Posting Date: 02-12-2021

NOTICE OF REGULAR BI-MONTHLY MEETING
BOARD OF DIRECTORS

MEETING DATE: 02-16-2021

TIME: 6:00 p.m.

LOCATION: **This meeting will be held virtually, pursuant to the Governor's Executive Order N-29-20.**

To participate online, go to https://zoom.us/j/99622592181. You can also participate by phone by calling 1-669-900-6833 and entering the webinar ID#: 996 2259 2181.

PARTICIPATION DURING MEETINGS**:** During the public comment periods, the public may comment by clicking the "raise hand" button on the bottom of the Zoom screen; if you are joining by phone and would like to comment, press *9 and we will call on you as appropriate.

EMAILED PUBLIC COMMENTS: You may submit your comments in advance of the meeting by emailing them to BoardComment@MarinWater.org. All emailed comments received by 3 p.m. on the day of the meeting will be provided to the Board of Directors prior to the meeting. Those emailed comments on approval items received by 3 p.m. will also be summarized by the board secretary at the board meeting. All emails will be posted on our website. (Please do not include personal information in your comment that you do not want published on our website such as phone numbers and home addresses.)

AGENDA ITEMS	RECOMMENDATIONS
Call to Order and Roll Call	
Adopt Agenda	***Approve***
Convene to Closed Session (Only the Board of Directors and staff will participate) The public will be asked to leave and come back to the open session beginning at 7:30 p.m.	
Closed Session Item	
1. Public Employee Performance Evaluation (Government Code §54957) Title: General Manager	

AGENDA ITEMS	RECOMMENDATIONS
2. Conference with Legal Counsel – Anticipated Litigation Significant exposure to litigation pursuant to § 54956.9(b) One case Consideration of a settlement proposal from Jeff Omhart related to past employment	
Convene to Open Session at or after 7:30 p.m.	
Closed Session Report Out	

Public Comment

Members of the public may comment on any items not listed on the agenda during this time. Comments will be limited to three (3) minutes per speaker, and time limits may be reduced by the board president to accommodate the number of speakers and ensure that the meeting is conducted in an efficient manner.

Directors' and General Manager's Announcements	
Consent Calendar All matters listed on the consent calendar are considered to be routine and will be enacted by a single action of the Board, unless specific items are removed from the consent calendar by the Board during adoption of the agenda for separate discussion and action.	
3. Minutes of the Board of Director's Regular Meeting of February 2, 2021	*Approve*
4. General Manager's Report for January 2021	*Approve*
5. Adopt Board of Directors' Handbook	*Approve*
6. Fourth Amendment to District Lease No. 44 with American Tower, LP	*Approve*
7. Professional Service Agreement with Kennedy/Jenks Consultants, Inc., for Engineering Services in support of the future Smith Saddle Tanks Rehabilitation Project	*Approve*
Regular Calendar	
8. Water Supply Report for January 2021	*Information*
9. Declare Initial Drought Water Conservation Actions	*Approve*

AGENDA ITEMS	RECOMMENDATIONS
10. Wildfire Resilience Study 2021 – Final Report	*Information*
11. Ordinance adoption to allow for extended repayment schedule for delinquent customers	*Approve*
12. Authorize General Manager to execute Professional Services Agreement with Carollo Engineers for the Kastania Pump Station Rehabilitation Project	*Approve*
13. Request approval to fill Associate Engineer Position	*Approve*
14. Future Meeting Schedule and Agenda Items	*Information*
Adjournment	

ADA NOTICE AND HEARING IMPAIRED PROVISIONS:

In accordance with the Americans with Disabilities Act (ADA) and California Law, it is Marin Water's policy to offer its public programs, services, and meetings in a manner that is readily accessible to everyone, including those with disabilities. If you are disabled and require a copy of a public hearing notice, an agenda, and/or agenda packet in an appropriate alternative format, or if you require other accommodations, please contact Board Secretary Terrie Gillen at 415.945.1448, at least two days in advance of the meeting. Advance notification will enable the Marin Water to make reasonable arrangements to ensure accessibility.

INFORMATION PACKETS ARE AVAILABLE FOR REVIEW AT THE CIVIC CENTER LIBRARY, CORTE MADERA LIBRARY, FAIRFAX LIBRARY, MILL VALLEY LIBRARY, MARIN WATER OFFICE, AND ON THE MARIN WATER WEBSITE (MARINWATER.ORG)

FUTURE BOARD MEETINGS:

- Wednesday, February 17, 2021
  Communications & Water Efficiency Committee/Board of Directors (Communications & Water Efficiency) Meeting
  9:30 a.m.

- Friday, February 19, 2021
  Operations Committee/Board of Directors (Operations) Meeting
  9:30 a.m.

Board Secretary

Item Number: 03
Meeting Date: 02-16-2021
Meeting: Board of Directors

Approval Item

TITLE
Minutes of the Board of Directors' Regular Meeting of February 2, 2021

RECOMMENDATION
Approve the adoption of the minutes.

SUMMARY
On February 2, 2021, the board held its regular bi-monthly meeting. The minutes of both meetings are attached.

DISCUSSION
None

FISCAL IMPACT
None

ATTACHMENT(S)
1. Minutes of the Board of Directors' Regular Bi-Monthly Meeting of February 2, 2021

DEPARTMENT OR DIVISION	DIVISION MANAGER	APPROVED
Communications & Public Affairs Department	Terrie Gillen Board Secretary	Ben Horenstein General Manager

Item Number: 03
Attachment: 1

MARIN MUNICIPAL WATER DISTRICT
BOARD OF DIRECTORS

MEETING MINUTES

Tuesday, February 2, 2021

Via teleconference
(In accordance with Governor Gavin Newsom's Executive Order N-29-20)

DIRECTORS PRESENT: Larry Bragman, John C. Gibson, Cynthia Koehler, Larry L. Russell, and Monty Schmitt

DIRECTORS ABSENT: None

CALL TO ORDER AND ROLL CALL
Board President Koehler called the meeting to order at 7:30 p.m.

ADOPT AGENDA
On motion made by Director Gibson and seconded by Director Schmitt, the board adopted the agenda by the following roll call vote:

Ayes:	Directors Bragman, Gibson, Russell, Schmitt and Koehler
Noes:	None
Abstain:	None

DIRECTORS' AND GENERAL MANAGER'S ANNOUNCEMENTS

There were no announcements.

PUBLIC COMMENT
There were no public comments.

CONSENT CALENDAR (ITEMS 1-6)

Item 1 **Minutes of the Special Board of Directors' Meeting of January 13, 2021, and Regular Bi-Monthly Board of Directors' Meeting of January 19, 2021**

Item 2 **Purchase of Fourteen (14) Portable Emergency Generators**

Item 3 **Purchase of Agilent Technologies ICP-MS**

Item 4 **Award of Contract No. 1916, Kent Lake Aerator Vent Lines Replacement Project, in the amount of $59,681.25, to Associated Underwater Services, Inc. to replace the Kent Lake Aerator vent and air lines, and install a new aerator lifting rope**

Item 5 **Coastal Conservancy Grant Forestry Restoration**

Item 6 **Continuation of Emergency Contracting Provisions for Replacement of the Porteous Tunnel Pipeline**

On motion made by Director Gibson and seconded by Director Russell, the board approved the Consent Calendar by the following roll call vote:

Ayes: Directors Bragman, Gibson, Russell, Schmitt, and Koehler
Noes: None
Abstain: None

REGULAR CALENDAR (ITEMS 7-10)

Item 7 **Water Supply Update**

Operations Manager Paul Sellier brought forth this item. Discussion ensued.

There was no public comment.

The board did not take any formal action on this agenda item.

Item 8 **Rental of Temporary Portable Generators for Soulajule Pump Station**

Operations Manager Sellier also introduced this agenda item. Afterwards, the board and staff conversed on this topic.

There were no public comments.

On motion made by Director Gibson and seconded by Director Russell, the board approved the authorization of the general manager to negotiate and execute an agreement with Sunbelt Rentals for the rental of temporary portable generators to power Soulajule Pump Station in an amount not to exceed $1,267,748 that includes a $100,000 contingency for necessary amendments to the agreement, by the following roll call vote:

Ayes: Directors Bragman, Gibson, Russell, Schmitt, and Koehler
Noes: None
Abstain: None

Item 9 2020 Urban Water Management Plan (UWMP) Demand Projections

Water Conservation Manager Carrie Pollard presented this item. Discussion followed.

There was no public comment.

The board did not take any formal action on this agenda item.

Item 10 Future Meeting Schedule and Agenda Items

The board secretary brought forth this item. There was no discussion nor public comment.

The board took no formal action.

ADJOURNMENT
There being no further business, the regular bi-monthly Board of Directors' meeting of February 2, 2021, adjourned at 8:26 p.m.

_____
Board Secretary

Item Number: 04
Meeting Date: 02-16-2021
Meeting: Board of Directors

Approval Item

TITLE
General Manager's Report for January 2021

RECOMMENDATION
Approve Report.

SUMMARY

A. HIGHLIGHTS:

- Conducted annual inspection of the District seven dams with the State Division of Safety of Dams, which determined the District's dams to be safe for continued use.

- Conducted BFFIP environmental compliance surveys along Ridgecrest Blvd to facilitate fuel reduction work.

- Completed vegetation management and fuel reduction work below Crown Road/Kent Woodlands, along lower Rail Road Grade, at Phoenix Dam spillway, along Upper Eldridge Road, at Knob I. and around Bon Tempe Treatment Plant.

- Our first approved applicant to the Garden Grant Program (Homestead Valley Community Center, Mill Valley) completed garden installation and is finalizing educational signage. Project will be completed by mid-March 2021. A second garden site at Dominican University has been proposed by staff/students in the University's Institute for Leadership Studies (ILS) with a tentative project completion by the end of 2021. MMWD staff are working with ILS staff to guide them through the formal application process.

- Partnered with Rachio and the California Water Efficiency Partnership to offer single-family residential customers a 70% discount on Rachio 3 controllers through an innovative direct distribution program, starting 2/1/2021. These smart controllers accurately predict weather changes and automatically adjust watering schedules so landscapes receive just the right amount of water. Through the Rachio Insights Portal, water efficiency staff can monitor irrigation programming and send notifications to customers, including the 1,217 Marin Water customers who are already using Rachio controllers.

- The Water Quality Lab ensured that the water we supplied met or surpassed water quality regulations by collecting and analyzing over 120 Total Coliform Rule (TCR), and 16 treatment plant samples. The lab performed 20 tank surveys and checked an additional 18 tanks for low chlorine, resulting in 6 water storage tanks chlorinated in January 2021.

- Staff have completed the process of installing tank hatch alarms on all storage tanks and have started the process of installing door alarms on all pump stations.

DISCUSSION

B. SUMMARY:

AF = Acre Feet

Mg/L = milligrams per liter

MPN = most probable number

MPY = mils per year

MG = million gallons

NTU = nephelometric turbidity units

1. Water Production:

Item	FY 2020/21		FY 2019/20	
	(million gallons)	(acre-feet)	(million gallons)	(acre-feet)
Potable				
Total production this FY	5,395	16,558	5,311	16,300
Monthly production, January	486	1,493	467	1,433
Daily average, January	15.69	48.16	15.06	46.23
Recycled[1]				
Total production this FY	0.00	0.00	0.00	0.00
Monthly production, January	0.00	0.00	0.00	0.00
Daily average, January	0.00	0.00	0.00	0.00
Raw Water				
Total production this FY	41.23	126.53	37.46	114.96
Monthly production, January	0.00	0.00	0.37	1.14
Daily average, January	0.00	0.00	0.01	0.04
Imported Water				
Total imported this FY	1,467	4,503	933	2,864
Monthly imported, January	285	875	141	433
Reservoir Storage				
Total storage, January	14,740	45,236	24,463	75,073
Storage change during January	-157	-482	1,701	5,220
Stream Releases				
Total releases this FY	2,033	6,239	2,037	6,250
Monthly releases, January	571	1,751	387	1,187

[1] Recycled water was temporarily discontinued in February 2019 to accommodate construction of the Las Gallinas Valley Sanitary District's Secondary Treatment Plant Upgrade and Recycled Water Expansion Project. Production will resume upon completion of this project, which is anticipated to occur in late 2020.

2. Precipitation:

	FY 2020/21 (in.)	FY 2019/20 (in.)
Alpine	13.56	22.70
Bon Tempe	10.93	20.48
Kent	11.63	21.28
Lagunitas *	14.57	27.65
Nicasio	7.10	15.61
Phoenix	10.71	27.74
Soulajule	6.64	17.40

* Average to date = 30.14 inches

3. Water Quality:

Laboratory:	FY 2020/21	FY 2019/20
Water Quality Complaints:		
Month of Record	14	8
Fiscal Year to Date	101	230
Water Quality Information Phone Calls:		
Month of Record	6	10
Fiscal Year to Date	86	96

The lab performed 1,865 analyses on lakes, treatment plants and distribution system samples.

Mild steel corrosion rates averaged 2.36 (0.37–5.40) MPY. The AWWA has recommended an operating level of <5 MPY with a goal of <1 MPY.

Complaint Flushing: No complaint flushing was performed for this month on record.

Tank Survey Program: 20 water storage tank sanitary surveys were performed during the month. 7.94 % planned survey program has been completed for calendar year 2021.

Disinfection Program: 2,350’ of new pipeline was disinfected during the month. Performed chlorination’s on 6 water storage tanks to ensure compliance with bacteriological water quality regulations.

Tank Water Quality Monitoring Program: Performed 18 water quality-monitoring events on storage tanks for various water quality parameters this month to help ensure compliance with bacteriological water quality regulations.

4. Water Treatment:

	San Geronimo		Bon Tempe		Ignacio	
Treatment Results	Average	Monthly Goal	Average	Monthly Goal	Average	Monthly Goal
Turbidity (NTU)	0.06	≤ 0.10	0.04	≤ 0.10	0.05	≤ 0.10
Chlorine residual (mg/L)	2.52	2.50 *	2.49	2.50 *	2.48	2.50 *
Color (units)	0.6	≤ 15	0.3	≤ 15	0.0	≤ 15
pH (units)	7.8	7.8*	7.8	7.8*	8.0	8.1**

* Set monthly by Water Quality Lab

** pH to Ignacio is controlled by SCWA

5. Capital Improvement:

a. Sir Francis Drake Blvd Corridor Rehabilitation Project
Summary: This project involves the replacement of 8,500 feet of 100-year-old, leak prone cast iron pipe as a joint project with Marin County along Sir Francis Drake Blvd.
- Project Budget: $4,647,762
- Monthly Activities: The contractor continues to actively work during daylight hours on both the road improvement and pipeline replacement portions of the work. To date, approximately 3,650 feet of 12 and 8-inch water main have been installed. Completion is anticipated for May/June.

b. Piedmont Road Pipeline Replacement Project
Summary: This project involves the replacement of 2,190 feet of 100-year old, cast iron and galvanized threaded leak prone pipe in Larkspur, in coordination with Larkspur's road paving project.

- Project Budget: $744,610
- Monthly Activities: The contractor finished installing the additional 350 feet of pipe on West Baltimore. All work should be completed in February.

c. 5th Ave FFIP Pipeline Replacement Project
Summary: This project involves the replacement of 3,990 feet of 90-year old, leak prone cast iron undersized fire flow deficient pipe in support of the District's Fire Flow Improvement Program in San Rafael.

- Project Budget: $2,279,140
- Monthly Activities: The contractor is currently installing mainline pipe on 5th Avenue. To date approximately 2,700 feet of 18-inch pipe has been installed.

d. San Geronimo Treatment Plant Permanent Emergency Generator Project
Summary: This project involves the installation of two 1.5 MW generators, electrical equipment, fuel storage tanks and site grading all within the community of Woodacre at the District's San Geronimo Treatment Plant to provide emergency power to the plant in the event that power from PG&E is disrupted by a Public Safety Power Shutoff (PSPS) event or some other cause.

- Project Budget: $5,375,600
- Monthly Activities: District staff is currently reviewing submittals and request for information from the contractor. Contractor will be starting construction in March.

e. Southern Marin Pipeline Replacement Project (D20022)
Summary: This project involves the replacement of 5,080 feet of problematic and leak prone cast iron pipe, originally installed in the 1960s and 1970s, in Tiburon, Sausalito and Belvedere, in coordination with Belvedere's earthquake resiliency program and Sanitary District No. 5's Cove Road Force Main Replacement Project, and planned paving work to minimize public impacts.

- Project Budget: $2,985,000
- Monthly Activities: District awarded the contract and construction is scheduled to begin in February.

f. Porteous Tunnel Pipeline Emergency Replacement Project (F21001)
Summary: This project involves the emergency repair/replacement of the failing 100-year old pipeline inside Porteous Tunnel on the District's watershed.

- Project Budget: $1,400,000
- Monthly Activities: The pipeline has been installed through the tunnel and tied into the transmission system. Only minor grading and other small items are necessary to be completed with this project. The project will be completed in early February.

g. Alpine/Bon Tempe Raw Water Transfer Pipeline Replacement Project (D20027)
Summary: This project involves the replacement of approximately 300-feet of the pipeline transferring raw water from Alpine to Bon Tempe.

- Project Budget: $312,000
- Monthly Activities: Contractor has mobilized on site to start construction work.

6. Other:

Pipeline Installation	FY2020/21	FY2019/20
Pipe installed during January (feet)	525	20
Total pipe installed this fiscal year (feet)	9,417	15,247
Total miles of pipeline within the District	908*	908*

** Reflects adjustment for abandoned pipelines*

Pipe Locates	FY2020/21	FY2019/20
Month of January (feet)	29,775	44,333
Total this fiscal year (feet)	251,686	282,392

Main Line Leaks Repaired:	FY2020/21	FY2019/20
Month of January	14	8
Total this fiscal year	105	105

Services:	FY2020/21	FY2019/20
Service upgrades during January	9	18
Total service upgrades this FY	95	104
Service connections installed during January	1	2
Total active services as of February 1, 2021	60,475	60,520

7. Demand Management:

	Jan-21	FY 20/21 TOTAL	FY 19/20 TOTAL	FY 18/19 TOTAL
WATER-EFFICIENCY PROGRAMS				
Water-Use Site Surveys				
Conservation Assistance Program (CAP) Consultations				
Residential properties resi 1-2 (single-family)	1	18	127	109
Residential properties resi 3-5 (multi-family units)	0	1	30	2
Non-residential properties resi 6-7 (commercial)	1	1	3	6
Dedicated irrigation accounts resi 8-10 (large landscape)	0	0	-	2
Marin Master Gardeners' Marin-Friendly Garden Walks				
Residential garden walks	0	65	91	122
CYES Water/Energy Surveys				
Residential surveys	0	0	86	238
Public Outreach and Education, Customer Service				
Public outreach events (number of people attending)	0	0	1,150	13,691
Public education events (number of participants)	0	0	-	500
Laundry-to-Landscape Graywater webinars (participants)	0	84	-	-
Customer calls/emails admin staff	121	1199	2,230	1,835
School Education				
School assemblies				
Number of activities	0	0	15	17
Number of students reached	0	0	6,349	5,915
Field trips				
Number of activities	0	0	11	6
Number of students reached	0	0	91	130
Classroom presentations				
Number of activities	0	0	11	21
Number of students reached	0	0	305	554
Other (e.g. booth events, school gardens)		0		
Number of activities	0	0	-	1
Number of students reached	0	0	-	250
Incentives				
Number of HECWs approved	12	45	53	61
Number of Rain Barrel/Cisterns approved	1	8	4	8
"Landscape Your Lawn" Turf Replacments approved	0	1		
Number of Laundry-to-Landscape Systems approved	0	0	-	-
Number of Smart Controllers rebates approved	9	43	12	-
Advanced Metering Infrastructure (AMI)				
AMI leak letters sent to customers (>200 GPD)	64	838	1,384	896
ORDINANCES				
Water Waste Prevention				
No. of properties reporting activity	3	48	147	148
Landscape Plan Review				
Plans submitted	8	47	89	113
Plans exempt	0	3	5	6
Plans completed	3	12	23	37
Plans in workflow (pass & fail)	17	79	145	173
Tier 4 Exemption				
Inspections that resulted in a pass	0	0	1	1
Graywater Compliance Form				
Applications Received *(as of Dec 2019)*	2	55	39	-
Systems installed	0	4	11	14

8. Watershed Protection:

Rangers Investigate Alleged Assaults

During January, Rangers investigated two cases of alleged assaults that occurred on our trails. Both incidents involved cyclists riding trails illegally and hikers confronting them. In both cases, Rangers interviewed the involved parties and reviewed the available evidence. In the first case the aggressor could not be determined. In the second case the victim did not want charges filed. All parties were counseled in both cases. The cyclists were reminded to stay off trails closed to bike use, and the hikers were told not to confront, but report cyclists to us.

Visitor Use Remains High in January

The Watershed remained busy with visitors. Every weekend the parking lots around the watershed fill to capacity. On three occasions this month Sky Oaks Road had to be shutdown to incoming vehicles due to the parking lots being full. Locations like Cataract Trail, have seen record levels of use. One Saturday Rangers counted over 500 hikers in an hour on Cataract Trail, and the same day counted over 240 cars parked along Bolinas Road Trailhead for Cataract. There are only 100 safe parking places.

Hasty Search for 10 Year Old on Cataract Trail

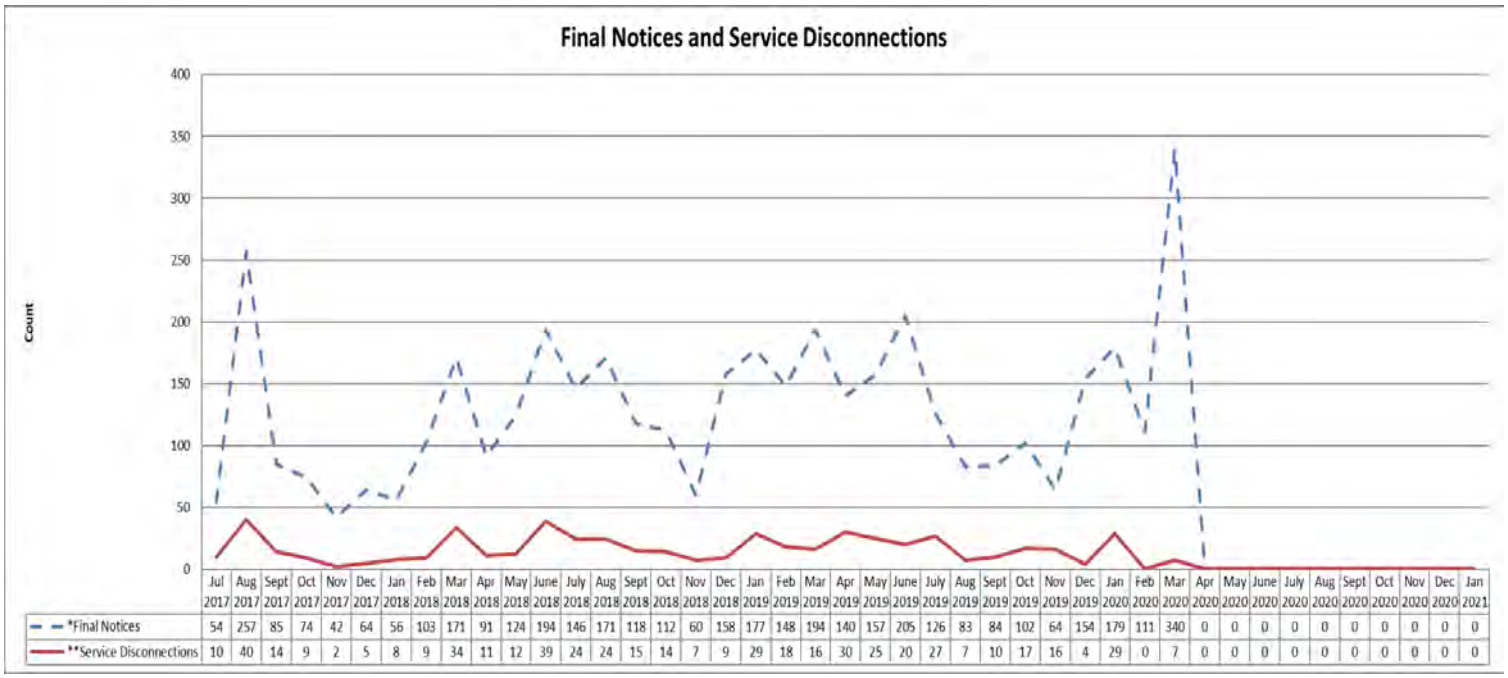
On January 23rd a Ranger was flagged down by the parents of a 10 year old boy who had gone missing on Cataract Trail. A hasty search involving multiple Rangers was begun and after an hour and a half, the boy was found. The boy stated he became lost after losing sight of his parents due to the crowds on the trail.

Incidents and Events	819
Warnings	276
Citations	220
Visitor Assists	212
Dam Check	17
Vandalism	14
Misc. Law Enforcement Calls	10
Illegal Trail Work	10
Parking at Capacity/Lots Closed	10
Preventative Search and Rescue	8
Assist Watershed Maintenance	7
Citizen Complaint: Illegal Bike Use	4
Search and Rescue	3
Medical Aid	3
Assist Outside Law Enforcement	3
Citizen Complaint: Recreational Impacts	3
Assault/Battery	2
Ranger Callouts	1
Theft	1
Traffic Court Appearance	1
Humane or Animal Related Call	1
Citizen Complaint: Swimming	1
Citizen Complaint: EBike	1
Creating Hazard to Others	1
Illegal Dumping	1
Assist Other Agency	1
Citizen Complaint: Dog off Leash	1
Illegal Camping	1
Citizen Complaint: Amplified Music	1
Vehicle Accident	1
Found Property	1
Weapons Violation	1
Citations	**220**
Non-payment of parking fees	161
Parking After Sunset	22
Park on Roadway or Parking w/ 6' Center	21
No Parking	6
Dog off Leash	4
Bike on Trail	3
Park in Front of Gate	2
Vehicle Code Violation	1

9. Shutoff Notices and Disconnections:

January 2021
Final Notices: 0 Service Disconnections: 0

* Includes 5 day, 10 day and final notices
**3/13/20 Suspended termination of water service for non-payment due to COVID- 19
*3/24/20 Suspended Late Fees and Final Notices



	Jul 2017	Aug 2017	Sept 2017	Oct 2017	Nov 2017	Dec 2017	Jan 2018	Feb 2018	Mar 2018	Apr 2018	May 2018	June 2018	July 2018	Aug 2018	Sept 2018	Oct 2018	Nov 2018	Dec 2018	Jan 2019	Feb 2019	Mar 2019	Apr 2019	May 2019	June 2019	July 2019	Aug 2019	Sept 2019	Oct 2019	Nov 2019	Dec 2019	Jan 2020	Feb 2020	Mar 2020	Apr 2020	May 2020	June 2020	July 2020	Aug 2020	Sept 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2021
*Final Notices	54	257	85	74	42	64	56	103	171	91	124	194	146	171	118	112	60	158	177	148	194	140	157	205	126	83	84	102	64	154	179	111	340	0	0	0	0	0	0	0	0	0	0
**Service Disconnections	10	40	14	9	2	5	8	9	34	11	12	39	24	24	15	14	7	9	29	18	16	30	25	20	27	7	10	17	16	4	29	0	7	0	0	0	0	0	0	0	0	0	0

FISCAL IMPACT
None

ATTACHMENT(S)
None

DEPARTMENT OR DIVISION	DIVISION MANAGER	APPROVED
Office of the General Manager	_____	
	Ben Horenstein **General Manager**	**Ben Horenstein** **General Manager**

Item Number: 05
Meeting Date: 02-16-2021
Meeting: Board of Directors

Approval Item

TITLE
Adopt Board of Directors' Handbook

RECOMMENDATION
Adopt the Marin Municipal Water District Board of Directors' Handbook as a Board Policy.

SUMMARY
At the December 1, 2020 regular bi-monthly Board of Directors meeting, staff introduced a draft of the Marin Municipal Water District Board of Directors' Handbook (Board Handbook) for Board approval. Multiple Board members expressed concern regarding the language pertaining to the Use of Title provisions in the version of the Board Handbook presented then. Based upon input from the Board during that meeting, staff has revised the Use of Title language in the Board Handbook and now staff requests that the Board approve the revised Board Handbook being presented and adopt it as a Board Policy.

DISCUSSION
Board handbooks or similar board governance documents are utilized by most agencies including: Alameda County Water District, California Special District Association, Central Contra Costa County Sanitary District, Contra Costa Water District, East Bay Municipal Water District, North Marin Water District, and Ross Valley Sanitary District. A board handbook informs Directors of policies, procedures and practices applicable to the Board and serves as a governance document for the Board of Directors.

At the December 1, 2020 regular bi-monthly Board of Directors meeting, staff introduced a draft of the Board Handbook for Board approval. During that meeting multiple Board members expressed concern regarding the Use of Title provisions in the version of the Board Handbook presented then. Staff has revised the Use of Title provisions in an effort to address the concerns expressed at that meeting.

Use of Title/ Advocacy on Non-Board Approved Matters

Staff has revised the Use of Title Provision of the Board Handbook to read as follows:

Elected or appointed officials may not take positions on behalf of the District without the express prior permission and direction of the Board. When Board members are asked for

the District's opinion on an issue, the response should reflect the position of the Board. Any position of the Board is developed through a collective action taken by the entire Board.

It is the preference of the Board that Board members refrain from using their titles to engage in advocacy on matters that do not reflect the position of the Board. If, however, an individual Board member elects to engage in producing any correspondence, public comment or oral presentation or to engage in advocacy on matters other than in representation of a Board position, the Board member should not use his or her Board title, or otherwise suggest or imply that their positions reflect the position of the Board or the District.

If a Board member produces or engages in advocacy that does not reflect a collective action taken by the entire Board and finds that it is necessary to make reference to their Board title, the advocacy must be accompanied by a clear and prominent disclaimer stating that the position being expressed is that of the individual Board member and does not reflect the position of the District or the Board.

For reference, a redline version of the Board Handbook highlighting the revisions to the Use of Title provisions is attached hereto.

In addition to this change, staff also revised the Board Meetings section of the Board Handbook to reflect the current meeting days of the first and third Tuesdays each month, which reads as follows:

Regular Meetings

> *The principal type of meeting at which District business is conducted is at a regular bi-monthly meeting of the Board. Regular bi-monthly meetings of the Board of Directors will be held the first and third Tuesdays of each month, to begin at or after 6p.m., but normally at 7:30p.m., in the boardroom located at the District office (220 Nellen Avenue, Corte Madera, California) unless otherwise stated in a Board adopted calendar for the upcoming year, prior to January 31st of each year.*

If the Board Handbook is adopted tonight, staff will bring a future item to (1) repeal certain Board Policies that are now addressed in the Board Handbook, and (2) repeal Chapter 2.10 of the District Code pertaining to Board meetings, as the information is now also addressed in the Board Handbook. This is a first step in a larger effort by staff to update Board Policies and District Code where appropriate.

FISCAL IMPACT
None

ATTACHMENT(S)
1. Redline Revised Marin Municipal Water District Board of Directors' Handbook
2. Resolution No.

DEPARTMENT OR DIVISION	GENERAL COUNSEL	APPROVED
General Counsel's Office	**Molly MacLean** **General Counsel**	**Ben Horenstein** **General Manager**

MARIN MUNICIPAL WATER DISTRICT

Board of Directors Handbook

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    iii. Urgency Items
c. Attendance, Conduct, Quorum & Voting, Rules of Order, Brown Act
    i. Teleconferencing
    ii. Quorum/Board Action
    iii. Brown Act (Open Meetings)
d. Meeting Minutes

SECTION 4: Conferences, Training, Reporting Requirements

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MARIN MUNICIPAL WATER DISTRICT

BOARD OF DIRECTORS HANDBOOK

~~December 1,~~February 16, 2020

SECTION 1: Introduction/Purpose

Introduction

This handbook is compiled as a guidance document to provide incumbent and newly elected members of the Marin Municipal Water District ("District") Board of Directors ("Board") with general information and specific authorities regarding oversight of the District. This handbook is intended to facilitate the handling of Board affairs, assist the Board in complying with open meeting laws, and is complementary to applicable laws and other requirements.

The District is an independent special district, formed pursuant to the Municipal Water District Law of 1911 and approved by voters to provide specific services to residences within the District's service area. The District is a single function, enterprise special district because it charges its customers for the service provided. The District is governed by a five-member Board elected by voters within a specified limited boundary or division. Each Board member must be a resident of the division from which he or she is elected. Regular elections for Board members are held every 2 even years for staggered 4-year terms (i.e., divisions I, III & IV are elected in one 2-year election cycle and divisions II & V in the other 2-year election cycle).

The Board holds publicly noticed meetings in accordance with the Brown Act where citizens may address the Board regarding matters within the subject matter jurisdiction of the District.

Governing Laws and Regulations

The District was formed pursuant to California Water Code Section 71000 *et seq*., commonly known as the Municipal Water District Law of 1911. The California Government Code contains a number of provisions applicable to the District and Board member activities including, but not limited to: the Ralph M. Brown Act (Open Meetings Law), Public Records Act (Public Access to Information), Government Code Section 1090 and the Political Reform Act (Conflict of Interest), Assembly Bill 1234 (Ethics), and Assembly Bill 1661 (Sexual Harassment Prevention).

Board Policies and Administrative Procedures

The mission of the District, as established by the Board of Directors, is to manage its natural resources in a sustainable manner and to provide its customers with reliable, high-quality water at a reasonable price. The Board communicates its direction, or its philosophy, toward fulfilling this mission by developing and periodically reviewing its values and goals, and creating and updating various policies and procedures to ensure that the District's customers and the public are treated in a fair and consistent manner. In most instances, policy is established by at least a majority vote of the Board, and a decision of the majority of the Board generally binds the District to a given course of action. However, some circumstances may necessitate the approval of a supermajority of the Board. The District's General Counsel will advise the Board of the approval requirements necessary to bind the Board to a given course of action.

Current District values and goals are listed below:

VALUES

- Promote environmental stewardship and sustainability
- Conduct business with integrity and in an ethical manner
- Ensure fair, open, and responsive interactions with MMWD customers and other members of the public
- Promote diversity in and equitable treatment of our employees
- Provide a healthy work environment
- Work cooperatively with other public agencies and groups
- Treat all individuals with fairness, dignity, and respect
- Continuously improve through the promotion of initiative, leadership, professional development and training
- Exercise responsible financial management

DISTRICT GOALS

- Assure that water produced is of high quality and protects public health from source to the customer's tap
- Provide a long-term reliable water supply for MMWD customers
- Maintain the District's infrastructure in a cost-effective manner to assure reliable operation
- Provide a water rate structure that is fair and reasonable, and that adequately funds the long-term maintenance and capital needs of the District's supply and delivery systems
- Promote conservation and water recycling programs and other practices which encourage the efficient use of water
- Provide responsible stewardship of land under district management, balancing existing mandates to safeguard ecological integrity, protect against wildfire, and maintain water quality

- Provide for visitor access and activities on watershed lands consistent with the constraints of watershed stewardship
- Maintain excellent communications with customers and assure responsive customer service
- Ensure a stable and talented workforce to do the District's work today and into the future

District governing documents include but are not limited to: the Marin Municipal Water District Code, Board Policies, Administrative Policies, Administrative Procedures, and applicable state and federal laws, which collectively constitute the policies and procedures which District staff follow when carrying out their day-to-day duties.

District administrative and operating procedures are approved by the General Manager pursuant to the authority delegated by the Board and are implemented to ensure that the District operates in a uniform and businesslike manner, and in accordance with the established policies of the Board.

SECTION 2: Board Officers and Board Appointed Staff

Board Officers and General Board Duties

Appointment of Officers and Duties

At its first meeting in January of each year the Board elects one of its members President and one of its members Vice President. The Board President and Vice President have no additional powers beyond those of any other Board member except that all committees of the Board are appointed by the President, with the advice and consent of other Board members.

The following are the responsibilities of the Board President:

- Serve as presiding officer of all Board meetings and maintain proper and appropriate parliamentary procedure (Robert's Rules of Order) and agenda management (e.g. ensure that actions are taken with proper motions and seconds);
- Run effective and efficient Board meetings and keep the Board discussions focused on agenda items to steadfastly move the Board toward making decisions true to its proper role and responsibility;
- Maintain proper conduct at Board meetings and diplomatically facilitate appropriate public participation in the activities of the Board in accordance with the Brown Act, while managing time and avoiding diversions from the agenda or disruptions in conducting District business;
- Allow other Board members to complete their comments on an item before offering his or her own;
- Vote, discuss, and make motions the same as other Board members; however, the President only makes motions and seconds when other Board members are reluctant to do so;

- Sign various Board-approved documents, including every original ordinance and resolution passed and adopted by the Board; and
- Act as the official representative of the District for ceremonial purposes, unless unavailable or delegated to another Board member or the General Manager.

The Vice President exercises the powers and responsibilities of the President in his or her absence.

General Board Duties

The Board is collectively the unit of authority within the District. Apart from a Board member's normal function as a part of this unit, an individual Board member has no authority to bind the District to a specific course of action.

The Board, as governing body of the District, is charged with full jurisdiction over all water works necessary for the acquisition, storage, treatment, sale and distribution of water served to District customers. The General Manager is charged with carrying out this responsibility on a day-to-day basis. Among other duties the Board has the authority to:

- Acquire or sell real District property, to construct and operate facilities, to purchase equipment and enter into contracts;
- Adopt and oversee annual District budgets and finances, set water rates and charges, and approve the purchase of resources needed by management to carry out District policies; and
- Appoint and conduct annual performance evaluations of the General Manager and General Counsel, and approve compensation for all District employees.

Communication to/from the Board

The tone and content of all communications should reflect the highest degree of professionalism and respect. Board members are responsible for the content of all text, audio, or images that they place or send, including those sent over the District computer network. Messages with fraudulent, harassing, abusive, obscene, vulgar, profane, offensive, or sexually suggestive content are prohibited. Messages with derogatory or inflammatory remarks related to a person's membership in any protected class are also prohibited.

When a Board member receives a complaint or inquiry from the public regarding the District's services and/or staff, the Board member should acknowledge the complaint or inquiry without making any promise or commitment as to what will happen on behalf of the District and forward the message to the General Manager. Board members are encouraged to engage the public on matters of District interest and concern but cannot guarantee an outcome or result before the Board has acted.

Emails/ Text Messages

The District provides each Board member his or her own District email address. Routine communication should be by District email. Board members should refrain from using any

communication method that may result in a serial meeting. For example, Board members should refrain from using the "reply all" function to respond to emails sent to the Board and should not use email or other means of communication to develop a consensus on any issue within the Board's subject matter jurisdiction outside of a public meeting. (See later reference to the Brown Act, Section 3)

Email messages related to District business, sent from either District email accounts or personal accounts, are considered "public records" and accordingly, unless exempt from disclosure pursuant to the provisions of the California Public Records Act, may be disclosed in response to a public records request. These emails may also be subpoenaed as evidence in litigation. The District reserves the right to access and disclose all messages sent over its computer network and email system for any lawful purpose. The use of personal email accounts and personal electronic devices for District business is still subject to the disclosure requirement of the Public Records Act or a subpoena. Board members should carefully consider whether the use of personal email for District business is appropriate.

Board members are responsible for checking their incoming email frequently, reading its contents and responding in a timely manner. Messages transmitted over the District email system should only involve District-related activities for the accomplishment of business-related tasks or any communication directly related to District business, administration or practices. The District email system should not be used for personal correspondence. All email messages received at or sent through the District server system, including emails sent and received by Board members' District email addresses, are property of the District and are not private.

Board members should remain aware that the rules applicable to emails also apply to text message communications. Therefore, Board members should use good judgment when sending and receiving electronic communications of any kind, including text messages. Board members should refrain from sending any electronic communications regarding matters within the subject matter jurisdiction of the Board during Board or committee meetings. Instead, Board member comments and discussions should occur aloud during the meeting in order to ensure members of the public may properly observe their elected official's opinions on District matters.

Social Media

Board members may use social media to engage in separate conversations or communications on an internet-based social media platform to answer questions, provide information to the public, or to solicit information from the public regarding matters that are within the subject matter jurisdiction of the Board provided that a majority of the members of the Board do not use the internet-based social media platform to discuss among themselves business within the subject matter jurisdiction of the Board. Board members should remain aware that the phrase "discuss among themselves" is broadly defined to include any communications made, posted, or shared on an internet-based social media platform between members of the Board, including comments or use of digital icons that express reactions to communications made by other members of the Board, such as "like". For this reason, Board members should not comment or use any digital icons (i.e., like, dislike, etc.) expressing reactions to fellow Board members' social

media posts related to District business. Board members should also refrain from taking positions on social media regarding any matter that is pending or may become before the Board.

Contact with Media

Because the public receives much of its information regarding District programs, policies and operations through the media, it is important that the District provide the media with the most complete and accurate sources of information available. Thus, the General Manager or his designee shall serve as the District's primary spokesperson and the media's primary source of contact with the District. Media inquiries about official District business, including requests for explanations of District policy, should be directed to the General Manager or his designee.

Board member communications with the media in which the District is a subject matter of discussion shall be clearly identified as an expression of personal opinion of the individual Board member who is expressing his or her opinion to the media.

Use of Title/ Advocacy on Non-Board Approved Matters

Elected or appointed officials may not take positions on behalf of the District without the express prior permission and direction of the Board. When Board members are asked for the District's opinion on an issue, the response should reflect the position of the Board. Any position of the Board is developed through a collective action taken by the entire Board.

It is the preference of the Board that Board members refrain from using their titles to engage in advocacy on matters that do not reflect the position of the Board. If, however, an individual Board member elects to engage in producing any correspondence, public comment or oral presentation or to engage in advocacy on matters other than in representation of a Board position, the Board member should not use his or her Board title, or otherwise suggest or imply that their positions reflect the position of the Board or the District.

If a Board member produces or engages in advocacy that does not reflect a collective action taken by the entire Board and finds that it is necessary to make reference to their Board title, the advocacy must be accompanied by a clear and prominent disclaimer stating that the position being expressed is that of the individual Board member and does not reflect the position of the District or the Board.

~~Elected or appointed officials may not take positions on behalf of the District without the express prior permission and direction of the Board. When Board members are asked for the District's opinion on an issue, the response should reflect the position of the Board. An individual Board member may clarify his or her position on an issue if requested to do so, however, any position of the Board is developed through a collective action taken by the entire Board. This collective Board action is then the District's position on the issue.~~

~~Board members may not take positions on behalf of the District without the express prior permission and direction of the entire Board. Board members should refrain from the use of their title (e.g. Mary Jane, Marin Municipal Water District Board President) in letters or communication~~

~~on advocacy for non-District business. This will prevent confusion among members of the public who may not understand whether the subject matter is or is not District business and if the advocacy is the sole opinion of the individual Board member or the collective position of the Board. If the Board member elects to use his or her title for non-District advocacy, the Board member must include a disclaimer that immediately follows the opinion expressed by the individual Board member. The disclaimer should indicate that the matter does not relate to District business and that the position of the individual Board member is his or her sole opinion and does not reflect the position of the District or the Board.~~

Board Appointed Staff

General Manager

The General Manager is appointed by and reports to the Board to carry out the day-to-day activities of the District pursuant to adopted ordinances, resolutions and policies. The General Manager has full charge and control of the maintenance, operation and construction of the waterworks system of the District and authority to employ and discharge employees, except those appointed by the Board, and determine employee duties necessary to carry out these responsibilities. The General Manager shall provide a written monthly report to the Board summarizing the work performed during the month and other items of importance or interest to the Board, and approve, or appropriately delegate, all requisitions for materials, supplies, equipment and services necessary for carrying out the work, with Board approval where required.

General Counsel

The General Counsel is appointed by and reports to the Board, and is the legal advisor to the District regarding all legal matters pertaining to the District. The General Counsel performs such duties in relation to the District's legal matters as the General Manager, or Board may request. The General Counsel is authorized to retain outside counsel from time to time to represent the District in various matters.

Board Secretary

The Board Secretary is appointed by the Board and reports to the General Manager and attends all Board meetings and committee meetings; keeps a complete record of the proceedings including attendance; prepares and maintains official correspondence as directed; maintains custody of the District seal; countersigns all District warrants; maintains oaths of office of all appointed or elected officials and performs such other duties as may be required by the Board.

Finance Director/Treasurer

The Finance Director/Treasurer is appointed by the Board and reports to the General Manager and is the chief financial officer of the District. He or she supervises and administers the financial accounts, records and accounting controls in accordance with generally accepted accounting procedures regarding the financial status and requirements of the District.

Consulting Auditor

The Consulting Auditor shall be an independent public accountant annually retained by and reporting solely to the Board to make an examination of the District's financial position in accordance with generally accepted accounting and auditing standards. The Consulting Auditor may perform other services as requested by the Board from time to time. The Consulting Auditor is not an employee of the District and is engaged on a fee basis for the services rendered.

Evaluation of Board Appointed Staff

Annually, the Board should meet and discuss the performance of the General Manager and prepare a documented performance appraisal to be shared individually with the General Manager in closed session.

Annually, the Board should meet and discuss the performance of the General Counsel and prepare a documented performance appraisal to be shared individually with the General Counsel in closed session.

District Organization and Communications between Board Members and Staff

Organization

The District is organized into four divisions with each division leader reporting directly to the General Manager. The four divisions are as follows:

- Administrative Services Division, including functional responsibilities of Finance, Customer Service & Meters, and Information Technology;
- Engineering & Environmental Services Division, including functional responsibilities of Engineering;
- Facilities and Watershed Division, including functional responsibilities of Facility Maintenance & Support, Watershed Management, and Water Conservation; and
- Operations Division, including Water Treatment and Distribution, Distribution System Maintenance, Water Quality and Laboratory Services, and Safety/Emergency Response.

Additionally, the District's Human Resources and Communications & Public Affairs Departments report directly to the General Manager. The General Counsel's Office reports directly to the Board and provides ongoing support to the General Manager and District staff regarding legal and related matters.

Communication between Board Members and Staff

All communication between Board members and staff regarding District business should be coordinated through the General Manager, including requests from individual Board members. The General Manager will then generate a staff assignment to develop information or reports responsive to the Board member(s) request.

Responses from staff shall be communicated through the General Manager's Office or designee to the requesting Board member(s) and, if the General Manager believes that the information may be of general interest, the response may be sent to all Board members. This does not apply to requests for routine information (e.g. lake storage status, stream flows, fire conditions on the watershed, etc.). Routine information will be provided to Board members in the same way that it is provided to the general public.

SECTION 3: Board Meetings

Scheduling Meetings

Regular Meetings

The principal type of meeting at which District business is conducted is at a regular bi-monthly meeting of the Board. Regular bi-monthly meetings of the Board of Directors will be held the first and third Tuesdays of each month, to begin at or after 6p.m., but normally at 7:30p.m., in the boardroom located at the District office (220 Nellen Avenue, Corte Madera, California) unless otherwise stated in a Board adopted calendar for the upcoming year, prior to January 31st of each year. ~~*Regular Meetings*~~

~~The principal type of meeting at which District business is conducted is at a regular bi-monthly meeting of the Board. An annual calendar of regularly scheduled Board meetings is adopted at the first meeting in January, which sets forth the dates and times of all regularly scheduled meetings for the upcoming year. Regular Board meetings are generally held in the boardroom located at the District office, 220 Nellen Avenue, Corte Madera, California, unless otherwise noticed.~~

Meeting notices and agendas for regular meetings are posted online at marinwater.org, and physically posted at the District office in Corte Madera, and at the Corte Madera, Fairfax, Mill Valley and San Rafael Civic Center public libraries on the Friday (at least 72 hours) before each meeting. Reports and other materials related to the agenda items are posted on the District's website and hard copies are available for review at the District office.

Special Meetings

Occasionally, special meetings of the Board are held to consider a particular topic, conduct a workshop or study session or, if necessary, hold a meeting at a time or date other than a regularly scheduled Board meeting. Agendas for special Board meetings must be posted in a public place and online at least one-day (24 hours) prior to the meeting. However, the District makes every effort to provide more than one-day (24 hours) notice prior to the meeting, when possible.

Regular and special meetings of the Board should generally be held within the boundaries of the District's jurisdiction with certain exceptions. The Board may adjourn a regular or special meeting to another place, date or time if the business considered at that particular Board meeting has not yet been completed and/or if Board deliberations would benefit from re-convening the meeting to another place, date or time.

Emergency Meetings

When an emergency occurs, such as a crippling disaster, work stoppage or other activity that severely impairs public health, safety or both, as determined by a majority of the Board, an emergency meeting may be called. Notice of an emergency meeting must be given to local media at least one hour prior to the meeting. However, in the case of a dire emergency such as mass destruction, terrorist act, or threatened terrorist activity posing peril so immediate and significant that providing one-hour notice may endanger public health, safety or both, as determined by a majority of the Board, notice need only be provided at or near the time that notice is provided to members of the Board.

Public Hearings

Public hearings are held on matters of special importance when required by law.

Closed Sessions

Meetings of the Board are either fully open or fully closed, and there is nothing in between. The Brown Act strongly favors open meetings and private discussions among a majority of the Board members are prohibited, unless expressly authorized by the Brown Act. Closed sessions are an exception to open meeting requirements, and the authority for such sessions is narrowly construed. The fact that material may be sensitive, embarrassing or controversial does not justify consideration in a closed session unless authorized by a specific statutory exception(s) to the Brown Act. The most commonly cited exceptions relate to litigation (including threat of), real property negotiations, public employment issues, and labor negotiations.

Closed sessions are generally held immediately prior to or following regular bi-monthly meetings of the Board but may also be scheduled at other designated times. Only individuals having an official role in the closed session subject matter may attend and the confidential information discussed during the closed session is explicitly prohibited from unauthorized disclosure. It is incumbent upon those attending closed sessions to protect the confidentiality of those discussions.

Following a closed session the Board shall reconvene in open session and publicly report out final decisions and the votes for or against any final decisions. The Board President or General Counsel generally makes these public reports.

Committee Meetings

Board committees act in an advisory capacity to the Board. Two Board members (Chair and Member) are annually appointed to each committee by the Board President with the advice and consent of other Board members.

Committee meetings are typically held in the boardroom at the District office, 220 Nellen Avenue, Corte Madera, California, unless otherwise noticed. Committee meeting notices and agendas are prepared and posted in accordance with the Brown Act similar to regular Board meetings and

minutes are prepared for each meeting. The minutes are included in the next committee meeting agenda packet and approved by the committee during a subsequent meeting of the committee.

The District dually notices all committee meetings as both committee meetings and special meetings of the Board. This ensures that a quorum of the Board may attend and participate in the committee meeting, while maintaining compliance with the Brown Act. If less than a quorum of the Board (less than three Board members) participates in the meeting, it is a committee meeting. When a quorum of the Board (three or more Board members) participates in the meeting, it is a Board meeting. The Board, as a practice, generally does not take final action on items during committee meetings, unless District staff determines the urgency of the item requires immediate action that cannot be delayed until a subsequent regular bi-monthly Board meeting. This practice generally allows members of the public multiple opportunities to submit comments and participate in the Board's decision-making process prior to the Board taking final action on an item.

Currently there are four Board committees:

- Communications Committee, which meets quarterly on the 3rd Wednesday of the month in February, May, August and November;
- Finance Committee, which meets on the 3rd Thursday of each month;
- Operations Committee, which meets on the 3rd Friday of each month; and
- Watershed Committee, which meets quarterly on the 3rd Thursday of the month in March, June, September and December.

From time-to-time the Board may establish ad hoc committees to address issues with a limited scope and duration. The Board President may appoint Board members to ad hoc committees. These committees are not subject to the Brown Act.

Additionally, Board members may be assigned to represent the District before other broad based regional groups including: Tamalpais Lands Collaborative Executive Committee, Lagunitas Creek Sediment and Riparian Management Plan Technical Advisory Committee, North Bay Watershed Association, Tomales Bay Watershed Council, Sonoma County Water Agency Water Advisory Committee, North Bay Water Reuse Authority, Las Gallinas Recycled Water Committee, and Association of California Water Agencies.

Preparation of Agenda and Order of Business

Agendas

Meeting agendas specify the date, time and location of the meeting, in accordance with Brown Act requirements, and must contain a brief general description of each item of business to be transacted or discussed at the meeting. It should be clear from the agenda wording what will be discussed and what action is being proposed so members of the public can determine if they would like to observe or participate in the meeting. The Brown Act generally prohibits any Board action or substantive Board discussion of items that are not on the agenda.

Most items on the agenda originate from the General Manager and District staff. Staff maintains a detailed list of upcoming agenda items that is updated after each Board and committee meeting. Typical types of agenda items include the following:

- Policy direction from the Board;
- Public hearings;
- Items with overarching policy implications (e.g. strategic planning, budgeting, labor negotiations);
- Actions required by law;
- Actions on the overall implementation of a Board approved project or program (e.g. award of construction contracts, consideration of an environmental review document, etc.);
- Discretionary decisions for which authority has not been delegated to the General Manager; and
- Informational items to update the Board and public on District matters.

A draft agenda for regular Board meetings is developed by the General Manager and reviewed by the Board President prior to the agenda being publicly posted. The Board formally adopts the agenda for each meeting as an initial order of business after each meeting is called to order.

Future Agenda Items

Board members may request that items be placed on agendas during discussion of the "Future Agenda Items" portion of the agenda. A motion by a Board member and a second by another Board member will initiate bringing the item to a future meeting for discussion and consideration.

Urgency Items

In rare cases, a legitimate urgent need may arise that must be acted upon even though the item was not included on a posted agenda. The General Counsel shall be consulted on all urgency items. In order for the Board to take action on an urgency item, two determinations must be approved by a two-thirds vote of the Board members present (or by unanimous vote if less than two-thirds (2/3) but more than a quorum of members are present):

- There is an immediate need to take action; and
- The need for action arose after the agenda-posting deadline.

If the above requirements are met, the Board may vote to add the urgency item to the agenda.

Attendance, Conduct, Quorum & Voting, Rules of Order, Brown Act

Board members should strive to attend all Board and committee meetings in person. If a Board member will be absent, he or she should notify the General Manager and Board President as soon as possible.

Teleconferencing

A Board member may participate in meetings via teleconference when not able to attend in person. For each meeting that a Board member will participate by teleconference, the Board member should notify the Board Secretary of his or her teleconference location prior to the agenda being posted, so that the agenda for the meeting will properly identify the teleconference location. All teleconference locations must be accessible to the public, have a copy of the agenda posted, and allow members of the public to address the Board at the teleconference location. When a Board member or members, participate via teleconference meeting all votes must be taken by roll call.

Quorum/ Board Action

A majority of Board members (three or more members) constitutes a quorum necessary for conducting business at a Board meeting. The Board shall act only by motion, resolution or ordinance. As long as a quorum of Board members is present, a simple majority of those Board members present is satisfactory to approve routine agenda items, such as approving the expenditure of funds, or passing an ordinance or resolution not requiring a supermajority. A supermajority of votes is necessary to consider an urgency item not previously posted on the Board meeting agenda or to take certain actions in response to an emergency situation. The District utilizes the parliamentary procedure from Robert's Rules of Order to conduct Board meetings.

Brown Act (Opening Meetings Law)

In compliance with the Ralph M. Brown Act ("Act"), all meetings of the Board are to be held in open session, unless a closed session is expressly permitted by the Act, and the general public is permitted to attend all open sessions. In order to ensure proper public participation and that all decisions are reached only during public meetings, Board members should refrain from participating in phone calls or emails that:

- Discuss issues within the Board's subject matter jurisdiction and are directed to a majority of the Board members;
- Take a position or make commitments on matters yet to be decided by the Board; and/or
- Communicate his/her position on a matter pending before the Board to all other members of the Board.

Meeting Minutes

Draft meeting minutes are prepared by the Board Secretary and presented to the Board and/or committee for approval at a next meeting of the Board or applicable committee.

SECTION 4: Conference, Training, Reporting Requirements

Conferences

In accordance with Board policy, Board members may elect to attend conferences, meetings and other functions from which the District derives specific benefit through attendance, including those affiliated with District membership in various associations. After attending the conference, meeting or training, the Board member who attended on behalf of the District should provide a brief oral report during the Directors' and General Manager's Announcements portion of the agenda to share information about the event with fellow Board members and the public.

Mandatory Ethics and Sexual Harassment Prevention Training

The Board Ethics Policy promotes awareness of ethics, integrity and fidelity as critical elements in Board members' conduct and in achievement of the District's mission. The proper operation of the District requires that Board members remain objective and responsive to the needs of the public they serve, make decisions within the proper channels of governmental structure, and not use public office for personal gain. Pursuant to the Board Ethics Policy and provisions of the California Government Code set forth in Assembly Bill 1234, Board members are required to receive two hours of ethics training within the first six months of taking office and every two years thereafter.

Board members must also receive two hours of sexual harassment prevention training within the first six months of taking office and every two years thereafter. The District's current Sexual Harassment Policy is intended to prevent sexual harassment in the work environment and provides procedures for resolving complaints of sexual harassment.

Public Records Act Training

All records of the District, except those exempt from disclosure pursuant to the California Public Records Act and/or other applicable laws, are public records. Any person may examine public records during regular business hours of the District or may obtain a copy of requested records in accordance with the California Public Records Act. For convenience to the public, the District has a Public Records Act Request form on its website and provides electronic records at no charge to the public.

The Board Secretary maintains a records retention policy and works with the General Counsel's Office in responding to Public Records Act requests. The Board Secretary and the General Counsel conduct periodic in-house trainings pertaining to the California Public Records Act. Board members are encouraged to participate in said training.

The Board Secretary maintains certificates of completion and a training log for all Board member training. The Board Secretary keeps Board members informed of all training requirements and applicable due dates to ensure compliance with applicable laws.

Conflict of Interest/Form 700

State laws attempt to eliminate any action by a Board member that may implicate a conflict of interest. The purpose of such laws and regulations is to ensure that all actions taken are in the public interest. The Political Reform Act of 1974 requires public officials and designated employees to disclose financial interests that could cause a conflict of interest. Public officials may be required to disqualify themselves from making, participating in, or attempting to influence any decision that will materially affect their financial or economic interest. If a Board member is unsure whether or not he or she may have a disqualifying economic interest, he or she should consult the General Counsel as soon as possible.

Economic interests include, but are not limited to, those items public officials are required to report on the Form 700, Fair Political Practices Commission ("FPPC") "Statement of Economic Interest" and include sources of income, business interests and real estate investments. The Form 700 also requires the annual reporting of all gifts received that are valued at $50 or greater in a calendar year. The Political Reform Act precludes the acceptance of any gifts with a value totaling more than $500 in a calendar year. These Form 700s are provided to Board members each calendar year, and within 30 days of assuming or leaving office, and filed with the Board Secretary who forwards them to the FPPC and makes them available for public inspection and reproduction.

Conflict of Interest Reporting at Board Meetings

A Board member may be disqualified from participating in agenda items that present a financial conflict of interest. If a Board member is disqualified due to a financial conflict, he or she must abstain from the item, state the reason for the disqualification, and leave the room during the agenda item (unless the item is listed on the consent calendar).

SECTION 5: Compensation/Benefits

Board Compensation

The District has adopted a policy regarding Compensation of Elected or Appointed Officials to address Board member compensation.

Each Board member shall receive as compensation $200 per day for each day's attendance at meetings of the Board or for each day's service rendered as a Board member by request of the Board. No Board member may receive compensation for more than 10 days in any calendar month. The District authorizes payment to Board members at the daily compensation rate for attending Board meetings and committee meetings. In addition, pursuant to Board policy, the District authorizes payment of the daily compensation rate to Board members for attendance at other specified meetings or attendance at other District business as authorized by the General Manager.

Additionally, Board members receive medical and dental benefits consistent with other District employees.

Travel Authorization and Reimbursement of Travel Expenses

In accordance with Board policy, Board members may attend, travel and seek reimbursement of all normal and necessary expenses incurred while attending conferences, training, meetings and other functions from which the District derives a specific benefit through attendance. Only that travel/attendance which serves a District purpose and is deemed necessary and/or advantageous to the District shall be approved and reimbursed. Travel shall be by means most economical to the District. Board members are expected to exercise sound judgment in the incurring and submittal of travel expenses in keeping with the standards and proprieties of a visible and accountable public agency.

Reimbursement of costs shall be based on the minimum number of days and hours required to transact District business. Early departures and late arrivals shall be at the Board member's own expense, except where savings to the District can be demonstrated. Reimbursement will not be allowed for travel between a Board member's residence and the location of a meeting that does not exceed the Board member's normal commute distance to the District's office.

Items of a personal nature are not reimbursable, including but not limited to: movies, entertainment, premium television services, alcoholic beverages, dry cleaning, spas, gyms, barber, magazines, shoe shines, travel insurance, purchase of clothing or toiletries, loss of tickets, fines or traffic violations, excess baggage costs, spouse and/or guest expenses/ accommodations, repairs to personal vehicles, and office equipment. Optional tours, banquets or other activities not related to District business offered through a conference, but as an additional cost to registration, are solely at the discretion of the Board member and will be considered a personal expense.

SECTION 6: Other Related Information

Human Resources

The Board has established a District Human Resources (HR) goal to "*Ensure a stable and talented workforce to do the District's work today and into the future.*" This goal is based on District values of promoting diversity in and equitable treatment of its employees; providing a healthy work environment; and continuously improving through the promotion of initiatives, leadership and personal development and training. Ensuring District HR policy is current and consistent with this strategy is a shared responsibility between staff and the Board. Board members should be familiar with key HR documents including but not limited to: the Equal Employment Opportunity Policy, labor agreements with both represented and non-represented employees, benefit summaries, job descriptions and salary schedules.

Risk Management and Emergency Operations

The District maintains a range of insurance coverage to limit financial risks, which may occur from an uncertain event or loss. The District's insurance portfolio includes both a self-insured component and third party insurance coverage. The third-party insurance coverage provides coverage for the following: Property Damage, General & Auto Liability (including vehicle physical damage), Public Officials Errors and Omissions (E&O) and Employee Practices Liability, Employee Fidelity, Workers' Compensation and Cyber Liability coverage.

The Public Officials E&O coverage insures Board members and District officers against claims made against them for "breach of duty" occurring through negligence, error or unintentional omission. Violations of certain laws and regulations by a Board member, such as discrimination, harassment or fraud, may result in that individual member being personally liable for damages that may not be covered by this insurance policy.

All insurance coverage is annually reviewed and approved by the Board. Additionally, District contract language for procuring equipment, supplies and services (including consultant services), includes general provisions that reduce potential risks to the District. These contracting provisions include, but are not limited to, the following topics: indemnification, insurance, nondiscrimination and conflict of interest.

The District maintains an active emergency preparedness program that includes an Emergency Operations Plan (EOP) to help manage District critical functions during an emergency and ensure the safety of staff. The EOP has been prepared to provide a plan of action in response to various emergencies that may involve the District and/or its facilities. The plan primarily addresses the possible emergencies of earthquake, electrical power failure, fire, flood, hazardous or toxic spills, potential water contamination, vandalism and sabotage, and vehicle or personnel accidents. The District coordinates its EOP, functions and response with first responders from other public and private entities and organizations, and the District designates staff as liaisons with general-purpose government Emergency Operations Centers as necessary. The General Manager, or his designee, may request mutual aid assistance from other local government or public agencies, or commit District resources to other agencies requesting aid. The General Manager provides regular reports to the Board on the District's response to emergency situations and presents annual reports on the District Emergency Preparedness Program. Each Board member receives a copy of the EOP, which is updated from time to time.
When an emergency situation arises, the General Manager may award necessary contracts without competitive bidding. The Board must ratify the emergency contract award within 14 days.

Electronic Equipment, Data and Software

The District's employees are given access to the District's software, information and applications to perform the functions of the District. Information and applications developed by employees are added to the District's overall information system. The District purchased data for the District's Geographic Information System from the County of Marin.

Board members are regarded as "District employees" with respect to the use of District electronic equipment, data and software and should follow the same rules as District employees. As with any District employee, Board members should only use these materials for District business and assure no dissemination of the materials to the public. Any requests for use of District electronic data and software will be subject to approval by the General Manager.

Community Outreach

Supplementing Board member assignments to participate in broad based regional groups, the District provides extensive community outreach programs through its Water Conservation, Watershed Management and Public Information departments. Outreach activities and opportunities can be located on the District's website and through its social media accounts.

Association Memberships

The District holds memberships in and attends meetings of associations, which have applicability to District functions, and looks upon such memberships as opportunities for in-service training. Board members may participate in the following associations with which the District holds memberships: the American Water Works Association (AWWA), the Association of California Water Agencies (ACWA) and the Water Environment Association (WEA). Board members who vote or hold a formal position in these associations recognize that they are representing the District when attending these functions.

When Board members are attending meetings on their own accord, and are not requested to attend by the Board, Board members are cautioned that they are not authorized to officially represent the District at those meetings.

Orientation of New Board Members

Newly elected Board members are subject to the Brown Act immediately upon being elected to office, even though their swearing in does not occur until noon on the first Friday in December. Current and newly elected Board members should remain cognizant of this when communicating with each other in order to prevent an unintentional serial meeting from occurring, which would constitute a violation of the Brown Act.

The Board Secretary is the point of contact for newly elected Board members regarding:

- Filing an assuming office Statement of Economic Interests Form 700 with the FPPC within 30 days of taking office;
- Completing mandatory Ethics and Harassment training;
- Procuring a suitable photograph and developing a brief biography to be posted on the District website;
- Completing employee on-boarding, payroll and benefit paperwork and setting up a District email account; and
- Providing important reading materials including the Board of Directors Handbook, District policies, recent water rate information and Cost of Service Analysis, budgets, capital improvement program information and Water Resources Plan.

The General Manager is the point of contact for newly elected Board members to tour District offices, meet staff, visit key facilities and address pertinent questions.

The General Counsel is the point of contact for all legal matters, including conflicts of interest and the Brown Act.

MARIN MUNICIPAL WATER DISTRICT

RESOLUTION NO.

RESOLUTION OF THE BOARD OF THE MARIN MUNICIPAL WATER DISTRICT ADOPTING THE BOARD HANDBOOK AS BOARD POLICY

WHEREAS, the Marin Municipal Water District Board of Directors (Board) has not previously adopted a Board Handbook, which can be a helpful tool to Board Directors, as it compiles important legal requirements, policies and procedures applicable to the function and governance of the Board in one document; and

WHEREAS on December 1, 2020, the Board reviewed a draft Board Handbook and provided comments to staff; and

WHEREAS, based on input from the Board, staff undertook certain revisions to the draft Board Handbook and presented the revised draft at the regular Board meeting on February 16, 2021.

NOW, THEREFORE, BE IT RESOLVED, that the Board hereby adopts the Board Handbook dated February 16, 2021 as Board Policy to be provided to current and future Board Directors.

PASSED AND ADOPTED this 16th day of February, 2021, by the following vote of the Board of Directors.

AYES:

NOES:

ABSENT:

_____
President, Board of Directors

ATTEST:

_____
Board Secretary

Item Number: 06
Meeting Date: 02-16-2021
Meeting: Board of Directors

Approval Item

TITLE
Fourth Amendment to District Lease No. 44 with American Tower, LP

RECOMMENDATION
Authorize the General Manager to execute the Fourth Amendment to District Lease No. 44 with American Tower, LP, thereby extending the term of the Lease to August 30, 2022.

SUMMARY
This item was reviewed by the Board in closed session on January 5, 2021, and the proposed Fourth Amendment to Lease No. 44 is consistent with the price and terms parameters provided to staff. At the request of the District and to assure staff has a complete picture of the current circumstances at the site, American Tower has provided a complete list of current subtenants as well as improvements to the site.

The Mount Tamalpais Communications Site comprises 5.74 acres of District property located at Middle Peak on Mount Tamalpais. In 1979 the District executed a 20-year lease (Lease No. 44) with Watson Communications Systems Inc. for the improvement and management of the Mount Tamalpais Communications Site, which included two 10-year renewal options. American Tower assumed all rights under the Lease as Lessee in November 1997 and continues as the Lessee today.

American Tower exercised the first 10-year renewal option in 1999. In July 2005, the District and American Tower agreed to amend the Lease (Amendment No. 2) to provide site management for "off-premises" telecommunications facilities as described in the Lease and comprising 0.69 acres of District property on the West Peak of Mount Tamalpais. American Tower exercised the second 10-year renewal option in 2009. Pursuant to the terms of the Lease, the District receives 35% per month of the gross receipts or $35,000, whichever is greater, plus a 75% portion of the monthly gross receipts for the "off-premises facilities." Total revenue in Fiscal Year 2020 for Lease No. 44 was $636,000.

In January 2020, the District and American Tower executed Amendment No. 3 to Lease No. 44 and extended the term of the Lease to February 28, 2021. The Lease No. 44 is now set to expire on February 28, 2021, unless extended. Amendment No.4 to Lease 44 with American Tower would extend the Lease on the same terms through August 30, 2022. This would allow staff time to develop a request for proposal for the Middle Peak and West Peak communication sites and proceed with a selection process that would culminate in a new lease.

One of American Towers' long-term communications tenants at the West Peak communication site is the Civil Air Patrol (CAP). CAP is a congressionally chartered non-profit corporation under

the auspices of the United States Air Force. CAP provides approximately 90% of the inland search and rescue services nationwide, saving several hundred lives annually, using a team of nearly 65,000 volunteers. CAP also supports the California Office of Emergency Services and other agencies through hyperspectral photography of disasters, long range communications support, equipment relocation and many other activities that benefit the public. Due to CAP's limited budget and congressional charter, which limits additional appropriations, it has no way to pay increased rent amounts and has terminated its lease with American Tower. To resolve this matter, the Federal Aviation Administration (FAA) has consented to a no cost co-location of CAP's communications equipment onto the Mount Tamalpais communications site leased by the FAA from the District. Amendment No. 4 to Lease No. 44 acknowledges and the parties agree that this action falls within the exception to the exclusive rights area pursuant to Section 7 of Lease No. 44 between the District and American Tower.

In summary, District staff recommend the Board authorize the General Manager to execute Amendment No. 4 to Lease 44 which extends the term of the Lease to August 30, 2022 and clarifies that the CAP may co-locate its communications equipment onto the FAA's Mount Tamalpais communications site.

FISCAL IMPACT
None

ATTACHMENT(S)
1. Fourth Amendment to Lease No. 44

DEPARTMENT OR DIVISION	DIVISION MANAGER	APPROVED
Engineering	Michael Ban	Ben Horenstein
	Michael Ban **Director of Engineering**	**Ben Horenstein** **General Manager**

FOURTH AMENDMENT TO LEASE

MOUNT TAMALPAIS COMMUNICATIONS SITE

This Lease Amendment ("Fourth Amendment"), is entered into by and between Marin Municipal Water District, ("District") and American Tower, L.P., a Delaware limited partnership and successor in interest to Watson Communication Systems, Inc. and Television Communications, Inc., the original Lessee ("Lessee").

For good and valuable consideration the receipt and adequacy of which is hereby acknowledged, the parties hereto agree as follows:

Section 1. Recitals:

A. On July 23, 1979 the District executed a twenty year lease with Watson Communications Systems Inc. for the improvement and management of the Mount Tamalpais Communications Site ("Lease"). The Lease contained two ten-year options to renew.

B. In November 1997, the District consented to Lessee assuming the rights, title and interest in the Lease.

C. The District and Lessee entered into an amendment to the Lease on May 2, 2003 for Lessee to construct a new building to house public safety radio systems at the Mount Tamalpais Communications Site ("First Amendment").

D. On July 8, 2005 the District and Lessee amended the Lease for Lessee to provide communications site management for facilities located at the former Mill Valley Air Force Base ("Second Amendment").

E. On January 13, 2020 the District and Lessee amended the Lease for Lessee to extend the term of the Agreement for one term of 18 months, until February 28, 2021 ("Third Amendment").

F. Lease, First Amendment, Second Amendment, and Third Amendment shall collectively be referred to herein as ("Agreement") for the purposes of this Fourth Amendment.

G. Lessee exercised its ten-year options to renew under the Lease in 1999 and 2009 respectively. The term of the Agreement expires on February 28, 2021. At this time, the parties desire to extend the term of the Agreement for a period of eighteen (18) months, until August 30, 2022.

Section 2. Terms:

A. This Fourth Amendment modifies solely the term of the Agreement. Except for the modifications contained herein, all of the remaining terms of the Agreement

shall apply and continue in full force and effect.

B. Terms:

1. Section 2 of the Lease entitled "Term" is amended to read as follows:

The term of this lease shall be extended for a period of eighteen (18) months, from March 1, 2021 to August 30, 2022.

2. Section 3 of the Lease entitled "Rent" is amended to read as follows:

Lessee shall continue to pay District rent of the greater of $35,000 per month or 35% of Lessee's gross receipts derived from the leased premises, plus the 75% portion of the gross receipts from off-premises facilities provided for in paragraph 7 in lawful money of the United States at 220 Nellen Avenue, Corte Madera, CA 94925, or at such other place as District may from time to time designate. Commencing March 1, 2021, rent shall be paid monthly as follows:

(A) On the 10th day of each month beginning March 10, 2021 and ending with the August 10, 2022 payment - $35,000 per month plus any amounts owed to the District pursuant to Section 3(B) below.

(B) On the 10th day of each month beginning March 10, 2021, and ending with the August 10, 2022 payment -the amount, if any, by which 35% of Lessee's gross receipts from the leased premises for the prior calendar month exceeds $35,000, plus the 75% portion of the gross receipts for the prior month from off-premises facilities within the exclusive right area provided for in paragraph 7.

Lessee shall furnish and deliver with each rental payment due under subparagraph (B) above a written statement listing its licensees, itemizing all equipment currently installed on the leased premises and within the exclusive rights area and itemizing its gross receipts from the leased premises and from the exclusive rights area for the previous calendar month. "Gross receipts from the leased premises," for purposes of computing rents due, is defined as the total aggregate amount of income received by Lessee from the rental of space and facilities on the leased premises including space, buildings, and antenna structures, use of special facilities such as non-commercial power or security systems, and radio frequency interference protection provided under the "transmitter and associated receiver" or "receiver only" charges, but shall specifically exclude the one- time installation or connection charges, site maintenance charges, computerized frequency compatibility verification within the sites, or the lease or rental of communications equipment and payments received for the maintenance thereof.

3. Section 19 of the Lease entitled "Option to Renew" is amended to read as follows:

Lessee shall have no further option to extend or renew the term of this lease, which shall expire on August 30, 2022.

4. Lessee hereby acknowledges and agrees that the co-location of Civil Air Patrol communications equipment onto the Mount Tamalpais communications facilities premises leased by District to the Federal Aviation Administration falls within the exception to the exclusive rights area pursuant to Section 7 of the Agreement and shall not entitle Lessee to any remuneration therefor.

AMERICAN TOWER, L.P., a Delaware limited partnership

By: _____

Name: _____

Title: _____

Date: _____ ____, 20____

MARIN MUNICIPAL WATER DISTRICT

By: _____

Bennett Horenstein
General Manager

Date: _____ ___, 20___

Item Number: 07
Meeting Date: 02-16-2021
Meeting: Board of Directors

Approval Item

TITLE
Professional Service Agreement with Kennedy/Jenks Consultants, Inc., for Engineering Services in support of the future Smith Saddle Tanks Rehabilitation Project

RECOMMENDATION
Authorize the General Manager to execute a professional services agreement with Kennedy/Jenks Consultants, Inc. in the amount of $213,097, with a staff requested contingency of $22,000, for a total not exceed amount of $235,097, in support of the future Smith Saddle Tanks Rehabilitation Project.

SUMMARY
The Operations Committee reviewed this item on January 15, 2021, and referred it to a future Regular Bi-Monthly Meeting of the Board of Directors with the Operations Committee's recommendation to proceed with the engineering services in support of the future Smith Saddle Tanks Rehabilitation Project.

The Smith Saddle Tanks provide 10 million gallons of critical potable water storage for the District's water distribution system. The exterior coatings are 38 years old and the interior coatings are the original coatings from when the tanks were built in 1960. The exterior and interior coatings for the welded steel tanks have reached the end of their useful life. The tanks are in need of rehabilitation or possible replacement in order to continue providing critical water storage service to the District. This preliminary phase in support of the future Smith Saddle Tanks Rehabilitation Project involves conducting a comprehensive structural and seismic evaluation of the tanks, and making recommendations for their rehabilitation or possible replacement. Following a competitive request for proposal process, Kennedy/Jenks Consultants, Inc. was selected for this work based on their expertise in tank structural and seismic evaluation, project understanding, strong technical skills and experienced project manager. Future phases of the project include design and construction.

DISCUSSION
Constructed in 1960, the Smith Saddle Tanks provide a total of 10 million gallons of potable water storage via two, welded steel, 5,000,000 gallon water storage tanks located adjacent to each other in the foothills above the Town of Fairfax, off of Glen Drive Fire Road (see Attachment 1) at an elevation of approximately 500 feet. The interior and exterior coatings for the Smith Saddle Tanks have reached the end of their useful life – the interior coatings are original and the exterior coatings are 35-years old. As presented at the Finance Committee meeting on December 17, 2020 (as part of the Ten-year Financial Plan Workshop 1A), and at the Operations Committee on January 15, 2021, extensive corrosion is present throughout the roof structures of the tanks including the rafters and entry points, especially above the water line. Additionally, the tanks are not seismically anchored and may be vulnerable to a seismic

event. Major rehabilitation of the tanks, or possible replacement, is needed in order for the Smith Saddle Tanks to continue serving the District at their full capacity.

Professional engineering consultant services are needed in order to provide the range of services and expertise needed, including but not limited to corrosion, structural, civil and geotechnical engineering. This preliminary phase in support of the project will include needed preliminary design services, including a comprehensive structural and seismic evaluation of the Smith Saddle Tanks and recommendations for their rehabilitation or replacement, if needed. The District will reserve the option to continue working with the selected consultant to provide the services required to develop plans, specifications and construction cost estimates along with the required environmental documentation and permitting for the preferred tank rehabilitation design. This information would then be brought back to the Board for final consideration and Project approval.

District staff conducted a competitive consultant selection process and issued a Request for Proposal (RFP) to five (5) firms. Four firms responded and their proposals were evaluated according to criteria outlined in the RFP. The top three proposers, GHD, Kennedy/Jenks, and AECOM, were selected to move forward in the RFP process and were interviewed on January 26th and January 27th. The interviews opened with a presentation by the prospective firms, followed by an extensive dialogue and question and answer session.

At the conclusion of the interviews, the Review Committee discussed the relative merits of each firm and then rated them. The Review Committee evaluated the proposers based on the following criteria: Project Understanding, Project Team, Project Approach, Schedule, Qualifications and Experience, and Budget.

The Review Committee unanimously recommends the District select Kennedy/Jenks Consultants, Inc. based on their expertise in tank structural and seismic evaluation, project understanding, strong technical skills and experienced project manager. The subconsultants included on the Kennedy/Jenks Consultants, Inc. team for this work are: GEI Consultants (Geotechnical), Envirosurvey, Inc. (Hazardous Materials) and Underwater Resources, Inc. (Divers). Past clients spoke very highly of Kennedy/Jenks when contacted by District staff conducting reference checks.

Project Implementation**:**

RFP Advertisement:	December 7, 2020
RFP Deadline:	January 18, 2021
Consultant Selection:	January 26, 2021
Professional Services Agreement Award:	February 16, 2021
Tank Evaluation Report Due:	May 31, 2021

FISCAL IMPACT

As shown in Table 1, the total cost for the contract with Kennedy/Jenks Consultants, Inc. is $213,097, with a staff requested contingency of $22,000, for a total authorized amount of $235,097. This work is included in the FY 20-21 capital improvement budget.

Table 1
Scope of Work Summary

Task Description	Budget
Task 1 – Project Management: The Consultant shall be available to the District to discuss the project throughout the contract period and shall coordinate internally to assign suitable staff to complete deliverables in accordance with the project schedule. Project management shall also include monitoring budget, sending monthly billings, and hosting check-in calls with the District.	$45,368
Task 2 – Review Existing Records: The Consultant shall study and analyze all available background information, record drawings, previous condition assessment data, seismic adequacy calculations, and reports prior to performing site inspection. Conduct interviews with key District staff regarding system operations, known points of concern, and seasonal operational requirements.	$13,854
Task 3 – Tank Condition Evaluation & Report: The Consultant shall conduct a seismic and structural evaluation of both tanks and recommend modifications, repairs and retrofits to correct deficiencies. The condition evaluation and recommendations shall be finalized in a report and used to develop a basis of design to rehabilitate the tanks.	$153,874
TOTAL	**$213,097**
Contingency	**$22,000**
Total Authorized Amount	**$235,097**

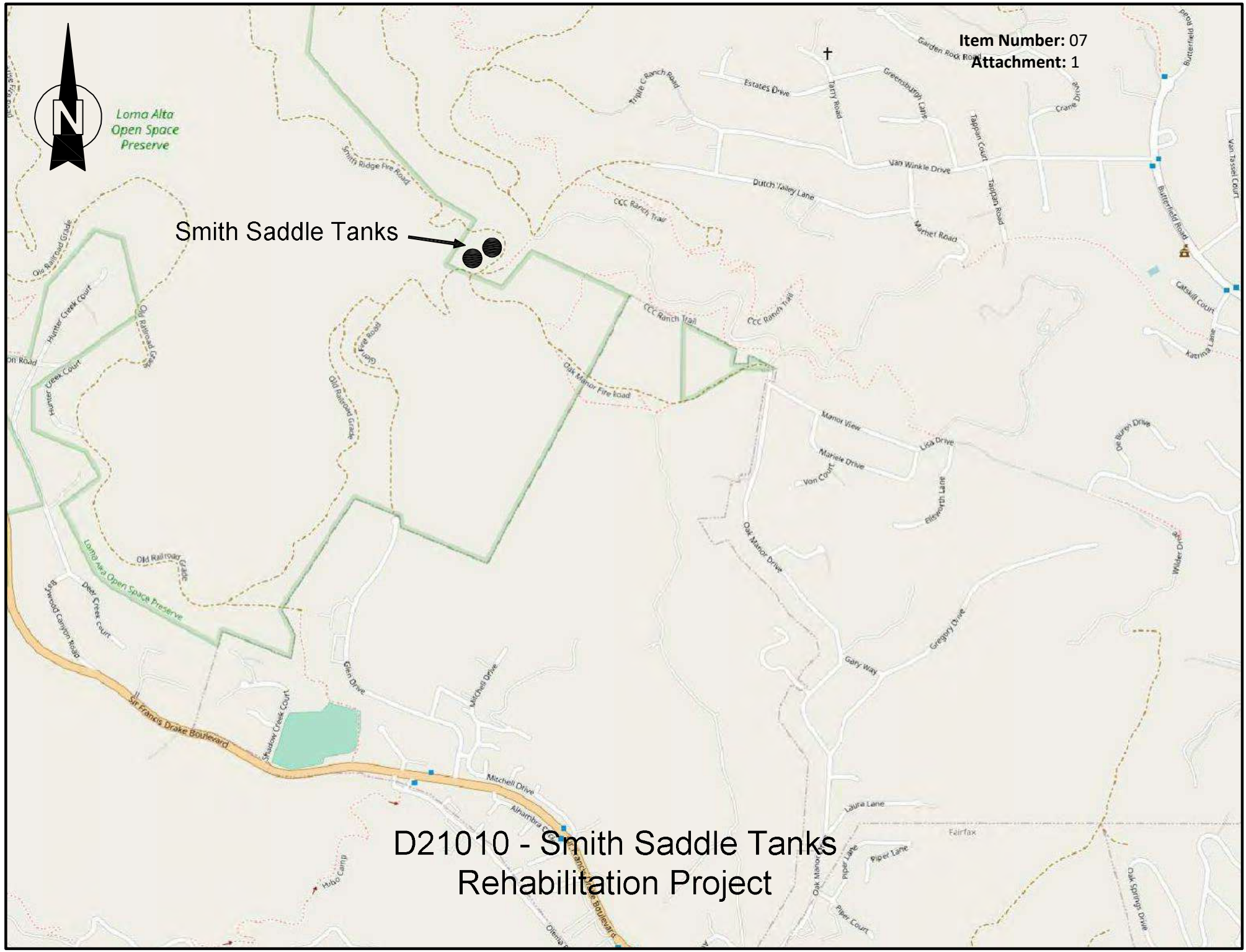
In summary, District staff request the Board authorize the General Manager to execute a professional services agreement with Kennedy/Jenks in support of the future Smith Saddle Tanks Rehabilitation Project in the amount of $213,097, plus a contingency of $22,000, for a total authorized amount of $235,097.

ATTACHMENT(S)

1. Location Map

DEPARTMENT	DEPARTMENT OR DIVISION MANAGER	APPROVED
Engineering	Director Engineering	General Manager

Item Number: 07
Attachment: 1



D21010 - Smith Saddle Tanks Rehabilitation Project

Item Number: 08
Meeting Date: 02-16-2021
Meeting: Board of Directors

Informational Item

TO: Board of Directors

FROM: Paul Sellier, Operations Director

THROUGH: Ben Horenstein, General Manager

DIVISION NAME: Operations

ITEM: Water Supply Report for January 2021

SUMMARY
The District's total reservoir storage volume at the end of January was 68.5% of the historical average or 57% of total storage. While there is still more of the rainy season ahead of us, drier than normal conditions have resulted in reservoir storage levels that are 31.5% lower than average for this time of year. This wet weather season the District has received 14.22-inches of rain compared to an average rainfall of 30.6-inches over the same period. The past 12-months have been the fifth driest such period in the 142 years of District rainfall records. Given the state of the District's storage, and the uncertainty of any meaningful rainfall through April, staff will be recommending that the Board adopt a resolution calling for the declaration of drought water conservation actions, including voluntary conservation that may need to be increased should dry conditions persist.

DISCUSSION

Monthly Highlights:

- In January, the District's total gross water production was 1,490 acre-feet, with 615 acre-feet from the District's reservoirs and 875 acre-feet of imported water.
- For the fiscal year through January, the District has imported 4,503 acre-feet of water from the Sonoma County Water Agency, which is 85% of the annual minimum of 5,300 acre-feet.
- The average rate of water production for January was 15.7 million gallons per day (MGD) compared to a peak summertime demand of approximately 35 MGD.
- As of January 31, 2021, the District had 45,236 acre-feet of reservoir water storage, which is 57% of capacity and 31% below average for this date.

- For habitat benefit, in January, the District released a total of 1,751 acre-feet of water from Kent Reservoir into Lagunitas Creek and from Soulajule Reservoir into Walker Creek. The January releases into Lagunitas Creek included one 3-day migration release to support returning Coho salmon totaling 208 acre-feet. Each year over the period from November to February the District ensures that a total of four migration flows occur, each totaling 208 acre-feet (approximately 68 million gallons). When runoff from precipitation is insufficient to meet the in-stream flow requirements the flow is augmented by releasing water stored in Kent reservoir.

- In January, the District received 5 calls regarding taste and odor complaints. Compared to the prior 5-years this tracks the average for this time of year. The District routinely monitors the reservoirs for the presence of algae and taste and odor compounds produced by algae (Geosmin and MIB). Lab analysis indicates residual taste and odor in the source water for Bon Tempe Treatment Plant persist at low levels.

- The District conducted chlorine addition at 6 storage tanks with low chlorine residual in January to preserve water quality.

- In January, the water sources for the San Geronimo Treatment Plant (SGTP) were Kent and Nicasio Reservoirs, and for the Bon Tempe Treatment Plant the water sources were Bon Tempe and Alpine Reservoirs.

Drought Task Force:
A Drought Task Force was instituted consisting of staff throughout the organization to work collaboratively to develop and implement key initiatives to reduce demand and optimize our existing water supply. Some of the key actions include:

- Optimized the Use of Supplemental Water. Water imported from the Sonoma County Water Agency has been an important part of the District's water supply since the 1970s, and accounts for approximately 25 percent of our water supply. The District has been and continues to use this supply source to its fullest availability. As of the end of January the District has purchased 85% or 4500 acre-feet of the 5300 acre-feet that is normally received by end of June. The District is continuing to utilize this water to the maximum extent practicable.

- Suspended Water Quality Flushing Program. To improve water quality and minimize discoloration, the District's water mains are comprehensively flushed by a technique known as unidirectional flushing. The procedure is generally performed in low-water use months and involves the systematic opening and· closing of hydrants, one section of main at a time, to force the water through the pipes at high velocity, removing accumulated mineral sediment until the water is clear. The operation averages about 30 minutes per section of pipe. The volume of water consumed in flushing is low in comparison to other uses, but the water cannot be re-captured and used. Given the

current dry weather conditions, staff has suspended the flushing program for 2021, and intends to resume the practice when appropriate.

- Re-Prioritized Leak Repair. District staffs construction crews are constantly balancing their resources with other field repair priorities. Leak repair has been given the highest priority during this period of drought.

- Utilize Phoenix Lake. Phoenix Lake is a reserve reservoir, used only during periods of very dry weather. The reason the District does not usually draw from this reservoir is because water demand in most years can be easily met without its use. Phoenix Lake drawdown will occur this February. While only providing an additional 200cre-feet of water, a benefit is the visual to visitors to Phoenix Lake – one of the highest trafficked areas on the Watershed.

- Utilize Soulajule Reservoir. Soulajule reservoir is a reserve reservoir and not used during normal water supply conditions. Given the low levels in storage and dry conditions District staff will make preparations for pumping from this reservoir including the mobilization of the rental generators need to transfer water from Soulajule to Nicasio reservoir beginning in late spring 2021.

- Public Outreach. Staff has already started the process of consistent and frequent messaging emphasizing the dry conditions and need for water conservation. Increased social media messaging on Facebook, Twitter, Nextdoor and Instagram includes water saving tips, educational information about the district's water code, and rebates and incentives. The website also includes a new landing page on the importance of water conservation during drought conditions. Water use efficiency messaging is also part of all of our customer newsletters, and additional bill inserts that support and reinforce the social media messaging have been added to the mix.

FISCAL IMPACT
None

ATTACHMENT(S)
1. Water Supply tables and charts

Item Number: 09
Meeting Date: 02-16-2021
Meeting: Board of Directors

Approval Item

TITLE
Declare Initial Drought Water Conservation Actions

RECOMMENDATION
Adopt the Resolution declaring Initial Drought Water Conservation Actions

SUMMARY
Marin Water received just over 20 inches of rain in calendar year 2020, the second lowest rainfall total in the past 90 years. In the current water year (October 2020– September 2021) 15.4- inches of rainfall has been measured through February 5, which is approximately 50% of average rainfall. As a result of this drought, the district reservoirs contained 45,275 acre-feet on February 1, 2021, which is 20,812 acre-feet less than the average and 68% of average storage volume for this date. If the dry weather continues through April, storage volumes will be at historically low levels as we enter the summer months, and potentially as low as 30,000 AF on December 1, 2021. In order to preserve the district's limited water supply, staff is recommending the Board adopt the Resolution declaring Initial Drought Water Conservation Actions (see attachment 1) for district customers to voluntarily reduce their water usage. Should the dry conditions continue into April, staff will plan to bring additional recommendations to the Board in order to maximize the efficient use of water available in storage.

DISCUSSION
Seventy-five percent of the district's water supply depends on rainfall in the district's watershed, with the remaining 25% provided by imported water from Sonoma County Water Agency. The historically dry calendar year of 2020, combined with a very dry winter with only 50% of average precipitation so far in 2021, has produced limited runoff and notably lower than normal storage levels. As of February 1, the district reservoirs contained 45,275 acre-feet of water which is 20,812 acre-feet lower than average for this date. Lake Sonoma, which is the primary source of water imported from Sonoma County Water Agency, has 157,700 acre-feet of water storage, which is 63.6% of water supply capacity as of January 25. If the district's watersheds do not receive a substantial amount of rain over the next few months the amount of water stored in the district reservoirs will be less than 50,000 acre-feet on April 1, and projected to be as low as 30,000 AF by December 1, 2021.

The district has numerous Water Waste Prohibitions (see attachment 2) and a Dry Year Water Use Reduction Program (Program, see attachment 3), both included in the Water Code. This Program was initially adopted by the Board in February 1999. It was developed with hydrologic

simulations and has been in place over 20 years. It is designed to provide guidance to the Board, but not limit the district's options.

The purpose of the Program is to significantly reduce the consumption of water during drought. Under the Program, the Board may consider water conservations actions triggered by total lake storage as follows:

- Alert Stage
  - Storage less than 50,000 acre-feet on April 1
  - Voluntary 10 percent reduction
- Mandatory Use Reduction
  - Storage less than 40,000 acre-feet on April 1
  - Mandatory 25 percent use reduction
- Emergency
  - Storage less than 30,000 December 1
  - Mandatory 50 percent use reduction

In consideration of the unique circumstances resulting in lower than normal storage levels for this time of year, and in order to preserve the district's water supply, it is recommended the Board consider a slight shift from the current Program as written and activate an Initial Drought response for district customers to voluntarily reduce their water usage through compliance with the Water Waste Prohibitions and taking actions to reduce water use. While the adoption of these measures is earlier than defined in the Program, if dry weather prevails through the fall, storage levels may be below 30,000 acre-feet by December 1, 2021. Early, effective and increased conservation will help preserve the water supply. As we move through the remainder of the wet season depending, in part, on the weather condition and the response to the voluntary conservation efforts, more stringent levels of conservation may be necessary to preserve the water supply. Alternatively, if rainfall exceeds expectations, the measures can be terminated by the Board at that time.

District customers can reduce their water usage a number of ways. The top ways for customers to save water are:

- Compliance with the district's water waste prohibitions.
- Participation in the district's conservation programs, for example;
  a. Request a conservation assistance program audit of water usage in your home.
  b. Install water efficient faucet aerators and showerheads. Free aerators and showerheads are available from Marin Water.
  c. Install a high-efficiency clothes washer and get a rebate from Marin Water.
  d. Install a WaterSense labeled smart irrigation controller and get a rebate from Marin Water.

e. Convert lawns to a low water use landscape with free materials from Marin Water or get a rebate from Marin Water.
f. Install a graywater system to irrigate gardens. Participate in Marin Water's Graywater Webinar and receive a discounted DIY Graywater Kit.

- Other suggested water use reduction actions beyond water waste provisions;
  a. Check for leaks and repair them immediately.
  b. Turn off automatic sprinkler systems and water plants only as needed.
  c. Check your water meter and learn to read it and spot unusual usage and leaks.
  d. Add compost and mulch to gardens.
  e. Hold off on refilling decorative fountains, swimming pools and hot tubs until drought conditions end.
  f. Don't wash your car at home, take your car to a carwash that recycles water.
  g. Do not power wash buildings and homes.

Additionally, the district has analyzed and implemented a number of operational adjustments designed to optimize our water system and conserve water during the dry year we are experiencing. These operational adjustments were described in the Water Supply Report for January 2021, and staff will present a status on these actions during the Water Supply Report on February 16th.

Finally, it is recognized that weather conditions could change and the district will need to be agile in its approach and response. If drought conditions continue and storage levels continue to drop, increased levels of conservation may be needed to preserve the water supply and staff will return to the Board with recommendations for timely adjustments.

FISCAL IMPACT

The fiscal impact of a drought is significant in that as customers reduce demand the revenue the district needs to operate is reduced in a comparable measure. Compounding this loss of revenue, this drought will require the use of more expensive water supply options such as Soulajule reservoir water, Phoenix Lake and additional supplemental water. The combined loss in water revenue and unbudgeted expenditures is approximately $12.5M over the next 8 months. The District's Rate Stabilization Reserve of $9.4M is expected to provide for some of this expected deficit.

ATTACHMENT(S)

1. Resolution
2. Water waste prohibitions
3. Dry Year Water Use Reduction Program (Program)

Item Number: 09
Meeting Date: 02-16-2021

DEPARTMENT OR DIVISION	DIVISION MANAGER	APPROVED
Office of the General Manager	_____	
	Ben Horenstein **General Manager**	**Ben Horenstein** **General Manager**

MARIN MUNICIPAL WATER DISTRICT

RESOLUTION NO. ____

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE MARIN MUNICIPAL WATER DISTRICT DECLARING INITIAL DROUGHT WATER CONSERVATION ACTIONS

WHEREAS, average annual rainfall at Lake Lagunitas is approximately 52 inches; and

WHEREAS, the district has received just over 20 inches of rain in calendar year 2020, the second lowest rainfall total in 90 years; and

WHEREAS, the previous 12 months have been the fifth driest on record in the 142 year history of District rainfall records; and

WHEREAS, the District's Urban Water Management Plan (UWMP) contains water shortage contingency planning that is tied to Chapter 13.02 of the District's Code which was adopted in 1999 and contains trigger points for voluntary and mandatory water rationing based upon reservoir levels; and

WHEREAS, Chapter 13.02 calls for voluntary water use reductions when District reservoir storage levels are below 50,000 acre-feet (AF) on April 1; 25% mandatory water use reductions when District reservoir storage levels are below 40,000 AF on April 1 and 50% mandatory water usage reduction when reservoir storage levels on December 1 are projected to be in the vicinity or less than 30,000 AF; and

WHEREAS, the purpose of the contingency plan contained in Chapter 13.02, as described in the staff report that accompanied that item was designed to " ... provide some guidance to decision makers, not to limit their-options;" and

WHEREAS, as of February 1, District reservoir storage is 45,275 AF, well below the District average of 66,087 AF and the 75,108 AF of storage in District reservoirs at this same time last year; and

WHEREAS, with reservoir levels below 50,000 AF, preservation of the District's water supply is essential to District customers and conservation actions taken now by District customers can minimize the reduction in reservoir storage levels in order to conserve water for future use; and

WHEREAS, given all of the above described considerations, additional measures are necessary by District customers until the current weather conditions have abated.

NOW, THEREFORE, BASED ON THE FINDINGS SET FORTH ABOVE WHICH ARE HEREBY ADOPTED BY THE BOARD, THE BOARD OF DIRECTORS RESOLVES AS FOLLOWS:

1. In an effort to preserve the District's limited water supply and maximize the time available for the effect of conservation measures, the Board is activating an early voluntary phase of its water shortage contingency planning and is calling for District customers to voluntarily reduce their water usage.
2. The Board is asking all District customers to be judicious and prudent with every gallon of water used and to voluntarily turn off outdoor irrigation systems and minimize outdoor watering.
3. The Board and staff are committed to working with customers to lower water usage and towards that end, the Board is calling all customers to save water by:

    - Compliance with District's water waste prohibitions.
    - Participation in the District's conservation programs, for example;
        a. Request a conservation assistance program audit of water usage in your home.
        b. Install water efficient faucet aerators and showerheads. Free aerators and showerheads are available from Marin Water.
        c. Install a high-efficiency clothes washer and get a rebate from Marin Water.
        d. Install a WaterSense labeled smart irrigation controller and get a rebate from Marin Water.
        e. Convert lawns to a low water use landscape with free materials from Marin Water or get a rebate from Marin Water.
        f. Install a graywater system to irrigate your garden. Participate in Marin Water's Graywater Webinar and receive a discounted DIY Graywater Kit.
    - Other suggested water use reduction actions beyond water waste provisions;
        a. Check for leaks and repair them immediately.
        b. Turn off automatic sprinkler systems and water plants only as needed.
        c. Check your water meter and learn to read it and spot unusual usage and leaks.
        d. Add compost and mulch to gardens.
        e. Hold off on refilling decorative fountains, swimming pools and hot tubs until drought conditions end.
        f. Don't wash your car at home, take your car to a carwash that recycles water.
        g. Do not power wash buildings and homes.

4. District Staff is directed to:
    a. Communicate to all District customers advising them of the Board's call for the water usage reductions described above, asking for their cooperation and educating them on the top ways to save water.

b. Provide customers with updates on the drought conditions, District reservoir storage levels and any anticipated changes through local and social media and the District's website.
c. Continue with the operational adjustments staff has been discussing with the Board.
d. Closely monitor water supply to determine if further action is needed.

5. The Board recognizes that weather conditions could change and intends to be agile in its approach and response to dealing with the drought and any changes in weather conditions.
6. The Board thanks District customers for their anticipated cooperation and fully understands that it will take all of us, customers, staff and the Board to successfully navigate this situation.

PASSED AND ADOPTED this 16th day of February 2021, by the following vote of the Board of Directors.

AYES:

NOES:

ABSENT:

_____

President, Board of Directors

ATTEST:

_____

Board Secretary

Attachment 2:
Water Waste Prohibitions

13.02.020 Water waste prohibitions.

No customer of the district shall make, cause, use or permit the use of potable water from the district for residential, commercial, industrial, agricultural, governmental or any other purpose in a manner contrary to any provision of this section.

(1) Prohibited Nonessential Uses Applicable to Customers. It is unlawful for any person, firm, partnership, association, corporation, or political entity to use potable water from the district for the following nonessential uses:

(A) The washing of sidewalks, walkways, driveways, parking lots and all other hard surfaced areas by direct hosing, except as may be permitted by current regulations pertaining to urban water runoff pollution prevention as defined by the Marin County Stormwater Pollution Prevention Program and other controlling agencies.

(B) The escape of water through breaks or leaks within the consumer's plumbing or private distribution system for any substantial period of time within which such break or leak should reasonably have been discovered and corrected. It shall be presumed that a period of forty-eight hours after the consumer discovers such a leak or break, or receives notice from the district of such leak or break, whichever occurs first, is a reasonable time within which to correct such leak or break.

(C) Non-recycling decorative water fountains.

(D) Restrictions on Irrigation. Irrigation shall not be conducted in a manner or to an extent that allows water to run off or overspray the areas being watered. Every consumer is required to have his or her water distribution lines and facilities under control at all times to avoid water waste.

(E) Any excess water runoff flowing onto the public right-of-way at a rate of one gallon per minute or greater not caused by storm water or naturally occurring groundwater, is prohibited.

(F) Using a garden hose without a shut-off nozzle.

(G) Landscape irrigation between the hours of 9:00 a.m. and 7:00 p.m.

(H) Operating outdoor irrigation systems using potable water for the purpose of irrigating ornamental landscape areas or turf areas on more than three days within any week of the calendar year. Customers are strongly encouraged to irrigate ornamental landscapes or turf on fewer days and only as required to maintain plant health and replace evapotranspiration loss as defined by the California Irrigation Management Information System.

(I) The application of potable water to outdoor landscapes during and within 48 hours after measurable rainfall.

(J) Irrigating ornamental turf on public street medians.

(2) Restrictions on Reverse Osmosis Units. The installation of reverse osmosis water purifying systems not equipped with an automatic shutoff unit is prohibited.

(3) The following are prohibited for new connections:

(A) Single pass cooling systems for air conditioning or other cooling system applications unless required for health or safety reasons;

(B) Non-recirculating systems for conveyer carwash applications.

(4) Exemption From Daytime Water Prohibition. Notwithstanding anything contained in this Title 13, testing and repairing irrigation systems for the purpose of eliminating water waste is permitted during the hours of 9:00 a.m. and 7:00 p.m. (Ord. 436 §2, 2016; Ord. 428 §2, 2015; Ord. 427 §2, 2014; Ord. 421 §2, 2011; Ord. 387 §1, 1999; Ord. 332 §1, 1992; Ord. 316 §2, 1991)

Attachment 3:
Dry Year Water Use Reduction Program

13.02.030 Water use reduction in dry periods.
No customer of the district shall make, cause, use or permit the use of potable water from the district for residential, commercial, industrial, agricultural, governmental or any other purpose in a manner contrary to any provision of this section.

(1) Program to Reach a Ten Percent Water Use Reduction Goal (alert stage). When lake storage on April 1st in any year is below fifty thousand acre-feet and system modeling based on historic hydrologic data and use patterns indicates that a minimum reduction in use is required to assure a sufficient carry-over storage, the board may activate by resolution a voluntary use reduction program and should review its financial reserves to determine if a reduction in tier breaks is fiscally warranted to achieve ten percent savings in district's overall water use as follows:

(A) Consumer Percentage Curtailment. Every consumer shall eliminate water wastage in an effort to aid the district in achieving a ten percent reduction of the amount of potable water used by all consumers during the last year in which no restrictions in water use were required.

(B) Curtailment of Program. When lake storage on April 1st of any year is above fifty thousand acre-feet or when lake storage on or after January 1st is sufficiently above fifty thousand acre feet and projected demands will not reduce lake storage below fifty thousand acre-feet by the following April 1st, the requirements of this subsection shall be deactivated by resolution of the board.

(2) Twenty-Five Percent Water Use Reduction Program. When lake storage on April 1st is below forty thousand acre-feet and system modeling based on historical hydrologic data and use patterns indicates a reduction in use is required to assure sufficient carry-over storage, the board may activate by resolution a mandatory use reduction program to achieve twenty-five percent savings in district's overall water use as follows:

(A) Consumer Use Reduction. Residential consumers, Billing Codes 1 through 5, shall use no more than the water use allocation assigned by the district based on an allotment per resident to aggregate a thirty-two percent reduction by all residential consumers. A resident is considered to be an individual who resides, or is expected to reside in the structure for a mini-mum of six months of the year.

Each nonresidential consumer, Billing Code 6 shall use no more than seventy-five percent, Billing Code 7 shall use no more than eighty percent, and Billing Code 8 shall use no more than fifty percent, of the annual water budget calculated by the district for said consumer pursuant to Chapter 13.03 of the district's code.

Every consumer shall eliminate water wastage and non-essential use of potable water from the district in an effort to aid the district in achieving a twenty-five percent reduction in the amount of water used by all consumers in the last year in which no restrictions in water use were required.

(B) Prohibited Nonessential Uses Applicable to All Consumers. It is unlawful for any person, firm, partnership, association, corporation or political entity to use potable water from the district contrary to the provisions of this subsection, or, if more restrictive, subsections (1), (2) and (3) of this section, or to use potable water for: refilling or as make-up water for decorative fountains or pools; irrigation between the hours of 11:00 a.m. and 7:00 p.m.; irrigation of new turf areas; washing of cars, boats, airplanes with hose without a shut-off nozzle; or serving water to restaurant patron except on request.

(C) Curtailment of Program. When lake storage on April 1st is above forty thousand acre-feet or when lake storage is sufficiently above forty thousand acre-feet and projected demands will not reduce lake storage below forty thousand acre-feet by the following April 1st, the requirements of this subsection shall be deactivated by resolution of the board. (Ord. 387 §1, 1999; Ord. 376 §8, 1997; Ord. 325 §1, 1991; Ord. 323 §1, 1991; Ord. 316 §2, 1991)

Item Number: 10
Meeting Date: 2-16-2021
Meeting: Board of Directors

Informational Item

TO: Board of Directors

FROM: Michael Ban, Director of Engineering

THROUGH: Ben Horenstein, General Manager

DIVISION NAME: Engineering

ITEM: Wildfire Resilience Study 2021 – Final Report

SUMMARY
The Wildfire Resilience Study 2021 (Study) is a living document that presents a comprehensive review of the current state of the District's wildfire preparedness programs and operations, and builds on the Draft Wildfire Resilience Plan presented to the Board on March 17, 2020. Staff will discuss recent progress on fire preparedness activities and outreach captured in the final Wildfire Resilience Study 2021.

DISCUSSION
In April 2019, the District formed an internal Wildfire Task Force comprised of staff throughout the organization to investigate existing wildfire preparedness programs and operations with the intent to better understand the District's strengths, weaknesses, and potential vulnerabilities to wildfire. The Wildfire Task Force developed the Draft Wildfire Resilience Plan (Draft Plan) to document findings and identify a suite of hazard reduction actions that could improve water system and community resilience to wildfire. The Draft Plan was completed in March 2020 and presented to the Board on March 17, 2020.

Since completing the Draft Plan, staff has progressed wildfire resilience planning efforts by engaging and soliciting feedback on the Draft Plan, establishing the internal process for tracking the status of hazard reduction actions, implementing hazard reduction actions, and finalizing the Wildfire Resilience Study 2021, which supersedes the Draft Plan.

Engagement
District staff shared the Draft Plan with and solicited feedback from outside entities who have a responsibility, commitment, and interest in community resilience to wildfire. FIRESafe Marin reviewed the document in November 2020 and acknowledged the Draft Plan was "comprehensive" and appreciated the Plan's focus on data gaps and hazard reduction actions. FIRESafe Marin identified a nexus between their mission of educating landowners about defensible space and the District's desire to protect infrastructure (pump stations, tanks, etc.) in the Wildland Urban Interface (WUI) where land ownership patterns complicate the District's

ability to reduce vegetation-related wildfire risk. FIRESafe Marin offered their support in forming working partnerships with adjacent landowners whereby the District could leverage FIRESafe Marin's education, outreach, and community events (chipper days) platform to achieve the District's infrastructure protection measures in the WUI.

Shortly after completing the Draft Plan, District staff was notified that Marin County Fire and FIRESafe Marin were updating the 2017 Marin Community Wildfire Protection Plan (CWPP). The primary purpose of the CWPP is "to reduce wildfire risk to communities, municipal water supplies, and other at-risk land through a collaborative process of planning, prioritizing, and implementation hazardous fuels reduction projects"[1]. Projects included in Marin's CWPP receive federal priority funding status and may benefit from streamlined National Environmental Policy Act review in the event they are funded. Most importantly, inclusion of a project in the CWPP signifies a community-wide consensus and consciousness of which projects should be pursued to reduce the impacts of wildfires. District staff engaged Marin County Fire to incorporate fuel reduction projects on the District's watershed and two of the most critical hazard reduction actions identified in the District's Draft Plan: 1) a focused study of hardening actions at San Geronimo and Bon Tempe water treatment plants and, 2) implementation of structure hardening at both critical water infrastructure sites.

In September 2020, staff presented the Draft Plan to the Marin Conservation League's Fire and Environment Working Group. Staff explained the purpose of the Wildfire Task Force and how the District would seek to incrementally increase water system and community resilience by implementing hazard reduction actions. Attendees were supportive of the District's approach but questioned whether adequate funding was available to accomplish all of the actions identified in the Draft Plan. A meeting attendee subsequently approached District staff with an opportunity to participate in a 3-year CalFIRE grant awarded to the Southern Marin Fire District. The grant will create over 4 miles of fuel break adjacent to 2,500 parcels, potentially including four District water tanks and a pump station. Staff is currently evaluating District infrastructure protection needs in the area and coordinating with the Southern Marin Fire District.

In March 2020, Marin county voters approved Measure C which assesses a parcel tax to fund formation of the Marin Wildfire Prevention Authority. (MWPA). The MWPA is a joint powers authority that will oversee a coordinated county-wide wildfire planning effort including vegetation management in the WUI. Since approval of Measure C, staff has completed WUI infrastructure maps and presented them to MWPA staff to communicate District asset protection priorities. Staff will continue our outreach to individual members of the MWPA to identify and prioritize defensible space inspections and vegetation management activities around critical water infrastructure identified in the Study.

In addition to engaging Marin County Fire, FIRESafe Marin, and the MWPA, staff has also reached out to the Marin County Fire Chief's association and solicited their input regarding the Draft Plan. District staff will continue to engage the Marin County fire chiefs and integrate their input in future updates to the Study.

[1] https://www.firesafemarin.org/cwpp/what-is-a-cwpp

Internal Process & Tracking
In August 2020 District managers reviewed the hazard reduction actions in the Draft Plan and identified individual groups and staff who would take the lead in implementing particular actions. As part of this process, staff developed a tracking spreadsheet and a review process that will be used in subsequent updates to the Study.

Implementation
The Draft Plan identified 99 potential hazard reductions actions that would improve wildfire resilience. The hazard reduction actions vary in terms of cost, ability to mitigate risk, and required time to implement. Some of the identified actions are part of ongoing initiatives and operations and some will require advanced planning and technical studies. Despite these differences, staff has already been successful in implementing some of the hazard reduction actions including, but not limited to, the following:

- Completed design and contracting for a permanent generator at the San Geronimo Water Treatment Plant. Construction will start in March 2021 and will provide permanent backup power to mitigate the impacts of PG&E's Public Safety Power Shutoff (PSPS) events and other power failure events at the District's largest treatment plant.
- Installed two new fire condition signs at the Sky Oaks entrance and on Bolinas Fairfax Road near Meadow Club.
- Completed fuel reduction activities at the Bon Tempe Treatment Plant.
- Improved our response capabilities by upgrading the District's Type IV engine with one purchased from Marin County Fire.
- Removed barbeques at Laurel Dell, Barth's Retreat, Rifle Camp, and Potrero Camp in an effort to mitigate potential ignition sources in remote hard to access locations.
- The District was awarded a FEMA grant to develop a Local Hazard Mitigation Plan and selected a consultant to develop the plan, following a comprehensive Request for Proposal process. Staff anticipates completing a draft plan for State and Federal review by early 2022. This critical document will enable the District to pursue federal cost-share grants to mitigate natural hazards including those associated with seismic events, flooding, and wildfires.
- The District selected a consultant and is currently in the beginning stages of developing the Water System Master Plan to better define day-to-day system capabilities, limitations, and operational vulnerabilities. The plan is a critical document that will inform capital expenditures and future investments in wildfire resilience projects such as pump station and tank replacements, structure hardening, and new water treatment technologies.
- Coordinated with Marin County to close Bolinas Fairfax during all Red Flag Events to reduce the potential for ignition in remote portions of the watershed.
- Conducted initial testing of the administration building's electrical panel to inform future backup power system design.

Wildfire Resilience Study 2021
Staff updated the Draft Plan to reflect the feedback of external agencies, additional legal review, and minor grammatical and formatting corrections. The final Study now includes a summary table reflecting the status of all hazard reduction actions. A full copy of the report is provided in Attachment 1.

Environmental Review
The Wildfire Resilience Study 2021 is statutorily exempt pursuant to California Environmental Quality Act (CEQA) Guidelines Section 15262. The Project qualifies for exemption as it is a planning and feasibility study focused on identifying existing conditions and possible future actions the District has not approved, adopted, or funded. In the event a specific hazard reduction action identified in the Wildfire Resilience Study 2021 is considered for implementation, the District will comply with CEQA before approving, adopting, or funding any activity that meets the definition of a Project[2] as defined in the CEQA Guidelines.

FISCAL IMPACT
None

ATTACHMENT(S)
1. Wildfire Resilience Study 2021

[2] CEQA Guidelines Section 21065

Item Number: 10
Attachment: 1

Wildfire Resilience Study 2021

MARIN WATER

Cover Photo:

2017 Pine Mountain fire burning above Kent Lake

Photo: Matt Cerkel

Marin Municipal Water District
Wildfire Resilience Study 2021

Cynthia Koehler, President
Division IV
Board of Directors

Larry Russell, Vice President
Division V

Monty Schmitt
Division II

Jack Gibson
Division I

Larry Bragman
Division III

MARIN WATER

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Acronyms & Abbreviations

BFFIP	Biodiversity, Fire, and Fuels Integrated Plan
CalFire	California Department of Forestry & Fire Protection
CalOES	California Office of Emergency Services
CMF	Capital Maintenance Fee
CFR	Code of Federal Regulations
CPUC	California Public Utilities Commission
CPVC	Chlorinated Polyvinyl Chloride
CWPP	Community Wildfire Protection Plan
DH	Direct Hazard
District	Marin Municipal Water District
EOC	Emergency Operations Center
EOP	Emergency Operations Plan
EPA	Environmental Protection Agency
ERP	Emergency Response Plan
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FHSZ	Fire Hazard Severity Zone
FMA	Flood Mitigation Assistance Program
FRAs	Federal Responsibility Areas
HMA	Hazard Mitigation Assistance
HMG	Hazard Mitigation Grant
HMGP	Hazard Mitigation Grant Program
HUD	Housing and Urban Development

IH	Indirect Hazard
IS	Ignitions Source (Hazard)
LHMP	Local Hazard Mitigation Plan
MCFD	Marin County Fire Department
MCOSD	Marin County Open Space District
MMWD	Marin Municipal Water District
No.	Number
NPS	National Park Service
NTU	Nephelometric Turbidity Units
OES	Office of Emergency Services (Marin or California)
PA	Public Assistance
PDM	Pre-Disaster Mitigation Program
PG&E	Pacific Gas & Electric
Plan	Water Infrastructure Wildfire Resilience Plan
Plan Area	Geographic Domain of Plan
PLC	Programmable Logic Controllers
PPE	Personal Protective Equipment
PSPS	Public Safety Power Shut
PVC	Polyvinyl Chloride
SAP	Systems Applications and Products (software company)
SCADA	Supervisory Control and Data Acquisition
SRAs	State Responsibility Areas
SRFs	State Revolving Funds
SP	California State Parks
T1	T Carrier 1 (Digital Transmission Line)

U.S.	United States
VMP	Vegetation Management Plan
WFSTAR	Wildfire Fire Safety Training Annual Refresher
WFTF	Wildfire Task Force
WRS	Wildfire Resilience Study
WUI	Wildland Urban Interface

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Executive Summary

The Marin Municipal Water District's core mission is explicitly focused on natural resource management, sustainability, and water supply reliability. Implicit in this mission statement is a guiding principle that water reliability is a fundamental element of the community; supporting the economy, ecology, and landscapes that make Marin a unique and desirable place to live.

District Mission Statement

"To manage our natural resources in a sustainable manner and to provide our customers with reliable, high-quality water at a reasonable price."

As the community we serve contends with potential natural disasters, the district recognizes we have a responsibility and role to play; we have a duty to protect the community we serve by preparing for and mitigating against wildfire. District staff developed this Wildfire Resilience Study (WRS) to summarize existing district programs and operations related to wildfire preparedness, identify data gaps, and develop recommended actions that will lead to a more wildfire resilient and reliable water system that protects communities throughout the district's service area.

The district's Wildfire Task Force (WFTF) developed this Study to capture the perspectives, observations, and input of the district's most critical asset: the personnel who operate the system and understand its strengths, weaknesses, and potential vulnerabilities as it relates to wildfire. This Study represents more than 15 WFTF meetings over a 12-month period. It is a document; updated periodically to address changing conditions and the evolution of wildfire resiliency best practices.

The district will use this Study to 1) inform our board, community, internal organization, and agency partners of preparedness status and needs; 2) develop, implement, and track recommended hazard reduction actions; and 3) provide a basis for future investments related to wildfire resilience.

WRS Goal

Increase district wildfire preparedness to ensure water system resilience and protection of neighboring communities.

WRS Objectives

1. Inform the organization, board, agency partners, and public of preparedness status and needs.
2. Develop and facilitate implementation of recommended actions that improve mitigation, planning, response, and recovery activities.
3. Inform Capital Improvement Program to evaluate and prioritize water infrastructure and wildfire resilience projects.

This Study is comprised of eight sections: Introduction, Background & Setting, Threat Identification, four focus areas of Mitigation, Planning & Preparedness, Response, and Recovery, and Recommended Actions. Each focus area section reviews existing hazard reduction actions, identifies data gaps, and develops actions that could be implemented to improve water system and community resilience to wildfire.

Hazard Reduction Actions

Specific strategies, approaches, or actions that promote wildfire resilience.

The Study concludes with an initial internal evaluation of all identified hazard reduction actions and data gaps, subsequently providing an initial list of recommended actions as a starting point for future discussions. A summary of the Study sections follows:

Section 1 - Introduction

This section explains, in detail, the purpose, goals, objectives, and organization of the Study including a review of contemporary wildfire patterns, the district, and the importance of cross-jurisdictional collaboration to improve community and water system resilience to wildfire.

Section 2 - Background & Setting

This section reviews topics and characteristics specific to the district with the goal of providing a baseline understanding of district assets, the Study Area, fire environment, and history of fire within the Study Area.

Section 3 - Threat Identification

Threat identification is the first step in the emergency management process where potential hazards and threats are identified using a combination of experience, forecasting, and subject matter expertise. The purpose is to conduct a comprehensive and broad-based review of district operations and the surrounding community to identify specific fire-related threats. Staff identified a total of 23 threats to district assets and core business activities including water storage, treatment, delivery, system maintenance and operation, and watershed

management. The identified hazards were organized into three general categories including Ignition Sources, Direct Hazards, and Indirect Hazards (**Table 1**). The subsequent focus area sections seek to identify existing develop potential hazard reduction actions that target the 23 identified hazards.

Table 1: Identified Hazards

Ignition Source
IS-1: Electrical Service Connections
IS-2: Outside Utilities (PG&E)
IS-3: District Facilities
IS-4: Leased Facilities
IS-5: System Maintenance
IS-6: Watershed Maintenance & Management
IS-7: Watershed Visitors
IS-8: Outside Contractors
Direct
DH-1: Damage to Assets
DH-2: Damage to Communications System
DH-3: Impacts to Physical Hydrology
DH-4: Source Water Quality
DH-5: Vegetation
DH-6: Access to Facilities
DH-7: Distribution System Contamination
DH-8: Pressure Loss
DH-9: Staff Safety
DH-10: Visitor Safety
Indirect
IH-1: Staffing
IH-2: Public Safety Power Shutoff
IH-3: Fire Response & Suppression
IH-4: Staff Preparation & Training
IH-5: Financial Security

Section 4 - Mitigation

Mitigation is the second step in the emergency management process where hazard reduction actions (mitigations) are developed and implemented that will prevent or reduce the probability of an emergency event occurring or reduce the damaging effects of unavoidable emergencies. This section of the Study reviews existing hazard reduction actions and develops potential actions that target identified hazards. A total of 52 potential mitigation actions were identified to improve district and community resilience to wildfire.

Section 5 - Planning & Preparedness

Preparing for natural disasters means developing a plan that identifies the resources, processes, and procedures necessary to respond and recover. The fundamental goal is to develop and document strategies and approaches that enhance an organization's ability to provide services in the face of significant operational challenges. This section of the Study reviews planning and preparedness actions already being performed by the district and identifies data gaps and potential planning and preparedness actions that target the identified hazards. A total of 24 potential planning and preparedness actions were identified to improve district and community resilience to wildfire.

Section 6 - Response

Response is the fourth step in the emergency management process where an

entity addresses short-term, immediate effects of an emergency event. The primary focus is to limit the loss of life and property, personal injury, and in the case of the district, to maintain water supply. This section of the Study reviews existing response processes and procedures and identifies potential actions to improve the district's ability to respond to wildfire events. A total of 11 potential response actions were identified to improve district and community resilience to wildfire.

Section 7 - Recovery

Recovery the final step in the emergency management process where the primary focus is restoring or improving pre-disaster community services and operational capabilities. Recovery activities typically occur after immediate threats to life and property have passed and crews can safely begin the process of assessing damage and making necessary repairs to operationalize affected components of the water system. This section of the Study reviews existing recovery processes, identifies data gaps, and develops potential recovery actions. A total of 12 potential recovery actions were identified to improve district and community resilience to wildfire.

Section 8 - Recommended Actions

Upon completing its review of the four focus areas staff compiled all identified hazard reduction actions and conducted an internal scoring and ranking process based on three general criteria.

Potential hazard reduction actions were initially prioritized based on the consequence or impact to district operations if an action is not pursued, the time required to implement the action, and the degree to which an action reduces the probability of a wildfire. The resulting prioritized list of recommended actions includes a spectrum of actions including policy changes, updates to response plans, formalizing best practices for district crews and district contractors, and capital investments. Some of the highest ranking actions included updating the district's Emergency Operations Plan, completing design and construction of a backup power facility at the San Geronimo Treatment Plant, developing a prioritized list of key facilities to protect during a wildfire, and removing remote infrequently used barbeques on the watershed. The full list of prioritized recommended actions is provided in **Table 8.2**.

Conclusion

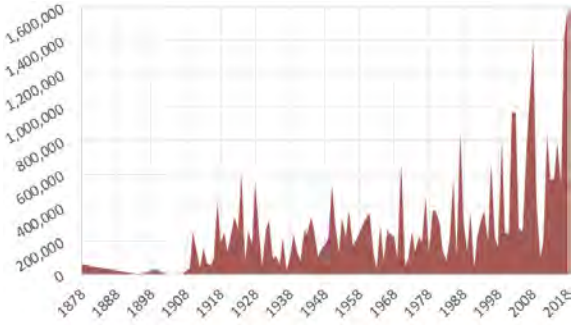
Fifteen of the most destructive wildfires in California's recorded history have occurred in the last 20 years; 10 in the last 4 years. Local governments and water agencies must address this emerging threat including impacts to life, property, the community, and municipal water system. The district developed this Study to identify and address wildfire hazards in order to protect the system we operate and the community we serve.

Introduction

Introduction

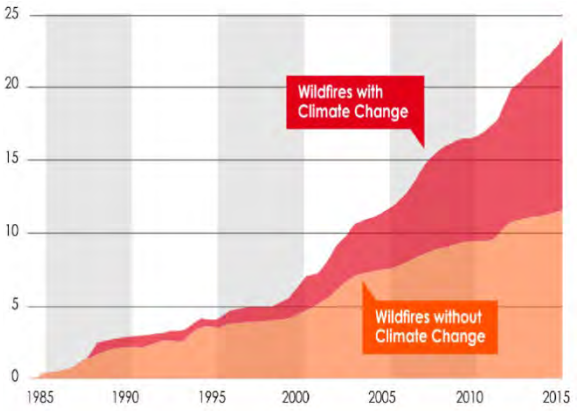
Fifteen of the most destructive wildfires in California's recorded history have occurred in the last 20 years; 10 in the last 4 years[1]. Despite a 50% reduction[2] in reported ignitions the total area burned in California has more than doubled since the 1980s (**Figure 1-1**).

Figure 1-1: *Total Acres Burned in California*



This increased activity can be attributed to fuel load accumulation associated with historic fire suppression, natural climate variability, and human induced climate change. Research indicates that human-caused climate change has been responsible for a 55% increase in fuel aridity and a doubling of the total area burned between 1984 and 2015 in the west[3] (**Figure 1-2**).

Figure 1-2: *Effect of Climate Change on Acres Burned in the Western United States*

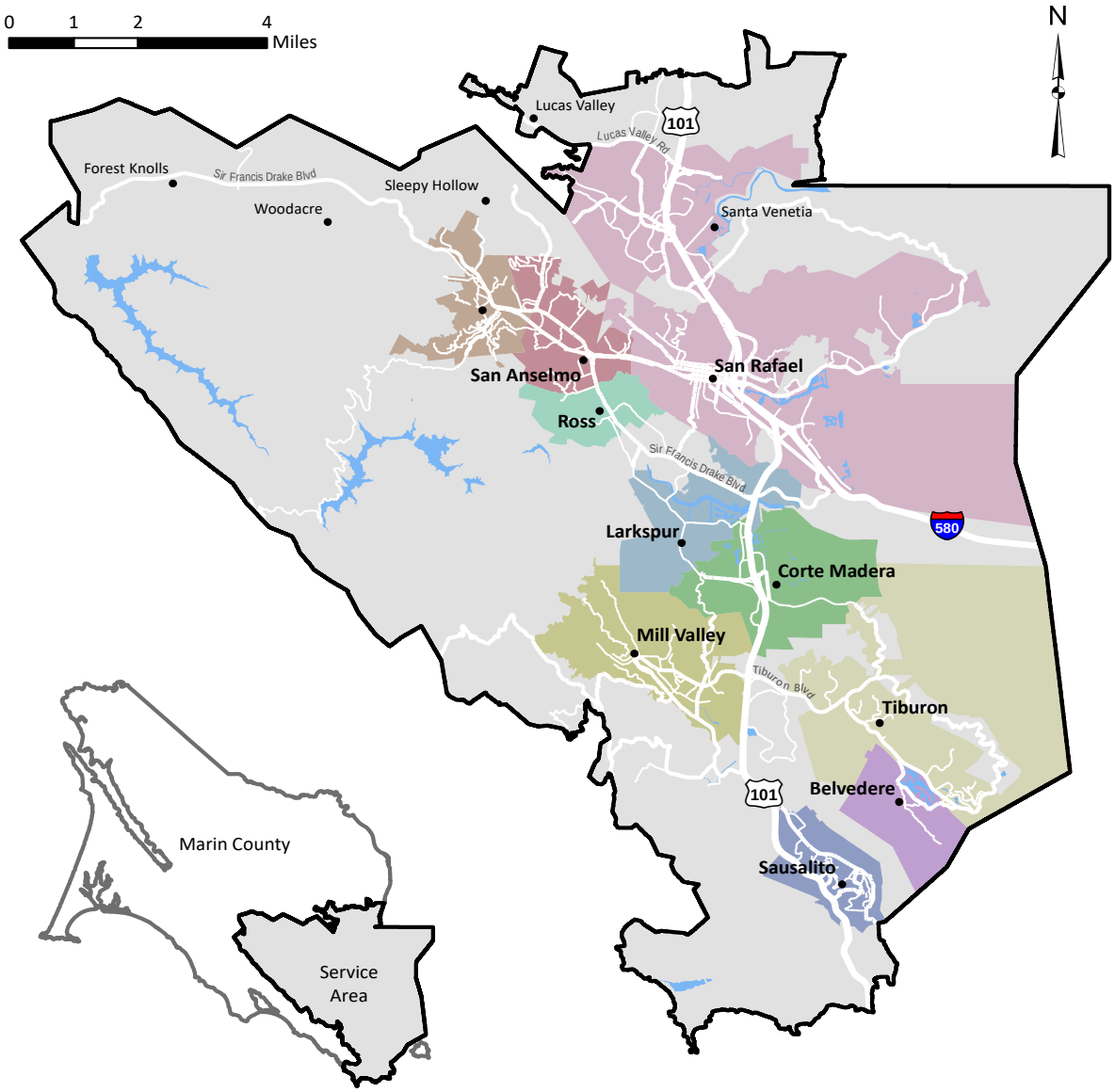


The recent uptick in wildfire impacts and destruction has been dubbed "the new abnormal"[4]. Local governments and water agencies must address this scenario and associated impacts to life, property, and water infrastructure. This includes secondary impacts like those observed after the Camp and Tubbs fires in Butte and Sonoma Counties where pressure loss and contamination of service laterals and distribution mains with toxic organic compounds affected water system reliability long after the wildfire event passed.

Marin Municipal Water District

Established in 1912, the Marin Municipal Water District (district) is the oldest municipal water district in the state of California. The district serves a population of approximately 190,000 in central and southern Marin County including incorporated Sausalito, Tiburon, Belvedere, Mill Valley, Corte Madera, Larkspur, San Anselmo, Ross, Fairfax, and San Rafael along the U.S. Route 101 corridor and the mostly rural locales and communities of Lucas Valley, and San Geronimo Valley (**Figure 1-3**). Throughout the 147 square-mile service area the district's water infrastructure intersects landscapes that are increasingly susceptible to wildfire. After years of fire suppression, inconsistent levels of vegetation management, and the influence of global climate change, the importance of planning for wildfire in order to meet our primary mission has reached a critical level.

Figure 1-3: *Municipalities Within the Marin Municipal Water District Service Area*



1.1 Policy Statement

The district's fundamental goal for wildfire planning is captured in our mission statement.

District Mission Statement

"To manage our natural resources in a sustainable manner and to provide our customers with reliable, high-quality water at a reasonable price."

The district endeavors to fulfill this mission in the event of a wildfire by evaluating the status of existing wildfire programs and preemptively developing and implementing hazard reduction actions to improve overall community and water system resilience and reliability.

1.2 Purpose, Goal, & Objectives

Historically, wildfire preparedness planning has focused on developing and implementing hazard reduction actions that avoid or minimize the loss of structures and human life. The county of Marin, along with municipal departments and special fire districts, non-profits, and state and federal agencies have expended considerable effort to identify key risks, areas of concern, and develop hazard reduction strategies that will reduce the impact of wildfire to life and property in Marin County[5, 6]. Recent wildfire events and concomitant impacts to water supply infrastructure across the western United States have emphasized the importance of integrating these wildfire-planning efforts with water infrastructure planning to improve water system and community resilience and reliability in the face of increased wildfire risk.

WRS Goal

Increase district wildfire preparedness to ensure water system resilience and protection of neighboring communities.

WRS Objectives

1. Inform the organization, board, agency partners, and public of preparedness status and needs.
2. Develop and facilitate implementation of recommended actions that improve mitigation, planning, response, and recovery activities.
3. Inform Capital Improvement Program to evaluate and prioritize water infrastructure and wildfire resilience

The purpose of this Wildfire Resilience Study (WRS) or "Study" is to approach wildfire planning efforts in a programmatic way that informs the district's core business *and* embraces the responsibility we have to protect the community we serve. This Study will summarize existing district programs and operations related to wildfire preparedness, identify data gaps, and develop recommended actions that will lead to a more fire resilient and reliable water transmission and distribution system that protects the communities adjacent to district lands and communities throughout the service area.

The district will use this Study to 1) inform our board, community, internal organization, and agency partners of preparedness status and needs; 2) develop, implement, and track recommended

actions; and 3) provide a basis for future investments related to wildfire resilience. It is expected that it will be a living document updated periodically to address changing conditions and evolution of wildfire resiliency best practices.

1.3 Study Organization & Development

The district's Wildfire Task Force (WFTF), which is composed of key staff with an expertise in system maintenance and operation, water treatment, engineering, and watershed management, developed this Study to capture the perspectives, observations, and input of the district's most critical asset: the personnel who operate the system and understand its strengths, weaknesses, and potential vulnerabilities. The Study represents over 15 staff meetings over the course of a 12-month period and extensive internal communication and analyses. The final Study will incorporate input and review from the Marin County Fire Chief's Association, the district's Board, local municipalities, and the public through formal workshops.

The Study includes an Executive Summary, Introduction, Threat Identification, and four "Focus Area" sections that consider the emergency planning topics of Mitigation, Preparedness, Response, and Recovery. Each "Focus Area" section includes a review of existing hazard reduction actions and identifies data gaps and potential actions that could be implemented to improve district and community resilience. Hazard reduction actions are organized into "Categories" and "Topic Areas".

Hazard Reduction Action
Specific strategies, approaches, and actions that promote wildfire resilience.

Category
A grouping of topic areas and associated hazard reduction actions with a similar instrument of implementation (e.g. Plans, Programs, & Procedures, Policies, Agreements, & Contracts, Training).

Topic Area
A specific subject area for which existing and proposed hazard reduction actions are discussed.

The Study concludes with an initial prioritization of hazard reduction actions and list of recommended actions (Section 8). This Study includes analysis and recommended actions but is not self-implementing. Any actions or projects recommended in this Study will require further consideration and review for approval or adoption as well as an appropriate level of environmental review in accordance with the California Environmental Quality Act.

1.4 Coordination & Collaboration

The district acknowledges that to be effective, wildfire and water infrastructure planning should cross jurisdictional and organizational boundaries. As described in the Marin County Community Wildfire Protection Plan (CWPP), fire protection in Marin County is the responsibility of federal agencies, local municipalities, and the State of California. The district is just one agency,

with a focus on water supply and delivery, in a suite of governmental organizations that are responsible for and can influence and improve the county's overall preparedness to wildfire through communication and coordinated implementation of hazard reduction actions.

The Marin County Fire Department (MCFD) is the primary provider of fire protection and prevention activities in both Federal and State Responsibility Areas (FRAs and SRAs, respectively) and although the district's watershed maintenance and law enforcement park ranger staff are trained wildland firefighters, MCFD serves as the lead agency in dispatching and responding to fires on district lands. Of the thirteen professional fire service agencies in Marin County, eleven are responsible for protecting district water infrastructure in the event of a wildfire (**Table 1-1**). In March of 2020, Marin County voters approved Measure C and with it the formation of the Marin Wildfire Prevention Authority (MWPA). The MWPA is a joint powers authority that will develop and implement a comprehensive and coordinated wildfire prevention and emergency preparedness plan between its 17 member agencies. Continued coordination and communication with these entities will be a critical element of the district's process.

Table 1-1: *Fire Districts in Study Area*

Marin County Fire Department[1]
Corte Madera Fire Department
Kentfield Fire Protection District
Larkspur Fire Department
Marinwood Community Services District
Mill Valley Fire Department
Novato Fire Department
Ross Valley Fire Department
San Rafael Fire Department
Southern Marin Fire Protection District
Tiburon Fire Protection District

[1] Provides fire protection and prevention for State and Federal Responsibility Areas

[1] CalFire "*Top 20 Most Destructive California Wildfires*" August, 8, 2019. http://www.fire.ca.gov/media/5511/top20_destruction.pdf, Last accessed on 10/18/2019

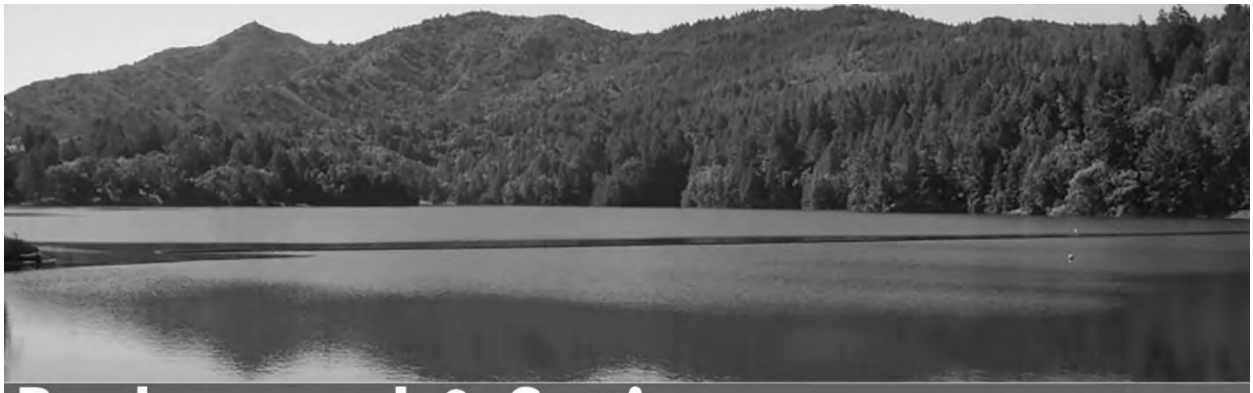
[2] 2018 CalFire Strategic Plan. pp 6

[3] Abatzoglou and Williams, 2016. Impact of Anthropogenic climate change on wildfire across western US forests. PNAS 113

[4] Governor Jerry Brown, 9/11/2018 Paradise Fire press conference

[5] Wildfire Preparedness – A New Approach. 2018-2019 Marin County Civil Grand Jury

[6] Marin County Community Wildfire Protection Plan, 2017



Background & Setting

2.1 District Profile

The Marin Municipal Water District is a special district headquartered in Corte Madera, California and governed by a five-member board of directors. The district operates and maintains a highly complex water collection, treatment, and distribution system reflective of the 26 separate water companies[1] that were merged to form the district and the infrastructure (pumps, tanks, etc.) required to collect, transport, treat, and deliver water over significant elevation gradients across the service area.

The district operates and maintains over 900 miles of pipeline, 7 dams and reservoirs, 94 pump stations, 128 water supply tanks, and 3 water treatment plants. This system of water infrastructure provides water to 190,000 customers (73% of Marin's population) through 61,800 service connections. The district is the second largest landowner and land management agency in Marin County, second only to the National Park Service, and owns 21,600 acres of watershed lands mainly on Mt. Tamalpais which are open to recreational use and attract approximately 2 million visitors a year. Approximately 75% of delivered water is locally sourced from five reservoirs encompassed by district lands (Lagunitas, Bon Tempe, Alpine, Kent, and Phoenix) and two reservoirs in West Marin (Soulajule and Nicasio) surrounded by mostly rural unincorporated private lands. The other 25% of the district's water is imported from Sonoma County Water Agency's Russian River system. Locally sourced water is treated at the San Geronimo and Bon Tempe treatment plants using a combination of physical and chemical processes to remove impurities and deactivate pathogens before entering the distribution system. On average, the district provides 25,000 AF of water per year to its customers; an essential life-service integral to public health and the region's economic vitality.

Table 2-1: *Summary of Water Infrastructure Assets Potentially Affected by Fire*

Water Supply/Watershed	Dams, reservoirs, and natural landscapes which capture and store runoff for long-term storage.
Transmission Mains	Pipe network transporting raw water from water supply reservoirs to treatment plants and treated water to storage tanks prior to distribution.
Treatment Plants	Permanent facility that receives and treats raw water to state and federal drinking water quality standards.
Storage Tanks	Steel, concrete, wood, or plastic tanks used to store water for high demand periods and to maintain system pressure.
Pump Stations	Mechanical pumps, motors, facilities, and associated controls used to transport and control the flow of water between water supply sources, treatment plants, and storage tanks.
Distribution Mains	Pipe network transporting treated water to primary consumption zones in service areas.
Valve/Regulators	Mechanical components used to control the flow of water in the system.
Roads & Facilities	Paved and unpaved roads, watershed facilities, and infrastructure providing access to Water Supply, Transmission Mains, Treatment Plants, Storage Tanks, and Pump Stations.
SCADA/Communications	Supervisory Control and Data Acquisition (SCADA) system and associated telemetry resources that facilitate remote observation and control of the water system.

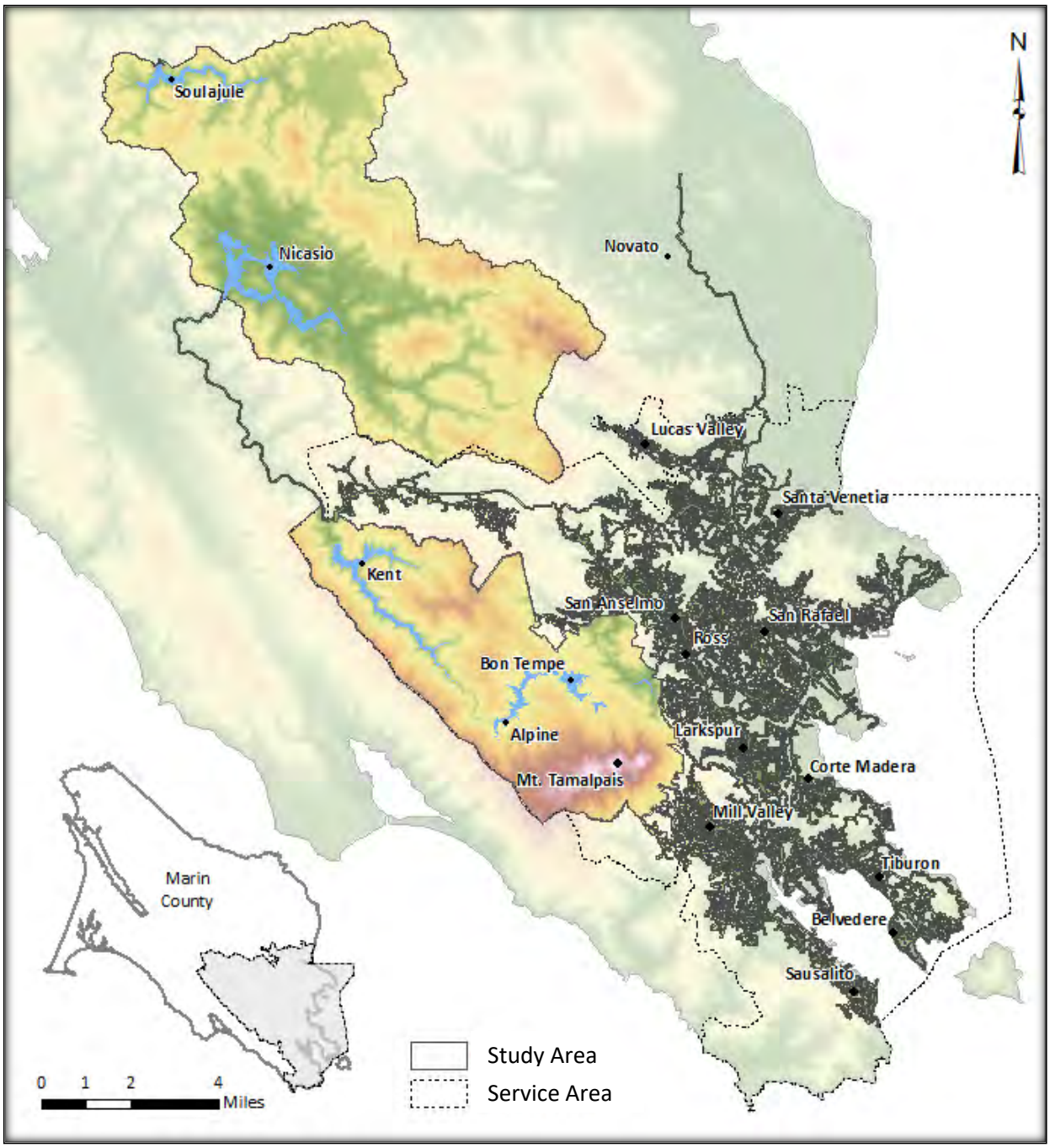
2.2 District Assets

The district developed an asset management program to prioritize and allocate limited capital infrastructure funding to improve system reliability. This Study adopts and follows asset management principles to ensure prudent use of available financial resources. District assets potentially affected by fire are summarized in **Table 2-1**.

2.3 Study Area

District staff defined a "Study Area" for which fire preparedness would be evaluated. The Study Area extends beyond the district's service area to encompass 110 square-miles of Marin County from the shores of the San Francisco Bay to the top of Mt. Tamalpais, west towards Lagunitas, and northward encompassing the Nicasio and Soulajule watersheds. It includes a 100-foot buffer around all water infrastructure assets and the source watersheds that collect precipitation (**Figure 2-1**). The Study Area defines the spatial scope of the WRS. However, it is not a representation of proposed actions, programs, or district responsibility as it extends beyond areas owned by the district. Instead, the Study Area is a planning-boundary that seeks to capture the zone of wildfire influence on district facilities and operations and includes urbanized city centers, densely populated residential neighborhoods situated on steep vegetated slopes, rural agricultural lands, and over 21,600 acres of district-owned watershed lands managed for the protection of water quality.

Figure 2-1: *Wildfire Resilience "Study Area"*



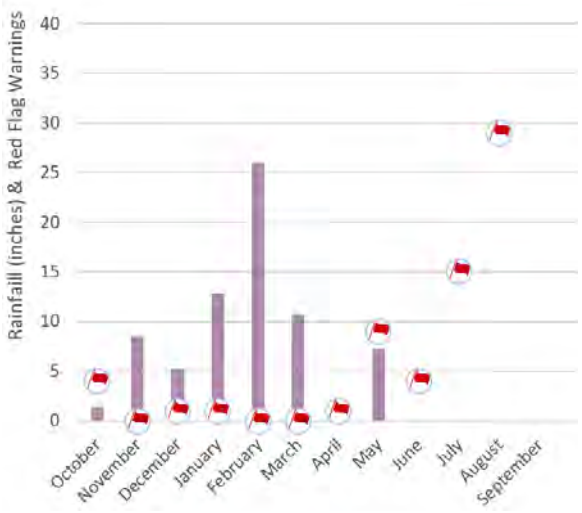
2.4 Fire Environment

The entire Study Area is vulnerable to some level of wildfire depending on the local site-specific fire environment. The Fire Environment is the combination of weather, vegetation, topography, and land use patterns that influence wildfire behavior and risk at a particular location.

Weather Patterns

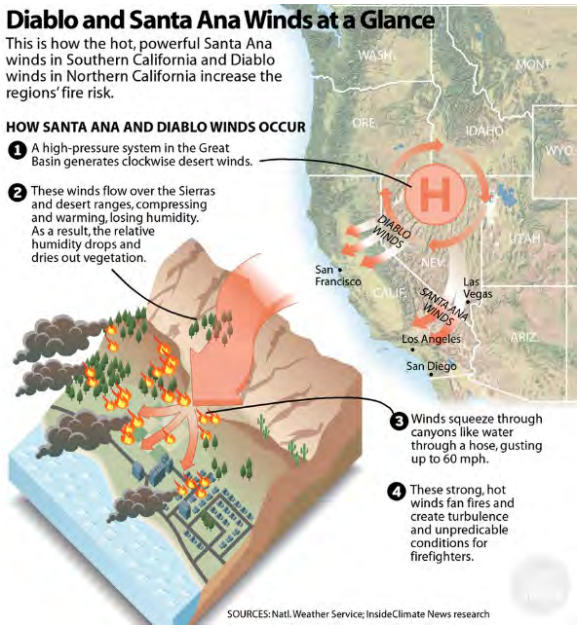
The CWPP provides a detailed description of typical weather patterns and the resulting microclimates that develop across Marin County. In general, a Mediterranean climate with cool, wet winters and hot, dry summers prevails; wildfire season is considered to extend from May to late October or until significant rain events increase soil and vegetation moisture (**Figure 2-2**). However, recent climatological studies and fire history have suggested fire season extends through November each year.

Figure 2-2: *Average Monthly Rainfall & Total Red Flag Warnings Between 2004 and 2019*



Two notable synoptic patterns influence fire weather and fire behavior in the Study Area. During normal summer season wildfire weather, the Pacific High is situated over the eastern Pacific and California coast. As inland areas heat up surface air rises and low pressure develops over central California creating a strong pressure gradient that drives cool moist air from the Pacific Ocean to inland areas. These onshore "Delta" winds are highest in the late afternoon (15 – 25 mph), recede overnight as inland heating subsides, and are responsible for moderating local climate conditions and fire conditions.

Figure 2-3: *Extreme Fire Conditions ("Diablo" wind event)*



Extreme summer wildfire weather occurs when the Pacific High shifts inland over southeastern Oregon and northern Nevada and the dominant wind direction transitions from onshore to offshore (**Figure 2-3**[2]). This seemingly minor change in the location of the Pacific High has a substantial effect on

potential fire risk and behavior as it results in warmer temperatures, lower humidity, and stronger wind conditions. As described in the CWPP, this extreme summer wildfire condition decouples the typical heating, cooling, and moisture delivery cycle that mitigates wildfire conditions and local climates.

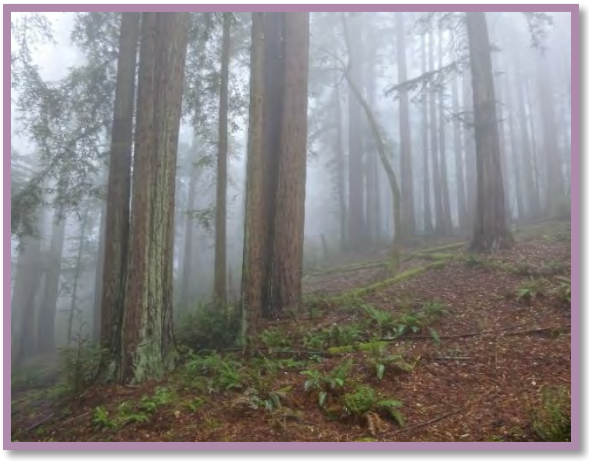
Because the winds originate from descending air masses over continental areas they are extremely dry (low humidity) as compared to typical onshore winds. Dubbed "Diablo" winds, they exacerbate fuel aridity, increase the probability that ignition sources will develop into full-fledged wildfires, and decrease the effectiveness of fire suppression activities.

Reviewing normal and extreme wildfire season weather may not adequately capture future fire environment conditions. Climate models predict a widespread increase in extreme or anomalous weather events such as tornados, hurricanes, flooding, and severe prolonged drought[3,4]. Longer droughts have the potential to change vegetation patterns and increase the rate of tree mortality and infestations that leave landscapes more susceptible to wildfire. California's Fourth National Climate Assessment in November of 2018 reported that planners should expect climate change to "increase the frequency and intensity of wildfires". Overall, given known weather processes and anticipated effects of climate change, the district should anticipate that fire weather conditions will not subside and will likely become more extreme throughout the Study Area.

Vegetation & Topography

The diverse assemblage of vegetation across the Study Area is determined by the interaction and combination of long-term weather patterns, soil type, aspect, and elevation. For example, north facing second-growth redwood forests along the watershed's western boundary are relatively high in elevation and interact with cool and moist onshore flow to generate localized precipitation known as "Fog Drip" throughout the typical dry season. Fog drip tends to increase local soil moisture and support vegetation that requires a higher water input (redwoods, ferns, etc.) which, if managed appropriately, may be more resilient to wildfire.

Image 2-1: *Fog Drip in Redwood Forests*



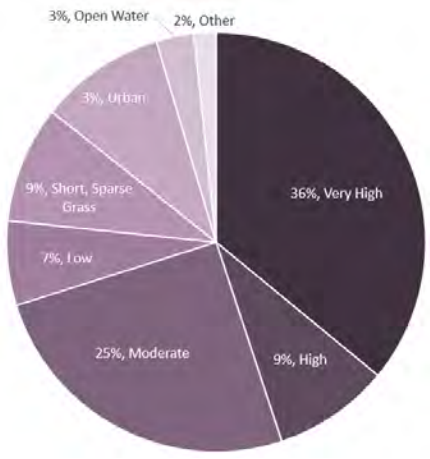
This is in sharp contrast to areas less than ½ mile away along Pine Mountain Fire Road and Azalea Hill where serpentine soils, south-facing exposures, and a subtle ocean influence result in vegetation that's

adapted to drier conditions; short grass, shrubs, and oak woodlands.

Image 2-2: *Grassland, Shrub, and Oak Woodland Dominated Vegetation*

The diversity of vegetation types in the Study Area denotes fuel loads and wildfire risk are heterogeneous across the landscape. The CWPP developed a fuel model to represent the spatial variation in fuels loads in order to analyze its effects on anticipated fire behavior and overall fire risk. Approximately 70% of the Study Area falls into moderate, high, or very high fuel loads based on the CWPP vegetation and fuel load model (**Figure 2-4**[5]).

Figure 2-4: *Study Area Fuel Loads*



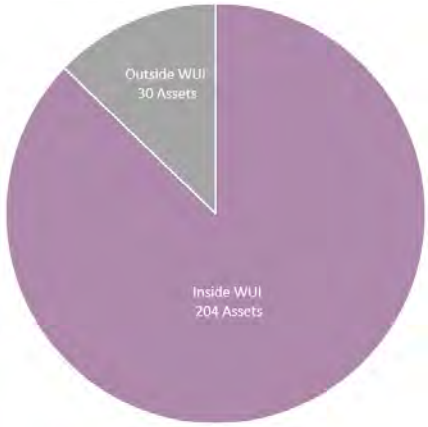
Land Use

Wildfire preparedness and planning typically focuses on vegetation management, structure hardening, and clearing defensible space in the Wildland Urban Interface (WUI) where structures are comingled amongst wildfire prone vegetation and landscapes and are therefore significantly more susceptible to wildland fire. District assets within the WUI are similarly more vulnerable to wildland fire.

Wildland Urban Interface (WUI)
Areas of increased risk of wildfire where fire-evolved fuels interface with habitable structures.

The Study Area includes 27 square miles of WUI encompassing almost 90% (204) of the district's assets (**Figure 2-5**). Within the WUI the district's pump stations, tanks, and treatment plants are positioned amongst privately owned structures, landscapes, and wildland fuels. In these areas, limited access, complex topography, and landowners with varying landscape management approaches complicate fuels management and response activities.

Figure 2-5: *District Assets and the WUI*



The highly distributed nature of the district's infrastructure, especially as it relates to the WUI and high fuel loads is one of the primary threats to community and water system resilience and reliability (see Section 3). While the district can manage vegetation and fuels in the immediate vicinity of critical assets, management and operations staff have little control over fuel loads on adjacent private property; a key factor influencing asset vulnerability.

Image 2-3: *District Tanks in the Wildland Urban Interface (WUI)*

2.5 Fire History

Marin County and the lands encompassing the Study Area have an active history and relationship with fire. Prior to European colonization indigenous peoples used fire to remove undergrowth, promote the growth of valuable resources, improve hunting grounds and travel routes, and to protect their communities. Indigenous peoples applied fire at specific frequencies and locations to achieve desired outcomes.

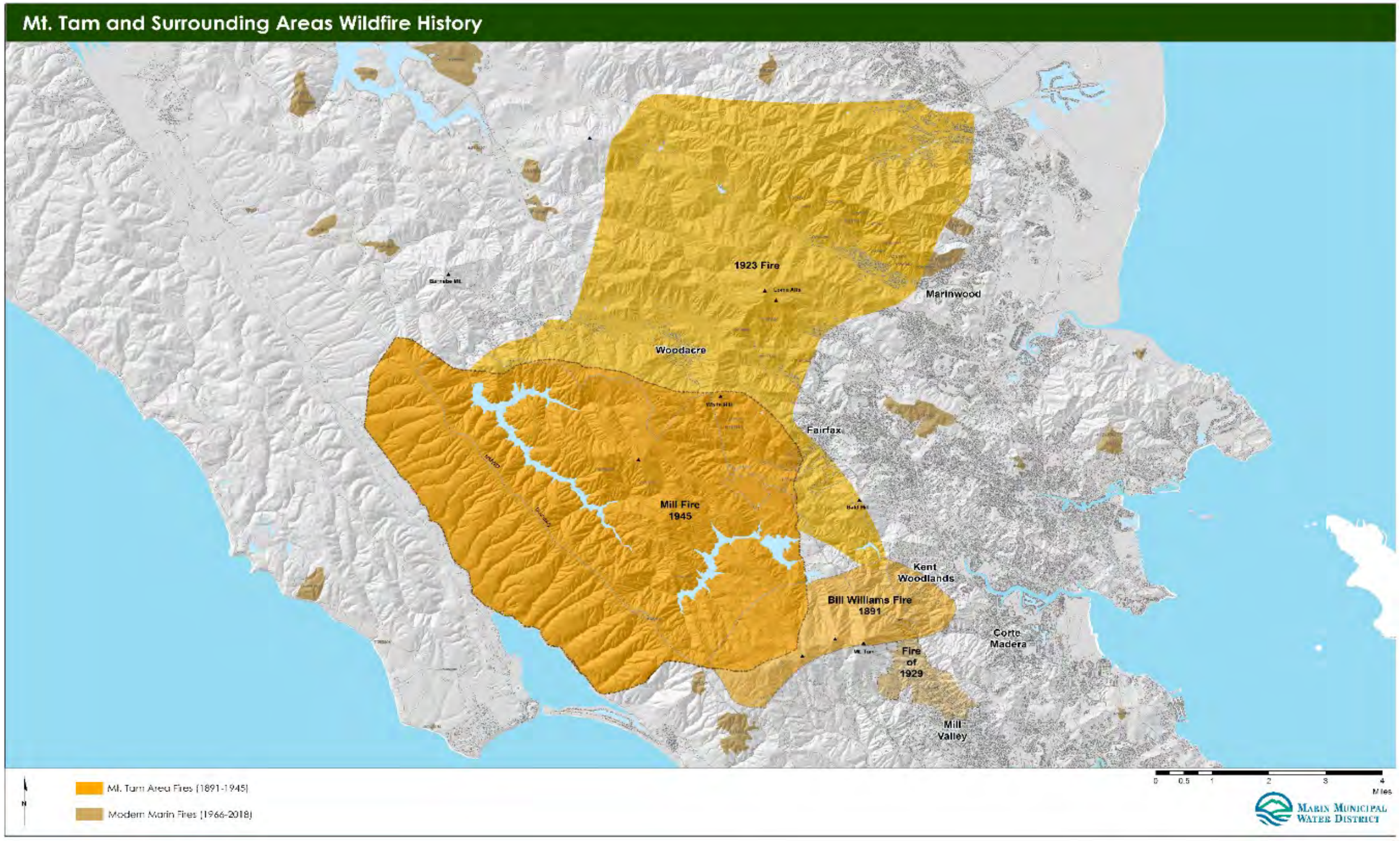
After European contact, the relationship between humans, fire, and the landscape changed dramatically. In 1881, a landowner targeting blackberry removal lost control of a fire that subsequently burned 65,000 acres[6]. At the turn of the 19th century, efforts were already underway to protect the wildlands surrounding Mt. Tamalpais from conflagration. William Kent spearheaded the formation of the Tamalpais Forestry Association whose members engaged and suppressed a large fire in 1904. The Tamalpais Fire Association was formed after a 5,025 acre 1913 fire along the south face of Mt. Tamalpais. This locally funded effort was a precursor to the Tamalpais Forest Fire District (TFFD) which was formed by the state in 1917 and tasked with wildfire prevention and control. In 1917 the Marin Municipal Water District established its firefighting program by creating its ranger program and funding two joint patrolman and fire warden positions in TFFD. In addition to the 1881 fire there have been five other large wildfires within the Study Area over recorded history including the Bill Williams, 1913, 1923, Mill Valley, and Mill Fires (**Table 2-2** and **Figure 2-6)**) as well as forty-two smaller fires less than 500 acres. Most of Marin's largest wildfires have occurred under the extreme offshore wind conditions discussed in Section 2.4.

Table 2-2 – *Wildfires in Study Area*

Year	Name	Acres Burned
1881	1881 Fire	3,400
1891	Bill Williams	3,900
1913	1913 Fire	3,000
1923	1923 Fire	40,000
1929	Mill Valley Fire	900
1945	Mill Fire	22,600

In 1941, the responsibility of fire prevention and suppression in the Study Area (Marin County) was transferred to the newly created MCFD[7]. MCFD is the lead fire suppression agency in Marin County although the district maintains initial attack and suppression capabilities (staff training, fire apparatus, etc.) as part of managing the watershed (see Section 5).

Figure 2-6: *Selected Large Wildfires Around Mt. Tamalpais*



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[1] Gibson, 2012, *Mount Tamalpais and the Marin Municipal Water District*

[2] Source: Paul Horn/Inside Climate News

[3] Diffenbaugh et al, 2015. Anthropogenic warming has increased drought risk in California. PNAS 112 (13)

[4] Mann & Gleick, 2015. Climate Change and California drought in the 21st century. *PNAS, 112 (13)*

[5] Marin County Community Wildfire Protection Plan, 2017

[6] Spitz, 2012, To Save A Mountain, *The 100-Year Battle for Mt. Tamalpais*

[7] Spitz, 2012, To Save A Mountain, *The 100-Year Battle for Mt. Tamalpais*

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Threat Identification

Introduction

Threat identification is the first step in emergency management process where potential threats (seismic, flooding, wildfire, etc.) and associated hazards to a particular resource are identified using a combination of experience, forecasting, and subject matter expertise[1] (**Figure 3-1**). After threats and hazards are identified, planners can develop tailored hazard reduction actions within the focus areas of mitigation, planning and preparedness, response, and recovery that will increase system resilience. This Study specifically focuses on the threat of wildfires to district operations, therefore staff limited its focus to addresses hazards that are directly or indirectly associated with wildfire. As additional wildfires impact communities and "lessons-learned" are developed, there may be a need to expand on the hazards identified herein and develop additional hazard reduction actions.

Threat
A potential action or event that can cause loss or disruption to district operations (e.g. earthquake, flooding, wildfire).

Hazard
The mechanism, characteristic, circumstances, or agent leading to a loss or disruption in district operations.

This section describes the district's process for threat identification and summarizes key wildfire related hazards. The hazards will be linked to existing and potential hazard reduction actions in subsequent "Focus Area" sections.

3.1 Threat Identification Process

Staff with an expertise in system maintenance and operation, water treatment, engineering, and watershed management met over a 12-month period to review wildfire hazards and associated consequences.

Figure 3-1: Threat Identification and the Emergency Management Process

Staff reviewed district asset types, vulnerabilities, and core business activities including water storage, treatment, delivery, system maintenance and operation, and watershed management. The process tapped lessons learned from recent wildfire effects on water agencies across the state, local and regional wildfire planning documents, and available literature on wildfire and water infrastructure planning[2].

3.2 Hazard Categories

Staff identified wildfire hazards and organized them into the three following general categories: Ignition Sources, Direct Hazards, and Indirect Hazards.

Ignition Sources

The best way to avoid a wildfire is to preclude or avoid scenarios or circumstances that can lead to potential ignitions. For example, Pacific Gas and Electric's (PG&E) Wildfire Safety Plan[3] uses Public Safety Power Shutoffs (PSPSs) to reduce potential ignitions across its service area when fire weather conditions are critical. Given the spatial extent and scope of the district's activities in relation to the water shed and WUI, staff considered potential ignition sources as a significant hazard to the water system and surrounding communities. Therefore, this category includes ignition related hazards associated with district operations, watershed visitors, contractors, and lessees within the Study Area.

Image 3-1: *Downed Power Lines Near Kent Lake (Ignition Source)*

Direct Hazards

Wildfires have the potential to directly consume or damage district assets that are essential to water treatment and delivery. This hazard is a function of location, surrounding vegetation or wildfire risk profile, and the vulnerability and criticality of the asset. This category includes distinct hazards that directly contribute to the damage and destruction of district assets and the surrounding community.

Image 3-2: *City of Napa Pump Station Near Silverado Country Club Destroyed During the 2017 Atlas Fire (Direct Hazard)[4]*

Indirect Hazards

In addition to direct hazards, wildfire emergencies have the potential to indirectly affect the district's core mission. Indirect hazards can be as consequential as direct hazards and therefore necessitate hazard reduction actions. This category includes ancillary or secondary threats that may

disrupt system performance, personnel, financial security, and staffing but are not distinct threats to particular assets. In total, staff identified 23 Ignition Source, Direct, and Indirect Hazards (**Table 3-1**).

Table 3-1: *Summary of Identified Hazard*

Ignition Source
IS-1: Electrical Service Connections
IS-2: Outside Utilities (PG&E)
IS-3: District Facilities
IS-4: Leased Facilities
IS-5: System Maintenance
IS-6: Watershed Maintenance & Management
IS-7: Watershed Visitors
IS-8: Outside Contractors
Direct
DH-1: Damage to Assets
DH-2: Damage to Communications System
DH-3: Impacts to Physical Hydrology
DH-4: Source Water Quality
DH-5: Vegetation
DH-6: Access to Facilities
DH-7: Distribution System Contamination
DH-8: Pressure Loss
DH-9: Staff Safety
DH-10: Visitor Safety
Indirect
IH-1: Staffing
IH-2: Public Safety Power Shutoff
IH-3: Fire Response & Suppression
IH-4: Staff Preparation & Training
IH-5: Financial Security

3.3 Hazard Descriptions

Ignition Sources

Staff identified a total of 8 general types of hazards that could lead to an ignition event. A brief summary of each ignition source (IS) hazard is provided below.

IS-1: Electrical Service Connections

As described above, the district maintains assets across central and southern Marin County that rely on electrical power to run the pumps that transmit, treat, and then distribute water. The district also operates and maintains communications equipment essential to system control and operation that require electrical service connections. Power to run the district's assets is obtained from PG&E's distribution network via overhead or underground service connections at each facility.

PG&E is responsible for maintenance of electrical infrastructure up to the service connection. This does not include weatherheads, or roof, wall, or ground conduit leading up to the service panel and meter. It also does not include any poles, conduit, or connections after the service connection and meter box that power district infrastructure. Therefore, the district is responsible for maintaining and inspecting interpoles, conductors, conduit, and electrical service connections. If the vegetation surrounding these connections is not managed or if the components are not adequately maintained they could cause an ignition.

IS-2: Outside Utilities

PG&E operates transmission and distribution lines throughout the Study Area that are a potential ignition hazard. The California Public Utilities Commission (CPUC) regulates privately-owned utilities such as PG&E and has published a Fire-threat map that identifies where there is an elevated (Tier 2) and extreme (Tier 3) risk for utility-caused wildfire damage (**Figure 3-2**). The CPUC threat zones do not indicate or infer the level of risk to a specific asset within each zone but instead provide a relative assessment of the likelihood and potential level of damages to people and property at a broad scale for planning and regulatory purposes. Overall, approximately 27% and 43% of the district's pump stations, tanks, and treatment plants are located in CPUC Tier 2 and Tier 3 risk zones, respectively (**Figure 3-3**). Therefore, without considering local site specific conditions the potential for a utility caused wildfire in the Study Area is high.

The threat of utility caused wildfires extends onto water district lands. PG&E operates and maintains 14 miles of distribution line and 3.4 miles of transmission line on the watershed which provide power to Bolinas and services district dam, pump, and reservoir facilities.

Image 3-3: *Crews at the Site of a Utility Caused Wildfire on Watershed Lands (2006 Pine Fire)*

PG&E is required to develop and implement wildfire safety plans for transmission and distribution lines to reduce the potential for utility-caused ignitions. These plans must include vegetation management, regular maintenance and inspection, equipment replacement, and potential power grid shutdown actions. Despite these efforts, the utilities within the Service Area are a hazard and must be considered in future district wildfire planning efforts.

Figure 3-2: *Study Area CPUC Threat Zone*

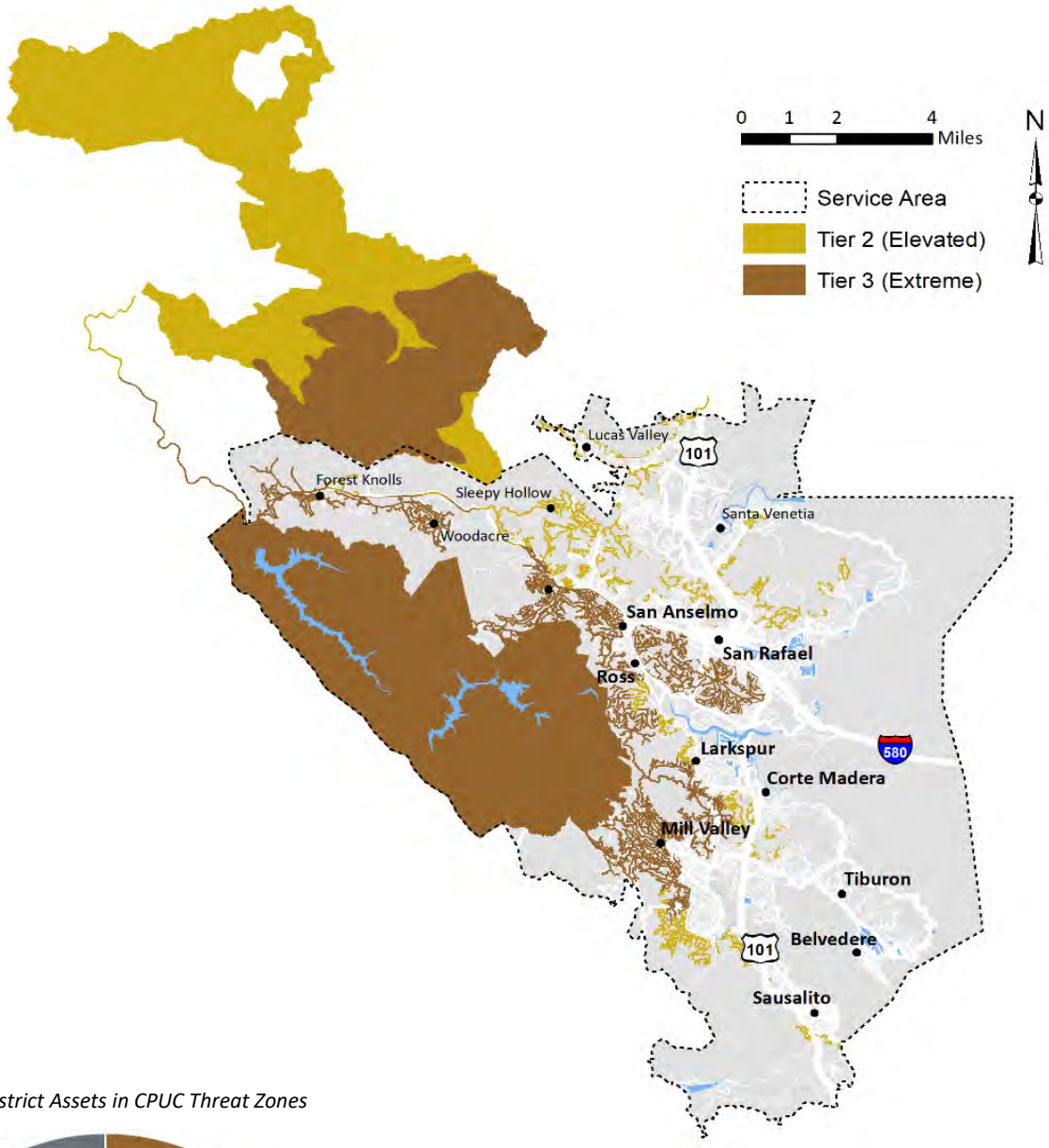
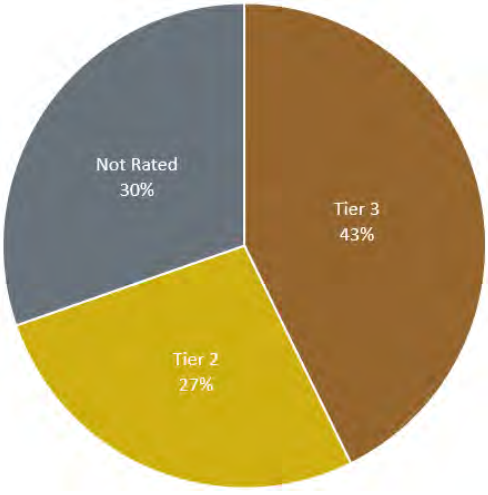


Figure 3-3: *District Assets in CPUC Threat Zones*



IS-3: District Facilities

Similar to district owned and maintained electrical service connections, the district operates a broad range of mechanical and electrical components at each facility that could potentially cause an ignition. For example, pump motors, circuitry, fuel storage, and other facilities could potentially serve as an ignition source if they are inadvertently overloaded, under-designed, improperly maintained or otherwise. This could potentially lead to an ignition within a district facility that spreads to adjacent wildlands and WUI.

IS-4: Leased Facilities

The district has 16 long-term leases with private, public, and government entities who use district land and facilities for various activities including cell tower communication infrastructure, horse boarding, construction staging, and overnight lodging. Given that these activities are not under the direct control of the district and could involve electrical systems, maintenance, and fuel storage, activities on leased premises could initiate an ignition.

IS-5: System Maintenance

Continuous maintenance and repair of district assets is required to reliably transmit, treat, and deliver water. Crews use heavy equipment, cut-off saws, grinders, torches, and welding equipment to dig up and repair leaks throughout the Study Area on a daily basis regardless of the time of day and fire conditions.

Many of the district's assets (pump stations, air relief valves, valves, etc.) are located in rural areas and require driving and working near combustible vegetation and terrain. The district also conducts scheduled landscape and facilities maintenance operations that use mowers, chainsaws, and other equipment that could potentially cause an ignition near tank sites, pump stations, and other district-owned parcels.

Image 3-4: *District Staff Welds a Pipe Repair (Potential Ignition Source)*

IS-6: Watershed Maintenance & Management

The district manages 21,600 acres of watershed lands surrounding Mt. Tamalpais including over 90 miles of fire roads and critical facility access routes leading to pump stations, treatment plants, and reservoirs. Watershed maintenance activities include the use of heavy equipment to grade roads, gas-powered tools for weed control, mowers for fuel reduction activities, prescribed burns, and facilities maintenance projects that require welding.

Image 3-5: *MCFD Ignites a Prescribed Burn on Watershed Lands (Ignition Source)*

IS-7: Watershed Visitors

The district completed a visitor use and census survey in 2014 which estimated that approximately 1.8 million visitors trek to the roads and trails of the Mt. Tamalpais Watershed each year[5]. Based on recent observations and regional patterns, use has likely climbed to over 2 million visitors a year. Watershed use peaks in March, April, and May at around 200,000 visitors per month and then levels off during the hotter and drier summer months to approximately 125,000 monthly users. Visitors can enter the watershed through 98 access points, including gateways, formal trailheads, parking lots, and informal trails. However, the largest proportion of visitors enter via the East Peak, Phoenix Lake, and Sky Oaks gateways. During the typical fire season, watershed lands can receive around 29,000 visitors a week; the majority of which occur on weekday evenings and midday weekends when fire hazard conditions are typically the highest. Weekend activity is typically four times that of weekday activity (2,500 people/day) and coincides with a lower level of district staffing and associated response capabilities.

Potential ignition sources associated with watershed users are of three general categories: accidental, intentional (arson), and those associated with unlawful activities. Accidental ignitions can occur from parking on dry grass, vehicles or even electric bikes that suffer mechanical issues, or unextinguished charcoal barbeques in picnic areas. Although less common than unextinguished barbeques, since 2010 there have been at least five intentionally set vegetation fires on the watershed. Other activities that could ignite a wildfire include encampments, bonfires, wood-fired barbeques, fireworks, and smoking; all of which are not permitted (illegal) on watershed lands.

Image 3-6: *Watershed Lands are Open to the Public 7 Days a Week, 7 am to Sunset*

IS-8: Outside Contractors

The district relies on outside contractors to implement capital improvement projects such as pipeline replacement, vegetation

management, and other special projects throughout the Study Area. Contractor activities and risk factors parallel that of district system maintenance (IS-5) and watershed maintenance and management (IS-6); they use heavy equipment, combustion engines, welding equipment, and vehicles that could initiate a wildfire if conditions are dry. Some contractors working on district lands are subcontracted by PG&E, and therefore the district has less control over them compared to contractors working directly for the district.

Direct Hazards

Staff identified 10 direct hazards and associated consequences to district operations. A brief summary of each direct hazard (DH) is provided below.

DH-1: Damage to Assets

As described in section 2, the district's primary assets (pump stations, tanks, and treatment plants) are distributed throughout a wide geographic region with varying fire risk characteristics. The primary differentiator of vulnerability is whether the asset is located aboveground or underground. Underground facilities are more insulated from the effects of fire even if the components are combustible (CPVC mains, PVC services, etc.). Therefore, staff focused on aboveground assets.

Underground Assets
Underground facilities such as pipes, meters, valves, electrical components are impacted by conductive heat with the depth of burial indicating the level of insulation and resiliency to fire.

Aboveground Assets
Assets that are directly exposed to all three heat transfer processes; radiant, convective, and conductive and are most susceptible to fire behavior.

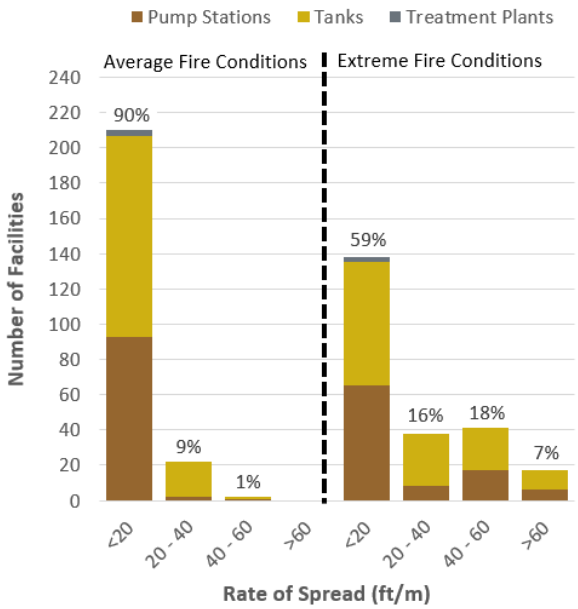
Image 3-7: *San Geronimo Water Treatment Plant (Aboveground Asset)*

The Marin CWPP developed a 5-meter resolution fire risk map for Marin County that incorporates fuel loads (vegetation), topography, population density, and areas of concern to prioritize future wildfire hazard reduction activities. Although most of the district's assets are within the WUI and are captured in CWPP Areas of Concern, the CWPP analysis did not specifically address fire behavior in relation to water district assets.

Staff utilized the CWPP fire behavior model results to make an initial assessment of wildfire risk at each of the district's pump

stations, storage tanks, and treatment plants. The model-predicted rate of spread within a 200 foot region of each pump station, storage tank, and treatment plant was extracted for average and extreme fire conditions. Higher rates of spread are inversely related to fire suppression efficacy. Therefore the rate of spread around each district asset represents the likelihood an asset can be protected in the event of a fire.

Figure 3-4: *Rate of Fire Spread Near District Facilities*

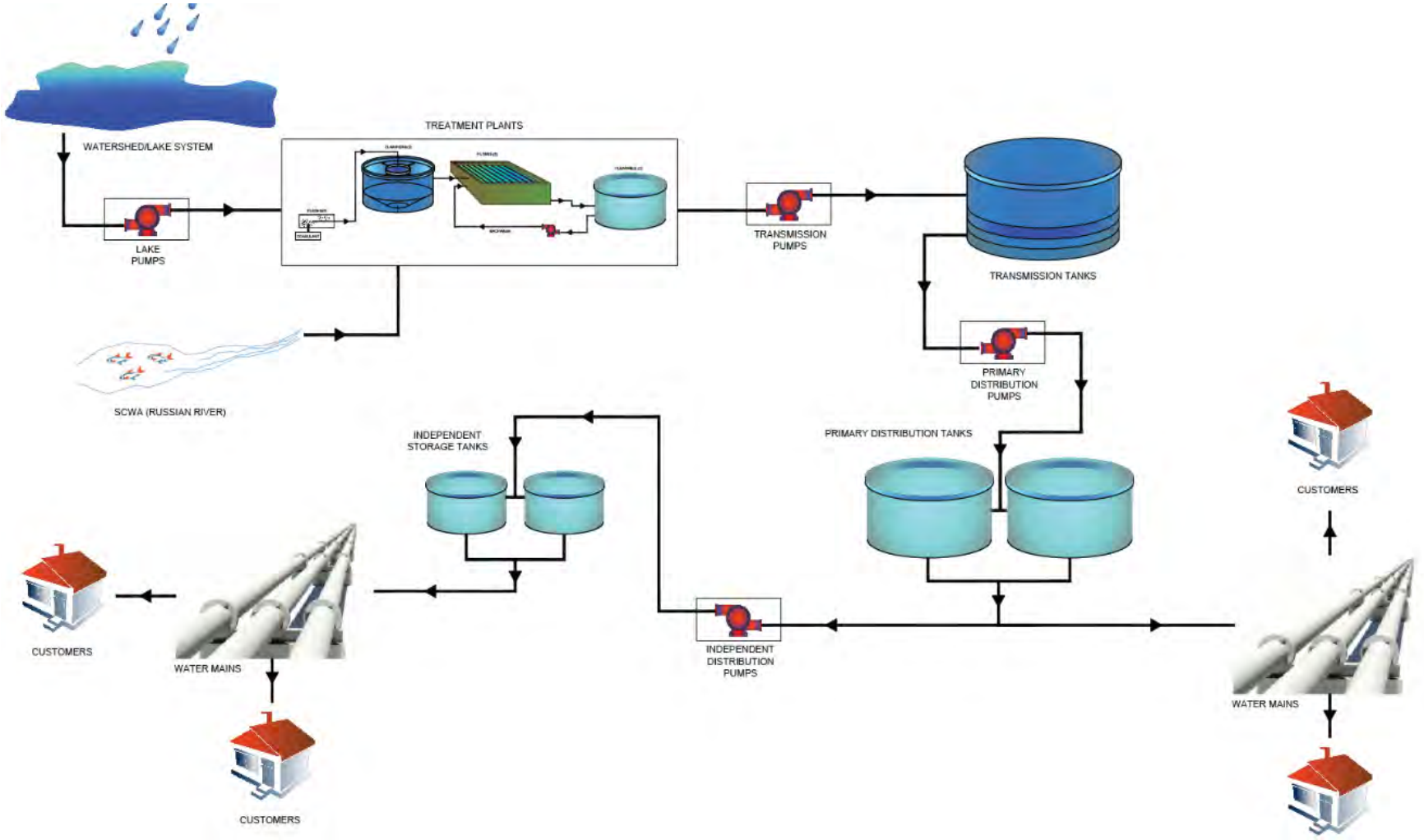


Results of this initial analysis (**Figure 3-4**) indicate the majority (90%) of district assets fall in regions that have predicted rates of spread in the 20 feet/minute range for average fire conditions but shift to more rapid rates for extreme fire conditions which are representative of wind-driven wildfire events that have plagued California over the last decade.

However, this approach does not integrate factors such as structure vulnerability (e.g. roof type, structure type, etc.), site-specific vegetation characteristics, potential access limitations, and emergency response times that have a large effect on asset vulnerability.

Despite the seemingly low predicted rates of spread, the district should expect and plan for asset damage that will affect the water transmission, treatment, and distribution system (**Figure 3-5**) and should consider efforts to make key features and system components more resistant to fire. Damage to a treatment plant, transmission pump, or primary distribution pump could severely impact water production and lead to a significant disruption. In the event a primary distribution pump station is damaged, all customers connected to the local gravity system as well as the associated independent storage tanks could be affected. In the event of damage to an independent pump station or storage tank, service disruptions would be limited and isolated to the pressure zone serviced by the pump and tank system.

Figure 3-5: *Schematic of District Water Transmission, Treatment, and Distribution System*



DH-2: Damage to Communications System

The district's water transmission, treatment, and distribution systems are monitored and controlled remotely using a digital technology system called Supervisory Control and Data Acquisition (SCADA). The system includes water level and flow sensors, programmable logic controllers (PLCs), power systems, and antennas mounted on poles, buildings, and tanks.

The purpose of the system is to monitor and adjust system processes (water treatment, pumping, and storage) to balance spatial and temporal demand patterns across the service area. This process occurs 24 hours a day, 365 days a year. Damage to any of the components has the potential to interrupt communication links, disrupt real-time remote monitoring and control of the system, disrupt service, and complicate response communication.

DH-3: Impacts to Physical Hydrology

A wildfire with a high burn severity has the capacity to drastically impact physical hydrology and geomorphic processes[6,7]. Burn severity is the degree to which fire consumes organic compounds in surface litter and the upper soil horizon and has been correlated to higher erosion rates, perturbations in hydrology, and slope instability. Research has shown that severely burned slopes produce higher amounts of sediment in receiving waterbodies and in extreme cases can lead to large-scale slope stability issues resulting in localized landslides and debris flows. Debris flows could potentially damage district assets, the community at large, and affect source water quality (see below). Furthermore, high severity burns change soil structure and in combination with the removal of vegetation and soil organics that intercept precipitation, result in higher peak flows. Both of these physical responses have the potential to impact access to critical facilities by overwhelming drainage networks, altering water sourcing and treatment processes, and affecting reservoir operations.

DH-4: Source Water Quality

Source water quality is representative of biogeochemical processes acting at a watershed scale. Wildfire influences these processes and therefore the district's ability to effectively treat source water to state and federal standards. A range of water quality impacts have been linked to wildfire including increased nutrients (nitrogen & phosphorous), dissolved and particulate carbon, sediment from erosion and debris flows, heavy metals, and other toxic compounds associated with urban influenced watersheds[6].

Image 3-8: *Alpine Lake (Source Water)*

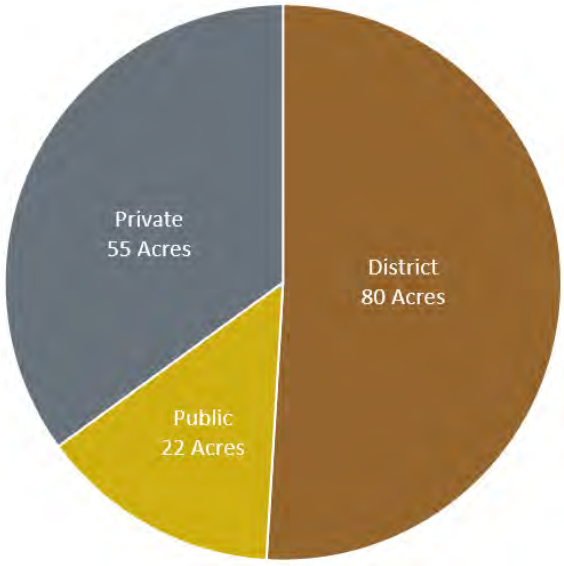
Based on the district's system design capabilities and processes, the main impact of source water quality changes is the decreased production of water due to an increase in turbidity associated with higher rates of erosion. When source water exceeds approximately 100 nephelometric turbidity units (NTUs) output at district treatment plants is expected to decrease. At levels in excess of 300 NTU, water treatment facilities would potentially be inoperable. Post-fire source water is also expected to contain increased organics which could result in disinfection byproducts (trihalomethanes, haloacetic acids, bromate, and chlorite) above state and federal drinking water standards.

DH-5: Vegetation

Aside from weather conditions, the primary determinant of wildfire behavior and severity is the availability of fuel (vegetation). Most wildfire preparedness efforts focus on mimicking the effects of fire to reduce fuel loads and the risk of property loss. This includes performing activities such as clearing, burning, masticating, or controlling the type and location of vegetation. Unfortunately, vegetation management is a complex issue affecting aesthetics, biological diversity, safety, and air quality; all key issues that do not coincide with a single jurisdictional boundary or regulatory framework. The result of this complexity is a range or assemblage of vegetation management activities, or lack thereof, over the Study Area that is a direct hazard to district operations, assets, the community, and the watershed.

Staff organized vegetation-related hazards to district assets into three categories based on land ownership and the degree of district influence over vegetation management (**Figure 3-6**). Based on current defensible space recommendations, areas within 100 feet of tanks, pump stations, and treatment plants were calculated within the Study Area.

Figure 3-6: *Land Ownership in Defensible Space Zone*



The district-owned category includes parcels sited with key infrastructure (tanks, pump stations) while the public-owned category includes lands administered by Marin County Open Space, State Parks, National Park Service, and other local cities and towns within the Study Area (**Figure 2-1**). The third category includes privately-owned parcels within 100 feet of critical district assets where the district has little control over vegetation management activities. Overall, the district is in control of

approximately half of the state recommended defensible space around its assets.

Vegetation on the watershed is inherently connected to the wildfire resilience of surrounding communities. For example, much of the eastern edge of the district's watershed lands are encircled by the communities of Woodacre, Fairfax, San Anselmo, Ross, and Mill Valley. These communities, all within the WUI, may be impacted by wildfires originating on or burning through district lands. From that perspective, the district can play an integral role in protecting the community.

DH-6: Access to Facilities

Wildfires can damage culverts and bridges, cause tree falls, or initiate emergency road closures along routes to critical facilities. Emergency road closures and evacuation zones may restrict district personnel from accessing, assessing, and repairing critical facilities. Tree falls and other hazardous conditions could delay chemical deliveries at water treatment plants, affect staffing, or reduce the district's ability to respond to large leaks and equipment failure. Together, these access-related issues pose a significant hazard to district operations.

DH-7: Distribution System Contamination

During a wildfire event, private plumbing and distribution systems are exposed to significant levels of radiant heat which can melt or burn system components and release hazardous chemicals, soot, and ash into the distribution system. This process was observed in two recent fires; the 2017 Tubb's Fire in Santa Rosa, CA and the 2018 Camp Fire in Paradise, CA. In both circumstances benzene and other chemicals from fire-damaged plumbing components (pipes & gaskets) were drawn into and contaminated the local water distribution system. The very nature of the district's water infrastructure, with tanks, distribution mains, and service laterals in high fire danger areas (WUI) and at higher elevations then adjoining pressure zones suggests that contaminants could easily migrate (down gradient) throughout the system in the event of a major wildfire and pressure loss in the adjacent water system.

DH-8: Pressure Loss

Pressure loss in the distribution system can occur when an isolated water tank falls below operational levels or when increased demand associated with fire-suppression approaches system capacity. Both circumstances could lead to the flow of water into the distribution system (backflow) from affected residences or those within the same pressure zone. Pressure loss could potentially contaminate a portion of the distribution system.

DH-9: Staff Safety

Some district staff work in or travel through high fire risk areas on a daily basis. In the event of a wildfire, district staff at Sky Oaks and the San Geronimo and Bon Tempe Treatment plants, and staff working on district facilities across the Study Area could be subjected to extremely hazardous conditions or even trapped. Furthermore, it

is likely that during a wildfire event staff will need to cross evacuation zones and enter areas of active fire to maintain and assess system components or even engage in fire suppression efforts. Therefore, there is some potential for suffering wildfire-related injuries and even loss of life.

DH-10: Visitor Safety

Similar to district staff, watershed visitors travel through or recreate in high fire risk areas on a daily basis. Given recent visitor use estimates, it's possible that on an average weekend day there could be upwards of 10,000 people on the watershed. In the event of a wildfire, visitors could be subjected to extremely hazardous conditions or even trapped.

Indirect Hazards

Staff identified a total of 5 indirect hazards. A brief summary of each indirect hazard (IH) is provided below.

IH-1: Staffing

District staff must be available and have access to assets and facilities in order to implement response and recovery activities. Given that the majority of staff are not located close to the district's base facilities in Corte Madera, there is a potential that wildfire could impede workers from getting to work. This could be due to road closures or staff who are directly affected by evacuation orders. Overall, there could be a shortage of staff which would limit response and recovery activities.

IH-2: Public Safety Power Shutoff

Potential controlled PSPS events are an ancillary but consequential hazard associated with the threat of wildfires. Under normal operating conditions the district relies on PG&E's electrical grid to power all assets and critical facilities. When PG&E implements a PSPS event power is not available to run the district's 94 pump stations and deliver water through the distribution system; whatever storage is in the tanks and distribution system is limited until backup power can be established. If not adequately addressed, the PSPS events could lead to localized or even widespread loss of service.

IH-3: Fire Response & Suppression

Although Marin County and other fire districts in the Study Area (**Table 1-1**) are responsible for fire response and suppression, the district equips and prepares its own forces to respond to wildfire ignitions on watershed lands.

The wildfire response and suppression forces take the form of watershed maintenance staff and the district's park rangers who are cross-trained as wildland firefighters. The park rangers are equipped with patrol trucks that double as initial attack fire engines. Additionally the watershed maintenance staff can staff the district's water tender, dozer, and other fire apparatus.

Maintaining fire response and suppression capabilities requires considerable resources and continued investment to be effective

and safe. It's critical to understand any potential limitations to response capabilities and identify and complete required training so district resources and efforts are aligned with national standards and consistent with county-led suppression efforts.

IH-4 Staff Preparation & Training

During any emergency event, whether it be an earthquake, wildfire, or PSPS, district staff are expected to transition into and take on roles and responsibilities that are different from their normal duties. This applies district-wide; all staff join forces to implement the District's Emergency Operations Plan. Adequate preparation and training is critical to ensure the efficacy and continuity of emergency response activities.

IH-5 Financial Security

Regardless of the hazard reduction actions employed, it is possible that at some point the district will suffer asset losses due to wildfire or other natural disasters. The associated cost to restore system operation could vary widely based on the extent and severity of the natural disaster and corresponding number of assets damaged. For singular or localized impacts to one or two pump stations, existing capital improvement projects could be delayed to pay for necessary repairs. For more expansive impacts, such as damage to a treatment plant, loss of an entire network of pump stations, or replacement of contaminated distribution piping, the district would need to find alternative methods to fund repairs and maintain financial security.

3.4 Hazard Summary

All identified ignition source, direct, and indirect hazards are summarized in **Table 3-2**.

Table 3-2: *Summary of Identified Hazards*

Ignition Source
IS-1: Electrical Service Connections
IS-2: Outside Utilities (PG&E)
IS-3: District Facilities
IS-4: Leased Facilities
IS-5: System Maintenance
IS-6: Watershed Maintenance & Management
IS-7: Watershed Visitors
IS-8: Outside Contractors
Direct
DH-1: Damage to Assets
DH-2: Damage to Communications System
DH-3: Impacts to Physical Hydrology
DH-4: Source Water Quality
DH-5: Vegetation
DH-6: Access to Facilities
DH-7: Distribution System Contamination
DH-8: Pressure Loss
DH-9: Staff Safety
DH-10: Visitor Safety
Indirect
IH-1: Staffing
IH-2: Public Safety Power Shutoff
IH-3: Fire Response & Suppression
IH-4: Staff Preparation & Training
IH-5: Financial Security

[1] FEMA, 2013. Threat and Hazard Identification and Risk Assessment and Stakeholder Preparedness Review Guide. 3rd Edition. May 2018

[2] EPA, 2003. Effects of Wildfire on Drinking Water Utilities and Best Practices for Wildfire Risk Reduction and Mitigation

[3] PG&E, 2019. Pacific Gas and Electric Company Amended 2019 Wildfire Safety Plan. February 6, 2019

[4] City of Napa, 2018. City of Napa Presentation on Natural Disaster Preparedness. ACWA 2018 Spring Conference. May 10, 2018

[5] MMWD, 2014. Marin Municipal Water District 2012-2013 Mt. Tamalpais Visitor Use Census and Survey

[6] Neary, Daniel G. et al 2003. Hydrologic Effects of High Severity Wildfire: Learning from the Past and Preparing for the Future. USDA Forest Service, Rocky Mountain Research Station

[7] Neary, Daniel G.; Ryan, Kevin C.; DeBano, Leonard F., eds. 2005. (revised 2008). Wildland fire in ecosystems: effects of fire on soils and water. Gen. Tech. Rep. RMRS-GTR-42-vol.4. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 250 p.

Introduction

Mitigation is the second step in the emergency management process where hazard reduction actions (mitigations) are developed and implemented that will prevent or reduce the probability of an emergency event occurring or reduce the damaging effects of unavoidable emergencies (**Figure 4-1)**. Mitigations can include operational strategies, policies, programs, and ad-hoc best management practices that reduce the district's vulnerability to wildfire, increase water infrastructure resilience, and in doing so, protect the community we serve. This section has three goals; to review existing district mitigation categories and actions, identify data gaps, and develop additional mitigation actions targeting the hazards identified in Section 3.

4.1 Existing Mitigation Actions

The district currently implements a range of mitigation actions that reduce the potential for ignitions and target direct and indirect wildfire hazards. The following section reviews existing mitigation actions in 11 topic areas and concludes with a summary of how each action targets the hazards identified in Section 3.

Plans, Programs, & Procedures

Red Flag Procedures

Red Flag Warnings are issued by the National Weather Service based on meteorological models and real-time observations that indicate when weather conditions are most conducive for the spread of wildfire. When a red flag warning is issued MCFD notifies public park and land management agencies, including the

Figure 4-1: *Mitigation and Emergency Management Process*

district, who determine if land use restrictions should go into effect. When a Red Flag Warning is issued the district works collaboratively with MCFD, Marin County Parks, and CA State Parks to implement land closures and specific Red Flag measures to avoid or reduce the impacts of wildfire (**Table 4-1**).

Table 4-1: *Red Flag Measures*

Close watershed access points • Sky Oaks entrance • Natalie Coffin Green parking lot • Leo Cronin parking lot
Suspend all watershed use permits
Ban use of barbeques
Suspend work of outside contractors
Post additional fire hazard signage
Staff Type III engine
Patrol efforts focused on fire response
Increase standby staffing levels

District staff close the watershed to vehicular traffic to minimize the potential for unintended ignitions. The closure applies to the general public, district contractors, special use permits, leased facilities, and all outside contractors. The lessee for the district-owned West Point Inn cancels all overnight lodging reservations.

During red flag closures, only essential district staff are permitted on the watershed which include law enforcement/public safety and staff accessing the water treatment plants and key facilities for system operation. Therefore, all vegetation management, system maintenance, and watershed maintenance activities are put on hold unless critical to system operation.

Image 4-1: *Red Flag Warning & Watershed Closure*

During Red Flag Events, staff at Sky Oaks are in "Critical Status" (see Watershed Wildfire Operations in Section 6) which means they're tasked with ensuring personal protection equipment, supplies, and all fire suppression apparatus are ready for response. Staff stages the district's dozer and transport, readies the Type 3 engine, fills and checks the district's water tender, and coordinates internally to organize extended or stand-by assignments. District staff also communicate the closure to the community in a number of ways; a watershed closure banner is posted on the district's homepage, a pre-recorded closure message is set on the watershed information line, wildfire hazard and closure signs are placed at major entrances, and temporary signs are deployed in Fairfax.

Vegetation Management Programs

The district performs regular vegetation management around all pump stations, tank sites, district-owned parcels, and at specific locations throughout the Study Area to reduce fuel loads and mitigate the effects of wildfire. Roles and responsibilities are generally divided into watershed maintenance and facilities maintenance with the former completing vegetation management activities on the watershed and the latter working primarily around district assets off the watershed.

Vegetation Management on the Watershed

The district is currently transitioning its vegetation management program activities that addresses fire risk and fuels on the watershed. Before adoption of the Biodiversity, Fire, and Fuels Integrated Plan (BFFIP) in October of 2019, vegetation management actions were conducted in accordance with the 1995 Vegetation Management Plan (VMP). The VMP included prescribed burning and three types of fuel reduction zones. It was developed to specifically mitigate the effects of fire by physically removing fuel in strategic locations to reduce the rate of spread and provide containment and access opportunities for initial attack operations. The goal of the 1995 VMP was to strategically place fuel reduction zones and conduct understory burning to facilitate response and suppression activities and therefore limit the extent of wildfire.

1995 VMP Fuel Reduction Strategies

60-foot Wide Fuel Reduction Zone – Increase evacuation safety, promote safe access for initial attack, and support control of small fires along specific fire access roads/trails.

200-foot Wide Fuel Reduction Zone – Increase evacuation safety, promote safe access for initial attack, provide an opportunity to establish major fire control lines that minimize fire size and reduce the likelihood of fires escaping the watershed along boundaries and key ridgelines.

Understory Burning – Reduce fuel loads and slow the progression of fire on the south face of Mt. Tamalpais by burning understory vegetation.

The design and location of fuel reduction zones (fuel breaks) were informed by a fuel inventory and fire behavior modeling. Using computer simulations and expert fire suppression and equipment knowledge, fire behavior specialists used table-top exercises to infer where fuel reduction zones would be the most effective in supporting containment of simulated fires. This analysis led to the location of the fuel reduction zones in the 1995 VMP and subsequent 2019 BFFIP. Since 1995 the district has implemented and continues to maintain 900 acres of fuel reduction zones including defensible space around district and third-party facilities and along critical service roads and ridgelines on the watershed.

Image 4-2: *Rocky Ridge Fire Road Before Fuel Reduction*

Image 4-3: *Rocky Ridge Fire Road After Fuel Reduction*

In 2019, the district's board approved the BFFIP, a new vegetation management plan that will guide vegetation management actions for the foreseeable future. The BFFIP continues the management of strategic fuel reduction zones identified in the VMP but expands vegetation management actions across the entire landscape to mitigate for wildfire. A summary of key vegetation management wildfire mitigations goals included in the BFFIP is provided in **Table 4-2**. In total, the district anticipates the BFFIP will cost approximately $13.7 million over the next 5 years.

Table 4-2: *Wildfire Mitigations in the BFFIP*

Expand fuel reduction zones by 11% (45 Acres)
Increase fuel reduction maintenance by 33%
Treat 180 acres of diseased forest
Complete 550 acres of broadcast burns
Reduce Douglas-fir encroachment on 620 acres

In addition to implementing the BFFIP, the district also requires all lessees to conduct vegetation management in accordance with the State Fire Code (4907.1 and 4907.2). Each year, staff work with each leaseholder to review lease conditions and observe lessee-led fuel reduction activities to establish defensible space in accordance with state guidelines. District staff also coordinates with PG&E subcontractors who perform vegetation management along the 14 miles of distribution and 3.4 miles of transmission lines on the watershed.

Vegetation Management Around Assets

The district is responsible for vegetation management and landscape improvements around all facilities (district offices, pump stations, treatment plants, tank sites, and communication system components). This includes inspection and maintenance at over 200 sites in the WUI which are scheduled by the district's enterprise management system (**Figure 2-4**). In total, staff trims grasses, removes brush and shrubs, and eradicates non-natives on approximately 80 acres of district lands excluding access roads and easements. All sites are managed for vegetation each year

and approximately 50% are inspected and managed on a bi-monthly basis. Staff assesses each location for hazardous trees that could damage assets and restrict access and works to maintain defensible space in accordance with CalFire recommendations, where feasible. However, in some circumstances maintaining complete consistency with defensible space guidelines isn't feasible due to a variety of factors. In these cases district staff strives to strike a balance between aesthetics, adjacent landowner requests, and topographic constraints. Vegetation management typically begins in May and is complete by the end of July.

Hot Work Procedures

As summarized in Section 3, district staff routinely perform maintenance activities that have the potential to cause an ignition. These "Hot Work" activities include saw-cutting, welding, mowing, operation of equipment and tools, and driving vehicles on unpaved roads with grassy margins.

Hot Work
Work activities such as saw-cutting, welding, mowing, and operation of combustion equipment that has the potential to cause an ignition.

Although no formal district-wide hot work program exists, district supervisors and work crews implement informal processes and best management practices based on the anticipated risk and weather conditions to mitigate ignition potential. If feasible, supervisors first seek to schedule hot work for periods of lower fire risk such as during the winter, early spring, or when conditions are not dry or windy. Work activities like leak repairs may use grinders, cut-off saws, and welding equipment but are often confined to roadways and trenches below ground and are already wet with overspray from the leak. The potential for an ignition in this scenario is extremely low so mitigation includes best management practices that equip all vehicles with fire extinguishers and training staff to suppress any accidental ignitions.

In other situations, where work will occur above ground and cannot be rescheduled for lower risk periods staff use an informal hot work permit to categorize the type of work, review ignition hazards, and then select and implement best management practices to minimize ignition potential. Best management practices employed by staff when conducting hot work are summarized in **Table 4-3**

Table 4-3: *Hot Work Best Management Practices*

Identification of hazard (sparks, fuel, etc.)
Communication of hazards to work group
Staging of fire suppression equipment
Equipment condition assessment
Fire watch: Dedicated watchperson during work with extinguisher and suppression equipment on hand.
Fire watch: Site inspection 30 minutes after work
Notify local fire department of activities and location
Pre-wet work area and immediate surroundings

Hot work on the watershed is primarily associated with vegetation management and in some circumstances facilities maintenance that may include use of hand tools, welding equipment, and prescribed fire. During the fire season such activities are completed with the district's fire engines or water tender nearby to pre-wet the work area and immediate surroundings to reduce the ignition potential.

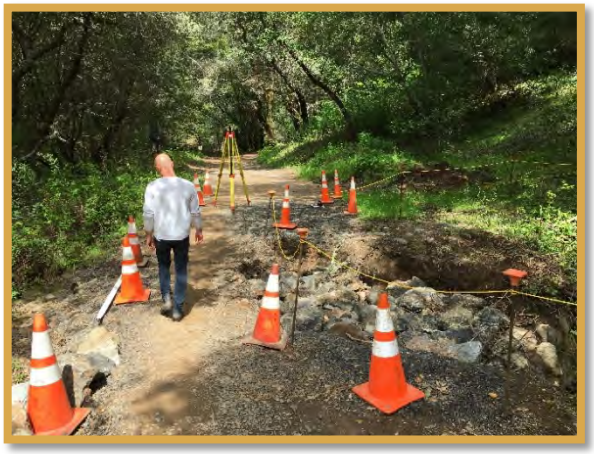
Image 4-5: *District and MCFD Staff Performing Pile Burns on West Ridgecrest Boulevard.*

In the case of pile and wide area burns, the district works with MCFD and the Bay Area Air Quality Management District to develop and implement burn plans that define the work area, fuels, pre-burn containment measures, required staffing and equipment, and the acceptable meteorological conditions for burning to reduce the likelihood of an uncontrolled fire.

Culvert Replacement Program

When combined with easements on other public and privately held lands in the Study Area, the District is responsible for managing and maintaining over 700 stream crossings which include bridges, culverts, and rock fjords (crossings). Maintaining and replacing these stream crossings is pertinent to the district's ability to provide drinking water, recreational access, respond to and fight potential wildfires, and mitigate post-fire impacts.

Image 4-4: *Failed Culvert Blocking Deer Park Fire Road*



In 2018, the district completed a stream crossing condition assessment on 724 culverts as part of a new asset management program looking to prioritize the expenditure of limited capital resources to maximize system resiliency. District staff identified 40 culverts that are in a "failed" condition and are located along roads that provide access to critical system infrastructure such as transmission lines, transmission and distribution pumps, water treatment plants, and emergency access/egress. The district is in the process of replacing the failed culverts with corrugated metal pipe and concrete materials which, unlike plastic culverts, are expected to endure a wildfire. Without incorporating fire resistant materials, burned or melted culverts could restrict access during fire response or cause

significant erosion during post-fire winter rainfall events.

In addition to replacing culverts with more resilient materials, the district's design criteria for culverts has been upgraded to allow for the passage of wood and sediment for a 100-year flood event. Although this does not account for potential increased discharge and sediment associated with moderate or high severity burns, the upgraded design criteria makes the district's crossings and critical access routes more resilient to fire by increasing the post-fire operational performance of stream crossings.

Road & Trail Management Plan

The district manages approximately 90 miles of roads and 60 miles of trails on the watershed which, in the event of fire, are the primary points of access for response personnel. The district's Mt. Tamalpais Road and Trail Management Plan was adopted in 2005 and is the document which guides how roads are maintained to ensure consistent access protection of water quality, and preservation of environmentally sensitive habitats.

Facilities Maintenance Program

District staff perform routine maintenance of roads and facilities to ensure uninterrupted access and that buildings housing critical assets are protected from the elements, including wildfire. Staff grades access roads to tank and pump station sites, caulks and paints exterior surfaces, replaces roofing material, windows, and damaged siding, cleans gutters, and performs other general carpentry and construction activities to maintain building envelopes; an important factor in structure vulnerability. Maintenance activities at each facility are typically performed on 1 or 2-year intervals and are increased in frequency based on observations by staff in the water quality, corrosion, and mechanical and electrical groups who visit sites more frequently.

Operations Procedures

District staff takes proactive measures to ensure the system is ready for potential disruptions. During the fire season and especially in advance of red flag warnings and PSPS events staff top off (fill) all tanks to ensure they are at capacity.

Operations Maintenance Program

District staff maintains system operating components such as pumps, valves, backup generators, and electrical system connections. This includes preventative maintenance procedures (maintenance plans) that are tracked and scheduled with the district's enterprise management system. Typical routine maintenance activities include servicing, rebuilding, or replacing pumps and motor components, upgrading system connections, and general cleaning and maintenance to ensure system components operate within required performance metrics. The primary goal is to maximize service life and prevent equipment failures. As part of general operations maintenance, staff also inspects electrical system components, makes

modifications as necessary to maintain and improve system reliability and safety, and makes notes of any necessary facility maintenance needs.

Fire Flow Improvement Program

As described in Section 5, the district coordinates and implements a Fire Flow Improvement Program to prepare for fire events by improving the capacity and accessibility to water for fire suppression efforts. By providing additional capacity and accessibility to water, the district is increasing the potential that fire suppression activities can protect both district facilities and private structures throughout the Service Area.

Policies, Agreements, & Contracts

Watershed Policies & Enforcement

The district's Park Rangers patrol the watershed daily from 7 am until one hour after sunset and have been an integral part of enforcing the district's policies and ordinances that seek to preserve and protect the unique resource that is the foundation to the district's mission. Rangers serve a multitude of roles including enforcement of state laws and water district regulations, responding to public safety issues, providing initial attack on wildland fires on the watershed, educating, emergency medical response, search and rescue and informing the public of responsible uses that are consistent with water quality preservation.

With regard to fire regulations specifically, Title 9 of the district code identifies the regulations for use of water district lands. The chapter includes a section (9.07) specifically targeting watershed visitor ignitions by limiting the use of fire to district-provided barbeques, and making it unlawful to use fireworks, smoke, or have fires outside of provided barbeques.

Watershed Use Regulations

9.07.01 Fires. No person shall light, build or maintain a fire of any nature on district lands, except in permanent fixed barbecues, camp stoves or fireplaces established by the district. The use of portable barbeques and camp stoves is prohibited.

9.07.02 Fireworks. No person shall possess, bring onto, set-off or otherwise cause to explode on district lands any firecrackers, skyrockets or other fireworks or explosives.

9.07.03 Smoking. No person shall smoke on district watershed lands at any time.

In addition to enforcing watershed use regulations, rangers search for illegal encampments and campfires, inspect barbeques for unextinguished coals, and are frequently the first responders to fires on the watershed. As such, all field-level ranger vehicles meet either the Type 6 or Type 7 Engines standard. Due to their limited water storage capacity, both Type 6 and 7 Engines are considered quick response units and are most effective in suppressing small fires over short durations (< 10 minutes).

Type VI Engine
Tank Capacity[1] –150 Gallons
Pump[1] –50 gpm

Type VII Engine
Tank Capacity[1] –100 Gallons
Pump[1] –10 gpm

[1]Minimum specifications

District Contracting Policies

The district utilizes contractors to complete pipe replacement, vegetation management, and other work on watershed lands, district facilities, and throughout the Service Area. During the project development phase, staff involved in procuring and organizing contracts incorporate work period restrictions and requirements to mitigate the potential for ignitions.

Work period restrictions related to potential ignitions are stipulated in the project contract documents (general and technical specifications). Article 88 of the district's general specifications prohibits smoking on district watershed lands and open space lands and Section 01000 of the technical specifications identifies required hazard reduction actions (processes, procedures, and best management practices) the contractor shall employ. (**Table 4-4**). Contractors are also required to monitor fire conditions by calling the MCFD fire condition hotline and adjusting their work schedule accordingly. If a red flag warning is declared, contractor operations are suspended with no financial impact to the district.

Contracts for work on the watershed integrate similar work period restrictions and best management practices to those identified in **Table 4-4**. All Contractors and use permit holders must follow a Fire Prevention Plan which requires that fire suppression tools such as extinguishers, backpack pumps, shovels, McLeods, rakes, and pitchforks be on site at all times.

Table 4-4: Select List of *Contract Required Hazard Reduction Actions*

Work suspension during Red Flag Warning
Radio and cell phone requirements for fire response
Vehicle, Equipment, & Tools
• Stay on roads and avoid parking in dry grass
• Clear areas around combustion equipment and exhaust
• Install and maintain spark arrestors
• Suppression equipment (water truck and/or extinguishers on site)
• Only non-metallic heads on weed cutters
• Cool equipment before refueling
Welding
• Performed before 10 am
• Clear 12-foot radius around welding site to mineral soil
• Wet ground and surrounding vegetation
• Use a welding screen to control sparks
• Water truck and dedicated fire watch personnel

Summary of Existing Mitigation Action Categories

A summary of existing mitigation actions (by topic area) and targeted hazards is provided in **Table 4-5**

Table 4-5: *Summary of Existing Mitigation Actions (by Topic Area) & Targeted Hazards*

Existing Mitigation Action Topic Area	Targeted Hazard																						
	IS-1: *Electrical Service Connections*	IS-2: *Outside Utilities*	IS-3: *District Facilities*	IS-4: *Leased Facilities*	IS-5: *System Maintenance*	IS-6: *Watershed Maintenance & Management*	IS-7: *Watershed Visitors*	IS-8: *Outside Contractors*	DH-1: *Damage to Assets*	DH-2: *Damage to Communication System*	DH-3: *Impacts to Physical Hydrology*	DH-4: *Source Water Quality*	DH-5: *Vegetation*	DH-6: *Access to Facilities*	DH-7: *Distribution System Contamination*	DH-8: *Pressure Loss*	DH-9: *Staff Safety*	DH-10: *Visitor Safety*	IH-1: *Staffing*	IH-2: *Public Safety Power Shutoff*	IH-3: *Fire Response & Suppression*	IH-4: *Staff Preparation & Training*	IH-5: *Financial Security*
Red Flag Procedure				●	●	●	●	●										●			●		
Vegetation Management Programs									●	●	●	●	●	●			●						
Hot Work Procedures					●	●			●	●	●	●					●						
Culvert Replacement Program														●							●		
Road & Trail Management Plan												●		●							●		
Facilities Maintenance Program									●					●									
Operations Procedures															●	●				●	●		
Operations Maintenance Program	●		●						●					●									
Fire Flow Improvement Program									●	●													
Watershed Policies & Enforcement		●					●	●			●							●					
District Contracting Policies								●	●	●	●	●											

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4.2 Data Gaps & Additional Mitigation Actions

After a review of the existing data and mitigation actions there are a number of potential data gaps that could be pursued and additional mitigation actions that could be employed to improve overall system and community resilience to wildfire.

Plans, Programs, & Procedures

Red Flag Procedures

During Red Flag Warnings there are a number of potential procedures that could be instated to mitigate wildfire.

- Cell phone service along Bolinas-Fairfax road is inconsistent, fire response times are limited, fire risk is high, and numerous fires have started in the general area. The district should consider working with Marin County to close Bolinas Fairfax Road during Red Flag Warnings. This measure could be employed with little additional cost as gates at Ridgecrest and near Pine Mountain Fire road already exist and could be closed to limit public access during critical fire weather.

- Visitors continue to use the watershed during Red Flag Warnings which may stretch limited public safety staffing (law enforcement, EMS and fire response and suppression) and complicate watershed evacuation processes in the event a wildfire occurs. Consider evaluating district policies to close the watershed during Red Flag Warnings. Ordinance 9.07.04 already allows the district to "close all or designated portions of district watershed lands to public entry". This action would allow rangers to focus on red flag procedures, and improve the district's response to ignitions that may occur.

Prioritized Vegetation Management

Establishing and maintaining defensible space is a key component of mitigating the impacts of wildfire on district assets and the district's ability to provide critical life services during a wildfire event. Pump stations and tanks are more likely to survive a wildfire event if defensible space is established and maintained. Approximately half of the required 100-foot defensible space area around aboveground assets is not owned by the district (**Figure 3-6**). Prioritizing defensible space inspections and projects within these areas is essential to providing water to the surrounding communities. With that in mind, the district could:

- Collaborate with local fire districts to prioritize defensible space inspections and vegetation management around critical assets. Inspections and enforcement should be prioritized based on structure vulnerability, anticipated site-specific fire behavior, defensibility of the structure, and criticality of the asset. Prioritization may be based on the number of service connections supported by the tank or

pump station in accordance with the district's asset management program.

- Formalize a single point-of-contact and process of communication to facilitate collaboration with adjacent landowners. This could include bill inserts for service connects adjacent to critical assets and a resources link on the district's website. This may also include partnering with FIRESafe Marin who have established effective education and outreach programs to target and involve adjacent landowners.

- Complete a site-by-site analysis to document and establish required defensible space specifications at each district asset and develop a tracking and reporting process and program to document vegetation management activities performed.

- Review existing processes, procedures, and responsibilities for approving variances to established defensible space specifications.

Operations Procedures

As described above, the district does not have an official operations manual that documents the processes and actions necessary to prepare for high fire danger and PSPS events.

- The district should develop formal procedures regarding the level of tanks during defined fire season, dry periods, red flag events, and impending PSPS events.

- Review approach and develop procedures for capital and maintenance projects that remove tanks from service or shut down water service during defined fire season, dry periods, red flag events, and impending PSPS events.

Fuel Reduction Zone Analysis

The fuel reduction zones created and maintained on watershed lands were developed as part of the 1995 VMP to limit the rate of spread of wildfire. The analysis used fire behavior modeling based on existing vegetation and 90-percentile fire conditions Therefore, the fuel reduction zones in the VMP and BFFIP have been selected to mitigate smaller fuel-driven rather than wind-driven wildfires capable of casting embers more than a mile ahead of a fire front. A potential data gap is that the analysis did not directly test or analyze the effect of proposed fuels treatment on fire behavior but instead relied on the interpretation of model results and anticipated effects of fuel reduction zones on suppression capabilities.

- In order to better understand the effectiveness and optimize various fuel reduction zones on the watershed, the district could assess the performance and basis of fuel reduction zones using an updated fire and fuels model.

Hot Work Procedures

The district's hot work procedures and processes have been effective in minimizing district-caused ignitions. Formalizing existing procedures, with enhancements, could help further mitigate ignition hazards.

- The district should aggregate and formalize existing hot work procedures and integrate them with jobsite safety plans. The plan should include a hazard level screening of proposed work activities that determines which practices and procedures should be employed based on the level of risk. For example, open flame work within the WUI would require the highest level of fire safety measures, including fire watch, pre-staged suppression equipment, and pre-notification of the local fire district. Lower risk hot work such as saw-cutting or welding in trenched urban environments would have a lower level of required mitigation.

- The district should conduct a basic hot work training program each year in advance of fire season for all groups to ensure staff are cognizant of and utilize formal hot work procedures.

Recreational Facilities

The district provides facilities for picnicking, and barbequing. Watershed rangers frequently douse fires at picnic grounds and must check remote infrequently used barbeques at Laurel Dell, Barth's Retreat, Rifle Camp, and Potrero Camp. Because these facilities are located in remote locations, visitors often collect material to burn rather than packing in charcoal briquettes. The following minor changes to recreational facilities could be instated to mitigate potential visitor ignitions.

- Permanently remove remote and infrequently used barbeques at Laurel Dell, Barth's Retreat, Rifle Camp, and Potrero Camp.

- Pre-position fire extinguishers or water pails at picnic areas where barbeques are present. Alternatively, consider installation of fire hose and housing within reach of barbeques.

- Install additional signage notifying visitors of legal use of barbeques (briquettes only, no collecting wood/vegetation).

- Install additional fire conditions or fire hazard signage at all gateways.

Culvert Replacement Program

As discussed in Section 4.1, the district keeps records of culvert characteristics on the watershed. The current culvert replacement program is focused on culverts that have failed and may impact future access. One potential vulnerability not currently considered is that some culverts along critical access routes have been replaced with plastic materials (e.g. corrugated plastic pipe).

- The district should conduct a review of available culvert records along critical access routes, as defined by the asset management steering committee, to determine the number of fire susceptible crossings.

- Culverts that currently meet operational requirements but are vulnerable to fire should be prioritized for replacement.

Parking Improvements & Barriers

During high-use periods, visitors park vehicles along road margins, unofficial parking spaces, and on entrances to watershed fire roads. In these locations, dry grass can be ignited by exhaust systems and vehicles can potentially block fire response personnel. The following action could be instated to mitigate potential visitor ignitions associated with indiscriminate parking.

- Identify and formalize all acceptable parking locations by installing additional signage (parking and no-parking signs) and natural barriers.

- Increase enforcement activities for parking in non-sanctioned areas.

- Develop a GIS database of approved parking spaces to assist with maintenance tracking and response.

Facilities Maintenance Program

The district utilizes an enterprise management system to schedule routine facilities maintenance plans and to coordinate other activities to ensure system operation. The following elements should be integrated into the existing work orders for facilities maintenance plans and other district staff who routinely visit assets.

- Increase facility inspection frequency by:
  - Conducting annual fire risk inspections for assets within the WUI and;

  - Capitalize on staff visiting assets to perform maintenance. Require a rapid fire-risk assessment element in all work orders when any personnel visit an asset between March and November of each year. At a minimum this should include training staff on what risk factors to consider and development of a 1-page assessment checklist. This will effectively increase inspection frequencies by capitalizing on staff already visiting an asset.

- Update Maintenance Plans
  - Include clearing pump station and treatment plant roofs and gutters of combustible material on all maintenance plan work orders.

  - Include caulking gaps in eaves and covering of openings.

Formalized Coordination

The district should continue to require vegetation management and defensible

space maintenance activities as a condition of leased properties and utility corridors. To facilitate this process, the district could:

- Formalize annual vegetation management/defensible space reviews with lessees and PG&E in the spring of each year to review vegetation management actions for the coming summer.

- Continue to request PG&E inspection and maintenance records and track in the district's enterprise management system. This would allow the district to track and request additional maintenance and/or inspections.

- Request assessment of contents and potential for ignition on all leased properties (propane tanks, fuel tanks, etc.).

- When possible, update leases to require an electrical system inspection and repairs to comply with current code and minimize the potential for electrical fires.

- When possible, update leases to include vegetation management of entire premises – not just area where the structure is located.

Electrical System Review

Staff identified at least two circumstances where the district is responsible for electrical service connections (power lines and electrical infrastructure) after a PG&E power drop. Given the complexity of the district's system and lack of detailed electrical-related records for each asset, there may be additional electrical service connections for which the district is responsible that should be inspected and subsequently improved to reduce the potential for electrical fires.

- The district should prepare a comprehensive review of all power sources and electrical system components at district facilities. This includes reconciling district and PG&E records to identify the responsible party for electrical system components (poles, transformers, etc.) and develop maintenance plans, as needed.

- The district should incorporate, with already scheduled maintenance plans and processes, a checklist to identify any components not in conformance with current electrical code or which may be an ignition hazard.

- Consider and prioritize projects that reduce ignition potential (undergrounding, decommissioning, breaker/wire replacement, etc.) of district electrical connections and facilities.

Structure Hardening

A recent case-study identified that two-thirds of the structures lost in a San Diego area wildfire were caused by wind-driven embers that either directly or indirectly

ignited the structures[1]. This suggests that in addition to establishing defensible space around an asset, a structure's ability to resist wind-driven embers is a key component of its vulnerability. Structures that are made of combustible materials (wood siding, shake shingles, etc.) or have pathways by which embers can enter into the structure (vents, gaps, etc.) are more vulnerable. Structure hardening seeks to reduce vulnerability by modifying or incorporating components that reduce the potential of ignition as a wildfire approaches a facility.

The California Building and Residential codes, Chapter 7A and Section R327 respectively, have adopted new construction materials and methods aimed to increase the probability that structures in high fire hazard zones can survive a wildfire. Hardening district assets (pump stations, tanks, generator systems, bridges, power poles, and treatments plants) to improve resistance to embers and radiative heat would reduce asset vulnerability.

Pump Stations

Most of the district's pump stations were constructed before modern building codes targeting fire resistance were adopted and therefore include materials and construction methodologies that do not meet current building code requirements. The district maintains records on the materials, construction type, and frequency of maintenance activities at each pump station which could aid future efforts to evaluation and prioritize structure hardening actions. Staff reviewed the records to determine what information, if any, could be interpreted as factors of vulnerability to develop and select potential mitigation measures. A summary of available pump station construction type and material data are provided in **Table 4-6**.

Gutters
• Presence/absence
Vents
• Presence/absence
Windows
• Presence/absence
Construction Type
• Block • Concrete • Metal • Wood frame
Roof Material
• Composition • Laminate • Concrete • Foam • Metal • Tar/Gravel
Siding
• Board/batten • Concrete • Metal • Plywood (T1-11) • Block • Metal • Stucco

Table 4-6: *Available Pump Station Construction and Material Types*

Based on available information the following actions could be implemented:

- Include consideration of fire risk and structure hardening actions when selecting pump station and tank sites.

- Develop a ranking or prioritization matrix of pump stations to receive structure hardening based on fire risk, and structure materials (**Table 4-6**), and consequence of failure.

- Consider and evaluate required structure hardening actions for each asset in the prioritization matrix based on professional technical expertise. Strongly consider implementation of the following structure hardening actions:
  - Lowest Priority
    - Install 1/8-inch screens over vents (where application of paint or other surface coverings may clog vents) and 1/16-inch where feasible per CBC 706A
    - Caulk all gaps, joints, and unscreened openings in siding, blocking, etc.
  - Medium Priority
    - Complete low priority actions
    - Replace siding with non-combustible material (three-coat stucco, metal siding, fiber cement board) per CBC 707A.3
    - Replace roof with Class A composition shingles
  - Highest Priority
    - Complete low and medium priority actions
    - Replace roofs with non-combustible material per CBC 705A
    - Add screens (bronze, pvc coated fiberglass or aluminum) around window exteriors
    - Replace windows with dual or three panel tempered glass per CBC 708A
    - Replace exterior doors with non-combustible material per CBC 708A
    - As pump stations need replacement, utilize non-combustible materials (concrete block and metal roofs)

Treatment Plants

The district's treatment plants are primarily composed of concrete and steel so the combustibility of the core water treatment infrastructure may not be the primary concern. However, all of the district's water treatment plants have vents, windows, and membrane roofing material that could be susceptible to and be penetrated by blowing embers. Embers could make their way into control and chemical storage rooms and cause substantial potentially life-threatening damage that would divert response resources during a fire. As such, some level of structure hardening is warranted especially considering the consequence of a failed or damaged treatment plant.

Many of the minimum structure hardening actions for pump stations apply to treatment plants. However, because treatment plants are so critical to the system, all applicable structure hardening actions should be prioritized including, but not limited to:

- Installing 1/8-inch screens over vents and 1/16-inch where feasible especially over openings that lead to control rooms and chemical storage areas per CBC 706A

- Replacing roofs with metal or other non-combustible material per CBC 705A

- Adding screens (bronze, pvc coated fiberglass or aluminum) around window exteriors

- Replacing windows with dual or three panel tempered glass per CBC 708A.

- Securing all roof and door openings with mesh

- Installing a fire sprinkler system that could be controlled remotely (SCADA) to protect treatment plants using raw or treated water

- Installing shielding to enclose backup generator fuel storage tanks and appurtenances.

Tank Sites

The district has replaced all but seven of its redwood water storage tanks with more fire-resilient bolted, welded, and riveted steel tanks. Although water tanks are typically more resilient to wildfire due to the moderating effect large volumes of water have on burning materials, redwood tanks are more vulnerable to wildfire than those made of steel and could be replaced or even removed to improve system resiliency.

- Replace the remaining redwood tanks with bolted steel tanks.

- Remove redwood tanks from the system where subsequent analysis (Master Plan) indicates they are not required. See Section 5 for discussion of a Master Plan to identify system capabilities.

- Remove and dismantle existing redwood tanks that are permanently out of service.

Sky Oaks Headquarters

After the Tubb's fire in Sonoma County, utilities attempted to deliver fuel to backup generators within the fire perimeter. However, safety officials restricted deliveries of propane due to the risk of explosion to transport vehicles. The district's backup generator at Sky Oaks is propane, and although it can last approximately three days without refueling it is possible that fire activity could restrict fuel deliveries. In the event a fire is burning on the watershed, maintaining power at Sky Oaks, which could be an operations center for fire suppression forces, is essential. Therefore, the district should consider the following:

- Coordinate with Ross Valley Fire district and MCFD to identify potential restrictions to propane fuel deliveries

through fire areas. If coordination indicates fuel deliveries could be delayed by three days or more, replace Sky Oaks backup generator with a comparable diesel unit with greater capacity.

- Install additional shielding around backup generator tank and appurtenances.

Bridges & Crossings

During the Tubb's fire in rural Sonoma County, many steel or wood supported structures with wood decking caught fire and were subsequently impassable after the fire front passed. The district relies on similar structures to access critical facilities including the Natalie Coffin Green, Bon Tempe spillway, Nicasio spillway, Phoenix Dam, Lagunitas Rock Spring Fire Road, Soulajule bridges, and the Lake Lagunitas spillway. The district also has water mains that are supported by bridges that are susceptible to wildfire. The following actions could be implemented to mitigate damage to these facilities.

- Develop a database of water mains supported by bridge structures and categorize based on combustibility of structure (wood, concrete, etc.)

- On district owned structures replace wood materials with non-combustible elements.

- Install additional hydrants near critical bridge facilities to facilitate structure protection.

Federal Disaster Assistance

As the district moves forward it should consider leveraging the district's capital dollars to complete necessary mitigation projects before and after a disaster. The district is positioned to benefit from a portion of available federal assistance programs but does not currently meet eligibility criteria for pre-disaster (PDM) and post-disaster (HMGP) hazard mitigation assistance. To be eligible for these funding programs a local jurisdiction must have a Local Hazard Mitigation Plan (LHMP) completed by the time of award and approved by FEMA every five years. To make the district eligible for pre- and post-disaster hazard mitigation funding the district should:

- Complete efforts to develop a LHMP

- Send appropriate staff to IS-1001: "The Public Assistance Delivery Model Orientation" to obtain training on available mitigation funding opportunities.

Policies, Agreements, & Contracts

Watershed Policies & Enforcement

Current water district fire regulations clarify that smoking and fireworks are not allowed and that cooking is only permitted in barbeques, camp stoves, and fireplaces that are provided by the district (WDO 9.07).

However, district rangers frequently observe visitors either importing or collecting wood and burning it in district-provided facilities. Burning wood, branches, leaves, rather than charcoal briquettes, has a higher risk of dispersing embers. Changes in watershed policies could mitigate this hazard and improve enforcement effectiveness.

- Supplement district code 9.07.01 with a description of which materials are allowed to be burned on watershed lands and in district-provided facilities. For example, clarify that only charcoal briquettes may be used and that the import or collection of any woody, vegetative or combustible material is not permitted.

- Consider banning all use of barbeques during fire season.

- Supplement district code 9.07.01 to require that all fires be fully extinguished after use. Post signs and develop education materials on how to fully extinguish fires.

- Modify district code 9.07.01 to allow rangers to cite violations as infractions rather than misdemeanors, which would make prosecutions more expeditious.

District Contracting Policies

The district's contracting policies have been effective in minimizing ignitions associated with district contractors. The following additional mitigation actions would reduce ignition hazards associated with outside contractors.

- Review and make improvements to the district's standard specifications to bolster and require adherence to wildfire best management practices, including, but not limited to the following:
  - Modify the definition of "Open Space" in the district's technical specification section 01000 to reflect fire hazard and risk rather than land use. Consider amending the definition to include high hazard areas (WUI, district facilities, watershed lands, or CalFire high and very high fire hazard severity zones). Develop polygon from available fire hazard metrics to screen and identify projects that will require this special consideration.

  - Require a notification from the contractor 24 hours before hot-work and inspection by district staff

  - For projects within high hazard areas that will be completed during fire season consider requiring each contractor to develop a wildfire mitigation plan for review and approval (by the district) prior to start of work that specifies the best management practices, processes, and procedures the contractor will employ to mitigate potential

ignitions. The submittal should identify the potential ignition risks (types of work), processes for avoiding inadvertent ignitions, and a list of fire suppression materials that will be on site at all times.

- For projects within high hazard areas that will be completed during fire season consider increasing contractor liability insurance requirements.

Outside Contractors & Use Permits

District staff work extensively with PG&E subcontractors and watershed use permit holders to review work areas, activities, access plans, and best management practices to reduce the potential for ignitions associated with vegetation management, utilities maintenance, and other permitted activities. Despite these efforts staff identified that PG&E subcontractors often enter water district lands and complete vegetation management and maintenance with little advance notification to district staff. The following measures would formalize additional requirements and mitigate ignition hazards associated with outside contractors.

- The district should develop a Fire Protection Plan to be followed by all outside contractors and permit holders. The plan should identify the minimum required equipment and procedures to follow by activity type (mowing, vegetation clearing, use of combustion engines, etc.) For example, mastication and mowing should require the presence of a water truck and pump, hand tools, and an established communication channel to communicate with the district's point of contact.

- Require all permit holders to notify the district of anticipated work start date/time no later than 24 hours before work commences.

- District staff should perform work inspections to confirm the fire protection plan is in place.

Summary of Potential Mitigation Actions

A summary of potential mitigation actions (by topic area) and targeted hazards is provided in **Table 4-7**.

There is considerable overlap between potential hazard reduction actions identified in the Focus Areas of Mitigation, Planning & Preparedness, Response, and Recovery. District staff has exercised discretion on how best to associate hazard reduction actions and each Focus Area, however, readers are encouraged to review the other sections of this report to better understand the full suite of potential hazard reduction actions identified.

See Section 8 for an initial list of recommended actions.

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Table 4-7: *Summary of Potential Mitigation Actions (by Topic Area) and Targeted Hazards*

Potential Mitigation Action Topic Area	Targeted Hazard																						
	IS-1: *Electrical Service Connections*	IS-2: *Outside Utilities*	IS-3: *District Facilities*	IS-4: *Leased Facilities*	IS-5: *System Maintenance*	IS-6: *Watershed Maintenance & Management*	IS-7: *Watershed Visitors*	IS-8: *Outside Contractors*	DH-1: *Damage to Assets*	DH-2: *Damage to Communication System*	DH-3: *Impacts to Physical Hydrology*	DH-4: *Source Water Quality*	DH-5: *Vegetation*	DH-6: *Access to Facilities*	DH-7: *Distribution System Contamination*	DH-8: *Pressure Loss*	DH-9: *Staff Safety*	DH-10: *Visitor Safety*	IH-1: *Staffing*	IH-2: *Public Safety Power Shutoff*	IH-3: *Fire Response & Suppression*	IH-4: *Staff Preparation & Training*	IH-5: *Financial Security*
Red Flag Procedures							●	●										●			●		
Prioritized Vegetation Management									●	●			●			●							
Operations Procedures															●	●			●	●		●	
Fuel Reduction Zone Analysis											●	●	●										
Hot Work Procedures					●	●																	●
Recreational Facilities							●											●					
Culvert Replacement Program																							
Parking Improvements & Barriers							●																
Facilities Maintenance Program							●														●		
Formalized Coordination		●		●				●															
Electrical System Review	●		●																				●
Structure Hardening									●	●				●		●							
Federal Disaster Assistance									●	●													●
Watershed Policies & Enforcement								●															
District Contracting Policies								●															
Outside Contactors & Use Permits									●	●						●							

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[1] Maranghides & Mell, 2009. A Case Study of a Community Affected by the Witch and Guejito Fires. National Institute of Science and Technology Technical Note 1635. Available at: https://nvlpubs.nist.gov/nistpubs/Legacy/TN/nbstechnicalnote1635.pdf

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Introduction

Planning and preparedness is an essential step in emergency planning that seeks to identify the resources, processes, and procedures necessary to respond to and recover from a natural disaster such as catastrophic wildfire (**Figure 5-1**). The fundamental goal is to develop strategies and plans that enhance an organization's ability to provide services in the face of significant operational challenges. This requires that each department and associated personnel clearly understands their roles and responsibilities in executing a plan of action before the event. In short, planning and preparedness actions increase overall system resiliency by establishing efficient, focused, and effective response and recovery.

5.1 Existing Planning & Preparedness Actions

As part of its routine operations, the district is engaged in planning activities to ensure treatment and delivery of water to its customers. Although much of the planning is focused on the operational components of the water system, there are planning and preparedness actions that reduce the potential for ignitions and target direct and indirect wildfire hazards. The following section reviews existing planning and preparedness actions in 16 topic areas and concludes with a summary of how each action targets the hazards identified in Section 3.

Plans, Programs, & Procedures

Community Wildfire Protection Plan

In 2016, Marin County fire agencies working in collaboration with county, state, and federal land management agencies, and community members published the Marin

Figure 5-1: *Planning & Preparedness and the Emergency Management Process*

County Community Wildfire Protection Plan (CWPP)[1]. The CWPP is a science-based hazard, asset, and risk assessment performed using up-to-date, high resolution topography and fuels information combined with local fuel moisture and weather data. The assessment was focused on identifying areas of concern throughout the county and on modeling fire behavior scenarios to inform hazard reduction strategies. The CWPP provides the district and community with a robust scientific understanding of assets at risk within Marin County by providing fire behavior modeling data that the district can use to inform risk-based decision-making regarding its assets. This baseline data is also an important planning document for coordinating cross-jurisdictional strategies for addressing wildfire hazards within Marin County.

Biodiversity, Fires, & Fuels Integrated Plan

The Biodiversity, Fire, and Fuels Integrated Plan (BFFIP) describes actions that the district will take to minimize fire hazards and maximize ecological health on its watershed lands in accordance with Board Policy No. 7.

District Board Policy No. 7 Fire Management Goal

"The District will manage its lands to prevent loss of watershed resources from uncontrolled wildfire, will carefully restore the role of fire in ecosystem management, and will use fire as a tool for specific management objectives."

The purpose is to define and guide the methods that will minimize the risk from wildfires while simultaneously preserving and enhancing existing significant biological resources. The management actions described in the BFFIP include analytical planning actions, and physical vegetation management actions. The administration actions include the inventorying of biological resources and threats (e.g., Sudden Oak Death), monitoring, and planning. The physical actions related to vegetation management include fuel break construction and maintenance, weed control, and habitat restoration, which include improvements to forests stands structures, improvements to grasslands and oak woodlands, reintroduction of special-status species, and meadow restoration. The BFFIP identifies four threats to water storage and supply facilities as well as other vital infrastructure, human lives, the district, and private property, and the health of the ecosystems located within or near district lands. The threats include (1) fire, (2) invasive species or weeds, (3) forest disease, and (4) climate change.

Fire Flow Improvement Program

Fire Flow is the term firefighters use to describe how much water can be delivered by a water system through one or more hydrants to fight a fire at a specific location or to state the optimum amount (standard) of water flow firefighters require for a theoretical fire at a specific location. The former is determined by a pipe's size, pressure, and internal condition and the latter is based on standards developed over years of experience. To meet Fire Flow standards, a water distribution system must deliver large amounts of water in a short

period of time, whereas for daily use, water systems provide smaller amounts of water on a continuing basis.

Image 5-1: *Upsizing Water Main for Improved Fire Flow*

In the aftermath of the Oakland Hills fire, on November 5, 1996, Marin County voters approved advisory measure L supporting a $75 parcel fee to establish a $4.5 million per year funding source to implement the Fire Flow Master Plan (FFMP). The purpose of the FFMP was to improve firefighting capabilities and seismic reliability of the district's water system by increasing pipeline flow rates and improving system components. The projects in the FFMP were identified by the Marin County Fire Chief's Association based on experience and hydraulic modeling of the district's system. The $75/year parcel fee was extended in 2012 and will be used to complete additional Fire Flow projects through fiscal year 2031. To date, the program has funded over $110 million in pipeline replacement projects, tank replacements, and treatment plant upgrades that improve the district's ability to respond to and support fire suppression efforts.

Condition Assessment Program

The vulnerability of pump stations, tank sites, and treatment plants is a function of anticipated fire behavior at a site and the material characteristics and condition of an asset. The district has compiled and retains records of facility characteristics that could be useful in identifying asset vulnerability including those identified in **Table 5-1**.

Table 5-1: *Pump Station Characteristics*

Construction Type (Brick, Concrete, Wood Frame)
Gutters (Presence/Absence)
Roof Type (Composition, Wood, Metal, etc.)
Windows (Presence/Absence)
Vents (Presence/Absence)
Siding Material (Plywood, Block, Shiplap)

In addition to keeping records of asset material characteristics the district is in the process of performing condition assessments on all pump stations, tanks, and treatment plants. The condition assessment program will evaluate the performance of mechanical components, condition of building structures, and supplement district facility records such as the identification of ventilation opening sizes, window types, electrical service connections, defensible space, and other characteristics that influence the vulnerability to wildfire. Results of the

facilities assessments can be used to prioritize capital investments through the district's asset management program and identify structure hardening actions that would improve system resiliency.

Public Safety Power Shutoff Program

Pacific Gas and Electric has started to de-energize portions of the electrical grid during extreme fire weather events to mitigate potential electrical system ignitions. PG&E determines which areas and customers are affected based on several factors, including weather conditions such as Red Flag Warnings, high winds, and dry conditions. Without sufficient planning, the PSPS events have the potential to adversely affect the district's ability to treat, store, and transmit water.

Image 5-2: *Rental Generators Staged in Anticipation of a Public Safety Power Shutoff*

The district completed the following actions in anticipation of the 2019 wildfire season to mitigate the effects of PSPS events[2]:

- Conducted mock power shutdowns at the corporation yard and administration building to identify impacts and capabilities;
- Determined the number and size of backup generators required to operate the water system;
- Executed agreements to rent 25 generators to supplement the 16 district-owned units for a cost of ~$555,000;
- Rented spare fuel tanks and entered into fuel supply agreements;
- Reconfigured 27 pump stations to allow remote backup generator activation through the SCADA system;
- Installed solar panels and backup batteries to provide standby power to critical control valves and SCADA components;
- Installed transfer switches at 4 pump stations and the corporation yard trailer to enable backup generator connections;
- Installed a transfer switch on the corporation yard emergency garage and set up a charging station for SCADA system batteries;
- Developed generator tender and servicing schedule;
- Developed and disseminated public outreach materials and communications regarding readiness and potential impacts to water availability.

Emergency Operations Plan

The district developed its current Emergency Operations Plan (EOP) in 2013 to guide the organization's response to extraordinary emergency situations associated with natural disasters and technological incidents. The EOP is a preparedness document designed to be read and understood before an emergency and to be a reference during an event to facilitate response activities. The EOP identifies potential threats, outlines emergency management policies, defines the district's organizational structure during an emergency, and assigns roles and responsibilities. The district's EOP is designed to function in concert with the established emergency management structure at the local (County), regional (operational area), state, and federal levels.

Policies, Agreements, & Contracts

Master Mutual Aid Agreement

MCFD has the primary responsibility for fire response and suppression within all State Responsibility Areas in Marin County. Therefore, MCFD, along with municipal and special fire districts in the Study Area (**Table 1-1**) are tasked with providing the resources and capabilities to protect district assets in the event of a wildfire.

Through a Memorandum of Understanding (MOU) with MCFD, the district is a participant in the California Master Mutual Aid Agreement (MMAA) system; a well-organized state-level program of mutual aid based on the principles of resource sharing and cooperation. The system acknowledges that disasters are rarely confined to a particular set of political or geographical boundaries and can exceed local fire protection capabilities. The MMAA seeks to provide the public with the highest level of service when local agencies are overwhelmed. As such, if the district and MCFD are overwhelmed and stretched beyond their combined capabilities, MCFD can request additional resources through CalOES who administers the MMAA system.

As a participating MMAA agency, district fire apparatus and personnel can technically respond to and support wildfire events throughout the state. However, through a memorandum of understanding with MCFD, the allocation and response of district fire apparatus is limited to the county. Personnel trained in the Incident Command System (ICS) are, however, occasionally dispatched across the state to support incident management activities.

Participation in the MMAA dramatically increases response capabilities and the potential level of protection of district assets. When the MMAA resources are deployed in the Study Area, the district will partner with other agencies through the Marin EOC to share information about assets and to coordinate the response and recovery effort.

Master Mutual Benefit Agreement

The district and MCFD established a Master Mutual Benefit Agreement (MMBA) in 2018. The agreement recognizes MCFD's primary responsibility for fire prevention

and that the district has a specific need for assistance with vegetation management activities such as prescribed burning, construction and maintenance of fuel breaks, and hazardous fuel reduction activities. The MMBA provides the necessary contracting mechanism to utilize county fire personnel at predetermined rates in implementing the district's vegetation management goals and effectively expands the district's capabilities to conduct vegetation management activities.

Training

Staff training helps to build critical skills that responders need to function effectively during wildfire or natural disaster events. The following sections describe ongoing district training activities.

Wildland Fire Training

In 2008, the district modernized its firefighting training program so that it would be compliant with established professional standards and address the current performance expectations for watershed firefighters. This includes training and position task books that meet the standards of the National Wildfire Coordinating Group (NWCG) and California Incident Command Certification System. All district employees with wildland firefighting duties are annually required to complete the 8 hour Wildland Fire Safety Training Refresher. The district keeps up to date records of all staff training and makes resources available under the Mutual Aid Agreement during wildfire incidents. All watershed Park Rangers and Maintenance staff at minimum must complete the trainings in **Table 5-2**.

Table 5-2: *Required Wildland Fire Training Courses*

Training	Course Title
L-180	Human Factors in the Wildland Fire Service
ICS-100	Introduction to the Incident Command System
ICS-200	Basic Incident Command System for Initial Response
IS-700	National Incident Management System, An Introduction
RT-130	Wildland Fire Safety Training Annual Refresher (WFSTAR)
S-130	Basic Wildland Firefighter Training
S-190	Introduction to Wildland Fire Behavior
S-212	Wildland Fire Chainsaws

Emergency Operations Center

An organization's Emergency Operations Center (EOC) serves as the coordination hub for an incident response. This facility provides a central intelligence arena for decision makers and response team personnel to gather critical information, coordinate response activities, and manage personnel as an emergency situation dictates. All district staff are required to work as disaster services workers in the case of an emergency and select staff have pre-determined roles in the EOC. The district's emergency operations center is located at the district's corporation yard in Corte Madera and is supplied by backup power sources.

Fire Response Equipment & Infrastructure

The district maintains equipment to ensure that initial attack and wildfire patrol operations can be carried out on watershed lands. Additionally, the district has fixed infrastructure on the watershed to assist with wildfire response and initial attack.

Wildland Fire Equipment

The district has wildland firefighting equipment staged at the Sky Oaks Ranger Station on the Mt. Tamalpais Watershed and at the Ranger Residence at Soulajule. The district's ranger staff patrols the watershed using trucks that also serve as wildland firefighting engines to ensure operational readiness in the case of a wildfire incident. In addition to the rangers trucks the district has a Type 3 Fire Engine and Water Tender that are critical pieces of equipment for wildland fire response.

Table 5-3: *District-owned Wildland Firefighting Equipment (Apparatus)*

Apparatus	Total Owned
Type 3 Engine	1
Type 6 Engine	2
Type 7 Engine	3
Water Tender	1
Type 2 Utility	1
Dozer	1
Type 3 Portable Pump	4

Spring Tanks & Hydrants

The district has 8 raw water storage tanks located throughout the watershed to assist with fire response (**Table 5-5**). The tanks are located in remote locations, far away from the district's water distribution system and are primarily filled by natural springs. During a wildfire event, response personnel and equipment can connect to the spring-fed tanks via wharf hydrants and fill internal water tanks rather than making longer journeys to potable hydrants on the district's distribution system which may be over an hour away (one-way). Therefore, the spring tanks are particularly important for initial attack operations on small fires in remote areas of the watershed when minimizing response times is critical.

Table 5-4: *Spring-fed Tanks on Watershed*

Tank Sites	Volume (Gallons)
Poison Spring[1]	20,000
Shafter Grade[2]	20,000
Rock Springs	20,000
Rocky Ridge[2]	1,500
Copper Mine	25,000
Liberty Gulch	20,000
Barth's Retreat	500
Rifle Camp	10,000

[1]Poor condition, [2] Out of Service

In addition to spring tanks, the district also has approximately twenty wharf hydrants located primarily along the eastern edge of the watershed and also services over 7,400 potable hydrants throughout the Study Area. Local fire protection districts and MCFD have access to a database containing the location, connection size, calculated pressure, and available flow rates at each potable hydrant in the distribution system.

Wildfire Detection Cameras

To aid in early wildfire detection and location efforts, MCFD operates wildfire detection cameras at 5 critical locations in Marin County and staffs volunteers on the East Peak of Mt. Tamalpais. The system of 7

cameras at 5 locations (Mt. Tamalpais, Mt. Barnabe, Big Rock Ridge and Point Reyes Hill, and San Pedro) were upgraded in 2018 to include high definition, pan, tilt, and zoom capabilities, and advanced spatial algorithms to geo-locate fires. The fire cameras are available on the AlertWildfire[3] website which is run by the University of Nevada, Reno, University of California, San Diego, and University of Oregon. The cameras are monitored locally by MCFD Emergency Command Center and assist in discovering, locating, and confirming fire ignitions, accurately dispatching fire suppression resources, monitoring fire behavior, and enhancing situational awareness.

Weather Stations

Weather and climate are major factors in the development and spread of wildfires. Of the three major components that influence a fire's environment (fuel, weather, and topography), weather is the most important and continuously changing. Weather elements that play the largest role in wildfires are wind, relative humidity/atmospheric moisture and, temperature. The district owns a weather station on the west peak of Mt. Tamalpais (West Peak) and maintains, on behalf of MCFD, a second weather station on Carson Ridge. These two weather stations provide local temperature, wind, and humidity measurements to inform land management, water system operation, and wildland fire suppression activities.

Pre-Positioning of Resources

The district coordinates with MCFD to pre-position wildfire suppression resources. This planning and preparedness action facilitates an efficient and rapid response, especially during high fire hazard conditions. For additional detail on how the district pre-positions resources see Section 6.

Backup Communications

The district has a number of communication systems set up to facilitate district operations. Primary communications includes landlines between key offices and treatment plants, internet access to support email communication, cellular network to facilitate phone calls while offsite or in the field, and radios on the Marin Emergency Radio Authority (MERA) to support communication between and among local and regional public entities.

The district has access to its own dedicated channel on the MERA system but can also communicate more broadly with other MERA entities. MERA is comprised of representatives from the County of Marin, all cities, towns, and fire districts in Marin, and other special districts including the district. Ranger staff are also equipped high-band frequency emergency radios that can be used if the MERA system is offline.

Summary of Existing Planning & Preparedness Actions

A summary of existing planning and preparedness actions (by topic area) and the hazards targeted is provided in **Table 5-5**.

Table 5-5: *Summary of Existing Planning & Preparedness Actions (by Topic Area) and Targeted Hazards*

	Targeted Hazard																						
Existing Planning & Preparedness Action Topic Area	IS-1: *Electrical Service Connections*	IS-2: *Outside Utilities*	IS-3: *District Facilities*	IS-4: *Leased Facilities*	IS-5: *System Maintenance*	IS-6: *Watershed Maintenance & Management*	IS-7: *Watershed Visitors*	IS-8: *Outside Contractors*	DH-1: *Damage to Assets*	DH-2: *Damage to Communication System*	DH-3: *Impacts to Physical Hydrology*	DH-4: *Source Water Quality*	DH-5: *Vegetation*	DH-6: *Access to Facilities*	DH-7: *Distribution System Contamination*	DH-8: *Pressure Loss*	DH-9: *Staff Safety*	DH-10: *Visitor Safety*	IH-1: *Staffing*	IH-2: *Public Safety Power Shutoff*	IH-3: *Fire Response & Suppression*	IH-4: *Staff Preparation & Training*	IH-5: *Financial Security*
Community Wildfire Protection Plan									●	●			●				●	●			●	●	
Biodiversity, Fires, & Fuels Integrated Plan									●	●	●	●	●	●			●	●					
Fire Flow Improvement Program									●	●											●		
Condition Assessment Program									●	●													
Public Safety Power Shutoff Program															●	●				●	●		
Emergency Operations Plan									●	●												●	
Master Mutual Aid Agreements									●	●				●					●		●		●
Master Mutual Benefit Agreement									●	●	●	●	●	●					●				●
Wildland Fire Training																	●				●	●	
Emergency Operations Center Training																			●			●	●
Wildland Fire Equipment											●	●									●		
Spring Tanks & Hydrants		●				●	●	●			●	●									●		
Wildfire Detection Cameras																					●		
Weather Stations					●	●	●	●													●		
Pre-positioning of Equipment & Resources																					●		
Backup Communications																					●		

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5.2 Data Gaps & Additional Planning & Preparedness Actions

There are a number of potential data gaps that could be pursued and additional actions that could be employed to improve overall system resilience to catastrophic wildfire.

Plans, Programs, & Procedures

Water Supply Planning

The district has the capability to divert water from up to 5 independent or separate sources including Bon Tempe, Alpine, Kent, Nicasio/Soulajule reservoirs and the Russian River aqueduct. The diversity of the district's water supply portfolio provides system redundancy that can be leveraged when a particular water source may need to be avoided due to fire-related water quality impacts. For example a catastrophic wildfire that affects water quality at Kent Lake could be mitigated by avoiding Kent diversions entirely or by mixing with alternate (Nicasio/Soulajule) sources. Similarly, the district could increase the amount of water sourced from the Russian River system to compensate for reduced treatment plant output.

Currently, the district has an understanding of the effects of raw water quality on treatment plant operations and performance based on typical conditions and observed seasonal variability. However, the district's source watersheds have not been significantly impacted by fire since contemporary treatment facilities were installed. Therefore, the potential impacts of landslides, erosion, and debris flows on raw water and treatments plant operations is a data gap that could be further investigated.

The district should consider the following:

- Conduct a thorough review of possible effects of post-fire sediment input and debris into the district's water supply reservoirs and develop a set of mitigations and response actions including, but not limited to:
  - Post-fire actions to contain and/or divert sediment from erosion and debris flows;
  - Assessing the efficacy of treatment plants to continue to operate with projected raw water quality;
  - Investigate potential treatment enhancements to improve system resiliency.

Water System Resilience Projects

In the event a wildfire impacts Marin County the district's system will be tested. Integrating additional redundancy through strategic capital infrastructure investments in treatment plants, transmission lines, additional storage, and pump stations could improve overall system resilience by improving operational capabilities. Potential projects that could increase resiliency under certain natural disaster scenarios could include those summarized in **Table 5-6**.

Table 5-6: *Potential Resiliency Projects*

Projects	Purpose	Cost
Replace Treatment Plants	Add new processes to treat broader range of raw water including higher sediment, taste and odor control, and improved sludge handling.	$100 Million
Treatment Plant Storage	Add storage at treatment plants to mitigate for reduced treatment plant output and increased demand.	$30 Million
High Level Storage	Increase high level storage to meet increased demand.	$75 Million
Transmission Lines	New large diameter transmission lines from existing transmission network to additional high level storage to meet increased demand	$75 Million
Pump Stations	New or upgraded pump stations and generators to increase operational capabilities (e.g. bi-directional and increased pumping)	$20 Million

Given the complexity of the district's system, limited capital resources, and high cost of potential resilience projects, the district should ensure capital investments in resiliency projects, similar to those in **Table 5-6** are well-informed and are directed towards operational limitations and vulnerabilities.

- The district should complete a transmission and distribution Master Plan study to better define day-to-day system capabilities, limitations, and operational vulnerabilities.

- Utilize results from the transmission and distribution Master Plan study to guide investments in potential resilience projects to improve overall system performance in certain circumstances.

Asset Specific Action Plans

The district does not have asset specific wildfire protection plans for any of its critical infrastructure such as treatment plants, primary pump stations, and storage tanks. Where the consequence of fire damage or asset failure is high, the district should consider developing asset specific wildfire action plans within the updated emergency operations plan, which outline the strategy, approach, and available onsite resources to protect a facility. The district should work with County fire personnel to develop the plans for selected assets to function as the primary playbook for district and fire suppression personnel during a wildfire event. In addition to including plans

a strategy for protecting each facility during an incident, methods for maintaining services, and actions to take if the facility is damaged.

Condition Assessment

Currently in progress, the district's condition assessment program is projected to take approximately two years to complete before the full spectrum of asset condition information can be incorporated into district decision-making processes. Once complete the condition assessment data can be combined with risk factors such as anticipated fire behavior, structure vulnerability (materials & construction), criticality (e.g. number of service connections), and consequence of failure to prioritize where limited capital and maintenance dollars should be invested. The district should:

- Complete the ongoing condition assessment program in parallel with a fire risk assessment that utilizes structure type (material) and fire risk (CWPP fire behavior data).

- Integrate the condition assessment data and fire risk factors with the district's asset management framework.

Public Safety Power Shutoff Program

The district was successful in maintaining water to its customers during two prolonged PSPS events in October of 2019. Through the PSPS planning and preparation process the district identified a number of data gaps and key actions that should be further evaluated to ensure uninterrupted delivery of water in the event of future PSPS events including:

- Complete design and construction of a permanent backup generator at the San Geronimo Treatment Plant.

- Install permanent backup generators at key pump stations.

- Install a permanent backup generator capable of providing power to the entire administration building, Yard and Water Quality Lab.

- Develop a new pump station standard that includes transfer switches and backup power sources.

- Implement the lessons learned from the 2019 PSPS event including, but not limited to those identified as Critical (**Table 5-7)**.

Table 5-7: *"Critical" Actions Identified After 2019 PSPSs Events*

Develop a print and electronic list of emergency cell numbers for all key staff
Develop backup contracts for fuel-delivery
Construct larger EOC
Test and upgrade EOC conference phones
Formalize a staff call out procedure
Confirm/update password for employee hotline
Develop procedure document to manually fill tanks to 100% of capacity
Develop generator site maps, directions, equipment requirements, and logistical guidance for each site.

Emergency Operations Plan

The district's Emergency Operations Plan (EOP) was last updated in 2013 and was primarily developed to support operations and response activities associated with a seismic event. The current EOP doesn't specifically address roles, responsibilities, and action plans during a wildfire within the service area or on the Watershed.

To increase the effectiveness of wildfire response operations the district would benefit from investing in a Wildfire Response Plan as a component or chapter in the district's Emergency Operations Plan. A Wildfire Response Plan would provide critical information to first responders, identify roles and responsibilities, and would help to guide the district's support of MCFD wildland fire fighting operations. This would help to limit impacts to district facilities by identifying critical assets and response actions for protecting those assets. It would also clearly define the staff roles and responsibilities relating to wildland fire fighting operations. The district should consider:

- Updating the Emergency Operations Plan to include a section on Wildfire Response which may include personnel assignments, priority actions, watershed activities, evacuation procedures, etc.

- The updated Emergency Operations Plan should identify the role of the district's emergency operations center as the central organizing and command center for specific issues on the watershed and throughout the service area.

Resource Identification & Protection

In recent years land management agencies have begun developing geospatial data libraries or geodatabases of sensitive resources and critical infrastructure to share with first responders during a wildfire incident. The district does not currently have an official database of wildfire suppression infrastructure or natural resources to avoid on the watershed. This data could help to ensure that wildfire response operations are carried out in a strategic and coordinated fashion and that they avoid and protect resources and infrastructure to the greatest extent practicable. This can help with the recovery process by limiting the need for mitigation, restoration, and reconstruction of critical facilities.

- The district should develop a geodatabase of natural resources and wildfire suppression infrastructure to disseminate or guide fire response and activities. The database should include:

    - Critical natural resource and water infrastructure to avoid and protect

    - Wildfire suppression infrastructure (wharf hydrants, spring-fed tanks, engine turnarounds, fuel reduction zones, etc.)

- Critical facilities on the watershed to protect

Much of the necessary data already exists relating to sensitive cultural resources, biological resources, and critical water infrastructure. However, one data gap that will require additional data collection and analysis would be the identification of infrastructure on the watershed, including roads, turnarounds, access routes, fuel reduction zones, and confirmation of the number and location of wharf hydrants.

Wildfire Modeling

Wildfire modeling is an inherently challenging exercise and is only a first approximation of potential wildfire behavior. The predictive power of fire and fuels models are expected to increase as vegetation assemblages are better characterized and novel modeling methods are developed. For example, MCFD anticipates updating the fuels and fire-behavior modeling in the CWPP based on recently collected topographic and vegetation data. The results of this updated analysis could be used to prioritize vegetation management activities and vegetation inspections and inform wildfire resilience planning at the district.

- The district should continue its involvement with MCFD and utilize updated fire behavior modeling data, as it becomes available, to inform planning efforts.

Watershed Modeling

The district does not currently have a hydrologic model of the Lagunitas, Nicasio, or Soulajule watersheds. A hydrologic model would help clarify the characteristics and physical processes of source water catchments, could be used to prioritize vegetation management actions that protect and mitigate the effects of wildfire, and inform post-fire water planning by quantifying potential watershed response to catastrophic wildfire, particularly as it relates to the control of sediment entering the district's water supply reservoirs. For example burn severity and fire perimeter maps can be used to predict changes in hydrology and identify potential management actions to mitigate the effects of fire. Fire initiated changes in hydrology can then be cross-referenced with system capabilities to determine what actions might be necessary to protect water and natural infrastructure. The district should consider:

- Developing an integrated watershed model of the Lagunitas and Nicasio creek watersheds and a separate model for the Soulajule system.

Policies, Agreements, & Contracts

Agreements

As discussed above, there is some potential that sourcing additional water from the Russian River system could help compensate for reduced treatment plant output. Such water transfers would be most effective if they were negotiated before a wildfire event such that water, as a

resource, could be shared in similar fashion as wildfire suppression equipment. The district should consider:

- Developing projects and/or agreements with adjoining water districts to increase operational capabilities and water source redundancy, particularly after a natural disaster.

Contracts

If the district seeks to be reimbursed by FEMA to pay for materials, labor, or services associated with an emergency event the contracts and procurement process used must adhere to federal standards. Setting up the appropriate contract language and adhering to federal procurement processes is a critical element of wildfire planning and preparedness and is discussed in Section 7.

Training

Wildland Fire

The district has staff trained in wildland fire fighting, however, training requirements should be evaluated and aligned with the district's anticipated responsibilities during a wildfire incident. Additionally, the district does not have a Wildfire Response Plan or section in its Emergency Operations Plan that clearly identifies roles and responsibilities to ensure all staff are prepared to act and support operations during a wildfire incident in a safe and effective manner. In order to better prepare for wildland fire the district should consider the following:

- Develop a Wildfire Response Plan as an element in the district's Emergency Operations Plan to guide watershed response activities.

- Based on an updated Emergency Operations Plan, review and align staff training requirements with anticipated responsibilities.

- Based on anticipated roles and responsibilities, identify the required personal protection equipment (PPE) necessary for key staff to respond to a wildfire event.

- Consider purchasing and storing a limited supply of required PPE equipment for key staff including Nomex clothing, emergency fire shelters, eyewear, respirators, etc.

Emergency Operations Center

The district does not currently conduct regular trainings for emergency events. Table-top drills and exercises would improve staff familiarity with roles and responsibilities, hone skills necessary to make expedient decisions, and identify any weaknesses in existing facilities, operations, or emergency operation plans. The district should consider:

- Have all EOC staff complete the minimum FEMA-recommended training (**Table 5-8**).

- **Table 5-8***: Minimum EOC Trainings*

Training	Course Title
IS-700B	An Introduction to the National Incident Management System
IS-2200	Basic Emergency Operations Center Functions

- Completing bi-annual table-top EOC drills and exercises related to wildfire and other natural disasters.

Fire Response Equipment & Infrastructure

Wildfire Fire Equipment

The second edition of *Managing Fire Services* by the ICMA states that "All fire service organizations should develop a needs assessment and amortization or replacement schedule for their major equipment in anticipation of growth or cutbacks, service life, obsolescence, maintenance costs, and so on." Systematic replacement of all emergency response equipment ensures equipment is safe to use and equipped with up to date technology.

Although the district's wildfire response equipment is operational and supports the current needs some of the equipment is reaching the end of its useful life and is in-need of replacement. **Table 5-9** outlines the current age of wildfire response equipment.

Table 5-9: Wildland Fire Equipment Age Class

Fire Apparatus	Model Year
Type 3 Engine	1992
Type 6 Engines (2)	2010
Type 7 Engines (3)	2009, 2014, 2019
Water Tender	2006
Type 2 Utility	2014
Dozer	2000
Type 3 Pumps (4)	Varies

- The district should review the condition of existing fire apparatuses and identify necessary investments to ensure staff have the necessary equipment to safely carry out the initial attack of wildfire on the watershed.

Summary of Potential Planning & Preparedness Actions

A summary of potential planning and preparedness action (by topic area) and the targeted hazards is provided in **Table 5-10**.

There is considerable overlap between potential hazard reduction actions identified in the Focus Areas of Mitigation, Planning & Preparedness, Response, and Recovery. District staff have exercised discretion on how best to associate hazard reduction actions and each Focus Area, however, readers are encouraged to review the other sections of this report to better understand the full suite of potential hazard reduction actions identified.

See Section 8 for an initial list of recommended actions.

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Table 5-10: *Summary of Potential Planning & Preparedness Actions (by Topic Area) and Targeted Hazards*

	Targeted Hazard																						
Potential Planning & Preparedness Action Topic Area	IS-1: *Electrical Service Connections*	IS-2: *Outside Utilities*	IS-3: *District Facilities*	IS-4: *Leased Facilities*	IS-5: *System Maintenance*	IS-6: *Watershed Maintenance & Management*	IS-7: *Watershed Visitors*	IS-8: *Outside Contractors*	DH-1: *Damage to Assets*	DH-2: *Damage to Communication System*	DH-3: *Impacts to Physical Hydrology*	DH-4: *Source Water Quality*	DH-5: *Vegetation*	DH-6: *Access to Facilities*	DH-7: *Distribution System Contamination*	DH-8: *Pressure Loss*	DH-9: *Staff Safety*	DH-10: *Visitor Safety*	IH-1: *Staffing*	IH-2: *Public Safety Power Shutoff*	IH-3: *Fire Response & Suppression*	IH-4: *Staff Preparation & Training*	IH-5: *Financial Security*
Water Supply Planning											●	●											●
Water System Resilience Projects									●	●		●			●	●				●			
Federal Disaster Assistance									●	●													●
Asset Specific Action Plans									●	●			●		●	●							
Condition Assessment	●		●										●										
Public Safety Power Shutoff																				●			
Resource Identification & Protection															●	●				●			
Wildfire Modeling									●	●		●	●										
Watershed Modeling											●	●	●										
Jar Testing											●												
Agreements												●											●
Contracts									●	●													
Wildland Fire																	●				●	●	
Emergency Operations Center																					●	●	
Wildfire Response Equipment							●	●									●				●	●	

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[1] Marin County Community Wildfire Protection Plan, 2017

[2] Update on PG&E's Public Safety Power Shutoff Program, Staff Report, September 26, 2019, Marin Municipal Water District Operations Committee

[3] Alert Wildfire Website: http://www.alertwildfire.org/

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FOCUS AREA 3

Response

Introduction

Response is the step within the emergency management process (**Figure 6-1**) where an entity addresses short-term, immediate effects of a disaster. The primary focus is to limit the loss of life and property, personal injury, and stem the immediate effects of an emergency.

Response activities are contingent on implementing planning and preparedness actions before an emergency event occurs. Planning and preparing for an emergency incident ensures district staff and contractors have the necessary equipment, training, and logistical information to respond to an emergency. During a wildfire incident staff would be involved in a variety of response operations relating water infrastructure, watershed lands, emergency water supplies, communication, and public safety.

6.1 Existing Response Actions

The district currently has a range of response guidance documents and processes to support specific facilities and operations during an emergency event. The district is also a part of local, regional and state emergency response organizations. These emergency response networks combined with the district facility-focused response processes are critical to ensuring a coordinated response during a wildfire incident. The following section outlines existing response actions in 10 topic areas and concludes with a summary of how each action targets the hazards identified in Section 3.

Figure 6-1: *Response and the Emergency Management Process*

Plans, Programs, & Procedures

District Emergency Operations Center

As described in Section 5, in the event a wildfire impacts district infrastructure, the district's general manager may activate an Emergency Operation Center (EOC) to coordinate response activities. When activated, the district EOC is a central command and control facility responsible for carrying out emergency response and management on the watershed and throughout the service area to ensure the continuity of district operations.

Standardized Emergency Management System

As a result of the 1991 East Bay Hills Fire in Oakland, Marin County implements the Standardized Emergency Management System (SEMS), which is the cornerstone of California's emergency response system and the fundamental structure for the response phase of emergency management. The system unifies all elements of California's emergency management community into a single integrated system and standardizes key elements.

SEMS incorporates:

- *Incident Command System (ICS)*

  A field-level emergency response system based on management by objectives.

- *Multi/ Inter-agency coordination*

  Affected agencies working together to coordinate the allocation of resources and emergency response activities.

- *Mutual aid*

  A system for obtaining additional emergency resources from non-affected jurisdictions.

- *Operational Area Concept*

  County and its subdivisions to coordinate damage information, resource requests and emergency response.

Watershed Wildfire Operations

The district has been involved with wildland firefighting since 1917, when the park ranger program was established, in part, to respond to and extinguish wildfires on the watershed. Although an official wildfire response plan does not exist, staff identified the operational procedures and processes that are currently implemented.

District Park Rangers and Watershed Maintenance staff are trained in wildland firefighting and would most likely be the first on scene if a vegetation fire broke out on the district's watershed lands. Currently, the district has twelve full-time certified (red-carded) firefighters, whose training meets the standards of California Incident Command Certification System and the National Wildfire Coordinating Group[1] who are prepared and equipped to respond to wildfires on the watershed. Their role is to respond to the scene with a district fire apparatus, assess the situation and report the incident to MCFD, request additional district resources (if needed), and secure the scene. Once MCFD arrives on-scene MCFD would take over the incident

command or establish unified command with the district. District Park Rangers and maintenance staff would continue to assist with fire suppression and initial attack until called off by MCFD. With the assistance of the contract Deputy Sheriff, staff would be deployed to evacuate watershed visitors and attempt to prevent further public access. All watershed access points would be immediately closed to non-emergency personnel.

Pre-positioning of Resources

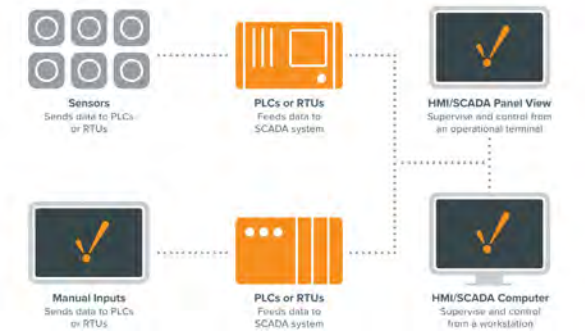
The district, in coordination with MCFD, monitors weather and fire conditions to determine if equipment needs to be staged or mobilized to strategic locations to reduce response times. For example, during a Red Flag Warning, district equipment is staged in easy to access locations and staff are on hand to mobilize equipment for initial response and attack. Staff coordinates with local and state fire officials as necessary to facilitate resource sharing. In addition to pre-positioning of equipment, during wildfire season the district sends out daily watershed crew assignments, which identifies where wildfire suppression equipment is staged on the watershed and assigned roles and responsibilities. In addition, all watershed rangers are equipped with wildland fire engines and patrol the watershed during wildfire season.

District Operations

The district has an Operations Center supported by a Supervisory Control and Data Acquisition (SCADA) system (**Figure 6-2**). The SCADA system allows the district to monitor, gather and process real time water infrastructure data to inform operations. The operations center is staffed 24 hour a day. Staff have a direct line to 911 emergency response and monitors the Marin Emergency Radio Authority (MERA) system.

Staff in the Operations Center are a central support system for the district's field operations and response activities. In the event of a wildfire, until the EOC is deployed, the Operations Center coordinates with field staff and emergency response agencies to ensure that water services are maintained to support first responders and community needs and relay critical information to the County.

Figure 6-2: *Diagram of simple SCADA system.*



Marin County Emergency Operations Center

In the event of a countywide incident the Marin County Operational Area Emergency Operations Center (Marin EOC) would be initiated and assigned district staff representatives would be given emergency management responsibilities. The Marin EOC would facilitate a coordinated response under direction of the Director of

Emergency Services and designated staff from local agencies. The level of Marin EOC staffing would vary depending upon the scale and specifics of the emergency situation.

- Marin County Operational Area EOC
  Marin Commons
  1600 Los Gamos Drive,
  San Rafael, CA 94903

Incident Management Team

The district's EOC is composed of a designated Incident Management Team (IMT) made up of staff from different departments. Staff have predetermined roles and responsibilities. In the event of an emergency the IMT would be deployed in the district's EOC. Some IMT members would be assigned as district representatives in the Marin County EOC to provide a direct link between the district EOC and the emergency response efforts of local and state agencies.

Emergency & Community Notifications

The district coordinates public notifications through the district website, social media, and the County Office of Emergency Services who have access to six emergency notification systems [2] During a wildfire event when water quality and human health could be impacted, it may be necessary to issue a health advisory that provides guidance and recommendations to water customers on how to protect their health if the district's EOC determines that there may be water quality issues within the system. Advisories would also be used to inform customers of system outages, alternative water sources, home treatment options, and updates as needed.

Emergency Water Service Operations

During a wildfire the district's EOC would coordinate wildfire response with MCFD to ensure that water is available to meet fire suppression needs in affected areas. The EOC would identify critical facilities within the vicinity of the fire that need to be protected in order to continue water services. The EOC would be monitoring the system and coordinating system operations with field crews.

In the event that a service area is impacted by a wildfire it may be necessary to make operational adjustments to protect water quality, increase pressure in another service area, or shut down parts of the system. The district's EOC would coordinate and complete field reconnaissance, infrastructure assessments, operational adjustments and emergency communication.

Polices, Agreements, & Contracts

CalWARN

In addition to requesting resources and support through the Marin EOC, the district can obtain water infrastructure specific support from the California Water Water/Wastewater Agency Response Network (CalWARN). As a participating member in CalWARN, a coalition of water and wastewater agencies which provide mutual aid and mutual assistance when a member utility agency requires resources beyond their normal capabilities to

reinstate critical life services (water and wastewater), the district can request mutual aid and mutual assistance from over 380 CalWARN members across the state.

Mutual Aid
Resources shared without expectation of reimbursement.

Mutual Assistance
Resources shared with an expectation of reimbursement

Requests may include service crews and equipment to fix leaks while district staff tend to emergency infrastructure repairs or requesting pumps, generators, and communications equipment to restore system operation. Basic requests can be communicated directly with member agencies while larger complex events may require coordination through regional CalWARN committees.

Participation in the CalWARN system effectively increases the district's response capacity and improves the pace of recovery efforts; especially for more localized threats such as wildfire.

Summary of Existing Response Actions

A summary of existing response actions (by topic area) and the hazards they target is provided in in **Table 6-1**.

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Table 6-1: *Summary of Existing Response Actions (by Topic Area) and Targeted Hazards*

Existing Response Action Topic Area	Targeted Hazard: IS-1: *Electrical Service Connections*	IS-2: *Outside Utilities*	IS-3: *District Facilities*	IS-4: *Leased Facilities*	IS-5: *System Maintenance*	IS-6: *Watershed Maintenance & Management*	IS-7: *Watershed Visitors*	IS-8: *Outside Contractors*	DH-1: *Damage to Assets*	DH-2: *Damage to Communication System*	DH-3: *Impacts to Physical Hydrology*	DH-4: *Source Water Quality*	DH-5: *Vegetation*	DH-6: *Access to Facilities*	DH-7: *Distribution System Contamination*	DH-8: *Pressure Loss*	DH-9: *Staff Safety*	DH-10: *Visitor Safety*	IH-1: *Staffing*	IH-2: *Public Safety Power Shutoff*	IH-3: *Fire Response & Suppression*	IH-4: *Staff Preparation & Training*	IH-5: *Financial Security*
District Emergency Operations Center									●	●									●	●			
Standardized Emergency Management System									●	●												●	
Watershed Wildfire Operations																	●	●			●	●	
Pre-Positioning of Resources									●	●	●	●									●	●	
District Operations																					●		
Marin County Emergency Operations Center									●	●				●					●		●		
Incident Management Team									●	●										●	●		
Emergency & Community Notifications																		●		●		●	
Emergency Water Service Operations															●								
CalWARN									●	●									●		●		

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6.2 Data Gaps & Additional Response Actions

The district responds to unanticipated events on a regular basis and is well equipped to adjust operations and staffing to respond to a range of incidents. Through proactive planning with this document and updating and maintaining the district's Emergency Operations Plan, the district can establish technical skills, processes, and guiding documents that will help to minimize potential impacts to water services and the community during a wildfire event. Furthermore, the district has an important role to play during the response to ensure that watershed visitors are safe, facilities are protected, and the flow of water is maintained to the community and first responders during a wildfire incident.

After a review of the existing data and response actions there are a number of potential data gaps that could be pursued and additional response actions that could be employed to improve overall system resilience to wildfire.

Plans, Programs, & Procedures

Response Prioritization

The district owns, operates, and maintains water infrastructure assets across the entire Study Area. Proactive planning to develop asset specific action plans is discussed in Section 5. Implementation of the action plans and the resources dispatched to protect specific assets should be based on the consequence of failure (i.e. number of service connections impacted) and impact to the broader community. In order to facilitate MCFD's response to wildfire events and protection of water infrastructure, the district should develop a prioritized list of assets to protect. The list should also be accompanied by a GIS database of facility locations.

Facility Assessment Prioritization

The district does not have established guidelines for prioritizing facility assessments immediately after an emergency event when the condition and operational capabilities of assets are unknown. Including a Facility Assessment Priority list, as part of an updated Emergency Operations Plan would help focus assessment resources on the district's most critical infrastructure to ensure operations are restored as quickly and efficiently as possible without compromising public safety.

District Emergency Operations Center

The emergency operations center is not currently equipped to support long-term emergency response operations – the structure housing the Yard Training room does not meet current seismic standards and is limited in space. The technology could be updated to ensure that the district has additional system redundancy and capacity for staff to support emergency response operations. The district should consider the following:

- Review the current emergency operations center from the context of the updated Emergency Operations Plan to ensure it can

meet functional requirements with a specific focus on technology, space, and structural improvements.

- Update or construct a new EOC that meets operational requirements.

Emergency Water Service Operations

As part of an updated EOP, the district should evaluate emergency water service operations and invest in equipment and infrastructure to support response and recovery operations. Lessons learned from the North Bay Earthquakes identified Emergency Water Fill Stations at fire hydrants near public transportation hubs as an important service that could be deployed quickly during an emergency event. The district would benefit from having parts stockpiled to support emergency water services at fire hydrants. Investments in equipment such as a potable water tender, or a contract to lease one following a natural disaster, would allow the district to deliver water to impacted areas. Investments in emergency water distribution systems prior to an emergency event will help the district better serve the community and mitigate impacts during the response and recovery process.

Policies, Agreements, & Contracts

CalWARN

CalWARN has proven to be an excellent resource for water and wastewater agencies throughout the state when responding and recovering from disasters. In order to maximize the benefit of CalWARN the district could:

- Should identify an authorized district staff and alternates for all coordination and administration with CalWARN.

- Ensure the district is meeting the minimum member utility responsibilities[3].

- Ensure the authorized official and alternate review the CalWARN operations plan, attend meetings and trainings, and understand how to activate CalWARN.

- Review available resources from nearby partner agencies in relation to district capabilities and potential needs.

- Develop a contact list of local and regional CalWARN contacts that should be incorporated into the district's updated emergency operations plan for quick reference.

Training

Emergency Response Training

Natural disasters are not an everyday occurrence and are not something that all district staff are trained to support and respond to. However, all staff are designated as disaster services works per California Government Code (Title 1, Division 4, Chapter 8, Section 3100). District staff should be completing designed and routine trainings on the updated Emergency Operations Plan to ensure all staff are

adequately prepared to respond to emergency service needs.

Rangers and Watershed Maintenance staff are trained and certified in wildland firefighting. During wildfire season Ranger staff coordinate a monthly refresher training on the use of wildfire apparatus and equipment. Additionally, Rangers coordinate with other local emergency response organizations and hold joint trainings annually. An updated Emergency Response Plan with a Wildfire Response section will improve the integration of watershed staff with wildfire firefighting capabilities, coordination with the district EOC, and MCFD as the lead firefighting agency.

Summary of Potential Response Actions

A summary of potential response actions (by topic area) and targeted hazards is provided in **Table 6-2**.

There is considerable overlap between potential hazard reduction actions identified in the Focus Areas of Mitigation, Planning & Preparedness, Response, and Recovery. District staff have exercised discretion on how best to associate hazard reduction actions and each Focus Area, however, readers are encouraged to review the other sections of this report to better understand the full suite of potential hazard reduction actions identified.

See Section 8 for an initial list of recommended actions.

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Table 6-2: *Summary of Potential Response Actions (by Topic Area) and Targeted Hazards*

Potential Response Action Topic Area	Targeted Hazard: IS-1: *Electrical Service Connections*	IS-2: *Outside Utilities*	IS-3: *District Facilities*	IS-4: *Leased Facilities*	IS-5: *System Maintenance*	IS-6: *Watershed Maintenance & Management*	IS-7: *Watershed Visitors*	IS-8: *Outside Contractors*	DH-1: *Damage to Assets*	DH-2: *Damage to Communication System*	DH-3: *Impacts to Physical Hydrology*	DH-4: *Source Water Quality*	DH-5: *Vegetation*	DH-6: *Access to Facilities*	DH-7: *Distribution System Contamination*	DH-8: *Pressure Loss*	DH-9: *Staff Safety*	DH-10: *Visitor Safety*	IH-1: *Staffing*	IH-2: *Public Safety Power Shutoff*	IH-3: *Fire Response & Suppression*	IH-4: *Staff Preparation & Training*	IH-5: *Financial Security*
Response Prioritization	●	●	●	●	●	●	●	●	●	●							●				●	●	
Facility Assessment Prioritization									●	●					●	●					●	●	
District Emergency Operations Center									●	●									●	●		●	
Emergency Water Service Operations									●	●					●	●							
CalWARN									●	●									●		●		
Emergency Response Training																					●		

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[1] Fire Qualified Staff 4/20/19

[2] Marin County Sheriff's Office. Public Emergency and Warning Tools. https://www.marinsheriff.org/services/emergency-services/emergency-alert-and-warning-tools Accessed: November 12, 2019

[3] California Water/Wastewater Agency Response Network (CalWARN) Mutual Aid/Assistance Operational Plan, 2009 pp. 4

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Introduction

Recovery is the final step in the emergency management process where the primary focus is restoring or improving pre-disaster community services and operational capabilities (**Figure 7-1**). The key differentiator between response and recovery is that recovery occurs after immediate threats to life and property have passed and crews can safely begin the process of assessing damage and making necessary repairs to operationalize components of the water system that were damaged. Recovery can be the longest stage in the emergency planning process, can take years before systems and communities attain pre-disaster capabilities, and includes seeking and obtaining financial assistance to help pay for response, repairs, and improvements.

7.1 Existing Recovery Actions

The district currently implements a range of recovery actions aimed at reinstating and restoring the water system after a wildfire. The following section discusses existing recovery actions in fourteen topic areas and concludes with a summary of how each action targets the hazards identified in Section 3.

Plans, Programs, & Procedures

Disaster Service Workers

As mentioned in Section 5, all district staff are designated as disaster service workers and can be reassigned to duties that support recovery efforts if a district emergency is declared. This could include reassigning staff to the district Emergency Operations Center (EOC), coordinating with outside entities, and performing infrastructure assessments. To facilitate the use of disaster service workers, the district maintains a hotline where all staff call in to

Figure 7-1: *Recovery and Emergency Management Process*

determine if they need to report, where to report, and if appropriate, how to notify district managers of extenuating circumstances that preclude them from reporting.

Operations & Maintenance Staff

The ability to staff adequate skilled personnel during the recovery phase is essential to restoring system operation and service. The normal duty and core function of operations and maintenance staff is to respond to emergency situations and ensure system operation twenty-four hours a day, seven days a week. Therefore, even during normal (non-emergency) circumstances staff are already on standby to assist in the recovery process. Staff is available and can be reallocated as needed between work groups to repair leaks and the electrical and mechanical systems that transmit and distribute water. If a district emergency is declared, standby crews would be immediately mobilized and supplemented with additional staff and contractors as conditions warrant. Therefore, the organizational structure and job specifications of maintenance and operations staff positions the district to staff personnel integral to recovery efforts.

Enterprise Management System

Recovering from a wildfire event can be costly and extremely complicated to track and account for expenditures. However, accurate accounting is essential if the district expects to seek state or federal disaster assistance and understand how response and recovery events will affect the district's financial standing. To that end, the district utilizes an enterprise management system which has the capacity to track labor, materials, equipment, and outside contracts and associate them with specific stages of emergency events. To accomplish this, the district's finance team establishes unique codings that are used by staff to log labor hours, purchases of materials, and contracts to capture the nature and extent of resources expended. This operational capability allows the district to organize and track response costs for future reimbursements.

Marin County Emergency Operations Center

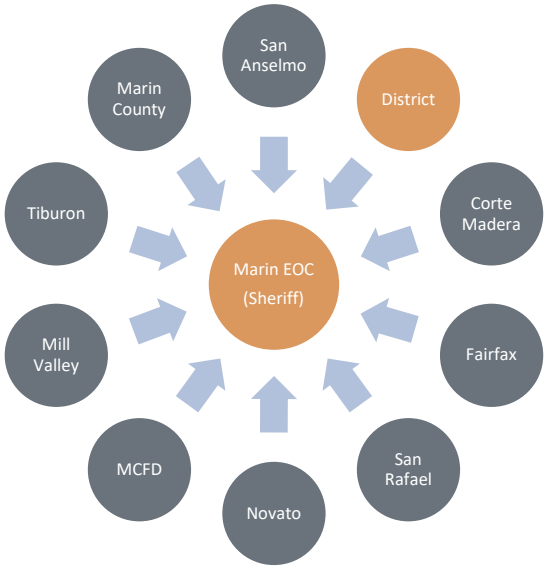
The district is in the Marin County Operational Area, one of sixteen counties within the CalOES coastal region who coordinate emergency planning, response, and recovery services at the county level (**Figure 7-2**). As the Marin County Operational Area administrator, the Marin County Sheriff's Office of Emergency Services (MarinOES) coordinates recovery actions for eleven jurisdictions and over 300 special districts.

Figure 7-2: *CalOES and CalWARN Regions*

MarinOES developed an emergency recovery plan (ERP) that identifies the objectives, assumptions, constraints, roles and responsibilities, and strategies for recovering the county's infrastructure (including water) in an emergency event. Despite a lack of detailed recovery plans specific to water infrastructure, the county ERP has an objective of immediately restoring utilities or providing temporary services and capabilities for basic utilities such as water service. The ERP assigns the task of assessing and restoring services to each utility provider. Although the district is responsible for restoring system capabilities it can work within the established emergency planning framework to request additional resources, as needed, to establish temporary services and facilitate the recovery process.

When an event warrants an "emergency" status, the MarinOES opens an emergency operations center (EOC) to act as the centralized hub for coordinated response and recovery actions across the county (**Figure 7-3**). The district sends staff to the EOC to maintain consistent communication and act as a liaison between the district's EOC (see below) and countywide response and recovery efforts. District staff at the Marin EOC relay critical information including the extent of service outages and expected duration of service loss, provide status updates, and request resources, mutual aid, and assistance to facilitate district efforts at restoring service.

Figure 7-3: *Marin County EOC as Hub of Response & Recovery Activities*



The Marin EOC coordinates and responds to the requests of each jurisdiction and is the first gateway for obtaining supplemental support. Requests for assistance could include clearing roads of fire debris or parked vehicles to coordinating access to evacuated areas to enable the assessment and repair of district facilities. Requests could also include temporary sources of water for affected populations, fuel deliveries for backup generators or other supplies and equipment.

For more significant events that require resources beyond the capabilities of local Marin County jurisdictions, the district can request regional resources through the Marin EOC (**Figure 7-4**).

Figure 7-4: *EOC Communication Channels*

District Emergency Operations Center

As described in Section 5, in the event a wildfire impacts district infrastructure, the district's general manger may activate an EOC to coordinate response activities at the district. In the case of a widespread catastrophic wildfire affecting numerous assets, the district's EOC would likely stay activated for the initial recovery phase until temporary services are reestablished. The district EOC would organize assessment teams, prioritize system repairs, track expenditures, develop and disseminate public communications, coordinate with the Marin EOC, and determine staffing needs. The district uses the County's WebEOC system to document events, activities, and conditions and request additional recovery support. The tracking of events, resources deployed, and expenditures is essential as it is a pre-condition for recouping costs from post-disaster funding programs. The WebEOC system also supplements district staff sitting at the MarinEOC by providing a redundant communication link with the Marin EOC.

CalFIRE

After a significant wildfire event CalFIRE completes general suppression repair activities which replace infrastructure damaged during fire suppression activities. CalFIRE pays for and repairs damaged fences, mastication of burn piles, closure of dozer lines, installation of water bars along roads and dozer lines, and removal of any hazardous trees along primary access routes.

After suppression repairs are completed CalFIRE's Watershed Emergency Response Team (WERT) coordinates and completes a rapid assessment of values at risk due to debris flow, erosion, flooding, rock fall, and other post-fire hazards. The WERT is composed of engineers, soils scientists, hydrologists, and geomorphologists who take a life-safety and property focus to identify hazards and recommend mitigation actions to protect buildings, infrastructure, municipal water sources, and other values. The WERT develops burn severity maps, models potential post-fire debris flows, erosion rates, and changes in hydrology. In the event of a wildfire on district watershed lands the data and recommendations provided by WERT can be used to prioritize district-led recovery actions, where warranted, and potentially indicate how district operations and water treatment processes may be impacted.

Policies, Agreements, & Contracts

Contracting Code

Under normal, non-emergency situations, the district's contracting code provides

accommodations to facilitate an efficient response to time-sensitive exigent events. Similar to other public agencies the district follows a contracting code that requires a competitive bidding process for construction contracts larger than $35,000. For projects less than $35,000, the district general manager may execute a contract without a formal bidding process or additional approvals from the board of directors (district code Section 2.90.030). This could include contracting with a communications installer to replace damaged SCADA or radio equipment or to clear downed trees leading to district facilities.

Construction contracts that are considered an emergency by the district general manager which exceed the $35,000 threshold can be executed without a formal bid process after obtaining informal quotations (district code 2.90.055[b]). The general manager shall report the action to the board within seven days or at the next regularly scheduled meeting for board consideration and approval in accordance with district code 2.90.055[a, b, c] and Board Policy No. 40. An example of such an emergency may include repairing a $120,000 fire-damaged transmission line providing raw water connection to a treatment plant. Under these circumstances the continued operation of the system is reliant upon on immediately executing a contract to make repairs.

The district's contracting code and Board Policy No. 40 aids recovery efforts by allowing for the immediate repair of district assets and communication systems and avoiding additional financial loss that may occur during exigent circumstances.

Existing Agreements & Contracts

At any time, the district has existing agreements and contracts with suppliers, contractors, and professional service providers that are based on unit costs or hourly rates that can be used to respond to and recover from emergency situations. This could include requests for additional fuel deliveries for backup generators during a PSPS or wildfire event. It could also include requesting landscape services to clear vegetation around assets in an area that is in the potential path of an ongoing wildfire or professional services to assist in the replacement of communication system components. Overall, the district has at its disposal, a range of existing agreements and contract for materials and labor to assist in recovery efforts.

Capital Financing

The district is in the process of shifting its capital financing structure which will improve financial standing and resilience to natural disasters (earthquake, fire, etc.) Historically, the district relied on long-term debt (bonds) to fund system improvements such as tank and pipe replacements and treatment plant upgrades. Using bonds to finance capital infrastructure projects has a major drawback; the cost of servicing debt is a function of debt. If a municipality already has some debt exposure any additional bond issues associated with

emergency repairs could lower the district's bond rating and exacerbate the district's financial standing by requiring the district to offer bonds at a higher coupon rate.

In July of 2019, the district switched to a pay-as-you-go approach for funding capital improvements which relies on a capital maintenance fee to fund critical capital infrastructure projects. A capital financing structure that shifts towards pay-as-you-go will make the district less reliant on debt, improve the district's municipal bond rating, and result in lower coupon rates in the event a bond issue is required to fund emergency repairs and upgrades.

District Reserves

In addition to operating the capital program as a pay-as-you-go system, the district has additional financial flexibility by maintaining reserve funds to adapt to unforeseen catastrophic events. Reserve funds could be used to cover damages caused by the district (Insurance Reserve) and the cost to repair assets in the event of a wildfire (Capital and Unrestricted Reserves).

Summary of Existing Topic Areas & Hazards

A summary of existing recovery actions (by topic area) and targeted hazards is provided in **Table 7-1.**

Table 7-1: *Summary of Existing Recovery Actions (by Topic Area) and Targeted Hazards*

	Targeted Hazards																							
Existing Recovery Action Topic Area	IS-1:- *Electrical Service Connections*	IS-2: *Outside Utilities*	IS-3: *District Facilities*	IS-4: *Leased Facilities*	IS-5: *System Maintenance*	IS-6: *Watershed Maintenance & Management*	IS-7: *Watershed Visitors*	IS-8: *Outside Contractors*	DH-1: *Damage to Assets*	DH-2: *Damage to Communication System*	DH-3: *Impacts to Physical Hydrology*	DH-4: *Source Water Quality*	DH-5: *Vegetation*	DH-6: *Access to Facilities*	DH-7: *Distribution System Contamination*	DH-8: *Pressure Loss*	DH-9: *Staff Safety*	DH-10: *Visitor Safety*	IH-1: *Staffing*	IH-2: *Public Safety Power Shutoff*	IH-3: *Fire Response & Suppression*	IH-4: *Staff Preparation & Training*	IH-5: *Financial Security*
Disaster Service Worker									●	●									●					
Operations & Maintenance Staff																			●					
Enterprise Management System																								●
Marin County Emergency Operations Center									●	●				●										
District Emergency Operations Center									●	●									●	●				
CalFIRE											●	●												
Contracting Code									●	●									●					●
Existing Agreements & Contracts									●	●									●					●
Capital Financing									●	●														●
District Reserves									●	●														●

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7.2 Data Gaps & Additional Recovery Actions

After a review of existing recovery categories and actions there are a number of potential data gaps that could be pursued and additional recovery actions that could be employed to improve overall system resilience to catastrophic wildfire.

Plans, Programs, & Procedures

SAP Hierarchy Implementation

The district tracks its assets using an enterprise management (SAP) that includes a functional location for each asset and associated equipment. The district's operations staff also maintains an "operations manual" that is available over the district's internal network which has key information about each asset, the types of pumps and valves installed at each location, and information on how the element can be operated in the event of a power outage. In the event wildfire or other natural disaster affects an asset and replacement supplies, materials, and parts need to be ordered, it would be useful to have a single location with all critical information available to district EOC staff. To aid recovery efforts the district should consider:

- Harvesting available asset information to update the SAP Hierarchy Implementation Project or provide links in SAP that direct users to other relevant asset data. Updates could include spare part numbers, links to maintenance plans, and a manifest of critical components for each asset.
- Conduct a review of lead times for operation critical facilities. For hard to source materials and parts consider ordering spares.

Damage Assessment Program

Pump stations, tanks, communication systems, buildings, culverts, crossings and watershed facilities could all be destroyed or partially damaged due to fire. In all circumstances the district's current emergency operations plan identifies there will be need to assess damage, identify necessary repairs, and prioritize recovery efforts and approaches accordingly. The responsibility of damage assessments is given to the Planning unit of the district EOC. In order to streamline the damage assessments and aid future recover efforts the district should consider the following:

- Update the district's emergency operations plan to include damage assessment forms specific to each type of water infrastructure asset (pump station, tank, treatment plant, communication component, hydrants, etc.) and watershed facilities (culverts, roads, recreational facilities, etc.). The CalOES Safety Assessment Program, which primarily targets the assessment of structures after earthquakes, floods, and wind storms may provide a good reference or process to follow.

Water Quality Testing

Contamination of water mains and service laterals with volatile organic compounds (VOCs) may occur if a wildfire burns through a populated community in the Study Area particularly if a loss of system pressure occurs during the event. Establishing an initial assessment of water quality impacts will be an essential first step in the recovery process.

The extent of testing will be determined by the size of the wildfire and affected water infrastructure. Municipalities recently affected by wildfire induced VOC contamination such as benzene have had to work with the state and adapt testing plans based on event specific characteristics to determine the presence and extent of system contamination. Therefore, proposed testing locations and potential isolation of portions of the water system to slow or limit system contamination will require situational awareness and a detailed understanding of the local distribution system. The following measures, when combined with system knowledge and operational awareness during the emergency event would support identification and potential isolation of contaminated areas of the distribution system.

- Identify the required testing methodologies and standards.
- Determine the capacity of the district's water quality lab in performing analyses for VOCs.
- Identify laboratories to supplement any district-led testing program
- Identify a general testing strategy or priority for testing distribution mains, tanks, and service laterals in fire affected areas.

Business Continuity Plan

Catastrophic events put additional financial and managerial stressors on an organization even after an event is over. While an emergency operation plan identifies how an organization will respond to an event in real-time, a business continuity plan outlines how an organization will maintain operations after an event is over. Therefore, the district should consider developing a business continuity plan for maintaining operations from a financial, managerial, and functional perspective after a natural disaster.

Training

Staff Training

Many district staff will be involved, in some manner, with the Marin EOC and district EOC during recovery operations. In order to ensure staff understand their roles, responsibilities, and capabilities in the EOC the district should review and assign required trainings to appropriate staff based on the needs and content of the updated emergency operations plan.

Policies, Agreements, & Contracts

Contracting Code

If the district seeks to be reimbursed by FEMA programs, the contract language for all materials, services, and construction must include specific federal contract provisions consistent with the Stafford Act and federal regulations (2 CFR Part 200). The district should consider conducting a review of the Stafford Act and its contracting provisions, and develop an emergency contracting approach that will facilitate future reimbursements.

Procurement

The procurement process, which includes selecting and purchasing materials and/or contractors is a critical element of recovery planning. The Public Assistance, Hazard Mitigation Assistance, and Pre-Disaster Mitigation programs all require that district procurement processes follow federal standards. Failure to follow the Stafford Act and federal regulations puts the district at risk of not receiving full reimbursement for associated disaster costs.

In order to ensure the district can be reimbursed for potential disaster response and recovery and pre-disaster mitigation projects, the district should evaluate the FEMA procurement requirements for Public Assistance pursuant to the Stafford Act and include required procurement provisions in the updated Emergency Operations Plan.

District Reserves

For any catastrophic event impacting the Study Area, there is some potential that revenues from water sales and fees would drop considerably; thus leaving a gap between revenues and the costs to operate and repair the system. During this time the district would need to rely on reserves and insurance pay-outs to bridge the revenue gap and make repairs. The district should review existing reserve policies in light of expected replacement costs for critical facilities.

Summary of Potential Topic Areas & Hazards

A summary of potential recovery actions (by topic area) and targeted hazards is provided in **Table 7-2**.

There is considerable overlap between potential hazard reduction actions identified in the Focus Areas of Mitigation, Planning & Preparedness, Response, and Recovery. District staff have exercised discretion on how best to associate hazard reduction actions and each Focus Area, however, readers are encouraged to review the other sections of this report to better understand the full suite of potential hazard reduction actions identified.

See Section 8 for an initial list of recommended actions.

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Table 7-2: *Summary of Potential Recovery Actions (by Topic Area) and Targeted Hazards*

Potential Recovery Topic Areas	Targeted Hazards: IS-1: *Electrical Service Connections*	IS-2: *Outside Utilities*	IS-3: *District Facilities*	IS-4: *Leased Facilities*	IS-5: *System Maintenance*	IS-6: *Watershed Maintenance & Management*	IS-7: *Watershed Visitors*	IS-8: *Outside Contractors*	DH-1: *Damage to Assets*	DH-2: *Damage to Communication System*	DH-3: *Impacts to Physical Hydrology*	DH-4: *Source Water Quality*	DH-5: *Vegetation*	DH-6: *Access to Facilities*	DH-7: *Distribution System Contamination*	DH-8: *Pressure Loss*	DH-9: *Staff Safety*	DH-10: *Visitor Safety*	IH-1: *Staffing*	IH-2: *Public Safety Power Shutoff*	IH-3: *Fire Response & Suppression*	IH-4: *Staff Preparation & Training*	IH-5: *Financial Security*
SAP Hierarchy Implementation									●	●											●		
Damage Assessment Program									●	●		●		●									
Water Quality Testing															●								
Business Continuity Plan									●	●													●
Staff Training																	●		●		●	●	
Contracting Code									●	●													●
Procurement									●	●											●		●
District Reserves									●	●													●

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Recommended Actions

Introduction

The Study's focus areas of Mitigation (Section 4), Planning & Preparedness (Section 5), Response (Section 6), and Recovery (Section 7) identified data gaps and developed potential hazard reduction actions to improve community and water system resilience to wildfire. Through this process, staff was focused on actions that could target specific hazards identified in Section 3 (Threat Identification) with the understanding that each action differs in terms of its effectiveness, feasibility, timeline for implementation, and other factors. The goal of this section is to provide an initial prioritization and set of recommended actions based on a ranking system developed by staff. As this Study is updated, staff will incorporate the input, expertise, and experience of the board, community, and partnering agencies to refine the prioritization of recommended actions, as appropriate.

8.1 Prioritization Process

Staff compiled all hazard reduction actions and developed a set of questions and corresponding answers that could be used to differentiate and rank actions. Potential hazard reduction actions were initially prioritized based on the time required to implement, the degree to which an action reduces the probability of a wildfire, the consequence or impact to district operations if an action is not pursued, and anticipated cost (**Table 8-1**).

Table 8-1: *Hazard Reduction Action Ranking Criteria*

Question	Answer
Time required to implement action	Short (0-2 years)
	Medium (2-5 years)
	Long (>5 years)
How much the action reduces probability of wildfire	None
	Low
	Medium
	High
Consequence of inaction (impact to district operations)	Low
	Medium
	High
	Critical
Cost of action	<$10,000
	$10,000-$50,000
	$50,000-$100,000
	$100,000-$500,000
	$500,000-$1,000,000
	>$1,000,000

Staff recognized that while cost is a component to consider, incorporating cost could inadvertently skew rankings towards actions that are less expensive at the expense of actions that are more integral to the district's core mission. As such, cost was removed from the prioritization process and is not reflected in the recommended actions presented below.

8.2 Recommendations

The full list of initial recommendations for hazard reduction actions is provided in **Table 8-2**. The final calculated scores were binned into four groups representing the approximate quartiles. For example, actions grouped as "Highest" priority signify those that fall within the upper 25% of the scores. Similarly, those that fall within the lowest 25% of scores are denoted as "Lowest" priority. The hazard reduction actions identified in **Table 8-2** should be viewed as a living list of recommended actions that may be amended and supplemented in future updates to this study.

8.3 Implementation Updates

As described in Section 1, this Study will be a living document; updated periodically to address changing conditions and the evolution of wildfire resiliency best practices. Each future version of the Study will also provide a status update (see **Table 8-2**) for hazard reduction actions that have been implemented or progressed over the intervening years in accordance with the following terminology. Additional notes and details are provided in **Table 8-2**.

In Process
Staff have started the initial steps of implementing the action which may include planning, internal and external communication, and identification of strategies and next steps for implementation.

Ongoing
Due to the nature of the action, staff will continue working towards implementing the action through existing processes and programs.

Complete
Staff have completed implementation of the action.

Table 8-2: *Prioritized Recommended Actions*

Priority Group	Action	Update (as of 1/31/2021)
Highest	Updating the Emergency Operations Plan to include a section on Wildfire Response which may include personnel assignments, priority actions, watershed activities, evacuation procedures, etc.	**In Process**
Highest	Complete design and construction of permanent generator at San Geronimo Water Treatment Plant	**In Process** ✓Design Complete ✓Construction Contract Awarded Construction Starts March 2021
Highest	Develop a prioritized list of facilities to protect based on consequence of failure and impact to broader community	**In Process**
Highest	Permanently remove remote and infrequently used barbeques in at Laurel Dell, Barth's Retreat, Rifle Camp, and Potrero Camp	**Complete**
Highest	The district should review the condition of existing fire apparatuses and identify necessary investments to ensure staff have the necessary equipment to safely carry out the initial attack of wildfire on the watershed	**Ongoing** ✓Complete – Presented to Board Purchased Used County Type IV Engine
Highest	The district should review existing reserve policies in light of expected replacement costs for critical facilities	**In Process** To be Evaluated in 10-Yr Financial Plan
Highest	Review the current emergency operations center from the context of the updated Emergency Operations Plan to ensure it can meet functional requirements with a specific focus on technology, space, and structural improvements	
Highest	Review and assign required trainings to appropriate staff based on the needs and content of the updated emergency operations plan	
Highest	Prioritize county defensible space inspections around critical district assets	**In Process** ✓Facilities Maps Created ✓Outreach to Marin Wildfire Prevention Authority Complete Next Step – Reach Out to Individual Fire Protection Districts

Priority Group	Action	Update (as of 1/31/2021)
Highest	Develop asset specific action plans	
Highest	Develop a Wildfire Response Plan as an element in the district's Emergency Operations Plan to guide watershed response activities	
Highest	Consider banning all use of barbeques during fire season	**In Process** To be Evaluated in Recreation Plan
Highest	Consider purchasing and storing a limited supply of required PPE equipment for key staff including Nomex clothing, emergency shelters, eyewear, respirators, etc.	In Process
Highest	Based on anticipated roles and responsibilities, identify the required personal protection equipment (PPE) necessary for key staff to respond to a wildfire event	
Highest	Assess, evaluate, and develop required structure hardening actions and approach for defensible space at each treatment plant. Consider implementing minimum structure hardening actions	
Highest	The updated Emergency Operations Plan should identify the role of the district's emergency operations center as the central organizing and command center for specific issues on the watershed and throughout the service area	**In Process**
Highest	Implement the lessons learned from the 2019 PSPS event including, but not limited to those identified as critical	**In Process**
Highest	Ensure district staff is completing designed and routine trainings on the updated Emergency Operations Plan	
Highest	Complete a site-by-site analysis to document and establish required defensible space specifications at each district asset and develop a tracking and reporting process and program to document vegetation management activities performed	

Priority Group	Action	Update (as of 1/31/2021)
Highest	Integrate the condition assessment data and fire risk factors with the district's asset management framework	**In Process**
Highest	Install permanent backup generators at key pump stations	
Highest	District staff should perform work inspections to confirm the fire protection plan is in place	**In Process**
Highest	Develop facility assessment prioritization checklist to aid in the response and recovery processes	
Highest	Consider closing watershed during Red Flag Warnings	**In Process** To be Evaluated in Recreation Plan
Highest	Complete bi-annual EOC Table-top drills and exercises related to wildfire, preferably in the spring of each year	
Moderately High	The district should develop a Fire Protection Plan to be followed by all outside contractors and permit holders	
Moderately High	Supplement district code 9.07.01 with a description of which materials are allowed to be burned on watershed lands and in district-provided facilities	**In Process** To be Evaluated in Recreation Plan
Moderately High	Based on an updated Emergency Operations Plan, review and align staff training requirements with anticipated responsibilities	
Moderately High	Develop a geodatabase of natural resources and critical infrastructure to protect and wildfire suppression infrastructure on the watershed	**In Process** Part of LHMP
Moderately High	The district should develop formal procedures regarding the level of tanks during fire season, dry periods, red flag, and impending PSPS events	**In Process**
Moderately High	The district should complete a transmission and distribution Master Plan study to better define day-to-day system capabilities, limitations, and operational vulnerabilities	**In Process** ✓Consultant Selected Master Plan Study Started in November 2020

Priority Group	Action	Update (as of 1/31/2021)
Moderately High	Supplement district code 9.07.01 to require that all fires be fully extinguished after use	**In Process** To be Evaluated in Recreation Plan
Moderately High	Review existing processes, procedures, and responsibilities for approving variances to established defensible space specifications	
Moderately High	Review approach and develop procedures for capital and maintenance projects that remove tanks from service or shut down water service during defined fire season, dry periods, red flag events, and impending PSPS events	
Moderately High	Pre-position fire extinguishers or water pails at picnic areas where barbeques are present. This may include installation of fire hose and housing within reach of barbeques	
Moderately High	Consider and prioritize projects that reduce ignition potential (undergrounding, decommissioning, breaker/wire replacement, etc.) of district electrical connections and facilities	
Moderately High	Develop a ranking or prioritization matrix of pump stations to receive structure hardening based on fire risk (fire behavior modeling and structure type) and consequence of failure	
Moderately High	Develop a new pump station standard that includes transfer switches and backup power sources	
Moderately High	Consider conducting a review of the Stafford Act and its contracting provisions, and develop an emergency contracting approach that will facilitate future reimbursements	
Moderately High	Consider and evaluate required structure hardening actions for each asset in the prioritization matrix based on professional technical expertise. Strongly consider implementing structure hardening actions based on asset priority	**In Process** Part of LHMP
Moderately High	Complete Minimum FEMA-recommended training for all EOC staff	

Priority Group	Action	Update (as of 1/31/2021)
Moderately High	Aggregate existing hot work procedures and integrate them with jobsite safety plans	**In Process**
Moderately High	Work with County to close Bolinas Fairfax during Red Flag conditions	✓Complete
Moderately High	Identify required testing methodologies and standards	**In Process**
Moderately High	Update maintenance plans to include factors of structure vulnerability	
Moderately High	Increase facility inspection frequency	
Moderately High	Conduct a thorough review of possible effects of post-fire sediment input and debris into the district's water supply reservoirs and develop a set of mitigations and response actions	**In Process**
Moderately High	Complete ongoing condition assessments	**In Process**
Moderate	Identify an authorized official and alternate for all coordination and administration with CalWARN	
Moderate	Conduct annual hot work training and refresher in advance of fire season	
Moderate	Complete efforts to develop a LHMP	**In Process** ✓Consultant Selected
Moderate	When possible, update leases to include vegetation management of entire premises – not just area where the structure is located	Ongoing
Moderate	The district should incorporate, with already scheduled maintenance plans and processes, a checklist to identify any components not in conformance with current electrical code or which may be an ignition hazard	

Priority Group	Action	Update (as of 1/31/2021)
Moderate	Identify a general strategy for testing main, tanks, and severe laterals in fire-affected areas	
Moderate	Formalize annual vegetation management/defensible space reviews with lessees and PG&E in the spring of each year to review vegetation management actions for the coming summer	**Ongoing** Component of Existing Permit Process
Moderate	Review and make improvements to the district's standard specifications to bolster and require adherence to wildfire best management practices	
Moderate	Modify district code 9.07.01 to allow rangers to cite violations as infractions rather than misdemeanors which would make prosecutions more expeditious	
Moderate	Install permanent backup generator to power the administration building, corporation yard, and water quality lab	**In Process** ✓Preliminary Circuit Testing Complete
Moderate	Include consideration of fire risk and structure hardening actions when selecting future pump station and tank sites	
Moderate	Ensure the authorized official and alternate review the CalWARN operations plan, attend meetings and trainings, and understand how to activate CalWARN	
Moderate	Coordinate with Ross Valley Fire district and MCFD to identify potential restrictions to propane fuel deliveries through fire areas. If coordination indicates fuel deliveries could be delayed by three days or more, replace Sky Oaks backup generator with a comparable diesel unit with greater capacity	**Complete** Instituted Operational Changes to Ensure Tanks Filled Before Fire Season
Moderate	Require all permit holders to notify the district of anticipated work start date/time no later than 24 hours before work commences	**Complete** Part of Existing Watershed Permit Process
Moderate	Request assessment of contents and potential for ignition on all leased properties (propane tanks, fuel tanks, etc.)	
Moderate	Identify laboratories to supplement any district-led testing program	**In Process**

Priority Group	Action	Update (as of 1/31/2021)
Moderate	Develop a contact list of local and regional CalWARN contacts that should be incorporated into the district's updated emergency operations plan for quick reference	**In Process**
Moderate	Develop a business continuity plan	**In Process** Some Content Generated for COVID-19 Response Activities
Moderate	Send appropriate staff to IS-1001: "The Public Assistance Delivery Model Orientation" training	**In Process**
Moderate	Replace the remaining redwood tanks with bolted steel tanks	**In Process**
Moderate	Ensure the district is meeting the minimum CALWARN member utility responsibilities	
Moderate	When possible update leases to require an electrical system inspection and repairs to comply with current code and minimize the potential for electrical fires	**Ongoing**
Moderate	Utilize results from the transmission and distribution Master Plan study to guide investments in potential resilience projects to improve overall system performance in certain circumstances	
Moderate	Update or construct a new EOC that meets operational requirements	
Moderate	The district should prepare a comprehensive review of all power sources and electrical system components at district facilities	
Moderate	The district should evaluate the FEMA procurement requirements for Public Assistance pursuant to the Stafford Act and include required procurement provisions in the updated Emergency Operations Plan	
Moderate	Review available resources from nearby partner agencies in relation to district capabilities and potential needs	**In Process**

Priority Group	Action	Update (as of 1/31/2021)
Moderate	Review available culvert data and identify non-fire resistant crossings on critical access routes	
Moderate	Evaluate the anticipated performance of the existing fuel reduction zones and other configurations that may optimize implementation and effectiveness of the BFFIP	**Ongoing**
Moderate	Develop a database of water mains supported by bridge structures and categorize based on combustibility of structure	
Moderate	Continue to request PG&E inspection and maintenance records and track in the district's enterprise management system	**Ongoing**
Moderate	Continue to coordinate with MCFD and integrate updated fuels and wildfire modeling results with district planning studies.	**Ongoing**
Moderate	Invest in equipment and infrastructure to support emergency water distribution systems	
Moderate	Install additional shielding around Sky Oaks backup generator tank and appurtenances.	**In Process** Staff Evaluating Costs and Siting Requirements
Moderate	Install additional fire condition or fire hazard signage at all gateways	**Complete** Additional Permanent and Temporary Signs Deployed
Moderate	Culverts that currently meet operational requirements but are vulnerable to fire should be prioritized for replacement	
Lowest	Develop projects or agreements with adjoining water districts to increase operational capabilities and water source redundancy	**In Process**
Lowest	Install additional signage notifying visitors of legal use of barbeques (briquettes only, no collecting wood/vegetation)	**In Process**
Lowest	On district owned structures replace wood materials with non-combustible elements	

Priority Group	Action	Update (as of 1/31/2021)
Lowest	Identify and formalize all acceptable parking locations by installing additional signage (parking and no-parking signs) and natural barriers	**In Process** To be Evaluated in Recreation Plan
Lowest	Formalize a single point-of-contact and process of communication to facilitate collaboration with adjacent landowners	
Lowest	Update district's emergency response plan to include asset specific damage assessment forms	
Lowest	Install additional hydrants near critical bridge facilities to facilitate structure protection	
Lowest	Develop an integrated hydrologic model of the district's watersheds	
Lowest	Remove redwood tanks from the system where subsequent analysis (Master Plan) indicates they are not required	**Ongoing**
Lowest	Develop a GIS database of approved parking spaces to assist with maintenance tracking and response	**In Process** To be Evaluated in Recreation Plan
Lowest	Conduct a review of lead times for operation critical facilities. For hard to source materials and parts consider ordering spares	
Lowest	Update the SAP Hierarchy	
Lowest	Remove and dismantle existing redwood tanks that are permanently out of service	
Lowest	Increase enforcement activities for parking in non-sanctioned areas	**Ongoing**
Lowest	Determine capacity of district's water quality lab in performing VOC analyses	**In Process**

8.3 Conclusion

The purpose of the Study is to approach wildfire planning efforts in a programmatic way that informs the district's core business and embraces the responsibility we have to protect the community we serve. The Study provides an initial summary of existing district programs and operations related to wildfire preparedness, identifies immediate data gaps, and develops an initial set of recommended actions that if implemented, will lead to a more fire resilient and reliable water transmission and distribution system that protect communities adjacent to district lands and communities throughout the service area. Staff anticipates this document to be a living document and reviewed as recommended actions are implemented and additional measures are identified that would improve system resilience to wildfire.

Item Number: 11
Meeting Date: 02-16-2021
Meeting: Board of Directors

Approval Item

TITLE
Ordinance adoption to allow for extended repayment schedule for delinquent customers

RECOMMENDATION
Adopt the attached Ordinance 447 and direct staff to proceed with the administrative changes to the low-income program for eligible customers

SUMMARY
Staff is recommending an addition to the MMWD Code to temporarily extend repayment plans for a term of five years for customers who are delinquent by 60 days or more. Staff also recommends proceeding with administrative changes to the district's low-income program that will allow some additional relief to customers who have suffered adverse financial effects resulting from the pandemic.

DISCUSSION
In response to the COVID-19 outbreak and the resulting financial stress many district customers have experienced, the district ceased collections efforts in March 2020, including customer notifications via telephone and written past due reminders and ceased water shut-offs. In May 2020, the Board of Directors took further action to provide financial relief to customers, including the acceleration of the summer rate structure by one month and a deferment of a four percent rate increase scheduled for July 1, 2020. The Board further directed staff to investigate options for extending repayment plans for customers who were delinquent in paying their bi-monthly water bills and explore other options that may provide financial relief.

Staff discussed options for financial relief for customers at several Finance Committee meetings. At the meeting of the Finance Committee on January 28, 2021, staff presented options to extend repayment options for delinquent customers beyond the 12-month term allowed under District Code Section 11.28.030. Staff also discussed administrative modifications to make it easier for customers who find their financial condition impacted by the current pandemic to take advantage of bill reductions.

The district has approximately 60,800 customers, of which 7,459 were more than 60 days delinquent as of December 2020, for a total of $2.6 million in arrears. In December 2019, prior to the pandemic, 3,987 customers were 60 days or more delinquent for a total of $700,000.

Repayment Plan for Delinquent Customers

Currently, alternative payment programs for customers in arrears are limited to a term of 12 months, per MMWD Code Section 11.28.030. The attached ordinance will provide customers

who are delinquent by 60 days or more increased flexibility to bring past due billings current by extending the repayment period to up to five years. The ordinance would not re-write the current code, but would provide a time-limited exception to address the economic hardship due to the COVID-19 pandemic, and is set to expire December 31, 2021. The ordinance authorizes the General Manager to develop and implement the extended payment plan.

At the January 28, 2021 Finance Committee meeting, staff presented an option to the Board whereby customers with delinquencies would automatically be placed in a 5-year repayment plan. Although customers would be automatically enrolled in these repayment plans, they could opt out of the program at any time. Staff believes that offering the extended payment plan will provide relief to those customers in arrears and assist the district in revenue recovery.

A recent survey of district customers conducted by the Wharton School at the University of Pennsylvania found that customers experiencing economic disruption from the pandemic, including job loss and reduction in work schedules, were receptive to repayment plans.

The recommended ordinance would provide an extended term as an overlay to the existing MMWD Code for a temporary period, after which the normal repayment plan terms would revert to twelve months.

Administrative Changes for Additional COVID Relief

At the January 28, 2021 Finance Committee, the Board also discussed further options for providing relief to financially distressed customers. One option contemplated was to provide bill relief for customers who find themselves with reduced household income as a result of the pandemic. Customers whose annual income was at 80 percent or below of the Marin County low-income level could qualify for a waiver of certain fixed fees, such as the Service Charge and Capital Maintenance Fee (CMF), which could provide substantial relief to customers in lower usage tiers.

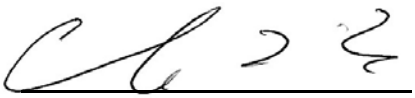
Staff is recommending to streamline the process to allow eligible customers to apply for this fee waiver, and that the waiver will be retroactive to March 1, 2020. This administrative change will remain in effect until the end of the calendar year, but could be modified if conditions changed.

FISCAL IMPACT

The cost of providing fixed-fee waivers under the new ordnance will be funded from non-rate revenue. The current low-income waiver program cost approximately $437,000, last fiscal year, and is projected to increase to approximately $560,000 by the end of this fiscal years. Staff anticipates that the additional interest in the low-income program that may arise through this Covid relief effort will be covered by the available non-rate revenue.

ATTACHMENT(S)

1. Ordinance xxxx

DEPARTMENT OR DIVISION	DIVISION MANAGER	APPROVED
Administrative Services		
	Chuck McBride **Finance Director/Treasurer**	**Ben Horenstein** **General Manager**

MARIN MUNICIPAL WATER DISTRICT
ORDINANCE NO. 447

AN ORDINANCE ADDING CERTAIN PROVISIONS TO TITLE 11 CHAPER 11.28 ENTITLED "TERMINATION OF WATER SERVICE" OF THE MARIN MUNICIPAL WATER DISTRICT CODE REGARDING EXTENDED REPAYMENT OPTIONS FOR CUSTOMERS EXPERIENCING FINANCIAL DIFFICULTIES ARISING FROM THE COVID-19 PUBLIC HEALTH CRISIS

BE IT ORDAINED BY THE BOARD OF DIRECTORS OF THE MARIN MUNICIPAL WATER DISTRICT AS FOLLOWS:

SECTION 1. Purpose: The purpose of this ordinance is to permit extended repayment options for customers experiencing financial difficulties arising from the COVID-19 public health crisis.

SECTION 2. Section 11.28.090 of the Marin Municipal Water District Code entitled "COVID-19 Extended Payment Plans" is added to read as follows:

Notwithstanding other provisions of this Chapter to the contrary, for customers experiencing financial difficulties arising from the COVID-19 pandemic, the District shall offer payment plans or alternative payment periods allowing for the repayment of past due water bill amounts beyond the current twelve-month period. The District General Manager is authorized to develop a COVID-19 Relief payment plan to extend repayment periods for up to five-years. This section shall remain in effect through December 31, 2021.

SECTION 3. Findings. After considering all of the information, documents and testimony at the public hearing the Board of Directors finds as follows:

A. It is the established policy of the State of California pursuant to Water Code section 106.3 that every human being has the right to safe, clean, affordable and accessible water adequate for human consumption, cooking, and sanitary purposes.
B. On March 13, 2020, the District proactively suspended termination of water services for nonpayment in response to the COVID-19 public health crisis. On April 2, 2020, Governor Newsom signed Executive Order N-42-20 implementing a statewide moratorium on terminations of water service for non-payment in response to COVID-19.
C. On March 16, 2020, the Marin County Health Officer issued a Shelter-in-Place Order requiring all non-essential businesses to immediately cease operations and mandated that citizens of Marin County shelter in place at their place of residence, unless engaging in essential activities.
D. Many customers are experiencing or will experience substantial losses of income because of business closures. The loss of work hours or revenue related to COVID-19 is already hindering many customers' ability to make payments for water service and more customers are likely to experience financial hardship in the future as the pandemic continues.
E. As of December 2020, the District had approximately 7,459 customers more than 60 days delinquent on their water account, for a total of $2.6 million in unpaid bills compared to

December 2019, prior to COVID-19, 3,987 customers were 60 days or more delinquent for a total of $700,000 in unpaid bills.

F. It is in the financial interest of both ratepayers and the District to provide extended repayment options to customers in order to increase the likelihood of revenue recovery, reduce the need for, and additional cost of, collections, and alleviate the need for some customers to pursue financial relief through bankruptcy proceedings, which result in the District generally receiving only pennies on the dollar for the unpaid balance.

G. The District finds that extended payment plans serve the public purposes of reducing collection costs, delinquencies, and potential bankruptcy filings, all of which increase costs to the District and its ratepayers, and reduce the overall likelihood of revenue recovery.

H. The public health and safety is protected by these extended repayment option because they ensure that water will remain available to all customers for hand washing and other sanitary purposes during this public health crisis.

I. Water availability is critical for businesses to reopen safely, and produce and provide their goods and services to consumers. Extended repayment options for businesses will help to ensure a success economic recovery of the local economy.

SECTION 4. Severability: If any section, subsection, sentence, clause, phrase, portion or part of this ordinance is for any reason held to be invalid or unconstitutional by any court of competent jurisdiction, such section shall not affect the validity of the remaining portions of this code. The Board of Directors hereby declares that it would have adopted this ordinance and each section, subsection, sentence, clause, phrase, part or portion thereof, irrespective of the fact that any one or more sections subsections, sentences, clauses, phrases, parts or portions be declared invalid or unconstitutional and, to that end, declares the provisions of this ordinance severable from one another.

SECTION 5. Effective Date: This ordinance shall take effect 30 days following its adoption.

SECTION 6. Reservation of Powers: Nothing in this Ordinance shall prevent the District from exercising any of its powers under the California Water Code or other applicable law including but not limited to its power to adopt ordinances, resolutions, rules or regulations in response thereto.

PASSED AND ADOPTED this 16th day of February 2021 by the following vote of the Board:

AYES:

NOES:

ABSENT:

President, Board of Directors

ATTEST:

Board Secretary

Item Number: 12
Meeting Date: 02-16-2021
Meeting: Board of Directors

Approval Item

TITLE
Professional Services Agreement with Carollo Engineers for Engineering Services in support of the future Kastania Pump Station Rehabilitation Project

RECOMMENDATION
Authorize the General Manager to execute a professional services agreement with Carollo Engineers in the amount of $140,924, with a staff requested contingency of $40,000, for a total not exceed amount of $180,924, in support of the future Kastania Pump Station Rehabilitation Project.

SUMMARY
This preliminary phase of the Kastania Pump Station Rehabilitation Project will evaluate and address the hydraulic constraints in the imported water supply network, and specifically evaluate the rehabilitation of the Kastania Pump Station, which ceased operating in 2015, and the potential impact this action may have on the District's ability to efficiently import its supplemental water.

DISCUSSION
Rainfall and runoff into the District's reservoirs annually provides 75% of the District's water supply, with approximately 25% provided by water imported from the Sonoma County Water Agency (Sonoma Water). This wet weather season the District has received 14.22 inches of rain which is more than 50% less than the average rainfall of 30.6 inches over the same period. The past 12-months have been the fifth driest period in the 142 years of District rainfall records. As a result, on February 1st District reservoirs held 45,275 acre-feet of stored water, which is 20,812 acre-feet, or 31%, less than the average storage volume for this date. If the dry weather continues, storage levels in the District's reservoirs will reach historically low levels. In order to preserve the District's water supply, the District is pursuing numerous actions, including evaluating the rehabilitation of the Kastania Pump Station (KPS) as reported to the Board on January 19, 2021, as part of the Water Supply Report and Drought Action Plan presentation.

The KPS is located at 4100 Kastania Road in Petaluma, CA. Constructed in 1977 by the District, the KPS was designed to increase the flow and pressure in the North Marin Aqueduct and offset the hydraulic impact of increased consumption of imported water by Petaluma and the North Marin Water District. The District filed a Notice of Determination on the project with the County of Marin in 1975, issued the plans and specifications for bidding purposes in February 1977, and completed construction of the pump station in September 1977.

The KPS is located on a 0.83 acre parcel and comprises a 1,200 square foot building which houses two pumps. Pump No. 1 is rated at 12,000 gallons per minute at 110 feet of head and Pump No. 2 is rated at 9,000 gpm at 90-feet of head. Both pumps are driven by 400-hp motors. Imported water was delivered to the KPS through a 30-inch pipeline which was connected to the 30-inch North Marin Aqueduct in Kastania Road by a 30-inch wye fitting. After leaving the KPS, treated water entered a 30-inch discharge pipe which was connected to the North Marin Aqueduct at a point further south on Kastania Road. At the time the KPS was constructed, the North Marin Aqueduct originated at a connection to Sonoma Water's Petaluma Aqueduct in McNear Road near the intersection of Petaluma Blvd in Petaluma.

The eventual transfer of ownership of KPS and the northern portion of the North Marin Aqueduct (Reach 5 or the Kastania Pipeline) to Sonoma Water was first agreed to in the 1993 "Intertie Agreement between the North Marin Water District and the Marin Municipal Water District (Intertie Agreement)" wherein within 90 days of the effective date of the Intertie Agreement the District agreed to offer to transfer all of its rights and interest in the KPS to Sonoma Water and the North Marin Water District agreed to offer to transfer all of its rights and interest in Reach 5 of the North Marin Aqueduct, consisting of 8,000-feet of pipeline from Kastania meter to McNear Avenue in Petaluma, to Sonoma Water.

The District owned and operated the KPS until 1999 when, following discussions by the District Operations Committee on February 23, 1999 and the Board on March 3, 1999, it executed the "Agreement Among the Sonoma County Water Agency, the North Marin Water District and the Marin Municipal Water District for Acquisition of a Portion of the North Marin Aqueduct and the Kastania Pump Plant," dated April 13, 1999, and the following actions occurred:

1. The District transferred ownership of the KPS to the Sonoma County Water Agency; and
2. The North Marin Water District transferred ownership of the Kastania Pipeline, which was the portion of the North Marin Aqueduct which connected Sonoma Water's Petaluma Aqueduct in McNear Avenue at the intersection of Petaluma Blvd. with Sonoma Water's Kastania Reservoir and terminated at the 30-inch wye at the connection of the District's 30-inch Kastania Pump Station discharge pipeline with the North Marin Aqueduct in Kastania Road.

Approximately five years later, the California Department of Transportation began planning its' Marin-Sonoma Narrows US 101 highway widening project (CalTrans MSN Project), which would require portions of the North Marin Aqueduct to be relocated.

In approximately 2007, the North Marin Water District began evaluating its Aqueduct Energy Efficiency Project (AEEP) in anticipation of the CalTrans MSN Project. At the time, the North

Marin Water District determined the North Marin Aqueduct was operating near its hydraulic capacity of approximately 18 million gallons per day (mgd). A hydraulic analysis conducted by the North Marin Water District determined that increasing the size of the North Marin Aqueduct from the KPS to just south of the Redwood Landfill Road would allow the North Marin Aqueduct to convey 18 mgd of flows by gravity alone and eliminate the need for pumping at the KPS. The North Marin Water District's AEEP would include:

- The relocation of approximately 4 miles of the North Marin Aqueduct affected by the CalTrans MSN Project. At the time that CalTrans relocates portions of the North Marin Aqueduct, a 42-inch diameter pipeline would be installed instead of replacing in kind the existing 30-inch pipeline;
- The installation of new 36-inch pipes parallel to approximately 2,000-feet of the North Marin Aqueduct not to be relocated by CalTrans; and
- The removal of the KPS from service.

The North Marin Water District issued the Notice of Preparation for its AEEP on September 23, 2010, issued the Draft Environmental Impact Report on March 18, 2011, and certified the Environmental Impact Report on July 15, 2011. Construction of the AEEP was completed in 2015. This project resulted in the discontinuation of the KPS by Sonoma Water on August 13, 2015.

The District's water supply is balanced approximately 75% from water stored in the District's seven reservoirs on Mount Tamalpais and west Marin, and approximately 25% from supply imported from Sonoma Water, whose primary source of water is water stored in Lake Sonoma. However, the District's ability to increase its imported water supply is impacted by hydraulic constraints in the imported water supply pipe network and the modifications to the system completed in 2015. In order to be able to efficiently operate our system, the District will evaluate rehabilitation of the KPS.

The District's preliminary phase of the Kastania Pump Station Rehabilitation Project will evaluate and address the hydraulic constraints in the imported water supply network, and specifically evaluate the rehabilitation of the Kastania Pump Station and the potential impact this action may have on the District's ability to efficiently and effectively convey our supplemental water. Staff would then bring the preliminary design report containing this information back to the Board for future discussion anticipated in May 2021. Those discussions would inform the future KPS Project and potentially lead to subsequent project consideration, environmental review, and final project approval.

In support of the KPS Rehabilitation Project, District staff have met with staff from the North Marin Water District; conducted a preliminary site visit at the KPS with Carollo Engineers and

Sonoma Water; and have begun gathering background materials including the North Marin Water District's AEEP EIR, the District's 1976 plans for construction of the KPS, and obtaining a copy of the hydraulic model developed by the North Marin Water District for their AEEP. During the preliminary site visit, it was observed that the pump station structure appears to be in relatively good condition, the roof appears to be in good condition with no apparent leakage, and the motor for one of the pumps may have been damaged in a small fire.

This preliminary phase of the KPS Rehabilitation Project requires the services of a consulting engineering firm with expertise in civil, mechanical, electrical, structural and hydraulic engineering, and familiarity with North Bay water systems. District staff recommends the District hire Carollo Engineers (Carollo) for this preliminary phase of the KPS Rehabilitation Project. Carollo's project team has substantial relevant experience that includes hydraulic modeling and pump station evaluation and design for the City of Millbrae, the Los Angeles Department of Water and Power, and Washoe County Nevada.

Project Implementation**:**

Professional Services Agreement:	February 16, 2021
Complete Preliminary Design Report:	May 2021

FISCAL IMPACT

As shown in Table 1, the total cost for the contract with Carollo Engineers is $169,924. In support of getting this work effort underway, District staff provided Carollo with an initial authorization of $29,000 towards this work scope work, resulting in a remaining contract amount of $140,924. Staff requests a contingency in the amount of $40,000, for a total authorized amount of $180,294.

Table 1
Kastania Pump Station Rehabilitation Project
Scope of Work Summary

Task Description	Budget
Task 1 – Project Management and Project Meetings: This task includes managing the project team, the scope of work, the project schedule and budget, and the coordination of, and documentation of, project meetings. Additionally, the project management task includes Carollo's quality management program and providing monthly progress reports to the District to accompany the invoices for the services provided by Carollo related to the project.	$25,672
Task 2 – Review Background Information: Carollo will perform a detailed site visit to observe existing conditions and will gather and evaluate background information related to the preliminary design of improvements to the KPS. These efforts constitute a condition assessment of the KPS.	$13,776
Task 3 – Design Criteria/Standards and Methods of Operations and Control and Features: In Task 3 design criteria and design standards governing the preliminary design of KPS improvements will be established. Additionally, Task 3 will define the intended use, the features, and the method of pump station operation and control the MMWD required for pump station rehabilitation, recommissioning, and long term operational and maintenance needs. Lastly, Task 3 includes a regulatory review and an evaluation of requirements for compliance with current design codes and regulations. The determinations made in Task 3 will be discussed in a Design Criteria Review meeting with MMWD staff.	$13,952
Task 4 – Hydraulic Analysis: In Task 4 Carollo will perform a hydraulic analysis of the Petaluma/Marin aqueduct system. The hydraulic analysis will confirm the flow and head requirements of the Kastania Pump Station and identify related necessary improvements within the SCWA and NMWD service areas to address hydraulic limitations.	$29,056
Task 5 – Pump Station Configuration: In Task 5 the efforts of Tasks 2, 3, and 4 will be used to develop the preliminary design of the proposed improvements for the KPS rehabilitation including structural, mechanical, electrical and control/instrumentation improvements along with site considerations of the proposed construction. Improvement layout drawings will be developed to the roughly 30% complete design level and will be provided to MMWD staff for review and comment. Review comments received will be incorporated into the Preliminary Design Report to be prepared as part of Task 6.	$40,680
Task 6 – Conceptual Design of Related Projects: In Task 6 Carollo will develop conceptual designs of the related projects identified in Task 4 that are needed to address the hydraulic constraints, including projects needed in the SCWA service area and the NMWD service area. The conceptual design will include project descriptions, project location exhibits, salient information including, but not limited to, pipe component diameters and lengths, construction cost estimates with an appropriate level of contingency, and other information as required, and will consider .	$10,472
Task 7 – Preliminary Design Report: In Task 7 Carollo will prepare a preliminary design report that will serve as the basis for subsequent detailed design. The Preliminary Design Report will summarize key design criteria and considerations. Plan and section views of the proposed improvements developed in Task 5 will be included detailing the proposed improvements required to the KPS to get it back into service. The Preliminary Design Report will also include a construction cost estimate of the proposed improvements and a preliminary construction schedule taking into consideration sequencing constraints.	$36,316
Subtotal	**$169,924**

Initial Authorization	**($29,000)**
TOTAL	**$140,924**
Contingency	**$40,000**
Total Authorized Amount	**$180,924**

In summary, District staff request the Board authorize the General Manager to execute a professional services agreement with Carollo Engineers for this preliminary phase of the Kastania Pump Station Rehabilitation Project in the amount of $140,924, plus a contingency of $40,000, for a total authorized amount of $180,294.

ATTACHMENTS

1. Location Map

DEPARTMENT OR DIVISION	DIVISION MANAGER	APPROVED
Engineering	**Michael Ban** **Director of Engineering**	**Ben Horenstein** **General Manager**


Kastania Tank
Kastania Pump Station
D21027 - Kastania Pump Station
Rehabilitation Project
Petaluma Golf & Country Club
Haystack
Landing Way
Petaluma Boulevard South
Redwood Highway
Kastania Road
US 101
Petaluma

Item Number: 13
Meeting Date: 02-16-2021
Meeting: Board of Directors

Approval Item

TITLE
Approval to Fill Associate Engineer Position

RECOMMENDATION
Authorize the General Manager to recruit and hire one Associate Engineer in the Engineering Division.

SUMMARY
Staff recommends filling the vacant Associate Engineer position in the Engineering Division at either the Assistant or Associate Engineer level. The Associate Engineer position became vacant when the previous incumbent accepted a position with another agency.

DISCUSSION
The Associate Engineer conducts a variety of tasks in support of the maintenance, improvement, replacement and operation of the District's water system and watershed. These tasks include preparing regulatory reports; preparing capital improvement plans, system planning and asset management reports; designing projects to improve, replace and upgrade the District's water system; preparing engineering design documents and reports; preparing contract documents, including plans and specifications, for District capital improvement projects; conducting engineering investigations and analyses; working closely with Operations and Facilities and Watershed staff on District capital improvement projects; preparing project cost estimates; and preparing agenda reports and making presentations to the Operations Committee and Board. District staff anticipate filling this position by May 2021.

FISCAL IMPACT
The budgeted amount of $30,000 reflects the FYE 2021 total amount, based on the median annual salary and benefits and filling the Associate Engineer position on May 1, 2021. Salary and benefits for the Associate Engineer position are budgeted in the Engineering Division's budget for FYE 2021. The total annual salary with benefits for the Associate Engineer position ranges from $163,548 to $197,551. Filling this position will not increase the total number of FTEs in the Engineering Division.

ATTACHMENT(S)
None

Item Number: 13
Meeting Date: 02-16-2021

DEPARTMENT OR DIVISION	DIVISION MANAGER	APPROVED
Engineering		
	Michael Ban **Director of Engineering**	**Ben Horenstein** **General Manager**

Item Number: 14
Meeting Date: 02-16-2021
Meeting: Board of Directors

Informational Item

TO: Board of Directors

FROM: Terrie Gillen, Board Secretary

THROUGH: Ben Horenstein, General Manager

DIVISION NAME: Communications & Public Affairs Department

ITEM: Future Meeting Schedule and Agenda Items

SUMMARY
Review of the upcoming Board of Directors and Committee meetings.

DISCUSSION
Below are the upcoming meetings of the Board of Directors and/or Committees:

- Wednesday, February 17, 2021
  Communications & Water Efficiency Committee/Board of Directors (Communications & Water Efficiency) Meeting
  9:30 a.m.

- Friday, February 19, 2021
  Operations Committee/Board of Directors (Operations) Meeting
  9:30 a.m.

- Thursday, February 25, 2021
  Finance & Administration Committee/Board of Directors (Finance & Administration) Meeting
  9:30 a.m.

- Tuesday, March 2, 2021
  Regular Bi-Monthly Board of Directors' Meeting
  7:30 p.m.

- Tuesday, March 23, 2021 **OR** Wednesday, March 24, 2021
  Board of Directors' 10-Year Financial Plan Workshop 2
  9:00 a.m.-12:00 p.m.

FISCAL IMPACT
None

ATTACHMENT(S)
None