MEETING NOTICE AND AGENDA

TECHNICAL ADVISORY COMMITTEE OF THE SEASIDE BASIN WATER MASTER

DATE: Wednesday, June 9, 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:
JOIN FROM A PC, MAC, IPAD, IPHONE OR ANDROID DEVICE (NOTE: ZOOM APP MAY NEED TO BE DOWNLOADED FOR SAFARI OR OTHER BROWSERS PRIOR TO LINKING) BY GOING TO THIS WEB ADDRESS:
https://us02web.zoom.us/j/86316923066?pwd=RmJVc3paZVJLRWFqUVo1aGlyQVU2UT09
If joining the meeting by phone, dial either of these numbers:
+1 408 638 0968 US (San Jose)
+1 669 900 6833 US (San Jose)
If you encounter problems joining the meeting using the link above, you may join from your Zoom screen using the following information:
Meeting ID: 863 1692 3066
Passcode: 553065

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 County Water Resources Agency	
Monterey Peninsula Water Management District		

Agenda Item

The next regular meeting is tentatively planned for Wednesday July 14, 2021 at 1:30 p.m.

SEASIDE BASIN WATER MASTER TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	June 9, 2021
AGENDA ITEM:	2.A
AGENDA TITLE:	Approve Minutes from the May 12, 2021 Meeting
PREPARED BY:	Robert Jaques, Technical Program Manager

SUMMARY:

Draft Minutes from this meeting were emailed to all TAC members. Any changes requested by TAC members have been included in the attached version.

ATTACHMENTS:	Minutes from this meeting
RECOMMENDED ACTION:	Approve the minutes

D-R-A-F-T
MINUTES

Seaside Groundwater Basin Watermaster
Technical Advisory Committee Meeting
May 12, 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
Martin Feeney – Martin Feeney

Others
City of Seaside – Nisha Patel
MCWD – Patrick Breen

The meeting was convened at 1:35 p.m.

1. **Public Comments**

There were no public comments.

2. **Administrative Matters:**

A. Approve Minutes from the April 14, 2021 Meeting

Mr. Jaques reported a correction needed to be made to the minutes pertaining to item 2.C "Water Quality Sampling Results from SNG Well." The motion that was made with regard to that agenda item passed unanimously, with Mr. Gomez abstaining.

In the final paragraph under the same agenda item, Ms. Voss clarified that Monterey County Health does not have a program to help with well destruction costs.

With these corrections made, on a motion by Ms. Voss, seconded by Mr. O'Halloran, the minutes were unanimously approved.

B. Sustainable Groundwater Management Act (SGMA) Update

Mr. Jaques summarized the agenda packet materials for this item, and there was no further discussion.

3. Report on Findings and Conclusions from Video Inspection of Monitoring Well FO-9
Mr. Jaques summarized the agenda packet materials for this item.

Mr. Gaglioti said that even though the leak was not seen in the video inspection, the conclusion is that the well must be leaking. He understood MPWMD's concern about having a leaking well. He wondered if there was any way to link well destruction with installing a new replacement well.

Mr. Lear said the Watermaster Board has asked that a letter be sent to MPWMD and MCWD with regard to sharing the cost of constructing a replacement well.

Mr. Lear said that the video inspection shows a piece of PVC pipe in the shallow well. He said that Monterey County Health told him that if that piece of pipe can be retrieved, then only the shallow well would need to be destroyed. If not, the whole nested well would need to be destroyed. Mr. Feeney commented that it would probably be possible to get the PVC out, but if not there may be other approaches to address the issue. He went on to say that he was assisting MPWMD with those discussions with Monterey County Health.

Ms. Voss said it would be good to move forward expeditiously with getting a replacement well. Mr. Gaglioti agreed, noting that this well is close to the coast and the Sentinel wells are not as good for detecting seawater intrusion as those from which actual water quality samples can be taken. There was much discussion on this matter, with Mr. Feeney disagreeing, saying that similar Sentinel Wells in Carpinteria do show seawater intrusion via induction logging. Mr. Lear said he agreed that induction logging does show seawater intrusion, but it does not provide chloride concentrations.

4. Board Discussion at its May 5, 2021 Meeting 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 and there was no other discussion.

5. Discuss 2012 Cross-Aquifer Contamination Study and Develop Recommendations
Mr. Jaques summarized the agenda packet materials for this item.

Mr. Feeney said that we could do conductivity logging rather than video inspections. For some of the wells we already know they have the potential for cross-connect contamination, for example the SNG well. Mr. Lear said that video logging would not likely show a problem, whereas conductivity logging would. Ms. Voss said MCWRA identified cross-aquifer connected wells in the Salinas Valley by examining changes in water quality over time in those wells.

Ms. King said some of the wells in the study had already been sampled and therefore there was historical data, but some had not.

Ms. Voss felt it was not worth the expense of performing video inspections for the reasons stated above. Mr. Feeney said that logging would cost about $1,000-$1,300 per well and any sample pump or other obstruction in the well would have to be removed that would block equipment from being lowered into the well, and that this would add cost. Ms. King asked if a conductivity probe could be attached to a video camera to get video information as well as conductivity information at the same time.

Mr. Feeney said that it would probably cost about $900 to perform conductivity probing of one or a few wells that were in the same area. Ms. King said she would like to look at the list of wells, it might only be necessary to do one or two wells in an area, if they are close together geographically. Mr. Feeney said that conductivity logging could be done first, and only do video inspection if cross-contamination was detected.

Ms. Voss said she would like to have more data, but there is a cost associated with, and that it would be important to decide what we would do with the information we would get from any of this additional work. Ms. King noted that we don't know the location of the front of the seawater intrusion in the Aromas Sands. Ms. Voss felt that we should look at a map showing where these wells are located to help make a decision. Mr. Gaglioti wondered if this work would help us spend money more efficiently in the future. Mr. Jaques suggested mapping the wells and seeing what water quality information we already have on them and then continue this discussion at a future TAC meeting.

Mr. Lear felt that it would be appropriate to pursue destruction of any well that was found to be cross-contaminating. Mr. Feeney said a well that is not used for over a year is, by State law, an abandoned well, and that it is a misdemeanor to have an abandoned well that is not properly maintained.

Mr. Gaglioti and Ms. Voss suggested potentially considering budgeting for this work in 2022. Mr. Feeney said the Dune Sand electrical conductivity value in FO-9 shallow was not as high as seawater. The elevated conductivity could be the result of agricultural return water, golf course irrigation water, etc., and not seawater. He went on to say that you would need to characterize the water to try to identify the source.

Following discussion it was agreed that this matter would be continued for further discussion at a future TAC meeting with more information provided.

6. Datalogger Issues with Monitoring Well PCA-West Shallow

Mr. Jaques summarized the agenda packet materials for this item

Mr. Lear said that the well can currently be manually sounded to obtain groundwater levels. He went on to say that if a new data logger were installed, it might also get tangled in the other cables and sample tubing in the well. The PCA-East deep sampling pump recently failed, and is of the same age as the sample pump in PCA-West shallow, so the PCA-West shallow sample pump might also fail in the near future. He also noted that pushing equipment down to the bottom of the well had the potential of damaging the well.

Ms. Voss noted that since the well is owned by MPWMD, they would be the ones to make a final decision on what would be done in this well. Mr. Lear said that the equipment in there (data logger and sample pump) belongs to the watermaster,. Mr. Feeney said it is tough to budget doing work to resolve the problem in this well because of the uncertainty of the problem and the difficulty having equipment access this site because of its sand dune location. He went on to say that if an effort was made to pull the blockage out, and that failed, the items in the well could be pushed to the cellar at the bottom of the well. Ms. King noted that it is very hard to retrieve things from a 2 inch diameter well like this.

Mr. Jaques asked if we could just do sounding for water level information at this time and use the sample pump for water quality, and therefore not do anything at all this time. There was much discussion about the situation and what can be done.

Mr. Lear summarized that there appeared to be three options: (1) Do nothing now and obtain water levels through monthly soundings, (2) Fix the problem by retrieving the blockage or pushing the blockage down to the bottom of the well, (3) When the pump fails, replace both the pump and the data logger.

Ms. King felt it was okay to only have monthly water level data until the pump fails, if it is not for too long a time.. Once the pump has to be replaced, then a replacement data logger should be installed.

Mr. Ottmar said he preferred to do nothing at this time, and to wait until the pump fails and then do that work. That could be budgeted for in the future. Mr. Jaques concurred with Mr. Ottmar's preference. Ms. King felt we could hold off for a couple of years on doing any work, and revisit the situation then. Mr. Lear said he also concurred with Mr. Ottmar's recommendation. He went on to say that MPWMD would consider a cost-share for doing the data logger replacement work on this well at a future date.

A motion was made by Ms. Voss, seconded by Mr. Gaglioti, to approve Mr. Ottmar's recommendation of budgeting next year to potentially have to do work on this well, but to do nothing until the pump fails for up to a couple of years. The motion passed unanimously.

7. Datalogger Issues and Contract Amendment with MPWMD

Mr. Jaques summarized the agenda packet materials for this item

Mr. Lear said that since water quality sampling in FO-9 shallow is no longer being performed, the money already included in the contract for FO-9 shallow water quality sampling could instead be used to pay for the increased frequency of water quality sampling of FO-10 shallow without having to provide any additional funds.

Ms. Voss said she concurred that the list of unbudgeted work that the Board is considering undertaking, as shown on page 47 of the agenda packet, was currently more important than performing the data logger network modifications. She also felt that performing a Sustainable Yield analysis was very important. Ms. King said she concurred.

Mr. Lear said that no data would be lost by not processing the data logger data at this time, but that it would be necessary to budget for continuing to download the data on an annual basis. He went on to say that the data loggers are downloaded annually in the fourth quarter of the Water Year. The data loggers can store up to about five years' worth of data.

Ms. King commented that her earlier Technical Memo about data loggers was based on having the financial resources budgeted to perform this work. Since there is no budget available at this time, it would be okay to defer until next year's budget to perform data logger network modifications.

There was consensus to defer the data logger work to a future budget year

8. Schedule

Mr. Jaques briefly summarized updates to the schedule.

Mr. Lear asked when the letter would be sent to MPWMD with regard to replacing monitoring well FO-9 shallow. Ms. Paxton said the letter was currently in draft form for internal review and would be going out in the immediate future.

9. Other Business

There was no other business.

The meeting adjourned at 3:12 PM.

SEASIDE BASIN WATER MASTER TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	June 9, 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:
Attached are summaries of meetings held in May 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 MAY 2021

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

Monterey Subbasin GSP Committee Meeting, May 7, 2021

Topics discussed included:

- The draft of Chapter 7 about Monitoring Networks was provided for review. I raised the need to include monitoring wells in the Seaside Subbasin that are near the boundaries of the Monterey Subbasin and also submitted these and other comments in writing.
- They hope to have a complete draft of the groundwater sustainability plan for initial review around the end of August and that would begin the public review process. They have to submit the completed document to the Department of Water Resources in January 2022.
- The SVBGSA is developing a communications and outreach program to educate the public, stakeholders, and policymakers about the Sustainable Groundwater Management Act and Groundwater Sustainability Plans.
- The Monterey Subbasin model being developed by EKI is being coordinated with the Seaside Basin model, so they are consistent at the boundary. It is calibrated much more accurately than the Salinas Valley Integrated Hydrogeologic Model and will be used for the Monterey Subbasin GSP.
- The Monterey Subbasin seawater intrusion model which is being developed will only cover the Monterey Subbasin, and will not extend into the Seaside Subbasin unless seawater intrusion in the Seaside Subbasin is detected. Ms. Voss commented that there is seawater intrusion in the dunes sand of the Seaside Subbasin, although not in the Paso Robles and Santa Margarita, and that this should be taken into consideration in the development and application of the seawater intrusion model.
- The 180/400-foot Aquifer GSP includes two projects, one to construct a seawater extraction barrier, and a separate one to desalinate and distribute that water to other parts of the basin. The estimated cost of the project is $350 million and the delivered unit cost of water is about $3,000 per acre foot. Patrick Breen of MCWD said the Marina-Ord portion of the Monterey Subbasin GSP may or may not include this regional desalination project.
- The Monterey Subbasin GSP Committee discussed requesting Monterey County to extend the area in which the B-8 zoning restrictions are applied, so that it would include the full Corral de Tierra subarea. Those restrictions limit new development to minimize water needs from that subarea. One of the committee members commented that the County has not been enforcing these restrictions, and felt that the County should be updated to reflect current conditions and that the County should be asked to enforce the restrictions. Staff will research this topic and agendize it for further discussion at a future meeting.
- The draft of Chapter 8 will be coming out for the review in the near future. This will include Sustainable Management Criteria.

SVBGSA Advisory Committee Special Meeting, May 14, 2021

This meeting was attended by Laura Paxton. Topics discussed included:

- Water Budget Item - The SVIHM has underestimated pumping based on GEMS data by approximately 20%. USGS is looking into this.

- DWR has stated that the Sustainable Management Criteria are what is important, not the Sustainable Yield number.
- A figure from the Basin Model highlighting that there is next to no information on the aquifer connection under Fort Ord.
- There will be an update to County Board of Supervisors on the Regional Basin Investigation on May 18th at 1 or 2pm.
- There will be a USGS Model Workshop on June 30th from 1-3pm.
- The Governor's Drought Declaration comes with $5.1 billion added to Prop 68.
- Upcoming full review of Federal Infrastructure Investment Plan, then SVBGSA will issue a funding strategy report.

SVBGSA Advisory Committee Meeting, May 20, 2021

This meeting was attended by Laura Paxton. Topics discussed included:

- Structure of committees and converting Planning Committee to GSP Implementation Committee. It was noted that a mechanism needs to be added to include surrounding basins outside the Salinas Valley Basin in integrated GSP implementation.
- The model workshop is June 30 from 1-3 pm.

Pure Water Monterey Water (PWM) Quality and Operations Committee Meeting, May 26, 2021

The information presented at this meeting included:

- In recent months the PWM Project average injection rate has been about 3.5 MGD.
- All permit requirements have been met.
- In FY 2020-2021, as of March 31, 2021 1,552 AF has been injected.
- Status of construction of new injection wells:
    - Deep Injection Well (DIW)-3: This well has been completed and is in the process of being developed.
    - DIW-4: This well is still under construction and is nearly complete.
- The Tracer Study final report is now being prepared and will be available for review in the near future.
- Arsenic levels at the monitoring wells are remaining at low levels, well within permit requirements. I asked that product water quality parameters that are required in the Watermaster's Storage and Recovery Permit for the PWM Project be included in future WQ&Ops Committee meetings, to confirm that they are being met.
- The next meeting is scheduled for June 23, 2021.

SEASIDE BASIN WATER MASTER TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

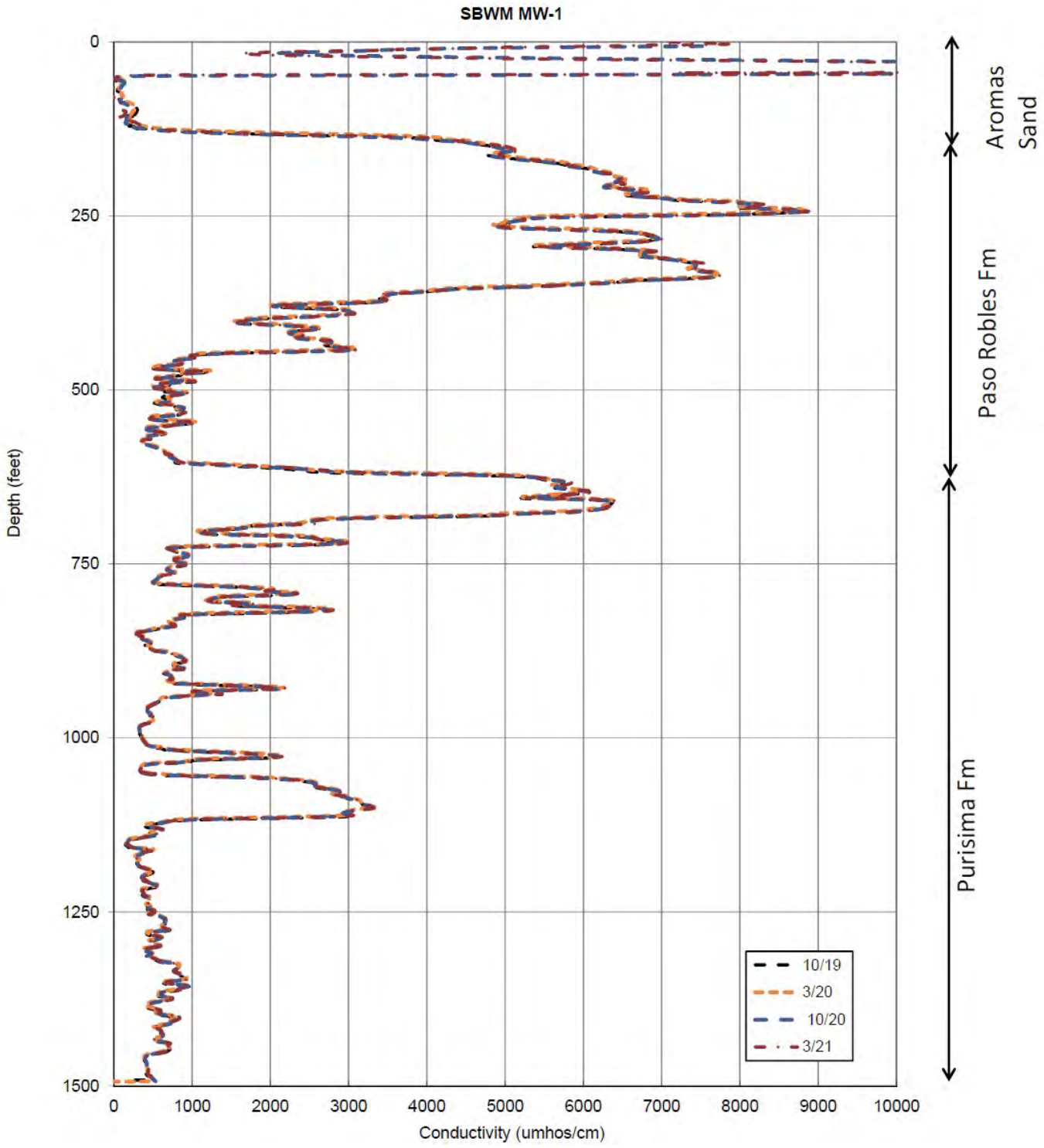
MEETING DATE:	June 9, 2021
AGENDA ITEM:	2.C
AGENDA TITLE:	Results from Martin Feeney's March 2021 Induction Logging of the Sentinel Wells
PREPARED BY:	Robert Jaques, Technical Program Manager

Attached are plots of the induction logging data from the March 2021 Sentinel Well logging event.

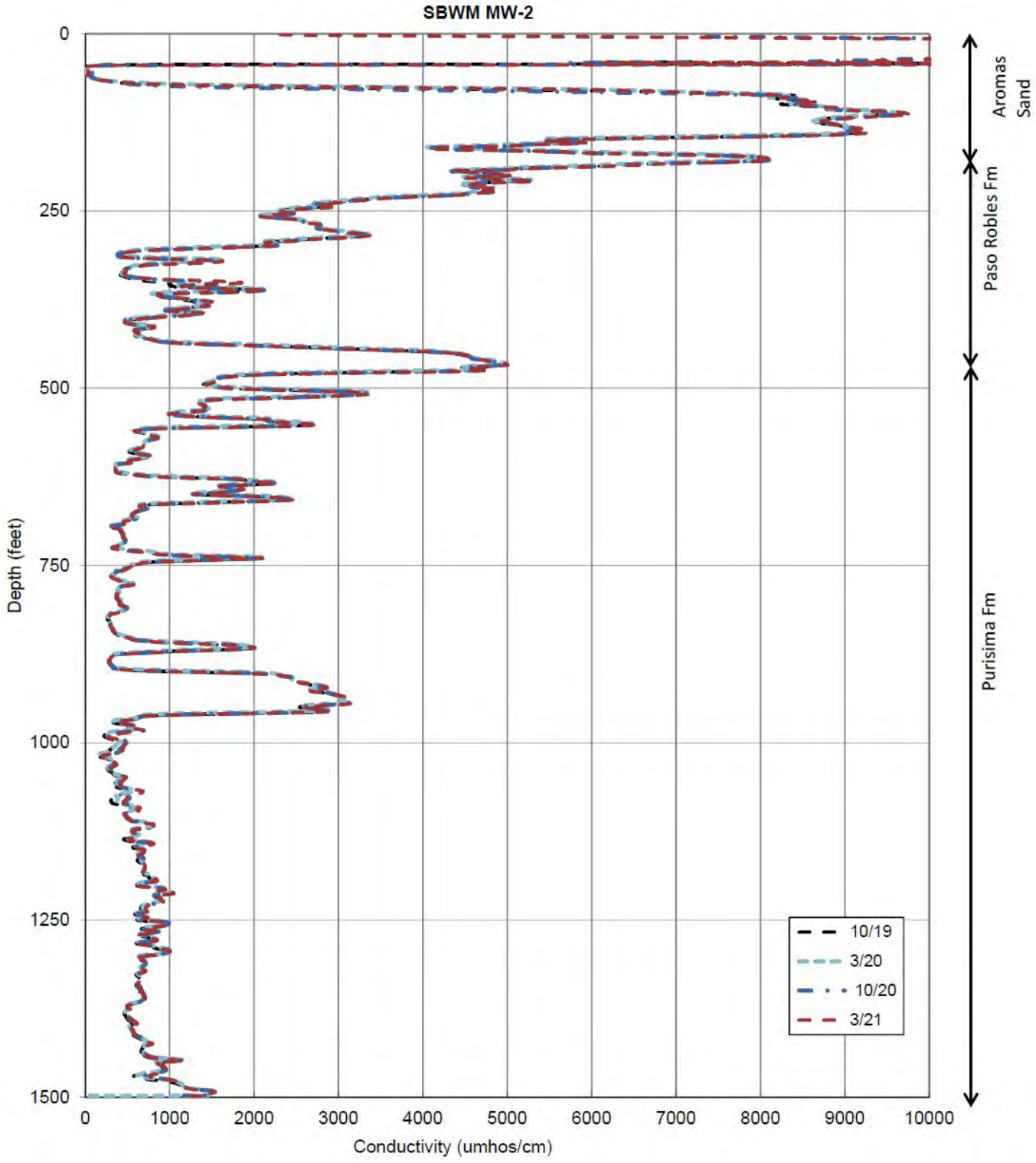
Mr. Feeney reports that the March 2021 data shows no detectable change in formation conductivity – a proxy for seawater intrusion. Thus, the induction logging does not show any indication of the start of seawater intrusion in any of the formations within which production wells are located (primarily the Paso Robles and Santa Margarita formations).

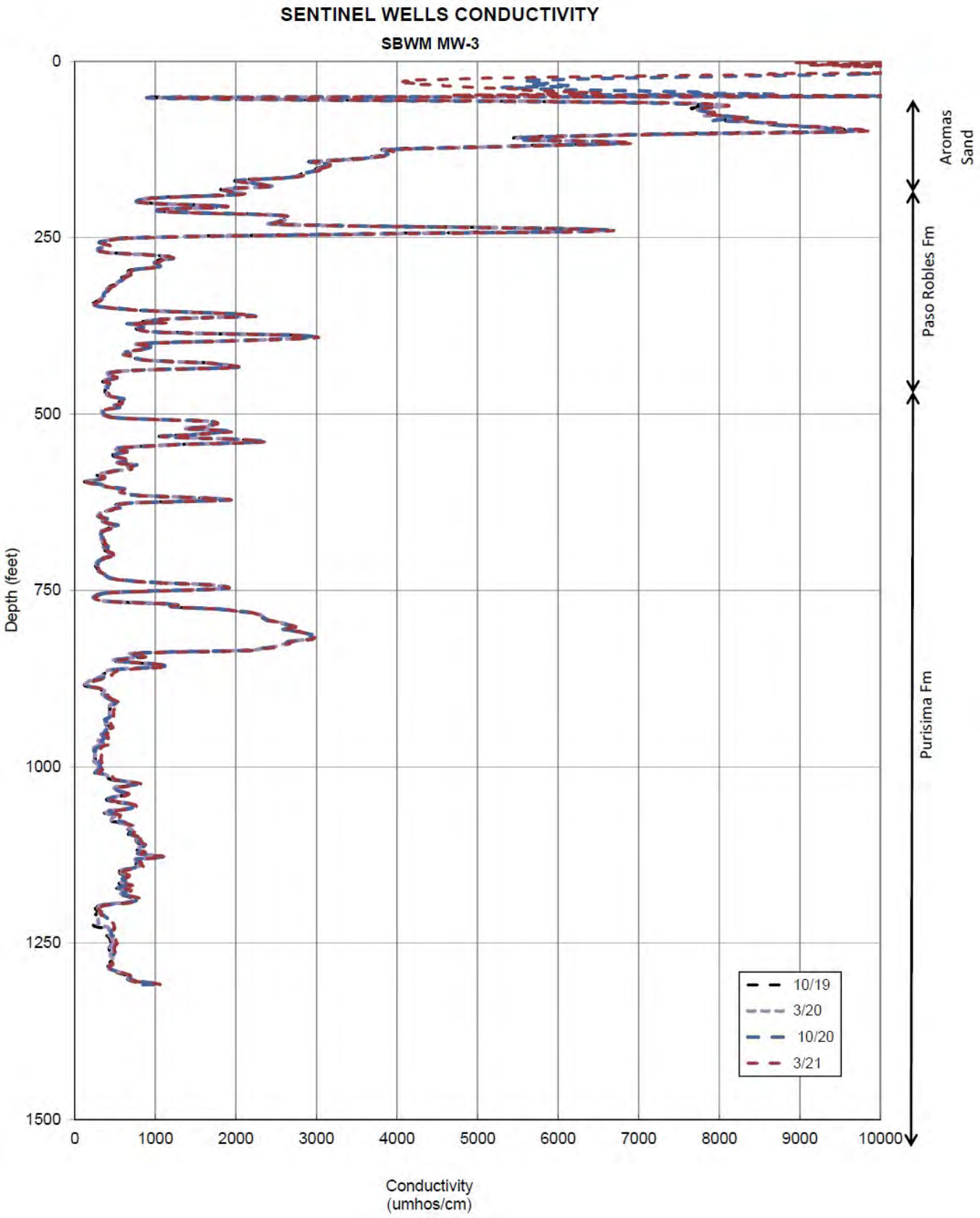
ATTACHMENTS:	Induction Logging Results
RECOMMENDED ACTION:	None required – information only

SENTINEL WELLS CONDUCTIVITY

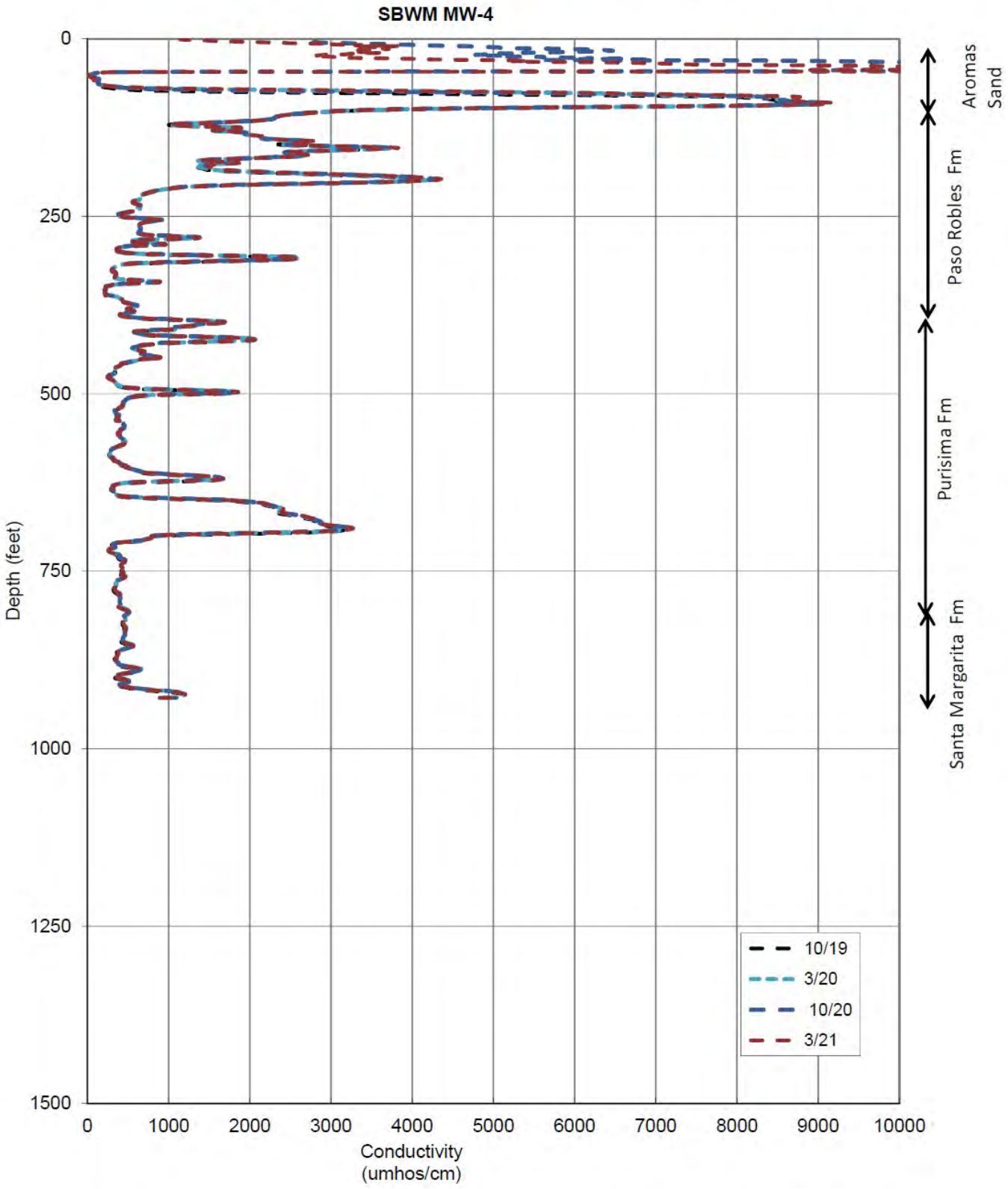


SENTINEL WELLS CONDUCTIVITY




SENTINEL WELLS CONDUCTIVITY
SBWM MW-3
Depth (feet)
0
250
500
750
1000
1250
1500
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Conductivity
(umhos/cm)
10/19
3/20
10/20
3/21
Aromas
Sand
Paso Robles Fm
Purisima Fm

SENTINEL WELLS CONDUCTIVITY



SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	June 9, 2021
AGENDA ITEM:	3
AGENDA TITLE:	Update on Water Quality Issues at Monitoring Well FO-9 Shallow
PREPARED BY:	Robert Jaques, Technical Program Manager

SUMMARY:

Induction logging and conductivity profiling has been completed on Monitoring Wells FO-9 and FO-10, and , Monitoring Well FO-9 was also video inspected. The results of that work were discussed at previous TAC meetings. Attached are the reports describing that work.

At FO-9 Shallow, the induction logging and conductivity profiling led to the conclusion that the increase in chloride is being caused by leakage in the casing of that well, allowing saltier water from the shallow strata to flow into the well. 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. What might be causing that is not clear. The video inspection of FO-9 Shallow was inconclusive as to the nature of the leak, but the conductivity log showed that it is obviously leaking.

I polled our experts on these issues and asked them:
1. For their confirming opinion that they concur with Martin's conclusion that the only logical explanation for the FO-9 Shallow induction logging and conductivity probing results is that the higher than usual chloride level found in the water quality sample from that well is due to casing leakage from the shallow (dunes sand) aquifer going downward in the casing, and that it is not indicative of seawater intrusion in the Paso Robles aquifer.
2. If they had any ideas that would explain the findings from the induction logging and conductivity probing of FO-10 Shallow.

Attached is a compilation of their responses. From these responses it is my conclusion that:
1. The increase in the chloride level in FO-9 Shallow is not being caused by seawater intrusion in the Paso Robles aquifer.
2. Although isotope analyses may be useful in determining if the source of the water that is causing the increase in chloride level is seawater or some other source, it would not be worthwhile to have those analyses conducted due to the high degree of dilution in the sample of this water (based on Gus Yates comment). Also, it is not known if the most recent sample has been retained by the lab, so that it would even be possible to analyze it, or whether another sample (at additional expense) would need to be taken.
3. There may be water quality data available from monitoring wells constructed in conjunction with the closure of Fort Ord as an active Army base. However, it may be a complicated and time-consuming undertaking to compile and evaluate that data.
4. In the former Fort Ord area, the hydraulic gradient in the Dunes/Aromas Sands shallow aquifer appears to be seaward, and intrusion appears only to have occurred near the coast, not further inland.

ATTACHMENTS:	1. Induction logging, conductivity profiling, and video inspection reports 2. Compilation of responses from experts
RECOMMENDED ACTION:	Provide direction to the Technical Program Manager regarding any further action the Watermaster should take regarding these issues

Martin B. Feeney
Consulting Hydrogeologist

P.G. 4634
C.E.G. 1454
C.Hg 145

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.

P.O. Box 23240, Ventura, CA 93002 ♦ **Phone: 831-915-1115** ♦ e-mail mfeeney@ix.netcom.com

- 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

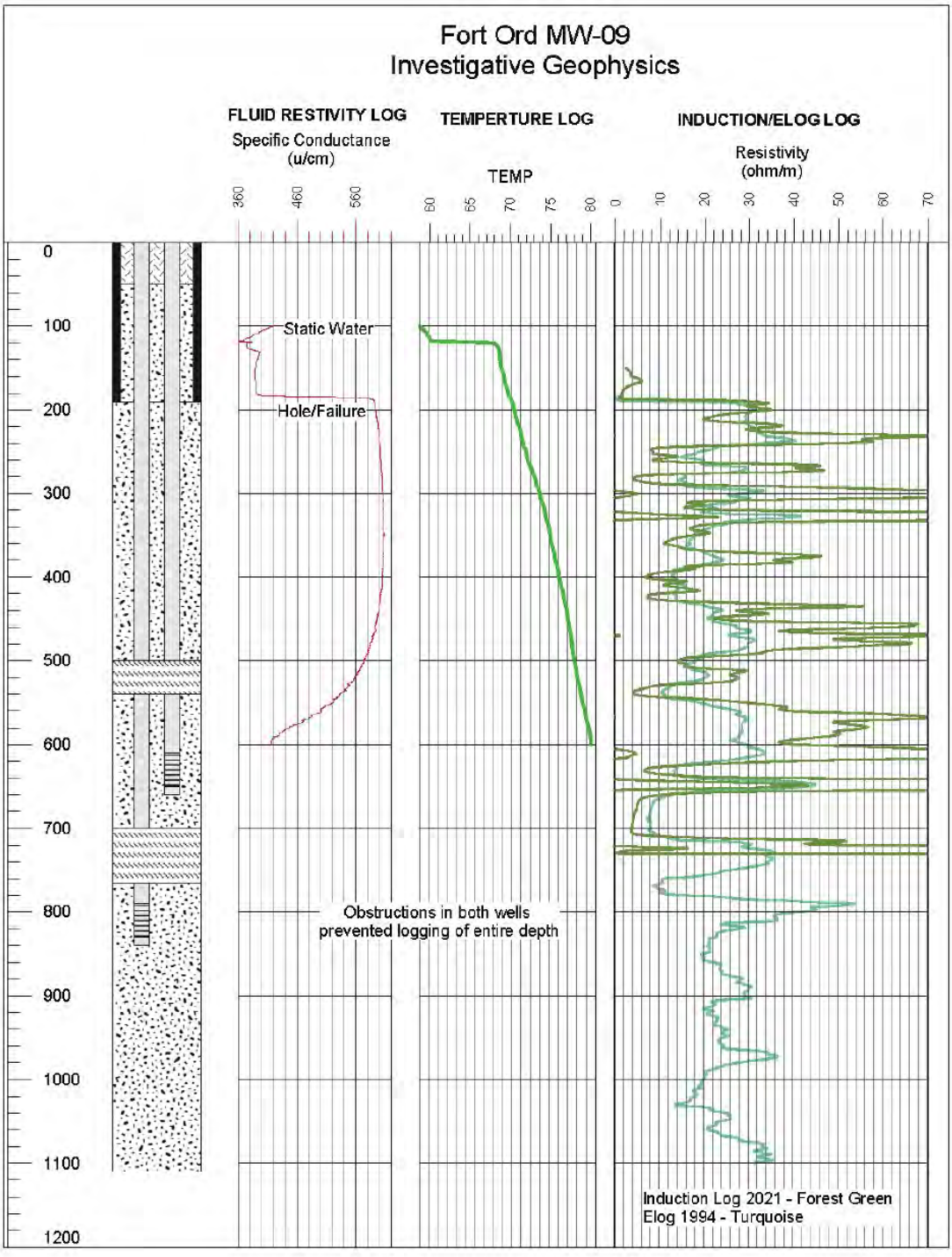
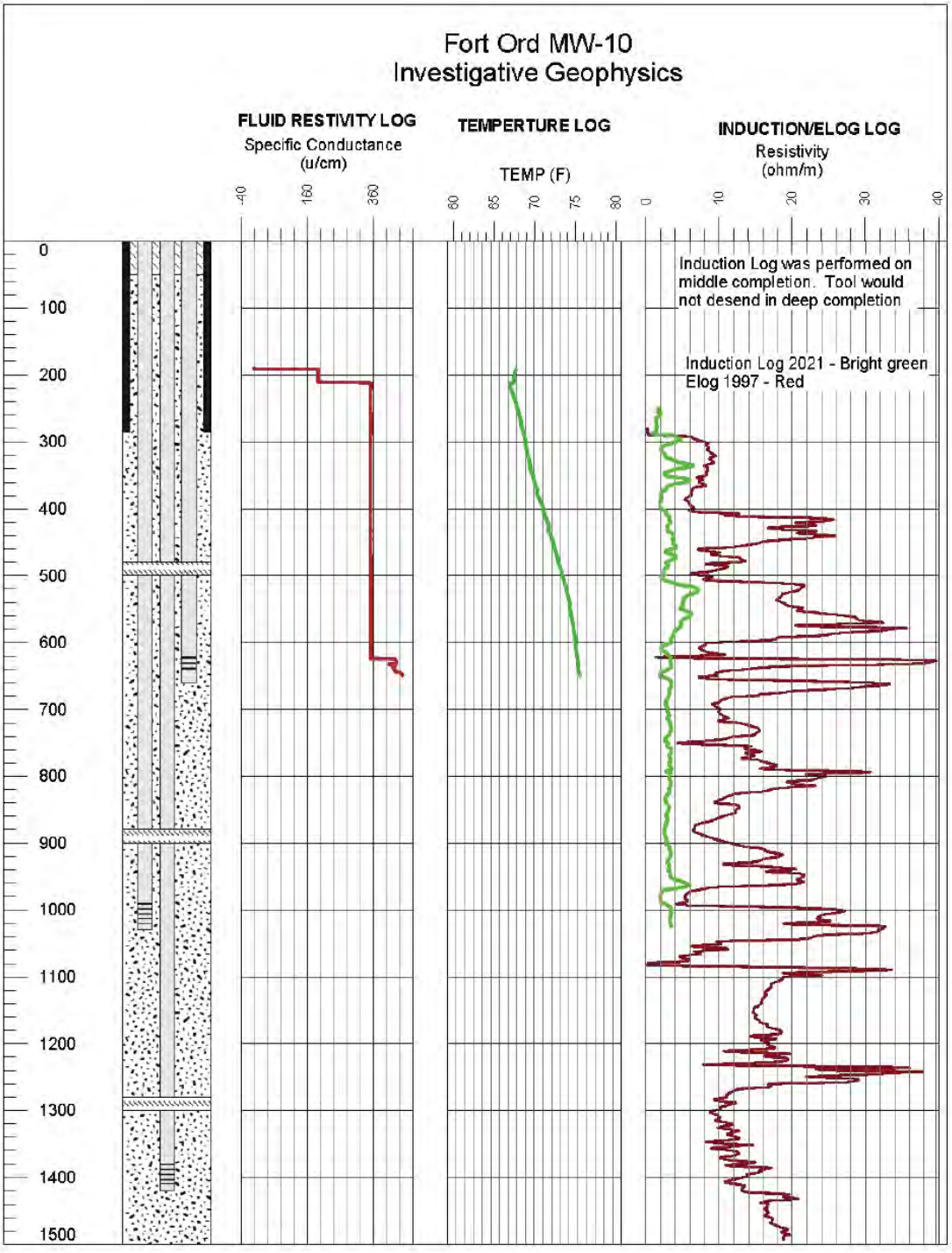

Fort Ord MW-09
Investigative Geophysics
FLUID RESTIVITY LOG
Specific Conductance
(u/cm)
TEMPERTURE LOG
TEMP
INDUCTION/ELOG LOG
Resistivity
(ohm/m)
360
460
560
60
65
70
75
80
0
10
20
30
40
50
60
70
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
Static Water
Hole/Failure
Obstructions in both wells
prevented logging of entire depth
Induction Log 2021 - Forest Green
Elog 1994 - Turquoise

Figure 2


Fort Ord MW-10
Investigative Geophysics
FLUID RESTIVITY LOG
Specific Conductance
(u/cm)
TEMPERTURE LOG
TEMP (F)
INDUCTION/ELOG LOG
Resistivity
(ohm/m)
Induction Log was performed on middle completion. Tool would not desend in deep completion
Induction Log 2021 - Bright green
Elog 1997 - Red

Pacific Surveys

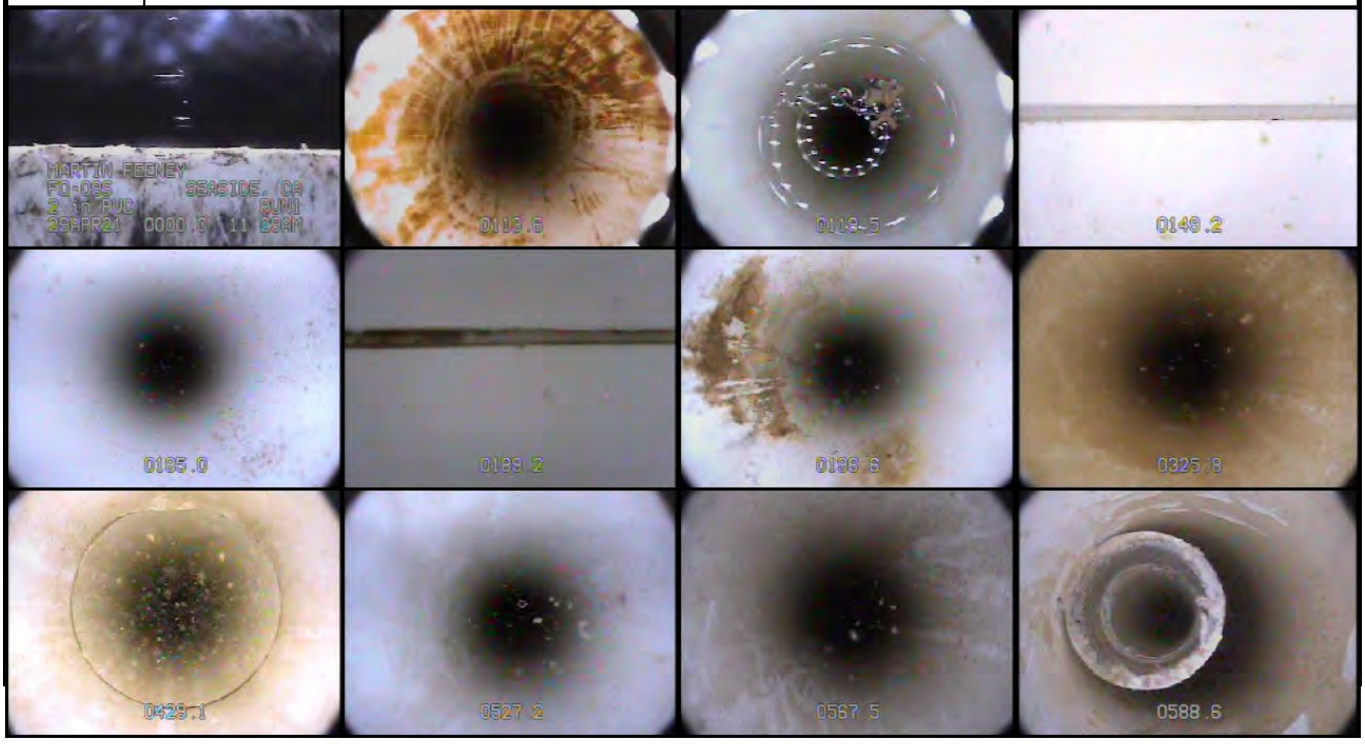
a full service geophysical well logging company

Video Survey Report

Company:	Martin Feeney	**Date:**	29-Apr-21
Well:	FO-09S	**Run No.**	One **Truck** PS-7
Field:	Seaside	**Job Ticket:**	28067
State:	California	**Total Depth:**	588.8 ft
Location:	600' NW of Kiska Rd. & Okinawa Rd.	**Water Level:**	120.0 ft
		Oil on Water:	No **Amount:** N/A
GPS:	36.638191 -121.827554	**Operator:**	Farrell
Zero Datum:	Top of CSG **Tool Zero:** Side-Scan		**Dead Space** 0"
Reason for Survey:	General Inspection	**Guides Set @**	N/A

Depth	Observations
0.0 ft	Begin survey at top of caisng.
50.0 ft	Casing appears in normal condition.
110.0 ft	Casing has some dark staining.
117.0 ft	Less staining on casing wall.
120.0 ft	SWL; water is clear with good visibility.
149.2 ft	Typical joint.
185.0 ft	Stop to observe flow. No flow observed. A lot of time was spent in this area from 180-190 ft to see if
	the casing was compromised. Other than some staining, operator could not see any problems with the
	well at this location.
188.8 ft	Stop to observe flow. No flow observed.
320.0 ft	Casing wall appears darker.
429.6 ft	It appears that some tooling had got caught on the lip of a joint and pulled it slightly into the well.
588.8 ft	Top of ostruction. End survey.

Well Details		
Perforation:		**As-Built**
Horizontal Mill Slot		610.0 ft to 650.0 ft
Casing Size (in):		**As-Built**
O.D.	**I.D.**	0.00 ft to 660.00 ft
	2.00	
Casing Size Measured by Operator:		
O.D.	**I.D.**	
Casing Material		PVC
Screen Material		PVC



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Pacific Surveys

a full service geophysical well logging company

Video Survey Report

Company:	Martin Feeney	**Date:**	29-Apr-21
Well:	FO-09D	**Run No.**	One **Truck** PS-7
Field:	Seaside	**Job Ticket:**	28067
State:	California	**Total Depth:**	738.6 ft
Location:	600' NW of Kiska Rd. & Okinawa Rd.	**Water Level:**	138.9 ft
		Oil on Water:	No **Amount:** N/A
GPS:	36.638191 -121.827554	**Operator:**	Farrell
Zero Datum:	Top of CSG **Tool Zero:** Side-Scan		**Dead Space** 0"
Reason for Survey:	General Inspection	**Guides Set @**	N/A

Depth	Observations
0.0 ft	Begin survey at top of casing.
50.0 ft	Casing appears in normal condition.
134.5 ft	Scum line from historical water levels.
138.9 ft	SWL; water is slightly cloudy.
149.1 ft	Typical joint.
192.0 ft	Cloudiness of water column decreases.
426.1 ft	Stain on casing wall.
530.0 ft	Casing wall appears darker.
534.0 ft	Casing wall appears less dark.
535.0 ft	Casing wall appears darker.
730.0 ft	Casing wall appears darker.
738.0 ft	Stain on casing wall.
738.6 ft	Top of obstruction. End survey.

Well Details		
Perforation:		**As-Built**
Horizontal Mill Slot		790.0 ft to 830.0 ft
Casing Size (in):		**As-Built**
O.D.	**I.D.**	0.00 ft to 840.00 ft
	2.00	
Casing Size Measured by Operator:		
O.D.	**I.D.**	
Casing Material		PVC
Screen Material		PVC

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Compilation of Responses from Experts

Combined Responses from Derrik Williams and Georgina King of Montgomery & Associates:

Well FO-09

I agree that the data suggest increased chlorides appear to result from vertical migration of seawater. It is difficult to say horizontal seawater intrusion has definitely not occurred. But the data collected by Martin strongly point to the vertical migration hypothesis, and it is definitely the best working hypothesis we have that matches all the data. It is interesting to me that the kick in specific conductance (SC) is right where the conductor casing ends. Not sure if Martin has given any thought to that? Another thing I noticed is that SC increases slightly maxing out around 350 ft bgs. At the TAC we discussed the origin of the salinity being some source other than seawater. Isotope studies may be a good way to determine the source.

I cannot speak to the statement that "The induction logging matches the original elog reasonably well." Confirming that statement might take somebody with more expertise in geophysics. And it may not be something that can be confirmed, given the different methods that Martin pointed out.

I would disagree that this means we are not seeing seawater intrusion at well F-09. The seawater might be taking a more convoluted pathway, but it is still seawater intrusion (pending additional confirmation sampling). However, it is only localized seawater intrusion, and there is a definitive action that would prevent further seawater intrusion: properly repairing destroying well F-09 (as suggested my Martin). I agree that well FO-09 does not appear to be indicative of broader, regional seawater intrusion. See my point above on isotope analysis.

Martin's comment (below) that the increased chloride level could be caused by sources other than sea water is well taken.

Well FO-10

This well is more problematic because there is little evidence that points to poor well construction as the source of seawater intrusion. The fact that well FO-10 is relatively inland (compared to well FO-09) makes it difficult to assess if there is any horizontal flow of seawater intrusion. Because this well is not officially in the Seaside subbasin, it may be beneficial to coordinate the MCWD to address the source of increased chlorides. Based on the data Martin has gathered, it is not really possible to provide an explanation of the findings. Again, an isotope study may shed light on the source of chlorides.

There appears to be a scaling problem or instrument discrepancy in the geophysical data: in FO-9 the amplitude of resistivity variations was much larger in 2021 than in the original log, and in FO-10 the relationship was the opposite. So I am cautious about drawing firm conclusions. However, I would like to offer the following additional thoughts regarding the results:

Response from Gus Yates of Todd Groundwater:

Well FO-9

1. The peaks and troughs of the 1994 and 2021 resistivity traces were at the same locations, which confirms both surveys were detecting the same formation materials. The difference in magnitude between old and new peaks was not constant, however. For example, at 260 ft the new peak was only about 18 ohm/m higher than the original peak, whereas at 650 ft it was about 65 ohm/m higher. The differences generally increased with depth, suggesting a possible change in aquifer water quality. Ironically, the new peaks are all higher than the original peaks. Intrusion would result in lower resistivity (lower peaks). So unless there is a global scaling problem in the data (see above concern about the difference between the two wells), then the new resistivity pattern does not suggest intrusion.
2. The gradual decrease in fluid resistivity over the 150 feet above the well screen might be explainable by a very slow rate of leakage into the casing. The leaked water is moving downward in the casing. If

that were caused by a water-level difference between the upper aquifer (at the leak) and the lower aquifer (at the screen), one would expect the elevated salinity to continue uniformly down to the screen unless the leak rate is very slow. There must be a downward gradient or water would leak out of the casing rather than into it. I surmise that the water-level difference and/or the leak rate is small and that the gradient over the last 150 ft above the screen is actually a diffused front of the slowly advancing leakage water.

3. I agree with Martin that leakage seems the most likely explanation for the fluid resistivity pattern and that the specific conductance is far below that of seawater. The data do not support a conclusion that seawater intrusion is occurring at the depth of the well screen.

Well FO-10

1. Elaborating on Martin's comment that the uniformly lower resistivity in the 2021 log is not likely indicative of intrusion, I would expect intrusion to cause a large drop in resistivity in coarse layers (i.e. the resistivity spikes) and little drop in fine-grained layers (the troughs) because intrusion would move primarily via the coarse layers. The data do not match that expected pattern.
2. The specific conductance of groundwater at the well screen (about 450 uS/cm) is about two orders of magnitude smaller than the specific conductance of seawater. As Martin noted, it is in a range that could derive from a number of potential salt sources.

Stable isotopes of oxygen and hydrogen could potentially reveal whether the source of elevated salinity is seawater, as Georgina suggested. My only concern is that the percent seawater would be so low (less than 1 percent) that the isotope results might not give a clear answer (that is, the noise might be bigger than the signal).

Response from Tamara Voss of MCWRA:

I haven't been to these well locations…Do we know what the land use (or historical use) is near F09 and FO10? Is this near irrigated agricultural lands or known areas using septic tanks? What source for this salinity makes the most sense? Are there other analytes that have been collected that we could evaluate (Bromide, Iodide, Boron, or others) that could help identify the source?

I also like the idea of stable isotopes for oxygen and hydrogen and they shouldn't be very expensive to run.

Comments from Martin Feeney regarding the responses:

- Although there is evidence of higher chloride content in the water that is leaking in, that doesn't make it seawater - the incoming water only has a SC of 600 uS. This SC is less than that of the Santa Margarita formation. It could easily be ag return, historical septic, etc. Isotopes would be useful, but the well is to be destroyed.

Wells on the old Fort Ord are shown below on Map No. 1. No telling what land uses occurred in the past. [Comment from Bob Jaques: I worked as Chief of the Sanitation Branch of Facilities Engineering at Fort Ord from 1974 to 1976. My Branch was responsible for operation and maintenance of all of the water and wastewater systems on Fort Ord. From my personal knowledge, there was no agricultural activity, nor were there any septic tanks, in the vicinities of either FO-9 and FO-10 at that point in time. The family housing near FO-9 had been in existence form some years prior to the time I started working there. The Main PX which is near FO-10, as I recall, was constructed sometime around the time I worked there, and prior to that the site was open space that was unused.] I looked at water quality/water level data in the Ford Ord cleanup database. That data is from the shallow Fort Ord wells put in by Harding Lawson. There is a lot of data there, but some limitations. Very little inorganic data. Only chloride and specific conductance from 1992. Water level data for many wells stops in 1995 but one continues until 2013. All of the FO wells on the map have been destroyed. I prepared a rough map of the data. It is

attached as Map No.2. Don't get confused the "FO-09 etc" are old, now destroyed, production wells for the Army.

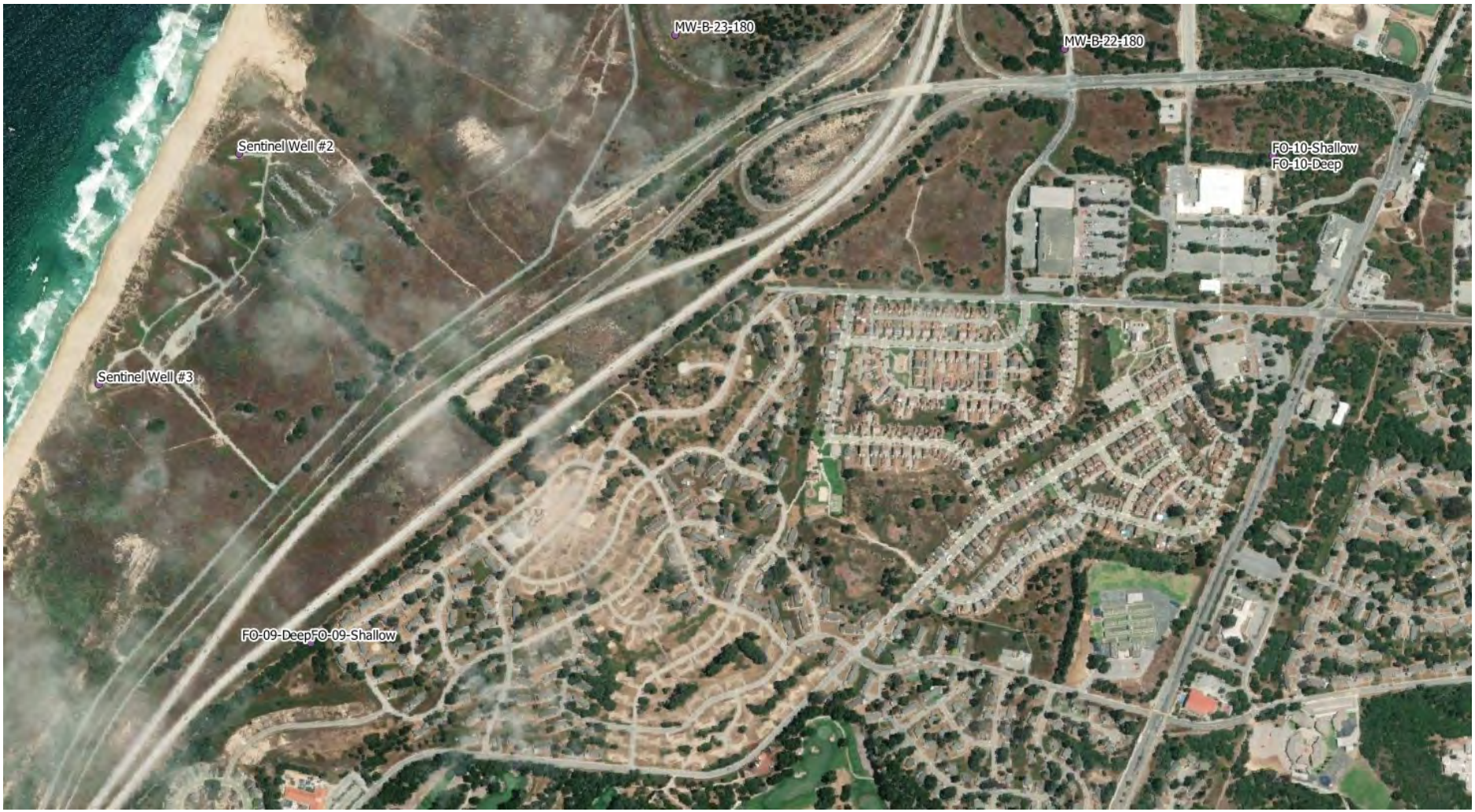
Looking at the data, dated as it is, a couple of things can be teased out of the data:

- The record shows water levels above sea level and a seaward gradient in the shallow zone (Dune/Aromas Sands). While the data are sparse, the record that extends to 2013 suggest no significant change in water levels. Which if you think about, isn't surprising since there are no extractions from this zone.
- Also water quality, again data are dated, documents no evidence of saltwater degradation very far inland. At the extreme coast, yes. Again, without a landward gradient no driving force to move the seawater the water quality is unlikely to change.

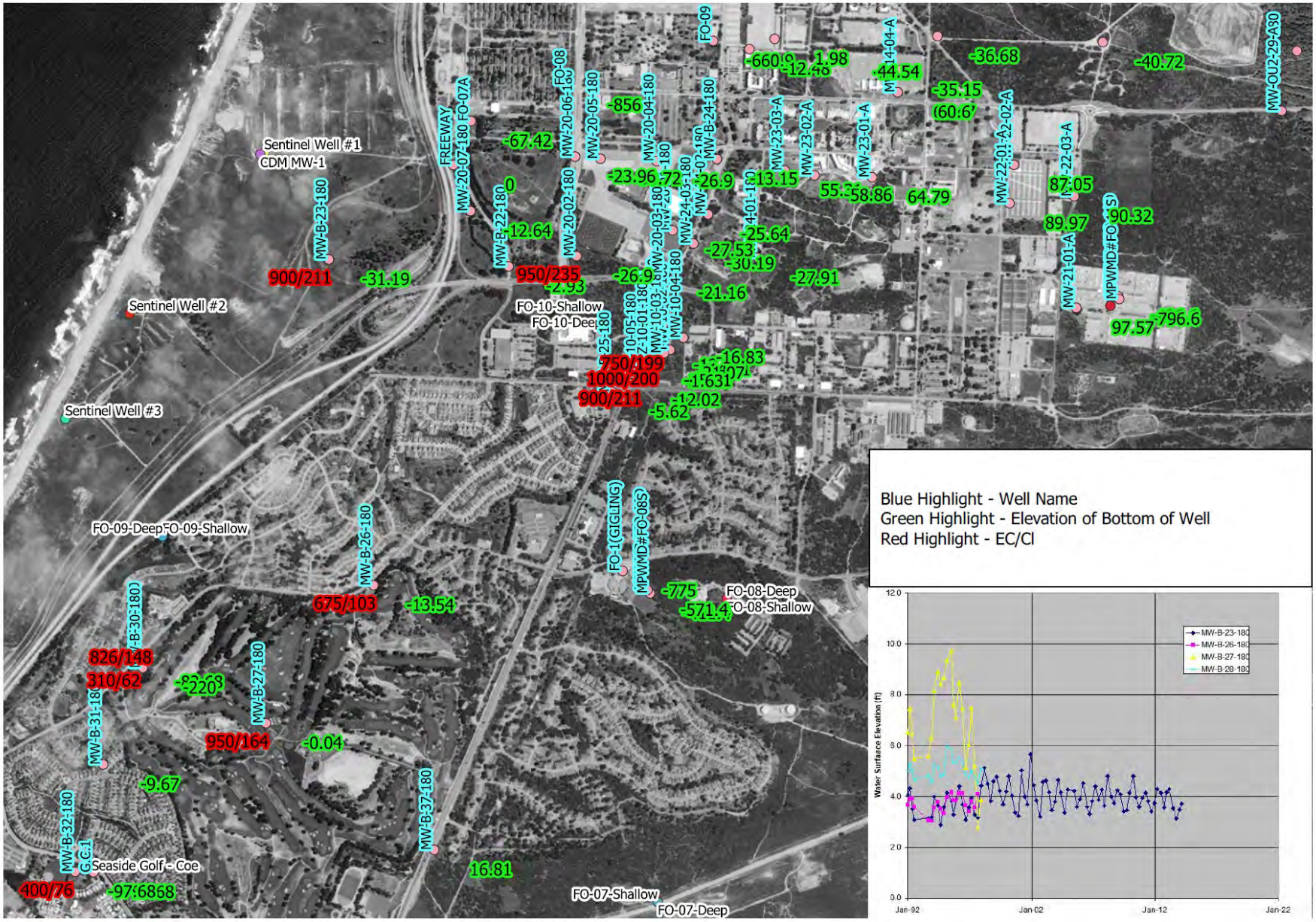
Comments from Jon Lear of MPWMD:

The District used to sample MW-B-23-180 (shown on Map No.1 below) annually, but the well was destroyed by the Army in 2014. See monitoring data spreadsheets below.

Map No. 1


MW-B-23-180
MW-B-22-180
Sentinel Well #2
FO-10-Shallow
FO-10-Deep
Sentinel Well #3
FO-09-Deep
FO-09-Shallow

Map No. 2


Sentinel Well #1
CDM MW-1
Sentinel Well #2
Sentinel Well #3
FREEWAY
MW-20-07-180
FO-07A
FO-08
MW-20-06-180
MW-20-05-180
MW-20-04-180
MW-B-24-180
FO-09
MW-23-03-A
MW-23-02-A
MW-23-01-A
MW-14-04-A
MW-22-01-A
MW-22-02-A
MW-22-03-A
MW-OU2-29-A30
MW-B-23-180
MW-B-22-180
MW-20-02-180
MW-20-03-180
MW-24-03-180
MW-24-01-180
MW-10-04-180
MW-10-03-180
MW-10-01-180
MW-10-05-180
MW-B-25-180
FO-10-Shallow
FO-10-Deep
MW-21-01-A
MPWMD#FO-10(S)
MW-B-26-180
FO-09-Deep
FO-09-Shallow
FO-1(GIGLING)
MPWMD#FO-08S
FO-08-Deep
FO-08-Shallow
MW-B-30-180
MW-B-27-180
MW-B-31-180
MW-B-32-180
MW-B-37-180
G C-1
Seaside Golf - Coe
FO-07-Shallow
FO-07-Deep
-660.0
-12.48
1.98
44.54
-36.68
-40.72
-35.15
(60.6')
-856
-67.42
-23.96
-72
-26.9
-13.15
55.3
58.86
64.79
87.05
89.97
90.32
0
-12.64
950/235
-2.93
-31.19
900/211
-26.9
-21.16
-27.91
25.64
-27.53
-30.19
97.57
796.6
750/199
1000/200
900/211
-16.83
-1631
-12.02
-5.62
675/103
-13.54
-775
-571.4
826/148
310/62
-220
950/164
-0.04
-9.67
16.81
400/76
-97.6858
Blue Highlight - Well Name
Green Highlight - Elevation of Bottom of Well
Red Highlight - EC/Cl
Water Surface Elevation (ft)
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Jan-92
Jan-02
Jan-12
Jan-22
MW-B-23-180
MW-B-26-180
MW-B-27-180
MW-B-29-180

Water Quality										
Sample Number	MPWMD_id	Common Name	Sampling Date	Sampling Time	Date Analyzed	Method	Constituent	Value	Unit	AMDL
AA57529	258	MW-B-23-180 (QED) 15S01E11Aa	6/4/2009	3:30:00 PM	6/8/2009	2320B	Alkalinity, Total (as CaCO3)	184	mg/L	2
AA57529	258	MW-B-23-180 (QED) 15S01E11Aa	6/4/2009	3:30:00 PM	6/11/2009	4500NH3 D	Ammonia-N	<0.05	mg/L	0.05
AA57529	258	MW-B-23-180 (QED) 15S01E11Aa	6/4/2009	3:30:00 PM	6/8/2009	2320B	Bicarbonate (as HCO3-)	224.48	mg/L	
AA57529	258	MW-B-23-180 (QED) 15S01E11Aa	6/4/2009	3:30:00 PM	6/17/2009	EPA200.7	Boron	0.09	mg/L	0.05
AA57529	258	MW-B-23-180 (QED) 15S01E11Aa	6/4/2009	3:30:00 PM	6/5/2009	EPA300.0	Bromide	0.4	mg/L	0.2
AA57529	258	MW-B-23-180 (QED) 15S01E11Aa	6/4/2009	3:30:00 PM	6/9/2009	EPA200.7	Calcium	48	mg/L	1
AA57529	258	MW-B-23-180 (QED) 15S01E11Aa	6/4/2009	3:30:00 PM	6/5/2009	EPA300.0	Chloride	126	mg/L	1

Water Quality										
Sample Number	MPWMD_id	Common Name	Sampling Date	Sampling Time	Date Analyzed	Method	Constituent	Value	Unit	AMDL
AA57529	258	MW-B-23-180 (QED) 15S01E11Aa	6/4/2009	3:30:00 PM	6/5/2009	EPA300.0	Fluoride	<0.10	mg/L	0.10
AA57529	258	MW-B-23-180 (QED) 15S01E11Aa	6/4/2009	3:30:00 PM	6/9/2009	2340B	Hardness (as CaCO3)	239	mg/L	10
AA57529	258	MW-B-23-180 (QED) 15S01E11Aa	6/4/2009	3:30:00 PM	6/9/2009	EPA 200.7	Iron	119	ug/L	50
AA57529	258	MW-B-23-180 (QED) 15S01E11Aa	6/4/2009	3:30:00 PM	6/9/2009	EPA200.7	Magnesium	29	mg/L	1
AA57529	258	MW-B-23-180 (QED) 15S01E11Aa	6/4/2009	3:30:00 PM	6/9/2009	EPA 200.7	Manganese, Total	21	ug/L	20
AA57529	258	MW-B-23-180 (QED) 15S01E11Aa	6/4/2009	3:30:00 PM	6/5/2009	EPA300.0	Nitrate as NO3	47	mg/L	1
AA57529	258	MW-B-23-180 (QED) 15S01E11Aa	6/4/2009	3:30:00 PM	6/5/2009	EPA300.0	Nitrite as Nitrogen	<0.1	mg/L	0.1
AA57529	258	MW-B-23-180 (QED)	6/4/2009	3:30:00 PM	6/5/2009	EPA300.0	o-Phosphate-P	<0.1	mg/L	0.1

Water Quality											
Sample Number	MPWMD_id	Common Name	Sampling Date	Sampling Time	Date Analyzed	Method	Constituent	Value	Unit	AMDL	
		15S01E11Aa									
AA57529	258	MW-B-23-180 (QED) 15S01E11Aa	6/4/2009	3:30:00 PM	6/5/2009	4500-H+B	pH (Laboratory)	7.1	STD. Units		
AA57529	258	MW-B-23-180 (QED) 15S01E11Aa	6/4/2009	3:30:00 PM	6/9/2009	EPA200.7	Potassium	5	mg/L	0.5	
AA57529	258	MW-B-23-180 (QED) 15S01E11Aa	6/4/2009	3:30:00 PM	6/17/2009	Calculation	QC Anion Sum x 100	97%	%		
AA57529	258	MW-B-23-180 (QED) 15S01E11Aa	6/4/2009	3:30:00 PM	6/17/2009	Calculation	QC Anion-Cation Balance	2	%		
AA57529	258	MW-B-23-180 (QED) 15S01E11Aa	6/4/2009	3:30:00 PM	6/17/2009	Calculation	QC Cation Sum x 100	100%	%		
AA57529	258	MW-B-23-180 (QED) 15S01E11Aa	6/4/2009	3:30:00 PM	6/17/2009	Calculation	QC Ratio TDS/SEC	0.62			
AA57529	258	MW-B-23-180 (QED) 15S01E11Aa	6/4/2009	3:30:00 PM	6/9/2009	EPA200.7	Sodium	108	mg/L	1	

Water Quality										
Sample Number	MPWMD_id	Common Name	Sampling Date	Sampling Time	Date Analyzed	Method	Constituent	Value	Unit	AMDL
AA57529	258	MW-B-23-180 (QED) 15S01E11Aa	6/4/2009	3:30:00 PM	6/4/2009	2510B	Specific Conductance (E.C)	956	umhos/cm	1
AA57529	258	MW-B-23-180 (QED) 15S01E11Aa	6/4/2009	3:30:00 PM	6/5/2009	EPA300.0	Sulfate	62	mg/L	1
AA57529	258	MW-B-23-180 (QED) 15S01E11Aa	6/4/2009	3:30:00 PM	6/8/2009	2540C	Total Diss. Solids	596	mg/L	10
AA57529	258	MW-B-23-180 (QED) 15S01E11Aa	6/4/2009	3:30:00 PM	6/11/2009	SM5310 C	Total Organic Carbon	0.73	mg/L	0.20
AA67959	258	MW-B-23-180	7/27/2010	2:00:00 PM	7/30/2010	2320B	Alkalinity, Total (as CaCO3)	169	mg/L	2
AA67959	258	MW-B-23-180	7/27/2010	2:00:00 PM	8/16/2010	4500NH3 D	Ammonia-N	<0.05	mg/L	0.05
AA67959	258	MW-B-23-180	7/27/2010	2:00:00 PM	7/30/2010	2320B	Bicarbonate (as HCO3-)	206.18	mg/L	
AA67959	258	MW-B-23-180	7/27/2010	2:00:00 PM	7/28/2010	EPA200.7	Boron	<0.05	mg/L	0.05
AA67959	258	MW-B-23-180	7/27/2010	2:00:00	7/28/2010	EPA300.	Bromide	0.13	mg/L	0.05

Water Quality										
Sample Number	MPWMD_id	Common Name	Sampling Date	Sampling Time	Date Analyzed	Method	Constituent	Value	Unit	AMDL
				PM		0				
AA67959	258	MW-B-23-180	7/27/2010	2:00:00 PM	7/28/2010	EPA200.7	Calcium	50	mg/L	1
AA67959	258	MW-B-23-180	7/27/2010	2:00:00 PM	7/28/2010	EPA300.0	Chloride	132	mg/L	1
AA67959	258	MW-B-23-180	7/27/2010	2:00:00 PM	7/28/2010	EPA300.0	Fluoride	<0.10	mg/L	0.10
AA67959	258	MW-B-23-180	7/27/2010	2:00:00 PM	7/29/2010	2340B	Hardness (as CaCO3)	244	mg/L	10
AA67959	258	MW-B-23-180	7/27/2010	2:00:00 PM	7/28/2010	EPA 200.7	Iron	<0.05	mg/L	0.05
AA67959	258	MW-B-23-180	7/27/2010	2:00:00 PM	7/28/2010	EPA200.7	Magnesium	29	mg/L	1
AA67959	258	MW-B-23-180	7/27/2010	2:00:00 PM	7/28/2010	EPA 200.7	Manganese, Total	<0.02	mg/L	0.02
AA67959	258	MW-B-23-180	7/27/2010	2:00:00 PM	7/28/2010	EPA300.0	Nitrate as NO3	44	mg/L	1
AA67959	258	MW-B-23-180	7/27/2010	2:00:00 PM	7/28/2010	EPA300.0	Nitrite as Nitrogen	<0.05	mg/L	0.05
AA67959	258	MW-B-23-180	7/27/2010	2:00:00 PM	7/28/2010	EPA300.0	o-Phosphate-P	0.07	mg/L	0.05
AA67959	258	MW-B-23-180	7/27/2010	2:00:00	7/27/2010	4500-	pH	7.3	STD.	

Water Quality										
Sample Number	MPWMD_id	Common Name	Sampling Date	Sampling Time	Date Analyzed	Method	Constituent	Value	Unit	AMDL
				PM		H+B	(Laboratory)		Units	
AA67959	258	MW-B-23-180	7/27/2010	2:00:00 PM	7/28/2010	EPA200.7	Potassium	4.0	mg/L	0.5
AA67959	258	MW-B-23-180	7/27/2010	2:00:00 PM	8/4/2010	Calculation	QC Anion Sum x 100	93%	%	
AA67959	258	MW-B-23-180	7/27/2010	2:00:00 PM	8/4/2010	Calculation	QC Anion-Cation Balance	3	%	
AA67959	258	MW-B-23-180	7/27/2010	2:00:00 PM	8/4/2010	Calculation	QC Cation Sum x 100	98%	%	
AA67959	258	MW-B-23-180	7/27/2010	2:00:00 PM	8/9/2010	Calculation	QC Ratio TDS/SEC	0.60		
AA67959	258	MW-B-23-180	7/27/2010	2:00:00 PM	7/28/2010	EPA200.7	Sodium	109	mg/L	1
AA67959	258	MW-B-23-180	7/27/2010	2:00:00 PM	7/27/2010	2510B	Specific Conductance (E.C)	990	umhos/cm	1
AA67959	258	MW-B-23-180	7/27/2010	2:00:00 PM	7/28/2010	EPA300.0	Sulfate	65	mg/L	1
AA67959	258	MW-B-23-180	7/27/2010	2:00:00 PM	8/3/2010	2540C	Total Diss. Solids	595	mg/L	10
AA67959	258	MW-B-23-180	7/27/2010	2:00:00	8/9/2010	SM5310	Total Organic	0.94	mg/L	0.20

Water Quality										
Sample Number	MPWMD_id	Common Name	Sampling Date	Sampling Time	Date Analyzed	Method	Constituent	Value	Unit	AMDL
				PM		C	Carbon			
AA78632	258	MW-B-23-180	7/27/2011	1:30:00 PM	8/1/2011	2320B	Alkalinity, Total (as CaCO3)	169	mg/L	2
AA78632	258	MW-B-23-180	7/27/2011	1:30:00 PM	7/28/2011	4500NH3 D	Ammonia-N	<0.05	mg/L	0.05
AA78632	258		7/27/2011				Bicarbonate (as HCO3-)	NA		
AA78632	258	MW-B-23-180	7/27/2011	1:30:00 PM	7/29/2011	EPA200.7	Boron	0.05	mg/L	0.05
AA78632	258	MW-B-23-180	7/27/2011	1:30:00 PM	7/28/2011	EPA300.0	Bromide	0.41	mg/L	0.05
AA78632	258	MW-B-23-180	7/27/2011	1:30:00 PM	7/29/2011	EPA200.7	Calcium	47	mg/L	0.5
AA78632	258	MW-B-23-180	7/27/2011	1:30:00 PM	7/28/2011	EPA300.0	Chloride	139	mg/L	1
AA78632	258	MW-B-23-180	7/27/2011	1:30:00 PM	7/28/2011	EPA300.0	Fluoride	<0.10	mg/L	0.10
AA78632	258	MW-B-23-180	7/27/2011	1:30:00 PM	8/1/2011	2340B	Hardness (as CaCO3)	229	mg/L	10
AA78632	258	MW-B-23-180	7/27/2011	1:30:00 PM	7/29/2011	EPA 200.7	Iron	0.055	ug/L	10

Water Quality										
Sample Number	MPWMD_id	Common Name	Sampling Date	Sampling Time	Date Analyzed	Method	Constituent	Value	Unit	AMDL
AA78632	258	MW-B-23-180	7/27/2011	1:30:00 PM	7/29/2011	EPA200.7	Magnesium	27	mg/L	0.5
AA78632	258	MW-B-23-180	7/27/2011	1:30:00 PM	7/29/2011	EPA 200.7	Manganese, Total	0.015	ug/L	10
AA78632	258	MW-B-23-180	7/27/2011	1:30:00 PM	7/28/2011	EPA300.0	Nitrate as NO3	43	mg/L	1
AA78632	258	MW-B-23-180	7/27/2011	1:30:00 PM	7/28/2011	EPA300.0	Nitrite as Nitrogen	<0.05	mg/L	0.05
AA78632	258	MW-B-23-180	7/27/2011	1:30:00 PM	7/28/2011	EPA300.0	o-Phosphate-P	<0.05	mg/L	0.05
AA78632	258	MW-B-23-180	7/27/2011	1:30:00 PM	7/27/2011	4500-H+B	pH (Laboratory)	7.2	STD. Units	
AA78632	258	MW-B-23-180	7/27/2011	1:30:00 PM	7/29/2011	EPA200.7	Potassium	3.8	mg/L	0.1
AA78632	258	MW-B-23-180	7/27/2011	1:30:00 PM	8/4/2011	Calculation	QC Anion Sum x 100	97%	%	
AA78632	258	MW-B-23-180	7/27/2011	1:30:00 PM	8/4/2011	Calculation	QC Anion-Cation Balance	0	%	
AA78632	258	MW-B-23-180	7/27/2011	1:30:00 PM	8/4/2011	Calculation	QC Cation Sum x 100	97%	%	
AA78632	258	MW-B-23-180	7/27/2011	1:30:00	8/8/2011	Calculati	QC Ratio	0.61		

Water Quality										
Sample Number	MPWMD_id	Common Name	Sampling Date	Sampling Time	Date Analyzed	Method	Constituent	Value	Unit	AMDL
				PM		on	TDS/SEC			
AA78632	258	MW-B-23-180	7/27/2011	1:30:00 PM	7/29/2011	EPA200.7	Sodium	108	mg/L	0.5
AA78632	258	MW-B-23-180	7/27/2011	1:30:00 PM	7/27/2011	2510B	Specific Conductance (E.C)	967	umhos/cm	1
AA78632	258	MW-B-23-180	7/27/2011	1:30:00 PM	7/28/2011	EPA300.0	Sulfate	67	mg/L	1
AA78632	258	MW-B-23-180	7/27/2011	1:30:00 PM	8/5/2011	2540C	Total Diss. Solids	588	mg/L	10
AA78632	258	MW-B-23-180	7/27/2011	1:30:00 PM	8/9/2011	SM5310C	Total Organic Carbon	1.1	mg/L	0.20
AA90002	258	MW-B-180	7/17/2012	1:40:00 PM	7/17/2012	2320B	Alkalinity, Total (as CaCO3)	179	mg/L	2
AA90002	258	MW-B-180	7/17/2012	1:40:00 PM	7/17/2012	4500NH3D	Ammonia-N	<0.05	mg/L	0.05
AA90002	258	MW-B-180	7/17/2012	1:40:00 PM	7/17/2012	EPA200.7	Boron	0.06	mg/L	0.05
AA90002	258	MW-B-180	7/17/2012	1:40:00 PM	7/17/2012	EPA300.0	Bromide	0.37	mg/L	0.1
AA90002	258	MW-B-180	7/17/2012	1:40:00	7/17/2012	EPA200.	Calcium	51	mg/L	0.5

Water Quality										
Sample Number	MPWMD_id	Common Name	Sampling Date	Sampling Time	Date Analyzed	Method	Constituent	Value	Unit	AMDL
				PM		7				
AA90002	258	MW-B-180	7/17/2012	1:40:00 PM	7/17/2012	EPA300.0	Chloride	135	mg/L	1
AA90002	258	MW-B-180	7/17/2012	1:40:00 PM	7/17/2012	EPA300.0	Fluoride	<0.1	mg/L	0.1
AA90002	258	MW-B-180	7/17/2012	1:40:00 PM	7/17/2012	2340B	Hardness (as CaCO3)	251	mg/L	10
AA90002	258	MW-B-180	7/17/2012	1:40:00 PM	7/17/2012	EPA200.7	Iron	0.547	ug/L	10
AA90002	258	MW-B-180	7/17/2012	1:40:00 PM	7/17/2012	EPA200.7	Magnesium	30	mg/L	0.5
AA90002	258	MW-B-180	7/17/2012	1:40:00 PM	7/17/2012	EPA 200.7	Manganese, Total	0.080	ug/L	10
AA90002	258	MW-B-180	7/17/2012	1:40:00 PM	7/17/2012	-0-	MPWMA Standard GW Panel	Completed	-0-	-0-
AA90002	258	MW-B-180	7/17/2012	1:40:00 PM	7/17/2012	EPA300.0	Nitrate as NO3	37	mg/L	1
AA90002	258	MW-B-180	7/17/2012	1:40:00 PM	7/17/2012	EPA300.0	Nitrite as NO2-N	<0.1	mg/L	0.1
AA90002	258	MW-B-180	7/17/2012	1:40:00 PM	7/17/2012	EPA300.0	o-Phosphate-P	<0.1	mg/L	0.1

Water Quality										
Sample Number	MPWMD_id	Common Name	Sampling Date	Sampling Time	Date Analyzed	Method	Constituent	Value	Unit	AMDL
AA90002	258	MW-B-180	7/17/2012	1:40:00 PM	7/17/2012	4500-H+B	pH (Laboratory)	7.2	pH (H)	-0-
AA90002	258	MW-B-180	7/17/2012	1:40:00 PM	7/17/2012	EPA200.7	Potassium	4.6	mg/L	0.1
AA90002	258	MW-B-180	7/17/2012	1:40:00 PM	7/17/2012	Calculation	QC Anion Sum x 100	97%	%	-0-
AA90002	258	MW-B-180	7/17/2012	1:40:00 PM	7/17/2012	Calculation	QC Anion Sum x 100	97.2	%	-0-
AA90002	258	MW-B-180	7/17/2012	1:40:00 PM	7/17/2012	Calculation	QC Anion-Cation Balance	3	%	-0-
AA90002	258	MW-B-180	7/17/2012	1:40:00 PM	7/17/2012	Calculation	QC Cation Sum x 100	103	%	-0-
AA90002	258	MW-B-180	7/17/2012	1:40:00 PM	7/17/2012	Calculation	QC Cation Sum x 100	103%	%	-0-
AA90002	258	MW-B-180	7/17/2012	1:40:00 PM	7/17/2012	Calculation	QC Ratio TDS/SEC	0.59	-0-	-0-
AA90002	258	MW-B-180	7/17/2012	1:40:00 PM	7/17/2012	EPA200.7	Sodium	110	mg/L	0.5
AA90002	258	MW-B-180	7/17/2012	1:40:00 PM	7/17/2012	2510B	Specific Conductance (E.C)	959	umhos/cm	1

Water Quality										
Sample Number	MPWMD_id	Common Name	Sampling Date	Sampling Time	Date Analyzed	Method	Constituent	Value	Unit	AMDL
AA90002	258	MW-B-180	7/17/2012	1:40:00 PM	7/17/2012	EPA300.0	Sulfate	64	mg/L	1
AA90002	258	MW-B-180	7/17/2012	1:40:00 PM	7/17/2012	2540C	Total Diss. Solids	570	mg/L	10
AA90002	258	MW-B-180	7/17/2012	1:40:00 PM	7/17/2012	SM5310 C	Total Organic Carbon	2.9	mg/L	0.2
AB03486	258	MW-BW-180	7/18/2013	3:15:00 PM	7/18/2013	SM2320 B	Alkalinity, Total (as CaCO3)	171	mg/L	2
AB03486	258	MW-BW-180	7/18/2013	3:15:00 PM	7/18/2013	SM4500 NH3 D	Ammonia-N	<0.05	mg/L	0.05
AB03486	258	MW-BW-180	7/18/2013	3:15:00	7/18/2013	EPA200.	Barium, Total	0.074	mg/L	0.01

Water Quality										
Sample Number	MPWMD_id	Common Name	Sampling Date	Sampling Time	Date Analyzed	Method	Constituent	Value	Unit	AMDL
				PM		8				
AB03486	258	MW-BW-180	7/18/2013	3:15:00 PM	7/18/2013	SM2320 B	Bicarbonate (as HCO3-)	209	mg/L	10
AB03486	258	MW-BW-180	7/18/2013	3:15:00 PM	7/18/2013	EPA200.7	Boron	0.06	mg/L	0.05
AB03486	258	MW-BW-180	7/18/2013	3:15:00	7/18/2013	EPA300.	Bromide	0.4	mg/L	0.1

Water Quality											
Sample Number	MPWMD_id	Common Name	Sampling Date	Sampling Time	Date Analyzed	Method	Constituent	Value	Unit	AMDL	
				PM		0					
AB03486	258	MW-BW-180	7/18/2013	3:15:00 PM	7/18/2013	EPA200.7	Calcium	46	mg/L	0.5	
AB03486	258	MW-BW-180	7/18/2013	3:15:00 PM	7/18/2013	SM2320 B	Carbonate as CaCO3	<10	mg/L	10	
AB03486	258	MW-BW-180	7/18/2013	3:15:00	7/18/2013	EPA300.	Chloride	131	mg/L	1	

Water Quality										
Sample Number	MPWMD_id	Common Name	Sampling Date	Sampling Time	Date Analyzed	Method	Constituent	Value	Unit	AMDL
				PM		0				
AB03486	258	MW-BW-180	7/18/2013	3:15:00 PM	7/18/2013	EPA300.0	Fluoride	0.1	mg/L	0.1
AB03486	258	MW-BW-180	7/18/2013	3:15:00 PM	7/18/2013	SM2340B	Hardness (as CaCO3)	222	mg/L	10
AB03486	258	MW-BW-180	7/18/2013	3:15:00	7/18/2013	EPA200.	Iron	0.218	mg/L	0.01

Water Quality											
Sample Number	MPWMD_id	Common Name	Sampling Date	Sampling Time	Date Analyzed	Method	Constituent	Value	Unit	AMDL	
				PM		7					
AB03486	258	MW-BW-180	7/18/2013	3:15:00 PM	7/18/2013	EPA200.7	Iron, Dissolved	0.093	mg/L	0.01	
AB03486	258	MW-BW-180	7/18/2013	3:15:00 PM	7/18/2013	EPA200.7	Magnesium	26	mg/L	0.5	
AB03486	258	MW-BW-180	7/18/2013	3:15:00	7/18/2013	EPA200.	Manganese,	<0.01	mg/L	0.01	

Water Quality											
Sample Number	MPWMD_id	Common Name	Sampling Date	Sampling Time	Date Analyzed	Method	Constituent	Value	Unit	AMDL	
				PM		7	Dissolved				
AB03486	258	MW-BW-180	7/18/2013	3:15:00 PM	7/18/2013	EPA200.7	Manganese, Total	0.023	mg/L	0.01	
AB03486	258	MW-BW-180	7/18/2013	3:15:00 PM	7/18/2013	EPA300.0	Nitrate as NO3	40	mg/L	1	
AB03486	258	MW-BW-180	7/18/2013	3:15:00	7/18/2013	EPA300.	Nitrate as	9.1	mg/L	0.1	

Water Quality										
Sample Number	MPWMD_id	Common Name	Sampling Date	Sampling Time	Date Analyzed	Method	Constituent	Value	Unit	AMDL
				PM		0	NO3-N			
AB03486	258	MW-BW-180	7/18/2013	3:15:00 PM	7/18/2013	EPA300.0	Nitrate+Nitrite as N	9.1	mg/L	0.1
AB03486	258	MW-BW-180	7/18/2013	3:15:00 PM	7/18/2013	EPA300.0	Nitrite as NO2-N	<0.1	mg/L	0.1
AB03486	258	MW-BW-180	7/18/2013	3:15:00	7/18/2013	EPA300.	o-Phosphate-	<0.1	mg/L	0.1

Water Quality											
Sample Number	MPWMD_id	Common Name	Sampling Date	Sampling Time	Date Analyzed	Method	Constituent	Value	Unit	AMDL	
				PM		0	P				
AB03486	258	MW-BW-180	7/18/2013	3:15:00 PM	7/18/2013	SM4500-H+B	pH (Laboratory)	7.4	pH (H)		
AB03486	258	MW-BW-180	7/18/2013	3:15:00 PM	7/18/2013	EPA200.7	Potassium	3.8	mg/L	0.1	
AB03486	258	MW-BW-180	7/18/2013	3:15:00	7/18/2013	Calculati	QC Anion	97%	%		

Water Quality										
Sample Number	MPWMD_id	Common Name	Sampling Date	Sampling Time	Date Analyzed	Method	Constituent	Value	Unit	AMDL
				PM		on	Sum x 100			
AB03486	258	MW-BW-180	7/18/2013	3:15:00 PM	7/18/2013	Calculation	QC Anion-Cation Balance	-3	%	
AB03486	258	MW-BW-180	7/18/2013	3:15:00 PM	7/18/2013	Calculation	QC Cation Sum x 100	91%	%	
AB03486	258	MW-BW-180	7/18/2013	3:15:00	7/18/2013	Calculati	QC Ratio	0.61	-0-	

Water Quality										
Sample Number	MPWMD_id	Common Name	Sampling Date	Sampling Time	Date Analyzed	Method	Constituent	Value	Unit	AMDL
				PM		on	TDS/SEC			
AB03486	258	MW-BW-180	7/18/2013	3:15:00 PM	7/18/2013	EPA200.7	Sodium	92	mg/L	0.5
AB03486	258	MW-BW-180	7/18/2013	3:15:00 PM	7/18/2013	SM2510 B	Specific Conductance (E.C)	934	umhos/cm	1
AB03486	258	MW-BW-180	7/18/2013	3:15:00	7/18/2013	EPA300.	Sulfate	62	mg/L	1

Water Quality											
Sample Number	MPWMD_id	Common Name	Sampling Date	Sampling Time	Date Analyzed	Method	Constituent	Value	Unit	AMDL	
				PM		0					
AB03486	258	MW-BW-180	7/18/2013	3:15:00 PM	7/18/2013	SM2540 C	Total Diss. Solids	573	mg/L	10	
AB03486	258	MW-BW-180	7/18/2013	3:15:00 PM	7/18/2013	SM5310 C	Total Organic Carbon	0.72	mg/L	0.2	

SEASIDE BASIN WATER MASTER TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	June 9, 2021
AGENDA ITEM:	4
AGENDA TITLE:	Proposed Scopes and Costs for Board Consideration in Response to 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 May 5, 2021 meeting the Board approved the TAC's recommendations regarding follow-up actions to take in response to concerns about possible seawater intrusion (SWI) starting to occur at Monitoring Wells FO-9 and FO-10 Shallow. Those recommendations included:

1. Updating the 2013 groundwater modeling to provide a more accurate indication of current replenishment water needs.
2. Updating the Seawater Intrusion Response Plan (SIRP) to provide site-specific indicators of SWI (e.g. chloride threshold levels) for additional wells.
3. Developing flow direction and flow velocity maps.

Developing the scope of work and cost proposal to update the 2013 modeling will take some time and will hopefully be ready for presentation to the TAC at its July meeting.

Updating the SIRP to provide site-specific chloride threshold levels for additional wells is recommended on the bottom paragraph of page 7 of the SIRP. It states there that as additional geochemical data are collected through future groundwater monitoring, groundwater quality in these wells should be evaluated to determine site - specific indicators. Georgina King has clarified that recommendation pertained to production wells that are screened across multiple aquifers. The existing monitoring wells are between the coast and the production wells, so having chloride thresholds for the monitoring wells (already established) is sufficient, and it is not necessary to develop chloride threshold levels for additional wells. She will discuss this in the 2021 Seawater Intrusion Analysis Report.

Attached is the proposed RFS No. 2021-01 Amendment No. 1 for Montgomery & Associates to develop flow direction and flow velocity maps. This Amendment is a slightly revised version of the amendment which the TAC approved at its March 2021 meeting. The revised version incorporates changes that will provide the Watermaster with an improved work product for Basin management purposes. M&A was reviewing the cost for this revised work, and it may be slightly lower than that shown in this Draft Amendment. If so, the Amendment will be revised to reflect the lower cost. The proposed work will only cover the Paso Robles aquifer. If desired, as a subsequent work assignment a similar evaluation could be made for the Santa Margarita aquifer. Focusing only on the Paso Robles aquifer at this time will keep the cost down and will give us the chance to see how valuable the information will be for making Basin management decisions.

If the TAC approves, this Amendment will be sent to the Board for their approval.

ATTACHMENTS:	RFS No. 2021-01 Amendment No. 1 for Montgomery & Associates
RECOMMENDED ACTION:	Approve this contract amendment

SEASIDE BASIN WATERMASTER
REQUEST FOR SERVICE

DATE: March 10, 2021 **RFS NO**. 2021-01 Amendment No. 1
(To be filled in by WATERMASTER)

TO: Hale Barter **FROM**: Robert Jaques
Montgomery & Associates WATERMASTER
PROFESSIONAL

Services Needed and Purpose: Perform additional hydrogeologic consulting services 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 $19,290.00 by this Amendment No. 1, and the Total Price for RFS No. 2021-01 is therefore increased to $36,610.00.

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. WATERMASTER wishes to also have PROFESSIONAL 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. 1 to RFS No. 2021-01 authorizes the performance of the work described in Attachment 2 hereto.

ATTACHMENT 2

MONTGOMERY
& ASSOCIATES
Water Resource Consultants

www.elmontgomery.com
1814 Franklin Street, Ste. 501
Oakland, CA 94612
510.903.0458

June 3, 2021

Mr. Bob Jaques
Seaside Watermaster Technical Program Manager
83 Via Encanto
Monterey, CA 93940

SUBJECT: SCOPE FOR ASSESSMENT OF SEASWATER INTRUSION TRAVEL TIME TO SEASIDE PRODUCTION WELLS

Dear Mr. Jaques

Montgomery & Associates (M&A) appreciates the opportunity to provide this scope of work for assessing the trajectories and potential range of travel times of potential seawater intrusion from locations along the coastline to municipal and irrigation water supply wells screened in the Paso Robles formation in the Northern Coastal Subarea of the Seaside Basin. As per your request, we also provide an additional cost estimate for an expanded scope to perform the same the analysis for both the shallow Paso Robles and the deeper Santa Margarita aquifers.

While the Seaside Basin Watermaster Model ("the Model") could be used for this type of analysis, this would require first updating the model to reflect current and recent pumping operations, estimated groundwater recharge and boundary conditions, and validating the updated model against recently observed water levels. The Model was most recently updated in 2018 to include historical operations and conditions through the end of 2017. Some of these new model update activities are already scheduled to occur as part of ongoing work that M&A is carrying out in support of the permitting for the Pure Water Monterey (PWM) aquifer replenishment project, which will also include estimates on the impacts of the PWM injection future water levels. These PWM activities, however, will likely not be completed until later this summer and would thus delay a preliminary analysis of potential seawater intrusion travel times.

What we propose as an alternative, is a hybrid analytic approach for estimating travel trajectories and travel times from the coastline that integrates aquifer parameters for the Paso Robles formation from the calibrated Seaside model, including aquifer thickness, hydraulic conductivity and storage coefficients, with groundwater elevation maps based on recent groundwater level monitoring data in the shallow aquifer that reflect current conditions and operations in and around the Northern Coastal Subarea of the basin. These groundwater elevation maps would be conceptually similar to the contour maps of the shallow aquifer that are regularly developed for the annual Sea Water Intrusion Analysis Reports, but would focus only on the Northern Coastal subarea and would include refined contours based on all available monitoring data, including available data from the Cal-Am ASR and PWM projects.

The contour maps will represent the potentiometric surface that drives groundwater flow and in combination with the aquifer parameters from the model by applying Darcy's law, they can be used to generate flow fields that can be used to estimate groundwater velocities and travel times from one point in the aquifer to another. The advantage of this approach is that we benefit both from using aquifer data already developed for the Model combined with actual groundwater level measurements reflecting current basin operations and conditions.

The travel trajectory and travel time analysis can be automated in GIS using an existing groundwater particle tracking toolset implemented and available within the ESRI ArcGIS Spatial Analyst Toolbox. M&A has recently used these tools in support of work in the Santa Cruz Mid-County groundwater basin to estimate travel times between proposed injection wells and water supply and will adapt existing workflows developed during that work to minimize the effort necessary for this analysis. Particles will be released along the entire extent of the coastline of the Seaside basin and the portions of the neighboring Monterey basin and tracked inland to determine if, and when they reach the vicinity of the supply wells screened in the Paso Robles formation. Groundwater travel times are very sensitive to the effective porosity of the aquifer; and since the effective porosity of the Paso Robles is not a calibrated parameter from the Model, upper and lower bound estimates on the travel times will be developed based on considering a reasonable range of aquifer effective porosities supported by available field data and literature values to provide a range of possible travel times.

A map displaying the trajectories of the released particles, color coded by the travel times from their initial locations will be produced to provide a clear visualization of the potential pathways and travel times from the coastline. Similar types of visualization have been developed in support of planning and permitting for the Pure Water Monterey project and the Cal-AM/MPWMD ASR projects. An example is shown in Figure 1 which shows simulated particle travel paths and travel times from existing and proposed Pure Water Monterey deep injection wells to downgradient productions wells in the Santa Margarita formation for modeling conducted in support of the proposed Pure Water Monterey Project Expansion Supplemental EIR. For the analysis proposed in this scope of work we would instead have these particle path-lines that start off along the coastline and then move inland, with the color-coding indicating estimates for how much time it takes to move inland.

The tasks to be performed are detailed in the following scope of work.

Scope of Work

TASK 1 – Develop Groundwater Elevation Surface Map Snapshots of Aquifer(s)

M&A will review available groundwater level monitoring data for supply and monitoring wells in the Northern Coastal Subarea and will develop a dataset to be used for creating a groundwater elevation map of the Paso Robles aquifer, representative of recent conditions in the subarea. Generally speaking, even when groundwater levels fluctuate seasonally in relation to seasonal demands, the average velocity can be evaluated through use of an

average groundwater level (e.g. during periods of peak pumping, gradients are steeper and groundwater velocities are faster, and in periods of lower pumping, the gradients decrease and groundwater velocities are slower, and average gradients will adequately represent the average velocities). The groundwater elevation map will incorporate observed levels in the Paso Robles aquifer (and optionally also the Santa Margarita aquifer) along the coastline and will also incorporate overlapping pumping cones of depression and injection mounds associated with extraction and injection wells during the monitoring period.

The analysis will assume that average groundwater levels remain at the same conditions for the duration of the travel time analysis.

TASK 2 – Perform Particle Tracking and Travel Time Analysis on the Developed Water Elevation Map

M&A will extract the spatially variable hydraulic aquifer properties from the Model grid and convert into the GIS format used by the particle tracking tool set.

The travel time analysis tools assume that hydraulic heads remain constant for the duration of the analysis. This is equivalent to assuming that moving forward the pumping and recharge conditions in the basin will be such that the current hydraulic heads would still be a representative snapshot of conditions in the future. This is a simplification that will allow for an initial assessment of an average ground water velocity field representative of current basin conditions and a range of potential travel times under the assumption that we could temporarily freeze the conditions in the basin. The approach also assumes that flow is two-dimensional and horizontal and uniform across the thickness of the aquifer. Broadly speaking this is the same approach used for preliminary assessment of well head protection zones for the Pure Water Monterey Project.

The particle tracking analysis will be performed for the groundwater level map developed in Task 1, and a lower and upper range effective porosity will be evaluated, for a total of two sets of particle tracking runs.

The analysis considers only advective groundwater transport and does not consider spreading of a potential salinity plume due to hydrodynamic dispersion which would have the effect of some particle flow paths getting farther out in a shorter amount of time.

From the results of the particle tracking analysis the map that will be produced will show the path that particles of water released at the coast take as they travel inland, color-coded by the estimated travel time. A table will also be produced summarizing the range of estimated travel times to the supply wells for the simulated conditions.

TASK 3 –Technical Memorandum and TAC Presentation

M&A will prepare a technical memorandum which documents Tasks 1 and 2, with a synthesis of the results for the conditions and scenarios evaluated. For costing purposes, we

assume preparing one draft, responding to and addressing one round of review comments, and one final version of the report. The report will be provided in Microsoft Word and PDF formats.

M&A will present the results to the Seaside Basin Technical Advisory Committee (TAC) at a regularly scheduled TAC meeting. The presentation will review the analysis assumptions and results, and provide any additional information requested by the TAC. After making the TAC presentation M&A will also make a similar presentation of the results to the Watermaster Board at one of its meetings.

Staffing Plan

Georgina King, P.G., C.Hg., will be the project manager, and Pascual Benito, Ph.D. will be the technical lead overseeing the work. Pascual is an experienced hydrogeologist who is currently supporting the Pure Water Monterey indirect potable reuse project and as needed hydrogeological services for the Seaside Basin Watermaster and it also supporting modeling work for the Salinas Valley groundwater basin sustainability plans. Derrik Williams, P.G., C. Hg., will provide senior review.

Project Budget and Schedule

We anticipate that the work for only the Paso Robles aquifer can be completed within a two-month period, though the timing may depend on the scheduling of TAC and Board meetings. We can begin work on this immediately following notice to proceed.

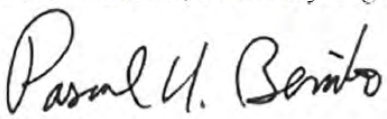
The total cost estimate for these tasks for the Paso Robles aquifer is $19,290 as detailed in the attached Table 1.

Please feel free to contact us with any questions about the proposed scope of work and budgets.

Sincerely,

E.L. MONTGOMERY & ASSOCIATES

Pascual Benito, Senior Hydrogeologist



Georgina King, Senior Hydrogeologist

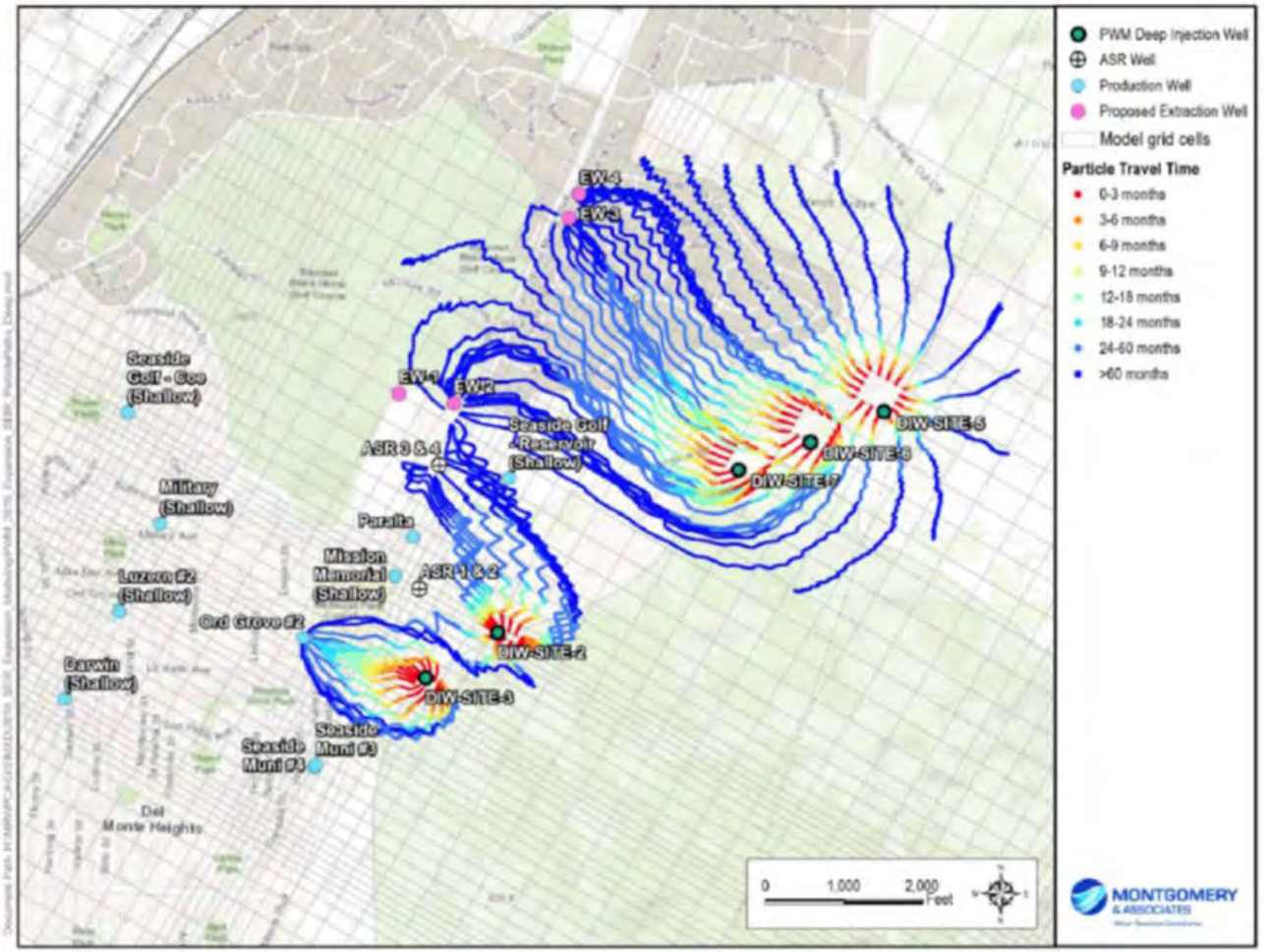


Figure 1. Sample visualization of particle travel paths and travel times. Source: Expanded Pure Water Monterey Groundwater Replenishment Project Supplemental EIR Groundwater Modeling Analysis Memo (M&A, 2919).

MONTGOMERY & ASSOCIATES

Table 1. Detailed Cost Table –Analysis for Paso Robles Aquifer Only

Cost Estimate for Seaside Basin Sea Water Intrusion Travel Time Estimates									
		Montgomery & Associates Labor						Other Direct Costs	TOTALS
		Scientist VIII	Scientist VI	Scientist V	Scientist III	Labor Total			
		D. Williams	G. King	P. Benito					
Task	Hourly Rates	$260	$215	$195	$150	Hours	(S)	(S)	
1.0	DEVELOP GROUNDWATER LEVEL MAPS								
	Review and compile monitoring data & previous modeling results and develop hydraulic head maps for current conditions	1	2	6	12	21	$3,660	$0	$3,660
	Task 1 Subtotal	*1*	*2*	*6*	*12*	*21*	*$3,660*	*$0*	*$3,660*
2.0	PERFORM PARTICLE TRACKING & TRAVEL TIME ANALYSIS								
2.1	Prepare Aquifer Parameter + hydraulic head GIS grid input files	0	0	4	8	12	$1,980	$0	$1,980
2.2	Particle Tracking Runs & Travel Analysis	0	0	8	16	24	$3,960	$0	$3,960
2.3	Develop travel time maps and tables	0	0	4	14	18	$2,880	$0	$2,880
	Task 2 Subtotal	*0*	*0*	*16*	*38*	*54*	*$8,820*	*$0*	*$8,820*
3.0	TECHNICAL MEMORANDUM AND TAC & BOARD PRESENTATIONS								
	Document, Summarize & Synthesize Analysis and Results	4	8	10	14	36	$6,810	$0	$6,810
	Task 3 Subtotal	*4*	*8*	*10*	*14*	*36*	*$6,810*	*$0*	*$6,810*
	Total	**5**	**10**	**32**	**64**	**111**	**$19,290**	**$0**	**$19,290**

SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	June 9, 2021
AGENDA ITEM:	5
AGENDA TITLE:	Continued Discussion of 2012 Cross-Aquifer Contamination Study and Development of Recommendations
PREPARED BY:	Robert Jaques, Technical Program Manager

SUMMARY:

In 2012 the Monterey Peninsula Water Management District (MPWMD) prepared a report that evaluated Seaside Groundwater Basin wells for contamination potential between two primary aquifers: the confined Santa Margarita aquifer and the unconfined Paso Robles aquifer. This report was presented to, and discussed by, the TAC at its May 12, 2021 meeting. It was concluded that video inspection of these wells would not likely provide any useful information. However, there was consensus that the discussion should continue to today's meeting, with the objective of determining whether it would be worthwhile to perform conductivity profiling in some of the wells that are screened in multiple aquifers. The purpose of conductivity profiling would be to determine if intruded water from the shallowest aquifer (Aromas or Dune Sands) was going downward in the well casing and intruding the Paso Robles aquifer.

The report identified 176 wells in the coastal subareas of the basin. Of the 176, lithological analysis suggests that roughly 60% (104 wells) are screened in multiple aquifers. These are shown in Figure 3 in the report (attached). In August 2011, MPWMD staff performed site investigations into the status of certain of these wells. Out of the 59 wells identified for field inspection, Figure 6 (attached) shows the 18 wells that are cross-screened over one or multiple aquifers. 33 of the 59 wells were determined to have been destroyed, and 8 were not locatable.

It may be worthwhile to conductivity profile the four yellow-colored and the one orange-colored well in Figure 6, since they are near the coast and are geographically far enough apart to potentially provide useful information at a modest cost. This work could be included in the Watermaster's 2022 Budget, if the TAC recommends doing this work and the Board concurs.

ATTACHMENTS:	Figures from the 2012 Cross-Aquifer Contamination Study
RECOMMENDED ACTION:	Develop Recommendations of Work to be Performed with Regard to Potential Cross-Aquifer Contamination Wells

FIGURE 3: WELLS BELIEVED TO BE SCREENED IN MULTIPLE AQUIFERS

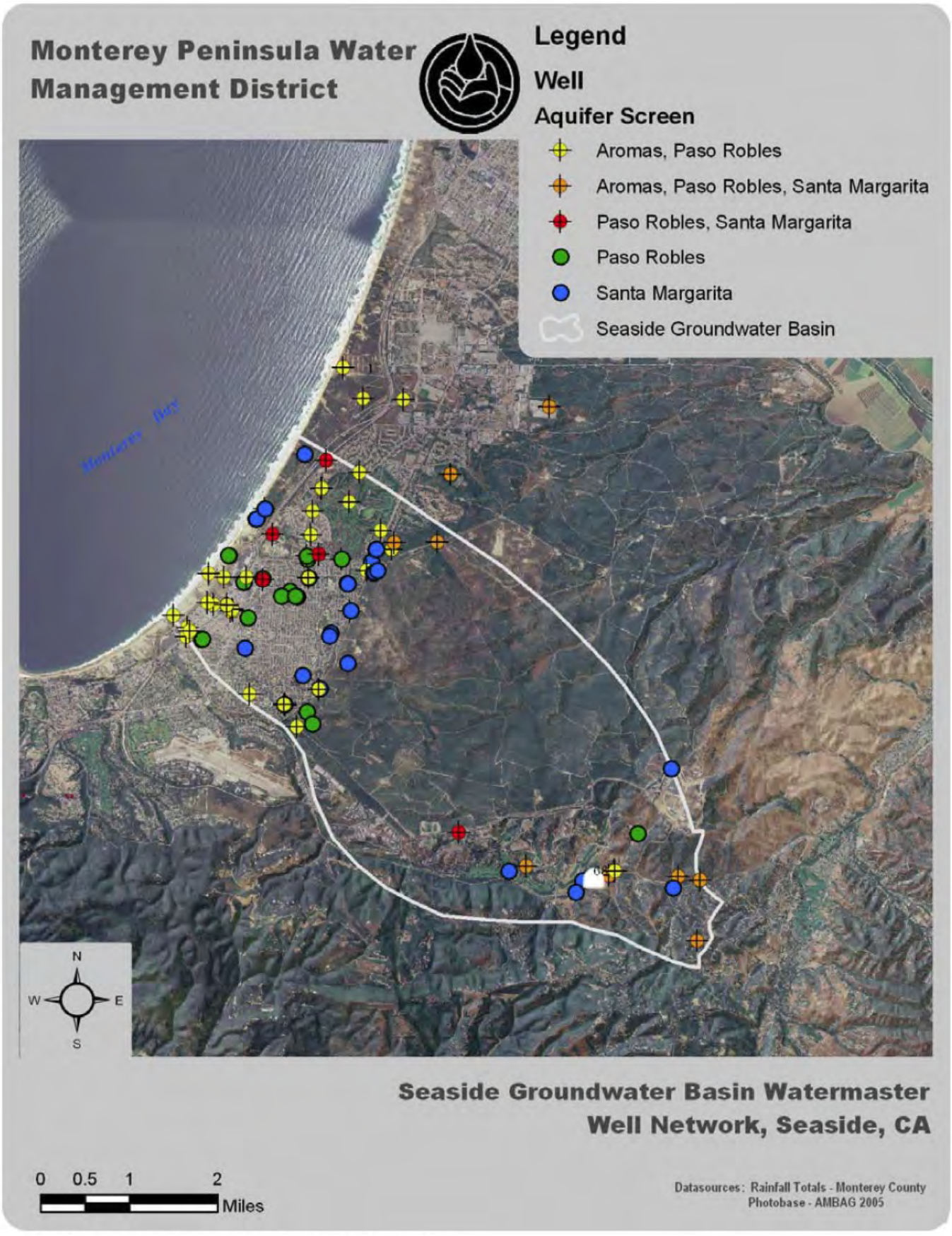
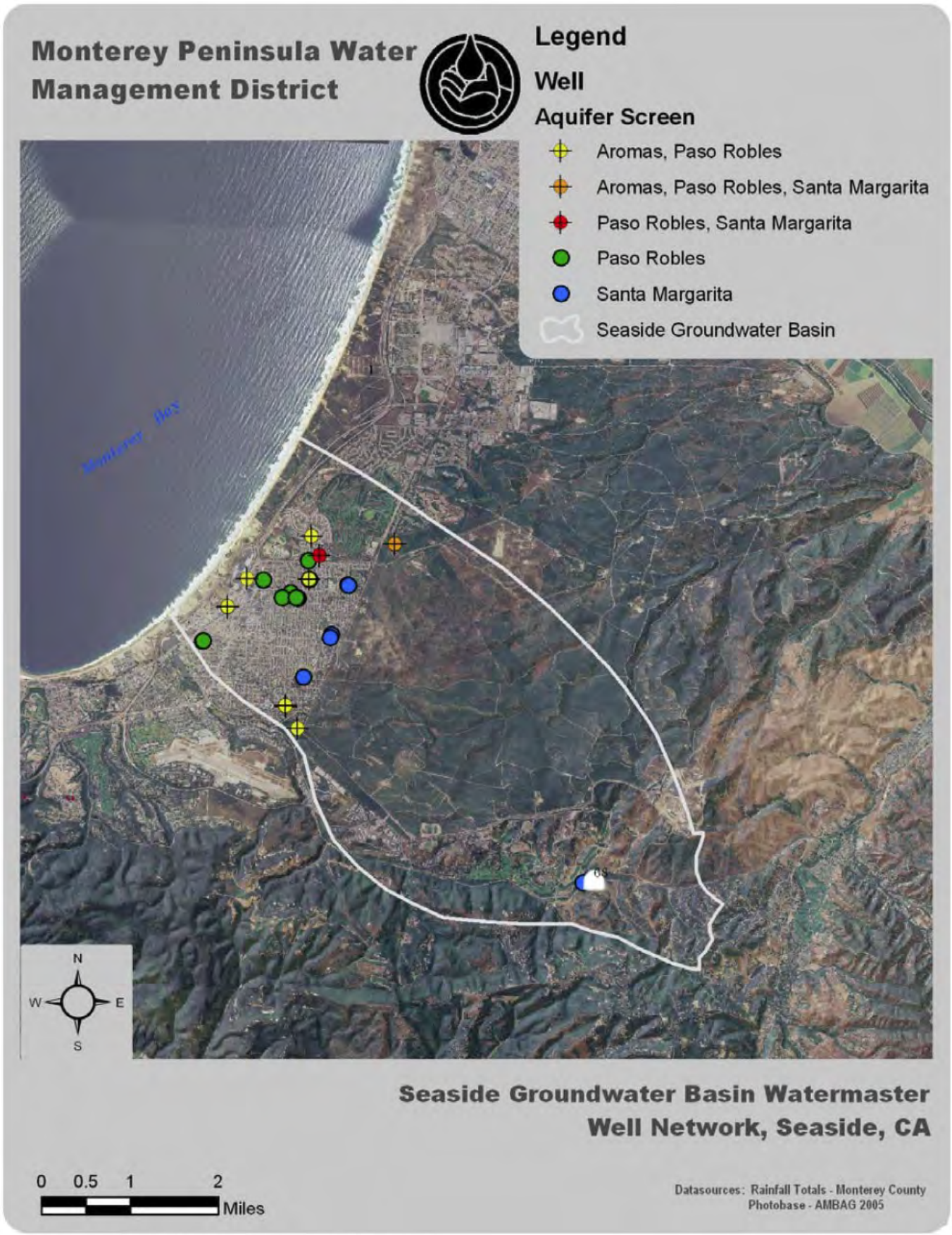


FIGURE 6: WELLS FIELD INSPECTED BY MPWMD



SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	June 9, 2021
AGENDA ITEM:	6
AGENDA TITLE:	Information Regarding Airborne Electromagnetic (AEM) Surveys
PREPARED BY:	Robert Jaques, Technical Program Manager

SUMMARY:

At the State level, I previously reported that DWR will be conducting AEM surveys statewide in conjunction with assisting Groundwater Sustainability Agencies in the development of Groundwater Sustainability Plans. Per their request, I have provided DWR with copies of well completion and well logging reports for a number of wells that are near the boundary between the Monterey Subbasin and the Seaside Subbasin for their use in performing that work. I am hopeful that geophysical information that will be useful to the Watermaster will come out of DWR's AEM work.

More locally, Georgina King reports that Rosemary Knight of Stanford University recently contacted her about the possibility of doing offshore EM work using a ship to drag the equipment instead of airborne (AEM). The offshore system can reportedly go to a depth of 150 meters, which is deeper than the AEM can go to at the coast. This is particularly useful if you are interested in seeing how far offshore the seawater in the aquifers is. They were interested in Montgomery & Associates' client Soquel Creek Water District/ Santa Cruz Mid-County Groundwater Agency, as they have been very proactive in trying to figure out their seawater intrusion risks this way. They used AEM a few years ago and Rosemary was trying to feel out if they would go for the offshore EM when the GSA next needs to do their survey. Their GSP says the survey will be repeated every 5 years to see where and how fast seawater intrusion is advancing.

She is looking for agencies with funding and/or grants to help pay for this.

Ms. King felt it might be a good option for the Watermaster to have this type of data, since it would give important information that would help manage the basin more proactively instead of reactively. Unfortunately it costs a lot of money. However, she felt that if the Watermaster teamed up with other agencies such as Salinas Valley GSA, Marina Coast GSA, Pajaro Valley, and the Santa Cruz Mid-County Groundwater Agency, there might be some cost savings if the entire Monterey Bay was surveyed at one time. Ms. King said she was going to speak to some of the agencies individually.

I am interested in hearing the TAC's thoughts on this matter, and whether having the Watermaster participate financially in such work should be considered.

ATTACHMENTS:	None
RECOMMENDED ACTION:	Provide direction to the Technical Program Manager on whether to further investigate offshore electromagnetic surveying

SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	June 9, 2021
AGENDA ITEM:	7
AGENDA TITLE:	Schedule
PREPARED BY:	Robert Jaques, Technical Program Manager

SUMMARY:

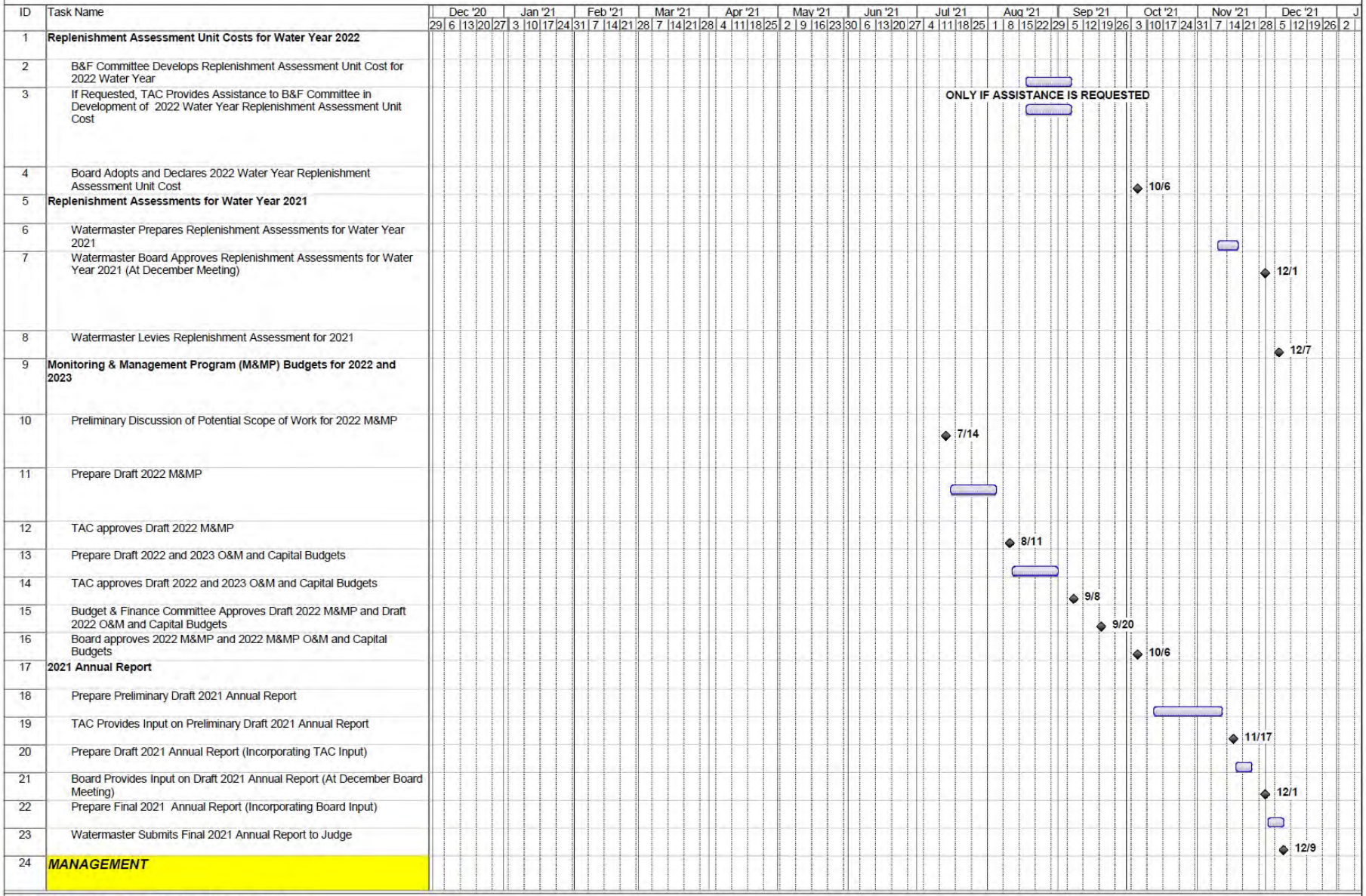
As a regular part of each monthly TAC meeting, I will provide the TAC with an updated Schedule of the activities being performed by the Watermaster, its consultants, and the public entity (MPWMD) which are performing certain portions of the work.

Attached is the updated schedule for 2021 activities. Consistent with the determination that seawater intrusion is not occurring in Monitoring Well FO-9 Shallow, I have closed out the Task pertaining to implementation of the Seawater Intrusion Response Plan.

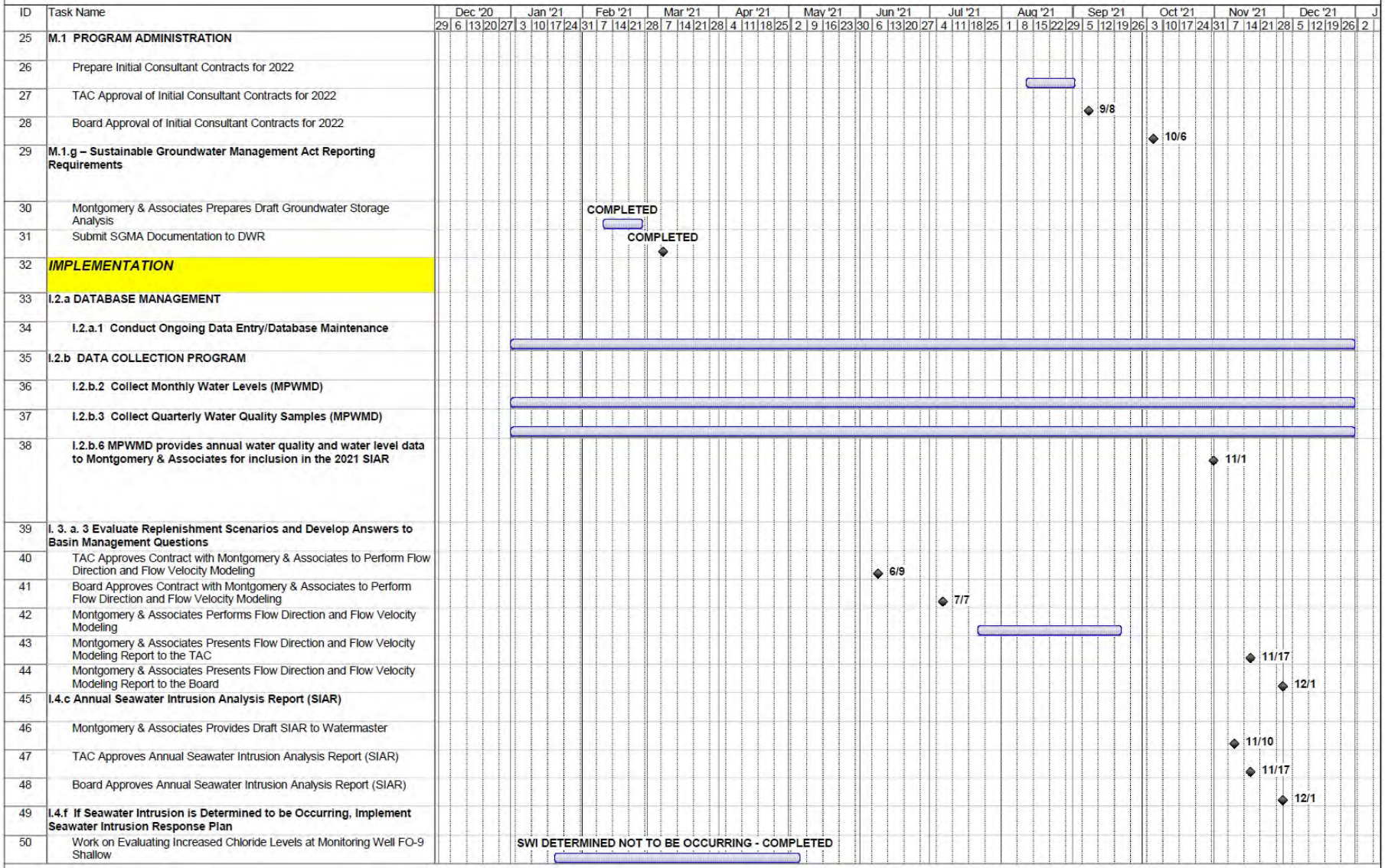
I have included Tasks pertaining to the follow-up actions approved by the Board at its May 5 meeting.

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 Watermaster
2021 Monitoring and Management Program
Work Schedule



Seaside Basin Watermaster
2021 Monitoring and Management Program
Work Schedule



SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	June 9, 2021
AGENDA ITEM:	8
AGENDA TITLE:	Other Business
PREPARED BY:	Robert Jaques, Technical Program Manager

SUMMARY:
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.

ATTACHMENTS:	None
RECOMMENDED ACTION:	None required – information only