

MEETING NOTICE AND AGENDA
TECHNICAL ADVISORY COMMITTEE OF THE
SEASIDE BASIN WATER MASTER

DATE: Wednesday, April 14, 2021

MEETING TIME: 1:30 p.m.

IN KEEPING WITH GOVERNOR NEWSOMS EXECUTIVE ORDERS N-29-20 AND N-35-20,
 THE TECHNICAL ADVISORY COMMITTEE MEETING WILL BE CONDUCTED BY
 TELECONFERENCE AND WILL NOT BE HELD IN THE MONTEREY ONE WATER OFFICES.

YOU MAY ATTEND AND PARTICIPATE IN THE MEETING AS FOLLOWS:
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 TO BE DOWNLOADED FOR SAFARI OR OTHER BROWSERS PRIOR TO LINKING) BY GOING
 TO THIS WEB ADDRESS:

<https://us02web.zoom.us/j/84080960452?pwd=eFFiUHNBmzAxUEpWekZrdFlrZS9qQT09>

If joining the meeting by phone, dial either of these numbers:

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 screen using the following information:

Meeting ID: 840 8096 0452

Passcode: 625735

OFFICERS

Chairperson: Jon Lear, MPWMD

Vice-Chairperson: Tamara Voss, MCWRA

MEMBERS

California American Water Company	City of Del Rey Oaks	City of Monterey
City of Sand City	City of Seaside	Coastal Subarea Landowners
Laguna Seca Property Owners	Monterey Peninsula Water Management District	Monterey County Water Resources Agency

Agenda Item

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The next regular meeting is tentatively planned for Wednesday May 12, 2021 at 1:30 p.m.

**SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE**

*** * * AGENDA TRANSMITTAL FORM * * ***

MEETING DATE:	April 14, 2021
AGENDA ITEM:	2.A
AGENDA TITLE:	Approve Minutes from the March 10, 2020 Meeting
PREPARED BY:	Robert Jaques, Technical Program Manager
SUMMARY:	<p>Draft Minutes from this meeting were emailed to all TAC members. Any changes requested by TAC members have been included in the attached version.</p>
ATTACHMENTS:	Minutes from this meeting
RECOMMENDED ACTION:	Approve the minutes

D-R-A-F-T
MINUTES

**Seaside Groundwater Basin Watermaster
Technical Advisory Committee Meeting
March 10, 2021
(Meeting Held Using Zoom Conferencing)**

Attendees: TAC Members

City of Seaside – Scott Ottmar
California American Water – Tim O’Halloran
City of Monterey – Cody Hennings
Laguna Seca Property Owners – Wes Leith
MPWMD – Jon Lear
MCWRA – Tamara Voss
City of Del Rey Oaks – John Gaglioti
City of Sand City – Leon Gomez
Coastal Subarea Landowners – No Representative

Watermaster

Technical Program Manager - Robert Jaques
Administrative Officer – Laura Paxton

Consultants

Montgomery & Associates – Georgina King

Others

City of Seaside – Nisha Patel
California American Water – Chris Cook and Ian Crooks

The meeting was convened at 1:38 p.m.

Note: The meeting was chaired by Ms. Voss as Mr. Lear was delayed in joining until 1:45 p.m.

1. Public Comments

There were no public comments.

2. Administrative Matters:

A. Approve Minutes from the February 10, 2021 Meeting

On a motion by Mr. Gaglioti, seconded by Mr. O’Halloran, the minutes were unanimously approved as presented.

B. Sustainable Groundwater Management Act (SGMA) Update

Mr. Jaques summarized the agenda packet materials for this item. There was no other discussion on this item.

3. Continued Discussion of the Need for Dataloggers in Monitoring Wells

Mr. Jaques summarized the agenda packet materials for this item.

Mr. Gaglioti said that the summary of recommendations contained in the bullet list on page 12 of the agenda packet was accurate.

Mr. Ottmar noted that the PCA-West Shallow well has a datalogger that is not listed in Table 3. Mr. Lear recommended equipping it similar to well FO-9, with the datalogger on its own communication cable along with a separate cable for the sample pump.

Mr. Jaques will add PCA-West Shallow to Table 3 as needing a replacement datalogger.

Mr. Lear will research why dataloggers were proposed for these wells one the Monitoring and Management Program was developed, and provide that information at a future TAC meeting.

On a motion by Mr. Gaglioti, seconded by Mr. Lear, there was unanimous approval to send the information contained in this agenda item forward to the Board with the recommended changes to the Watermaster's datalogger management program.

4. Contract Amendments for Martin Feeney and Montgomery & Associates

Mr. Jaques summarized the agenda packet materials for this item.

Mr. Lear reported that he had been working with Mr. Feeney on well FO-10. The deep completion at this well is obstructed, so it cannot be induction logged. The intermediate and shallow completions seem to be clear. He provided some background information on the well completions at this location. The intermediate and deep completions appear to be in the same aquifer.

Ms. King noted that these are very deep completions, over 1,000 feet deep for the intermediate and deep ones.

Ms. Voss commented that she would like to send some of her personnel to observe the induction logging work when it is being performed.

On a motion by Mr. Gaglioti, seconded by Mr. Gomez, the contract amendments were unanimously approved.

5. Discuss Board Direction Regarding Concerns about Possible Detection of Seawater Intrusion in Monitoring Wells FO-9 and FO-10 Shallow

Mr. Jaques summarized the agenda packet materials for this item. The numbers below refer to the numbered items on page 31 of the agenda packet.

Item 1: (Discussed on pages 32-33 of the agenda packet) Mr. Gaglioti felt that the finding in the 2013 HydroMetrics report that 25,000 acre-feet of replenishment water would be required in order to achieve protective groundwater levels should be updated. Mr. Jaques and Ms. King concurred with Mr. Gaglioti's recommendation. Ms. King went on to say that ASR and pure water Monterey injection impacts should be addressed to update the analysis. Mr. Gaglioti felt that the status of the basin with regard to risk of seawater intrusion is probably more severe now than it was when the 2013 analysis was performed. Mr. Jaques said he would revise the language in his Discussion Paper to reflect that.

Mr. O'Halloran said he felt that the 1,300 acre-feet per year of projected ASR water in Mr. Stoldt's Supply and Demand Memo and in the Supplemental EIR for the Pure Water Monterey Expansion Project was too high to be reasonable. Mr. Lear responded that MPWMD feels the 1,300 acre-feet is not too high for use as a long-term average. Mr. Gaglioti commented that he felt the quantity of water attributed to ASR is of concern to some people. Following much discussion on the ASR topic there was consensus to agendize further discussion of ASR flow projections for a future TAC meeting. Information contained in the Supplemental EIR on this issue would be included as part of that discussion background information.

Mr. Crooks asked if the 1,300 acre-feet per year of ASR water was to be used solely for water supply and not for replenishment. Mr. Lear responded that was correct, it would be used solely for water supply.

Item 2: (Discussed on pages 33-34 of the agenda packet) Mr. Gaglioti said he felt that the recommendations on this item is contained on page 34 the agenda packet were fine. Mr. O'Halloran recommended starting to identify where supplemental water should be injected and how.

Item 3: (Discussed on pages 34-36 of the agenda packet) Ms. King reported that she did not see anything beyond what Mr. Jaques had already identified that needed to be updated in the seawater intrusion response plan.

Ms. Voss commented that although we are seeing rising chloride levels, it is hard at this time to determine if seawater intrusion is actually occurring. She felt that more data points would be needed to clearly indicate seawater intrusion. Mr. Gaglioti felt it was better to act soon, as there are many indicators that tell us that seawater intrusion is a risk to the Basin.

Item 4: (Discussed on page 40 of the agenda packet) The induction logging work is already scheduled for performance.

Item 5: (Discussed on page 40 of the agenda packet) The work to analyze groundwater flow directions and velocities is covered by the contract amendment approved under the previous agenda item.

Mr. Lear noted that we haven't been able to identify the source of pumping near well FO-11 that is causing groundwater levels to drop in that location. Ms. Voss noted that seawater intrusion can move both horizontally and vertically, and they are seeing some of that in the Salinas Valley 180/400-foot aquifer.

Mr. Jaques reported that Mr. Ghandour has agreed to have the water quality sample from his well taken as soon as possible, rather than delaying it to the usual September sampling date.

Mr. Lear reported that he plans to take the next set of quarterly water quality samples in April and the data would probably be available in late April or early May.

Item 6: (Discussed on page 40 of the agenda packet) Mr. Gaglioti commented that we need to understand the "baseline" of how overdrafted the Basin is before trying to calculate a revised Natural Safe Yield figure or performing a Sustainable Yield analysis. Ms. King noted that some of the work within the proposal from Montgomery and Associates to prepare the Sustainable Yield analysis was to incorporate climate change impacts. Mr. Lear reported that the Bureau of reclamation, USGS, and MPWMD will be completing a basin study that will address climate change impacts with regard to ASR. A model is being used for this, and it covers the Seaside Basin. Ms. King said if there is already a climate change analysis available to use in performing the Sustainable Yield analysis, it would somewhat reduce the cost for that work.

Mr. Jaques noted that when the Sustainable Yield analysis cost proposal was presented to the Board, because of its high cost of over \$100,000 there was reluctance to proceed with it at this time. The Board's preference was to wait until the Groundwater Sustainability Plan for the Monterey Subbasin has been completed, and its impacts on the Seaside Basin could be evaluated, before deciding whether or not to proceed with performing a Sustainable Yield analysis.

Item 7: (Discussed on pages 40-44 of the agenda packet) Mr. Gaglioti said he felt the get charts contained in the agenda packet were okay.

Mr. Ottmar said he felt that starting negotiations with regard to obtaining replenishment water should reflect actual pumping amounts needed by the City of Seaside in order to meet its customers' water demands.

Mr. Jaques said he would make edits to the Discussion Paper to reflect input from the TAC at today's meeting and provide it for final review by the TAC via email in late March.

6. Opinions of Consultants and TAC Members Regarding Implementation of the Seawater Intrusion Response Plan and Ionic Analysis

Mr. Jaques summarized the agenda packet materials for this item.

Mr. Gaglioti felt this was information that should go to the Board. He did not see any reason to delay declaring that seawater intrusion has occurred. He did not think it was appropriate for the TAC to say it is not occurring as a basis for waiting to take action. He felt the Board should make that decision. Ms. Voss felt the TAC was not saying that seawater intrusion is not occurring, rather that if it is, it is very early on in the process. Mr. Gaglioti felt the TAC should stay silent on this matter and let the Board review the information and draw its own conclusions by reading the comments on page 55 in the agenda packet.

Mr. Jaques highlighted that are that there are significant workload and cost impacts if the Seawater Intrusion Response Plan is triggered into implementation. Mr. Ottmar said we are already starting to do some of the Seawater Intrusion Response Plan work such as increased monitoring frequency and analyzing flow directions and velocities.

Mr. Lear said the MPWMD has a duty to protect and augment the water supply, and that MPWMD feels more data is needed to support making a decision with regard to whether or not seawater intrusion is occurring. He recommended that the Watermaster and MPWMD Boards work collaboratively regarding this issue.

Ms. Voss suggested informing the Board that the experts are not saying that seawater intrusion is not occurring, but that the TAC feels that more data is needed to make a determination, including performing induction logging of Wells FO -9 and FO - 10, getting more water quality sampling data points, and performing the analysis by Montgomery and Associates of the cation/anion evaluations described in their previously submitted Work Plan.

Mr. Lear said that the increasing chloride levels may be the upward movement of connate salt water rather than seawater intrusion. If so, the Seawater Intrusion Response Plan actions may not be the most effective way of addressing the problem.

There was consensus to bring this topic back to the TAC for further discussion at its next meeting.

7. Schedule

Mr. Jaques explained why he was recommending that the next TAC meeting be held on March 31 which is two weeks earlier than its normal meeting date. Mr. Leith recommended delaying the Board meeting discussion on issues of concern to it until May, and skipping the April Board meeting.

Ms. Paxton recommended getting the induction logging work by Mr. Feeney completed before having the next Board meeting. Mr. Lear noted that Mr. Feeney's work may not be conclusive. Ms. Voss felt that there is enough information to go to the Board for its April meeting, but to hold back from making any recommendation with regard to whether or not to implement the Seawater Intrusion Response Plan.

Following further discussion on this matter, there was consensus to not have a second TAC meeting in March, but instead to have the next TAC meeting on the normal April date.

Ms. Paxton will discuss with the Board chairman when to have the next Board meeting to receive information from the TAC on these issues.

[Note: Ms. Paxton discussed this with the Chair of the Board after today's TAC meeting and a decision was made to provide a brief progress report to the Board via email, but to hold off until May to have the next Board meeting in order to give the TAC more time to evaluate these issues.]

8. Other Business

There was no Other Business.

The meeting adjourned at 4:00 PM.

**SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE**

*** * * AGENDA TRANSMITTAL FORM * * ***

MEETING DATE:	April 14, 2021
AGENDA ITEM:	2.B
AGENDA TITLE:	Sustainable Groundwater Management Act (SGMA) Update
PREPARED BY:	Robert Jaques, Technical Program Manager
At the State level: Since my last update, I have not received any new materials from the State that would impact the Watermaster.	
At the Monterey County level: Because so many Board meetings are being cancelled, the Board asked that I keep them updated on issues related to my participation in meetings pertaining to Sustainable Groundwater Management Act issues and Pure Water Monterey issues by sending out meeting summaries on a monthly basis. Attached are summaries of those meetings held in March 2021.	
ATTACHMENTS:	Meeting Summaries
RECOMMENDED ACTION:	None required – information only

SUMMARY OF
PURE WATER MONTEREY,
SALINAS VALLEY GROUNDWATER SUSTAINABILITY, AND
MARINA COAST WATER DISTRICT GROUNDWATER SUSTAINABILITY
ZOOM MEETINGS
IN MARCH 2021

Note: This is a synopsis of information from these meetings that may be of interest to the Seaside Basin Watermaster

SVBGSA Monterey Subbasin GSP Committee meeting, March 5, 2021

This Committee is involved in developing the Groundwater Sustainability Plan for the Corral de Tierra Subarea of the Monterey Subbasin. Topics discussed at this meeting included:

- A report on the ongoing coordination between the SVBGSA and the MCWDGSA on development of the Monterey Basin GSP.
- Projects being proposed in the Corral de Tierra subarea include:
 - Streamflow diversions with recharge basins
 - Check-dams for in-stream recharge
 - Decentralized in-lieu recharge projects (residential rainwater, graywater reuse, etc.)
 - Decentralized stormwater capture by retaining runoff and allowing it to percolate
 - Multi-benefit stream channel improvements involving vegetation removal and vegetation management to enhance infiltration
 - Potential for use of recycled water on golf course and other suitable landscaped areas
 - Implementing pumping allocations to reduce pumping down to the subarea's sustainable yield. This is similar to the pumping allocation approach in the Seaside Basin Adjudication Decision. This is expected to be a complex and time-consuming process. I commented that since the projects listed above will almost certainly fall short of what is needed to achieve sustainability, pumping allocations should be the focus of much of the effort going into developing the GSP.
- Because of the complexity of discussion on some of these topics, and the extensive input coming from Committee members and members of the public who participate in these meetings, an extra (special) meeting will be held on May 23 to continue these discussions.

MCWD GSA Monterey Subbasin GSP Committee meeting, March 11, 2021

This Committee is involved in developing the Groundwater Sustainability Plan for the Marina-Ord Subarea of the Monterey Subbasin. Topics discussed included:

- MCWD proposes to take over the monitoring responsibilities for wells FO-10 and FO-11 which are located outside of the Seaside Basin and are within the Marina-Ord area.
- The data gap in the area just to the north of the Monterey Subbasin's boundary with the Seaside Basin has been identified, and MCWD is looking at installing new monitoring wells in that area so data can be obtained there.
- Projects being proposed in the Marina-Ord subarea include:
 - Indirect potable reuse by injecting AWT water into the aquifer and extracting it with existing MCWD production wells (similar to the PWM Project). This AWT water would come from the PWM AWT Plant.
 - Continued and perhaps more vigorous water conservation
- The next meeting will be in May on a date TBD.

Department of Water Resources Airborne Electromagnetic (AEM) Survey Workshop, March 12, 2021

At this workshop was held by DWR to provide information on the AEM surveys that it will be conducting Statewide starting this summer. Selected high priority basins (those that are critically overdrafted) will be the first to be surveyed, and the program will take several years to complete. It is likely that the survey for the Salinas Valley Basin's 180/400-foot aquifer will be in the first group to be surveyed. This will hopefully provide geophysical information that will be useful to the Watermaster. There are many permitting requirements in order to conduct these surveys, which are done by a helicopter flying at an elevation of 200 feet with an instrument array suspended beneath it at an elevation of 100 feet. Permits are normally required from the FAA as well as local entities, and can involve protection of endangered species during the overflights. Overflights cannot be conducted over densely populated areas. DWR will be conducting Statewide outreach to educate entity staffs and the public on this work.

The AEM surveys can penetrate to a depth of approximately 1,000 feet, with decreasing resolution as the depth increases to this maximum depth. AEM can detect high salinity water which is useful in identifying seawater intrusion.

DWR will be asking basins to provide whatever site-specific data it has such as lithology logs and geophysical data, so the AEM work can be correlated ("calibrated") against this actual hard data. I will be asking Montgomery & Associates to provide information to DWR for the Seaside Basin.

The AEM report will be available about 6 months after a survey is performed.

Pure Water Monterey Water (PWM) Quality and Operations Committee Meeting, March 17, 2021

Due to a scheduling conflict I did not attend this meeting, but the materials presented at this meeting included:

- A progress report was provided on work being done on the vadose and deep injection wells. Improvements to the vadose zone wells has been completed. Work to construct the two new deep injection wells is underway. Completion of the first of these well is scheduled to occur in late 2021 and completion of the second well is scheduled for early 2022.
- A report on operation of the Advanced Water Treatment Plant, showing that it met all of the water quality requirements in its permit.
- Total water injected by PWM in FY 2021 through February 28, 2021 was 1,238 acre-feet.
- The next meeting is scheduled for May 26 at 3:00 PM.

SVBGSA Advisory Committee meeting, March 18, 2021

Topics discussed included:

- The SVBGSA is anticipating a 5% fee increase to supports its operational costs in the upcoming fiscal year.
- The implementation grant application from the SVBGSA to the State was not approved. Other funding sources are being investigated.
- Other topics mainly related to the membership in the Advisory Committee and brief progress reports

SVBGSA Seawater Intrusion Work Group meeting, March 22, 2021

Topics discussed included:

- To perform the Deep Aquifer Study the SVBGSA is looking to raise \$1 million. Funding for this may be sought through a one-time fee that would be imposed in fiscal year 2021-2022.. The one-time fee would be based on irrigated acreage for agricultural users and on a per-connection basis for domestic users. It was noted that MCWRA has some funds available that could be used for this purpose, which would somewhat lower the amount of money that the SVBGSA would need to raise.

- The SVBGSA’s consultant “WestWaterResearch” made a presentation on development of a water charge framework to establish how future fees will be levied.

SVBGSA Monterey Subbasin GSP Committee meeting, March 23, 2021

Items of interest to the Watermaster that were discussed at this meeting included:

- There was further discussion of Sustainable Management Criteria for groundwater levels and groundwater storage.
- The El Toro primary aquifer includes both the Paso Robles and Santa Margarita aquifers, as there does not appear to be an aquitard separating the two aquifers in this area.
- Ongoing groundwater depletion is occurring in the Corral de Tierra subarea.
- Work is in progress to coordinate the various models so they are consistent with each other at the model boundaries. However, there are very few monitoring wells to use for calibration of the models in the Corral de Tierra subarea.
- Groundwater Sustainability Plans are required to achieve sustainability within 20 years from implementation, but need to start showing progress in their annual reports.
- I pointed out that once sustainable yield is achieved, the groundwater levels won’t increase to replenish the prior overpumping. To raise groundwater levels it will be necessary to either pump below the sustainable yield or find replenishment water.
- I stressed the need to include in the project listings and management activities actions to raise groundwater levels after achieving sustainable yield in order to reach groundwater level Measurable Objectives.
- Beverly Bean pointed out the need to get more monitoring wells, as recommended in the earlier GeoSynTech report in order to get sufficient data to make informed management decisions. Abby Ostovar of Montgomery and Associates said it is necessary to make the decisions with what information we currently have, in order to finish the GSP by the January 2022 submittal deadline. The GSP can include language about providing more monitoring wells to get more data.
- A motion was made to set the Management Objective for groundwater levels at the 2008 groundwater levels, with the Minimum Threshold at the 2015 groundwater levels. It was noted that all of these can be changed in the future, especially during the five-year Comprehensive Review of the GSP. The motion passed unanimously.
- The Committee is recognizing that groundwater levels are dropping substantially, and that rapid action is needed to stop this.
- Two additional projects are now being scoped, these include importing desalinated water and treating wastewater for indirect potable reuse.
- It was noted by one of the committee members, Beverly Bean, that there is always the potential to impose a moratorium on new hookups as was done on the Monterey Peninsula.
- I recommended including the use of recycled water for landscape and golf course irrigation, and limiting or freezing new development connections, as projects or management actions that should be included in the listing in the GSP.
- Sarah Hardgrave pointed out the falling groundwater levels in the Laguna Seca subarea. She said she felt that looking at a larger geographic area for regional solutions may be necessary.
- I urged that pumping allocations be the top priority management action, and several others supported this thought. A motion was made by Beverly Bean to do this, and the motion passed unanimously.
- The next meeting will be on May 7.

**SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE**

*** * * AGENDA TRANSMITTAL FORM * * ***

MEETING DATE:	April 14, 2021
AGENDA ITEM:	2.C
AGENDA TITLE:	Water Quality Sampling Results from SNG Well
PREPARED BY:	Robert Jaques, Technical Program Manager

SUMMARY:

The SNG well, which is owned by Ed Ghandour and is located in the dunes area in the northern portion of Sand City, was recently sampled for the first time for water quality. Attached are the analytical results from that sample.

The very high chloride level (8,660 mg/L) is a strong indicator that this well is sea water intruded.

Georgina King of Montgomery & Associates provided this info: Apparently this is the first water quality sample from it (chloride = 8,660 mg/L). Since it is screened from 200 – 630 ft below ground it is likely screened through most of the Paso Robles and the Purisima. I make this assumption based on the depths of the different formations Martin logged for nearby Sentinel Well #4 (see table below from his Sentinel Well report). The PCA-W shallow well (525 – 575 ft below ground) is screened in the Purisima Formation and deeper than the majority of the SNG well's screens. This is reflected in the water quality from the PCA-W shallow well (chloride = 50 mg/L) clearly not being the same as water quality in the SNG well (chloride = 8,660 mg/L). The PCA-W deep well is screened 195 ft deeper than the SNG well (825-875 ft below ground) and has a chloride concentration around 150 mg/L.

This suggests the source of high chlorides in the SNG well is either directly from seawater intruded Paso Robles or the intruded Beach Sands and Aromas Sands are recharging the underlying Paso Robles with saline water. This is not total unexpected as Martin reported in 2007: "Geophysical data reveal significant seawater intrusion in the upper portions of SBWM #1 borehole to depths of approximately 350 feet. The existence of seawater intrusion in the shallow Dune Sands/Aromas Sands units in this area has been known for decades." The problem is that it appears it is now impacting the underlying Paso Robles aquifer.

The table below shows information about the Sentinel Wells.

**SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE**

***** AGENDA TRANSMITTAL FORM *****

AGENDA ITEM:

2.C (Continued)

Geologic Formation	Depth to Top of Geologic Unit (feet)			
	SBWM-1	SBWM-2	SBWM-3	SBWM-4
Beach Sand/Dunes Sands Deposits	0	0	0	0
Aromas Sand	140	155	75	68
Paso Robles Formation	380	165	132	100
Upper Purisima Formation	600	490	428	332
Lower Purisima Formation	1,115	944	878	691
Santa Margarita Sandstone	NP	NP	NP	860
Monterey Formation	1,650 ¹	1,488	1,308	913

¹ – Although the borehole only extended to a depth of 1,500 feet, the depth to the Monterey Formation can be projected from the geophysical log signature. NP denotes unit is not present.

ATTACHMENTS:

SNG Well Water Quality Sampling Results

**RECOMMENDED
ACTION:**

None required – information only



MBAS

Monterey Bay Analytical Services

Craig Evans Pump Testing Service

Craig Evans
PO Box 1270
Marina, CA 93933

4 Justin Court Suite D, Monterey, CA 93940
831.375.MBAS (6227)
www.MBASinc.com

ELAP Certification Number: 2385
Wednesday, March 10, 2021

Lab Number: 210226_07-01 Sample Description: SNG PCA Well

Collection Date/Time: 2/26/2021 12:30 Sample Collector: EVANS C Client Sample #:
Received Date/Time: 2/26/2021 13:32 System ID:

Analyte	Method	Unit	Result	Dilution	Qualifier	PQL	MCL	Analysis Date / Time	Analyst
Anion-Cation Balance	Calculation	%	3	1					
QC Anion Sum x 100	Calculation	%	110	1					
QC Cation Sum x 100	Calculation	%	118	1					
QC Ratio TDS/SEC	Calculation	NA	0,68	1					
Ammonia-N	EPA 350.1	mg/L	ND	1		0.15		3/1/2021 13:02	HC
Turbidity	EPA180.1	NTU	6.0	1		0.1	5	2/26/2021 14:21	IG
Boron	EPA200.7	mg/L	0.59	1		0.1		3/9/2021 13:58	BS
Calcium	EPA200.7	mg/L	2430	1		1		3/9/2021 13:58	BS
Copper, Total	EPA200.7	µg/L	ND	1		20	1300	3/9/2021 13:58	BS
Iron, Total	EPA200.7	µg/L	12400	1		30	300	3/9/2021 13:58	BS
Magnesium	EPA200.7	mg/L	658	1		0.5		3/9/2021 13:58	BS
Manganese, Total	EPA200.7	µg/L	191	1		15	50	3/9/2021 13:58	BS
Potassium	EPA200.7	mg/L	79.0	1		0.5		3/9/2021 13:58	BS
Silica (SiO2), Total	EPA200.7	mg/L	38.2	1		1		3/9/2021 13:58	BS
Sodium	EPA200.7	mg/L	2500	1		1		3/9/2021 13:58	BS
Zinc, Total	EPA200.7	µg/L	61	1		30	5000	3/9/2021 13:58	BS
Barium, Total	EPA200.8	µg/L	237	1	LO	5	1000	3/2/2021 15:07	MW
<i>LO: MS and/or MSD result unavailable. Acceptability based on LCS recovery.</i>									
Bromide	EPA300.0	mg/L	41,7	50		5		3/2/2021 16:58	BS
Chloride	EPA300.0	mg/L	8660	50		50	250	3/2/2021 16:58	BS
Fluoride	EPA300.0	mg/L	ND	1		0.1	2	2/26/2021 22:17	BS
Nitrate as N	EPA300.0	mg/L	0.7	1		0.1	10	2/26/2021 22:17	BS
Nitrate as NO3	EPA300.0	mg/L	3.1	1		0.44	45		
Nitrite as N	EPA300.0	mg/L	ND	10	CL	1	1	3/2/2021 16:43	BS
<i>CL: Initial analysis within holding time but required dilution.</i>									
Orthophosphate as P	EPA300.0	mg/L	55.8	1		0.06		2/26/2021 22:17	BS
Sulfate	EPA300.0	mg/L	1020	50		50	250	3/2/2021 16:43	BS
Alkalinity, Total (as CaCO3)	SM2320B	mg/L	97	1		10		3/2/2021 15:24	OW
Bicarbonate (as HCO3-)	SM2320B	mg/L	118	1		10			
Langelier Index, 15°C	SM2330B	NA	0,37	1					

Abbreviations/Definitions:
 mg/L: Milligrams per liter (=ppm) µg/L: Micrograms per liter (=ppb) MPN: Most Probable Number
 MDL: Method Detection Limit PQL: Practical Quantitation Limit MCL: Maximum Contamination Level ND: Not Detected at the PQL (or MDL, if shown)
 E: Analysis performed by External Laboratory; see Report attachments H: Analyzed outside of method hold time QC: Quality Control
 J: Result is < PQL but ≥ MDL; the concentration is an approximate value.



MBAS

Monterey Bay Analytical Services

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www.MBASinc.com

ELAP Certification Number: 2385

Wednesday, March 10, 2021

Craig Evans Pump Testing Service

Craig Evans
PO Box 1270
Marina, CA 93933

Lab Number: 210226_07-01 Sample Description: SNG PCA Well

Collection Date/Time: 2/26/2021 12:30 Sample Collector: EVANS C Client Sample #:
Received Date/Time: 2/26/2021 13:32 System ID:

Analyte	Method	Unit	Result	Dilution	Qualifier	PQL	MCL	Analysis Date / Time	Analyst
Langelier Index, 60°C	SM2330B	NA	1.19	1					
Hardness (as CaCO3)	SM2340B/Calc	mg/L	8790	1		5			
Specific Conductance (EC)	SM2510B	µmhos/cm	24300	1		3	900	3/2/2021 15:24	OW
Total Dissolved Solids	SM2540C	mg/L	16600	1		10	500	3/2/2021 8:19	OW
pH (Laboratory)	SM4500-H+B	pH (H)	6.9	1		0.1	8.5	2/26/2021 16:21	KG
Total Organic Carbon	SM5310C	mg/L	ND	1		0.3		3/3/2021 17:42	BS

Report Approved by:


David Holland, Laboratory Director

Abbreviations/Definitions:
mg/L: Milligrams per liter (=ppm)
MDL: Method Detection Limit
E: Analysis performed by External Laboratory; see Report attachments
J: Result is < PQL but ≥ MDL; the concentration is an approximate value.

µg/L: Micrograms per liter (=ppb)
MCL: Maximum Contamination Level
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MPN: Most Probable Number
ND: Not Detected at the PQL (or MDL, if shown)
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**SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE**

***** AGENDA TRANSMITTAL FORM *****

MEETING DATE:	April 14, 2021
AGENDA ITEM:	2.D
AGENDA TITLE:	MPWMD Water Supply Committee Meeting Agenda Items
PREPARED BY:	Robert Jaques, Technical Program Manager
SUMMARY:	
<p>On April 5, 2021 MPWMD’s Water Supply Committee met. Two items on the agenda from that meeting are attached.</p> <p>The first agenda item discusses the topic of replenishment water to help the Seaside Basin achieve protective water levels. It concludes that the Pure Water Monterey Expansion project could provide all of the replenishment water that is estimated to be needed to achieve protective water levels. This differs from the conclusion of the Watermaster’s analysis and comparison of the MPWSP with the Pure Water Monterey Expansion Project in terms of providing the needed replenishment water. Since the MPWMD and Watermaster analyses both used the same set of supply and demand figures for each year, the difference apparently is because the MPWMD projection of “Excess Available Water” in Exhibit 2A of the agenda item assumes that the Pure Water Monterey Expansion Project is <u>already</u> in operation (current demand of 9,825 AFY was for 2019), whereas the Watermaster’s analysis estimates the Pure Water Monterey Project would not become operational until 2023 following completion of design, permitting, and funding. With a 2023 startup date for the Pure Water Monterey Expansion Project and a 2024 startup date for the MPWSP Desalination Plant, Figure 1 in Item 4 of today’s TAC meeting agenda packet (on page 38) provides a visual comparison of the two projects’ replenishment water production capabilities. Figure 1 indicates that the Pure Water Monterey Expansion Project would provide slightly less replenishment water than is currently estimated to be needed, and that it would take many years for it to provide all of the replenishment water that it can provide. Figure 1 shows that the MPWSP would be able to provide all of the replenishment water that is currently estimated to be needed in the matter of just a few years.</p> <p>The second agenda item discusses the findings of investigation into the rising chloride levels in monitoring well FO-9 Shallow. It indicates MPWMD staff is recommending that this monitoring well be destroyed, and that MPWMD does not need it for its monitoring purposes. Thus, if a monitoring well in that location were needed, a new well would need to be installed which MPWMD estimates would cost of over \$100K. (Note: This cost is considerably lower than the estimate provided in the recent past by Martin Feeny to install a new monitoring well between FO-9 and the Seaside Golf Course wells.) It is interesting to note that Table 2 in the RFS from the Watermaster to MPWMD to perform monitoring work lists the wells to be monitored and identifies which wells are part of which party’s monitoring network. Table 2, and Footnote 1 in that table, shows FO-9 Shallow to be a well that is in MPWMD’s Monitoring Well Network and is a well that MPWMD monitors monthly for water level as part of its own monitoring program. That information was provided by MPWMD when Table 2 was created some years ago, and that assignment of monitoring responsibility has not changed over the years. Other than to avoid the cost of installing a shallow aquifer monitoring well to replace the existing damaged well, there is no explanation in the agenda about why MPWMD feels it no longer needs to monitor groundwater levels in this well.</p>	
ATTACHMENTS:	Agenda items from MPWMD Water Supply Committee meeting of April 5, 2021
RECOMMENDED ACTION:	None required – information only

additional water needed to allow Watermaster to sustain PWL in the Basin” is actually an admission that the desalination plant is sized grossly over the needed capacity as a replacement supply for consumers on the Peninsula, further underscoring that the demand forecast used was inflated. Further, it ignores that a Pure Water Monterey expansion of 2,250 AFY could also provide the needed water for such a purpose, as shown in **Exhibit 2-A** attached. The Watermaster has simplified the annual requirements for PWLs which would be 1,000 AFY if at inland wells, but only 850 AFY if at coastal wells. The new 2022 AMBAG growth forecast indicates even more water available from Pure Water Monterey Expansion that could be made available for protective levels, drought reserve, or unexpected growth.

Assuming available supplies of 11,294 AF each year with Pure Water Monterey (PWM) expansion, as shown below, then over 30 years there would be additional water available of 27,931 AF or an average of 931 AF per year.

Supply Source	w/ PWM Expansion
Pure Water Monterey	3,500
PWM Expansion	2,250
Carmel River	3,376
Seaside Basin	774
Aquifer Storage & Recovery (ASR)	1,300
Sand City Desalination Plant	94
Total Available Supply	11,294

If there was concern over the viability of ASR to provide 1,300 AF per year – even though studies show that over time ASR builds up a drought reserve in average-to-wet years sufficient to handle an extended drought – then PWM expansion could first be used to build up a 5-year ASR reserve of 6,500 AF. Since there already exists 1,290 AF of ASR water in the ground another 5,210 would be required – almost the first 4 years of PWM expansion excess. The 30 years after that would yield 24,131 AF or 804 AF per year on average.

Both of these scenarios ignore that 700 AF per year becomes available in year 26 after the Cal-Am in-lieu recharge program is concluded.

EXHIBIT

2-A Calculation of Excess Water Availability under Pure Water Monterey Expansion

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EXHIBIT 2-A

Calculation of Excess Water Availability under Pure Water Monterey Expansion

		Water	
	Water	Demand	
	Supply	Assuming	
	Available	AMBAG	Excess
Year	w PWMexp	Growth	Available
1	11,294	9,825	1,469
2	11,294	9,862	1,432
3	11,294	9,899	1,395
4	11,294	9,936	1,358
5	11,294	9,973	1,321
6	11,294	10,011	1,284
7	11,294	10,048	1,246
8	11,294	10,085	1,209
9	11,294	10,122	1,172
10	11,294	10,159	1,135
11	11,294	10,196	1,098
12	11,294	10,233	1,061
13	11,294	10,270	1,024
14	11,294	10,307	987
15	11,294	10,344	950
16	11,294	10,382	912
17	11,294	10,419	875
18	11,294	10,456	838
19	11,294	10,493	801
20	11,294	10,530	764
21	11,294	10,567	727
22	11,294	10,604	690
23	11,294	10,641	653
24	11,294	10,678	616
25	11,294	10,715	579
26	11,294	10,753	541
27	11,294	10,790	504
28	11,294	10,827	467
29	11,294	10,864	430
30	11,294	10,901	<u>393</u>
			27,931

WATER SUPPLY PLANNING COMMITTEE

ITEM: DISCUSSION ITEM

3. UPDATE ON SEASIDE WELL FO-09 AND SEAWATER INTRUSION

Meeting Date:	April 5, 2021	Budgeted:	N/A
From:	David J. Stoldt General Manager	Program/ Line Item:	N/A
Prepared By:	David Stoldt	Cost Estimate:	N/A

General Counsel Review: N/A

Committee Recommendation: N/A

CEQA Compliance: This action does not constitute a project as defined by the California Environmental Quality Act Guidelines section 15378.

SUMMARY: At the December 2, 2020 Board meeting of the Seaside Groundwater Basin Watermaster, Georgina King of Montgomery & Associates made a presentation on the annual Seawater Intrusion Analysis Report. The consultants concluded that what may be a precursor to seawater intrusion was detected in two monitoring wells experiencing increasing chloride concentrations. One of these is north of and outside of the Seaside Basin (monitoring well FO-10 Shallow), and the other is just inside the northern boundary of the Seaside Basin in the Northern Coastal Subarea (monitoring well FO-09 Shallow). However, none of the Watermaster's Sentinel Wells, located closer to the coastline than monitoring wells FO-09 and FO-10, detected seawater intrusion in the shallow aquifer in their induction logs. This was reported to the Water Supply Planning Committee at its February meeting.

The consultants concluded that the sampling frequency for monitoring wells FO-09 Shallow and FO-10 Shallow should be increased to quarterly to establish if their chloride concentrations are true trends, or anomalous. Following the December 2, 2020 report to the Watermaster board, FO-09 shallow was sampled on January 5th and its chloride concentration was 92.2 mg/L. That was up from 90.4 mg/L from the last Sept 28, 2020 sample, and above the well's Chloride Threshold Level of 67 mg/L. The last 4 samples have increased above each previous sample.

On March 23rd, District staff pulled the pump at FO-09 Shallow and consultant Martin Feeney ran an induction and fluid conductivity log of the well. At 185' below grade, the conductivity greatly spiked and was high all the way down the well. The likely cause of this is a crack in the casing or a separated joint. This is problematic because it means the shallow seawater intrusion in the dune sands has found a pathway to the Paso Robles. However, this is a good discovery because it is the source of the rising chlorides in the well. The sample pump was deployed at 130 feet with a drop tube down to the screens. A seal in the pump had failed and instead of pulling water from the screens, which would have detected the high conductivity water, the pump was pulling from its

base at 130 feet above the crack in the casing leaving it undetected. Good news: no seawater intrusion. Bad news: as the owner of the well, the District will need to destroy the well.

The consultant (Feeney) wants to video the well to see the problem, which District staff thinks is a good idea to get an idea of the damage and inform us how to move forward. However, even if the damage is slight and it appears as if a slip seal could be slid and placed in the well, Monterey County Health Department only allows casing down to 2 inches, and in this case when installed would be on the order of 1 inch, which would not likely be approved by the County. Instead, we would be instructed to destroy the well. It is staff's recommendation that we should not make a repair to this well outside of spec. We would use the video to write the specifications for destruction. After the video, we should let the Health Department know what we have found and that we plan to take care of the issue.

The District needs to destroy this well because it is allowing seawater intrusion to short circuit the Paso Robles strata. However, the District does not use data from this well for any of its programs. FO-09 Deep is in the ASR permits, but not the shallow completion. We can destroy the shallow completion and retain the deep (we will also video the deep so we can prove it is not damaged), so this borehole will still provide the data we need. These FO wells were drilled by Joe Oliver in the early 1990s as exploratory bores to help define the hydrogeology of the Northern Coastal Sub Area and prior to the formation of the Watermaster these wells were infrequently sampled. Upon formation of the Watermaster, quarterly sampling of FO-09S was incorporated into the Court adopted Monitoring and Maintenance plan. Many of the completions from the early 1990 FO effort are not monitored and are nearing the end of life expectancy. If they were found damaged they would be destroyed and not replaced. FO-09S is one of those completions.

The Watermaster and Marina Coast will likely want this well replaced, as it is in their official monitoring plans for the MMP and GSP respectively. The District does not need this well replaced. A replacement well is on the order of \$100K. The District will have to decide what, if any, financial contribution it would make to a replacement, since a replacement is not needed for District purposes. The District has not informed either of those entities that the outcome of the cracked casing we be to destroy the well.

Here are some approximate costs for the proposed options for FO-9S:

Video Survey - Pacific Surveys and Supervision - \$3K

Well repair – Will depends on survey, use as estimate - \$15K

Well destruction - including permits, contractor time, concrete, concrete pumper, supervision, - \$15K cheaper if done at time of new construction.

Well replacement – Est. \$140/foot (\$84K) and \$30K supervision - \$114K

EXHIBITS

None

**SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE**

*** * * AGENDA TRANSMITTAL FORM * * ***

MEETING DATE:	April 14, 2021
AGENDA ITEM:	3
AGENDA TITLE:	Report on Findings and Conclusions from Induction Logging of Monitoring Wells FO-9 and FO-10
PREPARED BY:	Robert Jaques, Technical Program Manager
SUMMARY:	
<p>On March 24, 2021 Martin Feeney performed induction logging of Monitoring Wells FO-9 and FO-10. The purpose of doing this was to have the induction logging results on those wells compared to the E-logs for those wells when they were constructed to identify possible changes in water quality surrounding those wells.</p> <p>Mr. Feeney's report providing the findings and conclusions from this work is attached. As his report concludes, the increase in chloride in FO-9 is apparently being caused by leakage in the casing of that well, allowing saltier water from the shallow strata to flow into the well. Video inspection of this well is being planned by MPWMD to gain a better understanding of that problem. At FO-10 the induction logging indicates highly conductive strata for nearly the entire length of the mid-depth casing, and this differs significantly from the E-log from the original construction of that well. However, what might be causing that is not clear. Mr. Feeney will participate in today's meeting to provide an overview of the work and respond to questions from the TAC.</p> <p>I am considering having another Zoom meeting with our consultants, and TAC members who have expertise in this subject matter, to get their feedback and opinions regarding this work, and would appreciate getting the TAC's thoughts on whether there would be benefit from doing that.</p>	
ATTACHMENTS:	Martin Feeney induction logging report
RECOMMENDED ACTION:	Accept the report and provide direction to the Technical Program Manager regarding discussing the report with consultants and TAC members with expertise in this topic.

April 5, 2021

Seaside Basin Watermaster
PO Box 51502
Pacific Grove, CA
93950

Attention: Bob Jaques, PE

Subject: Geophysical Investigation Fort Ord Monitoring Wells FO-9 and FO-10 – Preliminary Findings

Dear Bob:

Two monitoring wells in the Seaside Basin monitoring program, FO-9 Shallow and FO-10 Shallow, have recently displayed increasing concentrations of chloride ions; raising the possibility that these data are indicative of advancement of seawater into the basin. However, these data are difficult to reconcile with other data from the more seaward Sentinel Wells that have seen no changes. The ad-hoc advisory team discussed this and generally believed that the data from the monitoring wells would benefit from further confirmation. It was suggested that the monitoring wells be induction logged and the data from the induction logs be compared to the original electric logs to assist in evaluating if there have been conductivity changes in the formation since the time of the well installations. This work has been completed and I'm pleased to provide the initial data and preliminary interpretations.

Background.

Monitoring Wells Clusters FO-9 and FO-10 were drilled in 1994 and 1996, respectively. The wells are nested completions with multiple casings of varying lengths in the same borehole. FO-9 has two completions - a shallow completion in the Paso Robles Formation and a deeper completion in the Santa Margarita Sandstone. FO-10 has 3 completions - one in the Paso Robles Formation, one in the Santa Margarita Sandstone and a third completion in an intermediate depth. The details of well construction are shown on Figures 1 and 2.

Findings

Prior to the recent field work, the original elogs from both of the borings were digitized so the original elogs could be easily compared to the inverse of the induction logs (elog measures resistivity, induction log measures the inverse, i.e., conductivity). After acquiring digital versions of the elogs, the wells were geophysically logged on March 23, 2021. Both induction logs and temperature/fluid resistivity logs were performed. The induction logging measures the bulk conductivity of a sphere of earth materials (including the borehole contents - gravel envelope and casings) of approximately 6 feet in diameter. The temperature/fluid resistivity measures temperature/resistivity of the fluid in the casing. The temperature data allows for the resistivity data to be corrected for temperature. At each location, the deepest accessible well was induction logged while the shallow well was temperature/fluid resistivity logged. The data from the logging and the well construction are attached as Figure 1 and 2.

FO-09

- Both of the completions (shallow and deep) at this site have debris (airlift pipe, suction pipe?) in the bottom of the wells so we were not able to get to bottom or even into perforations.

- As can be seen in the Fluid Resistivity log for this well, FO-09 Shallow is leaking poor quality water into the well at about 185 feet bgs (about -40 ft msl). The data suggest the well has a structural flaw (crack, open joint?) at this depth.
- Below this depth, water quality is impacted but as the log approaches the perforations, the quality improves.
- The induction logging matches the original elog reasonably well. Although the magnitude of the recent trace appears higher than the original, no area looks more conductive than it was in 1994. The higher magnitude of the recent trace is likely a function relating to the legacy elog to which it is compared, which reflects the higher conductivity fluid in the borehole at the time of original logging. The drilling mud had a conductivity (EC) of about 625 μS at time of drilling whereas now the water (where not impacted by the leak) in the well (and formation) is closer to 400 μS .
- The elevated chloride values in the water quality samples from this well are the result of the entry of water from higher in the casing, not recently advancing SWI.

FO-10

- The induction tool was not able descend in the deep well as the upper section has a bend in the casing that is too tight for passage. The intermediate and shallow wells were successfully logged to bottom.
- The induction log is severely muted when compared with the original elog. At first glance it looks like seawater intrusion, but on further reflection the shift is along the entire profile, which is considered unlikely. The reason for the muted response is unclear. Discussions with the geophysical contractor suggest that all the intermediate well seals are leaking and allowing poor quality water from above. Whereas that theory would explain the data, it again is consider highly unlikely because water level data from these wells consistently show significant differences between shallow and deep completions.
- The fluid resistivity logs show elevated EC in the screen section relative to the standing water in the casing, suggesting the quality in the screen section may be changing and the water quality samples from this well maybe valid.

The two shallow wells were displaying elevated chloride values. The new data confirms that the water quality samples from FO-09 Shallow are impacted by a structural flaw in the casing that is allowing poor quality water to enter the casing and contaminate the perforated area from which samples are taken. The recent samples are not representative of the in-situ aquifer water from the screened interval at this location. It is recommended that this well be video surveyed to assess the nature of the flaw. After confirmation of the nature of the structural flaw, the well should be repaired or destroyed to prevent continued contamination of the Paso Robles Formation at this location.

The data also confirms that the recent increase in chlorides in FO-10 Shallow is representative of the water in the perforations. The reason for the increase is not known. Ongoing routine sampling may assist in better determining water quality trends and any additional well investigative recommendations at this location.

The opportunity to perform this work is appreciated. Please call if you have any questions.

Sincerely,



Figure 1

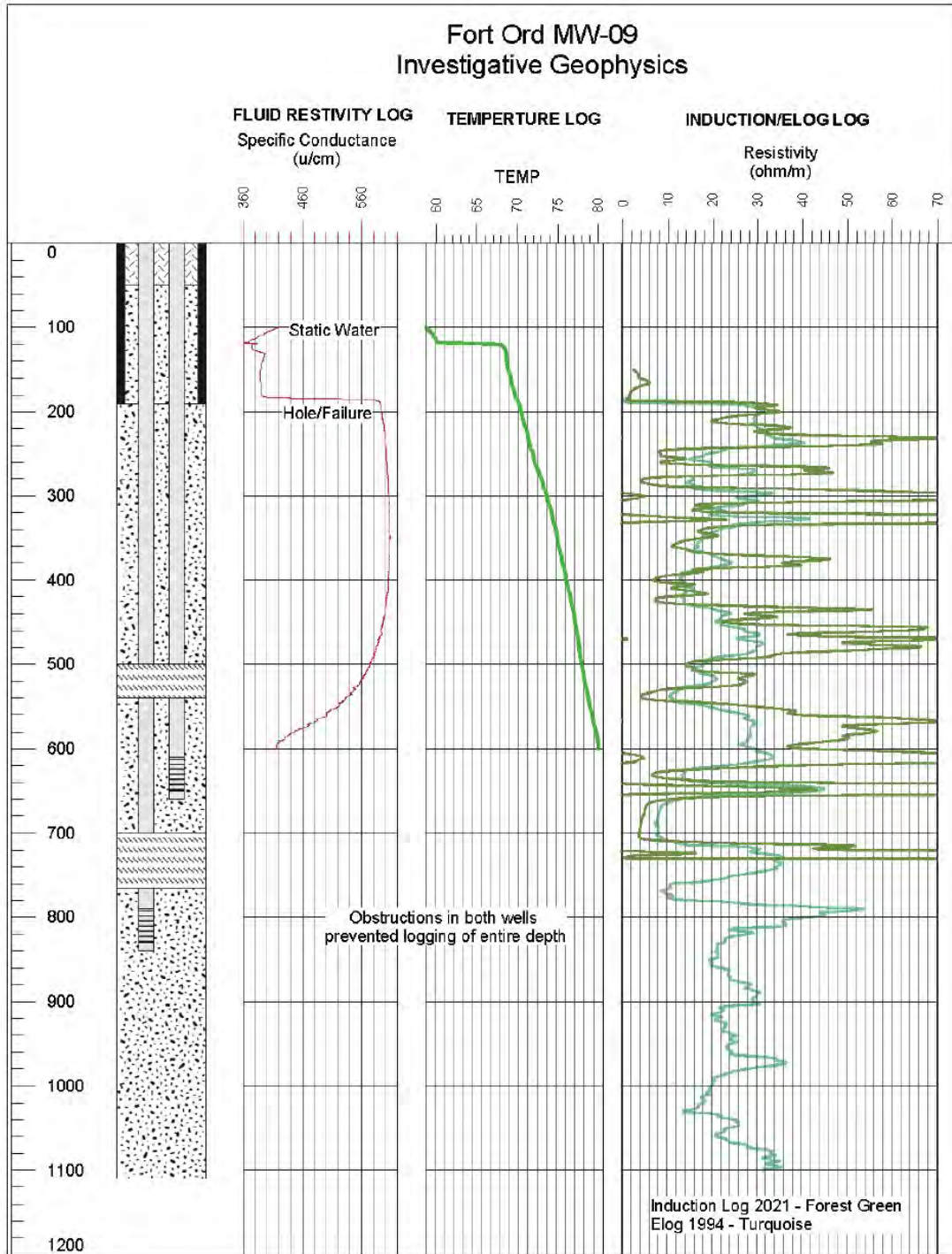
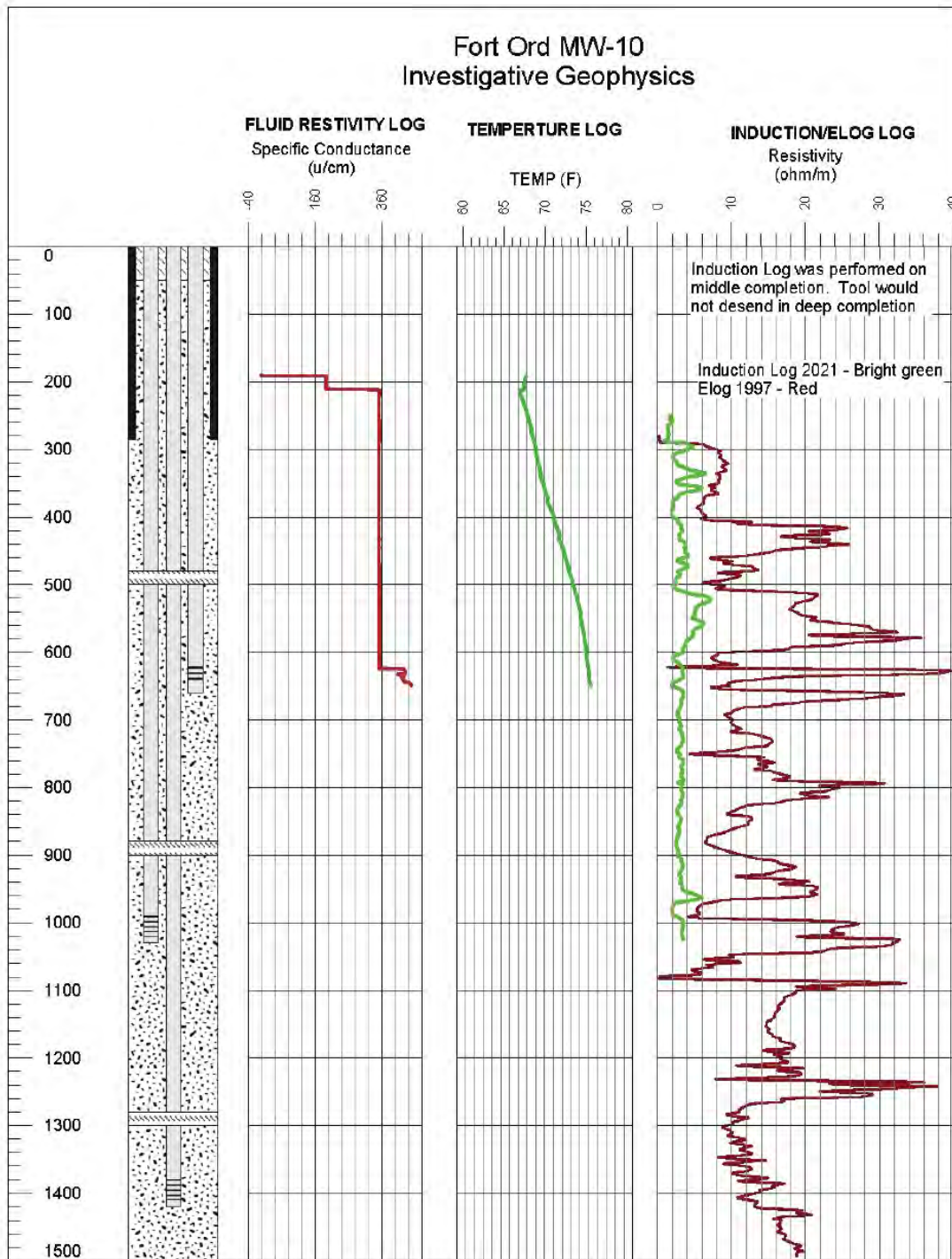


Figure 2



**SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE**

***** AGENDA TRANSMITTAL FORM *****

MEETING DATE:	April 14, 2021
AGENDA ITEM:	4
AGENDA TITLE:	Continued Discussion of Board Direction Regarding Concerns about Possible Detection of Seawater Intrusion in Monitoring Wells FO-9 and FO-10 Shallow
PREPARED BY:	Robert Jaques, Technical Program Manager

SUMMARY:

At its March 10, 2021 meeting the TAC reviewed and discussed a Draft Discussion Paper to provide information to the Board about the possible detection of seawater intrusion (SWI) in Monitoring Wells FO-9 and FO-10 Shallow. That paper was prepared in response to the requests made by the Board at their February 3, 2021 meeting at which they asked the TAC to undertake a number of actions regarding this, including:

1. Informing the Board what the TAC envisions if:
 - No Basin replenishment projects are constructed
 - The Cal Am Desalination Project is constructed
 - The Pure Water Monterey (PWM) Expansion Project is constructed
2. Recommending what the Watermaster should do right now if it is determined that SWI is determined to be occurring?
3. Reviewing the Seawater Intrusion Response Plan (SIRP) to determine if it is up-to-date and adequate at this time
 - Clarifying why the four criteria were selected in the SIRP to make the determination as to whether or not SWI is occurring
 - Providing more detail on SIRP response actions (listed only in general terms in the SIRP) e.g. specific steps to take, timelines for taking them, etc.
4. Performing induction logging of Monitoring Wells FO-9 and FO-10 so that data can be compared to the E-logs when the wells were constructed to see what information that may provide regarding SWI in those wells
5. Having Montgomery & Associates perform an analysis of groundwater flow directions and velocities to determine where groundwater in the vicinity of Monitoring Well FO-9 Shallow is moving and at what speed
6. Revisiting the previously discussed topics of (1) lowering the Natural Safe Yield (NSY) to match the lower NSY value in the Basin Management Action Plan (BMAP) Update of July 2019, and (2) changing from using NSY to using Sustainable Yield for Basin management purposes
7. Preparing a Gantt Chart showing the timing for actions that should be taken if it is determined that SWI is occurring

Attached is a revised version of the Discussion Paper, reflecting comments and suggested edits made by the TAC at its March 10, 2021 meeting, shown in Track Changes.

ATTACHMENTS:	Revised Discussion Paper
RECOMMENDED ACTION:	Provide final comments and suggested edits to the attached document, for incorporation into the version that will be presented to the Board at its May 5 th meeting

**DISCUSSION PAPER
ON BOARD-REQUESTED ACTIONS
REGARDING THE POSSIBLE DETECTION OF SEAWATER
INTRUSION (SWI)
IN MONITORING WELLS FO-9 AND FO-10 SHALLOW**

What is envisioned if:

a. No Basin replenishment projects are constructed.

If no replenishment projects are constructed there will be no way of achieving protective groundwater levels, short of drastically reducing pumping from the Basin and waiting for natural recharge from rainfall to begin to raise groundwater levels. Because the Basin is recharged mainly from inland areas, and since groundwater flows very slowly in the horizontal direction, it would be many years before natural recharge water could adequately raise groundwater levels near the coast. Modeling performed for the Watermaster by HydroMetrics in 2013 is described in the Technical Memorandum titled *Groundwater Modeling Results of Replenishment Repayment in the Seaside Basin*, dated April 5, 2013. This Technical Memorandum can be viewed in Attachment 10 of the Watermaster's 2013 Annual Report, which starts on page 143, at this link: <http://www.seasidebasinwatermaster.org/Other/Final%20Annual%20Report%202013%20A%202-5-13-1.pdf>. This modeling found that in order to achieve protective groundwater elevations in all six of the wells for which protective elevations have been established, all pumping from the Basin by both Standard and Alternate Producers would have to cease for a period of 25 years, with the exception of recovery of ASR injected water. Some of the wells achieved protective elevations sooner than 25 years, but these were wells in the shallow aquifers, not the deep aquifers where the majority of the production pumping occurs. ~~Clearly, unless a new water source becomes available to completely replace the Seaside Basin as a water supply source, it would be infeasible to discontinue all pumping from it.~~ **The 2013 modeling needs to be updated to reflect the impacts of changes in ASR injection quantities, injection of water through the Pure Water Monterey Project, changes in groundwater levels that have occurred since 2013, and other factors, so that it will provide a more accurate indication of current replenishment water needs. Because of the continued overpumping of the Basin since the 2013 report was prepared, the amount of replenishment water needed may now be greater.**

Clearly, unless a new water source becomes available to completely replace the Seaside Basin as a water supply source, it would be infeasible to discontinue all pumping from it. This means the Basin will continue to be vulnerable to SWI. Our consultants have told us that if protective groundwater elevations are not achieved, seawater will eventually enter the Basin's aquifers. This may be a slow process, but it would accelerate if groundwater levels continue to fall. It may already be occurring in the vicinity of Monitoring Well FO-9, and possibly in other areas of the Basin where there are no monitoring wells that would detect this. Because of the pumping depression in the Northern Coastal Subarea, intruded seawater will flow toward that due to the downward hydraulic gradient. Unless wells in that part of the Northern Coastal Subarea are relocated elsewhere, they would eventually begin pumping intruded seawater.

b. The Cal Am Desalination Project is constructed.

If the Desalination Project is constructed, it would offer the potential to produce water that could be used to replenish the Basin. Replenishment means water would be injected into the Basin and not pumped back out, so that it would raise groundwater levels. The 2013 HydroMetrics modeling report referred to above found that it would take approximately 1,000 acre-feet-per-year (AFY) of replenishment water, injected for a period of 25 years, in order to achieve protective elevations in all six of the protective elevation wells. This would be a total replenishment water volume of approximately 25,000 AF.

Because the Desalination Project would be designed to provide an adequate water supply to support expected growth in demand in future years, in its initial years of operation its production capacity would exceed the levels of demand, thus enabling the plant to produce replenishment water. An evaluation of the Desalination Project's replenishment water production potential was provided to the Board at its February 3, 2021 meeting, under Agenda Item XI.C, the subject of which was *Direct Staff Regarding Obtaining Additional Water to Recharge the Basin to Raise Groundwater Levels*. The attachment included with that Agenda Item, titled *Information on Issues Associated with Obtaining Additional Water to Recharge the Basin in Order to Raise Groundwater Levels* contained a Figure showing the potential amounts of replenishment water that the Desalination Project could provide out to the year 2050 under five growth scenarios, and assuming the Desalination Project began operation in 2020. A revised copy of that figure, reflecting the later start-of-operation dates used to prepare Gantt Chart 2, is shown below in Figure 1. Figure 1 shows that the Desalination Project could provide 25,000 AF of water for replenishment by 2028 under the average growth rate of the five growth scenarios.

c. The Pure Water Monterey (PWM) Expansion Project is constructed.

Similarly, the PWM Expansion Project would be designed to support expected growth in demand in future years. Therefore, just like the Desalination Project, in its initial years of operation its production capacity would exceed the levels of demand, thus enabling it to produce replenishment water. Under the later start-of-operation dates used to prepare Gantt Chart 2, the PWM Expansion Project does not go into operation until 2023. As a consequence, the PWM Expansion Project would not be able to provide more than a maximum of 22,010 AF of water for replenishment, and that would not occur until 2059. After that date all of the Pure Water Monterey Project's water would be needed to meet projected water demands, and it would not be able to provide replenishment water. By the end of 2048 the total potential amount of replenishment water the PWM Expansion Project could provide would be approximately 20,625 AF under the average growth rate of the five growth scenarios.

What should the Watermaster should do right now if it is determined that SWI is determined to be occurring?

If it is determined, using the criteria contained in the Watermaster's Seawater Intrusion Response Plan (SIRP), that SWI is occurring, then the Seawater Intrusion Contingency Actions contained in Section 4 of the SIRP should be implemented. These consist of:

- Action 1: Verification
- Action 2: Declaration of Seawater Intrusion
- Action 3: Notification
- Action 4: Pumping Redistribution Plan
- Action 5: Focus Supplemental Supplies to Halt and Reverse Seawater Intrusion

Each of these actions is described in more detail in the SIRP.

Under Action 4 the pumping redistribution plan is designed to contain observed seawater intrusion, and to protect production wells until a supplemental water supply is obtained. The pumping redistribution plan consists of a series of activities including relocating and reducing pumping in order to prevent intruded seawater from reaching production wells. It includes evaluating the potential benefit of installing additional monitoring wells.

Under Action 5 when a supplemental water supply becomes available for Basin replenishment, the Watermaster is to have the supplemental water used strategically to protect the Basin from further seawater intrusion, and to restore the Basin to pre-seawater intruded conditions. Supplemental supplies

are to be used to both offset pumping that causes the observed seawater intrusion, and to raise groundwater levels to reverse seawater intrusion, i.e. to achieve protective groundwater levels.

Regarding supplemental water supplies, the 2019 update of the Watermaster's Basin Management Plan includes a recommendation to develop a long-term financing plan for replenishment water, which reads as follows:

The Adjudication Decision identifies three separate budgets that the Watermaster oversees: (1) the Monitoring and Management Plan budget, (2) an annual Administrative budget, and (3) a Replenishment budget. These budgets are set every year by the Watermaster.

The replenishment assessments are only intended to offset overproduction that has occurred after the Decision was issued. The current replenishment assessments are not sufficient to buy water that offsets over-pumping that occurred prior to the Adjudication Decision. The over-pumping prior to the Adjudication Decision added to the Basin's deficit. Offsetting only the over-production that occurred after the Adjudication Decision may not be sufficient to raise groundwater levels in the Basin sufficiently to prevent seawater intrusion.

The Watermaster should develop a plan to address this issue.

Based on cost information provided by Cal Am, the currently projected cost of water from the Desalination Project is on the order of \$5,500/AF, and from the PWM Expansion Project is on the order of \$2,500/AF. Regardless of which project moves forward, acquiring 1,000 AFY of replenishment water will cost several million dollars per year.

The Watermaster should right now (1) start negotiating with both Cal Am and MPWMD/M1W to establish terms and conditions under which replenishment water can be provided by the Desalination Project or the PWM Expansion Project, respectively, and (2) start developing a plan to finance the cost of obtaining such replenishment water for the Basin.

Is the Seawater Intrusion Response Plan (SIRP) up-to-date and adequate at this time?

After thoroughly reviewing the Watermaster's 2009 SIRP, ~~only~~ it was found that only a few things ~~that I felt might be worth~~ would benefit from being updated:

1. Page 7 in the SIRP includes this paragraph: *Some production wells in the Seaside Groundwater Basin are screened across multiple depth zones, and the water qualities of these wells reflect a blend from multiple sources. These wells cannot be used for assessing water quality of individual aquifers. Water quality data are, however, collected at these wells; and seawater intrusion indicators should be established for these wells after sufficient data are acquired. Seawater intrusion indicators for wells completed across multiple depth zones should be the least restrictive indicators of all the screened zones. As additional geochemical data are collected through future groundwater monitoring, groundwater quality in these wells should be evaluated to determine site-specific indicators.*

We now have additional water level and water quality data since the SIRP was prepared. ~~Would it~~ It would be beneficial to develop site-specific indicators (e.g. chloride threshold values) for these wells.

2. Page A-15 in the SIRP includes this paragraph: *Hem (1989) suggested several other indicators for seawater intrusion, including the concentration ratio of calcium to magnesium (approximately 0.3 in seawater and greater in fresh water); the percentage of sulfate among all ions (approximately 8 percent in seawater and larger in fresh water); and the concentrations of minor constituents such as iodide, bromide, boron, and barium.*

These other indicators have thus far not been used when preparing the annual Seawater Intrusion Analysis Reports, but data to analyze these anions and cations has been collected in many wells since the SIRP was

prepared. In addition to these, Martin Feeney suggested other anion/cation analyses that might also be helpful, specifically:

- *Ca to HCO₃+SO₄ (mg/l) - greater than 1 can be indicative of SWI*
- *Ratio of Chloride to Bromide (mg/l) – Seawater-297, Pajaro GW –*
- *Simpson Ratio (Todd 1959) – Ratio of Cl/HCO₃ + CO₃ (mg/l) => good quality (< 0.5), slightly contaminated (0.5-1.3), moderately contaminated (1.3-2.8), injuriously contaminated (2.8-6.6), highly contaminated (6.6 – 15.5)*
- *Base Exchange Index (BEX) – BEX = Na + K + Mg – 1.0716 Cl (all units in meq/l[2]); positive value indicates freshening, negative value indicates salinization.*

~~I believe~~ It would be beneficial at this time to perform these analyses on Monitoring Well FO-9 Shallow, to help see if the source of the increasing chloride levels can be determined. A Work Plan was developed for us by HydroMetrics in 2017 after we became concerned about seeing fluctuations in chloride levels in some of our Sentinel Wells. A copy of that Work Plan, which we never pursued after deciding that water quality samples taken in the Sentinel Wells were not representative of the water quality in the aquifers where these wells are located, is attached. If at this time we only performed the anion/cation analyses described in the Work Plan, and had only an informal report prepared on the findings of those analyses as they pertain to determining the source of the increased chloride in FO-9 Shallow, the cost would be much lower than that shown in Table 1 of the Work Plan. This information could be helpful in determining whether or not the increased chloride levels are being caused by intruding seawater, and thus what actions the Watermaster should take.

Comments not involving updating of the SIRP:

- Page A-6 in the SIRP contains this paragraph: *No single analysis definitively identifies seawater intrusion, however by looking at various analyses we can ascertain when fresh groundwater mixes with seawater. At low chloride concentrations, it is often difficult to identify incipient seawater intrusion. Mixing trends between groundwater and seawater are more easily defined when chloride concentrations exceed 1,000 milligrams per liter (mg/L). This is due to the dominance of natural variation in fresh water chemistry at chloride concentrations below 1,000 mg/L (Richter and Kreitler, 1993). Chloride concentrations greater than 1,000 mg/L are clearly indicative of seawater intrusion in the local aquifers.*

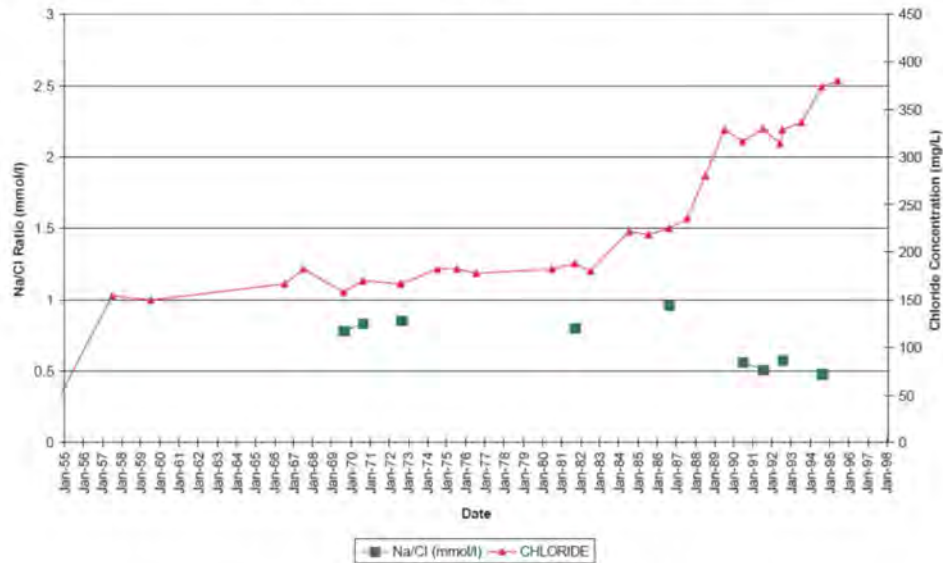
It is interesting to know that it takes higher chloride levels than we are seeing in any of our wells before it is likely that mixing trends between freshwater and seawater will be easily seen.

- Page A-11 in the SIRP contains this paragraph: *Example graphs showing historical chloride concentration increases indicative of seawater intrusion are shown in Figure 8 and Figure 9. Figure 8 graphs steadily increasing chloride concentrations in a shallow well in the Salinas Valley. Figure 9 graphs increasing chloride concentrations in a well in the Pajaro Valley. Both of these graphs show that the rise in chlorides is a lengthy and persistent process; chloride concentrations began to increase in the representative Salinas Valley well in 1982, and took six years before exceeding the Safe Drinking Water Act secondary drinking water standard of 250 mg/L. This long-term and relatively slow increase in chlorides suggests that while chloride concentrations are strongly indicative of seawater intrusion, it often takes time for the increasing chloride trend to be recognizable.*

It is interesting to know that it may take a trend of increasing chloride levels a long time to be easily recognized. It is also interesting to note that well FO-9 Shallow currently is showing chloride levels in the 90 mg/L range, whereas the Safe Drinking Water Act secondary drinking water standard is 250 mg/L, much higher than the level in FO-9 Shallow.

• Page A-14 in the SIRP contains this paragraph: *In addition to plotting increasing chloride concentrations, decreasing sodium/chloride ratios are plotted on Figure 8 and Figure 9. The strong correlation between the two indicators of seawater intrusion can be observed on these two figures. The potential utility of sodium/chloride ratios as an early indicator of seawater intrusion is shown on Figure 9. This figure shows that by August 1988, chloride concentrations in the Pajaro Valley well had remained relatively constant, yet sodium/chloride ratios were beginning to drop, suggesting incipient seawater intrusion. By September 1990, the rising chloride levels can be clearly correlated to dropping sodium/chloride ratios; definitively associating the t.*

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Figure 8: Historical Chloride Concentrations and Sodium/Chloride Ratios for a Well in Salinas Valley Showing Incipient Intrusion (Source: MCWRA)

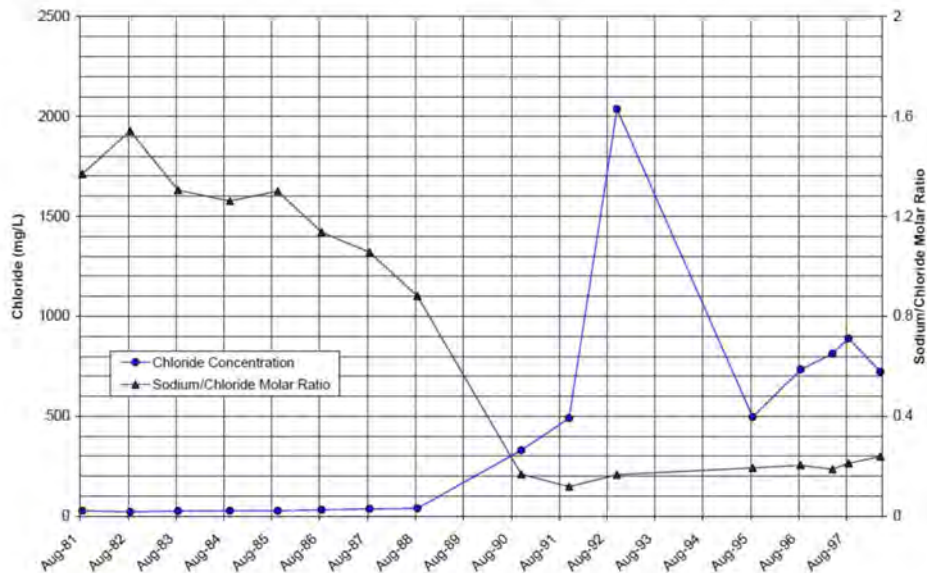


Figure 9: Historical Chloride Concentrations and Sodium/Chloride Ratios for a Well in Pajaro Valley Showing Incipient Intrusion (Data source: PVWMA)

Why were the four criteria listed in the SIRP selected in order to make the determination as to whether or not SWI is occurring?

The following four indicators of SWI are used in the SIRP. A brief explanation of why each of these indicators were selected is provided below.

Indicator 1: Increasing Chloride Concentrations

Unusually high or steadily increasing chloride concentrations are one of the most commonly used indicators of seawater intrusion. At low chloride concentrations, trends are often as important as absolute concentrations because of natural variations in groundwater chemistry. While chloride concentrations are strongly indicative of seawater intrusion, it often takes time for the increasing chloride trend to be recognizable due to the long-term and relatively slow increase in chlorides during seawater intrusion.

Indicator 2: Decreasing Sodium/Chloride Molar Ratios

A rapid decline in the molar ratio of sodium to chloride may indicate seawater intrusion. In the early stages of seawater intrusion, sodium often replaces calcium on the aquifer's clay particles through ion exchange before significant chloride increases are observed. This effectively removes sodium from the water, and sodium/chloride molar ratios drop. The ratio of sodium to chloride in groundwater can therefore sometimes be used as an early indicator of seawater intrusion. Sodium/chloride molar ratios can also be used to differentiate between seawater intrusion and other sources of salinity. The literature suggests that sodium/chloride molar ratios in advance of a seawater intrusion front will be below 0.86 molar ratio.

Indicator 3: Visual Inspection of Cation/Anion Ratios

Seawater intrusion is often indicated by graphically analyzing shifts in groundwater quality. Two common graphical techniques for these analyses are Piper diagrams and Stiff diagrams.

Indicator 4: Chloride Concentration Maps

In basins experiencing seawater intrusion, chloride concentrations will be highest at the coast. If chloride concentrations have a distribution that can be contoured, annual chloride iso-concentration maps can be generated. This would show whether seawater is migrating in from the coast. Chloride data compiled in the annual Seawater Intrusion Analysis Reports for the shallow aquifer has not shown a distribution that could be contoured. Therefore, the data were simply plotted on the maps but not contoured.

Provide more detail on SIRP response actions (listed only in general terms in the SIRP) e.g. specific steps to take, timelines for taking them, etc.

As noted above, these are the response actions listed in the SIRP:

- Action 1: Verification
- Action 2: Declaration of Seawater Intrusion
- Action 3: Notification
- Action 4: Pumping Redistribution Plan
- Action 5: Focus Supplemental Supplies to Halt and Reverse Seawater Intrusion

The first three Actions are administratively straightforward and are clearly described in the SIRP.

Action 4 involves the following eight steps, some of which should be applied iteratively:

- ***Discontinue or substantially reduce pumping the Impacted Well(s).*** *If seawater intrusion has been declared for a production well, pumping at this well shall be discontinued or substantially reduced as soon as possible, but no longer than 30 calendar days after the Declaration of Seawater Intrusion. If seawater intrusion has been declared for only monitoring wells, this activity is unnecessary.*

Since the current well of concern (FO-9 Shallow) is a monitoring well, not a production well, this step is not applicable.

• **Identify At Risk Well(s) where seawater intrusion might occur.** *At Risk Wells are production wells that have the potential to become impacted by seawater intrusion based on their proximity to the Impacted Well(s), local groundwater gradients, and other conditions.*

Using either the Seaside Basin Groundwater Model, or by performing manual analyses of groundwater level data, the direction (and potentially the speed of movement) of groundwater containing the increasing chloride levels in FO-9 Shallow can be estimated. This will enable the identification of the production well(s) that will be at the greatest risk of experiencing increased chloride levels. From a discussion with Montgomery & Associates (Georgina King) it will be quicker and considerably less expensive to do this manually than it will be to use the Groundwater Model. As time goes on and the Basin reacts to the impacts of injection and extraction of water from the Pure Water Monterey Project, it might be necessary to use the Groundwater Model. However, the results from the manual analysis should be adequate to make decisions at this time.

• **Identify and/or install additional monitoring wells.** *The Watermaster will evaluate the benefit of installing additional groundwater monitoring wells to evaluate the movement of seawater intrusion towards the At Risk Well(s). If this evaluation concludes that monitoring wells should be installed, the Watermaster will pursue installation of these wells with due diligence.*

As reported to the Board at its February 3, 2021 meeting, installing a new monitoring well will be quite costly and will only provide data from the location where the well is installed. However, a new monitoring well would be useful in seeing how water quality in its location is changing over time. As discussed above, using the groundwater model, or manually estimating groundwater flow patterns using available groundwater level data, would provide information on how groundwater is moving in a larger area, but would only be as accurate as the model or the manual plotting can predict. The model is currently not capable of predicting changes in water quality, only the movement of groundwater. A supplemental software would need to be added to the model to predict water quality changes. In the Zoom meeting with the Watermaster's hydrogeologic consultants held on February 2, 2021 there was general consensus that performing a geophysical survey would be a better and more cost-effective means of testing the hypothesis that seawater is coming in via the shallow sand formations near the coastline and gradually working its way downward into the Paso Robles aquifer, than it would be to put in a monitoring well at this time. This information could also be helpful in finding the best location for a new monitoring well, if it was ultimately decided that it would be beneficial to install a new monitoring well.

• **Estimate the groundwater conditions that protect production wells.** *The Watermaster shall estimate the maximum acceptable groundwater gradient between the Impacted Well(s) and the At Risk Well(s) that prevents seawater intrusion from reaching the At Risk Wells before a supplemental supply is obtained, currently estimated to be 2015. The Watermaster should further estimate the expected total dissolved solids (TDS) and chloride concentrations over time that might be observed at existing or new monitoring wells under this maximum groundwater gradient.*

We now know that no supplemental supply will be available to the Basin by 2015. In fact there is currently no estimated date for which a new supplemental supply, to augment the existing Pure Water Monterey Project, will become available. The two potential supplemental supply sources are the Cal Am Desalination Plant and the Pure Water Monterey Expansion Project. Consequently, it would be impossible at this time to estimate the maximum acceptable groundwater gradient required under this Action. Once a date is known upon which a supplemental supply will be available to the Basin, this Action could be carried out using the groundwater model, or manually estimating groundwater flow patterns using available groundwater level data, to estimate the maximum acceptable groundwater gradient.

• **Identify and evaluate production wells' influence on observed seawater intrusion.** *All production wells in the Seaside Groundwater Basin shall be evaluated and ranked for their influence on the groundwater gradients that are causing seawater intrusion and migration. The Watermaster shall estimate one or more recommended pumping scenarios that will achieve the maximum acceptable*

gradient between Impacted and At Risk well(s).

As noted above, it is currently not possible to estimate the maximum acceptable groundwater gradient. Therefore, it is not currently possible to evaluate and rank production wells for their influence on those gradients. However, it may be possible using the groundwater model to draw some conclusions, based on locations and production quantities, that would enable estimating which wells will likely have the greatest effect on the movement of SWI into the Basin.

• **Increase monitoring frequency.** *The Watermaster should increase the monitoring frequency of the Impacted Well(s), monitoring wells, and At Risk Well(s) to evaluate the progress of the seawater intrusion. Groundwater elevations at these wells should be measured monthly, and groundwater samples should be collected from these wells and analyzed monthly for major cations and anions. The groundwater gradient should be analyzed every month to confirm that the pumping reduction is having the planned effect.*

The water quality monitoring frequency in FO-9 Shallow has already been increased from twice a year to quarterly, and the monitoring frequency of FO-10 Shallow has already been increased from annually to quarterly. If this more frequent monitoring data provides further indication of the occurrence of SWI at well FO-9 Shallow, then it would be appropriate to increase this frequency to monthly. These wells are already being monitored monthly for groundwater level, so that requirement is already being fulfilled. The only well within the Seaside Basin currently showing the appearance of potentially being impacted by SWI is monitoring well FO-09 Shallow. Since this is not a production well, pumping from it cannot be reduced. However, as described above, if it is possible to estimate which production well(s) will likely have the greatest effect on the movement of SWI, then efforts to reduce pumping from those well(s) could be undertaken as an early proactive step to control the movement of SWI, if it is occurring.

• **Re-evaluate the Operating Yield.** *In accordance with the Amended Decision, the Watermaster should re-evaluate the Operating Yield to prevent further Material Injury.*

The Seaside Groundwater Basin 2018 Basin Management Action Plan (BMAP) dated July 19, 2019 estimated the Natural Safe Yield (NSY) for the Basin as a whole to be 2,370 AFY. This is lower than the 3,000 AFY Decision-established NSY. At its June 5, 2019 meeting the Board received a presentation on this BMAP and determined to ramp-down the Operating Yield to match the 3,000 AFY NSY for the time being while awaiting completion of the Groundwater Sustainability Plan (GSP) for the Monterey Subbasin. The Seaside Basin groundwater level impacts that would result from implementation of the Monterey Subbasin GSP could then be evaluated. At this same meeting the Board also determined that after that evaluation was made, it would be appropriate to reevaluate the NSY and also to consider changing from the NSY approach to a Sustainable Yield (SY) approach for Basin management purposes. If the determination is made that SWI is occurring at FO-9 Shallow, then it would be appropriate to now consider both (1) lowering the NSY from 3,000 AFY to 2,370 AFY and/or (2) changing to the SY approach.

The following activity shall be initiated within 90 calendar days of the Water master Board adopting recommendations from the previous activities:

• **Modify pumping to achieve the desired groundwater gradient.** *Groundwater pumping at the most influential production wells should be modified to achieve the groundwater gradient calculated above.*

This Action could be undertaken after it becomes possible to calculate the maximum acceptable groundwater gradient.

Action 5 pertains to the use of a supplemental water supply for Basin replenishment. Action 5 reads as follows: *When a supplemental water supply becomes available for Seaside Groundwater Basin replenishment, the Watermaster will seek to have the supplemental water used strategically to protect the Seaside Groundwater Basin from further seawater intrusion, and to restore the Basin to pre-seawater*

intruded conditions. Supplemental supplies should be used to both offset pumping that causes the observed seawater intrusion, and to raise groundwater levels to reverse seawater intrusion.

Since no supplemental water supply is currently available, it is not currently possible to carry out this Action. Further, simply having a supplemental supply become available would not immediately halt the advance of seawater intrusion. The advance would only be sufficiently halted by raising groundwater levels such that there was no downward gradient between the seawater intruded area(s) and the production wells that are At Risk. As the groundwater levels rise, the rate of advance would slow. However, it would be a complicated analysis requiring the use of the Groundwater Model, and making a number of assumptions, to determine how best to use the supplemental water to protect production wells against seawater intrusion.

Perform induction logging of Monitoring Wells FO-9 and FO-10 so that data can be compared to the E-logs when the wells were constructed to see what information that may provide regarding SWI in those wells.

At its February 3, 2021 meeting the Board provided direction to staff to perform this work. A scope of work and cost proposal to perform this work has been requested, and will be authorized by the issuance of a contract with Martin Feeney once the proposal is received. It is expected that this work will be performed in March 2021.

Perform an analysis of groundwater flow directions and velocities to determine where groundwater in the vicinity of Monitoring Well FO-9 Shallow is moving and at what speed.

At its February 3, 2021 meeting the Board provided direction to staff to perform this work. A scope of work and cost proposal to perform this work has been requested, and will be authorized by the issuance of a contract with Montgomery & Associates once the proposal is received and the work is approved by the Board. It is expected that this work will be performed later this Spring following Board approval.

Revisit the previously discussed topics of (1) lowering the Natural Safe Yield (NSY) to match the lower NSY value in the Basin Management Action Plan (BMAP) Update of July 2019, and (2) changing from using NSY to using Sustainable Yield for Basin management purposes.

As noted above it would be appropriate to ~~re~~ revisit the Board's previous decision on this if the determination is made that SWI is occurring at any location within the Seaside Basin.

Prepare a Gantt Chart showing the timing for actions that could be taken in response to determining that SWI is occurring.

Two Gantt Charts were prepared, Gant Chart 1 showing activities to carry out the SIRP itself, and Gant Chart 2 showing the supplemental supply projects and their use in replenishing the Basin.

Preparing these charts required making a number of assumptions, as follows:

1. Since it is not currently known when or if the Cal Am Desalination Plant or the Pure Water Monterey Expansion Project will be constructed, the Gantt Chart 2 shows both of these projects. Construction of the Desalination Plant was assumed to start on October 1, 2021, following an assumed Coastal Commission permit approval sometime in the summer of 2021, and to have a 27-month construction period. Construction of the Pure Water Monterey Expansion Project was assumed to start on January 1, 2022, following an assumed approval of the Supplemental EIR in the summer of 2021 and completion of design and permitting by the end of 2021, and to have an 18-month construction period.
2. Although the SIRP calls for the Watermaster to initiate all of the activities under Action 4 – Pumping Redistribution Plan within 90 days after the Declaration of Seawater Intrusion, I assumed

that the Board would want to start those activities as soon as practically possible, rather than waiting 90 days.

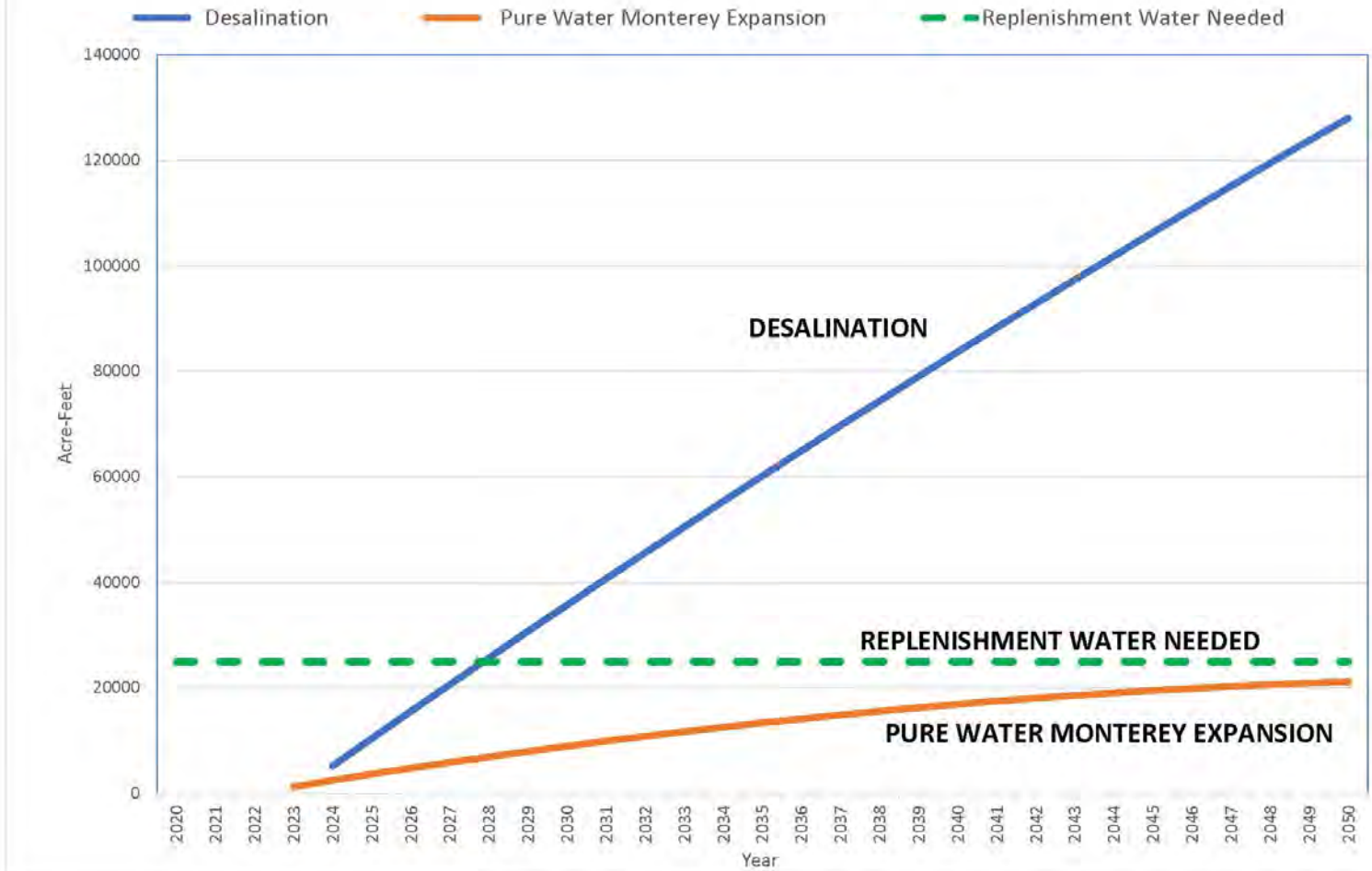
3. The durations of many of the activities are very preliminary and are based on past experience in carrying out similar types of activities. They will likely to need to be revised based on input from the consultants and contractors that will be performing certain of the activities, the amount of TAC and Board deliberation on certain of the activities, and other factors.

4. Construction of new monitoring well(s) under Task 12 in Gantt Chart 1 will be dependent on how long it takes to obtain permits and right-of-way for them, and the availability of the well drilling contractor to perform the work.

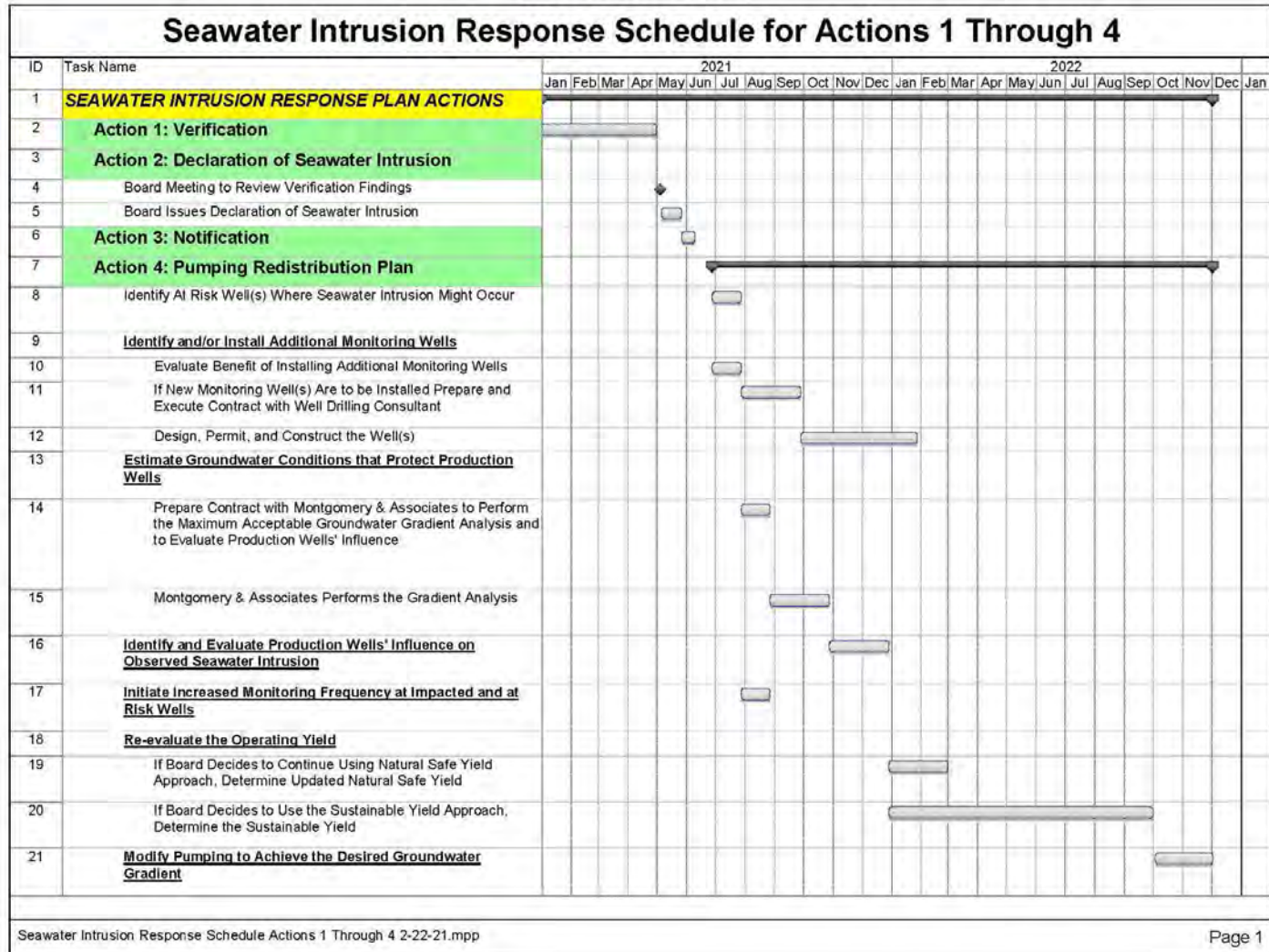
5. The 8-month duration of Task 20-Determine Sustainable Yield in Gantt Chart 1 is based on the proposal received from Montgomery & Associates dated February 1, 2019

6. The duration of Task 21-Modify Pumping will be dependent on the ability of producers (mainly Cal Am and the City of Seaside) to relocate their pumping to other wells, or to install replacement wells for the ones that are At Risk.

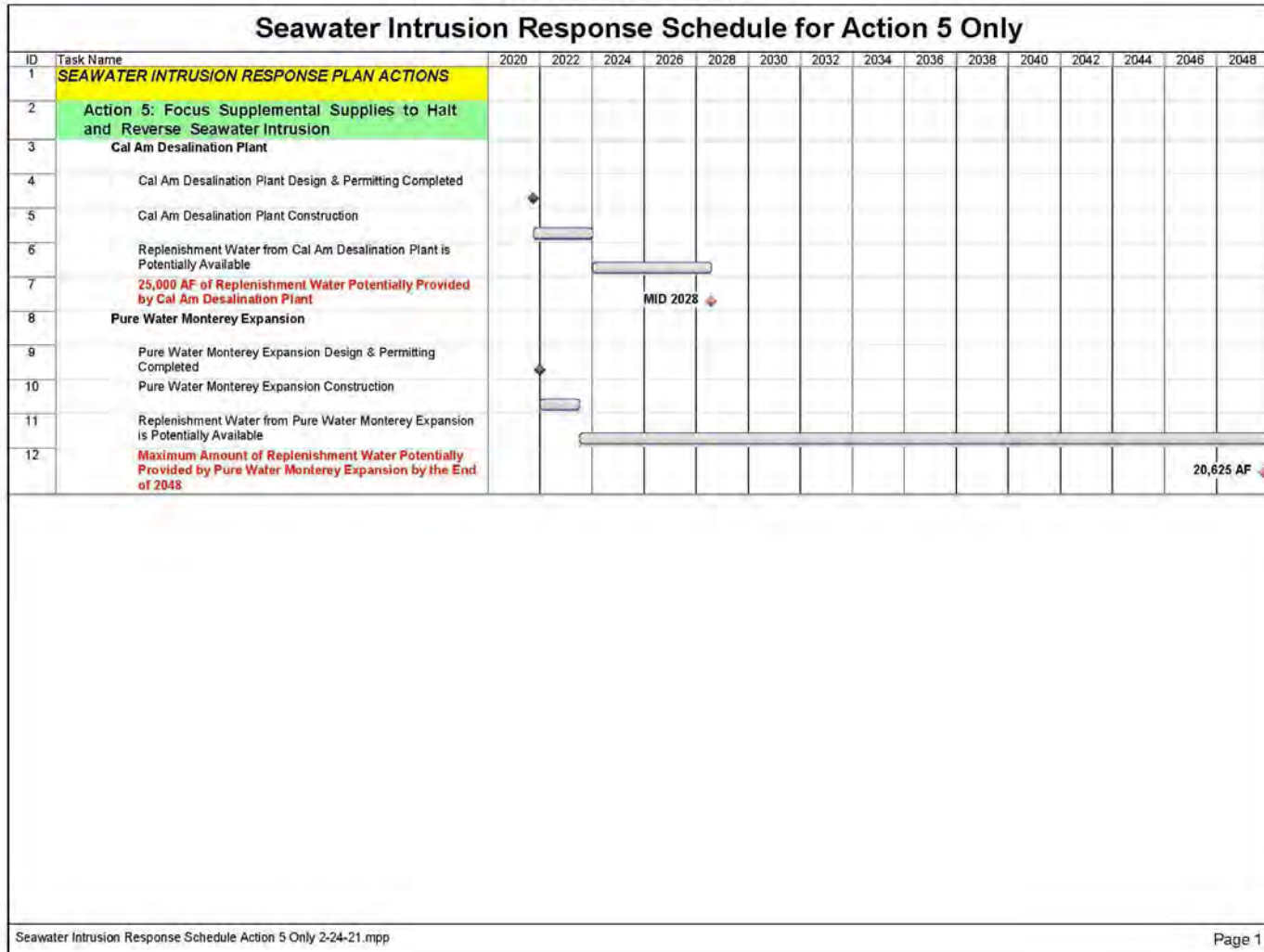
Figure 1. Comparison of Cumulative Excess Capacity Available with Pure Water Monterey Expansion and Desalination Under the Average of All 5 Growth Rate Scenarios



GANTT CHART 1



GANTT CHART 2



Mr. Robert S. Jaques
Seaside Groundwater Basin Watermaster
83 Via Encanto
Monterey, CA 93940

February 2, 2017

Subject: Proposed Work Plan to Investigate Sources of Fluctuating Chlorides in the Sentinel Wells

Mr. Jaques:

This letter outlines a proposed Work Plan to investigate sources of fluctuating chloride in some of the Seaside Basin's coastal sentinel wells. Preparation of the Work Plan was approved at the Technical Advisory Committee's January 11, 2017 meeting.

The Work Plan objectives are:

1. Investigate the source(s) of elevated chlorides.
2. Determine the mechanism causing the chloride fluctuations observed in recent groundwater samples.

Objective 1 – Investigate the Source of Elevated Chlorides

No single water quality analysis, or ratio between water quality constituents, can definitively differentiate between potential sources of chloride. This is partially because the source of the elevated chlorides may be from similar sources, e.g. ocean water. Figure 1 shows a number of potential salinization mechanisms, with three mechanisms highlighted are potential mechanisms introducing higher chloride water to the groundwater basin. Upwelling is not shown on Figure 1. The source of any potential upwelling water is the underlying Monterey Shale, which is a marine sediment containing connate water (seawater trapped at the time of sedimentation) that reflects its marine origin. The differences in the water chemistry of the various sources reflect the

amount of time the saline water has been separated from the ocean, and the amount of time the saline water has interacted with sediments. The proposed analyses can assess whether the chlorides are from recent seawater, or seawater that has been in contact with sediments for an extended period of time. Seawater intrusion, however, could occur through sediments that have had seawater in them for an extended period of time (bottom arrow on Figure 1), and that are geochemically similar to connate water. For this reason, the analyses may not definitively identify the source of the chlorides.

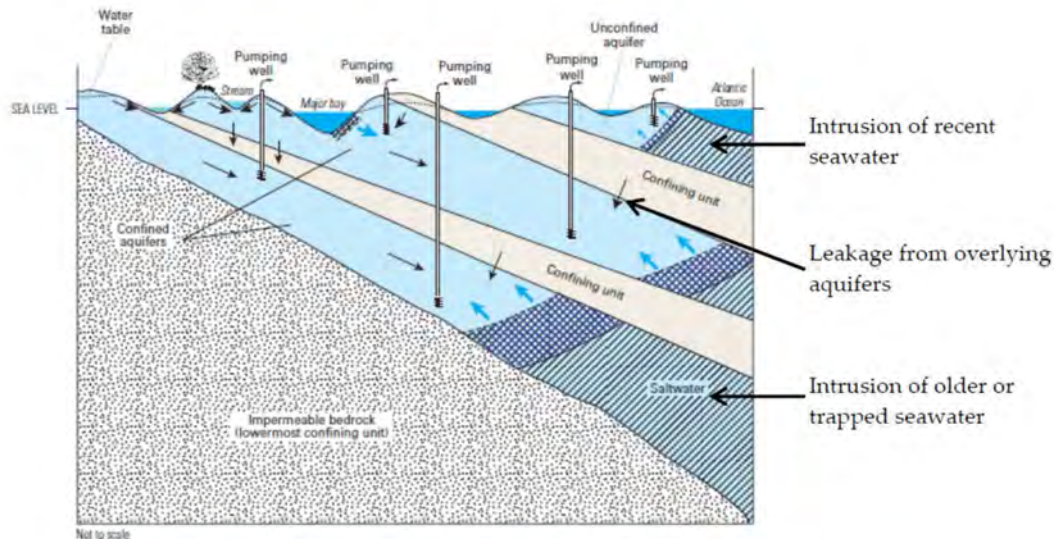


Figure 1: Potential Salinization Mechanisms (from Barlow, 2003)

As described above, comparing results from a number of analyses can suggest the source of elevated chlorides, although not always definitively. Typically, all or a combination of the following analyses are undertaken to investigate chloride sources (Izbicki et al., 2005; Martin, 1984; Klassen et al., 2014):

- Physical properties (temperature, pH, specific conductivity);
- Major-ion composition (piper and stiff diagrams; Na/Cl, Ca/Mg, Ca/(HCO₃ and SO₄), and Cl/EC plots);
- Selected minor ion and trace-element concentrations: boron, iodide, bromide, and barium;
- Minor ion ratio vs. chloride plots, e.g., Cl/Br vs. Cl, Cl/I vs. Cl, Cl/Ba vs. Cl, Cl/B vs. Cl); and
- Isotopic composition of groundwater using the stable isotopes of deuterium in hydrogen, oxygen-18 in oxygen, sulfur-34 in sulfur, and carbon-13 in inorganic carbon.

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To control the costs of differentiating between differing chloride sources, we have divided the chloride source assessment into two phases.

Phase I

Phase I will compare the groundwater quality from the Northern Coastal Subarea with (1) seawater and (2) the groundwater quality in selected Laguna Seca wells or other nearby wells that are influenced by connate water in the underlying Monterey Shale. Most of the analyses on major ions are already included in the annual SIARs, but they do not provide an indication of the source(s) of the elevated chloride levels in the Sentinel Wells.

For Phase I, we recommend focusing analyses on the minor ions of boron, iodide, bromide, and barium, and including some additional major ion analyses as listed in the bullets below. The minor ion analyses were also recommended in the 2016 SIAR and have been used together with other indicators in similar studies to determine chloride sources in Santa Barbara and Oxnard (Martin, 1984 and Izbicki et al., 2005, respectively). The Watermaster has been analyzing samples from selected coastal monitoring and production wells for iodide, bromide, boron, and barium since 2012. Figure 2 shows the location of wells with minor ion data.

The Phase I work will consist of:

- Compare chloride to iodide ratios. Iodide is strongly depleted in seawater as a result of biological sequestration by marine organisms, such as kelp. Enriched iodide in groundwater indicates long residence time where iodide has had the opportunity to leach out of the sediments and may build up in groundwater (Kim et al., 2002). Changes in the chloride to iodide ratio in high-chloride water are often diagnostic of the source of high-chloride water in coastal aquifers (Kim et al., 2002).
- Compare barium concentrations. High barium concentrations are presumptive (but not conclusive) evidence that the source of high chloride in groundwater might be from the underlying Monterey Shale and not seawater. Barium is a reactive chemical constituent. Its concentrations may provide a means of determining whether ocean water or water from the Monterey Shale is the source of increasing chloride levels in the groundwater. The concentration of barium in seawater is typically less than 100 µg/L, whereas its concentration in groundwater from connate water sources is generally greater.

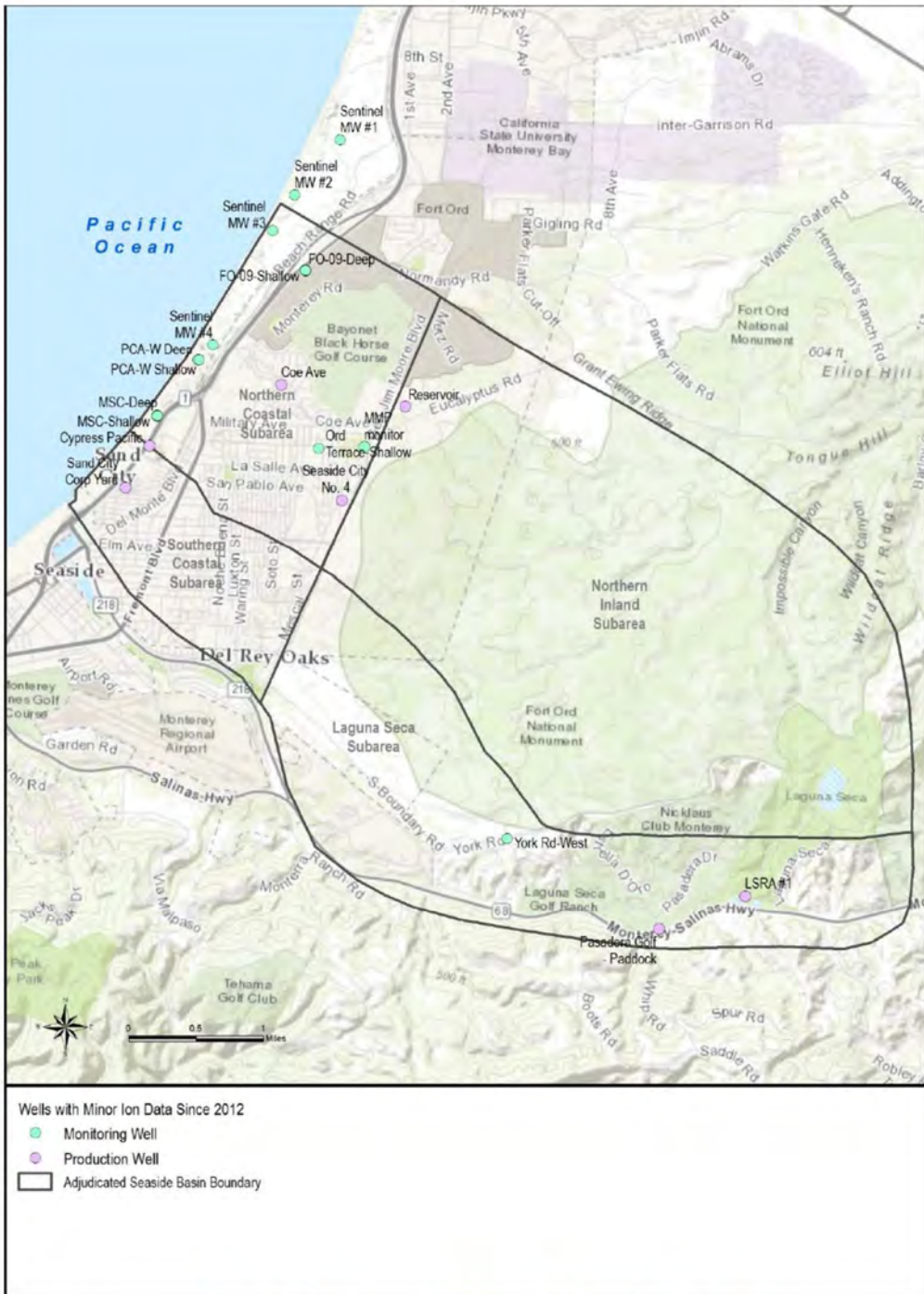


Figure 2: Location of Wells with Minor Ion Data

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- Compare chloride to boron ratios. Chloride-to-boron ratios in the higher-chloride groundwater samples in the Sentinel Wells that are substantially less than the ratio for seawater is presumptive evidence that the source of the increased chloride levels is groundwater from the underlying Monterey Shale.
- Compare chloride to bromide ratios. Bromide is a generally nonreactive dissolved species, and like chloride, it behaves conservatively in groundwater environments (i.e., it does not take part in significant ion exchange reactions, nor are adsorbed onto mineral surfaces). Seawater typically has a bromide concentration of about 67 mg/L. Chloride-to-bromide ratios plotting along the native freshwater/seawater mixing line (blue line on Figure 3) may indicate evidence of groundwater mixing with seawater.

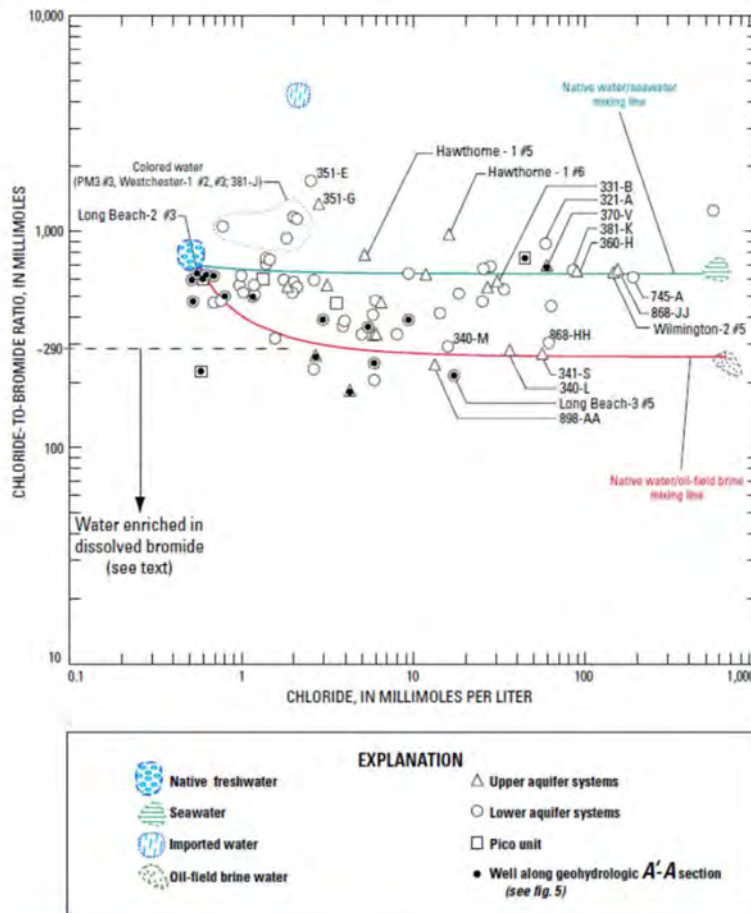


Figure 3: Example Chloride-to-Bromide Ratio of a Function of Chloride (from Land et al., 2004)

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- Investigate whether calcium enrichment has occurred in any coastal monitoring wells. Evaluate whether calcium enrichment is taking place by plotting ratios of Ca/Mg and Ca/(HCO₃ and SO₄). Calcium enrichment may be occurring if Ca/Mg > 1 and Ca/(HCO₃ and SO₄) > 1. If it calcium enrichment is taking place, it may indicate incipient seawater intrusion.
- Profiling conductivity and temperature within each of the Sentinel Wells when they are next sampled in September/October 2017 may indicate whether upwelling is occurring within the wells.

Phase II

If determination of the source of elevated chloride levels in the Sentinel Wells from Phase I is inconclusive, it may be necessary to evaluate the isotopic composition of the coastal groundwater as a second phase of study. Isotopic analysis may be used to distinguish between waters of similar chemical character and to understand the source and movement of groundwater near the coast. Typically, the stable isotopes of deuterium in hydrogen and oxygen-18 in oxygen are the only isotopes analyzed. However, in Oxnard, Izbicki et al. (2005) included analysis of the stable isotopic composition in sulfur and inorganic carbon to evaluate the source of these dissolved constituents and to evaluate geochemical processes that may have altered their concentration and isotopic composition over time. If this phase is necessary, laboratory analyses will be needed from either Lawrence Livermore Laboratory, U.C Santa Cruz, University of Arizona or the USGS. If Phase II is required, a detailed work plan will be developed for TAC and Board approval.

Objective 2 – Mechanism for Fluctuating Chloride Concentrations

To determine a mechanism for the fluctuations in chloride concentrations in the Sentinel Wells, we will first need to identify the likely source of chloride (Objective 1) and also examine groundwater quality results from the October 2017 sampling event. These data are key to establishing a relationship between groundwater levels and chloride fluctuations.

As part of the analysis of fluctuating chloride concentrations, we propose to use a specialized diagram that can be used to categorize the hydrochemical environment of water types, also known as a hydrochemical facies evolution diagram (Figure 4) that has been used to track the onshore (intrusion) and offshore (freshening) movement of seawater in aquifers (Giménez-Forcada, 2010). Using the percentage content of principal major ions, the multi-rectangular diagram classifies groundwater by hydrochemical environment.

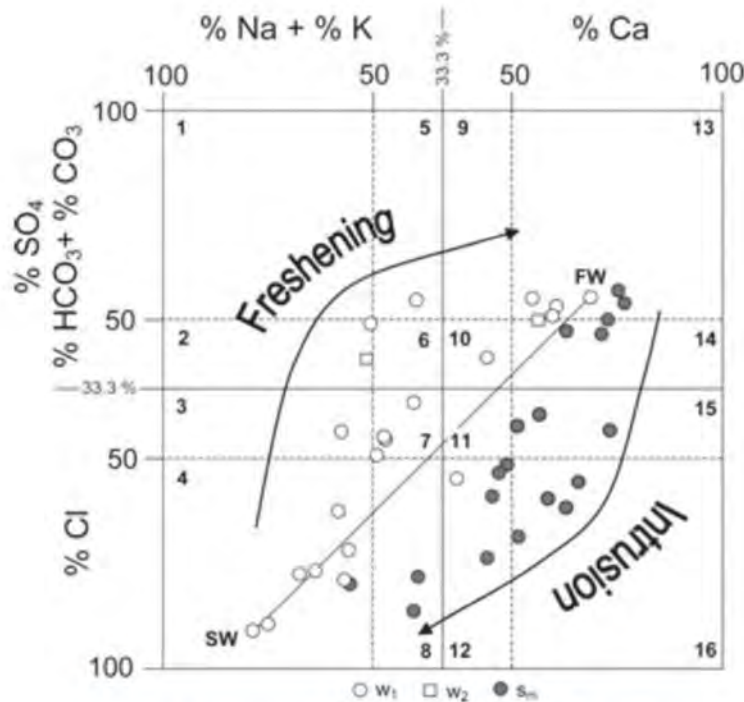


Figure 4: Example Hydrochemical Facies Diagram

References

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Operations and BC Ministry of Environment. June 2014. Accessed online at: https://www.sfu.ca/personal/dallen/Chemical%20Indicators%20of%20SWI_Final.pdf, January 25, 2017.

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Martin, P. 1984. Ground-water monitoring at Santa Barbara, California: phase 2 – effects of pumping on water levels and on water quality in the Santa Barbara ground-water basin. US Geological Survey Water-Supply Paper 2197. pp. 31

United States Geological Survey. 1996. Seawater intrusion in a coastal California aquifer. Fact Sheet 6.

Estimated cost for Phase I

The estimated cost for Phase I (Objectives 1 and 2) are included in Table 1 at the end of this Work Plan. Work to investigate the source of elevated chlorides can be completed within six weeks from receiving a notice to proceed. However, work on determining the mechanism causing the chloride fluctuations can only be completed in November 2017 once the 4th quarter samples have been analyzed and conductivity and temperature profiling has been completed.

It is assumed that HydroMetrics WRI will prepare for and attend two TAC meetings by phone to present the results. The cost estimate includes time for Derrik Williams to present study results in-person at up to two Board meetings, if needed.

Please call if you have any questions.

Sincerely,



Georgina King, Principal Hydrogeologist
HydroMetrics Water Resources Inc.

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Table 1: Cost Estimate for Phase I

Phase I Tasks	HydroMetrics WRI Labor				Other Direct Costs	TOTALS
	Derrick Williams	Georgina King	Labor Total			
	President	Principal Hydrogeologist	Hours	(\$)		
Rates	\$220	\$195			(\$)	(\$)
Task 1: Characterize Monterey Shale Groundwater Chemistry	2	12	14	\$ 2,780	\$ -	\$ 2,780
Task 2: Analyze Major Ions	1	8	9	\$ 1,780	\$ -	\$ 1,780
Task 3: Analyze Minor Ions	2	16	18	\$ 3,560	\$ -	\$ 3,560
Task 4: Analyze Conductivity and Temperature Profiling Data	2	8	10	\$ 2,000	\$ -	\$ 2,000
Task 5: Prepare Technical Memorandum with Charts and Maps	6	32	38	\$ 7,560	\$ -	\$ 7,560
Task 6: Prepare for and Present Results by Phone to TAC (assume 2 meetings)	4	8	12	\$ 2,440	\$ -	\$ 2,440
Task 7: Prepare for and Present Results in Person to Board (assume 2 meetings)	16	8	24	\$ 5,080	\$ 400	\$ 5,480
TOTAL			125	\$ 25,200	\$ 400	\$ 25,600

Notes

Cost estimate does not include field work related to conductivity and temperature profiling in Sentinel Wells
 Other direct costs include per diem, transportation, office supplies, photocopies, postage, and equipment rental
 Per diem rate is \$150 per day, mileage is at current IRS rate

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**SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE**

*** * * AGENDA TRANSMITTAL FORM * * ***

MEETING DATE:	April 14, 2021
AGENDA ITEM:	5
AGENDA TITLE:	Continued Discussion of Opinions of Consultants and TAC Members Regarding Implementation of the Seawater Intrusion Response Plan and Ionic Analysis
PREPARED BY:	Robert Jaques, Technical Program Manager
SUMMARY:	<p>At the TAC's March 10, 2021 meeting there was a presentation of the opinions of our consultants and TAC members as to whether they believed seawater intrusion (SWI) has been detected in the Basin, and whether the Seawater Intrusion Response Plan should be implemented at this time. Attached is a tabulation of the opinions that were received (same as provided to the TAC at its March 10 meeting).</p> <p>Their consensus is that it would be best to perform the induction logging of this well, and to obtain further water quality data from it, before making a determination as to whether or not seawater intrusion is occurring.</p> <p>At that meeting there was mixed TAC input as to what should be reported to the Board, and whether the TAC should make a recommendation to the Board on this matter, and that discussion on this topic should be continued at today's meeting.</p> <p>In view of the finding by Martin Feeney that there is an apparent casing leak in the upper portion of the FO-9 Shallow casing, and that this is likely the cause of the high chloride levels being experienced in that well, the TAC should hold off on further discussion of this topic until that issue has been fully explored.</p>
ATTACHMENTS:	Tabulation of opinions
RECOMMENDED ACTION:	Hold off on providing any recommendations on this to the Board until the apparent casing leak issue in well FO-9 Shallow has been explored

Opinions From Consultants and TAC Members Regarding the Increasing Chloride Levels at Monitoring Well FO-9 Shallow

Derrick Williams: My opinion is that seawater intrusion has been indicated, but the indications still contain too much uncertainty to state that seawater intrusion has been definitively observed.

I think the Watermaster has correctly opted to sample well FS-09 more frequently. The more frequent sampling will allow the Watermaster to assess any trends towards definitive seawater intrusion in a timely manner. And the Watermaster must be prepared to act swiftly if the current trends continue. However, with a chloride concentration of 90 mg/L, I believe we have the luxury of obtaining a couple more quarterly samples before initiating the Seawater Intrusion Mitigation Plan. However, should chloride levels rise more quickly during the next couple sampling events, and should the Na/Cl ratios change significantly, the Watermaster should not hesitate in implementing the Seawater Intrusion Response Plan.

I suggest we revisit this analysis after every quarterly sampling event.

Jon Lear: The District would like to see the results of Martin's work prior to supporting declaration of Seawater Intrusion.

Gus Yates: I concur with Derrick's description of the status and degree of urgency with respect to seawater intrusion. I think the data are indicating likely intrusion, but we might not be able to rule out influence from some local body of groundwater with elevated salinity. I think we can afford to spend a few months completing Martin's logging work and tracking the continued trends in FO-9 and FO-10 before concluding that intrusion response actions need to be implemented.

Martin Feeney: I agree with Derrick and Gus that more data are required before declaring SWI. I will be submitting a proposal to Bob this afternoon for the borehole geophysics so we can get some confirmation or not.

Tamara Voss: I would also agree with the general consensus that the group seems to be developing. If this is seawater intrusion, and I also think that this is likely the case, then it is at a very early stage and we can take the time to look at the induction logging and WQ sampling results before triggering the SIRP.

Georgina King: My thoughts on activating the SIRP are that we need hold off until we can be more sure that the source of chloride in FO-9 shallow is seawater. The Na/Cl molar ratio in that well is not declining as much I would expect compared to the increased chloride and so I think we need stronger confirmation on chloride source. Carrying out those items outlined in the attached work plan we put together in 2017 to investigate sources of chloride in the Sentinel wells would give us more certainty. Water quality results over the next few quarters are crucial for providing us even more definitive trends.

As Gus pointed out, Martin's work on logging the well is also a key part to the picture that we need to understand.

**SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE**

*** * * AGENDA TRANSMITTAL FORM * * ***

MEETING DATE:	April 14, 2021
AGENDA ITEM:	6
AGENDA TITLE:	Recommendations and/or Contract Amendments with Martin Feeney, MPWMD, and Montgomery & Associates
PREPARED BY:	Robert Jaques, Technical Program Manager

SUMMARY:

At its March 10, 2021 meeting the TAC provided approval to proceed with certain actions, including:

- Revising the datalogger program by having dataloggers in specified wells and relocating some dataloggers from their existing wells to other wells
- Installing a replacement datalogger in PCA-West Shallow
- Performing certain cation/anion analyses on FO-9 Shallow
- Processing the historical data which has been downloaded from the existing dataloggers but has never been processed

All of this work is outside of our consultants' current contract authorizations, so I will need to issue either amendments to their existing contracts, or prepare new contracts, to authorize them to perform this work. In order to do this I requested that they provide me scope of work and cost proposals for their portions of the work. Specifically, I asked for the following:

Montgomery & Associates:

1. Proposal to perform cation/anion analysis on FO-9 Shallow (Note: Because of the detection of an apparent casing leak in FO-9 which likely explains why there are high chloride levels in that well, per Georgina King's recommendation this work will be deferred [or potentially not be necessary] until that issue has been explored.)
2. Proposal to process historical downloaded datalogger data.

Martin Feeney:

1. Proposal to replace the datalogger in PCA-W Shallow. (Note: In the attached comments and recommendations from Martin Feeney, he recommends that the existing datalogger there be abandoned in place and that a new datalogger be installed. That work can be performed by MPWMD without Mr. Feeney's assistance, so no proposal from Mr. Feeney is needed).

MPWMD:

1. Proposal to relocate dataloggers to different wells per Georgina King's Tech Memo on this, Table 3, and for the purchase of any new dataloggers needed to accomplish this work.
2. Proposal to provide the new datalogger for PCA-W Shallow and to assist Martin Feeney in the replacement of the existing datalogger there.
3. Proposal to compile the historical datalogger data so it can be sent to Montgomery & Associates for processing.

(Note: MPWMD recently completed a review of its contracting procedures and sent a letter to the Watermaster raising a number of concerns about its contract with the Watermaster. The Watermaster provided a response letter addressing those concerns. As of the date of preparation of this Agenda

**SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE**

*** * * AGENDA TRANSMITTAL FORM * * ***

AGENDA ITEM: 6 (Continued)

Transmittal, MPWMD was still having internal discussions about those issues and was therefore not able to provide the requested Proposal.)

Attached are Mr. Feeney's comments and recommendations regarding Monitoring Well PCA-West Shallow, and a contract amendment for Montgomery & Associates to process the historical datalogger data.

Since no Proposal was received from MPWMD to compile and send the historical datalogger data to Montgomery & Associates, I plan to hold off on forwarding Montgomery & Associates' RFS to the Board until MPWMD's Proposal has been received and approved by the TAC.

ATTACHMENTS:	1. Amendment No. 2 to Montgomery & Associates RFS No. 2021-01 to process historical datalogger data 2. Comments and recommendations from Martin Feeney regarding Monitoring Well PCA-West Shallow
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RECOMMENDED ACTION:	Approve Mr. Feeney's recommendation regarding Monitoring Well PCA-West Shallow, and the contract amendment for Montgomery & Associates
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SEASIDE BASIN WATERMASTER
REQUEST FOR SERVICE

DATE: TBD

RFS NO. 2021-01 Amendment No. 2
(To be filled in by WATERMASTER)

TO: Hale Barter
Montgomery & Associates
PROFESSIONAL

FROM: Robert Jaques
WATERMASTER

Services Needed and Purpose: Process historical datalogger data as described herein.

Completion Date: All work of this RFS shall be completed not later than December 31, 2021, and shall be performed in accordance with the Schedule contained in Attachment 2.

Method of Compensation: Time and Materials (As defined in Section V of Agreement.)

Total Price The Total Price for RFS No. 2021-01 is increased by \$7,400 by this Amendment No. 2, and the Total Price for RFS No. 2021-01, including Amendment No. 1 thereto, is therefore increased to \$46,410.00.

Total Price may not be exceeded without prior written authorization by WATERMASTER in accordance with Section V. COMPENSATION.

Requested by: _____ Date: _____
WATERMASTER Technical Program Manager

Agreed to by: _____ Date: _____
PROFESSIONAL

ATTACHMENT 1

SCOPE OF WORK

PROFESSIONAL was authorized by RFS No. 2021-01 to perform general on-call hydrogeologic consulting services, and by Amendment No. 1 thereto to perform an analysis of groundwater flow directions and velocities to determine where groundwater in the vicinity of Monitoring Well FO-9 Shallow is moving and at what speed. This Amendment No. 2 to RFS No. 2021-01 authorizes the processing of historical datalogger data as described in Attachment 2 hereto.

ATTACHMENT 2

Under this Amendment No. 2 to RFS No. 2021-01 the data from the 11 monitoring wells with dataloggers that have not been processed and evaluated since the dataloggers were installed in them will be corrected and processed for the multiple years they have been collecting data. This backlog of data will be processed through Water Year 2020.

This work will entail:

1. Organizing the dozens of files for each well and uploading them to a database, since the files will be too large to use in a spreadsheet format (this will take the longest since there are almost 20 years of records)
2. Adjusting each well's depth-to-water reading based on regularly collected hand measured data
3. Converting the depth-to-water to a mean sea level elevation
4. Plotting the data on hydrographs for quality control and editing spurious data
5. Creating final hydrographs for each well

Comments and Recommendations from Martin Feeney
Regarding Monitoring Well PCA-West Shallow

Monitoring Well PCA-W Shallow has a data logger tangled with the permanent pump and the entire assembly is stuck in the well. In its current condition the sample pump works, but no water level data is collected. Although MPWMD has made efforts to remove the pump and data logger, these efforts have failed. At the Watermaster's request I have been looking into the level of effort to remove the pump and data logger. The approach would be to get a pump rig out to the well and to attempt to fish for the assembly and pull it out. However, there is no guarantee that this will be successful. As a fall-back I had suggested that the entire assembly be pushed to the bottom of the well and then replaced in kind. Based on discussions with Salinas Pump, rig time for this operation, assuming 2 days, would cost \$3,400 with professional staff time being about the same. Say \$9K including a new data logger with Rugged Cable. The Rugged Cable allows the data to be downloaded from the data logger from the surface, whereas the existing data logger had to be pulled to the surface to download it. However, there is some uncertainty that either the removal or the pushing to bottom will be successful.

As a quick and more inexpensive option, the Watermaster could simply install a new data logger on a Rugged Cable, abandoning the existing one. This would restore water level data collection and cost approximately \$2K. The existing pump/transducer tangle could be removed at a later time when the sample pump eventually fails.

**SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE**

***** AGENDA TRANSMITTAL FORM *****

MEETING DATE:	April 14, 2021
AGENDA ITEM:	7
AGENDA TITLE:	Discussion of Projected ASR Volumes
PREPARED BY:	Robert Jaques, Technical Program Manager
SUMMARY:	
<p>At its March 10th meeting the topic of projected volumes that can be injected into the Basin under the Aquifer Storage and Recovery (ASR) program was raised by TAC member O'Halloran. There was agreement that this topic would be agendized for discussion at a future TAC meeting.</p> <p>Attached is background information on this topic, as taken from various sources, and notes provided by Mr. Lear. The information shows that the 1,300 AFY ASR volume has been used in numerous environmental and other documents in recent years.</p> <p>Mr. Lear may be able to provide more information and respond to questions about how the 1,300 AFY of ASR water, which was used in the EIR/EIS for the Monterey Peninsula Water Supply Project, the Supplemental EIR for the Pure Water Monterey Expansion Project, and MPWMD's Water Supply and Demand analysis, was calculated.</p>	
ATTACHMENTS:	Background information on ASR injection volumes
RECOMMENDED ACTION:	None required – information only

Excerpt of General Information About ASR from the MPWMD Website

Project Overview: Aquifer Storage and Recovery (ASR) entails diversion of “excess” Carmel River winter flows, as allowed by state and federal resource agencies, which is then treated and transmitted via the California American Water (Cal-Am) distribution system to specially-constructed injection/recovery wells in the Seaside Groundwater Basin. Water is diverted from the Carmel River only when it is plentiful, and is used to recharge the over-pumped Seaside Basin in wet periods. Available storage capacity in the Seaside Basin serves as an underground reservoir for the diverted water. Water is then pumped back out from the Seaside Basin in dry periods to help reduce pumping-related impacts on the Carmel River. This “conjunctive use” more efficiently utilizes local water resources to improve the reliability of the community’s water supply while reducing the environmental impacts to the Carmel River and Seaside Basins.

A third phase is envisioned as part of the overall Monterey Peninsula Water Supply Project to be installed in the Fitch Park neighborhood north of Phase 2. This additional phase is designed to accommodate water produced by the proposed desalination facility in off-peak hours, in order to make it available for periods of greater demand.

Project Background:

In 1996, the Monterey Peninsula Water Management District (MPWMD or District) began investigating the feasibility of ASR in the local setting. The District constructed a “proof-of-concept” demonstration project in 1997, followed by a pilot test well in 1998 in the shallower aquifer of the Seaside Basin, the Paso Robles aquifer. After several years of successful pilot-well testing, the District acquired property and approvals to construct a full-scale, 700-foot deep test well in 2001 in the deeper aquifer, the Santa Margarita Sandstone aquifer. The subsequent results of extensive water quality and quantity testing were very promising, and led to planning for a permanent ASR project.

Based on the success of the feasibility testing program, MPWMD then focused on developing a permanent project at the site of the full-scale test well located east of General Jim Moore Boulevard near Eucalyptus Road on the former Fort Ord Military Base (i.e., the Santa Margarita site). A second full-scale well was completed at this site in 2007, and the District received the needed approvals to transition the site from a testing program to a permanent project in 2008. The Phase 1 ASR Project entails a maximum annual diversion of about 2,400 acre-feet per year (AFY) from the Carmel River, and an average yield of about 920 AFY.

MPWMD began to undertake Phase 2 ASR expansion planning in 2008 in cooperation with Cal-Am at a site that is adjacent to the Phase 1 site in the Seaside Basin. The Phase 2 ASR Project also consists of two ASR wells (completed in 2011 and 2013) that are designed to store up to 2,900 AFY of excess Carmel River flows. Water recovered from the Phase 2 site ASR wells will be treated at the Phase 1 ASR treatment facility prior to delivery to Cal-Am system customers. The average yield of the Phase 2 ASR project is estimated at approximately 1,050 AFY of additional water supplies.

Excerpt from an Appendix of the Draft Supplemental EIR for the Pure Water Monterey Expansion Project

Predicted Carmel River Flow and Injection Assumptions Monterey Peninsula Water Management District (MPWMD) estimated the amount of Carmel River water available for ASR injection for the predictive simulation based on historical streamflow records (MPWMD, 2019). Because the future simulated hydrology is based on the historical hydrology between 1987 and 2008, the future streamflows are expected to be the same as the historical streamflows. MPWMD staff compared historical daily streamflows between water year (WY) 1987 and WY 2008 with minimum streamflow requirements for each day. This allowed MPWMD to identify how many days in each month ASR water could be

extracted from the Carmel River. Using a daily diversion rate of 20 acre-feet per day (AF/day), MPWMD calculated how many acre-feet of water from the Carmel River could be injected into the ASR system each month. The Carmel River water available for injection was divided between the ASR 1&2 Well Site and the ASR 3&4 Well Site according to the historic division of injection. The distribution of the estimated available monthly ASR injection volumes for the predictive simulation for both ASR wells is shown along with the simulated monthly extractions from the existing Cal-Am wells and proposed new extraction wells in Figure 8.

Excerpt from Supply and Demand for Water on the Monterey Peninsula Prepared by David J. Stoldt, General Manager Monterey Peninsula Water Management District FINAL March 13, 2020

Aquifer Storage & Recovery: There are two water rights that support ASR. Permit 20808A allows maximum diversion of 2,426 AFA and Permit 20808C allows up to 2,900 AFA for a total of 5,326 AFA. However, these are maximums that may only be close to being achieved in the wettest of years. Based on long-term historical precipitation and streamflow data, ASR is designed to produce 1,920 AFA on average. The MPWSP assumes a lesser amount of 1,300 AFA to be conservative.

represents water from the MPWSP that could be available for other uses, such as returning water to the Salinas Valley Groundwater Basin, or supporting growth. Both uses are discussed in Section 6.3, Growth Inducing Impacts.

**TABLE 2-4
 CALAM MONTEREY DISTRICT WATER SUPPLIES WITH PROPOSED MPWSP
 (acre-feet per year)**

Supply Source	During Replenishment of the Seaside Groundwater Basin		After Replenishment of the Seaside Groundwater Basin	
	Without GWR (9.6 mgd ^a Desalination Plant)	With GWR (6.4 mgd ^b Desalination Plant)	Without GWR (9.6 mgd ^a Desalination Plant)	With GWR (6.4 mgd ^b Desalination Plant)
Carmel River ^c	3,376	3,376	3,376	3,376
Seaside Groundwater Basin ^d	774	774	1,474	1,474
Aquifer Storage and Recovery (ASR) ^e	1,300	1,300	1,300	1,300
Sand City Coastal Desalination Plant ^f	94	94	94	94
Groundwater Replenishment Project (GWR) ^g	0	3,500	0	3,500
MPWSP Desalination Plant Production ^h	10,750	7,167	10,750	7,167
Total Supplies	16,294	16,211	16,994	16,911
Service Area Demand (from Table 2-3)	14,275	14,275	14,275	14,275
Supply Available for Other Use (Total Supplies Minus Service Area Demand)	2,019	1,936	2,719	2,636

NOTE: mgd = million gallons per day

- ^a 9.6 mgd is the rated capacity of the desalination plant CalAm proposes to build for the MPWSP, and is typically used to characterize the size of the plant; operating at full capacity a 9.6 mgd plant would produce 10,750 acre feet of desalinated water per year. (That is, the conversion factor is 893 gallons per day per acre-foot per year, or about 1,120 acre-feet per year per 1 million gallons per day.)
- ^b 6.4 mgd is the rated capacity of the desalination plant CalAm proposes to build if the GWR project is successfully implemented. The 6.4 mgd rated capacity is typically used to characterize the size of the smaller plant proposed in conjunction with the GWR water purchase. Operating at full capacity a 6.4 mgd plant would produce 7,167 acre feet per year.
- ^c CalAm's recognized right to Carmel River water established in Order 95-10.
- ^d CalAm's adjudicated water right in the Seaside Groundwater Basin is 1,474 afy; in-lieu recharge of 700 afy would occur during 25-year Seaside Groundwater Basin replenishment period.
- ^e Assumed average annual yield with completion of Phase II of the ASR; Phase I of the ASR is currently in operation, and Phase II is nearing completion.
- ^f Quantity shown is CalAm's long-term share of plant production pursuant to agreements between CalAm and the city of Sand City.
- ^g The Final EIR for the GWR project was certified and the GWR project approved by the Monterey Regional Water Pollution Control Agency, the lead agency, in October 2015.
- ^h Assumes 9.6 mgd and 6.4 mgd desalination plants operating at full capacity.

SOURCE: CalAm, 2016b; Svindland, 2016.

2.4.1 Carmel River System

As described above in Section 2.2.3, State Water Board Order 95-10 established that CalAm has a legal right to divert a total of 3,376 afy from the Carmel River system, including surface water diversions from the Carmel River and water pumped from the Carmel Valley Alluvial Aquifer.

**Table 5-1
Monterey Peninsula Available Supply and Demand**

Future Supplies			
Supply Source	Available Supply (Acre-Feet per Year)		
	MPWSP	Proposed Modifications (Back Up Supply)	
MPWSP Desalination Plant ¹	6,252	0	
Pure Water Monterey	3,500	3,500	
PWM Expansion	0	2,250	
Carmel River	3,376	3,376	
Seaside Basin	774	774	
Aquifer Storage & Recovery	1,300	1,300	
Sand City Desalination Plant	94	94	
Total Available Supply	15,296	11,294	
Other Available Supplies	406	406	
Total Available Supply w/Other	15,702	11,700	
Future Demand Projections			
Demand Component	Demand Projections (Acre-Feet Per Year)		
	MPWSP Demand Projections*	MPWMD**** (High)	MPWMD**** (Low)
Average Current Customer Demand	12,350	11,232	9,788
Legal Lots of Record	1,181	1,014	864
Tourism Bounce-Back	500	250	100
Pebble Beach Entitlements	325	160	130
Total Water Demand	14,356**	12,656	10,882
Water Supply vs. Demand Summary			
	MPWSP	MPWMD Revised Demand Projections (High)	MPWMD Revised Demand Projections (Low)
Water Supply	15,702***	11,700	11,700
Total Water Demand	14,355	12,656	10,882
Net Difference	1,347***	(956)	818
Notes:			
1. While the MPWSP Desalination Plant is sized to produce 6,252 AFY, the facility would operate at 85% of the design capacity. The additional capacity would be available to accommodate fluctuations in demand. As a result, for planning purposes the MPWSP Desalination Plant would provide an estimated 5,314 AFY when accounting for the facility operating at 85% of its design capacity. (Source: MPWSP Final EIR/EIS, as supplemented by additional information contained in CPUC Decision 18-09-017)			
*estimates obtained from the MPWSP Final EIR/EIS, as supplemented by additional information contained in the CPUC's Decision 18-09-017.			
** CPUC concluded that approximately 14,000 AFY represented a reasonable estimate of anticipated future demand for the purposes of sizing the desalination plant. (Source: CPUC Decision 18-09-017)			
*** Based on the available supply information and related demand projections, supply would exceed available demand. However, this difference is largely to account for the necessary sizing of the MPWSP, which would operate at 85% of system capacity. This would result in a reduction of available supply by approximately 940 AFY. Moreover, available supply also assumes that the ASR project would be capable of delivering all of its stated supply. The ability of ASR to fully achieve its stated available supply is contingent upon a variety of factors, including climatic conditions. During periods of prolonged drought, ASR may not be able to fully realize its total supply. (Source: MPWSP Final EIR/EIS as supplemented by additional information contained in CPUC Decision 18-09-017)			
Source: California Public Utilities Commission (2018), Monterey Peninsula Water Supply Final Environmental Impact Report/Environmental Impact Statement; see also California Public Utilities Commission (2018), Decision 18-09-017; see also Monterey Peninsula Water Management District (2019), Supply and Demand for Water on the Monterey Peninsula.			

the Proposed Modifications could be slightly lower than under No-Project groundwater levels for short periods of time during periods of extended drought, reflecting the extraction of PWM/GWR Project water during droughts. However, the difference in groundwater levels would be temporary and difficult or impossible to detect at any wells. Groundwater levels under the approved PWM/GWR Project with the Proposed Modifications would be higher along the coast in comparison to groundwater elevations under the No-Project scenario, thereby decreasing the potential/risk of seawater intrusion in the future. Because the Project with the Proposed Modifications would recover no more additional water than was injected, there would be no long-term change in groundwater storage. The purified water being injected would eventually be extracted for municipal use.

Impact Conclusions

The Proposed Modifications would not result in any new significant impacts or worsen the severity of any previously identified significant impacts. Operation of the Project with the Proposed Modifications would not result in significant impacts on Seaside Basin recharge, volume, or levels, and no mitigation measures would be required.

Impact GW-6: Operational Groundwater Quality: Seaside Basin. Operations of the Project with the Proposed Modifications would not degrade groundwater quality in the Seaside Basin, including due to injection of purified recycled water into the basin. (Criterion b) (Less-than-Significant/Beneficial Impact)

The Proposed Modifications would inject additional purified water within a portion of the adjudicated Seaside Groundwater Basin, a Subbasin of the Salinas Valley Groundwater Basin (Seaside Basin). The 2006 adjudication established a natural perennial yield for the Seaside Basin of 2,581 to 2,913 AFY. Groundwater pumping in the Seaside Basin provides water supply for municipal, (primarily golf course) irrigation, and industrial uses. Prior to the adjudication, pumping exceeded the natural perennial yield, resulting in significant basin-wide water level declines. Over-pumping in the coastal subareas has resulted in water levels near the coast declining below sea level, placing aquifers at risk of seawater intrusion. Since 2008, groundwater pumping has decreased in response to the adjudication. In addition, the Monterey Peninsula ASR Project has provided about 1,500 to 1,800 AFY of treated Carmel River Basin groundwater for injection and recovery into the basin.² The ASR project is located hydraulically downgradient (north) and within about 1,000 feet from the approved PWM/GWR Project Injection Well Facilities (and 6,000 feet east of the relocated/new wells of the Proposed Modifications).

Replenishment will occur in the two aquifer systems used for water supply in the Seaside Basin – the shallow Paso Robles Aquifer and the deeper Santa Margarita Aquifer– and will be accomplished using two types of Injection Wells: (1) deep Injection Wells (deep Injection Wells), which will inject purified recycled water directly into the Santa Margarita Aquifer, and (2) shallower

² Currently, Carmel River Basin water (extracted from wells in the alluvial aquifer) is treated to drinking water standards and conveyed to the ASR wells for recharge when excess water is available. There are two water rights that support ASR. Permit 20808A allows maximum diversion of 2,426 AFY and Permit 20808C allows up to 2,900 AFA for a total of 5,326 AFY. However, these are maximums that may only be close to being achieved in the wettest of years. Based on long-term historical precipitation and streamflow data, ASR is designed to produce 1,920 AFY on average.

Notes Provided by Mr. Lear

SUMMARY: There have been recent suggestions at the March 2021 Watermaster Technical Advisory Committee that the annual average ASR volume assumption used in the Pure Water Monterey SEIR is too high because the operational history of the ASR project is lower than 1,300 acre-feet per year. However, the District believes that using the historical average of the project is not a good estimation of how the project will perform in the future and that 1,300 acre-feet per year (AFY) remains a reasonable estimate.

The 1,300 AFY figure was first formally put forward in the initial application (A.12-04-019) by Cal-Am to the California Public Utilities Commission (CPUC).¹ Cal-Am's President, Mr. Richard C. Svindland's testimony went on to say that the plant is initially sized assuming ASR water is not available in dry water years, and "The size of the plant is based on the assumption that California American Water can achieve a yield of 1,300 AFY from our ASR system..."² The testimony went on to state that ASR could potentially deliver 3,000 AFY.

Cal-Am reaffirmed their plant sizing in testimony to the CPUC by Mr. Svindland January 11, 2013 and April 14, 2016 (Errata version). It was also affirmed in Attachment H to an Amended Application of Cal-Am to the CPUC on March 14, 2016. Similarly, the 1,300 AFY number was utilized in testimony to the CPUC by Cal-Am's Vice President of Engineering, Ian Crooks, on September 27, 2017 (Errata version). The same figure was used in the Monterey Peninsula Water Supply Project Draft Environmental Impact Report.³ Finally, the CPUC itself said, in issuing its Certificate of Public Convenience and Necessity September 20, 2018 that "There is general agreement among the parties as to the basic elements of supply available to Cal-Am" including "an average of 1,300 afy from the Aquifer Storage and Recovery..."⁴ In other words, in the 6 years between initial application and decision by the CPUC, no one questioned 1,300 AFY as a long-term, predictable average water supply from ASR, despite the drought that occurred, as well as the very constrained operating parameters on ASR during the Cease and Desist Order period.

The ASR project has been built out over the last 15 years and has transitioned from a pilot testing program into a fully functioning project. All 4 ASR wells have only been operational since 2017 and the Monterey Pipeline was not operational until 2018, which was identified by Cal-Am in the previous General Rate Case as having a positive effect on daily ASR injection volumes. Therefore, it is a better forecast to use daily operational averages and an analysis of Carmel River flow related to ASR water rights to calculate the estimated number of operational days in a normal water year. Daily injection volumes depend on the balance between sources and daily system demand. In the winter injection months demand is low, injection volumes are higher and as people begin to use more water in the spring, the daily ASR volumes drop. Daily injection values also depend on the condition of the Carmel Valley well field, therefore choosing to use the daily average of the last 4 years will take into account the effects of well outages and changing demand over the operational year. For water years 2017, 2018, 2019, and 2020, the average injection was 12.5 acre-feet per day. For the 50% percentile of operational days over

¹ Specifically, Attachment 3 to Direct Testimony of Richard C. Svindland in CPUC Application 12-04-019, plant sizing memorandum by RBF Consulting dated April 20, 2012; page 4.

² Direct Testimony of Richard C. Svindland in CPUC Application 12-04-019, page 18, line 8.

³ Monterey Peninsula Water Supply Project Draft Environmental Impact Report, Table 2-4, page 2-18, and narrative page 2-19.

⁴ California Public Utilities Commission Decision D. 18-09-017, September 13, 2018, page 33.

the last 60 water years is 98 days with 62 operational days at the bottom of the normal classification and 151 at the top.

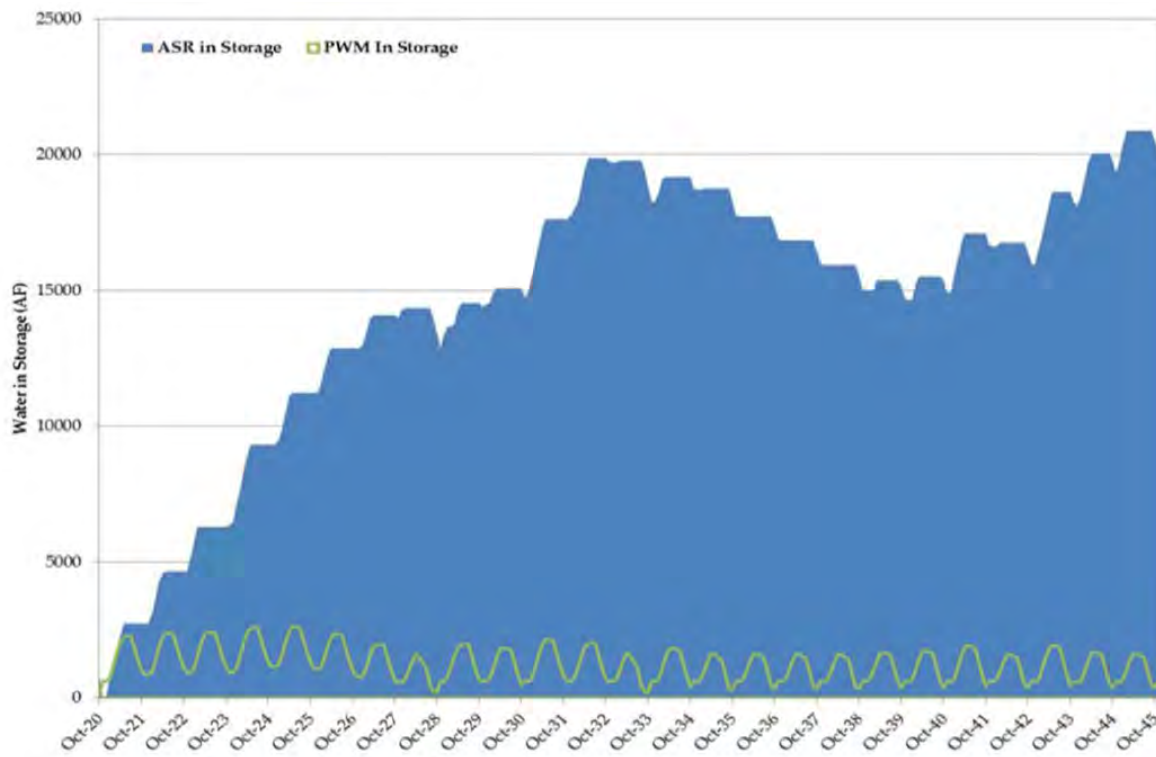
Therefore, the 50%, middle of Normal Classification, yearly predicts an ASR injection volume of 1,225 acre-feet with the Cal-Am system in its current state. In the most recent General Rate Case, Cal-Am has asked for funding to drill another Lower Valley well and to undertake a frequent treatment process of the Carmel Valley wellfield to improve the production. An average daily rate of 13.2 acre-feet per day will provide the average 1,300 acre-feet per year for the 50% water year. The additional 0.7 acre-feet per day improvement to go from 1,225 to 1,300 acre-feet per year is an improvement in the Carmel Valley Wellfield of 160 gpm. The well identified in the General Rate Case should produce 1,200 to 1,500 gpm, which is a 5.3 to 6.63 acre-feet per day increase over the current capacity of the Cal-Am system. The estimate of 1,300 acre-feet per day is conservative because with the planned well installed, the estimate is using wellfield firm capacity to calculate the annual average injection total.

It should also be noted that the District and Cal-Am recently filed a Petition for Extension of Time related to the ASR Water Rights. The combined maximum daily ASR volume is 29 acre-feet per day and the maximum daily operational volume has been 21 acre-feet. In the Petition, the District and Cal-Am laid out a longer-term plan install more wells to raise the firm system capacity to 29 acre-feet per day before licensing the Water Rights. The injection total for the 50% water year at 29 acre-feet per day is 2,842 acre-feet per year. There is more reason to expect higher daily ASR injection totals in the future than there is to expect lower daily totals.

Further, based on the Benito/Williams technical memorandum modeling assumptions contained in the Pure Water Monterey SEIR appendices, it can be concluded that build-up of ASR storage would be sufficient to meet a 5-year drought as well as yield at least 1,300 AF annually. The Historic climate record does not contain a 5-year drought, this drought was created to test the robustness of ASR to drought by superimposing the drought of the mid 1980's on to the end of the drought occurring in the late 2000's creating a larger drought than the Peninsula has experienced in the 100 year climate record. The build-up occurs based on historical data including wet, normal, and dry years. If the data is randomized, the same results will occur – ASR acts like a lake behind a dam, building up supplies for use later during a drought. To remove ASR from the resource planning mix in a dry year is inappropriate and would be inconsistent with industry practice for estimating water supply availability. Even AWWA recognizes ASR in its reliability assessment: *“ASR wells can improve water basin management by storing water underground from periods of excess supply..., and later allowing a portion of the stored water to be extracted during periods of demand or short supply”*⁵

The manner in which ASR is expected to operate after the Cease and Desist Order is lifted is shown in the graphic below:

⁵ AWWA, “Water Resources Planning: Manual of Water Supply Practices M50”, 3rd Edition, page 148



The scenario shown actually starts at a higher demand assumption than current year demand, but the annual growth in demand is similar to the AMBAG 2022 Growth Forecast rate. However, actual results will depend on the achieved diversion rates to ASR and other supplies available to Cal-Am.

**SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE**

*** * * AGENDA TRANSMITTAL FORM * * ***

MEETING DATE:	April 14, 2021
AGENDA ITEM:	8
AGENDA TITLE:	Discussion of Potential for Providing Recycled Water for Irrigation of Laguna Seca Golf Course
PREPARED BY:	Robert Jaques, Technical Program Manager
SUMMARY:	
<p>TAC member Wes Leith recently asked that the topic of potentially providing recycled water for irrigation of the Laguna Seca Golf Course be agendized for discussion. Attached is background information on this topic.</p> <p>From the attached information pertaining to Pasadera, it appears that all of the wastewater that is collected from a portion of the Laguna Seca development and all of the Pasadera development is being given tertiary treatment, and the reclaimed water is used to irrigate the Pasadera golf course. There is not enough reclaimed water to meet the irrigation demands of the golf course, so well water is used to supplement the irrigation.</p> <p>There does not appear to be any excess reclaimed water available from the Pasadera system for irrigation of the Laguna Seca golf course.</p> <p>It appears that reclaimed water might become available from the Regional Urban Water Augmentation Project (RUWAP), since the description in the attached background material indicates that the RUWAP included water for a possible Del Rey Oaks golf course (which may no longer be under consideration by the City of Del Rey Oaks) and water for landscape/golf course irrigation in Monterey (which may no longer be under consideration by the City of Monterey). A pipeline to deliver water to the Laguna Seca golf course would need to be constructed to connect to the main RUWAP pipeline that is partially completed along General Jim Moore Boulevard in the former Fort Ord, and arrangements would need to be made with the Marina Coast Water District to receive water from the RUWAP.</p>	
ATTACHMENTS:	Background Information About the Pasadera Reclaimed Water System and the Regional Urban Water Augmentation Project
RECOMMENDED ACTION:	None required – information only

Background Information About the Pasadera Reclaimed Water System and the Regional Urban Water Augmentation Project

Pasadera Reclaimed Water System

Paraphrased Excerpt from Notes Prepared by Joe Oliver (formerly with MPWMD) from a Site Visit to the Pasadera Golf Course Site on December 5, 2002

The reclaimed water plant was at one time operated by CSA-10 but is now being operated by Cal Am. There are three discharges into the Tertiary (reclaimed water) storage pond: (1) from the tertiary reclamation plant (on the southeast side of the pond), (2) from the main gate well (on the southwest side of the pond), and (3) from a storm drain collector (on the northwest side of the pond). The pond capacity was estimated to be about 13 million gallons. The storm drain pipe no longer discharges into the pond, as this was noted to be in violation of a recent RWQCB inspection. The golf course ponds do not receive any treated wastewater; the treated wastewater is applied to the golf course turf only. Inside the pump control station northwest of the pond there are 3-50 horsepower pumps in a pit that send water from the tertiary pond to various locations on the course. The pumps are tied to automatic controllers at the station. This is also where the meter is that records production from the pumps.

Excerpt from the October 3, 2010 TAC Meeting Agenda Packet

Wastewater generated within the (Pasadera) development is combined with wastewater from a portion of the adjacent Laguna Seca development and is treated to a tertiary level by an on-site water recycling plant. The treated water is pumped to a storage reservoir at an upper elevation within the development and feeds the golf course's irrigation system. Since there is insufficient recycled water to meet all of the golf course's irrigation needs, this water source is supplemented as necessary with water from the Domestic Water Supply System. Recycled water is rarely used in the winter months, unless it is an extremely dry winter, so there should be little opportunity for recycled water to mix with storm water runoff.

Excerpt from the 2020 Annual Report filed with the RWQCB for the Pasadera Wastewater Treatment Plant

California American Water (CAW) owns and operates the Pasadera Wastewater System, located adjacent to the Laguna Seca Ranch east boundary, serving residential and commercial customers in the Pasadera subdivision, in Monterey County, California. Operation and maintenance are in accordance with Wastewater Discharge and Water Reclamation Requirements Order No. 86-273 and Revised Monitoring and Reporting Program No. 98-58, Waste Discharge Identification (WDID) No. 3-270100009, issued by the Central Coast Regional Water Quality Control Board on September 14, 2001, and March 10, 2011, respectively.

The wastewater collection system has approximately ten miles of sanitary sewer lines, and three lift/pump stations. The Pasadera Wastewater Treatment Plant (Pasadera WWTP) has a peak design capacity of 74,000 gallon per day (GPD). Main pollutants for removal at Pasadera WWTP are Biochemical Oxygen Demand 5-Day (BOD5), Total Suspended Solids (TSS), Total Dissolved Solids (TDS). Additional constituents/pollutants targeted for removal are included in the full monitoring schedules in Section B (Compliance and Performance). The Pasadera WWTP's Active Tertiary Treatment technology processes consist of one stainless steel static screen at the headworks, a flow equalization basin, two (2) primary clarifiers, two (2) trickling filters, two (2) secondary clarifiers in series with two (2) additional trickling filters, a final clarifier and wet well, two (2) pressure sand filters, and a sodium hypochlorinator. An almost identical treatment plant exists next door, but is currently out-of-service (non-operational). An

odor control system (scrubber) is also used throughout the WWTP. Sludge biosolids are discussed in Section G (Sludge Management).

Tertiary treated effluent from the Pasadera WWTP is discharged to storage ponds and used for golf course irrigation adjacent to the WWTP (or discharged to a lined storage reservoir). Present and anticipated beneficial uses of groundwater in the vicinity of the recycled water area include Domestic, Agricultural, and Industrial Supply. Long term storage is used when irrigation is not allowed, typically during the wet season. Inadequately treated flows can be diverted to a short term (3 day) storage pond and be redirected back through the WWTP prior to long term storage and delivery for reuse. A 120-Day wet weather storage pond is located onsite.

The Pasadera WWTP facility objectives are 1) to adequately treat wastewater and dispose of sewerage sludge to protect the beneficial uses of State waters in accordance with the CCRWQCB Basin Plan, and 2) to produce recycled water that conforms to recycled water criteria established in Title 22, Division 4, Chapter 3, of the California Code of Regulations.

Regional Urban Water Augmentation Project

The Regional Urban Water Augmentation Project (RUWAP) is managed by the Marina Coast Water District. It includes a recycled water distribution system that will provide recycled water from the existing M1W Pure Water Monterey Advanced Water Treatment Plant to urban users within the Cities of Marina, Seaside, Monterey, Del Rey Oaks, and the County of Monterey. Additional recycled water could be provided to the Monterey Peninsula under a joint cooperative effort with MCWD, M1W, and CAWC.

A project-level EIR was certified for the RUWAP in 2015 to provide up to 1,727 AFY of recycled water to the identified urban areas: 1,427 AFY within the former Fort Ord and 300 AFY to the Monterey Peninsula. Of the 1,427 AFY available to the former Fort Ord, approximately 450 AF would be available to two City of Seaside golf courses and approximately 250 AF would be available to a proposed golf course in Del Rey Oaks. Therefore, the amount of water benefiting the Basin could be on the order of 700 AFY. When combined with other projects, the RUWAP would both help provide water to offset over pumping of the Basin and to help satisfy Order No. 95-10.

MCWD received a Proposition 1 low-interest loan and grant for the RUWAP. The RUWAP will serve both MCWD's Water Augmentation Program and the PWM project, as the MCWD and M1W combine their projects for the construction of one transmission pipeline that will serve both of these projects.

MCWD has completed the engineering and design for the RUWAP and has started construction on several sections of the transmission pipeline. Along with building the pipeline, MCWD has approved plans to construct a storage reservoir and distribution pipes to deliver advanced treated water to existing and planned urban irrigation facilities.

Phase 1 of the RUWAP was under construction in 2018. Phase 2 will include an additional 827 AFY of recycled water for a total of 1,427 AFY. Phase 2 is planned for a future date after construction of recycled water lateral pipelines to the other irrigation sites that would use this additional recycled water has been completed.

**SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE**

*** * * AGENDA TRANSMITTAL FORM * * ***

MEETING DATE:	April 14, 2021
AGENDA ITEM:	9
AGENDA TITLE:	Schedule
PREPARED BY:	Robert Jaques, Technical Program Manager
SUMMARY:	<p>As a regular part of each monthly TAC meeting, I will provide the TAC with an updated Schedule of the activities being performed by the Watermaster, its consultants, and the public entity (MPWMD) which are performing certain portions of the work.</p> <p>Attached is the updated schedule for 2021 activities. The attached schedule includes a Task pertaining to implementation of the Seawater Intrusion Response Plan, if it is determined that seawater intrusion is occurring. It will probably be at least another month or more before the Board makes a determination on this.</p> <p>The Board canceled its normal March and April meetings in order to allow time for the TAC to complete taking the actions the Board directed at its February 3, 2021 meeting. The next Board meeting is currently scheduled for May 5.</p>
ATTACHMENTS:	Schedule of Work Activities for FY 2021
RECOMMENDED ACTION:	Provide Input to Technical Program Manager Regarding Any Corrections or Additions to the Schedules

**SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE**

*** * * AGENDA TRANSMITTAL FORM * * ***

MEETING DATE:	April 14, 2021
AGENDA ITEM:	10
AGENDA TITLE:	Other Business
PREPARED BY:	Robert Jaques, Technical Program Manager
SUMMARY:	<p>The “Other Business” agenda item is intended to provide an opportunity for TAC members or others present at the meeting to discuss items not on the agenda that may be of interest to the TAC.</p>
ATTACHMENTS:	None
RECOMMENDED ACTION:	None required – information only