

# NOVATO SANITARY DISTRICT

Meeting Date: February 24, 2014

**The Board of Directors of Novato Sanitary District will hold a regular meeting at 6:00 p.m., Monday, February 24, 2014, at the District Offices, 500 Davidson Street, Novato.**

*Materials related to items on this agenda are available for public inspection in the District Office, 500 Davidson Street, Novato, during normal business hours. They are also available on the District's website: [www.novatosan.com](http://www.novatosan.com).*

## **AGENDA**

### **1. PLEDGE OF ALLEGIANCE:**

### **2. AGENDA APPROVAL:**

### **3. PUBLIC COMMENT (PLEASE OBSERVE A THREE-MINUTE TIME LIMIT):**

This item is to allow anyone present to comment on any subject not on the agenda, or to request consideration to place an item on a future agenda. Individuals will be limited to a three-minute presentation. No action will be taken by the Board at this time as a result of any public comments made.

### **4. REVIEW OF MINUTES:**

- a. Consider approval of minutes of the February 18, 2014 meeting.

### **5. CONSENT CALENDAR:**

The Manager-Engineer has reviewed the following items. To her knowledge, there is no opposition to the action. The items can be acted on in one consolidated motion as recommended or may be removed from the Consent Calendar and separately considered at the request of any person.

- a. Approve regular, payroll, and payroll-related disbursements.

### **6. WASTEWATER OPERATIONS:**

- a. Wastewater Operations Committee Report.
- b. Odor control, noise, and landscaping report.

### **7. BOARD OF DIRECTORS**

- a. Presidential appointment of an Adhoc Manager-Engineer Contract Negotiating Committee.

**8. CAPITAL PROJECTS:**

- a. Consider approval of a contract with Nute Engineering for the design of a force main parallel to the Olive St. PS force main, including engineering services during construction, and authorize the Manager-Engineer to execute an agreement with Nute Engineering on a time and materials basis for an amount not-to-exceed \$66,000.

**9. RECYCLED WATER:**

- a. Consider adoption of a resolution adopting the San Francisco Bay Area Integrated Regional Water Management Plan Update.
- b. North Marin Water District recycled water commitment.

**10. MANAGER'S ANNOUNCEMENTS:**

**11. ADJOURNMENT:**

Next resolution no. 3067

**Next regular meeting date: Monday, March 10, 2014, 6:00 PM at the Novato Sanitary District office, 500 Davidson Street, Novato, CA**

***In compliance with the Americans with Disabilities Act, if you need special assistance to participate in this meeting, please contact the District at (415) 892-1694 at least 24 hours prior to the meeting. Notification prior to the meeting will enable the District to make reasonable accommodation to help ensure accessibility to this meeting.***

A special meeting of the Board of Directors of the Novato Sanitary District was held at 6:00 p.m., Tuesday, February 18, 2014, preceded by a closed session beginning at 5:00 p.m. at the District offices, 500 Davidson Street, Novato.

At 5:00 p.m. President Di Giorgio announced that the Board would meet in closed session to discuss the following matters on the Closed Session Agenda:

- Government Code Section 54957: Public Employee Evaluation, Deputy Manager-Engineer
- Government Code Section 54957: Public Employee Appointment, Manager-Engineer

BOARD MEMBERS PRESENT FOR CLOSED SESSION: President Michael Di Giorgio, Members William C. Long, Jean Mariani, Brant Miller, and Jerry Peters.

STAFF PRESENT: Manager-Engineer-Secretary Beverly B. James and Deputy-Manager Engineer Sandeep Karkal.

Deputy Manager-Engineer Sandeep Karkal left the closed session at 5:50 p.m. and returned at 6:04 p.m.

The closed Session ended at 6:07 p.m.  
Open session began at 6:12 p.m.

BOARD MEMBERS PRESENT FOR OPEN SESSION: President Michael Di Giorgio, Members William C. Long, Jean Mariani, Brant Miller, and Jerry Peters.

STAFF PRESENT: Manager-Engineer-Secretary Beverly James, Deputy Manager-Engineer Sandeep Karkal, and Administrative Secretary Julie Swoboda.

ALSO PRESENT: John O'Hare, Operations Technical Support, Veolia Water  
John Bailey, Project Manager, Veolia Water  
Brian Exberger, Assistant Project Manager, Veolia Water  
Shilen Patel, Veolia Water

PLEDGE OF ALLEGIANCE:

AGENDA APPROVAL: The agenda was approved as written.

REPORT FROM CLOSED SESSION:

President Di Giorgio announced that the Board had made an employment offer for the Manager-Engineer position to Deputy Manager-Engineer Sandeep Karkal, effective April 1, 2014, subject to approval of the employment contract.

PUBLIC COMMENT: None.

REVIEW OF MINUTES:

- Consider approval of minutes of the January 23<sup>rd</sup> and 27<sup>th</sup>, 2014 meetings.

*On motion of Member Miller, seconded by Member Peters, and carried unanimously, the minutes of the January 23<sup>rd</sup> and 27<sup>th</sup> meetings were approved.*

WASTEWATER OPERATIONS:

- Consider making CEQA findings and approving the “Amended and Restated Contract Service Agreement for Operation, Maintenance, and Management of Wastewater Treatment Facilities” (Agreement) with Veolia Water West Operating Services subject to minor edits approved by District Counsel and Manager-Engineer. The Manager provided to the Board and to those present amended pages of the Agreement. She reviewed the changes and edits and received direction from the Board to proceed with approval of the Agreement, subject to necessary changes as per District Counsel.

The Manager presented to the Board and to those present a document that discussed CEQA findings for the Agreement. She stated that the Agreement was categorically exempt because the project is the amendment of the Agreement.

*On motion of Member Long, seconded by Member Peters and carried unanimously, the Board made CEQA findings for the Agreement and approved the Amended and Restated Contract Service Agreement for Operation, Maintenance, and Management of Wastewater Treatment Facilities” (Agreement) with Veolia Water West Operating Services subject to minor edits approved by District Counsel and Manager-Engineer.*

MANAGER’S ANNOUNCEMENTS:

- The Wastewater Operations Committee will be held on Wednesday, February 19<sup>th</sup> at 3:00 p.m. at the District office.
- The next regular Board meeting will be held on Monday, February 24<sup>th</sup> at 6:00 p.m. at the District office.

ADJOURNMENT: There being no further business to come before the Board, President Di Giorgio adjourned the meeting at 7:10 p.m.

Respectfully submitted,

Beverly B. James  
Secretary

Julie Swoboda, Recording

# Novato Sanitary District Operating Check Register

For February 24, 2014

Date	Num	Name	Credit
<b>Feb 24, 14</b>			
2/24/2014	56662	Pacific, Gas & Electric	48,333.42
2/24/2014	56669	US Bank Corporate Trust	32,171.25
2/24/2014	56666	Roy's Sewer Service, Inc.	8,300.00
2/24/2014	56657	North Bay Petroleum	6,086.14
2/24/2014	56642	Aqua Science	5,650.00
2/24/2014	56641	American Express-21007	4,459.97
2/24/2014	56648	Delta Dental	3,062.50
2/24/2014	56659	North Marin Water District	2,674.36
2/24/2014	56674	Wedge Roofing Inc.	1,900.00
2/24/2014	56670	Verizon EQ	1,508.50
2/24/2014	56646	Cintas Corporation	1,298.93
2/24/2014	56647	Control Systems West, Inc.	1,278.75
2/24/2014	56661	North Marin Water District Pa...	1,180.00
2/24/2014	56668	Telstar Instruments Inc	1,125.00
2/24/2014	56645	CED Santa Rosa, Inc	1,123.25
2/24/2014	56660	North Marin Water District - L...	880.00
2/24/2014	56652	HACH/American Sigma Inc	849.32
2/24/2014	56672	VWR International Inc.	842.72
2/24/2014	56650	Empire Mini Storage - Novato	840.00
2/24/2014	56665	Rauch Communication Cons...	826.00
2/24/2014	56654	Marin Independent Journal	720.00
2/24/2014	56653	Leonardi Automotive & Electr...	705.21
2/24/2014	56664	Quincy Compressor	669.68
2/24/2014	56655	Marin Mechanical II, Inc.	596.40
2/24/2014	56644	Cagwin & Dorward Inc.	435.00
2/24/2014	56640	Able Tire & Brake Inc.	409.16
2/24/2014	56663	Pitney Bowes	400.00
2/24/2014	56643	Art's Towing	290.00
2/24/2014	56671	Verizon Wireless-	171.38
2/24/2014	56658	North Marin Auto Parts	145.61
2/24/2014	56649	Di Giorgio, Mike	74.00
2/24/2014	56673	WECO	60.20
2/24/2014	56656	National Notary Association	59.00
2/24/2014	56667	Staples Business Adv Inc.	53.93
2/24/2014	56639	3T Equipment Company Inc.	52.32
2/24/2014	56651	Fisher-Scientific	22.82
<b>Feb 24, 14</b>			<b>129,254.82</b>

# Novato Sanitary District Capital Projects Check Register

February 24, 2014

Date	Num	Name	Credit
<b>Feb 24, 14</b>			
2/24/2014	2659	Veolia Water North America, ...	9,619.00
2/24/2014	2657	Miller Pacific Engineering, Inc.	8,432.30
2/24/2014	2658	Nute Engineering Inc.	2,057.74
<b>Feb 24, 14</b>			<b><u>20,109.04</u></b>

**Novato Sanitary District**  
**Payroll and Payroll Related Check Register**  
**February 2014**

<u>Date</u>	<u>Description</u>	<u>Amount</u>
02/28/2014	February - Payroll	99,572.71
02/20/2014	February - Retirees Health Benefits	16,641.12
02/11/2014	Personnel agreement	50,000.00
02/20/2014	CalPers Health	31,432.45
02/20/2014	CALPERS Retirement	20,205.07
02/28/2014	United States Treasury	19,336.22
02/20/2014	CalPers Supplemental Income Plan	2,500.00
02/28/2014	EDD	5,202.34
02/20/2014	Lincoln Financial Group	18,634.21
02/20/2014	Lincoln Financial Group-401a Plan	4,171.30
02/20/2014	Lincoln Financial Group-401a Plan	4,074.87
02/20/2014	CALPERS Retirement	5,586.59
02/20/2014	Local Union 315	768.00
02/20/2014	Operating Engineers Trust	263.65
		<b><u>278,388.53</u></b>

# NOVATO SANITARY DISTRICT BOARD AGENDA ITEM SUMMARY

<b>TITLE: Wastewater Operations Committee – Meeting Report for January 2014</b>	<b>MEETING DATE: February 24, 2014</b> <b>AGENDA ITEM NO.: 6 a., b.</b>
<b>RECOMMENDED ACTION:</b> Information. Receive report.	
<b>SUMMARY AND DISCUSSION:</b>  <p>The January 2014 operations reports for the wastewater treatment, collections, and reclamation facilities are attached.</p> <p><b>Wastewater Treatment Facility</b></p> <p>The Novato Treatment Plant (NTP) water quality performance was excellent with all parameters well within effluent standards. There were no NPDES violations. The Recycled Water Facility did not produce recycled water in January. Safety performance was excellent with another accident-free month for a total of 1,338 accident-free days at the end of January. Routine maintenance activities were performed at the NTP and the Ignacio Transfer Pump Station (ITPS). The December 2013 Electronic Self-Monitoring Report (e-SMR) was submitted on January 28, 2014.</p> <p><b>Collection System</b></p> <p><u>Sewer Mains:</u> A total of 64,518 feet of sewer pipelines were cleaned for the month by District staff. Outside contractors cleaned 2,301 feet of larger diameter (&gt;12-inch) District main line. Staff used the CCTV truck to televise 24,487 feet of sewer line, and the push camera to televise an additional 449 ft of main line. Outside contractors televised another 2,301 ft of larger diameter District main.</p> <p><u>Pump Stations:</u> Staff conducted 245 lift station inspections, and upgraded pumps at BMK 4 and 7. Staff also worked with Industrial Electric and C&amp;D Power to repair emergency generators at the Marin Village and Bahia Main pump stations.</p> <p><u>Safety:</u> There were no lost time accidents for a total of 365 accident-free days at the end of January.</p> <p><u>SSOs:</u> There were no (zero) sanitary sewer overflows (SSOs) in January.</p> <p><b>Reclamation Facility</b></p> <p>The rancher continued to spray weed suppressant around sprinkler heads this month. A repair to the irrigation feed system was completed in Site 2. Control system voltage was documented at various locations on all Sites to help identify irrigation zones that may require new large voltage drop actuators. Approximately 17.87 MG of recycled water was used this month for irrigation. The main breaker to the irrigation pump station tripped once this month and the cause is unknown. An investigation by staff with the assistance of a local electrician did not reveal any problems.</p> <p><b>Odor Control, Noise, and Landscaping</b></p> <p>Two odor report contacts were received in January. The District’s odor control consultant Brown &amp; Caldwell (B&amp;C) continued work on aeration basin odor control, and issued some preliminary recommendations, including sodium hypochlorite feed to the influent wastewater. More information will be forthcoming from B&amp;C in February.</p>	
<b>DEPT.MGR.:</b>	<b>MANAGER-ENGINEER:</b>



February 12, 2014

Ms. Beverly James  
Manager - Engineer  
Novato Sanitary District  
500 Davidson Street  
Novato, CA 94545

**Subject: Veolia Water Operations Report – January 2014**

Dear Ms. James:

We are pleased to provide this updated activity report for January 2014.

As always, please give me a call at 707-208-4491 should you have any questions.

Regards,

A handwritten signature in blue ink, appearing to read "John Bailey".

John Bailey  
Project Manager

**MONTHLY OPERATIONS REPORT  
January 2014**

Prepared for

**NOVATO SANITARY DISTRICT (NSD)  
WASTEWATER TREATMENT PLANT  
500 Davidson Street  
Novato, CA 94545**

Prepared by

**Veolia Water West Operating Services, Inc. (VWWOS)**

**TABLE OF CONTENTS**

---

TREATMENT PLANT PERFORMANCE SUMMARY .....	2
OPERATIONS AND MAINTENANCE STATUS / REVIEW .....	3-4
ADMINISTRATION.....	4
SAFETY AND TRAINING .....	4
ODORS.....	4
MISCELLANEOUS.....	4

---

**TREATMENT PLANT PERFORMANCE SUMMARY: January 2014:**

**Bay Discharge – NPDES Limits**

Parameter	Value		Limit	
	Ave	Max	#1	#2
Flow, MGD (monthly ave/max)	3.73	4.39	N/A	N/A
Max Peak Hour, MGD – Daily (Dry Weather)	N/A	N/A	N/A	N/A
Influent BOD <sub>5</sub> , lb/day (month ave/max)	10,964	26,837	N/A	N/A
Influent TSS, lb/day (monthly ave/max)	16,184	68,942	N/A	N/A
Effluent BOD <sub>5</sub> , mg/L (monthly ave/weekly max)	13	17	30	45
Effluent TSS, mg/L (monthly ave/weekly max)	<4	4	30	45
Effluent BOD <sub>5</sub> - % Removal, Minimum	95	N/A	85	N/A
Effluent TSS - % Removal, Minimum	99	N/A	85	N/A
Ammonia, mg/L – (monthly ave/daily max)	2.33	4.83	6	21
pH, su (min / max)	6.9	7.1	6.5	8.5
Enterococcus, mpn (30 day geo mean)	3.3	N/A	35	N/A
Fecal Coliform, mpn (30 day median)	2.5	N/A	140	N/A
Fecal Coliform, mpn (90 <sup>th</sup> percentile)		N/A	430	N/A
<b>Total Permit Exceedances (NPDES)</b>	0			

NA – Not Applicable

Discussion of Violations / Excursions: NONE

**Title 22 - Recycled Water Production and Quality (Off Line)**

Description	Units	Value	Limit
Volume Produced	Million Gallons		N/A
Average Turbidity	NTU		2.0
Turbidity > 5 NTU (in 24 hour)	Minutes		72
Minimum CT (disinfection)	ml-min/L		> 450
Minimum Dissolved Oxygen (DO)	mg/L		> 1.0
Maximum Total Coliform	mpn/100 ml		2

Total Rainfall. – 0.04 inches

**OPERATIONS & MAINTENANCE STATUS / REVIEW:**

**Key events for the period:**

**Novato**

- Routine rounds, readings and maintenance
- Performed Thermographic Imaging of Electrical Panels
- Replaced Thickened Waste Activated Sludge (TWAS) Pump #2 Drive
- Mixed Liquor Pump to Xylem for repairs
- Replaced Mercoid switch on Primary Clarifier #2 Bubbler Panel
- Placed Primary Clarifier #2 in Service
- Took Primary Clarifier #1 Out of Service for repair
- Cleaned Primary Clarifier #1
- Installed additional UV Transmittance T-Strainer
- Replaced Sump Pump in old influent pump station
- Repair UV (disinfection lamp) modules
- Replaced Uninterruptible Power Supply (UPS) on Blowers #1, 2, & 3

**Equipment Out of Service – Due to Planned Servicing, Maintenance, or Replacement**

- Gravity Belt Thickener (GBT) Odor Fan #1 OOS - replace bearings/belts

**Ignacio Transfer Pump Station**

- Routine rounds, readings and maintenance
- Replaced backflow prevention device, damaged by December freeze

**Equipment Out of Service – Due to Planned Servicing, Maintenance, or Replacement**

- Bio-Filter OOS

**Recycled Water Plant**

- Performed plant rounds and maintenance
- No recycled water production in January

**Equipment Out of Service – Due to Planned Servicing, Maintenance, or Replacement**

- None

**Sludge Lagoons**

- Performed routine rounds and inspection

**ADMINISTRATION:**

- December Electronic Self Monitoring Report submitted on January 28, 2014
- December DMR submitted on January 28, 2014

**SAFETY AND TRAINING:**

- Monthly plant safety inspections for Novato WWTP and Ignacio Pump Station completed
- Five Minute Tailgate training is held daily with all staff.
- No safety incidents for the month of January 2014
- Accident Free: 6/1/10 – 1/31/14: 1,338 days / 61,013 Hours
- Hazard Communication Training

**ODORS:**

- Jerome Meter (H2S) readings performed in neighborhood and within treatment plant.
- Meeting held to update neighbors

**MISCELLANEOUS**

- Process Control Management Plan (PCMP) meetings held weekly.

**Veolia Support Staff On/Off Site (Various Times)**

John O'Hare	Technical Support
Chris McAuliffe	District Manager
Sachin Chawala	Northern California Area Manager
Bill Thompson	Technical Direction Group Manager
Jeremiah Danielson	Environmental, Health, and Safety
Mel Demsky	Regional Director of Asset Management
Dan Brown	Asset Manager

Novato Sanitary District  
BOD/TSS Report



January, 2014

Date	Flow MGD	Influent				Effluent				BOD % Removal PERCENT	TSS % Removal PERCENT	
		BOD		TSS		BOD		TSS				
		mg/l	lb/d	mg/l	lb/d	mg/l	lb/d	mg/l	lb/d			
01/01/14	3.39											
01/02/14	3.64											
01/03/14	3.51											
01/04/14	3.60											
01/05/14	3.67											
01/06/14	4.05	271	9,154	298	10,066	19	642	3	101	93.0	99.0	
01/07/14	3.85											
01/08/14	4.05	229	7,735	326	11,011	15	507	<3	<101	93.4	99.1	
01/09/14	3.57											
01/10/14	4.21	314	11,025	361	12,675	17	597	3	105	94.6	99.2	
01/11/14	3.99											
01/12/14	4.21											
01/13/14	3.90	253	8,229	311	10,116	8	260	3	98	96.8	99.0	
01/14/14	3.64											
01/15/14	3.37	339	9,528	476	13,378	12	337	4	112	96.5	99.2	
01/16/14	3.52											
01/17/14	3.33	249	6,915	310	8,609	18	500	4	111	92.8	98.7	
01/18/14	3.46											
01/19/14	3.41											
01/20/14	3.58											
01/21/14	3.89	275	8,922	327	10,609	10	324	3	97	96.4	99.1	
01/22/14	4.14	240	8,287	354	12,223	17	587	<3	<104	92.9	99.2	
01/23/14	4.09											
01/24/14	4.39	733	26,837	1,883	68,942	13	476	3	110	98.2	99.8	
01/25/14	3.90											
01/26/14	4.03	258	8,671	345	11,596	6	202	8	269	97.7	97.7	
01/27/14	3.82											
01/28/14	3.45	230	6,618	306	8,805	10	288	<3	<86	95.7	99.0	
01/29/14	3.44											
01/30/14	3.27	256	6,982	353	9,627	8	218	<3	<82	96.9	99.2	
01/31/14	3.23											
<b>Weekly Averages</b>												
01/04/14	Week 1	272	3,775	366	5,078	16	224	3	46			
01/11/14	Week 2	271	4,220	328	5,103	17	264	3	47			
01/18/14	Week 3	280	3,730	366	4,854	13	166	4	49			
01/25/14	Week 4	416	6,660	855	13,876	13	210	3	47			
	Week 5											
<b>Monthly</b>												
Minimum		3.23	229	6,618	298	8,609	6	91	<3	<37	93	98
Maximum		4.39	733	26,837	1,883	68,942	19	291	8	122	98	100
Total		115.60										
Average		3.73	304	9,908	471	15,638	13	187	<4	<52	95	99

Novato Sanitary District  
Conventional Pollutants Report



January, 2014

Date	INFLUENT - A001			Effluent - E002							
	Flow Total	pH	Ammonia	Coliform / Bacteria			pH	Ammonia	Unionized Ammonia	Oil & Grease	Temp
				Fecal	Entero	Total					
MGD	su	mg/L	MPN/100 mL			su	mg/L	mg/L		Deg C	
01/01/14	3.39										
01/02/14	3.64	7.2					7.0				18.4
01/03/14	3.51	7.3	41				7.0	4.83			18.6
01/04/14	3.60										
01/05/14	3.67										
01/06/14	4.05	7.5		<2.0	1.0		7.0				17.9
01/07/14	3.85	7.5					7.0			<1.4	17.9
01/08/14	4.05	7.4		2.0	6.2		7.0				18.4
01/09/14	3.57	7.0					7.0				18.9
01/10/14	4.21	7.1		500.0	3.0		6.9	1.70			18.7
01/11/14	3.99										
01/12/14	4.21										
01/13/14	3.90	6.9		<2.0	8.5		7.0				18.3
01/14/14	3.64	7.0					7.0	2.20			18.7
01/15/14	3.37	7.6		170.0	4.1		7.0	1.40			18.5
01/16/14	3.52	7.0		2.0			7.1	1.40			18.7
01/17/14	3.33	7.5		4.0	16.0		7.0	1.30			18.5
01/18/14	3.46										
01/19/14	3.41										
01/20/14	3.58						7.0				18.3
01/21/14	3.89	7.2		30.0	3.0		7.0				18.1
01/22/14	4.14			4.0	<1.0		7.0				18.2
01/23/14	4.09	7.1					7.0				18.6
01/24/14	4.39	6.4		170.0	2.0		7.0	3.50			18.3
01/25/14	3.90										
01/26/14	4.03			2.0	<1.0						
01/27/14	3.82	6.8					7.0				18.6
01/28/14	3.45	6.9		<2.0	1.0		7.0				18.9
01/29/14	3.44	7.7					7.0				19.4
01/30/14	3.27	7.7		130.0	<1.0		7.0				19.0
01/31/14	3.23	7.5					7.0				18.8
<b>Monthly</b>											
Minimum	3.23	6.4	41	<2.0	<1.0		6.9	1.30			17.9
Maximum	4.39	7.7	41	500.0	16.0		7.1	4.83		<1.4	19.4
Total	115.60										
Average	3.73	7.2	41				7.0	2.33		<1.4	18.5

Novato Plant : Bacterial Results  
 EFFLUENT: E-002 Station  
 Jan-14

<b>Fecal Coliform</b>	<b>Enterococcus</b>
(1) 30-Day Median not to exceed 140 MPN/100 mL	(2) 90th Percentile not to exceed 430 MPN/100 mL
	30-Day Geometric mean not to exceed 35 MPN/100 mL

January 1, 2014		
January 2, 2014		
January 3, 2014		
January 4, 2014		
January 5, 2014		
January 6, 2014	< 2	
January 7, 2014		
January 8, 2014	2	
January 9, 2014		
January 10, 2014	500	
January 11, 2014		
January 12, 2014		
January 13, 2014	< 2	
January 14, 2014		
January 15, 2014	170	
January 16, 2014	2	
January 17, 2014	4	
January 18, 2014		
January 19, 2014		
January 20, 2014		
January 21, 2014	30	
January 22, 2014	4	
January 23, 2014		
January 24, 2014	170	
January 25, 2014		
January 26, 2014	2	
January 27, 2014		
January 28, 2014	< 2	
January 29, 2014		
January 30, 2014	130	
January 31, 2014		

**90th Percentile Ranking**

Sample #1	<2
Sample #2	<2
Sample #3	<2
Sample #4	2
Sample #5	2
Sample #6	2
Sample #7	4
Sample #8	4
Sample #9	30
Sample #10	130
Sample #11	170
Sample #12	170
Sample #13	500
Sample #14	
Sample #15	
Sample #16	

January 1, 2014		
January 2, 2014		
January 3, 2014		
January 4, 2014		
January 5, 2014		
January 6, 2014	1.0	
January 7, 2014		
January 8, 2014	6.2	
January 9, 2014		
January 10, 2014	3.0	
January 11, 2014		
January 12, 2014		
January 13, 2014	8.5	
January 14, 2014		
January 15, 2014	4.1	
January 16, 2014		
January 17, 2014	16.0	
January 18, 2014		
January 19, 2014		
January 20, 2014		
January 21, 2014	3.0	
January 22, 2014	< 1.0	
January 23, 2014		
January 24, 2014	2.0	
January 25, 2014		
January 26, 2014	< 1.0	
January 27, 2014		
January 28, 2014	1.0	
January 29, 2014		
January 30, 2014	< 1.0	
January 31, 2014		

<b>Max</b>	500
<b>Min</b>	2.0
<b>Avg</b>	78.46
<b>30-Day Median</b>	4

90th Percentile Value 170

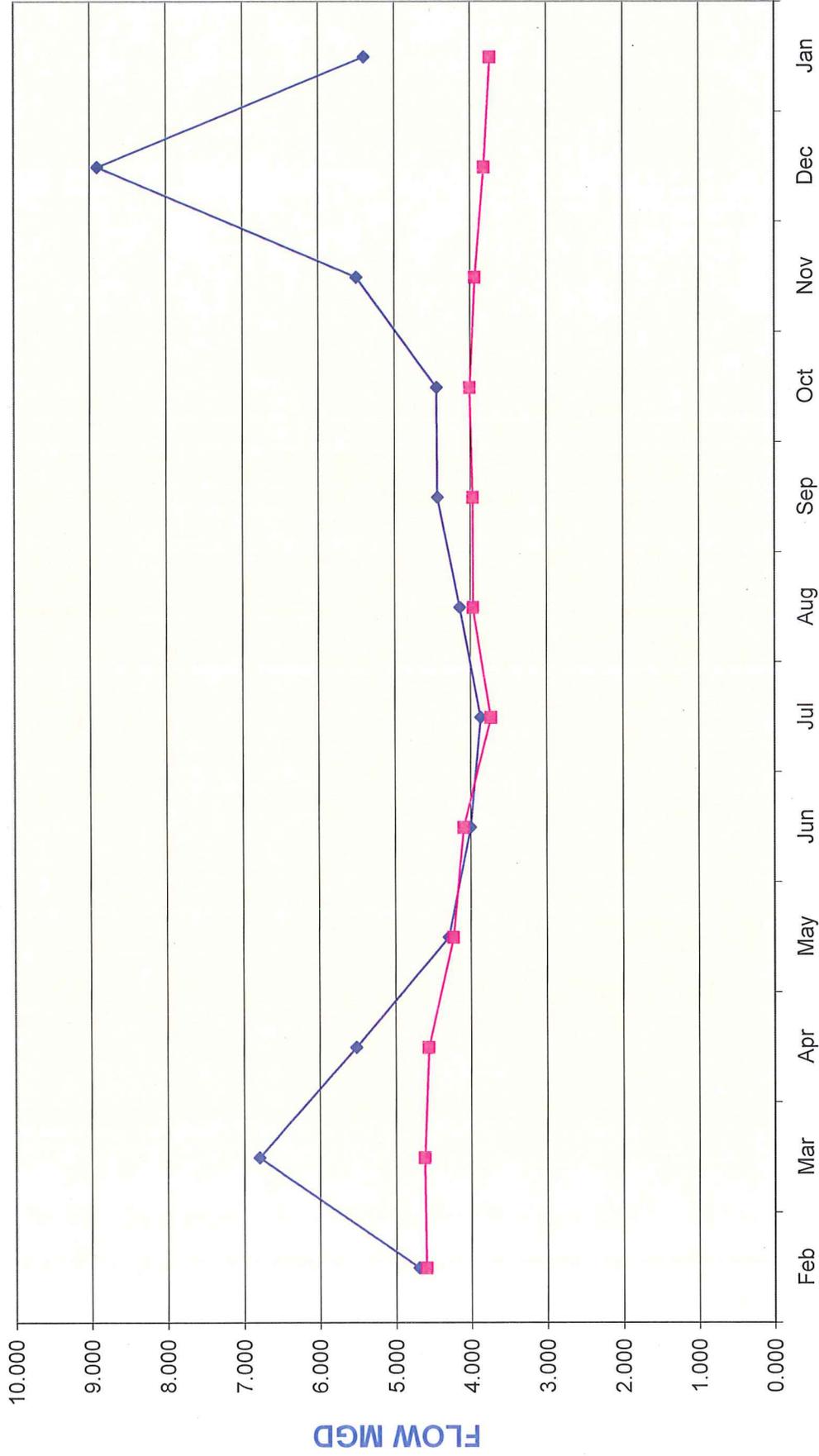
<b>Max</b>	16
<b>Min</b>	1.0
<b>Avg</b>	4.0
<b>30 Day Geo. Mean</b>	2.5

<sup>1</sup> = indicates that more than ONE UV channel was in operation at sample time; All UV channels in operation were sampled.

<b>90th Percentile</b>	13.00	0.9	11.7
------------------------	-------	-----	------

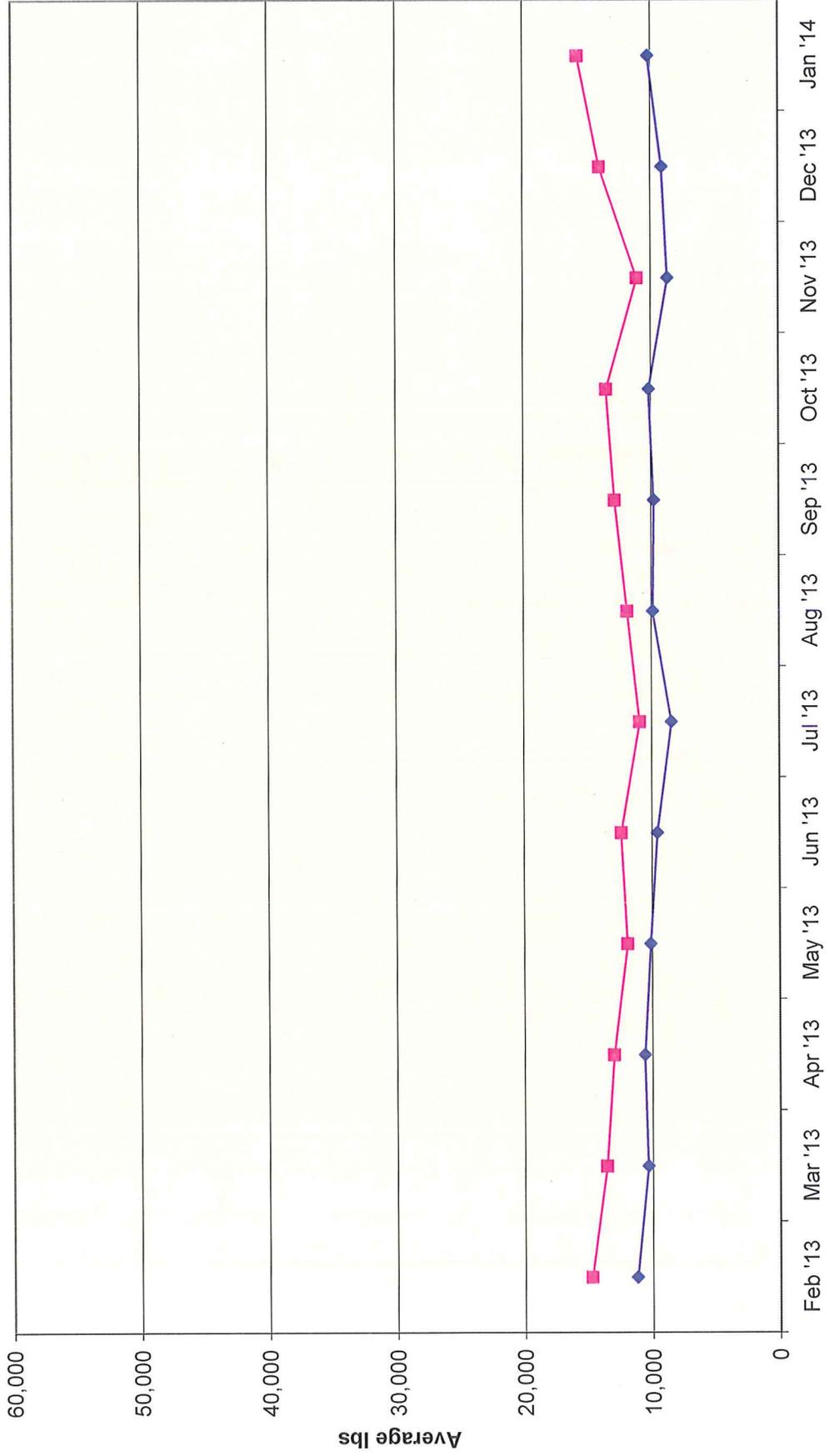
# FLOW COMPARISON

—◆— 2012 —■— 2013



# Influent Load BOD / TSS lbs

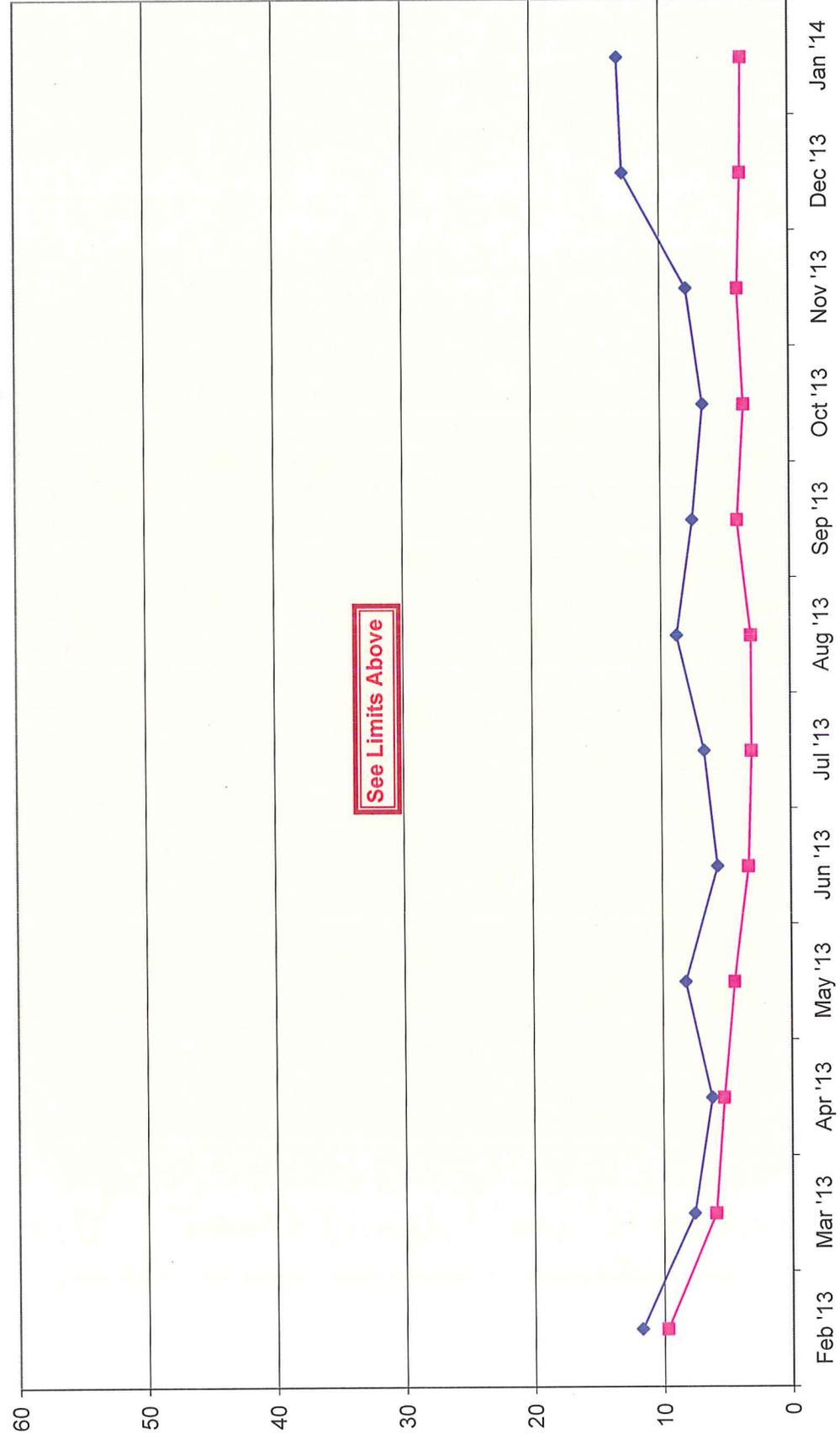
—◆— BOD lbs —■— TSS lbs



# Effluent BOD / TSS Concentration

NPDES LIMITS WET SEASON  
BOD & TSS - 30 mg/L Monthly Ave, 45 mg/L Weekly Ave  
NPDES LIMITS DRY SEASON  
BOD - 15 mg/L Monthly Ave, 30 mg/L Weekly Ave  
TSS - 10 mg/L Monthly Ave, 20 mg/L Weekly Ave  
WDR (Waste Discharge Requirements) RECLAMATION  
BOD - 40 mg/L

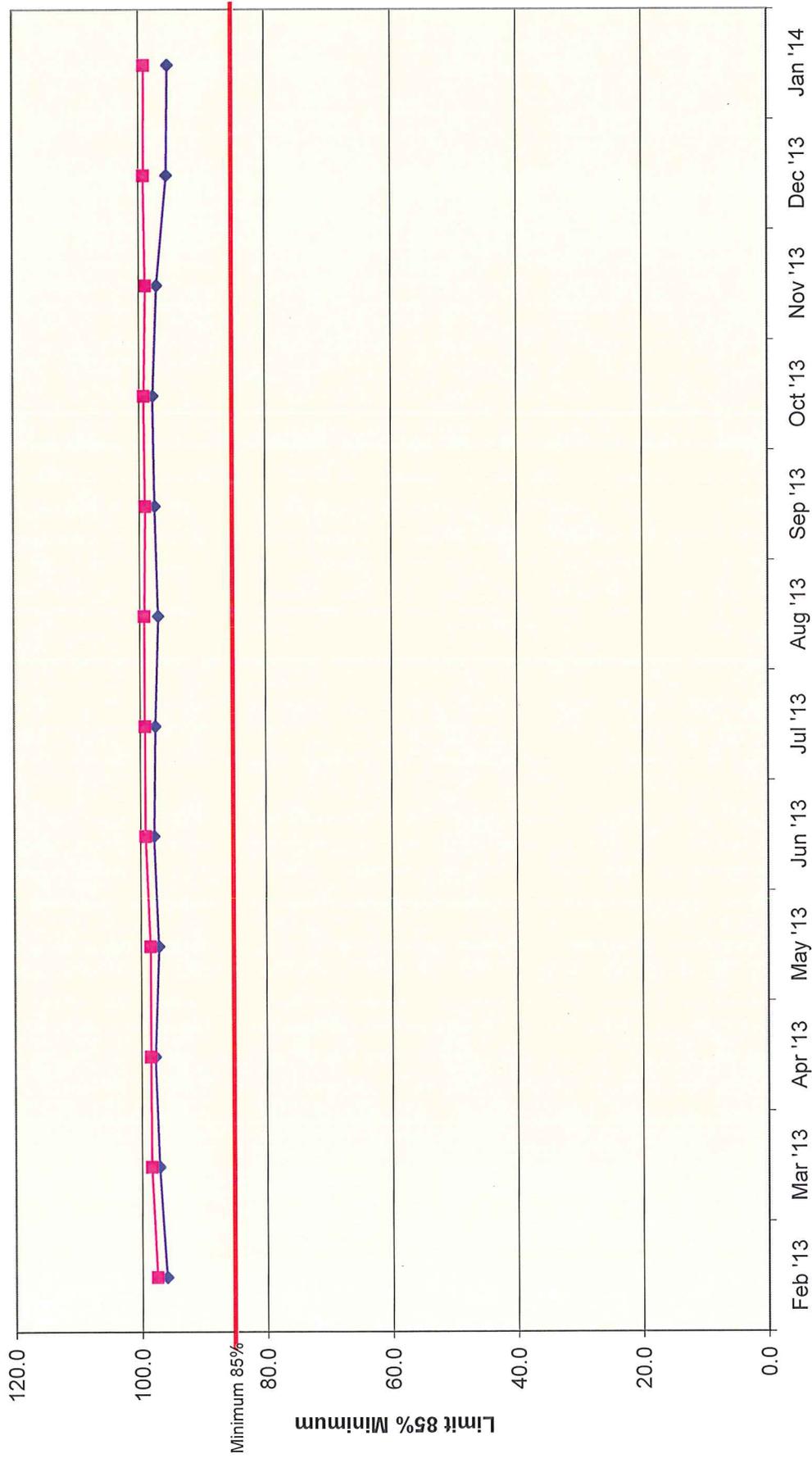
—◆— BOD —■— TSS



See Limits Above

# BOD / TSS Percent Removal

—◆— BOD —■— TSS



# Effluent Ammonia

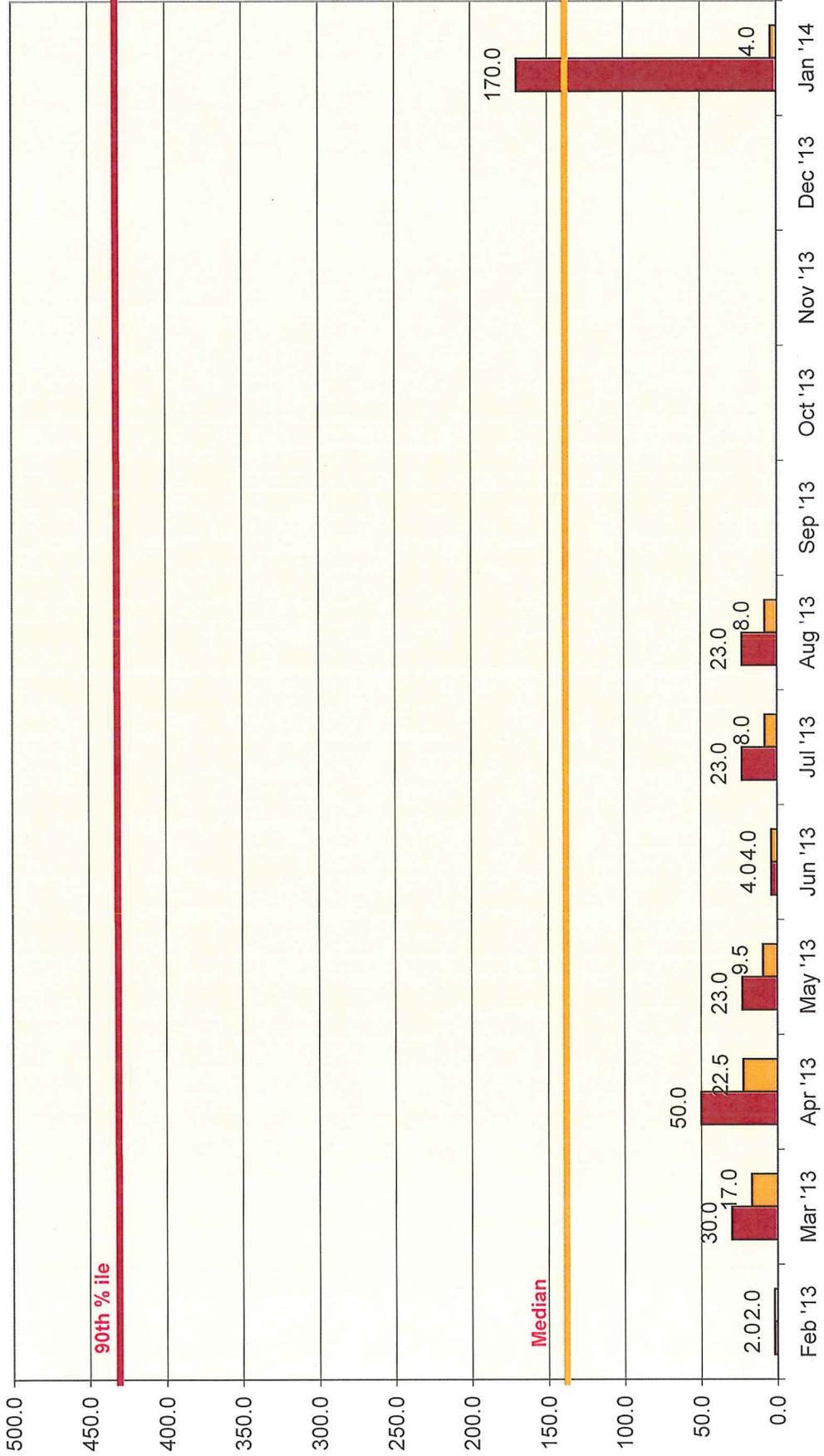
No Ammonia Limits During Reclamation, Jun - Sep



# Disinfection

LIMITS - NPDES  
 Fecal 140 mpn monthly median  
 Fecal 430 mpn 90th percentile 30 day

Fecal 90th %ile Fecal Med



LIMITS - NPDES  
Enterococcus 30 day geo mean 35 mpn /100ml

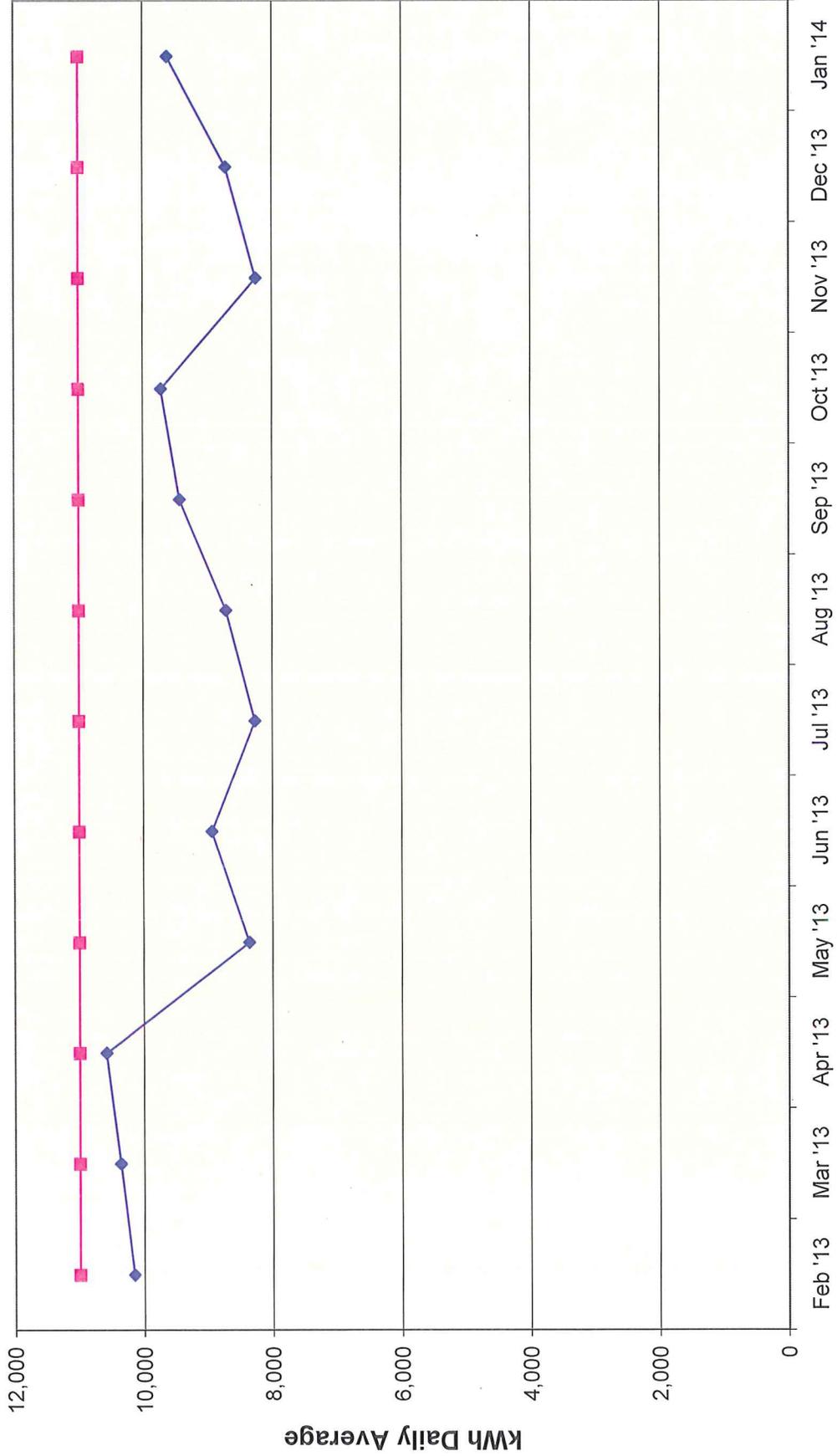
# Disinfection

Enterococcus



# Energy kWh

—◆— kWh —■— Cap



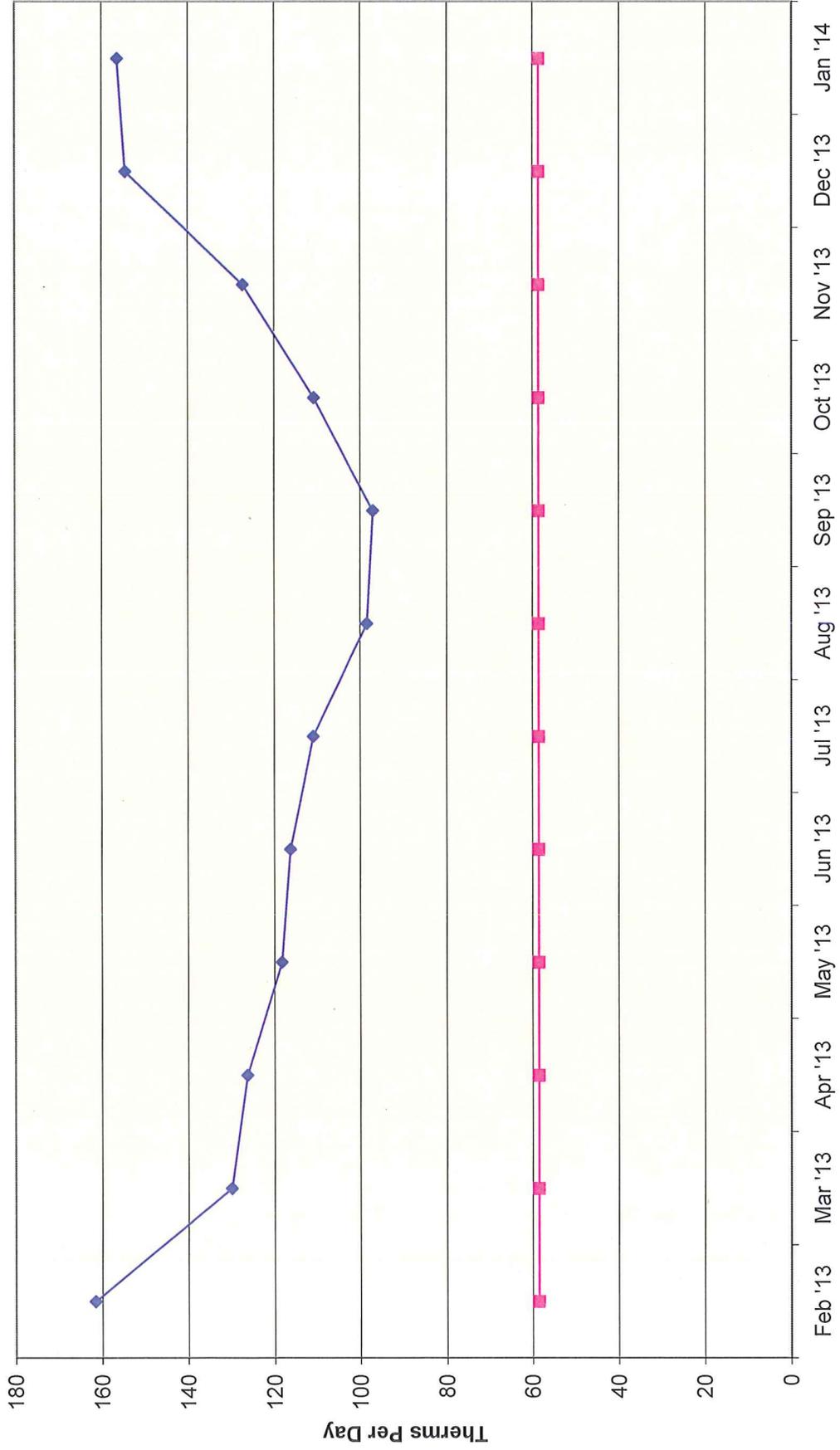
# Energy kWh/MG

—◆— kWh/MG —■— Cap

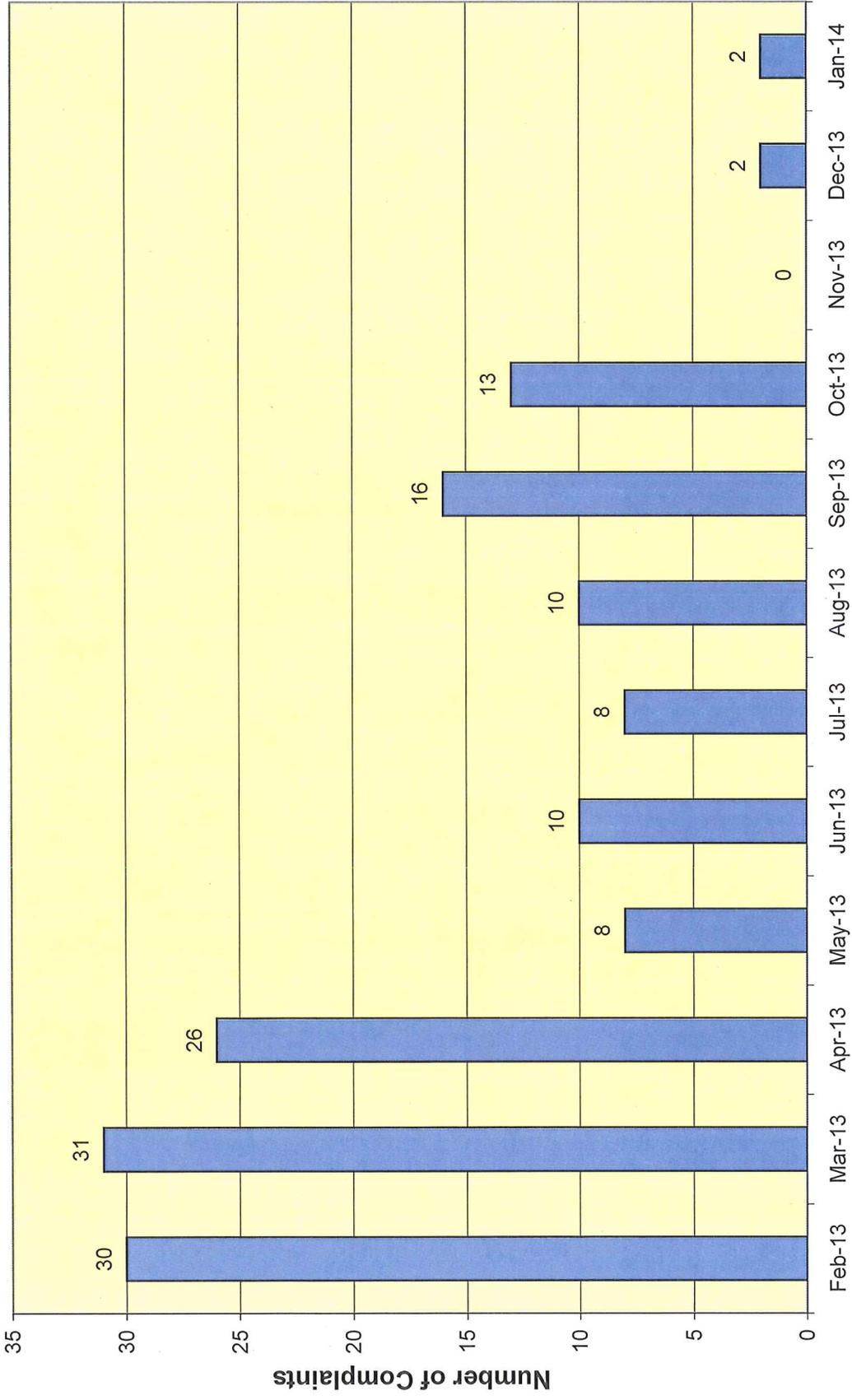


# Natural Gas Use

—◆— Natural Gas —■— Cap



# Complaints /Contacts Received



**WORK ORDER STATISTICS**

**December 1, 2013 - December 31, 2013**

	<b>Open Work Orders Due Prior to 1/1/14</b>	<b>Open Work Orders 1/1/14 - 1/31/14</b>	<b>Total Open Work Orders</b>
Preventative	5	292	297
Corrective	0	31	31
<b>Total</b>	<b>5</b>	<b>323</b>	<b>328</b>

	<b>Closed Work Orders 1/1/14 - 1/31/14</b>
Preventative	293
Corrective	17
<b>Total</b>	<b>310</b>

<b>Total Outstanding Work Orders as of February 1, 2014</b>	<b>18</b>
---	-----------

**Novato Sanitary District  
Wastewater Operations Committee meeting  
Collection System Operations Report  
January 2014**

**General:**

The breakdown of Collection System department staff time for January 2014, in terms of equivalent full-time employee (FTE) hours utilized, works out approximately as follows:

- 2.6 FTE field workers for Sewer Maintenance (main line cleaning)
- 1.4 FTE field workers for Pump Station Maintenance
- 0.9 FTE field workers for CCTV work
- 1.7 FTE field workers for time spent on data input, training, service calls, overflow response, or any other activity that does not directly relate to main line cleaning, CCTV work or pump station maintenance, and
- 1.6 FTE field workers Vacation/Sick Leave/Holiday.

**Collection System Maintenance:**

Performance metrics for the department are presented in the attached graphs showing the length of line cleaned/month, footage cleaned/hour worked, overflows/month, and the CCTV footage achieved. A brief discussion is also provided below.

Line Cleaning Performance: A total of 64,518 feet of sewer pipelines were cleaned for the month by District staff. Staff completed 408 maintenance work orders generated by the ICOM3 CMMS system, with 66 outstanding work orders. Outside contractors cleaned 2,301 feet of District main line.

Both hydro-flusher trucks were down for mechanical issues for a total of 21 days which contributed to the outstanding work orders. Both trucks have been repaired, and staff expects to complete all scheduled work orders and backlog work orders in February.

Also, staff is working with ICOM to correct a discrepancy between the footage listed in the ICOM3 system and that listed on District maps; therefore the footage listed in the Collection System reports is based off of footage obtained by the field crews during cleaning operations. The field crews measure line segment lengths using a measuring wheel whenever they note a line segment length discrepancy of more than 10 ft between the work order and District maps.

CCTV Performance: The District's CCTV van was in the field for a total of 12 working days and televised 125 line segments for 24,487 feet of CCTV production. A total of 449 ft of main line was inspected w the push camera, and outside contractors televised 2,301 ft of District main.

CCTV Findings: The January CCTV work indicated four (4) significant defects in District mains televised that will require a change in cleaning methods and/or frequency. These defects were determined to be grease buildup related and they have been added to the mechanical rodding schedule in addition to routine cleaning using the hydro-flushers. There were no defects noted that require infrastructure repair.

**Novato Sanitary District  
Wastewater Operations Committee meeting  
Collection System Operations Report  
January 2014**

**Collection System Projects:**

As part of the ongoing Collections System repair projects (Account No. 72803), three manholes in easements were raised to grade, one at 10 Jeffery Court and two at 10 Saddle Lane. Also, the Center Road Sewer Project, Phase H: Diablo Avenue to Kristy Court, (Account 72706), reached substantial completion.

**Pump Station Maintenance:**

The Collection System Department conducted 245 lift station inspections for the month with 124 of the inspection visits generated through the JobCal Plus CMMS system\*. There are 3 outstanding work orders for the month of January. The breakdown of the lift station inspections is as follows: 27 Flygt submersible pump stations, 1 time per month, 6 Gorman/Rupp dry well/wet well stations, 1 entry per month, and 4 main stations that are visited daily.

A Collection Systems (Pump Stations) Work Order Statistics summary is attached.

Staff upgraded pumps at BMK 4 and 7 during January. Staff also worked with Industrial Electric and C&D Power to repair emergency generators at the Marin Village and Bahia Main pump stations.

**\*Note:** The JobCal Plus program is not only used for scheduling and tracking pump station related maintenance work orders, it is also used for ladder inspections, reclamation maintenance work orders, SCADA backup scheduling, and vehicle maintenance scheduling.

**Pump Station Rehabilitation:**

Currently, there are no pump stations under construction as part of the District's continuing multi-year Pump Station Rehabilitation Project (Capital Improvement Project No. 72403. The next phase, (Unit 5), includes rehabilitation/reconstruction of the Los Robles and Digital Drive pump stations and will likely begin construction in March 2014.

**Safety and Training:**

General: The Collection System crew attended four safety tailgate meetings.

Specialized training: Collection System staff attended Injury and Illness Prevention Program, Injury Reporting, and Annual Flygt pump service training during the month of January. Tim O'Connor and Dasse de longh attended a webinar on Great Utility Operations in January.

Safety performance: There were no lost time accidents this month for a total of 365 accident-free days.

**Novato Sanitary District  
Wastewater Operations Committee meeting  
Collection System Operations Report  
January 2014**

**Standard Operating Procedures (SOPs):**

Department staff continues to work on generating new SOPs, and working towards finalizing earlier draft SOPs. One (1) SOP revision was issued in January. Staff also continues to assist the District's consultant DFK Solutions in updating its Sewer System Emergency Overflow Response Plan (EORP).

**Emergency Operating Procedures (EOPs) – Pump Stations:**

Staff has also been working with DKF Solutions since summer 2013 to generate the 36 Emergency Operating Procedures (EOPs) required for all of the District pump stations. At this time, one EOP is almost complete (except for some minor edits), 11 have had a final review and need some minor edits, and 14 more require edits before staff gives them a final review. It is anticipated that the EOPs will be in place (along with all relevant training performed) by April 2014.

**Sanitary Sewer Overflows (SSOs):**

For the month of January, there were no (zero) SSO's.

\*\*\*

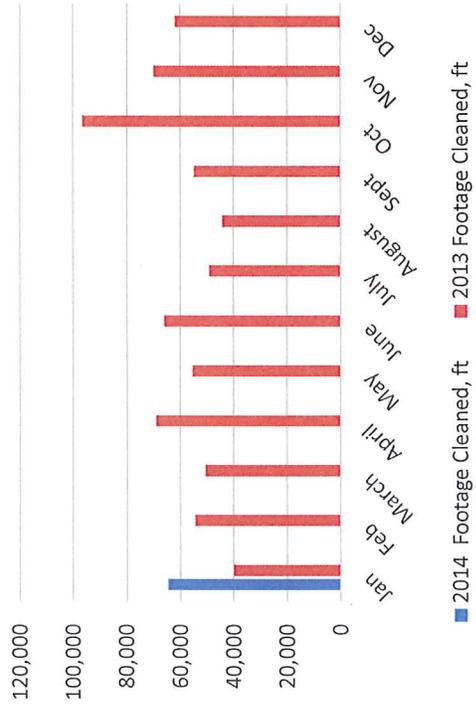
**Novato Sanitary District  
Collection System Monthly Report For January 2014 (as of January 31, 2014)**

	Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec	Total Year to Date	Average Year to Date
<b>A. Employee Hours Worked</b>														
Number of FTEs (main line cleaning), hrs.	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	0.2
Number of FTEs (other)	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	0.1
Number of FTEs (CCTV)	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	0.1
Total, FTEs	5.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	0.4
Regular Time Worked, (main line cleaning), hrs	448													
Regular Time Worked on Other, hrs (1)	294													
Regular Time Worked on CCTV (2)	158													
Total Regular time, worked, hrs	900	0	0	0	0	0	0	0	0	0	0	0	900	75
Total Vacation/Sick Leave/Holiday, hrs	285													285
Vacation/Sick Leave/Holiday, FTEs	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.1
Overtime Worked on Coll. Sys., hrs	2												2	2
Overtime Worked on Other, hrs (1)	22												22	22
Overtime Worked on CCTV (2)	0												0	0
Total Overtime, hrs	24	0	0	0	0	0	0	0	0	0	0	0	24	2
<b>B. Productivity</b>														
<b>1. Line Cleaning</b>														
Rodder Work Orders generated	57												57	57
Rodder 3203 ft. cleaned	10,989												10,989	10,989
Rodder - outside services, ft cleaned	0												0	0
Flusher Work Orders generated	351												351	351
Truck 3205V ft. cleaned	16,187												16,187	16,187
Truck 3206V ft. cleaned	37,342												37,342	37,342
Flusher - outside services, ft. cleaned	2,301												2,301	2,301
Total Footage cleaned(3)	64,518	0	0	0	0	0	0	0	0	0	0	0	64,518	5,377
Work Orders completed	408												408	408
Work Orders backlog	66												66	6
<b>2. Closed Circuit Television (CCTV)</b>														
Camera Work Orders generated	0												0	0
CCTV Truck 3126T, ft. videoed	24,487												24,487	24,487
CCTV (hand cam), ft. videoed	449												449	449
CCTV Inspection - outside services, ft. videoed	2,301												2,301	2,301
Total CCTV footages(3)	27,237	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	27,237	24,487
<b>C. Sanitary Sewer Overflows (SSOs)</b>														
Minor (Category III)	0												0	NA
Major (Category II)	0												0	NA
Minor (Category I)	0												0	NA
Overflow Gallons	0												0	NA
Volume Recovered	0												0	NA
Percent Recovered	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	#DIV/0!	NA
<b>D. Service Calls (non-SSO related)</b>														
Service calls, normal hours, #	8												8	8
Normal hours S.C. response time, mins (avg.)	38												38	38
Service Callouts, after hours, #	0												0	0
After Hours S.C. response time, mins (avg.)	0												0	0
<b>E. Benchmarks</b>														
Average Ft. Cleaned/Hour Worked	144	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	144
Total Stoppages/100 Miles	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average spill response time (mins)	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Callouts/100 Miles	1	0	0	0	0	0	0	0	0	0	0	0	1	0
Overtime hours/100 Miles	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Overflow Gallons/100 Miles	0	0	0	0	0	0	0	0	0	0	0	0	0	0

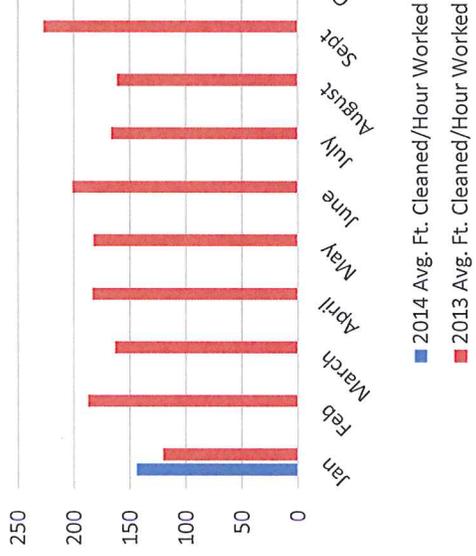
(1) This category includes time spent on: Data input, Training, Service Calls, Overflow Response, as well as any other activity that does not directly relate to main line cleaning or CCTV work.  
(2) This category separates time spent on CCTV from other Collection System maintenance activities.  
(3) Does not include outside services (tracked separately)

# Collection System 2013-14 Graphs

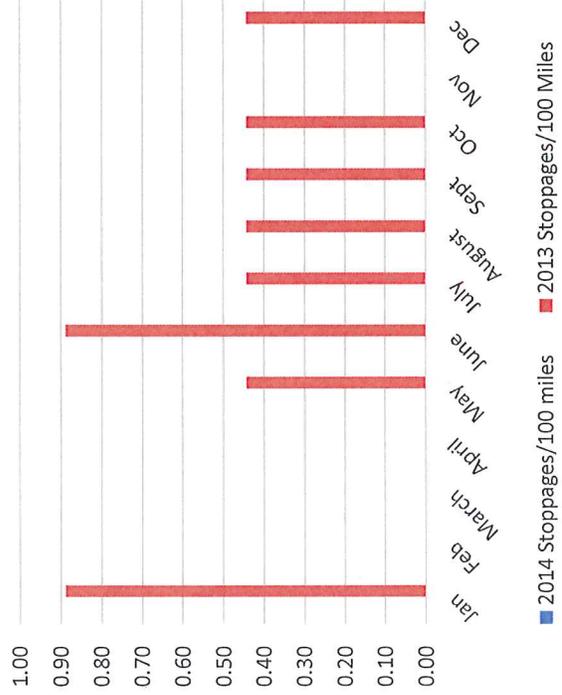
Total Length Cleaned, ft



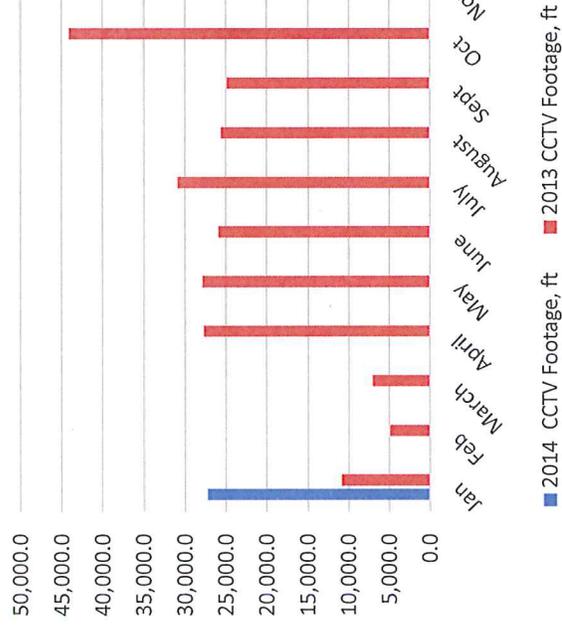
Cleaning Efficiency



Stoppages/100 miles



CCTV Footage, ft





**NOVATO SANITARY DISTRICT**  
**Wastewater Operations Committee Meeting**  
**Reclamation Facilities Report**  
**January 2014**

**Summary:**

The rancher continued to spray weed suppressant around sprinkler heads this month. A repair to the irrigation feed system was completed in Site 2. Control system voltage was documented at various locations on all Sites to help identify irrigation zones that may require new large voltage drop actuators. Approximately 17.87 MG of recycled water was used this month for irrigation. The main breaker to the irrigation pump station tripped once this month and the cause is unknown.

**Ranch Operations:**

The rancher continued to spray weed suppressant around sprinkler heads this month.

In October, Mosquito Abatement found a sinkhole in Parcel 27. The sinkhole appears to be over one of the large irrigation mains. Staff issued a Work Order to a local contractor for repair which was completed this month. The contractor found a six inch plastic coupling that had failed.

**Irrigation Parcels:**

As previously reported, the valve actuators for some irrigation zones within the parcels will not fully open or close and some motors have failed. The District's electrical engineering consultant is investigating options to address this issue. Staff received an e-mail report this month on the results of the investigation. The electrical engineer recommended installing actuators that can handle large voltage drops at locations that experience a large voltage drop when the valve is actuated.

Staff worked with a local electrical contractor to take voltage and amperage readings at various locations on all three sites to determine voltage drop. This information was forwarded on to the electrical engineer for review.

**Irrigation Pump Station:**

Due to the dry conditions, the District was granted permission from the Regional Water Quality Control Board to irrigate the pastures to encourage newly planted seed to sprout and the pasture grass to grow. Approximately 17.87 MG of recycled water was used this month for irrigation. The average storage pond staff gauge depth at the beginning of January was 3.3 feet and 2.3 feet at the end of the month with a considerable amount of the bottom showing.

At the end of the month the pump station shut down due to a power failure due to the main breaker tripping off. This apparently occurred when the irrigation pumps were called to pump. An investigation by staff with the assistance of a local electrician did not reveal any problems.

A purchase order was issued to remove Irrigation Pump 2 for repair.

**Sludge Handling & Disposal:**

There were no sludge handling and disposal activities this month.

\*\*\*

**NOVATO SANITARY DISTRICT**  
**Wastewater Operations Committee Meeting**  
**Odor Control, Noise, and Landscaping Report**  
**January 2014**

**Summary:**

Staff and the District's consultants continue to work to address issues of concern relating to odor control, noise, and landscaping, specifically from the Lea Drive neighborhood, and in the northeast corner of the Novato Treatment Plant (NTP) site.

As explained in earlier reports, and to demonstrate its commitment, the District has already expended significant amounts beyond the substantial investment for odor control, noise, and landscaping included in the original WWTP Upgrade, Contract B - Novato Treatment Plant (NTP), Project No. 72609. These additional costs have included operational changes and measures related to further odor control measures, noise abatement, visual screening, wind shielding, and daily monitoring. The District has also retained Brown and Caldwell (B&C) and their project manager, Mr. Dave McEwen, to study the issue of potential odor emissions from the aeration basins, and identify any other potential sources not previously considered or overlooked.

A summary of activities since the last Wastewater Operations Committee meeting is provided below.

**Odor control:**

The District's odor control consultant, Mr. Dave McEwen of Brown and Caldwell (B&C) issued some preliminary recommendations for odor control at the aeration basins. Staff continued to feed sodium hypochlorite to the influent, but it is anticipated that implementation and further testing of Mr. McEwen's recommendations will occur more fully in February, and that he will issue a draft technical memorandum in spring 2014. An update meeting with Lea Drive neighborhood representatives will also be held in February to update the neighborhood on Mr. McEwen's progress.

**Noise:**

The low level noise concerns of some Lea Drive neighbors, from the fans for the main odor control biofilter, appears to have abated with completion of the construction of the permanent sound reducing enclosure for these fans, which up to this point had resided inside a temporary insulated enclosure.

**Landscaping:**

Staff continued to work with the District's landscaping contractor Cagwin and Dorward (C&D), on the landscaping installed at the District's fence-line on Lea Drive at the northeast corner area of the NTP. Staff received and addressed concerns from neighborhood representatives on the issue of frost impact to the oleander bushes along the Lea Drive fence-line. C&D will continue to provide services on an as-needed and as-requested basis by the District to care for the landscaping in this area through the winter, and the scope of their services will be re-evaluated in the spring.

\*\*\*\*\*

# NOVATO SANITARY DISTRICT BOARD AGENDA ITEM SUMMARY

<b>TITLE: Collection System Improvements; Project 72706, Olive Street Pump Station Force Main Rehabilitation Project</b>	<b>MEETING DATE: February 24, 2014</b>  <b>AGENDA ITEM NO.: 8.a.</b>
<p><b>RECOMMENDED ACTION:</b> Approve a contract with Nute Engineering for the final design of a parallel 27-inch force main to the Olive Street Pump Station Force Main, and authorize the Manager-Engineer to execute an agreement with Nute Engineering on a time and materials basis in the not-to-exceed amount of \$40,000.</p>	
<p><b>SUMMARY AND DISCUSSION:</b></p> <p>At its June 10, 2013, meeting the Board of Directors rejected bids for the rehabilitation of the Olive Street Pump Station (OSPS) Force Main. The purpose of that project was to slip-line the existing 27-inch fiberglass pipe with a smaller diameter high-density polyethylene pipe.</p> <p>Subsequent to receiving bids, the District learned that the City of Novato was looking at projects that could significantly increase the number of living units tributary to the OSPS, potentially increasing flows, and result in capacity issues for the smaller, slip-lined pipe. Also, the District learned that the North Marin Water District would require additional work to their parallel water main, which could have potentially increased the project cost substantially. Consequently, at that time, the Board rejected all bids, and also authorized staff to work with Nute to explore other options to rehabilitating the force main.</p> <p>Staff requested a proposal from Nute Engineering (Nute) to study other options to slip-lining, such as a parallel pipeline to the existing force main. Nute responded that they could complete the study within their prior budget. The study is now complete, and Nute, in conjunction with some potholing work arranged by District staff, has identified a parallel route for a new 27-inch force main. This option can be completed with minimal disruption to the pump station operation. It also has the advantage of leaving the existing force main in place for redundancy/emergency use, while potentially allowing the District to upgrade it in the future to provide full long term redundancy.</p> <p>Therefore, with the study complete, staff requested a proposal from Nute to complete final design documents for the project. Nute has submitted a proposal to provide these services for \$40,000. Staff has reviewed the proposal, and finds the proposed fee amount to be commensurate with the level of effort required.</p> <p>Accordingly, it is recommended that the Board approve a contract with Nute, and authorize the Manager-Engineer to execute an agreement with Nute on a time and materials basis in the not to exceed amount of \$40,000.</p>	
<p><b>ALTERNATIVES: N/A.</b></p>	
<p><b>BUDGET INFORMATION:</b> The FY2013-14 budget for Project No. 72706 includes a budget amount of \$1,760,000, of which about \$785,487 has been spent as of January 31, 2014.</p>	
<p><b>DEPT.MGR.:</b></p>	<p><b>MANAGER:</b></p>

# NOVATO SANITARY DISTRICT BOARD AGENDA ITEM SUMMARY

<b>TITLE:</b> Recycled Water: Integrated Regional Water Management Plan (IRWMP)	<b>MEETING DATE:</b> February 24, 2014 <b>AGENDA ITEM NO.:</b> 9.a.
<b>RECOMMENDED ACTION:</b> Consider adoption of a resolution adopting the San Francisco Bay Area Integrated Regional Water Management Plan Update.	
<b>SUMMARY AND DISCUSSION:</b> <p>The Board of Directors adopted Resolution No. 3044 on April 23, 2012 authorizing execution of an agreement with Bay Area Clean Water Agencies (BACWA) in order to receive a Proposition 84 grant of \$625,000. BACWA is the administrative agency for the Round 1 IRWM implementation grants. The grant was used for the construction of the recycled water treatment facility and distribution system. The District's project is now complete and all of the grant monies have been received.</p> <p>The IRWM grants were based on the 2006 Integrated Regional Water Management Plan. The Round 1 grant agreement required the SF Bay Area to adopt an updated plan within 2 years of the date of the agreement in accordance with new guidelines if the adopted plan predated September 30, 2008, in order to remain eligible to receive State Grant Share funds. The deadline for adopting the revised plan is May 14, 2014.</p> <p>The SF Bay Region has prepared a plan and submitted it to the Department of Water Resources for review. The Executive Summary of the plan is attached. The NBWRA project was ranked number 1 of the 332 projects submitted to the plan. The full plan is available on the IRWM website at; <a href="http://bairwmp.org/docs/2013-bairwm-plan-update">http://bairwmp.org/docs/2013-bairwm-plan-update</a></p> <p>Staff recommends adopting the attached resolution.</p>	
<b>ALTERNATIVES:</b> N/A.	
<b>BUDGET INFORMATION:</b> Failure to adopt the resolution could result in the requirement to return the \$635,000 received through the grant.	
<b>DEPT.MGR.:</b>	<b>MANAGER-ENGINEER:</b>

**RESOLUTION NO. \_\_\_\_\_**

**A RESOLUTION ADOPTING THE SAN FRANCISCO BAY AREA  
INTEGRATED REGIONAL WATER MANAGEMENT PLAN UPDATE**

WHEREAS, the State electorate approved multiple statewide bond measures since 2000, including Propositions 50 and 84, to fund water and natural resource projects and programs, including Integrated Regional Water Management (IRWM); and

WHEREAS, the benefits of integrated planning for water resources management activities include increased efficiency or effectiveness, enhanced collaboration across agencies and stakeholders, and improved responsiveness to regional needs and priorities; and

WHEREAS, state statute and guidelines required that an IRWM Plan be adopted by the governing boards of participating agencies before IRWM grant funds would be provided for water resources management projects that are part of the IRWM Plan; and

WHEREAS, several of the participating agencies in the Bay Area jointly submitted an IRWM grant application for state consideration where a condition for funding required the Bay Area IRWM Plan to be adopted by January 1, 2007; and

WHEREAS, the Bay Area agencies that received funding in previous grant rounds did adopt the Bay Area IRWM Plan before such funds were received; and

WHEREAS, more recent state statutes and guidelines require that the Bay Area IRWM Plan be updated before agencies may receive future IRWM grant funding; and

WHEREAS, a grant was received to update the Bay Area IRWM Plan, that Plan having been completed in the fall of 2013 and submitted to the Department of Water Resources in January 2014; and

WHEREAS, a series of workshops were held on the initial Bay Area IRWM Plan and recently the Plan Update to provide stakeholders, including Bay Area local governments, an opportunity to ask questions, provide comments and make recommendations; and

WHEREAS, the Draft Bay Area IRWM Plan Update was posted on the internet and made available for public comment; and

WHEREAS, the Bay Area IRWM Plan Update before the Board for consideration incorporates changes based on comments received during the public review period in the areas of environmental justice, technical project data, and other elements of the Plan; and

WHEREAS, the Bay Area IRWM Plan Update provides an implementation framework that calls for tracking accomplishments, developing lists of prioritized projects and periodically updating the Bay Area IRWM Plan as conditions warrant, providing funding and resources are available to carry out these activities; and

WHEREAS, adoption of the Bay Area IRWM Plan Update does not entail a direct commitment of resources and implementation of each project, as such will be the responsibility of the project proponent and any applicable project partners, and there is no joint commitment or responsibility by the Bay Area IRWM Plan Update participants to implement any or all of the projects; and

WHEREAS, the \_\_\_\_\_ (*fill in title of whoever determines this at your agency*) \_\_\_\_\_ has reviewed the Bay Area IRWM Plan Update and determined that it is exempt from the California Environmental Quality Act pursuant to CEQA Guidelines §15262 and §15306 because the IRWM Plan Update consists of basic data collection that would not result in the disturbance of any environmental resource and involves planning studies for possible actions that the participating agencies have not yet approved; and

WHEREAS, the IRWM Plan Update is meant to be complementary to participating agencies' individual plans and programs and does not supersede such plans and programs, and adoption of the IRWM does not prohibit or effect in any way a participating agencies' planning efforts separate from the IRWM Plan; and

NOW THEREFORE, BE IT RESOLVED that the Novato Sanitary District Board of Directors does hereby adopt the Bay Area IRWM Plan Update.

I hereby certify that the foregoing resolution was duly and regularly adopted and passed by the Board of Directors of the Novato Sanitary District, Marin County, California, at a meeting thereof held on the 9<sup>th</sup> day of December, 2013, by the following vote:

AYES, and in favor thereof, Members:

NOES, Members:

ABSENT, Members:

APPROVED:

\_\_\_\_\_  
President  
Board of Directors

ATTEST:

\_\_\_\_\_  
Secretary



# San Francisco Bay Area *Integrated Regional Water Management Plan*

September 2013



# Table of Contents

---

*List of Tables*..... *i*

*List of Figures*..... *ii*

Executive Summary ..... I

    1.1 Introduction and Background..... I

    1.2 Governance (Chapter 1)..... II

        1.2.1 Coordinating Committee..... IV

        1.2.2 Stakeholders ..... V

    1.3 Region Description (Chapter 2) ..... V

        1.3.1 Demographics ..... VII

        1.3.2 Biologic Resources and Water Quality ..... VII

        1.3.3 Reliability: Water Supply - Water Quality - Wastewater  
                Integration ..... VIII

        1.3.4 Regional Challenges ..... IX

    1.4 Objectives (Chapter 3) ..... X

    1.5 Resource Management Strategies (Chapter 4) ..... XII

    1.6 Integration of Supporting Activities (Chapter 5) ..... XIII

    1.7 Regional Priorities (Chapter 6) ..... XIV

    1.8 Impacts and Benefits (Chapter 7) ..... XV

    1.9 Performance and Monitoring (Chapter 8) ..... XXII

    1.10 Data Management (Chapter 9) ..... XXIV

    1.11 Financing (Chapter 10)..... XXIV

    1.12 Technical Analysis (Chapter 11)..... XXV

    1.13 Relation to Local Water Planning (Chapter 12) ..... XXVI

    1.14 Relation to Local Land Use Planning (Chapter 13)..... XXVIII

    1.15 Stakeholder Involvement (Chapter 14)..... XXX

    1.16 Coordination (Chapter 15)..... XXXI

    1.17 Climate Change (Chapter 16)..... XXXIII

    1.18 Conclusion ..... XXXIV

## List of Tables

---

Table ES-1: Threatened and Endangered Species in the Bay-Delta ..... VIII

Table ES-2: Selected 2013 Bay Area IRWMP Resource Management Strategies<sup>(a)</sup> ..... XIII

Table ES-3: Potential IRWMP Environmental Impacts by Project Type ..... XVI

Table ES-4: Potential IRWMP Benefits by Project Type ..... XVIII

Table ES-5: Bay Area Water Resource Plan types by Water Management Activity and  
        Functional Area ..... XXVII



## Table of Contents (cont'd)

---

Table ES-6: Changes in Regional Boundaries since 2006 Plan .....	XXXII
Table ES-7: Relative Sea-Level Rise Projections for San Francisco Bay .....	XXXIII

## List of Figures

---

Figure ES-1: Bay Area IRWM Region .....	III
Figure ES-2: IRWMP Governance Structure .....	IV
Figure ES-3: Major Cities of the Bay Area .....	VI
Figure ES-4: Development of Regional Goals, Objectives and Suggested Measures.....	XII
Figure ES-5: Bay Area IRWMP Implementation and Performance Assessment .....	XXIII
Figure ES-6: Water Resources Policies Contained In Bay Area General Plans.....	XXIX
Figure ES-7: Stakeholder-based Plan Development.....	XXX

## Executive Summary

---

### 1.1 Introduction and Background

The San Francisco Bay Area Integrated Regional Water Management Plan (IRWMP or Plan) represents a significant accomplishment in regional water resources planning. The collective vision presented in this Plan aims to address the major challenges and opportunities related to managing water and associated natural resources within the Bay Area IRWM region (Region). It outlines the Region's water resources management needs and objectives, and presents innovative strategies and important actions to help achieve these objectives.

The IRWMP was first completed and adopted in 2006 (2006 IRWMP). This Plan updates and expands upon the 2006 IRWMP, documents progress towards meeting IRWMP objectives, and identifies ongoing regional needs and issues.

This IRWMP is not intended to duplicate existing and ongoing plans, but to better integrate these efforts, and utilize the results and findings of existing plans to put forward the projects needed to address IRWMP goals and objectives. This Plan provides a framework to improve collective understanding and to take actions to collaboratively address the many major water-related challenges, needs and conflicts within the Region through the 20-year planning horizon (2013-2033). The array of goals, objectives, selected resource management strategies, and prioritized projects of this Plan represents a collective view of how to improve integrated water resources management throughout the Region. As regional goals, objectives, and priorities evolve over time, this IRWMP will be adapted to meet the changing needs of the region.

#### The Bay Area IRWMP:

- Provides a valuable venue for regional collaboration across agencies
- Improves responsiveness to regional needs and priorities
- Helps to effectively integrate water resources management activities
- Serves as a platform to secure state and federal funding

The IRWMP complies with the 2012 Integrated Regional Water Management Guidelines for Proposition 84 and 1E (DWR Guidelines) published by the California Department of Water Resources (DWR) in November 2012. Financial assistance from DWR and contributions from the participating Bay Area groups and entities funded the development of this Plan. Proposition 84 identified 11 funding areas throughout the state, including the Bay Area Region. Each Funding Area is allocated, based on population, a portion of the \$1 billion approved by the voters under Proposition 84 in 2006. Predecessor bonds, including Propositions 13 and 50, also provided incentives for development of IRWM Plans. DWR designed the IRWM planning process to be consistent with the California Water Plan, a statewide water resources planning document which is updated periodically, and intends that IRWM Plans and future updates of the California Water Plan, be integrated further in the future.

## 1.2 Governance (Chapter 1)

Developing an Integrated Regional Water Management Plan that covers all aspects of water resources management across a geographic region as large as the Bay Area poses many institutional challenges. Chapter 1 describes the Bay Area’s IRWMP governance structure, including participating agencies and organizations and their management responsibilities related to water. This chapter also covers the evolution of the governance structure and function since 2004 through to the current update process.

During the 2006 IRWMP process, the participants developed and organized themselves into four Functional Areas (FA):

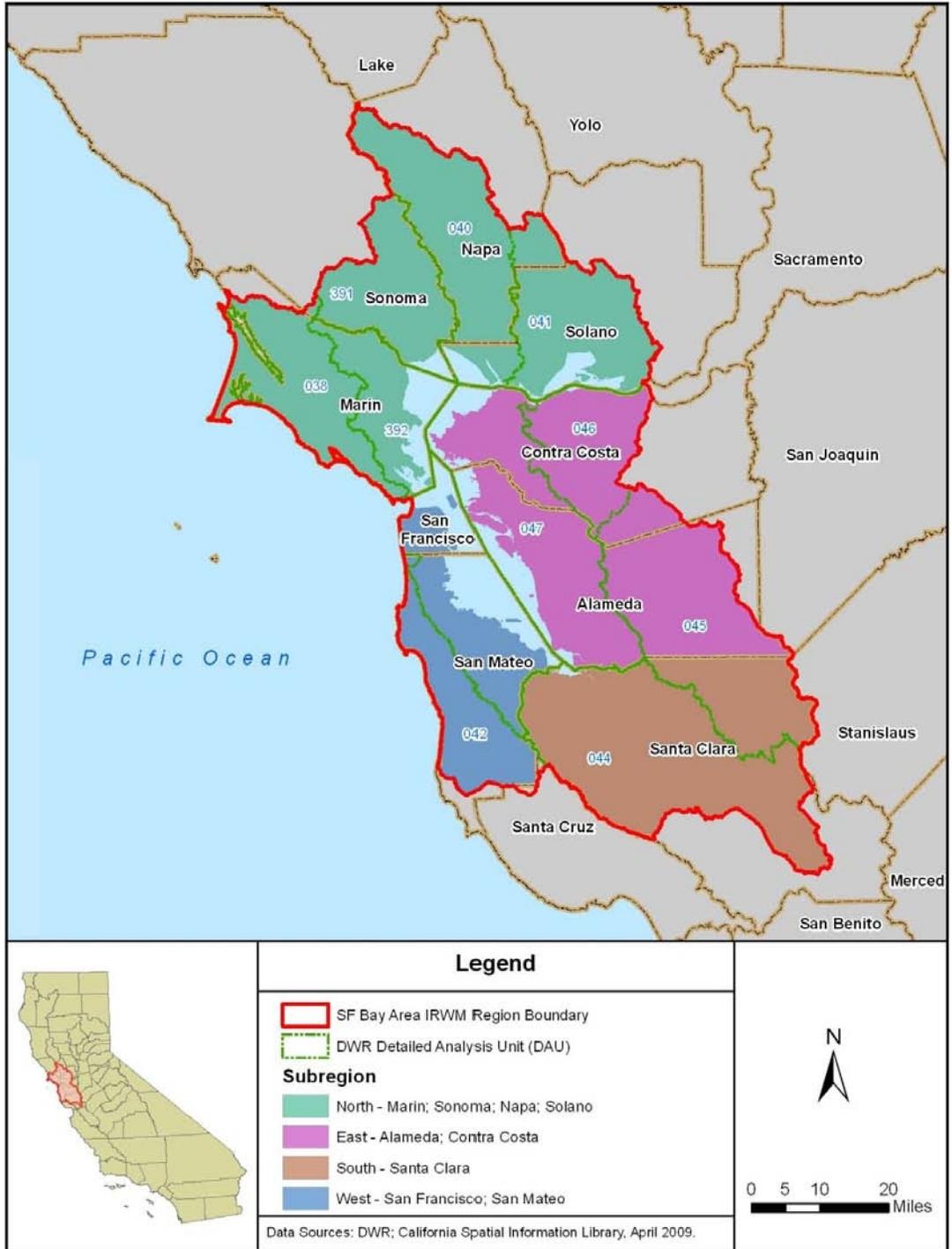
1. Water Supply & Water Quality
2. Wastewater & Recycled Water
3. Flood Protection & Stormwater Management
4. Watershed Management & Habitat Protection and Restoration

During the formation of the Bay Area IRWM region, a 2004 Letter of Mutual Understanding (LOMU) was created to allow groups to join the planning effort. Signatories included state and regional organizations, cities, counties, local agencies, special districts, and non-governmental organizations. A full list of organizations can be found in Section 1.2.3.

Organizations that adopt the Bay Area IRWMP, similar to the original signatories of the LOMU, are furthering the Region’s efforts to better collaborate and enhance integration of water resources and management. The IRWMP is meant to be complementary to participating agencies’ individual plans and programs and does not supersede such plans and programs, and adoption of the IRWMP is intended to complement participating agencies’ planning efforts.

During the development of the Region Acceptance Process (RAP) initiated by DWR to establish each region in 2009, an additional organizational structure was developed based on demographic and geographic divisions. This “subregional” approach was developed to facilitate truly integrated projects with smaller geographical areas and better address the diversity of needs and ideas across the SF Bay Area Region, and provide better local access to the IRWM process. Four subregions were defined—East, West, South, and North— which have since become the focal points for outreach, project solicitation, and integration in the Plan Update. Figure ES-1 provides a map of the Region and the four Subregions.

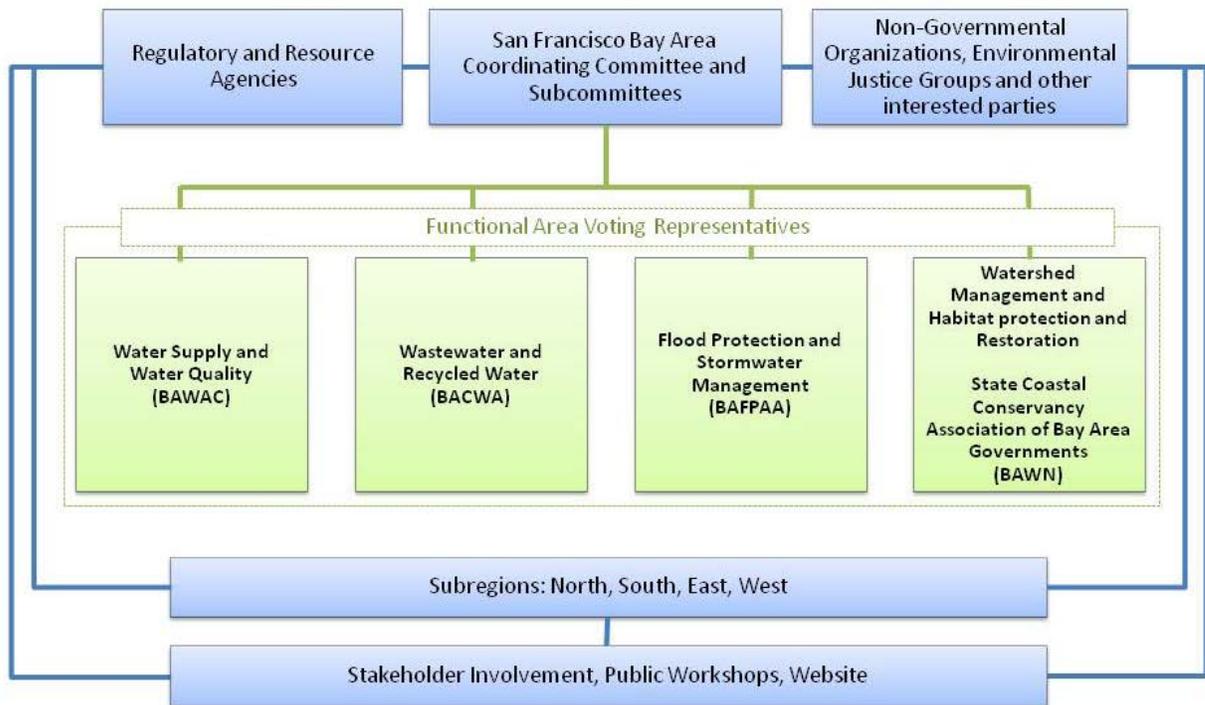
**Figure ES-1: Bay Area IRWM Region**



### 1.2.1 Coordinating Committee

The IRWMP Coordinating Committee (CC) serves as the governing body for the Plan, providing oversight of the process, guiding development, and supporting implementation. The CC is composed of representatives from the four FAs—Bay Area water supply agencies, wastewater agencies, flood control agencies, ecosystem management and restoration agencies—regulatory and planning agencies, as well as nongovernmental organizations (NGOs). Meetings are noticed on the IRWMP website (bairwmp.org). Figure ES-2 shows the overall governance structure. The CC operates through consensus-based decision making and has succeeded in reaching consensus on all decisions during the past. If an issue needing a firm decision cannot be resolved via consensus, the Chair or Vice Chair of the CC shall call for a vote (See Appendix A-2: Voting Principles).

**Figure ES-2: IRWMP Governance Structure**



To date, various subcommittees of the CC have been established to undertake specific tasks and to develop recommendations that are then forwarded to the full CC for discussion and consideration. These include:

1. The Plan Update Team (PUT) is a subset of the CC, committed to day-to-day management of the Plan Update process. The PUT served as the primary “work group” for the Plan Update.

2. The Project Screening Committee (PSC) was established to facilitate the process of incorporating new project ideas and processing/updating existing projects. They also make recommendations to the CC related to the IRWMP and to future funding applications, such as the Round 2 IRWM Implementation Grant.
3. The Website Subcommittee is tasked with ensuring that the website functions as a reasonable communication and information tool, and is appropriately updated.
4. The Planning and Process subcommittee was established to analyze issues, perform specific work tasks as needed, and recommend potential actions to the CC.

### 1.2.2 Stakeholders

Broad stakeholder involvement is crucial to ensure that the Plan identifies local issues, reflects local needs, promotes the formation of partnerships, and encourages coordination with state and federal agencies. One of the benefits of the IRWM planning process is that it brings a broad array of groups together into a forum to discuss and better understand shared needs and opportunities. A full list of stakeholders that have been a part of the original and updated IRWMP process can be found in Sections 1.2.2.1 and 1.2.6.

## 1.3 Region Description (Chapter 2)

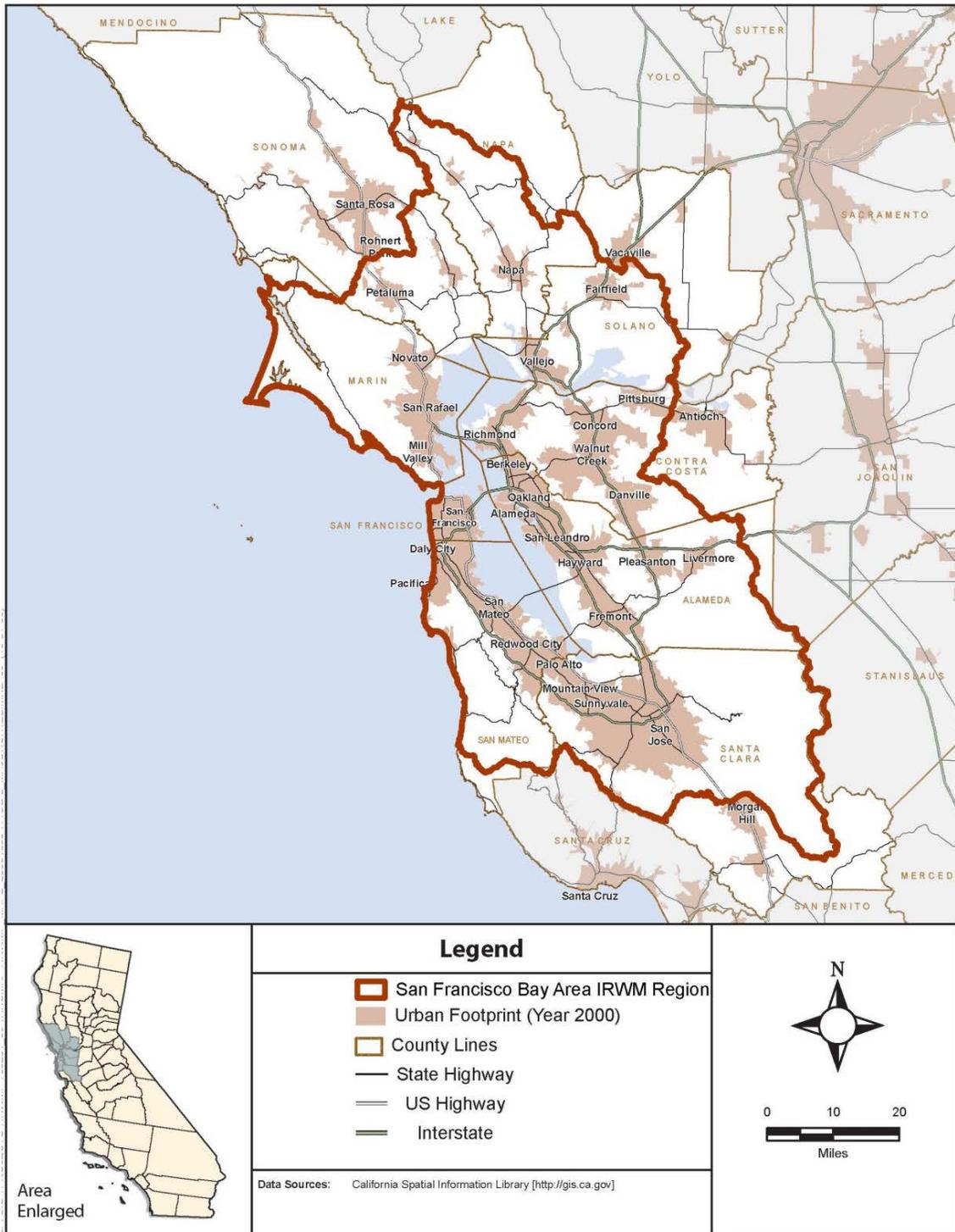
Chapter 2 describes the physical, environmental, social and demographic characteristics of the Region, provides an overview of its water systems, and identifies key issues and challenges facing the Region.

The Region is defined by the jurisdiction of the San Francisco Bay Regional Water Quality Control Board Region 2. The Region is expansive, diverse and complex. It includes all or portions of nine counties (Marin, Sonoma, Napa, Solano, Contra Costa, Alameda, Santa Clara, San Mateo and San Francisco), numerous water, wastewater, flood protection and land use agencies, and many NGO and non-profit organizations. With a population of 7.2 million (in 2010), the San Francisco Bay metropolitan region is the second largest in California, and the fifth largest in the nation. The Region includes three major metropolitan cities and approximately 100 smaller cities and towns (Figure ES-3).

#### **Bay Area Fast Facts:**

- Includes 9 counties and 101 cities
- 5<sup>th</sup> largest metropolitan area in the United States
- Home to 7.2 million people
- 24<sup>th</sup> largest economy in the world with 3.5 million jobs
- Home to over 105 animal and plant species that have been designated as threatened or endangered

**Figure ES-3: Major Cities of the Bay Area**



### 1.3.1 Demographics

The San Francisco Bay Area consists of 9 counties (whole and partial), 101 municipalities, 2.6 million households and a population of 7.15 million (Bay Area Census, 2010), making the metropolitan region the second largest in California (U.S. Census Bureau, 2011). Currently, almost half of the region's population resides in Santa Clara and Alameda counties. North Bay counties, including Marin, Sonoma, and Napa, have the lowest population densities and are also projected to change the least in the 20-year planning horizon.

During this planning effort, additional research into disadvantaged and environmental justice communities was undertaken. The distribution of such communities was mapped along with the locations of wastewater treatment facilities and flood-prone areas. This effort helped to better identify and understand the environmental burden that these communities may endure. Mapping the locations of environmental justice communities and environmental burdens assists water and flood agencies to identify water resources management projects that may reduce or relieve potential water-related adverse impacts to these communities. Efforts to effectively involve and collaborate with disadvantaged and environmental justice communities are discussed in Chapters 12 and 14.

### 1.3.2 Biologic Resources and Water Quality

The San Francisco Bay Area is a complex network of watersheds, marshes, rivers, creeks, reservoirs, and bays predominantly draining into the San Francisco Bay and Pacific Ocean. The largest bodies of water in the Bay Area Region are the San Francisco Bay, San Pablo Bay, and Suisun Bay. The largest rivers are the Sacramento and San Joaquin Rivers which drain into the Sacramento-San Joaquin River Delta and then to Suisun Bay. Other major rivers include the Napa River and the Petaluma River in the North Bay and the Guadalupe River in the South Bay.

The Bay estuary is the largest estuary of the West Coast and one of North America's most important. It is an environmentally sensitive and biologically diverse ecosystem made up of freshwater streams, tidelands, marshlands, wetlands, mudflats, farmland and other unique systems. The estuary has been designated by US EPA as an estuary of national significance, one of 28 in the US. Bay Area watersheds and their associated habitats provide a myriad of water resource and ecological benefits to both humans and wildlife. Watersheds provide freshwater sources for humans and wildlife; floodplains and wetlands can reduce flood impacts and improve water quality and groundwater resources; diverse habitats allow wildlife to flourish; and vegetation can reduce water temperatures and minimize erosion and sedimentation.

The Bay Estuary and its supporting local watersheds, host a distinct natural environment and ecology that includes many important habitats for species of regional, national and international significance. Bay Area watershed habitats include ephemeral and perennial rivers and streams, montane and valley foothill riparian areas, lakes and ponds, freshwater and tidal wetlands, and associated uplands habitats. The Region is an internationally recognized biodiversity hotspot, recognized for its abundance of birds, plants, insects and other species, and known for a high diversity of endemic species which thrive in the Mediterranean-type climate. The Bay Area is home to over 90 animal and plant species that have been designated by state and federal agencies as threatened or endangered (sfbaywildlifeinfo.org 2012, Center for Biological Diversity 2012), including the ones listed in Table ES-1.

**Table ES-1: Threatened and Endangered Species in the Bay-Delta**

<b>Classification</b>	<b>Species</b>
Mammals	San Joaquin kit fox, Salt-marsh harvest mouse
Birds	California least tern, California clapper rail, Western snowy plover, Marbled Murrelet, Northern spotted owl
Reptiles	Giant garter snake, Alameda whipsnake, Green sea turtle, Leatherback sea turtle, Olive ridley sea turtle
Fish	Chinook salmon, Coho salmon, Steelhead trout, Delta smelt, Tidewater goby
Amphibian	California red-legged frog, California tiger salamander
Crustaceans	California freshwater shrimp, Conservancy fairy shrimp, Longhorn fairy shrimp, Vernal pool tadpole shrimp
Insects	Calippe silverspot butterfly, Delta green ground beetle, Lange's metalmark butterfly, Mission blue butterfly, Myrtle's silverspot butterfly, San Bruno elfin butterfly
Plants	Antioch Dunes evening-primrose, Baker's larkspur, Beach layia, Calistoga allocarya, Clara Hunt's milk-vetch, Clousa grass, Contra Costa wallflower, Coyote ceanothus, Few-flowered navarretia, Fountain thistle, Keck's Checker-mallow, Lake County stonecrop, Loch Lomond coyote thistle, Many-flowered navarretia, Marin dwarf-flax, Metcalf Canyon jewelflower, Bapa bluegrass, Pallid Manzanita, Palmate-braced bird's beak, Pennel's bird's beak, Pitkin Marsh lily, Presidio clarkia, Presidio Manzanita, San Francisco lessingia, San Joaquin Orcutt grass, San Mateo thornmint, San Mateo woolly sunflower, Santa Clara Valley dudleya, Sebastapol meadowfoam, Soft bird's-beak, Solano grass, Sonoma alopecurus, Sonoma spineflower, Sonoma sunshine, Suisun thistle, Tiburon jewelflower, Tiburon mariposa lily, Tiburon paintbrush, Vine Hill clarkia, White sedge, White-rayed pentachaeta, Yellow larkspur

Source: USFWS 2012, [sfbaywildlifeinfo.org](http://sfbaywildlifeinfo.org) 2012.

In the Bay Area Region, surface water and groundwater quality is regulated by the SF RWQCB. The SF RWQCB classifies the San Francisco Bay and many of its tributaries as impaired for various water quality constituents. The SF RWQCB staff is currently developing more than 30 water quality improvement plans, known as Total Maximum Daily Loads (TMDL), to address the impaired water bodies. Water bodies in the Region are listed for pollutants including sediment, mercury, pathogens, PCBs, pesticide toxicity, nutrients, selenium, and bacteria.

### 1.3.3 Reliability: Water Supply - Water Quality - Wastewater Integration

Bay Area water supply agencies manage a diverse portfolio of water sources to meet the needs of the Region:

- Local Supplies: Local groundwater and surface water (31%)
- Sierra Nevada Supplies: Tuolumne and Mokelumne River supplies (38%)

- Delta Supplies: State Water Project, Central Valley Project, and other delta supplies (28%)
- Other: Desalination, recycled water, water transfers, and other supplies (3%)

The quality of water supplies used within the Bay Area Region varies greatly by source. Mokelumne River and Tuolumne River surface water supplies are of very good quality, with low concentrations of total dissolved solids (TDS), total organic carbon (TOC), chloride, bromide, microbial contaminants, and other water quality parameters. Delta supplies exhibit elevated concentrations of several water quality parameters including TDS, chloride, bromide, and TOC. Delta supplies also exhibit significant water quality variability by location, season, and hydrologic year type. TDS and hardness of groundwater supplies, similarly, vary significantly by basin. Bay Area water agencies are continually striving to address drinking water contaminants of concern through source water protection and advanced treatment strategies.

Recycled water, desalination, transfers, interties, groundwater banking, as well as other supply sources are used by many Bay Area agencies to supplement their water supplies. Over 30 agencies in the Bay Area have developed recycled water programs, providing the water for irrigation, commercial, industrial, agricultural, municipal and residential uses. In 2010, the Bay Area recycled almost 10% of the wastewater effluent generated, and supply is expected to more than double over the next 20 years.

Bay Area water agencies continue to seek to protect the reliability and quality of existing supplies through innovative water management strategies and regional cooperation.

#### 1.3.4 Regional Challenges

Bay Area water management agencies and organizations pursue a variety of different resource management objectives to balance the water needs of sensitive habitats with customer water demands, provide a reliable supply of high quality water, protect and improve water quality in creeks and the Bay, provide flood management, restore watershed habitats and natural hydrologic functions, and ensure that natural resources and habitats are shielded from potential adverse impacts associated with land and water management. Meeting multiple objectives comes with challenges. In addition to the water supply quality and reliability challenges mentioned above, the key issues, needs, and priorities for the Bay Area Region with respect to water resource management include:

**Regulatory Compliance Challenges:** Challenges to achieving and maintaining compliance with applicable regulatory requirements such as stormwater requirements, flood protection permitting and more.

**Flood Protection Challenges:** The Region includes flat and highly developed valleys and bayside alluvial plains surrounded by steep terrain, a geography conducive to sudden flooding. This natural physical setting, and the increase in impervious surfaces due to urban development, puts many locales in the Bay Area at risk for flooding.

**Financial and Funding Challenges:** Water resources management entities in the Bay Area face several financial challenges for regional projects including, among other things, competing costs between existing operating costs and improvement projects, lack of funding

to maintain or replace aging infrastructure, and lack of funding to comply with stormwater permit obligations.

**Environmental and Watershed Challenges:** The Region’s water resource management and environmental stewardship challenges often occur when resources are managed for conflicting uses, such as instream flows and municipal water supplies, or land use development and habitat conservation. Effective management requires ongoing communication and collaboration between land and water resources managers and stewards.

**Dependence on the Sacramento-San Joaquin Delta:** Many Bay Area water agencies purchase imported water that flows through the Sacramento-San Joaquin Delta, where long-term reliability is impacted by a variety of issues including infrastructure reliability, endangered species, water quality, sea level rise, ecosystem restoration, political interests and more.

**Interagency Coordination:** Inter-jurisdictional coordination is a major challenge facing water resource management. Municipal boundaries, water supply service areas, and the boundaries of county flood protection agencies rarely coincide with watershed boundaries and can impede implementation of projects.

**Expanding Recycled Water Use:** Expanding recycling water use is important for meeting future demands in the Bay Area; however, some of the challenges include increasing salinity in recycled water supplies, and the cost per acre-foot of water for expanding non-potable distribution systems. Potable reuse is another option for expanding recycled water, but requires extensive public engagement and regulatory support.

**Climate Change:** Climate change is driven by increasing concentrations of carbon dioxide and other greenhouse gases that cause an increase in temperature and stress natural systems, such as oceans and the hydrologic cycle, resulting in environmental changes that may include sea level rise, changes in precipitation, and increasingly extreme storm events.

**Coordination with Other Regions:** Representatives from other regions are invited to participate in the development of the Bay Area’s IRWMP to provide a linkage between the Bay Area and IRWMPs from other areas, enabling information sharing and communication between the planning efforts.

## 1.4 Objectives (Chapter 3)

Chapter 3 presents the goals and objectives for the Plan, and describes how they were developed. The goals and objectives represent what the stakeholders and the CC have determined they would like the IRWMP to accomplish when its projects are implemented. Formulating meaningful and relevant goals and objectives for the Region required collaboration and collective interaction amongst the PUT, CC and stakeholders.

The process for developing goals and objectives for the Plan included review, confirmation and/or modification of the goals and objectives identified in the 2006 Plan, and development of “new” goals and objectives through a collaborative and iterative process. As a result of the process, the following changes were made to the 2006 IRWM:



2013

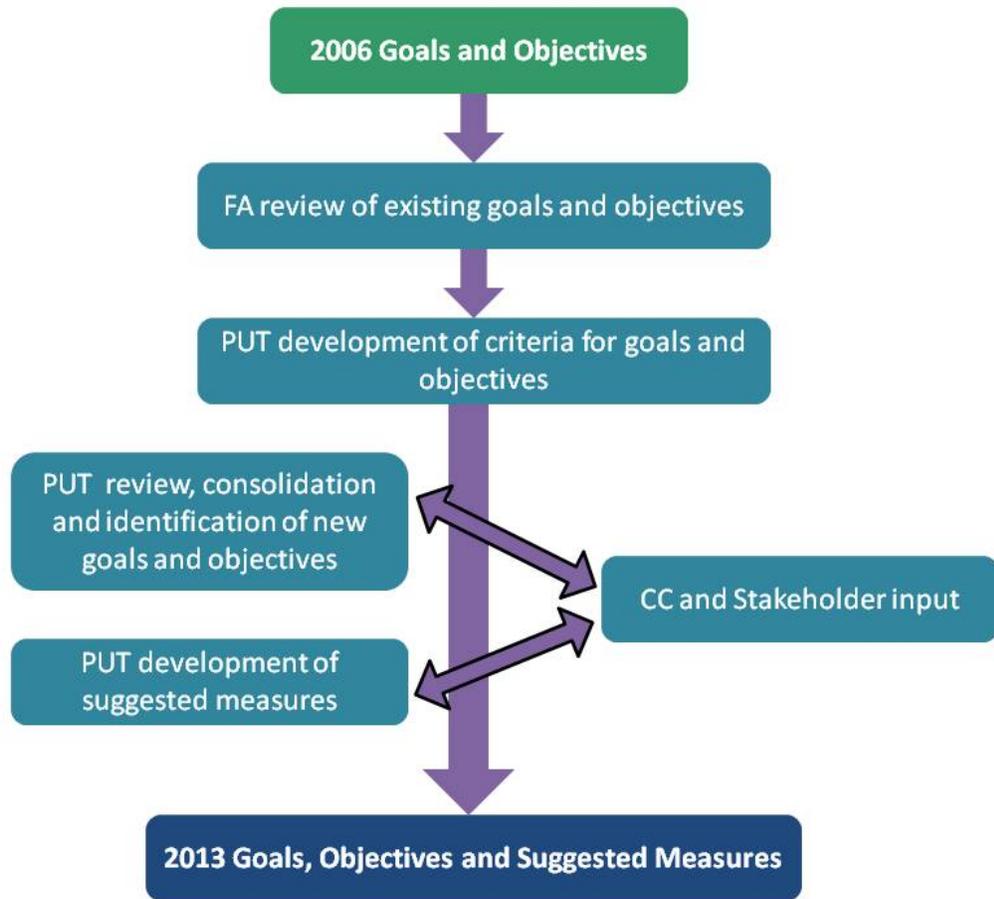
- The number of goals was reduced from six to five.
- The number of objectives was consolidated from 65 to 35.
- Objectives that address climate change and integration were added.

Objectives for the Bay Area Region were developed to support the goals and are categorized accordingly, as is shown in Figure ES-4.

**The goals of the Bay Area IRWMP are to:**

1. Promote environmental, economic and social sustainability
2. Improve water supply reliability and quality
3. Protect and improve watershed health and function and Bay water quality
4. Improve regional flood management
5. Create, protect, enhance, and maintain environmental resources and habitats

**Figure ES-4: Development of Regional Goals, Objectives and Suggested Measures**



The objectives generally apply to the Region as a whole and are meant to focus attention on the primary needs of the Region. Once the list of goals was developed, suggested measures for each objective were identified to provide a framework for measuring project outcomes and to gauge successful implementation of the IRWMP projects (See Chapter 3, Table 3-2).

### 1.5 Resource Management Strategies (Chapter 4)

A resource management strategy (RMS) is a project, program or policy that helps local agencies manage their water and related resources. Chapter 4 describes how the CC and its subcommittees developed an updated set of RMS for the IRWMP based on the strategies included in the 2006 IRWMP and the most recent set of statewide RMS developed by DWR as part of the California Water Plan Update processes for both 2009 and 2013 (now underway). The intent of this chapter is to encourage diversification of water management approaches as a way to mitigate for future uncertainties, including the effects of climate change.

The IRWMP incorporates an extensive range of RMS that includes most of the RMS on DWR's most recent list, along with some additional Bay Area-specific RMS. The chapter provides a

brief description of each RMS, along with examples of how these strategies are being implemented in the Bay Area. Table ES-2 shows the RMS that were selected for inclusion in the IRWMP.

**Table ES-2: Selected 2013 Bay Area IRWMP Resource Management Strategies<sup>(a)</sup>**

<p><b>Reduce Water Demand</b></p> <ul style="list-style-type: none"> <li>• Agricultural Water Use Efficiency</li> <li>• Urban Water Use Efficiency</li> </ul> <p><b>Improve Operational Efficiency</b></p> <ul style="list-style-type: none"> <li>• Conveyance – Delta</li> <li>• Conveyance – Regional/Local</li> <li>• Imported Water*</li> <li>• Infrastructure Reliability*</li> <li>• System Reoperation</li> </ul> <p><b>Increase Water Supply</b></p> <ul style="list-style-type: none"> <li>• Conjunctive Use and Groundwater Management</li> <li>• Water Recycling</li> <li>• Desalination – Brackish and Seawater</li> <li>• Surface Storage – CALFED</li> <li>• Surface Storage – Regional / Local</li> <li>• Water Transfers</li> <li>• Stormwater Capture and Management*</li> </ul> <p><b>Improve Water Quality</b></p> <ul style="list-style-type: none"> <li>• Pollution Prevention</li> <li>• Urban Runoff Management</li> <li>• Water Quality Protection and Improvement*</li> <li>• Salt and Salinity Management</li> <li>• Groundwater and Aquifer Remediation</li> <li>• Monitoring and Modeling</li> <li>• Drinking Water Treatment/Distribution</li> <li>• Matching Water Quality to Use</li> <li>• Wastewater Treatment*</li> </ul>	<p><b>Improve Flood Management</b></p> <ul style="list-style-type: none"> <li>• Integrated Flood Management</li> </ul> <p><b>Practice Resources Stewardship</b></p> <ul style="list-style-type: none"> <li>• Environmental and Habitat Protection and Improvement*</li> <li>• Ecosystem Restoration</li> <li>• Sediment Management</li> <li>• Recharge Areas Protection</li> <li>• Agricultural Lands Stewardship</li> <li>• Watershed Management and Planning</li> <li>• Land Use Planning and Management</li> </ul> <p><b>People and Water</b></p> <ul style="list-style-type: none"> <li>• Economic Incentives</li> <li>• Outreach and Education</li> <li>• Regional Cooperation*</li> <li>• Recreation and Public Access*</li> <li>• Water-dependent Recreation</li> <li>• Water-dependent Cultural Resources</li> </ul>
---	--

Note: (a) The Selected RMS are from DWR draft California Water Plan Update 2013, except those marked by the “\*”, which were carried forward from the 2006 Bay Area IRWMP.

## 1.6 Integration of Supporting Activities (Chapter 5)

Chapter 5 presents potential activities, including planning efforts and efforts to establish policies, that may be undertaken to support integrated water resources management in the Bay Area.

An example of a planning activity includes Salt and Nutrient Management Plans (SNMP) developed by stakeholders to manage salts and nutrients on a basin- or watershed-wide basis,

as stipulated in the Recycled Water Policy (2009). An example of a SNMP preparation process is described in this section of the IRWMP, with the final SNMP and Guidance documents provided in Appendices B-1 and B-2.

In addition, policies adopted or implemented by individual organizations throughout the Region can support integrated water resources management by focusing attention on specific important elements. This section of the Plan describes policies supporting integration and development of integrated, multi-benefit projects, and various policy approaches that agencies throughout the Region have undertaken. Example documents which may be useful to organizations in the Region are Sample Integration Policies provided in Appendix B-3, Climate Change Adaptation Resources for Policy Development in Appendix B-4.

## 1.7 Regional Priorities (Chapter 6)

Chapter 6 describes the project solicitation, development, and review process that was used to select and prioritize projects for inclusion in the Plan, and provides the ranked project list.

During a “Call for Projects,” stakeholders were invited to submit any projects, programs, and action ideas they thought could help contribute to fulfilling the Plan goals and objectives irrespective of the project’s current funding, level of development, or readiness to proceed. The process to decide which projects to include in the Plan, and how to score them, relied on information submitted by the proponents that addressed a standard list of project criteria based on DWR guidelines.

The solicitation yielded 332 projects, which included some projects from the 2006 IRWMP and its appendices, and “new” projects that were submitted and subsequently added to the list by the CC. Of this list of projects, 30 were regional and 123 indicated DAC benefits. A total of 315 projects were ranked and 17 did not comply with IRWM goals and guidelines and were not considered eligible for ranking and evaluation.

### The scoring criteria include:

- Addressing Multiple Goals
- Integrating Multiple Resource Management Strategies
- Strategic Considerations for IRWM Plan implementation (regionalism, partnerships and integration)
- Project Status
- Technical Feasibility
- Benefits to DAC Water Issues
- Benefits to Native American Tribal Community Water Issues
- Environmental Justice Considerations
- Project Costs and Financing
- Economic Feasibility
- Climate Change Adaptation
- Reducing GHG Emissions
- Reducing Dependence on the Delta

The CC developed a scoring methodology that assigned projects into three tiers. The review and ranking process was developed to reflect DWR guidelines, limit ambiguity, and be consistent and transparent to participants and stakeholders. The prioritization of projects was based on a detailed two-phase screening process consisting of an initial screening by the sub-region leads, followed by project evaluation and ranking. The process encouraged subregional integration while ranking at a regional level. The review and scoring process was available on the website so that project proponents could be informed about the process and how the

projects would be ranked as they completed their templates for project submittal. All projects that were submitted are included on a list that will be updated as projects are developed, or modified over time and re-prioritized. The ranked list is presented in Chapter 6, Table 6-2 or can be found at:

[http://bairwmp.org/docs/2013-bairwm-plan-update/Active%20Project%20List\\_scored\\_2012.pdf](http://bairwmp.org/docs/2013-bairwm-plan-update/Active%20Project%20List_scored_2012.pdf)

## 1.8 Impacts and Benefits (Chapter 7)

Chapter 7 describes the potential impacts and benefits of IRWMP implementation. This includes impacts and benefits within and between regions, and those potentially affecting disadvantaged and Native American Tribal communities. The chapter provides a screening-level analysis of the impacts and benefits of implementing the IRWMP, which will serve as a benchmark to help IRWM planners assess whether the anticipated benefits of the IRWMP have been realized, and/or unanticipated impacts have occurred.

For the purposes of characterizing potential impacts and benefits of IRWMP implementation, a list of project categories and types (based in part on RMS identified in Chapter 4 and projects submitted for consideration as part of the IRWMP update process) was developed. Potential impacts, benefits, and interregional effects were identified for each project type within each category. Table ES-3 and Table ES-4 list the impacts and benefits identified by the Region and associated with the project types identified in Chapter 7. Impacts and benefits will be analyzed in more detail prior to implementation of specific projects. As project concepts are further developed and advanced for approval, detailed environmental impact assessments will be conducted in accordance with the California Environmental Quality Act (CEQA) and, if applicable, the National Environmental Policy Act (NEPA).

**Table ES-3: Potential IRWMP Environmental Impacts by Project Type**

Project Categories and Type	Impact Category															
	Land Use						Water Resources				Biological Resources		Air and Energy			Delta water and biological resources
	Agriculture	Land Use Compatibility	Recreation	Hazardous Materials	Cultural Resources	Growth Inducement Potential	Surface Water	Groundwater	Water Quality	Flooding	Aquatic Resources	Terrestrial Resources	Pollutant Emissions	Greenhouse Gas Emissions	Energy Use	
<b>Water Conservation and Demand Management</b>																
Agricultural and Urban Water Use Efficiency						✓	✓	✓	✓		✓					
<b>Water Supply Enhancement</b>																
Infrastructure Reliability		✓				✓	✓		✓					✓	✓	✓
Surface Water Supply	✓	✓	✓		✓	✓		✓		✓	✓	✓	✓	✓	✓	✓
Groundwater Management	✓	✓				✓	✓	✓	✓	✓	✓			✓	✓	
Water Reuse		✓				✓	✓	✓	✓		✓	✓	✓	✓	✓	
Stormwater Capture		✓					✓	✓	✓	✓	✓					
Desalination		✓				✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
<b>Water Quality Protection and Improvement</b>																
Water, Wastewater Treatment Facilities		✓		✓		✓	✓		✓		✓		✓	✓	✓	
Pollution Prevention and Runoff Management	✓	✓					✓		✓	✓	✓					
Aquifer Remediation				✓		✓	✓	✓	✓		✓		✓	✓	✓	
Salt and Salinity Management		✓					✓	✓	✓		✓		✓	✓	✓	
<b>Watershed Management</b>																
Watershed Erosion Control, Land Stewardship		✓	✓				✓		✓		✓	✓				
<b>Habitat Protection and Restoration</b>																
Habitat Protection and Improvement		✓	✓		✓		✓	✓	✓	✓	✓					
Ecosystem Restoration and Wetland Creation	✓	✓	✓		✓		✓	✓	✓	✓	✓					

Project Categories and Type	Impact Category															
	Land Use						Water Resources				Biological Resources		Air and Energy			Delta water and biological resources
	Agriculture	Land Use Compatibility	Recreation	Hazardous Materials	Cultural Resources	Growth Inducement Potential	Surface Water	Groundwater	Water Quality	Flooding	Aquatic Resources	Terrestrial Resources	Pollutant Emissions	Greenhouse Gas Emissions	Energy Use	
<b>Flood and SLR Hazard Management</b>																
Flood Hazard Management		✓	✓		✓		✓	✓	✓	✓	✓	✓				
SLR Hazard Management	✓	✓	✓		✓		✓	✓	✓	✓	✓					✓
<b>Public Access, Recreation and Uses</b>																
Water Dependant Recreation, Trails, etc.	✓	✓	✓		✓		✓		✓		✓	✓				









## Disadvantaged and Environmental Justice Communities

Section 7.11 provides an overview of IRWMP projects potentially benefitting disadvantaged communities, impacts resulting from implementation of disadvantaged community based projects, and effects on Native American Tribal communities. The IRWMP currently includes 123 projects that were identified by project proponents as providing DAC benefits. A majority of projects identified as providing DAC benefits are aimed at implementing low impact design features to control stormwater, improving levees and other flood control facilities, developing climate change adaptation strategies, restoring habitat or providing education and outreach to involve the community (including DACs) in watershed stewardship and protection efforts. In addition, a considerable number of wastewater treatment and recycled water projects were identified during the review process as providing DAC benefits.

Examples of projects that would provide environmental justice and DAC benefits include:

- Retrofit streets in DACs with low impact development features to control stormwater
- Conduct outreach to involve DAC communities in watershed stewardship activities
- Install stormwater retention and groundwater recharge facilities to improve flood protection
- Fund trash capture infrastructure and tracking tools for DACs
- Create seasonal wetlands to provide habitat and flood control benefits to a DAC
- Improve water supply reliability through the development of local groundwater and recycled water supplies

### 1.9 Performance and Monitoring (Chapter 8)

Chapter 8 documents the institutional structure and parties responsible for plan implementation and monitoring, ongoing data management, and how performance data will be used to improve future versions of the Plan.

The IRWMP is a dynamic document and its success is related to how well its goals and objectives are accomplished, at both the Plan and project levels. IRWMP objectives and regional priorities will continue to be reviewed for relevance and modified as needed to ensure the Plan reflects changing regional needs and continues to be effective. The list of projects will be reviewed and evaluated every five years, or as needed, to ensure that Plan objectives will be met, that the Plan projects offer the greatest benefit possible, and that the list of Plan projects continues to

#### **Plan Performance and Monitoring is designed to ensure that:**

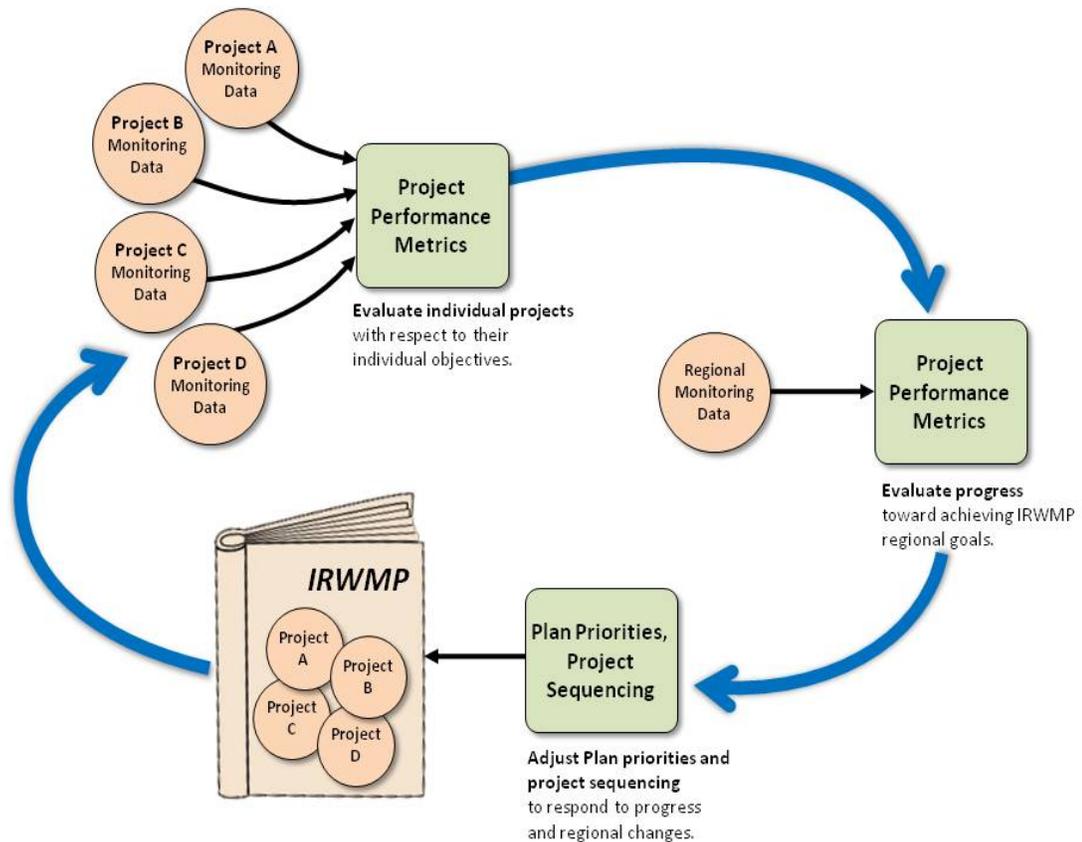
- Progress is being made towards meeting the objectives in the Plan.
- Projects listed in the Plan are being implemented.
- Projects are monitored to comply with all applicable rules, laws, and permit requirements.

address IRWMP objectives as well as state and regional priorities. Ongoing review and update will allow the plan to evolve in response to changing conditions and as better data is developed.

As noted above, the institutional structure for overseeing IRWMP development and implementation is the CC, which will continue to be responsible for Plan management and oversight. Once the Plan is adopted, the focus of the CC will shift toward implementation and tracking of progress. Each project identified in the Plan has a lead project proponent that has agreed to oversee project implementation. Therefore, implementation of the Plan will rely on actions taken by existing agencies and organizations within the Region. The project proponent will be responsible for ensuring that project operations are adjusted as appropriate based on the changing needs of the Region.

As work is completed and the Plan is implemented, the CC will recommend whether changes to the Region's goals, objectives, and needs should be considered. In response to the CC assessment, and considering the project's performance with respect to its performance measures, project proponents will be responsible for identifying and adjusting project operations as appropriate and feasible. The relationships between project performance, Plan performance, and adjustments to the regional goals are illustrated in Figure ES-5.

**Figure ES-5: Bay Area IRWMP Implementation and Performance Assessment**



## 1.10 Data Management (Chapter 9)

Chapter 9 discusses data management needs associated with the IRWMP. This section provides an overview of data needs in the Region, discusses data collection techniques, and the approach to data management and dissemination. Existing data collection and monitoring efforts are described, and data gaps with potential new data collection programs are identified. This section also discusses supporting statewide data needs via the abundance of information collected by Bay Area agencies and water resource programs.

As part of IRWMP implementation, data will be collected and compiled at several levels: the project level, the functional area and sub-region level, and the Regional, or Plan level. At each of these levels, effective data management and dissemination is critical to successful implementation of the IRWMP, and the Region's approach to managing this data is described in Chapter 9.

A wealth of information is collected by individual Bay Area agencies and water resource programs. While a limited number of programs compile and assess water resources data for the Bay Area region, it is not clear whether new regional assessments versus more efficient coordination of existing efforts would lead to more useful regional information. As future work is completed, the Bay Area's data library of relevant water resources information and data that have been collected by projects funded through IRWM grants will grow. Whether the library can become a more comprehensive resource throughout the region has yet to be determined. As such, the process represents an important first step toward developing a regional perspective on water resources management information.

The data and conclusions developed through the Bay Area IRWMP assessment process may be used by state agencies for developing regional fact sheets and determining regional funding priorities. In addition, DWR may use the information developed through future work to support updates to the California Water Plan. In addition to compiling water resources data and information about Bay Area IRWM Projects, the Bay Area data will support statewide data activities by retaining data collected to support project performance assessment in a manner consistent with continuing statewide data collection programs. Consistency with statewide monitoring programs is critical to ensure that regional projects contribute to efficient, uniform, and comprehensive study design and data collection.

## 1.11 Financing (Chapter 10)

Chapter 10 identifies various funding sources, including their associated requirements and guidelines, which may be available to assist with implementation of Plan projects. The chapter also provides a summary of funding opportunities by local, state, and federal funding sources.

The 332 projects identified in this Plan have total capital costs of approximately \$4.1 billion, with individual project costs ranging from \$27,500 to \$292 million, and averaging \$13.9 million. Securing adequate funding for program planning and implementation is one of the biggest challenges facing integrated regional planning efforts. Successful IRWMP implementation requires capital and planning expenditures associated with project implementation, as well as ongoing funding to support operation, maintenance and administration costs.

The Bay Area Region looked beyond state and federal funding sources to find examples of Innovative Local Funding Mechanisms. These included such efforts as setting up watershed trusts, enacting drainage fees, local voter initiatives, public-private partnerships, local grant programs, spending-offset projects, as well as private sources such as foundations and educational institutions.

## 1.12 Technical Analysis (Chapter 11)

Chapter 11 documents that the IRWMP is based on sound technical information, analyses, and methods, and provides a description of studies, models, or other methodologies used to analyze the technical information and data sets, and how they have shaped the CC and stakeholders' understanding of water management in the Region.

The Bay Area IRWMP builds on the data and technical analysis completed as part of other planning efforts. A wide variety of technical studies have been developed at the local level and the subregional level, and used in development and support of the IRWMP. Table 11-1 provides examples of studies and analyses completed by local agencies, including some developed in conjunction with state and/or federal agencies. Many studies are also being conducted in parallel with IRWMP development. The Plan was prepared using information and guidance provided by agencies representing all four FAs, and to varying degrees, municipalities, town councils, regulatory, environmental and land use planning entities that represent the CC and stakeholders. The IRWMP, in turn, will be used by these same entities to guide and support their future regional water resources management efforts.

During the course of preparing this IRWMP, data needs were identified by stakeholders and resource specialists working on the plan. Data needs identified for the Region include:

- Updated climate change projections to reflect new data, methods, and improved understanding of climate change
- Regional hydroclimate (hydrology and weather), including projections of microclimatic change and fog
- Statewide hydroclimate data on imported water supplies that show influence of climate change
- Data on sea level rise
- Weather variability (e.g., monthly averages of maximum and minimum daily air temperatures monthly precipitation and ET, etc.) in the Region and subregions
- Market saturation of water efficient fixtures
- Projections of future habitat change
- Improved projections of wetland response to sea level rise

### 1.13 Relation to Local Water Planning (Chapter 12)

Chapter 12 discusses the relationship between the IRWMP and local water planning efforts, and documents the local water plans on which the Plan Update is based. The intent of coordinating the IRWMP with local water planning efforts is: to ensure that the IRWMP is consistent with local water plans and reflects current, relevant elements of local water planning; to describe how the IRWMP relates to local planning efforts (including how regional planning feeds back into local planning, and how any inconsistencies between local and regional plans are identified and resolved), and; to incorporate climate mitigation and adaptation strategies from local plans into the IRWMP.

The IRWMP coordinates with local planning efforts by using local water plans as a basis for developing a regional view of water supply, water quality, wastewater, recycled water, flood protection, stormwater management, watershed management, habitat protection/restoration and climate change mitigation and adaptation strategies. The CC relied on local and regional plans, and information provided by local water managers, as a basis for developing all aspects of the IRWMP. To facilitate future coordination with local planning efforts, a comprehensive inventory containing over 100 local and regional water resource plans was developed and will be used for future IRWMP updates. Any inconsistencies that arise between the IRWMP and local water plans will be resolved on a case-by-case basis through consultation with the agency that prepared the plan. Chapter 12 also incorporates climate change mitigation and adaptation strategies from regional plans and local planning efforts.

Table ES-5 shows the Resource Plan types used within the Region for water management planning.



**Table ES-5: Bay Area Water Resource Plan types by Water Management Activity and Functional Area**

Water Management Activity (2012 Guidelines) <sup>a</sup>		Corresponding Functional Area	Plans in Bay Area IRWMP Water Plan Inventory <sup>b</sup> Addressing these Topics	
General	Specific			
Multi-Purpose Program Planning	<ul style="list-style-type: none"> <li>• Groundwater Management</li> <li>• Urban Water Management</li> <li>• Water Supply Assessments</li> <li>• Agricultural Water Management</li> <li>• Salt and Salinity Management</li> </ul>	Water Supply & Water Quality	<ul style="list-style-type: none"> <li>• Water Supply Management Programs</li> <li>• Urban Water Management Plans</li> <li>• Clean Water Programs</li> <li>• Groundwater Management Plans</li> <li>• Salt Management Plans</li> <li>• Salt/Nutrient Management Plans</li> </ul>	<ul style="list-style-type: none"> <li>• Water Supply Evaluations</li> <li>• Stormwater Pollution Prevention Program</li> <li>• Integrated Resource Management Plan</li> <li>• Water Supply Strategies Action Plans</li> <li>• Water Supply Infrastructure Master Plan</li> </ul>
		Wastewater & Recycled Water	<ul style="list-style-type: none"> <li>• Recycled Water Master and Strategic Plans</li> <li>• Sewer System Master Plans</li> </ul>	<ul style="list-style-type: none"> <li>• Wastewater Treatment Plant Master Plan</li> <li>• Water Reuse Programs</li> </ul>
City and County General Planning	<ul style="list-style-type: none"> <li>• Flood Protection</li> <li>• Stormwater Management</li> <li>• Low Impact Development</li> </ul>	Flood Protection & Stormwater Management	<ul style="list-style-type: none"> <li>• Stormwater Management Plans</li> <li>• Flood Management Plans</li> <li>• Sediment Management Studies/Plans</li> </ul>	<ul style="list-style-type: none"> <li>• Stream Management Master Plans</li> <li>• Stormwater Pollution Prevention Program</li> <li>• Stream Maintenance Plans</li> </ul>
Emergency Response, Disaster Plans		Watershed Management - Habitat Protection & Restoration	<ul style="list-style-type: none"> <li>• Habitat Restoration Plans</li> <li>• Watershed Management and Stewardship Plans</li> <li>• Habitat Conservation Plans</li> <li>• Conservation Strategy Plans</li> <li>• Habitat and Species Recovery Plans</li> <li>• Historical Ecology Studies</li> </ul>	<ul style="list-style-type: none"> <li>• Vegetation Management Plans</li> <li>• Habitat Stewardship Plans</li> <li>• Stream Maintenance Plans</li> <li>• Coastal Waters Management Plans</li> <li>• Watershed Action Plan</li> <li>• Invasive Species Studies/Plans</li> </ul>

The Bay Area also benefits from several existing forums that promote regional planning and allow for coordination and collaboration of ideas. These include:

- Association of Bay Area Governments (ABAG)
- Metropolitan Transportation Commission (MTC)
- Joint Policy Committee
- Bay Area Clean Water Agencies (BACWA)
- Bay Area Water Supply and Conservation Agency (BAWSCA)
- Bay Area Water Agencies Coalition (BAWAC)
- Bay Area Flood Protection Agencies Association (BAFPAA)
- Bay Area Watershed Network (BAWN)
- North Bay Watershed Association (NBWA)
- City/county councils of government
- Low Impact Development Leadership Group
- Watershed Information Center & Conservancy (WICC) of Napa County
- Santa Clara County Basin
- Watershed Management Initiative (WMI)
- Bay-Delta Region of Resource Conservation Districts (RCDs)

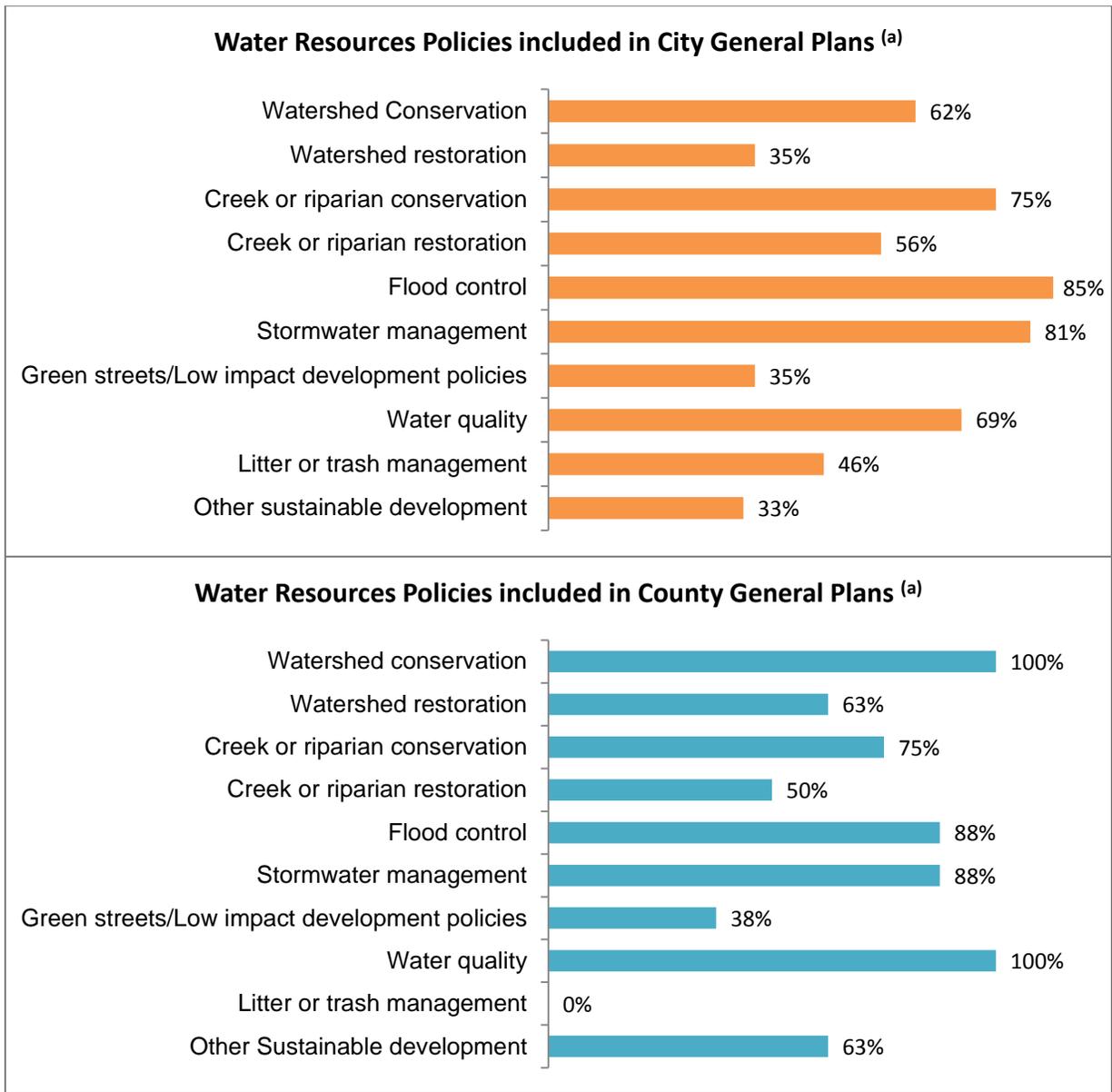
#### 1.14 Relation to Local Land Use Planning (Chapter 13)

Chapter 13 describes the processes that foster communication between land use managers and regional water management groups with the intent of effectively integrating water management and land use planning. The chapter documents land use planning processes currently in place in the Bay Area Region, describes the current relationship between land use and water resources managers (including coordination with land use planning agencies undertaken as part of the IRWMP), and identifies opportunities to facilitate a better working relationship between water resources managers and land use decision makers in the future. Figure ES-6 presents the results of a survey (described in Section 13.2.2) of the prevalence of water resources policies contained in city and county general plans.

Coordination between land use planners and water resources managers in the Bay Area Region occurs during long-term planning, at the project level, and in association with a variety of specific initiatives and regulatory drivers. As part of the development of the IRWMP, the San Francisco Estuary Partnership (SFEP) convened discussions on collaboration between water agencies and land use agencies, and conducted a survey of local governments to establish a baseline inventory of local watershed policies and to assess the current degree of inter-agency collaboration. Telephone surveys with water resources managers also were conducted. These outreach efforts helped to identify constraints that may inhibit opportunities to facilitate improved collaboration among local land use planning and water resources managers. These constraints and opportunities in turn informed development of a draft plan for improving collaboration between land use and water resources managers in the future. The intent of the draft

collaboration plan presented in Chapter 13 is to promote a shared understanding of the effects of climate change on the Region, and to cultivate inter-agency ties to support implementation of integrated land-use and water resources related adaptation strategies.

**Figure ES-6: Water Resources Policies Contained In Bay Area General Plans**



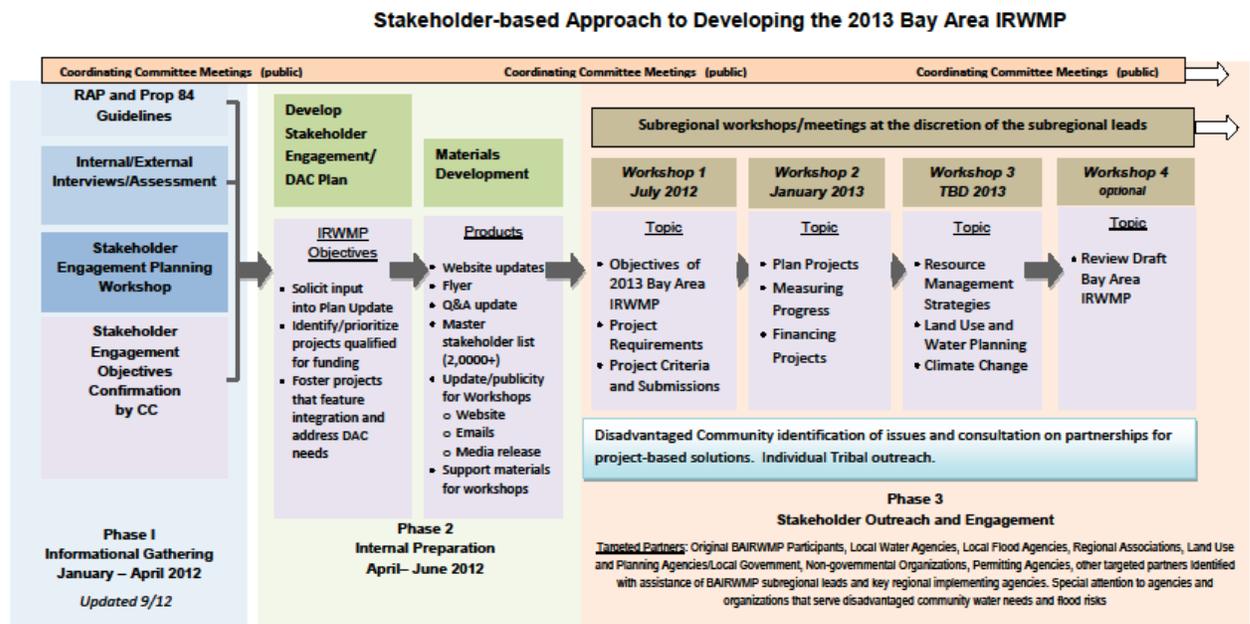
**Note:** (a) "Other sustainable development" includes green building, density increase, water recycling, greenhouse gas (GHG) emissions, open space conservation, green government, climate change and sea level rise plans, complete streets, transit oriented development, and rainwater and greywater reuse.

Source: San Francisco Estuary Partnership, *Local Governments Watershed Inventory*, September 12, 2012.

## 1.15 Stakeholder Involvement (Chapter 14)

Chapter 14 identifies the approach to stakeholder engagement and specific activities to involve a range of interests in development of the Plan and submission of proposed projects as shown in Figure ES-7. It also describes next steps to encourage ongoing participation in IRWMP activities, including outreach to Disadvantaged Communities (DACs) and Native American tribes.

**Figure ES-7: Stakeholder-based Plan Development**



The Plan Update outreach process was augmented by the consolidation of numerous existing IRWMP contact lists, and the addition of potentially interested water-related agencies and organizations, land use agencies, public policy organizations, and NGOs. At 1,500 contacts, this nearly tripled the stakeholder list that existed at the beginning of the planning process.

Particular attention was paid to identifying DAC and tribal representatives and encouraging their participation. This effort included producing one regional, and four subregional 2010 U.S. Census-based maps showing locations of DACs, producing DAC-specific informational materials including information in Spanish, collaborating with the San Francisco Estuary Partnership to help with outreach, and providing guidance to organizations and



Public Workshop #2

agencies interested in submitting DAC-serving projects. The outreach resulted in the submission of numerous DAC-serving projects.

General outreach materials included a flyer, a set of Frequently Asked Questions, CC meeting materials, and website information (<http://bairwmp.org/>). The website features a forum for linking potential project partners and an online project submission form.

Forums for stakeholder outreach included meetings in the four subregions, presentations to 20 local government and land use planning agencies, and two public workshops. These workshops attracted 60 to 80 participants each, a fourth of whom represented environmental, community, environmental justice and agricultural organizations.

## 1.16 Coordination (Chapter 15)

Chapter 15 describes how the CC has taken steps forward to improve coordination of water resources related matters in the Region. As described in previous sections of this Plan, management of water and other related resources within this Region is complex and has many interdependencies. Furthermore, the authorities and responsibilities for managing water and related resources within the Region are spread across many different agencies, organizations, and other stakeholders. This level of complexity, and the distributed network of shared responsibilities, creates the need for robust and effective coordination. This chapter also outlines how the CC coordinates with neighboring IRWM regions, local, state, and federal agencies and other stakeholders to improve integrated water management throughout the Region and neighboring areas.

Developing this Plan involved a diverse group of water supply, water quality, wastewater, stormwater, flood protection, watershed, municipal, environmental, and regulatory groups whose input played a key role in defining water resources management goals and objectives, identifying and selecting priority projects to help meet those goals and objectives, and coordinating IRWM related activities and efforts. The outreach and coordination process of the IRWMP brings together a broad array of groups into a forum to help ensure that the Plan reflects the water-related needs of the entire Region, promotes the formation of regional partnerships, and encourages increased coordination with local, state and federal agencies.

Coordination efforts within the Bay Area Region are facilitated by the following regional groups: Bay Area Water Agencies Coalition (BAWAC), Bay Area Clean Water Agencies (BACWA), Bay Area Stormwater Management Agencies Association (BASMAA), Bay Area Flood Protection Agencies Association (BAFPAA), Bay Area Water Supply and Conservation District (BAWSCD), and Bay Area Watershed Network (BAWN). Many of these groups also have representatives on the CC and act as representatives to the Functional Areas.

Multiple IRWM planning efforts, as individual regions, were initiated during 2005-2006 creating significant overlap among regions in the Bay Area. Several of the individual regions were consolidated into the Bay Area IRWMP during the plan update process. Since the IRWMP was first adopted in 2006, additional consolidation and clarification has occurred. Table ES-6 summarizes the historic overlaps in the San Francisco Bay Area region that have been consolidated since the 2006 Plan.

**Table ES-6: Changes in Regional Boundaries since 2006 Plan**

<b>Region</b>	<b>Description of Previous Region Overlap</b>	<b>Boundary Resolution</b>
Tomales Bay Watershed Integrated Coastal Water Management Plan	Complete overlap	The Tomales Bay Watershed Council decided not to pursue its Integrated Coastal Watershed Management Plan independently of the Bay Area IRWMP. IRWM efforts in the Tomales Bay watershed are now included in the San Francisco Bay Area IRWM effort.
East Contra Costa County (ECCC) IRWM Plan	Overlap of northwestern triangular area	Integration of northwestern portion into the Bay Area Region. Efforts with the San Joaquin IRWM region to be coordinated under East Contra Costa County region's governance
Napa-Berryessa IRWM Plan	Overlap of southwestern portion	Complete integration of southwestern portion into the Bay Area Region. The rest of their original region is coordinating with the Westside IRWM Region.
Solano IRWM Plan	Overlap of southwestern portion	Complete integration of southwestern portion into the Bay Area Region. The rest of their original region is coordinating with the Westside IRWM Region.
Sonoma County Agencies	Overlap of southeastern-portion	Integration of southeastern portion into the Bay Area Region through Sonoma County Water Agency. The rest of the county is involved in the North Coast IRWM efforts.

The CC and the leaders from other regions listed in Table ES-6 resolved the overlapping boundaries listed in the table through direct communication in writing, in phone conversations, and through invitations and participation in CC meetings. Through direct communication, individual regions could determine for themselves if partnering and integrating with the Bay Area IRWMP was beneficial to them. Each region reached their decision independently after attending CC meetings and discussing the proposed mergers of the boundaries with their respective organizing committees.

Representatives from neighboring regions are invited to participate and to provide a linkage between the Bay Area and other IRWMPs, enabling information sharing and communication between the regional planning efforts.

## 1.17 Climate Change (Chapter 16)

The climate change standard is new to the 2012 DWR guidelines, and the topic is addressed throughout the Bay Area IRWMP including in Chapter 3 - Goals and Objectives, and Chapter 12 – Relation to Local Water Planning. Chapter 16 focuses on assessing the potential climate change vulnerability areas of the Region’s water resources and identifying climate change adaptation strategies with the overall goal of making climate change adaptation an overarching theme throughout the Plan.

“Climate change is already affecting California and is projected to continue to do so well into the foreseeable future. Current and projected climate changes include increased temperatures, sea-level rise, a reduced winter snowpack, altered precipitation patterns, and more frequent storm events. These changes have the potential for a wide variety of impacts such as altered agricultural productivity, wildfire risk, water supply, public health, public safety, ecosystem function and economic continuity.”<sup>1</sup>

The recent sea-level rise publication from the National Research Council titled *Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future* (NRC 2012) provided estimates of relative sea-level rise for San Francisco Bay and is shown in Table ES-7. The “Projection” represents the mid-range estimate with an estimated accuracy of (i.e.,  $\pm 2$  inches), and the “Range” represents the high and low estimates from the models.

**Table ES-7: Relative Sea-Level Rise Projections for San Francisco Bay**

Year	Projection (in)	Range (in)
2030	6 ( $\pm 2$ )	2-12
2050	11 ( $\pm 4$ )	5-24
2100	36 ( $\pm 10$ )	17-66

Source: Table 5.3, NRC (2012).

The climate change assessment is consistent with DWR’s *Climate Change Handbook for Regional Water Planning* and with the climate change requirements in the Proposition 84 IRWMP Guidelines (October 2012). The Vulnerabilities Areas from the Handbook were discussed and prioritized by the IRWMP’s climate change Technical Advisory Committee (TAC) comprised of local agency climate change specialists. The prioritized six vulnerability areas were:

1. Sea-Level Rise
2. Flooding
3. Water Supply and Hydropower
4. Water Quality
5. Ecosystem and Habitat
6. Water Demand

The potential impacts of each vulnerability area were discussed at the Bay Area level, and at each of the four subregional levels (North, East, South and West). Additional information on regional and local mitigation and adaptation strategies can be found in Chapter 12, Tables 12-2

<sup>1</sup> *California Climate Adaptation Planning Guide*, 2012, Executive Summary.

and 12-3. Regional adaptation strategies and performance metrics were identified for each vulnerability area. The next steps for future IRWMP updates were identified, including a discussion of needed research, models, and data. In addition, it is recognized that analysis needs to be done at the project level including: GHG baseline calculations, adaptation strategies, mitigation strategies and performance metrics.

## 1.18 Conclusion

The Bay Area IRWMP presents information and a water resources management plan for a diverse and complex region with many challenges. However, in the intervening years between the original 2006 Plan and this update, many advances have been made. A new “Subregional” strategy was developed to improve coordination and broaden participation throughout the region. Clarification of boundaries, and the roles of other Regions have been sought, and more communication among these external Regions was facilitated. Plan objectives were scrutinized and reorganized to better reflect the current needs. The Region examined various ways to enhance the resource management strategies, and selected specific strategies for inclusion. For the first time, supporting activities, like an example Salt and Nutrient Management Plan, are provided for others as resources. Projects were considered through Regional priorities that address multiple goals, not only at the Regional level, but also at the Subregional level. This shift allowed for initiation of the Subregional Process. From the new list of projects, impacts and benefits to the Region were assessed, and performance and monitoring criteria were established along with recommendations for data management and improvements to the website. Also, the Region explored options for addressing climate change and identified projects that may provide adaptation options. Innovative local water funding mechanisms were shared among the Region’s participants and discussed as options to augment the state and federal funding for implementing the IRWMP. The CC continued to foster collaboration and coordination of land-use and water planning efforts. Efforts to engage the public included several public workshops and stakeholders were encouraged to participate, review and comment on the IRWM Plan update. New research into local disadvantaged and environmental justice communities added to an already extensive project list and provided additional information on community needs. This IRWMP update addresses the critical needs of the Bay Area IRWM Region and provides a framework for continued collaboration.



Table 6-2: Project Scoring Results

Project Name	Goals/Integration/Coordination					Technical	Social Considerations			Financial Considerations			Environmental Considerations			Total Score	Rank	Tiers	
	Addresses Multiple Goals	Integrates Multiple Resource Management Strategies	Strategic Considerations for IRWM Plan implementation			Project Status	Technical Feasibility	Benefits to DAC Water Issues	Benefits to Tribal Community Water Issues	Environmental Justice Considerations	Project Costs & Financing		Economic Feasibility	Climate Change Adaptation	Reducing GHG Emissions				Reducing Dependence on the Delta
			Regionalism	Partnership	Integration with Land Use Planning						Cost Estimate	Financing							
<b>Max Score</b>	<b>200</b>	<b>120</b>	<b>50</b>	<b>30</b>	<b>20</b>	<b>10</b>	<b>75</b>	<b>Yes/No</b>	<b>15</b>	<b>15</b>	<b>25</b>	<b>25</b>	<b>50</b>	<b>50</b>	<b>50</b>	<b>Yes/No</b>	<b>735</b>		
North Bay Water Reuse Program	180	120	50	20	20	8	75	No	0	0	0	25	50	50	20	No	618	1	Tier 1
Building Climate Change Resiliency Along the Bay with Green Infrastructure & Treated Wastewater	180	80	50	30	20	4	75	Yes	0	0	25	25	50	45	20	No	604	2	Tier 1
Resilient Landscapes Climate Adaptation Strategy: Tools for Designing Sustainable Bay Area Stream, Wetland, and Riparian Habitats	190	80	50	30	20	0	75	Yes	15	15	0	25	50	50	0	Yes	600	3	Tier 1
Sonoma Valley Integrated Water Management Program	200	100	15	30	20	2	75	Yes	0	0	0	25	50	50	15	No	582	4	Tier 1
Bay-Friendly Landscape Standards for Green Infrastructure Projects: Maximizing Watershed Benefits	200	100	50	20	20	10	75	Yes	0	0	0	25	0	50	30	Yes	580	5	Tier 1
Satellite Recycled Water Treatment Plant Project	140	120	25	20	20	0	75	Yes	0	0	25	25	50	50	25	Yes	575	6	Tier 1
Napa River Restoration, Bioassessment & Education Project	180	120	50	30	20	2	75	Yes	0	0	0	25	0	50	20	Yes	572	7	Tier 1
Bay-Friendly Outreach Campaign for Home Gardeners and Nurseries	200	120	50	10	0	10	75	Yes	0	0	0	25	0	50	25	Yes	565	8	Tier 1
Bay-Friendly Qualified Landscape Professionals Training	200	120	50	10	0	10	75	No	0	0	0	0	0	50	30	Yes	545	9	Tier 1
City Watersheds of Sonoma Valley	200	80	5	30	20	0	75	No	0	0	0	25	50	50	10	No	545	9	Tier 1
East Bayshore Recycled Water Project Phase 1A	140	120	0	20	0	8	75	yes	0	0	25	25	50	50	25	Yes	538	11	Tier 1
East Bayshore Recycled Water Project Phase 1B - Oakland-Alameda Estuary Crossing	140	120	0	20	0	8	75	yes	0	0	25	25	50	50	25	yes	538	11	Tier 1
East Bayshore Recycled Water Project Phase 1B - Alameda	140	120	0	20	0	6	75	yes	0	0	25	25	50	50	25	yes	536	13	Tier 1
Lake Chabot Raw Water Expansion Project	140	120	5	20	0	0	75	Yes	0	0	25	25	50	50	25	Yes	535	14	Tier 1
Improving Quantitative Precipitation Information for the San Francisco Bay Area	170	100	50	20	0	0	75	Yes	0	0	0	25	50	40	5	Yes	535	14	Tier 1
East Bayshore Recycled Water Project Phase 2	140	120	0	20	0	2	75	yes	0	0	25	25	50	50	25	yes	532	16	Tier 1
Richmond Advanced Recycled Expansion (RARE) Water Project Phase 2	140	120	0	20	0	2	75	Yes	0	0	25	25	50	50	25	Yes	532	16	Tier 1
Rodeo Recycled Water Project	140	120	0	20	0	2	75	Yes	0	0	25	25	50	50	25	Yes	532	16	Tier 1
Watershed Information Center & Conservancy of Napa County	150	80	15	30	20	6	75	Yes	0	0	25	25	50	45	10	Yes	531	19	Tier 1
Diablo Country Club Satellite Recycled Water Project	140	120	0	20	0	0	75	yes	0	0	25	25	50	50	25	yes	530	20	Tier 1
Richmond Advanced Recycled Expansion (RARE) Water Project - Future Expansion	140	120	0	20	0	0	75	Yes	0	0	25	25	50	50	25	Yes	530	20	Tier 1
San Leandro Water Reclamation Facility Expansion Project	140	120	0	20	0	0	75	Yes	0	0	25	25	50	50	25	Yes	530	20	Tier 1
San Ramon Valley Recycled Water Program - Phase 5-6 (DSRSD-EBMUD Recycled Water Authority)	140	120	0	20	0	0	75	No	0	0	25	25	50	50	25	Yes	530	20	Tier 1
Bay Area Green Infrastructure Initiative: Scientific support related to planning and implementation of water infrastructure upgrades toward green alternatives	160	80	50	0	20	0	75	Yes	0	0	0	25	50	50	20	Yes	530	20	Tier 1
Implementing "Slow It, Spread It, Sink It!" in Sonoma and Napa Counties	150	100	25	30	20	0	75	Yes	0	0	0	25	50	35	20	No	530	20	Tier 1
Implementing LandSmart Plans to Improve Water Quality	150	80	25	20	20	0	75	Yes	0	0	25	25	50	40	20	No	530	20	Tier 1
Petaluma Flood Impact Reduction, Water & Habitat Quality, Recreation, Phase IV	200	60	15	30	20	0	75	No	0	0	0	25	50	45	10	No	530	20	Tier 1
San Ramon Valley Recycled Water Program - Phase 2A (DSRSD-EBMUD Recycled Water Authority)	130	120	0	20	0	8	75	Yes	0	0	25	25	50	50	25	Yes	528	28	Tier 1
San Ramon Valley Recycled Water Program - Phase 3 - 4 (DSRSD-EBMUD Recycled Water Authority)	130	120	0	20	0	6	75	Yes	0	0	25	25	50	50	25	Yes	526	29	Tier 1
SFPUC Eastside Watershed Green Infrastructure Early Implementation Projects	170	100	5	0	20	0	75	Yes	0	0	0	25	50	45	30	No	520	30	Tier 1
SFPUC Westside Watershed Green Infrastructure Early Implementation Projects	170	100	5	0	20	0	75	Yes	0	0	0	25	50	45	30	No	520	30	Tier 1
Reliez Valley Recycled Water Project	130	120	0	10	0	0	75	Yes	0	0	25	25	50	50	25	Yes	510	32	Tier 1

# NOVATO SANITARY DISTRICT BOARD AGENDA ITEM SUMMARY

<b>TITLE:</b> Recycled Water: North Marin Water District	<b>MEETING DATE:</b> February 24, 2014 <b>AGENDA ITEM NO.:</b> 9.b.
<b>RECOMMENDED ACTION:</b> Information only	
<b>SUMMARY AND DISCUSSION:</b> <p>The Novato Sanitary District and the North Marin Water District have a history of cooperation on the development of recycled water projects to offset potable water use dating back to the preparation of a Recycled Water Master Plan completed in 2004. Two of the three projects identified in the Master Plan, the Novato North and South projects have been completed under Phase I of the NBWRA program. The remaining project to serve the central service area is included in the NBWRA Phase I program and is anticipated to begin construction in 2015/16.</p> <p>North Marin Water District has chosen not to participate in the NBWRA Phase II project but, as noted in the attached letter, continues to be committed to the development and use of recycled water. NMWD is independently preparing an update of the Marin Country Club Golf Course Recycled Water Feasibility Study.</p>	
<b>ALTERNATIVES:</b> N/A.	
<b>BUDGET INFORMATION:</b> NA	
<b>DEPT.MGR.:</b>	<b>MANAGER-ENGINEER:</b>



**NORTH MARIN  
WATER DISTRICT**

RECEIVED  
FEB 14 2014  
NOVATO SANITARY DISTRICT

February 14, 2014

999 Rush Creek Place  
P.O. Box 146  
Novato, CA 94948

**PHONE**  
415.897.4133

**FAX**  
415.892.8043

**EMAIL**  
info@nmwd.com

**WEB**  
www.nmwd.com

Beverly James, General Manager/Engineer  
Novato Sanitary District  
500 Davidson Street  
Novato, CA 94945

Re: North Marin Water District Recycled Water Commitment

Dear Ms. James: *Beverly*

Pursuant to our recent discussions, this letter serves as a commitment by North Marin Water District (NMWD) to continue utilization of Recycled Water in our Novato service area and to expand the existing system as appropriate and planned pursuant to the North Bay Water Reuse Authority (NBWRA) Phase 1 Project.

NMWD's Novato Recycled Water Expansion in the central service area is currently anticipated to begin in fiscal year 2015/16. The cost of the central area expansion is projected to be \$6M, to be funded 25% by grants through the NBWRA program and 75% by loan funds. The central area expansion is anticipated to be completed by fiscal year 2018. Once the central area expansion is completed, debt service on the north, south and central expansion loans is projected to be at just under \$1M annually. This debt service will be funded from connection fees, collected for connection to the potable system, as the Recycled Water frees up potable water for new connections in Novato. Once the central service area projects are completed, NMWD will continue as an associate member in NBWRA Phase 2.

Additionally, the NMWD Board of Directors has authorized an agreement with Nute Engineering for preparation of the Marin County Club Golf Course Recycled Water Feasibility Study Update. A copy of that information reviewed by the Board of Directors at their January 7<sup>th</sup> meeting, including the draft scope of work is attached to this letter for your information. We expect the update by Nute will be completed this calendar year and will share the study findings with Novato Sanitary District (NSD) when available.

The NMWD Board of Directors recommends that the Recycled Water Subcommittee of NMWD and NSD continue to meet periodically. Should you have further questions in regard to NMWD's commitment to Recycled Water service in Novato, please contact me.

Sincerely,

*Chris DeGabriele*  
Chris DeGabriele  
General Manager

Enclosures

CD/kly

t:\gm\insd\letter to james re central service area.doc

## MEMORANDUM

To: Board of Directors January 3, 2014  
 From: Drew McIntyre, Chief Engineer   
 Re: Approve Agreement with Nute Engineering for Preparation of the Marin County Club Golf Course Recycled Water Feasibility Study Update - 2014  
R:\NON JOB No ISSUES\Consultants\NUTE\FY13-14\Nute Contract for MCC RW Feas Study BOD Memo 1-14.doc

**RECOMMENDATION:** That the Board authorize the General Manager to execute an agreement with Nute Engineering for preparation of Marin County Club Golf Course Recycled Water Feasibility Study Update.

**FINANCIAL IMPACT:** None – applicant funded

At the February 18, 2003 meeting, the Board authorized a change order to Nute Engineering's 1991 Water Recycled Study in the amount of \$9,500 for preparation of a Marin County Club (MCC) Golf Course Recycled Water Feasibility Study. The MCC Recycled Water Feasibility Study was subsequently approved by the Board at the September 7, 2004 meeting. At that time staff also received Board authorization to proceed with preparation of the Water Service Agreement with MCC for supplemental golf course irrigation. Said Water Service Agreement was subsequently approved by the Board at the April 5, 2005 meeting. Almost ten years has elapsed since the original feasibility study report and MCC is now requesting an update to incorporate recent recycled water expansion in the Novato north and south service areas (as well as the planned central service area expansion) and develop new updated costs associated with potential expansion of recycled water to MCC Golf Course.

Background

Marin County Club is located at 500 Country Club Drive, south of Ignacio Blvd. in the southern Novato Zone 2 hydraulic zone (see maps in Attachment A). The 72 acre golf course and club house facilities were originally constructed in 1958 and a Water Service Agreement to provide a 1.5" domestic meter for the club house and pool was approved by the Board the same year. In 1999, an additional 1.5" domestic water service and 4" fire service was approved by the Board for the MCC clubhouse/pool and renovation project. On April 5, 2005, the Board approved a Water Service Agreement that entitled MCC to 58 equivalent dwelling units (EDUs) of water from an existing 1" service located on Verde Drive. This service was originally installed on August 10, 1977 to provide 3 EDUs to supplement MCC's locally supplied on-site irrigation water.

MCC has six man-made lakes throughout the golf course along the Arroyo San Jose water course. The combined seasonal storage within the six lakes is relatively small (24 acre feet or approximately eight million gallons). This volume represents approximately 12% of a normal year irrigation water requirement. In addition to these six on-site lakes, MCC also has

an on-site well which consistently produces about 65 gallons per minute (gpm) throughout the summer. Existing local supply is adequate to supply approximately 90% of the golf course irrigation demand during normal rainfall years and significantly less during major drought years.

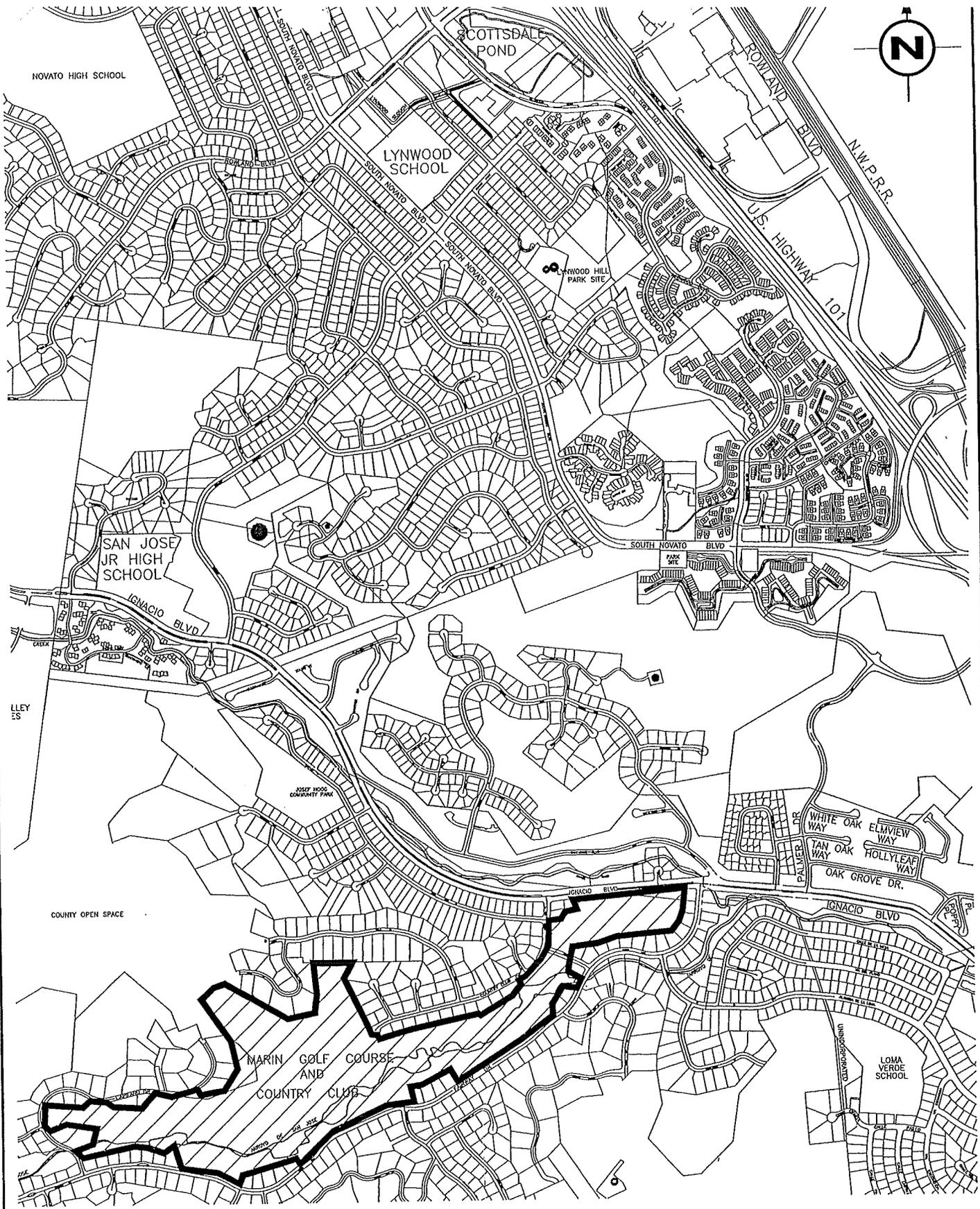
Nute Contract

Since Nute prepared the original feasibility study for MCC and was the engineer who developed NMWD's Recycled Water Master Plan, staff believes that the attached proposal by Nute Engineering (Attachment B) represents the most efficient and cost effective manner in which to prepare the MCC Recycled Water Feasibility Study Update. Nute Engineering's fee to prepare this study is \$10,000. Work will not begin until MCC provides the requested \$10,000 engineering advance.

RECOMMENDATION

That the Board authorize the General Manager to execute an agreement with Nute Engineering in the amount of \$10,000 for preparation of Marin County Club Golf Course Recycled Water Feasibility Study Update.

F:\drawings\JENIPHER\MARIN\_MAP.dwg, 12/11/2002 02:48:24 PM



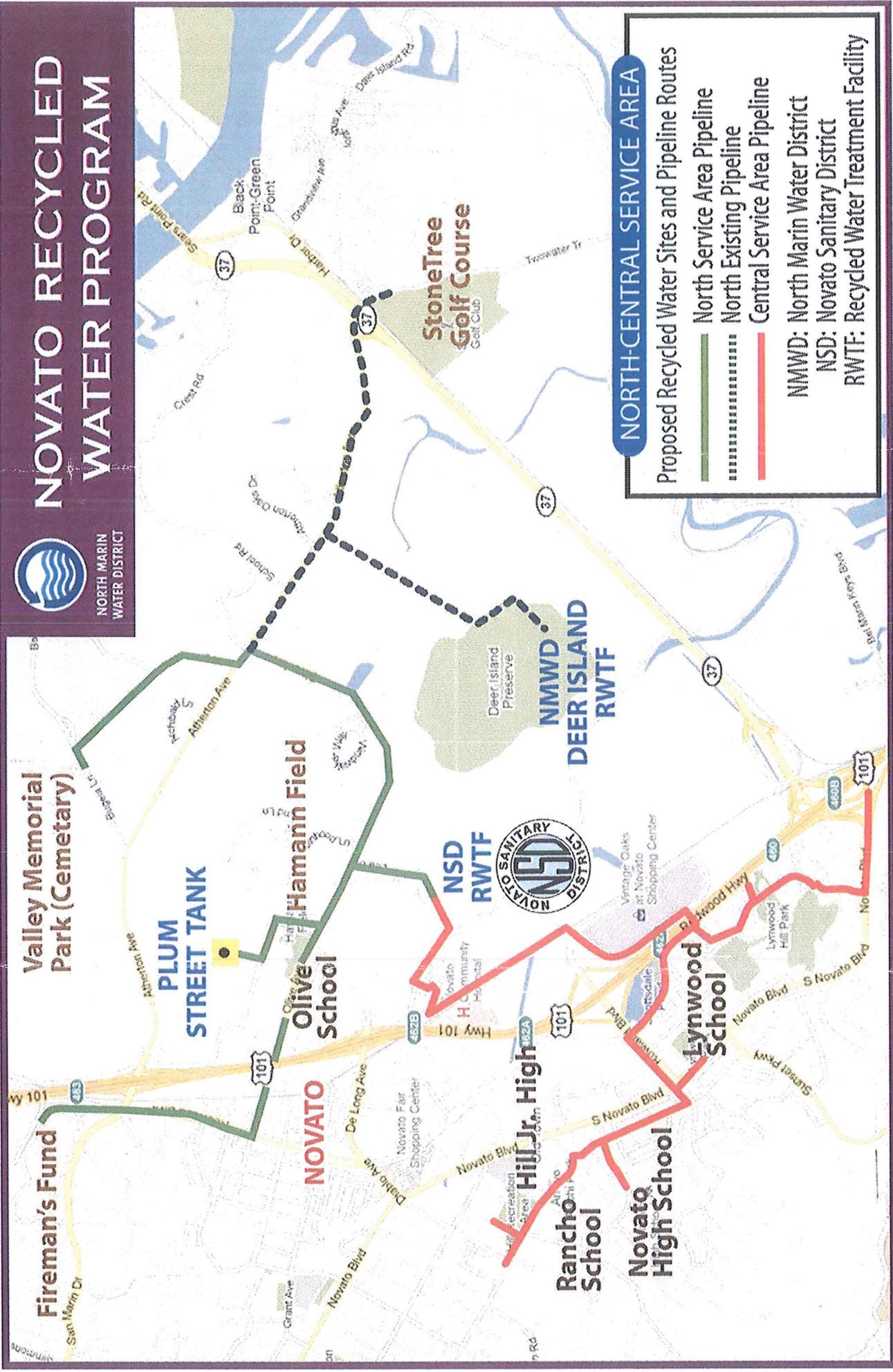
MARIN COUNTRY CLUB GOLF COURSE IRRIGATION			
DATE	SCALE	JOB.NO.	DWG.NO
12/11/02	N.T.S.	0000	MAP

ATTACHMENT A



NORTH MARIN WATER DISTRICT

# NOVATO RECYCLED WATER PROGRAM WATER PROGRAM



## NORTH-CENTRAL SERVICE AREA

Proposed Recycled Water Sites and Pipeline Routes

-  North Service Area Pipeline
  -  North Existing Pipeline
  -  Central Service Area Pipeline
- NMWD: North Marin Water District  
 NSD: Novato Sanitary District  
 RWTF: Recycled Water Treatment Facility

September 19, 2013

Mr. Drew McIntyre, Chief Engineer  
North Marin Water District  
999 Rush Creek Place  
Novato, CA 94948

**Re: Proposal to Update the Feasibility Study to Provide Recycled Water to the  
Marin Country Club Golf Course**

Dear Drew:

As you requested we are pleased to provide the following proposal for preparation of an update to the study of the Feasibility of Providing Recycled Water to the Marin Country Club (MCC) Golf Course, which was prepared by our firm in 2004.

**BACKGROUND**

The MCC maintains an eighteen hole golf course in the Ignacio area of Novato. For the most part of the year irrigation water is supplied from MCC's own sources. Which include a well and a significant amount of runoff and spring water which is captured in their six storage ponds. These ponds are maintained for aesthetics as well as for water capture and storage prior to irrigation.

In years with low rainfall the MCC water supply becomes short at the end of the summer and early fall until the weather cools and rains resume. During some dry periods MCC has obtained a hydrant meter from NMWD to augment water in their ponds. MCC also takes measures to minimize their water usage to get through these dry periods.

Recently NMWD has developed two recycled water distribution systems, one serving the north Novato area and the other serving Hamilton in the south Novato area. Extension of the distribution system serving the central service area is now being planned. However, even with the planned central service area pipeline extension NMWD's Recycled Water distribution system will still be a long distance from the MCC golf course. If recycled water could be brought to the MCC golf course the water could be used for direct irrigation or to augment the water in the ponds.

Recycled water service to MCC and the Indian Valley College has been projected in the NMWD Recycled Water master planning. A pipeline extension to MCC would need to be routed in the most cost effective manner including maximizing the recycled water customer base.

In order to determine the feasibility of providing recycled water to the MCC golf course it will be necessary to estimate the cost of extending a recycled water line.

## **STUDY OBJECTIVE**

The objective of the feasibility study update as proposed herein will be to update the feasibility study for supplying recycled water to the Marin Country Club including determination of the potential recycled water demand, projection of the most feasible route and estimated cost for extending a recycled water pipeline to serve MCC.

## **SCOPE OF WORK**

The following is the scope of work for updating the feasibility study for providing recycled water to the MCC golf course:

1. Estimate the recycled water demand of the MCC golf course.
2. Evaluate possible pipeline routings to serve the MCC and other customers from the ends of the existing north and south recycled water distribution systems.
3. Investigate possible methods to supplement the irrigation water at the golf course including adding recycled water directly to one of the ponds or connecting directly to the irrigation system.
4. Update the potential recycled water demand of other customers in the Ignacio area.
5. Estimate the capital cost of extending a recycled water pipeline to serve the MCC.
6. Summarize the study findings in a written report to NMWD.
7. Attend one meeting to discuss the report.

## **ASSUMPTIONS**

In developing this study the following assumptions will be made:

1. NMWD will be developing a project to extend the recycled water pipeline to the South Novato Blvd area on the west side of Highway 101.
2. NMWD will provide an update of the non-potable water demands in the area which could be potentially served by a recycled water pipeline extension to MCC.

## **DELIVERABLES**

Ten printed copies of the written report will be provided together with an electronic file of the report and all exhibits.

**ENGINEERING FEE**

The Nute Engineering billing rates are set forth in Attachment A and an estimate of the anticipated engineering hours necessary for the study described above is given in Attachment B. The proposed budget is \$10,000.

Very truly yours,

NUTE ENGINEERING

By \_\_\_\_\_  
W. Edward Nute

8.

