,814,436. Valuation detail is shown in Table 4-4.

Table 4-4: Water System Asset Valuation

Fund Description	Original Cost (A)	OC Accumulated Depreciation (B)	Book Value (A-B)	Replacement Cost (C)	RC Accumulated Depreciation (D)	RCLD (C-D)
Water Replacement	$66,336,748	$30,064,617	$34,957,275	$148,765,240	$103,555,916	$45,209,324
Water Expansion	$23,404,328	$12,151,040	$11,260,746	$38,210,253	$22,605,140	$15,605,113
Water System Total	**$89,741,076**	**$42,215,657**	**$46,218,021**	**$186,975,493**	**$126,161,057**	**$60,814,436**

4.3. Proposed Water Capacity Fee

The calculation of the water capacity fee is shown in Table 4-5. The proposed capacity fee is derived on a per MEU basis with one MEU representing the base 3/4" meter with a maximum flow rate of 30 gpm. Therefore, the proposed capacity fee for a 3/4" meter is 1 MEU or $7,225.

Table 4-5: Buy-In Fee Calculation for Water System

Capacity Fee Calculation	
Water System Value (RCLD)	$60,814,436
÷ Units of Service (MEUs)	8,417
Proposed Buy-In Capacity Fee (per MEU)	**$7,225**

Table 4-6 shows the proposed capacity fees at each meter size as well as the respective AWWA ratio at each meter size. The ratio is multiplied by the cost per MEU to derive the fee. Fees are rounded to the nearest whole dollar.

Table 4-6: Proposed Water Capacity Fees, by Meter Size

Connection Size	Ratio	Proposed Water Fee
3/4"	1.00	$7,225
1"	1.67	$12,042
1-1/2"	3.33	$24,085
2"	5.33	$38,536
3"	11.67	$84,297
4"	21.00	$151,735
6"	46.67	$337,189
8"	80.00	$578,038

Table 4-7 compares proposed water capacity fees with current capacity fees. The changes are shown in both absolute dollars and percentage. The base 3/4" meter (1 MEU) experiences a modest 1 percent change, equal to an increase of $99. All other meter sizes experience varying degrees of decreases. The changes are caused by a combination of the change in methodology (Buy-In only), system valuation approach (RCLD), and meter ratios (AWWA) to determine existing MEUs. For example, the AWWA capacity ratios are "tighter" than the District calculated ratios used in 2007. That is, the relative difference between the base meter and the larger meters is less and so the fees are reduced proportional to the ratios.

Table 4-7: Proposed versus Current Water Capacity Fees

Connection Size	Proposed Water Fee	Current Fee*	$ Change	% Change
3/4"	$7,225	$7,126	$99	1%
1"	$12,042	$15,461	($3,418)	-22%
1-1/2"	$24,085	$38,878	($14,794)	-38%
2"	$38,536	$71,256	($32,720)	-46%
3"	$84,297	$183,983	($99,686)	-54%
4"	$151,735	$287,449	($135,714)	-47%
6"	$337,189	$574,683	($237,494)	-41%
8"	$578,038	$574,684	$3,354	1%

5. Proposed Wastewater Capacity Fees

To calculate wastewater capacity fees for FY 2019 and beyond, we incorporate data on existing MEUs in the system and system valuation in RCLD dollars. Same as the water capacity fees, the District provided consumption data across three fiscal years ending 2016, 2017, and 2018. Each FY begins on April 1 and ends on March 31. Raftelis utilized the water use data to determine average winter water use[2], by meter size, to compare against existing MEU ratio calculations. Raftelis worked with District finance and engineering staff to determine the appropriate ratios to use for purposes of calculating existing MEUs. District staff briefed an internal committee on the proposed change in MEU calculation from District calculated ratios based on summer water use to the flow ratios of EBMUD measured in hundred cubic feet (hcf) per year. RCLD system valuation is divided by the total existing MEUs to determine the cost per MEU. The following sub-sections detail calculations of the proposed wastewater capacity fees.

5.1. System Demand

The denominator in calculating the wastewater capacity fees uses the Buy-In approach. The Buy-In determines the demand placed on the wastewater collection system and treatment facilities by existing users. To derive system demand the number of service connections at each meter size is multiplied by a ratio relative to the base 3/4" meter. While the existing wastewater capacity fees utilize the demand ratios derived from District data, Raftelis recommends MCWD utilize the flow ratios of East Bay Municipal Utilities District (EBMUD) for wastewater fees for the following reasons.

The sewer ratios calculated using District winter water use present challenges due to a small population of larger meters with disparate and seasonal use. For example, when calculating wastewater ratios, the 4” meter ratio is less than the 2” and the 8” ratio is less than the base 3/4". To avoid manipulation of the data while maintaining a similar approach to derive sewer ratios, Raftelis relies on the sewer flow ratios of EBMUD. EBMUD serves 685,000 customers across a large service area, with a mix of residential and commercial customers. The connections at EBMUD are on the order of 50 times greater than those served by the District. The ratios of EBMUD are calculated in average annual flow in hcf for each meter size.

5.2. Existing MEUs

Table 5-1 shows the flow generation and corresponding flow ratios at each meter size as determined by EBMUD wastewater data. For example, the annual flow generation of a 3/4" meter is 132 hcf per year while a 2” meter is 1,267 hcf. Dividing 1,267 by 132 yields a ratio of 9.60. The ratios relative to the base 3/4" meter is shown in the right most column of Table 5-1.

[2] Winter is defined as the months of December, January, and February.

Table 5-1: EBMUD Flow Generation Ratios (3/4" Base Meter)

Connection Size	Flow Generation (hcf/year)	EBMUD Ratio
3/4"	132	1.00
1"	347	2.63
1-1/2"	676	5.12
2"	1,267	9.60
3"	2,660	20.15
4"	5,403	40.93
6"	9,451	71.60
8"	6,243	47.30

Table 5-2 shows the District's total potable water meters at each meter size. The majority of the District's meters are 3/4" in size. The total metered connections contributing flow to the wastewater system are 3,609. The count of meters omits irrigation meters and recycled water meters as these connections do not have complementary sewer connections.

Table 5-2: Existing Wastewater Connections, by Meter Size

Connection Size	Meter Count
3/4"	2,209
1"	769
1-1/2"	326
2"	231
3"	18
4"	26
6"	28
8"	2
Total Connections	**3,609**

Having derived the wastewater flow generation ratios and knowing the total number of metered connections in the wastewater system, we can calculate the total number of existing MEUs. The count of meters at each size is multiplied by the respective ratio to determine the total MEUs at each meter size. The MEUs at each size are summed to yield the total existing (or current) MEUs in the wastewater system. The District has 11,644 MEUs as of April 2018. Wastewater MEU detail is shown in Table 5-3.

Table 5-3: Existing Wastewater MEUs

Connection Size	Meter Count	EBMUD Ratio	MEUs
3/4"	132	1.00	2,209
1"	347	2.63	2,022
1-1/2"	676	5.12	1,670
2"	1,267	9.60	2,217
3"	2,660	20.15	363
4"	5,403	40.93	1,064
6"	9,451	71.60	2,005
8"	6,243	47.30	95
Total	**3,609**		**11,644**

5.3. System Valuation

The wastewater system consists of the wastewater replacement and wastewater expansion fund assets from Table 3-1. The RCLD valuation estimate of the wastewater utility is $36,390,720. Valuation detail is shown in Table 5-4.

Table 5-4: Wastewater System Asset Valuation

Fund Description	Original Cost (A)	OC Accumulated Depreciation (B)	Book Value (A-B)	Replacement Cost (C)	RC Accumulated Depreciation (D)	RCLD (C-D)
Wastewater Replacement	$23,340,468	$12,468,855	$11,109,546	$83,817,444	$60,393,354	$23,424,089
Wastewater Expansion	$22,421,140	$14,198,318	$8,222,822	$39,105,598	$26,138,968	$12,966,630
Water System Total	**$45,761,608**	**$26,667,173**	**$19,332,368**	**$122,923,042**	**$86,532,322**	**$36,390,720**

5.4. Proposed Wastewater Capacity Fee

The calculation of the wastewater capacity fee is shown in Table 5-5. The proposed capacity fee is derived on a per MEU basis with one MEU representing the base 3/4" meter with assumed flow generation of 132 hcf per year. Therefore, the proposed wastewater capacity fee for a 3/4" meter is 1 MEU or $3,125.

Table 5-5: Buy-In Fee Calculation for Wastewater System

Capacity Fee Calculation	
Wastewater System Value (RCLD)	$36,390,720
÷ Units of Service (MEUs)	11,644
Proposed Buy-In Capacity Fee (per MEU)	**$3,125**

Table 5-6 shows the proposed wastewater capacity fees at each meter size as well as the respective EBMUD ratio at each meter size. The ratio is multiplied by the cost per MEU to derive the fee. Fees are rounded to the nearest whole dollar.

Table 5-6: Proposed Wastewater Capacity Fees, by Meter Size

Connection Size	Ratio	Proposed Water Fee
3/4"	1.00	$3,125
1"	2.63	$8,216
1-1/2"	5.12	$16,006
2"	9.60	$29,999
3"	20.15	$62,981
4"	40.93	$127,928
6"	71.60	$223,773

Table 5-7 compares proposed wastewater capacity fees with current fees. The changes are shown in both absolute dollars and percentage. The base 3/4” meter (1 MEU) experiences a modest two percent decrease, equal to $49. The 1” meter is nearly identical to the existing fee ($8 decrease). The 1 ½” meter is the only other meter to experience a decrease ($887). All other meter sizes experience varying degrees of increase. The changes are caused by a combination of the change in methodology (Buy-In only), system valuation approach (RCLD), and meter ratios (EBMUD) to determine existing MEUs. For example, the EBMUD capacity ratios result in more MEUs than the current methodology calculated in 2007. The result is to increase the share of system capacity to larger meters and modestly reduce the share of system capacity to smaller meters. Fees greater than 6” will be discretionary based on the District’s evaluation of estimated flow generation of the development and demand on the wastewater system.

Table 5-7: Proposed versus Current Fees Comparison

Connection Size	Proposed Wastewater Fee	Current Wastewater Fee	$ Change	% Change
3/4"	$3,125	$3,174	-$49	-2%
1"	$8,216	$8,224	-$8	0%
1-1/2"	$16,006	$16,893	-$887	-5%
2"	$29,999	$23,468	$6,531	28%
3"	$62,981	$36,518	$26,463	72%
4"	$127,928	$69,286	$58,641	85%
6"	$223,773	$131,459	$92,314	70%

6. Combined Fees

Table 6-1 combines the water and wastewater fees at each meter size to show the combined proposed fee versus the combined current fee. Table 6-2 gives a detailed comparison of the current and proposed combined capacity fees, with changes expressed in both dollar and percentage terms. The base 3/4" meter sees a minor increase of $50 on a combined fee of $10,350. All other meter sizes experience varying degrees of decrease. This is because the tightening of water ratios (and therefore decrease to larger meters) outweighs in absolute terms the expansion of wastewater ratios (and therefore increases to larger meters).

Table 6-1: Proposed versus Current Combined Fees Comparison

Meter Size	Water	Wastewater	Combined Fee (Proposed)	Combined Fee (Current)
3/4”	$7,225	$3,125	$10,350	$10,300
1”	$12,042	$8,216	$20,258	$23,685
1 ½”	$24,085	$16,006	$40,091	$55,771
2”	$38,536	$29,999	$68,535	$94,723
3”	$84,297	$62,981	$147,278	$220,501
4”	$151,735	$127,928	$279,663	$356,735
6”	$337,189	$223,773	$560,962	$706,142

Table 6-2: Proposed versus Current Combined Fees Comparison, Detail

Meter Size	Combined Fee (Proposed)	Combined Fee (Current)	$ Change	% Change
3/4”	$10,350	$10,300	$50	0%
1”	$20,258	$23,685	($3,427)	-14%
1 ½”	$40,091	$55,771	($15,681)	-28%
2”	$68,535	$94,723	($26,188)	-28%
3”	$147,278	$220,501	($73,222)	-33%
4”	$279,663	$356,735	($77,072)	-22%
6”	$560,962	$706,142	($145,180)	-21%

Raftelis recommends the District continue its policy of adjusting the capacity fees annually to keep pace with inflation. We recommend applying the Engineering News Record Construction Cost Index, with the first adjustment on April 1, 2020 to account for year over year inflation. We recommend the District conduct a comprehensive review of its capacity charges in three to five years to capture any major changes to the utilities or growth in the service area to ensure capacity fees remain equitable.

APPENDIX A:

Construction Cost Index

Appendix A – Construction Cost Index

Engineering News Record Construction Cost Index – 20 Cities

Year	CCI Average	Year	CCI Average	Year	CCI Average
1908	97	**1945**	308	**1982**	3825
1909	91	**1946**	346	**1983**	4066
1910	96	**1947**	413	**1984**	4146
1911	93	**1948**	461	**1985**	4195
1912	91	**1949**	477	**1986**	4295
1913	100	**1950**	510	**1987**	4406
1914	89	**1951**	543	**1988**	4519
1915	93	**1952**	569	**1989**	4615
1916	130	**1953**	600	**1990**	4732
1917	181	**1954**	628	**1991**	4835
1918	189	**1955**	660	**1992**	4985
1919	198	**1956**	692	**1993**	5210
1920	251	**1957**	724	**1994**	5408
1921	202	**1958**	759	**1995**	5471
1922	174	**1959**	797	**1996**	5620
1923	214	**1960**	824	**1997**	5826
1924	215	**1961**	847	**1998**	5920
1925	207	**1962**	872	**1999**	6059
1926	208	**1963**	901	**2000**	6221
1927	206	**1964**	936	**2001**	6343
1928	207	**1965**	971	**2002**	6538
1929	207	**1966**	1019	**2003**	6694
1930	203	**1967**	1074	**2004**	7115
1931	181	**1968**	1155	**2005**	7446
1932	157	**1969**	1269	**2006**	7751
1933	170	**1970**	1381	**2007**	7966
1934	198	**1971**	1581	**2008**	8310
1935	196	**1972**	1753	**2009**	8570
1936	206	**1973**	1895	**2010**	8802
1937	235	**1974**	2020	**2011**	9070
1938	236	**1975**	2212	**2012**	9311
1939	236	**1976**	2401	**2013**	9547
1940	242	**1977**	2576	**2014**	9806
1941	258	**1978**	2776	**2015**	10035
1942	276	**1979**	3003	**2016**	10338
1943	290	**1980**	3237	**2017**	10737
1944	299	**1981**	3535	**2018**	11028

APPENDIX B:

Replacement Cost Less Depreciation Valuation

Appendix B – Asset Original Cost and Replacement Cost Valuation

Fund	Asset ID	Description	Installed	Year Installed	Life (Years)	Orig Cost	Accumulated Depreciation	Book Value
22	1300-1970-05	Balance B/Fwd	06-30-1970	1970	50	$539,190	$514,964	$24,226
23	1300-1980-06	Balance B/Fwd	06-30-1980	1980	60	$5,190,941	$3,266,263	$1,924,677
22	1300-1984-11	Various Equipment	06-30-1984	1984	5	$94,929	$94,929	$0
21	1300-1992-132	Fuel System	04-01-1992	1992	5	$24,859	$24,859	$0
31	1300-1993-150	Lunch Room Remodel	03-31-1993	1993	5	$7,248	$7,248	$0
21	1300-1996-218	Install Exhaust Sys in Garage	09-23-1996	1996	5	$7,825	$7,825	$0
22	1300-1997-247	Quonset Huts ~ Foundation	09-29-1997	1997	30	$37,950	$25,938	$12,012
21	1300-1997-249	Fuel System Replacement	10-25-1997	1997	20	$103,516	$103,516	$0
21	1300-1999-277	Admin Heater	04-01-1999	1999	10	$21,381	$21,381	$0
21	1300-2000-304	Operations & Maintenance Building	03-31-2000	2000	50	$1,877,218	$675,904	$1,201,315
21	1300-2000-305	Annex Bldg Furnish	03-31-2000	2000	10	$302,390	$302,390	$0
21	1300-2000-306	Gas Tank Replacement	03-31-2000	2000	20	$27,754	$24,982	$2,771
21	1300-2001-330	Garage Roof from C.I.P.	03-31-2001	2001	30	$20,391	$11,557	$8,834
21	1300-2003-395	Vehicle Storage Building	03-31-2003	2003	50	$815,581	$244,721	$570,860
21	1300-2005-476	Admin Frnt / Fans	10-13-2005	2005	5	$5,200	$5,200	$0
21	1300-2006-487	Admin Bldg Remodel	04-01-2006	2006	5	$5,814	$5,814	$0
96	1300-2006-516	GIS Project	04-01-2006	2006	10	$599,973	$599,973	$0
22	1300-2006-531	Quonset Hut	09-29-2006	2006	10	$90,500	$90,500	$0
21	1300-2007-547	Install Gate System	04-01-2007	2007	10	$26,365	$26,365	$0
21	1300-2007-548	Sub-grade Landscape Annex	04-01-2007	2007	10	$57,402	$57,402	$0
22	1300-2007-549	Facility Relocation	04-01-2007	2007	20	$65,518	$36,035	$29,483
22	1300-2007-550	Asbuilt Data Conversion	04-01-2007	2007	5	$49,330	$49,330	$0
23	1300-2007-599	Facility Relocation	04-01-2007	2007	20	$59,752	$32,863	$26,888
23	1300-2007-600	Asbuilt Data Conversion	04-01-2007	2007	5	$43,868	$43,868	$0
21	1300-2008-625	Upgrade Fuel System	04-01-2008	2008	10	$6,136	$6,136	$0
21	1300-2011-001	Carpet - Admin. Bldg.	04-01-2010	2010	10	$22,211	$17,769	$4,442

23	1300-2012-001	Quonset Hut ~ XQ40-16	11-01-2011	2011	20	$43,689	$14,011	$29,678
22	1300-2012-002	Quonset Hut ~ XQ30-14	11-01-2011	2011	20	$34,670	$11,118	$23,551
21	1300-2013-001	New Computer Server Room	04-01-2012	2012	10	$33,093	$19,856	$13,237
21	1300-2013-002	Energy Conservation System - Admin & Eng Bldgs	10-31-2012	2012	5	$5,648	$5,648	$0
22	1300-2013-003	Garage door for quonset 1	06-28-2012	2012	20	$8,412	$2,422	$5,990
23	1300-2013-004	Garage door for quonset 2	06-28-2012	2012	20	$8,412	$2,422	$5,990
22	1300-2014-007	Facility Relocation	12-31-2013	2013	20	$172,360	$36,621	$135,739
22	1300-2015-001	Quonset Hut Door	05-07-2014	2014	20	$8,980	$1,752	$7,228
21	1300-2015-002	Reroof Storage Building	06-30-2014	2014	30	$39,425	$4,933	$34,492
22	1300-2017-002	Asphalt	10-26-2016	2016	20	$85,936	$6,145	$79,791
22	1300-2017-003	Machine Shop	03-31-2017	2017	20	$39,788	$1,995	$37,793
22	1300-2017-004	Equipment Storage Building	03-31-2017	2017	50	$950,765	$19,067	$931,698
21	1303-1987-46	Land	07-01-1987	1987	999	$215,000	$0	$215,000
96	1303-2001-327	Purchase of L'Abri - Land	02-28-2001	2001	999	$54,000	$0	$54,000
32	1303-2006-528	Land Purchase Well #25	07-31-2006	2006	999	$43,000	$0	$43,000
96	1304-2001-328	L'Abri Employee Housing	02-28-2001	2001	50	$428,932	$146,591	$282,341
21	1304-2006-485	L'Abri #9 & #6 - Carpet & Flooring	02-23-2006	2006	5	$6,487	$6,487	$0
96	1304-2007-617	Employee Housing - Trailer Park	04-01-2007	2007	50	$17,681	$3,890	$13,791
96	1304-2010-0001	Timberline #11 Purchase	02-11-2010	2010	50	$207,550	$33,766	$173,784
22	1305-2002-374	Petro-Vend Fuel System (1 of 2)	06-13-2002	2002	5	$4,150	$4,150	$0
23	1305-2002-375	Petro-Vend Fuel System (2 of 2)	06-13-2002	2002	5	$4,150	$4,150	$0
21	1305-2002-388	Document Imaging Project	11-14-2002	2002	15	$6,408	$6,408	$0
21	1305-2002-390	Document Imaging System	12-12-2002	2002	15	$25,256	$25,256	$0
22	1305-2005-458	Maintenance Software Fuel Sys & Laptop Interface	03-25-2005	2005	5	$6,911	$6,911	$0
23	1305-2005-459	Maintenance Software Fuel Sys & Laptop Interface	03-25-2005	2005	5	$7,087	$7,087	$0
23	1305-2006-510	SCADA	04-01-2006	2006	10	$27,498	$27,498	$0

21	1305-2008-626	Fuel Software for Petro Vend	04-01-2008	2008	10	$10,952	$10,952	$0
22	1305-2008-627	IPM Project Management Software	04-01-2008	2008	10	$11,125	$11,125	$0
23	1305-2008-635	IPM Project Management Software	04-01-2008	2008	10	$11,125	$11,125	$0
22	1305-2009-0001	IPM Proj Mgmt Travel Expenses - OnSite Training	01-15-2009	2009	5	$6,850	$6,850	$0
21	1305-2009-0017	Springbrook Software and Training	03-31-2009	2009	10	$162,500	$174,312	$23,189
21	1305-2009-0120	Audiotel Software and Equipment	08-21-2008	2008	10	$6,702	$6,442	$261
21	1305-2009-0130	Network Switch Replacement	10-17-2008	2008	5	$10,859	$10,859	$0
23	1305-2011-001	Sewer CAD Software	04-01-2010	2010	5	$53,885	$53,885	$0
21	1305-2012-001	Server MCWDSVR11	02-01-2012	2012	4	$15,556	$15,556	$0
22	1305-2012-002	Operations Reporting Software	08-01-2011	2011	5	$8,000	$8,000	$0
22	1305-2012-003	InfraMAP Maintenance Software	08-01-2011	2011	5	$12,447	$12,447	$0
22	1305-2013-001	SCADA Logic Upgrade	05-31-2011	2011	15	$25,080	$11,429	$13,651
21	1305-2014-001	Trimble GPS Unit Upgrade	05-02-2013	2013	5	$8,286	$8,145	$141
21	1305-2014-002	UB10 Server Replacement	03-17-2014	2014	4	$9,878	$9,878	$0
22	1305-2014-004	SCADA PLC Telemerty Upgrade	03-31-2014	2014	15	$38,200	$10,194	$28,006
23	1305-2017-001	TV Van Software	06-30-2016	2016	5	$22,331	$7,831	$14,499
21	1305-2018-001	Phone System Update	03-31-2018	2018	10	$20,646	$0	$20,646
22	1307-2010-0001	GWTP #1 Security Fence	10-31-2009	2009	5	$32,906	$32,906	$0
22	1308-2008-628	Server MCWDEXCH 08	04-01-2008	2008	5	$14,086	$14,086	$0
21	1315-2011-001	GIS Plotter	12-01-2010	2010	10	$8,400	$6,158	$2,241
21	1315-2012-001	Telephone System for District	10-01-2011	2011	10	$30,174	$19,609	$10,565
21	1315-2015-006	Canon Image Runner	02-05-2015	2015	5	$15,119	$9,527	$5,592
21	1315-2015-007	Canon Image Runner	02-05-2015	2015	5	$15,119	$9,527	$5,592
23	1315-2015-009	Grinder	03-31-2015	2015	10	$59,738	$17,938	$41,800
22	1315-2016-001	HP DesignJet T2500ps ePrinter	03-31-2016	2016	5	$8,906	$3,567	$5,338

22	1317-1992-135	Ingersoll Rand Air Compressor V#5	04-30-1992	1992	5	$7,262	$7,262	$0
23	1317-1992-136	Ingersoll Rand Air Compressor V#5	04-30-1992	1992	5	$7,262	$7,262	$0
22	1317-1994-178	Shoring System	10-13-1994	1994	5	$5,594	$5,594	$0
23	1317-1994-179	Shoring System	10-13-1994	1994	5	$5,604	$5,604	$0
22	1317-1996-202	Welder Veh #64	03-19-1996	1996	15	$13,896	$13,896	$0
23	1317-1999-289	Swr Lft Station Project	09-15-1999	1999	15	$13,368	$13,368	$0
22	1317-2000-296	Generator Emergency (Admin)	01-19-2000	2000	5	$11,101	$11,101	$0
22	1317-2000-297	Generator Emergency (WWTP)	01-19-2000	2000	10	$15,665	$15,665	$0
23	1317-2000-298	Generator Emergency (Admin)	01-19-2000	2000	10	$11,101	$11,101	$0
23	1317-2000-299	Generator Emergency (WWTP)	01-19-2000	2000	10	$15,665	$15,665	$0
22	1317-2002-369	Sifter Box/Crossing Plate	05-15-2002	2002	5	$5,682	$5,682	$0
22	1317-2002-371	Safety Arrow Board Traffic Signs (1 of 2)	05-31-2002	2002	5	$2,628	$2,628	$0
23	1317-2002-372	Safety Arrow Board Traffic Signs (2 of 2)	05-31-2002	2002	5	$2,628	$2,628	$0
22	1317-2003-410	Air Compressor - Veh #46	05-08-2003	2003	5	$14,754	$14,754	$0
21	1317-2003-420	Install 2 Lennox HS-29 Air Cond. Units	09-30-2003	2003	5	$5,800	$5,800	$0
22	1317-2004-432	Excavator Veh #47	04-01-2004	2004	10	$73,217	$73,217	$0
22	1317-2004-435	Broce BB-250-8' Sweeper Veh #45	05-07-2004	2004	5	$10,240	$10,240	$0
22	1317-2004-436	Road Plates / Vertical Shore	05-07-2004	2004	5	$6,594	$6,594	$0
22	1317-2004-438	Muel Tapping Tool Rebuild	05-27-2004	2004	5	$8,997	$8,997	$0
22	1317-2004-440	Radio Line Detection (1 of 2)	06-03-2004	2004	5	$2,629	$2,629	$0
23	1317-2004-441	Radio Line Detection (2 of 2)	06-03-2004	2004	5	$2,629	$2,629	$0
22	1317-2004-442	Radar Line Locator	06-03-2004	2004	5	$5,494	$5,494	$0
23	1317-2004-443	Radar Line Locator	06-03-2004	2004	5	$5,494	$5,494	$0
22	1317-2004-445	Hydraulic Braker for Cat 430 Backhoe	07-28-2004	2004	5	$9,326	$9,326	$0

23	1317-2004-447	Hydraulic Braker for Cat 430 Backhoe	07-28-2004	2004	5	$9,326	$9,326	$0
22	1317-2005-460	Roller Drum & Trailer	04-01-2005	2005	5	$13,121	$13,121	$0
22	1317-2005-463	Trenchless Pipe Replacement Tool	06-30-2005	2005	5	$6,000	$6,000	$0
23	1317-2005-464	Replace Reznor Furnace in Chlorine Bldg	06-30-2005	2005	5	$6,778	$6,778	$0
21	1317-2005-477	Bobcat - Snow Removal Veh #6	10-28-2005	2005	10	$53,518	$53,518	$0
22	1317-2006-520	Concrete Saw & Trailer (1 of 2)	06-08-2006	2006	10	$2,972	$2,972	$0
23	1317-2006-521	Concrete Saw & Trailer (2 of 2)	06-08-2006	2006	10	$2,972	$2,972	$0
22	1317-2008-630	Leak Detection Replace/Upgrade	04-01-2008	2008	10	$36,054	$36,054	$0
23	1317-2008-637	See Snake Replacement	04-01-2008	2008	10	$11,660	$11,660	$0
23	1317-2009-0345	Sewer Bypass Pump Veh #62	03-31-2009	2009	10	$27,202	$24,490	$2,713
22	1317-2009-170	Laser Level	04-30-2008	2008	5	$5,237	$5,237	$0
22	1317-2010-0001	Trench Shoring	05-21-2009	2009	5	$13,029	$13,029	$0
21	1317-2010-0003	Forklift (2007) - Veh #57	07-16-2009	2009	10	$43,500	$37,887	$5,613
22	1317-2011-001	Sewer Lateral Cleaner	03-17-2011	2011	10	$41,388	$29,142	$12,246
22	1317-2011-003	Telemetry (Component OMR Gauging Sta.)	07-15-2010	2010	10	$12,524	$9,659	$2,865
22	1317-2011-004	Arsenic Analyzer System (Component)	07-01-2010	2010	5	$50,552	$50,552	$0
22	1317-2011-005	Arsenic Analyzer System (Component)	03-03-2011	2011	5	$50,962	$50,962	$0
22	1317-2011-02	Valve Service Trailer - Veh #71	10-01-2010	2010	5	$46,547	$46,547	$0
22	1317-2012-002	Mini Excavator - Veh #66	06-01-2011	2011	10	$36,159	$24,708	$11,452
21	1317-2013-001	Security Gate	06-28-2012	2012	10	$6,682	$3,848	$2,834
23	1317-2013-002	WWTP Replacement Grinder	07-26-2012	2012	5	$47,954	$47,954	$0
22	1317-2013-003	Snowblower - Holder C992	12-26-2012	2012	15	$141,362	$49,600	$91,762
22	1317-2014-001	Snow Cat and Trailor Veh #72	04-03-2013	2013	20	$160,198	$40,006	$120,192
23	1317-2014-002	Submersible Sewage Pump	06-05-2013	2013	5	$6,283	$6,059	$224
22	1317-2014-003	Rotary Garage Lift	08-07-2013	2013	25	$12,160	$2,261	$9,898
23	1317-2014-004	Primary Covers	08-01-2013	2013	20	$10,994	$2,565	$8,429

22	1317-2014-005	Plasma Cutting System	04-16-2014	2014	15	$18,279	$4,824	$13,455
23	1317-2014-006	Replacement Blower Head	09-27-2013	2013	15	$8,768	$2,636	$6,132
22	1317-2014-007	Install Radio Communications Equipment Phase 2	03-01-2014	2014	10	$179,455	$73,308	$106,147
23	1317-2015-001	Primary Clarifier #4	05-01-2014	2014	15	$14,362	$3,751	$10,611
22	1317-2015-002	Asphalt Grinder	06-11-2014	2014	10	$16,034	$6,102	$9,932
22	1317-2015-003	Compressor	05-14-2014	2014	15	$18,335	$4,746	$13,590
22	1317-2015-004	Cutting System	04-16-2014	2014	15	$18,906	$4,990	$13,916
21	1317-2015-005	Utility Bed for Veh #58	07-02-2014	2014	5	$19,117	$14,330	$4,787
21	1317-2015-008	Tire Changer, Lifter & Balancer	03-04-2015	2015	10	$17,185	$5,287	$11,898
23	1317-2017-001	Emergency Generator	10-15-2016	2016	10	$5,184	$0	$5,184
23	1317-2018-001	Leak Detection Equipment	04-01-2017	2017	5	$29,680	$5,936	$23,744
23	1317-2018-002	Sewer Inspection Camera	04-01-2017	2017	5	$10,900	$2,180	$8,720
22	1317-2018-003	Genie Electric Scisor Lift	06-07-2017	2017	10	$11,636	$950	$10,686
23	1317-2018-004	Emergency Generator/Trailer	03-23-2018	2018	10	$24,976	$62	$24,915
23	1317-2018-005	Tucker LW2 trailer	03-23-2018	2018	10	$24,192	$60	$24,132
22	1317-2018-006	Walk-Behind Snow Blower	03-23-2018	2018	10	$19,874	$49	$19,825
23	1317-2018-008	Sewer Camera with Lateral Capability	03-23-2018	2018	10	$94,696	$234	$94,463
22	1317-2018-009	Bobcat Snowblower	10-11-2017	2017	15	$8,013	$252	$7,761
23	1317-214-008	Primary Covers	08-01-2013	2013	1	$0	$0	$0
22	1320-1988-75	John Deer 410C Veh #31	09-15-1988	1988	5	$55,354	$55,354	$0
22	1320-1993-152	Forklift for Warehouse Veh #35	05-05-1993	1993	5	$6,703	$6,703	$0
23	1320-1993-153	Forklift for Warehouse Veh #35	05-05-1993	1993	5	$6,703	$6,703	$0
23	1320-1993-157	Vactor 2110C Veh #33	11-02-1993	1993	15	$174,684	$174,684	$0
22	1320-1993-159	936F Caterpillar Loader Veh #30	11-17-1993	1993	15	$61,007	$61,007	$0
23	1320-1993-161	936F Caterpillar Loader Veh #30	11-17-1993	1993	15	$61,007	$61,007	$0
22	1320-1994-163	Used Snow Bucket (1 of 2)	01-22-1994	1994	15	$2,343	$2,343	$0
23	1320-1994-164	Used Snow Bucket (2 of 2)	01-22-1994	1994	15	$2,343	$2,343	$0

22	1320-1995-184	Snowcat Trailer Veh #36	01-11-1995	1995	15	$5,616	$5,616	$0
22	1320-1995-190	Dodge Dump Truck 4X4 Veh #27	06-07-1995	1995	5	$16,341	$16,341	$0
23	1320-1995-191	Dodge Dump Truck 4X4 Veh #27	06-07-1995	1995	5	$16,341	$16,341	$0
22	1320-1995-192	Ford Ranger Veh #18 (Replaced; In Construction)	07-20-1995	1995	5	$18,816	$18,816	$0
22	1320-1996-197	Snow Plow Blade (1 of 2)	01-10-1996	1996	15	$4,923	$4,923	$0
23	1320-1996-198	Snow Plow Blade (2 of 2)	01-10-1996	1996	15	$4,923	$4,923	$0
22	1320-1996-200	Ford Ranger Vehicle #19	03-10-1996	1996	5	$9,251	$9,251	$0
23	1320-1996-201	Ford Ranger Veh #19	03-10-1996	1996	5	$9,251	$9,251	$0
22	1320-1997-243	Ford F-250 Veh #20	07-18-1997	1997	5	$28,449	$28,449	$0
23	1320-1997-244	Ford F-250 Veh #25	07-18-1997	1997	5	$28,449	$28,449	$0
22	1320-1998-272	Ford F-350 Veh #7	12-10-1998	1998	5	$24,749	$24,749	$0
23	1320-1999-285	Ford Ranger 4X4 Veh #22	07-08-1999	1999	5	$13,762	$13,762	$0
21	1320-2000-315	Mule 2500 4X4 ATV Veh #40 (1 of 3)	04-26-2000	2000	5	$3,058	$3,058	$0
22	1320-2000-316	Mule 2500 4X4 ATV Veh #40 (2 of 3)	04-26-2000	2000	5	$3,058	$3,058	$0
23	1320-2000-317	Mule 2500 4X4 ATV Veh #40 (3 of 3)	04-26-2000	2000	5	$3,067	$3,067	$0
21	1320-2000-318	Ford Ranger 4X4 Veh #39	05-08-2000	2000	5	$19,202	$19,202	$0
23	1320-2000-320	Ford Ranger 4X4 Veh #3	05-08-2000	2000	5	$19,324	$19,324	$0
22	1320-2001-351	2001 Cat MD430D IT Backhoe Loader Veh #41	08-15-2001	2001	20	$44,611	$37,089	$7,522
23	1320-2001-352	2001 Cat MD430D IT Backhoe Loader Veh #41	08-15-2001	2001	20	$44,611	$37,089	$7,522
22	1320-2003-411	2003 Ford Ranger XLT Veh #44	05-22-2003	2003	5	$18,974	$18,974	$0
21	1320-2003-414	2003 Explorer Veh #11	06-30-2003	2003	5	$23,442	$23,442	$0
22	1320-2004-433	Ford 2004 F350 4X4 Veh #12 w/Crane	04-01-2004	2004	5	$41,084	$41,084	$0
22	1320-2004-453	Veh #48 Frontier Crew XE-V6 Long Bed	12-01-2004	2004	5	$11,044	$11,044	$0

23	1320-2004-454	Veh #48 Frontier Crew XE-V6 Long Bed	12-01-2004	2004	5	$11,044	$11,044	$0
22	1320-2005-469	Vactor 2005 Sterling L7501 Veh #51	08-22-2005	2005	15	$114,706	$96,416	$18,290
23	1320-2005-470	Vactor 2005 Sterling L7501 Veh #51	08-22-2005	2005	15	$114,706	$96,416	$18,290
22	1320-2006-517	Snowmobile Veh #28	04-07-2006	2006	7	$7,000	$7,000	$0
22	1320-2006-518	Ford F-250 4X4 Veh #52	05-30-2006	2006	5	$16,459	$16,459	$0
23	1320-2006-519	Ford F-250 4X4 Veh #52	05-30-2006	2006	5	$16,459	$16,459	$0
22	1320-2006-522	Ford F-550 4X4 Flat Bed Veh #53	06-30-2006	2006	10	$24,590	$24,590	$0
23	1320-2006-523	Ford F-550 4X4 Flat Bed Veh #53	06-30-2006	2006	5	$24,590	$24,590	$0
23	1320-2007-545	Peterbult Dump Model 340 Veh #1	02-01-2007	2007	20	$95,541	$53,320	$42,221
22	1320-2007-619	New 938 Cat Loader - Veh #54	06-26-2007	2007	10	$180,180	$180,180	$0
23	1320-2007-620	Veh #1 - Additional Fees - Taxes	07-18-2007	2007	5	$7,244	$7,244	$0
23	1320-2008-638	TV Van Upgrade Veh #60	04-01-2008	2008	10	$20,672	$20,672	$0
21	1320-2009-0011	Ford Van - Veh #9 (VanPool)	03-31-2009	2009	10	$30,381	$27,351	$3,030
22	1320-2009-023	Ford Ranger - Veh #2	05-06-2008	2008	10	$19,003	$18,821	$182
22	1320-2010-0001	2006 Chevy 3500 ~ Veh #58 (1 of 2)	07-16-2009	2009	5	$11,375	$11,375	$0
23	1320-2010-0002	2006 Chevy 3500 ~ Veh #58 (2 of 2)	07-16-2009	2009	5	$11,375	$11,375	$0
23	1320-2010-0003	TV Van - Veh #60	03-31-2010	2010	8	$174,594	$174,594	$0
22	1320-2011-001	2010 Ford Ranger Veh #63	10-08-2010	2010	10	$18,851	$14,100	$4,751
22	1320-2012-001	Snowmobile - Veh #67	05-01-2011	2011	10	$9,884	$6,838	$3,046
21	1320-2012-002	Ford Ranger XLT - Veh #69	06-01-2011	2011	10	$20,347	$13,903	$6,444
22	1320-2013-002	Veh #70 F350 w/ Utility Bed	11-28-2012	2012	5	$44,318	$44,318	$0
21	1320-2013-003	Veh #65 F-150 4X4 w/ Work Shell	06-28-2012	2012	5	$25,843	$25,843	$0
22	1320-2014-001	F-250 XL Veh #73	08-21-2013	2013	5	$27,452	$25,969	$2,191

22	1320-2014-002	F-350 XL w/ Utility Bed Veh #74	10-08-2013	2013	5	$43,177	$38,682	$4,495
21	1320-2014-003	Escape Veh #76	11-14-2013	2013	5	$27,075	$23,708	$3,367
22	1320-2014-004	Vactor Veh #77	12-04-2013	2013	15	$324,889	$93,644	$231,245
22	1320-2014-005	Snow Plow Blade	03-18-2014	2014	25	$16,196	$2,616	$13,580
22	1320-2015-001	Veh #58 F150 XL	07-23-2014	2014	5	$24,622	$18,173	$6,449
22	1320-2015-002	Veh #79 F350 XL	07-23-2014	2014	5	$62,937	$46,709	$16,575
23	1320-2015-003	Cradle for TV Camera	04-23-2014	2014	10	$6,506	$2,563	$3,943
22	1320-2016-001	Skid Steer Bobcat	03-31-2016	2016	5	$56,841	$22,768	$34,073
21	1320-2016-002	2016 Ford Explorer Veh #84	03-31-2016	2016	5	$39,855	$15,964	$23,891
22	1320-2017-001	F150 Veh #85	06-23-2016	2016	5	$30,167	$10,695	$19,472
22	1320-2017-002	F150 Veh #86	06-23-2016	2016	5	$29,211	$10,356	$18,855
23	1320-2017-003	Dump Truck Veh #87	11-09-2016	2016	15	$151,310	$14,040	$137,270
22	1320-2018-001	2017 Honda CR-V	04-26-2017	2017	5	$29,965	$5,583	$24,383
22	1320-2018-002	Ford F-150 Veh #89	03-23-2018	2018	5	$33,013	$163	$32,850
22	1320-2018-003	Ford F-150 Veh #90 w/ Tool Box	03-23-2018	2018	5	$34,435	$170	$34,265
22	1320-2018-004	Veh #91 Tacoma Double Cab	03-31-2018	2018	5	$33,149	$0	$33,149
22	1320-2018-005	Veh #92 Tacoma Access Cab	03-31-2018	2018	5	$35,124	$0	$35,124
22	1325-2001-347	Master Meter	06-01-2001	2001	30	$7,309	$4,101	$3,208
22	1325-2007-552	Snowcreek 6 Meter	04-01-2007	2007	20	$3,499	$1,924	$1,574
22	1325-2007-553	Master Meter Mammoth View	04-01-2007	2007	20	$5,957	$3,277	$2,681
22	1325-2007-554	Master Meter Val D'sre	04-01-2007	2007	20	$7,295	$4,013	$3,283
22	1325-2007-555	Master Meter Mammoth View Villas	04-01-2007	2007	20	$8,173	$4,495	$3,678
22	1325-2007-556	Master Meter Wildflower	04-01-2007	2007	20	$11,416	$6,279	$5,137
22	1325-2007-557	Fire Service Meters	04-01-2007	2007	20	$13,315	$7,323	$5,992
22	1325-2007-558	Master Meter Mammoth Estates	04-01-2007	2007	20	$16,363	$9,000	$7,363
22	1325-2007-559	Master Meter North Village	04-01-2007	2007	20	$25,272	$13,900	$11,372
22	1325-2007-560	Master Meter Gateway	04-01-2007	2007	20	$25,330	$13,931	$11,398
22	1325-2007-561	Master Meter Snowcreek 4	04-01-2007	2007	20	$27,193	$14,956	$12,237
22	1325-2007-562	Master Meter Do-It Center	04-01-2007	2007	20	$29,103	$16,007	$13,096

22	1325-2007-563	Master Meter Hidden Valley Condos	04-01-2007	2007	20	$53,169	$29,243	$23,926
22	1325-2013-001	Water Meter Radio Read Replacement	11-30-2012	2012	20	$608,512	$162,302	$446,209
22	1325-2013-002	Water Model Master Meter Zone	03-31-2012	2012	10	$31,362	$18,826	$12,536
22	1325-2014-001	Meter Radio Read Unit Replacement	03-31-2014	2014	20	$120,316	$9,221	$36,851
22	1325-2014-002	MCC Replacement at Juniper Ridge	10-31-2013	2013	20	$95,507	$21,091	$74,416
22	1325-2016-001	AMI - Advanced Metering Infrastructure	03-31-2016	2016	20	$1,689,989	$169,234	$1,520,755
22	1325-2016-003	Master Meter / Metering Equipment	03-31-2016	2016	20	$21,080	$2,111	$18,969
22	1325-2016-004	MES Meter Relocation	03-31-2016	2016	20	$39,437	$3,949	$35,488
22	1325-2018-001	Woodlands Meter Upgrade	03-31-2018	2018	20	$19,755	$0	$19,755
22	1340-1993-142	Davison PR Station	03-31-1993	1993	30	$98,726	$82,281	$16,445
22	1340-1995-193	Parts for Hidden Valley Vault	07-31-1995	1995	10	$9,001	$9,001	$0
22	1340-1995-194	Hidden Valley PR Vault	07-31-1995	1995	10	$20,204	$20,204	$0
22	1340-1998-254	Forest Trail Tank	03-31-1998	1998	50	$617,499	$247,035	$370,464
32	1340-1999-280	Assessment District	04-01-1999	1999	30	$6,805,377	$4,310,072	$2,495,305
22	1340-2001-331	Juniper Ridge Tank Rehab - CIP	03-31-2001	2001	10	$116,529	$116,529	$0
22	1340-2003-398	Lake Mary T-1 Tank Rehab	03-31-2003	2003	10	$84,500	$84,500	$0
22	1340-2003-399	Tank Rehab - Clearwell	03-31-2003	2003	10	$168,022	$168,022	$0
22	1340-2005-456	Install Snow Retention Rails on WTP #1 Roof	02-24-2005	2005	5	$12,750	$12,750	$0
22	1340-2007-564	Well #1 Building Improvements	04-01-2007	2007	10	$18,157	$18,157	$0
22	1340-2007-565	Update - H2O Distribution Model	04-01-2007	2007	10	$61,148	$61,148	$0
32	1340-2007-605	Water Connection Fee Study	04-01-2007	2007	5	$70,493	$70,493	$0
32	1340-2007-606	GWTP #2 Reclaim Backwash	04-01-2007	2007	10	$20,527	$20,527	$0
32	1340-2008-640	Water Connection Fee Study Labor/Benefits	04-01-2008	2008	5	$6,126	$6,126	$0

32	1340-2010-0001	Ski Trails PR Station	12-31-2009	2009	30	$22,112	$6,080	$16,032
22	1340-2011-001	Arsenic Removal Studies	05-20-2010	2010	30	$75,215	$19,721	$55,494
32	1340-2011-997	Recycled H2O (1410 Cleanup)	04-01-2010	2010	10	$250,000	$200,000	$50,000
22	1340-2011-998	LMTP (1410 Cleanup)	04-01-2010	2010	10	$1,867,489	$1,493,991	$373,498
32	1340-2011-999	General Well Development (1410 Cleanup)	04-01-2010	2010	10	$1,000,000	$800,000	$200,000
22	1340-2013-002	GWTP #1 Improvements	03-31-2013	2013	20	$2,532,448	$638,516	$1,930,407
22	1340-2013-003	Well Maintenance	12-27-2012	2012	10	$402,917	$211,951	$190,966
22	1340-2014-001	Meridian Well 25	02-01-2014	2014	50	$190,734	$7,144	$78,684
22	1340-2014-002	Well 25 Development	04-01-2013	2013	35	$787,457	$26,051	$156,308
22	1340-2014-003	Update H2O Distribution Model	08-30-2013	2013	5	$29,816	$27,349	$2,467
22	1340-2014-004	Well Maintenance	09-01-2013	2013	10	$499,613	$31,413	$37,161
22	1340-2014-005	GWTP#2 Treatment Improvement	03-31-2014	2014	20	$2,575,221	$520,949	$2,089,344
22	1340-2014-006	Well #11 Development	04-01-2013	2013	35	$101,997	$14,571	$87,426
22	1340-2014-007	GWTP#1 Treatment Improvement	03-05-2014	2014	20	$24,207	$4,931	$19,276
22	1340-2014-008	GWTP #1 Valve	04-18-2013	2013	5	$15,329	$15,186	$143
22	1340-2016-001	Water & Wastewater Rate Study	03-31-2016	2016	5	$112,050	$44,882	$67,168
22	1340-2016-002	Well #1 Improvements	03-31-2016	2016	10	$764,226	$153,057	$611,169
22	1340-2016-003	2015-2016 Well Maintenance	03-31-2016	2016	5	$547,499	$219,303	$328,196
22	1340-2017-001	Pressure Reducing Valve Ranch Rd	02-23-2017	2017	50	$101,563	$2,304	$102,300
22	1340-2017-002	Knolls Tank Mixer T-5	02-23-2017	2017	7	$36,621	$5,762	$30,859
22	1340-2017-003	Knolls Tank Rehab	03-31-2017	2017	10	$50,300	$5,044	$45,256
22	1340-2017-004	Well Improvement 2017	03-31-2017	2017	10	$59,728	$5,989	$53,739
22	1340-2017-005	Tank 3 Rehab/Improvement	03-31-2017	2017	10	$459,474	$46,073	$413,401
22	1345-1969-04	Balance B/Fwd	06-30-1969	1969	40	$44,149	$44,149	$0
22	1345-1998-255	Lake Mary Plant	03-31-1998	1998	30	$732,547	$488,435	$244,112
22	1345-2000-324	From Lake Mary Treatment	08-31-2000	2000	5	$37,158	$37,158	$0

22	1345-2007-566	Lake Mary WTP Equipment & Instrument	04-01-2007	2007	15	$87,199	$63,946	$23,253
22	1345-2007-567	Lake Mary WTP Engineering	04-01-2007	2007	20	$377,861	$207,823	$170,037
22	1345-2007-568	Lake Mary WTP Building	04-01-2007	2007	40	$988,251	$271,769	$716,482
22	1345-2007-569	Lake Mary WTP Filtration System	04-01-2007	2007	15	$1,453,311	$1,065,761	$387,550
22	1345-2007-570	Lake Mary Equip Replacement	04-01-2007	2007	20	$109,961	$60,479	$49,482
22	1345-2009-0230	LMTP Polymer Feed Flowmeter	03-31-2009	2009	10	$5,184	$4,667	$517
22	1345-2009-0231	Lake Mary Flow Measure Flume	03-31-2009	2009	15	$119,943	$71,989	$47,954
22	1345-2010-0001	LMTP Filter Media	12-31-2009	2009	15	$56,464	$31,053	$25,411
22	1345-2013-001	LMTP Corrosion Control	03-31-2013	2013	20	$1,306,732	$248,842	$749,158
22	1345-2014-001	LMTP Corrosion Control Purchase	05-22-2013	2013	20	$5,358	$2,073	$9,892
22	1345-2018-001	Lake Mary Rd Valves	03-31-2018	2018	50	$45,690	$0	$45,690
22	1345-2018-002	LMWTP Filter Platform	03-31-2018	2018	15	$8,316	$0	$8,316
32	1346-1989-81	Ground Water Treatment Plant #1	03-31-1989	1989	30	$2,582,151	$2,496,319	$85,831
32	1346-1989-88	Design & Engineering GWTP #1	10-09-1989	1989	5	$15,000	$15,000	$0
22	1346-2001-359	Pavement Overlay @ GWTP#1	11-19-2001	2001	5	$27,405	$27,405	$0
22	1346-2003-426	Well #10 Replacement Column Pipe	11-19-2003	2003	10	$11,467	$11,467	$0
22	1346-2007-571	Arsenic Removal	04-01-2007	2007	50	$820,182	$180,440	$639,742
22	1346-2007-572	Monitoring Wells	04-01-2007	2007	20	$318,857	$175,371	$143,486
22	1346-2008-632	Zone 4 Booster Pump #512 - Rebuild	04-01-2008	2008	10	$8,546	$8,546	$0
22	1346-2008-633	Well #1 Chlorine Feed Pump & Static Mixer	04-01-2008	2008	10	$9,912	$9,912	$0
22	1346-2009-0013	Well #10 Motor Replacement / Rehab	03-31-2009	2009	10	$35,057	$31,561	$3,496
22	1346-2009-0220	FCP Filter Control Panel GWTP #2	03-31-2009	2009	10	$42,600	$38,351	$4,248

22	1346-2009-0221	Well #6 Repairs	03-31-2009	2009	8	$42,972	$42,972	$0
22	1346-2009-0227	Monitor Wells #26 and #27 Final Payment	03-31-2009	2009	20	$10,510	$4,731	$5,779
22	1346-2009-0228	Monitor Well #31	03-31-2009	2009	20	$42,276	$19,030	$23,246
22	1350-1968-02	Balance B/Fwd	06-30-1968	1968	40	$1,763,171	$1,763,171	$0
22	1350-1986-16	Master Water Plan	06-30-1986	1986	5	$19,574	$19,574	$0
22	1350-1987-43	Master Water Plan	04-01-1987	1987	5	$12,675	$12,675	$0
32	1350-1987-47	Install Horizontal Well	07-31-1987	1987	5	$5,654	$5,654	$0
22	1350-1987-51	Parshall Flumes	08-18-1987	1987	30	$11,119	$11,119	$0
32	1350-1987-56	Well #6	10-13-1987	1987	30	$53,586	$53,586	$0
22	1350-1987-58	Lake Mary Penhall Flumes Concrete	10-25-1987	1987	30	$8,014	$8,014	$0
32	1350-1987-61	Well #6	11-12-1987	1987	30	$39,661	$39,661	$0
32	1350-1987-63	Well #10	11-16-1987	1987	30	$81,688	$81,688	$0
32	1350-1987-67	Well #11	11-30-1987	1987	5	$24,175	$24,175	$0
32	1350-1989-82	Well No.10	03-31-1989	1989	30	$387,975	$375,079	$12,896
32	1350-1989-84	Well No.6	03-31-1989	1989	30	$291,249	$281,568	$9,681
22	1350-2001-333	Stream Flow Study	03-31-2001	2001	5	$429,426	$429,426	$0
32	1350-2001-338	Stream Flow Study - CIP	03-31-2001	2001	5	$204,542	$204,542	$0
32	1350-2006-515	Dry Creek	04-01-2006	2006	20	$104,968	$62,981	$41,987
22	1350-2006-533	Well #16 Rehab	10-20-2006	2006	10	$115,262	$115,262	$0
22	1350-2007-573	Lake Mary Tank Rehab	04-01-2007	2007	20	$29,577	$16,267	$13,309
22	1350-2007-578	Initial Study H2O Rights	04-01-2007	2007	5	$81,530	$81,530	$0
22	1350-2007-579	Mammoth Creek EIR	04-01-2007	2007	5	$708,085	$708,085	$0
32	1350-2007-607	Dry Creek	04-01-2007	2007	50	$187,701	$41,294	$146,406
22	1350-2009-0110	2007 Fish Survey	03-31-2009	2009	5	$21,039	$21,039	$0
22	1350-2009-0115	2008 Fish Survey	03-31-2009	2009	5	$22,123	$22,123	$0
32	1350-2009-0210	Wildermuth Groundwater Modeling	03-31-2009	2009	10	$164,592	$148,178	$16,413
32	1350-2014-001	Zone 2B Storage	04-01-2013	2013	50	$104,420	$10,442	$93,978
22	1355-1968-03	Balance B/Fwd	06-30-1968	1968	50	$4,738,630	$4,715,263	$23,368
22	1355-1986-14	Replace Water Main	04-11-1986	1986	30	$11,966	$11,966	$0
22	1355-1986-17	Engineering Services	07-01-1986	1986	30	$8,368	$8,368	$0

22	1355-1986-18	Pay Request #1	07-25-1986	1986	30	$98,091	$98,091	$0
22	1355-1986-22	Pay Request #2	08-20-1986	1986	30	$207,515	$207,515	$0
22	1355-1986-23	Evaluation	09-01-1986	1986	5	$9,059	$9,059	$0
22	1355-1986-25	Pay Request #3	09-23-1986	1986	30	$182,840	$182,840	$0
22	1355-1986-26	Pay Request #1	09-23-1986	1986	30	$173,113	$173,113	$0
22	1355-1986-27	Paving of Silver Tip	09-26-1986	1986	30	$10,880	$10,880	$0
22	1355-1986-29	Replace Water Line	10-01-1986	1986	30	$88,947	$88,947	$0
22	1355-1986-31	Pay Request #2	10-16-1986	1986	30	$217,076	$217,076	$0
22	1355-1986-34	Engineering Services	11-25-1986	1986	30	$11,691	$11,691	$0
22	1355-1986-35	Pay Request	11-26-1986	1986	30	$74,171	$74,171	$0
22	1355-1986-36	Compaction Testing	11-30-1986	1986	30	$8,816	$8,816	$0
22	1355-1986-37	Coating Tank 7&8	12-01-1986	1986	30	$7,230	$7,230	$0
22	1355-1986-38	Inspection Services	12-01-1986	1986	30	$19,091	$19,091	$0
22	1355-1987-41	Pay Request	01-05-1987	1987	30	$34,182	$34,182	$0
22	1355-1987-42	Pay Request	03-18-1987	1987	30	$231,286	$231,286	$0
22	1355-1987-45	Knolls Progress Payment	06-12-1987	1987	30	$68,468	$68,468	$0
22	1355-1987-48	Inspection Services	08-10-1987	1987	30	$7,473	$7,473	$0
22	1355-1987-52	Sugar Pine	09-18-1987	1987	30	$52,377	$52,377	$0
22	1355-1987-54	Paving & Permit	10-09-1987	1987	30	$5,804	$5,804	$0
22	1355-1987-64	Line Installation	11-17-1987	1987	30	$20,769	$20,769	$0
22	1355-1987-68	Materials Meadow Lane	12-10-1987	1987	30	$14,417	$14,417	$0
22	1355-1987-69	Progress Payment #5	12-16-1987	1987	30	$9,665	$9,665	$0
22	1355-1988-70	Release Retention	01-07-1988	1988	30	$54,219	$54,219	$0
22	1355-1988-71	Pay Request	04-30-1988	1988	30	$43,354	$43,240	$115
22	1355-1989-77	Mill Street Water Line	03-31-1989	1989	30	$164,125	$158,669	$5,456
22	1355-1989-78	Minaret Water Main	03-31-1989	1989	30	$242,226	$234,174	$8,052
22	1355-1989-79	Sierra Manors Water Line	03-31-1989	1989	30	$122,098	$118,040	$4,059
22	1355-1990-89	Mill St Water Line	03-31-1990	1990	30	$131,096	$122,369	$8,727
22	1355-1990-90	Old Mammoth Water Line	03-31-1990	1990	30	$439,199	$409,960	$29,239
22	1355-1990-91	Metering PR Stations	03-31-1990	1990	5	$5,726	$5,726	$0
22	1355-1991-106	Laurel Mt Water Line Repl	03-31-1991	1991	30	$193,103	$173,811	$19,292

22	1355-1991-107	Mammtoh Tavern Rd - W Line	03-31-1991	1991	30	$67,972	$61,181	$6,791
22	1355-1991-108	Mill St Water Line	03-31-1991	1991	30	$13,000	$11,701	$1,299
22	1355-1991-109	Timberidge Tank Rnvtn	03-31-1991	1991	15	$65,868	$65,868	$0
32	1355-1991-110	Trails II Water Lines	03-31-1991	1991	30	$94,468	$85,030	$9,438
32	1355-1991-111	Trails I Water Lines	03-31-1991	1991	30	$138,890	$125,014	$13,876
32	1355-1991-112	Snowcreek Crest Water Lines	03-31-1991	1991	30	$150,860	$135,788	$15,072
32	1355-1991-113	Juniper Ridge Water Lines	03-31-1991	1991	30	$212,520	$191,288	$21,232
32	1355-1991-114	Mill City Tract	03-31-1991	1991	30	$58,352	$52,522	$5,830
22	1355-1992-130	Lupin St Line Replace	03-31-1992	1992	30	$185,142	$160,474	$24,668
32	1355-1992-131	Manzanita St W Line Replace	03-31-1992	1992	30	$136,498	$118,311	$18,187
22	1355-1992-134	Chateau Rd Water Line	04-01-1992	1992	30	$14,913	$12,924	$1,988
22	1355-1993-145	Mono St Water Line	03-31-1993	1993	30	$137,719	$114,779	$22,940
22	1355-1993-146	Joaquin St Water Line	03-31-1993	1993	30	$148,503	$123,766	$24,737
22	1355-1993-147	Owen St Water Line	03-31-1993	1993	30	$23,472	$19,562	$3,910
22	1355-1993-148	Timberidge Tank	03-31-1993	1993	15	$20,410	$20,410	$0
22	1355-1993-149	St Moritz Water Line	03-31-1993	1993	30	$26,141	$21,787	$4,354
32	1355-1993-154	Fairway Ranch Water Lines	06-30-1993	1993	30	$64,950	$53,591	$11,359
22	1355-1994-167	Tavern Line Replacement	03-31-1994	1994	30	$53,611	$42,894	$10,717
22	1355-1994-168	Sierra Nevada Water Line	03-31-1994	1994	5	$52,407	$52,407	$0
32	1355-1994-180	Business Park Water Lines	11-30-1994	1994	30	$68,080	$52,954	$15,127
22	1355-1995-186	Red Fir Replacement	03-31-1995	1995	30	$162,202	$124,371	$37,832
22	1355-1996-205	Ski Trails Water Line	03-31-1996	1996	30	$98,136	$71,976	$26,160
22	1355-1996-206	Majestic Pines Water Line	03-31-1996	1996	30	$458,050	$335,947	$122,103
22	1355-1996-207	Azimuth Dr Water Replace	03-31-1996	1996	30	$45,300	$33,224	$12,076
22	1355-1996-217	H20 Line - USFS	08-01-1996	1996	30	$11,133	$8,040	$3,093
22	1355-1997-226	Sierra Valley Sites - Water Laterals	03-31-1997	1997	30	$11,408	$7,987	$3,421
22	1355-1997-227	Majestic Pines Water Line	03-31-1997	1997	30	$35,898	$25,132	$10,766
22	1355-1997-228	Meridian/Elem PR Station	03-31-1997	1997	30	$53,675	$37,578	$16,098
22	1355-1997-229	Valley Vista	03-31-1997	1997	30	$32,176	$22,526	$9,650
32	1355-1997-231	Mammoth College	03-31-1997	1997	30	$7,141	$5,000	$2,142
22	1355-1997-239	Water Lateral - Old Mammoth	07-01-1997	1997	30	$1,219	$843	$376

32	1355-1997-240	Water Lateral - Snowridge Lane	07-05-1997	1997	30	$676	$468	$209
32	1355-1997-241	Water Lateral - Forest Lane	07-05-1997	1997	30	$1,118	$773	$345
22	1355-1998-257	Monterey Pines	03-31-1998	1998	30	$502,724	$335,197	$167,527
22	1355-1999-292	Install Wtr Davidson	11-05-1999	1999	5	$5,571	$5,571	$0
22	1355-2000-295	Old Mammoth Hydrant Line	01-18-2000	2000	20	$8,488	$7,724	$764
22	1355-2000-308	Hwy 203 - Phase I	03-31-2000	2000	50	$199,926	$71,985	$127,941
22	1355-2000-309	Hwy 203 - Phase II	03-31-2000	2000	50	$294,444	$106,017	$188,427
22	1355-2000-310	Hwy 203 - Phase III	03-31-2000	2000	50	$421,887	$151,904	$269,983
22	1355-2000-312	Majestic Pines Water Replacement	03-31-2000	2000	50	$2,189	$788	$1,401
22	1355-2000-313	Grindelwald Water Replace	03-31-2000	2000	50	$186,977	$67,323	$119,655
22	1355-2000-321	Install Lateral - Grindelwald	07-03-2000	2000	10	$3,186	$3,186	$0
22	1355-2001-355	Labor	09-28-2001	2001	5	$3,822	$3,822	$0
22	1355-2001-358	Install Lateral @ Hillside	11-07-2001	2001	10	$5,352	$5,352	$0
22	1355-2002-365	Water Lateral, Azimuth, Sunshine Village	01-30-2002	2002	10	$25,681	$25,681	$0
32	1355-2002-366	Contributed Cap, H2O Lines	03-31-2002	2002	30	$1,156,359	$616,836	$539,523
22	1355-2002-377	Control Valve Parts	07-16-2002	2002	10	$11,848	$11,848	$0
22	1355-2002-382	Install Water Lateral - Forest Trail	09-30-2002	2002	5	$2,364	$2,364	$0
22	1355-2002-386	Install Water Lateral, Lot 43 Rainbow	10-30-2002	2002	5	$3,435	$3,435	$0
22	1355-2003-402	Radio Read Upgrade	03-31-2003	2003	10	$537,394	$537,394	$0
22	1355-2003-403	Meter Replacement	03-31-2003	2003	10	$492,604	$492,604	$0
22	1355-2003-404	Chateau Water Line	03-31-2003	2003	50	$151,713	$45,523	$106,190
22	1355-2003-405	North St. Water Line	03-31-2003	2003	50	$68,688	$20,611	$48,078
22	1355-2003-406	Azimuth Water Line	03-31-2003	2003	50	$131,827	$39,556	$92,271
22	1355-2003-407	Old Mammoth Water Line	03-31-2003	2003	50	$918,178	$275,505	$642,673
22	1355-2003-423	Install Water Laterals	10-22-2003	2003	10	$8,491	$8,491	$0
32	1355-2004-431	Well Pumps #16, 17, 18, 20, 21	01-31-2004	2004	30	$77,565	$36,622	$40,942
22	1355-2004-446	Lateral Install @ Alpine Cir	07-28-2004	2004	20	$1,661	$1,136	$525

22	1355-2005-465	Parts for Line Repl- Sestriere Pl	07-27-2005	2005	20	$5,807	$3,681	$2,125
22	1355-2005-478	Final Paving for WL Projects	10-28-2005	2005	20	$7,869	$4,889	$2,981
22	1355-2006-491	Chateau West	04-01-2006	2006	50	$248,181	$59,563	$188,618
22	1355-2006-492	Horsehoe Dr	04-01-2006	2006	50	$129,105	$30,985	$98,120
22	1355-2006-493	Lakeview/Horsehoe/Canyon	04-01-2006	2006	50	$231,327	$55,519	$175,809
22	1355-2006-494	Sierra Nevada/Chap/Old Mam	04-01-2006	2006	50	$415,612	$99,747	$315,865
22	1355-2006-495	Sierra Nevada	04-01-2006	2006	50	$7,707	$1,850	$5,858
22	1355-2006-496	Larkspur Lane	04-01-2006	2006	50	$70,468	$16,912	$53,556
22	1355-2006-497	Valley Vista	04-01-2006	2006	50	$496,410	$119,138	$377,272
22	1355-2006-498	Connel	04-01-2006	2006	50	$91,614	$21,987	$69,626
22	1355-2006-499	Hidden Valley	04-01-2006	2006	50	$215,566	$51,736	$163,831
22	1355-2006-500	Old Mammoth/Red Fir/Woodman	04-01-2006	2006	50	$672,347	$161,363	$510,984
22	1355-2006-501	Sherwin	04-01-2006	2006	50	$289,500	$69,480	$220,020
22	1355-2006-502	Crystal	04-01-2006	2006	50	$169,173	$40,602	$128,572
22	1355-2006-503	Meridian	04-01-2006	2006	50	$1,057,790	$253,870	$803,921
22	1355-2006-504	Hwy 203 / Main	04-01-2006	2006	50	$410,852	$98,604	$312,247
22	1355-2006-505	T-4 Parking	04-01-2006	2006	50	$546,499	$131,160	$415,339
22	1355-2006-506	Minaret Water	04-01-2006	2006	50	$346,078	$83,059	$263,020
22	1355-2006-507	Meadow Lane	04-01-2006	2006	50	$145,100	$34,824	$110,276
22	1355-2006-508	Pinehurst	04-01-2006	2006	50	$106,145	$25,475	$80,670
22	1355-2006-509	Panorama Ridge	04-01-2006	2006	50	$39,630	$9,511	$30,119
22	1355-2007-580	Convict H2O Line	04-01-2007	2007	50	$182,677	$40,189	$142,488
22	1355-2007-581	Canyon Blvd (FT to TL) H2O Line	04-01-2007	2007	50	$242,506	$53,351	$189,154
22	1355-2007-582	Lee Road H2O Line	04-01-2007	2007	50	$19,598	$4,312	$15,286
22	1355-2007-583	Tavern / Sierra Park H2O Line	04-01-2007	2007	50	$89,324	$19,651	$69,673
22	1355-2007-584	Holiday Way H2O Line	04-01-2007	2007	50	$59,238	$13,032	$46,206
22	1355-2007-585	Twin Lakes H2O Line	04-01-2007	2007	50	$146,139	$32,150	$113,988
22	1355-2007-586	Tavern Rd H20 Line	04-01-2007	2007	50	$24,829	$5,462	$19,366
22	1355-2007-587	Hillside Ct H2O Line	04-01-2007	2007	50	$585	$129	$456
22	1355-2007-588	Hillside Pl H2O Line	04-01-2007	2007	50	$28,173	$6,198	$21,975

22	1355-2007-589	Waterford & Hill H2O Line	04-01-2007	2007	50	$3,272	$720	$2,552
22	1355-2007-590	Crawford St H2O Line	04-01-2007	2007	50	$493,991	$108,678	$385,313
22	1355-2007-591	Rainbow Lane Replacement H2O Line	04-01-2007	2007	50	$26,614	$5,855	$20,759
22	1355-2007-592	Mammoth Knolls Dr H2O Line	04-01-2007	2007	50	$672,038	$147,848	$524,190
22	1355-2007-593	T-4 Line to Parking Lot	04-01-2007	2007	50	$246,291	$54,184	$192,107
22	1355-2007-594	Sierra Park Rd H2O Line	04-01-2007	2007	50	$144,785	$31,853	$112,933
22	1355-2007-595	St Anton / Knolls Area H2O Line	04-01-2007	2007	50	$431,234	$94,871	$336,362
22	1355-2007-596	John Muir H2O Line	04-01-2007	2007	50	$503,623	$110,797	$392,826
22	1355-2007-597	Skate Park H2O Line	04-01-2007	2007	50	$23,278	$5,121	$18,157
22	1355-2007-598	Process Aerial Photos	04-01-2007	2007	5	$23,533	$23,533	$0
32	1355-2007-608	Minaret Rd (Z3A & Z3B Expansion)	04-01-2007	2007	50	$4,467	$983	$3,484
22	1355-2007-609	Process Aerial Photos	04-01-2007	2007	5	$23,533	$23,533	$0
32	1355-2008-623	Contributed Capital	03-31-2008	2008	30	$296,593	$98,893	$197,700
22	1355-2008-634	Labor / Benefits 2006 WL Replacement	04-01-2008	2008	50	$18,931	$3,786	$15,144
22	1355-2009-0210	Snowcreek Pond Fill Valve	03-31-2009	2009	10	$16,761	$15,090	$1,671
22	1355-2009-0223	Knolls PS Telemetry	03-31-2009	2009	10	$27,347	$24,620	$2,727
22	1355-2009-0225	Timber Ridge Telemetery	03-31-2009	2009	10	$26,010	$23,417	$2,594
22	1355-2009-0245	Raise Water Valves on Highway 203	03-31-2009	2009	5	$37,057	$37,057	$0
22	1355-2009-0250	2007 WL Replacement	03-31-2009	2009	50	$1,708,105	$307,558	$1,400,547
22	1355-2010-0001	2008 WL Replacement	04-01-2009	2009	50	$23,479	$4,226	$19,253
22	1355-2011-001	2007 WL Replacement	04-01-2010	2010	50	$3,210	$514	$2,696
22	1355-2011-002	2009 WL Replacement	04-01-2010	2010	50	$1,361,567	$217,851	$1,143,716
22	1355-2011-003	Master Meter Repl. ~ Snowcreek	12-23-2010	2010	30	$88,555	$21,464	$67,091
22	1355-2011-999	2008 WL Rep. (1410 Cleanup)	04-01-2010	2010	50	$1,637,032	$261,925	$1,375,107
22	1355-2012-001	2010 WL Replacement	04-01-2011	2011	50	$1,057,940	$148,249	$912,780
22	1355-2012-002	2011 WL Replacement	02-01-2012	2012	50	$284,494	$35,060	$249,434
22	1355-2012-003	Water Loss Reduction Project	05-01-2011	2011	50	$231,377	$32,013	$199,365

22	1355-2013-001	2012-2013 Water Line Replacement	10-31-2012	2012	50	$359,060	$38,898	$320,162
22	1355-2014-002	2013-2014 Water Line Replacement	11-30-2013	2013	50	$432,525	$47,625	$501,759
22	1355-2015-001	2012-2013 Water Line Replacement	02-25-2015	2015	50	$2,798	$173	$2,625
22	1355-2015-002	2013-2014 Water Line Replacement	03-11-2015	2015	50	$3,394	$208	$3,187
22	1355-2015-003	2014-2015 Water Line Replacement - Bigwood	03-31-2015	2015	50	$156,314	$9,519	$148,979
22	1355-2015-004	2014-2015 Water Line Replacement	03-31-2015	2015	50	$866,708	$52,223	$817,349
22	1355-2016-001	2015-2016 Water Line Replacement	03-31-2016	2016	50	$1,242,744	$49,779	$1,192,965
22	1355-2016-002	Facility Relocation/Hydrant/Lateral Replacement	03-31-2016	2016	30	$183,512	$12,251	$171,261
22	1355-2016-003	Snowcreek Recycled Water Line	03-31-2016	2016	50	$119,464	$4,785	$114,679
22	1355-2017-001	2016/17 Water Line Replacement Program	03-31-2017	2017	50	$555,548	$11,141	$544,406
22	1355-2017-002	Canyon Lodge Water Line Replacement	03-31-2017	2017	50	$105,241	$2,111	$103,131
22	1355-2018-001	Water Line Replacement FY18	03-31-2018	2018	50	$528,522	$0	$528,522
22	1355-2018-003	Timber Ridge Pump Station	03-31-2018	2018	10	$27,580	$0	$27,580
22	1355-2018-004	Timber Ridge Steel Line Replace	03-31-2018	2018	50	$173,961	$0	$173,961
22	1357-1995-195	Fire Hydrants	07-31-1995	1995	20	$9,717	$9,717	$0
22	1357-2001-334	GIS Pilot Fire Hydrant Program	03-31-2001	2001	15	$22,191	$22,191	$0
22	1357-2005-482	Hydrants (3)	12-29-2005	2005	20	$7,427	$4,551	$2,876
23	1360-1990-98	Transfer from 1365	07-11-1990	1990	30	$8,298	$7,668	$630
23	1360-1992-137	Diffusers / Washers / Gaskets	05-29-1992	1992	5	$10,872	$10,872	$0
33	1360-1994-171	WWTP Design	03-31-1994	1994	30	$897,335	$717,954	$179,382
33	1360-1994-172	Construction Management	03-31-1994	1994	30	$887,700	$710,244	$177,456
33	1360-1994-173	Construction	03-31-1994	1994	30	$7,618,882	$6,095,830	$1,523,052

33	1360-1994-174	Finance Costs	03-31-1994	1994	30	$590,989	$472,847	$118,142
23	1360-1995-187	Wet Wells Rehabilitation	03-31-1995	1995	15	$8,548	$8,548	$0
23	1360-1996-222	Truck Cover at WWTP	10-21-1996	1996	10	$18,916	$18,916	$0
23	1360-1997-230	Aeration Basin	03-31-1997	1997	15	$105,502	$105,502	$0
33	1360-1997-232	Aeration Basin	03-31-1997	1997	15	$382,238	$382,238	$0
23	1360-1997-236	Sanitare Aerobic Diffusion Replace	06-16-1997	1997	15	$54,900	$54,900	$0
23	1360-1999-279	Chlorine Induct Pump	04-01-1999	1999	10	$14,307	$14,307	$0
23	1360-2000-314	Overlay WWTP	03-31-2000	2000	5	$64,820	$64,820	$0
23	1360-2006-512	East & West Twin Telemetry	04-01-2006	2006	10	$40,140	$40,140	$0
23	1360-2006-513	Tamarack & E. Mary Telemetry	04-01-2006	2006	10	$18,757	$18,757	$0
23	1360-2006-514	Sherwin & Shady Telemetry	04-01-2006	2006	10	$29,823	$29,823	$0
23	1360-2007-601	Rainbow & Falls Tract - Tele Repl	04-01-2007	2007	10	$20,625	$20,625	$0
33	1360-2007-610	Wastewater Connection Fee Study	04-01-2007	2007	5	$61,533	$61,533	$0
33	1360-2007-611	WWTP Expansion Buildings	04-01-2007	2007	40	$2,089,560	$574,629	$1,514,931
33	1360-2007-612	WWTP Expansion Concrete Tanks	04-01-2007	2007	50	$2,998,065	$659,574	$2,338,491
33	1360-2007-613	WWTP Expansion Pumps & Motors	04-01-2007	2007	15	$908,505	$666,237	$242,268
33	1360-2007-614	WWTP Expansion Engineering	04-01-2007	2007	20	$1,362,757	$749,516	$613,241
33	1360-2007-615	WWTP Expansion Equip & Instruments	04-01-2007	2007	15	$1,726,159	$1,265,850	$460,309
33	1360-2008-641	WWTP Expansion - Phase 2	04-01-2008	2008	20	$11,341	$5,671	$5,671
33	1360-2011-999	General Waste Water Exp. (1410 Cleanup)	04-01-2010	2010	30	$35,232	$9,395	$25,837
32	1360-2012-001	Recycled Water Facility	01-01-2012	2012	40	$8,470,793	$1,323,501	$7,154,749
23	1360-2012-003	WWTP Solar System	11-01-2011	2011	20	$5,486,362	$1,759,464	$3,726,898
23	1360-2013-001	WWTP MCC Blower	11-30-2012	2012	50	$109,984	$11,734	$98,250
23	1360-2013-005	New Paving @ WWTP	05-30-2012	2012	20	$119,873	$34,994	$84,879

23	1360-2014-001	WWTP MCC/Blower VFD Retro Fit	04-01-2013	2013	50	$2,248	$225	$2,023
23	1360-2014-002	Truck Fill Pump	03-31-2014	2014	5	$10,996	$8,803	$2,193
23	1360-2015-001	Truck Fill Station	07-24-2014	2014	15	$19,259	$4,735	$14,524
23	1360-2015-002	WWTP MCC/Blower VFD Retrofit	10-08-2014	2014	50	$94,993	$21,026	$311,900
23	1360-2016-001	WWTP Air Compressors	03-31-2016	2016	10	$7,107	$1,423	$5,684
23	1360-2017-001	Press MCC Room Filtration	02-23-2017	2017	5	$16,909	$3,725	$13,184
23	1360-2017-002	Sewer Holding Tank	03-31-2017	2017	15	$215,729	$14,421	$201,308
23	1360-2017-003	WWTP Asset Replacement	03-31-2017	2017	5	$14,439	$2,896	$11,543
23	1360-2017-004	Bredel Sludge Pump	06-16-2016	2016	5	$15,748	$5,644	$10,104
23	1360-2018-001	WWTP Aeration Control	03-31-2018	2018	15	$38,076	$0	$38,076
23	1360-2018-003	WWTP Primary Clarifiers	03-31-2018	2018	10	$37,942	$0	$37,942
23	1360-2018-004	Trash Removal System	03-31-2018	2018	15	$359,829	$0	$359,829
23	1360-2018-005	Aeration Basin Baffles	03-31-2018	2018	15	$30,343	$0	$30,343
23	1360-2018-006	Digester Choper Pump Rebuild	03-31-2018	2018	15	$65,090	$0	$65,090
23	1360-2018-007	Aeration Train Piping Repair	03-31-2018	2018	20	$75,690	$0	$75,690
23	1360-2018-008	Vactor Receiving Station	03-31-2018	2018	50	$20,963	$0	$20,963
23	1365-1967-01	Balance B/Fwd	06-30-1967	1967	60	$4,578,945	$3,873,291	$705,653
23	1365-1986-39	Lakes Basin Pump Stations	12-01-1986	1986	30	$46,791	$46,791	$0
23	1365-1989-80	Bus Dump Station	03-31-1989	1989	30	$13,967	$13,502	$464
23	1365-1990-92	Woodman Sewer Line	03-31-1990	1990	30	$93,764	$87,522	$6,242
33	1365-1991-115	Trails I Sewer Lines	03-31-1991	1991	30	$124,308	$111,889	$12,419
33	1365-1991-116	Trails II Sewer Lines	03-31-1991	1991	30	$141,696	$127,540	$14,156
33	1365-1991-117	Snowcreek Crest Sewer Lines	03-31-1991	1991	30	$262,278	$236,075	$26,203
33	1365-1991-118	Juniper Ridge Sewer Lines	03-31-1991	1991	30	$395,226	$355,740	$39,486
33	1365-1993-155	Fairway Ranch Sewer Lines	06-30-1993	1993	30	$105,395	$86,963	$18,432
33	1365-1994-181	Sewer Line - Business Park	11-30-1994	1994	30	$58,440	$45,455	$12,985
23	1365-1995-188	East Twin Force Main	03-31-1995	1995	30	$42,914	$32,905	$10,009
23	1365-1996-220	Install Sewer Lateral - Ridgecrest	10-07-1996	1996	5	$1,352	$1,352	$0
33	1365-1997-242	Sewer Lateral - Hillside	07-05-1997	1997	5	$5,206	$5,206	$0
23	1365-1997-246	Manholes - Majestic Pines Dr	08-07-1997	1997	5	$5,266	$5,266	$0

23	1365-1998-263	Install Sewer Lat	07-08-1998	1998	30	$4,865	$3,200	$1,665
23	1365-1998-268	Manhole Rehab	10-25-1998	1998	20	$24,355	$23,664	$691
23	1365-2000-325	Manhole Rehab	12-08-2000	2000	5	$45,102	$45,102	$0
23	1365-2001-349	TV Inspection Equipment	06-20-2001	2001	15	$43,533	$43,533	$0
23	1365-2001-350	Install Sewer Lateral	07-17-2001	2001	30	$1,686	$939	$747
23	1365-2001-353	Lift Station & Tank Monitors	08-29-2001	2001	10	$9,036	$9,036	$0
33	1365-2002-367	Contributed Cap. WW Lines	03-31-2002	2002	30	$1,358,338	$724,574	$633,764
23	1365-2002-378	Sewer Installation	07-26-2002	2002	5	$2,738	$2,738	$0
23	1365-2003-408	Meridian Blvd Slip Lining	03-31-2003	2003	20	$46,848	$35,142	$11,705
23	1365-2003-428	Manhole Sealing	12-03-2003	2003	5	$22,435	$22,435	$0
23	1365-2005-472	Install Sewer Lateral Manzanita	08-31-2005	2005	20	$3,162	$1,990	$1,173
23	1365-2005-481	Manhole / Sewer Line Rehab	12-07-2005	2005	20	$54,221	$33,387	$20,834
23	1365-2006-486	Chopper Pump Tamarack Lifts	03-30-2006	2006	5	$5,933	$5,933	$0
23	1365-2006-534	New Sewer Lat Install - Ridgecrest	10-24-2006	2006	30	$3,722	$1,419	$2,303
23	1365-2006-538	Hillside Dr - Install Sewer Lateral	11-14-2006	2006	10	$3,978	$3,978	$0
23	1365-2006-542	Slip Line Across Creek	12-14-2006	2006	30	$39,975	$15,052	$24,923
23	1365-2006-543	Rehab Sewer	12-14-2006	2006	15	$23,430	$17,644	$5,786
23	1365-2007-602	Waterford WW Line	04-01-2007	2007	30	$28,809	$10,563	$18,245
23	1365-2007-603	Skate Park Collection Lines	04-01-2007	2007	50	$24,193	$5,323	$18,871
23	1365-2007-604	Process Aerial Photos	04-01-2007	2007	5	$23,533	$23,533	$0
23	1365-2007-616	Process Aerial Photos	04-01-2007	2007	5	$23,533	$23,533	$0
33	1365-2008-624	Contributed Capital	03-31-2008	2008	30	$399,957	$133,358	$266,600
23	1365-2008-639A	West Twin Lift Station Improvement	04-01-2008	2008	5	$4,194	$4,194	$0
23	1365-2009-6140	Slipline Sewer Line - Meadow Lane	04-01-2008	2008	20	$29,126	$14,563	$14,563
23	1365-2009-6150	Manholes on Highway 203	03-31-2009	2009	5	$27,126	$27,126	$0
23	1365-2011-001	Bluffs Lift Station Improvements	11-24-2010	2010	30	$3,213	$787	$2,426
23	1365-2013-002	Manhole Replacement	09-30-2012	2012	20	$248,131	$68,255	$179,876

23	1365-2013-004	Road Plates (4 split between funds)	07-05-2012	2012	50	$6,250	$717	$5,532
23	1365-2013-005	Road Plates (4 split between funds)	07-05-2012	2012	50	$6,250	$717	$5,532
23	1365-2014-001	2013-2014 Sewer Line Replacement	10-31-2013	2013	50	$211,018	$18,640	$192,378
23	1365-2014-002	Manhole Sealing and Lining	10-31-2013	2013	20	$22,950	$5,068	$17,882
23	1365-2014-003	Center/Shady Rest Sewer Replacement	10-31-2013	2013	50	$307,884	$27,196	$280,688
23	1365-2014-004	Meridian Sewer Expansion	04-01-2013	2013	50	$436,343	$43,634	$392,708
23	1365-2015-002	2014-2015 Sewer Line Replacement	10-01-2014	2014	50	$194,323	$13,598	$180,725
23	1365-2016-001	2015-2016 Sewer Line Replacement	03-31-2016	2016	40	$344,203	$17,234	$326,969
23	1365-2017-001	2016-2017 Sewer Line Replacement	02-23-2017	2017	40	$250,745	$6,905	$243,840
23	1365-2018-001	2017-2018 Sewer Line Replacement	03-31-2018	2018	50	$426,838	$0	$426,838
23	1365-2018-002	Snowcreek GC Pond Fill Control	03-31-2018	2018	15	$52,967	$0	$52,967
23	1370-1983-07	Balance B/Fwd	06-30-1983	1983	60	$782,066	$452,993	$329,074
23	1370-1986-33	Easement Deed	11-03-1986	1986	60	$7,454	$3,902	$3,552
23	1375-1983-08	Balance B/Fwd	06-30-1983	1983	60	$19,784	$11,459	$8,325
23	1380-1983-09	Balance B/Fwd	06-30-1983	1983	60	$102,815	$59,553	$43,262
23	1390-1984-13	Balance B/Fwd	06-30-1984	1984	30	$526,413	$526,413	$0
22	1390-2001-335A	Aerial Photos - CIP	03-31-2001	2001	15	$12,274	$12,274	$0
23	1390-2001-337	Aerial Photos - CIP	03-31-2001	2001	5	$12,274	$12,274	$0
22	1390-2001-340	Aerial Photos - CIP	03-31-2001	2001	5	$12,274	$12,274	$0
23	1390-2001-341	Aerial Photos - CIP	03-31-2001	2001	5	$12,274	$12,274	$0
22	1390-2011-999	General Studies/Surveys (1410 Cleanup)	04-01-2010	2010	5	$1,000,000	$1,000,000	$0
22	1390-2013-001	Asset Management Study	07-31-2012	2012	5	$87,081	$87,081	$0
22	1390-2013-002	Mammoth Creek EIR	02-28-2012	2012	50	$571,450	$69,578	$501,872
22	1390-2014-001	Mammoth Creek EIR	03-31-2014	2014	50	$15,575	$1,247	$14,328

22	1390-2014-002	Urban Water Management Plan	04-01-2013	2013	5	$77,409	$77,409	$0
22	1390-2015-003	Mammoth Creek EIR	03-31-2015	2015	50	$11,389	$684	$10,705
22	1390-2015-004	Well Profiling	03-31-2015	2015	5	$43,381	$26,053	$17,328
22	1390-2016-001	Backflow Survey	03-31-2016	2016	5	$59,857	$23,976	$35,881
21	1390-2016-002	Weather Station	03-31-2016	2016	10	$5,012	$1,004	$4,008
22	1390-2016-003	Capital Asset Replacement	03-31-2016	2016	10	$123,015	$24,637	$98,378
22	1390-2016-004	Groundwater Management Plan	03-31-2016	2016	5	$106,953	$42,840	$64,113
22	1390-2017-001	Urban Water Management Plan	02-23-2017	2017	5	$87,574	$19,713	$69,776

Fund	Asset ID	Description	Installed	Year Installed	Life (Years)	Replacement Cost	Accumulated Depreciation	Replacement Cost Less Depreciation
22	1300-1970-05	Balance B/Fwd	06-30-1970	1970	50	$4,305,537	$4,133,316	$172,22
23	1300-1980-06	Balance B/Fwd	06-30-1980	1980	60	$17,684,068	$11,199,910	$6,484,15
22	1300-1984-11	Various Equipment	06-30-1984	1984	5	$252,493	$252,493	$
21	1300-1992-132	Fuel System	04-01-1992	1992	5	$54,992	$54,992	$
31	1300-1993-150	Lunch Room Remodel	03-31-1993	1993	5	$15,341	$15,341	$
21	1300-1996-218	Install Exhaust Sys in Garage	09-23-1996	1996	5	$15,355	$15,355	$
22	1300-1997-247	Quonset Huts ~ Foundation	09-29-1997	1997	30	$71,832	$50,283	$21,55
21	1300-1997-249	Fuel System Replacement	10-25-1997	1997	20	$195,937	$195,937	$
21	1300-1999-277	Admin Heater	04-01-1999	1999	10	$38,913	$38,913	$
21	1300-2000-304	Operations & Maintenance Building	03-31-2000	2000	50	$3,327,617	$1,197,942	$2,129,67
21	1300-2000-305	Annex Bldg Furnish	03-31-2000	2000	10	$536,026	$536,026	$
21	1300-2000-306	Gas Tank Replacement	03-31-2000	2000	20	$49,197	$44,277	$4,92
21	1300-2001-330	Garage Roof from C.I.P.	03-31-2001	2001	30	$35,451	$20,089	$15,36
21	1300-2003-395	Vehicle Storage Building	03-31-2003	2003	50	$1,343,570	$403,071	$940,49
21	1300-2005-476	Admin Frnt / Fans	10-13-2005	2005	5	$7,701	$7,701	$
21	1300-2006-487	Admin Bldg Remodel	04-01-2006	2006	5	$8,271	$8,271	$
96	1300-2006-516	GIS Project	04-01-2006	2006	10	$853,597	$853,597	$
22	1300-2006-531	Quonset Hut	09-29-2006	2006	10	$128,757	$128,757	$
21	1300-2007-547	Install Gate System	04-01-2007	2007	10	$36,498	$36,498	$
21	1300-2007-548	Sub-grade Landscape Annex	04-01-2007	2007	10	$79,463	$79,463	$
22	1300-2007-549	Facility Relocation	04-01-2007	2007	20	$90,699	$49,884	$40,81
22	1300-2007-550	Asbuilt Data Conversion	04-01-2007	2007	5	$68,288	$68,288	$
23	1300-2007-599	Facility Relocation	04-01-2007	2007	20	$82,716	$45,494	$37,22
23	1300-2007-600	Asbuilt Data Conversion	04-01-2007	2007	5	$60,727	$60,727	$
21	1300-2008-625	Upgrade Fuel System	04-01-2008	2008	10	$8,143	$8,143	$
21	1300-2011-001	Carpet - Admin. Bldg.	04-01-2010	2010	10	$27,836	$22,269	$5,56
23	1300-2012-001	Quonset Hut ~ XQ40-16	11-01-2011	2011	20	$53,118	$18,591	$34,52
22	1300-2012-002	Quonset Hut ~ XQ30-14	11-01-2011	2011	20	$42,152	$14,753	$27,39
21	1300-2013-001	New Computer Server Room	04-01-2012	2012	10	$39,207	$23,524	$15,68
21	1300-2013-002	Energy Conservation System - Admin & Eng Bldgs	10-31-2012	2012	5	$6,692	$6,692	$
22	1300-2013-003	Garage door for quonset 1	06-28-2012	2012	20	$9,966	$2,990	$6,97
23	1300-2013-004	Garage door for quonset 2	06-28-2012	2012	20	$9,966	$2,990	$6,97
22	1300-2014-007	Facility Relocation	12-31-2013	2013	20	$199,089	$49,772	$149,31

22	1300-2015-001	Quonset Hut Door	05-07-2014	2014	20	$10,099	$2,020	$8,07
21	1300-2015-002	Reroof Storage Building	06-30-2014	2014	30	$44,336	$5,911	$38,42
22	1300-2017-002	Asphalt	10-26-2016	2016	20	$91,668	$9,167	$82,50
22	1300-2017-003	Machine Shop	03-31-2017	2017	20	$40,864	$2,043	$38,82
22	1300-2017-004	Equipment Storage Building	03-31-2017	2017	50	$976,493	$19,530	$956,96
21	1303-1987-46	Land	07-01-1987	1987	999	$538,112	$0	$538,11
96	1303-2001-327	Purchase of L'Abri - Land	02-28-2001	2001	999	$93,881	$0	$93,88
32	1303-2006-528	Land Purchase Well #25	07-31-2006	2006	999	$61,177	$0	$61,17
96	1304-2001-328	L'Abri Employee Housing	02-28-2001	2001	50	$745,715	$253,543	$492,17
21	1304-2006-485	L'Abri #9 & #6 - Carpet & Flooring	02-23-2006	2006	5	$9,229	$9,229	$
96	1304-2007-617	Employee Housing - Trailer Park	04-01-2007	2007	50	$24,476	$5,385	$19,09
96	1304-2010-0001	Timberline #11 Purchase	02-11-2010	2010	50	$260,117	$41,619	$218,49
22	1305-2002-374	Petro-Vend Fuel System (1 of 2)	06-13-2002	2002	5	$7,000	$7,000	$
23	1305-2002-375	Petro-Vend Fuel System (2 of 2)	06-13-2002	2002	5	$7,000	$7,000	$
21	1305-2002-388	Document Imaging Project	11-14-2002	2002	15	$10,809	$10,809	$
21	1305-2002-390	Document Imaging System	12-12-2002	2002	15	$42,599	$42,599	$
22	1305-2005-458	Maintenance Software Fuel Sys & Laptop Interface	03-25-2005	2005	5	$10,235	$10,235	$
23	1305-2005-459	Maintenance Software Fuel Sys & Laptop Interface	03-25-2005	2005	5	$10,495	$10,495	$
23	1305-2006-510	SCADA	04-01-2006	2006	10	$39,122	$39,122	$
21	1305-2008-626	Fuel Software for Petro Vend	04-01-2008	2008	10	$14,533	$14,533	$
22	1305-2008-627	IPM Project Management Software	04-01-2008	2008	10	$14,764	$14,764	$
23	1305-2008-635	IPM Project Management Software	04-01-2008	2008	10	$14,764	$14,764	$
22	1305-2009-0001	IPM Proj Mgmt Travel Expenses - OnSite Training	01-15-2009	2009	5	$8,814	$8,814	$
21	1305-2009-0017	Springbrook Software and Training	03-31-2009	2009	10	$209,099	$188,189	$20,91
21	1305-2009-0120	Audiotel Software and Equipment	08-21-2008	2008	10	$8,894	$8,894	$
21	1305-2009-0130	Network Switch Replacement	10-17-2008	2008	5	$14,411	$14,411	$
23	1305-2011-001	Sewer CAD Software	04-01-2010	2010	5	$67,532	$67,532	$
21	1305-2012-001	Server MCWDSVR11	02-01-2012	2012	4	$18,430	$18,430	$
22	1305-2012-002	Operations Reporting Software	08-01-2011	2011	5	$9,727	$9,727	$

22	1305-2012-003	InfraMAP Maintenance Software	08-01-2011	2011	5	$15,133	$15,133	$
22	1305-2013-001	SCADA Logic Upgrade	05-31-2011	2011	15	$30,493	$14,230	$16,26
21	1305-2014-001	Trimble GPS Unit Upgrade	05-02-2013	2013	5	$9,571	$9,571	$
21	1305-2014-002	UB10 Server Replacement	03-17-2014	2014	4	$11,109	$11,109	$
22	1305-2014-004	SCADA PLC Telemerty Upgrade	03-31-2014	2014	15	$42,959	$11,456	$31,50
23	1305-2017-001	TV Van Software	06-30-2016	2016	5	$23,820	$9,528	$14,29
21	1305-2018-001	Phone System Update	03-31-2018	2018	10	$20,646	$0	$20,64
22	1307-2010-0001	GWTP #1 Security Fence	10-31-2009	2009	5	$42,343	$42,343	$
22	1308-2008-628	Server MCWDEXCH 08	04-01-2008	2008	5	$18,692	$18,692	$
21	1315-2011-001	GIS Plotter	12-01-2010	2010	10	$10,527	$8,422	$2,10
21	1315-2012-001	Telephone System for District	10-01-2011	2011	10	$36,686	$25,680	$11,00
21	1315-2015-006	Canon Image Runner	02-05-2015	2015	5	$16,614	$9,969	$6,64
21	1315-2015-007	Canon Image Runner	02-05-2015	2015	5	$16,614	$9,969	$6,64
23	1315-2015-009	Grinder	03-31-2015	2015	10	$65,647	$19,694	$45,95
22	1315-2016-001	HP DesignJet T2500ps ePrinter	03-31-2016	2016	5	$9,500	$3,800	$5,70
22	1317-1992-135	Ingersoll Rand Air Compressor V#5	04-30-1992	1992	5	$16,066	$16,066	$
23	1317-1992-136	Ingersoll Rand Air Compressor V#5	04-30-1992	1992	5	$16,066	$16,066	$
22	1317-1994-178	Shoring System	10-13-1994	1994	5	$11,406	$11,406	$
23	1317-1994-179	Shoring System	10-13-1994	1994	5	$11,426	$11,426	$
22	1317-1996-202	Welder Veh #64	03-19-1996	1996	15	$27,267	$27,267	$
23	1317-1999-289	Swr Lft Station Project	09-15-1999	1999	15	$24,331	$24,331	$
22	1317-2000-296	Generator Emergency (Admin)	01-19-2000	2000	5	$19,677	$19,677	$
22	1317-2000-297	Generator Emergency (WWTP)	01-19-2000	2000	10	$27,768	$27,768	$
23	1317-2000-298	Generator Emergency (Admin)	01-19-2000	2000	10	$19,677	$19,677	$
23	1317-2000-299	Generator Emergency (WWTP)	01-19-2000	2000	10	$27,768	$27,768	$
22	1317-2002-369	Sifter Box/Crossing Plate	05-15-2002	2002	5	$9,584	$9,584	$
22	1317-2002-371	Safety Arrow Board Traffic Signs (1 of 2)	05-31-2002	2002	5	$4,432	$4,432	$
23	1317-2002-372	Safety Arrow Board Traffic Signs (2 of 2)	05-31-2002	2002	5	$4,432	$4,432	$
22	1317-2003-410	Air Compressor - Veh #46	05-08-2003	2003	5	$24,306	$24,306	$
21	1317-2003-420	Install 2 Lennox HS-29 Air Cond. Units	09-30-2003	2003	5	$9,555	$9,555	$

22	1317-2004-432	Excavator Veh #47	04-01-2004	2004	10	$113,480	$113,480	$
22	1317-2004-435	Broce BB-250-8' Sweeper Veh #45	05-07-2004	2004	5	$15,871	$15,871	$
22	1317-2004-436	Road Plates / Vertical Shore	05-07-2004	2004	5	$10,221	$10,221	$
22	1317-2004-438	Muel Tapping Tool Rebuild	05-27-2004	2004	5	$13,944	$13,944	$
22	1317-2004-440	Radio Line Detection (1 of 2)	06-03-2004	2004	5	$4,075	$4,075	$
23	1317-2004-441	Radio Line Detection (2 of 2)	06-03-2004	2004	5	$4,075	$4,075	$
22	1317-2004-442	Radar Line Locator	06-03-2004	2004	5	$8,515	$8,515	$
23	1317-2004-443	Radar Line Locator	06-03-2004	2004	5	$8,515	$8,515	$
22	1317-2004-445	Hydraulic Braker for Cat 430 Backhoe	07-28-2004	2004	5	$14,454	$14,454	$
23	1317-2004-447	Hydraulic Braker for Cat 430 Backhoe	07-28-2004	2004	5	$14,454	$14,454	$
22	1317-2005-460	Roller Drum & Trailer	04-01-2005	2005	5	$19,432	$19,432	$
22	1317-2005-463	Trenchless Pipe Replacement Tool	06-30-2005	2005	5	$8,886	$8,886	$
23	1317-2005-464	Replace Reznor Furnace in Chlorine Bldg	06-30-2005	2005	5	$10,038	$10,038	$
21	1317-2005-477	Bobcat - Snow Removal Veh #6	10-28-2005	2005	10	$79,260	$79,260	$
22	1317-2006-520	Concrete Saw & Trailer (1 of 2)	06-08-2006	2006	10	$4,228	$4,228	$
23	1317-2006-521	Concrete Saw & Trailer (2 of 2)	06-08-2006	2006	10	$4,228	$4,228	$
22	1317-2008-630	Leak Detection Replace/Upgrade	04-01-2008	2008	10	$47,844	$47,844	$
23	1317-2008-637	See Snake Replacement	04-01-2008	2008	10	$15,473	$15,473	$
23	1317-2009-0345	Sewer Bypass Pump Veh #62	03-31-2009	2009	10	$35,003	$31,502	$3,50
22	1317-2009-170	Laser Level	04-30-2008	2008	5	$6,950	$6,950	$
22	1317-2010-0001	Trench Shoring	05-21-2009	2009	5	$16,766	$16,766	$
21	1317-2010-0003	Forklift (2007) - Veh #57	07-16-2009	2009	10	$55,974	$50,377	$5,59
22	1317-2011-001	Sewer Lateral Cleaner	03-17-2011	2011	10	$50,321	$35,224	$15,09
22	1317-2011-003	Telemetry (Component OMR Gauging Sta.)	07-15-2010	2010	10	$15,695	$12,556	$3,13
22	1317-2011-004	Arsenic Analyzer System (Component)	07-01-2010	2010	5	$63,356	$63,356	$
22	1317-2011-005	Arsenic Analyzer System (Component)	03-03-2011	2011	5	$61,960	$61,960	$
22	1317-2011-02	Valve Service Trailer - Veh #71	10-01-2010	2010	5	$58,337	$58,337	$
22	1317-2012-002	Mini Excavator - Veh #66	06-01-2011	2011	10	$43,964	$30,774	$13,18
21	1317-2013-001	Security Gate	06-28-2012	2012	10	$7,916	$4,750	$3,16
23	1317-2013-002	WWTP Replacement Grinder	07-26-2012	2012	5	$56,813	$56,813	$

22	1317-2013-003	Snowblower - Holder C992	12-26-2012	2012	15	$167,477	$66,991	$100,48
22	1317-2014-001	Snow Cat and Trailor Veh #72	04-03-2013	2013	20	$185,041	$46,260	$138,78
23	1317-2014-002	Submersible Sewage Pump	06-05-2013	2013	5	$7,258	$7,258	$
22	1317-2014-003	Rotary Garage Lift	08-07-2013	2013	25	$14,045	$2,809	$11,23
23	1317-2014-004	Primary Covers	08-01-2013	2013	20	$12,698	$3,175	$9,52
22	1317-2014-005	Plasma Cutting System	04-16-2014	2014	15	$20,556	$5,482	$15,07
23	1317-2014-006	Replacement Blower Head	09-27-2013	2013	15	$10,127	$3,376	$6,75
22	1317-2014-007	Install Radio Communications Equipment Phase 2	03-01-2014	2014	10	$201,810	$80,724	$121,08
23	1317-2015-001	Primary Clarifier #4	05-01-2014	2014	15	$16,151	$4,307	$11,84
22	1317-2015-002	Asphalt Grinder	06-11-2014	2014	10	$18,031	$7,213	$10,81
22	1317-2015-003	Compressor	05-14-2014	2014	15	$20,619	$5,498	$15,12
22	1317-2015-004	Cutting System	04-16-2014	2014	15	$21,261	$5,670	$15,59
21	1317-2015-005	Utility Bed for Veh #58	07-02-2014	2014	5	$21,498	$17,199	$4,30
21	1317-2015-008	Tire Changer, Lifter & Balancer	03-04-2015	2015	10	$18,885	$5,665	$13,21
23	1317-2017-001	Emergency Generator	10-15-2016	2016	10	$5,530	$1,106	$4,42
23	1317-2018-001	Leak Detection Equipment	04-01-2017	2017	5	$30,483	$6,097	$24,38
23	1317-2018-002	Sewer Inspection Camera	04-01-2017	2017	5	$11,195	$2,239	$8,95
22	1317-2018-003	Genie Electric Scisor Lift	06-07-2017	2017	10	$11,951	$1,195	$10,75
23	1317-2018-004	Emergency Generator/Trailer	03-23-2018	2018	10	$24,976	$0	$24,97
23	1317-2018-005	Tucker LW2 trailer	03-23-2018	2018	10	$24,192	$0	$24,19
22	1317-2018-006	Walk-Behind Snow Blower	03-23-2018	2018	10	$19,874	$0	$19,87
23	1317-2018-008	Sewer Camera with Lateral Capability	03-23-2018	2018	10	$94,696	$0	$94,69
22	1317-2018-009	Bobcat Snowblower	10-11-2017	2017	15	$8,229	$549	$7,68
23	1317-214-008	Primary Covers	08-01-2013	2013	1	$0	$0	$
22	1320-1988-75	John Deer 410C Veh #31	09-15-1988	1988	5	$135,078	$135,078	$
22	1320-1993-152	Forklift for Warehouse Veh #35	05-05-1993	1993	5	$14,188	$14,188	$
23	1320-1993-153	Forklift for Warehouse Veh #35	05-05-1993	1993	5	$14,188	$14,188	$
23	1320-1993-157	Vactor 2110C Veh #33	11-02-1993	1993	15	$369,738	$369,738	$
22	1320-1993-159	936F Caterpillar Loader Veh #30	11-17-1993	1993	15	$129,129	$129,129	$
23	1320-1993-161	936F Caterpillar Loader Veh #30	11-17-1993	1993	15	$129,129	$129,129	$
22	1320-1994-163	Used Snow Bucket (1 of 2)	01-22-1994	1994	15	$4,778	$4,778	$

23	1320-1994-164	Used Snow Bucket (2 of 2)	01-22-1994	1994	15	$4,778	$4,778	$
22	1320-1995-184	Snowcat Trailer Veh #36	01-11-1995	1995	15	$11,319	$11,319	$
22	1320-1995-190	Dodge Dump Truck 4X4 Veh #27	06-07-1995	1995	5	$32,937	$32,937	$
23	1320-1995-191	Dodge Dump Truck 4X4 Veh #27	06-07-1995	1995	5	$32,937	$32,937	$
22	1320-1995-192	Ford Ranger Veh #18 (Replaced; In Construction)	07-20-1995	1995	5	$37,927	$37,927	$
22	1320-1996-197	Snow Plow Blade (1 of 2)	01-10-1996	1996	15	$9,659	$9,659	$
23	1320-1996-198	Snow Plow Blade (2 of 2)	01-10-1996	1996	15	$9,659	$9,659	$
22	1320-1996-200	Ford Ranger Vehicle #19	03-10-1996	1996	5	$18,153	$18,153	$
23	1320-1996-201	Ford Ranger Veh #19	03-10-1996	1996	5	$18,153	$18,153	$
22	1320-1997-243	Ford F-250 Veh #20	07-18-1997	1997	5	$53,848	$53,848	$
23	1320-1997-244	Ford F-250 Veh #25	07-18-1997	1997	5	$53,848	$53,848	$
22	1320-1998-272	Ford F-350 Veh #7	12-10-1998	1998	5	$46,102	$46,102	$
23	1320-1999-285	Ford Ranger 4X4 Veh #22	07-08-1999	1999	5	$25,048	$25,048	$
21	1320-2000-315	Mule 2500 4X4 ATV Veh #40 (1 of 3)	04-26-2000	2000	5	$5,420	$5,420	$
22	1320-2000-316	Mule 2500 4X4 ATV Veh #40 (2 of 3)	04-26-2000	2000	5	$5,420	$5,420	$
23	1320-2000-317	Mule 2500 4X4 ATV Veh #40 (3 of 3)	04-26-2000	2000	5	$5,436	$5,436	$
21	1320-2000-318	Ford Ranger 4X4 Veh #39	05-08-2000	2000	5	$34,037	$34,037	$
23	1320-2000-320	Ford Ranger 4X4 Veh #3	05-08-2000	2000	5	$34,254	$34,254	$
22	1320-2001-351	2001 Cat MD430D IT Backhoe Loader Veh #41	08-15-2001	2001	20	$77,558	$65,924	$11,63
23	1320-2001-352	2001 Cat MD430D IT Backhoe Loader Veh #41	08-15-2001	2001	20	$77,558	$65,924	$11,63
22	1320-2003-411	2003 Ford Ranger XLT Veh #44	05-22-2003	2003	5	$31,257	$31,257	$
21	1320-2003-414	2003 Explorer Veh #11	06-30-2003	2003	5	$38,619	$38,619	$
22	1320-2004-433	Ford 2004 F350 4X4 Veh #12 w/Crane	04-01-2004	2004	5	$63,677	$63,677	$
22	1320-2004-453	Veh #48 Frontier Crew XE-V6 Long Bed	12-01-2004	2004	5	$17,118	$17,118	$
23	1320-2004-454	Veh #48 Frontier Crew XE-V6 Long Bed	12-01-2004	2004	5	$17,118	$17,118	$
22	1320-2005-469	Vactor 2005 Sterling L7501 Veh #51	08-22-2005	2005	15	$169,880	$147,229	$22,65
23	1320-2005-470	Vactor 2005 Sterling L7501 Veh #51	08-22-2005	2005	15	$169,880	$147,229	$22,65

22	1320-2006-517	Snowmobile Veh #28	04-07-2006	2006	7	$9,959	$9,959	$
22	1320-2006-518	Ford F-250 4X4 Veh #52	05-30-2006	2006	5	$23,416	$23,416	$
23	1320-2006-519	Ford F-250 4X4 Veh #52	05-30-2006	2006	5	$23,416	$23,416	$
22	1320-2006-522	Ford F-550 4X4 Flat Bed Veh #53	06-30-2006	2006	10	$34,984	$34,984	$
23	1320-2006-523	Ford F-550 4X4 Flat Bed Veh #53	06-30-2006	2006	5	$34,984	$34,984	$
23	1320-2007-545	Peterbult Dump Model 340 Veh #1	02-01-2007	2007	20	$132,260	$72,743	$59,51
22	1320-2007-619	New 938 Cat Loader - Veh #54	06-26-2007	2007	10	$249,428	$249,428	$
23	1320-2007-620	Veh #1 - Additional Fees - Taxes	07-18-2007	2007	5	$10,028	$10,028	$
23	1320-2008-638	TV Van Upgrade Veh #60	04-01-2008	2008	10	$27,433	$27,433	$
21	1320-2009-0011	Ford Van - Veh #9 (VanPool)	03-31-2009	2009	10	$39,093	$35,183	$3,90
22	1320-2009-023	Ford Ranger - Veh #2	05-06-2008	2008	10	$25,218	$25,218	$
22	1320-2010-0001	2006 Chevy 3500 ~ Veh #58 (1 of 2)	07-16-2009	2009	5	$14,637	$14,637	$
23	1320-2010-0002	2006 Chevy 3500 ~ Veh #58 (2 of 2)	07-16-2009	2009	5	$14,637	$14,637	$
23	1320-2010-0003	TV Van - Veh #60	03-31-2010	2010	8	$218,813	$218,813	$
22	1320-2011-001	2010 Ford Ranger Veh #63	10-08-2010	2010	10	$23,626	$18,901	$4,72
22	1320-2012-001	Snowmobile - Veh #67	05-01-2011	2011	10	$12,017	$8,412	$3,60
21	1320-2012-002	Ford Ranger XLT - Veh #69	06-01-2011	2011	10	$24,739	$17,317	$7,42
22	1320-2013-002	Veh #70 F350 w/ Utility Bed	11-28-2012	2012	5	$52,505	$52,505	$
21	1320-2013-003	Veh #65 F-150 4X4 w/ Work Shell	06-28-2012	2012	5	$30,617	$30,617	$
22	1320-2014-001	F-250 XL Veh #73	08-21-2013	2013	5	$31,709	$31,709	$
22	1320-2014-002	F-350 XL w/ Utility Bed Veh #74	10-08-2013	2013	5	$49,873	$49,873	$
21	1320-2014-003	Escape Veh #76	11-14-2013	2013	5	$31,274	$31,274	$
22	1320-2014-004	Vactor Veh #77	12-04-2013	2013	15	$375,272	$125,091	$250,18
22	1320-2014-005	Snow Plow Blade	03-18-2014	2014	25	$18,214	$2,914	$15,30
22	1320-2015-001	Veh #58 F150 XL	07-23-2014	2014	5	$27,690	$22,152	$5,53
22	1320-2015-002	Veh #79 F350 XL	07-23-2014	2014	5	$70,777	$56,621	$14,15
23	1320-2015-003	Cradle for TV Camera	04-23-2014	2014	10	$7,316	$2,927	$4,39
22	1320-2016-001	Skid Steer Bobcat	03-31-2016	2016	5	$60,633	$24,253	$36,38
21	1320-2016-002	2016 Ford Explorer Veh #84	03-31-2016	2016	5	$42,513	$17,005	$25,50
22	1320-2017-001	F150 Veh #85	06-23-2016	2016	5	$32,179	$12,872	$19,30
22	1320-2017-002	F150 Veh #86	06-23-2016	2016	5	$31,159	$12,464	$18,69
23	1320-2017-003	Dump Truck Veh #87	11-09-2016	2016	15	$161,402	$21,520	$139,88

22	1320-2018-001	2017 Honda CR-V	04-26-2017	2017	5	$30,776	$6,155	$24,62
22	1320-2018-002	Ford F-150 Veh #89	03-23-2018	2018	5	$33,013	$0	$33,01
22	1320-2018-003	Ford F-150 Veh #90 w/ Tool Box	03-23-2018	2018	5	$34,435	$0	$34,43
22	1320-2018-004	Veh #91 Tacoma Double Cab	03-31-2018	2018	5	$33,149	$0	$33,14
22	1320-2018-005	Veh #92 Tacoma Access Cab	03-31-2018	2018	5	$35,124	$0	$35,12
22	1325-2001-347	Master Meter	06-01-2001	2001	30	$12,708	$7,201	$5,50
22	1325-2007-552	Snowcreek 6 Meter	04-01-2007	2007	20	$4,843	$2,664	$2,17
22	1325-2007-553	Master Meter Mammoth View	04-01-2007	2007	20	$8,247	$4,536	$3,71
22	1325-2007-554	Master Meter Val D'sre	04-01-2007	2007	20	$10,099	$5,555	$4,54
22	1325-2007-555	Master Meter Mammoth View Villas	04-01-2007	2007	20	$11,314	$6,223	$5,09
22	1325-2007-556	Master Meter Wildflower	04-01-2007	2007	20	$15,803	$8,692	$7,11
22	1325-2007-557	Fire Service Meters	04-01-2007	2007	20	$18,432	$10,138	$8,29
22	1325-2007-558	Master Meter Mammoth Estates	04-01-2007	2007	20	$22,652	$12,459	$10,19
22	1325-2007-559	Master Meter North Village	04-01-2007	2007	20	$34,985	$19,242	$15,74
22	1325-2007-560	Master Meter Gateway	04-01-2007	2007	20	$35,065	$19,286	$15,77
22	1325-2007-561	Master Meter Snowcreek 4	04-01-2007	2007	20	$37,645	$20,705	$16,94
22	1325-2007-562	Master Meter Do-It Center	04-01-2007	2007	20	$40,288	$22,159	$18,13
22	1325-2007-563	Master Meter Hidden Valley Condos	04-01-2007	2007	20	$73,603	$40,481	$33,12
22	1325-2013-001	Water Meter Radio Read Replacement	11-30-2012	2012	20	$720,927	$216,278	$504,64
22	1325-2013-002	Water Model Master Meter Zone	03-31-2012	2012	10	$37,155	$22,293	$14,86
22	1325-2014-001	Meter Radio Read Unit Replacement	03-31-2014	2014	20	$135,304	$27,061	$108,24
22	1325-2014-002	MCC Replacement at Juniper Ridge	10-31-2013	2013	20	$110,318	$27,580	$82,73
22	1325-2016-001	AMI - Advanced Metering Infrastructure	03-31-2016	2016	20	$1,802,711	$180,271	$1,622,44
22	1325-2016-003	Master Meter / Metering Equipment	03-31-2016	2016	20	$22,486	$2,249	$20,23
22	1325-2016-004	MES Meter Relocation	03-31-2016	2016	20	$42,068	$4,207	$37,86
22	1325-2018-001	Woodlands Meter Upgrade	03-31-2018	2018	20	$19,755	$0	$19,75
22	1340-1993-142	Davison PR Station	03-31-1993	1993	30	$208,965	$174,137	$34,82
22	1340-1995-193	Parts for Hidden Valley Vault	07-31-1995	1995	10	$18,143	$18,143	$
22	1340-1995-194	Hidden Valley PR Vault	07-31-1995	1995	10	$40,723	$40,723	$
22	1340-1998-254	Forest Trail Tank	03-31-1998	1998	50	$1,150,253	$460,101	$690,15

32	1340-1999-280	Assessment District	04-01-1999	1999	30	$12,385,971	$7,844,448	$4,541,52
22	1340-2001-331	Juniper Ridge Tank Rehab - CIP	03-31-2001	2001	10	$202,590	$202,590	$
22	1340-2003-398	Lake Mary T-1 Tank Rehab	03-31-2003	2003	10	$139,203	$139,203	$
22	1340-2003-399	Tank Rehab - Clearwell	03-31-2003	2003	10	$276,795	$276,795	$
22	1340-2005-456	Install Snow Retention Rails on WTP #1 Roof	02-24-2005	2005	5	$18,883	$18,883	$
22	1340-2007-564	Well #1 Building Improvements	04-01-2007	2007	10	$25,136	$25,136	$
22	1340-2007-565	Update - H2O Distribution Model	04-01-2007	2007	10	$84,649	$84,649	$
32	1340-2007-605	Water Connection Fee Study	04-01-2007	2007	5	$97,586	$97,586	$
32	1340-2007-606	GWTP #2 Reclaim Backwash	04-01-2007	2007	10	$28,416	$28,416	$
32	1340-2008-640	Water Connection Fee Study Labor/Benefits	04-01-2008	2008	5	$8,130	$8,130	$
32	1340-2010-0001	Ski Trails PR Station	12-31-2009	2009	30	$28,453	$8,536	$19,91
22	1340-2011-001	Arsenic Removal Studies	05-20-2010	2010	30	$94,264	$25,137	$69,12
32	1340-2011-997	Recycled H2O (1410 Cleanup)	04-01-2010	2010	10	$313,318	$250,655	$62,66
22	1340-2011-998	LMTP (1410 Cleanup)	04-01-2010	2010	10	$2,340,473	$1,872,378	$468,09
32	1340-2011-999	General Well Development (1410 Cleanup)	04-01-2010	2010	10	$1,253,273	$1,002,618	$250,65
22	1340-2013-002	GWTP #1 Improvements	03-31-2013	2013	20	$2,925,179	$731,295	$2,193,88
22	1340-2013-003	Well Maintenance	12-27-2012	2012	10	$477,351	$286,410	$190,94
22	1340-2014-001	Meridian Well 25	02-01-2014	2014	50	$214,494	$17,160	$197,33
22	1340-2014-002	Well 25 Development	04-01-2013	2013	35	$909,576	$129,939	$779,63
22	1340-2014-003	Update H2O Distribution Model	08-30-2013	2013	5	$34,440	$34,440	$
22	1340-2014-004	Well Maintenance	09-01-2013	2013	10	$577,093	$288,546	$288,54
22	1340-2014-005	GWTP#2 Treatment Improvement	03-31-2014	2014	20	$2,896,019	$579,204	$2,316,81
22	1340-2014-006	Well #11 Development	04-01-2013	2013	35	$117,815	$16,831	$100,98
22	1340-2014-007	GWTP#1 Treatment Improvement	03-05-2014	2014	20	$27,223	$5,445	$21,77
22	1340-2014-008	GWTP #1 Valve	04-18-2013	2013	5	$17,707	$17,707	$
22	1340-2016-001	Water & Wastewater Rate Study	03-31-2016	2016	5	$119,524	$47,810	$71,71
22	1340-2016-002	Well #1 Improvements	03-31-2016	2016	10	$815,200	$163,040	$652,16
22	1340-2016-003	2015-2016 Well Maintenance	03-31-2016	2016	5	$584,017	$233,607	$350,41
22	1340-2017-001	Pressure Reducing Valve Ranch Rd	02-23-2017	2017	50	$104,312	$2,086	$102,22
22	1340-2017-002	Knolls Tank Mixer T-5	02-23-2017	2017	7	$37,612	$5,373	$32,23

22	1340-2017-003	Knolls Tank Rehab	03-31-2017	2017	10	$51,661	$5,166	$46,49
22	1340-2017-004	Well Improvement 2017	03-31-2017	2017	10	$61,344	$6,134	$55,20
22	1340-2017-005	Tank 3 Rehab/Improvement	03-31-2017	2017	10	$471,908	$47,191	$424,71
22	1345-1969-04	Balance B/Fwd	06-30-1969	1969	40	$383,650	$383,650	$
22	1345-1998-255	Lake Mary Plant	03-31-1998	1998	30	$1,364,561	$909,707	$454,85
22	1345-2000-324	From Lake Mary Treatment	08-31-2000	2000	5	$65,867	$65,867	$
22	1345-2007-566	Lake Mary WTP Equipment & Instrument	04-01-2007	2007	15	$120,711	$88,522	$32,19
22	1345-2007-567	Lake Mary WTP Engineering	04-01-2007	2007	20	$523,083	$287,695	$235,38
22	1345-2007-568	Lake Mary WTP Building	04-01-2007	2007	40	$1,368,062	$376,217	$991,84
22	1345-2007-569	Lake Mary WTP Filtration System	04-01-2007	2007	15	$2,011,856	$1,475,361	$536,49
22	1345-2007-570	Lake Mary Equip Replacement	04-01-2007	2007	20	$152,222	$83,722	$68,50
22	1345-2009-0230	LMTP Polymer Feed Flowmeter	03-31-2009	2009	10	$6,671	$6,004	$66
22	1345-2009-0231	Lake Mary Flow Measure Flume	03-31-2009	2009	15	$154,338	$92,603	$61,73
22	1345-2010-0001	LMTP Filter Media	12-31-2009	2009	15	$72,656	$43,593	$29,06
22	1345-2013-001	LMTP Corrosion Control	03-31-2013	2013	20	$1,509,379	$377,345	$1,132,03
22	1345-2014-001	LMTP Corrosion Control Purchase	05-22-2013	2013	20	$6,189	$1,547	$4,64
22	1345-2018-001	Lake Mary Rd Valves	03-31-2018	2018	50	$45,690	$0	$45,69
22	1345-2018-002	LMWTP Filter Platform	03-31-2018	2018	15	$8,316	$0	$8,31
32	1346-1989-81	Ground Water Treatment Plant #1	03-31-1989	1989	30	$6,170,050	$5,964,382	$205,66
32	1346-1989-88	Design & Engineering GWTP #1	10-09-1989	1989	5	$35,843	$35,843	$
22	1346-2001-359	Pavement Overlay @ GWTP#1	11-19-2001	2001	5	$47,645	$47,645	$
22	1346-2003-426	Well #10 Replacement Column Pipe	11-19-2003	2003	10	$18,891	$18,891	$
22	1346-2007-571	Arsenic Removal	04-01-2007	2007	50	$1,135,399	$249,788	$885,61
22	1346-2007-572	Monitoring Wells	04-01-2007	2007	20	$441,402	$242,771	$198,63
22	1346-2008-632	Zone 4 Booster Pump #512 - Rebuild	04-01-2008	2008	10	$11,341	$11,341	$
22	1346-2008-633	Well #1 Chlorine Feed Pump & Static Mixer	04-01-2008	2008	10	$13,154	$13,154	$
22	1346-2009-0013	Well #10 Motor Replacement / Rehab	03-31-2009	2009	10	$45,110	$40,599	$4,51
22	1346-2009-0220	FCP Filter Control Panel GWTP #2	03-31-2009	2009	10	$54,815	$49,334	$5,48
22	1346-2009-0221	Well #6 Repairs	03-31-2009	2009	8	$55,294	$55,294	$

22	1346-2009-0227	Monitor Wells #26 and #27 Final Payment	03-31-2009	2009	20	$13,524	$6,086	$7,43
22	1346-2009-0228	Monitor Well #31	03-31-2009	2009	20	$54,400	$24,480	$29,92
22	1350-1968-02	Balance B/Fwd	06-30-1968	1968	40	$16,834,156	$16,834,156	$
22	1350-1986-16	Master Water Plan	06-30-1986	1986	5	$50,256	$50,256	$
22	1350-1987-43	Master Water Plan	04-01-1987	1987	5	$31,724	$31,724	$
32	1350-1987-47	Install Horizontal Well	07-31-1987	1987	5	$14,151	$14,151	$
22	1350-1987-51	Parshall Flumes	08-18-1987	1987	30	$27,828	$27,828	$
32	1350-1987-56	Well #6	10-13-1987	1987	30	$134,117	$134,117	$
22	1350-1987-58	Lake Mary Penhall Flumes Concrete	10-25-1987	1987	30	$20,057	$20,057	$
32	1350-1987-61	Well #6	11-12-1987	1987	30	$99,265	$99,265	$
32	1350-1987-63	Well #10	11-16-1987	1987	30	$204,454	$204,454	$
32	1350-1987-67	Well #11	11-30-1987	1987	5	$60,507	$60,507	$
32	1350-1989-82	Well No.10	03-31-1989	1989	30	$927,067	$896,164	$30,90
32	1350-1989-84	Well No.6	03-31-1989	1989	30	$695,939	$672,741	$23,19
22	1350-2001-333	Stream Flow Study	03-31-2001	2001	5	$746,574	$746,574	$
32	1350-2001-338	Stream Flow Study - CIP	03-31-2001	2001	5	$355,604	$355,604	$
32	1350-2006-515	Dry Creek	04-01-2006	2006	20	$149,341	$89,605	$59,73
22	1350-2006-533	Well #16 Rehab	10-20-2006	2006	10	$163,986	$163,986	$
22	1350-2007-573	Lake Mary Tank Rehab	04-01-2007	2007	20	$40,944	$22,519	$18,42
22	1350-2007-578	Initial Study H2O Rights	04-01-2007	2007	5	$112,864	$112,864	$
22	1350-2007-579	Mammoth Creek EIR	04-01-2007	2007	5	$980,221	$980,221	$
32	1350-2007-607	Dry Creek	04-01-2007	2007	50	$259,839	$57,165	$202,67
22	1350-2009-0110	2007 Fish Survey	03-31-2009	2009	5	$27,073	$27,073	$
22	1350-2009-0115	2008 Fish Survey	03-31-2009	2009	5	$28,467	$28,467	$
32	1350-2009-0210	Wildermuth Groundwater Modeling	03-31-2009	2009	10	$211,790	$190,611	$21,17
32	1350-2014-001	Zone 2B Storage	04-01-2013	2013	50	$120,614	$12,061	$108,55
22	1355-1968-03	Balance B/Fwd	06-30-1968	1968	50	$45,242,818	$45,242,818	$
22	1355-1986-14	Replace Water Main	04-11-1986	1986	30	$30,722	$30,722	$
22	1355-1986-17	Engineering Services	07-01-1986	1986	30	$21,485	$21,485	$
22	1355-1986-18	Pay Request #1	07-25-1986	1986	30	$251,851	$251,851	$
22	1355-1986-22	Pay Request #2	08-20-1986	1986	30	$532,801	$532,801	$

22	1355-1986-23	Evaluation	09-01-1986	1986	5	$23,259	$23,259	$
22	1355-1986-25	Pay Request #3	09-23-1986	1986	30	$469,447	$469,447	$
22	1355-1986-26	Pay Request #1	09-23-1986	1986	30	$444,473	$444,473	$
22	1355-1986-27	Paving of Silver Tip	09-26-1986	1986	30	$27,935	$27,935	$
22	1355-1986-29	Replace Water Line	10-01-1986	1986	30	$228,375	$228,375	$
22	1355-1986-31	Pay Request #2	10-16-1986	1986	30	$557,350	$557,350	$
22	1355-1986-34	Engineering Services	11-25-1986	1986	30	$30,018	$30,018	$
22	1355-1986-35	Pay Request	11-26-1986	1986	30	$190,436	$190,436	$
22	1355-1986-36	Compaction Testing	11-30-1986	1986	30	$22,634	$22,634	$
22	1355-1986-37	Coating Tank 7&8	12-01-1986	1986	30	$18,563	$18,563	$
22	1355-1986-38	Inspection Services	12-01-1986	1986	30	$49,016	$49,016	$
22	1355-1987-41	Pay Request	01-05-1987	1987	30	$85,554	$85,554	$
22	1355-1987-42	Pay Request	03-18-1987	1987	30	$578,875	$578,875	$
22	1355-1987-45	Knolls Progress Payment	06-12-1987	1987	30	$171,366	$171,366	$
22	1355-1987-48	Inspection Services	08-10-1987	1987	30	$18,704	$18,704	$
22	1355-1987-52	Sugar Pine	09-18-1987	1987	30	$131,092	$131,092	$
22	1355-1987-54	Paving & Permit	10-09-1987	1987	30	$14,526	$14,526	$
22	1355-1987-64	Line Installation	11-17-1987	1987	30	$51,982	$51,982	$
22	1355-1987-68	Materials Meadow Lane	12-10-1987	1987	30	$36,085	$36,085	$
22	1355-1987-69	Progress Payment #5	12-16-1987	1987	30	$24,190	$24,190	$
22	1355-1988-70	Release Retention	01-07-1988	1988	30	$132,309	$132,309	$
22	1355-1988-71	Pay Request	04-30-1988	1988	30	$105,796	$105,796	$
22	1355-1989-77	Mill Street Water Line	03-31-1989	1989	30	$392,176	$379,103	$13,07
22	1355-1989-78	Minaret Water Main	03-31-1989	1989	30	$578,798	$559,505	$19,29
22	1355-1989-79	Sierra Manors Water Line	03-31-1989	1989	30	$291,754	$282,029	$9,72
22	1355-1990-89	Mill St Water Line	03-31-1990	1990	30	$305,509	$285,142	$20,36
22	1355-1990-90	Old Mammoth Water Line	03-31-1990	1990	30	$1,023,519	$955,284	$68,23
22	1355-1990-91	Metering PR Stations	03-31-1990	1990	5	$13,344	$13,344	$
22	1355-1991-106	Laurel Mt Water Line Repl	03-31-1991	1991	30	$440,424	$396,381	$44,04
22	1355-1991-107	Mammtoh Tavern Rd - W Line	03-31-1991	1991	30	$155,028	$139,525	$15,50
22	1355-1991-108	Mill St Water Line	03-31-1991	1991	30	$29,650	$26,685	$2,96

22	1355-1991-109	Timberidge Tank Rnvtn	03-31-1991	1991	15	$150,230	$150,230	$
32	1355-1991-110	Trails II Water Lines	03-31-1991	1991	30	$215,460	$193,914	$21,54
32	1355-1991-111	Trails I Water Lines	03-31-1991	1991	30	$316,777	$285,099	$31,67
32	1355-1991-112	Snowcreek Crest Water Lines	03-31-1991	1991	30	$344,078	$309,670	$34,40
32	1355-1991-113	Juniper Ridge Water Lines	03-31-1991	1991	30	$484,710	$436,239	$48,47
32	1355-1991-114	Mill City Tract	03-31-1991	1991	30	$133,088	$119,779	$13,30
22	1355-1992-130	Lupin St Line Replace	03-31-1992	1992	30	$409,562	$354,953	$54,60
32	1355-1992-131	Manzanita St W Line Replace	03-31-1992	1992	30	$301,953	$261,693	$40,26
22	1355-1992-134	Chateau Rd Water Line	04-01-1992	1992	30	$32,989	$28,591	$4,39
22	1355-1993-145	Mono St Water Line	03-31-1993	1993	30	$291,499	$242,915	$48,58
22	1355-1993-146	Joaquin St Water Line	03-31-1993	1993	30	$314,323	$261,936	$52,38
22	1355-1993-147	Owen St Water Line	03-31-1993	1993	30	$49,680	$41,400	$8,28
22	1355-1993-148	Timberidge Tank	03-31-1993	1993	15	$43,200	$43,200	$
22	1355-1993-149	St Moritz Water Line	03-31-1993	1993	30	$55,331	$46,109	$9,22
32	1355-1993-154	Fairway Ranch Water Lines	06-30-1993	1993	30	$137,474	$114,562	$22,91
22	1355-1994-167	Tavern Line Replacement	03-31-1994	1994	30	$109,320	$87,456	$21,86
22	1355-1994-168	Sierra Nevada Water Line	03-31-1994	1994	5	$106,863	$106,863	$
32	1355-1994-180	Business Park Water Lines	11-30-1994	1994	30	$138,823	$111,058	$27,76
22	1355-1995-186	Red Fir Replacement	03-31-1995	1995	30	$326,941	$250,655	$76,28
22	1355-1996-205	Ski Trails Water Line	03-31-1996	1996	30	$192,562	$141,212	$51,35
22	1355-1996-206	Majestic Pines Water Line	03-31-1996	1996	30	$898,784	$659,109	$239,67
22	1355-1996-207	Azimuth Dr Water Replace	03-31-1996	1996	30	$88,888	$65,184	$23,70
22	1355-1996-217	H20 Line - USFS	08-01-1996	1996	30	$21,845	$16,020	$5,82
22	1355-1997-226	Sierra Valley Sites - Water Laterals	03-31-1997	1997	30	$21,594	$15,115	$6,47
22	1355-1997-227	Majestic Pines Water Line	03-31-1997	1997	30	$67,948	$47,564	$20,38
22	1355-1997-228	Meridian/Elem PR Station	03-31-1997	1997	30	$101,597	$71,118	$30,47
22	1355-1997-229	Valley Vista	03-31-1997	1997	30	$60,904	$42,633	$18,27
32	1355-1997-231	Mammoth College	03-31-1997	1997	30	$13,517	$9,462	$4,05
22	1355-1997-239	Water Lateral - Old Mammoth	07-01-1997	1997	30	$2,308	$1,615	$69
32	1355-1997-240	Water Lateral - Snowridge Lane	07-05-1997	1997	30	$1,280	$896	$38
32	1355-1997-241	Water Lateral - Forest Lane	07-05-1997	1997	30	$2,115	$1,481	$63
22	1355-1998-257	Monterey Pines	03-31-1998	1998	30	$936,454	$624,303	$312,15

22	1355-1999-292	Install Wtr Davidson	11-05-1999	1999	5	$10,140	$10,140	$
22	1355-2000-295	Old Mammoth Hydrant Line	01-18-2000	2000	20	$15,047	$13,542	$1,50
22	1355-2000-308	Hwy 203 - Phase I	03-31-2000	2000	50	$354,395	$127,582	$226,81
22	1355-2000-309	Hwy 203 - Phase II	03-31-2000	2000	50	$521,941	$187,899	$334,04
22	1355-2000-310	Hwy 203 - Phase III	03-31-2000	2000	50	$747,850	$269,226	$478,62
22	1355-2000-312	Majestic Pines Water Replacement	03-31-2000	2000	50	$3,880	$1,397	$2,48
22	1355-2000-313	Grindelwald Water Replace	03-31-2000	2000	50	$331,442	$119,319	$212,12
22	1355-2000-321	Install Lateral - Grindelwald	07-03-2000	2000	10	$5,647	$5,647	$
22	1355-2001-355	Labor	09-28-2001	2001	5	$6,645	$6,645	$
22	1355-2001-358	Install Lateral @ Hillside	11-07-2001	2001	10	$9,304	$9,304	$
22	1355-2002-365	Water Lateral, Azimuth, Sunshine Village	01-30-2002	2002	10	$43,316	$43,316	$
32	1355-2002-366	Contributed Cap, H2O Lines	03-31-2002	2002	30	$1,950,413	$1,040,220	$910,19
22	1355-2002-377	Control Valve Parts	07-16-2002	2002	10	$19,984	$19,984	$
22	1355-2002-382	Install Water Lateral - Forest Trail	09-30-2002	2002	5	$3,988	$3,988	$
22	1355-2002-386	Install Water Lateral, Lot 43 Rainbow	10-30-2002	2002	5	$5,794	$5,794	$
22	1355-2003-402	Radio Read Upgrade	03-31-2003	2003	10	$885,291	$885,291	$
22	1355-2003-403	Meter Replacement	03-31-2003	2003	10	$811,506	$811,506	$
22	1355-2003-404	Chateau Water Line	03-31-2003	2003	50	$249,929	$74,979	$174,95
22	1355-2003-405	North St. Water Line	03-31-2003	2003	50	$113,156	$33,947	$79,20
22	1355-2003-406	Azimuth Water Line	03-31-2003	2003	50	$217,169	$65,151	$152,01
22	1355-2003-407	Old Mammoth Water Line	03-31-2003	2003	50	$1,512,586	$453,776	$1,058,81
22	1355-2003-423	Install Water Laterals	10-22-2003	2003	10	$13,987	$13,987	$
32	1355-2004-431	Well Pumps #16, 17, 18, 20, 21	01-31-2004	2004	30	$120,218	$56,102	$64,11
22	1355-2004-446	Lateral Install @ Alpine Cir	07-28-2004	2004	20	$2,574	$1,802	$77
22	1355-2005-465	Parts for Line Repl- Sestriere Pl	07-27-2005	2005	20	$8,600	$5,590	$3,01
22	1355-2005-478	Final Paving for WL Projects	10-28-2005	2005	20	$11,654	$7,575	$4,07
22	1355-2006-491	Chateau West	04-01-2006	2006	50	$353,094	$84,742	$268,35
22	1355-2006-492	Horsehoe Dr	04-01-2006	2006	50	$183,681	$44,083	$139,59
22	1355-2006-493	Lakeview/Horsehoe/Canyon	04-01-2006	2006	50	$329,115	$78,988	$250,12
22	1355-2006-494	Sierra Nevada/Chap/Old Mam	04-01-2006	2006	50	$591,302	$141,912	$449,38
22	1355-2006-495	Sierra Nevada	04-01-2006	2006	50	$10,965	$2,632	$8,33

22	1355-2006-496	Larkspur Lane	04-01-2006	2006	50	$100,257	$24,062	$76,19
22	1355-2006-497	Valley Vista	04-01-2006	2006	50	$706,255	$169,501	$536,75
22	1355-2006-498	Connel	04-01-2006	2006	50	$130,341	$31,282	$99,05
22	1355-2006-499	Hidden Valley	04-01-2006	2006	50	$306,692	$73,606	$233,08
22	1355-2006-500	Old Mammoth/Red Fir/Woodman	04-01-2006	2006	50	$956,566	$229,576	$726,99
22	1355-2006-501	Sherwin	04-01-2006	2006	50	$411,880	$98,851	$313,02
22	1355-2006-502	Crystal	04-01-2006	2006	50	$240,687	$57,765	$182,92
22	1355-2006-503	Meridian	04-01-2006	2006	50	$1,504,945	$361,187	$1,143,75
22	1355-2006-504	Hwy 203 / Main	04-01-2006	2006	50	$584,529	$140,287	$444,24
22	1355-2006-505	T-4 Parking	04-01-2006	2006	50	$777,518	$186,604	$590,91
22	1355-2006-506	Minaret Water	04-01-2006	2006	50	$492,375	$118,170	$374,20
22	1355-2006-507	Meadow Lane	04-01-2006	2006	50	$206,438	$49,545	$156,89
22	1355-2006-508	Pinehurst	04-01-2006	2006	50	$151,015	$36,244	$114,77
22	1355-2006-509	Panorama Ridge	04-01-2006	2006	50	$56,382	$13,532	$42,85
22	1355-2007-580	Convict H2O Line	04-01-2007	2007	50	$252,884	$55,635	$197,25
22	1355-2007-581	Canyon Blvd (FT to TL) H2O Line	04-01-2007	2007	50	$335,707	$73,856	$261,85
22	1355-2007-582	Lee Road H2O Line	04-01-2007	2007	50	$27,130	$5,969	$21,16
22	1355-2007-583	Tavern / Sierra Park H2O Line	04-01-2007	2007	50	$123,653	$27,204	$96,45
22	1355-2007-584	Holiday Way H2O Line	04-01-2007	2007	50	$82,005	$18,041	$63,96
22	1355-2007-585	Twin Lakes H2O Line	04-01-2007	2007	50	$202,304	$44,507	$157,79
22	1355-2007-586	Tavern Rd H20 Line	04-01-2007	2007	50	$34,371	$7,562	$26,80
22	1355-2007-587	Hillside Ct H2O Line	04-01-2007	2007	50	$810	$178	$63
22	1355-2007-588	Hillside Pl H2O Line	04-01-2007	2007	50	$39,000	$8,580	$30,42
22	1355-2007-589	Waterford & Hill H2O Line	04-01-2007	2007	50	$4,530	$997	$3,53
22	1355-2007-590	Crawford St H2O Line	04-01-2007	2007	50	$683,845	$150,446	$533,39
22	1355-2007-591	Rainbow Lane Replacement H2O Line	04-01-2007	2007	50	$36,843	$8,105	$28,73
22	1355-2007-592	Mammoth Knolls Dr H2O Line	04-01-2007	2007	50	$930,320	$204,671	$725,65
22	1355-2007-593	T-4 Line to Parking Lot	04-01-2007	2007	50	$340,947	$75,008	$265,93
22	1355-2007-594	Sierra Park Rd H2O Line	04-01-2007	2007	50	$200,430	$44,095	$156,33
22	1355-2007-595	St Anton / Knolls Area H2O Line	04-01-2007	2007	50	$596,969	$131,333	$465,63
22	1355-2007-596	John Muir H2O Line	04-01-2007	2007	50	$697,179	$153,379	$543,80
22	1355-2007-597	Skate Park H2O Line	04-01-2007	2007	50	$32,224	$7,089	$25,13

22	1355-2007-598	Process Aerial Photos	04-01-2007	2007	5	$32,577	$32,577	$
32	1355-2007-608	Minaret Rd (Z3A & Z3B Expansion)	04-01-2007	2007	50	$6,184	$1,360	$4,82
22	1355-2007-609	Process Aerial Photos	04-01-2007	2007	5	$32,577	$32,577	$
32	1355-2008-623	Contributed Capital	03-31-2008	2008	30	$393,586	$131,195	$262,39
22	1355-2008-634	Labor / Benefits 2006 WL Replacement	04-01-2008	2008	50	$25,121	$5,024	$20,09
22	1355-2009-0210	Snowcreek Pond Fill Valve	03-31-2009	2009	10	$21,568	$19,411	$2,15
22	1355-2009-0223	Knolls PS Telemetry	03-31-2009	2009	10	$35,188	$31,670	$3,51
22	1355-2009-0225	Timber Ridge Telemetery	03-31-2009	2009	10	$33,469	$30,122	$3,34
22	1355-2009-0245	Raise Water Valves on Highway 203	03-31-2009	2009	5	$47,683	$47,683	$
22	1355-2009-0250	2007 WL Replacement	03-31-2009	2009	50	$2,197,924	$395,626	$1,802,29
22	1355-2010-0001	2008 WL Replacement	04-01-2009	2009	50	$30,212	$5,438	$24,77
22	1355-2011-001	2007 WL Replacement	04-01-2010	2010	50	$4,022	$644	$3,37
22	1355-2011-002	2009 WL Replacement	04-01-2010	2010	50	$1,706,414	$273,026	$1,433,38
22	1355-2011-003	Master Meter Repl. ~ Snowcreek	12-23-2010	2010	30	$110,984	$29,596	$81,38
22	1355-2011-999	2008 WL Rep. (1410 Cleanup)	04-01-2010	2010	50	$2,051,647	$328,264	$1,723,38
22	1355-2012-001	2010 WL Replacement	04-01-2011	2011	50	$1,286,271	$180,078	$1,106,19
22	1355-2012-002	2011 WL Replacement	02-01-2012	2012	50	$337,051	$40,446	$296,60
22	1355-2012-003	Water Loss Reduction Project	05-01-2011	2011	50	$281,315	$39,384	$241,93
22	1355-2013-001	2012-2013 Water Line Replacement	10-31-2012	2012	50	$425,392	$51,047	$374,34
22	1355-2014-002	2013-2014 Water Line Replacement	11-30-2013	2013	50	$499,601	$49,960	$449,64
22	1355-2015-001	2012-2013 Water Line Replacement	02-25-2015	2015	50	$3,074	$184	$2,89
22	1355-2015-002	2013-2014 Water Line Replacement	03-11-2015	2015	50	$3,730	$224	$3,50
22	1355-2015-003	2014-2015 Water Line Replacement - Bigwood	03-31-2015	2015	50	$171,775	$10,306	$161,46
22	1355-2015-004	2014-2015 Water Line Replacement	03-31-2015	2015	50	$952,433	$57,146	$895,28
22	1355-2016-001	2015-2016 Water Line Replacement	03-31-2016	2016	50	$1,325,635	$53,025	$1,272,61
22	1355-2016-002	Facility Relocation/Hydrant/Lateral Replacement	03-31-2016	2016	30	$195,752	$13,050	$182,70
22	1355-2016-003	Snowcreek Recycled Water Line	03-31-2016	2016	50	$127,432	$5,097	$122,33
22	1355-2017-001	2016/17 Water Line Replacement Program	03-31-2017	2017	50	$570,581	$11,412	$559,16

22	1355-2017-002	Canyon Lodge Water Line Replacement	03-31-2017	2017	50	$108,089	$2,162	$105,92
22	1355-2018-001	Water Line Replacement FY18	03-31-2018	2018	50	$528,522	$0	$528,52
22	1355-2018-003	Timber Ridge Pump Station	03-31-2018	2018	10	$27,580	$0	$27,58
22	1355-2018-004	Timber Ridge Steel Line Replace	03-31-2018	2018	50	$173,961	$0	$173,96
22	1357-1995-195	Fire Hydrants	07-31-1995	1995	20	$19,586	$19,586	$
22	1357-2001-334	GIS Pilot Fire Hydrant Program	03-31-2001	2001	15	$38,579	$38,579	$
22	1357-2005-482	Hydrants (3)	12-29-2005	2005	20	$10,999	$7,150	$3,85
23	1360-1990-98	Transfer from 1365	07-11-1990	1990	30	$19,337	$18,048	$1,28
23	1360-1992-137	Diffusers / Washers / Gaskets	05-29-1992	1992	5	$24,051	$24,051	$
33	1360-1994-171	WWTP Design	03-31-1994	1994	30	$1,829,772	$1,463,818	$365,95
33	1360-1994-172	Construction Management	03-31-1994	1994	30	$1,810,124	$1,448,099	$362,02
33	1360-1994-173	Construction	03-31-1994	1994	30	$15,535,791	$12,428,633	$3,107,15
33	1360-1994-174	Finance Costs	03-31-1994	1994	30	$1,205,096	$964,077	$241,01
23	1360-1995-187	Wet Wells Rehabilitation	03-31-1995	1995	15	$17,229	$17,229	$
23	1360-1996-222	Truck Cover at WWTP	10-21-1996	1996	10	$37,117	$37,117	$
23	1360-1997-230	Aeration Basin	03-31-1997	1997	15	$199,695	$199,695	$
33	1360-1997-232	Aeration Basin	03-31-1997	1997	15	$723,506	$723,506	$
23	1360-1997-236	Sanitare Aerobic Diffusion Replace	06-16-1997	1997	15	$103,916	$103,916	$
23	1360-1999-279	Chlorine Induct Pump	04-01-1999	1999	10	$26,039	$26,039	$
23	1360-2000-314	Overlay WWTP	03-31-2000	2000	5	$114,902	$114,902	$
23	1360-2006-512	East & West Twin Telemetry	04-01-2006	2006	10	$57,109	$57,109	$
23	1360-2006-513	Tamarack & E. Mary Telemetry	04-01-2006	2006	10	$26,686	$26,686	$
23	1360-2006-514	Sherwin & Shady Telemetry	04-01-2006	2006	10	$42,430	$42,430	$
23	1360-2007-601	Rainbow & Falls Tract - Tele Repl	04-01-2007	2007	10	$28,552	$28,552	$
33	1360-2007-610	Wastewater Connection Fee Study	04-01-2007	2007	5	$85,182	$85,182	$
33	1360-2007-611	WWTP Expansion Buildings	04-01-2007	2007	40	$2,892,634	$795,474	$2,097,16
33	1360-2007-612	WWTP Expansion Concrete Tanks	04-01-2007	2007	50	$4,150,301	$913,066	$3,237,23
33	1360-2007-613	WWTP Expansion Pumps & Motors	04-01-2007	2007	15	$1,257,667	$922,289	$335,37
33	1360-2007-614	WWTP Expansion Engineering	04-01-2007	2007	20	$1,886,500	$1,037,575	$848,92
33	1360-2007-615	WWTP Expansion Equip & Instruments	04-01-2007	2007	15	$2,389,567	$1,752,349	$637,21

33	1360-2008-641	WWTP Expansion - Phase 2	04-01-2008	2008	20	$15,050	$7,525	$7,52
33	1360-2011-999	General Waste Water Exp. (1410 Cleanup)	04-01-2010	2010	30	$44,155	$11,775	$32,38
32	1360-2012-001	Recycled Water Facility	01-01-2012	2012	40	$10,035,673	$1,505,351	$8,530,32
23	1360-2012-003	WWTP Solar System	11-01-2011	2011	20	$6,670,464	$2,334,662	$4,335,80
23	1360-2013-001	WWTP MCC Blower	11-30-2012	2012	50	$130,302	$15,636	$114,66
23	1360-2013-005	New Paving @ WWTP	05-30-2012	2012	20	$142,018	$42,606	$99,41
23	1360-2014-001	WWTP MCC/Blower VFD Retro Fit	04-01-2013	2013	50	$2,597	$260	$2,33
23	1360-2014-002	Truck Fill Pump	03-31-2014	2014	5	$12,365	$9,892	$2,47
23	1360-2015-001	Truck Fill Station	07-24-2014	2014	15	$21,658	$5,775	$15,88
23	1360-2015-002	WWTP MCC/Blower VFD Retrofit	10-08-2014	2014	50	$106,826	$8,546	$98,28
23	1360-2016-001	WWTP Air Compressors	03-31-2016	2016	10	$7,582	$1,516	$6,06
23	1360-2017-001	Press MCC Room Filtration	02-23-2017	2017	5	$17,366	$3,473	$13,89
23	1360-2017-002	Sewer Holding Tank	03-31-2017	2017	15	$221,567	$14,771	$206,79
23	1360-2017-003	WWTP Asset Replacement	03-31-2017	2017	5	$14,830	$2,966	$11,86
23	1360-2017-004	Bredel Sludge Pump	06-16-2016	2016	5	$16,798	$6,719	$10,07
23	1360-2018-001	WWTP Aeration Control	03-31-2018	2018	15	$38,076	$0	$38,07
23	1360-2018-003	WWTP Primary Clarifiers	03-31-2018	2018	10	$37,942	$0	$37,94
23	1360-2018-004	Trash Removal System	03-31-2018	2018	15	$359,829	$0	$359,82
23	1360-2018-005	Aeration Basin Baffles	03-31-2018	2018	15	$30,343	$0	$30,34
23	1360-2018-006	Digester Choper Pump Rebuild	03-31-2018	2018	15	$65,090	$0	$65,09
23	1360-2018-007	Aeration Train Piping Repair	03-31-2018	2018	20	$75,690	$0	$75,69
23	1360-2018-008	Vactor Receiving Station	03-31-2018	2018	50	$20,963	$0	$20,96
23	1365-1967-01	Balance B/Fwd	06-30-1967	1967	60	$47,015,380	$39,963,073	$7,052,30
23	1365-1986-39	Lakes Basin Pump Stations	12-01-1986	1986	30	$120,137	$120,137	$
23	1365-1989-80	Bus Dump Station	03-31-1989	1989	30	$33,373	$32,261	$1,11
23	1365-1990-92	Woodman Sewer Line	03-31-1990	1990	30	$218,510	$203,943	$14,56
33	1365-1991-115	Trails I Sewer Lines	03-31-1991	1991	30	$283,519	$255,167	$28,35
33	1365-1991-116	Trails II Sewer Lines	03-31-1991	1991	30	$323,177	$290,859	$32,31
33	1365-1991-117	Snowcreek Crest Sewer Lines	03-31-1991	1991	30	$598,197	$538,377	$59,82
33	1365-1991-118	Juniper Ridge Sewer Lines	03-31-1991	1991	30	$901,421	$811,279	$90,14
33	1365-1993-155	Fairway Ranch Sewer Lines	06-30-1993	1993	30	$223,080	$185,900	$37,18

33	1365-1994-181	Sewer Line - Business Park	11-30-1994	1994	30	$119,166	$95,333	$23,83
23	1365-1995-188	East Twin Force Main	03-31-1995	1995	30	$86,499	$66,316	$20,18
23	1365-1996-220	Install Sewer Lateral - Ridgecrest	10-07-1996	1996	5	$2,653	$2,653	$
33	1365-1997-242	Sewer Lateral - Hillside	07-05-1997	1997	5	$9,854	$9,854	$
23	1365-1997-246	Manholes - Majestic Pines Dr	08-07-1997	1997	5	$9,968	$9,968	$
23	1365-1998-263	Install Sewer Lat	07-08-1998	1998	30	$9,063	$6,042	$3,02
23	1365-1998-268	Manhole Rehab	10-25-1998	1998	20	$45,368	$45,368	$
23	1365-2000-325	Manhole Rehab	12-08-2000	2000	5	$79,950	$79,950	$
23	1365-2001-349	TV Inspection Equipment	06-20-2001	2001	15	$75,683	$75,683	$
23	1365-2001-350	Install Sewer Lateral	07-17-2001	2001	30	$2,931	$1,661	$1,27
23	1365-2001-353	Lift Station & Tank Monitors	08-29-2001	2001	10	$15,710	$15,710	$
33	1365-2002-367	Contributed Cap. WW Lines	03-31-2002	2002	30	$2,291,088	$1,221,914	$1,069,17
23	1365-2002-378	Sewer Installation	07-26-2002	2002	5	$4,618	$4,618	$
23	1365-2003-408	Meridian Blvd Slip Lining	03-31-2003	2003	20	$77,176	$57,882	$19,29
23	1365-2003-428	Manhole Sealing	12-03-2003	2003	5	$36,959	$36,959	$
23	1365-2005-472	Install Sewer Lateral Manzanita	08-31-2005	2005	20	$4,683	$3,044	$1,63
23	1365-2005-481	Manhole / Sewer Line Rehab	12-07-2005	2005	20	$80,302	$52,196	$28,10
23	1365-2006-486	Chopper Pump Tamarack Lifts	03-30-2006	2006	5	$8,441	$8,441	$
23	1365-2006-534	New Sewer Lat Install - Ridgecrest	10-24-2006	2006	30	$5,296	$2,118	$3,17
23	1365-2006-538	Hillside Dr - Install Sewer Lateral	11-14-2006	2006	10	$5,659	$5,659	$
23	1365-2006-542	Slip Line Across Creek	12-14-2006	2006	30	$56,873	$22,749	$34,12
23	1365-2006-543	Rehab Sewer	12-14-2006	2006	15	$33,334	$26,668	$6,66
23	1365-2007-602	Waterford WW Line	04-01-2007	2007	30	$39,880	$14,623	$25,25
23	1365-2007-603	Skate Park Collection Lines	04-01-2007	2007	50	$33,492	$7,368	$26,12
23	1365-2007-604	Process Aerial Photos	04-01-2007	2007	5	$32,577	$32,577	$
23	1365-2007-616	Process Aerial Photos	04-01-2007	2007	5	$32,577	$32,577	$
33	1365-2008-624	Contributed Capital	03-31-2008	2008	30	$530,752	$176,917	$353,83
23	1365-2008-639A	West Twin Lift Station Improvement	04-01-2008	2008	5	$5,565	$5,565	$
23	1365-2009-6140	Slipline Sewer Line - Meadow Lane	04-01-2008	2008	20	$38,651	$19,325	$19,32
23	1365-2009-6150	Manholes on Highway 203	03-31-2009	2009	5	$34,905	$34,905	$
23	1365-2011-001	Bluffs Lift Station Improvements	11-24-2010	2010	30	$4,027	$1,074	$2,95
23	1365-2013-002	Manhole Replacement	09-30-2012	2012	20	$293,971	$88,191	$205,77

23	1365-2013-004	Road Plates (4 split between funds)	07-05-2012	2012	50	$7,404	$888	$6,51
23	1365-2013-005	Road Plates (4 split between funds)	07-05-2012	2012	50	$7,404	$888	$6,51
23	1365-2014-001	2013-2014 Sewer Line Replacement	10-31-2013	2013	50	$243,742	$24,374	$219,36
23	1365-2014-002	Manhole Sealing and Lining	10-31-2013	2013	20	$26,509	$6,627	$19,88
23	1365-2014-003	Center/Shady Rest Sewer Replacement	10-31-2013	2013	50	$355,630	$35,563	$320,06
23	1365-2014-004	Meridian Sewer Expansion	04-01-2013	2013	50	$504,011	$50,401	$453,60
23	1365-2015-002	2014-2015 Sewer Line Replacement	10-01-2014	2014	50	$218,530	$17,482	$201,04
23	1365-2016-001	2015-2016 Sewer Line Replacement	03-31-2016	2016	40	$367,162	$18,358	$348,80
23	1365-2017-001	2016-2017 Sewer Line Replacement	02-23-2017	2017	40	$257,530	$6,438	$251,09
23	1365-2018-001	2017-2018 Sewer Line Replacement	03-31-2018	2018	50	$426,838	$0	$426,83
23	1365-2018-002	Snowcreek GC Pond Fill Control	03-31-2018	2018	15	$52,967	$0	$52,96
23	1370-1983-07	Balance B/Fwd	06-30-1983	1983	60	$2,121,070	$1,237,291	$883,77
23	1370-1986-33	Easement Deed	11-03-1986	1986	60	$19,138	$10,207	$8,93
23	1375-1983-08	Balance B/Fwd	06-30-1983	1983	60	$53,657	$31,300	$22,35
23	1380-1983-09	Balance B/Fwd	06-30-1983	1983	60	$278,848	$162,661	$116,18
23	1390-1984-13	Balance B/Fwd	06-30-1984	1984	30	$1,400,155	$1,400,155	$
22	1390-2001-335A	Aerial Photos - CIP	03-31-2001	2001	15	$21,338	$21,338	$
23	1390-2001-337	Aerial Photos - CIP	03-31-2001	2001	5	$21,338	$21,338	$
22	1390-2001-340	Aerial Photos - CIP	03-31-2001	2001	5	$21,338	$21,338	$
23	1390-2001-341	Aerial Photos - CIP	03-31-2001	2001	5	$21,338	$21,338	$
22	1390-2011-999	General Studies/Surveys (1410 Cleanup)	04-01-2010	2010	5	$1,253,273	$1,253,273	$
22	1390-2013-001	Asset Management Study	07-31-2012	2012	5	$103,168	$103,168	$
22	1390-2013-002	Mammoth Creek EIR	02-28-2012	2012	50	$677,019	$81,242	$595,77
22	1390-2014-001	Mammoth Creek EIR	03-31-2014	2014	50	$17,515	$1,401	$16,11
22	1390-2014-002	Urban Water Management Plan	04-01-2013	2013	5	$89,413	$89,413	$
22	1390-2015-003	Mammoth Creek EIR	03-31-2015	2015	50	$12,516	$751	$11,76
22	1390-2015-004	Well Profiling	03-31-2015	2015	5	$47,672	$28,603	$19,06
22	1390-2016-001	Backflow Survey	03-31-2016	2016	5	$63,849	$25,540	$38,31
21	1390-2016-002	Weather Station	03-31-2016	2016	10	$5,346	$1,069	$4,27
22	1390-2016-003	Capital Asset Replacement	03-31-2016	2016	10	$131,220	$26,244	$104,97

22	1390-2016-004	Groundwater Management Plan	03-31-2016	2016	5	$114,087	$45,635	$68,45
22	1390-2017-001	Urban Water Management Plan	02-23-2017	2017	5	$89,944	$17,989	$71,95

AGENDA ITEM

Subject: Adoption of an Amended Master Fee Schedule

Information Provided By: Jeff Beatty, Finance Manager

Background

The Master Fee Schedule is a document adopted annually with the budget that provides a comprehensive list of all fees the District charges for services. Some fees are defined only in the Master Fee Schedule, while some fees are also defined in the District Code.

Discussion

Agenda item C-1 is asking the Board to adopt updated water and sewer Connection Fees. If the Board adopts the new connection fees, Chapters 11 and 12 of the District Code as well as the Master Fee Schedule will require amendment to reflect the updated fees.

Requested Action

Approve the amended Master Fee Schedule to conform to the adopted changes to the District Code pertaining to water and sewer Connection Fees.

Mammoth Community Water District

Master Fee Schedule

Effective July 19~~April 1~~, 2019

Utility Billing Fees

Water – Monthly Minimum Service Charge

Water system charges are authorized by MCWD Code Chapter 12, Division VI.

The monthly Minimum Service Charge for Single Family, Multi-Family, and Commercial properties shall be based on the size of the meter as shown below:

Meter Size	Effective April 2019
5/8" | 3/4" and Multi-Family Residential	$14.75
1”	$22.34
1-1/2”	$41.33
2”	$64.10
3”	$136.22
4”	$242.53
6”	$534.82
8”	$914.43

Water - Quantity Rate Charge

The Quantity Rate Charge shall be billed monthly at the following rates per 1,000 gallons:

	Effective April 2019
Single Family Residential	
First 4,000 gallons	$0.97
4,001 - 8,000 gallons	$2.27
Over 8,000 gallons	$4.96
Multi-Family Residential	$2.31
Commercial	$3.06
Irrigation	
Tier 1	$2.71
Tier 2	$6.06
Tier 3	$8.97
Recycled	$1.79

Water Shortage Surcharge

When authorized by the Board of Directors, the monthly Water Shortage Surcharge shall be based on meter size and water conservation level.

Meter Size	Level 1	Level 2	Level 3	Level 4
5/8" | 3/4" and Multi-Family Residential	$1.31	$2.62	$3.93	$6.55
1"	$2.19	$4.37	$6.55	$10.91
1 1/2"	$4.37	$8.73	$13.09	$21.82
2"	$6.99	$13.97	$20.95	$34.91
3"	$15.27	$30.54	$45.81	$76.35
4"	$27.49	$54.98	$82.46	$137.43
6"	$61.08	$122.16	$183.24	$305.40

Sewer – Monthly Charge

Sewer charges are authorized by MCWD Code Chapter 11 Division VI.

Customer Class	Effective April 2019
Single Family	$20.94
Multi-Family*	$18.02
RV Space	$3.05
Motel Units*	$9.53
Ski Dorm/Bed	$3.05
Commercial Unit	$13.50
Laundry - Commercial	$806.24
Laundromat - Public	$494.50
Service Station	$24.72
Car Wash	$61.86
Restaurant Seat	$2.52
Bar Seat	$1.32
Theatre Seat	$0.64
Public Building	$41.30
Elementary School*	$0.93
High School*	$1.13
Storage/Warehouse*	$18.63
Swimming Pool	$12.34
Spa/Hot Tub	$6.31
Hospital Bed	$28.43
Juniper	$13.57
Mill Cabins	$20.93

Notes:
*Multi Family includes condominium units, apartments units, and mobile units.
*Motel Units include all motel rooms and motel managers' units.
*Storage/Warehouses are unoccupied.
*Schools rates are based on average daily attendance.

Delinquent Accounts

A one-time basic penalty of ten percent (10%) of the charge or rate for a month shall be added to each delinquent charge for the first month the charge is delinquent.

Out-of-District Sewer Service Fees

Monthly Base Charge

The monthly Base Charge for each customer, including the United States Forest Service and those customers located in the Lakes Basin, are listed below:

Customer Class	Effective April 2019
Out-of-District Cabin	$20.94
Out-of-District Manager Unit	$20.94
Out-of-District Motel	$20.94
Out-of-District Commercial or Public	$13.50
Out-of-District Restaurant/Seat	$1.98
Out-of-District Campground Unit	$2.37
Out-of-District Picnic Area or Trailhead	$1.20

Operation and Maintenance Charges

The United States Forest Service shall pay monthly Operation and Maintenance Charges based on its proportionate share of average daily flow use of facilities including pump stations located outside the District boundaries.

Each customer other than the United States Forest Service shall pay monthly Operation and Maintenance Charges based on the proportionate share of average daily flow for use of facilities including pump stations located outside the District boundaries. The Operations and Maintenance Charges are listed below:

Customer Class	Effective April 2019
Out-of-District Cabin	$24.79
Out-of-District Manager Unit	$24.79
Out-of-District Motel	$24.79
	$15.96

Out-of-District Commercial or Public	
Out-of-District Restaurant/Seat	$2.37
Out-of-District Campground Unit	$2.78
Out-of-District Picnic Area or Trailhead	$1.41

Annual Replacement Charge

Each customer other than the United States Forest Service shall pay an Annual Replacement Charge to fund replacement projects located outside the District boundaries and/or on United States Forest Service land. The Annual Replacement Charge for each customer outside the District boundaries and/or on United States Forest Service land, including Mill City, is $94.37 per Cabin, Commercial, Public, Restaurant, or Motel complex.

Delinquent Accounts

A one-time basic penalty of ten percent (10%) of the charge or rate for a month shall be added to each delinquent charge for the first month the charge is delinquent.

Miscellaneous Fees and Fines

Description	Fee
New Customer Deposit	$50
Water Turn-on Following Shut-off	$100
Customer-Requested Shut-off/On	$40
Additional Fee for After-Hours Shut-off/On	$150
Posting of Shut-Off Notice - 1st Occurrence	$50
Posting of Shut-Off Notice - 2nd Occurrence	$50
Posting of Shut-Off Notice - 3rd Occurrence	$100
Returned Check Fee	$20
Release of Lien	$20

Water and Wastewater Connection Fees

Water and Wastewater connection fees are authorized by MCWD Code Chapter 12 Section 6.03 and Chapter 11 Section 6.03.

Mammoth Community Water District

Master Fee Schedule

Effective July 19~~April 1~~, 2019

Connection Fees

Meter Size	Water	Wastewater	Total
3/4"	$7,225~~126~~	$3,125~~74~~	$10,35~~0~~0
1"	$12,042~~5,461~~	$8,216~~24~~	$20,258~~3,685~~
1 1/2"	$24,085~~38,878~~	$16,006~~16,893~~	$40,091~~55,771~~
2"	$38,536~~71,256~~	$29,999~~3,468~~	$68,535~~94,724~~
3"	$84,297~~183,983~~	$62,981~~36,518~~	$147,278~~220,501~~
4"	$151,735~~287,449~~	$127,928~~69,286~~	$279,663~~356,735~~
6"	$337,189~~574,683~~	$223,733~~131,459~~	$560,962~~706,142~~
8”	$578,038	TBD	TBD

Meter Cost

Size	Cost
3/4"	$1,944
1"	$2,421
1 1/2"	$4,581
2"	$5,615
3"	quote required
4"	quote required
6"	quote required

Permit and Plan Checking Fees

- Landscape Plan Check fees are described in MCWD Code Chapter 12, Section 10.3
- Water Plan Check fees are described in MCWD Code Chapter 12, Section 6.01
- Sewer Plan Check fees are described in MCWD Code Chapter 11, Section 6.01
- Water Construction Permit fees are described in MCWD Code Chapter 12, Section 6.02
- Sewer Construction Permit fees are described in MCWD Code Chapter 11, Section 6.02
- Water Permit Application fees are described in MCWD Code Chapter 12, Section 6.06
- Sewer Permit Application fees are described in MCWD Code Chapter 11, Section 6.15
- Water Permit Plan Check fees are described in MCWD Code Chapter 12, Section 6.17
- Sewer Permit Plan Check fees are described in MCWD Code Chapter 11, Section 6.17
- Sewer Easement fees are described in MCWD Code Chapter 11, Section 6.05
- Fees for preparing or checking water and sewer special studies fees are described in MCWD Code Chapter 12, Section 6.07 and Chapter 11, Section 6.07
- Food Service Establishment/Property Owner Discharge Permit fee is $100 for a new permit and $50 for annual renewal of the permit

MCWD Services

Wastewater Disposal

Type	Fee
RV Dump Station	$10 per use
Commercial	$1.70/100 gallons
Industrial	See MCWD Code Chapter 11, Section 6.11 B

Labor and Equipment Fees

Equipment	Rate
Heavy Equipment	$100/hour
Vactor	$250/hour
Dump Truck	$75/hour
TV Inspection Van	$120/hour
Utility Truck	$40/hour
Water Line Tap Tool	$100 per use
See Snake	$100 per use
Flat-bed Truck	$40/hour
Contracted Services	Cost + 10%
Labor Rate	Fully Burdened Hourly Rate
Out-of-District Emergency Response Fee	$500

Material	Unit cost
Cold Mix	$110/ton
Concrete Bags	$9/bag
6 Sack Slurry	$128/yard
1.5 Sack Slurry	$62/year
Fill Sand	$15/ton
Gravel	$28/ton
Plumbing Fittings	Cost + 20%

Administrative Fees

Description	Fee
Reproduction Fees - Black and White	$0.15/page
Reproduction Fees - Color	$0.30/page

GIS Fees

Description	Fee
Contour Data (Any Interval)	$ 12/MB
Plotter Photo Paper Hard Copy Charge	$ 25/sq. ft.
Black & White Map Copy (8 x 11)	$ 0.15/page
Color Map Copy (8 x 11)	$ 0.30/page
Black & White Map Copy (11 x 17)	$ 0.30/page
Color Map Copy (11 x 17)	$ 0.40/page

Lab Fees

Test	Fee		
Alkalinitiy	$	44.18	
Ammonia Nitrogen	$	16.00	*
Arsenic	$	16.00	*
Biochemical Oxygen Demand Prep	$	125.91	
Biochemical Oxygen Demand Sample	$	30.00	
Carbonaceous BOD sample	$	30.00	
Chemical Oxygen Demand	$	38.45	
Colilert Present/Absent	$	20.58	
Colilert QuantiTray 51 Wells	$	22.26	
Colilert QuantiTray 97 Wells	$	22.84	
Color	$	15.00	
Copper	$	16.00	*
Dissolved Oxygen	$	15.00	
General Mineral & Inorganic Chemical	$	522.00	*
General Physical	$	32.00	*
Gross Alpha Radioactivity	$	28.00	*
Iron	$	16.00	*
Lead	$	16.00	*
MBAS	$	48.00	*
Nitrate Nitrogen	$	16.00	*
Nitrite Nitrogen	$	16.00	*
Odor	$	30.00	
pH & Temperature	$	15.00	
Physical Analysis	$	60.00	
Radium 228	$	149.00	*
Settleable Solids	$	15.00	
1,2,3 TCP	$	105.00	*
Total Dissolved Solids	$	15.00	

Total Hardness	$ 32.00	*
Total Kjeldahl Nitrogen	$ 53.00	*
Total Radium 226	$ 59.00	*
Total Solids	$ 15.00	
Total Suspended Solids	$ 15.00	
Turbidity	$ 15.00	
Uranium	$ 75.00	*

* *Shipping and handling fees may apply*

Miscellaneous Lab Services	Fee
Prior Results Search Fee	$ 15.00
Rush Fee	$ 30.00
Shipping & Handling	Actual Cost

Violations

- Enforcement actions for District water conservation standards and regulations are defined in MCWD Code Chapter 12, section 12.02. For three or more violations of permanent or declared water use restrictions, a fine of $50 per day is imposed after the notification period. If water is disconnected or a flow restrictor installed as a result of violations of water use restrictions, a charge of $100 per disconnected meter or $200 per flow restrictor, plus a fine of $500 is imposed. If a flow restrictor is installed, a $20 monthly fee will be imposed for the cost of administration and monitoring the flow restrictor. The District will impose a fine of $50 to a food service or lodging establishment upon three or more violations related to serving water or notification of option to reduce linen service.

- The fine for the second and subsequent violations of the Food Service Establishment/Property Owner Discharge Permit is $100 per violation notice.

- The fine for a permittee's failure to respond and correct a violation of the Food Service Establishment/Property Owner Discharge Permit within the specified time is $50 per day, up to a maximum of 12 days or $600.

- Annual Backflow Testing is required by the Water District's Cross-Connection Control Program and is mandated by the California Department of Public Health. Failure to comply may result in a discontinuation of water service and a fee of $100 to reinstate service.

AGENDA ITEM

Subject: Revised Draft Agreements between the District and Employees Entering into the Amended Employee Housing Purchase Assistance Program

Information Provided By: Jeff Beatty, Finance Manager
Legal Review Provided By: Joshua Horowitz, Attorney

Background

At the June 20, 2019 meeting, the Board reviewed the amended Employee Home Purchase Assistance Policy (EHPAP), and provided direction for additional provisions in the policy. The Board approved the policy pending review and approval by the members of the EHPAP Ad Hoc Committee. The final document incorporating the Board's direction has been reviewed and approved by the ad hoc committee and legal counsel.

District Counsel was directed to prepare draft agreements (a separate agreement for each of the two program options) that will be made between the District and Employees participating in the Employee Home Purchase Assistance Program. Counsel was also directed to review and provide all documents related to the program (Employee confirmation letter, note, deed of trust, and escrow instructions).

Discussion

Each agreement incorporates all the policy changes approved by the Board. There is an agreement template for each version of the Employee Home Purchase Assistance Program; the Shared Value with maximum District participation of 50% and the Subordinated Loan with maximum District participation of 35%.

Requested Action

Discuss and approve the agreement templates for the Shared Value Employee Home Purchase Assistance and the Subordinated Loan Employee Home Purchase Assistance.

MAMMOTH COMMUNITY WATER DISTRICT
EMPLOYEE HOME DOWN PAYMENT ASSISTANCE AGREEMENT
(Shared Value Program)

This Employee Home Down Payment Assistance Agreement – Shared Value Program ("Agreement") is made and entered into this ___________, 20__, at Mammoth Lakes, California, by and between the Mammoth Community Water District, a California special district ("District"), and [name] ("Employee") and [spouse name] ("Co-borrower") (collectively referred to as the "Parties" and individually as a "Party"), and is made with reference to the following facts:

Recitals:

A. District has a vested interest in employing and retaining productive employees;

B. District is located in the Town of Mammoth Lakes, which is a high-cost housing market, and is desirous of assisting its employees in purchasing homes in District's geographic area in order to ensure that its employees secure proper housing and are incentivized to continue their employment with District;

C. Employee presently holds the position with District of [title of position];

D. Employee has completed and submitted to District an application that includes a pre-qualifying loan statement completed by a qualified lender providing evidence of financing for the maximum amount the lender is willing to loan to Employee for purchase of a residence for Employee and Co-Borrower, and represents that the information in [his/her] application was and is truthful and accurate;

E. District has provided a letter to Employee dated ___________, 20__ informing [him/her] that for up to 120 days from the date of the letter, Employee is eligible to receive a maximum amount of $_______ in financial assistance ("Eligibility Amount") from District in the form of a secured variable interest rate loan, as that term is defined below, for the purchase by Employee and Co-Borrower of a residential unit that meets the criteria specified in District's Employee Home Purchase Assistance Program Policy ("Policy"), which is located at [address] ("Housing Unit");

F. Employee and Co-Borrower haves made an offer to purchase the Housing Unit at a price that is a reasonable estimate of the fair market value of that property, and said offer provides that the close of escrow is conditioned on District's approval of the purchase price, structural soundness, and code compliance;

G. District has provided to Employee written notification of its approval of Employee's and Co-Borrower's purchase of the Housing Unit in the amount of $_______ ("Purchase Price"), having concluded that District's criteria for purchase price (said purchase price not being greater than 110% of the appraised value), structural soundness and code compliance are satisfied after causing an inspection of, and reviewing the Employee-provided appraisal report by a certified appraiser, of the Housing Unit; and

H. District and Employee have negotiated this Agreement respecting District's financial assistance to the Employee for the purchase of the Housing Unit, which Employee and Co-Borrower intends to use as their[his/her] primary home, subject to the terms and conditions of this Agreement and the Policy.

I. Co-Borrower intendagrees to be bound by the same terms and conditions as Employee with respect to the Employee's participation in the Program and with respect to District's provision of the Eligibility Amount to the Employee for Employee's and Co-Borrower's purchase of the Housing Unit.

Agreement:

NOW, THEREFORE, the Parties agree as follows:

1. Method of Purchase of Home. Funds used to purchase the Housing Unit shall be comprised of the "District Assistance Loan," the "Employee Contribution" and the "Primary Loan" as provided herein:

a. District's Assistance Loan.

i. District shall contribute up to $________ to Employee toward Employee's and Co-Borrower purchase of the Housing Unit (the "District Assistance Loan"), provided the amount of the District Assistance Loan does not exceed the: (1) the Eligibility Amount; (2) 50% of the Purchase Price; or (3) $400,000. If the purchase of the Housing Unit by Employee and Co-Borrower fails for any reason, the District Assistance Loan shall be returned to District.

ii. The District Assistance Loan shall be made in the form of a "secured deferred interest loan," which means that District shall share in the future appreciation of the Housing Unit.

iii. Employee and Co-Borrower shall execute a recordable document with the Mono or Inyo County Recorder, which may be a deed of trust, securing the obligations created hereunder.

iv. The District Assistance Loan must be paid in full upon the earliest of the following: (1) on Employee's and Co-Borrower's sale or other conveyance of the Housing Unit; (2) one year after Employee passes away; (3) if Employee is then alive, six months after (i) Employee's separation from employment at District, or (ii) Employee no longer uses the Housing Unit as [his/her] principal place of residence; (4) upon Employee's or Co-Borrower's filing for protection under the Bankruptcy Act; (5) upon the award of all or any portion of the Housing Unit to Employee's spouseCo-Borrower in a proceeding for legal separation or for dissolution of marriage; or (6) upon condemnation of the Housing Unit.

v. The District Assistance Loan is not assumable or transferable.

vi. Upon close of escrow for Employee's and Co-Borrower's purchase, the Housing Unit may have a lien securing the Primary Loan, as defined below, which lien may be superior to the lien of the District Assistance Loan, but shall not be subject to any other mortgage, deed of trust, lien or other adverse encumbrance, except for real property taxes and special assessments and other encumbrances specifically approved by District.

vii. Nothing in this Agreement shall be construed as creating a joint venture or other partnership relationship between Employee and Co-Borrower and District. Employee and Co-Borrower and District have solely a debtor/creditor relationship arising from this Agreement.

b. Primary Loan.

Employee's and Co-Borrower's primary lender shall provide a first loan of $_______ for purchase of the Housing Unit ("Primary Loan"). Employee's and Co-Borrower's primary lender is [name of primary lender]. The Primary Loan must be a fully amortized fixed rate loan for a term not to exceed 30 years.

c. Employee Contribution.

Employee and Co-Borrower shall contribute a down payment of at least $_____, which is the balance of the Purchase Price of the Housing Unit ("Employee Contribution"), which shall be at least 5% of the total Purchase Price. The Employee Contribution shall not include any proceeds from a loan that is secured by the Housing Unit, including the Primary Loan or the District Assistance Loan.

2. Execution of Documents. The Parties shall cooperate in the preparation and execution of all documents necessary to conform the purchase of the Housing Unit to the provisions of this Agreement.

3. No additional mortgages or liens. Except for liens for property taxes, assessments, the deed of trust securing the Primary Loan, and the deed of trust or other security for the District Assistance Loan, Employee and Co-Borrower shall not refinance the Primary Loan or cause any mortgage, deed of trust, lien, encumbrance or other cloud upon title to be recorded against the Housing Unit or to attach to the real property except as expressly authorized by the District's Board of Directors. Employee and Co-Borrower shall not cause any delinquency in property taxes or any special assessment. Any refinancing of the Primary Loan shall not impair the District Assistance Loan and shall conform with the requirements of the Policy. Under no circumstances may Employee or Co-Borrower place anyone on title after the close of escrow for the purchase of the Housing Unit without District's prior written agreement.

~~4. Consent of Spouse. If Employee later marries, [he/she] shall notify District of the marriage as soon as possible. Upon receipt of such notice from Employee, District may request that Employee and Employee's spouse enter into an amendment to this Agreement for the purpose of obtaining Employee's spouse's consent to comply with the terms of this Agreement. Any refusal by Employee's spouse to execute an amendment to this Agreement as requested by District shall be deemed a breach if this Agreement in accordance with the terms of Section 5 below. This provision also shall apply if Employee enters into a registered domestic partnership in accordance with Family Code sections 297 and following.~~

~~5.~~4. Breach of Agreement. It shall be a breach of this Agreement for Employee or Co-Borrower to violate any covenant, condition or restriction in this Agreement, or to default in payment or other obligation due to be performed under a promissory note secured by a deed of trust encumbering the Housing Unit, or to breach any of the Employee's or Co-Borrower duties or obligations under said deed of trust. Employee and Co-Borrower must notify District, in writing, of any notification received from a lender, or its assigns, of past due payments or default payment or other obligations due or to be performed under a promissory note secured by a first deed of trust, as described herein, or of any breach of any of Employee's or Co-Borrower duties or obligations under said deed of trust, within five calendar days after Employee's or Co-Borrower notification from lender, or its assigns, of said default or past due payments or breach.

Upon receipt of notice as provided in the above paragraph, District shall have the right, in its sole discretion, to cure the default or any portion thereof. In such event, Employee and Co-Borrower shall be personally liable to District for past due payments made by District, together with interest thereon at a rate specified in the promissory note secured by the first deed of trust, plus one percent (1%) and all actual expenses of District incurred in curing the default. Employee and Co-Borrower may cure the default and satisfy their~~[his/her]~~ obligation to District under this Agreement at any time prior to execution of a contract for sale, upon such reasonable terms as specified by District. Otherwise, Employee's and Co-Borrower's indebtedness to District shall be satisfied from Employee's and Co-Borrower's proceeds arising from Subsections 10~~1~~(d), 10~~1~~(e)(2) and/or 10~~1~~(f) at closing or paid by Employee and Co-Borrower at the time of the repayment of the District Assistance Loan pursuant to Section 12~~3~~.

5~~6~~. Taxes, Assessments and Insurance. Employee and Co-Borrower shall pay all property taxes, assessments and homeowner association dues, if applicable, and all premiums for required insurance coverages for the Housing Unit without reimbursement from District. At purchase, Employee and Co-Borrower shall be required to purchase the most comprehensive, maximum limits homeowner's insurance coverage available, including full code upgrades. If the Housing Unit is located within a FEMA-designated flood zone requiring the purchase of a flood insurance policy, Employee and Co-Borrower also shall obtain a flood insurance policy for the Housing Unit. In addition, Employee and Co-Borrower shall obtain an earthquake insurance policy for the Housing Unit. Employee and Co-Borrower also shall secure at least a standard form full coverage CLTA title insurance policy on the Housing Unit. All insurance policies shall be issued in an amount not less than the purchase price or appraised value of the Property, whichever is greater and Employee and Co-Borrower shall pay all premiums. Employee and Co-Borrower shall be required to continue such insurance for the term of this Agreement; and not less than every two years from the close of escrow on the Housing Unit, Employee and Co-Borrower shall be required to increase the insurance coverage in amounts consistent with the Housing Unit's estimated appreciation. All policies of insurance shall state the respective interests of the Parties and provide that the proceeds of any such insurance shall be paid to the Parties as their respective interests may appear. Nothing in this Agreement shall be construed to create in District an obligation to pay property taxes, assessments, homeowner association dues, or insurance premiums for the Housing Unit.

6~~7~~. Maintenance. Employee and Co-Borrower shall maintain the Housing Unit in good condition and shall be solely responsible for all maintenance and repair costs, including uninsured losses. Employee and Co-Borrower shall pay all contractor invoices when due and shall not incur any mechanics lien or stop notice on the Housing Unit.

78. Capital Improvements. Employee and Co-Borrower may, at [his/her] their sole discretion and expense, make such reasonably necessary capital improvements to the Housing Unit as Employee and Co-Borrower deems beneficial to it. If Employee and Co-Borrower desires to receive credit for a capital improvement in the distribution of Gross Sale Proceeds under Section 10 below, a capital improvement must qualify for credit according to these criteria: (1) adds additional square footage to the Housing Unit; (2) is performed with a building permit that is subsequently signed off by the governing authority; and (3) receives prior written approval from District. Other types of improvements and any maintenance or repair expenses will not be considered as a qualifying capital improvement. At the completion of a qualifying capital improvement, an appraisal by a certified appraiser agreed upon by Employee and Co-Borrower and District will be conducted at Employee's and Co-Borrower's expense to confirm the actual value added by the capital improvement. Employee and Co-Borrower shall be credited the lesser of: (1) the value added to the Housing Unit as determined by the appraisal or (2) the total expenses incurred by Employee and Co-Borrower related to the capital improvement. Employee and Co-Borrower shall provide to District documentation that supports all expenses of the capital improvement and verifies Employee's and Co-Borrower's actual payment of all expenses. Any capital improvements that are gifted or otherwise obtained from funding sources other than Employee's and Co-Borrower's own funds, including insurance reimbursements, will not be considered as qualifying capital improvements for purposes of this Policy.

89. Sale of Housing Unit. Subject to the provisions of Paragraph 10, the sale of the Housing Unit shall occur on the happening of any of the following:

a. At the option of Employee and Co-Borrower;

b. One year after the Employee passes away; or

c. If Employee is then alive, six months after: (i) Employee's separation from employment at District, or (ii) Employee no longer uses the Housing Unit as [his/her] principal place of residence.

Any such sale of the Housing Unit shall be for an amount equal or greater than the Housing Unit's fair market value as determined by an appraisal made by a certified appraiser approved by District no sooner than 90 days prior to close of escrow for sale of the Housing Unit, unless District agrees in writing to another price.

109. Employee and Co-Borrower Purchase of District's Interest; Refinancing of Primary Loan. At any time during the term of this Agreement, Employee and Co-Borrower may propose to purchase District's interest in the Housing Unit. The proposed purchase shall be subject to the applicable conditions and procedures provided in Section 15 of the Policy. Employee and Co-Borrower also may request to refinance the Primary Loan. Any request for refinancing of the Primary Loan will be subject to the conditions and procedures provided in Section 16 of the Policy.

10~~1~~. Distribution of Proceeds from Sale of the Housing Unit. Upon sale of the Housing Unit pursuant to the provisions of Section ~~9~~ 8 or pursuant to any other circumstance, the gross proceeds of the sale (the "Gross Sale Proceeds") shall be allocated according to the following order of priority (see also Examples 1-3 attached as Exhibit 1 to this Agreement):

a. The normal and customary costs of sale, including, but not limited to, escrow fees, real estate brokers' fees, and related expenses, shall be deducted from the Gross Sale Proceeds of the Housing Unit.

b. The outstanding balance on the Primary Loan shall be paid in full to the primary lender or its successor in interest from the Gross Sale Proceeds. In the event the Gross Sale Proceeds are insufficient to pay the Primary Loan balance, District shall not be liable for payment of the Primary Loan.

c. To the extent Gross Sale Proceeds remain, District shall be distributed an amount equal to the amount District contributed to Employee's and Co-Borrower's purchase of the Housing Unit. This distribution does not include any apportionment made of the Remaining Gross Sale Proceeds discussed in Subsection e. below.

d. To the extent Gross Sale Proceeds remain, Employee and Co-Borrower shall receive the amount of the Employee ~~and Co-Borrower~~ Contribution, plus the total amount that Employee and Co-Borrower have~~s~~ then paid towards the principal of the Primary Loan, and the amount that Employee and Co-Borrower expended for Capital Improvements on the Housing Unit for which ~~[he/she]~~they can provide proof, and was approved in writing by District.

e. Any remaining Gross Sale Proceeds (the "Remaining Gross Sale Proceeds") shall be shared between District and Employee and Co-Borrower as follows:

(1) District shall receive a percentage of the Remaining Gross Sale Proceeds equal to the amount of the District Assistance Loan divided by the purchase price increased by the amount credited for any approved capital improvements. In no event, however, may District earn an annualized rate of return over the term of the entire loan greater than the maximum rate authorized by Section 1 of Article XV of the California Constitution. That rate is the higher of either 10 percent per annum or 5 percent over the rate charged by the Federal Reserve Bank of San Francisco on advances to member banks on the 25th day of the month before the down payment loan (if the agreement to loan and the actual lending of the money are in different months, the 25th day of the month before the earlier events is used) per annum.

(2) Employee and Co-Borrower shall receive a percentage of the Remaining Gross Sale Proceeds equal to the amount of the Employee and Co-Borrower Contribution, the Primary Loan and the amount credited for approved capital improvements, divided by the Purchase Price, as increased by the amount of any approved Capital Improvements, plus any funds, if any, District is not entitled to receive due to the fact that District is receiving its maximum permissible rate of return under Subsection e.(1), above.

f. In the event that any of the Gross Sale Proceeds are needed to pay any liens, taxes (delinquent or otherwise) or other adverse encumbrances, the amount of Gross

Sale Proceeds so expended shall be deducted from any amounts due Employee and Co-Borrower pursuant to Subsections d. and e.(2).

11~~2~~. District's Right of First Refusal. In the event the Housing Unit is offered for sale pursuant to Subsection ~~9~~8.a. or is required to be sold pursuant to Subsections ~~9~~8.b. or c., District shall have the first right to purchase the Housing Unit in accordance with the following provisions. If Employee and Co-Borrower desire~~s~~ to sell the Housing Unit, ~~[he/she]~~they shall first offer in writing to sell such Unit to District. If District desires to purchase the Housing Unit, it shall so advise Employee and Co-Borrower in writing within 20 days from the date of Employee's and Co-Borrower's written offer, unless the Parties agree to an extension in writing. In the event District desires to purchase the Housing Unit, then within 45 days from District's written notice of such desire, District and Employee and Co-Borrower shall agree on a certified appraiser to perform an appraisal of the Housing Unit. If the Parties cannot agree on a certified appraiser, then District shall have the right to select such appraiser. The appraisal shall be paid for by District. The appraisal shall determine the then fair market value of the Housing Unit. If District desires to pursue the purchase of the Housing Unit based on the appraisal, District shall submit the amount of the appraised value into an escrow opened for the consummation of the sale within 30 days after receipt of the appraisal report. In order to effect the sale of the Housing Unit to District, the Parties shall open an escrow with a mutually agreed title company within 30 days after District gives written notice of its desire to purchase the Housing Unit. District shall receive good, clear marketable title to the Housing Unit. If District desires to obtain title insurance, the premium for that insurance shall be at its expense. District's payment shall be distributed in accordance with the provisions of Section 10~~1~~.

In the event that the Housing Unit is required to be sold, District, within 45 days after the date which commences the requirement to sell the Housing Unit, shall notify Employee and Co-Borrower and/or Employee's successor in writing whether or not it desires to purchase the Housing Unit. If it desires to purchase the Housing Unit, then within 45 days from District's written notice of such desire, District and Employee and Co-Borrower and/or ~~[his/her]~~their successor shall agree on a certified appraiser to perform an appraisal of the Housing Unit. If the parties cannot agree on a certified appraiser, then District shall have the right to select such appraiser. The appraisal shall be paid for by District. The appraisal shall determine the then fair market value of the Housing Unit. If District desires to purchase the Housing Unit based on the appraisal, District shall submit the amount of the appraised value into an escrow opened for the consummation of the sale within 30 days after receipt of the appraisal report. In order to effect the conveyance of the Housing Unit from Employee or Co-Borrower or ~~Employee's~~ their successor to District, the Parties shall open an escrow with a mutually agreed title company within 30 days after District gives written notice of its desire to purchase the Housing Unit. District shall receive good, clear marketable title to the Housing Unit. If District desires title insurance, the premium for that insurance shall be at its expense. District's payment shall be distributed in accordance with the provisions of Section 10~~1~~.

If District so elects, the Parties shall execute, and District shall record, a memorandum reflecting District's rights under this Section 11~~2~~.

____ **Employee Shall Initial To Acknowledge That [He/She] Understands That [He/She] is Conveying to District a Right of First Refusal, As**

Provided Herein.

____ **Co-Borrower Shall Initial To Acknowledge That [He/She] Understands That [He/She] is Conveying to District a Right of First Refusal, As Provided Herein.**

123. Repayment of District Assistance Loan Upon Other Than a Sale Event.

a. Events Triggering Repayment of District Assistance Loan. Upon any of the following events, Employee and Co-Borrower immediately shall repay the District Assistance Loan in accordance with the provisions of subparagraph b. below: (i) upon condemnation of the Housing Unit; (ii) the award of all or any portion of the Housing Unit to Co-Borrower ~~Employee's spouse~~ in a proceeding for legal separation or for dissolution of marriage; (iii) upon the Employee or Co-Borrower filing for protection under the Bankruptcy Act; (iv) upon any other event other than a sale event whereby Employee no longer occupies the Housing Unit as his principal residence; or (v) a breach of this Agreement that is not cured by Employee and Co-Borrower.

b. Amount Paid to District. Upon the occurrence of any of the events described in subparagraph a. above, District shall be repaid the amount that District paid toward the Purchase Price, plus a share of the appreciation in the Housing Unit determined as follows: The Parties shall endeavor to agree on an appraiser to determine the fair market value of the Housing Unit. District shall pay for the appraisal. If the Parties are unable to agree on an appraiser within 10 days after the occurrence of one of the above-described events, District shall have an appraisal made by an appraiser of its choice to establish the fair market value. Employee and Co-Borrower also may, at ~~[his/her]~~their expense, have an appraisal made by an appraiser of Employee's and Co-Borrower's choice to establish the fair market value. If Employee and Co-Borrower secure~~s~~ such an appraisal within 30 days after the event and agreement cannot be reached by the Parties on the fair market value, the average of the two appraisals shall be deemed to be the fair market value. If Employee and Co-Borrower do~~es~~ not secure an appraisal within the 30-day period, then District's appraisal shall be the fair market value. District's share of appreciation in the Housing Unit shall be determined from the following calculation: fair market value of the Housing Unit minus the Purchase Price of Housing Unit, plus the total amount Employee and Co-Borrower expended for Capital Improvements on the Housing Unit for which ~~[he/she]~~ they can prove the expenditure, multiplied by a percentage equal to the ratio of the amount that District contributed to the Purchase Price and the Purchase Price increased by the amount credited for authorized Capital Improvements; provided that in no event may District earn an annualized rate of return over the term of the entire loan greater than the maximum rate authorized by Section 1 of Article XV of the California Constitution. Such rate is the higher of either 10% per annum or 5% over the rate charged by the Federal Reserve Bank of San Francisco on advances to member banks on the 25th day of the month before the loan (if the agreement to loan and the actual lending of the money are in different months, the 25th day of the month before the earlier events is used) per annum.

13~~4~~. Tax Consequences. Each Party shall be solely responsible for its own tax consequences arising out of this Agreement, as well as its own tax consequences arising out of any transaction consummated to which the provisions of this Agreement apply.

14~~5~~. Warranties and Representations. The Parties warrant and represent that no promise or inducement has been offered or made for this Agreement except as set forth herein, that this Agreement is executed without reliance on any statement or any representations not contained herein, including all exhibits, and that this Agreement reflects the entire agreement between the Parties. The warranties and representations made herein shall survive the execution and delivery of this Agreement, and shall be binding upon the respective heirs, representatives, successors and assign of each of the Parties.

15~~6~~. Entire Agreement. This Agreement is freely and voluntarily entered into by the Parties after having had the opportunity to consult with their respective attorneys. This Agreement represents the entire agreement of the Parties, and may be modified, amended or otherwise altered only upon written consent of the Parties.

16~~7~~. Assignment. The Parties acknowledge and agree that this Agreement is not assignable by any Party, unless approved in writing by each of the Parties.

17. Attorney's Fees and Costs. If any arbitration, action at law or in equity, or other proceeding is brought to enforce or interpret the provisions of this Agreement, the prevailing party shall be entitled to reasonable attorney's fees in addition to any other relief to which it may otherwise be entitled.

18. Binding Effect. Subject to the provisions of Paragraph 16~~7~~, this Agreement shall inure to the benefit of and be binding upon the heirs, assigns and successors in interest of the Parties.

19. Counterparts. This Agreement may be executed in multiple counterparts.

20. Additional Documents. The Parties agree to execute such additional documents and do such further things as are reasonably necessary to effectuate the purposes of this Agreement.

21. Waiver of Rights. Any waiver at any time by any Party of its rights with respect to a breach or default, or any other matter arising in connection with this Agreement, shall not be deemed to be a waiver with respect to any other breach, default or matter.

22. Remedies Not Exclusive. The use by any Party of any remedy specified herein for the enforcement of this Agreement is not exclusive and shall not deprive the Party using such remedy of, or limit the application of, any other remedy provided by law. In addition, if any Party fails to comply with any of its obligations hereunder, the other Party shall have the right to pursue all rights and remedies which may be available to it at law or in equity, including without limitation the specific performance of any such obligations.

23. Interpretation of this Agreement. The Parties acknowledge that each Party has reviewed, negotiated and revised this Agreement and that the normal rule of construction that any ambiguities are to be resolved against the drafting party shall not be employed in

the interpretation of this Agreement or any document executed and delivered by either Party in connection with the transactions contemplated by this Agreement. The paragraph headings used in this Agreement are for reference only, and shall not in any way limit or amplify the terms and provisions hereof, nor shall they enter into the interpretation of this Agreement.

24. Effective Date and Term. This Agreement shall be effective on the date stated in the preamble and shall terminate upon the happening of any of the following: (i) the cancellation of the purchase of the Housing Unit by Employee and Co-Borrower; (ii) the sale of the Housing Unit and repayment of the District Assistance Loan; (iii) District's purchase of the Housing Unit; or (iv) repayment of the District Assistance Loan pursuant to Section 1~~3~~2.

25. Recitals. The recitals on pages 1 and 2 of this Agreement are true and are made of this Agreement.

26. Notices. All notices required to be given by any Party shall be made in writing and shall be effectuated (i) by personal delivery, (ii) via reputable overnight courier service, or (iii) by mail, registered or certified, postage prepaid with return receipt requested. Notices sent by overnight courier or mail must be addressed to the Parties at their addresses shown below, but each Party may change its designated address by giving written notice to the other Party in accordance with the provisions of this Paragraph 27. Notices delivered personally shall be deemed communicated as of the date of actual receipt; notices sent via overnight courier shall be deemed communicated as of the date delivered by the courier; and mailed notices shall be deemed communicated as of the date of receipt or the third day after mailing, whichever occurs first. The Parties' addresses are as follows:

Employee:
____
____
__________, CA 93___

District:
Mammoth Community Water District
Attn: General Manager
P.O. Box 597
1315 Meridian Blvd.
Mammoth Lakes, CA 93546

IN WITNESS WHEREOF, this Agreement is made effective as of the date set forth in the preamble as follows:

MAMMOTH COMMUNITY WATER DISTRICT:

By: ______________________________
__________________, General Manager

EMPLOYEE:

____

[Employee Name]

CO_BORROWER

____

[Co-Borrower's Name]

Exhibit 1

For each example, the following facts and assumptions apply

Purchase Price	$375,000		
Primary Loan	$168,750	} 50% of purchase price	
Employee Contribution	$18,750		
District Assistance Loan	$187,500	50% of purchase price	(46.875% of Purchase price+capital improvements)
Capital Improvements	$25,000		

Employee sells after 10 years having paid $35,000 in principal of the primary loan.

Closing cost at sale	$25,000

SF Fed Reserve rate to member banks is .75%. District's maximum interest rate is 10% per annum.

Example 1: Sale Price $525,000 (Appreciation of $150,000)

Because there are sufficient sale proceeds, each of the following are paid in full: (¶11(a)) Closing Costs $25,000; (¶11(b)) Primary Loan $133,750; (¶11(c)) District Assistance Loan $187,500; (¶11(d)) Employee Capital Improvements + Employee Contribution + Primary Loan principal payments $78,750.

The balance remaining of $100,000 is the "Remaining Gross Sale Proceeds." 46.875% of it equals $46,875. This is within the maximum amount of interest proceeds that District may be distributed of $298,827, which would be the interest on the District Assistance Loan at 10% for 10 years. District is distributed $46,875 of the Remaining Gross Sale Proceeds. Employee is distributed the remaining $53,125.

Example 2: Sale Price $1,075,000 (Appreciation of $700,000)

Like Example 1, there are sufficient sale proceeds to pay all distributions of ¶¶11(a)-11(d) totaling $425,000.

Remaining Gross Sale Proceeds are $650,000. 46.875% equals $304,688. District may be distributed only $298,827 in Remaining Gross Sale Proceeds, which is the maximum amount of interest allowed pursuant to 11(e)(1). The $351,173 balance of the appreciation proceeds go to Employee.

Example 3: Sale Price $395,000 (Appreciation $20,000)

The following will be paid in full because there are sufficient proceeds from the sale: (¶11(a)) Closing Costs $25,000; (¶11(b)) Primary Loan $133,750; (¶11(c)) District Assistance Loan $187,500; (¶11(d)) Employee Contribution $18,750.

There is, however, only $30,000 remaining from the sale. This amount is insufficient to pay the $60,000 Employee made in capital improvements and primary loan principal payments. Because this distribution is lower in priority than the distributions provided above, Employee will only receive $30,000 towards the principal paid on the loan, and zero towards the capital improvements made. There are no Remaining Gross Sale Proceeds.

MAMMOTH COMMUNITY WATER DISTRICT
EMPLOYEE HOME DOWN PAYMENT ASSISTANCE AGREEMENT
(Subordinate Loan Program)

This Employee Home Down Payment Assistance Agreement – Subordinate Loan Program ("Agreement") is made and entered into this ___________, 20__, at Mammoth Lakes, California, by and between the Mammoth Community Water District, a California special district ("District"), and [name] ("Employee") and [spouse name] ("Co-Borrower")(collectively referred to as the "Parties" and individually as a "Party"), and is made with reference to the following facts:

Recitals:

A. District has a vested interest in employing and retaining productive employees;

B. District is located in the Town of Mammoth Lakes, which is a high-cost housing market, and is desirous of assisting its employees in purchasing homes in District's geographic area in order to ensure that its employees secure proper housing and are incentivized to continue their employment with District;

C. Employee presently holds the position with District of [title of position];

D. Employee has completed and submitted to District an application that includes a pre-qualifying loan statement completed by a qualified lender providing evidence of financing for the maximum amount the lender is willing to loan to Employee for purchase of a residence for Employee and Co-Borrower, and represents that the information in [his/her] application was and is truthful and accurate;

E. District has provided a letter to Employee dated ___________, 20__ informing [him/her] that for up to 120 days from the date of the letter, Employee is eligible to receive a maximum amount of $_______ in financial assistance ("Eligibility Amount") from District in the form of a secured variable interest rate loan, as that term is defined below, for the purchase by Employee and Co-Borrower of a residential unit that meets the criteria specified in District's Employee Home Purchase Assistance Program Policy ("Policy"), which is located at [address] ("Housing Unit");

F. Employee and Co-Borrower haves made an offer to purchase the Housing Unit at a price that is a reasonable estimate of the fair market value of that property, and said offer provides that the close of escrow is conditioned on District's approval of the purchase price, structural soundness, and code compliance;

G. District has provided to Employee written notification of its approval of Employee's and Co-Borrower's purchase of the Housing Unit in the amount of $_______ ("Purchase Price"), having concluded that District's criteria for purchase price (said purchase price not being greater than 110% of the appraised value), structural soundness and code compliance are satisfied after causing an inspection of, and reviewing the Employee-provided appraisal report by a certified appraiser, of the Housing Unit; and

H. District and Employee have negotiated this Agreement respecting District's financial assistance to the Employee- for the purchase of the Housing Unit, which Employee and Co-Borrower intends to use as their[his/her] primary home, subject to the terms and conditions of this Agreement and the Policy.

I. Co-Borrower intendagrees to be bound by the same terms and conditions as Employee with respect to the Employee's participation in the Program and with respect to District's provision of the Eligibility Amount to the Employee for Employee's and Co-Borrower's purchase of the Housing Unit.

Agreement:

NOW, THEREFORE, the Parties agree as follows:

1. Method of Purchase of Home. Funds used to purchase the Housing Unit shall be comprised of the "District Assistance Loan", the "Employee Contribution", and the "Primary Loan" as provided herein:

a. District Assistance Loan.

i. The District shall contribute up to $_______ to Employee toward Employee's and Co-Borrower's purchase of the Housing Unit (the "District Assistance Loan"), provided the amount of District Assistance Loan does not exceed the: (1) the Eligibility Amount; (2) 35% of the Purchase Price; or (3) $400,000. If the purchase of the Housing Unit by Employee and Co-Borrower fails for any reason, the District Assistance Loan shall be returned to District.

ii. The District Assistance Loan shall be made in the form of a "secured variable interest rate loan," with a term ending (date 15 years from date of agreement), 15 years from the date of this Agreement. The interest rate shall be set initially at the yield of the 10-year Treasury note on the first business day of the first year of the loan. The rate will be adjusted thereafter during the term of the loan on each subsequent January 1. The interest rate each year will be set at the yield of the 10-year Treasury note on the first business day of that year. The total amount of interest due for each year must be paid by Employee and Co-Borrower on or before the first business day of each following year, such that the loan balance is kept to the original loan amount. No compounding of the loan is permitted. Employee and Co-Borrower may pay any portion of the principal balance of the loan at any time with no prepayment penalty.

iii. Upon expiration of the 15-year term, this Agreement shall terminate and Employee and Co-Borrower shall be required to pay off the principal amount of the District Assistance Loan and all accrued interest by payment in cash, refinancing of the primary loan to a higher amount, or sale of the Housing Unit and repayment of the District loan from the sale proceeds. The General Manager shall have the discretion to approve another means of payment, provided that the alternative form of payment results in the District obtaining full repayment of the entire loan principal and all accrued interest due.

iv. Employee and Co-Borrower shall execute a recordable document with the Mono or Inyo County Recorder, which may be a deed of trust, securing the obligations created hereunder.

v. The District Assistance Loan must be paid in full upon the earliest of the following: (1) on Employee's and Co-Borrower's sale or other conveyance of the Housing Unit; (2) one year after Employee death; (3) if Employee is then alive, six months after (i) Employee's separation from employment at District, or (ii) Employee no longer uses the Housing Unit as [his/her] principal place of residence; (4) upon Employee's or Co-Borrower's filing for protection under the Bankruptcy Act; (5) upon the award of all or any portion of the Housing Unit to Co-Borrower ~~Employee's spouse~~ in a proceeding for legal separation or for dissolution of marriage; or (6) upon condemnation of the Housing Unit.

vi.The District Assistance Loan shall not be assumable or transferable.

vii. Upon close of escrow for the Housing Unit, the Housing Unit may have a lien securing the Primary Loan, as defined below, which lien may be superior to the lien of the District Assistance Loan, but shall not be subject to any other mortgage, deed of trust, lien or other adverse encumbrance, except for real property taxes and special assessments and other encumbrances specifically approved by District.

viii. Nothing in this Agreement shall be construed as creating a joint venture or other partnership relationship between Employee and Co-Borrower and District. Employee and Co-Borrower and District have solely a debtor/creditor relationship arising from this Agreement.

b. Primary Loan.

Employee's and Co-Borrower's primary lender shall provide a first loan of $_______ for purchase of the Housing Unit ("Primary Loan"). Employee's and Co-Borrower's primary lender is [name of primary lender]. The Primary Loan must be a fully amortized fixed rate loan for a term not to exceed 30 years.

c. Employee's Contribution.

Employee and Co-Borrower shall contribute a down payment of at least $_____, which is the balance of the Purchase Price of the Housing Unit ("Employee Contribution"). The Employee Contribution shall be at least 5% of the total Purchase Price. The Employee Contribution shall not include any proceeds from a loan that is secured by the Housing Unit, including the Primary Loan or the District Assistance Loan.

2. Execution of Documents. The Parties shall cooperate in the preparation and execution of all documents necessary to conform the purchase of the Housing Unit to the provisions of this Agreement.

3. No additional mortgages or liens. Except for liens for property taxes, assessments, the deed of trust securing the Primary Loan, and the deed of trust or other security for the District Assistance Loan, Employee and Co-Borrower shall not refinance the Primary Loan or cause any mortgage, deed of trust, lien, encumbrance or other cloud upon title to be

recorded against the Housing Unit or to attach to the real property except as expressly authorized by the District's Board of Directors. Employee and Co-Borrower shall not cause any delinquency in property taxes or any special assessment. Any refinancing of the Primary Loan shall not impair the District Assistance Loan and shall conform with the requirements of the Policy. Under no circumstances may Employee or Co-Borrower place anyone on title after the close of escrow for the purchase of the Housing Unit without District's prior written agreement.

~~4. Consent of Spouse. If Employee later marries, [he/she] shall notify District of the marriage as soon as possible. Upon receipt of such notice from Employee, District may request that Employee and Employee's spouse enter into an amendment to this Agreement for the purpose of obtaining Employee's spouse's consent to comply with the terms of this Agreement. Any refusal by Employee's spouse to execute an amendment to this Agreement as requested by District shall be deemed a breach if this Agreement in accordance with the terms of Section 5 below. This provision also shall apply if Employee enters into a registered domestic partnership in accordance with Family Code sections 297 and following.~~

~~5.~~4. Breach of Agreement. It shall be a breach of this Agreement for Employee or Co-Borrower to violate any covenant, condition or restriction in this Agreement, or to default in payment or other obligation due to be performed under a promissory note secured by a deed of trust encumbering the Housing Unit, or to breach any of the Employee's and Co-Borrower's duties or obligations under said deed of trust. Employee and Co-Borrower must notify District, in writing, of any notification received from a lender, or its assigns, of past due payments or default payment or other obligations due or to be performed under a promissory note secured by a first deed of trust, as described herein, or of any breach of any of Employee's and Co-Borrower's duties or obligations under said deed of trust, within five calendar days after Employee's and Co-Borrower's notification from lender, or its assigns, of said default or past due payments or breach.

Upon receipt of notice as provided in the above paragraph, District shall have the right, in its sole discretion, to cure the default or any portion thereof. In such event, Employee and Co-Borrower shall be personally liable to District for past due payments made by District, together with interest thereon at a rate specified in the promissory note secured by the first deed of trust, plus one percent (1%) and all actual expenses of District incurred in curing the default. Employee and Co-Borrower may cure the default and satisfy [his/her] obligation to District under this Agreement at any time prior to execution of a contract for sale, upon such reasonable terms as specified by District. Otherwise, Employee's and Co-Borrower's indebtedness to District shall be satisfied from Employee's and Co-Borrower's proceeds at closing or paid by Employee and Co-Borrower at the time of the repayment of the District Assistance Loan pursuant to Section 9~~10~~ of this Agreement.

~~6~~5. Property Taxes and Insurance. Employee and Co-Borrower shall pay all property taxes, assessments and homeowner association dues, if applicable, and all premiums for required insurance coverages for the Housing Unit without reimbursement from District. At purchase, Employee and Co-Borrower shall be required to purchase the most comprehensive, maximum limits homeowner's insurance coverage available, including full code upgrades. If the Housing Unit is located within a FEMA-designated flood zone requiring the purchase of a flood insurance policy, Employee and Co-Borrower also shall obtain a flood insurance policy for the Housing Unit. In addition, Employee and Co-Borrower shall obtain an earthquake insurance policy for the Housing Unit. Employee and Co-

Borrower also shall secure at least a standard form full coverage CLTA title insurance policy on the Housing Unit. All insurance policies shall be issued in an amount not less than the purchase price or appraised value of the Property, whichever is greater and Employee and Co-Borrower shall pay all premiums. Employee and Co-Borrower shall be required to continue such insurance for the term of this Agreement; and not less than every two years from the close of escrow on the Housing Unit, Employee and Co-Borrower shall be required to increase the insurance coverage in amounts consistent with the Housing Unit's estimated appreciation. All policies of insurance shall state the respective interests of the Parties and provide that the proceeds of any such insurance shall be paid to the Parties as their respective interests may appear. Nothing in this Agreement shall be construed to create in District an obligation to pay property taxes, assessments, homeowner association dues, or insurance premiums for the Housing Unit.

~~7~~6. Maintenance. Employee and Co-Borrower shall maintain the Housing Unit in good condition and shall be solely responsible for all maintenance and repair costs, including uninsured losses. Employee and Co-Borrower shall pay all contractor invoices when due and shall not incur any mechanics lien or stop notice on the Housing Unit.

~~8~~7. Capital Improvements. Employee and Co-Borrower may make, at ~~[his/her]~~ their sole expense, such reasonably necessary structural improvements to the Housing Unit as he or she deems beneficial. The District will not contribute any funds to such improvements.

~~9~~8. District's Right of First Refusal. In the event the Housing Unit is offered for sale during the term of this Agreement, District shall have the first right to purchase the Housing Unit in accordance with the following provisions. If Employee and Co-Borrower desire~~s~~ to sell the Housing Unit, ~~[he/she]~~they shall first offer in writing to sell such Unit to District. If District desires to purchase the Housing Unit, it shall so advise Employee and Co-Borrower in writing within 20 days from the date of Employee's and Co-Borrower's written offer, unless the Parties agree to an extension in writing. In the event District desires to purchase the Housing Unit, then within 45 days from District's written notice of such desire, District and Employee and Co-Borrower shall agree on a certified appraiser to perform an appraisal of the Housing Unit. If the Parties cannot agree on a certified appraiser, then District shall have the right to select such appraiser. The appraisal shall be paid for by District. The appraisal shall determine the then fair market value of the Housing Unit. If District desires to pursue the purchase of the Housing Unit based on the appraisal, District shall submit the amount of the appraised value into an escrow opened for the consummation of the sale within 30 days after receipt of the appraisal report. In order to effect the conveyance of the Housing Unit from Employee and Co-Borrower or ~~Employee's~~ their successor to District, the Parties shall open an escrow with a mutually agreed title company within 30 days after District gives written notice of its desire to purchase the Housing Unit. District shall receive good, clear marketable title to the Housing Unit. If District desires title insurance, the premium for that insurance shall be at its expense. If District so elects, the Parties shall execute, and District shall record, a memorandum reflecting District's rights under this Section 8~~9~~.

____ **Employee Shall Initial To Acknowledge That [He/She] Understands That [He/She] is Conveying to District a Right of First Refusal, As Provided Herein.**

Co-Borrower Shall Initial To Acknowledge That [He/She] Understands That [He/She] is Conveying to District a Right of First Refusal, As Provided Herein.

109. Repayment of District Assistance Loan Upon Other Than a Sale Event.

a. Events Triggering Repayment of District Assistance Loan. Upon any of the following events during the term of this Agreement, Employee and Co-Borrower immediately shall repay the District Assistance Loan in accordance with the provisions of paragraph b. below: (i) upon condemnation of the Housing Unit; (ii) the award of all or any portion of the Housing Unit to Co-Borrower Employee's spouse in a proceeding for legal separation or for dissolution of marriage; (iii) upon the Employee or Co-Borrower filing for protection under the Bankruptcy Act; (iv) death of the Employee or termination of Employee from District employment; (v) upon any other event other than a sale event whereby Employee no longer occupies the Housing Unit as [his/her] principal residence; or (vi) a breach of this Agreement that is not cured by Employee and Co-Borrower.

b. Amount Paid to District. Upon the occurrence of any of the events described in paragraph a. above, Employee and Co-Borrower shall repay to District the principal amount of the District Assistance Loan, plus any unpaid interest due as calculated according to the provisions of Section 1.a.ii. of this Agreement.

110. Employee and Co-Borrower Purchase of District's Interest; Refinancing of Primary Loan. At any time during the term of this Agreement, Employee and Co-Borrower may propose to purchase District's interest in the Housing Unit. The proposed purchase shall be subject to the applicable conditions and procedures provided in Section 15 of the Policy. Employee and Co-Borrower also may request to refinance the Primary Loan. Any request for refinancing of the Primary Loan will be subject to the conditions and procedures provided in Section 16 of the Policy.

11. Tax Consequences. Each Party shall be solely responsible for its own tax consequences arising out of this Agreement, as well as its own tax consequences arising out of any transaction consummated to which the provisions of this Agreement apply.

123. Warranties and Representations. The Parties warrant and represent that no promise or inducement has been offered or made for this Agreement except as set forth herein, that this Agreement is executed without reliance on any statement or any representations not contained herein, including all exhibits, and that this Agreement reflects the entire agreement between the Parties. The warranties and representations made herein shall survive the execution and delivery of this Agreement, and shall be binding upon the respective heirs, representatives, successors and assign of each of the Parties.

134. Entire Agreement. This Agreement is freely and voluntarily entered into by the Parties after having had the opportunity to consult with their respective attorneys. This Agreement represents the entire agreement of the Parties, and may be modified, amended or otherwise altered only upon written consent of the Parties.

1~~5~~4. Assignment. The Parties acknowledge and agree that this Agreement is not assignable by any Party, unless approved in writing by each of the Parties.

15. Attorney's Fees and Costs. If any arbitration, action at law or in equity, or other proceeding is brought to enforce or interpret the provisions of this Agreement, the prevailing party shall be entitled to reasonable attorney's fees in addition to any other relief to which it may otherwise be entitled.

16. Binding Effect. Subject to the provisions of Paragraph 14~~5~~, this Agreement shall inure to the benefit of and be binding upon the heirs, assigns and successors in interest of the Parties.

~~16.~~17. Counterparts. This Agreement may be executed in multiple counterparts.

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~~17.~~18. Additional Documents. The Parties agree to execute such additional documents and do such further things as are reasonably necessary to effectuate the purposes of this Agreement.

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~~18.~~19. Waiver of Rights. Any waiver at any time by any Party of its rights with respect to a breach or default, or any other matter arising in connection with this Agreement, shall not be deemed to be a waiver with respect to any other breach, default or matter.

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~~19.~~20. Remedies Not Exclusive. The use by any Party of any remedy specified herein for the enforcement of this Agreement is not exclusive and shall not deprive the Party using such remedy of, or limit the application of, any other remedy provided by law. In addition, if any Party fails to comply with any of its obligations hereunder, the other Party shall have the right to pursue all rights and remedies which may be available to it at law or in equity, including without limitation the specific performance of any such obligations.

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~~20.~~21. Interpretation of this Agreement. The Parties acknowledge that each Party has reviewed, negotiated and revised this Agreement and that the normal rule of construction that any ambiguities are to be resolved against the drafting party shall not be employed in the interpretation of this Agreement or any document executed and delivered by either Party in connection with the transactions contemplated by this Agreement. The paragraph headings used in this Agreement are for reference only, and shall not in any way limit or amplify the terms and provisions hereof, nor shall they enter into the interpretation of this Agreement.

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~~21.~~22. Effective Date and Term. This Agreement shall be effective on the date stated in the preamble and shall terminate upon the happening of any of the following: (i) the cancellation of the purchase of the Housing Unit by Employee and Co-Borrower; (ii) the sale of the Housing Unit and repayment of the District Assistance Loan; (iii) District's purchase of the Housing Unit; or (iv) repayment of the District Assistance Loan pursuant to Sections 1.a.iii or 9~~10~~.

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~~22.~~23. Recitals. The recitals on pages 1 and 2 of this Agreement are true and are made of this Agreement.

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~~23.~~24. Notices. All notices required to be given by any Party shall be made in writing and shall be effectuated (i) by personal delivery, (ii) via reputable overnight courier service, or (iii) by mail, registered or certified, postage prepaid with return receipt requested. Notices sent by

Formatted: Numbered + Level: 1 + Numbering Style: 1, 2, 3, … + Start at: 15 + Alignment: Left + Aligned at: 0.25" + Tab after: 0.75" + Indent at: -0.25" overnight courier or mail must be addressed to the Parties at their addresses shown below, but each Party may change its designated address by giving written notice to the other Party in accordance with the provisions of this Paragraph 245. Notices delivered personally shall be deemed communicated as of the date of actual receipt; notices sent via overnight courier shall be deemed communicated as of the date delivered by the courier; and mailed notices shall be deemed communicated as of the date of receipt or the third day after mailing, whichever occurs first. The Parties' addresses are as follows:

Employee and Co-Borrower:
____
____
__________, CA 93___

District:
Mammoth Community Water District
Attn: General Manager
P.O. Box 597
1315 Meridian Blvd.
Mammoth Lakes, CA 93546

IN WITNESS WHEREOF, this Agreement is executed as of the date first above written as follows:

MAMMOTH COMMUNITY WATER DISTRICT:

By: ________________________________
_________________, General Manager

EMPLOYEE:

____
[Employee Name]

CO-BORROWER

____
[Co-Borrower Name]

MAMMOTH COMMUNITY WATER DISTRICT

EMPLOYEE HOME PURCHASE ASSISTANCE PROGRAM POLICY

Adopted: January 17, 2008
Amended: July 21, 2016
Amended: June 20, 2019

1. PURPOSE

The Mammoth Community Water District values its employees. It is the policy of the Mammoth Community Water District to promote employee recruitment and retention. To that end, the Mammoth Community Water District Employee Home Purchase Assistance Program ("Program") is designed to facilitate home ownership for District employees ("Employee") and to provide an incentive for recruiting potential employees to ensure the District maintains the most skilled and professional workforce possible. The Program offers two options for home loan assistance: (1) a Shared Value Program, under which the District will contribute up to 50 percent of the home purchase price and share appreciation in value with the Employee upon sale, and (2) a Subordinate Loan Program, under which the District will lend up to 35 percent of the home purchase price in a loan with a maximum term of 15 years and a variable interest rate set each year according to the yield on 10-year Treasury note on the first business day of the year.

2. PROGRAM FUNDING

The Program shall be financed through the "New Enterprise Fund", which is funded as determined by the Board of Directors from a portion of the District's share of property tax revenues received from Mono County. Nothing in this Policy precludes a change in funding or termination of the Program as may be determined in the Board's sole discretion.

3. PROGRAM ELIGIBILITY

Homes purchased pursuant to the Program must be located within Mono and Inyo Counties. The purchased home must be the principal place of residence for the Employee. Housing unit types eligible for assistance shall be new or previously owned single-family detached houses, town homes, condominiums, or manufactured homes in mobile home parks or on a single-family lot and placed on a permanent foundation system ("Housing Unit").

Employees or their spouses who hold title to a single-family residence outside of Mono or Inyo County at the time of applying for Program assistance may retain such residences. An Employee applying for Program assistance may not own unimproved real property in Inyo and Mono County.

4. CONDITION OF HOUSING UNIT

Prior to a final commitment of District funds and prior to close of escrow on the purchase by the Employee, the Housing Unit under consideration shall be inspected by a home inspector or other professional approved by the District to determine if it is structurally sound, and identify any code-related and health and safety deficiencies that need to be corrected. The cost of the home inspection shall be paid by the Employee, and a copy of the final report provided to the District. All Housing Units to be purchased under the Program must be in compliance with State and local codes and ordinances. The District inspection and its approval of the remediation of any deficiencies shall be made a condition of the close of escrow for the purchase of the Housing Unit.

5. EMPLOYEE SELECTION PROCESS

All Program assistance shall be given on a first-come, first-served basis to full-time permanent Employees who have been employed by the District for at least 12 months, in accordance with the rules and procedures of the Program as set forth in this Policy.

6. EMPLOYEE HOME PURCHASE ASSISTANCE PROGRAM PROCESS

An Employee must complete an application and return it to the District's General Manager with all required information, including a pre-qualifying loan statement completed by a lender providing evidence of financing for the maximum amount that the primary lender is willing to loan to the Employee ("Primary Loan"). The application must designate which of the two assistance options the Employee is proposing to use.

Upon determination of eligibility for the Program, the Employee will receive a letter from the District stating the approximate amount of down payment assistance for which the Employee is eligible. This letter also will provide that the amount of assistance will be available for a period of up to 120 days after the date of the letter.

Once a suitable Housing Unit has been located, the Employee makes an offer to purchase. The offer must be an estimate of the fair market value of the Housing Unit. The offer must provide that the close of escrow shall be conditioned on the District's approval of the purchase price, District inspection as set forth above, and compliance with all applicable building codes. The Employee will submit a copy of the final purchase contract to the District.

The Employee shall provide the District with a copy of a current appraisal performed by a certified professional appraiser, which appraisal establishes that the proposed purchase price is no more than 10% above the appraised value. Upon receipt of the appraisal, the District will provide written notification to the Employee approving or denying the purchase price within 10 days.

If the District approves the purchase price, it shall prepare a written agreement with the Employee that includes terms for repayment of the District's home purchase assistance and other terms specific to either the shared value program or the subordinate loan program according to the Employee's choice of program. Agreements for both programs will provide the District with a first right of refusal to purchase the Housing Unit upon sale of the unit as provided in Section 14 of this Policy. The agreement shall be reviewed by the District's legal counsel prior to submitting to the employee for signature. Once the employee has signed, the General Manager may then execute the agreement provided it complies with this policy.

Once approval has been received from the District, the Employee may proceed with the close of escrow. When the primary lender requirements and District agreement requirements are met, District shall deposit its loan funds into escrow, with required closing instructions, Note, and Deed of Trust to be executed in escrow. The Employee shall be required to secure the most comprehensive, maximum limits homeowner's insurance coverage available, including full code upgrades, in the full amount of the purchase price, which amount the Employee shall increase over time consistent with the Housing Unit's appreciation. If the Housing Unit is located within a FEMA-designated flood zone requiring the purchase of a flood insurance policy, the Employee also shall obtain a flood insurance policy for the Housing Unit. In addition, the Employee shall obtain an earthquake insurance policy for the Housing Unit. The Employee also shall secure at least a standard form full coverage CLTA title insurance policy on the Housing Unit. All insurance policies shall be issued in an amount not less than the purchase price or appraised value of the Property, whichever is greater.

The Employee shall remain current in all financial obligations of ownership of the Housing Unit, including but not limited to payment of principal and interest on the primary loan, all insurance premiums, taxes, HOA fees and special assessments, and interest on the District subordinated loan. In December of each year, employees shall submit documentation that confirms compliance with these requirements. If an employee is in default of any financial obligation and cannot promptly cure the default, he or she shall notify the General Manager as soon as possible.

7. EMPLOYEE'S PRIMARY HOME LOAN

The Primary Loan must be a fully amortized fixed rate loan from a financial institution that makes market rate loans on conventional terms. No hard money loans or other unconventional loans will be permitted. The General Manager may, however, approve a Primary Loan that is not made by a financial institution, provided that any such loan is made at a market rate on conventional market terms.

The Primary Loan and the District agreement shall not be assumable or transferable.

8. EMPLOYEE PAYMENT OF HOME PURCHASE COSTS

The Employee shall pay all costs of the appraisal required by the District, and any District Housing Unit inspection costs. Such costs will not be deemed to be part of the Employee's down payment contribution required under this section.

The Employee shall contribute at least 5 percent of the purchase price as a down payment. The District shall not pay any closing costs for an Employee's purchase of a Housing Unit, except for the cost of a lender's title insurance policy covering the amount of the District's down payment or loan. The District also shall not be liable for any additional costs of purchase, repair or for other reasons before, during or after escrow.

9. AMOUNT OF DISTRICT HOME PURCHASE ASSISTANCE

Under the Shared Value Program, the amount of the District's home purchase assistance will be up to 50 percent of the purchase price with a $400,000 cap, and will be in the form of a loan without interest. In lieu of paying interest, the Employee shall share with the District the amount of the Housing Unit's appreciation realized upon sale as further provided in Section 10 of this Policy.

Under the Subordinate Loan Program, the amount of the District's loan to an Employee will be up to 35 percent of the purchase price with a $400,000 cap, and will be in the form of a loan with interest payable annually as further provided in Section 10 of this Policy.

10. DISTRICT HOME PURCHASE ASSISTANCE REPAYMENT

For the Shared Value option, the District will share with the Employee any gain in value at the time the property is sold. Upon sale of the Housing Unit, the proceeds of sale shall be allocated in the following order:

(a) The costs of sale, including but not limited to escrow fees, real estate broker's fees, and related expenses, shall first be deducted from the gross sales price.

(b) The Primary Loan shall be paid in full from the proceeds of the sale via escrow. In the event the gross sale proceeds are insufficient to pay the Primary loan balance, the District shall not be liable for payment of the Primary Loan.

(c) To the extent gross sale proceeds remain, the District shall be distributed an amount equal to the amount that the District contributed to the Employee's purchase of the Housing Unit (this distribution does not include any apportionment arising from the Appreciation Proceeds discussed below).

(d) To the extent gross sale proceeds remain, the Employee shall receive the amount of Employee's contribution to the purchase price, plus the total amount that the Employee has then paid towards the principal of the Primary Loan, and the amount that the Employee was credited for approved capital improvements as described in Section 13 below.

(e) Any remaining gross sale proceeds (the "Appreciation Proceeds") shall be shared between District and Employee as follows:

1. The District shall receive a percentage of the Appreciation Proceeds equal to the amount of the District's contribution to the purchase price divided by the purchase price increased by the amount credited for any approved capital improvements, although in no event may the District earn an annualized rate of (over the term of the entire down payment loan) greater than the maximum rate authorized by Section 1 of Article XV of the California Constitution. Such rate is the higher of either 10 percent per annum or 5 percent over the rate charged by the Federal Reserve Bank of San Francisco on advances to member banks on the 25th day of the month before the down payment loan (if the agreement to loan and the actual lending of the money are in different months, the 25th day of the month before the earlier events is used) per annum.

2 The Employee shall receive a percentage of the Appreciation Proceeds equal to the amount of Employee's contribution component, the Primary Loan components and the amount credited for approved capital improvements divided by the purchase price (as increased by the amount of any approved capital improvement), plus any funds, if any, the District is not entitled to receive due to the fact that the District is receiving its maximum permissible rate of return, as set forth above.

For the Subordinated Loan Program, the District's assistance to the Employee is in the form of a loan with a 15-year term and variable interest rate. The interest rate shall be set initially at the yield of the 10-year Treasury note on the first business day of the first year of the loan. The rate will be adjusted thereafter during the term of the loan on each subsequent January 1. The interest rate each year will be set at the yield of the 10-year Treasury note on the first business day of that year. The total amount of interest due for each year must be paid by the Employee on or before the first business day of each following year, such that the loan balance is kept to the original loan amount. No compounding of the loan is permissible. Any part of the principal balance of the loan may be paid at any time with no prepayment penalty.

Upon expiration of the 15-year term, the loan agreement between the District and the Employee will terminate and the Employee shall be required to pay off the principal amount of the District loan and any accrued interest by payment in cash, refinancing of the Primary Loan to a higher amount, or sale of the Housing Unit and repayment of the District loan from the sale proceeds. The General Manager shall have the discretion to approve another means of payment, provided that the alternative form of payment results in the District obtaining full repayment of the entire loan principal and all accrued interest due.

For both the Shared Value and Subordinate Loan Programs, except as otherwise provided in this Policy, the District Home Purchase Assistance must be paid in full if: (1) promptly through escrow if the Employee sells or refinances the Housing Unit; (2) within six months after (a) the Employee separates from employment with the District, or (b) the Employee no longer uses the Housing Unit as his or her principal place of residence; (3) within one year after the Employee passes away; or (4) on the catastrophic loss of the Housing Unit as further provided in Section 11 of this Policy.

11. REPAYMENT OF DISTRICT HOME PURCHASE ASSISTANCE UPON LOSS OF HOUSING UNIT

If an Employee in the Subordinated Loan Program experiences the catastrophic loss of a Housing Unit from fire, earthquake or other cause, the Employee shall repay the amount of the District Loan and any accrued interest and the existing agreement with the District shall terminate. Such repayment will be made within 10 days after the Employee's receipt of insurance proceeds in payment of the loss, unless otherwise approved by the Board. The Employee shall require that the insurance carrier make the check to pay off the District Loan payable to the District (or to the Employee and the District, in which case the Employee, and if required his or her spouse, shall endorse the check to the District).

If an Employee in the Shared Value Program experiences the catastrophic loss of a Housing Unit from fire, earthquake or other cause, the Employee shall either continue or terminate the agreement with the District in one of the methods described below.

(1) If the Employee chooses to retain the real property on which the Housing Unit stood and to rebuild the Housing Unit, the Employee may request that the District make a new District Loan to assist with construction of the new Housing Unit. The General Manager shall have the discretion to issue such a loan, provided that the loan would initially be provided in the form of a construction loan and that loan complies with the guidelines provided in this Policy. The District loan would be the last funds used by the Employee for construction after the Employee expends all insurance proceeds he or she receives for the loss of the original Housing Unit and all proceeds of any primary construction loan secured by the Employee are used. As conditions of the District providing such a loan: (1) the Employee and the District shall enter into a temporary loan agreement for construction funding at the interest rate applicable for that year as further provided in Section 10 of this Policy; (2) the Employee shall agree at the completion of construction to secure a conventional Primary Loan and to convert the District loan to a District down payment assistance shared value or subordinated loan in accordance with the terms of this Policy; and (3) the Employee shall secure all applicable insurance coverages required during the course of construction, including a builder's risk policy covering all perils in the full cost of the completed improvements. The Employee will deliver a copy of all required insurance policies to the General Manager for approval.

(2) If the Employee chooses to retain the property, but not rebuild within one year of the loss, the Employee must buy out the District's share of the agreement according to the provisions of Section 15.

(3) If the Employee chooses to sell the property without rebuilding within one year of the loss, the proceeds of the sale will be shared with the District according to the provisions of Section 10.

12. CONSENT OF SPOUSE

If an Employee is single at the time of obtaining a loan from the District under this Policy and later marries, the Employee shall promptly notify the District of his or her marriage. Upon receipt of such notice from the Employee, the District shall require the Employee and the Employee's spouse to enter into an amendment to the agreement for the purpose of obtaining the Employee's spouse's consent to comply with the terms of that agreement. The District shall require this amendment regardless of whether an Employee desires to place his or her spouse on title to the Housing Unit. Any refusal by an Employee's spouse to execute an amendment to the District agreement as required by the District shall be deemed a breach of that agreement. This provision also shall apply to an Employee who enters into a registered domestic partnership in accordance with Family Code sections 297 and following.

Under no circumstances may an Employee place anyone on title to the Housing Unit after the close of escrow for the purchase of the Housing Unit without prior written agreement of the District.

13. EMPLOYEE PROPERTY IMPROVEMENTS

The Employee may, at his or her sole discretion and expense, make such reasonably necessary capital improvements to the Housing Unit as he or she deems beneficial to it. For the Employee to receive credit in the distribution of proceeds under the Shared Value Program a capital improvement is limited to one which: (1) adds additional square footage to the Housing Unit (2) is performed with a building permit which is subsequently signed off by the governing authority, (3) which receives prior written approval from the District. No other types of improvements or any maintenance or repair expenses will be considered under this clause.

At the completion of the capital improvement, an appraisal by a certified appraiser agreed upon by the Employee and the District will be conducted at the expense of the Employee to confirm the actual value added by the capital improvement. The Employee shall be credited the lesser of: (1) the value added to the Housing Unit as determined by the appraisal or (2) the total expenses incurred by the Employee related to the capital improvement. The Employee shall provide to the District documentation that supports all expenses of the capital improvement and verifies the Employee's actual payment of all expenses. Any capital improvements that are gifted or otherwise obtained from funding sources other than the employee's own funds, including insurance reimbursements, will not be considered as qualifying capital improvements for purposes of this Policy.

This section does not apply to Employees who obtain District loans under the Subordinated Loan Program.

14. DISTRICT'S RIGHT OF FIRST REFUSAL UPON SALE OF HOUSING UNIT

The agreement between the Employee and District shall provide the District with a first right of refusal to purchase the Housing Unit if the Employee places it for sale during the term of the agreement. In such cases, the District shall be entitled to purchase the Housing Unit at its fair market value as determined by an appraisal prepared by a certified appraiser agreed upon between the Employee and the District and paid for by the District. For loans made under the Shared Value Program, the proceeds of a purchase of a Housing Unit by the District shall be allocated as provided in Section 10. For loans made under the Subordinated Loan Program, proceeds will be allocated as follows: (1) pay-off of the Primary Loan and any accrued interest; (2) pay-off of the District's loan and all accrued interest; (3) payment of costs of sale and escrow; (4) payment of any existing liens against the Housing Unit other the liens of the primary lender's first and the District's second deeds of trust; and (4) payment of all remaining proceeds to the Employee.

15. EMPLOYEE PURCHASE OF DISTRICT'S INTEREST

Employees in the Shared Value Program may request to purchase the District's interest in the Housing Unit. The Employee shall be entitled to purchase the Housing Unit at its fair market value as determined by an appraisal prepared by a certified appraiser agreed upon between the Employee and the District and paid for by the Employee. The proceeds of a purchase of the District's interest in a Housing Unit by the Employee shall be allocated in the same manner as described in the portion of Section 10 pertaining to pay-off of a shared value loan.

Employees in the Subordinated Loan Program may elect to purchase the District's interest by paying the principal balance of the District's loan and all accrued interest.

16. EMPLOYEE REFINANCING OF PRIMARY LOAN

During the term of a District loan agreement, an Employee may request to refinance his or her Primary Loan. All requests to refinance a Primary Loan shall be considered by the Board of Directors. The District shall evaluate each request in accordance with the following criteria: (1) generally, a refinancing of a Housing Unit on which a District loan exists should be for the amount of the Primary Loan's remaining principal balance for purposes such as reducing the interest rate on the Primary Loan, reducing the term of that loan, or obtaining more favorable loan terms; (2) the refinancing of the Primary Loan should not extend the term of the loan beyond its original term; and (3) if an Employee proposes to take cash out of equity, the proposed cash out amount should be for no more than the amount of equity an Employee has built through previous payments on the original loan principal and should not increase the principal balance on the Primary Loan above the original loan amount. This last requirement is imposed to help ensure that Employees avoid over-extending their credit and, in cases where the Employee has obtained a shared value loan, to protect the District's original participation interest percentage in the Housing Unit from a material reduction. The Board reserves the right to approve or reject any Employee request for District consent to a refinancing of the Primary Loan based on the proposed terms of the refinancing and the specific circumstances of each Employee's request.

17. Board Committee Review

The President of the Board of Directors shall appoint an Employee Housing Committee of the Board. The Committee shall meet at least annually to review the compliance of all participants in the Employee Home Purchase Assistance Program and consider any potential revisions to this Policy. Any revisions proposed by the Committee shall be recommended to the Board for consideration and approval.

AGENDA ITEM

Subject: Quarterly Water Supply Update

Information Provided By: Clay Murray, Operations Superintendent

Background

Due to the sustained low snowpack resulting in multi-year drought conditions from April 2012 through 2015, at the recommendation of staff the Board implemented various levels of water restrictions to conserve water supplies. With the record drought recorded in the winter of 2014-15, the Board implemented Level 3 water conservation measures in April, 2015 through April, 2017. After a massive winter in 2017 the Board modified the conservation level to Level 0 and requested the Water Supply Update be produced on a quarterly basis.

Discussion

Staff reviewed the status of both surface water and groundwater sources, and compared the available supplies against historical demands on a monthly basis. From this analysis staff projected demands and our ability to meet those demands for the 3rd quarter of 2019.

Surface water: Surface water from Lake Mary provided 99% of our supply in the April – June quarter. The flows in Mammoth Creek remained above the requirement 97% of the time during the quarter resulting in 12.34 ac/ft usage from storage during the beginning of April. Flows remained above the requirement for the remainder of the quarter. Peak runoff came in the second week of June resulting in diversions to storage and filling of the lake. Currently Lake Mary is full with 606 ac/ft in storage. We will continue to use surface water as the primary source through the summer months and groundwater to supplement as needed.

Groundwater: Staff have been closely tracking groundwater levels in all nine of the District's production wells and have observed recharge over the last year, especially in the Snowcreek Basin. Groundwater production Wells 1, 6, 10, 15, 16, 17, 18, 20, and 25 are operating as expected and are being operated as needed to supplement the demand in excess of surface water capacities.

Demand: Consumption of water for the previous quarter was as follows.

April, 114 ac/ft

May, 101 ac/ft

June, 194 ac/ft

The total demand for this quarter was 409 ac/ft. This was 28 ac/ft or 6% less than the same period in 2017 and 43 ac/ft or 9% less than the same period in 2011. This demand was 97 ac/ft or 19% less than the projected demand of 506 ac/ft. This reduction is primarily due to the late season precipitation and colder temperatures delaying the start of irrigation demand.

Demand Projections: The demand projection for the July – September quarter is based on the 2011 – 2017 average of 825 ac/ft. The monthly usage forecasts are as follows.

July, 304 ac/ft

August, 292 ac/ft

September, 229 ac/ft

Conclusion and Recommendation

In conclusion the surface and groundwater supplies are projected to meet normal demands as estimated. As anticipated, the spring runoff filled Lake Mary providing storage that will be used when the stream flows fall below the requirement later in the year. Current consumption aligns with the projections based on the 2011 – 2017 averages and the current water supply for both surface and groundwater are more than adequate to meet these demands.

Fiscal Impact

None

Requested Action

No action is recommended at this time.

AGENDA ITEM

Subject: Discussion of the Publication of the USGS Open-File Report: Hydraulic, Geochemical and Thermal Monitoring of an Aquifer System in the Vicinity of Mammoth Lakes, Mono County, California

Information Provided By: John Pedersen, District Engineer

Background

The current operator of the 40 MW geothermal power plant located near the intersection of US 395 and SR 203, ORMAT, has proposed a 30 MW expansion in the same area designated as the Casa Diablo IV Project (CD-4). The proposal requires discretionary permits from the Bureau of Land Management (BLM), United States Forest Service (USFS) and Great Basin Unified Air Pollution Control District (GBUAPCD). Environmental Documentation on the project consists of a Joint Environmental Impact Report / Environmental Impact Statement (EIR/EIS) with the GBUAPCD and BLM as respective lead agencies. The Final CD-4 EIR/EIS was released in July 2013, and the BLM and USFS released separate Records of Decision (ROD) in August 2013. The District appealed the RODs on the grounds that they do not comply with the National Environmental Policy Act. The USFS and BLM have denied the appeal to their respective RODs.

The GBUAPCD Board met to consider providing a recommendation on certification of the Final EIR to the Air Pollution Control Officer. The District provided comments during the public hearing and at a subsequent GBUAPCD Board meeting to show that the monitoring and mitigation measures in the Final EIR/EIS would not provide sufficient protection for the District's groundwater supplies. The Air Pollution Control Officer certified the EIR in spite of the District's concerns and the evidence it provided of potential harm to the water supply. The District subsequently filed a lawsuit to challenge the certification of the EIR. On June 26, 2015, MCWD's petition was denied in a Mono County Superior Court decision. The District appealed the trial court decision to the Third District Court of Appeal, but withdrew that appeal in late 2018.

Discussion

Since 2014, the United States Geologic Survey (USGS) has been working in cooperation with the BLM, Mono County, ORMAT, and the District to design and implement a groundwater monitoring program for the proposed CD-4 project. The District's role in USGS's program began by providing funding and staff resources for the USGS' sampling of eight District wells for analysis of geochemical parameters. The District then provided documentation of what this USGS program should include for monitoring to the BLM during its preparation of the monitoring program mandated by the ROD. The BLM issued the Groundwater Monitoring and Response Plan (GMRP, Version 1.0) on January 17, 2017. Since the plan was released, quarterly meetings have been held by BLM and stakeholders. GMRP Version 1.1 was released January 19, 2018 incorporating some minor changes requested by the District, but not the primary safeguards MCWD recommended for monitoring and mitigation of the CD-4 project.

After four years of USGS monitoring, including the sampling of District wells, the District contracted with Wildermuth Environmental Inc. (WEI) to analyze the new data produced by the USGS program. WEI provided its findings in a March 15, 2018 letter report showed that the new data does not support the conclusions of the EIR/EIS that there is no hydraulic connectivity between the deep geothermal aquifer and shallow aquifer system that the District uses for its groundwater supply. Using the USGS' monitoring data, the WEI report demonstrated that there is some hydraulic connectivity between the aquifer systems. The WEI letter report was peer reviewed by Hydrogeologist Dr. Robert Harrington (formerly Director of the Inyo County Water Department), who found that the methods of analysis of the WEI report were sound. He also found that the report provided analysis showing that the EIR/EIS' conclusion that there is an impermeable layer of rock between the two aquifers preventing hydraulic connection was not supported by the new data.

This month, the USGS published the peer reviewed Open-File report: Hydraulic, Geochemical and Thermal Monitoring of an Aquifer System in the Vicinity of Mammoth Lakes, Mono County, California. This report by the USGS presents its scientists' analysis of the new data and conclusions concerning the hydraulic connectivity between deep and shallow aquifers and effects observed in a shallow well during a long term flow test of a new geothermal production well. The attached WEI letter dated July 10, 2019 compares the results of both the WEI report and this new USGS report and how the new evidence shows that the EIR/EIS did not have the correct conclusions concerning hydraulic connectivity between the deep and shallow aquifers and monitoring programs for the CD-4 project need to be changed as a result of these new findings.

The recent publication of the USGS Open-File report provides the District with new evidence that additionally supports our continued efforts to have the BLM update the current GMRP to include three things:

1. Require a second deep geothermal reservoir monitoring well with a shallow nested pair monitoring well at the location MCWD has recommended and USGS supports.
2. Require an 18 month baseline monitoring period for these two new wells prior to operations starting at CD-4.
3. Establish action thresholds that define when BLM must impose modifications on CD-4 production and injection operations based on monitoring results that will avoid irreversible impacts to the quantity and quality of groundwater supplies in the shallow aquifer from which MCWD obtains water supplies.

On a local level, contact has been made with the BLM geologist managing the GMRP implementation to move forward to complete a permit for the second well pair. BLM has been working on finding an alternative site and the District will continue to evaluate these sites with input from the USGS. The site for these wells will be informed by the Authority to Construct (ATC) permits that GBUAPCD proposes to issue for two geothermal production wells to be used for the CD-4 project. These wells are located on the 15-25 well pad that is closest of all of the permitted well pads to the District's production wells. Knowing where the initial production for the CD-4 project will be located narrows the area of useful deep geothermal aquifer monitoring locations. The District will engage BLM to pursue the above changes to the GMRP at all levels and hopes to cooperate with Ormat in using its well driller and expertise in drilling the additional monitoring well.

Fiscal Impact

Our funding of the USGS monitoring of District wells has contributed to the publication of the USGS Open-File report. Continuing this funding provides important data vital to monitoring CD-4 effects on the shallow groundwater aquifer.

Requested Action

The information has been provided for information and discussion, and no specific actions are recommended.

Hydraulic, Geochemical, and Thermal Monitoring of an Aquifer System in the Vicinity of Mammoth Lakes, Mono County, California, 2015–17

Open-File Report 2019–1063

U.S. Department of the Interior
U.S. Geological Survey

Cover photo: View of Twin Lakes near Mammoth Lakes, California. Photograph ©iStockphoto.com/RiverNorthPhotography.

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Open-File Report 2019–1063

U.S. Department of the Interior
U.S. Geological Survey

U.S. Department of the Interior
DAVID BERNHARDT, Secretary

U.S. Geological Survey
James F. Reilly II, Director

U.S. Geological Survey, Reston, Virginia: 2019

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Funding for the drilling of the multiple-completion monitoring wells 14A-25 and 28A-25, which were installed by the U.S. Geological Survey (USGS), was provided through Mono County; the sources were a California Energy Commission grant and Ormat Technologies, Inc. (grantee). Funding for the subsequent USGS monitoring work at these wells was provided by Ormat through a joint funding agreement with Mono County. The funding for monitoring water chemistry in eight Mammoth Community Water District (MCWD) wells was provided to the USGS by the MCWD through a joint funding agreement with the USGS. Funding for the drilling of the multiple-completion monitoring well BLM-1, also installed by the USGS, was provided by the Bureau of Land Management.

Steve Ingebritsen, Michael Rosen, and John Izbicki of the USGS provided constructive technical reviews and suggested numerous improvements to the main text. Kolja Rotzoll and Andy Long of the USGS provided constructive technical reviews of the “Development of Digital Atmospheric-Loading and Earth-Tide Filters” section of the main text and appendix 2. Wes Hildreth of the USGS provided insightful discussions regarding the geology of the study area and described drill cuttings from the monitoring wells 14A-25, 28A-25, and BLM-1.

Contents

Figures

Tables

Conversion Factors

U.S. customary units to International System of Units

Multiply	By	To obtain
	Length	
inch (in.)	2.54	centimeter (cm)
inch (in.)	25.4	millimeter (mm)
inch (in.)	25,400.0	micrometer (µm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
mile, nautical (nmi)	1.852	kilometer (km)

International System of Units to U.S. customary units

Multiply	By	To obtain
	Length	
micrometer (µm)	0.00003937	inch (in.)
centimeter (cm)	0.3937	inch (in.)
meter (m)	3.281	foot (ft)
meter (m)	1.094	yard (yd)
	Volume	
milliliter (mL)	0.03381402	ounce, fluid (fl.oz)
liter (L)	33.81402	ounce, fluid (fl. oz)
	Mass	
gram (g)	0.03527	ounce, avoirdupois (oz)
kilogram (kg)	2.205	pound avoirdupois (lb)
kilogram per second (kg/s)	2.205	pound per second (lb/s)
	Pressure	
kilopascal (kPa)	0.009869	atmosphere, standard (atm)
kilopascal (kPa)	0.01	bar
kilopascal (kPa)	0.2961	inch of mercury at 60°F (in Hg)
kilopascal (kPa)	0.1450	pound-force per inch (lbf/in)
	Energy	
joule (J)	0.0000002	kilowatthour (kWh)

Temperature in degrees Celsius (°C) may be converted to degrees Fahrenheit (°F) as

$$°F = (1.8 \times °C) + 32.$$

Temperature in degrees Fahrenheit (°F) may be converted to degrees Celsius (°C) as

$$°C = (°F – 32) / 1.8.$$

This report uses dual units (both U.S. customary units and International System of units) to reflect the native measurement units of the various data types presented.

Datum

Vertical coordinate information is referenced to the North American Vertical Datum of 1988 (NAVD 88).

Horizontal coordinate information is referenced to the North American Datum of 1983 (NAD 83).

Supplemental Information

Specific conductance is given in microsiemens per centimeter at 25 degrees Celsius (µS/cm at 25 °C).

Concentrations of chemical constituents in water are given in either milligrams per liter (mg/L) or micrograms per liter (µg/L).

Abbreviations

BAL	Big Alkali Lake
BLM	Bureau of Land Management
BLS	below land surface
BTC	below top of casing
C	Celsius
CD-4	Casa Diablo IV Geothermal Power Project
FA	filtered acidified
FHCD	Fish Hatchery CD spring group
FU	filtered untreated
g/kg	grams per kilogram
g/L	grams per liter
GMWL	Global Meteoric Water Line
HCFW	Hot Creek Gorge Spring
IBW	inorganic blank water
LVEW	Long Valley exploratory well
MCWD	Mammoth Community Water District
NWIS	National Water Information System
NWQL	National Water Quality Laboratory
PRT	platinum resistance temperature

RDP	Research Drilling Program
RPD	relative percent difference
TDS	total dissolved solids
USGS	U.S. Geological Survey

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Abstract

Since 2014, the U.S. Geological Survey has been working in cooperation with the Bureau of Land Management, Mono County, Ormat Technologies, Inc., and the Mammoth Community Water District to design and implement a groundwater-monitoring program for the proposed Casa Diablo IV Geothermal Power Project in Long Valley Caldera, California, to characterize baseline groundwater-level, water-temperature, and water-chemistry conditions at dedicated monitoring wells and municipal supply wells. The publicly available data and the analyses provided here represent quality-assured and peer-reviewed information to help with the management of the thermal and non-thermal water resources beneath and in the vicinity of the town of Mammoth Lakes, California.

The methods of data collection for continuous water levels and quarterly water-temperature profiles for two 600-foot-deep monitoring wells during 2016 through 2017 are discussed. Also discussed are the methods of water-sample collection and characterizations of the water chemistry in numerous wells in the multilayered aquifer system beneath Mammoth Lakes. Additionally, the methodology used to develop digital (mathematical) filters to remove or reduce the effects of barometric pressure and solid Earth tides on the continuous water-level records is discussed.

Digitally filtered water levels for a 2017 flow test of a deep geothermal production well are described, and various aquifer responses observed during the flow test are discussed. These are further considered in a companion evaluation of potential physical and chemical influences on the water-level data collected during the flow test.

The digitally filtered water-level data indicated that some hydraulic communication exists between the deep geothermal aquifer and shallow groundwater aquifer at the location of the flow test, northeast of Mammoth Lakes. Groundwater-chemistry data from three wells indicated that shallow groundwater naturally mixes with a small component of geothermal water along the northern periphery of the shallow aquifer system at Mammoth Lakes.

Introduction

Since 1987, the U.S. Geological Survey (USGS) has conducted hydrologic monitoring to help assess potential effects from geothermal power development near Mammoth Lakes, California. As part of the Long Valley Hydrologic Advisory Committee (LVHAC), the USGS has monitored fluid pressure (hydraulic heads or water levels) and temperature (Farrar and others, 2010) in the shallow cold-water and deeper thermal aquifers in the south moat of the Long Valley Caldera (fig. 1), temperature and discharge of thermal springs, and water quality of streams and springs. These publicly available data have been provided to the LVHAC, which is composed of representatives of Federal, State, County, and local agencies as well as the geothermal power developer Ormat Technologies, Inc. (Ormat), for the oversight and management of the geothermal resource on public lands. Hydrologic monitoring was initially focused on potential impacts of fluid production and injection at the Casa Diablo geothermal power plant at the intersection of US Highway 395 and California State Route 203, approximately 2.7 miles (mi) east of the town of Mammoth Lakes (fig. 2; Howle and Farrar, 1996, 2001).

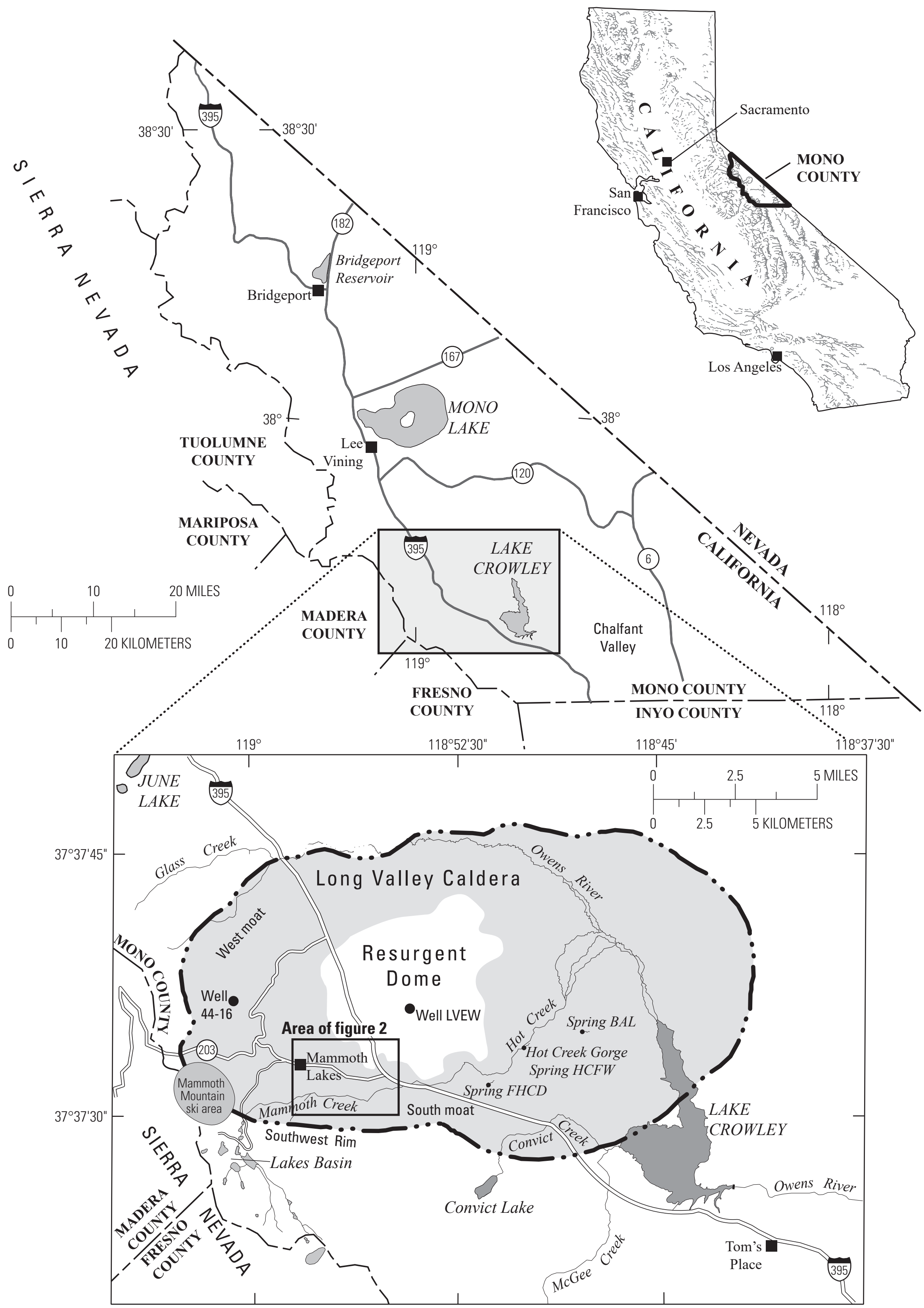

Figure 1. Location of study area, selected thermal springs, and wells in Long Valley Caldera, Mono County, California. LVEW, Long Valley exploratory well.

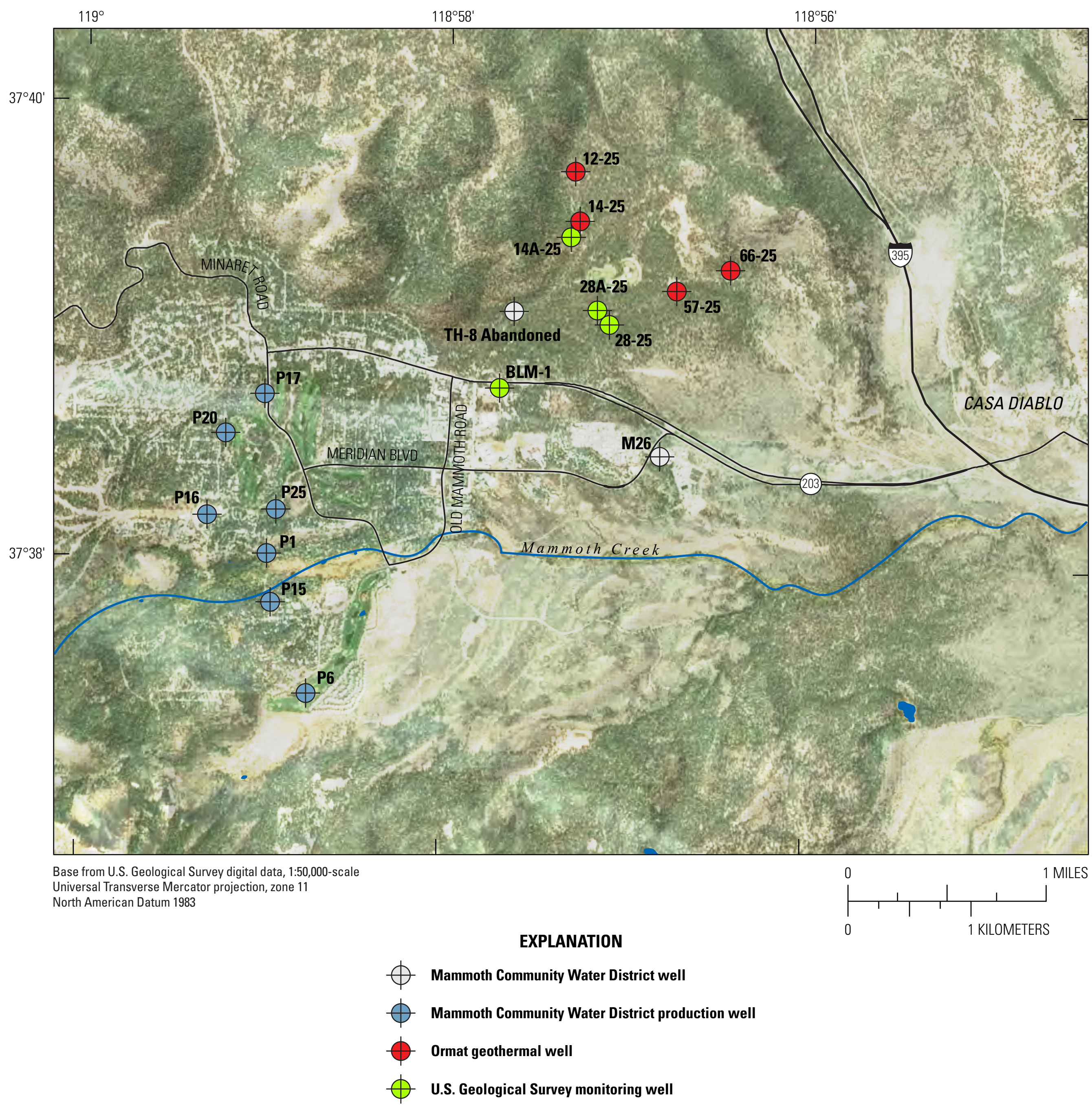

Figure 2. Mammoth Lakes area, California, showing the location of monitoring sites and other features.

In 2010, Ormat proposed expanding geothermal development to an area that is approximately 1 mi northeast of the town of Mammoth Lakes (fig. 2). This new geothermal power generation facility is the Casa Diablo IV Geothermal Power Project (CD-4 project). The Bureau of Land Management (BLM) is the permitting agency and regulatory authority for use of the subsurface federal mineral estate. All operations conducted on federal geothermal leases are subject to BLM approval. As a condition of approval for the CD-4 project, the BLM required the “development and implementation of a cooperative shallow ground water monitoring plan” (Bureau of Land Management, 2013), known as the Groundwater Monitoring and Response Plan (GMRP). The purpose of the GMRP “is to establish a monitoring program to detect any direct or indirect effects on the municipal water supply for the Town of Mammoth Lakes that may occur from geothermal production and injection associated with the CD-4 Project” (Bureau of Land Management, 2018). The GMRP established a monitoring well network of shallow groundwater and geothermal reservoir wells to be monitored for pressure (water level), temperature, and geochemical parameters, depending on well type. The GMRP also established a frequency schedule and party responsible for the data collection. Since 2014, the USGS has been working in cooperation with the BLM, Mono County, Ormat, and the Mammoth Community Water District (MCWD) to implement this BLM-required groundwater-monitoring program.

Geologic Setting

The tectonic setting and volcanic history of Long Valley have been discussed by many researchers (for example, Bailey and others, 1976; Hill and others, 1985; Suemnicht and Varga, 1988; Hildreth, 2004, 2017). The massive eruption that formed Long Valley Caldera 767,000 years ago deposited the Bishop Tuff on top of a rapidly subsiding caldera floor. During the next 125,000 years, eruptions in the caldera produced the lavas and pyroclastic deposits of the “early rhyolite” (Bailey and others, 1976). After emplacement, the early rhyolite in the central part of the caldera was uplifted forming the “resurgent dome” (fig. 1). The upper surface of the structurally domed early rhyolite gently slopes toward the caldera walls, which formed “moats” around the resurgent dome. Starting about 190,000 years ago, a sequence of andesitic to basaltic lava flows, interbedded with glacial tills, filled the south moat (Mammoth Creek and Hot Creek drainage, fig. 1) to the current topography (Hildreth and others, 2014). Mammoth Mountain, on the southwest topographic rim of the Long Valley Caldera, was formed during eruptions 50,000 to 100,000 years ago (Hildreth and others, 2014).

Beneath the town of Mammoth Lakes, the shallow-groundwater aquifer system used for the municipal water supply is primarily in the interbedded “south moat” units (lavas and tills). The thickness of south moat units generally decreases northward toward the CD-4 project area where the top of the early rhyolite becomes exposed at the surface. The deep geothermal aquifer used for electric power generation is in the lower part of the early rhyolite and the underlying Bishop Tuff. A fundamental hydrologic question in the Mammoth Lakes and CD-4 project area is, to what degree does the early rhyolite hydraulically isolate the shallow and deep aquifer systems?

Geothermal System

Uneven collapse of the caldera floor during eruption, simultaneous deposition of the Bishop Tuff, and subsequent offsets between collapse blocks produced near-vertical fracture pathways (faults) to the basement rocks, which facilitated deep fluid convection (Suemnicht and Varga, 1988). In the fault-bounded blocks of caldera fill (Bishop Tuff and early rhyolite), there are laterally continuous zones of relatively high fluid permeability, creating near-horizontal flow paths. A simplified conceptual flow-path of the geothermal system in the Long Valley Caldera begins with up-flow of hot water in the west moat of the caldera from a deep source reservoir, followed by lateral flow to the southeast along a near-horizontal aquifer (Sorey, 1985; Sorey and others, 1991; Shevenell and others, 1987; Goff and others, 1991; Brown and others, 2013; Evans, 2017).

The deep source reservoir is thought to be in metamorphic basement rocks approximately 2 miles north of the town of Mammoth Lakes (Peacock and others, 2016). Hot water, at a temperature of approximately 220 degrees Celsius (°C) and a mass flow rate of about 370 kilograms per second (kg/s), rises from this reservoir but does not reach the land surface north of the town of Mammoth Lakes (Suemnicht and Varga, 1988; Sorey and others, 1991). The ascending water and gas encounter permeable zones hundreds of meters below land surface and flow laterally to the southeast beneath the CD-4 project area and Casa Diablo geothermal well field toward discharge points in the Hot Creek gorge and isolated thermal springs farther east (fig. 1). In the lateral aquifer, the thermal water is progressively diluted by non-thermal groundwater and is chemically altered through reactions with the host rocks. Mixing relations among chloride, boron, and the stable isotopes of hydrogen and oxygen are consistent with a scenario in which (1) the deep geothermal reservoir is recharged by precipitation on the caldera’s western rim; (2) water resides in the reservoir long enough to acquire a substantial amount of dissolved solids from the reservoir rocks as well as a distinctive shift in the oxygen-isotope value; (3) the thermal water is diluted as it flows eastward, predominantly by old groundwater recharged in the eastern part of the caldera; and (4) other thermal or non-thermal water does not play a detectable role in controlling water chemistry or isotopic compositions (White and others, 1990; Sorey and others, 1991; Brown and others, 2013; Evans, 2017).

Electric Power Generation

Geothermal-water extraction for electric power generation began at Casa Diablo in early 1985 at an initial water production rate of approximately 230 kg/s (Howle and others, 2003) and a gross generation capacity of about 10 megawatts electric (MWe). In late 1990, geothermal-water extraction at Casa Diablo was increased to approximately 850 kg/s to supply two new electric generation plants that have a combined capacity of 30 MWe, bringing the gross power generation capacity to 40 MWe. Additional new wells in the CD-4 project area are expected to increase the gross power generation capacity to approximately 80 MWe (Bureau of Land Management, 2018). In late 2006, two new production wells (57-25 and 66-25; figs. 2, 3) were brought on line to replace cooler production wells at Casa Diablo. As of 2019, these two wells, about 1.25 mi northeast of Mammoth Lakes, provided about 50 percent of the geothermal water required to operate the three binary cycle power plants at Casa Diablo. The cooled water is injected into the Bishop Tuff at Casa Diablo. Injection depths are greater than production depths (in the early rhyolite) to minimize thermal breakthrough, but the consequent reduction in pressure support and cooling in the geothermal aquifer have resulted in land-surface subsidence at Casa Diablo (Howle and others, 2003). Pressure reduction in the geothermal aquifer, caused by geothermal water production, has also led to increased boiling in the geothermal aquifer or increased up-flow of steam, producing patches of hot ground (Bergfeld and others, 2006, 2015; Vaughan and others, 2018). Since the geothermal wells 57-25 and 66-25 began producing water (2006), the areal extent of thermal ground, vegetation die off, and carbon dioxide (CO_2) soil-gas emissions has enlarged to include areas near those wells (Bergfeld and others, 2015). During the same time, hydrogen sulfide (H_2S) gas surfaced in the nearby Shady Rest fumarole (fig. 3; Bergfeld and others, 2015). The binary working fluid (isobutane) from the Casa Diablo power plant, which leaked into the geothermal water during heat exchange and prior to reinjection, has migrated 2 mi up-gradient through the geothermal aquifer and has also been detected at the Shady Rest fumarole (Bergfeld and others, 2015). The temporal and spatial association of these gas emissions indicate boiling in the geothermal aquifer in the CD-4 project area (Sorey and others, 1998; Bergfeld and others, 2015) and that fluid-flow pathways exist from the geothermal aquifer to the land surface.

Purpose and Scope

The purposes and scope of this report are to (1) describe the monitoring well network in the Mammoth Lakes area as of late 2017; (2) document the methods used to collect groundwater-level data, groundwater-temperature profiles, groundwater-chemistry data, and associated quality-control measures; (3) describe the development of digital filters used to remove or reduce barometric pressure and Earth-tide effects in water-level data; (4) present baseline water-level and temperature datasets collected from late 2015 to 2017; (5) compare the chemical constituents, constituent ratios, and isotopic values in groundwater to those of the deep geothermal water; (6) discuss the digitally filtered water-level records from the monitoring wells during a 28-day flow test of a geothermal well (14-25); (7) demonstrate the accuracy of water-level data collected at the shallow monitoring wells; and (8) demonstrate the utility of water-level, water-temperature, and water-chemistry data from wells to evaluate the degree of hydrologic connection between shallow groundwater and deep geothermal water. This report is not intended to be a comprehensive assessment of the shallow groundwater and deep geothermal systems in the Mammoth Lakes area, but rather an initial evaluation of monitoring data collected for the period 2015 to 2017.

The purpose of the USGS groundwater-monitoring program related to the CD-4 project is to provide high-quality, publicly available data to Federal, State, County, and municipal agencies responsible for making resource-management decisions regarding the thermal and cold groundwater resources. The scope of the USGS monitoring program includes data collection from a network of shallow and deep wells such as continuous water-level (equivalent hydraulic head or fluid pressure) data, quarterly water-temperature profiles, and quarterly water-chemistry data. At two locations, the groundwater-monitoring program uses wells that are in hydraulic communication with the shallow-groundwater aquifer and a nearby well that taps the underlying geothermal system (wells 14A-25 and 14-25, 28A-25 and 28-25; fig. 3). A primary hydrologic topic of interest is the degree of hydraulic connection between the deep geothermal aquifer and shallow-groundwater system.

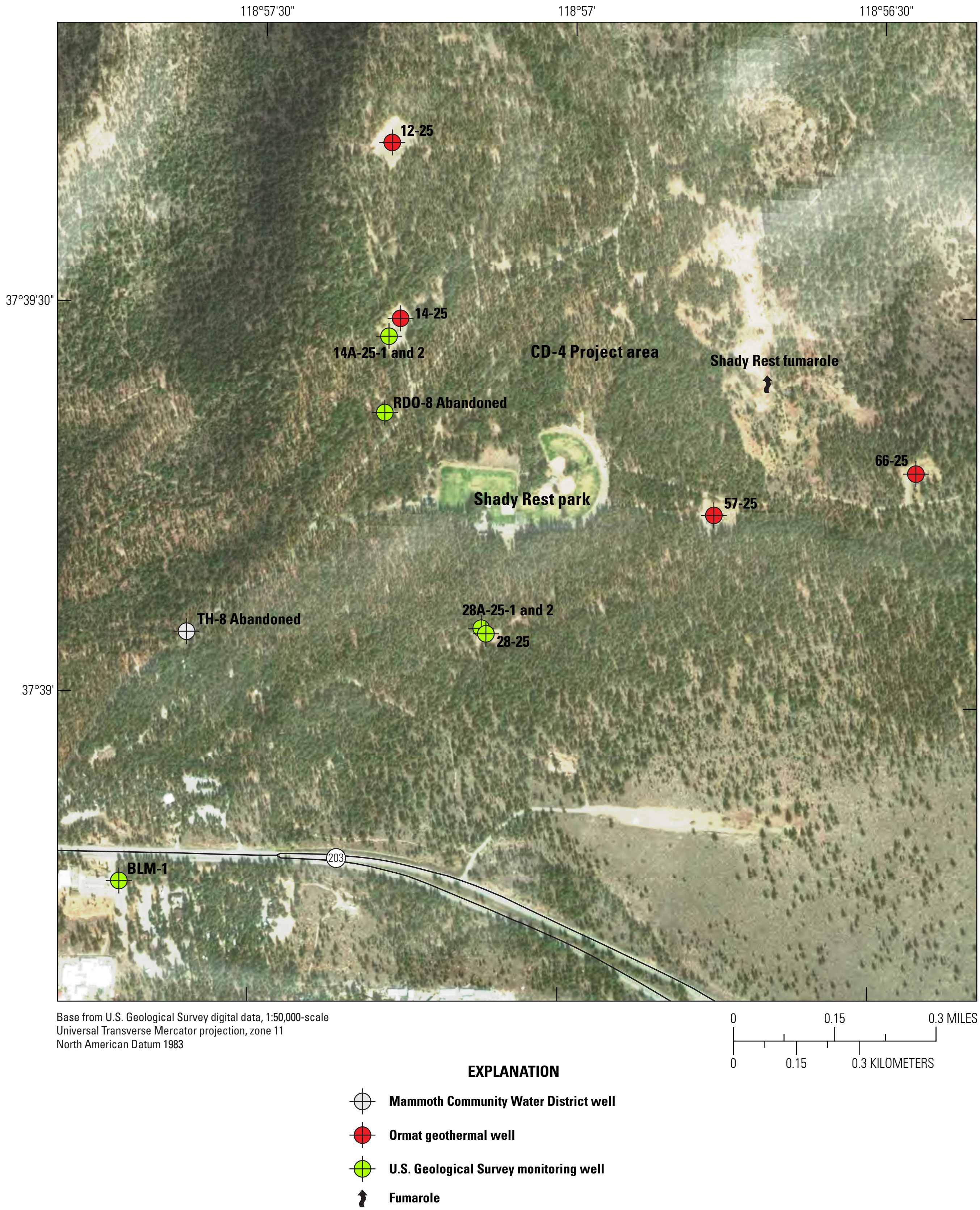

Figure 3. Casa Diablo IV project area showing the locations of monitoring sites and selected features in the Mammoth Lakes area, California.

Monitoring-Well Network

Shallow Multiple-Completion Monitoring Wells

In August of 2015, two multiple-completion monitoring wells (14A-25 and 28A-25, fig. 3) were drilled by the USGS Research Drilling Program (RDP). The depths of these wells, about 600 feet (ft) below land surface (BLS), were based on drillers' logs of the nearest wells (TH8 and M26, fig. 2) and were designed to penetrate the shallow-aquifer system. Both monitoring wells were constructed as multiple-completion wells such that screens in the 2-inch-diameter casings provide hydraulic communication with the surrounding formation at different depth intervals that are hydraulically isolated from each other in the well bore by geothermal-grade grout. The multiple-completion construction allows for the static fluid pressure (hydraulic head) to be measured for discrete depth intervals. Both the 14A-25-1 and 28A-25-1 wells were constructed with a screened interval open to the surrounding formation from 575 to 595 ft BLS (appendix 1). Shallower wells were also constructed at both sites, with screened intervals from 470 to 490 ft BLS in 14A-25-2 and from 440 to 460 ft BLS in 28A-25-2. The depths of the screened intervals were based on a suite of borehole geophysical logs collected from the open well bores after the target well-bore depths were reached.

In December 2017, a third multiple-completion monitoring well (BLM-1; fig. 3) was drilled by the USGS RDP to a total depth of 602 ft BLS. The deeper well (BLM-1-1) was screened from 520 to 540 ft BLS, and the shallow well (BLM-1-2) from 415 to 435 ft BLS. For details regarding the drilling methods, borehole geophysical logging, and construction of wells at sites 14A-25, 28A-25 and BLM-1, see appendix 1.

At the 14A-25 site, none of the south moat units, previously discussed, were evident in drill cuttings, but the early rhyolite was identified from 200 to 600 ft BLS (appendix fig. 1–1). At the 28A-25 site, approximately 2,600 ft southeast of the 14A-25 site (fig. 3), "south moat" lavas were encountered from 39 to 75 ft BLS, which overlie the early rhyolite that extends from 85 to 602 ft BLS (appendix fig. 1–2). The lithology at the BLM-1 site, approximately 3,400 ft southwest of the 28A-25 site (fig. 3), is composed entirely of the interbedded south moat lavas and tills (appendix fig. 1–3). Although the lithology at the 14A-25, 28A-25, and BLM-1 monitoring wells sites varies horizontally, the potentiometric head at the three sites (water-surface elevations in the wells) was within an approximate 30-ft elevation range (https://waterdata.usgs.gov/nwis), and the potentiometric surface gently sloped to the north (highest at BLM-1 and lowest at 14A-25).

Deep Geothermal Monitoring Well

In October of 2017, a deep geothermal monitoring well (28-25, fig. 3) was drilled by Geodrill LLC, a subsidiary drilling company of Ormat, close to the shallower monitoring wells at site 28A-25 (fig. 3). The well, approximately 1,618 ft deep, penetrates the geothermal aquifer (about 190 °C) at approximately 1,400 ft BLS. A 2-inch-diameter casing that has slotted perforations from 1,397 to 1,612 ft BLS is open to approximately the lower 100 ft of the early rhyolite and upper 100 ft of the underlying Bishop Tuff. Future water-level, temperature, and chemistry data collected from this deep well and the shallower monitoring site BLM-1 are important additions to the monitoring program.

Mammoth Community Water District Wells

Beginning in February of 2015, the USGS began a quarterly schedule of water-chemistry sampling of eight MCWD wells (seven production wells and one monitoring well; table 1 and fig. 2). The purpose of the sampling is to characterize the natural variability of water chemistry in the shallow-aquifer system prior to the expansion of geothermal development. The MCWD well P17 has been sampled intermittently by the USGS since 2011, allowing for a longer time series of some, but not all, of the water-chemistry constituents analyzed.

Table 1. Wells monitored or sampled, including site identifiers, data type, and frequency of data collection, Mammoth Lakes vicinity, California, 2015–17.

[BLM, Bureau of Land Management; ID, identifier; MCWD, Mammoth Community Water District; USGS, U.S. Geological Survey; —, not applicable]

Well owner and name	USGS site ID	Data type and frequency		
		Water-level	Vertical temperature profile	Water chemistry
BLM-1_01 (deep)	373845118574201	Continuous	Quarterly	Quarterly
BLM-1_02 (shallow)	373845118574202	Continuous	Quarterly	Quarterly
BLM 14A-25_01 (deep)	373927118571701	Continuous	Quarterly	Quarterly
BLM 14A-25_02 (shallow)	373927118571702	Continuous	Quarterly	Quarterly
BLM 28A-25_01 (deep)	373904118570701	Continuous	Quarterly	Quarterly
BLM 28A-25_02 (shallow)	373904118570702	Continuous	Quarterly	Quarterly
Ormat 28-25	373905118570701	Continuous	Quarterly	Quarterly
MCWD P1	373803118585901	—	—	Quarterly
MCWD P6	373727118583901	—	—	Quarterly
MCWD P15	373748118585201	—	—	Quarterly
MCWD P16	373811118591801	—	—	Quarterly
MCWD P17	373843118585901	—	—	Quarterly
MCWD P20	373833118590801	—	—	Quarterly
MCWD P25	373813118585401	—	—	Quarterly
MCWD M26	373829118564801	—	—	Quarterly

Methods

This section describes the methods used to collect water-level data, water-temperature profiles, and water-chemistry samples at monitoring sites 14A-25, 28A-25, and BLM-1 and water-chemistry samples from the MCWD wells. Also described is the development of digital filters used to remove or reduce the effects of barometric pressure and Earth tides in the water-level records at monitoring sites 14A-25 and 28A-25. The use of the term “filter” or “filtered” with respect to water levels refers to mathematical filters or digital filters, as opposed to the physical filters used to remove suspended particles in water-quality samples.

Continuous Water-Level Records

A continuous record of groundwater level (equivalent hydraulic head) is typically collected with a submersible pressure transducer that measures the height of the water column above the transducer. Initially, the height of the water column above the transducer is coupled with a physical measurement of the water-level depth below land surface to establish a transducer datum relative to the land surface. Subsequent transducer output values (height of the water column above the transducer) are subtracted from the transducer datum to yield a water level BLS.

During regular site visits, calibration checks of a pressure transducer’s accuracy are made by comparing an instantaneous measurement of the water level BLS (made with a calibrated electric water-level sounder; Fulford and Clayton, 2015) to a corresponding instantaneous transducer output value. The height of the water column above the transducer (output value) is subtracted from the transducer datum to yield an instantaneous computed water level BLS. The computed value is compared to the measured value, and the difference, if any, is applied to the computed water-level time series as a linear prorated correction between sequential calibration checks. A complete description of quality-assurance procedures for water-level records is available at https://pubs.usgs.gov/tm/1a1/pdf/GWPD16.pdf.

Water-Level Sensors in the Warm Monitoring Wells

Submersible pressure transducers were originally installed in the shallow and deep wells at site 28A-25, but the premature failure of these submersible transducers was likely due to elevated water temperature in the wells (about 50 °C), which was near the maximum operable temperature of most commercially available submersible transducers. Consequently, an alternative gas-bubbler technique (Sauer and Turnipseed, 2010), consisting of an up-hole pressure transducer connected to a nitrogen-gas-filled line, was used to measure hydraulic head changes in both wells at site 28A-25. This same technique was used at site 14A-25 because the water temperature at all depths in both wells was greater than 60 °C. The up-hole pressure transducer system converted gas-pressure changes in the nitrogen-gas-filled line to equivalent water-level changes. When the water level in the well rose, the gas pressure in the line rose. Conversely, when the water level in the well declined, the gas pressure sensed by the transducer declined proportionally.

A gas line made of high-density polyethylene tubing (fig. 4) was securely attached to a weighted stainless-steel cable to prevent the tubing from stretching due to heat or gravity. The weighted cable kept the open end of the gas line (orifice) at a constant depth below land surface. The constant depth ensured that the transducer output value (height of the water column above the orifice) reflected water-level changes in the well and not movement of the gas line. The anchored upper end of the gas line was connected to a continuous-flow (conoflow) regulator (fig. 4). The conoflow provided a steady flow of nitrogen gas through the gas line and had a monitoring port for the up-hole pressure transducer.

In both monitoring wells at sites 14A-25 and 28A-25, Paroscientific® model PS-2 up-hole pressure transducers were used. The PS-2 transducers have a pressure range of 0–22 pounds per square inch (PSI), or approximately 50.78 ft of water, and are gaged relative to atmospheric pressure. The accuracy of the PS-2 transducers is equivalent to 0.01 ft of water.

Similar to procedures for a submersible transducer previously described, the height of the water column above the orifice (transducer output value) was initially combined with a physical measurement of the water level BLS to establish an orifice datum relative to the land surface. Subsequent transducer output values were subtracted from the orifice datum to yield a water level BLS.

Also similar to those for a submersible transducer, the calibration checks of an up-hole pressure transducer's accuracy were assessed by comparing an instantaneous measurement of the water level BLS with a corresponding instantaneous transducer output value (Cunningham and Schalk, 2011). The height of the water column above the orifice was subtracted from the orifice datum to yield an instantaneous computed water level BLS. The computed value was compared to the measured value, and any difference was applied to the computed water-level time series as a linear prorated correction between sequential calibration checks.

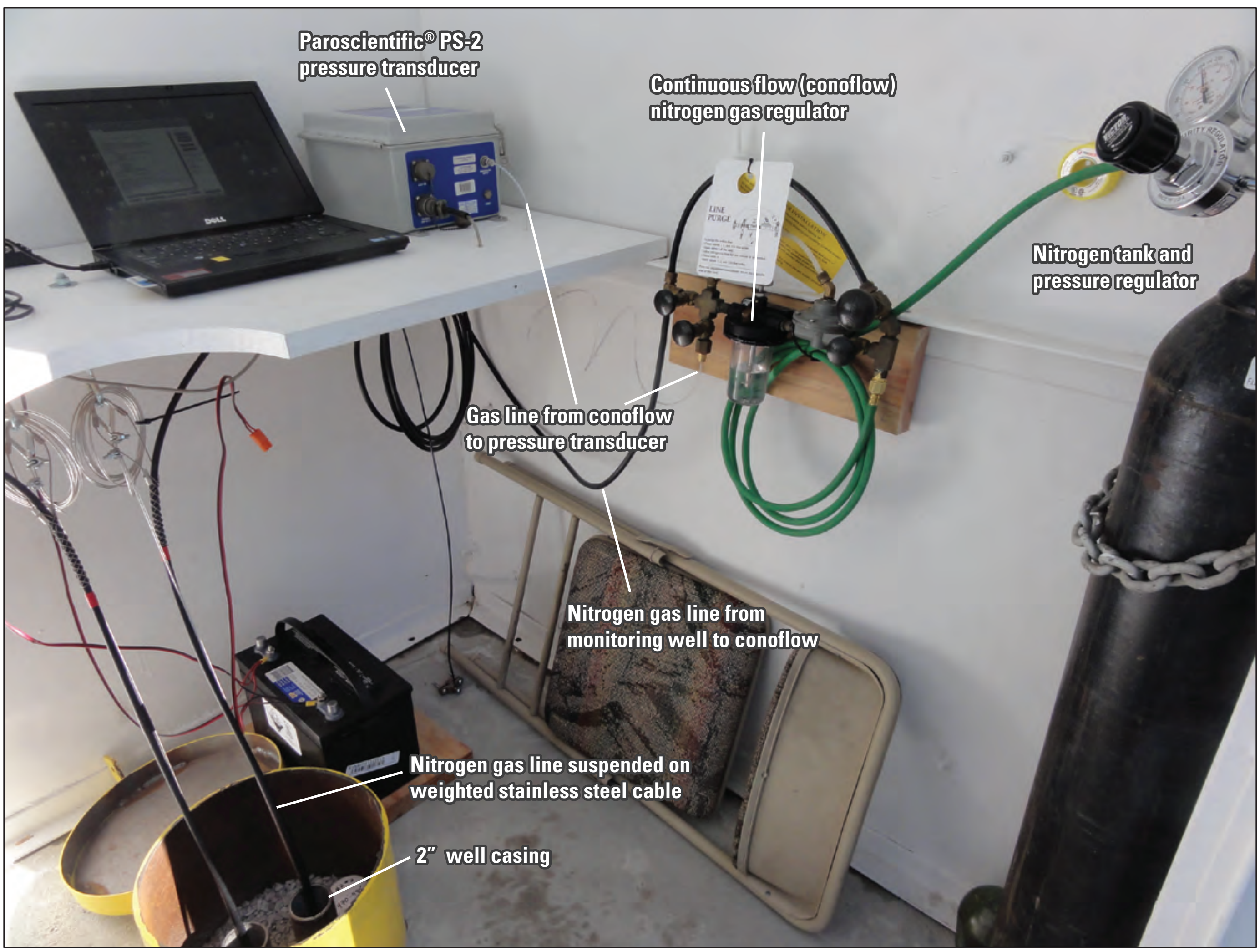

Figure 4. Typical U.S. Geological Survey hot-water-well fluid-pressure monitoring system consisting of an up-hole pressure transducer, continuous-flow nitrogen gas regulator, and fixed-depth nitrogen gas line.

Development of Digital Atmospheric-Loading and Earth-Tide Filters

Because water-level responses to barometric-pressure variations (atmospheric loading) and solid Earth tides can potentially mask subtle water-level responses to other hydrologic stresses, it is essential to filter water-level records to mitigate atmospheric-loading and Earth-tide effects. For monitoring wells 14A-25-1, 28A-25-1, and 28A-25-2, digital filters were developed to remove the water-level responses to atmospheric loading from the water-level records. A simplified version of the workflow process that was used to develop the digital atmospheric-loading and Earth-tide filters applied to the water-level time series is shown in figure 5. A detailed overview of the workflow including intermediate steps (appendix fig. 2–1), specific details of the methods used to develop the digital atmospheric-loading and Earth-tide filters, and the resulting filtered water-level responses are presented in appendix 2. The water-level and barometric-pressure data were processed into continuous, unpaired, variable-length (accounting for data gaps) water-level and barometric-pressure time series (referred to here as "pieces"). The individual pieces were resampled at hourly intervals, and data gaps less than or equal to 3 hours were filled using cubic spline interpolation. The individual pieces (with one exception, see appendix 2) were subsequently parsed to achieve the largest length of coincident, paired, continuous, hourly sampled time series (referred to as a "parsed" series here). The parsed barometric-pressure and water-level series were detrended using either a linear or higher-order polynomial determined by least-squares regressions of barometric pressure and water level on time. Detrending was aimed at removing the longer period (seasonal) hydrologic effects. Prior to developing the atmospheric-loading filters, harmonic analysis for the exact frequencies of six principal Earth tides was done to evaluate whether the wells responded to Earth tides. A distinct response to the principal lunar tide (M_2) and weaker responses to five other principal Earth tides in the well 14A-25-1 parsed water-level time series were filtered from the parsed water-level time series for that well. The mean ratio of the water-level amplitude to the theoretical areal-strain amplitude for the M_2 tide, the computed areal-strain amplitudes for each of the Earth tides, and the mean phase shift of the water-level response for the M_2 tide were used to filter Earth-tide responses from the parsed water-level time series.

The computed barometric efficiency (*BE*) of the well and aquifer system formed the basis of the atmospheric-loading filters. For a well open to the atmosphere and screened below the water table in an aquifer system, the *BE* is defined as the negative ratio of the change in water level to the change in barometric pressure (Jacob, 1940):

$$BE = -\frac{\Delta y}{\Delta x} = -\frac{\Delta y}{\left(\Delta p_x / \left(\rho_w g\right)\right)} \tag{1}$$

where

- Δy is the change in water level, and
- Δx is the change in barometric pressure expressed in equivalent units of head,
- Δp_x is the change in barometric pressure,
- ρ_w is the density of water, and
- g is the gravitational acceleration constant.

The *BE* is a positive quantity that generally ranges from 0 to about 1. The negative sign in equation 1 reflects that for a well open to the atmosphere, changes in barometric pressure cause opposite changes in water level.

Because application of single-valued, time-invariant *BE* computed using one of various linear regression models of water level on barometric pressure could not adequately account for the atmospheric-loading responses measured in the parsed water-level time series for each well, the *BE* was computed using single-input, single-output frequency-response functions for selected parsed time series of barometric pressure as input and water level as output, following the methods presented by Quilty and Roeloffs (1991). The selected parsed time series were those determined to be unaffected by earthquakes or hydrologic disturbances related to flow testing or drilling in nearby wells and included truncated versions (referred to as "modified" parsed series in appendix 2) of original parsed series in which the truncated version omits the affected portion of the original parsed series. This is described more fully in appendix 2 along with the naming convention adopted for the parsed series. This approach assumes that the outputs (water levels) can be represented as linear combinations of the frequency components of the input (barometric pressure), which are scaled relative to the barometric pressure input, and provides estimates of *BE* and phase as functions of frequency (*f*). The amplitude response (*BE*) and phase (ϕ) of the complex valued frequency-response function (*H*(*f*)) were calculated as follows:

$$\begin{aligned} BE\left(f\right) &= \left|H\left(f\right)\right| \\ \phi\left(f\right) &= \arg\left(H\left(f\right)\right) \end{aligned} \tag{2}$$

where

- $|H(f)|$ is the modulus or magnitude of $H(f)$, and
- $\arg(H(f))$ is the arctangent (computed using atan2, the two-argument arctangent) of $H(f)$.

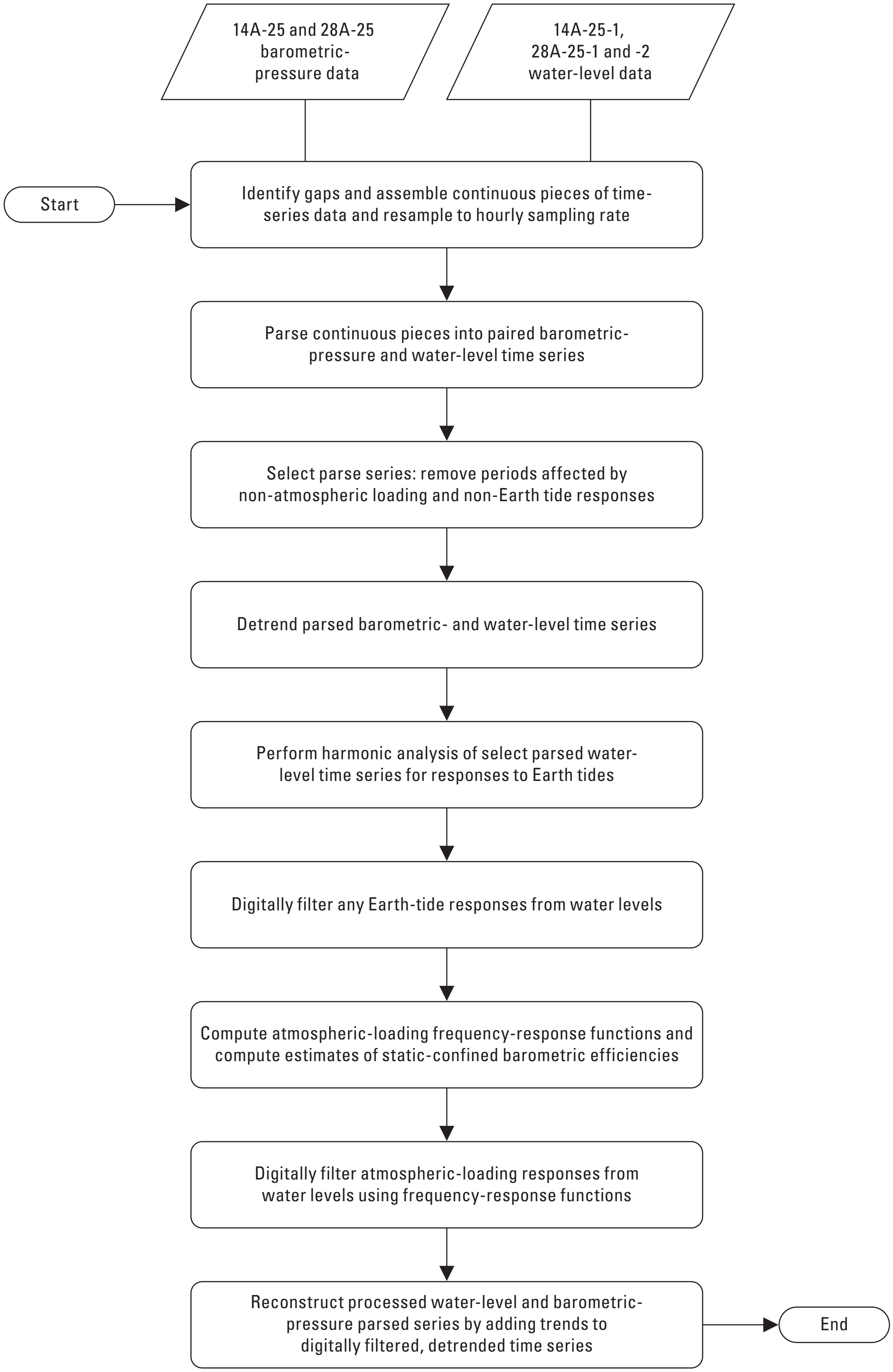

Figure 5. Simplified workflow process used to develop the digital atmospheric-loading and Earth-tide filters for water levels from monitoring wells 14A-25-1, 28A-25-1, and 28A-25-2, Mammoth Lakes area, California.

The method has been used successfully to evaluate the frequency dependence of the water-level response in wells to atmospheric loading (Rojstaczer, 1988a, 1988b; Galloway and Rojstaczer, 1989; Rojstaczer and Agnew, 1989; Spane, 2002).

The computed atmospheric-loading frequency-response functions ($H(f)$) were used to digitally filter the effects of barometric-pressure variations on water levels from the parsed time series. The method is described in detail, and examples are shown in appendix 2. The selected parsed time series for which frequency-response functions were computed and two other parsed time series affected by non-atmospheric loading and non-tidal responses (one in well 28A-25-1 affected by nearby drilling and one in well 14A-25-1 affected by flow testing in the nearby geothermal production well 14-25) were corrected in this way, and the filtered water-level time series are listed in Galloway (2019).

Collection of Water-Temperature Profiles

High-resolution water-temperature profiles were measured in the deep wells 14A-25-1 and 28A-25-1 at 10-ft increments through the water column. A platinum resistance temperature (PRT) probe, similar to the equipment previously used for measuring water temperature in many other wells in Long Valley Caldera (Farrar and others, 2010; Hurwitz and others, 2010) was used to take the high-resolution (plus or minus 0.1 °C) temperature measurements. The PRT probe, suspended from an armored logging cable, was lowered into the well over a sheave with a portable hand-cranked reel (fig. 6). Mechanical and digital depth counters were attached to the sheave. The PRT output and digital depth counter were connected to an electronic data logger programmed to display and record the temperature and depth values at 5 second intervals.

The temperature measurements were logged from the top of the water column downward, so that the thermal equilibrium of the water column was least disturbed by logging. Once the target depth was reached, the PRT probe was allowed to equilibrate for approximately 2 minutes. If after approximately 2 minutes the displayed temperature was stable at the 0.1 °C level, the probe was lowered to the next 10-ft increment. Otherwise, logging was continued until the displayed temperature was stable within 0.1 °C. The recorded data file was post-processed for each 10-ft increment by averaging the last 10 recorded values or the last 50 seconds of data collected. Times-series plots of water-temperature against the depth below the top of the casing (BTC) were used to track changes in water-temperature profiles through time.

Calibration of the PRT probe was checked periodically in a temperature-controlled water bath using an American Society for Testing and Materials (ASTM) certified mercury thermometer in a USGS laboratory in Menlo Park, California. In September of 2015, a 6-point calibration between 42 and 89 °C had a linear regression coefficient (coefficient of determination, or R^2) of 1.00; the average variance was –0.01 °C, and the maximum observed variance was 0.08 °C. A 9-point calibration between 22 and 97 °C in March of 2017 also had an R^2 value of 1.00; the average variance was 0.01 °C, and the maximum observed variance was 0.19 °C. A third, 18-point calibration between 21 and 90 °C in June of 2018 had an R^2 value of 1.00; the average variance was –0.04 °C, and the maximum observed variance was 0.11 °C. On the basis of these calibration checks no corrections were applied to the recorded water temperature logs, which were assumed to have a temperature resolution within 0.1 °C and a depth resolution conservatively estimated at within 0.5 ft.

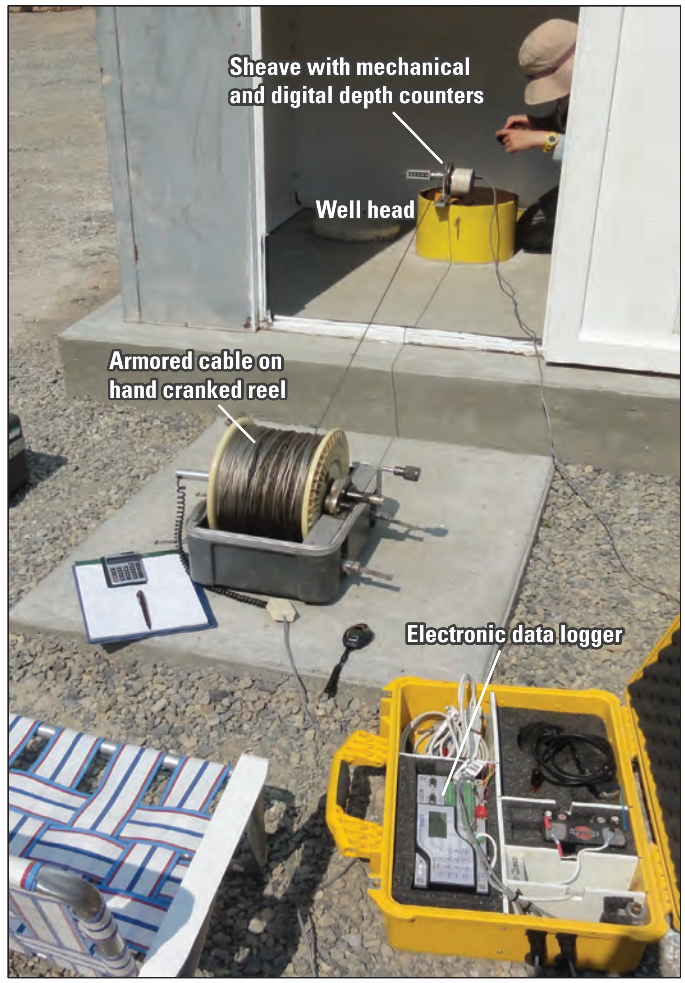

Figure 6. Portable water-temperature logging equipment used in the Mammoth Lakes area, California, study.

Collection of Water-Chemistry Samples

This section describes the USGS procedures and protocols used for the collection of water-chemistry samples at the monitoring wells (sites 14A-25 and 28A-25) and the MCWD wells. Also discussed are the various laboratories used by the monitoring program, the chemical constituents analyzed, and the quality-assurance and quality-control measures.

Sampling Procedures

Water-chemistry samples were collected from wells at sites 14A-25 and 28A-25 on a quarterly schedule starting in February of 2016. Sampling procedures followed protocols described in the USGS National Field Manual (NFM; U.S. Geological Survey, 2014).

Water samples were collected using a submersible, positive pressure, air-driven pump (fig. 7*A*) that was lowered to a depth below the pumping water level but above the top of the perforated interval of well casing. To ensure that the sampled water was representative of the formation water, three well-casing volumes were purged before sample water was collected (NFM protocol). The 500-foot-long tubing bundle (water-discharge line) connecting the submersible pump and relay tubing to a sampling chamber in a nearby mobile water-quality laboratory were made of Teflon with stainless-steel fittings. During purging, a log of water temperature, specific conductance, and pH was recorded and monitored to assess the efficacy of purging. Typically, the water temperature, specific conductance, and pH stabilized by the time two casing volumes had been purged.

Once a well was purged, raw (unfiltered) water was collected for the immediate determination of field water temperature, specific conductance, and pH. This was followed by collection of water samples for analysis of constituents that required no filtration. Raw samples for the analysis of bromide were collected in acid-rinsed, polyethylene bottles supplied by the analyzing lab, discussed later. Raw samples for analysis of stable isotopes in water were collected in 40-milliliter (ml) glass bottles. After filling, the glass bottles were sealed with a conical, plastic screw cap and taped to preclude leakage and evaporation prior to analysis.

A *B*

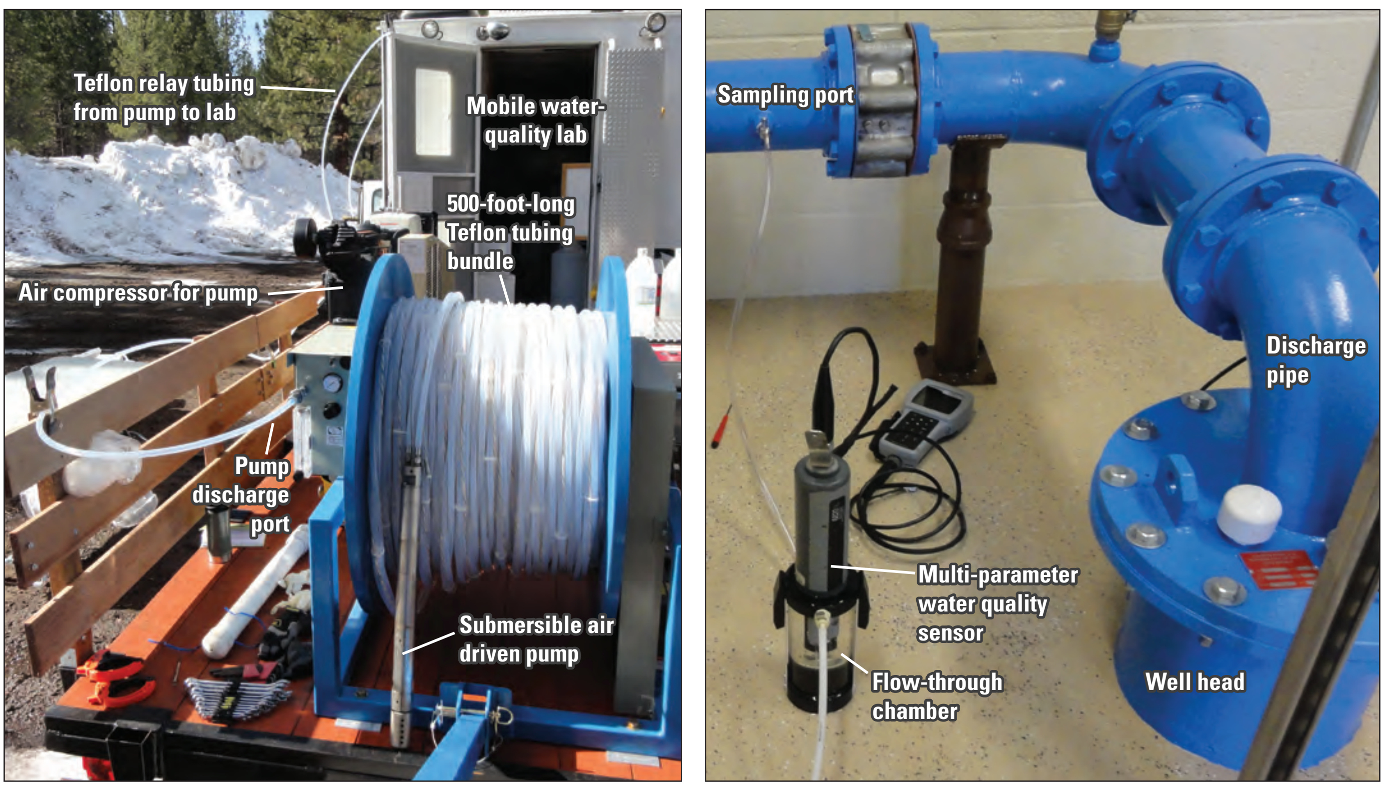

Figure 7. Data collection equipment used to collect water-chemistry samples from wells in the Mammoth Lakes area, California: *A*, submersible air-driven pump and related equipment components; *B*, typical well-head sampling port and multi-parameter water-quality sensor.

After the raw samples were collected, a 0.45-micrometer (µm) capsule filter (polyethersulfone membrane in a polypropylene housing) was attached to the outlet end of the relay tubing to collect filtered sample water. The capsule filter was rinsed with at least 1 liter of sample water prior to collecting a sample. Filtered, untreated samples were collected in clear polyethylene bottles first. Then, filtered water for analysis of major and minor cations and trace elements was collected in clear polyethylene bottles and acidified to a pH of less than or equal to 2 by addition of 6 N (normal) ultra-pure nitric acid. For nutrient sampling, filtered water collected in dark-brown polyethylene bottles was stored and shipped on ice to the laboratory.

Sample collection from the seven MCWD production wells (P-series in table 1) and monitoring well M26 followed the same methods described previously, and the only difference was that down-hole permanently installed pumps were used to obtain the sampled water. A purge volume of at least three casing volumes was pumped before a water sample was collected. During purging, water was diverted from sampling ports near the well head to a flow-through chamber attached to a multi-parameter water-quality sensor (fig. 7*B*). Water temperature, specific conductance, and pH were recorded and monitored to assure that these field parameters had stabilized before sampling. Raw water sample bottles were filled directly from the sampling ports near the well head (fig. 7*B*). The only other difference in the sampling procedures was that the water for filtered samples was collected in 4-liter polyethylene containers, dedicated to each well site, and then pumped with a peristaltic pump through the capsule filters as described before.

Laboratory Analyses

A few different laboratories were used to analyze the chemistry and isotopes of water samples collected for this study. Major ions, minor and trace elements, and nutrients were analyzed by various methods at the USGS National Water-Quality Laboratory (NWQL) in Denver, Colorado. Stable hydrogen and oxygen isotopes of water were analyzed by the USGS Stable-Isotope Laboratory in Reston, Virginia (RSIL). Low-level bromide analyses were done at Eurofins Eaton Analytical (EEA) in Monrovia, California, following the laboratory’s protocol of injecting undigested, unfiltered water through a coarse 30-µm filter into the analyzer.

Table 2 provides a complete list of constituents analyzed for water samples collected at the wells listed in table 1. These data are available at https://waterdata.usgs.gov/nwis.

Quality Assurance and Quality Control

To assess possible contamination of samples resulting from collection and processing procedures and to evaluate the repeatability of the laboratory analyses (analytical precision), quality-assurance procedures were used for the sample collection and quality-control (QC) measures were used to assess potential sources of contamination in the samples collected.

Equipment Blank Samples for Wells 14A-25 and 28A-25

During the quarterly sampling of wells 14A-25 and 28A-25, it was standard procedure to collect an equipment blank. The purpose of the equipment blank was to assess potential contamination of the samples due to sampling equipment or sampling procedure. Inorganic blank water (IBW) supplied by the USGS NWQL was used to prepare a raw and untreated (RU) and a raw and acidified (RA) blank-water QC sample. In the event that sample contamination resulting from sample collection or processing was suspected, these samples could be submitted for analysis to assess whether the IBW is the source of contamination. Then, IBW was progressively pumped through each component of the sampling equipment (air-driven pump, 500-foot-long Teflon tubing bundle and relay tubing), and a set of RU and RA samples were collected after the IBW was passed through each component. These samples could be analyzed to identify the source of suspected contamination. Finally, the IBW was pumped through each component of the sampling equipment and a capsule filter, and filtered untreated (FU) and acidified (FA) samples were collected. This final set of FU and FA samples was submitted to the appropriate laboratories and analyzed for the list of laboratory parameters in table 2. If any of the constituents were measured at concentrations above the reporting limit (table 2), the other sets of equipment blank samples were submitted for analysis to isolate the source of contamination.

For February 2016 through January 2018, nine equipment blank samples were analyzed for all constituents listed in table 2. Of those nine samples, two had an analyte concentration above the reporting limit (table 2). In February 2016 and August 2017, the reported manganese concentrations were 0.57 and 0.93 micrograms per liter (µg/L), respectively, and the reporting limit for manganese was 0.2 µg/L. For both, the source of contamination was isolated to the capsule filter. The non-detection level for manganese attributed to the capsule filter was 0.50 µg/L according to manufacturer specifications. Low-level manganese contamination has been documented from USGS tests of these filters (see Office of Water Quality Technical Memorandum 2016.05, https://water.usgs.gov/admin/memo/QW/qw2016.05.pdf). Because the analysis of manganese in this study was primarily done to assess the cation to anion balance, the February 23, 2016, and August 8, 2017, samples were not considered to be compromised by the low-level contamination.

Table 2. Water-quality parameters, U.S. Geological Survey parameter codes, measurement units, and reporting limits for constituents analyzed in groundwater samples, Mammoth Lakes vicinity, California, 2015–17.

[Bromide analyzed by Eurofins Eaton Analytical laboratory; stable isotopes analyzed by USGS Reston Stable Isotope Laboratory; other laboratory analytes determined at USGS National Water Quality Laboratory. See table 1 for list of sampled well sites. δD is the shift in the ratio of deuterium to hydrogen and $\delta^{18}O$ is the shift in the ratio of oxygen-18 to oxygen-16, both relative to Vienna Standard Mean Ocean Water. **Abbreviations**: $CaCO_3$, calcium carbonate; mg/L, milligrams per liter; °C, degrees Celsius; NO_2, nitrite; NO_3, nitrate; µg/L, micrograms per liter; µS/cm, microsiemens per centimeter]

Water chemistry parameter	Parameter code	Result units	Reporting limit
Field parameters			
Temperature	10	°C	0.1
Specific conductance	95	µS/cm at 25° C	3 significant figures
pH	400	Standard units	0.1
Alkalinity	39086	mg/L as $CaCO_3$	1.0
Carbonate	452	mg/L	0.1
Bicarbonate	453	mg/L	0.1
Laboratory analytes			
pH	403	Standard units	0.1
Ammonia	608	mg/L	0.01
Nitrite	613	mg/L	0.001
Nitrogen ($NO_2 + NO_3$)	631	mg/L	0.04
Orthophosphate	671	mg/L	0.004
Calcium	915	mg/L	0.022
Magnesium	925	mg/L	0.011
Sodium	930	mg/L	0.1
Potassium	935	mg/L	0.1
Laboratory analytes—Continued			
Chloride	940	mg/L	0.02
Sulfate	945	mg/L	0.02
Fluoride	950	mg/L	0.01
Silica	955	mg/L	0.018
Arsenic	1000	µg/L	0.05
Boron	1020	µg/L	2
Iron	1046	µg/L	10
Manganese	1056	µg/L	0.2
Lithium	1130	µg/L	0.15
Unfiltered bromide	91000	µg/L	0.1
Total dissolved solids at 180 °C	70300	mg/L	20
δD	82082	Per mil	0.1
$\delta^{18}O$	82085	Per mil	0.1
Specific conductance	90095	µS/cm at 25°C	5
Acid neutralizing capacity	90410	mg/L as $CaCO_3$	4

Quality-Control Measures at Mammoth Community Water District Wells

Equipment blanks were also collected during sampling of the MCWD wells. The only difference in the procedure was the equipment components (4-liter polyethylene container and Teflon tubing used with a peristaltic pump) that were assessed for contamination. As in the procedures described previously, the IBW was systematically processed through a randomly chosen polyethylene container and section of Teflon tubing, and RU and RA samples were collected for both items of equipment. These samples could be analyzed to assess which part of the equipment was the source of suspected contamination. Then, the IBW was pumped from the sample container through the section of Teflon tubing and a capsule filter to collect the FU and FA samples submitted to the NWQL.

For February 2015 to January 2018, six equipment blank samples were analyzed for the suite of constituents listed in table 2. Of those six samples, one (January 2016) had reported arsenic (0.27 µg/L) and lithium (1.34 µg/L) concentrations above the reporting limits of 0.1 and 0.22 µg/L, respectively (table 2). Once again, the source of contamination was isolated to the capsule filter. The non-detection level for arsenic attributed to the capsule filter was 0.2 µg/L, and the non-detection level for lithium attributed to the capsule filter was 0.03 µg/L, according to manufacturer specifications.

If the reported level of arsenic contamination was present in the suite of environmental samples collected at the MCWD wells during January 2016, the arsenic results could have been overestimated by as much as 5.7 percent (for the sample from well P1, which had with the lowest arsenic concentration of the group). If the reported level of lithium contamination was present in the suite of environmental samples collected at the MCWD wells during January 2016, the lithium concentrations could have been overestimated by as much as 2.6 percent (for the sample from well P15, which had the lowest lithium concentration of the group). These errors are comparable to analytical uncertainties and are less than the natural temporal variability of samples from the MCWD wells.

In addition to equipment blanks, sequential replicate samples were collected twice each year. The sequential replicate samples were collected such that the entire suite of bottle types was filled for the environmental sample, followed by a replicate. The purpose of these samples was to assess the repeatability of the laboratory results (precision of analyses). Replicate samples were analyzed for the suite of constituents (table 2) evaluated in the environmental samples. Replicate samples were submitted for analysis to the appropriate laboratory (NWQL, RSIL, and EEA), and the replicate results were compared to the corresponding environmental samples to assess variability (Mueller and others, 2015).

For February 2015 to January 2018, seven pairs of sequential replicate samples were analyzed for the suite of constituents listed in table 2. For those seven pairs, none of the reported concentrations of constituents for the replicate QC sample differed by more than 20 percent relative percent difference (RPD) from the paired samples' mean concentration. The average and maximum RPD of the seven pairs of replicate samples for the principle constituents of interest (chloride, boron, bromide, and lithium) follow. For chloride, the average RPD was 0.49 percent, and the maximum was 4.15 percent; for boron, the average was 2.5 percent, and the maximum was 17.7 percent; for bromide, the average was 0.18 percent, and the maximum was 5.41 percent; and for lithium, the average was 0.33 percent, and the maximum was 2.23 percent. With the exception of one replicate analysis of boron, all of the maximum RPD percentages were far below the maximum allowable 20 percent RPD from the paired samples' mean concentration.

Groundwater-Level Data

Pre-Filtered Groundwater-Level Data

Continuous pre-filtered water-level data (sampled at 10 minute or higher frequency intervals) were used to compute daily median values for sites 14A-25 and 28A-25 from late 2015 through 2017. The computed daily median values of water depth BLS and the corresponding instantaneous water-level measurements that were used to calibrate pressure-transducer readings are shown in figures 8 and 9. These data are available at https://waterdata.usgs.gov/nwis.

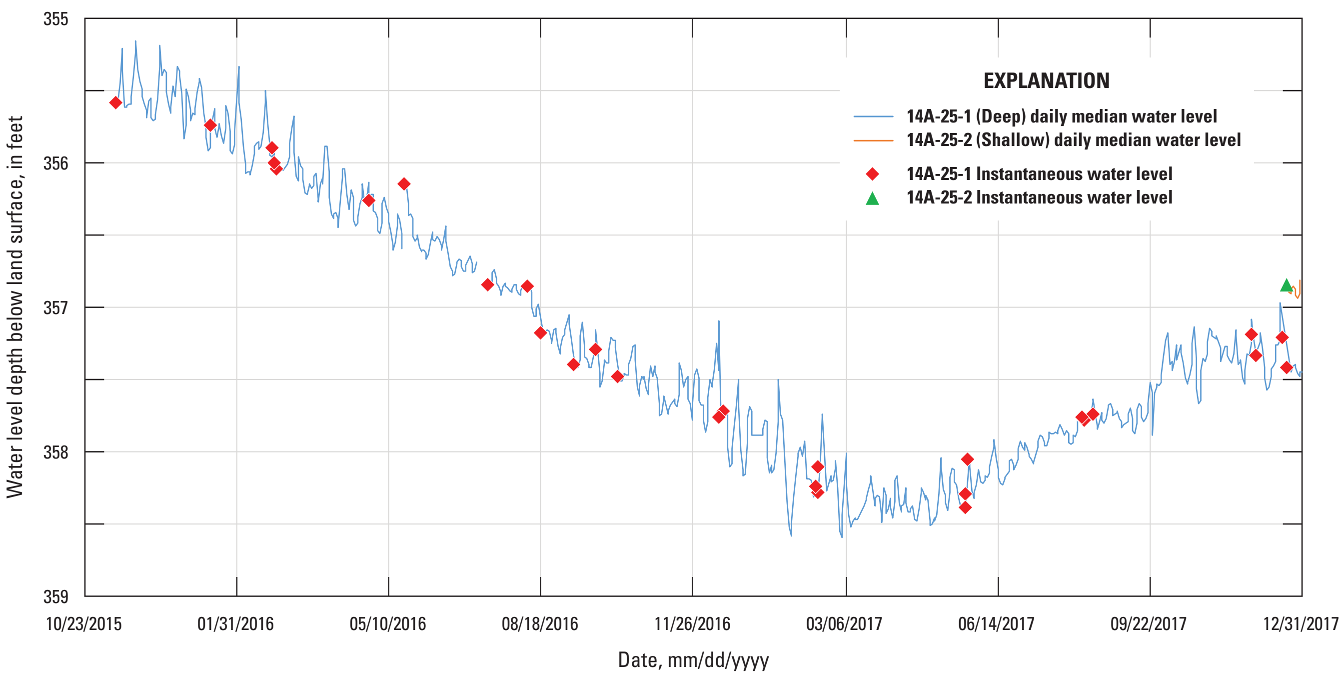

Figure 8. Daily median and instantaneous water levels, depth below land surface, 2015–17, for wells 14A-25-1 and 14A-25-2 in the Mammoth Lakes area, California.

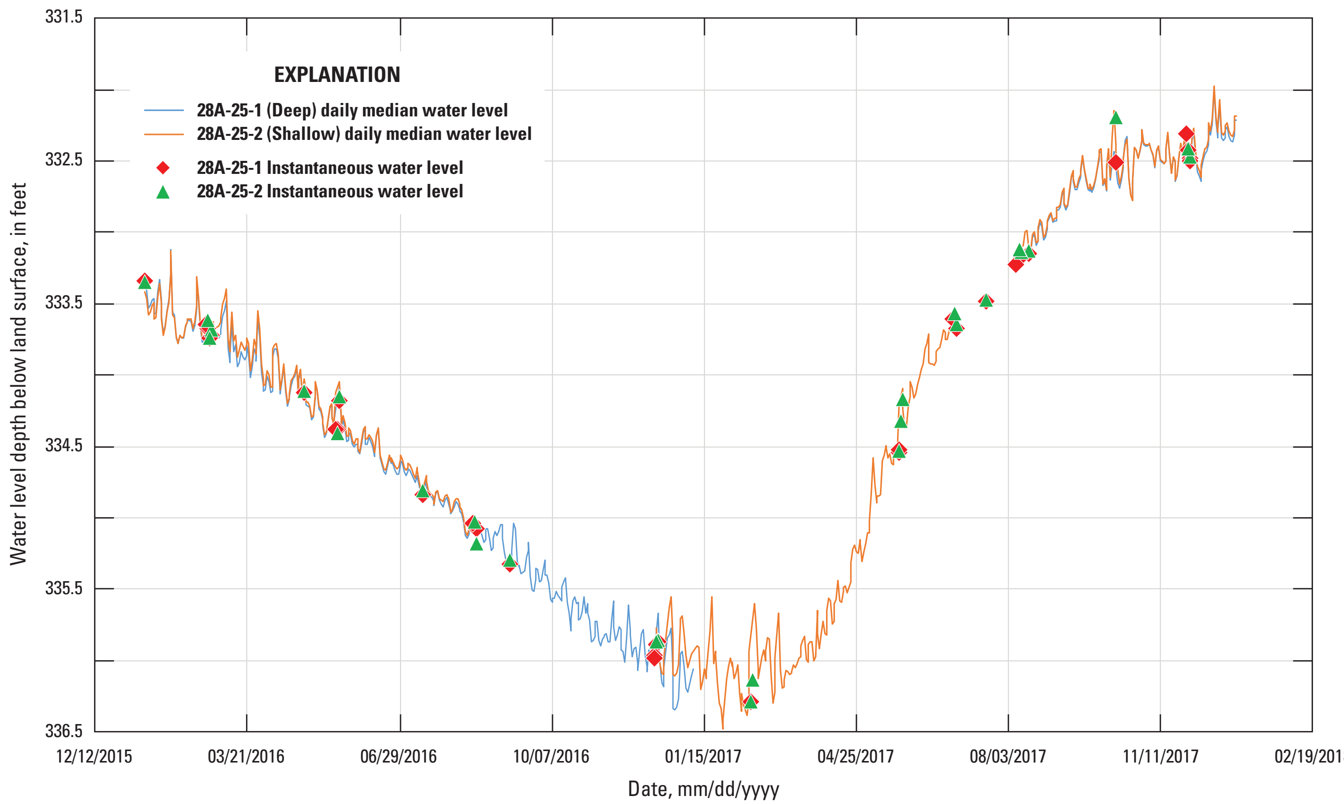

Figure 9. Daily median and instantaneous water levels, depth below land surface, 2016–17, for wells 28A-25-1 and 28A-25-2 in the Mammoth Lakes area, California.

Wells at Site 14A-25

Well 14A-25-2 (shallow) initially was not fully developed (by air-lifted flowing) after drilling. Consequently, residual rock flour in the well bore, left behind from the rotary air-hammer drilling (appendix 1), could have impeded fluid movement through the well screen. Because of the potentially impeded hydraulic communication with the surrounding formation, the fluid-pressure (water-level) record for late 2015 through most of 2017 was removed from the public National Water Information System (NWIS) database. In December of 2017, the 14A-25-2 well was fully developed, and the subsequent data were representative of hydraulic head in the adjacent formation. Although the residual rock flour in the bore hole of well 14A-25-2 could have impeded hydraulic communication through the well screen, this was not thought to affect the water chemistry because the purging of three casing volumes prior to water sampling would have drawn in representative formation water despite the impeded flow through the well screen.

From late 2015 to early March 2017, the groundwater level in well 14A-25-1 steadily declined about 3 feet in response to years of below-normal precipitation (fig. 8). After the above-normal-precipitation winter of 2016–17, the groundwater level in well 14A-25-1 began rising in early May 2017 and continued to rise through late 2017, but the water level only recovered about one-half of the decline from its late 2015 level (fig. 8).

Wells at Site 28A-25

The periods of missing water-level records from both wells at site 28A-25 (fig. 9) were due to the premature failure of the submersible pressure transducers, which was attributed to high water temperatures, as previously discussed. Where data exist for both wells, the water-level variations closely matched each other in phase and amplitude (fig. 9), demonstrating that one record was a reasonable surrogate for the other at this site.

The water-level trends in wells 28A-25-1 and 28A-25-2 were comparable to the record at well 14A-25-1, discussed previously, because groundwater levels in both wells steadily declined about 3 feet through 2016 in response to years of below-normal precipitation (fig. 9). Beginning in early March of 2017, the groundwater levels in both wells began rising rapidly. The rate of water-level rise slowed during the summer and fall of 2017, but water levels continued to rise through the end of the calendar year for a gain of about 4 feet by late 2017, surpassing the early 2016 level (fig. 9). The larger water-level rise in wells at site 28A-25 compared to well 14A-25-1 for the same period (fig. 8) indicates that the response to recharge was greater in the shallow-aquifer system south of well 14A-25-1.

Digitally Filtered Groundwater-Level Data

This section presents examples of digitally filtered groundwater-level data for wells 14A-25-1, 28A-25-1, and 28A-25-2 from mid-August to early October 2017. For well 14A-25-1, the water-level data were digitally filtered to remove the effects of solid Earth tides and atmospheric loading, but for wells 28A-25-1 and 28A-25-2, the water-level data were only filtered for atmospheric loading, because no solid Earth tide effects were detected in these water-level records. The hourly values of barometric pressure, unfiltered water level, and filtered water-level data for wells 14A-25-1, 28A-25-1, and 28A-25-2 are shown in figures 10, 11, and 12, respectively (hourly data available from Galloway, 2019). In each of the figures, the inverse relationship between barometric pressure and the unfiltered water-level data is evident. The sinusoidal effects of atmospheric loading can obscure subtle water-level responses to other hydrologic stresses, which are evident in the filtered water-level data (figs. 10, 11, and 12). The filtered water-level data during this approximately 2-month period are discussed in detail in a later section ("Water-Level Variations During a Flow Test of a Geothermal Production Well").

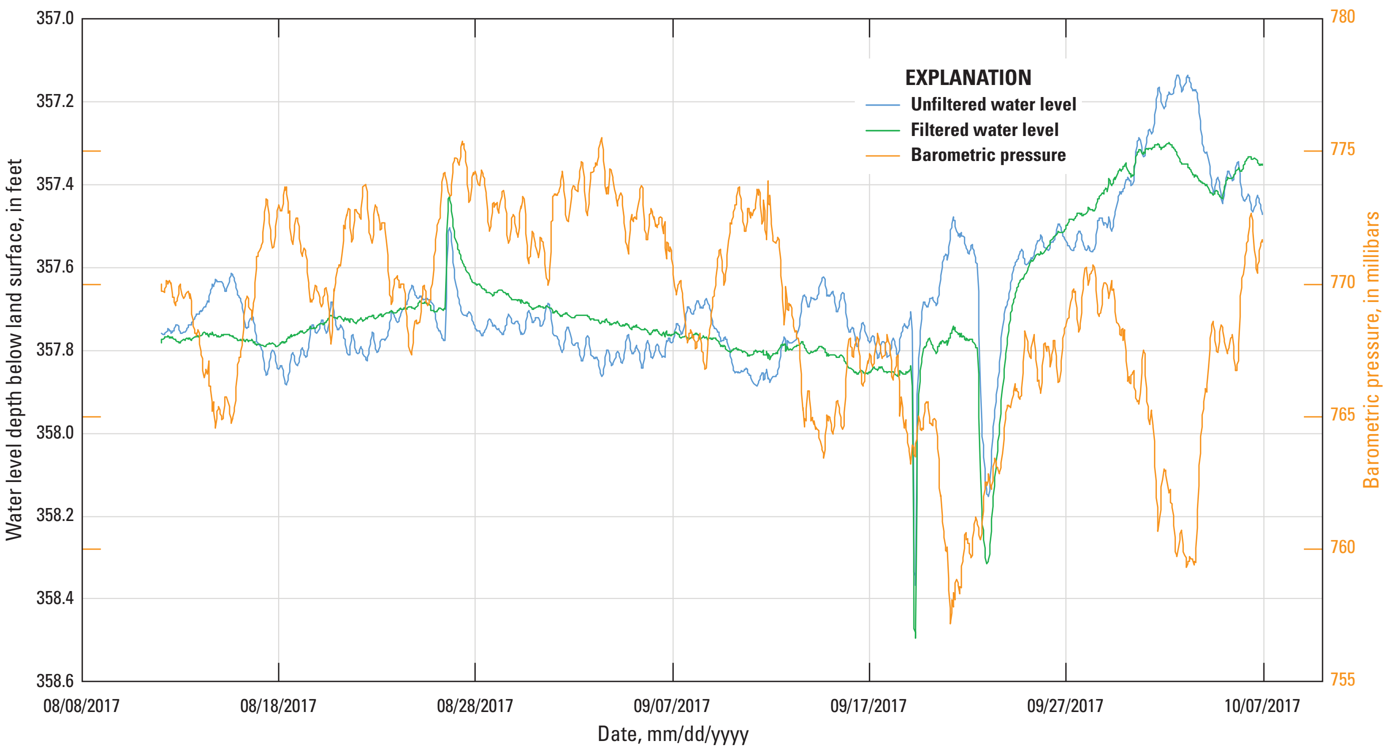

Figure 10. Hourly barometric pressure, water-level depth below land surface data, and filtered water-level depth below land surface for well14A-25-1 in the Mammoth Lakes area, California, from August 12 to October 6, 2017.

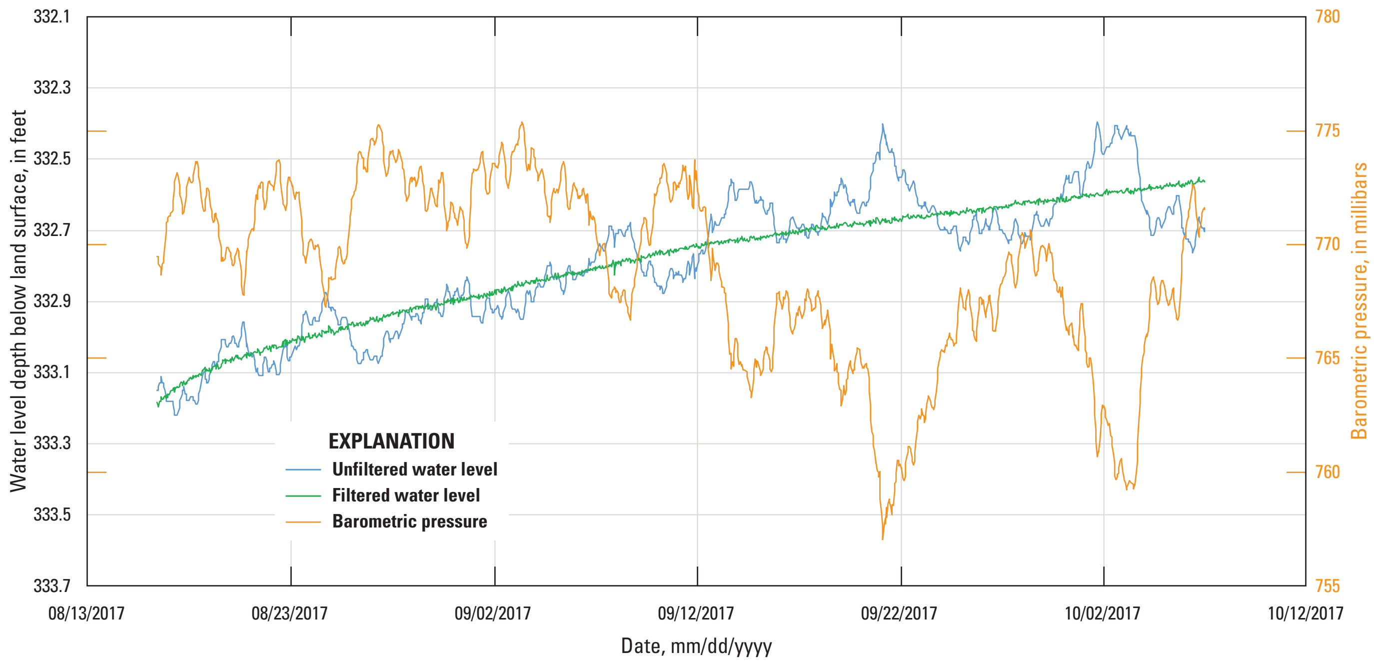

Figure 11. Hourly barometric pressure, water-level depth below land surface data, and filtered water-level depth below land surface for well 28A-25-1 in the Mammoth Lakes area, California, from August 16 to October 6, 2017.

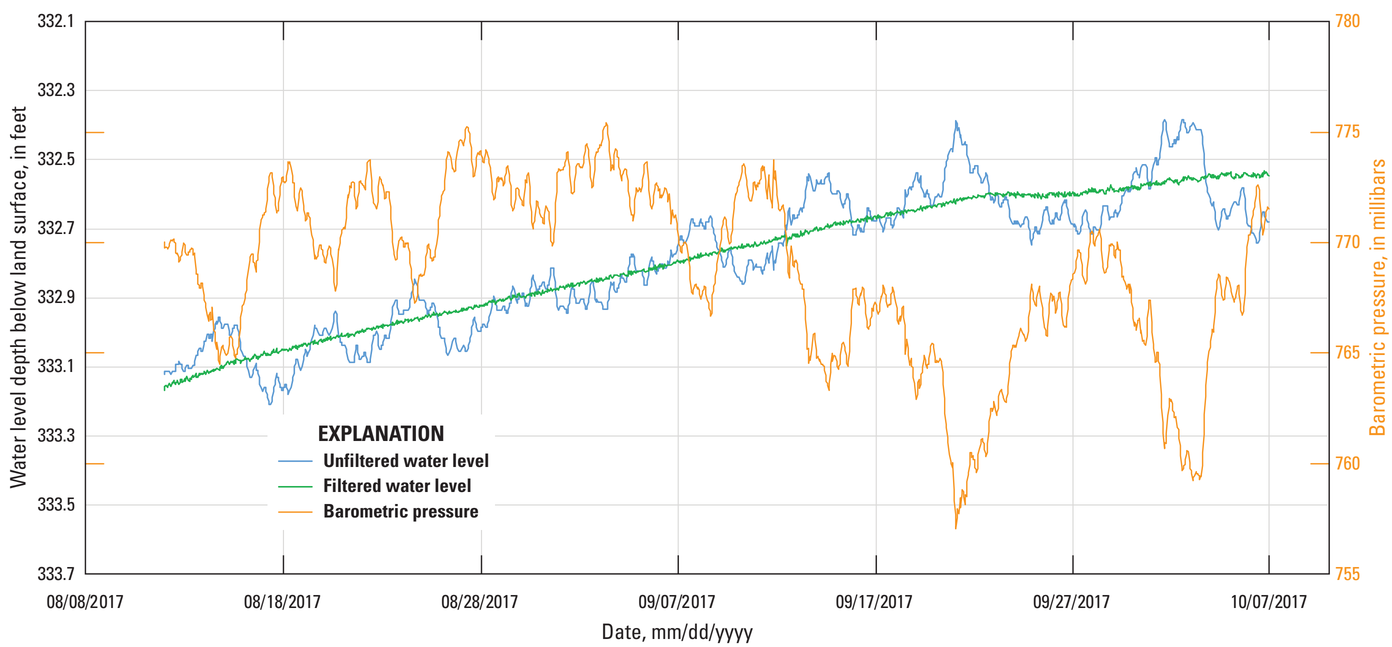

Figure 12. Hourly barometric pressure, water-level depth below land surface data, and filtered water-level depth below land surface for well 28A-25-2 in the Mammoth Lakes area, California, from August 12 to October 6, 2017.

Water-Temperature Profiles

Well 14A-25-1

The water-temperature profiles at well 14A-25-1 are characterized by an upper 80-ft-long section (360 to 440 ft BTC) that had an average temperature gradient of 0.18 degree Celsius per foot (°C/ft), a middle 50-ft-long section (440 to 490 ft BTC) that had an average temperature gradient of 0.05 °C/ft, and a lower 110-ft-long section (490 to 600 ft BTC) that had an average temperature gradient of 0.23 °C/ft (figs. 13 and 14). The temperature continuously increased with depth; the maximum water temperature, which varied between 104.4 and 106.9 °C, was measured at the bottom of the well (600 ft BTC), where the average temperature between February 2016 and December 2017 was 105.1 °C. See appendix table 3–1 for water-temperature profile data in well 14A-25-1 during 2016 to 2017.

The middle, low-gradient temperature section corresponded to a zone of high permeability where the shallower well 14A-25-2 is open to the adjacent formation (446–496 ft BLS and includes the permeable sand pack above and below the screened interval of 470–490 ft BLS; appendix fig. 1–1). For the 450–490 ft interval BTC (zone of high permeability where the shallower well 14A-25-2 is open to the adjacent formation), there was a 0.4 to 0.5 °C temperature decline during 2016 and a further 0.2 to 0.3 °C temperature decline during 2017 (figs. 13 and 14). From February 2016 to May 2017, the water temperature at 490 ft BTC (the bottom of the shallow open interval in well 14A-25-2) steadily declined by 0.8 °C (fig. 15). After May 2017, and for the remainder of 2017 the water temperature in the 440–490-ft BLS interval had stabilized within the 0.1 °C resolution of the measurements (fig. 15).

The deep well 14A-25-1 is open to the adjacent formation from 555 to 600 ft BLS (including the sand pack above and below the screened interval of 575 to 595 ft BLS). During 2016, there was also a general cooling trend at the open interval (555 to 600 ft BLS) of the well 14A-25-1 (fig. 16). The cooling near the bottom of the well stabilized by February 2017, and the temperatures through the remainder of 2017 averaged within 0.3 °C at any given depth.

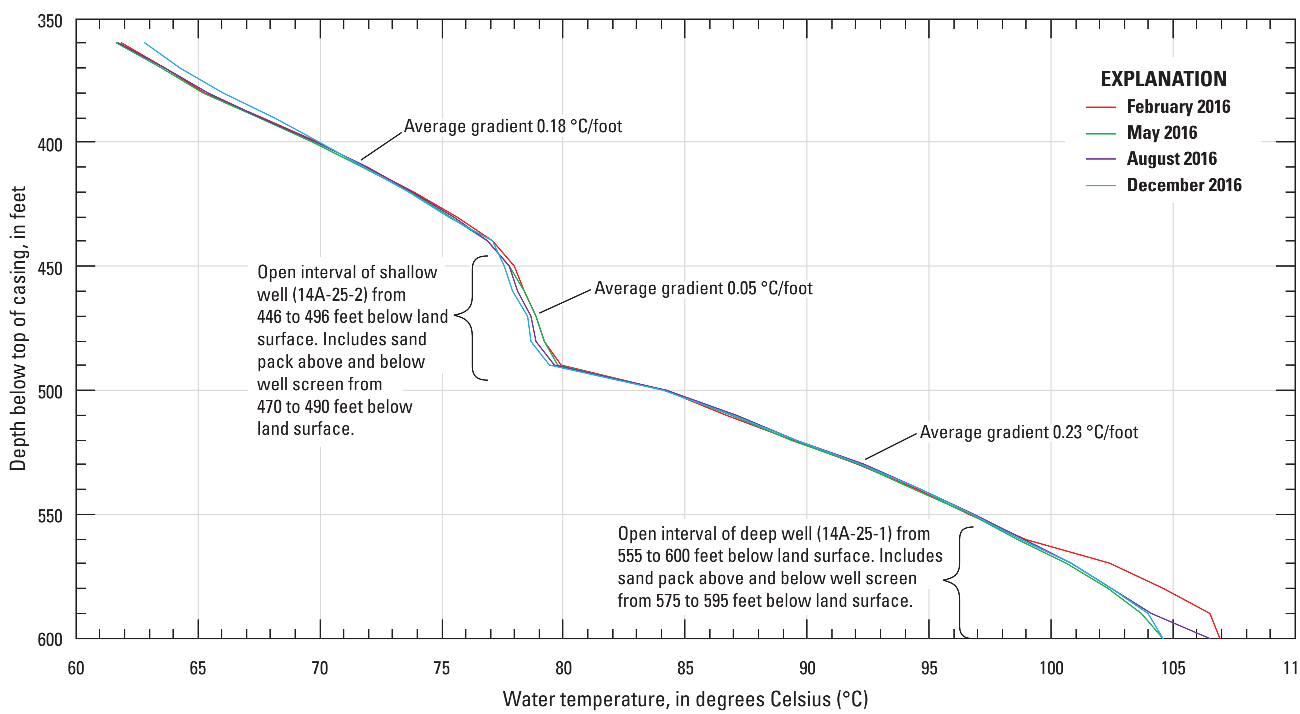

Figure 13. Water-temperature by depth below top of casing for well 14A-25-1, Mammoth Lakes area, California, 2016. °C/foot, degree Celsius per foot.

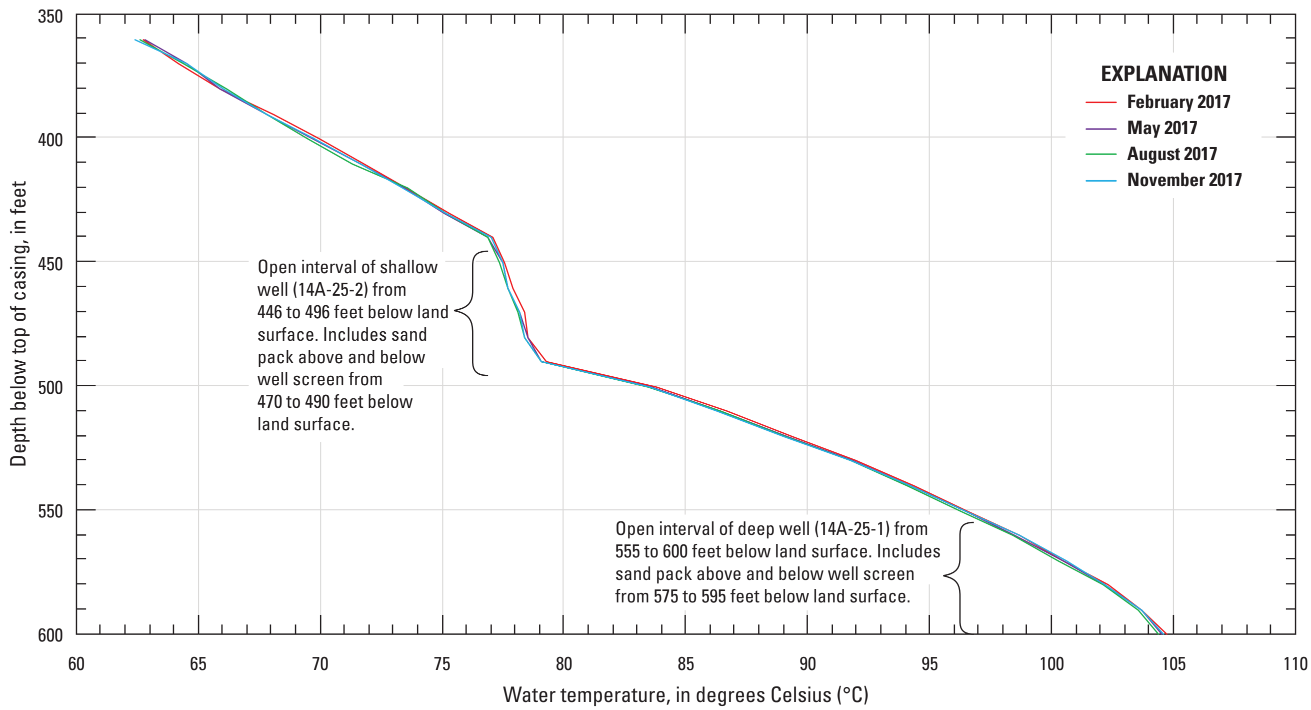

Figure 14. Water-temperature by depth below top of casing for well 14A-25-1, Mammoth Lakes area, California, 2017.

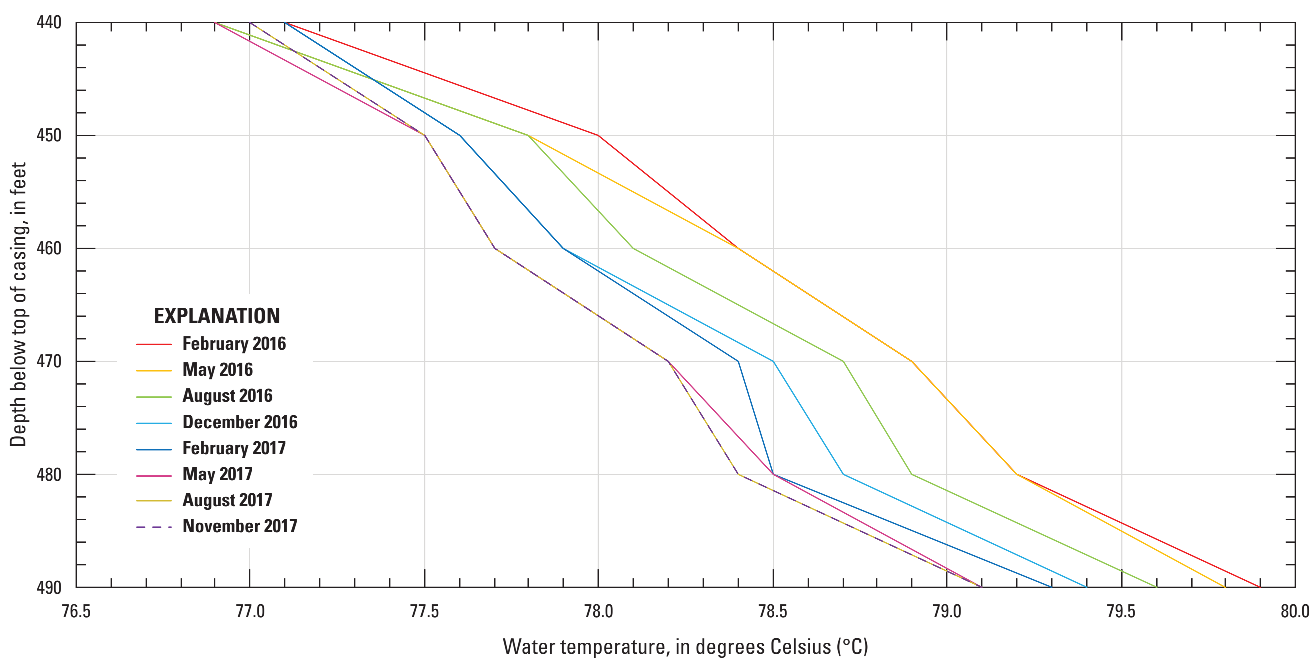

Figure 15. Water-temperature profiles in well 14A-25-1 for the depth interval from 440 to 490 feet below top of casing from 2016 to 2017 in the Mammoth Lakes area, California.

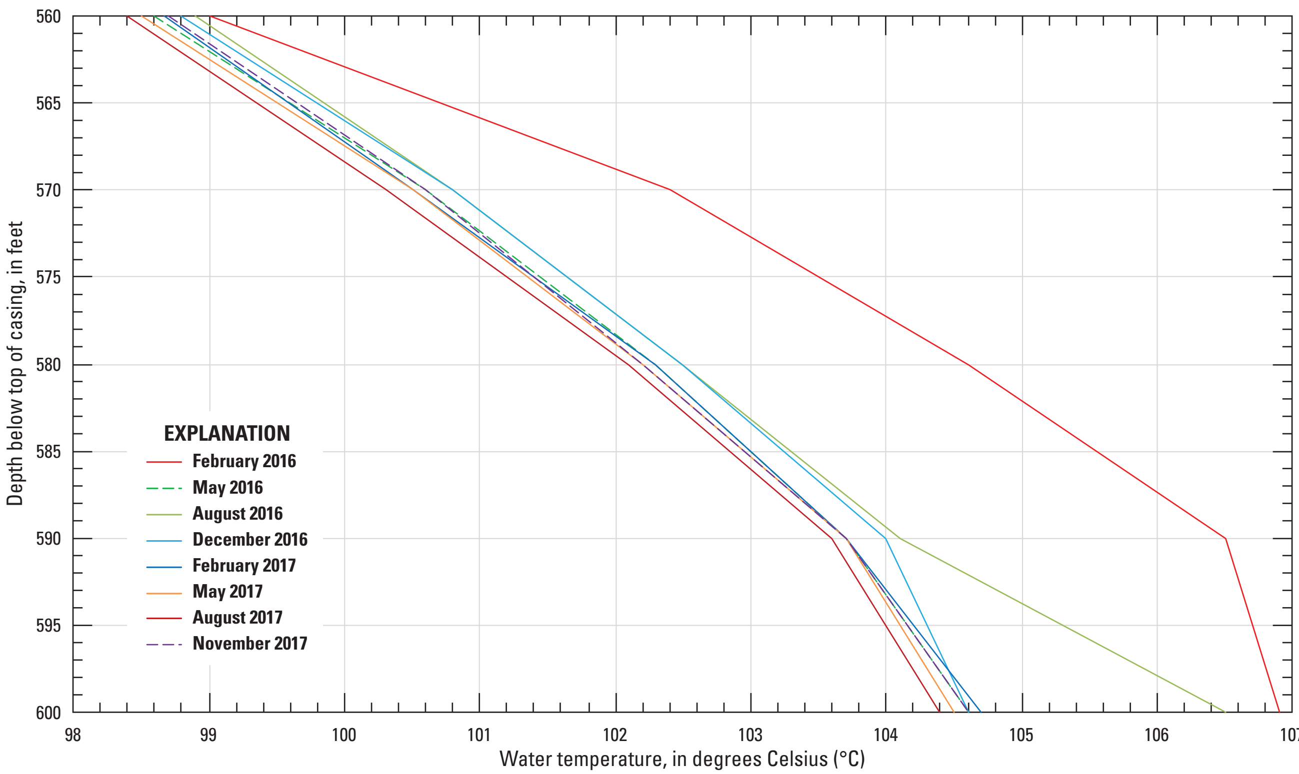

Figure 16. Water-temperature profiles for the depth interval 560 to 600 feet below top of casing for well 14A-25-1 from 2016 to 2017, Mammoth Lakes area, California.

Well 28A-25-1

The water-temperature profile for well 28A-25-1 was characterized by four different temperature gradients (fig. 17). The upper 10 ft of the water column (340 to 350 ft BTC) had the greatest average temperature gradient of 0.09 °C/ft. Below the upper 10 ft is a 150-ft-long section (350 to 500 ft BTC) that had an average temperature gradient of 0.04 °C/ft; that section is underlain by a 40-ft-long section (500 to 540 ft BTC) that had an average temperature gradient of 0.02 °C/ft (fig. 17). From 540 ft BTC to the bottom of the well, there was a temperature reversal to a cooling gradient of –0.01 °C/ft. The maximum water temperature in well 28A-25-1 typically was at 540 ft BTC, just above the temperature reversal, which averaged 53.2 °C during 2016–17 (figs. 17 and 18). In well 28A-25-1, the water-temperature gradient decreased with depth, in contrast with well 14A-25-1, where, in general, the thermal gradient increased with depth. See appendix table 3–2 for water-temperature profile data in well 28A-25-1 from 2016 to 2017.

During 2016, the water-temperature profiles in well 28A-25-1 were all within 0.3 °C of sequential profiles for any given depth, with two exceptions. In February 2016, there was a –0.5 °C difference at a depth of 470 ft, and in August, there was a 0.4 °C increase at a depth of 570 ft (fig. 17), which was the highest water temperature (53.5 °C) recorded in well 28A-25-1 from 2016 to 2017. Each of these temperature differences was at the open interval of the shallow or deep well (28A-25-2 and 28A-25-1), respectively (appendix fig. 1–2), and represent transient pulses of slightly cooler and warmer water.

In August 2017, the temperature logging equipment malfunctioned, and no log was recorded for well 28A-25-1. The February, May, and November temperatures were all within 0.3 °C at any given depth, except for the November profile for 340 to 430 ft BTC (fig. 18). Between May and November 2017, the water temperature in well 28A-25-1 declined by 1.3 to 1.5 °C throughout the 340 to 370 ft interval BTC. This was attributed to the injection of fluids during the drilling of nearby well 28-25 (fig. 3) during October 2017.

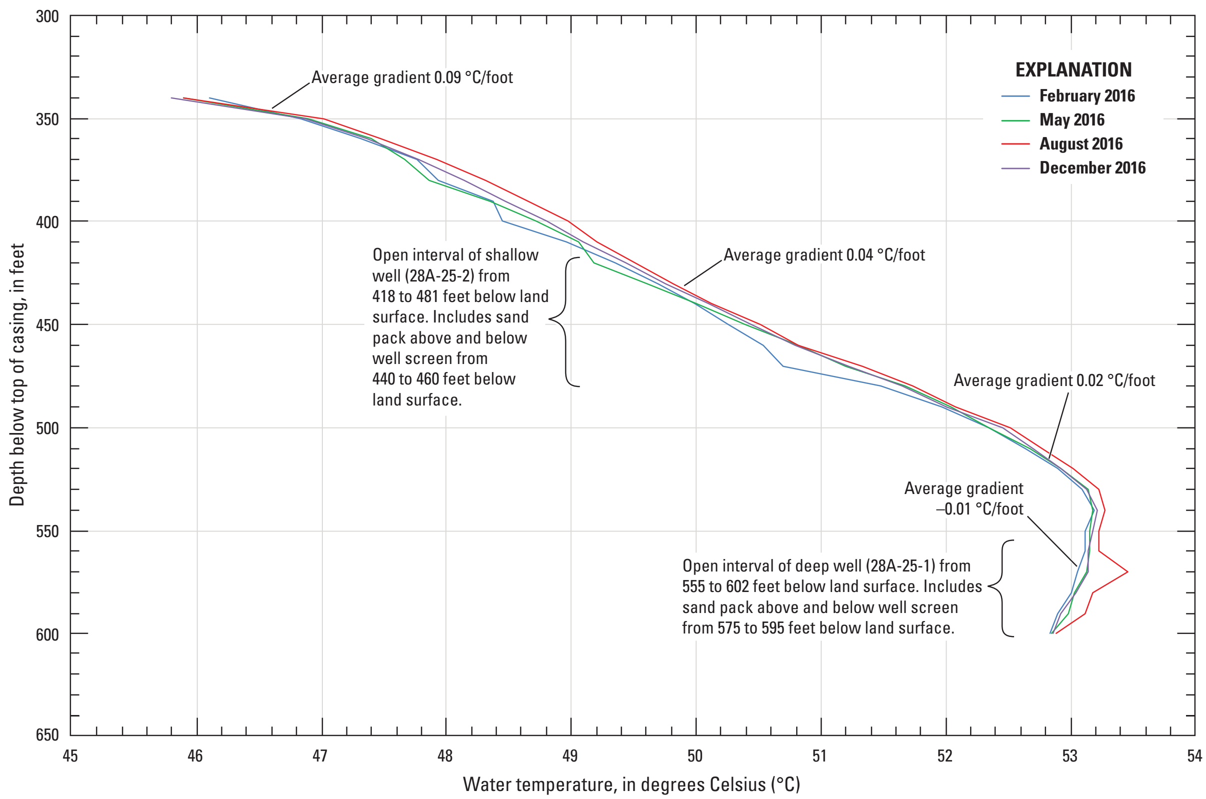

Figure 17. Water-temperature by depth below top of casing for well 28A-25-1, Mammoth Lakes area, California, 2016. °C/foot, degree Celsius per foot.

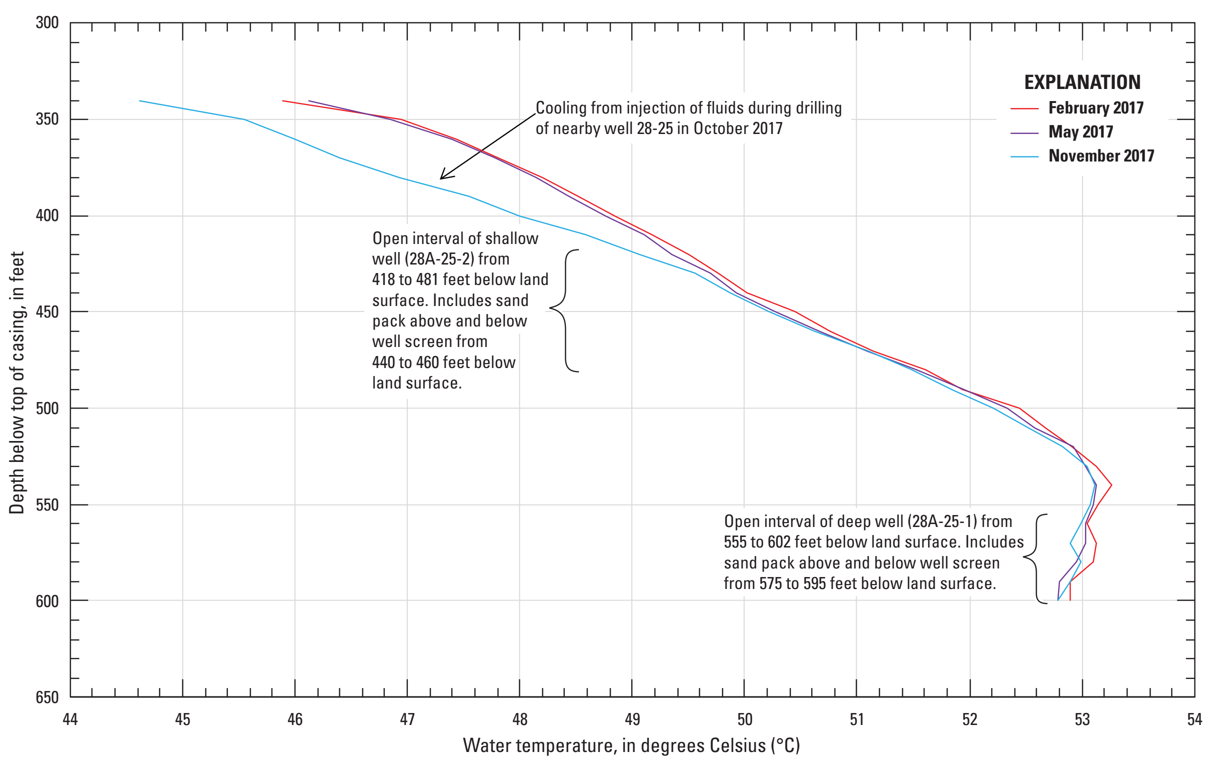

Figure 18. Water-temperature by depth below top of casing for well 28A-25-1, Mammoth Lakes area, California, 2017. No data for August 2017 because of equipment malfunction.

Water-Chemistry Comparisons

The chemical characteristics of the groundwater sampled from the multi-layered aquifer system in the Mammoth Lakes area are presented in this section. Table 3 shows results for samples collected mostly in October and November 2017 from the seven MCWD production wells; MCWD monitoring well M26; and monitoring wells 14A-25-1, 14A-25-2, 28A-25-1, and 28A-25-2. The MCWD production wells P1, P6, P15, P16, P20, and P25, which had relatively low water temperatures, can be considered representative of non-thermal groundwater in the study area. Well P17 is a MCWD production well that showed some geothermal characteristics, as discussed later. The above-normal water temperatures in monitoring wells M26, 14A-25-1, 14A-25-2, 28A-25-1, and 28A-25-2 were indicative of geothermal influence. These wells are also in or near areas of high conductive heat flow, however. Chemistry data for groundwater from the sampled wells for all sampling dates are available at https://waterdata.usgs.gov/nwis. See table 1 for a list of USGS site identifiers. For comparison of chemistry, a published analysis of water collected in 2006 from geothermal production well 57-25 (Brown and others, 2013) is also presented in table 3.

Analyzed Constituents

The suite of constituents analyzed was selected to characterize the geochemistry of groundwater—thermal and non-thermal—in the Mammoth Lakes area (table 2). Some of the constituents, for example, magnesium (Mg), are typically more abundant in non-thermal groundwater and have lower concentrations in thermal water. Other constituents, such as chloride (Cl), bromide (Br), boron (B), lithium (Li), arsenic (As), and silica (SiO_2), are typically more abundant in thermal water; some of them (for instance, chloride) can be a hundred times more abundant than in non-thermal water. The differences in these characteristics are evident in table 3, where non-thermal groundwater sources are compared to geothermal water from well 57-25. Some of these constituents (particularly chloride and boron) are considered to be conservative constituents (Shevenell and others, 1987; Sorey and others, 1991); that is, once dissolved from the host rocks, they are largely unreactive and stay in solution during groundwater flow, cooling, and dilution. Conservative constituents are of particular interest to this study because they can be used to evaluate mixing between thermal and non-thermal groundwater. Although arsenic is highly enriched in thermal water and is of interest in water-supply wells from a public health standpoint, it is reactive in groundwater systems and is not generally considered a conservative constituent.

Chloride Concentrations in Groundwater from Mammoth Community Water District Production Wells

Water chemistry in groundwater can be expected to vary through time in response to natural and human influences. The temporal variability of chemistry in water from the sampled wells was investigated in this monitoring program through a quarterly sampling schedule. Figure 19 shows the time series of chloride concentration in groundwater from the seven MCWD production wells. Groundwater from several of the wells (P6, P15, and P25) showed discernable variability, but no obvious seasonal patterns. Chloride concentrations in groundwater from well P17, the only MCWD production well that had groundwater with a chloride concentration greater than 3 milligrams per liter (mg/L), declined 40 percent during the monitoring period.

Assuming samples from wells P1, P6, P15, P16, P20, and P25 were representative of non-thermal groundwater in the study area, it is clear from figure 19 that non-thermal groundwater in this area dissolved very little chloride from the local rocks. The elevated chloride in water from well P17, together with its warmer water temperature than in other MCWD production wells (Kenneth D Schmidt and Associates, 2018), indicated that the well taps a source of thermal water rich in chloride. The ratio of the conservative constituents chloride and boron was used to investigate this.

Table 3. Water chemistry of selected groundwater samples, Mammoth Lakes vicinity, California.

[Water temperature, specific conductance, pH, and alkalinity are field measurements except for wells at sites 14A and 28A, where the alkalinity value is a laboratory measurement of acid neutralizing capacity, and water temperature is the average of downhole values measured as a vertical profile in the screened interval. Constituents other than bromide are for filtered water. δD is the shift in the ratio of deuterium to hydrogen and $\delta^{18}O$ is the shift in the ratio of oxygen-18 to oxygen-16, both relative to Vienna Standard Mean Ocean Water. δD, and $\delta^{18}O$ are for unfiltered water. Screen depths for Mammoth Community Water District wells are total intervals from Kenneth D. Schmidt and Associates, 2018. **Abbreviation**: mg/L, milligram per Liter; nr, not reported; YYYYMMDD, Year Month Day; °C, degrees Celsius; µs/cm, microsiemen per centimeter; µg/L, microgram per Liter; >, greater than; <, less than]

Water chemistry parameter	Units	Well name												
		P1	P6	P15	P16	P17	P20	P25	M26	14A-25-1	14A-25-2	28A-25-1	28A-25-2	[1]57-25
		Sample date (YYYYMMDD)												
		20171010	20171011	20171011	20171011	20171011	20171011	20171011	20171011	20171129	20160518	20171128	20171128	20061012
Screened interval, depths below land surface	feet	200–370	146–670	407–720	420–680	400–710	420–710	340–530	621–686	575–595	470–490	575–595	440–460	>600
Temperature, water	°C	7.5	9.4	9.1	18.2	22.6	15.6	8.2	35.2	102.8	79.3	52.9	50.2	175
Specific conductance	µS/cm	213	455	241	530	449	365	237	540	866	528	530	543	1,850
pH	pH units	7.0	7.1	7.3	6.4	6.9	6.4	7.0	6.9	6.2	5.7	6.5	6.3	5.9
Alkalinity as calcium carbonate	mg/L	92.6	218	116	275	199	187	110	261	304	81.9	221	224	454
Ammonia as nitrogen	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.64	0.06	0.01	<0.01	nr
Nitrite as nitrogen	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	nr
Nitrite + nitrate as nitrogen	mg/L	0.105	0.207	0.082	<0.04	0.088	0.067	0.209	0.072	<0.04	<0.04	<0.04	<0.04	<0.05
Orthophosphate as phosphorus	mg/L	0.325	0.169	0.490	0.122	0.240	0.097	0.170	0.200	0.210	0.985	0.369	0.401	<0.15
Calcium	mg/L	6.08	33.1	4.32	21.2	15.6	15.2	8.63	12.6	39.4	25.5	13.9	15.0	5.05
Magnesium	mg/L	12.5	30.6	17.0	28.8	16.0	20.6	15.2	25.0	1.90	6.05	13.1	14.8	0.1
Sodium	mg/L	15.7	18.4	20.2	54.8	56.6	32.9	16.5	61.8	71.0	49.2	79.3	77.9	409
Potassium	mg/L	3.2	6.7	4.0	6.9	8.0	4.4	3.3	9.8	110	35.9	12.0	14.8	43.2
Chloride	mg/L	1.33	0.94	1.30	0.60	7.38	0.78	2.34	7.76	22.3	18.0	11.5	11.5	253
Sulfate	mg/L	7.04	39.3	8.04	12.3	11.4	5.96	9.34	9.88	56.9	125	29.9	36.3	111
Fluoride	mg/L	0.33	0.20	0.43	0.57	0.62	0.49	0.24	0.66	0.21	0.23	0.63	0.53	11.4
Silica	mg/L	48.5	46.9	51.7	78.6	96.3	74.4	46	132	270	270	144	158	285
Arsenic	µg/L	4.3	38.9	10.8	5.6	98.0	5.7	3.6	166	146	47.4	219	155	1,540
Boron	µg/L	30	97	52	98	346	65	33	426	3,280	1,550	656	673	11,100
Chloride to boron ratio	µg/µg	44.3	9.7	25.0	6.2	21.3	12.0	70.9	18.2	6.8	11.6	17.5	17.1	22.8
Iron	µg/L	46	59	<10	33	136	389	21	65	<10	53	98	<10	170
Manganese	µg/L	3.38	290	<0.2	55.8	28.1	90.4	2.3	191	229	814	226	29.9	15
Lithium	µg/L	59.3	195	39.9	177	169	114	63.7	203	120	84.1	225	242	3,210
Chloride to lithium ratio	µg/µg	22.4	4.8	32.6	3.4	43.7	6.8	36.7	38.2	185.8	214.0	51.1	47.5	78.8
Unfiltered bromide	µg/L	29	6.8	16	3.1	23	4.6	33	31	62	46	33	32	480
δD	per mil	–105	–113	–108	–112	–114	–114	–106	–117	–117	–121	–115	–116	–117
$\delta^{18}O$	per mil	–14.19	–15.47	–14.55	–15.59	–15.52	–15.57	–14.21	–15.77	–15.18	–15.87	–15.66	–15.68	–14.70
Total dissolved solids dried at 180 °C	mg/L	140	298	169	352	330	256	165	386	740	593	414	434	nr

[1]Analysis of geothermal well 57-25 published by Brown and others (2013).

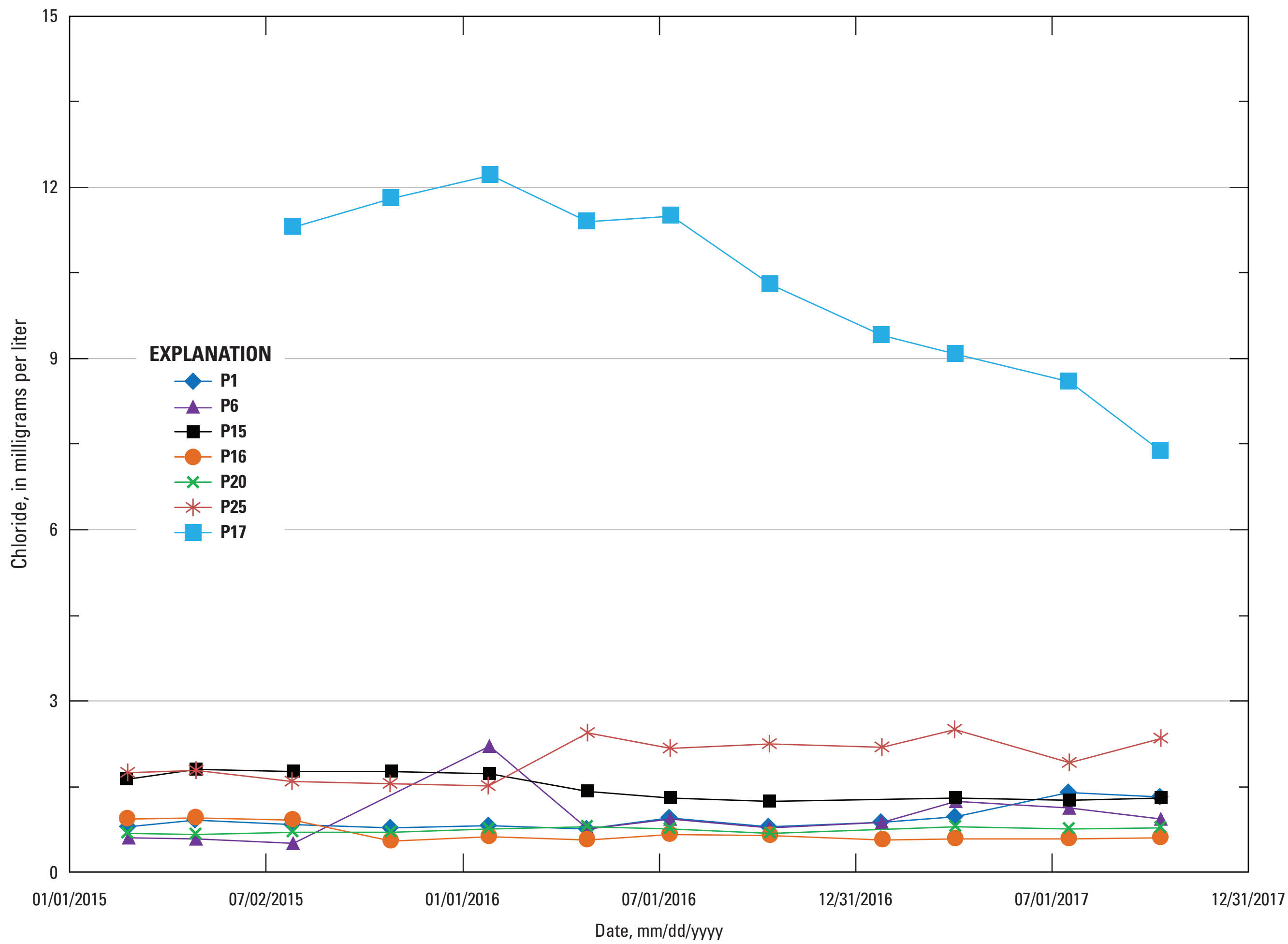

Figure 19. Time series of chloride concentrations in groundwater from Mammoth Community Water District production wells, 2015–17, Mammoth Lakes, California. No data for well P17 before July 2015.

Chloride to Boron Ratio

Numerous studies published in the past few decades have concluded that the nearly constant chloride to boron ratio of about 23 in thermal water samples from Long Valley Caldera links them all to a common deep geothermal reservoir (Shevenell and others, 1987; White and others, 1990; Sorey and others, 1991; Evans, 2017). A long residence time (probably centuries) in this hot reservoir, northwest of the CD-4 project area, allows the water to dissolve substantial quantities of chloride and boron from the host metasedimentary basement rocks. During subsequent flow southeastward, the thermal groundwater is progressively diluted by non-thermal groundwater, which does not contain enough chloride or boron to alter the chloride to boron ratio. Figure 20 shows the chloride and boron data for groundwater from a suite of geothermal wells and thermal springs in Long Valley Caldera sampled in 2005–07 and reported by Brown and others (2013). As in previous studies (Shevenell and others, 1987; Sorey and others, 1991), the data follow a dilution line that runs from well 44-16, the westernmost well (fig. 1) and the one having the highest downhole water temperature (214 °C), through wells and hot springs to the east as far as spring BAL (fig. 1), where the dilution is substantial. This dataset includes the newer geothermal production wells 57-25 and 66-25 (fig. 20) and shows that groundwater from these wells followed the same mixing line as in earlier studies. The regression line through this suite of thermal water yields a chlorine to boron ratio of 22.4 ($R^2 = 0.97$).

Farrar and others (2003) provided chloride and boron data for groundwater from two other sites that showed greater dilution, the approximately 100 °C Long Valley exploratory well (LVEW) on the resurgent dome (fig. 1) and a slightly thermal (15.6 °C) spring, Fish Hatchery CD spring group (FHCD), at the Hot Creek State Fish Hatchery (fig. 1). Only a small percentage of the spring discharge is thermal water, so the spring plotted near the origin but on the regression line through all the other thermal water sources (fig. 20).

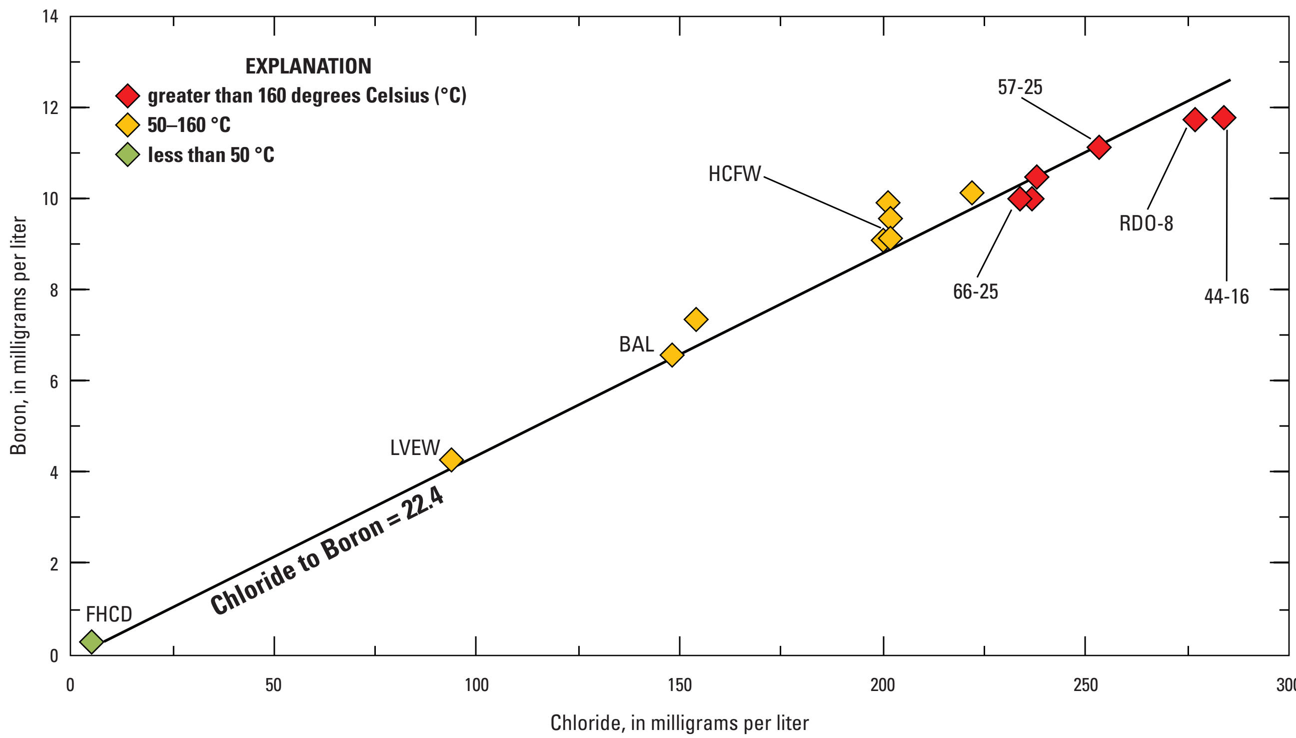

Figure 20. Correlation of chloride and boron concentrations in groundwater from a suite of Long Valley Caldera, California, geothermal wells (including wells 44-16, RDO-8, 57-25, and 66-25) and thermal springs in Hot Creek Gorge (HCFW) and at Big Alkali Lake (BAL) sampled in 2005–07 and reported by Brown and others (2013) and from the Long Valley exploratory well (LVEW) and warm springs at the fish hatchery (FHCD) sampled in 1999–2001 and reported by Farrar and others (2003). Points are color coded by discharge temperature for springs and maximum downhole temperature for wells. See figure 1 for the locations of 44-16, LVEW, FHCD, HCFW, BAL and figure 3 for the locations of RDO-8, 57-25 and 66-25.

Figure 21 shows the chloride and boron concentrations measured during the quarterly sampling of groundwater production and monitoring wells. The axes are much shorter than those in figure 20, and water from the geothermal wells and thermal springs in the study by the Brown and others (2013) plots far off-scale to the right, but the thermal-water trend line from figure 20 is retained. The MCWD production wells, except P17, access groundwater that acquired chloride and boron from precipitation inputs and low-temperature weathering of surficial rocks. The average chloride to boron ratios ranged from 6 to 49, but the low concentrations of chloride and boron plotted in a tight cluster near the origin. The average of all these non-thermal groundwater samples is shown by the black circle on figure 21. Samples that contained a mixture of the average non-thermal groundwater and the deep geothermal water should plot along the thermal-water trend line originating at the black circle, as does water from the fish hatchery spring group FHCD. Groundwater from MCWD production well P17 and monitoring wells M26 and 28A-25 (both depths) plotted along the thermal-water trend line. Well P17 groundwater composition remained near the geothermal trend line as boron and chloride concentrations decreased during the study period; this can be attributed to a change in mixing proportions of the thermal and non-thermal end-members (increased non-thermal component, possibly due in part to the extremely wet winter of 2016–17). Groundwater from monitoring well 14A-25 plotted off the thermal-water trend line and did not appear to be a mixture of the non-thermal and deep geothermal water, based on chloride and boron ratios. Groundwater from this well is discussed further in a subsequent section.

The Mammoth Mountain ski area (fig. 1) applies salt (sodium chloride) to some runs in late winter and spring to improve skiing conditions. As a result, surface and groundwater at the ski area are enriched in chloride from this source; for example, a value of 19 mg/L was reported for a sample from a well at the ski area by Farrar and others (2003). The chloride to boron ratio in this sample was 950. Combining this result with two analyses of runoff from a creek that drains the ski area (Evans and Bergfeld, 2017) yielded an average chloride to boron ratio of about 1,660 for water in the ski area. Groundwater affected by ski-area salting would be expected to plot on a line having a different slope than the thermal-water trend line (fig. 21). None of the groundwater sampled in this study showed any chloride contribution from ski-area salting.

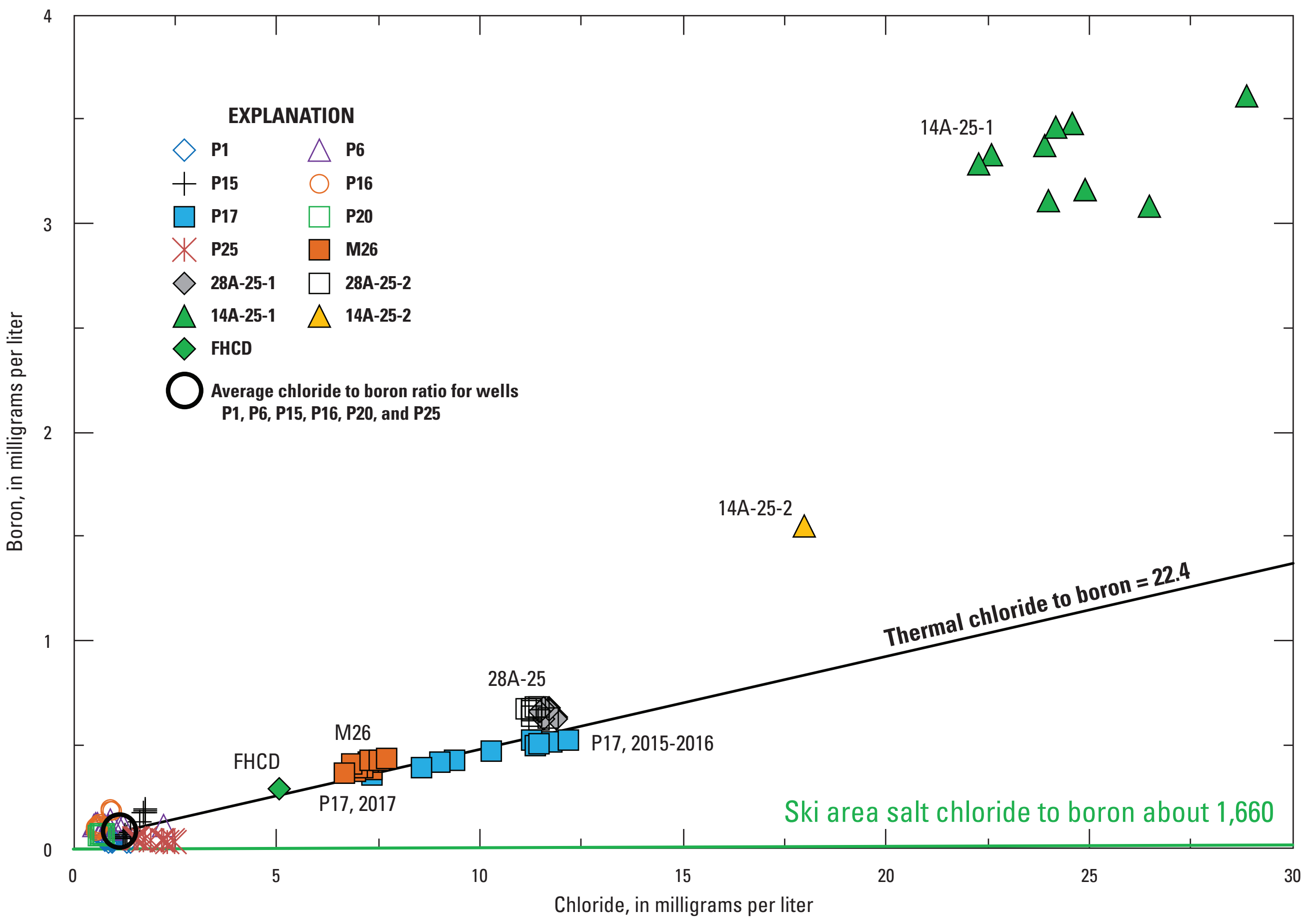

Figure 21. Chloride and boron data for groundwater from Mammoth Community Water District wells (P1, P6, P15, P16, P17, P20, P25, M26) and monitoring wells (14A-25-1, 14A-25-2, 28A-25-1, 28A-25-2) for samples collected 2015–17 and warm springs at the fish hatchery sampled in 1999–2001 and reported by Farrar and others (2003), Mammoth Lakes area, California.

Chloride to Bromide and Chloride to Lithium Ratios

Other chemical constituents, such as bromide and lithium, are also often considered to be conservative in geothermal systems. White and Peterson (1991) showed that lithium and chloride concentrations in geothermal water in Long Valley conformed to a mixing line having a chloride to lithium ratio of about 100. The lithium, bromide, and chloride data from the geothermal water samples reported by Brown and others (2013) are plotted in figure 22. Mixing lines are shown with a chloride to lithium ratio of 87 ($R^2 = 0.60$) and a chloride to bromide ratio of 540 ($R^2 = 0.31$)—but the scatter about the lines was much greater than for chloride to boron. Another shortcoming of using chloride to bromide and chloride to lithium ratios was evident when the axes were shortened (figs. 23 and 24). Groundwater composition from the MCWD production wells (excluding P17) showed more scatter, and the average compositions of water from these wells (black circles) were shifted substantially from the origin. Variations in the sources (precipitation and low-temperature rock weathering) of bromide and lithium were apparently greater than variations in the sources of boron in non-thermal groundwater. Nevertheless, groundwater from the MCWD production well P17 and monitoring wells M26 and 28A-25 (both depths) plotted reasonably close to the geothermal-water trend lines originating from the average non-thermal groundwater composition (black circles) on figures 23 and 24. Again, groundwaters affected by ski-area salting would be expected to plot on lines of a different slope, given chloride to bromide and chloride to lithium ratios reported for samples of stream water draining the ski area (Evans and Bergfeld, 2017). Thus, the chloride to bromide and chloride to lithium ratios were consistent with the thermal-water mixing scenario deduced from the chloride to boron ratios. The thermal-groundwater component would constitute as much as 5 percent of the water in well 28A-25 and the most chloride-rich water sample from well P17, assuming a chloride concentration of about 240 mg/L as the thermal end member, similar to that of water from the two geothermal wells 57-25 and 66-25.

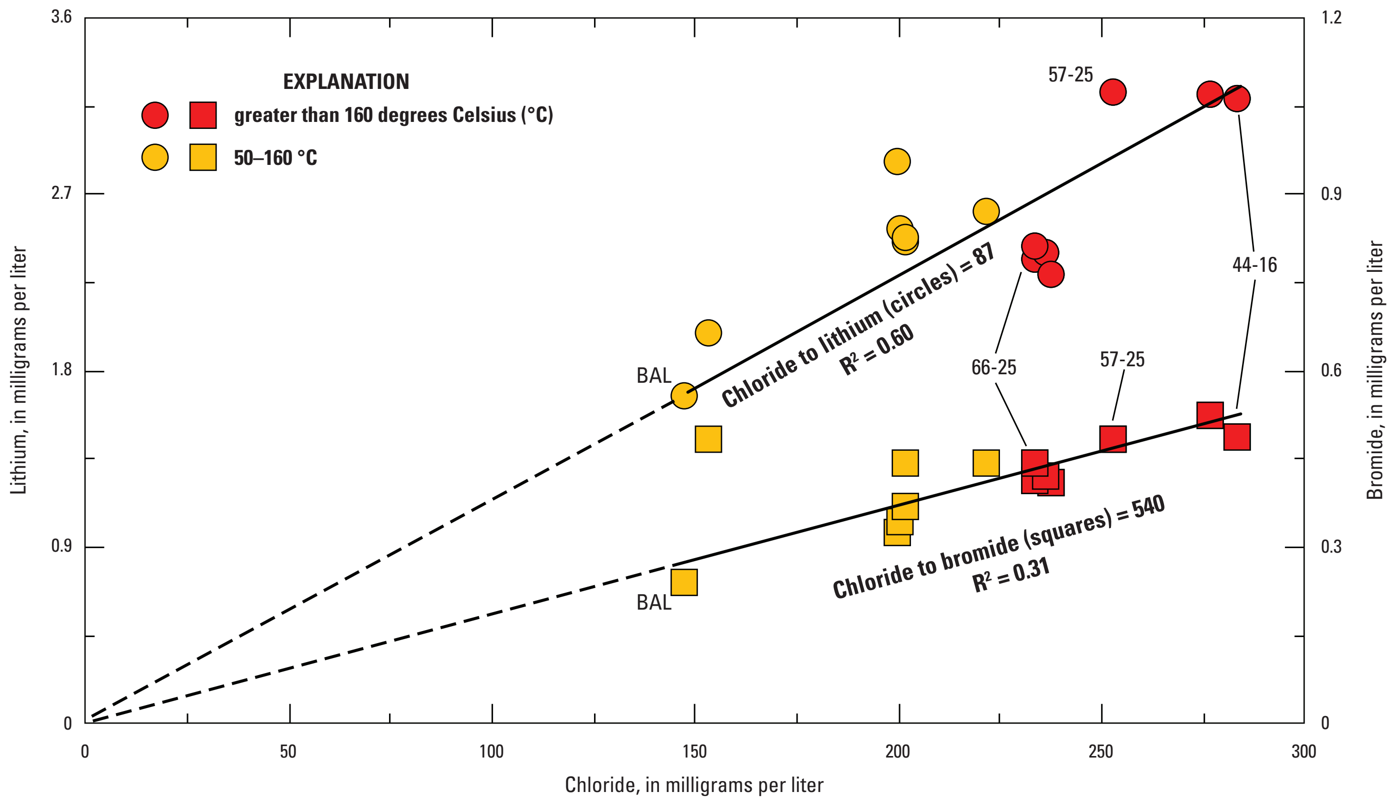

Figure 22. Correlations of chloride to lithium and chloride to bromide concentrations for water samples from sites shown in figure 20, including geothermal wells 44-16, 57-25, and 66-25 and Big Alkali Lake (BAL), Long Valley Caldera, California; data from Brown and others (2013). Points are color coded by discharge temperature for springs and maximum downhole temperature for wells.

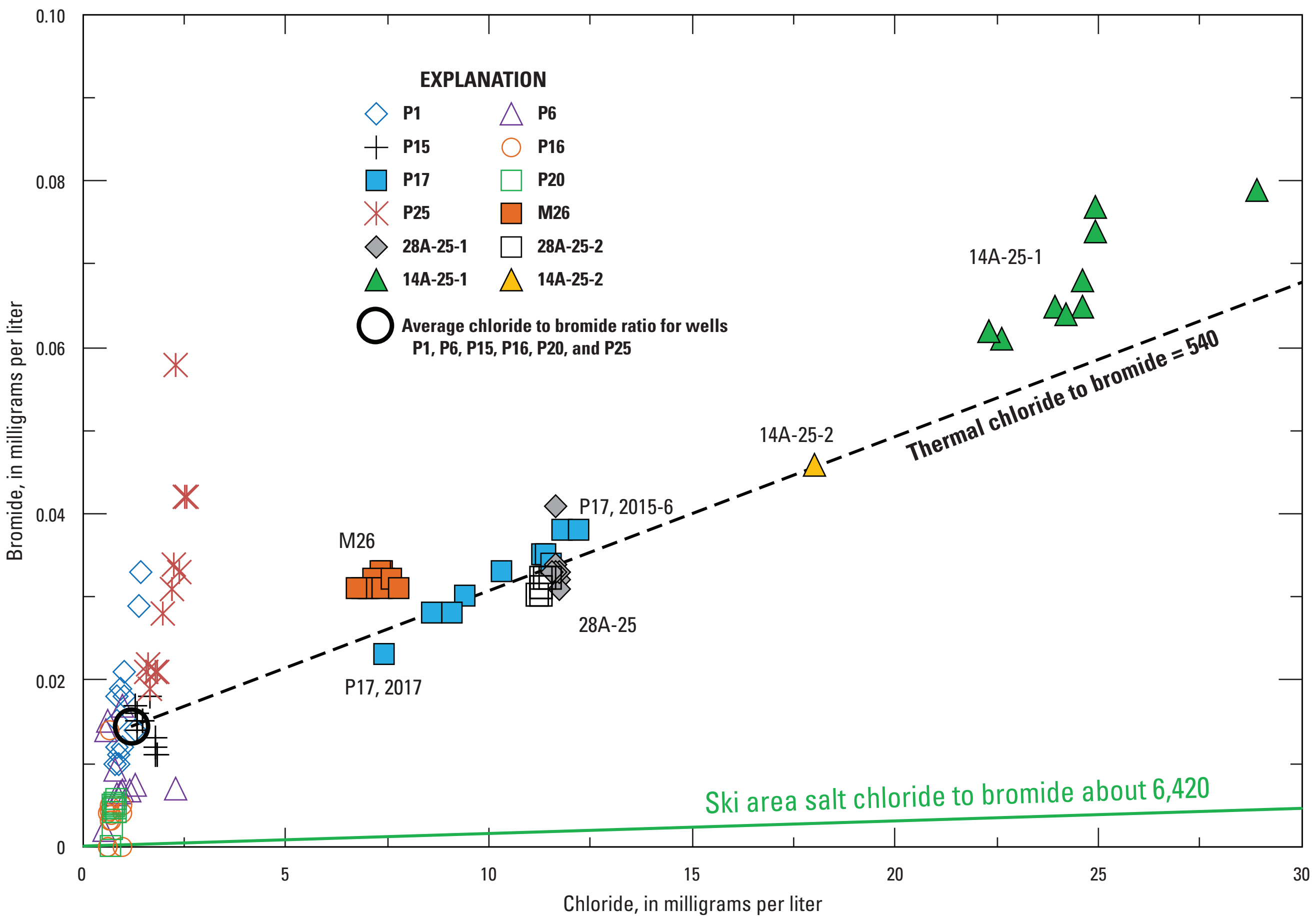

Figure 23. Correlation of chloride and bromide concentrations for groundwater from Mammoth Community Water District wells (P1, P6, P15, P16, P17, P20, P25, M26) and monitoring wells (14A-25-1, 14A-25-2, 28A-25-1, 28A-25-2) collected in 2015–17, Mammoth Lakes area, California.

Groundwater from wells 14A-25-1 and 14A-25-2 plotted near the thermal-water trend for chloride to bromide (fig. 23), but far from the thermal-water trends for chloride to boron and chloride to lithium (figs. 21 and 24); thus, the chemistry cannot be explained in the same way as that from the other monitoring wells. Other aspects of this chemistry are anomalous compared to other groundwater and geothermal water in the Long Valley area, such as the predominance of potassium (K) among the cations (table 3). Contamination by drilling fluids from drilling the nearby (105 ft distant) deep geothermal well 14-25 was suspected when the well was first sampled in February 2016, but enough water has been removed from the wellbore during subsequent samplings that contamination is an unlikely explanation for the anomalous chemical composition. The anomalous chemistry, which could result from extensive interaction with the local host rocks (rhyolitic lava), obscures the nature of any connections the water in well 14A-25 might have with either the deep geothermal water or the local groundwater in the MCWD production wells.

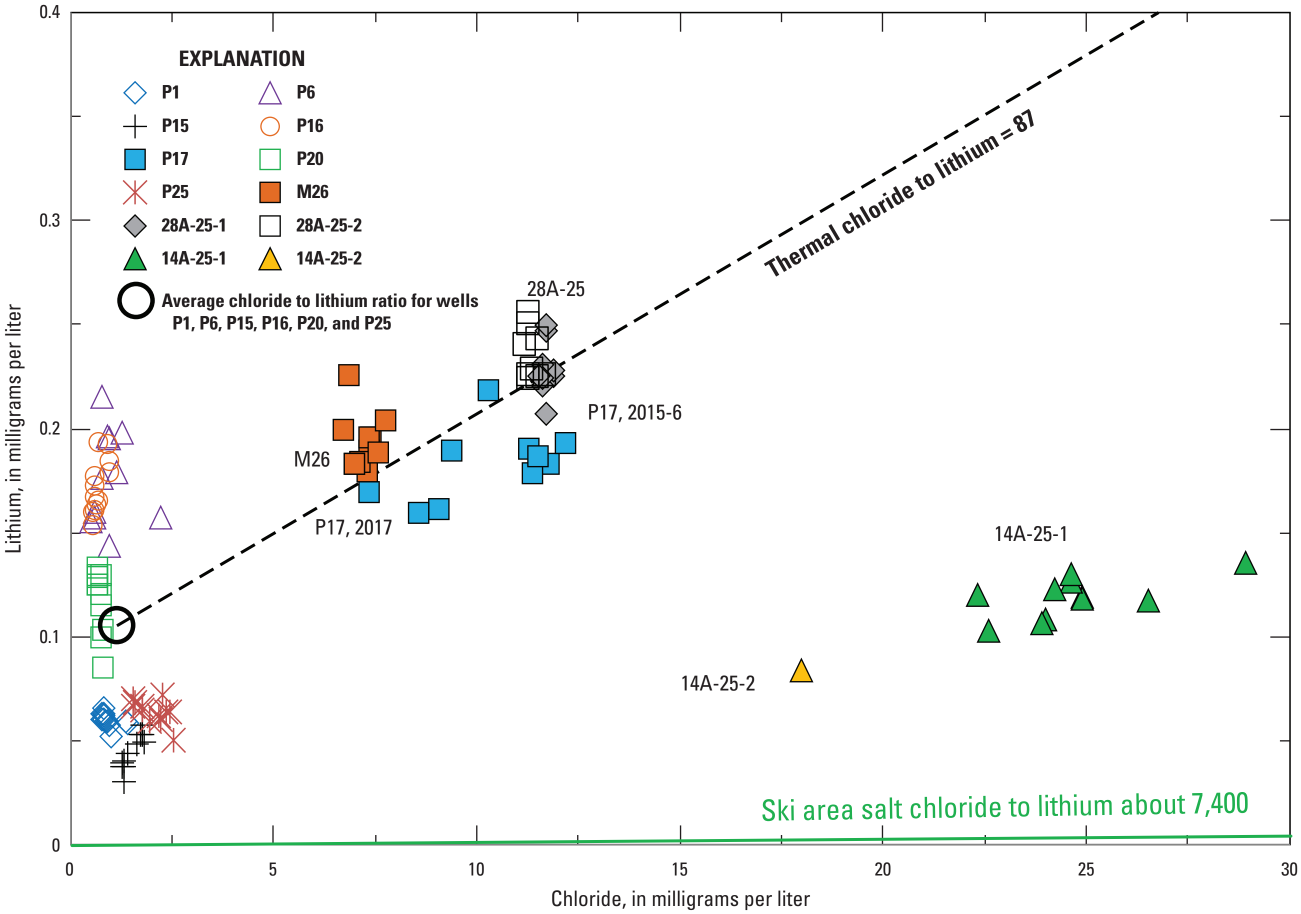

Figure 24. Correlation of chloride and lithium concentrations for groundwater from Mammoth Community Water District wells (P1, P6, P15, P16, P17, P20, P25, M26) and monitoring wells (14A-25-1, 14A-25-2, 28A-25-1, 28A-25-2) collected during 2015–17, Mammoth Lakes area, California.

Stable Isotopes

Previous studies in the Long Valley area have shown that the ratios of stable isotopes of hydrogen and oxygen in thermal and non-thermal water plotted on different trend lines (White and others, 1990; Sorey and others, 1991). Non-thermal groundwater plotted along or near the Global Meteoric Water Line (GMWL), and values became progressively lighter (more negative) from west to east across the caldera (White and others, 1990). Geothermal water plotted to the right of this line because of an oxygen-isotope shift during water-rock interaction at high temperatures in the deep geothermal reservoir (Sorey and others, 1991). Groundwater from the hottest, westernmost well (44-16, fig. 1) showed the extent of this shift, about 1.5 per mil. Figure 25 shows the stable-isotope compositions measured during the quarterly monitoring, the GMWL, and the trend line through the 2005–07 samples of geothermal water samples described previously. The groundwater from the production and monitoring wells (excluding well 14A-25-1) plotted reasonably close to the GMWL, and the geothermal water samples showed mixing between the geothermal source water (in well 44-16) and non-thermal water that was isotopically lighter than any of the local groundwater sampled in this study, as discussed by White and others (1990) and Sorey and others (1991).

Three of the MCWD production wells, P1, P15, and P25, are close to Mammoth Creek (fig. 2), and samples from them had isotopic values similar to those reported by Sorey and others (1991) for cold springs and streams draining Mammoth Mountain, shown as “Mammoth Mountain” on fig. 25. The slight shift to the right of the GMWL could indicate evaporation prior to recharge, perhaps in lakes along the upstream reaches of Mammoth Creek. Water from the other production wells, including P17, and most monitoring wells, had isotopic values characteristic of groundwater from points farther east, such as the southwest rim of the Long Valley Caldera (fig. 1; Sorey and others, 1991). In general, these results agreed with groundwater-flow models for the Mammoth Lakes area (Kenneth D Schmidt and Associates, 2018). Wells P1, P15, and P25 are thought to tap groundwater flowing out of the Mammoth “Lakes Basin” at the southeastern base of Mammoth Mountain; the other wells tap recharge areas further east.

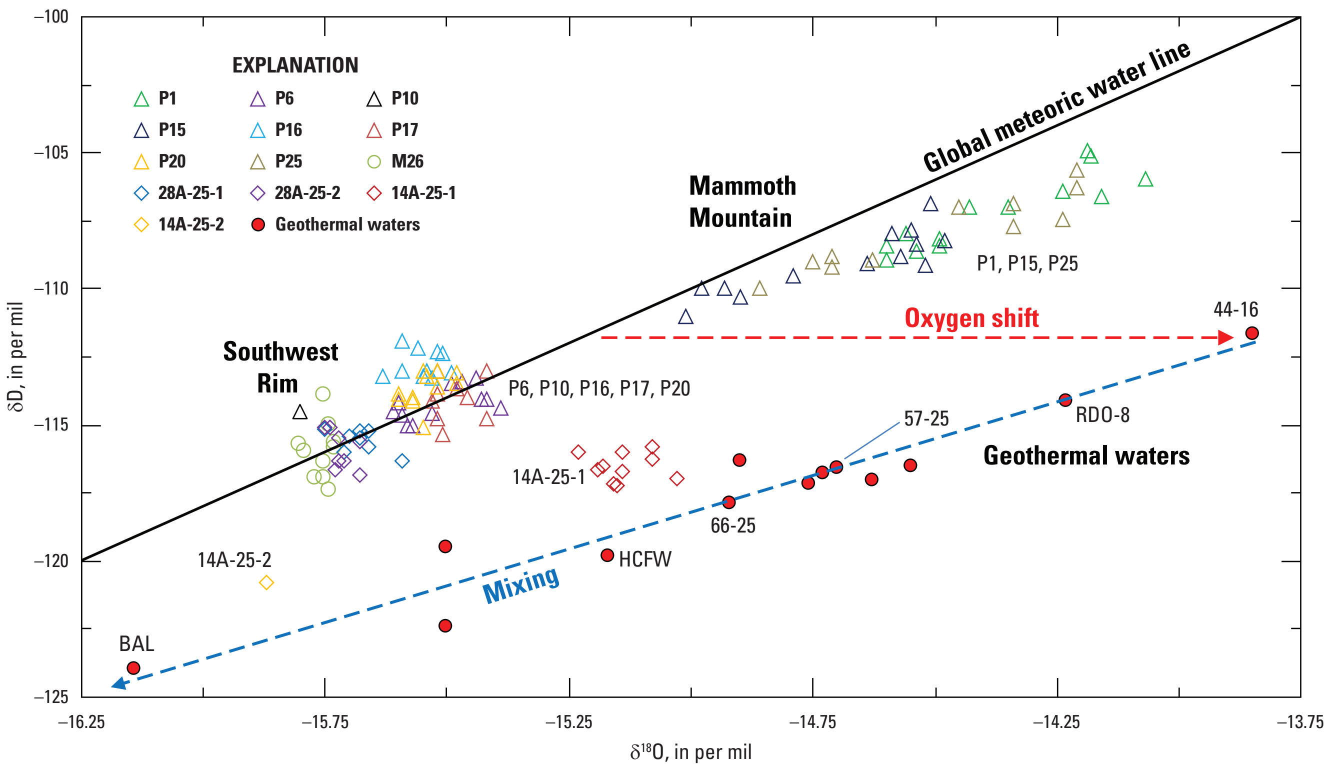

Figure 25. Relation between stable isotope ratios of hydrogen (δD) and oxygen ($\delta^{18}O$) in water for Mammoth Community Water District wells (P1, P6, P15, P16, P17, P20, P25, M26) and monitoring wells (14A-25-1, 14A-25-2, 28A-25-1 and 28A-25-2) for samples collected 2015–17 in Mammoth Lakes area, California. Geothermal-water samples from Brown and others (2013) shown as red dots. GMWL, Global Meteoric Water Line ($\delta D = 8 \times \delta^{18}O + 10$); HCFW, Hot Creek Gorge Spring. Red arrow shows oxygen shift in deep geothermal reservoir; blue line shows progressive mixing of reservoir water (well 44-16) with non-thermal groundwater.

Mixing with geothermal water would shift the isotopic values of any groundwater from the GMWL toward the geothermal trend shown on figure 25. The expected shift was too small to be discernable for groundwater from wells P17, M26, 28A-25-1, and 28A-25-2, which as discussed previously, contained as much as 5 percent geothermal water. Water from 14A-25-1 and 14A-25-2 showed a strong shift and plotted between the non-thermal and geothermal trend lines, however. A one-to-one mixture of geothermal water, similar to that in wells 66-25 and 57-25, and of non-thermal groundwater, similar to that in some MCWD production wells (P6 and P10), would plot within the array of points for water from 14A-25-1. A one-to-one mixture of these fluids, however, would also have a chloride concentration near 120 mg/L, much greater than the measured value of 22.3 mg/L for 14A-25-1 (table 3). The sample from 14A-25-2 plotted well away from the nearby geothermal wells and the local groundwater. Simple mixing between the deep geothermal water and local groundwater for 14A-25-1 and 14A-25-2 is thus inconsistent with the chemistry of the groundwater from this well. The nature of the connection between this water and either the deep geothermal water or the local groundwater remains unclear.

Water-Level Variations During a Flow Test of a Geothermal Production Well

Description of Flow Test

From August 26 to September 22, 2017, Ormat carried out a flow test for the geothermal production well 14-25 (fig. 3), which had been idle since it was drilled in 2010. The purpose of the flow test was to evaluate the production rate and temperature of geothermal water from this well, which is completed in the Bishop Tuff. The produced fluid was reinjected into the geothermal aquifer through well 12-25, approximately 1,480 ft north of 14-25 (fig. 3). The 600-ft-deep monitoring well 14A-25-1 is about 105 ft southwest of production well 14-25, and is completed in the early rhyolite (appendix fig. 1–1). The 600-ft-deep monitoring well 28A-25-1 is 2,600 ft to the southeast of the 14A-25 well site (fig. 3). At site 28A-25, both the deep (28A-25-1) and the shallow (28A-25-2) wells are completed in the early rhyolite (appendix fig. 1–2). The following section describes the filtered water-level data from the monitoring wells before, during, and after the 28-day flow test of production well 14-25.

Filtered Water-Levels at Sites 14A-25 and 28A-25 Before, During, and After the Flow Test

For several months prior to the flow test, steadily rising water levels were measured in wells 14A-25-1, 28A-25-1, and 28A-25-2 (figs. 8 and 9). When pumping began in production well 14-25 on August 26, the water level in the nearby monitoring well 14A-25-1 rose approximately 0.27 ft in 5 hours before returning to the pre-test water level on August 30 (fig. 26).

An abrupt rise and subsequent fall in water level in the hydrostratigraphic units above a pumped unit is known as a “reverse water-level fluctuation” or “Noordbergum effect” (Hsieh, 1996; Wang, 2000, p. 218–221). The rise in water level is due to a poroelastic effect (mechanical response of the aquifer matrix due to strain). At the onset of production from well 14-25, the decrease in fluid pressure in the produced unit (Bishop Tuff) resulted in a contraction of the aquifer matrix. This localized contraction in the producing unit, in turn, induced contraction of the overlying early rhyolite units, increasing the fluid pressure in those units, and causing a rise in water level after pumping started. After the initial contraction, the increased fluid pressure in the overlying early rhyolite units gradually dissipated, and the water level in well 14A-25-1 recovered to a pre-test level (fig. 26). A plot of the detrended, filtered, water-level response in well 14A-25-1 to the flow test is shown in appendix 2 (appendix fig. 2–16).

No poroelastic response at the start of pumping was discernable in the more distant monitoring wells 28A-25-1 and 28A-25-2 (fig. 26). Instead, the water level in both 28A-25 wells continued to rise steadily throughout the flow test. These water-level records serve as a background or reference to compare to the water-level record in well 14A-25-1 during the 28-day flow test (see appendix figure 2–17 for a longer period of record for the filtered water levels in the monitoring wells at sites 14A-25 and 28A-25 that includes the period of the flow test).

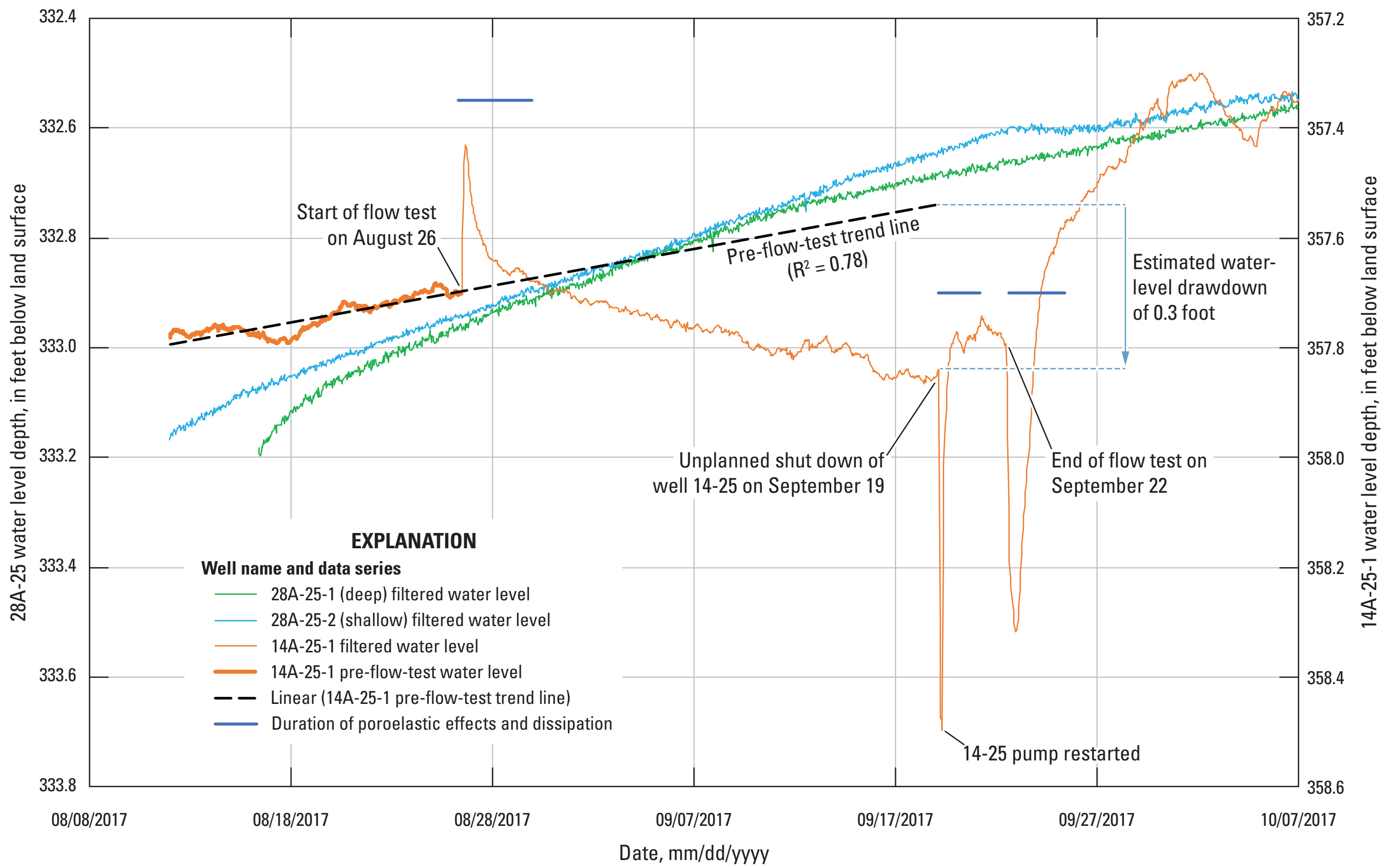

Figure 26. Digitally filtered water-level data for wells 14A-25-1, 28A-25-1, and 28A-25-2, Mammoth Lakes area, California, from August 12 to October 6, 2017.

By August 30, after the dissipation of the reverse water-level response, the water level in well 14A-25-1 began a steady decline, reversing the upward pre-test trend (fig. 26). The steady water-level decline in 14A-25-1 persisted until September 19, when the pump in production well 14-25 unexpectedly shut down for 5 hours. When the fluid production stopped, a second poroelastic “reverse water-level fluctuation” was observed in well 14A-25-1. In this case, however, the fluid pressure recovery in the deep geothermal aquifer (Bishop Tuff) caused a relative expansion of the aquifer matrix, which, in turn, expanded the overlying early rhyolite units. The expansion or dilation of the aquifer matrix in the overlying early rhyolite units caused the fluid pressure (water level) to abruptly drop approximately 0.66 ft (fig. 26). After five hours the pumping resumed, which caused a third reverse water-level response, in this case an increase in water level superimposed on the response from the second downward reverse water-level fluctuation. Note that the third reverse water-level response, when superimposed on the dissipation phase of the second reverse water-level response, caused a much shorter dissipation period compared to the first reverse water-level response. From early on September 20 until the flow test ended on September 22, the water level in 14A-25-1 fluctuated about the 357.8 ft level (fig. 26). The water level during this period primarily represents the combined responses of the unplanned shutdown and the restart of pumping. This is because the Noordbergum effect can take several days or more to dissipate, as indicated by the dissipation phase of the initial response to the start of production. When production well 14-25 was intentionally shut down on September 22, there was a fourth reverse water-level fluctuation (fig. 26). The reverse water-level fluctuation in this instance was a drop of approximately 0.51 ft. Following the 0.51 ft drop, the water level in well 14A-25-1 began a steep 0.72 ft rise (poroelastic dissipation) that continued until early on September 25 (fig. 26). By September 25, after the dissipation of the poroelastic effects the water level in well 14A-25-1 was at a level higher than the start of the flow test and returned to an upward trend.

Analysis of Water-Level Changes

Prior to the start of pumping, the water level in well 14A-25-1 showed a steadily rising trend (fig. 26). Starting on August 30, after the start of pumping and dissipation of poroelastic effects, the water level began a steady decline until the unplanned shutdown on September 19. By September 25, after the planned shutdown and dissipation of poroelastic effects, the water level had risen to a level higher than at the start of the flow test and returned to an upward trend. Collectively, the temporal changes in the water-level trends indicated hydraulic drawdown in the early rhyolite units monitored by well 14A-25-1 during the 28-day flow test. The hydraulic drawdown in well 14A-25-1 during the flow test (0.3 ft) was estimated as the difference between the best-fit ($R^2 = 0.78$), pre-flow-test trend line for well 14A-25-1 and the digitally filtered water level in well 14A-25-1 on September 19, prior to the unplanned shutdown of the pump in well 14-25 (fig. 26). This drawdown in the digitally filtered water-level data indicated that, near wells 14-25 and 14A-25-1, there is some hydraulic connection between the deep geothermal aquifer and the shallow aquifer in the early rhyolite units. The connection pathways are unknown but could be either subvertical through the early rhyolite matrix, through interconnected fracture networks in the early rhyolite, or through nearby high-angle faults (Hildreth, 2014). The degree of hydraulic connection (principally, the vertical hydraulic conductivity) between the deep geothermal aquifer and the shallow-aquifer system in the vicinity of wells 14-25 and 14A-25-1 is uncertain; however, the nature of the connection could be resolved better by numerical simulations of the flow test and by collecting additional data from, and simulations of, longer term flow tests. Furthermore, a calibrated groundwater-flow model (numerical simulation) that includes the shallow aquifer and deep geothermal aquifer could integrate the hydraulic monitoring data of both systems to improve assessments of potential effects on the shallow-aquifer system caused by the development of the geothermal resource.

Potential Physical and Chemical Influences on Water-Level Data

This section presents a discussion of potential physical and chemical influences to determine whether they could have had a substantive effect on the unfiltered water-level records for wells 14A-25-1, 28A-25-1, and 28A-25-2 during the 28-day flow test in August and September of 2017 of geothermal production well 14-25.

As described previously, water level in the shallow groundwater wells was monitored with an up-hole pressure transducer connected to a nitrogen-gas-filled line with a gas regulator (fig. 4). Placement of the nitrogen-gas-filled line in the upper 25 ft of the water column used with a low-range (that is, high resolution, about 0.01 ft) pressure transducer provides sensitive measurements of water-level changes. A record obtained in this manner, however, reflects pressure changes in the groundwater system at the screened interval (575–595 ft below land surface) as well as density changes in the 2-inch diameter well above the screened interval. The pressure at the screened interval (P_{SCR}) can be calculated using equation 3:

$$P_{SCR} = \rho \times g \times h \quad (3)$$

where

ρ is water density (kilograms per liter, kg/L),

g is the fixed gravitational acceleration (meters per second squared, m/s^2), and

h is the height (meters, m) of the water column above the screen.

A change in water density results in a change in h, even if P_{SCR} is constant. Water-density changes could be induced by variations in temperature or salinity. Discussed in the next section are various scenarios that could have caused density changes during the 28-day flow test, the calculated effect on water level, and a comparison between these calculated effects and the observed 0.3-ft water-level drawdown in well 14A-25-1.

Temperature-Induced Density Changes

Vapor-Phase Conditions at Well 14A-25-1

Formation of a vapor (steam) phase resulting from groundwater boiling would cause a large change in the bulk fluid density. Figure 27 shows the water-temperature profiles in well 14A-25-1 measured before and after the flow test of well 14-25. The difference between these two profiles is barely discernable at this scale. The boiling-point depth (BPD) curve shows the temperature at which water boils at the water-level elevation (approximately 7,424 ft) and the increase in boiling temperature by depth due to the increase in hydrostatic pressure. The boiling temperature at the water-surface elevation (93 °C) is much hotter than the measured temperature (approximately 62.5 °C), and the difference increases with depth. Thus, the formation of a steam phase in well 14A-25-1 during the flow test is unrealistic.

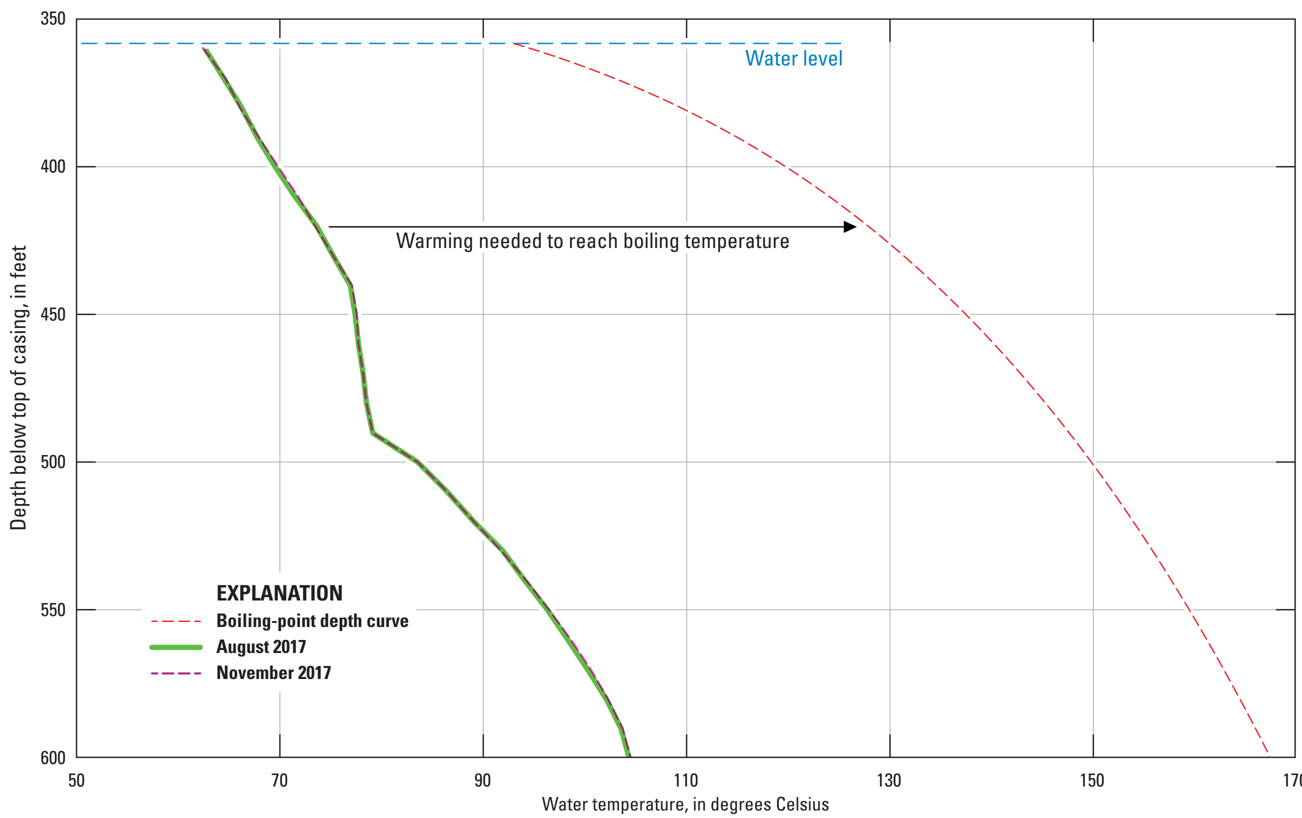

Figure 27. Well 14A-25-1 water-temperature profiles in August and November of 2017, Mammoth Lakes area, California (before and after the flow test of well 14-25), and boiling-point depth (BPD) curve. The boiling-point depth curve was calculated for a water table elevation of 7,424 feet and a barometric pressure of 78 kilopascals.

Thermal Conduction Due to Nearby Production Well 14-25

Upward flow of hot geothermal water in production well 14-25 during the flow test would have heated the groundwater surrounding the well by conduction through the well casing. Conductive heat transfer from piping is a well-studied process and can be modeled after Carslaw and Jaeger (1959, p. 334–337). Using the measured temperature conditions at well 14-25 during the flow test (about 170 °C) and reasonable assumptions about the heat capacity (1 kilojoule per kilogram per degree Celsius) and thermal conductivity (2 watts per meter per degree Celsius) of the surrounding rocks, temperature increases greater than 1 °C would be confined to a 16-ft radius around the well during the 28-days of the flow test. Some boiling or vapor-phase conditions could have existed within this radius, but this would not be expected to influence groundwater density 105 ft away at well 14A-25-1. Additionally, a temperature increase would reduce groundwater density at well 14A-25-1, which would cause a rise in water level rather than the observed 0.3-ft decline.

Variations in Water-Temperature Profiles During the Flow Test

Variations in the water-temperature profiles of well 14A-25-1 have been relatively small (fig. 28), and the differences were difficult to discern. Overall, there was a slight warming of the water column between August and November of 2017 (appendix table 3–1). The resultant decrease in water density, calculated from standard equations of state for the density and compressibility of water as a function of temperature (Jones and Harris, 1992; Wagner and Pruss, 2002), would produce a rise in water level of 0.013 ft—barely detectable by the monitoring instruments. A temperature decrease of 2.0 °C at every depth in the water column could account for a 0.3-ft water-level decline, as was measured by the pressure transducer. Although this hypothetical temperature decrease could be distributed through the water column differently from what is shown in figure 28, the cooling required far exceeds the water-temperature variability observed in this well (fig. 28).

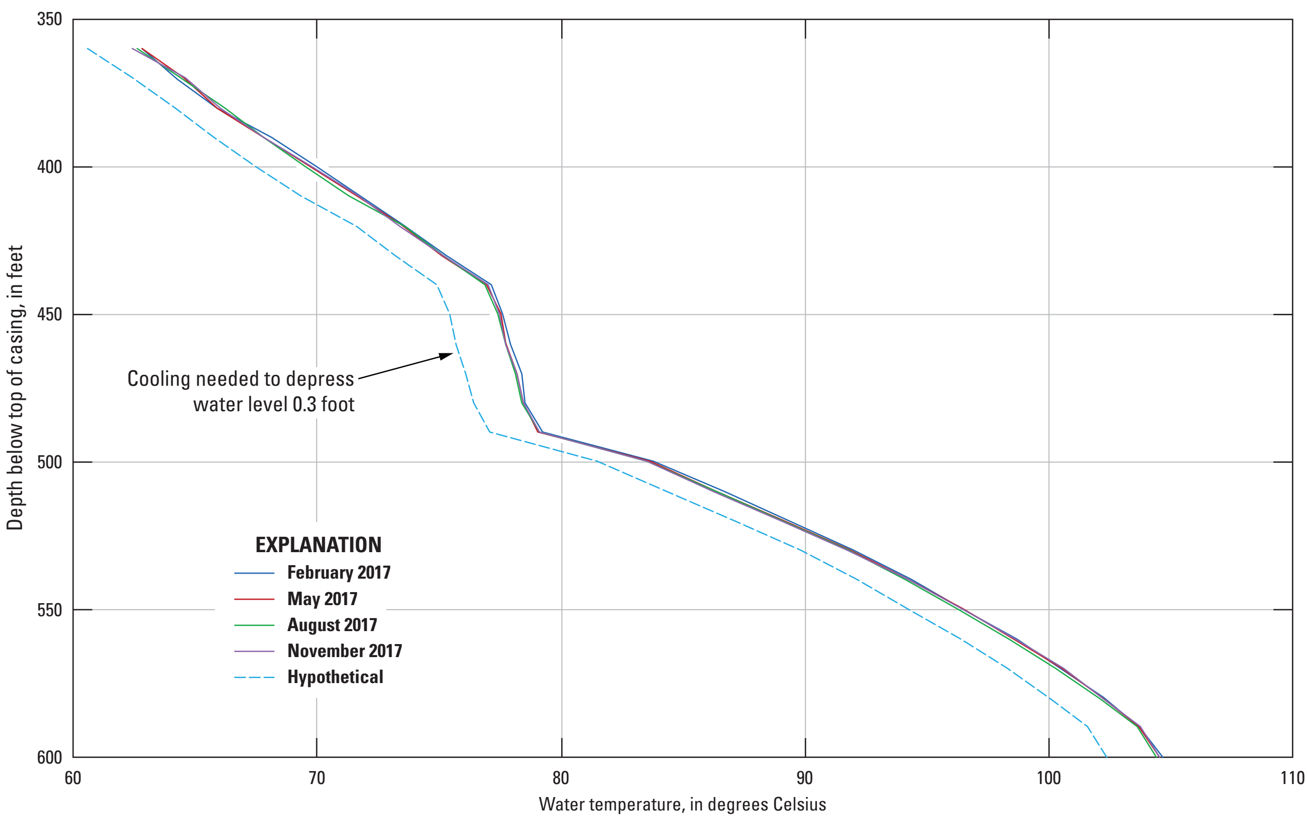

Figure 28. Well 14A-25-1 in Mammoth Lakes area, California, water-temperature profiles measured during 2017 and a hypothetical cooling profile.

Possible temperature-induced water-density changes must also be considered at well 28A-25, because it was used as the reference well for water-level change in well 14A-25-1 (fig. 26). For example, a temperature increase of 2.6 °C in groundwater at well 28A-25 during the flow test would cause a 0.3-ft rise in water level that could resemble a 0.3-ft decline in the water level in well 14A-25-1. Figure 29 shows water-temperature profiles at well 28A-25-1 from December 2016 through November 2017. Excluding the upper 100 feet of the November 2017 profile, which was affected by the nearby drilling of well 28-25, as discussed previously, the profiles showed relatively little variability through time; nothing in the measured profiles showed an increase of 2.6 °C.

Gas-Temperature Changes Above the Water Column

Temperature changes in the approximately 358-ft column of air above the water surface in well 14A-25-1 could cause density changes in the nitrogen-gas-filled line, previously described. A nitrogen-gas temperature drop could register as a water-level drop in the pressure-transducer output. To assess the possible magnitude of this effect, it was assumed that the air temperature in the well casing above the water surface would not be warmer than the 62.6 °C temperature of water near the water surface in August 2017 (appendix table 3–1). If the pressure transducer was calibrated to the water surface under these conditions, and then the entire air column cooled to 0 °C, the apparent water-level drop would be 0.125 ft. It is implausible that such extreme changes in air temperature were reached in well 14A-25-1 during the flow test. Seasonal temperature changes in the well casing are probably limited to a few degrees Celsius, and associated water-level changes would be approximately 0.01 ft.

Chemistry-Induced Density Changes

Water density increases with increasing total dissolved solids (TDS) concentration, the sum of all chemical species dissolved in a given water. The precise relation between TDS and density depends on chemical composition, but the relation between TDS concentration and density is well known for common salt (sodium chloride) solutions within a temperature range of 40–110 °C (equation 4; Rogers and Pitzer, 1982):

$$\Delta\rho = 0.677 \times \Delta NaCl \quad (4)$$

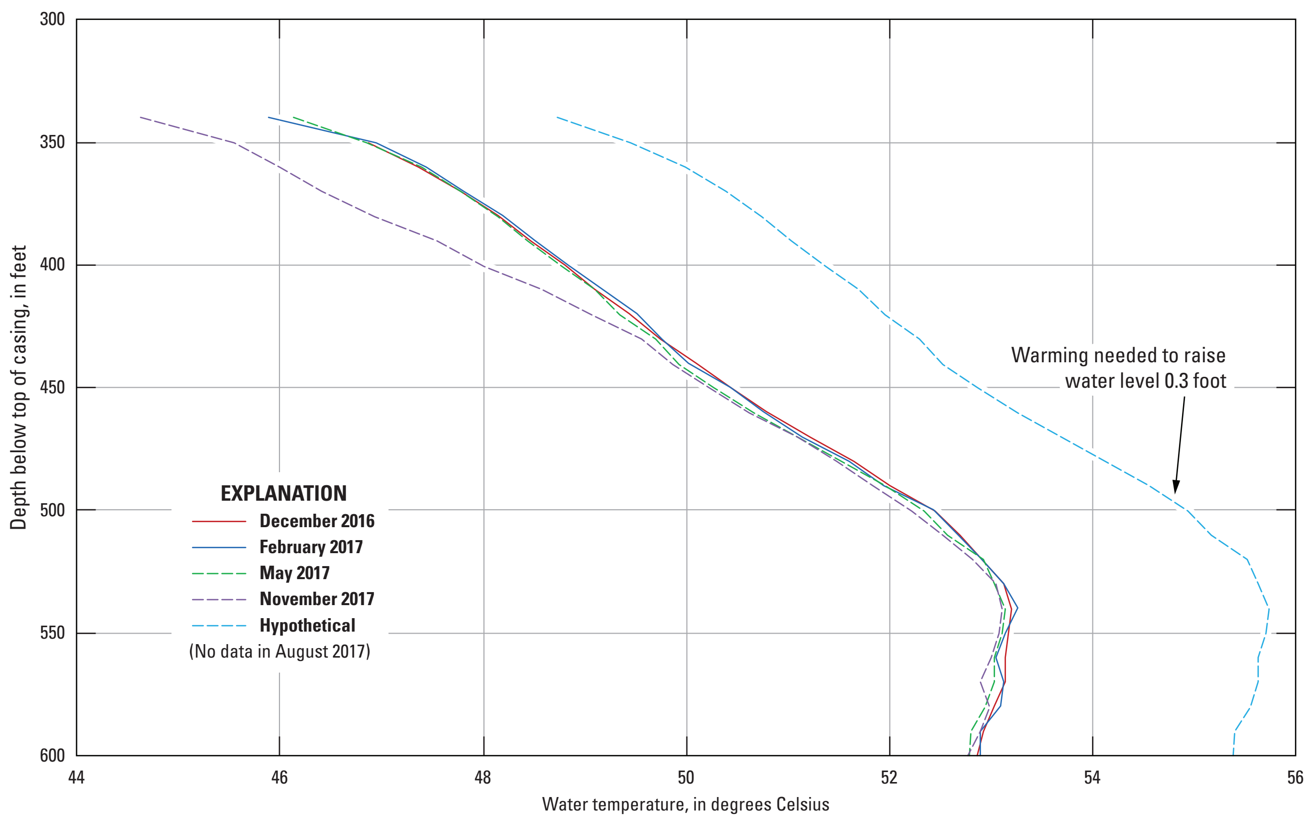

Figure 29. Water-temperature profiles measured in well 28A-25-1 in Mammoth Lakes area, California, from December 2016 to November 2017 and hypothetical warming profile.

In this equation, $\Delta\rho$ is the change in density in grams per liter (g/L) for each gram per kilogram (g/kg) concomitant change in the concentration of sodium chloride, and the multiplication factor (0.677) varies by less than 4 percent between 40 and 110 °C. A generic, empirical formula exists for mixed salt solutions, like those for water in well 14A-25-1 (equation 5; Kharaka and others, 1988):

$$\Delta\rho = 0.688 \times \Delta TDS \quad (5)$$

In this equation, the TDS concentration change is in grams per liter. Using either the measured TDS values for well 14A-25-1 in equation 5 or substituting TDS for NaCl in equation 4 yields similar results. The TDS concentration would need to increase to about 2,750 mg/L to increase the density of water in well 14A-25-1 enough to decrease the water level by 0.3 ft. Such an increase far exceeds the variability in TDS concentration measured in samples collected from the screened interval at 575–595 ft (fig. 30). Furthermore, the hypothetical increase in TDS concentration would have to occur at all water depths inside the cased well bore to cause this water-level decrease.

Chemistry-induced water-density changes must also be considered at the monitoring well 28A-25. The TDS concentration of water samples from well 28A-25-01 (deep well) showed little change through time (fig. 31); even a drop in TDS concentration to 0 mg/L would not produce a water-level rise of 0.3 ft.

Summary of Potential Physical and Chemical Influences on Water-Level Data

On the basis of the available data and a range of reasonable assumptions regarding ambient environmental conditions, the water-level decline of approximately 0.3 foot in well 14A-25-1 observed during the 28-day flow test cannot be attributed to density changes induced by variations in water temperature, water chemistry, or gas temperature in wells 14A-25-1, 28A-25-1, or 28A-25-2. The observed water-level decline in well 14A-25-1 represents a hydraulic head change at the depth of the screened interval. Furthermore, the water-level records at wells 14A-25-1 and 28A-25 are suitable for long-term monitoring of hydraulic head in the shallow-aquifer system in the CD-4 project area.

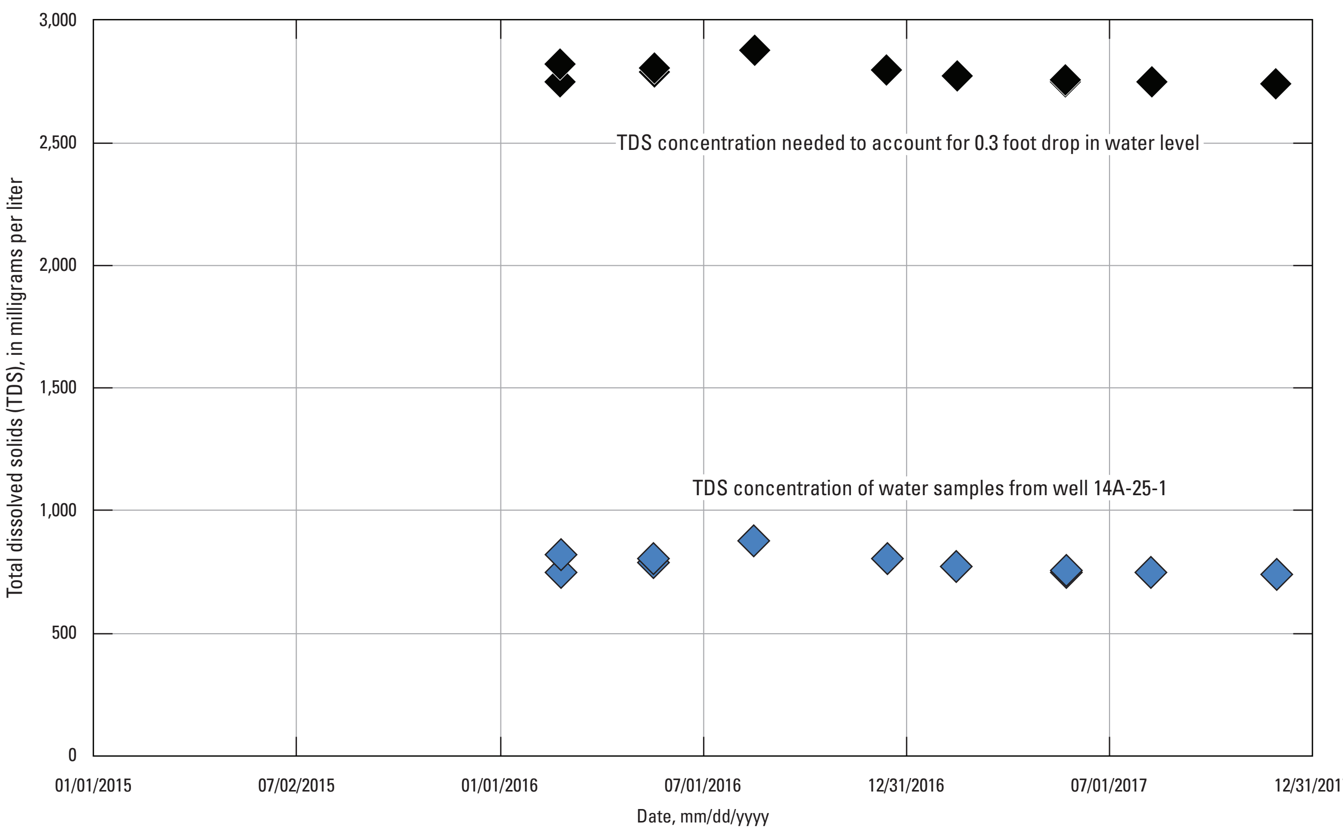

Figure 30. Time series of total dissolved solids (TDS) concentration in well 14A-25-1 in Mammoth Lakes area, California, during calendar years 2016–17, and hypothetical increase in the TDS concentrations.

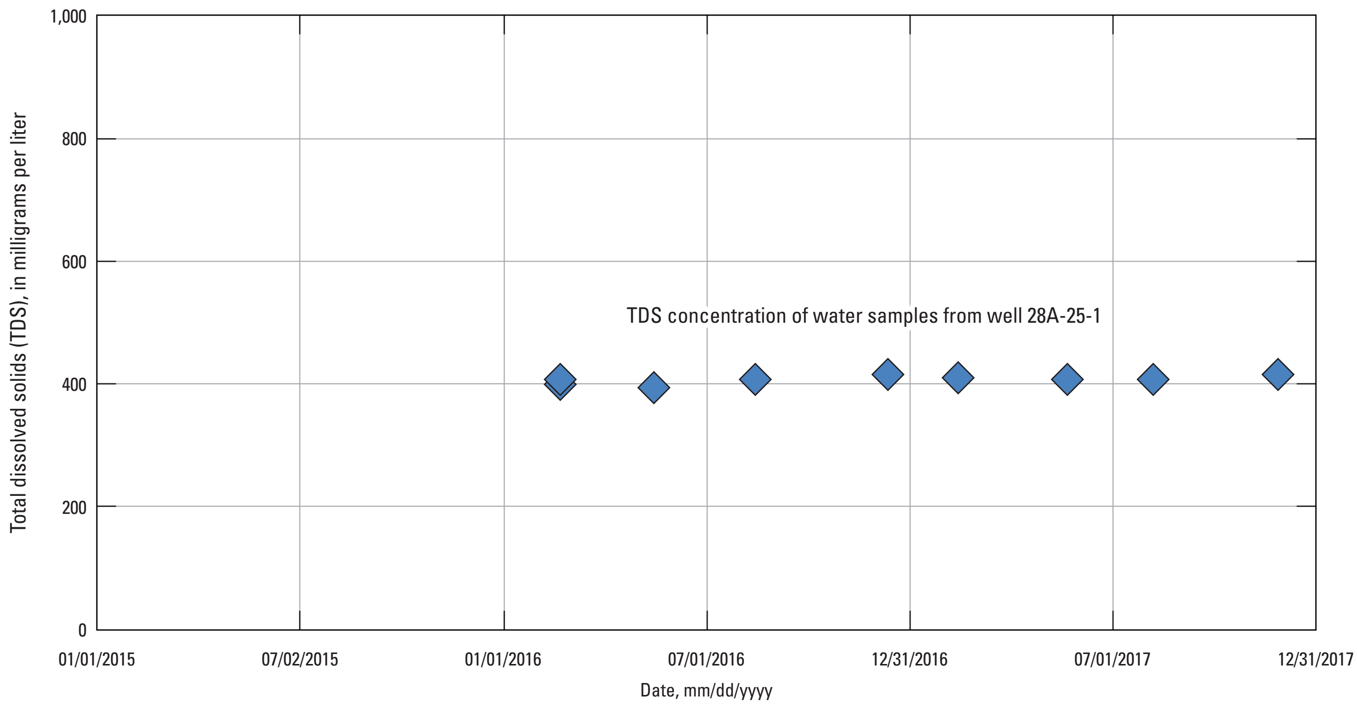

Figure 31. Time series of total dissolved solids (TDS) concentrations in water from well 28A-25-1 in Mammoth Lakes area, California, showing the low variability in TDS concentrations during calendar years 2016–17.

Summary

The purpose of the U.S. Geological Survey (USGS) groundwater-monitoring program in relation to the CD-4 project is to provide high-quality, publicly available data to Federal, State, County, and municipal agencies responsible for making resource-management decisions regarding the thermal and cold groundwater resources.

The purposes and scope of this report are to (1) describe the monitoring-well network near Mammoth Lakes, as of late 2017; (2) document the methods used to collect groundwater-level data, groundwater-temperature profiles, groundwater-chemistry data, and associated quality-control measures; (3) describe the development of digital filters used to remove or reduce barometric pressure and Earth-tide effects in water-level records; (4) present baseline water-level and temperature datasets collected from late 2015 to 2017; (5) compare the chemical constituents, constituent ratios, and isotopes of groundwater to the known characteristics of the deep geothermal water; (6) discuss digitally filtered water-level records from the monitoring wells during a 28-day flow test of a geothermal well (14-25); (7) demonstrate the accuracy of water-level data collected at the shallow monitoring wells; and (8) demonstrate the utility of water-level, water-temperature, and water-chemistry data to evaluate the degree of hydrologic connection between shallow groundwater and deep geothermal water. This report presents an initial evaluation of monitoring data collected for the period 2015 to 2017; it is not intended to be a comprehensive assessment of the shallow groundwater and deep geothermal systems in the Mammoth Lakes area.

The monitoring program uses two approximately 600-foot (ft) -deep wells (14A-25 and 28A-25) with deep and shallow completion depths (14A-25-1 and 14A-25-2; 28A-25-1 and 28A-25-2, respectively) that are in hydraulic communication with the shallow-aquifer system. Monitoring data from these wells include continuous water-level data, quarterly water-temperature profiles, and quarterly water-chemistry data. Quarterly water-chemistry data are also collected at seven Mammoth Community Water District (MCWD) production wells and one monitoring well.

The continuous water-level data, water-temperature profiles, and water-chemistry data were collected using established USGS methods, and procedures were incorporated into the various types of data collection for quality control. For monitoring wells 14A-25-1, 28A-25-1, and 28A-25-2 digital filters were developed to remove the water-level responses to atmospheric loading from the unfiltered water-level records. A simplified version of the workflow process used to develop the digital atmospheric-loading and Earth-tide filters applied to the water-level time series is described in the main text. A detailed description of the workflow, including intermediate steps and specifics of the methods used to develop the digital atmospheric-loading and Earth-tide filters, and the resulting filtered water-level records are in appendix 2.

Unfiltered water-level records at sites 14A-25 and 28A-25 tracked groundwater-level declines in the shallow-aquifer system resulting from years of below-normal precipitation.

After the above-normal precipitation during the winter of 2016–17, the groundwater levels at both sites began rising in the first half of 2017 and continued to rise through the remainder of the year.

Because water-level responses to barometric-pressure variations (atmospheric loading) and solid Earth tides can potentially mask subtle water-level responses to other hydrologic stresses, it was essential to filter the water-level records for atmospheric-loading and Earth-tide effects. For well 14A-25-1, the effects of both barometric pressure changes and solid Earth tides were filtered from the water-level data, whereas only the effects of atmospheric loading were filtered from the water-level data of wells 28A-25-1 and 28A-25-2, because there were no solid Earth tide effects detected in these water-level records. The mathematical filters effectively removed or substantially reduced the sinusoidal effects of atmospheric loading, thereby revealing subtle water-level responses to other hydrologic stresses.

The quarterly water-temperature profiles for the monitoring wells 14A-25-1 and 28A-25-1 had sufficient resolution to track subtle changes associated with groundwater flow through the surrounding formations through time. Although most water-temperature changes were within the open intervals of either the shallow or deep wells at both sites, water-temperature changes in other sections of the profiles were also observed.

The suite of chemical constituents measured on a quarterly schedule was used to determine the water-chemistry variability of groundwater in each well, evaluate source areas of groundwater recharge, assess the degree of connection between thermal and non-thermal groundwater, and detect changes in the mixing of thermal and non-thermal water as well as changes in source areas through time.

Conservative elements in water-chemistry data showed that MCWD production well P17 and monitoring wells M26 and 28A-25 (both depths) contained a small percentage of thermal water, which was consistent with a limited hydraulic connection between the shallow non-thermal and deep geothermal systems along the northern periphery of the study area. Although the flow paths that account for this natural mixing are unknown, samples from wells like P17 (and to a lesser extent M26) that varied in composition along the thermal-water trend lines, demonstrate how relative mixing proportions of thermal and non-thermal groundwater can change over time.

Stable isotope composition results for water samples from MCWD production wells and most monitoring wells were consistent with available groundwater-flow models. Results for monitoring wells 14A-25-1 and 14A-25-2, however, were inconsistent with available groundwater-flow models so additional information is needed to account for the source of water at this site.

Water-level records digitally filtered for the effects of atmospheric loading and solid Earth tides helped clarify if changes in the water levels were caused by natural or human-induced processes. Filtered water-level data from monitoring well 14A-25-1 collected during a 28-day flow test of geothermal production well 14-25 indicated there is some hydraulic connection between the deep geothermal aquifer and the shallow-aquifer system at this location. The flow paths are unknown and could be subvertical through the early rhyolite matrix, through interconnected fracture networks in the early rhyolite, or through nearby high-angle faults. The degree of hydraulic connection (vertical hydraulic conductivity) between the deep geothermal aquifer and the shallow-aquifer system in the vicinity of wells 14-25 and 14A-25-1 is also unknown; however, the nature of the connection could be resolved better by numerical simulations of the flow test and using additional data from and simulations of longer term flow tests. Furthermore, a calibrated groundwater-flow model (numerical simulation) that includes the shallow-aquifer and deep geothermal aquifer could integrate the hydraulic monitoring data for both systems to improve assessments of potential effects on the shallow-aquifer system caused by the development of the geothermal resource.

The water-level decline of approximately 0.3 foot in well 14A-25-1 during the 28-day flow test cannot be attributed to density changes induced by variations in water-temperature, water-chemistry, or gas-temperature in monitoring wells 14A-25-1, 28A-25-1, or 28A-25-2. The observed water-level decline in well 14A-25-1 represented a hydraulic head change at the depth of the screened interval.

The specialized equipment used to produce the continuous water-level records at sites 14A-25 and 28A-25 was suitable for monitoring-network objectives, including long-term monitoring of hydraulic head in the shallow-aquifer system of the CD-4 project area. The multi-disciplinary USGS groundwater-monitoring network described in this report has the capability to track conditions (static or dynamic) in the shallow-aquifer system.

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Appendix 1. U.S. Geological Survey Research Drilling Program Drilling Methods, Borehole Geophysical Techniques and Well-Construction Schematics for Wells 14A-25, 28A-25, and BLM-1 near Mammoth Lakes, California

Drilling Methods

The U.S. Geological Survey (USGS) Research Drilling Program used gravity-advancing ODEX casing with rotary air hammer for the upper 320 feet (ft) of the 14A-25 hole, upper 310 ft of the 28A-25 hole, and upper 260 ft of the BLM-1 hole. The 9-inch-diameter gravity-advancing ODEX casing with rotary air-hammer technique avoids the high-pressure forcing of drilling mud used by mud rotary drilling, which can plug the fracture permeability of the formation or contaminate the chemistry of the formation water. Below the previously mentioned depths in wells 14A-25, 28A-25, and BLM-1, competent rock was encountered, and a 7-inch-diameter rotary air-hammer was used to total depth. See figures 1–1, 1–2, and 1–3 for details of the well depths, well-construction materials, and depths of the screened intervals for wells 14A-25-1, 14A-25-2, 28A-25-1, 28A-25-2, BLM-1-1, and BLM-1-2.

Borehole Geophysical Logs

Once the total depth in wells 14A-25, 28A-25, and BLM-1 was reached, a suite of borehole geophysical logs were collected to help characterize the hydro-geologic properties of the surrounding formation and determine where the screened intervals would be constructed.

A brief description of the geophysical logging in the open boreholes below the bottom of the ODEX casing previously described follows. Except for the gamma log, most of logs yielded spurious or null signals in the interval of the ODEX casing.

The three-arm caliper log is a measurement of the borehole diameter; it is used to define zones of competent and incompetent wall rock. Caliper logs are useful for identifying zones of fractured rock that collapse into the well bore when the drill bit is removed.

The gamma-ray log is a measurement of natural gamma radiation emitted by the decay of potassium, thorium, and uranium in clay minerals. Clay-rich, hydrothermally altered zones produce ‘peaks’ in the log. Gamma-ray logs are useful for identifying potential zones of low permeability in the surrounding rock.

Conductivity, which is also referred to as electrical conductivity (EC), is a measure of the electrical conductivity of the fluid in the well bore. Conductivity logs are useful for identifying zones of solute-rich water flow into the well bore.

Resistivity logs (short normal—16-inch separation between electrodes—and long normal—64-inch separation between electrodes) are useful for differentiating low-resistivity clay-rich layers from high-resistivity sand- and gravel-rich layers.

Temperature logs are useful for identifying zones of fluid inflow. Deviations in the thermal gradient can be indicative of changes in the hydraulic permeability of the surrounding formation.

Sonic delta-T, also referred to as ”delta-T,” is an acoustic penetration measurement. Dense and compact wall rock have a relatively short return time of the acoustic pulse. As the fracture density and fracture depth increases in the surrounding rock, the return time of the acoustic pulse or delta-T increases proportionally.

Well-Construction Schematics

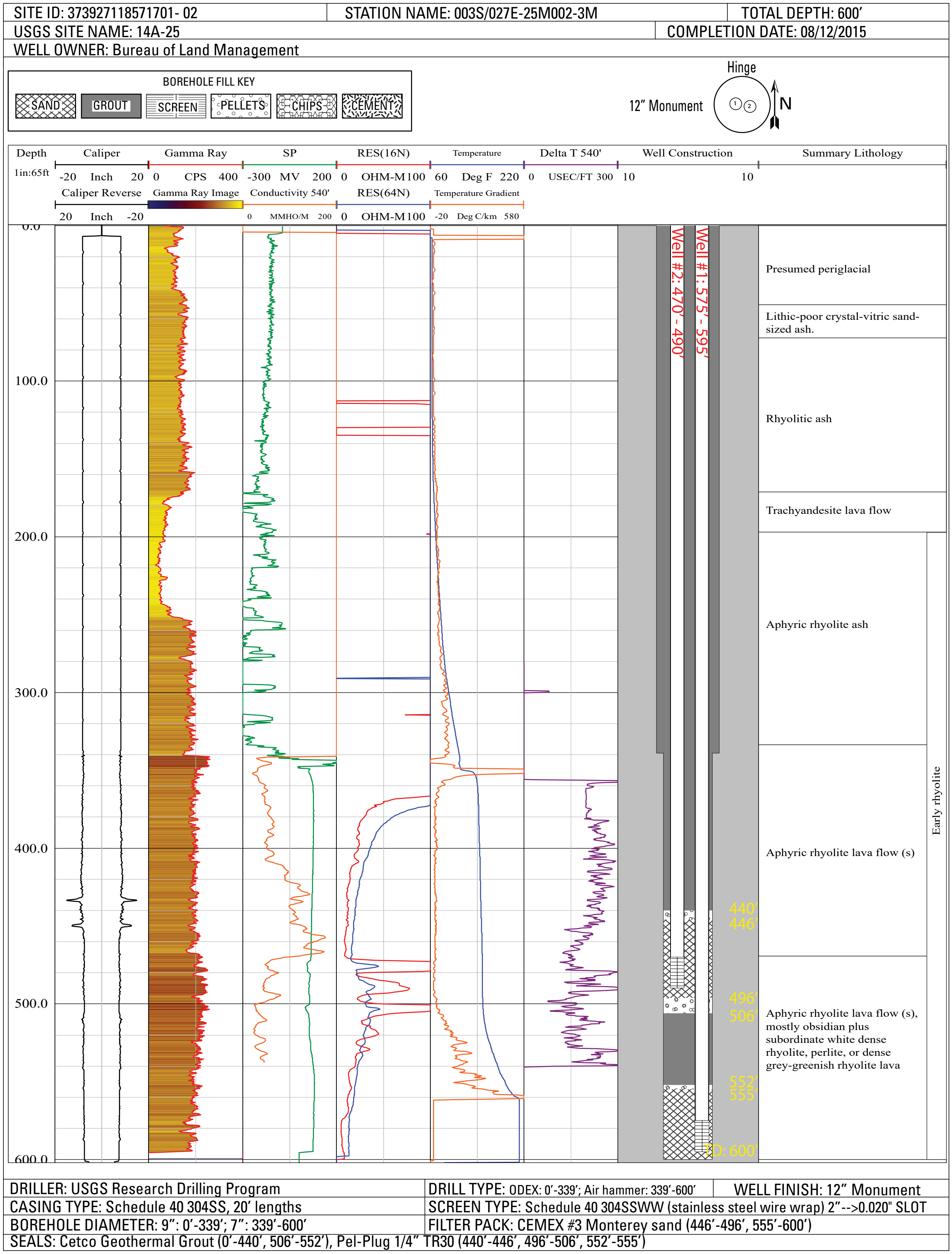
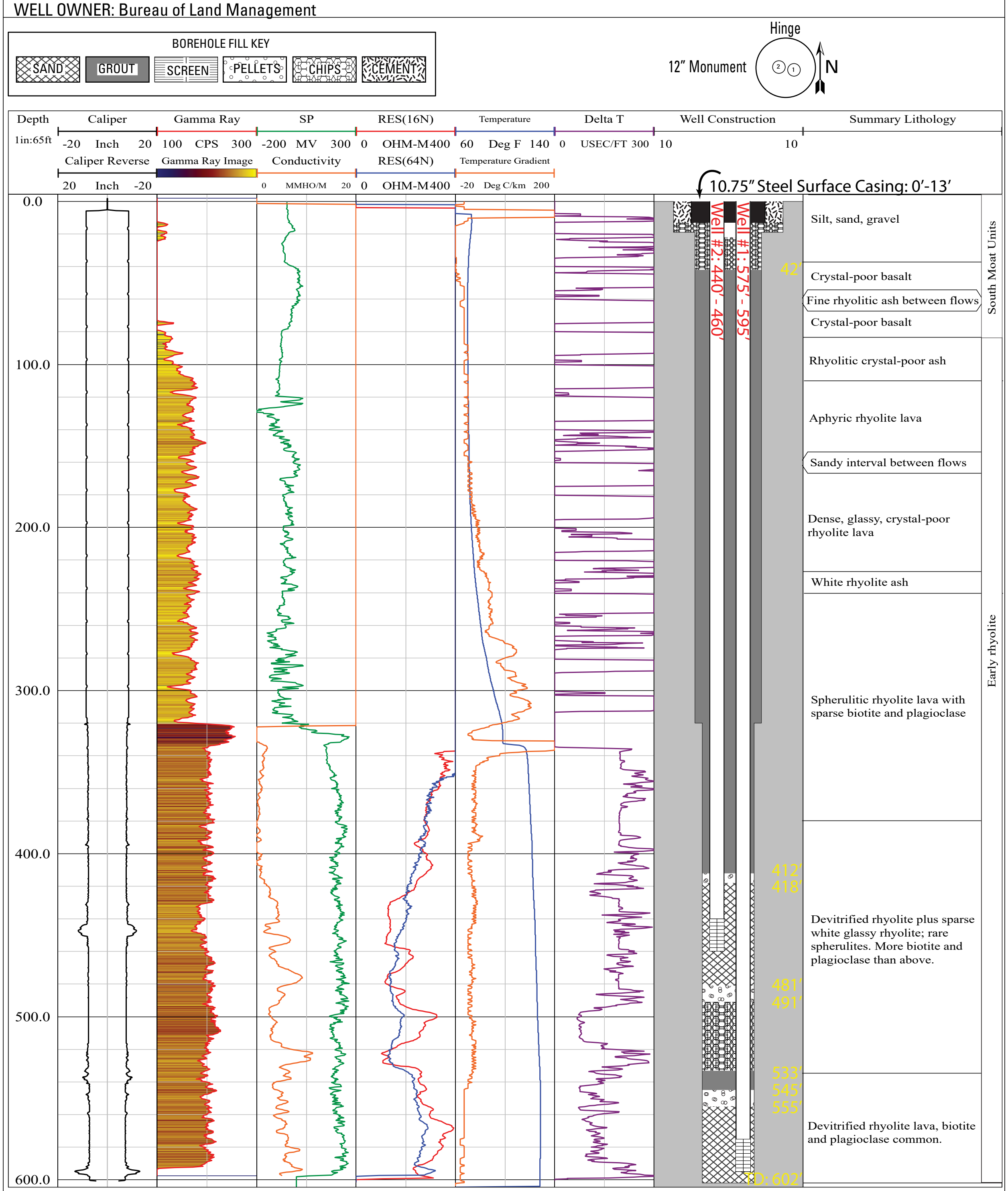


Figure 1–1. Borehole geophysical logs, well construction, and lithology summary for monitoring well 14A-25, Mammoth Lakes, California.

SITE ID: 373904118570701-02	STATION NAME: 003S/027E-25N001-2M	TOTAL DEPTH: 602′
USGS SITE NAME: 28A-25		COMPLETION DATE: 08/23/2015
WELL OWNER: Bureau of Land Management		



DRILLER: USGS Research Drilling Program	DRILL TYPE: ODEX: 0′-320′; Air hammer: 320′-602′	WELL FINISH: 12″ Monument
CASING TYPE: Schedule 40 304SS, 20′ lengths	SCREEN TYPE: Schedule 40 304SSWW (stainless steel wire wrap) 2″-->0.020" SLOT	
BOREHOLE DIAMETER: 14.75″: 0′-19′; 9″: 19′-320′; 7″: 320′-602′	FILTER PACK: CEMEX #3 Monterey sand (418′-481′, 555′-602′)	
SEALS: Cetco Geothermal Grout & Baroid Aquaguard (42′-412′, 533′-545′), Baroid 3/8″ Holeplug (0′-42′, 491′-533′), Pel-Plug 1/4″ TR30 (412′-418′, 481′-491′, 545′-555′)		

Figure 1–2. Borehole geophysical logs, well construction, and lithology summary for monitoring well 28A-25, Mammoth Lakes, California.

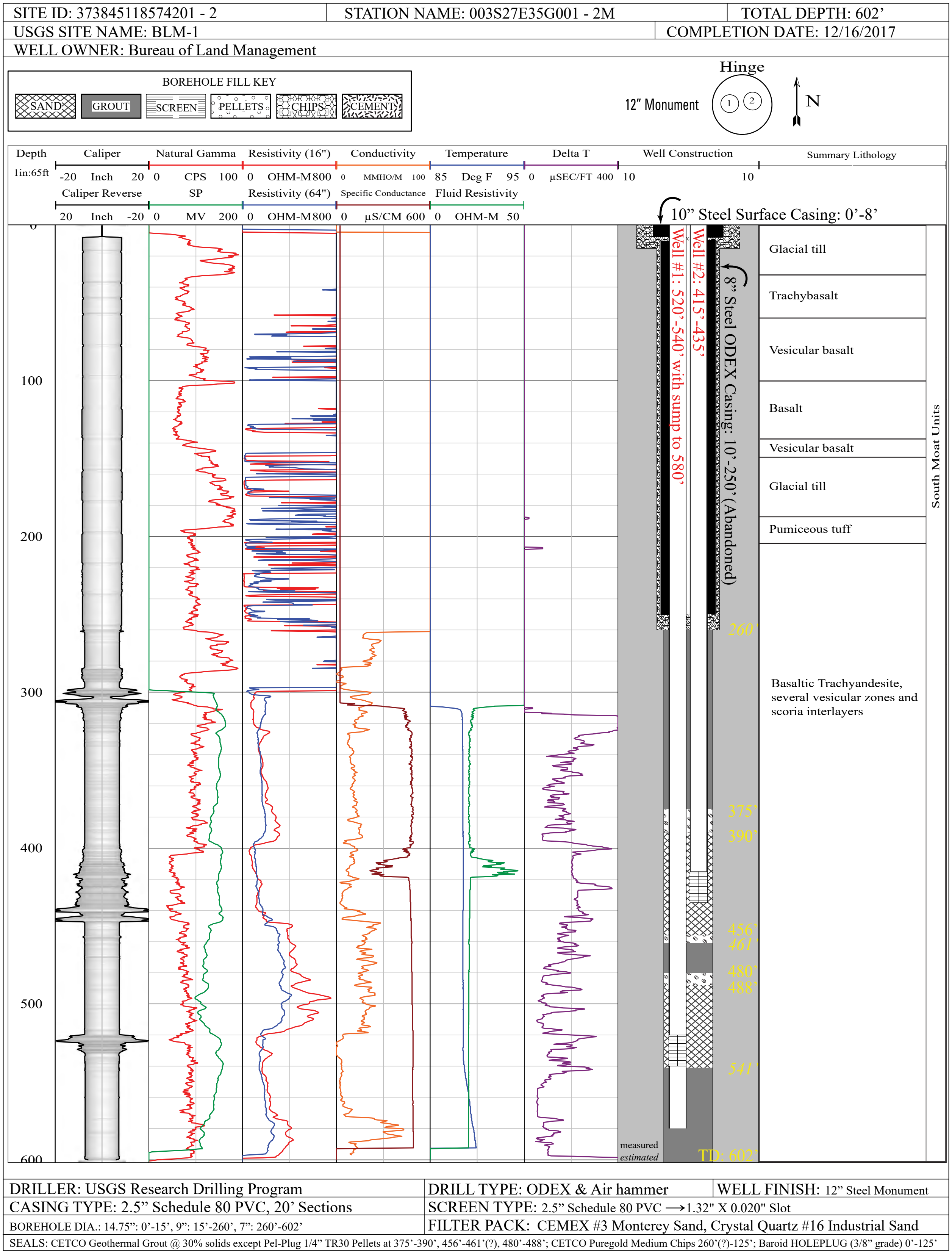


Figure 1–3. Borehole geophysical logs, well construction, and lithology summary for monitoring well BLM-1, Mammoth Lakes, California.

Appendix 2. Development of Digital Atmospheric-Loading and Earth-Tide Filters

The processing of raw data and the development of digital atmospheric-loading and Earth-tide filters were done using MATLAB® with the MATLAB® Signal Processing Toolbox software (release R2018A). For monitoring wells 28A-25-1, 28A-25-2, and 14A-25-1, water-level responses to changes in barometric pressure (atmospheric loading) and the solid Earth tide were evaluated and filtered from the raw water-level record. An overview of the workflow with intermediate steps is shown in figure 2–1. Details of the methods used to develop the digital atmospheric-loading and Earth-tide filters as well as the resulting digitally filtered water levels follow. Note, the water levels used here were measured as depth-to-water below land surface, and references to water level in the following discussions refer to the depth-to-water level rather than water-level elevation or head, unless otherwise stated.

All times are reported in Pacific Standard Time (PST, or Coordinated Universal Time minus 8 hours (hr)). To facilitate working with time in the algorithms developed to process the time series, time was converted from calendar dates (yr:month:day:hr:min) to decimal days (dd) referenced to day-of-the-year value for January 1, 2015; for example, noon on January 1, 2015, was dd 1.5. The raw water-level and barometric-pressure data were processed as continuous "unpaired," variable length (accounting for data gaps) water-level and barometric-pressure time series. "Unpaired" was used to indicate that the time-series lengths (or spans) and sample times were variable. For water-level and barometric-pressure time series, data gaps less than or equal to 3 hr were retained in the time series. The time series were resampled at even (on the hour) hourly intervals, and the retained data gaps were filled using cubic spline interpolation (fig. 2–1, box a). The resulting unpaired, variable-length, continuous time series are referred to here as "pieces." The raw, hourly resampled water-level and barometric-pressure time-series pieces are shown in figure 2–2 and given in Galloway (2019), referenced in the "Digitally Filtered Water-Level Time Series" section of this appendix. The individual pieces, except for 14A-25-1 piece 12, were subsequently parsed to achieve the longest length of paired (temporally coincident) barometric-pressure and water-level, continuous, hourly sampled time series (referred to as 'parsed' series here) (figs. 2–1, box b, and 2–3). The parsed series number was designated by the suffix '_#' (where # refers to the parsed series number) appended to the well number. For example, parsed series 8 for 14A-25-1 was designated as 14A-25-1_8 and refers to a set of paired, continuous water-level and barometric-pressure time series identified by the well from which the water-level series was derived. Piece 12 for 14A-25-1 was not parsed because it is short (about 12 days long), and spans the end of the record (end of 2017) selected for analysis.

Parsed series 3 for 14A-25-1 (14A-25-1_3) was omitted from these analyses because the water level was affected by a coseismic response to a distant earthquake, and it was too short (23 hr) to determine response characteristics to Earth tides and barometric-pressure variations. Other longer parsed series with water-level responses to flow testing or disturbances from nearby drilling were further subdivided into modified parsed water-level series in which these water-level responses were absent, and paired with modified barometric-pressure time series (fig. 2–1, box c). The modified parsed water-level series ideally contained predominately seasonal and annual hydrologic effects, atmospheric-loading responses, and any responses to Earth tides. These modified parsed series included (1) 28A-25-2_7modA and _7modB, which omitted an intervening period of record from 28A-25-2_7 that was affected by several water-level responses attributed to nearby drilling during Oct. 10–15, 2017, and (2) 14A-25-1_10mod, which omitted approximately the first half of 14A-25-1_10 that was affected by a flow test in the nearby 14-25 production well (discussed in the "Water-Level Variations During a Flow Test of a Geothermal Production Well" section in the main report and later in this appendix).

The parsed barometric-pressure series were detrended by removing a linear trend determined by least-squares regression of barometric pressure on time. The parsed water-level series were detrended using either a first- (linear) or higher-order polynomial determined by least-squares regression of water level on time, depending on the nature of the water-level trend for each parsed series (fig. 2–1, box d). Detrending was aimed at removing the longer period (seasonal) hydrologic and barometric effects. Table 2–1 lists various time parameters, derivations with respect to the originating time-series pieces, and detrending polynomial orders for the parsed time series. Barometric-pressure time series collected from the barometer at well site 28A-25 were used for all the 28A-25-1 and 28A-25-2 parsed series and for the 14A-25-1_1 to 14A-25-1_8 parsed series; barometric-pressure time series collected from a newly installed barometer at well site 14A-25 were used for the 14A-25-1_9 to 14A-25-1_11 parsed series. The use of the 28A-25 barometer for most of the 14A-25-1 parsed series is satisfactory given the proximity of the two well sites (about 0.5 mile) and the small elevation difference (about 7 ft). Selected detrended, parsed water-level and barometric-pressure time series are given in Galloway (2019) (referenced in the "Digitally Filtered Water-Level Time Series" section of this appendix).

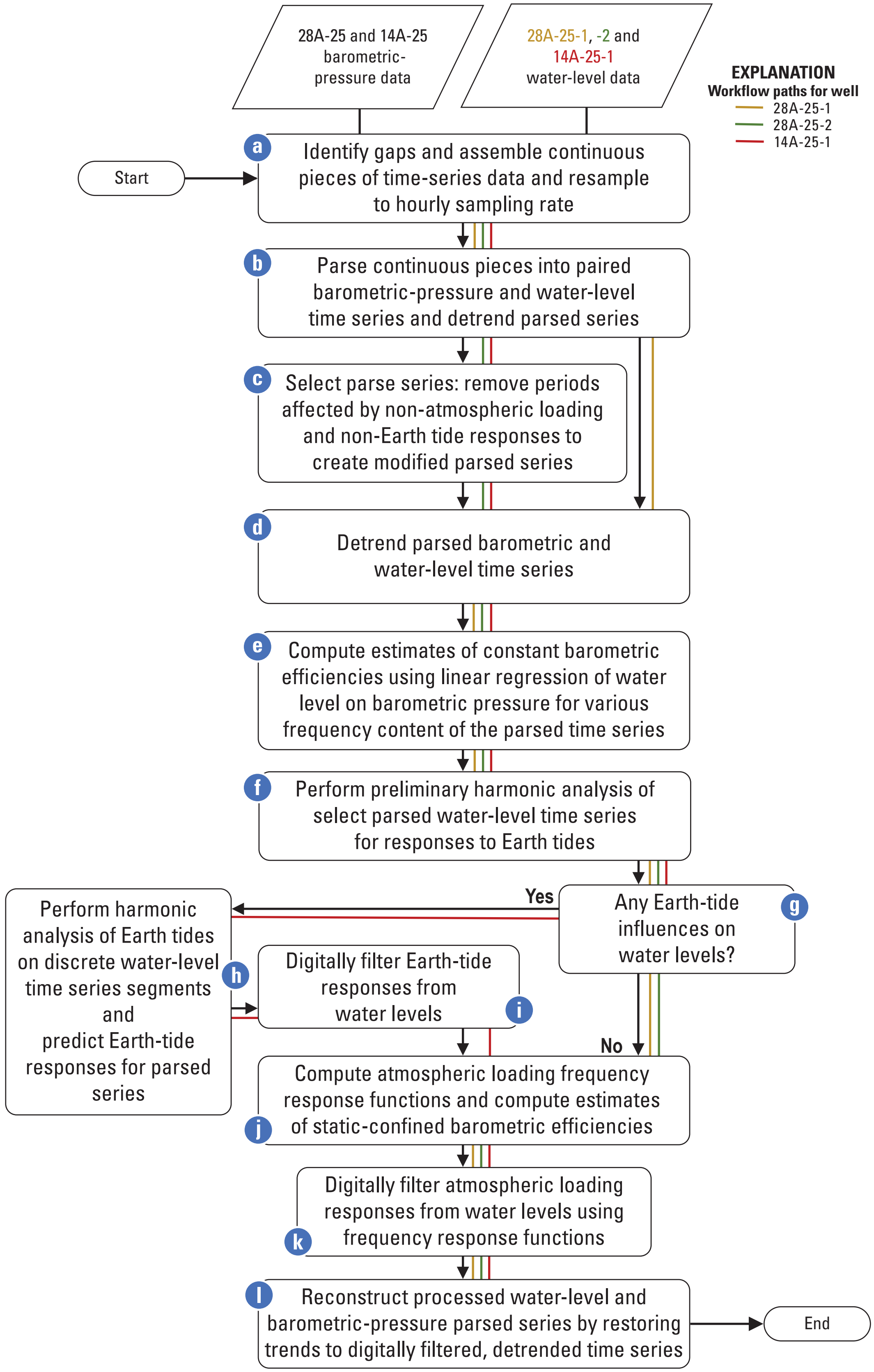


Figure 2–1. Workflow process used to develop the digital atmospheric-loading and Earth-tide filters for water levels from monitoring wells 28A-25-1, 28A-25-2, and 14A-25-1 in the area of Mammoth Lakes, California.

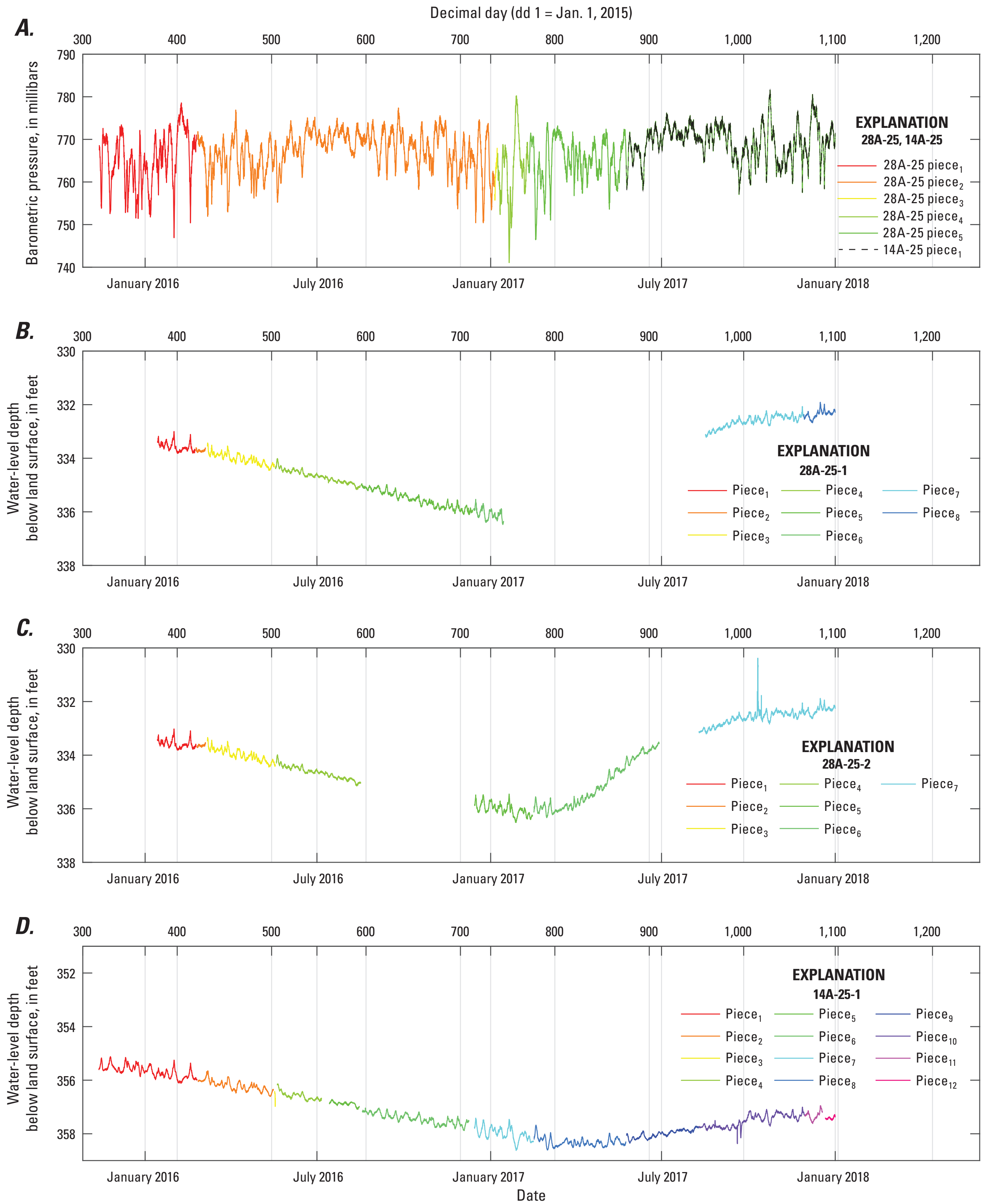


Figure 2–2. Continuous time-series pieces for wells 28A-25-1, 28A-25-2, and 14A-25-1 in the area of Mammoth Lakes, California: *A*, raw barometric-pressure for well sites 28A-25 during November 13, 2015–December 31, 2017, and 14A-25 during May 24, 2017–January 1, 2018; *B*, raw water-level time series for well 28A-25-1 during January 14, 2016–December 31, 2017; *C*, raw water-level time series for well 28A-25-2 during January 14, 2016–December 31, 2017; *D*, raw water-level time series for well 14A-25-1 during November 13, 2015–December 31, 2017.

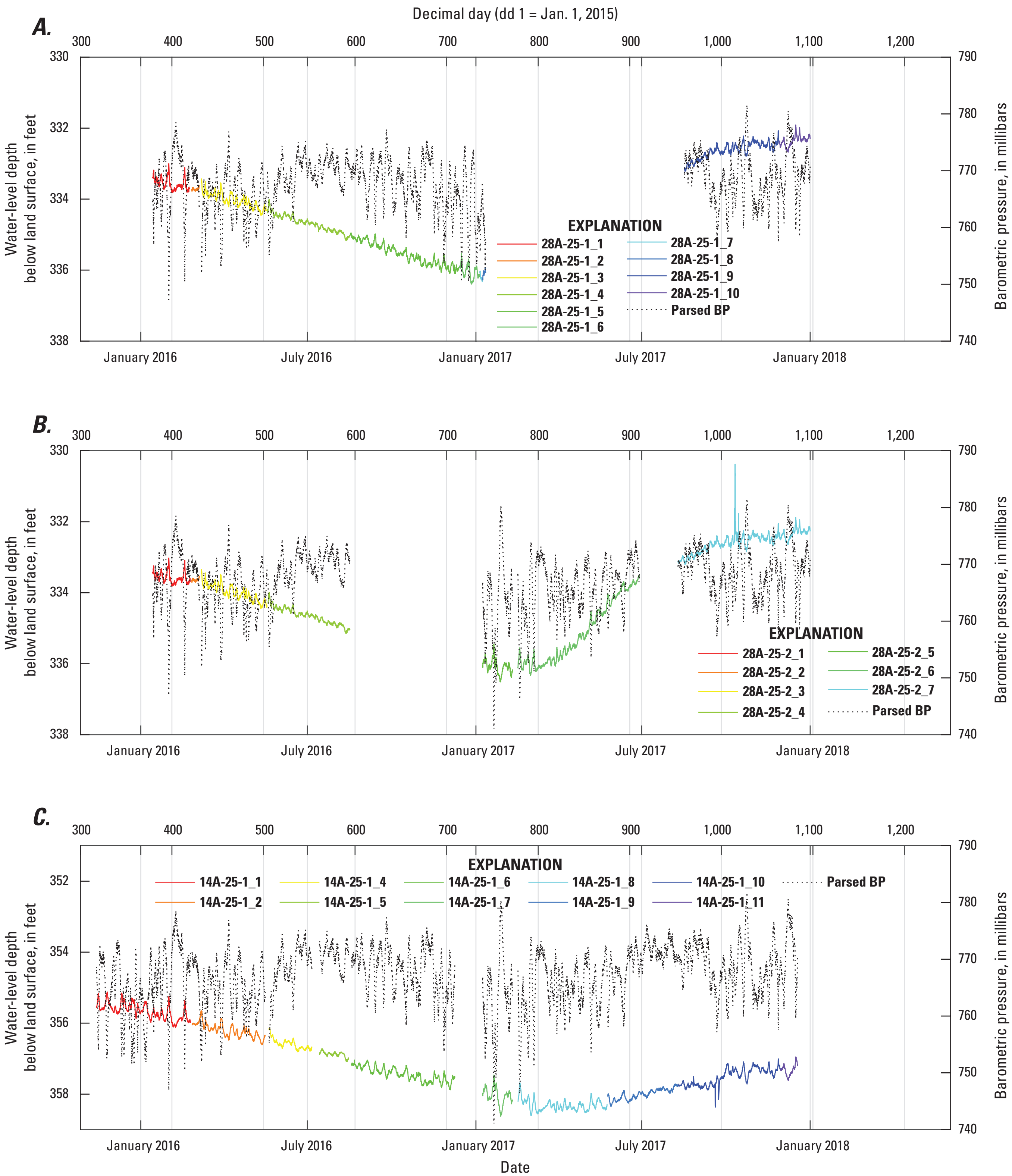


Figure 2–3. Parsed, coincident (paired) water-level and barometric-pressure (BP) time series for wells in the area of Mammoth Lakes, California: *A*, 28A-25-1, January 14, 2016–December 31, 2017; *B*, 28A-25-2, January 14, 2016–December 31, 2017; and *C*, 14A-25-1, November 13, 2015–December 18, 2017.

Table 2–1. Parsed time-series parameters for wells 28A-25-1 during January 14, 2016–December 31, 2017, 28A-25-2 during January 14, 2016–December 31, 2017, and 14A-25-1 during November 13, 2015–December 18, 2017, in the area of Mammoth Lakes, California.

[Series numbers in ***bold-italic*** font denote series analyzed for Earth-tide and atmospheric loading frequency responses; series numbers in underline font denote series influenced by non-atmospheric loading and Earth-tide responses. **Abbreviations**: BP, barometric pressure; dd, decimal day (dd 1 = Jan. 1, 2015); hh:mm, hour:minute; mm/dd/yyyy, month/day/year; N, number of hourly samples in the parsed time series; WL, water level]

Well/ parsed series	Start date and time (mm/dd/yyyy hh:mm)	End date and time (mm/dd/yyyy hh:mm)	Start dd	End dd	N samples	Time series length (days)	From WL piece	From BP piece	WL detrending polynomial order
28A-25-1									
1	01/14/2016 01:00	02/22/2016 23:00	379.0417	418.9583	959	39.9583	1	28A-1	1
2	02/25/2016 13:00	03/04/2016 22:00	421.5417	429.9167	202	8.4167	2	28A-2	1
3	03/07/2016 00:00	05/16/2016 23:00	432.0000	502.9583	1,704	71.0000	3	28A-2	1
4	05/18/2016 00:00	08/15/2016 23:00	504.0000	593.9583	2,160	90.0000	4	28A-2	1
5	08/17/2016 00:00	12/12/2016 23:00	595.0000	712.9583	2,832	118.0000	5	28A-2	1
6	12/14/2016 00:00	01/04/2017 16:00	714.0000	735.6667	521	21.7083	6	28A-2	1
7	01/05/2017 06:00	01/07/2017 22:00	736.2500	738.9167	65	2.7083	6	28A-3	1
8	01/08/2017 04:00	01/11/2017 15:00	739.1667	742.6250	84	3.5000	6	28A-4	1
9	08/16/2017 10:00	11/28/2017 13:00	959.4167	1063.5417	2,500	104.1667	7	28A-5	5
10	11/28/2017 18:00	12/31/2017 23:00	1063.7500	1096.9583	798	33.2500	8	28A-5	1
28A-25-2									
1	01/14/2016 01:00	02/23/2016 23:00	379.0417	419.9583	983	40.9583	1	28A-1	1
2	02/25/2016 13:00	03/05/2016 00:00	421.5417	430.0000	204	8.5000	2	28A-2	1
3	03/07/2016 00:00	05/17/2016 23:00	432.0000	503.9583	1,728	72.0000	3	28A-2	1
4	05/19/2016 00:00	08/16/2016 08:00	505.0000	594.3333	2,145	89.3750	4	28A-2	1
5	01/08/2017 04:00	02/10/2017 00:00	739.1667	772.0000	789	32.8750	5	28A-4	1
6	02/15/2017 15:00	06/28/2017 13:00	777.6250	910.5417	3,191	132.9583	6	28A-5	5
7	08/09/2017 15:00	12/31/2017 23:00	952.6250	1096.9583	3,465	144.3750	7	28A-5	5
7modA	08/09/2017 15:00	10/10/2017 08:00	952.6250	1014.3333	1,482	61.7500	7	28A-5	1
7modB	10/15/2017 23:00	12/31/2017 23:00	1019.9583	1096.9583	1,849	77.0417	7	28A-5	1
14A-25-1									
1	11/13/2015 12:00	02/24/2016 09:00	317.5000	420.3750	2,470	102.9167	1	28A-1	1
[1]2	02/26/2016 01:00	05/15/2016 23:00	422.0417	501.9583	1,919	79.9583	2	28A-2	1
4	05/20/2016 00:00	07/05/2016 23:00	506.0000	552.9583	1,128	47.0000	4	28A-2	1
5	07/14/2016 00:00	08/14/2016 23:00	561.0000	592.9583	768	32.0000	5	28A-2	1
6	08/18/2016 00:00	12/08/2016 23:00	596.0000	708.9583	2,712	113.0000	6	28A-2	1
7	01/08/2017 04:00	02/10/2017 00:00	739.1667	772.0000	789	32.8750	7	28A-4	1
8	02/15/2017 21:00	05/24/2017 07:00	777.8750	875.2917	2,339	97.4583	8	28A-5	1
9	05/24/2017 20:00	08/09/2017 07:00	875.8333	952.2917	1,836	76.5000	9	14A-1	1
10	08/09/2017 20:00	11/29/2017 08:00	952.8333	1064.3333	2,677	111.5417	10	14A-1	1
10mod	10/09/2017 00:00	11/29/2017 08:00	1013.0000	1064.3333	1,233	51.3750	10	14A-1	1
11	11/29/2017 19:00	12/18/2017 10:00	1064.7917	1083.4167	448	18.6667	11	14A-1	1

[1]Parsed series 14A-25-1_2 was not analyzed owing to a suspected time error in this time series.

The detrended, parsed series were used for subsequent analyses. Figure 2–4 shows an example for each of three detrended, parsed series: 28A-25-1_9 (fig. 2–4*A*, *B*), 28A-25-2_4 (fig. 2–4*C*, *D*), and 14A-25-1_8 (fig. 2–4*E*, *F*). For the detrended series, the units of water level were converted from feet (ft) to centimeters (cm), and the units of barometric pressure were converted from millibars (mbar) to equivalent centimeters of water. The unit conversions facilitated the time-series analyses and provided consistent units for water level and barometric pressure. The inverse relation between barometric pressure and water level (when plotted as decreasing depth-to-water below land surface) is evident in these plots (fig. 2–4*B*, *D*, *F*). The response of water level to changes in barometric pressure in a well open to the atmosphere is characterized by the barometric efficiency (BE) of the well (Jacob, 1940):

$$BE = -\frac{\Delta y}{\Delta x} \tag{2–1}$$

where

Δy is the change in head expressed as the change in the elevation of the water level in the well, and

Δx is the change in barometric pressure expressed in equivalent units of head:

$$\Delta x = \Delta p_x / (\rho_w g) \tag{2–2}$$

where

Δp_x is the change in barometric pressure,

ρ_w is the density of water, and

g is the gravitational acceleration constant.

Because water levels in monitoring wells were expressed as depth-to-water below land surface in this analysis, an increase in the level of the free-surface water level (the water-level elevation or head) in the wells (positive Δy) corresponded to a decrease in the depth-to-water below land surface.

Preliminary estimates of a constant BE for each of the detrended, parsed series shown in table 2–1, other than those series with series numbers in underline font (affected by non-atmospheric loading and Earth-tide responses) and series 14A-25-1_2 (suspected time error), were determined using several methods (fig. 2–1, box e). First, using method 1, BE was estimated from a linear least-squares regression of detrended water level (y) on detrended barometric pressure (x). Second, using methods 2a and 2b, BE was estimated from a least-squares linear regression of low-pass (lp) or high-pass (hp) filtered detrended time series, for instance, y_{lp} on x_{lp} or y_{hp} on x_{hp}, respectively, for a cutoff frequency of 0.7 cycles per day (cpd). Third, using method 3, BE was estimated from a linear least-squares regression of Δy on Δx using

$$\begin{aligned} \Delta x(t) &= x_t - x_{t-1} \\ \Delta y(t) &= y_t - y_{t-1} \text{ for } t = 2, N \end{aligned} \tag{2–3}$$

where

t is the index of hourly samples, and

N is the number of samples in the detrended, parsed time series.

Each of the methods tested different frequency content of the water-level responses to barometric-pressure variations. Method 1 estimated an approximate average response across the range of frequency content that was weighted more by the lower frequency content. Methods 2a and 2b estimated approximate average responses for frequency content below (lp) and above (hp) 0.7 cpd, respectively. Method 3 estimated the response from hour-to-hour and was more representative of the highest resolvable frequency component ($\frac{f_s}{2}$ = 12 cpd, where f_s is the sampling frequency of 24 samples per day) of the response. Table 2–2 lists the BEs estimated from each of the methods for the selected parsed series, and figure 2–5 shows an example of the detrended hydrographs, barographs and regressions for parsed series 14A-25-1_8. Note, the regressions were done using the negative of the depth-to-water level values to account for the inverse relation between depth-to-water level and water-level elevation or head. Thus, the computed BEs were represented by the negative slope of the equation of the best-fit line determined from the linear least-squares regression, consistent with equation 2–1.

The estimates of constant values of BE for each well (table 2–2) indicated that BE depended on the frequency content of the barometric-pressure time series (x). For each well, there was a notable difference between the BE estimates derived from the lower frequency components (methods 1 and 2a) and those derived from the higher frequency components (methods 2b and 3). For wells 28A-25-1 and 28A-25-2, the higher frequency component mean BE estimates ranged from 0.93 to 1.02, whereas the lower-frequency component mean estimates ranged from 0.60 to 0.71. The estimates computed using method 2b had higher coefficients of determination (r^2) than estimates computed using the other methods for these wells. For well 14A-25-1, the corresponding higher and lower frequency component mean estimates ranged from 0.54 to 0.62 and from 0.78 to 0.79, respectively. The responses for well 14A-25-1 were notably different, with higher BEs estimated from the lower frequency component responses (methods 1 and 2a) and with poorer r^2 values for the higher frequency component estimates (methods 2b and 3). Also, the higher frequency component BE estimates for parsed series from well 14A-25-1 had poorer r^2 values than the higher frequency component BE estimates for parsed series from wells 28A-25-1 and 28A-25-2.

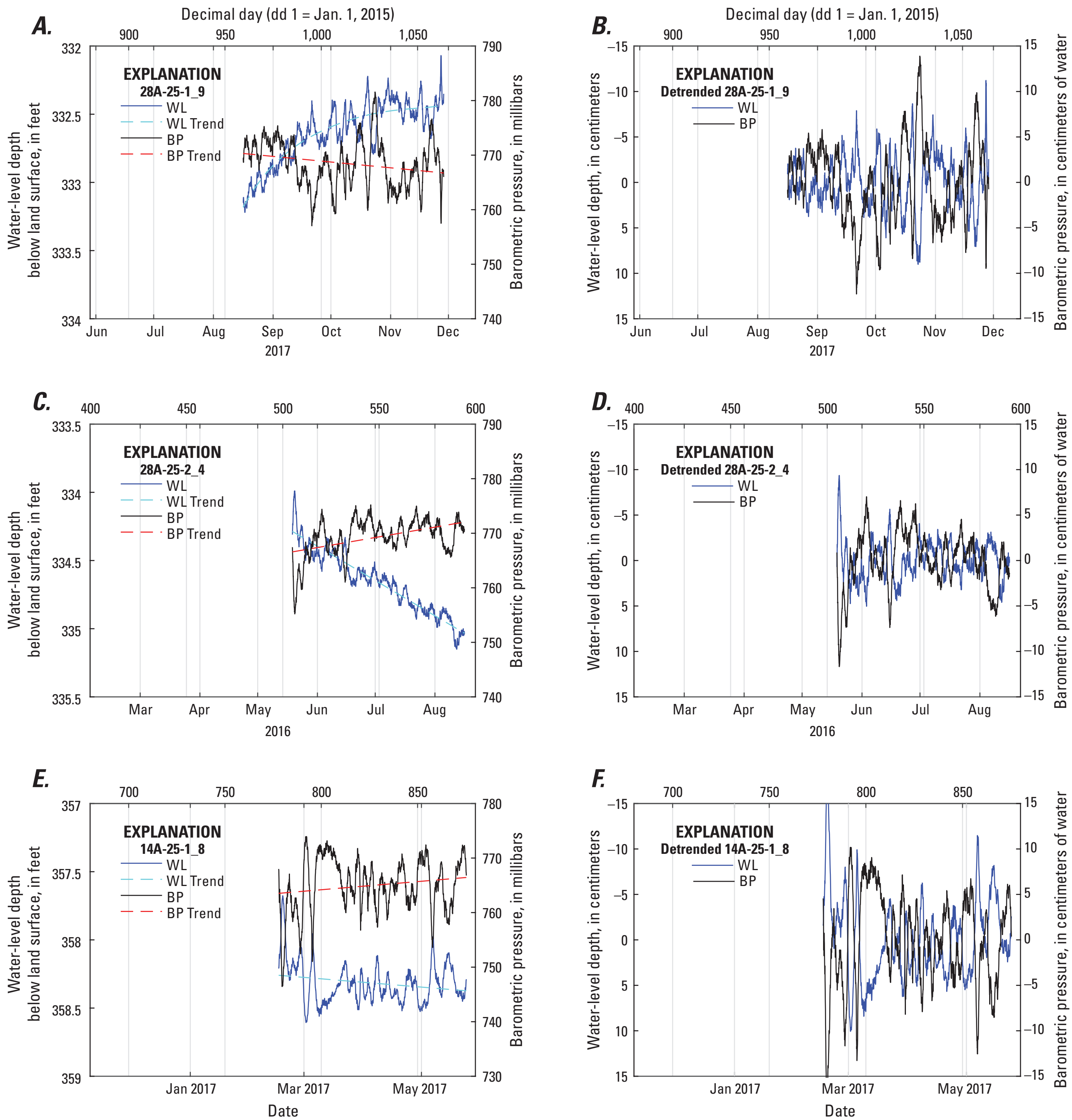


Figure 2–4. Trended and detrended water-level (WL) and barometric-pressure (BP) parsed time series 28A-25-1_9 during August 16–November 28, 2017, 28A-25-2_4 during May 19–August 16, 2016, and 14A-25-1_8 during February 15–May 24, 2017, from wells 28A-25-1, 28A-25-2, and 14A-25-1 in the area of Mammoth Lakes, California: *A*, trended data for 28A-25-1_9; *B*, detrended data for 28A-25-1_9; *C*, trended data for 28A-25-2_4; *D*, detrended data for 28A-25-2_4; *E*, trended data for 14A-25-1_8; *F*, detrended data for 14A-25-1_8.

Table 2–2. Estimates of constant barometric efficiency determined using methods 1, 2a, 2b, and 3 for each of the parsed time series shown in table 2–1, other than those with series numbers in underline font, for wells 28A-25-1, 28A-25-2, and 14A-25-1 in the area of Mammoth Lakes, California.

[BE1, BE2a, BE2b and BE3 refer to different methods for determining constant-valued barometric efficiency using least-squares linear regression. BE1, method 1; BE2a, method 2a; BE2b, method 2b; BE3, method 3; r^2 1, coefficient of determination from method 1; r^2 2a, coefficient of determination from method 2a; r^2 2b, coefficient of determination from method 2b; r^2 3, coefficient of determination from method 3. —, not applicable]

Well/parsed series	BE 1	r^2 1	BE 2a	r^2 2a	BE 2b	r^2 2b	BE 3	r^2 3
				28A-25-1				
1	0.647	0.730	0.638	0.725	1.026	0.963	0.960	0.846
2	0.822	0.932	0.761	0.925	0.965	0.955	0.934	0.820
3	0.643	0.680	0.633	0.672	1.014	0.956	0.958	0.806
4	0.467	0.490	0.456	0.482	1.020	0.915	0.952	0.651
5	0.625	0.686	0.616	0.682	1.007	0.895	0.940	0.606
6	0.697	0.759	0.694	0.759	1.036	0.849	0.911	0.698
7	1.060	0.924	1.070	0.919	1.044	0.940	0.927	0.776
8	0.903	0.823	0.936	0.736	0.852	0.847	0.746	0.514
9	0.558	0.645	0.548	0.638	0.992	0.964	0.970	0.824
10	0.648	0.686	0.641	0.680	0.989	0.967	0.954	0.874
mean	0.707	—	0.699	—	0.995	—	0.925	—
				28A-25-2				
1	0.643	0.726	0.634	0.721	0.993	0.940	0.950	0.854
2	0.811	0.882	0.715	0.880	1.073	0.926	0.993	0.795
3	0.652	0.692	0.642	0.686	1.021	0.937	0.956	0.808
4	0.473	0.492	0.462	0.483	1.020	0.938	0.975	0.741
5	0.597	0.682	0.593	0.679	0.985	0.959	0.903	0.841
6	0.582	0.623	0.574	0.618	1.012	0.944	0.945	0.824
7modA	0.570	0.534	0.555	0.519	1.044	0.964	0.979	0.828
7modB	0.594	0.602	0.585	0.596	1.021	0.928	0.966	0.799
mean	0.615	—	0.595	—	1.021	—	0.958	—
				14A-25-1				
1	0.748	0.862	0.751	0.866	0.575	0.583	0.500	0.532
4	0.817	0.875	0.824	0.889	0.579	0.381	0.490	0.273
5	0.729	0.849	0.731	0.869	0.690	0.534	0.540	0.335
6	0.768	0.836	0.772	0.843	0.660	0.568	0.542	0.385
7	0.879	0.940	0.883	0.944	0.523	0.456	0.512	0.630
8	0.833	0.866	0.837	0.869	0.573	0.612	0.537	0.641
9	0.712	0.771	0.716	0.780	0.616	0.518	0.541	0.514
10mod	0.780	0.885	0.783	0.889	0.652	0.663	0.593	0.690
11	0.815	0.959	0.818	0.964	0.694	0.683	0.595	0.683
mean	0.787	—	0.790	—	0.618	—	0.539	—

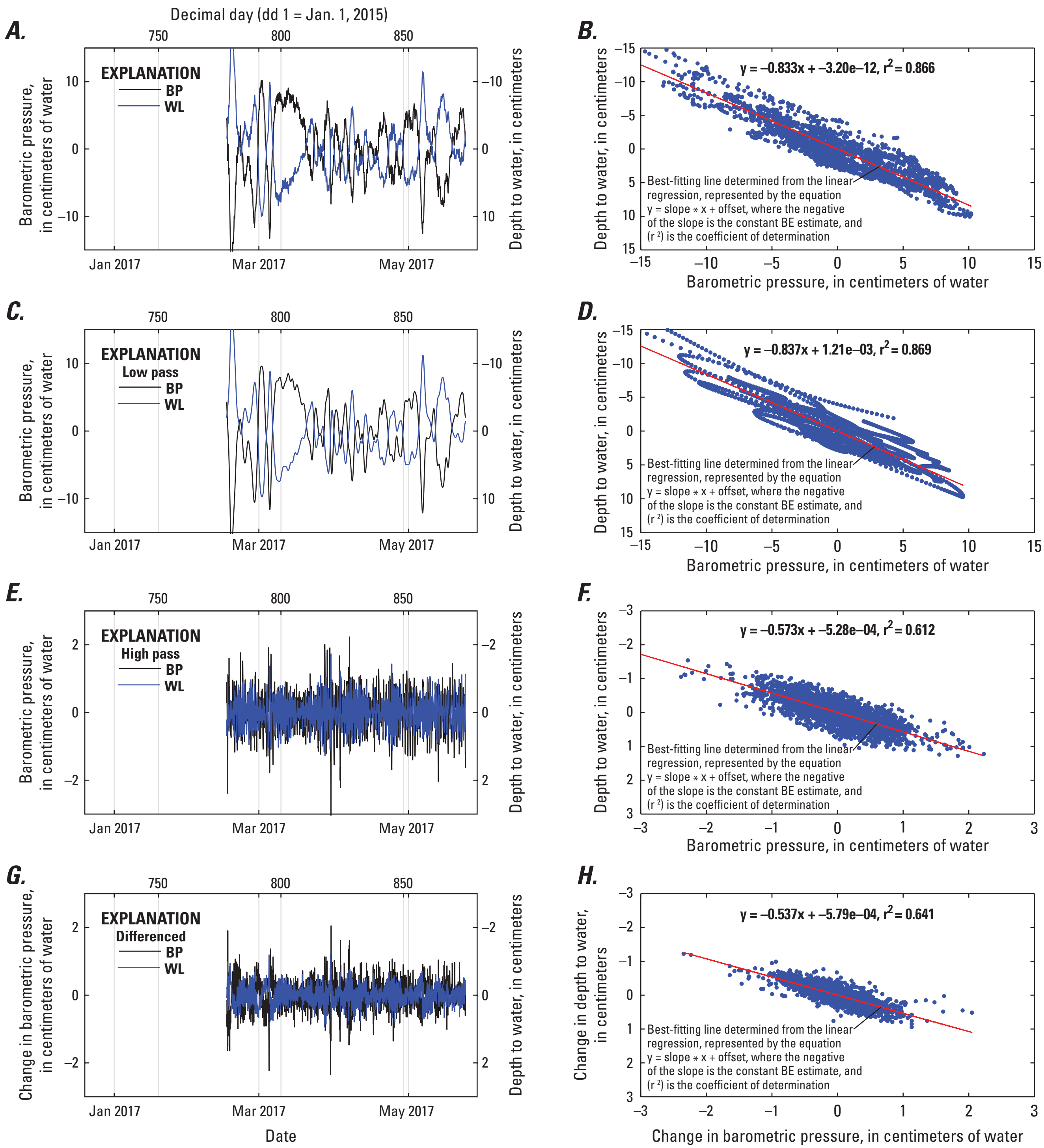


Figure 2–5. Estimates of constant barometric efficiency (BE) for detrended, parsed time series 14A-25-1_8, February 15–May 24, 2017, from well 14A-25-1 in the area of Mammoth Lakes, California, based on linear least-squares regression of water level (WL) on barometric pressure (BP) using methods 1, 2a, 2b, and 3. *A*, detrended series used for method 1; *B*, linear regression of detrended series for method 1; *C*, low-pass detrended series used for method 2a; *D*, linear regression of low-pass detrended series for method 2a; *E*, high-pass detrended series used for method 2b; *F*, linear regression of high-pass detrended series for method 2b; *G*, differenced, detrended series used for method 3; and *H*, linear regression of differenced, detrended series for method 3.

Filtered, detrended water-level estimates ($\tilde{y}$) based on the BEs estimated using methods 1, 2a and 2b were computed as follows:

$$\tilde{y}_{BE}(t) = y_t - \hat{y}_{BE_t} \text{ for } t = 1, N \tag{2–4}$$

where

$\hat{y}_{BE_t}$ is the predicted water-level,

$$\hat{y}_{BE_t} = -BEx_t \tag{2–5}$$

For method 3, $\tilde{y}_{BE}(t)$ was computed as follows:

$$\tilde{y}_{BE}(t) = y_t - \hat{y}_{BE_t} \text{ for } t = 2, N \tag{2–6}$$

where

$$\hat{y}_{BE_t} = -BE\sum_{i=2}^{N}(\Delta x_i) + \hat{y}_{BE_1} \tag{2–7}$$

where

$\sum_{i=2}^{N}(\Delta x_i)$ represents the cumulative sums of $\Delta x_i(t)$ for $t = 2, N$ from equation 2–3, and

$\hat{y}_{BE_1}$ is $\hat{y}_{BE}$ computed from equation 2–5 for t = 1.

Equations 2–6 and 2–7, as formulated, are equivalent to equations 2–4 and 2–5 where BE estimated using method 3 is used in equation 2–5. The filtered results for the 28A-25-1_9, 28A-25-2_4, and 14A-25-1_4 detrended, parsed series using the constant BE estimates from the lp (using method 2a) and hp (using method 2b) filtered time series (fig. 2–6) and for all of the parsed series listed in table 2–2 showed that a single-valued, frequency-independent BE could not adequately account for the atmospheric-loading responses measured in each well (fig. 2–1, box e).

Water-Level Responses to the Solid Earth Tide

Water-level responses in each well to the principal tides of the solid Earth tide were evaluated using harmonic analysis (for example, Hsieh and others, 1987; Galloway and Rojstaczer, 1989; Cutillo and Bredehoeft, 2011). Use of the terms 'tide' and 'tidal' here refer specifically to Earth tides in terms of the known frequencies of the principal constituents of the Earth tide and do not imply a more general reference that includes barometric tides. Table 2–3 lists the frequencies and periods of the six principal Earth tides (Godin, 1972), which constitute about 95 percent of the tidal potential. These tides result from the relative motions of the moon, sun, and Earth. The tides are designated as lunar (O_1, Q_1, M_2, N_2), solar (S_2), or mixed (K_1) and by their mode (diurnal, $_1$, or semidiurnal, $_2$).

The detrended, parsed water-level time series were digitally filtered using a high-pass Butterworth filter (Butterworth, 1930) (order 7) with a cut-off frequency of 0.7 cpd to generally separate the responses at higher frequencies (0.7–12 cpd) containing diurnal and semidiurnal tidal and atmospheric-loading responses from the responses at lower frequencies dominated by atmospheric-loading effects. At mid-latitudes, fluctuations in barometric pressure at 1 and 2 cpd are caused by solar heating of the atmosphere. The well responses at these frequencies, especially at 2 cpd, are dominated by atmospheric-loading effects, to which the responses to Earth tides are superimposed at nearby or coincident frequencies, such as for the K_1 and S_2 tides. Therefore, although the analysis included each of the tides in table 2–3, a focus was placed on the responses to the lunar tides (M_2, O_1, N_2, Q_1, listed in order of decreasing tidal potential).

The theoretical tidal potential and resulting body tides of a solid Earth (oceanless) produced by the moon and sun were computed from gravitational and astronomical theory for the locations and open-interval elevations of the monitoring wells at the sample times for each of the parsed series using the Harrison (1971) model. The Earth's crust undergoes volumetric strains, ε_v, due to variations in the tide-generating forces:

$$\varepsilon_v = \varepsilon_{\theta\theta} + \varepsilon_{\lambda\lambda} + \varepsilon_{rr} \tag{2–8}$$

where

$\varepsilon_{\theta\theta}$ is the component strain in the north principal axis,

$\varepsilon_{\lambda\lambda}$ is the component strain in the east principal axis, and

ε_{rr} is the component strain in the radial (downward toward the center of the Earth) principal axis.

Near the Earth's surface (within the upper 10 km or more), most of the stress is plane stress, and the resultant strain tide is predominantly an areal strain, ε_{Areal} (Melchior, 1966; Rojstaczer and Agnew, 1989):

$$\varepsilon_{Areal} = \varepsilon_{\theta\theta} + \varepsilon_{\lambda\lambda} \tag{2–9}$$

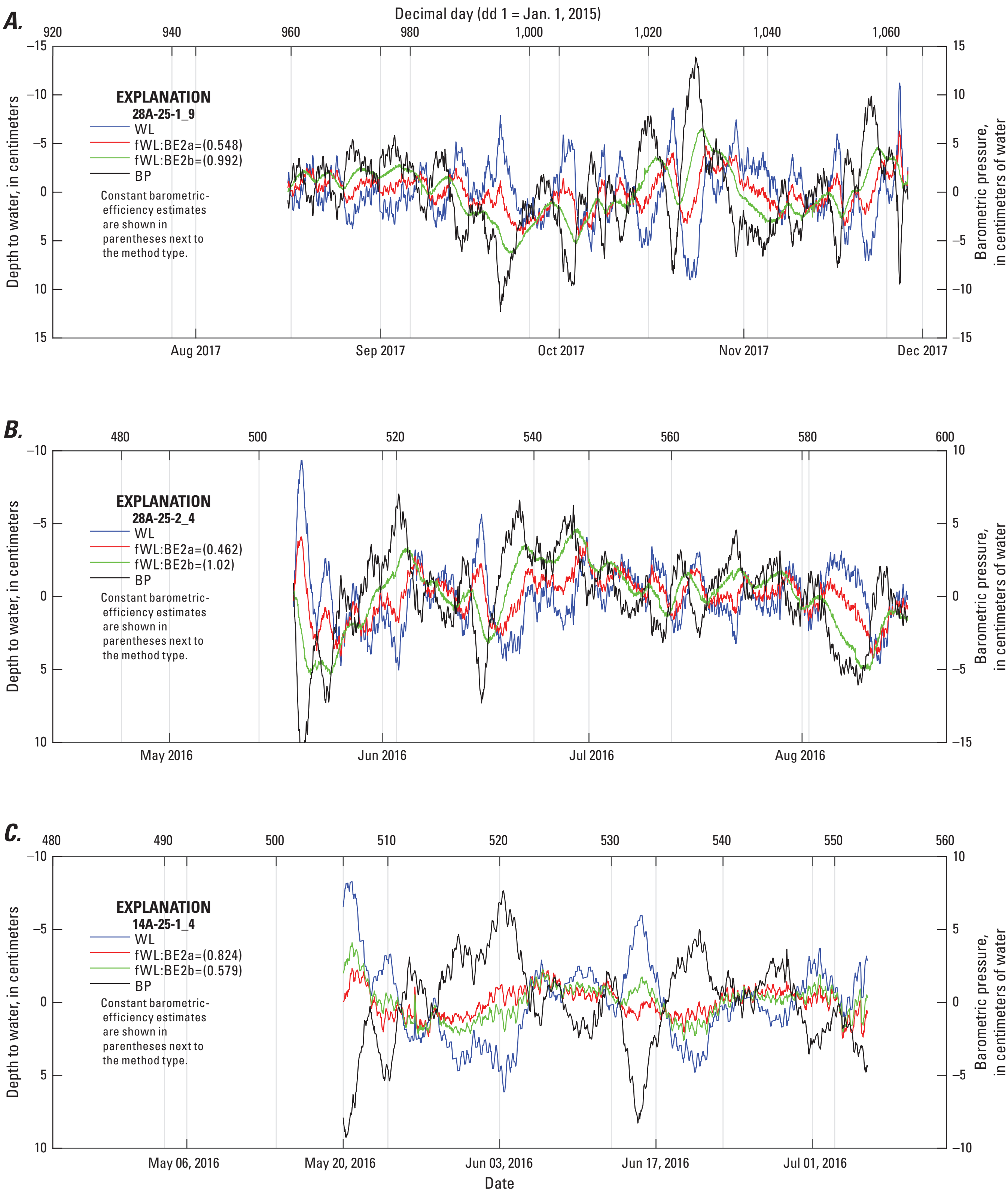


Figure 2–6. Digitally filtered water levels fWL:BE2a and fWL:BE2b for detrended, parsed water-level (WL) and barometric-pressure (BP) time series from wells 28A-25-1, 28A-25-2, and 14A-25-1 in the area of Mammoth Lakes, California, using the constant barometric-efficiency (BE) estimates determined from method 2a (low-pass) and method 2b (high-pass): *A*, 28A-25-1_9, August 16–November 28, 2017; *B*, 28A-25-2_4, May 19–August 18, 2016; *C*, 14A-25-1_4, May 20–July 5, 2016.

Table 2–3. Frequencies, periods, and indices used in the analysis of the six principal Earth tides (Godin, 1972).

Tide	Frequency (cycles per solar day)	Period (solar hours)	Constituent index (k)
Q_1	0.89324406	26.8683567	6
O_1	0.92953571	25.8193416	5
K_1	1.00273791	23.9344696	4
N_2	1.89598197	12.6583482	3
M_2	1.93227361	12.4206012	2
S_2	2.00000000	12.0000000	1

The areal-strain tide (positive for dilatation following the convention of Harrison, 1971) was computed in parts per billion (nanostrain) as a scaled function of the tidal potential (Munk and McDonald, 1960; Melchior, 1966; Bredehoeft, 1967):

$$\varepsilon_{Areal} = \left(2\bar{h} - 6\bar{l}\right)\frac{V}{r_e g} \times 10^9 \qquad (2\text{–}10)$$

where

$\bar{h}$ is a Love number taken to be 0.638,
$\bar{l}$ is a Love number taken to be 0.088,
V is the tidal potential,
r_e is the distance between the center of the Earth and the observation point on or near the Earth's surface, and
g is the gravitational acceleration constant.

Similar to the detrended, parsed water-level time series, the computed areal-strain tide time series were detrended and digitally filtered using a high-pass Butterworth filter (Butterworth, 1930) (order 7) with a cut-off frequency of 0.7 cpd. The amplitudes and phases of water level and the theoretical areal-strain tide at the principal tidal frequencies (table 2–3) were computed by multiple least-squares fitting for each tidal constituent of the respective parsed time series to the following functions:

$$y_{hp}\left(t_j\right) = \sum_{k=1}^{6}\left(a_k \cos\left(2\pi f_k t_j\right) + b_k \sin\left(2\pi f_k t_j\right)\right) + Ry_{hp_j} \qquad (2\text{–}11)$$

$$\varepsilon_{Areal\ hp}\left(t_j\right) = \sum_{k=1}^{6}\left(c_k \cos\left(2\pi f_k t_j\right) + d_k \sin\left(2\pi f_k t_j\right)\right) + R\varepsilon_{Areal\ hp_j} \qquad (2\text{–}12)$$

where

t_j is time in decimal days (for j = 1 to the number of samples, N);
y_{hp} is the high-pass, detrended water-level series;
$\varepsilon_{Areal\ hp}$ is the high-pass, areal-strain tide series;
f_k is the frequency in cycles per day of the k^{th} tidal constituent (for k = 1,6 corresponding to the six tides in table 2–3);
a_k, b_k are the coefficients of the regression for the high-pass water-level series;
c_k, d_k are the coefficients of the regression for the high-pass, areal-strain tide series;
Ry_{hp_j} are the residuals for the high-pass, water-level series; and
$R\varepsilon_{Areal\ hp_j}$ are the residuals for the high-pass, areal-strain tide series.

The summation terms in equations 2–11 and 2–12 represent the predicted values of the regressions $\hat{y}_{hpet}$ and $\hat{\varepsilon}_{Areal\ hp}$, respectively. Figure 2–7 shows the predicted fits to the high-pass, detrended, parsed water-level and theoretical areal-strain tide time series for 14A-25-1_5. Predicted fits to the theoretical areal-strain tide (fig. 2–7*B*) were much better than the predicted fits to water level (fig. 2–7*A*), reflecting that the six principal Earth tides accounted for almost all of the variation in the theoretical areal-strain tide and a much smaller proportion of the high-pass, detrended water-level variation.

The amplitudes ($Ay_k, A\varepsilon_{Areal_k}$) and phases ($\phi y_k, \phi\varepsilon_{Areal_k}$ expressed in degrees) referenced to the starting time of the individual parsed series were computed for each tidal constituent (k) in each time series ($\hat{y}_{hp}, \hat{\varepsilon}_{Areal_{hp}}$) using the following equations:

$$\begin{aligned} Ay_k &= \sqrt{{a_k}^2 + {b_k}^2}\,;\, A\varepsilon_{Areal_k} = \sqrt{{c_k}^2 + {d_k}^2} \\ \phi y_k &= \operatorname{atan2}\left(b_k, a_k\right);\, \phi\varepsilon_{Areal_k} = \operatorname{atan2}\left(d_k, c_k\right) \end{aligned} \qquad (2\text{–}13)$$

where

Ay_k and $A\varepsilon_{Areal_k}$ are the positive roots of the arguments, and
atan2 is the two-argument arctangent.

The phase shift of the water-level response to each tidal constituent (k = 1 to 6) in the forcing theoretical areal-strain tide was computed using the following equation:

$$\eta_k = \phi y_k - \phi\varepsilon_{Areal_k}, -180° \le \eta_k \le 180° \qquad (2\text{–}14)$$

Because an increasing tidal dilatation would be expected to cause an increasing depth-to-water level, the ideal water-level response in terms of depth-to-water level would be in-phase with the tidal dilatation. The phases and phase shifts were mapped in the interval –180 to +180 degrees (°) (eqn. 2–14). Thus, for the conventions used here to compute phases and phase shifts, positive (greater than 0°) phase shifts represented a phase lag of the water-level response to the tidal dilatation and negative phase shifts represented a phase advance. In terms of water-level elevation or head, the ideal water-level response would be antiphase (for example, −180°) with the tidal dilatation, and the phase shifts as computed here (eqn. 2–14) would need to be added to −180° to reflect the expected antiphase response.

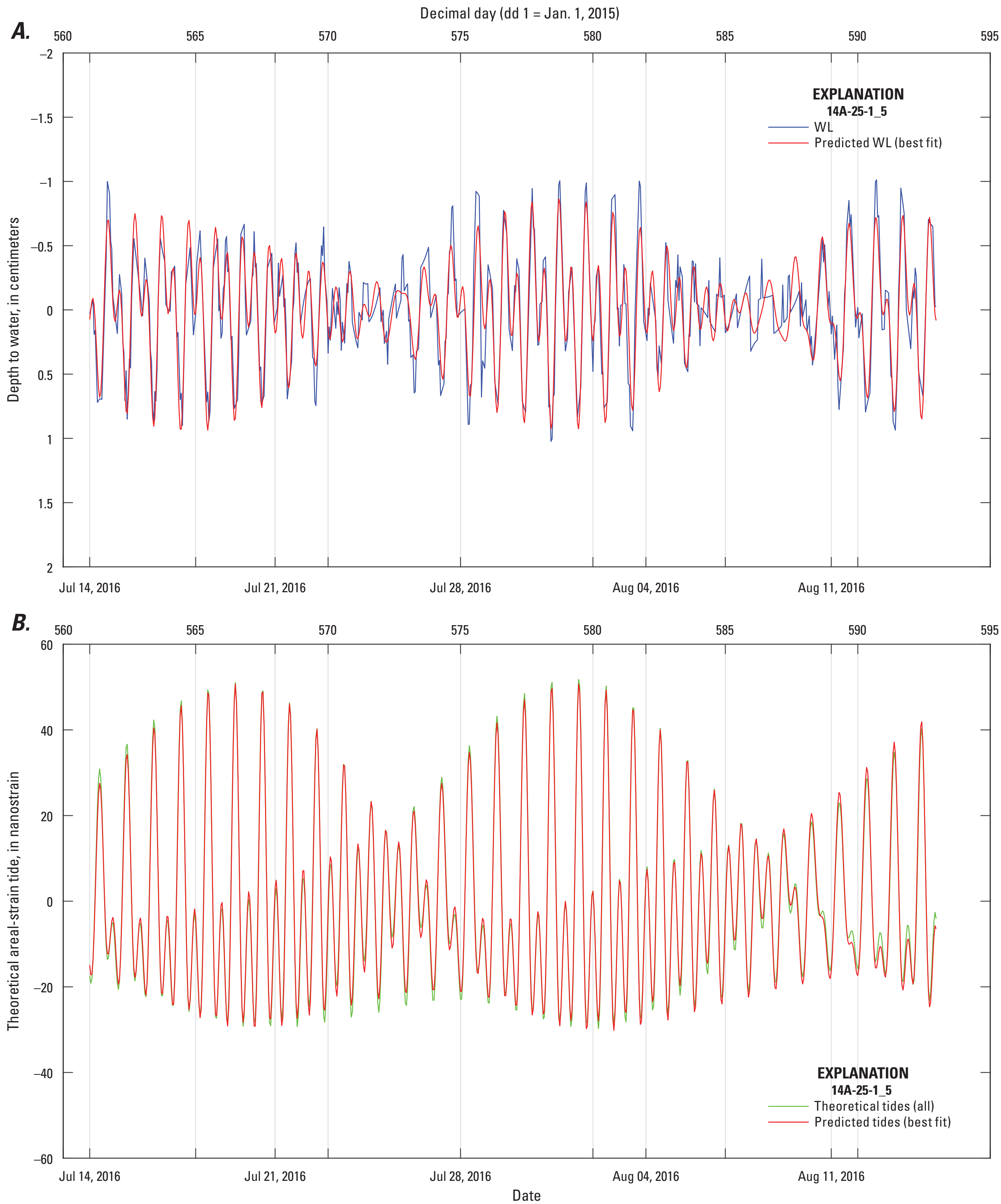


Figure 2–7. Predicted fits, $\hat{y}_{hpet}$ (Predicted WL) and $\hat{\varepsilon}_{Areal_{hp}}$ (Predicted tides), to the high-pass, detrended, parsed water-level (y_{hp}, or WL) and theoretical areal-strain tide, $\varepsilon_{Areal_{hp}}$ (Theoretical tides) time series, respectively, for 14A-25-1_5 during July 14–August 14, 2016, from well 14A-25-1 in the area of Mammoth Lakes, California: *A*, WL and Predicted WL; and *B*, Theoretical tides and Predicted tides.

Preliminary Earth-Tide Analyses of Parsed Series

A preliminary analysis was done for each of the parsed series indicated by series numbers in ***bold-italic*** font in table 2–1 to determine whether water levels responded to Earth tides (fig. 2–1, box f). The preliminary analysis comprised computing the amplitude, phase, and phase shift using equations 2–13 and 2–14 for each tidal constituent for each of the parsed series analyzed for 28A-25-1, 28A-25-2, and 14A-25-1 (table 2–4). Parsed series 28A-25-2_7 and 14A-25-1 _10 were not analyzed because they contained some water-level responses not attributable to atmospheric-loading and Earth tides, such as responses in 14A-25-1_10 to the flow test in production well 14-25. The modified versions of these parsed series, 28A-25-2_7modA and _7modB, and 14A-25-1_10mod were analyzed instead. Additionally, only parsed series with lengths greater than 1 lunar month were analyzed. This resulted in a total of 21 parsed series preliminarily analyzed for tides (indicated by series numbers in ***bold-italic*** font in table 2–1).

Because at the exact frequencies of the lunar Earth tides (M_2, N_2, O_1, and Q_1) there is little power in the barometric pressure signal, the presence of discernable water-level amplitudes at the frequencies of the principal lunar tides (M_2 and O_1) is an indication that a water-level response at these frequencies may be due to Earth tides. The estimated tidal constituent parameters in table 2–4 show, as expected, that the S_2 (solar) and K_1 (mixed) tides dominated the water-level amplitude responses at these tidal frequencies for 28A-25-1 and 28A-25-2. For 14A-25-1, the M_2 and to a lesser extent the O_1 amplitude responses were co-dominant with the S_2 and K_1 tidal-amplitude responses. Table 2–4 shows mean M_2 water-level amplitudes of about 0.27 cm for 14A-25-1 and only about 0.05 cm for 28A-25-1 and 28A-25-2. All the lunar tidal amplitude responses in 28A-25-1 and 28A-25-2, and the lesser lunar (N_2 and Q_1) tidal amplitude responses in 14A-25-1, were weak. Except for the S_2 component in each well that was dominated by responses to atmospheric loading, and the M_2 and O_1 components in 14A-25-1, the great variability in the computed phase shifts likely resulted from the small spectral power in the water-level responses at the tidal frequencies and further indicated that the water-level responses for all the lunar tides in 28A-25 wells and the lesser lunar tides in 14A-25-1 were negligible. Note that the means and standard deviations listed in table 2–4 do not represent the true population means and variances because the length (number of samples) for each parsed series (table 2–1) varied widely. Because the principal lunar tidal responses were potentially important in well 14A-25-1, and to compute relevant population statistics, the 14A-25-1 series analyzed previously were further analyzed for tidal responses.

Earth-Tide Analysis of Discrete Segments of Select 14A-25-1 Time Series

The 14A-25-1 detrended, parsed time series selected for further tidal analysis (fig. 2–1, box h) were divided into fifteen 32-day discrete (non-overlapping) segments: three each from parsed series 14A-25-1_1, _6, and _8; two from _9; and one each from _4, _5, _7, and _10mod. A segment length of 32 days was chosen primarily because it is sufficiently longer than 1 lunar month and preserves a maximum total number of discrete segments obtainable from the parsed water-level time series. A constant segment length simplified the computation of population statistics for the tidal responses. Table 2–5 lists the water-level and strain amplitudes and phases (mapped in the interval –180 to +180°), and the ratio of the water-level amplitude to the theoretical areal-strain amplitude computed for each of the principal tidal constituents in units of centimeters per nanostrain using equation 2–15:

$$\mathrm{A}_k = \frac{Ay_k}{A\varepsilon_{Areal_k}} \qquad (2\text{–}15)$$

The computed phase shift (η_k, eqn. 2–14) is also shown for each of the principal tides in table 2–5.

The segments were numbered sequentially (nd = 1–15) by the numerical order of the parsed series from which they were derived (for example, nd 1–3 were from 14A-25-1_1, and nd 15 was from 14A-25-1_10mod). The responses (table 2–5) showed similar results as those obtained in the preliminary tidal analysis for 14A-25-1 (table 2–4), described previously with some minor differences. For the M_2 and O_1 tides, the mean water-level amplitudes, 0.27 and 0.18 cm, and the mean phase shifts, 5.75 and –11.1°, respectively, were essentially equivalent to those computed in the preliminary analysis. However, the uncertainty in the O_1 phase shifts was much greater (more than a factor of two) than that computed in the preliminary analysis with a standard deviation greater than more than twice the mean, possibly indicating that the water-level responses at the O_1 tidal frequency were at least partially contaminated by atmospheric-loading effects. The greater uncertainty in the O_1 phase shift might simply be because most of the data were broken into shorter segments than for the preliminary analysis. For the preliminary analysis (table 2–4), the mean length of the data series for 14A-25-1 was about 72 days, compared with 32 days for the discrete tidal analysis (table 2–5). Results from longer series are expected to be less variable than results from shorter series, especially for lower frequency constituents (for example, O_1). The computed values of A_k and η_k indicated that the water-level responses for each tide were not due solely to the theoretical areal-strain tide. This was especially true for tidal frequencies other than the principal lunar tides (M_2 and O_1) for which water-level responses likely contained substantial barometric-pressure inputs. For M_2 and O_1, A_k may represent the areal-strain sensitivity of water-level response to the theoretical areal strain at these tidal frequencies.

Table 2–4. Results of tidal harmonic analysis of selected, detrended, parsed time series for wells 28A-25-1 during January 14, 2016–December 31, 2017, 28A-25-2 during January 14, 2016–December 31, 2017, and 14A-25-1 during November 13, 2015–November 29, 2017, in the area of Mammoth Lakes, California.

[Phase and phase shift in units of degrees; Strain (areal strain) is in units of nanostrain; Water level (WL) is in units of centimeters. **Abbreviation**: —, not applicable]

Well/parsed series	S_2					M_2				
	WL amplitude	WL phase	Strain amplitude	Strain phase	Phase shift	WL amplitude	WL phase	Strain amplitude	Strain phase	Phase shift
					28A-25-1					
1	0.58	–68.54	8.81	9.90	–78.44	0.04	55.14	18.76	112.91	–57.77
3	0.47	–34.06	9.28	25.57	–59.63	0.07	–36.35	18.73	–6.75	–29.61
4	0.35	–33.01	6.95	30.73	–63.74	0.05	–78.68	18.68	–51.23	–27.45
5	0.48	–45.98	9.05	21.46	–67.45	0.05	–15.48	18.64	8.22	–23.70
9	0.51	16.34	9.29	82.71	–66.36	0.04	–36.00	18.61	–45.94	9.93
10	0.49	132.27	7.16	–159.31	–68.42	0.04	137.15	18.33	97.25	39.90
mean	0.48	—	8.42	—	–67.34	0.05	—	18.63	—	–14.78
standard deviation	0.07	—	0.98	—	5.74	0.01	—	0.14	—	31.38
					28A-25-2					
1	0.56	–68.30	8.85	9.84	–78.14	0.05	51.50	18.81	112.83	–61.33
3	0.47	–33.06	9.26	25.41	–58.46	0.07	–38.73	18.76	–6.79	–31.95
4	0.36	–32.53	6.97	30.73	–63.26	0.05	–48.27	18.69	–26.84	–21.43
5	0.43	–165.31	8.01	–79.68	–85.63	0.02	8.59	18.58	163.33	–154.74
6	0.43	–115.77	8.61	–62.59	–53.18	0.04	51.95	18.54	50.76	1.19
7modA	0.50	–132.21	9.48	–60.11	–72.10	0.05	–21.07	18.72	–2.31	–18.76
7modB	0.53	–15.67	8.22	46.77	–62.44	0.04	21.08	18.57	–40.46	61.54
mean	0.47	—	8.48	—	–67.60	0.05	—	18.67	—	–32.21
standard deviation	0.07	—	0.79	—	10.65	0.01	—	0.10	—	61.02
					14A-25-1					
1	0.34	–14.41	7.87	30.80	–45.21	0.24	89.42	18.63	82.07	7.36
4	0.24	–7.66	6.66	25.48	–33.13	0.29	–0.92	18.56	–2.52	1.60
5	0.25	0.86	7.64	38.03	–37.17	0.28	–91.30	18.56	–101.13	9.83
6	0.33	–18.91	9.17	21.38	–40.29	0.27	41.15	18.65	32.87	8.28
7	0.27	–135.42	8.01	–79.67	–55.75	0.23	165.48	18.58	163.34	2.14
8	0.34	86.90	9.31	118.74	–31.85	0.27	–117.33	18.63	–123.52	6.19
9	0.25	111.77	6.74	149.47	–37.70	0.28	138.14	18.59	135.96	2.18
10mod	0.38	–24.21	9.24	15.16	–39.37	0.27	125.54	18.39	120.60	4.94
mean	0.30	—	8.08	—	–40.06	0.27	—	18.57	—	5.31
standard deviation	0.05	—	1.01	—	7.09	0.02	—	0.08	—	2.92

Table 2–4. Results of tidal harmonic analysis of selected, detrended, parsed time series for wells 28A-25-1 during January 14, 2016–December 31, 2017, 28A-25-2 during January 14, 2016–December 31, 2017, and 14A-25-1 during November 13, 2015–November 29, 2017, in the area of Mammoth Lakes, California.—Continued

[Phase and phase shift in units of degrees; Strain (areal strain) is in units of nanostrain; Water level (WL) is in units of centimeters. **Abbreviation**: —, not applicable]

Well/parsed series	N_2					K_1				
	WL amplitude	WL phase	Strain amplitude	Strain phase	Phase shift	WL amplitude	WL phase	Strain amplitude	Strain phase	Phase shift
28A-25-1—Continued										
1	0.05	–148.48	3.13	92.43	119.09	0.05	70.42	15.52	–3.58	74.01
3	0.04	44.31	4.31	–61.05	105.36	0.22	85.12	11.79	–74.48	159.60
4	0.05	72.00	3.31	106.94	–34.94	0.17	161.68	17.00	–126.00	–72.32
5	0.06	–98.02	3.94	–73.44	–24.58	0.28	116.74	12.82	133.84	–17.11
9	0.03	–93.44	3.37	–44.22	–49.22	0.32	–44.52	12.09	–11.92	–32.60
10	0.02	–94.75	4.42	20.29	–115.04	0.37	148.95	19.91	128.13	20.83
mean	0.04	—	3.75	—	0.11	0.24	—	14.86	—	22.07
standard deviation	0.01	—	0.50	—	84.42	0.10	—	2.94	—	76.43
28A-25-2—Continued										
1	0.07	–138.99	3.07	92.86	128.14	0.10	58.70	15.42	–3.52	62.22
3	0.04	38.61	4.28	–60.98	99.59	0.21	86.91	11.83	–74.62	161.53
4	0.06	117.22	3.33	145.01	–27.79	0.17	160.97	17.00	–126.57	–72.46
5	0.03	–117.55	3.41	152.38	90.07	0.01	155.35	17.38	–42.27	–162.38
6	0.02	–64.65	3.82	–163.22	98.57	0.02	–177.80	13.55	91.32	90.88
7modA	0.02	–109.24	3.24	–95.94	–13.30	0.52	–119.46	11.37	–62.79	–56.67
7modB	0.03	–46.50	3.98	31.75	–78.26	0.26	112.48	16.87	88.32	24.16
mean	0.04	—	3.59	—	42.43	0.19	—	14.77	—	6.75
standard deviation	0.02	—	0.41	—	74.29	0.16	—	2.34	—	102.34
14A-25-1—Continued										
1	0.05	–3.96	3.21	–33.25	29.29	0.33	–119.13	17.02	–122.99	3.86
4	0.07	164.15	3.67	179.33	–15.18	0.16	–160.69	18.38	–136.45	–24.23
5	0.06	74.30	3.09	88.81	–14.51	0.267	150.44	15.846	–168.70	–40.86
6	0.07	–33.36	3.97	–34.55	1.19	0.37	115.66	12.54	132.40	–16.73
7	0.04	–172.83	3.41	152.38	34.79	0.25	–44.56	17.39	–42.26	–2.29
8	0.04	47.38	3.60	26.69	20.69	0.11	36.23	11.70	0.52	35.71
9	0.05	118.70	3.98	115.21	3.49	0.24	–128.92	17.73	–69.45	–59.47
10mod	0.06	91.78	3.53	107.84	–16.07	0.31	61.81	14.28	72.90	–11.10
mean	0.06	—	3.56	—	5.46	0.25	—	15.61	—	–14.39
standard deviation	0.01	—	0.30	—	19.27	0.08	—	2.34	—	27.01

Table 2–4. Results of tidal harmonic analysis of selected, detrended, parsed time series for wells 28A-25-1 during January 14, 2016–December 31, 2017, 28A-25-2 during January 14, 2016–December 31, 2017, and 14A-25-1 during November 13, 2015–November 29, 2017, in the area of Mammoth Lakes, California.—Continued

[Phase and phase shift in units of degrees; Strain (areal strain) is in units of nanostrain; Water level (WL) is in units of centimeters. **Abbreviation**: —, not applicable]

Well/parsed series	O_1					Q_1				
	WL amplitude	WL phase	Strain amplitude	Strain phase	Phase shift	WL amplitude	WL phase	Strain amplitude	Strain phase	Phase shift
28A-25-1—Continued										
1	0.15	152.70	8.88	138.98	13.72	0.03	–150.00	1.32	126.07	83.93
3	0.07	135.98	8.54	51.23	84.75	0.05	–130.20	1.97	–8.52	–121.69
4	0.08	46.18	9.22	76.37	–30.20	0.09	17.47	1.50	–124.19	141.66
5	0.07	178.60	8.96	–134.03	–47.37	0.13	–24.79	1.91	149.06	–173.85
9	0.06	–60.96	9.70	–45.22	–15.75	0.10	151.31	1.87	–47.42	–161.27
10	0.14	–132.90	9.83	–37.41	–95.50	0.03	37.57	2.19	–106.51	144.09
mean	0.09	—	9.19	—	–15.06	0.07	—	1.79	—	–14.52
standard deviation	0.03	—	0.45	—	55.58	0.04	—	0.29	—	140.03
28A-25-2—Continued										
1	0.12	146.12	8.96	139.27	6.85	0.08	–156.76	1.23	125.22	78.02
3	0.08	118.97	8.53	51.46	67.51	0.03	–158.06	1.98	–9.28	–148.78
4	0.06	69.76	9.16	101.84	–32.08	0.08	57.68	1.51	–82.94	140.63
5	0.13	132.25	9.33	–140.09	–87.65	0.21	61.66	1.73	–149.46	–148.88
6	0.06	29.82	9.46	–49.27	79.10	0.06	–116.55	1.91	94.83	148.62
7modA	0.08	38.44	9.40	69.39	–30.95	0.05	–145.67	1.64	–34.21	–111.46
7modB	0.07	138.99	9.86	–142.62	–78.39	0.10	121.77	1.96	–70.30	–167.93
mean	0.09	—	9.24	—	–10.80	0.09	—	1.71	—	–29.97
standard deviation	0.03	—	0.39	—	60.78	0.05	—	0.25	—	134.48
14A-25-1—Continued										
1	0.19	–154.40	8.94	–150.19	–4.21	0.01	95.62	1.59	88.29	7.32
4	0.16	117.78	8.88	128.45	–10.67	0.00	116.42	2.00	–41.57	157.99
5	0.20	68.05	9.38	80.12	–12.07	0.05	64.43	1.33	–77.65	142.08
6	0.20	–123.64	8.96	–110.31	–13.34	0.02	51.68	1.92	–179.89	–128.43
7	0.19	–171.50	9.33	–140.09	–31.41	0.13	106.49	1.73	–149.45	–104.06
8	0.10	–129.54	8.99	–132.12	2.58	0.03	138.09	1.75	18.57	119.51
9	0.15	–160.86	9.56	–153.88	–6.99	0.05	108.55	1.80	–179.81	–71.64
10mod	0.17	5.58	9.33	24.37	–18.79	0.10	–138.73	1.73	6.36	–145.10
mean	0.17	—	9.17	—	–11.86	0.05	—	1.73	—	–2.79
standard deviation	0.03	—	0.24	—	9.52	0.04	—	0.19	—	118.81

Table 2–5. Results of tidal analysis of water-level responses to the six principal Earth tides for discrete segments of selected, detrended, parsed time series from well 14A-25-1 in the area of Mammoth Lakes, California, during November 13, 2015–November 9, 2017.

[Phase and phase shift is in units of degrees; Strain (areal strain) is in units of nanostrain; water level (WL) is in units of centimeters. **Abbreviations**: nd, segment number of the discrete (32-day long) time series; —, not applicable]

nd	S_2					
	WL amplitude	WL phase	Strain amplitude	Strain phase	Phase shift	WL/Strain amplitude ratio
1	0.33	–22.55	7.64	17.05	–39.60	0.043
2	0.35	–16.55	7.20	31.68	–48.23	0.049
3	0.35	–5.13	8.64	40.38	–45.51	0.041
4	0.25	–7.32	6.81	22.49	–29.80	0.037
5	0.25	0.85	7.58	37.50	–36.65	0.033
6	0.33	–7.59	9.42	31.38	–38.98	0.035
7	0.34	–21.69	9.90	20.63	–42.32	0.035
8	0.33	–25.53	9.03	13.61	–39.14	0.037
9	0.28	–137.36	8.07	–80.36	–57.00	0.034
10	0.36	90.91	9.96	127.34	–36.43	0.036
11	0.35	85.35	10.00	118.25	–32.90	0.035
12	0.33	84.86	8.44	110.27	–25.41	0.039
13	0.23	113.11	6.65	142.43	–29.33	0.035
14	0.26	112.89	6.50	154.42	–41.53	0.040
15	0.37	–24.25	9.64	15.59	–39.84	0.039
mean	0.31	—	8.37	—	–38.84	0.038
standard deviation	0.04	—	1.22	—	7.67	0.004
nd	M_2					
	WL amplitude	WL phase	Strain amplitude	Strain phase	Phase shift	WL/Strain amplitude ratio
1	0.25	90.62	18.70	81.82	8.80	0.014
2	0.24	147.14	18.87	142.00	5.14	0.012
3	0.25	–151.35	18.79	–157.84	6.50	0.013
4	0.28	1.02	18.73	–2.74	3.76	0.015
5	0.28	–91.30	18.65	–101.12	9.83	0.015
6	0.28	37.81	18.79	32.44	5.37	0.015
7	0.28	108.68	18.58	92.92	15.77	0.015
8	0.27	164.63	18.45	153.43	11.20	0.015
9	0.23	162.75	18.59	163.36	–0.61	0.012
10	0.24	–118.86	18.65	–123.18	4.32	0.013
11	0.28	–54.13	18.51	–62.59	8.46	0.015
12	0.28	1.27	18.51	–2.84	4.11	0.015
13	0.27	135.08	18.41	135.58	–0.50	0.015
14	0.28	–165.29	18.47	–163.48	–1.81	0.015
15	0.27	126.39	18.48	120.53	5.85	0.015
mean	0.27	—	18.61	—	5.75	0.014
standard deviation	0.02	—	0.14	—	4.54	0.001

Table 2–5. Results of tidal analysis of water-level responses to the six principal Earth tides for discrete segments of selected, detrended, parsed time series from well 14A-25-1 in the area of Mammoth Lakes, California, during November 13, 2015–November 9, 2017.—Continued

[Phase and phase shift is in units of degrees; Strain (areal strain) is in units of nanostrain; water level (WL) is in units of centimeters. **Abbreviations**: nd, segment number of the discrete (32-day long) time series; —, not applicable]

nd	N_2					
	WL amplitude	WL phase	Strain amplitude	Strain phase	Phase shift	WL/Strain amplitude ratio
1	0.07	–2.32	3.47	–41.88	39.56	0.019
2	0.03	85.02	2.97	84.44	0.59	0.011
3	0.05	–103.90	3.24	–144.34	40.44	0.014
4	0.07	176.33	3.74	178.41	–2.08	0.018
5	0.06	74.31	3.00	88.89	–14.58	0.020
6	0.09	–42.98	3.43	–31.52	–11.46	0.026
7	0.04	52.65	4.03	88.34	–35.69	0.009
8	0.09	–136.98	4.44	–160.41	23.43	0.019
9	0.03	–176.80	3.31	152.64	30.56	0.009
10	0.02	11.22	3.00	24.60	–13.38	0.006
11	0.07	151.62	3.58	148.61	3.01	0.019
12	0.05	–41.12	4.19	–97.69	56.57	0.013
13	0.06	137.09	4.30	118.24	18.86	0.014
14	0.06	–130.78	4.04	–128.34	–2.43	0.015
15	0.06	83.66	3.56	108.93	–25.26	0.016
mean	0.06	—	3.62	—	7.21	0.015
standard deviation	0.02	—	0.47	—	25.71	0.005

nd	K_1					
	WL amplitude	WL phase	Strain amplitude	Strain phase	Phase shift	WL/Strain amplitude ratio
1	0.40	–138.10	18.43	–140.67	2.57	0.022
2	0.37	–152.36	19.67	–153.99	1.62	0.019
3	0.32	–147.23	16.16	–170.33	23.11	0.020
4	0.14	–164.71	18.17	–140.88	–23.83	0.008
5	0.27	150.45	16.11	–168.14	–41.41	0.017
6	0.38	112.54	11.22	157.71	–45.17	0.034
7	0.33	87.65	10.14	96.99	–9.34	0.032
8	0.42	52.62	15.04	56.06	–3.44	0.028
9	0.26	–44.82	17.71	–43.20	–1.62	0.015
10	0.18	51.82	10.89	24.43	27.38	0.016
11	0.19	6.48	10.24	–37.56	44.04	0.018
12	0.05	–134.59	15.25	–74.69	–59.90	0.004
13	0.18	–150.52	18.85	–80.14	–70.39	0.009
14	0.33	–153.49	18.51	–95.71	–57.78	0.018
15	0.31	71.68	13.13	71.41	0.27	0.024
mean	0.27	—	15.30	—	–14.26	0.019
standard deviation	0.10	—	3.27	—	33.16	0.008

Table 2–5. Results of tidal analysis of water-level responses to the six principal Earth tides for discrete segments of selected, detrended, parsed time series from well 14A-25-1 in the area of Mammoth Lakes, California, during November 13, 2015–November 9, 2017.—Continued

[Phase and phase shift is in units of degrees; Strain (areal strain) is in units of nanostrain; water level (WL) is in units of centimeters. **Abbreviations**: nd, segment number of the discrete (32-day long) time series; —, not applicable]

nd	O_1					
	WL amplitude	WL phase	Strain amplitude	Strain phase	Phase shift	WL/Strain amplitude ratio
1	0.21	–142.80	9.29	–148.30	5.50	0.022
2	0.16	–57.92	9.52	–59.01	1.09	0.017
3	0.23	35.78	9.45	30.93	4.85	0.024
4	0.16	122.05	9.19	128.23	–6.18	0.018
5	0.20	68.03	9.35	80.93	–12.89	0.021
6	0.20	–121.95	8.91	–109.18	–12.77	0.023
7	0.28	–61.12	9.26	–14.66	–46.45	0.030
8	0.17	96.89	9.57	75.82	21.07	0.018
9	0.20	–173.25	9.67	–140.95	–32.30	0.020
10	0.09	–117.41	9.62	–132.88	15.47	0.009
11	0.12	–92.57	9.57	–41.02	–51.54	0.012
12	0.14	66.16	9.50	49.44	16.72	0.014
13	0.19	–148.72	9.76	–152.55	3.83	0.019
14	0.16	–90.78	9.74	–61.86	–28.92	0.016
15	0.20	–17.44	10.06	27.20	–44.64	0.020
mean	0.18	—	9.50	—	–11.14	0.019
standard deviation	0.04	—	0.27	—	23.42	0.005

nd	O_1					
	WL amplitude	WL phase	Strain amplitude	Strain phase	Phase shift	WL/Strain amplitude ratio
1	0.06	–159.23	1.73	88.36	112.42	0.035
2	0.06	–145.66	1.46	–116.70	–28.95	0.041
3	0.09	34.29	1.60	47.69	–13.40	0.057
4	0.03	7.27	1.88	–47.55	54.82	0.015
5	0.04	64.32	1.52	–84.84	149.16	0.029
6	0.09	42.06	1.60	–174.03	–143.92	0.053
7	0.08	95.06	2.03	–18.26	113.32	0.038
8	0.10	99.82	2.24	121.19	–21.37	0.043
9	0.14	103.79	1.74	–149.18	–107.03	0.080
10	0.07	75.30	1.48	18.56	56.74	0.046
11	0.09	74.74	1.80	169.74	–95.00	0.048
12	0.11	93.83	2.07	–45.21	139.04	0.053
13	0.03	72.96	2.37	–169.17	–117.86	0.014
14	0.07	–55.55	2.02	–28.22	–27.33	0.033
15	0.04	–156.68	1.91	14.90	–171.59	0.021
mean	0.07	—	1.83	—	–6.73	0.040
standard deviation	0.03	—	0.27	—	103.07	0.017

The computed mean ratio of the water-level amplitude to the theoretical areal-strain amplitude for O_1 ($\bar{A}_5$ = 0.019 cm/nanostrain) was larger than that for M_2, ($\bar{A}_2$ = 0.014 cm/nanostrain; table 2–5). The relative increased water-level responses to the O_1 tide compared to the M_2 tide could be further indication of atmospheric-loading contamination at the O_1 tidal frequency. It could also possibly be explained by an inhomogeneity in the physical setting owing to topographic effects (Berger and Beaumont, 1976) or the presence of the nearby generally north–south trending fault. For example, owing to the orthogonality of the principal directions of M_2 and O_1 theoretical areal strains, a compliant fault that is in hydraulic connection with the aquifer penetrated by the well could impart an anisotropic response to the two principal lunar tides by amplifying the water-level response to the O_1 tide, which has a principal strain axis oriented east–west, approximately perpendicular to the fault (Hanson and Owen, 1982; Hanson, 1984). Without more information, however, and given the evidence for possible contamination of the O_1 tidal response by atmospheric-loading effects, the following analysis assumed a homogenous tidal response that could be characterized by the response computed here for the M_2 tide with respect to $\bar{A}_2$. Under this assumption, the estimated homogenous tidal response of 0.014 cm/nanostrain computed for M_2 was used to digitally filter Earth tides from the 14A-25-1 high-pass, detrended, parsed water-level time series to improve the subsequent analysis of the frequency response of the tidally filtered time series to atmospheric loading for well 14A-25-1.

Digital Earth-Tide Filters for 14A-25-1 Time Series

The predicted water-level responses at the six principal Earth-tide frequencies (from eqn. 2–11) contained mixed atmospheric-loading and Earth-tide responses at some of the frequencies, especially at the frequencies of the solar and luni-solar tides, S_2 and K_1, respectively. Because the water-level response at the frequency of the M_2 tide likely represented more of a purely Earth-tide response, the water-level response to the M_2 tide was used to scale water-level responses to the other five Earth tides (table 2–4). The M_2-scaled responses were computed from the unscaled water-level responses to the tides on the basis of the mean ratio of the water-level amplitude and the theoretical areal-strain amplitude for the M_2 tide ($\bar{A}_2$), the computed areal-strain amplitudes for each of the Earth tides ($A\varepsilon_{Areal_k}$), and the mean phase shift of the water-level response for the M_2 tide ($\bar{\eta}_2$ = 5.75°). The equation used to compute the M_2-scaled water-level responses was developed as follows:

1. The predicted, unscaled water-level response for the high-pass, detrended water levels at the frequencies of the six principal Earth tides from equation 2–11 is

$$\hat{y}_{hpet}\left(t_j\right)=\sum_{k=1}^{6}\left(a_k\cos\left(2\pi f_k t_j\right)+b_k\sin\left(2\pi f_k t_j\right)\right) \quad (2\text{–}16)$$

Using $a_k = A_{y_k}\cos\left(\phi_{y_k}\right)$ and $b_k = A_{y_k}\sin\left(\phi_{y_k}\right)$, and the trigonometric identity for the expansion of the cosine sum of differences between two angles, equation 2–16 can be rewritten as

$$\begin{aligned}\hat{y}_{hpet}\left(t_j\right)&=\sum_{k=1}^{6}Ay_k\cos\left(\phi y_k\right)\cos\left(2\pi f_k t_j\right)\\&\quad+Ay_k\sin\left(\phi y_k\right)\sin\left(2\pi f_k t_j\right)\\&=\sum_{k=1}^{6}Ay_k\cos\left(2\pi f_k t_j-\phi y_k\right)\end{aligned} \quad (2\text{–}17)$$

2. Applying M_2 scaling is done in two steps:
   1. First, multiplying the argument of summation by the ratio of $\bar{A}_2$ to A_k gives this:

$$\hat{y}_{hpetM2}\left(t_j\right)=\sum_{k=1}^{6}\frac{\bar{A}_2}{A_k}Ay_k\cos\left(2\pi f_k t_j-\phi y_k\right) \quad (2\text{–}18)$$

where

$\hat{y}_{hpetM2}$ is the predicted value of the M_2-scaled response.

   2. Next, expressing ϕy_k in terms of the mean M_2 phase shift ($\bar{\eta}_2$), where $\phi y_k = \phi\varepsilon_{Areal_k}+\bar{\eta}_2$, gives this:

$$\hat{y}_{hpetM2}\left(t_j\right)=\sum_{k=1}^{6}\frac{\bar{A}_2}{A_k}Ay_k\cos\left(2\pi f_k t_j-\phi\varepsilon_{Areal_k}-\bar{\eta}_2\right) \quad (2\text{–}19)$$

3. Finally, substituting 2–15 into 2–19, and moving $\bar{A}_2$ outside the summation gives equation 2–20:

$$\hat{y}_{hpetM2}\left(t_j\right)=\sum_{k=1}^{6}A\varepsilon_{Areal_k}\cos\left(2\pi f_k t_j-\phi\varepsilon_{Areal_k}-\bar{\eta}_2\right) \quad (2\text{–}20)$$

The summation term is a function of the amplitude and phase of the theoretical tidal strain signal and the mean phase shift of the water-level response at the M_2 tidal frequency. The M_2-scaled water-level response is a constant factor multiplied by this term. The uses of $\bar{A}_2$ for this constant factor and of $\bar{\eta}_2$ to modify the phase of the response are reasonable because M_2 is the principal lunar tide for which power at principally solar frequencies in the barometric pressure signal is least among the other principal Earth tide frequencies. Values for $A\varepsilon_{Areal_k}$ and $\phi\varepsilon_{Areal_k}$ for each parsed series analyzed are available in table 2–4, and the values for $\bar{A}_2$ and $\bar{\eta}_2$ are available in table 2–5. This results in $\hat{y}_{hpetM2}$ with M_2-scaled amplitude and phase responses to Earth tides computed for each of the analyzed parsed series. Figure 2–8 shows the predicted, discrete amplitudes for the six principal tides (table 2–3) for (1) the theoretical areal-strain tide and (2) the unscaled ($\hat{y}_{hpet}$, or WL:ET) and M_2-scaled ($\hat{y}_{hpetM2}$, or WL:ETM2) water-level responses, computed using the high-pass, detrended areal-strain tide and water-level time series, respectively, for 14A-25-1_5 (fig. 2–1, box h). Digitally filtered water-level responses at tidal frequencies for each high-pass, detrended, parsed water-level time series analyzed (table 2–4) were computed using the following:

$$\tilde{y}_{hpet}\left(t_j\right) = y_{hp}\left(t_j\right) - \hat{y}_{hpet}\left(t_j\right) \tag{2–21}$$

$$\tilde{y}_{hpetM2}\left(t_j\right) = y_{hp}\left(t_j\right) - \hat{y}_{hpetM2}\left(t_j\right) \tag{2–22}$$

Here, y_{hp} is the high-pass, detrended water level used in equation 2–11. Figure 2–9 shows the predicted, unscaled ($\hat{y}_{hpet}$, or WL:ET) and the M_2-scaled ($\hat{y}_{hpetM2}$, or WL:ETM2), high-pass water-level responses to the six principal Earth tides compared to the high-pass, water levels (y_{hp}, or WL); and the resulting tidally filtered, unscaled ($\tilde{y}_{hpet}$, or fWL:ET) and M_2-scaled ($\tilde{y}_{hpetM2}$, or fWL:ETM2), high-pass water levels for the detrended series 14A-25-1_5. The filtered results from the M_2-scaled water-level responses (eqn. 2–22) retained slightly more atmospheric-loading effects than did those from the unscaled water-level responses at the frequencies of the six principal Earth tides (eqn. 2–21).

To digitally filter the tidal responses from the high-pass, detrended 14A-25-1 _10 full (unmodified), parsed water-level time series affected by flow testing, predicted, unscaled, high-pass water-level responses to the six principal Earth tides were computed using equation 2–23:

$$\hat{y}_{hpet}\left(t_j\right) = \sum_{k=1}^{6} \overset{mod}{A}_k \, A\varepsilon_{Areal_k} \cos\left(2\pi f_k t_j - \phi_{\varepsilon Areal_k} - \overset{mod}{\eta}_k\right) \tag{2–23}$$

where

$\overset{mod}{A}_k$ is the ratio of the water-level amplitude to the theoretical areal-strain amplitude for each of the principal Earth tides in the modified parsed series (14A-25-1_10mod), and

$\overset{mod}{\eta}_k$ is the phase shift of the water-level response for each of the principal Earth tides in the modified parsed series (14A-25-1_10mod).

The M_2-scaled water-level responses to the Earth tides were computed for the affected high-pass, detrended, full parsed series using equation 2–23. The terms $A\varepsilon_{Areal_k}$ and $\phi\varepsilon_{Areal_k}$ for the affected full parsed series (14A-25-1_10) are the theoretical areal-strain amplitude and phase, respectively (referenced to the start of the full parsed series), and are not presented in table 2–4. For the k[th] tidal constituents 1–6, the computed $A\varepsilon_{Areal_k}$ values for 14A-25-1_10 were 9.31, 18.59, 3.42, 12.21, 9.41, and 1.64 nanostrain, and the computed $\phi\varepsilon_{Areal_k}$ values were 143.33, –146.76, 128.18, –153.33, –1.26, and –90.25°, respectively.

Unscaled and M_2-scaled, tidally filtered water-level responses for each of the detrended parsed series for 14A-25-1 in table 2–4 and the affected, full parsed series 14A-25-1_10 (table 2–1; fig. 2–1, box i) were computed as follows:

$$\tilde{y}_{et}\left(t_j\right) = \tilde{y}_{hpet}\left(t_j\right) + y_{lp}\left(t_j\right) \tag{2–24}$$

$$\tilde{y}_{etM2}\left(t_j\right) = \tilde{y}_{hpetM2}\left(t_j\right) + y_{lp}\left(t_j\right) \tag{2–25}$$

where

$\tilde{y}_{et}\left(t_j\right)$ is the unscaled tidally filtered water level;

$\tilde{y}_{etM2}\left(t_j\right)$ is the M_2-scaled tidally filtered water level;

$y_{lp}(t_j)$ is the residual low-pass, detrended water level $(y(t_j) - y_{hp}(t_j))$; and

$y_{hp}(t_j)$ is the high-pass, detrended water level used in equation 2–11.

The unscaled and M_2-scaled tidally filtered detrended water levels, equations 2–24 and 2–25, respectively, for 14A-25-1_10 and 14A-25-1_10mod are shown in figure 2–10. The offset between the 14A-25-1_10 and 14A-25-1_10mod series, evident after the 14A-25-1_10mod starting date of October 9, 2017, was caused by the separate linear detrending functions used for the two series. The 14A-25-1_10 series contains the period of the flow test, which is shown at a larger scale (fig. 2–10*C*). The effects of digitally filtering Earth tides from the water levels were small compared to the effects of atmospheric loading on the water levels.

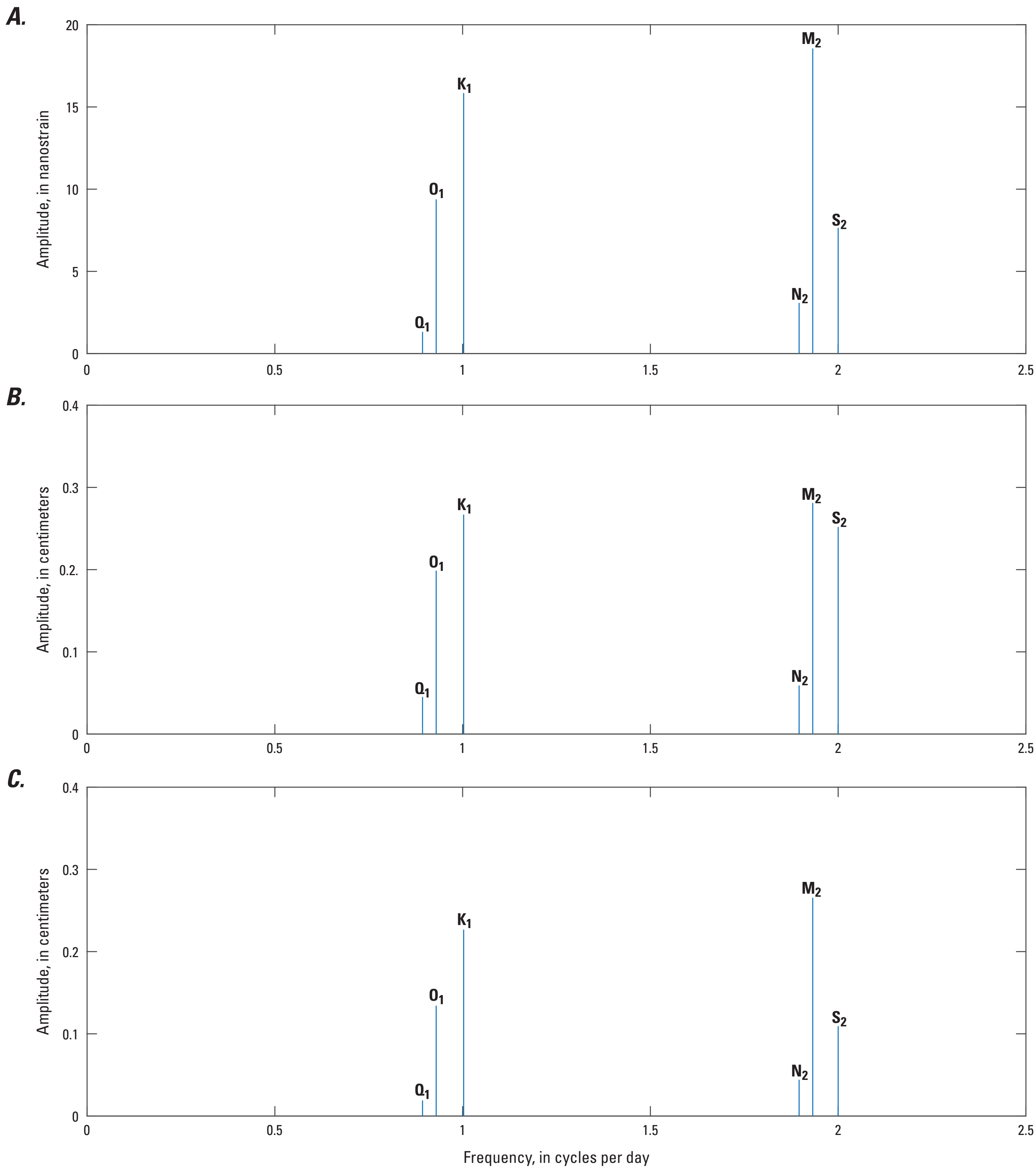


Figure 2–8. Predicted discrete amplitudes of the six principal Earth tides shown in table 2–3 computed for the high-pass (greater than 0.7 cycles per day, cpd), detrended theoretical areal-strain tide and unscaled (WL:ET) and M_2-scaled (WL:ETM2) water levels for 14A-25-1_5 during July 14–August 14, 2016, from well 14A-25-1 in the area of Mammoth Lakes, California: *A*, theoretical areal-strain tide amplitudes; *B*, WL:ET amplitudes; and *C*, WL:ETM2 amplitudes.

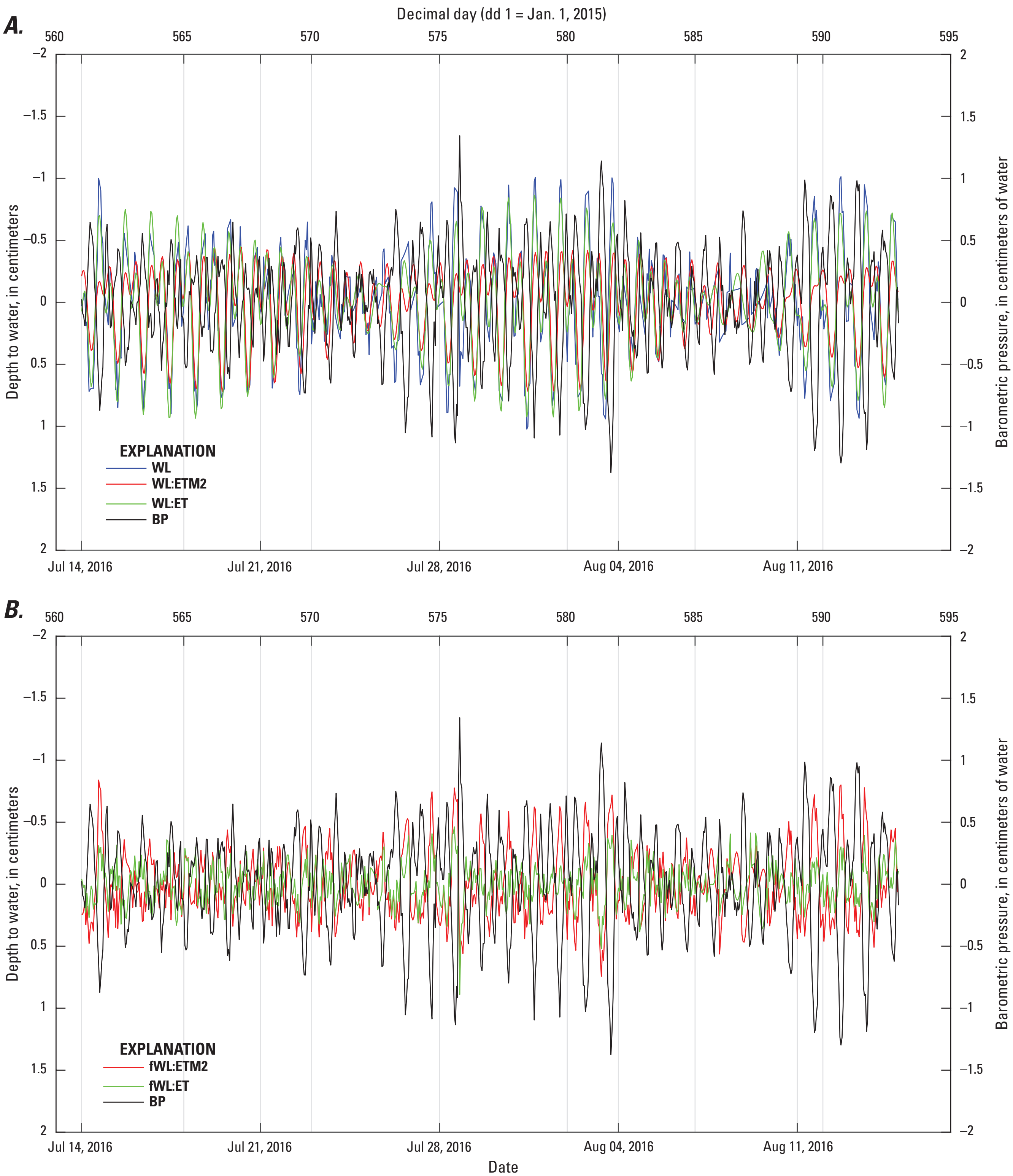


Figure 2–9. Predicted unscaled (WL:ET) and M_2-scaled (WL:ETM2) water-level responses to the six principal Earth tides shown in table 2–3 for the high-pass (greater than 0.7 cycles per day, cpd), detrended water levels (WL); and the tidally filtered, unscaled (fWL:ET) and M_2-scaled (fWL:ETM2), high-pass water levels for 14A-25-1_5 during July 14–August 14, 2016, from well 14A-25-1 in the area of Mammoth Lakes, California: *A*, WL, WL:ET and WL:ETM2 shown with high-pass (greater than 0.7 cycles per day, cpd), detrended barometric pressure (BP); and *B*, fWL:ET and fWL:ETM2 shown with high-pass (greater than 0.7 cycles per day, cpd), detrended barometric pressure (BP).

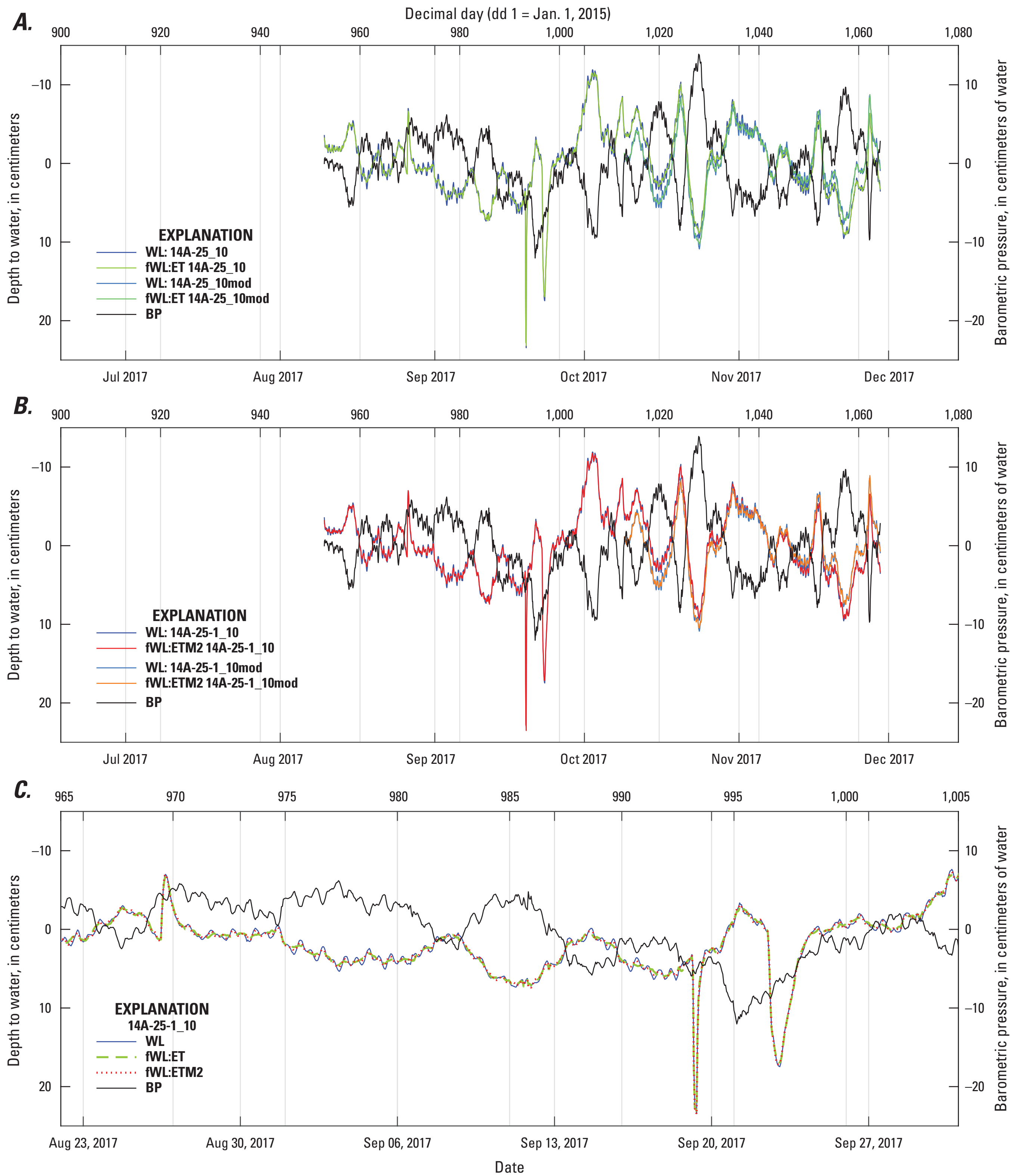


Figure 2–10. Unscaled (fWL:ET) and M_2-scaled (fWL:ETM2) tidally filtered water levels for the detrended, parsed time series 14A-25-1_10 during August 9–November 29, 2017, and 14A-25-1_10mod during October 9–November 29, 2017, from well 14A-25-1 in the area of Mammoth Lakes, California, shown with detrended water levels (WL) and barometric pressure (BP): *A*, fWL:ET, WL and BP for 14A-25-1_10 and 14A-25-1_10mod; *B*, fWL:ETM2, WL and BP for 14A-25-1_10 and 14A-25-1_10mod; and *C*, fWL:ET, fWL:ETM2, WL and BP for 14A-25-1_10 at a larger scale spanning the period of the flow test.

Frequency Responses of Water Levels to Atmospheric Loading

Although the primary purpose of this section is to describe the methods used to remove the effects of atmospheric loading from the water-level time series, it is also useful to describe the physical effects of atmospheric loading on ideal wells and aquifer systems to understand the computed frequency responses that were used to filter the water levels. Physically, a frequency-dependent response can be indicative of vertical fluid flow effects, either in the aquifers penetrated by the wells or, for example, between a shallower aquifer and a deeper, monitored aquifer where there is some impedance to vertical flow between the two aquifers, or both. The physical interpretation of the characteristics of a frequency-dependent response to atmospheric loading has been described by others (for example, Weeks, 1979; Rojstaczer, 1988a; Rojstaczer and Agnew, 1989).

Idealized Well and Aquifer Response to Atmospheric Loading

Note, in this section, water level refers to the water-level elevation or head and as such, is oppositely sensed with respect to water level measured as depth-to-water; for example, a decreasing water-level elevation corresponds to an increasing depth-to-water. Because aquifers are commonly imperfectly confined and their transmissivity can range over orders of magnitude, the water-level response of a well and aquifer to atmospheric loading does not always reflect the coupled hydraulic and mechanical response of the well and aquifer in the absence of fluid flow effects, referred to as the undrained or static-confined response. Figure 2–11 shows four idealized responses of water levels in wells that are open to the atmosphere to loads imposed by barometric pressure at the land surface. For each of the idealized responses, lateral flow exchanged between the well and the aquifer is shown on the plots for completeness, but for purposes of the following discussions it was assumed that there is no impedance to flow between the wellbore and the aquifer; for example, wellbore storage effects were assumed to be negligible. The BE for a well tapping a perfectly confined aquifer of infinite extent that has large transmissivity and no drainage effects (fig. 2–11*A*) represents the equilibrated balance between the air pressure imposed directly on the free-surface water level in the well and the mechanical response of the aquifer to the change in load (pressure) imposed on the land surface and translated to the saturated rock matrix (aquifer matrix or skeleton). For example, for a step increase in barometric pressure (Δx_0), initially, water level in the well would be forced downward in an amount equal to the change in barometric pressure (in equivalent units of head), and water would flow from the well to the aquifer. This response would be balanced by the increased load on the saturated aquifer matrix, which would compress, reduce porosity slightly, and increase heads in the aquifer and, in turn, cause water to flow from the aquifer to the well and water level in the well to increase, recovering a portion of the initial water-level decrease. If the permeability of the aquifer is large and the hydraulic connection between the well and aquifer does not impede flow, these effects would be simultaneous, and the resultant water level in the well (Δy_0) would represent the balanced response of the well and aquifer to the step increase in barometric pressure. As such, this ideal response in the ideal well tapping the ideal confined aquifer occurs under conditions absent of fluid-flow (drainage) effects, such as those related to the degree of confinement of the aquifer (discussed later).

Figure 2–11*B* shows the response of an ideal unconfined aquifer to a step increase in barometric pressure (Δx_0) where the water table is shallow or the air permeability of the unsaturated zone is large. In this case, the air pressure at the water table equilibrates rapidly with the barometric pressure change at land surface. As such, because there is no pressure imbalance between the water level in the open well and the water table, there is no change in water level in the well ($\Delta y_0 = 0$) and BE is zero. There is a negligible mechanical response to loading because any small decrease in storage owing to compression of the aquifer matrix is accommodated by the relatively large storage capacity provided by the available porosity in these unconfined systems, resulting in negligible change in aquifer hydraulic head. By contrast, figure 2–11*C* shows the response of an unconfined aquifer to a step increase in barometric pressure (Δx_0) where the water table is deep or the air permeability in the unsaturated zone is sufficiently small to delay equilibration of air pressure at the water table ($\Delta x_{t=0} < \Delta x_0$) with barometric pressure at land surface. Here, there is an initial pressure imbalance between the water level and the water table. Initially, the change in water level in the well ($\Delta y_{t=0}$) is equal to $-BE\Delta x_0$, approximating a confined aquifer response. With time, however, as the air pressure at the water table equilibrates with the step increase in barometric pressure at land surface ($\Delta x_{t\gg 0} \rightarrow \Delta x_0$), the change in water level in the well approaches zero ($\Delta y_{t\gg 0} \rightarrow 0$). For this case, described in detail by Weeks (1979) and Rojstaczer and Riley (1990), the computed barometric efficiency ($BE_t = -\Delta y_t / \Delta x_t$) is time dependent, a function of the transient diffusion of air pressure through the unsaturated zone.

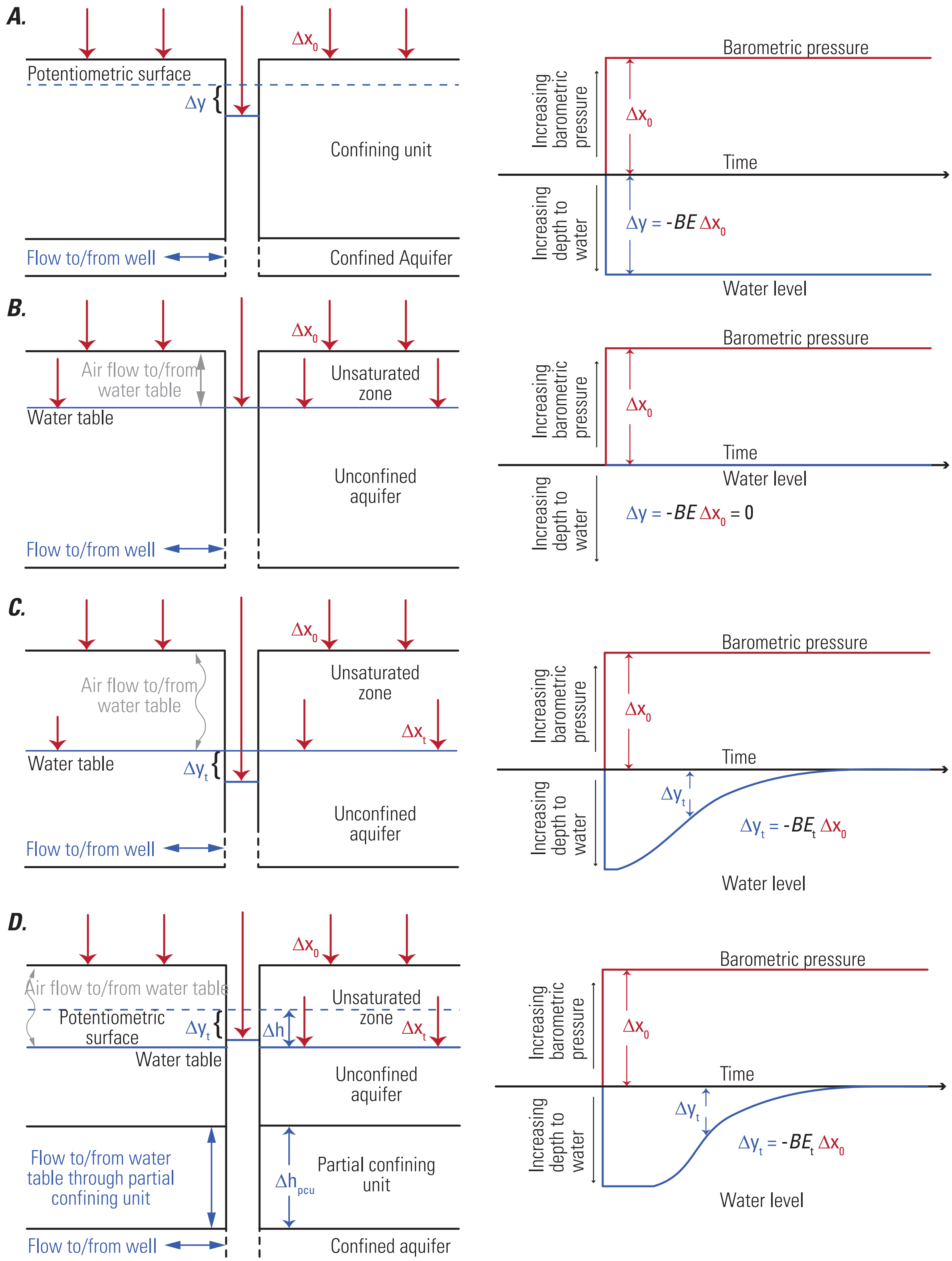


Figure 2–11. Cross sections of idealized aquifer systems showing idealized well responses to atmospheric loading with principal sources of attenuation owing to drainage (flow) effects and idealized water-level responses to a step increase in barometric pressure or load (right plots). Note, in this figure water level refers to the water-level elevation or head and as such, is oppositely sensed with respect to water level measured as depth-to-water; for example, a decreasing water-level elevation or head corresponds to an increasing depth-to-water. *A*, confined aquifer; *B*, unconfined aquifer (shallow or with large unsaturated-zone air permeability); *C*, unconfined aquifer (deep or with small unsaturated-zone air permeability); and *D*, partially confined aquifer overlain by unconfined aquifer (shallow or with small unsaturated-zone air permeability).

Figure 2–11*D* shows the response of a partially confined aquifer overlain by an unconfined aquifer to a step increase in barometric pressure at land surface. Here, the unconfined aquifer is shallow or the air permeability in the unsaturated zone is sufficiently large enough to facilitate rapid equilibration of air pressure at the water table with barometric pressure at land surface. There is a background head difference (Δh) between the water table and the confined aquifer equal to the background head difference across the partial confining unit ($\Delta h_{pcu_{t<0}}$) indicating upward flow from the confined aquifer through the partial confining unit to the unconfined aquifer. Similar to the response described for a deep unconfined aquifer, initially, the change in water level in the well ($\Delta y_{t=0}$) is equal to $-BE\Delta x_0$ approximating an undrained confined aquifer response. Owing to the increased head in the confined aquifer caused by the mechanical loading of the aquifer, approximately equal to $(1\text{-}BE)\Delta x_0$, $\Delta h_{pcu_{t<0}}$ is increased by that amount. Increased groundwater flow from the confined aquifer through the partial confining unit to the unconfined aquifer is induced by the increased head gradient across the partial confining unit until this drainage dissipates the head increase in the partially confined aquifer as $\Delta h_{pcu_{t\gg0}} \rightarrow \Delta h$. The resulting water-level change in the well re-equilibrates with the background head in the confined aquifer ($\Delta y_{t\gg0} \rightarrow 0$), which has re-equilibrated with the unconfined aquifer having a $BE = 0$. For this case, described in more detail by Rojstaczer (1988a), the computed barometric efficiency $BE_t = -\Delta y_t / \Delta x_t$ is time dependent, a function of transient fluid-pressure diffusion through the partial confining unit.

The time-dependent responses associated with a deep unconfined aquifer and drainage of a partially confined aquifer through a partial confining unit may exist in combination and further complicate the characterization of the time-dependence of BE for a well influenced by both governing processes. As a result of these time-dependent water-level responses, the BE of a well is a function of the length of time (period) or frequency of the barometric pressure (atmospheric load) fluctuation. Analytical approaches to resolving the effects of these processes in terms of the frequency response of water levels in wells to atmospheric loading are presented by Rojstaczer (1988a, 1988b).

Computed Frequency Responses

The frequency response of water level to atmospheric loading can be defined by this relation:

$$Y(\omega) = H(\omega)X(\omega) \tag{2–26}$$

where

- ω is the angular frequency that is equal to the frequency (f) by $f = \dfrac{\omega}{2\pi}$,
- $Y(\omega)$ is the discrete Fourier transform of the detrended water-level responses to barometric pressure,
- $X(\omega)$ is the discrete Fourier transform of the detrended barometric-pressure time series, and
- $H(\omega)$ is the frequency response function (Rojstaczer 1988a,b; Quilty and Roeloffs, 1991), which represents the barometric efficiency in the frequency domain.

The frequency response function was computed using equation 2–27:

$$H(\omega) = \frac{G_{xy}(\omega)}{G_{xx}(\omega)} \tag{2–27}$$

where

- $G_{xy}(\omega)$ is the cross-spectral density of the paired detrended barometric-pressure and water-level time series, and
- $G_{xx}(\omega)$ is the auto-spectral density of the barometric-pressure time series (fig. 2–1, box j).

The cross- and auto-spectral densities were computed using the Welch (1967) method. The gain (amplitude) and phase shift of the frequency response function were calculated as follows:

$$\begin{aligned} A(\omega) &= \left|H(\omega)\right| \\ \phi_s(\omega) &= \text{atan2}\left(H(\omega)\right) \end{aligned} \tag{2–28}$$

where

- $A(\omega)$ is the amplitude or gain,
- $|H(\omega)|$ is the magnitude of the complex valued ($a + bi$) frequency response function computed using $|a+bi| = \sqrt{a^2+b^2}$, and
- $\phi_s(\omega)$ is the phase shift of the water-level response relative to the forcing atmospheric load computed using atan2(b,a).

The squared coherence at each frequency ($\gamma^2(\omega)$) was computed using equation 2–29 (Bendat and Piersol, 1986):

$$\gamma^2(\omega) = \frac{\left|G_{xy}(\omega)\right|^2}{G_{xx}(\omega)G_{yy}(\omega)} \tag{2–29}$$

The amplitude of the frequency response represents the barometric efficiency (BE) of the response at the evaluated angular frequencies ($\omega = 2\pi f$). The phase shift represents the phase shift of the measured water-level response relative to the phase of the forcing atmospheric load (for example, phase of the load minus phase of the water-level response). Phase shifts were computed in the interval −180 to +180° and adjusted by adding the result to −180°. The adjustment arises from the fact that the water-level response in terms of water level measured as depth-to-water level are nearly in-phase with the atmospheric load compared with the nearly antiphase water-level response in terms of water level measured as elevation or head. Thus, phase shifts were portrayed in a manner that was consistent with the nearly antiphase water-level elevation or head response, where the ideal (absent of drainage effects) water-level response has a phase shift of exactly −180°, and is consistent with the representation of phase shift in Rojstaczer (1988a). As such, the adjustment facilitates comparisons of phase-shift responses presented here to responses presented in other studies. However, because this convention computes phase shifts of the water-level responses relative to the forcing atmospheric loads, the phase shifts are oppositely sensed compared to phase shifts computed for the water-level responses to Earth tides (discussed previously), which were computed relative to the phases of the measured depth-to-water level responses. Thus, here phase-shift angles greater than –180° (for example, –160°) represented phase advanced water-level responses with respect to the atmospheric load (in this example, advanced by 20°), and angles less than –180° represented phase lagged water-level responses.

Frequency response functions were computed for those parsed series analyzed for Earth tides shown in table 2–4 and indicated by series numbers in ***bold-italic*** font in table 2–1. For parsed series from wells 28A-25-1 and 28A-25-2, which responded negligibly to Earth-tide strains, the frequency responses to atmospheric loading were computed using the detrended depth-to-water ($y(t)$) and detrended barometric-pressure ($x(t)$) parsed time series. For parsed series from well 14A-25-1, frequency responses to atmospheric loading were computed using the unscaled and M_2-scaled, tidally filtered, detrended, parsed water-level time series, $\tilde{y}_{et}(t)$ and $\tilde{y}_{etM2}(t)$ (eqns. 2–24 and 2–25), respectively, and the detrended, parsed barometric-pressure time series ($x(t)$). To compare the effects of tidal filtering on the computed frequency-response functions for well 14A-25-1, frequency responses were also computed using the tidally unfiltered, detrended, parsed water-level series as done for the 28A-25 wells (see fig. 2–13*C*, *D* and accompanying discussion later in this section).

To compute $H(\omega)$, lengths or spans in hours (the sample rate or interval) were specified for the number of discrete Fourier transform points (*nfft*), window, and overlap parameters in the computations of the power spectra. A Hamming window was used to reduce spectral leakage of the computed spectral estimates. Values for *nfft*, window, and overlap were chosen to preserve frequency resolution in the sub-tidal frequencies (less than 0.7 cpd). The specified values were determined by trial and error to minimize the ratio of variances of filtered to detrended water levels (discussed later). For each $H(\omega)$ computed using the specified values of *nfft*, window, and overlap, a second $H(\omega)$ was computed after resampling the original $H(\omega)$ at a specified resampling rate. The resampled $H(\omega)$ was designated $reH(\omega)$. The resampling rate was specified as a multiple of the original rate. The resampling factor (*ref*) was computed to ensure the period associated with the minimum resampled frequency was less than the span in hours of the parsed time series (*N*). Resampling was achieved using an antialiasing finite-impulse response low-pass filter (order = 20 × [*N*-10]; Kaiser window shape factor, β = 5). The original sampling and resampling frequencies ranged from $\frac{24}{ref \times nfft}$ to 12 cpd, the Nyquist frequency, where *nfft* is in hours and *ref* = 1 for the original sampling rate. The use of relatively large *nfft*s to enhance resolution in the low-frequency range limited computed values of *ref*, which ranged from 1.1 to 1.9. Nevertheless, in most cases, resampling improved the frequency response function estimates and the filtered results, especially in the important sub-tidal frequency range where most of the cross-spectral power resides. Table 2–6 lists the parameters used to compute the power spectra for each parsed series analyzed (indicated by series numbers in ***bold-italic*** font in table 2–1). Figure 2–12 shows the auto- and cross-spectral density power spectra computed for non-tidally filtered, detrended, parsed series 28A-25-1_9, 28A-25-2_4, and 14A-25-1_8. For each time series, much of the spectral power was concentrated at lower frequencies (less than about 0.3 cpd), with peaks at lower levels of spectral power at diurnal and semi-diurnal frequencies in the 28A-25 wells and at the semidiurnal frequency in 14A-25-1_8. The peaks at 3 cpd in each plot are harmonics (integer multiples of the fundamental frequency) that arose with the Fourier transform of the imperfect sinusoid of the fundamental frequency at 1 cpd. In this case, it is an odd harmonic (3 times the fundamental frequency). No attempt was made to remove these harmonics from the time series prior to computing the frequency-response functions.

The computed frequency responses in terms of amplitude (BE) and phase shift for 28A-25-1_4 and 28A-25-2_4 (detrended, parsed series of the same period) and 14A-25-1_10mod are shown in figure 2–13. For the 28A-25 wells, two responses are shown for each tidally unfiltered parsed series, one based on the original sampling rate, $H_{frfbp}(\omega)$ (or FRF), and another based on the resampled rate, $H_{refrfbp}(\omega)$ (or reFRF). For series 14A-25-1_10mod, the responses at the original and resampled rates are shown for both the tidally unfiltered (FRF and reFRF) and the M_2-scaled, tidally filtered time series, $H_{frfbp:M2}(\omega)$ and $H_{refrfbp:M2}(\omega)$ (or FRF:ETM2) and reFRF:ETM2). The squared coherences, $\gamma^2_{frfbp}(\omega)$ (or Coh^2 for FRF), and $\gamma^2_{frfbp:etM2}(\omega)$ (or Coh^2:ETM2 for FRF:ETM2), are also shown on the respective phase plots (fig. 2–13*B*, *D*, *F*).

Table 2–6. Parameters used to compute frequency-response functions for the parsed time series analyzed for frequency response to atmospheric loading for wells 28A-25-1 during January 14, 2016–December 31, 2017, 28A-25-2 during January 14, 2016–December 31, 2017, and 14A-25-1 during November 13, 2015–November 29, 2017, in the area of Mammoth Lakes, California.

[hrs, hours; N, number of hourly samples in the parsed time series; nfft, number of discrete Fourier transform points]

Well/ parsed series	N samples	nfft (hrs)	Window (hrs)	Overlap (hrs)	Resampling factor
28A-25-1					
1	959	840	480	96	1.130
3	1,704	1,200	720	96	1.412
4	2,160	1,920	720	96	1.120
5	2,832	1,920	1,200	72	1.470
9	2,500	1,320	1,200	96	1.886
10	798	720	360	24	1.094
28A-25-2					
1	983	840	480	96	1.158
3	1,728	1,200	720	96	1.432
4	2,145	1,920	720	96	1.112
5	789	720	360	24	1.082
6	3,191	1,920	1,200	120	1.657
7modA	1,482	1,200	480	72	1.227
7modB	1,849	1,680	600	48	1.095
14A-25-1					
1	2,470	1,320	1,200	96	1.864
4	1,128	960	600	72	1.165
5	768	600	360	96	1.263
6	2,712	1,920	1,200	24	1.407
7	789	720	360	48	1.082
8	2,339	1,800	1,200	72	1.294
9	1,836	1,680	840	144	1.087
10mod	1,233	960	360	96	1.274

Generally, the signal-to-noise ratios of the computed frequency responses, as indicated by the power spectral densities (for example, fig. 2–12), were low for frequencies higher than about 2.5 cpd, and the squared coherences were highly variable and generally small. Spuriously high correlations are possible when the signal-to-noise ratios are small. Thus, including frequencies beyond the tidal frequencies, greater than about 2.5 cpd, was not that useful for demonstrating and analyzing the frequency responses of water levels to atmospheric loading because most of the signal power resided at frequencies less than about 2.5 cpd. Computed responses for frequencies greater than 5 cpd are not shown here. The computed frequency responses for the full frequency range up to 12 cpd were used in the analysis, however.

The responses showed a strong frequency dependence. BEs for 28A-25-1_4 and 28A-25-2_4 were similar and distinctly different from the BEs in 14A-25-1_10mod. Average BEs in the supra-tidal frequencies (more than 2.5 cpd) approached values of 1 and about 0.55 for the 28A-25 parsed series and 14A-25-1_10mod, respectively. For supra-tidal frequencies, average phase shifts approached values of –178° and –175° in 28A-25-1_4 and 28A-25-2_4, respectively, and about –192° in 14A-25-1_10mod. This part of the response, where BE and phase shift approached constant values at higher frequencies, is indicative of the ‘static-confined’ response (Rojstaczer, 1988a, 1988b) and represents the classic concept of barometric efficiency in terms of a simple loading response without the influence of fluid-flow effects. The phase shift of the static-confined response in 14A-25-1_10mod, corresponding to a phase lag of about 12° (–180°–(–192°)), agreed reasonably well with the phase lag of about 5° measured for the M_2 tide in this series (table 2–4, phase shift = 4.94°). Although the difference was small and likely within the error range of the analytical methods and field measurements, it could indicate a small difference in the responses to vertical loading imposed by atmospheric pressure and the responses to principally areal (plane-stress) loading imposed by the Earth tides. Removal of the M_2-scaled tidal responses generally improved the frequency response to atmospheric loading around the diurnal and especially the semi-diurnal frequencies (fig. 2–13*C*, *D*), and this was generally true of the other frequency responses computed for the 14A-25-1 parsed time series. At sub-tidal frequencies, the frequency responses in each well showed an increase in BE (slight for the 28A-25-2 wells) shifted toward lower frequencies for 14A-25-1_10mod, followed by a decrease in BE accompanied by generally concomitant increasing phase shifts (phase advances). These frequency responses of water level to atmospheric loading for each well are consistent with the theoretical responses of either a partially confined or a deep unconfined aquifer (Rojstaczer, 1988a; Rojstaczer and Riley, 1990) with drainage (vertical fluid-flow) effects manifest at frequencies of the imposed load below about 0.8 cpd in the 28A-25 wells and below about 0.4 cpd in well 14A-25-1. The effects of resampling $H(\omega)$ at the higher rates indicated by the resampling factor (*ref*) in table 2–6 had minimal effects on the character of the BEs and phase shifts of the computed frequency responses.

The frequency responses computed for other parsed series from the same wells were typified by the responses shown here. The computed frequency responses in the full frequency range for the original sampled frequency without tidal filtering (FRF) for all parsed time series analyzed (indicated by series numbers in ***bold-italic*** font in table 2–1) in each well are given in Galloway (2019) along with the computed frequency responses at the resampled frequencies without tidal filtering (reFRF) for the 28A-25-1 and 28A-25-2 parsed time series and with M_2-scaled tidal filtering (reFRF:ETM2) for the 14A-25-1 series.

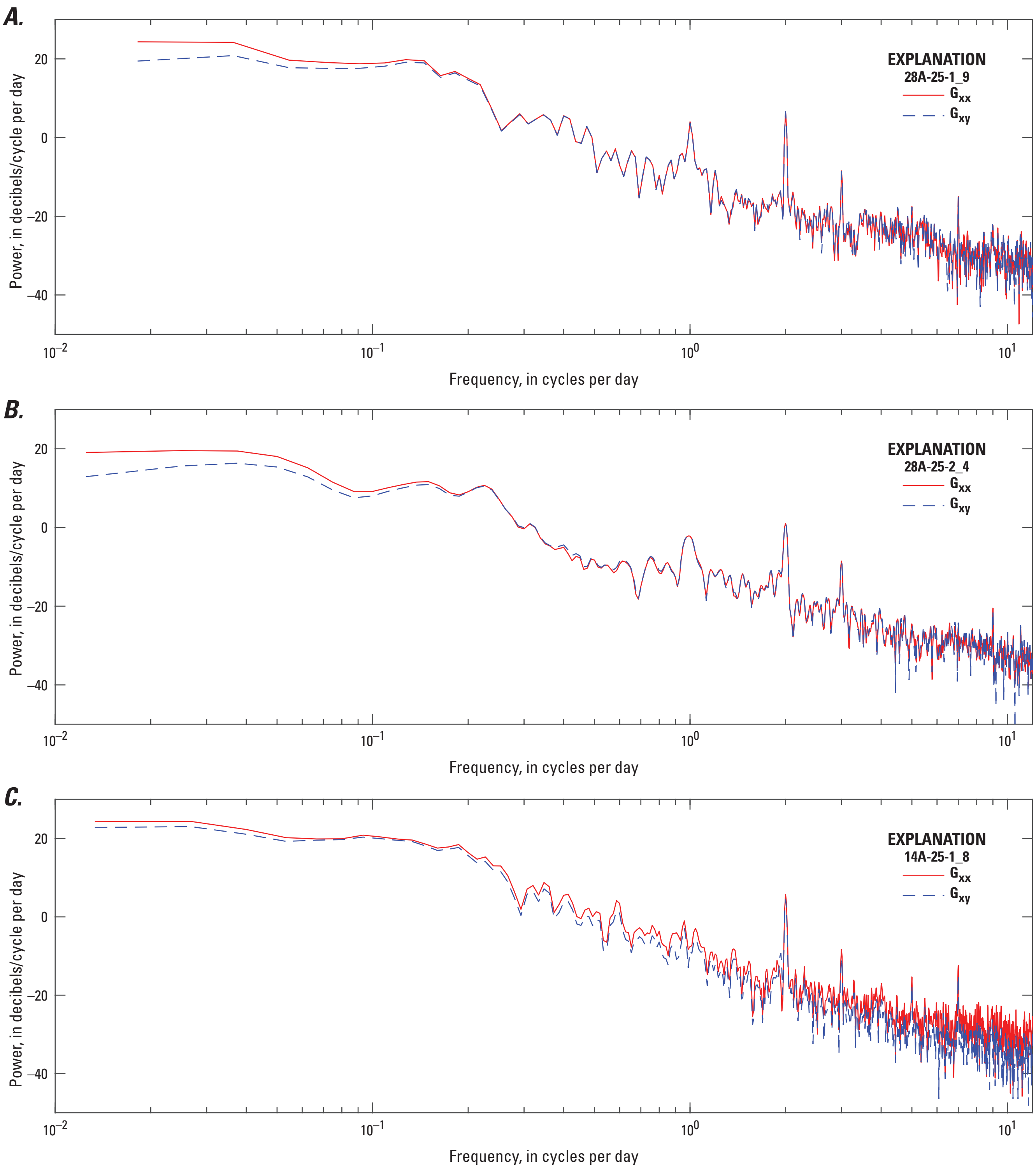


Figure 2–12. Power spectral densities (G_{xx}, G_{xy} from eqn. 2–27) computed for the parameters listed in table 2–6 for the non-tidally filtered, detrended, parsed series 28A-25-1_9 during August 16 to November 28, 2017, 28A_25-2_4 during May 19 to August 16, 2016, and 14A-25-1_8 during February 15 to May 24, 2017, from wells 28A-25-1, 28A-25-2, and 14A-25-1, in the area of Mammoth Lakes, California: *A*, 28A-25-1_9; *B*, 28A_25-2_4; and *C*, 14A-25-1_8.

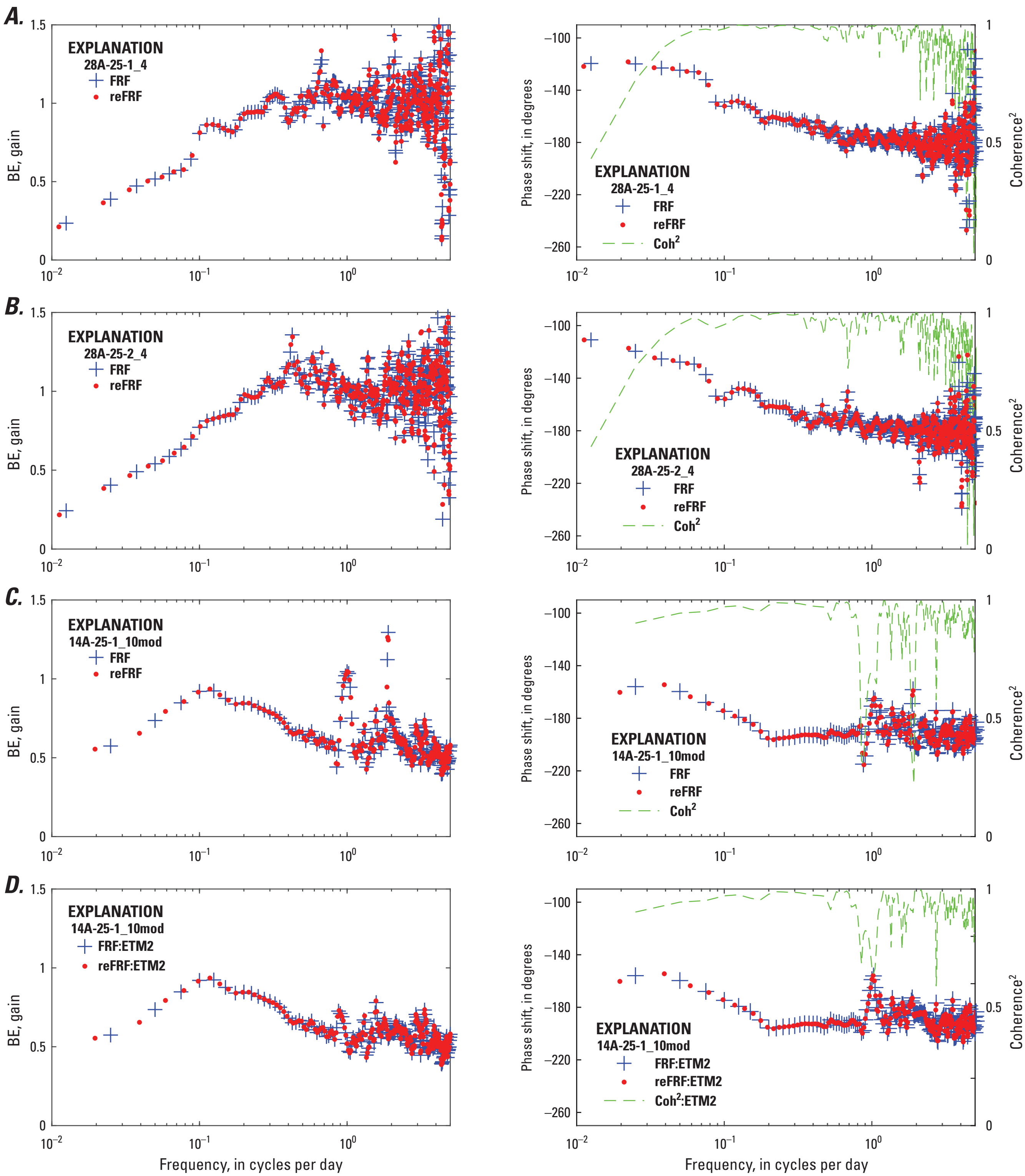


Figure 2–13. Computed atmospheric-loading frequency responses of water levels in terms of barometric efficiency (BE), phase shift, and squared coherence (Coh^2 for FRF, and Coh^2:ETM2 for FRF:ETM2) for selected, detrended, parsed time series for wells 28A-25-1, 28A-25-2 and 14A-25-1 in the area of Mammoth Lakes, California. For the parsed series from the 28A-25 wells, two frequency response functions are shown for each well, one based on the original sampling rate (FRF) and another based on the resampled rate (reFRF). For the parsed series from well 14A-25-1, the responses at the original and resampled rates are shown for both the tidally unfiltered (FRF, reFRF) and the M_2-scaled, tidally filtered (FRF:ETM2, reFRF:ETM2) time series. *A*, 28A-25-1_4, from May 18 to August 15, 2016, FRF, reFRF, and Coh^2; *B*, 28A-25-2_4, from May 19 to August 16, 2016, FRF, reFRF, and Coh^2; *C*, 14A-25-1_10mod, from October 9 to November 29, 2017, FRF, reFRF, and Coh^2; and *D*, 14A-25-1_10mod, from October 9 to November 29, 2017, FRF:ETM2, reFRF:ETM2, and Coh^2:ETM2.

The predicted time-domain responses of water levels to atmospheric loading were computed using the four frequency response functions models, FRF, reFRF, FRF:ETM2, and reFRF:ETM2. For each well, the predicted time-domain water-level responses were computed for each parsed series analyzed using the FRF and reFRF models. For 14A-25-1, predicted time-domain water-level responses were also computed for each parsed series analyzed using the FRF:ETM2 and reFRF:ETM2 models. The predicted time-domain responses were computed by taking the inverse discrete Fourier transform of $Y(\omega)$ in equation 2–26 for the different frequency response function models as follows:

$$\begin{aligned}
\hat{y}_{frfbp}(t) &= \mathrm{Re}\left(ifft\left(Y_{ftfbp}(\omega)\right)\right) \\
\hat{y}_{refrfbp}(t) &= \mathrm{Re}\left(ifft\left(Y_{reftfbp}(\omega)\right)\right) \\
\hat{y}_{frfbp:etM2}(t) &= \mathrm{Re}\left(ifft\left(Y_{ftfbp:etM2}(\omega)\right)\right) \\
\hat{y}_{refrfbp:etM2}(t) &= \mathrm{Re}\left(ifft\left(Y_{reftfbp:etM2}(\omega)\right)\right)
\end{aligned} \qquad (2–30)$$

where

$Y_{frfbp}(\omega)$ is the transformed water-level response from the FRF model,

$Y_{refrfbp}(\omega)$ is the transformed water-level response from the reFRF model,

$Y_{frfbp:etM2}(\omega)$ is the transformed water-level response from the FRF:ETM2 model,

$Y_{refrfbp:etM2}(\omega)$ is the transformed water-level response from the reFRF:ETM2 model,

$ifft$ is the inverse Fourier transform operator,

Re is the real part of the complex-valued argument,

$\hat{y}_{frfbp}(t)$ is the predicted time-domain water-level response for the FRF model,

$\hat{y}_{refrfbp}(t)$ is the predicted time-domain water-level response for the reFRF model,

$\hat{y}_{frfbp:etM2}(t)$ is the predicted time-domain water-level response for the FRF:ETM2 model, and

$\hat{y}_{refrfbp:etM2}(t)$ is the predicted time-domain water-level response for the reFRF:ETM2 model.

Digitally Filtered Water-Level Time Series

The predicted water-level responses (eqn. 2–30) computed using the FRF, reFRF, FRF:ETM2 and reFRF:ETM2 models were used to digitally filter atmospheric-loading responses from the detrended water levels (fig. 2–1, box k). The filtered, detrended water levels were computed using equation 2–31:

$$\begin{aligned}
\tilde{y}_{frfbp}(t_j) &= y(t_j) - \hat{y}_{frfbp}(t_j) \\
\tilde{y}_{refrfbp}(t_j) &= y(t_j) - \hat{y}_{refrfbp}(t_j) \\
\tilde{y}_{frfbp:etM2}(t_j) &= y(t_j) - \hat{y}_{frfbp:etM2}(t_j) \\
\tilde{y}_{refrfbp:etM2}(t_j) &= y(t_j) - \hat{y}_{refrfbp:etM2}(t_j)
\end{aligned} \qquad (2–31)$$

where

$\tilde{y}_{frfbp}$ is the filtered, detrended water-level time-series computed using the predicted time-domain water-level response from the FRF model;

$\tilde{y}_{refrfbp}$ is the filtered, detrended water-level time-series computed using the predicted time-domain water-level response from the reFRF model;

$\tilde{y}_{frfbp:etM2}$ is the filtered, detrended water-level time-series computed using the predicted time-domain water-level response from the FRF:ETM2 model; and

$\tilde{y}_{refrfbp:etM2}$ is the filtered, detrended water-level time-series computed using the predicted time-domain water-level response from the reFRF:ETM2 model.

Detrended, Parsed Time Series

Figure 2–14 shows examples of filtered results $\tilde{y}_{frfbp}$ (or ytFRF) and $\tilde{y}_{refrfbp}$ (or ytreFRF) for the FRF and reFRF models, respectively, and detrended depth-to-water (WL) and barometric-pressure (BP) time series for the detrended, parsed time series 28A-25-1_1 and _9, 28A-25-2_1, and _5, and 14A-25-1_9; filtered results $\tilde{y}_{frfbp:etM2}$ (or ytFRF:ETM2) and $\tilde{y}_{refrfbp:etM2}$ (or ytreFRF:ETM2) for the FRF:ETM2 and reFRF:ETM2 models, respectively, are also shown for the detrended, parsed time series 14A-25-1_9. Also shown in each plot is the filtered result ytrescBE or ytetrescBE for the resampled time series using a constant (frequency-independent) BE equal to the estimated static-confined BE (rescBE for the tidally unfiltered series and etrescBE for the M_2-scaled, tidally filtered series) for each time series. The static-confined BE estimates were computed from the mean of the BEs for the respective frequency response function with γ^2 (squared coherence) values greater than 0.85 at the resampled frequencies greater than 3 cpd, and its value is shown in the explanation of each plot. Filtered results for all the detrended series for which frequency response functions were computed (table 2–6; indicated by series numbers in ***bold-italic*** font in table 2–1), and the full parsed series affected by nearby drilling (28A-25-2_7) and the flow test in geothermal well 14-25 (14A-25-1_10) (indicated by series numbers in underline font in table 2–1), are given in Galloway (2019). The filtered, detrended water levels given in Galloway (2019) for wells 28A-25-1 and 28A-25-2, respectively, are ytreFRF computed using the reFRF atmospheric loading model. The filtered, detrended, water levels given in Galloway (2019) for well 14A-25-1 are ytreFRF:ETM2 computed using the reFRF:ETM2 atmospheric loading model.

Generally, the filtered results from the frequency response functions were acceptable, reducing variability in the resampled frequency-dependent filtered series compared with filtered results using constant BEs. In the well 14A-25-1 tidally filtered series, the variability was reduced by factors between 2.1 (14A-25-1_5) and 19.1 (14A-25-1_1), and in the wells 28A-25-1 and 28A-25-2 series, variability was reduced by factors between 47.6 (28A-25-1_9) and 4.8 (28A-25-2_7modA). The filters generally performed less well at the ends (“heads” and “tails”) of the parsed series, where there was some spectral leakage owing to depiction of the boundaries of the finite time series in the modeled frequency domain. Nevertheless, the heads and tails of the filtered results for each parsed time series were retained.

Next, for those parsed series presumed affected by nearby drilling or flow testing (28A-25-2_7 and 14A-25-1_10), the computed frequency response functions for the parts of those parsed series that were presumed affected mostly by atmospheric loading (28A-25-2_7modA) and by atmospheric loading and Earth tides (14A-25-1_10mod) were used to filter the responses to atmospheric loading. The tidally unfiltered parsed series was used to compute the frequency response functions for 28A-25-2_7mod, and the M_2-scaled, tidally filtered parsed series was used to compute the frequency response functions for 14A-25-1 _10mod. Figure 2–15 shows the filtered results for time series 28A-25-2_7, which was influenced by nearby drilling beginning around noon on Oct. 10, 2017 (dd 1014). The filtered water levels computed using both the frequency-dependent BE filter (reFRF) and the constant BE filter (rescBE = 0.995) for this series retained almost all the high-frequency peak water-level variations attributed to the effects of nearby drilling. A secondary peak effect from nearby drilling was also evident in the filtered results for Oct. 14, 2017 (dd 1018), and many smaller peaks were evident for Oct. 10–14. 2017 (dd 1014–1018), Oct. 15, 2017 (dd 1019), Oct. 23, 2017 (dd 1027), and Nov. 28, 2017 (dd 1063).

Figure 2–16 shows the digitally filtered results for time series 14A-25-1_10, which were influenced by flow testing (fluid withdrawal) of the nearby 14-25 production well that began around noon on Aug. 26, 2017 (dd 969), and stopped around noon on Sep. 22, 2017 (dd 996). The filtering process effectively removed the effects of Earth tides and atmospheric loading from the detrended series. The filtered water levels computed using both the frequency-dependent BE filter (reFRF:ETM2) and the constant BE filter (etrescBE = 0.590) derived from parsed series 14A-25-1_10mod retained almost all the high-frequency peak water-level variations attributed to the flow test. The detrended, filtered water levels showed a period of declining water-level elevation (or increasing depth-to-water level) following an initial increase of about 8 cm in water-level elevation (or 8 cm decrease in the depth-to-water level) at the onset of flow testing. The decline continued to about 8 cm of water-level elevation decrease (or 8 cm of depth-to-water level increase) since just prior to the onset of pumping, until production was unexpectedly stopped early on Sept. 19, 2017 (dd 993), and resumed shortly thereafter. A 20-cm water-level elevation decrease (or 20 cm depth-to-water to level increase) accompanied the stoppage of production, and this was followed by a period of water-level recovery (increasing water-level elevation or decreasing depth-to-water level) to a level approximating the water level prior to the unexpected stoppage. Water-level elevations declined (or depth-to-water levels increased) slightly during the following days until production was stopped around noon on September 22, 2017 (dd 996). The increase and decrease in water-level elevations (or decrease and increase in depth-to-water levels) accompanying the onset and end of production, respectively, are considered ‘reverse water-level responses’ with respect to the expected decrease and increase in water level elevations (or increase and decrease in depth-to-water levels) in response to the onset and end of production, respectively, from an aquifer system. The periods of water-level elevation decline and increase (depth-to-water level increase and decrease) following equilibration of the reverse water-level responses accompanying the period of production and the period following the cessation of production, respectively, were consistent with the expected response of an aquifer system subject to the onset and end of production.

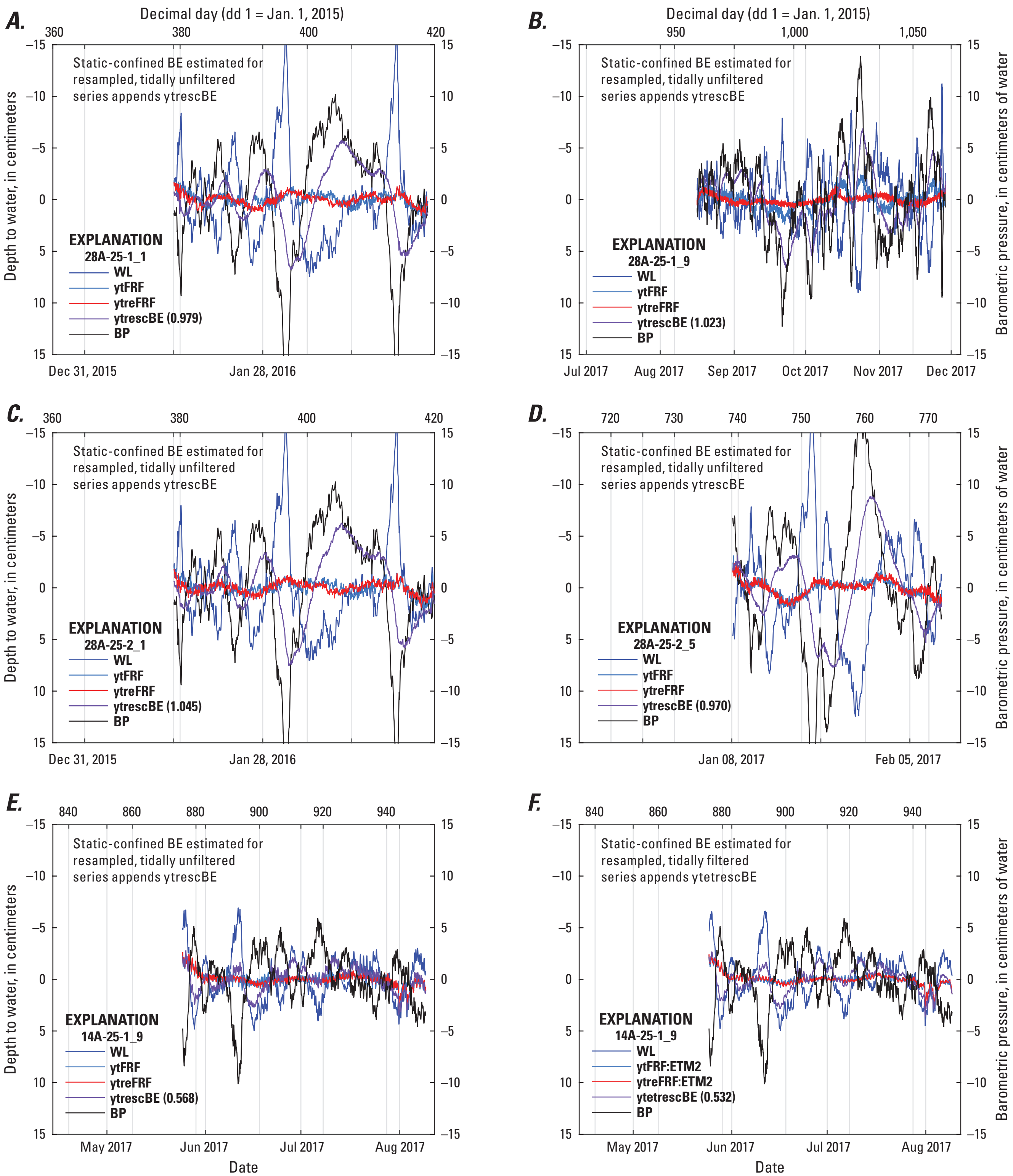


Figure 2–14. Filtered, detrended, parsed water-level time series shown with detrended water level (WL) and barometric pressure (BP) for parsed time series 28A-25-1_1 during January 14–February 22, 2016, 28A-25-1_9 during August 16–November 28, 2017, 28A-25-2_1 during January 14–February 23, 2016, 28A-25-2_5 during January 8–February 10, 2017 and 14A-25-1_9 during May 24–August 9, 2017, from wells 28A-25-1, 28A_25-2, and 14A-25-1 in the area of Mammoth Lakes, California: *A*, 28A-25-1_1, filtered time series ytFRF, ytreFRF, and ytrescBE; *B*, 28A-25-1_9, filtered time series ytFRF, ytreFRF, and ytrescBE; *C*, 28A-25-2_1, filtered time series ytFRF, ytreFRF, and ytrescBE; *D*, 28A-25-2_5, filtered time series ytFRF, ytreFRF, and ytrescBE; *E*, 14A-25-1_9, filtered time series ytFRF, ytreFRF, and ytrescBE; and *F*, 14A-25-1_9, filtered time series ytFRF:ETM2, ytreFRF:ETM2, and ytetresceBE.

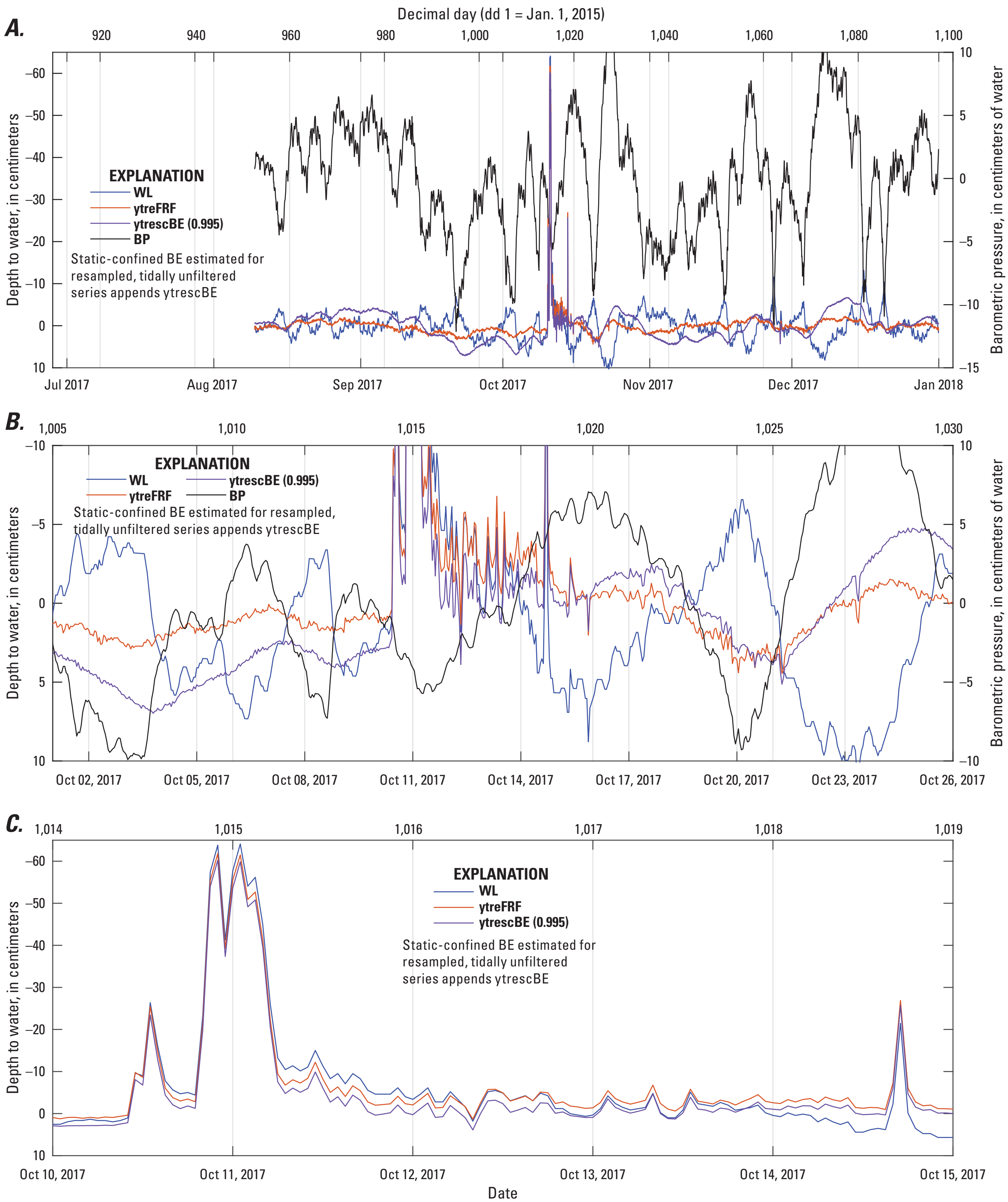


Figure 2–15. Filtered, detrended, parsed water-level time series ytreFRF and ytresceBE computed using the frequency response function model reFRF, and the static-confined barometric efficiency rescBE, respectively, shown with detrended, parsed water level (WL) and barometric pressure (BP) for parsed time series 28A-25-2_7, August 9–October 10, 2017, from well 28A-25-2 in the area of Mammoth Lakes, California, for a period influenced by nearby drilling: *A*, Filtered time series ytreFRF and ytrescBE shown with WL and BP for full length of parsed series; *B*, Filtered time series ytreFRF and ytrescBE shown with WL and BP for 25 days of parsed series bracketing the period influenced by nearby drilling; and *C*, Filtered time series ytreFRF and ytrescBE shown with WL and BP for 5 days of parsed series during the period influenced by nearby drilling.

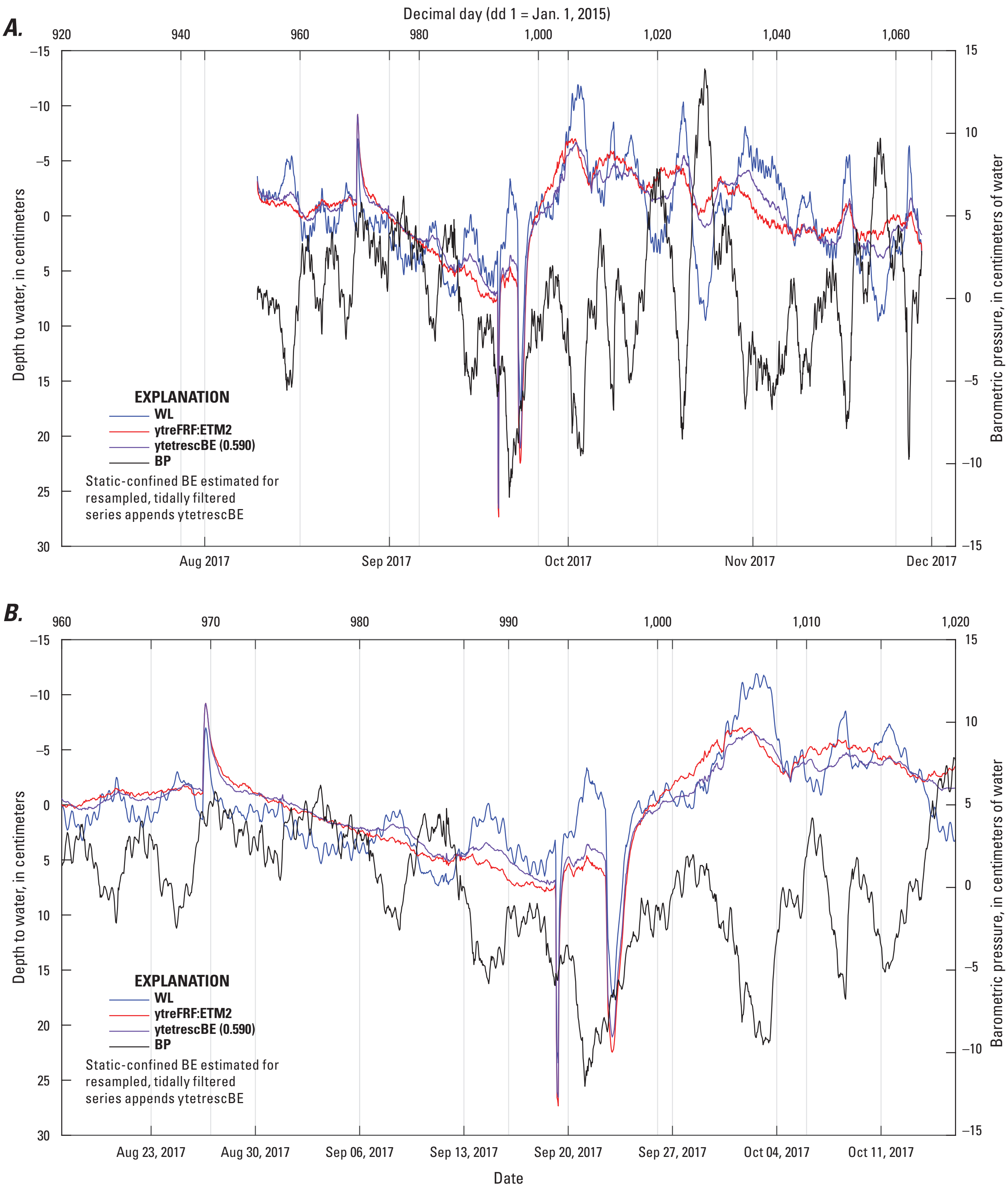


Figure 2–16. Filtered, detrended, parsed water-level time series ytreFRF:ETM2 and ytetrescBE, filtered using the frequency response function model reFRF:ETM2, and the estimated static-confined barometric efficiency etrescBE, respectively, shown with detrended, parsed water level (WL) and barometric pressure (BP) for parsed time series 14A-25-1_10, August 9–November 29, 2017, from well 14A-25-1 in the area of Mammoth Lakes, California, for a period influenced by flow testing in the nearby 14-25 production well: *A*, Filtered time series ytreFRF:ETM2 and ytetrescBE shown with WL and BP for full length of parsed series; and *B*, Filtered time series ytreFRF:ETM2 and ytetrescBE shown with WL and BP for 60 days of parsed series bracketing the period influenced by flow testing.

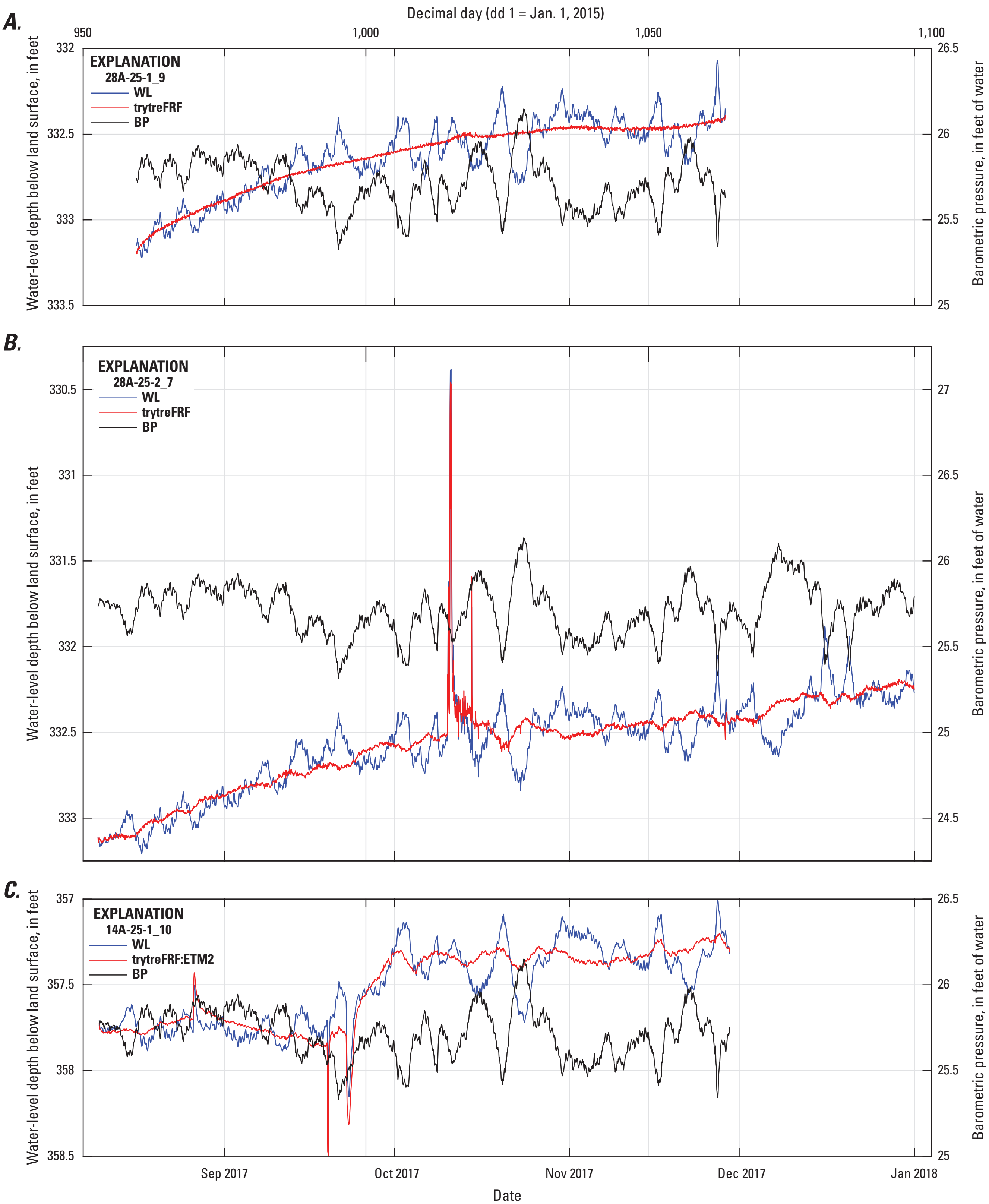


Figure 2–17. Reconstructed, digitally filtered water-levels trytreFRF or trytreFRF:ETM2 shown with water-level (WL) and barometric-pressure (BP) for parsed time series from wells 28A-25-1, 28A-25-2, and 14A-25-1 in the area of Mammoth Lakes, California, for the period influenced by the flow test in production well 14-25: *A*, 28A-25-1_9, August 16–November 28, 2017, trytreFRF shown with WL and BP; *B*, 28A-25-2_7, August 9–December 31, 2017, trytreFRF shown with WL and BP; and *C*, 14A-25-1_10, August 9–November 29, 2017, trytreFRF:ETM2 shown with WL and BP.

Reconstructed, Parsed Time Series

The trends removed to create the detrended time series were restored (added back) to the detrended, digitally filtered water-level time series computed using the reFRF and reFRF:ETM2 frequency response models to produce reconstructed filtered water-level time series (fig. 2–1, box l). Figure 2–17 shows an example of the reconstructed time series trytreFRF for parsed series 28A-25-1_9 and 28A-25-2_7, and trytreFRF:ETM2 for parsed series 14A-25-1_10 for the period that includes the flow test. Note, ‘tr’ prepended to ytreFRF and ytreFRF:ETM2 denotes the trend restored to the detrended filtered series computed using the reFRF and reFRF:ETM2 frequency response models, respectively. The water-level data are shown in units of feet of water for the corresponding calendar dates. Barometric pressure (in equivalent feet of water) from the barometer at site 28A-25 is shown with the 28A-25-2_7 reconstructed series. The responses, in terms of reconstructed filtered water levels in wells 28A-25-1, 28A-25-2, and 14A-25-1, to the flow test in production well 14-25 is discussed in more detail in the “Water-Level Variations During a Flow Test of a Geothermal Production Well” section of the report. Reconstructed, digitally filtered results for each of the selected parsed series shown in table 2–1 indicated by parsed series numbers in ***bold-italic*** and underline fonts are given in Galloway (2019).

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Appendix 3. Water-Temperature Profiles for Wells in the Vicinity of Mammoth Lakes, California, 2015–17

Table 3–1. Vertical water-temperature profiles for well 14A-25-1, Mammoth Lakes, California, 2016–17.

Depth in feet below top of casing	Temperature in degrees Celsius							
	Feb 2016	May 2016	Aug 2016	Dec 2016	Feb 2017	May 2017	Aug 2017	Nov 2017
[1]360	61.8	61.7	61.7	62.8	62.8	62.8	62.6	62.4
370	63.6	63.5	63.7	64.3	64.2	64.5	64.4	64.6
380	65.3	65.2	65.4	66.0	65.9	65.9	66.2	66.1
390	67.7	67.6	67.7	68.2	68.1	67.8	67.8	67.8
400	69.9	69.7	69.8	70.0	70.0	69.7	69.5	69.8
410	71.9	71.8	71.9	71.8	71.8	71.7	71.3	71.7
420	73.9	73.7	73.8	73.6	73.6	73.5	73.6	73.4
430	75.6	75.4	75.5	75.3	75.3	75.1	75.2	75.2
440	77.1	76.9	76.9	77.1	77.1	76.9	76.9	77.0
450	78.0	77.8	77.8	77.6	77.6	77.5	77.4	77.5
460	78.4	78.4	78.1	77.9	77.9	77.7	77.7	77.7
470	78.9	78.9	78.7	78.5	78.4	78.2	78.1	78.2
480	79.2	79.2	78.9	78.7	78.5	78.5	78.4	78.4
490	79.9	79.8	79.6	79.4	79.3	79.1	79.1	79.1
500	84.2	84.2	84.2	84.1	83.8	83.6	83.5	83.5
510	86.7	86.9	87.1	87.0	86.7	86.4	86.4	86.3
520	89.4	89.4	89.6	89.6	89.4	89.2	89.1	89.1
530	92.0	92.1	92.3	92.2	92.0	91.9	91.8	91.8
540	94.5	94.4	94.6	94.7	94.4	94.2	94.1	94.2
550	96.7	96.7	96.8	96.8	96.6	96.5	96.3	96.5
560	99.0	98.6	98.9	98.8	98.7	98.5	98.4	98.7
570	102.4	100.6	100.8	100.8	100.5	100.5	100.3	100.6
580	104.6	102.3	102.5	102.5	102.3	102.2	102.1	102.2
590	106.5	103.7	104.1	104.0	103.7	103.7	103.6	103.7
600	106.9	104.6	106.5	104.6	104.7	104.5	104.4	104.6

[1]Subtract 1.7 feet to convert to depth in feet below land surface.

Table 3–2. Vertical water-temperature profiles for well 28A-25-1, Mammoth Lakes, California, 2016–17.

Depth in feet below top of casing	Temperature in degrees Celsius							
	Feb 2016	May 2016	Aug 2016	Dec 2016	Feb 2017	May 2017	Aug 2017	Nov 2017
[1]340	46.1	45.9	45.9	45.8	45.9	46.1	—[2]	44.6
350	46.8	46.9	47.0	46.9	46.9	46.9	—	45.6
360	47.3	47.4	47.5	47.4	47.4	47.4	—	46.0
370	47.8	47.7	47.9	47.8	47.8	47.8	—	46.4
380	47.9	47.9	48.3	48.1	48.2	48.1	—	46.9
390	48.4	48.4	48.7	48.5	48.5	48.4	—	47.5
400	48.4	48.7	49.0	48.8	48.8	48.8	—	48.0
410	49.0	49.1	49.2	49.1	49.2	49.1	—	48.6
420	49.4	49.2	49.5	49.4	49.5	49.4	—	49.1
430	49.7	49.6	49.8	49.8	49.8	49.7	—	49.6
440	50.0	50.0	50.1	50.1	50.0	49.9	—	49.9
450	50.3	50.4	50.5	50.4	50.4	50.3	—	50.2
460	50.5	50.8	50.8	50.8	50.8	50.7	—	50.6
470	50.7	51.2	51.3	51.2	51.1	51.1	—	51.1
480	51.5	51.7	51.7	51.7	51.6	51.5	—	51.5
490	52.0	52.0	52.1	52.0	51.9	52.0	—	51.8
500	52.3	52.4	52.5	52.5	52.4	52.3	—	52.2
510	52.6	52.7	52.8	52.7	52.7	52.6	—	52.5
520	52.9	52.9	53.0	52.9	52.9	52.9	—	52.8
530	53.1	53.1	53.2	53.1	53.1	53.0	—	53.0
540	53.2	53.2	53.3	53.2	53.3	53.1	—	53.1
550	53.1	53.2	53.2	53.2	53.1	53.1	—	53.1
560	53.1	53.2	53.2	53.1	53.0	53.0	—	53.0
570	53.1	53.1	53.5	53.1	53.1	53.0	—	52.9
580	53.0	53.0	53.2	53.0	53.1	52.9	—	53.0
590	52.9	53.0	53.1	52.9	52.9	52.8	—	52.9
600	52.8	52.8	52.9	52.9	52.9	52.8	—	52.8

[1]Subtract 2.0 feet to convert to depth in feet below land surface.

[2]No temperature log because of equipment malfunction.

For more information concerning the research in this report, contact the
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Howle and others—**Hydraulic, Geochemical, and Thermal Monitoring of an Aquifer System in the Vicinity of Mammoth Lakes, Mono County, California, 2015–17**—Open-File Report 2019–1063

July 10, 2019

Mr. Mark Busby, Interim General Manager
Mammoth Community Water District
1315 Meridian Blvd.
Mammoth Lakes, CA 93546

Subject: Review of the United States Geological Survey Open-File Report, "Hydraulic, Geochemical, and Thermal Monitoring of an Aquifer System in the Vicinity of Mammoth Lakes, Mono County, California, 2015-17" in Relationship to the Casa Diablo IV Project and the Bureau of Land Management's CD-IV Geothermal Development Project Groundwater Monitoring and Response Plan

Dear Mr. Busby:

Per your request, Wildermuth Environmental, Inc. (WEI) reviewed the United States Geological Survey's (USGS) 2019 open-file report titled, "Hydraulic, Geochemical, and Thermal Monitoring of an Aquifer System in the Vicinity of Mammoth Lakes, Mono County, California, 2015-17."[1] This report was released about one year after WEI issued the letter report, "Groundwater Quality Monitoring West of the CD-IV Geothermal Area, Long Valley Caldera, California"[2] to the Mammoth Community Water District (MCWD) in 2018. The purpose of this letter is to summarize the Casa Diablo IV Project's (CD-IV) Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR) position regarding separation between the shallow cold groundwater aquifer and the deep geothermal reservoir, re-iterate the key concerns and findings from the WEI 2018 report,

[1] Howle, J.F., Evans, W.C., Galloway, D.L., Hsieh, P.A., Hurwitz, S., Smith, G.A., and Nawikas, J. (2019). *Hydraulic, geochemical, and thermal monitoring of an aquifer system in the vicinity of Mammoth Lakes, Mono County, California, 2015-17*: U.S. Geological Survey Open-File Report 2019-1063, 90 p., https://doi.org/10.3133/ofr20191063.

[2] Wildermuth Environmental, Inc. (2018). *Groundwater quality monitoring west of the CD-IV geothermal area, Long Valley Caldera, California*. Lake Forest, CA: Author.

and supplement the key concerns and findings in the WEI 2018 report with observations and conclusions from the newly published USGS report.

Background

Potential Impacts of Casa Diablo IV Project on MCWD Water Supplies

Up to sixteen geothermal wells (two existing and fourteen new) are operational or proposed for the CD-IV Project. Fourteen of the wells would be located in the Basalt Canyon area and two wells would be located southeast of proposed new power plant, east of U.S. Highway 395. Figure 1 shows the locations of the existing and proposed new Basalt Canyon geothermal wells. The CD-IV Project would have the following impacts:

1) The CD-IV Project would place new stresses on the region's complex hydrologic system.
2) The CD-IV Project's proposed new wells and associated pumping would be located about two miles from MCWD's well field.
3) The CD-IV Project may reduce the supply of groundwater necessary for public water system use available to the MCWD from the Mammoth Groundwater Basin and may degrade the water quality of waters in the shallow groundwater aquifer used by the MCWD. These deleterious changes in the groundwater available to the MCWD may not become apparent immediately after the start of CD-IV Project operations and could take several years to manifest themselves in groundwater monitoring data or become evident more quickly during a multi-year drought. The seepage volume from the shallow groundwater aquifer to the geothermal reservoir probably could appear to be comparatively small and unnoticeable to ORNI 50, LLC (the project developer), and at the CD-IV well field, but could be significantly large to the MCWD and the Town of Mammoth Lakes.

CD-IV Project EIS/EIR Assessment Regarding Separation Between the Shallow Groundwater Aquifer System and the Deep Geothermal Reservoir

One of the fundamental determinations in the CD-IV Project EIS/EIR dated June 2013 was that the available geologic and geochemical data indicated that the shallow groundwater aquifer used by the MCWD was physically separated and completely isolated from the deeper geothermal reservoir from which the CD-IV Project would pump geothermal fluids. The EIS/EIR describes a physical geologic barrier separating the shallow groundwater aquifer from the deeper geothermal reservoir as a thick, low-permeability section of altered Early Rhyolite to mostly impermeable clays. Statements in the EIS/EIR regarding alleged physical separation and complete isolation between the shallow groundwater aquifer and deeper geothermal reservoir are summarized in the table below. Based on the determination that the deeper geothermal reservoir is physically separated from the overlying shallow groundwater aquifer by an impermeable layer, the EIS/EIR disregarded the potential impacts of the proposed CD-IV Project on the overlying shallow groundwater aquifer and did not include any monitoring or mitigation measures to protect this aquifer from any stresses that may be caused by the project's new, additional geothermal pumping.

EIS/EIR Statements Regarding Separation Between the Shallow Groundwater Aquifer and the Deep Geothermal Reservoir	Page Number*
These cold groundwater aquifers are separated from the deeper hotter geothermal system by either intense alteration of thick ash-rich Early Rhyolite units in the western caldera or low permeability rocks of a landslide that slid into the south central part of the caldera at the end of the catastrophic collapse of the caldera 760,000 years ago.	D-25
Because the shallow cold groundwater system and the deeper geothermal system are physically separated from the principal supply aquifers of the western Mammoth Groundwater Basin, geothermal production from the project is not expected to adversely affect the water quality in MCWD wells through either depleting the aquifer or by drawing in lower quality waters because of pressure declines.	D-27
Unlike Casa Diablo, **shallow aquifers in the Basalt Canyon area are physically separated by thick sections of *impermeable* to very low permeability rocks** (landslide block and altered Early Rhyolites) overlying the production reservoir.	D-36
To the west, **shallow cold groundwater aquifers are separated from the deeper geothermal reservoir** by thick ash-rich Early Rhyolite units.	D-42
Drilling results establish that **the shallow cold groundwater system is separated from potential geothermal influence by thick *impermeable* altered sections** of Early Rhyolite underlying shallow groundwater aquifers in shallow moat basalt units, glacial outwash or poorly consolidated alluvium/colluvium in the western caldera.	D-43
Separations between the deeper geothermal reservoir and shallow cold groundwater aquifers in the central Mammoth Groundwater Basin limit the potential for impacts to groundwater quality and quantity of supply.	D-46
The shallow cold groundwater aquifers farther west in the Mammoth Groundwater Basin are separated from the underlying geothermal system by thick altered and ***impermeable*** sections of ash-rich Early Rhyolite.	D-47

* "D" refers to Appendix D in the CD-IV Project EIS/EIR.

Bold and italicized font added to original text for emphasis.

USGS and WEI Assessment Regarding Separation Between the Shallow Groundwater Aquifer System and the Deep Geothermal Reservoir – *New Data Demonstrates Permeability – refuting basis of EIS/EIR upon which the CD-IV permit was issued*

In direct contrast to the EIS/EIR assessment regarding separation between the shallow groundwater aquifer system and the deep geothermal reservoir, water quality data collected by the USGS as part of the Bureau of Land Management's (BLM) CD-IV Groundwater Monitoring and Response Plan (GMRP), indicate that the shallow groundwater aquifer system from which the MCWD pumps water for its customers and the deep geothermal reservoir from which the CD-IV Project would pump geothermal fluids in fact have some hydraulic connectivity and are not "physically separated" from each other. Additionally, water level data collected and analyzed by the USGS from the dual-nested monitoring well 14A-25 as part of the GMRP indicate there is some hydraulic connection between the shallow groundwater aquifer and deep geothermal reservoir near 14A-25 and ORNI's 14-25 geothermal production well.

To help document the contrast between the EIS/EIR's and the USGS/WEI's assessment regarding separation of the shallow groundwater aquifer from the deep geothermal reservoir, the table below includes a brief description of the data analyzed by the USGS at specific sites or areas and includes supporting statements from the USGS' 2019 report confirming there is some hydraulic connection between the two systems. Figure 1 shows the locations of the specific sites discussed in the table.

Site(s)	Data Observation(s)	USGS Statement(s)	Page Number
MCWD-16, 17, and -20	Warmer temperature production wells. Chloride concentrations are elevated in MCWD-17.	The elevated chloride in water from well P17, together with its warmer water temperature than in other MCWD production wells**, indicated that the well taps a source of thermal water rich in chloride.**	24
MCWD-26, 14A-25 (both wells), 28A-25 (both wells)	Warmer temperature monitoring wells.	The above-normal water temperatures in monitoring wells M26, 14A-25-1, 14A-25-2, 28A-25-1 and 28A-25-2 **were indicative of geothermal influence.**	24
MCWD-17, MCWD-26, 28A-25 (both wells)	Conservative element chemistry.	Conservative elements in water-chemistry data showed that MCWD production well P17 and monitoring wells M26 and 28A-25 (both depths) contained a small percentage of thermal water, **which was consistent with a limited hydraulic connection between the shallow non-thermal and deep geothermal systems along the northern periphery of the study area.**	40
14A-2501	Water-level response to the ORNI August to September 2017 Flow Test.	This drawdown in the digitally filtered water-level data [14A-25-1] indicated that, near wells 14-25 and 14A-25-1, **there is some hydraulic connection between the deep geothermal aquifer and the shallow aquifer in the early rhyolite units.**	34

Bold font added to original text for emphasis.

The USGS neatly summarizes its report's findings in the last paragraph of the abstract:

> The digitally filtered water-level data indicated that some hydraulic communication exists between the deep geothermal aquifer and shallow groundwater aquifer at the location of the flow test, northeast of Mammoth Lakes. Groundwater-chemistry data from three wells indicated that shallow groundwater naturally mixes with a small component of geothermal water along the northern periphery of the shallow aquifer system at Mammoth Lakes.

The data collected and analyzed from the MCWD production and monitoring wells and the dual-nested monitoring wells (14A-25 and 28A-25) between 2015 and 2017 by the USGS provide important new information regarding the water levels, temperature, and geochemistry data from these wells. As stated in the WEI (2018) report and validated in the USGS (2019) report, the data and analyses performed by the USGS as part of the GMRP indicate that **some degree of mixing between geothermal fluids and non-geothermal water is occurring.** Also, the determination in the EIS/EIR that the Early Rhyolite forms an impermeable barrier that physically separates and completely isolates the shallow groundwater aquifer from the deep geothermal **reservoir is not supported by the data collected and analyzed by the USGS.** *The new data also demonstrate the potential existential hazards to the overlying shallow groundwater aquifer (water quality degradation and reduction in sustainable groundwater yield) from the proposed CD-IV Project and the binary nature of the threat.*

The CD-IV GMRP, the MCWD's Recommendations to the GMRP, and Other MCWD Concerns with the CD-IV Project

In an effort to address its concerns regarding the CD-IV Project and the potential hazards to the overlying shallow groundwater aquifer, the MCWD submitted comments on the BLM's draft GMRP on December 28, 2016. On January 13, 2017, the BLM approved the GMRP (Version 1.0). On January 19, 2018 the BLM re-issued the GMRP as Version 1.1. Although minor revisions to the GMRP were made in Versions 1.0 and 1.1 based on the MCWD's comments, the existing GMRP Version 1.1 does not address the substance of the MCWD's concerns with the CD-IV Project. To summarize the MCWD's major comments on the GMRP, there are three major requirements it believes must be included in the GMRP to ensure that it is robust and will address any likely impacts from the CD-IV Project's operations before they become irreversible. They are:

1) Drilling, instrumenting, and monitoring an additional deep geothermal (BLM2) and shallow monitoring well pair;
2) Collecting and analyzing data from the BLM2 site over a period of at least 18 months to establish a baseline dataset before CD-IV Project operations begin; and,

3) Establishing action thresholds that define when the BLM must impose modifications on CD-IV production and injection operations based on monitoring results that will avoid irreversible impacts to the quantity and quality of water supplies in the shallow groundwater aquifer from which the MCWD obtains a portion of its water supplies.

Deep geothermal pressure monitoring at the BLM2 site provides the BLM, ORNI, and MCWD with the earliest detection of changes in geothermal and near or below the aquifer used by the MCWD for the Town's water supply, particularly in dry years when it is the only reliable source. Likewise, a deep geothermal monitoring well with a nested shallow and intermediate depth monitoring wells would also serve to assess the vertical gradient between the shallow cold groundwater system and the deep geothermal system nearest the MCWD production well field. Without this network of shallow, intermediate, and deep monitoring wells, it will be very difficult, if not impossible, to detect any problems that might be caused by the CD-IV Project (i.e., degradation in water quality or loss of supply due to leakage) in the MCWD's water supply wells before it is too late to remedy the problem. Understanding the connectivity between the two systems has important implications on clearly assessing attribution and to design appropriate and fair mitigation measures. The monitoring data collected at the BLM2 site is crucial to determining how the CD-IV well field can be operated without impacting the aquifer used by the MCWD for the Town's water supply.

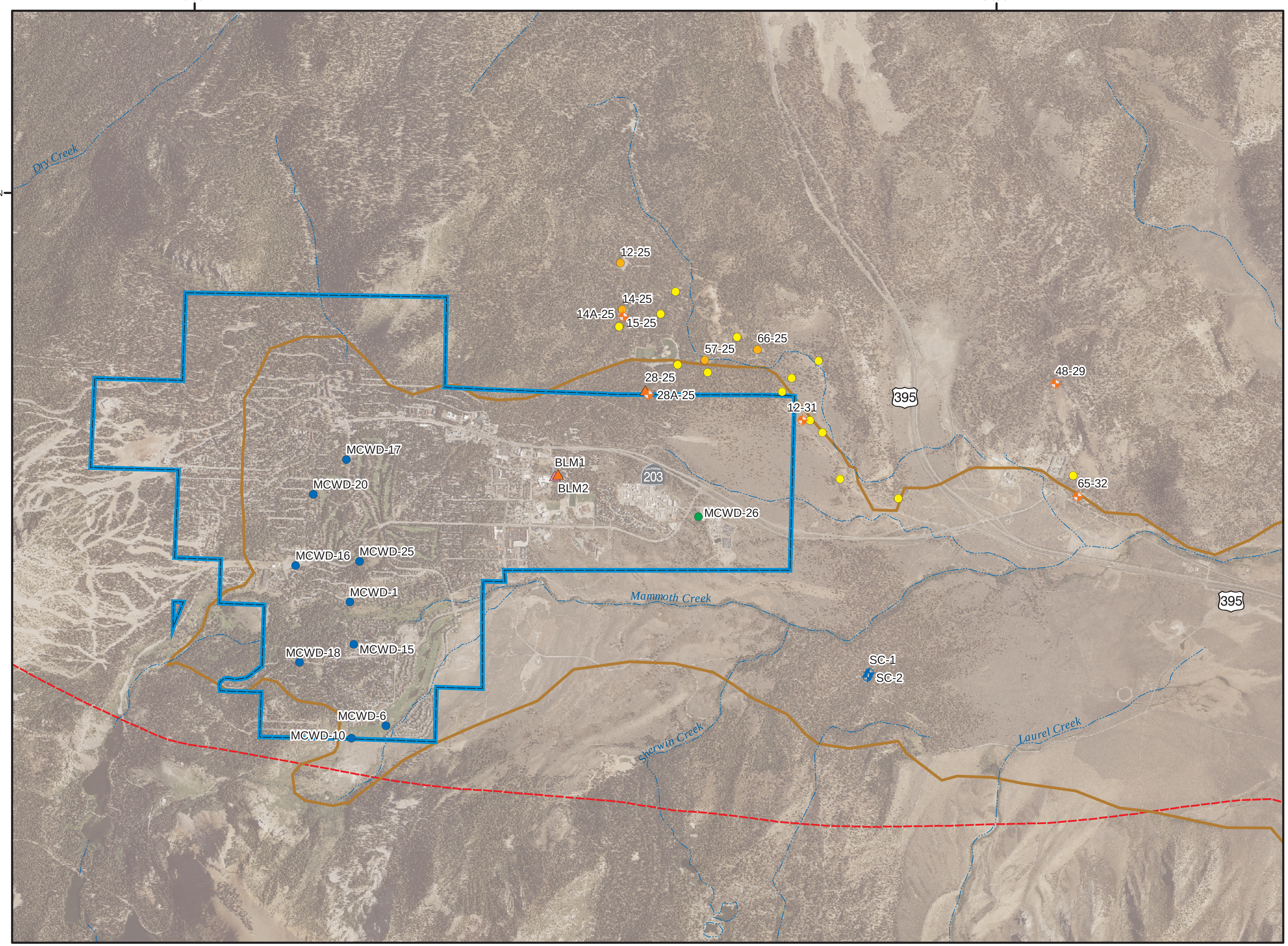
Wildermuth Environmental, Inc.

Mark J. Wildermuth, PE
President

Michael A. Blazevic, PG, CHG
Supervising Geologist

Encls.:

Figure 1: CD-IV Project and MCWD Well Locations

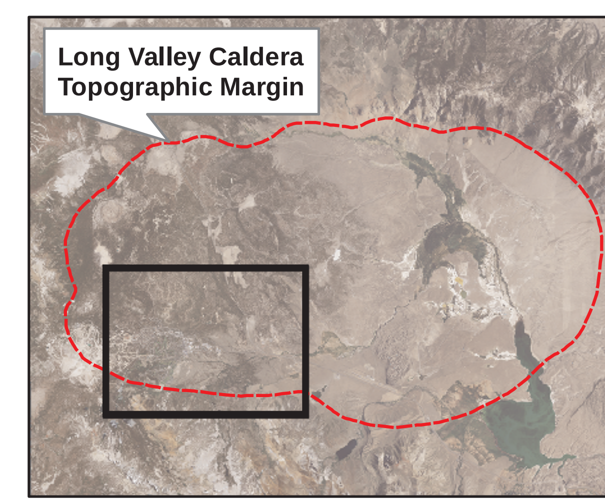


Explanation

- MCWD Monitoring Well
- MCWD Production Well
- USGS Monitoring Well
- Ormat Geothermal Monitoring Well
- Existing Geothermal Production Well*
- CD-IV Project Proposed Geothermal Well
- BLM Dual Completion Monitoring Well
- BLM Geothermal Monitoring Well (Prospective)

**Geothermal wells 12-25 and 14-25 are likely to become production or injection wells once the CD-IV project comes on-line.*

- Caldera Topographic Margin
- WEI (2009) Mammoth Groundwater Basin
- MCWD Service Area



WEI
Wildermuth Environmental, Inc.

Author: MAB
Date: 7/10/2019
Document Name: 20190710_MCWD_OrmatWells11x17

N
0 1 2 Miles
0 1 2 Kilometers

CD-IV Project and MCWD Well Locations

Figure 1

AGENDA ITEM

Subject: Discussion of the Status of the Administration Building Needs Assessment and Possible Direction to Staff Regarding Continuation of that Study

Information Provided By: Mark Busby, Interim General Manager

Background

In 2018 after discussions about noted deficiencies and aging equipment in the MCWD's existing Administration Building and the potential need for replacing or remodeling the existing building, the District budgeted for and then entered into a contract with Gillis+Panichapan Architects, Inc. (GPa) for a Needs Assessment of the existing Administration building.

Discussion

With recent changes in the District's management and at the direction of the Board, work on the Administration Building Needs Assessment has been placed on hold. A discussion is now needed to determine the value of completing the assessment or finding a stopping point at a place that captures some value for what the District has paid to date. The total not to exceed contract amount with GPa is for $52,800. Currently, MCWD has paid $16,435 with a balance due for work conducted to date of $10,145. To complete Stage 1 task of the contract, an assessment of the condition of the existing building, is estimated to be an additional $6,000.

See attached contract for work flow details and needs assessment methodology.

Fiscal Impact

Currently, MCWD has paid $16,435 with a balance due for work conducted to date of $10,145. To complete Stage 1 task of the contract, an assessment of the condition of the existing building, is estimated to be an additional $6,000. To complete all tasks would be an estimated additional amount of $26,220.

Requested Action

Direction to staff with regards to continuing work on with the Administration Building Needs Assessment contract.

Mammoth Community Water District
Services Agreement

THIS AGREEMENT is entered into as of the date last signed and dated below by and between Mammoth Community Water District, a local government agency ("District"), and Gillis + Panichapan Architects, a California Corporation ("Contractor"), who agree as follows:

1. Scope of Work. Contractor shall perform the work and render the services described in the attached Exhibit A (the "Work"). Contractor shall provide all labor, services, equipment, tools, material and supplies required or necessary to properly, competently and completely perform the Work. Contractor shall determine the method, details and means of doing the Work.

2. Payment.

a. District shall pay to Contractor a fee based on:

The fee arrangement described on the attached Exhibit A.

The total fee for the Work shall not exceed $52,800. There shall be no compensation for extra or additional work or services by Contractor unless approved in advance in writing by District. Contractor's fee includes all of Contractor's costs and expenses related to the Work.

b. At the end of each month, Contractor shall submit to District an invoice for the Work performed during the preceding month. The invoice shall include a brief description of the Work performed, the dates of Work, number of hours worked and by whom (if payment is based on time), payment due, and an itemization of any reimbursable expenditures. If the Work is satisfactorily completed and the invoice is accurately computed, District shall pay the invoice within 30 days of its receipt.

3. Term.

a. This Agreement shall take effect on the above date and continue in effect until completion of the Work, unless sooner terminated as provided below. Time is of the essence in this Agreement. If Exhibit A includes a Work schedule or deadline, then Contractor must complete the Work in accordance with the specified schedule or deadline, which may be extended by District for good cause shown by Contractor. If Exhibit A does not include a Work schedule or deadline, then Contractor must perform the Work diligently and as expeditiously as possible, consistent with the professional skill and care appropriate for the orderly progress of the Work.

b. This Agreement may be terminated at any time by District upon 10 days advance written notice to Contractor. In the event of such termination, Contractor shall be fairly compensated for all work performed to the date of termination as calculated by District based on the above fee and payment provisions. Compensation under this subsection shall not include any termination-related expenses, cancellation or demobilization charges, or lost profit associated with the expected completion of the Work or other such similar payments relating to Contractor's claimed benefit of the bargain.

4. Professional Ability of Contractor. Contractor represents that it is specially trained and experienced, and possesses the skill, ability, knowledge and certification, to competently perform the Work provided by this Agreement. District has relied upon Contractor's training, experience, skill, ability, knowledge and certification as a material inducement to enter into this Agreement. All Work performed by Contractor shall be in accordance with applicable legal requirements and meet the standard of care and quality ordinarily to be expected of competent professionals in Contractor's field.

5. Conflict of Interest. Contractor (including principals, associates and professional employees) represents and acknowledges that (a) it does not now have and shall not acquire any direct or indirect investment, interest in real property or source of income that would be affected in any manner or degree by the performance of Contractor's services under this agreement, and (b) no person having any such interest shall perform any portion of the Work. The parties agree that Contractor is not a designated employee within the meaning of the Political Reform Act and District's conflict of interest code because Contractor will perform the Work independent of the control and direction of the District or of any District official, other than normal contract monitoring, and Contractor possesses no authority with respect to any District decision beyond the rendition of information, advice, recommendation or counsel.

6. Contractor Records.

a. Contractor shall keep and maintain all ledgers, books of account, invoices, vouchers, canceled checks, and other records and documents evidencing or relating to the Work and invoice preparation and support for a minimum period of three years (or for any longer period required by law) from the date of final payment to Contractor under this Agreement. District may inspect and audit such books and records, including source documents, to verify all charges, payments and reimbursable costs under this Agreement.

b. In accordance with California Government Code section 8546.7, the parties acknowledge that this Agreement, and performance and payments under it, are subject to examination and audit by the California State Auditor for three years following final payment under the Agreement.

7. Ownership of Documents. All works of authorship and every report, study, spreadsheet, worksheet, plan, design, blueprint, specification, drawing, map, photograph, computer model, computer disk, magnetic tape, CAD data file, computer software and any other document or thing prepared, developed or created by Contractor under this Agreement and provided to District ("Work Product") shall be the property of District, and District shall have the rights to use, modify, reuse, reproduce, publish, display, broadcast and distribute the Work Product and to prepare derivative and additional documents or works based on the Work Product without further compensation to Contractor or any other party. Contractor may retain a copy of any Work Product and use, reproduce, publish, display, broadcast and distribute any Work Product and prepare derivative and additional documents or works based on any Work Product; provided, however, that Contractor shall not provide any Work Product to any third party without District's prior written approval, unless compelled to do so by legal process. If any Work Product is copyrightable, Contractor may copyright the same, except that, as to any Work Product that is copyrighted by Contractor, District reserves a royalty-free, nonexclusive and irrevocable license to use, reuse, reproduce, publish, display, broadcast and distribute the Work Product and to prepare derivative and additional documents or works based on the Work Product. If District reuses or modifies any Work Product for a use or purpose other than that intended by the scope of work under this Agreement, then District shall hold Contractor harmless against all claims, damages, losses and expenses arising from such reuse or modification. For any Work Product provided to District in paper format, upon request by District at any time (including, but not limited to, at expiration or termination of this Agreement), Contractor agrees to provide the Work Product to District in a readable, transferable and usable electronic format generally acknowledged as being an industry-standard format for information exchange between computers (e.g., Word file, Excel spreadsheet file, AutoCAD file).

8. Compliance with Laws.

a. General. Contractor shall perform the Work in compliance with all applicable federal, state and local laws and regulations. Contractor shall possess, maintain and comply with all federal, state and local permits, licenses and certificates that may be required for it to perform the Work. Contractor shall comply with all federal, state and local air pollution control laws and regulations applicable to the Contractor and its Work (as required by California Code of Regulations title 13, section 2022.1). Contractor shall be responsible for the safety of its workers and Contractor shall comply with applicable federal and state worker safety-related laws and regulations.

b. Pre- and Post-Construction Related Work.

(1) Applicability. This subsection (b) applies if the Work includes labor performed during the design and pre-construction phases of construction, including, but not limited to, inspection and land surveying work, and labor performed during the post-construction phases of construction, including, but not limited to, cleanup work at the jobsite. (See California Labor Code section 1720(a).) If the Work includes some labor as described in the preceding sentence and other labor that is not, then this subsection (b) applies only to workers performing the pre-construction and post-construction work.

(2) Contractor shall comply with the California Labor Code provisions concerning payment of prevailing wage rates, penalties, employment of apprentices, hours of work and overtime, keeping and retention of payroll records, and other requirements applicable to public works as may be required by the Labor Code and applicable state regulations. (See California Labor Code division 2, part 7, chapter 1 (sections 1720-1861), which is incorporated in this Agreement by this reference.) The state-approved prevailing rates of per diem wages are available at http://www.dir.ca.gov/oprl/DPreWageDetermination.htm. Contractor also shall comply with Labor Code sections 1775 and 1813, including provisions that require Contractor to (a) forfeit as a penalty to District up to $200 for each calendar day or portion thereof for each worker (whether employed by Contractor or any subcontractor) paid less than the applicable prevailing wage rates for any labor done under this Agreement in violation of the Labor Code, (b) pay to each worker the difference between the prevailing wage rate and the amount paid to each worker for each calendar day or portion thereof for which the worker was paid less than the prevailing wage, and (c) forfeit as a penalty to District the sum of $25 for each worker (whether employed by Contractor or any subcontractor) for each calendar day during which the worker is required or permitted to work more than 8 hours in any one day and 40 hours in any one calendar week in violation of Labor Code sections 1810 through 1815.

c. Maintenance of Public Facility, Plant or Structure.

(1) Applicability. This subsection (c) applies if the Work includes "maintenance" work. "Maintenance" means (a) routine, recurring and usual work for the preservation, protection and keeping of any District facility, plant, building, structure, utility system or other property ("District Facility") in a safe and continually usable condition, (b) carpentry, electrical, plumbing, glazing, touchup painting, and other craft work designed to preserve any District Facility in a safe, efficient and continuously usable condition, including repairs, cleaning and other operations on District machinery and equipment, and (c) landscape maintenance. "Maintenance" excludes (a) janitorial or custodial services of a routine, recurring or usual nature, and (b) security, guard or other protection-related services. (See California Labor Code section 1771 and 8 California Code of Regulations section 16000.) If the Work includes some "maintenance" work and other work that is not "maintenance," then this subsection (c) applies only to workers performing the "maintenance" work.

(2) Contractor shall comply with the California Labor Code provisions concerning payment of prevailing wage rates, penalties, keeping and retention of payroll records, and other prevailing wage and related requirements as may be required by the Labor Code section 1771 and applicable state regulations. The state-approved prevailing rates of per diem wages are available at http://www.dir.ca.gov/oprl/DPreWageDetermination.htm. Contractor also shall comply with Labor Code section 1775, including provisions that require Contractor to (a) forfeit as a penalty to District up to $200 for each calendar day or portion thereof for each worker (whether employed by Contractor or any subcontractor) paid less than the applicable prevailing wage rates for any Work done under this Agreement in violation of the Labor Code, and (b) pay to each worker the difference between the prevailing wage rate and the amount paid to each worker for each calendar day or portion thereof for which the worker was paid less than the prevailing wage.

9. Indemnification. Contractor shall indemnify, defend, protect, and hold harmless District, and its officers, employees and agents from and against any claims, liability, losses, damages and expenses (including attorney, expert witness and Contractor fees, and litigation costs) that arise out of, pertain to, or relate to the negligence, recklessness, or willful misconduct of Contractor or its employees, agents or subcontractors. The duty to indemnify, including the duty and the cost to defend, is limited as provided in this section. However, this indemnity provision will not apply to any claims, liability, losses, damages and expenses arising from the sole negligence or willful misconduct of District or its employees or agents. Contractor's obligations under this indemnification provision shall survive the termination of, or completion of Work under, this Agreement.

10. Insurance.

Types & Limits. Contractor at its sole cost and expense shall procure and maintain for the duration of this Agreement the following types and limits of insurance:

Type	*Limits*	*Scope*
Commercial general liability	$1,000,000 per occurrence & $2,000,000 aggregate	at least as broad as ISO CG 0001
Automobile liability	$2,000,000 per accident	at least as broad as ISO CA 0001, code 1 (any auto)
Workers' compensation	Statutory limits	
Employers' liability	$1,000,000 per accident	
Professional liability*	$1,000,000 per claim	

*Required only if Contractor is a licensed engineer, land surveyor, geologist, architect, doctor or attorney.

a. Other Requirements. The general and automobile liability policy(ies) shall be endorsed to name District, its officers, employees, volunteers and agents as additional insureds regarding liability arising out of the Work. Contractor's coverage shall be primary and apply separately to each insurer against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability. District's insurance or self-insurance, if any, shall be excess and shall not contribute with Contractor's insurance. Each insurance policy shall be endorsed to state that coverage shall not be canceled, except after 30 days (10 days for non-payment of premium) prior written notice to District. Insurance is to be placed with admitted insurers with a current A.M. Best's rating of A-:VII or better unless otherwise acceptable to District. Workers' compensation insurance issued by the State Compensation Insurance Fund is acceptable. Contractor agrees to waive subrogation that any insurer may acquire from Contractor by virtue of the payment of any loss relating to the Work. Contractor agrees to obtain any endorsement that may be necessary to implement this subrogation waiver. The workers' compensation policy must be endorsed to contain a subrogation waiver in favor of District for the Work performed by Contractor.

b. Proof of Insurance. Upon request, Contractor shall provide to District the following proof of insurance: (a) certificate(s) of insurance evidencing this insurance; and (b) endorsement(s) on ISO Form CG 2010 (or insurer's equivalent), signed by a person authorized to bind coverage on behalf of the insurer(s), and certifying the additional insured coverage.

11. Entire Agreement; Amendment. The parties intend this writing to be the sole, final, complete, exclusive and integrated expression and statement of the terms of their contract concerning the Work. This Agreement supersedes all prior oral or written negotiations, representations, contracts or other documents that may be related to the Work, except those other documents (if any) that are expressly referenced in this Agreement. This Agreement may be amended only by a subsequent written contract approved and signed by both parties.

12. Independent Contractor. Contractor's relationship to District is that of an independent contractor. All persons hired by Contractor and performing the Work shall be Contractor's employees or agents. Contractor and its officers, employees and agents are not District employees, and they are not entitled to District employment salary, wages or benefits. Contractor shall pay, and District shall not be responsible in any way for, the salary, wages, workers' compensation, unemployment insurance, disability insurance, tax withholding, and benefits to and on behalf of Contractor's employees. Contractor shall, to the fullest extent permitted by law, indemnify District, and its officers, employees, volunteers and agents from and against any and all liability, penalties, expenses and costs resulting from any adverse determination by the federal Internal Revenue Service, California Franchise Tax Board, other federal or state agency, or court concerning Contractor's independent contractor status or employment-related liability.

13. **Subcontractors.** No subcontract shall be awarded nor any subcontractor engaged by Contractor without District's prior written approval. Contractor shall be responsible for requiring and confirming that each approved subcontractor meets the minimum insurance requirements specified in Section 11 of this Agreement. Any approved subcontractor shall obtain the required insurance coverages and provide proof of same to District in the manner provided in Section 11 of this Agreement.

14. **Assignment.** This Agreement and all rights and obligations under it are personal to the parties. The Agreement may not be transferred, assigned, delegated or subcontracted in whole or in part, whether by assignment, subcontract, merger, operation of law or otherwise, by either party without the prior written consent of the other party. Any transfer, assignment, delegation, or subcontract in violation of this provision is null and void and grounds for the other party to terminate the Agreement.

15. **No Waiver of Rights.** Any waiver at any time by either party of its rights as to a breach or default of this Agreement shall not be deemed to be a waiver as to any other breach or default. No payment by District to Contractor shall be considered or construed to be an approval or acceptance of any Work or a waiver of any breach or default.

16. **Severability.** If any part of this Agreement is held to be void, invalid, illegal or unenforceable, then the remaining parts will continue in full force and effect and be fully binding, provided that each party still receives the benefits of this Agreement.

17. **Governing Law and Venue.** This Agreement will be governed by and construed in accordance with the laws of the State of California. The county and federal district court where District's office is located shall be venue for any state and federal court litigation concerning the enforcement or construction of this Agreement.

18. **Notice.** Any notice, demand, invoice or other communication required or permitted to be given under this Agreement must be in writing and delivered either (a) in person, (b) by prepaid, first class U.S. mail, (c) by a nationally-recognized commercial overnight courier service that guarantees next day delivery and provides a receipt, or (d) by email with confirmed receipt. Such notices, etc. shall be addressed as follows:

District:

Mammoth Community Water District
Attn: Patrick Hayes
1315 Meridian Blvd.
P.O. Box 597
Mammoth Lakes, CA 93546
E-mail: phayes@mcwd.dst.ca.us

Contractor:

Gillis + Panichapan Architects, Inc.
Attn: Jack Panichapan, AIA, LEED, AP
2900 Bristol Street, S. G-205
Costa Mesa, CA 92626

E-mail: jack@gparchitects.org

Notice given as above will be deemed given (a) when delivered in person, (b) three days after deposited in prepaid, first class U.S. mail, (c) on the date of delivery as shown on the overnight courier service receipt, or (d) upon the sender's receipt of an email from the other party confirming the delivery of the notice, etc. Any party may change its contact information by notifying the other party of the change in the manner provided above.

19. Signature Authority. Each party warrants that the person signing this Agreement is authorized to act on behalf of the party for whom that person signs. The Parties may execute and deliver this Agreement and documents necessary to perform it, including task orders and amendments, in any number of original or facsimile counterparts. When each Party has signed and delivered at least one counterpart to the other Party, each counterpart shall be deemed an original and, taken together, the counterparts shall constitute one and the same document, which shall be binding and effective.

MAMMOTH COMMUNITY WATER DISTRICT:

Dated: 01/21/2019

By: [signature]
Patrick A. Hayes
General Manager

GILLIS + PANICHAPAN ARCHITECTS, INC.:

Dated: 1/17/19

By: [signature]
Jack Panichapan
President, CEO

EXHIBIT A

Exhibit A to the Services Agreement Executed January 21, 2019

By and Between

Mammoth Community Water District

And

Gillis + Panichapan Architects

architecture • interior • planning
Gillis + Panichapan Architects, Incorporated
2900 Bristol Street, Suite G-205 Costa Mesa, CA 92626 Tel 714.668.4260 Fax 714.668.4265 www.gparchitects.org

November 12, 2018

Patrick A. Hayes, PE
General Manager
Mammoth Community Water District
1315 Meridian Blvd.
PO Box 597
Mammoth Lakes CA 93546

Re: Needs Assessment and Conceptual Master Planning for MCWD Administration Building & Site

Dear Patrick,

We are pleased to forward to you our proposal for the provision of a needs assessment of the MCWD Administrative facility current and future needs to provide a building program and block master plan diagrams. In addition, we will be providing an assessment of the existing administration building to determine the feasibility of its re-use and/ or renovation.

Our combined diversity of experience in municipal and water district facilities as well as budget management will provide great expertise to the master planning for the new administrative and operations facility on the dual sites.

Every stage would involve close interaction with you and your team to determine a final solution that would be formally documented by the end of each stage.

Please keep in mind that the scope of work described in the following pages is a suggested approach. If you have any additional ideas or suggestions I would be happy to work with you to modify the work plan in order to better tailor to the specific needs of the project.

I look forward to the opportunity to working with you and your team and demonstrate our expertise and our commitment to the success of this endeavor.

Respectfully,

Jack Panichapan, AIA, LEED AP
President, CEO
Gillis + Panichapan Architects, Inc.
jack@gparchitects.org

GENERAL NEEDS ASSESSMENT DESCRIPTION AND PROCESS

Project Understanding

Mammoth Community Water District (MCWD) administrative headquarters is located within an approximately 6000sf single story building originally built in the early 1970s. GPa will be providing a needs assessment of the District's Administrative facility current and future needs to provide a building program and block diagrams for a potential future building. The last stage will provide an assessment of the existing building to determine the feasibility of its re-use and/ or renovation.

The District consists of its 42-person staff inclusive of Operations and Maintenance, and Administrative Services Departments. The administrative building shares a contiguous campus with its Operations facilities. Effective workflow has been increasingly strained by issues associated with the size, age and configuration of MLWD's current administrative headquarters. An assessment of the District's current and future physical, administrative needs will be performed to quantify space and functional organization needs for current and potential future functions and activities of the District. This assessment would also provide recommendations for improvement, including assessments of effectiveness for potential renovation, expansion, or building a new facility.

This assessment will document current and potential future District functions and activities and provide opportunity for the district to consolidate and improve operations, provide safe and adequate work space for District staff, and better serve their clients.

The Approach in 3 Stages:

We will be performing needs assessment for the MLWD in three (3) stages:

This would entail sub-dividing the overall needs assessment portion of the project into three distinct iterative phases. Each stage will be a reflective outcome from information and insight attained from the stage before it.

The following are brief descriptions of the three noted stages:

Stage 1: Space Programming

This first stage will assess and document current and anticipated space needs for the facility based on the needs of the organization, each of its department, along with requirements of individual staff. Current and future furnishings, fixtures, and equipment will also play a role in tallying space requirements.

1. Kick-off meeting

The assessment will be initiated with an introductory meeting with the MLWD representative team members to convey GPa's programming approach. This meeting will establish project expectations, product deliverables, and timeline for this stage and the overall needs assessment process beyond. The kick-off meeting will be followed concurrently with a facility survey. We expect the kick-off meeting and the facility survey to be completed during a full working day.

2. Facility Survey

Prior to the formal assessment stages, GPa would conduct a general survey of the existing spaces and inventory of essential furniture fixtures and equipment for the facility. At this stage we would request the water district provide any available floor plans of the existing facility, and detailed organization charts depicting quantity of staff and associated position. We would also request a district vehicle and equipment list

On an individual staff scale, we would assess the needs for everyday functions in terms of space, equipment, and furniture and the relationship to their individual departments. On an overall department scale, we would assess requirements for quantity of staff, conference rooms, equipment and storage requirements and inter-connections between departments. Much of this data will be collected through observations and interviews conducted through chosen the water district representatives.

3. Interviews and Documentation

Next we would work interactively with the water district assigned team members to provide an analysis of the current facility needs. This can be done via conference call or online meeting coordination. This information would be used to document computed space requirements for the future facility. For an effective assessment, assigned team members should be representative of all levels of the organization chart (i.e. Department Head, Supervisor, and Staff).

Both existing and projected space needs would be depicted in a graphed chart per personnel and department. A summary each with charts describing needed spaces per individual department and staff by title and description, along with projected areas anticipated would be provided. A written description explains how size and configuration of spaces are determined for the future facility.

4. Workshops

During the process of documentation, organized workshops will be provided to share our findings. We plan on having two workshops via on-line meting/ skype. Draft space programming documents will be presented for input and guidance for iterative refinements.

The process will provide and review the following:

a. Projection of staff levels by department

b. Suggested work space layout- depict optimal furniture layout for work areas and individual personnel areas. Suggested furniture space layout for common spaces per department and the overall district would be provided. Each space will be correspondingly charted by size, type, and description. Associated information for parking tallies for personnel and public spaces will also be provided.

c. Space adjacency- portrays diagrams demonstrating preferred relationships between each personnel and/ or respective support spaces.

d. Detailed Department Adjacency- portray diagrams demonstrating critical relationships between each department and/or support spaces

5. Stage 1 Report

The information gathered at Stage 1 will be placed in a report to depict estimated current and projected future spatial needs of individual, common, and departmental spaces that offer a direct comparison to the existing conditions of the current existing facility.

As a team working together throughout this stage with the United Water Conservation District, the goal of our approach is to understand how personnel use space, furniture, equipment, and be able provide quantitative planning solutions to reflect how the organization works and grows overall.

Stage 2: Space Planning and Adjacency Needs

On the second stage, we would develop space block plan diagrams from the required program area obtained from the previous stage. The result will be a plan diagram (similar to a floor plan) that initiates the organization of spaces to depict possible ideal configurations for the future facility.

These block diagrams would convey the ideal size, positioning, and location of Administration spaces drawn to scale. Individual private offices, open offices, restrooms, storage, and common spaces etc. would be depicted within along with main circulation areas. Distinctions between public and district space would be depicted along with zones of landscape, hardscape, site circulation corridors, and respective zones for district, personnel, and public vehicle parking.

1. Block Diagram Development

This stage would offer a twofold direction with diagrams depicting how spaces and programs would optimally interconnect:

Optimum Layout - Space adjacency diagram optimized without the context of existing conditions. We would provide a conceptual proposed plan diagram that depicts ideal space adjacencies not constrained by site or existing conditions.

Layout in context of existing MLWD site – New Facility placed conceptually on the current MLWD site at - On top of the site plan drawing of the existing building, we would superimpose a scaled space adjacency diagrams depicting specific spaces in relation to their location and their associated sizes. This would also show the possible scale and configuration of the new footprint on top of the current facility site to give context for advantages and limitations on the current facility site in terms of space and access.

2. Presentation and Workshops

After the completion of the initial block diagrams, we would organize interactive workshops with team members to present them, gather input, and gage reaction via conference call and online meetings. Iterative refinements will be made to the diagrams after sessions with the water district team.

We will also provide written descriptions of the space adjacency solutions correlating respectively to propose improvements and describe the pros and cons of each solution. An associated Conceptual Statement of Probable Cost (SoPC) will be developed for the each block diagram scheme based on a current construction cost index on the general proposed building area on a unit cost calculation.

This will assist the water district to decide the best direction to move forward, between renovation and new construction.

3. Final Report

A final report booklet will be provided to formally organize:

a. Colored block diagram layouts drawn to scale.

b. Written assessments describing spatial requirements.

c. Statement of Probable Costs.

This report will contain information and assessments that will be the foundation of the development of a formal architectural floor plan. This option would develop the plan that would move forward to the next formal stage of assessment.

Stage 3: Existing Building Assessment

This stage would hinge on the Water District's decision to explore with the existing facility re-use. Overall, it would assess the feasibility of outfitting the existing building with the updated program determined from the earlier stages. It would involve a greater depth of analysis of the facility that will include the assessment of our engineers, namely structural and mechanical.

We will review the most significant changes that we anticipate impacting the existing facility in order to incorporate the new program and its likely associated cost impacts. Key items to be reviewed for compatibility include space alteration, structure, and code regulations to see how well the new spatial requirements provided by the previous stages integrate overall. The goal of this assessment will be to determine feasible options the existing facility will offer for renovation and expansion.

Architectural Condition Assessment and Building Code Review - An architectural and structural assessment in regards to codes, regulations, and general condition. This would determine feasibility of the existing building for integrating particular new programs/ spaces. It will also assess the infrastructure we would have to upgrade with the reconfiguration/ addition.

Structural Assessment - We would also review Structural and Seismic conditions of the existing facility to determine any modifications or upgrades are needed to support the added capacity.

Mechanical, Electrical, and Plumbing Assessment -We would also review Mechanical conditions of the existing facility to determine any modifications or upgrades are needed to support the added capacity.

SoPC - A Statement of Probable Cost of construction based on the upgrades including recommended and mandatory improvements the engineers foresee making in order to retrofit the existing building for renovation. This will be based on a unit cost.

A Life cycle cost consideration: Due to the existing structure being over 40 years old, the longevity of the addition/remodel may be reduced. (An asbestos assessment and abatement may also be needed).

Construction and Move Phasing: Assess impacts for time and costs to keep Water District remaining functional during the proposed renovation/ relocation. Provide conceptual description on how the renovation and the relocation would be phased.

Analysis and Comparison of re-use to building new: Assess and identify benefits and disadvantages of re-use versus building new facility on the campus.

The conclusion of this stage would include a report documenting:

a. Executive Summary
b. A summary of the building's existing architectural, MEP, as well as structural features.
c. Significant code and regulations that may be triggered by the renovation.
d. Summary of Pros and Cons of renovation/ alteration versus building new.
e. Description of general cost impacts of renovation/ expansion versus new.
f. Conclusion and recommendations.

FEE EXHIBIT

	Mammoth Lakes Water District **Facility Needs Assessment** **Time & Task Allocation Table** 11/8/2018	ARCHITECT						
		Principal	Project Dir.	Project Arch	Job Captain	CAD Tech	Clerical	sub-totals per line item
1	**Stage 1: Space Programing**							
1	Kick-off Meeting, Information Gathering, and Establishment of Project Agenda		4	4				$1,160
2	Facility Space Assessments, Survey, and Interviews	4	4	12	16			$4,500
3	Documentation	4	8	12	8	2	2	$4,660
4	Workshops	4	4		4			$1,740
5	Stage 1 Report	4	8	16	8	6		$5,410
	Stage 1 Total:							**$17,470**
2	**Stage 2: Space Planning and Adjacency Diagrams for Preliminary Master Planning**							
1	Block and adjacency Diagram Development	2	8	16	8	8		$5,210
2	Workshops	2	4	4				$1,530
3	Stage 2: Final Report	2	8	14	12	11	4	$5,835
	Stage 2 Total:							**$12,575**
3	**Stage 3: Existing Building Assessment**							
1	Architectural Evaluation and Assessment of Existing	2	6	8	8	8		$3,820
2	Code Assessments	2	6	2	2	2		$1,930
3	SoPC (Statement of Probable Costs)	2	4	6				$1,800
4	Analysis and Comparison of re-use to building new	2	4	4	4			$1,910
5	Project Management and Team Coordination	1	2	3	2			$1,090
6	Stage 3 Final Deliverables for the Report	1	4	6	6	6		$2,695
	Architectural Total:							**$13,245**
	MEP Engineering Assessments (see attached consultant proposal):							**$8,000**
	Structural Engineering Assessments (see attached consultant proposal):							**$6,000**
	Stage 3 Total:							**$22,245**
	Hours:	32	74	107	78	43	6	**340**
	Hourly rates	$185	$155	$135	$95	$85	$65	**total hours**
	TOTAL:						**$52,290**	**$52,290**
	Reimbursable Allowance **						**$510**	
	GRAND TOTAL						**$52,800**	

** Reimbursibles would cover fees accrued for travel and expense related to the project. Reproduction and delivery costs will be billed to client's or architect's reprographic company account at cost plus 10%.

DCSE
ASSOCIATES, INC.
STRUCTURAL ENGINEERS

Dale A. Christian, S.E., C.E.O.
Richard Suzuki, S.E., Sr. V.P.
Roberto Ortiz, S.E., Sr. V.P.
Todd Brown, S.E., Sr. V.P.
Winnie Cudd, Sr. V.P.

PROPOSAL FOR PROFESSIONAL SERVICES

Date: November 09, 2018 (revised 11/12/18)

Client: GPA, Inc.
2900 Bristol Street
Suite G-205
Costa Mesa, CA 92626

Phone: (714) 668-4260
Fax: (714) 668-4265
Email: vnguyen@gparchitects.org

Attn: Mr. Vic Nguyen

DCSE Project Name: **Mammoth Community Water District - Admin Building**
Mammoth, CA

DCSE JOB Number : **2018-129**

Scope of Work: Provide Professional Consulting Structural Engineering Services including consultation, structural survey and report regarding structural system and recommendations for seismic retrofit of an existing 1-story CMU building.

Requested by: Yourself

Structural Engineering Fee: **$2,500.00 (report) + $3,500.00 (site survey)**

CONDITIONS/COMMENTS:

This proposal is for your budgetary purposes and, when signed below, may be used for authorization to begin work. A formal contract may follow at time project actively begins for your signature.

AUTHORIZATION:

The professional services proposed herein for the above referenced project are hereby authorized for payment of stated fees subject to completion and conditions noted. All provisions and conditions noted in our standard contract for Structural Engineering Services shall be in force including limitation of liability provision. Please Liability Provision page.

Accepted by: Company Date

Please sign and return by **EMAIL to wcudd@dalechristian.com**, and original copy via US mail.

Thank you.

Dale A. Christian, S.E. 2705, President, CEO

LIABILITY PROVISION

Dale A. Christian, S.E., C.E.O.
Richard Suzuki, S.E., Sr. V.P.
Roberto Ortiz, S.E., Sr. V.P.
Todd Brown, S.E., Sr. V.P.
Winnie Cudd, Sr. V.P.

DCSE Associates, Inc. – Structural Engineers represents that the services shall be performed, within the limits prescribed by you or our Client, in a manner consistent with that level of care and skill ordinarily exercised by other professional consultants under similar circumstances. No other representations to you, expressed or implied, and no warranty or guarantee is included or intended in the Agreement, or in any report, opinion, document or otherwise. However, should we be found to have been negligent in the performance of professional services, the maximum aggregate amount of your recovery against us is limited to the amount of the fee paid us or $150,000.00, whichever is greater. The sole remedy shall be against the corporation and not against any of its officers or employees. Should there be any reason to do so, either party may terminate this Agreement with a 7 (seven) day written notice to the other party. All progress fees and costs for work done under this agreement to the date of termination will become due immediately.

Reproductions, delivery, and/or computer plotting shall be charged to client's or architect's reprographic company account, or at cost plus 25%. Alternately, this office may provide final plots and/or prints. Reimbursable travel expenses will also be billed at cost plus 25%.

Excludes Building Department or Plancheck Submittal Fees, City Business License fees (if required) or any other 3rd party fees. If these fees are required to be paid by this office they will be billed at cost plus, 25%, plus administrative time, see Fee Schedule. Also excludes "Structural Responses" to 3rd Party Peer review or other outside reviewing agency other than the Building Department having jurisdiction over the project.

Additional services may consist of but not be limited to changes to project scope once original structural design has begun, site retaining walls or landscape structure engineering, revisions required to conform to shop drawings differing from structural plans, services in preparing field bulletins during construction as a result of construction differing from approved plans, and site visitations. These and all additional services would be billed per our hourly rate schedule, Fee Schedule.

DCSE
ASSOCIATES, INC.
STRUCTURAL ENGINEERS

Dale A. Christian, S.E., C.E.O.
Richard Suzuki, S.E., Sr. V.P.
Roberto Ortiz, S.E., Sr. V.P.
Todd Brown, S.E., Sr. V.P.
Winnie Cudd, Sr. V.P.

FEE SCHEDULE

Principal Structural Engineer	$250.00/hour
Structural Engineer / Sr. V.P.	$190.00/hour
Senior Associate Engineer	$175.00/hour
Project Engineer/Designer	$165.00/hour
Draftsman	$105.00/hour
Clerical	$ 90.00/hour

Mileage will be charged at 65 cents/mile when incurred in conjunction with a specific project. Reproduction and delivery costs will be billed to client's or architect's reprographic company account or at cost plus 25%. Alternately, this office may provide final plots and/or prints based on the following fee schedule:

Vellum Plots	(24" x 36")	$24.00 each
Bond Plots	(24" x 36")	$10.00 each
Vellum Plots	(30" x 42")	$35.00 each
Bond Plots	(30" x 42")	$15.00 each
Calculations	(small)	$25.00 / set
	(medium)	$50.00 / set
	(large)	$75.00 / set

Gannett Fleming

Excellence Delivered ***As Promised***

November 11, 2018

Jack Panichapan/ Viet Nguyen
Gillis + Panichapan Architects, Inc.
2900 Bristol St., Suite G-205
Costa Mesa, CA 92626
714.668.4265
jack@gparchitects.org

Project: Feasibility Analysis for Mammoth Lake Water District Admin Building

Dear Jack/Vic:

Thank you for the opportunity to submit the following fee proposal for mechanical and electrical engineering associated with the scope. Our understanding of scope is outlined below:

Scope Understanding

1. The scope of this proposal is to perform a site visit and do a feasibility analysis of existing mechanical, electrical and plumbing systems.
2. Analysis goal is to determine condition of the existing system and possibility of their future or extended use.
3. Project deliverable will be an 8.5x11 report including findings and pictures.
4. Report will need to include approximate tonnage for new facility and recommendations of new system.
5. Report will need to include approximate power requirements for future and recommendations of modifications of the system.
6. Report will need to include recommendations of upgrades for existing plumbing system.
7. Report shall also include ROM cost estimate for recommendations.
8. Scope includes one (1) site visit.

Compensation

1. The lumpsum fee for this scope is $3,000.
2. Our fee will be billed monthly based on percentage of completion.
3. Reimbursable expenses including mileage and meals are included in the lumpsum fees *except charges occurring outside of the scope of work of this proposal.*

Thank you for the opportunity to submit this proposal. We look forward to working with you.

Please call if you have any questions.

Sincerely,

Gannett Fleming, Inc.

Hiten Sheth, PE, LEED AP,
Manager, West Mechanical

HOURLY RATE SCHEDULE (2018)	
CLASSIFICATION	**RATE PER HOUR**
Project Principal	$270
Project Manager	$225
Project Engineer	$180
Engineer	$150
Designer	$140
Cad Technician	$135
Clerical	$95

MAMMOTH COMMUNITY WATER DISTRICT
Post Office Box 597
Mammoth Lakes, California 93546-0597

NOTICE OF AN INVESTMENT COMMITTEE MEETING

NOTICE IS HEREBY GIVEN that the Investment Committee of the Board of Directors of the Mammoth Community Water District will hold an **INVESTMENT COMMITTEE MEETING** on **WEDNESDAY, JULY 17, 2019** at **12:00 P.M.**

Please Note:
Members of the public will have the opportunity to directly address the District Board of Directors concerning any item listed on the Agenda below before or during consideration of that item.

The agenda items are:

1. Review Management of Investment Accounts with Advisors from Chandler Asset Management, Inc. (CAM) (CAM advisors will participate by teleconference)

2. Provide Direction to Interim General Manager to Maintain or Change Current Allocation of Investments, Maintain or Change Specific Investments, or Make a Combination of Changes to Allocations or Investments to Meet Cash Flow Objectives

The Meeting will be held in the Conference Room at the District facility located at 1315 Meridian Boulevard, just off Highway 203, Mammoth Lakes, California

MARK BUSBY
Interim General Manager

Date of Issuance: Friday, July 12, 2019

Posted: MCWD Office
MCWD Website: www.mcwd.dst.ca.us
cc: Members, Board of Directors
Town of Mammoth Lakes
KMMT, KIBS, KSRW Radio

In compliance with the Americans with Disabilities Act, if you need a disability related modification or accommodation to participate in this meeting please call Stephanie Hake at (760) 934-2596 at least one full day before the meeting.

Documents and material relating to an open session agenda item that are provided to the Mammoth Community Water District Board of Directors less than 72 hours prior to a regular meeting will be available for public inspection and copying at the District facility located at 1315 Meridian Boulevard, Mammoth Lakes, California.

Mammoth Community Water District

Account #10652

Portfolio Summary

As of June 30, 2019

PORTFOLIO CHARACTERISTICS

Average Modified Duration	2.05
Average Coupon	2.23%
Average Purchase YTM	2.19%
Average Market YTM	2.13%
Average S&P/Moody Rating	AA/Aa2
Average Final Maturity	3.43 yrs
Average Life	2.13 yrs

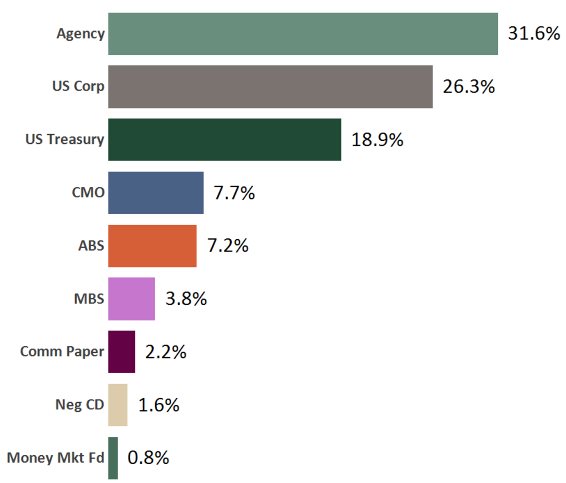
ACCOUNT SUMMARY

	Beg. Values as of 5/31/19	End Values as of 6/30/19
Market Value	15,963,510	16,011,921
Accrued Interest	65,901	75,199
Total Market Value	**16,029,411**	**16,087,120**
Income Earned	29,840	30,225
Cont/WD		-32,885
Par	15,917,194	15,877,563
Book Value	15,921,895	15,911,516
Cost Value	15,948,282	15,939,550

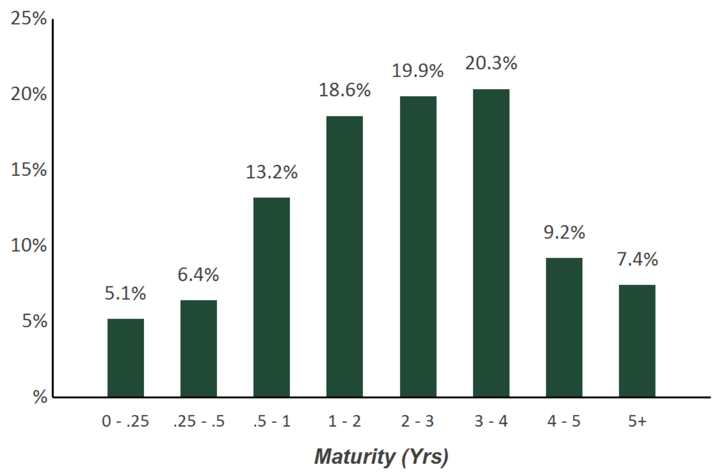
TOP ISSUERS

Federal National Mortgage Assoc	19.8%
Government of United States	18.9%
Federal Home Loan Bank	12.5%
Federal Home Loan Mortgage Corp	7.1%
Toyota ABS	2.6%
MUFG Bank Ltd/NY	2.2%
Goldman Sachs Inc.	1.8%
PNC Financial Services Group	1.6%
Total	**66.5%**

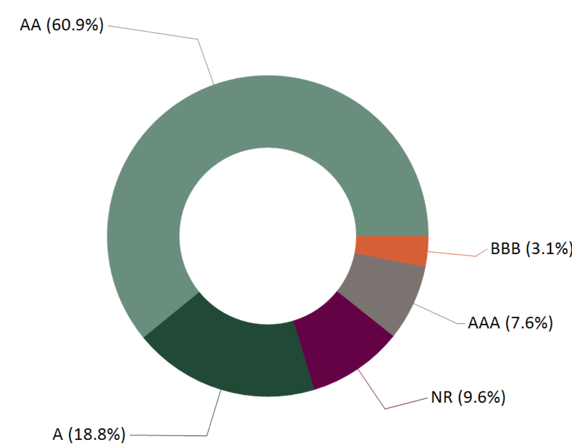
SECTOR ALLOCATION



MATURITY DISTRIBUTION



CREDIT QUALITY (S&P)



PERFORMANCE REVIEW

TOTAL RATE OF RETURN	1M	3M	YTD	1YR	*Annualized* 2YRS	3YRS	5YRS	10YRS	1/31/2019
Mammoth Community Water District	0.57%	1.43%	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ICE BAML 0-5 Yr US Treasury Index	0.58%	1.60%	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Sorted by Maturity Date

Date To	Issuer	Maturity Date	Cost	Mkt Value And Accrued Interest	S&P Rating	Purchase Yield	Mkt Duration	Security Type
7/1/2019	First American	7/1/2019	$ 122,818	$ 122,818	AAA	2.008	0.000	Money Market Fund FI
7/1/2019	Public Service El & Gas	8/15/2019	$ 40,473	$ 40,270	A	1.711	0.125	US Corporate
7/1/2019	American Express Credit	8/15/2019	$ 85,429	$ 85,709	A-	2.127	0.125	US Corporate
7/1/2019	FNMA	9/12/2019	$ 578,495	$ 577,482	AA+	1.534	0.199	Agency
7/1/2019	US Treasury	9/30/2019	$ 75,712	$ 75,254	AA+	1.361	0.250	US Treasury
7/1/2019	US Treasury	9/30/2019	$ 397,375	$ 400,570	AA+	2.511	0.250	US Treasury
7/1/2019	MUFG Bank Ltd/NY	10/22/2019	$ 347,285	$ 347,528	A-1	2.320	0.309	Commercial Paper
7/1/2019	Goldman Sachs Group Inc	10/23/2019	$ 101,064	$ 100,526	BBB+	2.092	0.312	US Corporate
7/1/2019	US Treasury	11/30/2019	$ 99,867	$ 99,873	AA+	1.528	0.414	US Treasury
				$ 1,850,031				
7/1/2019	FNMA	1/21/2020	$ 633,639	$ 627,926	AA+	1.183	0.549	Agency
7/1/2019	Wells Fargo Corp	1/30/2020	$ 99,965	$ 100,814	A-	2.162	0.571	US Corporate
7/1/2019	Union Pacific Corp	2/1/2020	$ 40,076	$ 40,149	A-	1.758	0.575	US Corporate
7/1/2019	Toyota Motor Credit Corp	3/12/2020	$ 100,913	$ 100,608	AA-	1.918	0.687	US Corporate
7/1/2019	Nordea Bank ABP New York	3/23/2020	$ 249,996	$ 251,886	A-1+	2.640	0.722	Negotiable CD
7/1/2019	US Treasury	3/31/2020	$ 395,125	$ 399,444	AA+	2.520	0.740	US Treasury
7/1/2019	IBM Corp	5/15/2020	$ 98,612	$ 99,638	A	1.916	0.861	US Corporate
7/1/2019	US Treasury	5/31/2020	$ 50,000	$ 50,330	AA+	2.500	0.903	US Treasury
7/1/2019	Cisco Systems	6/15/2020	$ 86,713	$ 85,317	AA-	1.996	0.942	US Corporate
7/1/2019	FNMA	6/22/2020	$ 361,226	$ 363,289	AA+	1.737	0.964	Agency
7/1/2019	Wells Fargo Corp	7/22/2020	$ 100,932	$ 101,484	A-	2.389	1.030	US Corporate
7/1/2019	US Treasury	7/31/2020	$ 61,153	$ 60,210	AA+	1.179	1.063	US Treasury
7/1/2019	John Deere Capital Corp	9/11/2020	$ 85,974	$ 85,884	A	2.202	1.166	US Corporate
7/1/2019	Goldman Sachs Group Inc	9/15/2020	$ 102,590	$ 101,234	BBB+	2.072	1.094	US Corporate
7/1/2019	JP Morgan Chase	10/29/2020	$ 76,460	$ 75,519	A-	2.055	1.216	US Corporate
7/1/2019	Chubb INA Holdings Inc	11/3/2020	$ 217,985	$ 220,923	A	2.858	1.229	US Corporate
7/1/2019	FHLMC	12/1/2020	$ 12,721	$ 12,174	AA+	1.556	0.579	Mortgage Pass Thru
				$ 2,776,830				
7/1/2019	FHLMC	1/1/2021	$ 11,452	$ 10,900	AA+	1.370	0.652	Mortgage Pass Thru
7/1/2019	HDMOT	1/15/2021	$ 5,401	$ 5,387	AAA	1.222	0.050	ABS
7/1/2019	Royal Bank of Canada	1/19/2021	$ 198,710	$ 203,113	AA-	2.857	1.500	US Corporate
7/1/2019	US Bancorp	1/29/2021	$ 102,740	$ 101,297	A+	1.729	1.450	US Corporate
7/1/2019	FHLB	2/18/2021	$ 239,948	$ 239,466	AA+	1.379	1.598	Agency
7/1/2019	Berkshire Hathaway	3/15/2021	$ 100,186	$ 100,931	AA	2.408	1.619	US Corporate
7/1/2019	Georgia Power Company	4/1/2021	$ 52,113	$ 50,340	A-	1.473	1.618	US Corporate
7/1/2019	US Treasury	4/30/2021	$ 301,863	$ 298,491	AA+	1.246	1.798	US Treasury

Sorted by Maturity Date

Date To	Issuer	Maturity Date	Cost	Mkt Value And Accrued Interest	S&P Rating	Purchase Yield	Mkt Duration	Security Type
7/1/2019	American Express Credit	5/5/2021	$ 76,014	$ 75,289	A-	1.944	1.712	US Corporate
7/1/2019	FNMA	5/6/2021	$ 347,202	$ 347,085	AA+	1.444	1.815	Agency
7/1/2019	General Dynamics Corp	5/11/2021	$ 220,781	$ 224,497	A+	2.832	1.801	US Corporate
7/1/2019	Abbvie Inc	5/14/2021	$ 99,823	$ 99,702	A-	2.347	1.814	US Corporate
7/1/2019	State Street Bank	5/19/2021	$ 215,387	$ 219,939	A	2.926	1.838	US Corporate
7/1/2019	FHLB	6/11/2021	$ 352,394	$ 353,034	AA+	1.893	1.897	Agency
7/1/2019	American Honda Finance	7/12/2021	$ 213,536	$ 219,336	A	2.936	1.971	US Corporate
7/1/2019	Caterpillar Finance Serv Corp	8/9/2021	$ 96,895	$ 99,623	A	2.457	2.044	US Corporate
7/1/2019	Paccar Financial Corp	8/11/2021	$ 213,319	$ 219,052	A+	2.938	2.051	US Corporate
7/1/2019	Florida Power Corp	8/15/2021	$ 103,524	$ 102,689	A	2.275	1.795	US Corporate
7/1/2019	JP Morgan Chase	8/15/2021	$ 99,271	$ 100,727	A-	2.472	1.644	US Corporate
7/1/2019	Honda Auto Receivables	8/16/2021	$ 124,086	$ 123,840	AAA	1.675	0.600	ABS
7/1/2019	FHLB	9/10/2021	$ 383,171	$ 392,239	AA+	2.570	2.117	Agency
7/1/2019	FHLMC	9/25/2021	$ 377,827	$ 380,691	NR	2.539	1.963	CMO
7/1/2019	Toyota Auto Receivable	11/15/2021	$ 174,954	$ 174,001	AAA	1.327	0.640	ABS
				$ 4,141,669				
7/1/2019	Toyota Auto Receivables Owner	1/18/2022	$ 249,975	$ 249,626	AAA	1.915	0.850	ABS
7/1/2019	US Treasury	1/31/2022	$ 319,211	$ 328,701	AA+	2.507	2.495	US Treasury
7/1/2019	Bank of NY Mellon Corp	2/7/2022	$ 97,233	$ 102,056	A	3.523	2.404	US Corporate
7/1/2019	PNC Bank	2/17/2022	$ 246,828	$ 254,600	A	3.074	2.432	US Corporate
7/1/2019	Verizon Communications	3/16/2022	$ 102,285	$ 103,398	BBB+	2.596	2.572	US Corporate
7/1/2019	FNMA	4/5/2022	$ 144,950	$ 150,948	AA+	2.850	2.671	Agency
7/1/2019	Amgen Inc	5/11/2022	$ 90,421	$ 91,023	A	2.549	2.658	US Corporate
7/1/2019	Simon Property Group	6/15/2022	$ 97,380	$ 101,076	A	3.355	2.831	US Corporate
7/1/2019	US Treasury	6/30/2022	$ 321,039	$ 328,872	AA+	2.506	2.898	US Treasury
7/1/2019	Chase CHAIT	7/15/2022	$ 199,412	$ 198,897	AAA	1.611	1.010	ABS
7/1/2019	US Treasury	8/31/2022	$ 199,352	$ 200,455	AA+	1.532	3.058	US Treasury
7/1/2019	US Treasury	11/30/2022	$ 398,555	$ 404,309	AA+	2.093	3.288	US Treasury
				$ 2,513,959				
7/1/2019	Nissan Auto Receivables Owner	1/17/2023	$ 99,093	$ 99,316	NR	1.807	0.930	ABS
7/1/2019	FNMA	1/19/2023	$ 356,605	$ 360,643	AA+	1.826	3.364	Agency
7/1/2019	Citibank Credit Card Issuance	1/23/2023	$ 207,156	$ 204,987	NR	1.689	1.490	ABS
7/1/2019	Morgan Stanley	1/23/2023	$ 98,258	$ 103,637	BBB+	3.551	3.317	US Corporate
7/1/2019	Goldman Sachs Group Inc	2/23/2023	$ 83,542	$ 87,963	BBB+	3.613	3.320	US Corporate
7/1/2019	FHLB	3/10/2023	$ 406,092	$ 415,093	AA+	2.340	3.479	Agency
7/1/2019	FHLMC	4/25/2023	$ 255,049	$ 260,980	NR	2.329	3.510	CMO

Sorted by Maturity Date

Date To	Issuer	Maturity Date	Cost	Mkt Value And Accrued Interest	S&P Rating	Purchase Yield	Mkt Duration	Security Type
7/1/2019	Apple Inc	5/3/2023	$ 216,665	$ 223,044	AA+	2.790	3.642	US Corporate
7/1/2019	American Express Credit	5/15/2023	$ 97,960	$ 100,041	AAA	2.924	1.250	ABS
7/1/2019	FHLMC	6/19/2023	$ 272,877	$ 285,007	AA+	2.921	3.754	Agency
7/1/2019	Bank of America Corp	7/24/2023	$ 102,422	$ 108,516	A-	3.562	3.693	US Corporate
7/1/2019	FNMA	9/12/2023	$ 364,217	$ 367,597	AA+	1.868	3.923	Agency
7/1/2019	US Treasury	9/30/2023	$ 384,203	$ 395,398	AA+	2.310	4.093	US Treasury
7/1/2019	FHLB	12/8/2023	$ 336,037	$ 346,489	AA+	2.620	4.124	Agency
				$ 3,358,711				
7/1/2019	FHLB	3/8/2024	$ 254,783	**$ 257,324**	AA+	1.949	4.395	Agency
7/1/2019	FNMA	12/1/2029	$ 67,826	$ 66,435	AA+	2.644	3.203	Mortgage Pass Thru
7/1/2019	FNMA	1/1/2030	$ 44,372	$ 43,964	AA+	2.243	3.641	Mortgage Pass Thru
7/1/2019	FNMA	7/1/2030	$ 54,614	$ 54,130	AA+	2.249	3.797	Mortgage Pass Thru
7/1/2019	FNMA	7/1/2030	$ 51,929	$ 51,060	AA+	2.430	3.442	Mortgage Pass Thru
7/1/2019	FNMA	7/1/2030	$ 52,554	$ 51,674	AA+	2.429	3.441	Mortgage Pass Thru
7/1/2019	FNMA	7/1/2030	$ 64,572	$ 62,813	AA+	1.954	3.756	Mortgage Pass Thru
7/1/2019	FHLMC	9/1/2030	$ 40,307	$ 39,694	AA+	2.162	3.740	Mortgage Pass Thru
7/1/2019	FHLMC	9/1/2030	$ 57,394	$ 57,193	AA+	2.325	3.790	Mortgage Pass Thru
7/1/2019	FHLMC	10/1/2030	$ 41,192	$ 40,344	AA+	2.385	3.430	Mortgage Pass Thru
7/1/2019	FHLMC	11/1/2030	$ 56,659	$ 56,056	AA+	2.526	3.440	Mortgage Pass Thru
7/1/2019	FNMA	1/1/2031	$ 64,788	$ 63,362	AA+	1.756	3.910	Mortgage Pass Thru
7/1/2019	Citigroup Commercial Mtg Trust	9/10/2045	$ 200,248	$ 198,173	NR	2.776	2.810	CMO
7/1/2019	Morgan Stanley BAML Trust	7/15/2046	$ 190,313	$ 186,359	NR	1.313	3.580	CMO
7/1/2019	GS Mortgage Securities Trust	8/10/2046	$ 217,992	$ 214,196	NR	1.343	3.660	CMO
				$ 1,185,455				
				$ 16,083,978				

Sorted by Security Type

Date To	Issuer	Maturity Date	Cost	Mkt Value And Accrued Interest	S&P Rating	Purchase Yield	Mkt Duration	Security Type
7/1/2019	HDMOT	1/15/2021	$ 5,401	5,386.68	AAA	1.222	0.050	ABS
7/1/2019	Honda Auto Receivables	8/16/2021	$ 124,086	123,839.75	AAA	1.675	0.600	ABS
7/1/2019	Toyota Auto Receivable	11/15/2021	$ 174,954	174,001.17	AAA	1.327	0.640	ABS
7/1/2019	Toyota Auto Receivables Owner	1/18/2022	$ 249,975	249,625.64	AAA	1.915	0.850	ABS
7/1/2019	Chase CHAIT	7/15/2022	$ 199,412	198,896.52	AAA	1.611	1.010	ABS
7/1/2019	Nissan Auto Receivables Owner	1/17/2023	$ 99,093	99,316.27	NR	1.807	0.930	ABS
7/1/2019	Citibank Credit Card Issuance	1/23/2023	$ 207,156	204,987.20	NR	1.689	1.490	ABS
7/1/2019	American Express Credit	5/15/2023	$ 97,960	100,040.63	AAA	2.924	1.250	ABS
				1,156,093.86				
7/1/2019	FNMA	9/12/2019	$ 578,495	577,482.40	AA+	1.534	0.199	Agency
7/1/2019	FNMA	1/21/2020	$ 633,639	627,925.85	AA+	1.183	0.549	Agency
7/1/2019	FNMA	6/22/2020	$ 361,226	363,289.49	AA+	1.737	0.964	Agency
7/1/2019	FHLB	2/18/2021	$ 239,948	239,466.26	AA+	1.379	1.598	Agency
7/1/2019	FNMA	5/6/2021	$ 347,202	347,084.65	AA+	1.444	1.815	Agency
7/1/2019	FHLB	6/11/2021	$ 352,394	353,033.98	AA+	1.893	1.897	Agency
7/1/2019	FHLB	9/10/2021	$ 383,171	392,239.11	AA+	2.570	2.117	Agency
7/1/2019	FNMA	4/5/2022	$ 144,950	150,948.49	AA+	2.850	2.671	Agency
7/1/2019	FNMA	1/19/2023	$ 356,605	360,642.97	AA+	1.826	3.364	Agency
7/1/2019	FHLB	3/10/2023	$ 406,092	415,093.02	AA+	2.340	3.479	Agency
7/1/2019	FHLMC	6/19/2023	$ 272,877	285,006.72	AA+	2.921	3.754	Agency
7/1/2019	FNMA	9/12/2023	$ 364,217	367,597.20	AA+	1.868	3.923	Agency
7/1/2019	FHLB	12/8/2023	$ 336,037	346,489.33	AA+	2.620	4.124	Agency
7/1/2019	FHLB	3/8/2024	$ 254,783	257,323.71	AA+	1.949	4.395	Agency
				5,083,623.18				
7/1/2019	FHLMC	9/25/2021	$ 377,827	380,690.66	NR	2.539	1.963	CMO
7/1/2019	FHLMC	4/25/2023	$ 255,049	260,980.17	NR	2.329	3.510	CMO
7/1/2019	Citigroup Commercial Mtg Trust	9/10/2045	$ 200,248	198,173.47	NR	2.776	2.810	CMO
7/1/2019	Morgan Stanley BAML Trust	7/15/2046	$ 190,313	186,359.46	NR	1.313	3.580	CMO
7/1/2019	GS Mortgage Securities Trust	8/10/2046	$ 217,992	214,195.77	NR	1.343	3.660	CMO
				1,240,399.53				
7/1/2019	MUFG Bank Ltd/NY	10/22/2019	$ 347,285	**347,528.22**	A-1	2.320	0.309	Commercial Paper
7/1/2019	First American	7/1/2019	$ 122,818	**122,817.88**	AAA	2.008	0.000	Money Market Fund FI
7/1/2019	FHLMC	12/1/2020	$ 12,721	12,174.46	AA+	1.556	0.579	Mortgage Pass Thru
7/1/2019	FHLMC	1/1/2021	$ 11,452	10,900.03	AA+	1.370	0.652	Mortgage Pass Thru

Sorted by Security Type

Date To	Issuer	Maturity Date	Cost	Mkt Value And Accrued Interest	S&P Rating	Purchase Yield	Mkt Duration	Security Type
7/1/2019	FNMA	12/1/2029	$ 67,826	66,435.48	AA+	2.644	3.203	Mortgage Pass Thru
7/1/2019	FNMA	1/1/2030	$ 44,372	43,963.90	AA+	2.243	3.641	Mortgage Pass Thru
7/1/2019	FNMA	7/1/2030	$ 54,614	54,130.45	AA+	2.249	3.797	Mortgage Pass Thru
7/1/2019	FNMA	7/1/2030	$ 51,929	51,059.78	AA+	2.430	3.442	Mortgage Pass Thru
7/1/2019	FNMA	7/1/2030	$ 52,554	51,673.74	AA+	2.429	3.441	Mortgage Pass Thru
7/1/2019	FNMA	7/1/2030	$ 64,572	62,813.13	AA+	1.954	3.756	Mortgage Pass Thru
7/1/2019	FHLMC	9/1/2030	$ 40,307	39,694.34	AA+	2.162	3.740	Mortgage Pass Thru
7/1/2019	FHLMC	9/1/2030	$ 57,394	57,192.60	AA+	2.325	3.790	Mortgage Pass Thru
7/1/2019	FHLMC	10/1/2030	$ 41,192	40,344.43	AA+	2.385	3.430	Mortgage Pass Thru
7/1/2019	FHLMC	11/1/2030	$ 56,659	56,056.25	AA+	2.526	3.440	Mortgage Pass Thru
7/1/2019	FNMA	1/1/2031	$ 64,788	63,362.42	AA+	1.756	3.910	Mortgage Pass Thru
				609,801.01				
7/1/2019	Nordea Bank ABP New York	3/23/2020	$ 249,996	**251,885.55**	A-1+	2.640	0.722	Negotiable CD
7/1/2019	Public Service El & Gas	8/15/2019	$ 40,473	40,270.36	A	1.711	0.125	US Corporate
7/1/2019	American Express Credit	8/15/2019	$ 85,429	85,708.61	A-	2.127	0.125	US Corporate
7/1/2019	Goldman Sachs Group Inc	10/23/2019	$ 101,064	100,525.85	BBB+	2.092	0.312	US Corporate
7/1/2019	Wells Fargo Corp	1/30/2020	$ 99,965	100,813.88	A-	2.162	0.571	US Corporate
7/1/2019	Union Pacific Corp	2/1/2020	$ 40,076	40,149.08	A-	1.758	0.575	US Corporate
7/1/2019	Toyota Motor Credit Corp	3/12/2020	$ 100,913	100,607.74	AA-	1.918	0.687	US Corporate
7/1/2019	IBM Corp	5/15/2020	$ 98,612	99,638.05	A	1.916	0.861	US Corporate
7/1/2019	Cisco Systems	6/15/2020	$ 86,713	85,316.62	AA-	1.996	0.942	US Corporate
7/1/2019	Wells Fargo Corp	7/22/2020	$ 100,932	101,484.46	A-	2.389	1.030	US Corporate
7/1/2019	John Deere Capital Corp	9/11/2020	$ 85,974	85,884.01	A	2.202	1.166	US Corporate
7/1/2019	Goldman Sachs Group Inc	9/15/2020	$ 102,590	101,234.36	BBB+	2.072	1.094	US Corporate
7/1/2019	JP Morgan Chase	10/29/2020	$ 76,460	75,518.67	A-	2.055	1.216	US Corporate
7/1/2019	Chubb INA Holdings Inc	11/3/2020	$ 217,985	220,923.44	A	2.858	1.229	US Corporate
7/1/2019	Royal Bank of Canada	1/19/2021	$ 198,710	203,113.29	AA-	2.857	1.500	US Corporate
7/1/2019	US Bancorp	1/29/2021	$ 102,740	101,296.75	A+	1.729	1.450	US Corporate
7/1/2019	Berkshire Hathaway	3/15/2021	$ 100,186	100,930.89	AA	2.408	1.619	US Corporate
7/1/2019	Georgia Power Company	4/1/2021	$ 52,113	50,339.98	A-	1.473	1.618	US Corporate
7/1/2019	American Express Credit	5/5/2021	$ 76,014	75,289.39	A-	1.944	1.712	US Corporate
7/1/2019	General Dynamics Corp	5/11/2021	$ 220,781	224,497.24	A+	2.832	1.801	US Corporate
7/1/2019	Abbvie Inc	5/14/2021	$ 99,823	99,701.97	A-	2.347	1.814	US Corporate
7/1/2019	State Street Bank	5/19/2021	$ 215,387	219,939.10	A	2.926	1.838	US Corporate
7/1/2019	American Honda Finance	7/12/2021	$ 213,536	219,336.19	A	2.936	1.971	US Corporate
7/1/2019	Caterpillar Finance Serv Corp	8/9/2021	$ 96,895	99,622.78	A	2.457	2.044	US Corporate
7/1/2019	Paccar Financial Corp	8/11/2021	$ 213,319	219,051.69	A+	2.938	2.051	US Corporate

Sorted by Security Type

Date To	Issuer	Maturity Date	Cost	Mkt Value And Accrued Interest	S&P Rating	Purchase Yield	Mkt Duration	Security Type
7/1/2019	Florida Power Corp	8/15/2021	$ 103,524	102,689.42	A	2.275	1.795	US Corporate
7/1/2019	JP Morgan Chase	8/15/2021	$ 99,271	100,726.68	A-	2.472	1.644	US Corporate
7/1/2019	Bank of NY Mellon Corp	2/7/2022	$ 97,233	102,056.12	A	3.523	2.404	US Corporate
7/1/2019	PNC Bank	2/17/2022	$ 246,828	254,599.69	A	3.074	2.432	US Corporate
7/1/2019	Verizon Communications	3/16/2022	$ 102,285	103,397.94	BBB+	2.596	2.572	US Corporate
7/1/2019	Amgen Inc	5/11/2022	$ 90,421	91,022.69	A	2.549	2.658	US Corporate
7/1/2019	Simon Property Group	6/15/2022	$ 97,380	101,075.76	A	3.355	2.831	US Corporate
7/1/2019	Morgan Stanley	1/23/2023	$ 98,258	103,636.91	BBB+	3.551	3.317	US Corporate
7/1/2019	Goldman Sachs Group Inc	2/23/2023	$ 83,542	87,963.16	BBB+	3.613	3.320	US Corporate
7/1/2019	Apple Inc	5/3/2023	$ 216,665	223,043.77	AA+	2.790	3.642	US Corporate
7/1/2019	Bank of America Corp	7/24/2023	$ 102,422	108,515.64	A-	3.562	3.693	US Corporate
				4,229,922.18				
7/1/2019	US Treasury	9/30/2019	$ 75,712	75,254.37	AA+	1.361	0.250	US Treasury
7/1/2019	US Treasury	9/30/2019	$ 397,375	400,569.54	AA+	2.511	0.250	US Treasury
7/1/2019	US Treasury	11/30/2019	$ 99,867	99,873.35	AA+	1.528	0.414	US Treasury
7/1/2019	US Treasury	3/31/2020	$ 395,125	399,444.34	AA+	2.520	0.740	US Treasury
7/1/2019	US Treasury	5/31/2020	$ 50,000	50,329.99	AA+	2.500	0.903	US Treasury
7/1/2019	US Treasury	7/31/2020	$ 61,153	60,210.19	AA+	1.179	1.063	US Treasury
7/1/2019	US Treasury	4/30/2021	$ 301,863	298,491.28	AA+	1.246	1.798	US Treasury
7/1/2019	US Treasury	1/31/2022	$ 319,211	328,701.40	AA+	2.507	2.495	US Treasury
7/1/2019	US Treasury	6/30/2022	$ 321,039	328,871.56	AA+	2.506	2.898	US Treasury
7/1/2019	US Treasury	8/31/2022	$ 199,352	200,454.51	AA+	1.532	3.058	US Treasury
7/1/2019	US Treasury	11/30/2022	$ 398,555	404,308.65	AA+	2.093	3.288	US Treasury
7/1/2019	US Treasury	9/30/2023	$ 384,203	395,397.54	AA+	2.310	4.093	US Treasury
				3,041,906.72				
				16,083,978.13				