M E E T I N G N O T I C E A N D A G E N D A

TECHNICAL ADVISORY COMMITTEE OF THE SEASIDE BASIN WATER MASTER

DATE: Wednesday, June 12, 2019
MEETING TIME: 1:30 p.m.
Monterey One Water Offices
5 Harris Court, Building D (Ryan Ranch)
Monterey, CA 93940

If you wish to participate in the meeting from a remote location, please call in on the Watermaster Conference Line by dialing (515) 604-9094 (Note that this is the new call-in number). Use the Meeting ID 355890617. Please note that if no telephone attendees have joined the meeting by 10 minutes after its start, the conference call will be ended.

OFFICERS
Chairperson: Nina Miller, California American Water Company
Vice-Chairperson: Jon Lear, MPWMD

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

The next regular meeting will be held on Wednesday July 10, 2019 at 1:30 p.m. at the M1W Board Room.

SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	June 12, 2019
AGENDA ITEM:	2.A
AGENDA TITLE:	Approve Minutes from the May 8, 2019 Meeting
PREPARED BY:	Robert Jaques, Technical Program Manager

SUMMARY:

Draft Minutes from this meeting was 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 8, 2019

Attendees: TAC Members

City of Seaside – Rick Riedl
California American Water – Nina Miller
City of Monterey – Max Rieser (via telephone)
Laguna Seca Property Owners – No Representative
MPWMD – No Representative
MCWRA – Tamara Voss
City of Del Rey Oaks – No Representative
City of Sand City – Leon Gomez (via telephone)
Coastal Subarea Landowners – No Representative

Watermaster
Technical Program Manager - Robert Jaques

Consultants
None

Others
None

The meeting was convened at 1:40 p.m. The conference line telephone number had been changed without our knowledge, so it took a while for everyone to get connected.

1. **Public Comments**

There were no public comments.

2. **Administrative Matters:**

   A. **Approve Minutes from the March 13, 2019 Meeting**

   On a motion by Ms. Voss, seconded by Mr. Gomez, the minutes were unanimously approved as presented.

3. **Report on Geochemical Modeling for the Pure Water Monterey Project AWT Water**

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

4. **Continued Discussion of Allocation of Water Rights After Decision-Required Pumping Ramp-Downs Have Been Completed**

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

Ms. Voss said that she was okay with using the Natural Safe Yield of 3,000 acre-feet per year for calculating the next pumping ramp-down. She noted that the Salinas Valley Basin Groundwater Sustainability Plans will need to be completed by 2022, and at that time it would be appropriate to reevaluate the Natural Safe Yield value, and also to consider the concept of Sustainable Yield versus Natural Safe Yield for basin management purposes.

Ms. Miller said she concurred with Ms. Voss' comments and that it was appropriate to take one step at a time and not undertake the Sustainable Yield analysis at this time because of the likelihood of having to redo it after the Salinas Valley Basin Groundwater Sustainability Plans have been completed.

Ms. Voss said she knew that the 3,000 acre foot per year Natural Safe Yield figure was probably too high, but the burden of lowering the Natural Safe Yield further is not justified or necessary at this time.

Ms. Voss made a motion to use 3,000 acre-feet per year as the Natural Safe Yield value when making the calculations for the next ramp-down in pumping. Mr. Riedl seconded the motion and it passed unanimously.

5. Continued Discussion of Pros and Cons of Using the Sustainable Yield Approach in Place of the NSY Approach for Basin Management

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

Ms. Voss said she felt that a Sustainable Yield analysis may be needed at a future point in time, but it was best to wait until the Salinas Valley Basin Groundwater Sustainability Plans were completed before making that decision.

Ms. Miller noted that waiting on making this decision will avoid the risk of having to revise the analysis after the Salinas Valley Basin Groundwater Sustainability Plans have been completed.

Mr. Gomez said he concurred with the comments made by Ms. Voss and Ms. Miller.

Mr. Riedl noted that a management objective for the Watermaster is to have pumping at a sustainable level. He noted that something could potentially change or be learned prior to the development of the Salinas Valley Basin Groundwater Sustainability Plans that would make it appropriate to perform a Sustainable Yield analysis before those plans were completed. Mr. Jaques said he could include that caveat in the TAC's recommendation to the Board.

A motion was made by Mr. Riedl, seconded by Ms. Voss, to make the following recommendation to the Board:

1. An SY analysis not be performed at this time.
2. That the concept of using the SY approach to replace the NSY approach be revisited after the Groundwater Sustainability Plan for the Monterey Subbasin of the Salinas Valley Groundwater Basin has been completed, and its impacts on the Seaside Groundwater Basin have been determined.
3. However, if something is learned or events occur, that would warrant performing a Sustainable Yield analysis sooner, the Board should revisit the decision at that time.

The motion passed unanimously.

6. Schedule

Mr. Jaques briefly summarized the changes to the schedule from the prior TAC meeting, noting that the geochemical modeling report was being moved from today's meeting to the June 12th TAC meeting.

7. Other Business

There was no other business.

The next regular meeting will be held on Wednesday June 12, 2019 at 1:30 p.m. at the M1W Board Room.

The meeting adjourned at 2:03 p.m.

SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	June 12, 2019
AGENDA ITEM:	3
AGENDA TITLE:	Report on Geochemical Modeling of the Pure Water Monterey AWT Water
PREPARED BY:	Robert Jaques, Technical Program Manager

SUMMARY:

Jon Lear of MPWMD provided a brief progress report at the TAC's March 13 meeting on the geochemical modeling work that is being performed to determine if there will be any adverse water quality impacts on the Seaside Basin aquifers as a result of injecting non-native water from the Monterey Peninsula Water Supply Project's desalination plant or the Pure Water Monterey Advance Treated Wastewater (AWT) project. A copy of the Technical Memorandum describing the work on the PWM AWT water is attached. Mr. Lear will provide an overview of the Technical Memorandum and respond to TAC questions at today's meeting.

The Storage and Recovery Agreement for the PWM water, approved by the Board at its December 2018 meeting, states in part in Section 6 "…DISTRICT agrees that prior to injecting any AWT Water into the Basin for Storage, it must provide to the WATERMASTER the geochemical interaction modeling assessment (including any recommended mitigation measures) ("Modeling Assessment") contemplated by the February 10, 2018 Memorandum of Agreement Between the Seaside Basin Watermaster, the Monterey Peninsula Water Management District, California American Water Company, and Monterey One Water to Share in the Costs of Performing Geochemical Modeling of the Seaside Basin Groundwater Basin (see Attachment C). If the Modeling Assessment recommends implementation of mitigation measures to avoid a Material Injury (as defined in the Decision) resulting from the injection of AWT Water into the Basin, DISTRICT must, prior to the initial injection of AWT Water, demonstrate to the reasonable satisfaction of WATERMASTER that sufficient measures will be implemented to avoid Material Injury."

Because the first three of the recommendations contained in the Technical Memorandum pertain to monitoring and operation of the PWM project, including the recommendation to cease injection of PWM water if certain undesirable conditions are detected, I recommend that those three recommendations be included in the Storage and Recovery Agreement for the PWM water. This would be done by issuing an amendment to the December 2018 Storage and Recovery Agreement.

ATTACHMENTS:	Technical Memorandum describing geochemical modeling of the PWM AWT water (Note: Attachments A and C of the Technical Memorandum are included. Only the Conclusions and Recommendations Sections of Attachment B are included because it is 32 pages long, is a very technically complex document, and pertains only to the evaluation of the Santa Margarita geologic matrix performed by the MPWMD in 2008 at ASR Well No. 2.).
RECOMMENDED ACTION:	1. Accept the Technical Memorandum as satisfactorily fulfilling MPWMD's obligation to perform geochemical modeling of the PWM AWT water. 2. Accept the Technical Memorandum's recommendation to defer geochemical modeling work on the desalination plant water at this time. 3. Include the first three of the Technical Memorandum's recommendations in the PWM Storage and Recovery Agreement by issuing an amendment to that Agreement.

TECHNICAL MEMORANDUM

Pueblo Water Resources, Inc.
4478 Market St., Suite 705
Ventura, CA 93003

Tel: 805.644.0470
Fax: 805.644.0480

To: Jonathan Lear, CHg; District Hydrogeologist

Date: May 21, 2019

From: Stephen Tanner, PE; Principal Engineer

Stephen A. Short, PhD; Geochemist

Project No: 12-0048

Copy To: Robert Marks, CHg.; Pueblo Water Resources

Subject: Summary of Geochemical Interaction Investigation of PWM Waters for Artificial Recharge of the Santa Margarita Sandstone Aquifer System

In accordance with our scope of services authorized by your Board in November 2017, this Technical memorandum (TM) presents Pueblo Water Resources (PWR) findings and conclusions regarding the geochemical interactions between the proposed Pure Water Monterey (PWM) treated recycled water and the mineralogy of the Santa Margarita Sandstone (Tsm), and the general suitability of the PWM treated water as a source for artificial recharge of the Tsm aquifers in the eastern Seaside Groundwater Basin (SGB). This phase of the investigation included the development and implementation of bench-scale verification testing of geochemical interactions between the minerals comprising the Tsm geologic matrix and the proposed PWM treated water; the results of this analysis were compared with similar interaction studies of Tsm mineralogy with existing recharge waters successfully utilized in the MPWMD/Cal-Am ASR artificial recharge program which has been in service since 2000 in the Northern Inland Sub-Area of the SGB.

Although the long term regional water supply program for the Monterey Peninsula also includes the utilization of desalinated seawater (Desal) for both direct potable use and SGB artificial recharge, the lack of actual Desal waters for geochemical analysis and testing precluded its inclusion into the study at this time.[1] The evaluation of Desal waters and its geochemical compatibility with the other regional water supply components (ie the SGB Tsm matrix, treated Carmel River waters for the Cal-Am ASR recharge supply, native SGB Tsm groundwaters (NGW), and PWM-treated waters) will necessarily be addressed in later phases of the investigation.

[1]It has been suggested that utilizing product water from the Sand City Desalination plant as a proxy for water produced from the regional plant could be implemented; however the availability of Tsm cuttings is extremely limited. It is of greater importance to have the limited amount of remaining cuttings available for bench testing of the actual Desal water proposed to be injected and stored in the Seaside Basin.

The bench testing investigation of the suitability of treated PWM water for SGB recharge included the assessment of its geochemical stability, the intermixing of SGB NGW's and treated Carmel River ASR program recharge waters, and its interaction potential with the mineralogy of the Tsm aquifer matrix was performed. The bench scale investigation of PWM-Tsm interactions included the following sequential tasks:

- Complete chemical analysis of the treated PWM water
- Complete chemical analysis of the geologic matrix of the Tsm by screening and selection of representative cuttings taken from the recently constructed DIW-2 test injection well
- Preparation and slurry mixing of treated PWM water and pulverized Tsm cuttings
- Separation of the slurry into residual solids and supernatant liquids via centrifuge, filtration and drying
- Post-reaction laboratory analysis of residual cuttings and filtered PWM supernatant

Figure 1 presents a flow chart of this sequential investigative procedure.

Samples of the PWM-treated water were obtained through Trussell Technologies from the PWM demonstration pilot plant located at the MRWPCA regional wastewater treatment plant located in Marina. The pilot plant takes secondary treated effluent from the existing Regional Treatment Plant and processes it through a series of operations known as the Advanced Water Treatment Facility (AWTF) process. This multistage multiple barrier process includes the following:

- Pre-ozonation
- Membrane Filtration
- Reverse Osmosis
- Advanced Oxidation (UV/Ozone/Peroxide)
- Lime stabilization

Samples of the Tsm geologic matrix were selected from drill cuttings collected during the construction of the PWM DIW-2 injection demonstration well, located on the former Fort Ord approximately 1000 feet Southeast of the existing MPWMD Santa Margarita ASR facility at 1910 General Jim Moore Blvd. in Seaside. Cuttings samples were collected from intervals every 5-10 feet as the well bore was advanced, vacuum sealed, and these cuttings were then visually segregated for lithologic similarity, cross referenced with the e-log, and then analytically screened via laboratory analyses to identify the samples best suited for further bench scale analysis. This selection process is detailed in PWR's November 2018 TM on the subject (Attachment A).

The two resulting cuttings samples were identified as:

- 465' , Tsm matrix, clean fine grained granular sand marking the transition between the upper and lower Tsm; high in transition metals content
- 595', Tsm/Tm transition zone, silty sand with a petroleum odor, high in minerals and transition metals

The selection of samples high in transition metals was made to demonstrate a 'worst case' scenario in leachability when the cuttings were tumbled in the PWM-treated water; noting that the resulting slurry would create an environment approximating full geochemical equilibrium between the water and geologic matrix, thus allowing a near quantitative analysis of any reactions that might occur when PWM waters were injected into the SGB.

Although the Tsm geologic matrix has been evaluated previously by the MPWMD at ASR 2 (Attachment B), the analyses primarily focused on major mineralogy of the formation rather than the minor/trace minerals contained therein. Mineralogy analysis of the Tsm identified the following major compounds:

- Quartz SiO_2 (68%)
- K-Feldspar; $KAlSi_3O_8$ (11%)
- Plagioclase Feldspar; $(Ca,Na)AlSi_3O_8$ (12%)
- Calcite; $CaCO_3$ (5%)
- Clays (predominantly Montmorillonites); $Na_{0.3}(Al,Mg)_2Si_4O_{10}(OH)_2 - xH_2O$ (4%)

The above mineralogical analysis did not, however, provide trace-level analyses of all possible compounds; the laboratory quantification limits for the analyses were approximately 1% by weight. While the trace mineral content is insignificant in the assessment of hydrogeologic and aquifer properties, these trace elements can sometimes play an important role in geochemical reactivity, particularly with respect to the leaching potential of non-native waters that would saturate the aquifer during artificial recharge operations.

Although the Tsm formation is generally considered a very clean Quartz-rich sandstone matrix, the results showed the presence of a variety of low level transition metals, including Cadmium, Copper, Iron, Manganese, Mercury, Nickel, Uranium, and Zinc. These constituents can impair ground water quality, and although the Tsm NGW has historically shown the presence of trace levels of variably soluble transition metals, their presence has historically been below the levels promulgated in California Drinking Water Standards (Title 22 Standards).

Bench Scale Testing Program

The bench scale testing was performed by McCampbell Analytic Laboratories of Pittsburg, CA, in accordance with procedures outlined in PWR's January 2019 Technical Memorandum and analyte methods jointly developed by PWR and McCampbell (Attachment C). The same procedure was used to evaluate the use of treated Carmel River water produced by Cal-Am as a potable water supply for municipal and industrial use within the Monterey Peninsula, and will also be utilized in assessment of Desal waters from the regional desalination facility when it becomes available.

The initial step in the bench scale testing program was to evaluate the chemical composition of the DIW-2 cuttings; Table 1 below presents the results for the 465' and 595' cuttings analyses.

Table 1 – Chemical Composition of DIW-2 Borehole Cuttings

ANALYTE	UNITS	465' CUTTINGS	595' CUTTINGS
Chloride	mg/kg-dry	35	50
Sulfate	mg/kg-dry	77	2000
Phosphorous	mg/Kg	800	3000
Cadmium	mg/kg-dry	0.56	23
Calcium	mg/kg-dry	4000	81000
Copper	mg/kg-dry	1.9	26
Iron	mg/kg-dry	4900	16000
Magnesium	mg/kg-dry	1900	35000
Manganese	mg/kg-dry	42	220
Mercury	mg/kg-dry	0.042	0.098
Nickel	mg/kg-dry	5.6	40
Selenium	mg/kg-dry	ND	4.3
Strontium	mg/kg-dry	17	150
Uranium	mg/kg-dry	2.2	12
Zinc	mg/kg-dry	25	120
% Moisture	wet wt%	23.0	25.8
Bicarbonate	mg $CaCO_3$/kg-dry	1640	3290
Carbonate	mg $CaCO_3$/kg-dry	ND	ND
Hydroxide	mg $CaCO_3$/kg-dry	ND	ND
Total Alkalinity	mg $CaCO_3$/kg-dry	1640	3290

As shown in Table 1, the 465' and 595' samples vary substantially in composition, particularly with respect to major cations / anions and total alkalinity. This selection was intended to provide

a wide variability in mineralogy to assess PWM treated water stability during aquifer storage conditions. In addition, while both samples contain measurable levels of transition metals Cd, Cu, Fe, Mn, Hg, Ni, Se, Sr, U, and Zn in various mineral or elemental forms, the 465 sample (which is more typical of Tsm formation) contains these compounds in lesser concentrations. As noted above, the Tsm NGW also shows trace levels of these transition metal compounds, which is unremarkable given the aquifer residence time the Tsm minerals have been in contact with the NGW. The PWM treated water, however, is void of essentially all of these transition metals, having been processed through the AWTF facilities.

The second step in the bench testing program was to mix the PWM treated water and pulverized cuttings samples in a 10:1 mix ratio followed by tumbling of the slurry mix for 48 hours. This process facilitates solid-liquid contacting and provides an opportunity for rapid geochemical equilibration between the two phases. After contacting, the solid material and liquids were separated by centrifugation and the liquid supernatant was filtered through a 0.45 micron membrane filter before analysis. The wet centrifuged sludge was dried at 60° C before being analyzed. The results of the PWM-treated water analyses before and after equilibration are presented in Table 2 below.

Table 2- PWM treated Water Composition Before and After Tsm Equalization

ANALYTE	UNITS	PWM water	465' Cuttings Equilibrated w/ PWM water	595' Cuttings Equilibrated w/ PWM water
Chloride	mg/L	10	13	14
Sulfate	mg/L	0.17	6.6	280
Bicarbonate	mg $CaCO_3$/L	54.5	65.9	122
Carbonate	mg $CaCO_3$/L	ND	ND	ND
Hydroxide	mg $CaCO_3$/L	ND	ND	ND
pH	UNITS	7.96	7.98	8.11
Total Alkalinity	mg $CaCO_3$/L	54.5	65.9	122
Phosphorous	mg/L	ND	ND	ND
Cadmium	µg/L	ND	ND	ND
Calcium	mg/L	18	15	96
Copper	µg/L	4.5	ND	ND
Iron	µg/L	42	ND	ND
Magnesium	mg/L	0.19	2.5	26
Manganese	µg/L	ND	ND	ND
Mercury	µg/L	ND	ND	ND
Nickel	µg/L	ND	ND	ND
Selenium	µg/L	ND	ND	ND
Strontium	µg/L	8.5	ND	390
Uranium	µg/L	ND	ND	9.2
Zinc	µg/L	ND	ND	ND

As shown in Table 2 above, the predominant geochemical interactions appear to be a minor uptake (leaching) of Magnesium (Mg), Sulfate (SO_4), and Chloride (Cl) in the 465' cuttings; with a similar but substantially greater uptake of major cations and anions occurring in the 595' cuttings. There was essentially no leaching of Transition Metals in the 465' cuttings, and only a very minor uptake of Strontium (Sr) (approximately 390 ug/L) and U (9.2 ug/L) in the 595' cuttings. These findings indicate that the PWM-treated water does not exacerbate the solubilization of Transition Metals, nor of other trace minerals that might compromise the composition of recovered waters at proximate SGB extraction well locations. The results also indicate that the PWM treated water appears to be controlled in a narrow Bicarbonate-based (HCO_3) alkalinity range, buffering the solution at a stable pH of approximately 8.0 (7.96 – 8.11). This suggests that as long as PWM waters remain above pH 8.0 (approximately) that no Transition Metal leaching should occur.

A comparison of the cuttings compositions before and after equilibration also (qualitatively) reflect the geochemical reaction mechanisms of the PWM-treated water analyses, (ie dissolution of Cl, Ca, and SO_4. Tables 3a and 3b below present the initial and final chemical composition of the 465' and 595' (respectively) cuttings.

Table 3a- 465' Cuttings Composition Before and After PWM-treated Water Equilibration

ANALYTE	UNITS	465' Cuttings Before Equilibration	465' Cuttings After Equilibration
Sample wt. (dry)	grams	38.5	37.4
% Moisture	wet wt%	23.0	45.8
Chloride	mg/kg-dry	35	19
Sulfate	mg/kg-dry	77	17
Phosphorous	mg/kg-dry	800	1300
Cadmium	mg/kg-dry	0.56	0.70
Calcium	mg/kg-dry	4000	5100
Copper	mg/kg-dry	1.9	2.7
Iron	mg/kg-dry	4900	5500
Magnesium	mg/kg-dry	1900	2100
Manganese	mg/kg-dry	42	60
Mercury	mg/kg-dry	0.042	0.028
Nickel	mg/kg-dry	5.6	6.0
Selenium	mg/kg-dry	ND	ND
Strontium	mg/kg-dry	17	17
Uranium	mg/kg-dry	2.2	3.0
Zinc	mg/kg-dry	25	23
Bicarbonate	mg $CaCO_3$/kg-dry	1640	3140
Carbonate	mg $CaCO_3$/kg-dry	ND	ND
Hydroxide	mg $CaCO_3$/kg-dry	ND	ND
Total Alkalinity	mg $CaCO_3$/kg-dry	1640	3140

Table 3b- 595' Cuttings Composition Before and After PWM-treated Water Equilibration

ANALYTE	UNITS	595' Cuttings Before Equilibration	595' Cuttings After Equilibration
Sample wt.	grams	37.1	33.5
% Moisture	wet wt%	25.8	49.2
Chloride	mg/kg-dry	50	19
Sulfate	mg/kg-dry	2000	760
Phosphorous	mg/kg-dry	3000	2200
Cadmium	mg/kg-dry	23	27
Calcium	mg/kg-dry	81000	54000
Copper	mg/kg-dry	26	25
Iron	mg/kg-dry	16000	9700
Magnesium	mg/kg-dry	35000	20000
Manganese	mg/kg-dry	220	200
Mercury	mg/kg-dry	0.098	0.074
Nickel	mg/kg-dry	40	34
Selenium	mg/kg-dry	4.3	4.3
Strontium	mg/kg-dry	150	86
Uranium	mg/kg-dry	12	9.9
Zinc	mg/kg-dry	120	100
Bicarbonate	mg $CaCO_3$/kg-dry	3290	16600
Carbonate	mg $CaCO_3$/kg-dry	ND	2480
Hydroxide	mg $CaCO_3$/kg-dry	ND	ND
Total Alkalinity	mg $CaCO_3$/kg-dry	3290	19100

Although these data are necessarily less accurate than the supernatant analyses due to the large differences in moisture content and possible loss of solids in the post equalization supernatant filtration step, the results qualitatively support the solubilization of cuttings minerals, particularly Ca, Mg, SO_4, and HCO_3, with the corresponding increases in these ions in the post-equilibrated PWM water samples. Mineral dissolution was relatively minor in the 465' Tsm cuttings as shown in Table 3a with a net loss of 1.1 grams in the 38.5 gram sample; however, as shown in Table 3b, the losses in the 595' Monterey formation transitional cuttings were more substantial with 3.6 grams lost in the 37.1 gram sample, which corresponded to a theoretical increase in equalized Total Dissolved Solids (TDS) of over 400 mg/L. It is important to note that this TDS increase occurred with only a very minor change in pH, demonstrating that the buffering capacity of the PWM water was not exceeded; this is the likely reason that transition metal dissolution did not occur. This also suggests that pH monitoring would provide a useful surrogate for monitoring aquifer conditions during operation of the PWM program.

Conclusions

Based on our evaluation of the water quality and bench scale test program and our experience with similar artificial recharge project applications, we conclude the following:

1- The bench scale testing program results were in general agreement with the geochemical modeling study performed by Pueblo Water related to the Carmel River ASR 2 well.

2- The use of PWM-treated produced waters appears to be geochemically suitable for artificial recharge operations within the Tsm formations of the SGB aquifer.

3- The program results verified that equalized PWM-treated water met the Title 22 standards for inorganic chemical constituents after contacting Tsm mineral in a simulated aquifer storage scenario.

4- Water quality changes during bench scale testing were observed, including Ion Exchange, Redox, and Dissolution reactions, although pH remained stable throughout the bench testing program. Even though these reactions were at times substantial (particularly with respect to Ca, Mg, and SO_4 solubilization) they did not adversely affect final water quality with respect to inorganic drinking water standards. The pH stability throughout the test program indicates that the buffering capacity of the PWM water was not exceeded even with increased bicarbonate alkalinity after equilibration with T_{sm} cuttings.

5- Overall, the geochemical nature of the PWM-treated water, with it's robust bicarbonate alkalinity buffering capacity appears to resist transition metal leaching; this was demonstrated in the substantially different cuttings compositions of the 465' and 595' samples used for the bench scale testing. Because of this empirical demonstration of geochemical stability, we conclude that specific modeling of interactions between PWM-treated waters and Carmel Valley-derived treated waters is not necessary at this time, as the PWM water appears to enhance, rather than impair adverse leaching potential due to its buffering capacity and lack of transition metal content. We opine that intermixing of PWM and Carmel River waters will likely improve the stability of Carmel River water with respect to inhibiting transition metal leaching potential.

6- Biochemical reactivity was not monitored in the bench testing program due to sample preservation issues and loss of microbes that would occur during bench testing procedures. If present, it did not measurably affect final water quality with respect to inorganic drinking water standards.

7- Overall, the bench test program results did not identify any fatal flaws or critical issues that would jeopardize the feasibility of a long term artificial recharge program implemented using PWM-treated water in the Tsm aquifer.

Recommendations

Based on the results of the bench testing program and our experience with artificial recharge operations via direct injection into the T_{sm} aquifer system, we provide the following recommendations regarding advancement of the PWM artificial recharge program in the SGB:

1- The water quality of treated PWM-treated AWTF water should be maintained as closely as possible with the waters tested in the bench scale test program. In particular, the pH and alkalinity of the AWTF process should be maintained to achieve a pH of at least 8.0 and Total Alkalinity of at least 54.5 mg/L as $CaCO_3$.

2- As PWM water is recharged into the T_{sm}, special care should be taken to monitor pH's at proximate monitoring wells to verify that a pH of 8.0 or greater is maintained within the T_{sm}. This pH should be monitored from Project monitoring wells in conjunction with concurrent analysis for Transition Metals to verify the stability of PWM water as it migrates within the Tsm.

3- For recharge well operations, the PWM recharge supply should be monitored daily for Silt Density Index (SDI) to ensure that well fouling via particulate plugging does not occur. SDI values above 2.5 (unitless) should be investigated immediately, and recharge operations stopped if SDI's exceed 3.5.

4- When Desal water becomes available, water quality analyses should be compared to existing PWM-treated waters with respect to geochemical similarity. At that time, additional bench scale testing with Tsm cuttings and Desal product water and potentially with other native and/or artificial recharge waters should be conducted. If large variations are observed between the PWM and Desal bench testing results, geochemical modeling should be performed to ascertain the mechanism(s) observed from the bench testing program. Because of the large range of variability in water quality between the various regional recharge waters, and the observed variability in mineralogy of the T_{sm} and T_m transitional formations, we opine that the combination of empirical bench testing followed by geochemical modeling will provide more accurate results than geochemical modeling simulations alone.

TECHNICAL MEMORANDUM
Pueblo Water Resources, Inc.
4478 Market St., Suite 705
Ventura, CA 93003

Tel: 805.644.0470
Fax: 805.644.0480

To: Jonathan Lear, CHg; District Hydrogeologist

Date: November 08, 2018

From: Stephen Tanner, PE, Principal Engineer

Project No: 12-0048

Copy To: Robert Marks, Pueblo Water Resources

Subject: Analysis of Santa Margarita Well Cuttings, Monterey One Water Well DIW-2

Jon:

In accordance with our recent meetings and discussions, This memorandum summarizes our findings and recommendations for analysis of the recently acquired cuttings samples from the Monterey One Water's DIW-2 well, which penetrates the Santa Margarita Sandstone (Tsm). Because of this well's proximity to the Santa Margarita ASR facility (SM Facility) at 1910 General Jim Moore Blvd. and the fact that the boring for this well encountered aquifer zones encountered at SM ASR Wells 1 and 2, we believe that the cuttings from DIW-2 should be representative of the mineralogy present at the SM Facility.

As you know, the goals for the recent analyses and the ongoing testing program for the ASR wells are to quantify and speciated trace minerals present in the Tsm geologic matrix. The DIW-2 well penetrates the Tsm aquifer, and the depth and extent of the Tsm formation appears distinctly in both the SM ASR wells. Comparing the drill cuttings from the two sites, the following visual indicators are present and are summarized in Table 1:

Table 1 – Hydrogeologic Features Comparison Summary

Lithologic Feature	ASR-1 Depth Interval (ft bgs)	DIW-2 Depth Interval (ft bgs)
Santa Margarita Sandstone	480 to 720	380 to 575
Hardpan Aquitard	590 to 610	440 to 470
Monterey Shale	730+	585+

The Tsm thickness of 240 ft vs 195 ft, the aquitard thickness of 20 ft vs 30 ft, the consistent vertical offset of approximately 145 ft, and the visual similarity of cuttings suggest that the cuttings mineralogy are likely also similar. In comparing the cuttings samples, we found 13 groupings of contiguous samples which appear to be essentially identical in character. These groupings are summarized in the table below:

Table 2 – Cuttings Summary

Cuttings Interval (ft bgs)	Notes
380-400	Top of Tsm
405-410	Tsm
415-420	Tsm
425-440	Tsm
445-470	Hard clay
480-485	Tsm - Fine sand
490-505	Tsm- Coarse sand
510-520	Tsm
525-555	Tsm
560-570	Tsm
555-570	Tsm
570-585	Clay

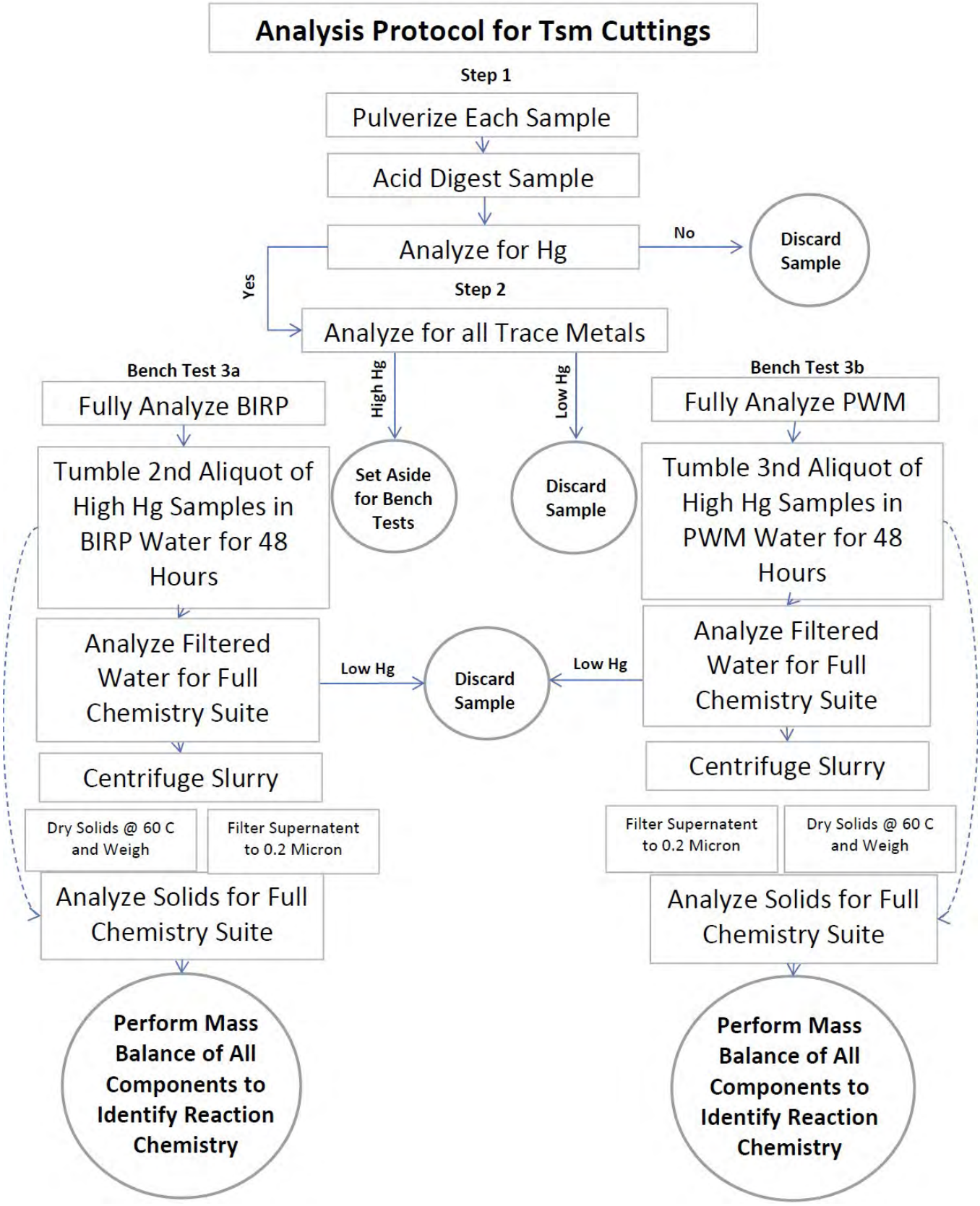
The similarities of these cuttings suggest that individual samples of these intervals need not all be analyzed for trace metals; we recommend for the initial screening analyses that one sample aliquot from each of the 13 horizons above be selected, along with the unique samples from the other cuttings between 360' and 595 feet.

Based on the above, we opine that matrix samples of approximately 100 grams each be taken from the following cuttings: 365', 375', 390', 410', 420', 435', 455', 475', 485', 485', 495', 500', 515', 525', 535', 575', 585', and 600'; (ie 18 samples).The samples should be gleaned from well-homogenized mixes of each original sample bag, then stored in vacuum-sealed bags for shipment to McCampbell Laboratories in Pittsburg, CA. The procedure McCampbell will use to analyze the samples is generally as follows:

1- Dry and weigh each sample
2- Acidify and digest each sample in acid
3- Analyze the dissolved sample for trace metals: Cu, Zn, Cd, Ni, Hg,
4- Report the trace metals concentrations in ug/kg of original dried sample weight.

This initial analysis will identify which geologic horizon contains trace elements of interest for further analyses; the subsequent investigation will include both reactivity testing and potentially direct analysis and quantification of specific mineral composition of these compounds.

Also as we discussed, a visual examination of the cuttings should be made for indications of Pyrite for each sample; this would appear as shiny gold-colored speck in the cuttings matrix. Any sample with evidence should be specifically noted on the Chain of Custody and noted for possible future analyses be special procedures.


Analysis Protocol for Tsm Cuttings
Step 1
Pulverize Each Sample
Acid Digest Sample
Analyze for Hg
No
Discard Sample
Yes
Step 2
Analyze for all Trace Metals
High Hg
Low Hg
Bench Test 3a
Fully Analyze BIRP
Tumble 2nd Aliquot of High Hg Samples in BIRP Water for 48 Hours
Set Aside for Bench Tests
Discard Sample
Bench Test 3b
Fully Analyze PWM
Tumble 3nd Aliquot of High Hg Samples in PWM Water for 48 Hours
Analyze Filtered Water for Full Chemistry Suite
Low Hg
Discard Sample
Low Hg
Analyze Filtered Water for Full Chemistry Suite
Centrifuge Slurry
Dry Solids @ 60 C and Weigh
Filter Supernatent to 0.2 Micron
Filter Supernatent to 0.2 Micron
Dry Solids @ 60 C and Weigh
Analyze Solids for Full Chemistry Suite
Analyze Solids for Full Chemistry Suite
Perform Mass Balance of All Components to Identify Reaction Chemistry
Perform Mass Balance of All Components to Identify Reaction Chemistry

Attachment B Conclusions and Recommendations Sections

4. CONCLUSIONS AND RECOMMENDATIONS

4.1 PRECIPITATION AND SCALING

4.1.1 SMTIW#2 Well Injection and Storage

It can be seen that the only significant model-predicted scalant in both of the SMTIW#2 (ASR-2) mixing scenarios A and B (refer **Section 3.2**) is chalcedony (opaline silica). This minor siliceous scaling potential around the well screens and the mixing zone in the aquifer (of about 2 – 4 mg/L) is predicted regardless of whether the mix is predominantly NGW and is reducing, or is predominantly MCWD water and is oxidizing.

In the SMTIW#2 (ASR-2) mixing scenarios with MCWD (refer **Section 3.2**) it can be seen that this siliceous scaling is predicted to increase with increasing admixture of MCWD water. This arises because the MCWD water contains slightly more dissolved silica (19.73 mg/L as Si) than the SMTIW#2 NGW (18.33 mg/L as Si). Likewise, the siliceous scale potential will decrease when using the more typical injectate , CAW water, due to its low silica content.

Calcite, magnesite and dolomite are shown to be unsaturated in these mixes, therefore calcareous scaling is not expected.

In the reducing mixtures this silica scalant may be accompanied by minor amounts of trace heavy metal sulfide precipitation, although this likelihood is primarily in the early stages of injection (i.e. <10% MCWD water) and these should generally be rapidly oxidized as further MCWD water is injected. This precipitate will likely see subsequent adsorption / coprecipitation with Fe- and Mn- oxyhydroxides present in the aquifer.

The predictions for ferruginous and manganiferous precipitation on the well screens and in the adjacent aquifer are very minor, even at late stage injection when the NGW is largely replaced by MCWD water. Such precipitation may not be observable at the low levels predicted by the model.

As noted in **Section 3.2,** FCO_3Apatite (i.e. Francolite) was chosen as the model compound representative of calcareous phosphate and fluoride-based scaling, because it was observed in both the Upper and Lower Interval leaches that trace P and F removal onto the cutting's substrates correlated very approximately in a 2 : 1 mole ratio. It is therefore likely that if the predicted minor siliceous scaling does occur, it would likely contain trace amounts of Ca, P and F; however these are highly unlikely to contribute significantly to its bulk.

It is important to note that as injection continues over time, and subsequent and successive pore volume exchanges with MCWD (or CAW) waters occur, the level of pH depression and associated silicious precipitation will attenuate due to the equilibration of the mineralogy with the injected waters.

4.1.2 SMTIW#1 Well Injection and Storage

It can be seen that the model-predicted principal scalant in the three SMTIW#1 (ASR-1) mixing scenarios C, D and E (refer **Section 3.3**) is also chalcedony (opaline silica).

As in the case of SMTIW#2 above, very minor siliceous scaling of the well screens and the mixing zone in the aquifer of (approximately of 0.2 – 2 mg/L) is likely, regardless of whether the mix is predominantly NGW (and is reducing) or is predominantly MCWD and/or CAW water (and is oxidizing).*Phase 1 ASR Project Water Year 2008 Seaside Basin Monterey Peninsula Water Management District By ECOENGINEERS Pty Ltd* REVISIONS STATUS AND RELEASE DATE: Revision: 5 Printed: 4 June, 2015 WP REF: MPWMD Phase 1 ASR Project WY2008 Geochemical Assessment Page 22

In the SMTIW#1 (ASR-1) mixing scenarios with bulk MCWD water (refer **Section 3.3**) it can be seen that the siliceous scaling is predicted to increase with increasing admixture of MCWD water. This arises because the MCWD water contains more dissolved silica (19.73 mg/L as Si) than the SMTIW#1 NGW (18.33 mg/L as Si) or the CAW BIRP water (8.41 mg/L as Si.) As with the ASR-2 model predictions, the higher the proportion of CAW BIRP water present, the less the degree of siliceous scaling is expected.

Calcite, magnesite and dolomite are unsaturated in these mixes so calcareous scaling is not expected, as was similarly determined for the case of SMTIW#2 above.

However, the very minor silica scaling will invariably be accompanied by a more significant proportion of calcium phosphate/fluoride-type material than for the newer SMTIW#2 well.

This arises principally because SMTIW#1 NGW has exhibited a more significant total P concentration (0.46 mg/L) than the MCWD water (<0.03 mg/L) or the CAW BIRP water (0.34 mg/L), or even the present indications for the newer SMTIW#2 NGW.

The amount of calcium phosphate-based scaling is predicted to still be very minor but to lie in the range 0.2 – 1.5 mg/L (i.e. comparable with the siliceous scaling). As it is well known that calcium phosphate-type scaling is relatively hard and intractable, this implies that the older SMTIW#1 well may require more frequent cleaning of well screens with organic or mineral acid mixtures than the SMTIW#2 well.

In support of the above model prediction, Pueblo's operational experience over the past 6 years has confirmed minor plugging of the SMTIW#1 well; however, overall injection efficiency has not been impaired, and formal well rehabilitation in 2007 fully restored the wells' performance.

Predictions for ferruginous and manganiferous precipitation on the well screens and in the adjacent aquifer for the SMTIW#1 well are very minor, even at late stage injection when the NGW is largely replaced by MCWD or CAW BIRP water. Nevertheless more ferruginous and manganiferous scaling is predicted for this well in comparison with the newer SMTIW#2 well.

Similarly to the case of SMTIW#2, as injection continues over time and subsequent and successive aquifer pore volumes exchange with MCWD (or CAW) waters, the level of pH depression induced and hence the degree of associated siliceous precipitation will attenuate due to the depletion of available oxidizable organic carbon in the accessible mineralogy of the aquifer.

4.2 BIOFOULING POTENTIAL

Biofouling is a much more difficult phenomenon to predict. It is quite likely that the growth of aerobic or facultative biofilms on the well screens is determined by the available nitrogen (N) and phosphorus (P) nutrient supply and the availability of readily utilizable small MW organic compounds in the injectates and in the NGWs.

In our view there is a distinct possibility that:

- the availability of dissolved C1 – C4 hydrocarbon gases, especially methane in the respective SMTIW#1 and SMTIW#2 NGWs;
- the leachability of DOC from the respective lithologies of the SMTIW#1 and #2 wells; and
- the levels of the limiting P nutrient in the injectates or in situ mixes,

are likely the most critical determinants of the likely level of long term biofouling of the well screens and the adjacent aquifer.

Unfortunately there is no available information on typical concentrations of dissolved C1 – C4 hydrocarbon gases in the SMTIW#1 and SMTIW#2 NGWs. We have made some recommendations in the following **Section 4.3** about the benefits of obtaining data on dissolved C1 – C4 hydrocarbon gases in NGWs.

There is some evidence that the lithology of the SMTIW#1 and #2 wells is such that, under reducing conditions DOC is leached into the NGWs at about the same level i.e. around 0.9 – 1.0 mg/L but this may differ under conditions of exposure to an oxidizing injectate.

Residual dissolved Total Phosphorus (TP) concentrations in the SMTIW#2 (ASR-2) mixing scenarios A and B ranged from 0.3 – 0.4 µg/L, whereas residual dissolved TP concentrations in the SMTIW#1 (ASR-1) mixing scenarios C, D and E ranged from 2 – 3 µg/L. It may therefore be concluded that the limitation to biofouling due to lower Phosphorus levels is likely to be significantly better in the newer SMTIW#2 well than in the older SMTIW#1 well.

4.3 LEACHING OF POTENTIALLY TOXIC TRACE ELEMENTS

Assessment of Upper and Lower Interval cuttings recovered from installation of the SMTWI#2 well using the standard USEPA TCLP leach protocol showed than only Zn could be detected above method detections limits ('MDLs') for this high solids leachant (sodium acetate- acetic acid). Zinc (Zn) was also the only element present (22 mg/L) above the State Maximum Contaminant Levels ('MCLs') (5.0 mg/L) in the TCLP leach of the Lower Interval cuttings (refer **Table 2.5, Section 2.3**).

It is important to note that this leaching simulation is highly conservative because of the use of a weakly acidic leachant to maximize the dissolution of minerals from the geologic matrix.

As discussed in **Section 2**, Pueblo also engaged McCampbell to conduct equivalent leaches of the SMTIW#2 Upper and Lower Intervals cuttings using the same solid : liquid mass : volume ratio, and identical 18 hour exposure period with tumbling, but using the CAW BIRP water as a leachate in an oxidizing context. The data from these leaches is also tabulated in **Table 2.5** in **Section 2.3**.

The outcomes from the CAW BIRP water leaches showed that no potentially toxic elements were leached sufficiently to produce an aqueous concentration which exceeded MCLs, and in most cases were significantly lower by one or two orders of magnitude.

In addition, as discussed in the early part of Section 3.3, it is absolutely clear that these laboratory leaches are likely to produce aqueous concentrations of potentially toxic trace elements which are approximately 15 times greater than would arise during injection and storage in the Tsm.

It is therefore concluded that it is highly unlikely that injection and storage of CAW BIRP water or MCWD water in the Tsm could induce concentrations of potentially toxic elements in those waters which would be found to exceed California Drinking Water MCLs upon extraction. Indeed, experience with the injection of CAW water in SMTIW#1 over the last 6 years has shown that the well consistently yielded recovered waters that meet all drinking water MCLs.

4.4 RECOMMENDATIONS

It is recommended that future total analyses of well-mixed and finely ground cuttings or crushed (e.g. to <10 mm) drill core material should be analyzed for at least the major elements Na, K, Ca, Mg, Ba, Sr, Al, and Fe.

It is particularly useful to know the total amount of Fe present as this will give an indication of the amount of pyrite present in shaley material and this can then checked against the reactive pyrite fraction determined by inverse modeling of laboratory leaches.

Should relatively higher levels of Fe be found then it is also recommended that testing to determine the amount of pyritic sulfur in recovered aquifer solid material be conducted.

In addition, it is strongly recommended that such rock material be analyzed for Total Organic Carbon ('TOC') and Total (Organic) Nitrogen ('TN') by some sort of combustion-based method. This is because the inverse modeling of the leaches which McCampbell conducted with Upper and Lower Interval SMTIW#2 borehole cuttings and CAW water showed quite clearly that it is reaction of the Dissolved Oxygen ('DO') (and also any free chlorine) in the injectates with available organic carbon in the cuttings e.g. located in shaley material, which generates CO_2, which in turn dissolves in the water to drive pH down. At the same time CO_2 is generated, trace organic nitrogen associated with the organic carbon is also released, probably largely as ammonia nitrogen (NH_3-N) but this is also oxidized on the 18 hour timescale of the leach to nitrate/nitrite nitrogen ('NO_x-N'). It is very likely that these reactions are biologically mediated even during the leaching period by natural aerobic or iron dissimilatory bacteria contained in the cuttings.

Regardless of the mechanism, when inverse modeling of such leaches actually quantifies the input of CO_2 and NH_3-N/NO_x-N to the water, it also provides an accurate measure of the available TOC and TN in the leached cuttings. This then can be related back to the overall TOC and TN in the cuttings to derive another 'scale-up or scale-down factor' (going from cuttings leaches outcomes to model-simulated *in situ* aquifer outcomes) for direct comparison with the CEC-derived scale-up or scale-down factor.

If these inferred scaling factors for modeling purposes proved to be somewhat different i.e. simply reflecting different distributions of available organic matter to available clays within the rock mass, these changes can be incorporated as different scale-up (or scale-down) factors in PHREEQC-2 modeling of the actual aquifer injection and storage scenarios.

It is also recommended that CEC determinations generally be conducted with a reagent which is not susceptible to trace dissolution of calcite. Ammonium acetate, even adjusted to pH 7.0 is likely to dissolve some calcite. This tends to bias the percent exchangeable of Ca a little too high. In addition, use of an ammonium-based catex reagent obviates the determination of the percent exchangeable NH_4X sites.

When the aquifer lithology is known, from Rietvelt powder XRD analysis, to contain a significant, even if minor fraction of calcite, then it would be preference to determine CEC on cuttings or crushed drill core using a reagent such as Silver Thiourea or Nickel Ethylenediamine to determine CEC and distribution of percent exchangeable.

It is note from **Table 3.1, Section 3.1** that the PHREEQC-2 modeling of the effective CEC in equilibrium with the groundwaters in wells SMTIW#1, SMTIW#2 and MW-1 slightly underestimated Ca concentrations. This is clearly due to a slight over-estimation of the percent exchangeable Ca on the catex sites and possible derives from:

- slight dissolution of calcite by the McCampbell ammonium acetate CEC reagent, tending to overestimated percent exchangeable Ca); and
- some minor contribution of natural NH_4X (and possible ZnX_2) occupied catex sites to the overall CECs of the cuttings, also tending to overestimate percent exchangeable Ca.

It is therefore also recommended that laboratory CEC and percent exchangeable determinations measure ammonium and Zn percent exchangeable as well.

In the presence of lithologies which contain shales, it is likely that carbonaceous material in the shales is out gassing trace C1 – C4 hydrocarbon gases etc into the NGW.

It is expected that any dissolved methane etc in NGWs would be immediately available for oxidation by aerobic and iron dissimilatory bacteria , thereby leading to biofouling. The higher the concentration of dissolved C1 – C4 gases available, the higher the probability of the development of aerobic biomass in, and around the injection well upon injection of the DO-containing injectate.

Methane is also a potential reactant with the free chlorine contained in candidate injectates for the production of trihalomethanes ('THM') Disinfection By-Products ('DBPs'), but conversely it is also well known that decay of THMs *in situ* is more rapid under anaerobic electron donor conditions. Lack of knowledge of that capacity impairs the measurement and modeling of the degree of anaerobiosis possible under various *in situ* mixing scenarios.

For these reasons, it is also strongly recommended that all NGWs and any re-extracted injectate/NGW mixes be routinely analyzed for dissolved C1 – C4 hydrocarbon gases (as well as TOC, DOC, NH_3-N, Filterable TKN and NO_x-N etc).

It is noted that, on occasion, analysis for NH_3-N have been less than ideal, employing methods with Method Detection Limits ('MDLs') of only about 0.2 mg/L, thus forcing assumption of a level of 0.1 mg/L in modeling. It is recommended that analysis for NH_3-N be conducted with methods which provide an MDL of 0.01 or 0.005 mg/L.

Attachment C

TECHNICAL MEMORANDUM
Pueblo Water Resources, Inc.
4478 Market St., Suite 705
Ventura, CA 93003
Tel: 805.644.0470
Fax: 805.644.0480

To:	Stephen A. Short, PhD	Date:	November 26, 2018
Copy to:	Jonathan Lear, PG, CHg ,	Project No:	14-0048
From:	Stephen Tanner, PE		
Subject:	Geochemical Interaction Assessment – Bench Scale Testing Program		

Steve –
Per our ongoing discussions, I have summarized the McCampbell procedure for analyses for the Tsm cuttings as follows.

Procedure for Analyses of Tsm Cuttings

1- Dry the entire aliquot of each sample (at 60 C); pulverize and homogenize the material, then weigh a portion and analyze the matrix for total Hg. Report results to us to determine the need for further analyses. If Hg is present in sufficient quantity, then Pueblo will direct you to proceed with additional analyses (below).
Results of this total Hg analysis should be reported on a dry-weight basis (mg/kg or ug/g) for each sample. Also report the total weight of dry, un-used sample for each sample.

2- For the samples with adequate Hg as determined by Pueblo from step #1 above; analyze for the following constituents: Ca, Mg, Sr, Cl, SO_4, P, Fe, Mn, Cu, Ni, Zn, U, Cd, alkalinity/carbonate, and Se. Report the results on a dry-weight basis as in 1 above. This will be a TTLC extraction, except for SO_4, P, and Cl; which will be an unacidified vortex extraction; the P analysis will be by Skalar.

3- After this, we may request further analysis of some of the samples. These would involve the following process:

   a. Pueblo will provide 4 liters of one (or more) process waters from the system to Mc Campbell. This water will be used to tumble the dry solid samples to test the leachability of the various waters with the solid samples. Initially, analyze the water for the following parameters:
      - Cl, F, N, NO3, NO2, NH3, TKN, SO_4, Alk., pH, EC, Si, P

- As, Ba, Be, Cd, Cr, Co, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Ag, Th, U, V, Zn
- Al, Ca, Li, Mg, K, Na, Sr, DOC, Iodine, ORP

b. Using a new aliquot of the dried/pulverized sample, tumble a weighed portion for 48 hrs in a measured aliquot of the water provided by Pueblo.

c. Centrifuge the tumbled sample to separate the supernatant from the solids. Filter the supernatant in a 0.2 micron filter and analyze for the constituents listed in #3a above by aqueous methods.

d. Take the centrifuged solids, dry at 60° C, weigh a portion and analyze for all constituents listed in #2 above. Report the results on a dry-weight basis.

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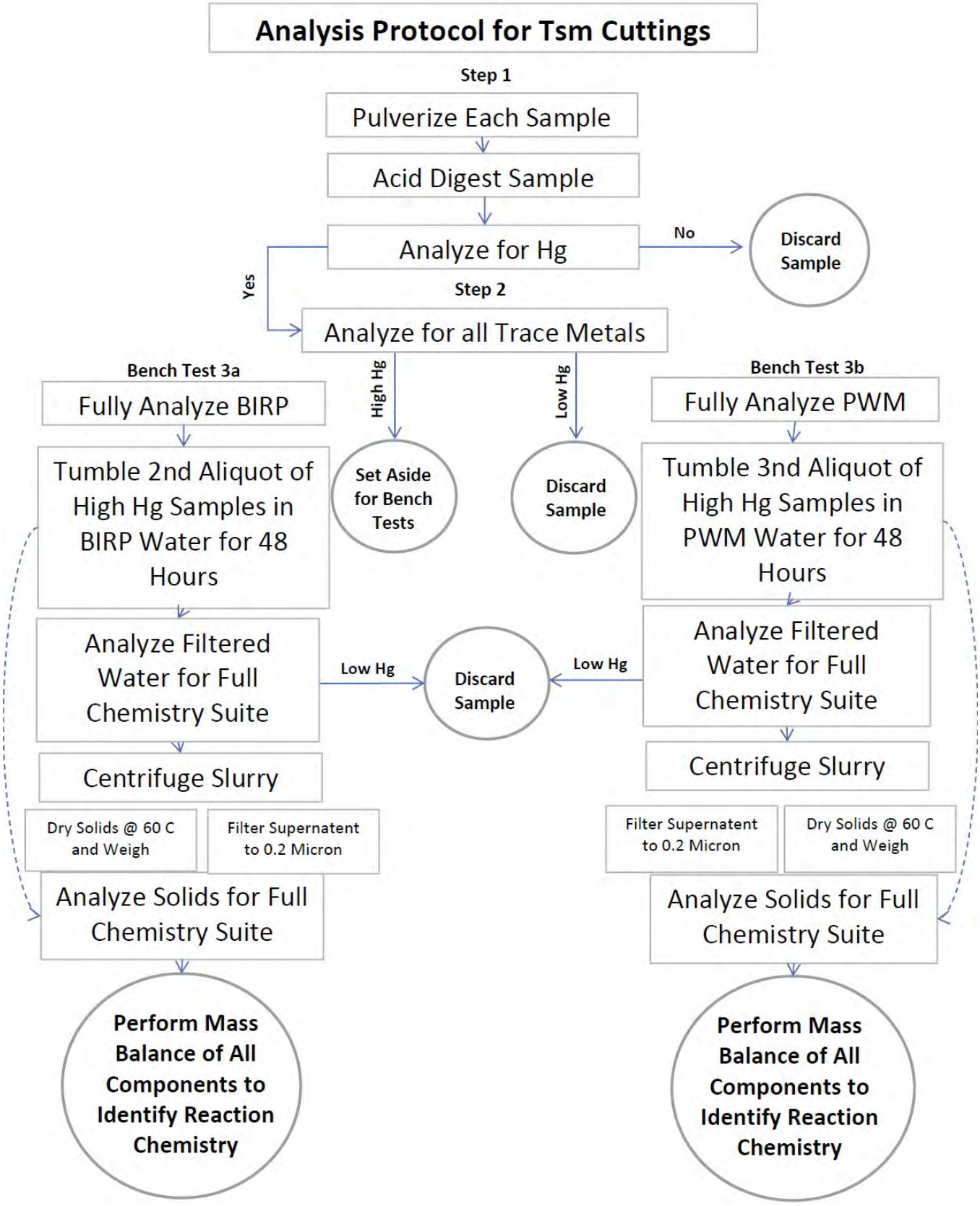
Analysis Protocol for Tsm Cuttings
Step 1
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Tumble 2nd Aliquot of High Hg Samples in BIRP Water for 48 Hours
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Discard Sample
Bench Test 3b
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Tumble 3nd Aliquot of High Hg Samples in PWM Water for 48 Hours
Analyze Filtered Water for Full Chemistry Suite
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Discard Sample
Low Hg
Analyze Filtered Water for Full Chemistry Suite
Centrifuge Slurry
Dry Solids @ 60 C and Weigh
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SEASIDE BASIN WATER MASTER TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	June 12, 2019
AGENDA ITEM:	4
AGENDA TITLE:	Application from the City of Seaside for a Storage and Recovery Agreement
PREPARED BY:	Robert Jaques, Technical Program Manager

SUMMARY: The City of Seaside has submitted the application for a Storage and Recovery Agreement contained in Attachment 1. The attorney working with the City of Seaside on this matter (Mr. Russ McGlothlin) provided the letter that is also contained in Attachment 1 to explain why the City is submitting its application.

I provided to Mr. McGlothlin my comments on the application, as set forth in Attachment 2.

I subsequently suggested that instead of applying for a Storage and Recovery Agreement, the City simply draw up a new agreement similar to the one it did when it used MCWD potable water to irrigate its golf courses instead of pumping the irrigation water from the Seaside Basin (in-lieu replenishment). Under that MOU the City was given a credit for the amount of MCWD water it used and applied this credit against its Replenishment Assessments for overpumping of its Municipal System. A copy of that MOU is contained in Attachment 3.

Mr. McGlothlin provided this email response to that suggestion:

> *The problem with something other than a storage agreement is that a storage agreement is what is needed to withdraw the stored water from the ground per the Judgment's term. It also appears that the point of misunderstanding/disagreement is the premise that the City is requesting to use its Alternative Production Allocation as a basis for storage. This is not the case. The City has a storage right as a Standard Producer, which is more than adequate to cover its present storage program. However, it can also undertake storage as a public entity making use of "public" storage space, consistent with common law precedent. The means that it is engaging in storage is through in lieu substitution of recycled water on an existing non-potable user of potable groundwater. This use just happens to be the City's golf course, but the City could be doing similar substitution of any non-potable demand (e.g., the cemetery) as a means of establishing in lieu storage.*

If I am correctly understanding the City's objectives, they are:

1. To be able to pump more water in its Municipal System than it has a Standard Allocation for, without incurring any net Replenishment Assessment charges for that overpumping.
2. To be able to use some of this over pumped amount to serve future developments within the former Fort Ord, and to use some of it for customers of its Municipal System.

In my opinion the City could use an MOU similar to the one contained in Attachment 3 to accomplish all that it is attempting to accomplish in its application for a Storage and Recovery Agreement, without having any conflicts (actual or potential) with the Decision. This would also likely save on the legal costs associated with filing documents with the Court for its determination of compliance with the Decision.

Since the MOU in Attachment 3 has already been approved by the Court, there should be no difficulty in getting a new, similar MOU approved. I therefore recommend that rather than approving the City's application, the City should instead be encouraged to pursue having an MOU with the Watermaster

SEASIDE BASIN WATER MASTER TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

AGENDA ITEM:	4 (Continued)

similar to the one contained in Attachment 3.

The proposed concept of using reclaimed water to irrigate the golf courses in-lieu of using pumped groundwater makes sense, and doing so will result in some water being left stored in the Basin. The real issue is seeing how the Decision provides for a storage and recovery agreement in this instance, since the stored groundwater would be the result of an Alternative Producer not pumping water under its Alternative Production Allocation, and only Standard Producers are allowed to have storage and recovery agreements.

Since the issues described above primarily revolve around the legal interpretation of the Decision and other legal matters, I believe this matter should first be referred to the Board for determination, and their possible decision to have the Watermaster's legal counsel advise them on this, rather than having the TAC take any action on the City's request. The TAC could take the matter up again if the Board determines that a storage and recovery agreement is appropriate in this instance.

ATTACHMENTS:	1. Application for a Storage and Recovery Agreement and Supporting Documentation 2. Comments by the Technical Program Manager on the Application 3. MOU for In-Lieu Replenishment of Seaside Golf Courses, April 7, 2010
RECOMMENDED ACTION:	Refer the matter to the Watermaster Board to determine if, in this instance, a storage and recovery agreement is legally consistent with the Decision, before taking any action on the City's application for a storage and recovery agreement

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June 5, 2019

Russell McGlothlin
D: +1 213 430 8163
rmcglothlin@omm.com

VIA EMAIL

Laura Paxton (watermasterseaside@sbcglobal.net)
Bob Jaques (bobj83Acomcast.net)
Seaside Groundwater Basin Watermaster
P.O. Box 51502
Pacific Grove CA 93950

Re: Proposed City of Seaside In-Lieu Storage Program (Substitution of Recycled Water on the Blackhorse and Bayonet Golf Courses)

Dear Laura and Bob:

The City of Seaside ("City") files the attached application with the Seaside Basin Watermaster for issuance of a storage and recovery agreement pursuant to Section III.3.L.3.j.xix of the Amended Decision ("Decision"). The storage agreement will facilitate the City's planned in lieu storage of water in the Basin. The proposed in lieu storage program will result from substituting recycled water obtained from Marina Coast Water District ("MCWD") for irrigation of the City's Bayonet and Blackhorse Golf Courses in lieu of the current use of approximately 450 AFY of groundwater produced from the Seaside Groundwater Basin ("Basin"). The substitution will cause the replenishment and storage of water in the Basin.[1]

The delivery of recycled water to the golf courses will be metered and reported to Watermaster on a schedule and pursuant to appropriate terms to be set forth in the storage and recovery agreement. The quantity of recycled water applied at the golf courses annually will establish the amount of water stored annually in the basin through in lieu storage. The City requests a maximum storage amount of 2,361 acre-feet, which is the amount of the Bain's storage space dedicated to the City by the Watermaster's Declaration of Total Usable Storage Space, dated February 3, 2010. This maximum amount will allow the City to accumulate stored water in the basin for several years if necessary, which may be needed to facilitate the City's land use and water planning goals.

[1] In lieu storage occurs when a foreign water supply is used in lieu of native groundwater production. The process is a common and preferred method of groundwater replenishment throughout California because it avoids the necessity of infrastructure to inject or spread water for replenishment as well as any necessary treatment prior to injection or spreading.

The stored water will be recaptured by the City at its Well Number 4 or a future planned replacement for this well. Much of the recovered water will be delivered to MCWD for use within MCWD's service area that is within the City's portion of the Ord Community (former Fort Ord), all of which overlies the Basin. The water is necessary to serve anticipated projects for which there is presently insufficient water allocation pursuant to the Fort Ord Reuse Authority's water allocation program.[2] Some of the stored water may also be recovered and used to serve the City's municipal water system, which, over the long-term, does not possess sufficient groundwater production rights pursuant to the City's Standard Production Allocation ("SPA") under the Decision.

To dispel any misunderstanding, the City desires to make clear that it is not requesting to use its Alternative Production Allocation ("APA") as a basis for its proposed storage program, which would contradict Section III.A.35 of the Decision.[3] Nor is the City seeking to transfer the APA associated with the golf courses for use on another property, which would violate Section III.B.3.a of the Decision. Rather, the City is proposing to undertake storage as a public entity making use of "public" storage space, consistent with common law precedent and the Decision. The golf courses only serve as a means of introducing imported (recycled) water into the basin through in lieu storage methods. Further, the City's APA will remain appurtenant to the golf course properties.

The 2,361 acre-feet of storage space dedicated by the Watermaster to the City is a derivative of the City's Standard Production Allocation ("SPA"). However, the City, as a public agency, need not rely on that allocation to make use of storage space in the Basin for public purposes. Section III.H.1 of the Decision provides that "Underground Storage within the Seaside Basin is and shall remain a public resource." Section III.H.6 likewise recognizes that "public agencies shall have the right to Store Water by Direct Injection, Spreading, or other artificial means."[4] These provisions are consistent with several court opinions recognizing the public nature of subterranean storage space and the rights of public agencies to make use of storage space for public welfare. (*See e.g., Niles Sand & Gravel Co. v. Alameda County Water Dist.* (1974) 37 Cal.App.3d 924 , 933-934 [discussing a public servitude applicable to storage space]; *see also Central and West Basin Water Replenishment District v. Southern California Water Co.* (2003)

[2] The allocations stem from limits to groundwater production from the Salinas Groundwater Basin agreed to by the United States Army in conjunction with annexing the area of the former Fort Ord into Zones 2 and 2A of the Monterey County Water Resources Agency, pursuant to an agreement titled "Agreement between the United States of America and the Monterey County Water Resources Agency concerning Annexation of Fort Ord into Zones 2 and 2A of the Monterey County Water Resources Agency, Agreement No. A-06404," dated September 21, 1993.

[3] "Producers proceeding under the Alternative Production Allocation are not allocated Storage rights and, consequently, their share of the Total Usable Storage Space is apportioned to the Producers proceeding under the Standard Production Allocation."

[4] III.H.3 also provides that if California American Water ("Cal-Am") has excess storage space, any of the cities may request to use that excess storage space. Although Cal-Am does appear to possess excess storage space, the City does not find it necessary, presently, to request use of the company's excess storage space since it can operate within the 2,361 acre-feet of storage space dedicated by Watermaster to the City. Still, this provision highlights the intention in the decision for the storage space to be made available to Cal-Am and the cities for public benefit.

109 Cal.App.4th 891, 904-905 [explaining that underground storage space is a public resource and that California Constitutional policy requires that it be put to use for the public welfare]; *accord Hillside Memorial Park & Mortuary v. Golden State Water Co.*, (2011) 205 Cal.App.4th 534, 539-540.)

Simply put, as a public agency, the City has a right to make use of unused storage space within the Basin for public purposes. It seeks to do so through in lieu substitution of recycled water on an existing non-potable use of potable groundwater. This substitution happens to be on golf courses owned by the City. However, the City could do a similar substitution of any non-potable demand as a means of establishing in lieu storage.

The propriety of the proposed storage program is underscored by a consideration of alternatives and broader state policy. First, as an alternative to the in lieu storage approach, the City could request a storage and recovery agreement for direct injection and recovery of water through a to-be-constructed aquifer storage and recovery well ("ASR Well"). Storage through an ASR Well would make use of the City's dedicated storage space in precisely the same manner as the program being undertaken by Cal-Am, which was previously authorized by Watermaster. Accordingly, the Watermaster would be compelled to authorize the storage just as it did on behalf of Cal-Am. This approach, however, would necessitate (1) expenditure of public funds to construct an ASR Well and (2) environmental impacts associated with the drilling, land use, power, etc. required for the physical injection of water into the Basin. Such public expenditures and environmental impacts can be readily avoided because in lieu methods are available to facilitate the storage. The Decision should logically be interpreted to avoid precluding in lieu storage, which is more cost effective and environmentally benign.

Further, the City's proposed in lieu storage program is consistent with state policy, which declares that "the use of potable domestic water for nonpotable uses, including… golf courses… is a waste or an unreasonable use of the water… if recycled water is available…" (Water Code § 13550.) If the City is prevented from undertaking an in lieu storage program due to an improperly narrow interpretation of the Decision, the City will either be forced to develop an ASR Well together with the attendant waste of public funds and unnecessary environmental degradation or precluded from storing imported recycled water entirely (i.e. because of exorbitant expense). In either case, potable groundwater would continue to be used on a non-potable demand at the golf courses in contravention of state policy.

Finally, we understand that some may argue that the City should be required to convert its APA currently appurtenant to the golf courses to SPA as authorized by Section III.B.3.e. of the Decision in order to facilitate the proposed project. Such APA-to-SPA conversion has been undertaken by other holders of APA. However, this is not required in this instance because the City is not seeking to transfer its APA for use off of the golf courses. Rather, it is seeking merely to offset production of APA through the recycled water substitution. Moreover, such APA-to-SPA conversion (while not required) would result in a greater than 50% reduction in the resulting recoverable water and thereby render the City's in lieu storage program financially infeasible. There is also a marked difference between the City's proposal here and the conversion of APA to SPA by other pumpers previously. In this circumstance, the City is causing new imported

water to replenish the Basin. As a result neither the Basin nor any pumper in the Basin is harmed in any respect by the City's proposed recovery of in-lieu stored water. In the prior APA-to-SPA conversion, no new water was brought to the Basin, and thus, the conversion was the only means of establishing additional production rights for use elsewhere in the Basin. In this application, the City is not seeking an increase to its SPA right, but rather a right to recover stored water from the Basin. The right to recover stored water, entirely distinct from native groundwater rights (e.g., APA and SPA), is well established in the common law. (*See City of Los Angeles v. City of Sa Fernando* (1975) 14 Cal.3d 199, 256-262.)

In sum, the proposed in-lieu storage program is essential to the City's water planning goals. The City respectfully requests Watermaster's issuance of a storage and recovery agreement for the program. The City will continue to collaborate with Watermaster to addresses any technical concerns to ensure that the basin is not harmed by the program. If Watermaster, or any party, feels that the storage and recovery agreement should be presented to the court for consideration and approval as well, the City will so move the court following Watermaster action on the application.

Thank you for your consideration.

Sincerely,

/s/ Russell McGlothlin
Counsel
for O'MELVENY & MYERS LLP

APPLICATION TO STORE AND RECOVER NON-NATIVE WATER FROM THE SEASIDE GROUNDWATER BASIN

INSTRUCTIONS: This Application form is for use by Standard Producers in the Seaside Groundwater Basin (Seaside Basin) for the purpose of obtaining approval from the Seaside Basin Watermaster (Watermaster) to store Non-Native water in, and to subsequently recover that stored water from, the Seaside Basin. The application process is as described in Section III.L.3.j.xx of the Amended Decision of the Monterey County Superior Court, Case No. M66343, filed February 9, 2007.

City of Seaside (the "City")

Name of Standard Producer (Applicant)

Contact Information for Applicant:

Contact Person: Kurt Overmeyer, Economic Development Director

Address: 440 Harcourt Ave, Seaside, CA 93955

Telephone: 831-899-6839

Proposed quantity of non-native water Applicant seeks to store through spreading or direct injection into the Seaside Basin (acre-feet per year):

Pursuant to Section III.3.L.3.j.xix of the Amended Decision and the Watermaster's Declaration of Total Usable Storage Space, February 3, 2010 ("Declaration"), the City requests a storage and recovering agreement authorizing the City to store up to 2,361 acre-feet per year, which is the amount of the City's share of the total usable storage space set forth in the Declaration.

Proposed location(s) where the spreading or direct injection of non-native water into the Seaside Basin will occur.

The City's storage of water in the basin will result from substituting recycled water obtained from the Pure Water Monterey project ("Recycled Water"), obtained from the Marina Coast Water District ("MCWD") for irrigation of the City's Bayonet and Blackhorse Golf Courses in lieu of the current use of approximately 450 acre-feet per year of groundwater from the Seaside Basin. The result of the substitution of the Recycled Water for groundwater production to irrigate the golf courses will cause the replenishment and storage of water in the basin. The location where the Recycled Water would be delivered to the golf courses is shown in Attachment A.

Proposed location(s) where the stored water may be recovered.

The City will recover the stored water at City Well No. 4, located on Juarez Street in the City of Seaside, Assessor's Parcel Number 012-115-017-000, as shown in Attachment B. City Well No. 4 withdraws water from the Santa Margarita aquifer and is perforated at 390 to 420 feet below ground surface (bgs), 430 to 470 feet bgs and at 490 to 550 feet bgs. Most, if not all, of the recovered water will be delivered to MCWD for use to serve users within the City's portion of the Ord Community. Some portion may be used within the City's municipal water system to cover long-term demand exceedances in excess of the City's pumping right for its municipal system.

Water quality characteristics of the non-native water proposed for spreading or direct injection into the Seaside Basin.

Because the storage pursuant to this application would occur through in lieu storage procedures rather than injection or spreading, water quality should not be of concern. However, the substitution water is Recycled Water from the Pure Water Monterey Project, which is the same water that MPWMD will inject into the Seaside Basin pursuant to the California-American Water Company storage program previously approved by Watermaster. The water quality constituents in the Recycled Water will not exceed the water quality limits contained in the Waste Discharge Requirements and Water Recycling Requirements issued for the Pure Water Monterey Project issued by the Central Coast RWQCB in Order No. R3-2017-0003.

Permits and approvals from regulatory agencies.

The Central Coast RWQCB has issued Waste Discharge Requirements and Water Recycling Requirements for the Recycled Water under Order No. R3-2017-0003.

The City will enter into an agreement with MCWD specifying the terms of the delivery of Recycled Water to the Bayonet and Blackhorse Golf Courses and delivery of recovered stored water to MCWD.

ATTACHMENT A

RECYCLED WATER CONNECTION
SEASIDE HIGHLANDS
SEASIDE, CALIFORNIA
FEBRUARY 2019

RUGGERI-JENSEN-AZAR
ENGINEERS • PLANNERS • SURVEYORS

JOB NUMBER: 132018 SHEET 1 OF 1

Attachment B

Seaside Wells

T:\Projects\CurrentProjects\WaterUtilityNetwork\Maps\Wells_Seaside.pdf

Attachment 2

COMMENTS FROM ROBERT JAQUES,
TECHNICAL PROGRAM MANAGER FOR THE SEASIDE GROUNDWATER BASIN WATERMASTER,
ON THE
DRAFT CITY OF SEASIDE APPLICATION FOR A STORAGE AND RECOVERY AGREEMENT

1. The City has two allocations under the Decision, one as a Standard Producer for its Municipal System and one as an Alternative Producer for its Golf Courses. The Application requests a storage and recovery agreement for the in-lieu replenishment of the Basin that will result from using reclaimed water from MCWD in place of pumped groundwater for irrigation of its golf courses. The golf courses are an Alternative Producer. Section III.A.35 of the Decision states in part "Producers proceeding under the Alternative Production Allocation are not allocated Storage rights and, consequently, their share of the Total Usable Storage Space is apportioned to the Producers proceeding under the Standard Production Allocation." Section III.B.3.b of the Decision states "The Party electing the Alternative Production Allocation may not establish Carryover Credits or Storage rights." Although the City is also a Standard Producer (for its Municipal System) the water for which the storage and recovery agreement is being requested will result from the City's Alternative Producer not pumping groundwater. None of the water to be stored will come from the City's Standard Production Allocation. Therefore, it is not clear to me how the proposed storage and recovery agreement would be consistent with Sections III.A.35 or III.B.3.b of the Decision.
2. Section III.B.3.a of the Decision states in part "The Alternative Production Allocation may not be transferred for use on any other property…". The requested storage and recovery agreement states that the stored water will be recovered by one of the wells that is part of the City's Municipal System (a Standard Producer) and at a location that does not overlie the land where the golf courses are located. This would seem to constitute a transfer of stored water generated by an Alternative Producer to a Standard Producer. Therefore, it is not clear to me how the proposed storage and recovery agreement would be consistent with Section III.B.3.a of the Decision.
3. Separate from the comments in paragraphs 1 and 2 above, the following are my specific comments on the Draft Application itself:
    a. In the section of the application where the proposed quantity of water to be stored is listed, rather than using the City's entire share of total usable storage space, the actual amount(s) the City proposes to store should be listed. This would appear to be approximately 450 AFY, rather than the 2,361 AFY that is cited. Alternatively, the proposed amount could be 540 AFY which is the entire amount of the Alternative Producer Allocation the City has for its Golf Courses. In this same section of the application the word "recovering" should read "recovery."
    b. In the section of the application where the locations where the stored water will be recovered is listed it states that most, if not all, of the recovered water will be delivered to MCWD for use to serve users within the City's portion of the Ord Community. It would be helpful to explain how the water will be delivered to MCWD and to also include as an attachment a map showing the area(s) where the recovered water will be used. This will be helpful in confirming that the stored water will not be exported outside of the boundary of the adjudicated Seaside Basin.

MEMORANDUM OF UNDERSTANDING BETWEEN THE SEASIDE BASIN WATERMASTER AND THE CITY OF SEASIDE

This Memorandum of Understanding ("MOU") is entered into between the Seaside Groundwater Basin Watermaster ("Watermaster") and the City of Seaside ("City") (individually a "Party" and together the "Parties") this 7 day of April, 2010 ("Effective Date") with respect to the following:

RECITALS

A. The amended final decision ("Decision") entered in the lawsuit, California American Water v. City of Seaside et al., Monterey Superior Court, (Case No. M 66343) governs groundwater production within the Seaside Groundwater Basin (the "Basin").

B. The City is a party to the lawsuit and received groundwater production allocation pursuant to the Decision as follows: (1) 540 acre-feet of Alternative Production Allocation[1] in relation to the City-owned Blackhorse and Bayonet Golf Courses ("Golf Courses"); and (2) Standard Production Allocation in relation to the City Municipal Water System.[2]

C. The Decision provides that any party that exceeds its allocation of Natural Safe Yield is subject to a Replenishment Assessment for each acre-foot of Over-Production during each Water Year.

D. The City presently owes certain sums to Watermaster for previously accrued Replenishment Assessments.

E. The City projects that it will continue to engage in Over-Production to supply its Municipal Water System, and potentially its Golf Course System, and therefore anticipates that it will continue to incur additional Replenishment Assessment liability.

F. The Decision obligates the Watermaster to procure new sources of water for replenishment of the Basin to offset cumulative Over-Production.

G. The Parties have identified an in lieu replenishment program ("Program") involving the Golf Courses and the City's Alternative Production Allocation associated with the Golf Courses, which is a viable means to obtain some of the replenishment water that Watermaster is obligated to procure.

H. To implement the Program, the City has entered into an agreement with the Marina Coast Water District ("MCWD") to supply water to irrigate the Golf Courses in lieu of production of Basin groundwater for irrigation pursuant to the City's Alternative Production

[1] All capitalized terms used in this MOU are to be given the same meaning as set forth in the Decision, unless otherwise described.

[2] The Standard Production Allocation is set forth as a percentage of Operating Yield of the Coastal Subarea. The City's Standard Production Allocation is roughly 10.47% of the Operating Yield.

Allocation, thereby causing an in lieu replenishment of the Basin.[3]

I. The City desires to engage in the Program in exchange for a monetary credit against its Replenishment Assessment liability.

J. The Parties desire to enter into this MOU to memorialize the terms upon which the City shall engage in the Program, and the Watermaster shall provide the City with a monetary credit against its Replenishment Assessment liability.

AGREEMENT

The Parties agree as follows:

1. Term. This MOU shall commence upon the Effective Date and continue until the earlier of five (5) years from the Effective Date, or three (3) months following the end of the Water Year in which the Chief Executive Officer of Watermaster anticipates that the City shall have provided sufficient in lieu replenishment water pursuant to the Program to offset all of its then-accrued Replenishment Assessment liability.

2. Commencement and Scope of Program. The Program shall commence, if at all, only once the City deems it appropriate to commence the Program, in its sole discretion. The City shall notify the Watermaster CEO in writing of the date it intends to commence the program as far in advance as is feasible. The amount of in lieu replenishment that shall occur in any particular year pursuant to the Program, if at all, shall also be determined by the City in its sole discretion.

3. Accounting and Replenishment Assessment Credit.

3.1 Annual Accounting. During the term of this MOU, the City shall report to the Watermaster an accounting of the amount of water received from MCWD to be used in lieu of groundwater production from the Basin for the preceding calendar quarter, in writing, on or before January 15, April 15, July 15, and October 15 of each Water Year. The City shall record and report the MCWD deliveries based upon accurate meter readings. All meters used for such reporting shall be regularly calibrated and maintained by the City, or the City's representative, and at the City's expense to ensure accuracy. Prior to the commencement of the Program the City shall provide to the Watermaster an initial calibration report certifying the accuracy of the flowmeter which will measure the delivery of MCWD water to the City's golf courses. When and if requested by the Watermaster, the City will perform additional calibrations to verify meter accuracy. Such requests by the Watermaster will not be made more often than once every two years, unless metering data are indicative of metering inaccuracies. If the Watermaster disputes the reported quantity of MCWD deliveries, it shall inform the City of the basis of its objection within one (1) month of receipt of the City's accounting, and the Parties shall thereafter engage in good faith negotiations to attempt to resolve the dispute. Any dispute that cannot thereby be settled shall be referred to the Court for resolution.

3.2 Calculating Credit Against City's Replenishment Assessment Liability.

[3] The water supply from Marina Coast Water District will initially be derived from Salinas Basin groundwater production and later reclaimed water, once available.

At the end of each Water Year, the Watermaster shall determine the cumulative gross Replenishment Assessment liability owed by the City in accord with Section 6.5 of the Watermaster's Rules and Regulations. The Watermaster shall then apply a credit against the City's gross Replenishment Assessment liability, which shall equal the amount of all MCWD deliveries to the Golf Courses for irrigation during the proceeding Water Year, not to exceed the City's 540 acre-feet of Alternative Production Allocation, multiplied by the amount of the effective Replenishment Assessment Unit Cost for that Water Year. Watermaster shall then promptly notify the City of the cumulative net Replenishment Assessment liability owed.

4. Temporary and Contingent Stay of Enforcement Proceedings for Un Paid Replenishment Assessments. To accommodate the City's efforts to offset its accrued Replenishment Assessments through the Program, enforcement against the City for unpaid Replenishment Assessments shall be stayed through the end of WY 2010. At the end of WY 2010, Watermaster shall make a recommendation to the Court in its Annual Report as to whether the stay of enforcement should be continued beyond this initial period. Watermaster's recommendation shall be based upon its determination of the relative success of the Program, the likelihood of the City continuing to make meaningful progression toward full offset of its accrued Replenishment Assessments, and whether Watermaster believes there is any other source of replenishment water available that could be purchased on an acre-foot basis in an amount at or below its Replenishment Assessment rate. If the stay is continued, Watermaster shall make such recommendations in each Annual Report thereafter until the stay is terminated, the City offsets all of its prior Replenishment Assessments pursuant to this MOU, or this MOU terminates. Should Watermaster recommend against continuation of the stay, the stay shall terminate unless otherwise ordered by the Court, and any continuation of the stay recommended by Watermaster shall be contingent upon consent by the Court.

5. Good Faith Negotiation of Program Extension. Upon termination of the initial term of this MOU, as set forth in Section 1 above, the Parties shall engage in good faith negotiations to determine whether the Program may be extended pursuant to mutual agreeable terms. No Party shall be obligated to commit to a Program extension or any particular term of a subsequent MOU for a Program extension.

6. Miscellaneous Terms. This Agreement shall be governed by and construed in accordance with the laws of California, without regard to conflicts of law principles, with venue for all purposes to be proper only in the County of Monterey, California. If any actions are required to interpret or enforce the provisions of this Agreement, the prevailing party shall be entitled to reasonable attorneys' fees and costs. Any failure to enforce any provision of this Agreement shall not constitute a waiver thereof or of any other provision hereof. This Agreement constitutes the entire understanding and agreement of the Parties with respect to the subject matter of this Agreement, supersedes the earlier version of this Agreement, and there have been no promises, representations, agreements, warranties or undertakings by any of the Parties, either oral or written, of any character or nature hereafter binding except as set forth herein. This Agreement may be altered, amended or modified only by an instrument in writing, executed by the Parties to this Agreement and by no other means. Each Party waives its future right to claim, contest or assert that this Agreement was modified, canceled, superseded, or changed by oral agreement, course of conduct, waiver or estoppel.

IN WITNESS WHEREOF the Parties hereby agree to perform pursuant to the terms set forth herein.

SEASIDE BASIN WATERMASTER

Dewey Evans, Chief Executive Officer
Date: April 7, 2010

CITY OF SEASIDE

Ray Corpuz, City Manager
Date: April 7, 2010

SB 542368 v1:006840.0001

SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	June 12, 2019
AGENDA ITEM:	5
AGENDA TITLE:	Schedule
PREPARED BY:	Robert Jaques, Technical Program Manager

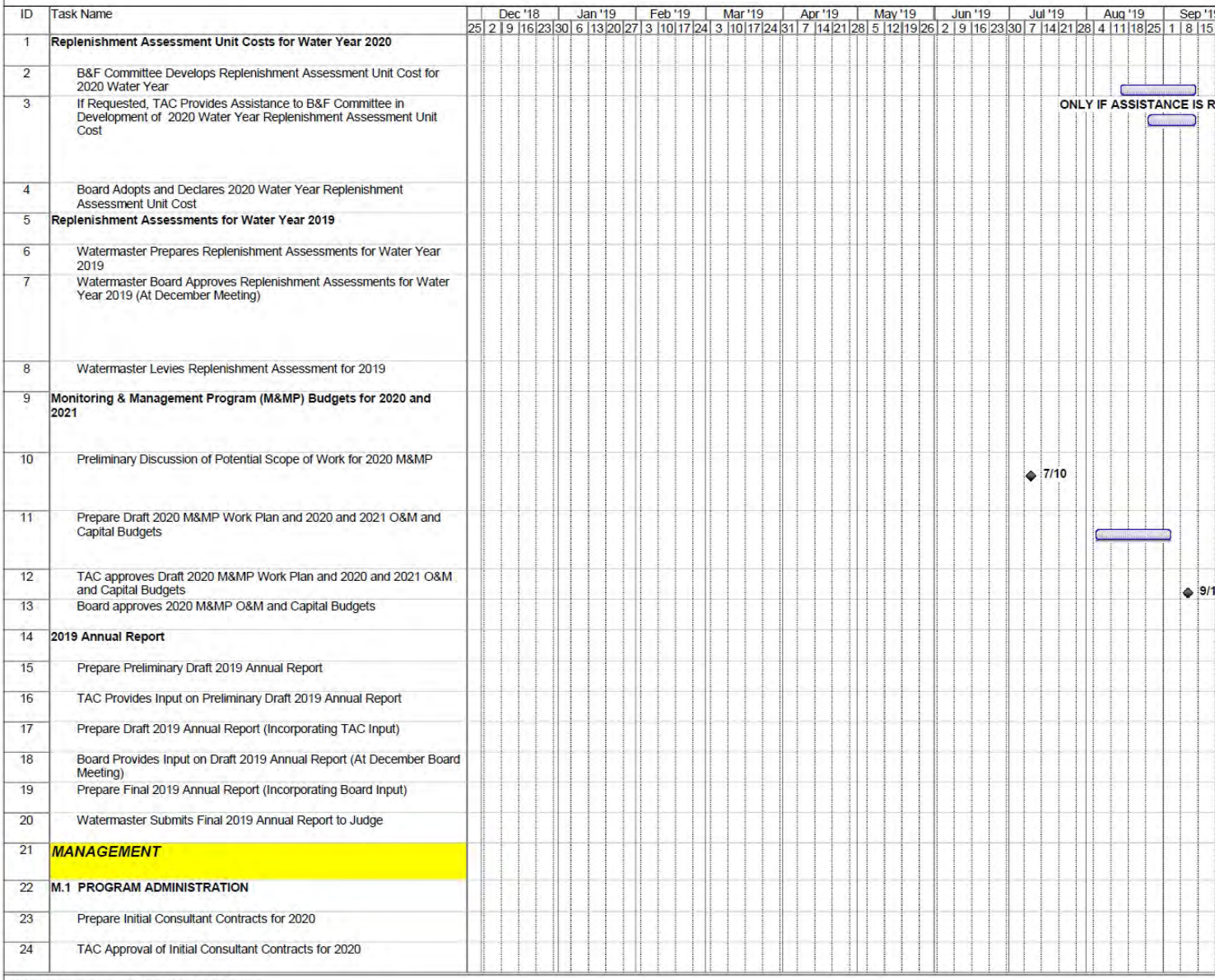
SUMMARY:

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 proposed Work Schedule for FY 2019.

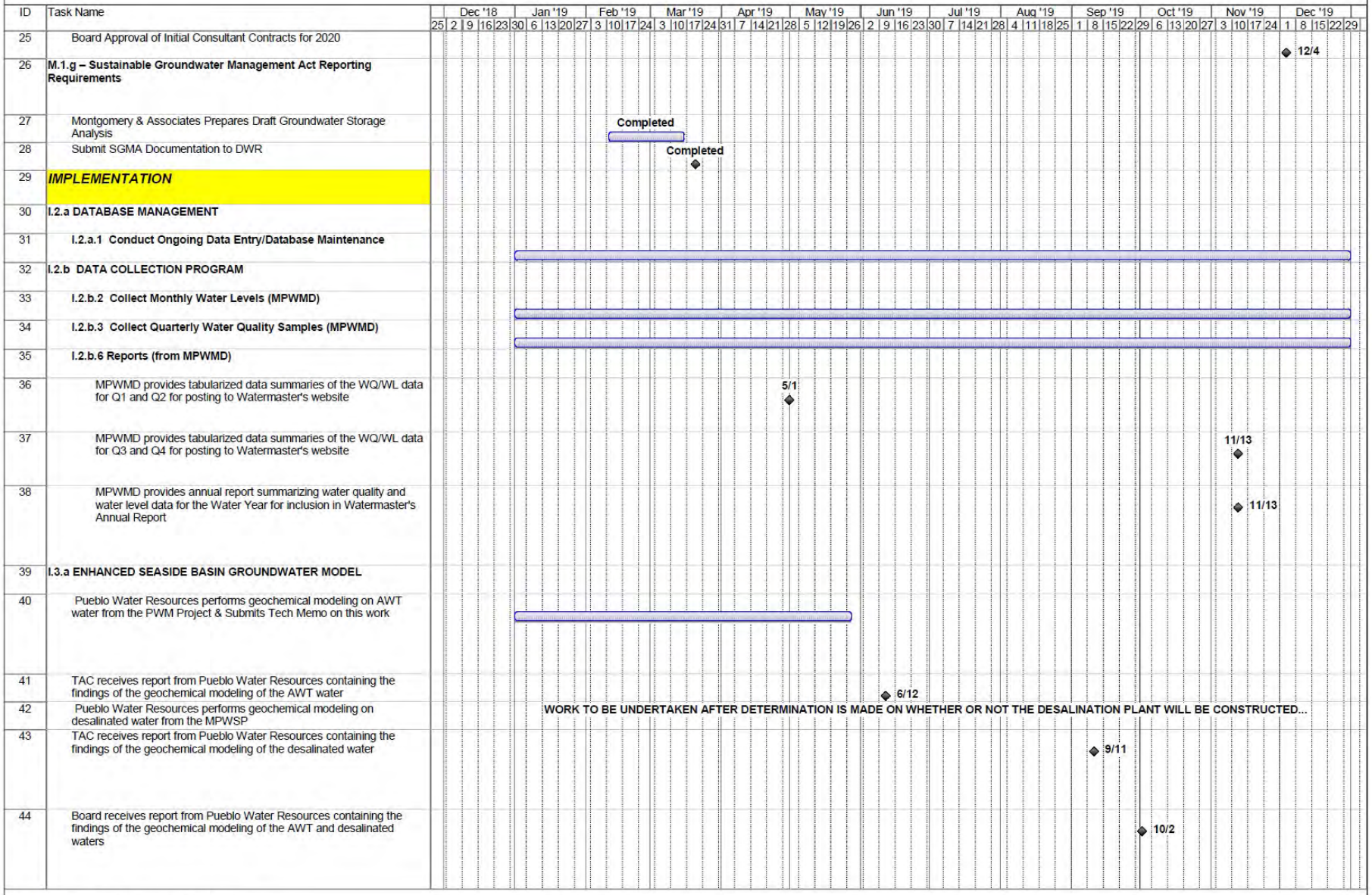
ATTACHMENTS:	Schedule of Work Activities for FY 2019
RECOMMENDED ACTION:	Provide Input to Technical Program Manager Regarding Any Corrections or Additions to the Schedule

Seaside Basin Watermaster
2019 Monitoring and Management Program
Work Schedule

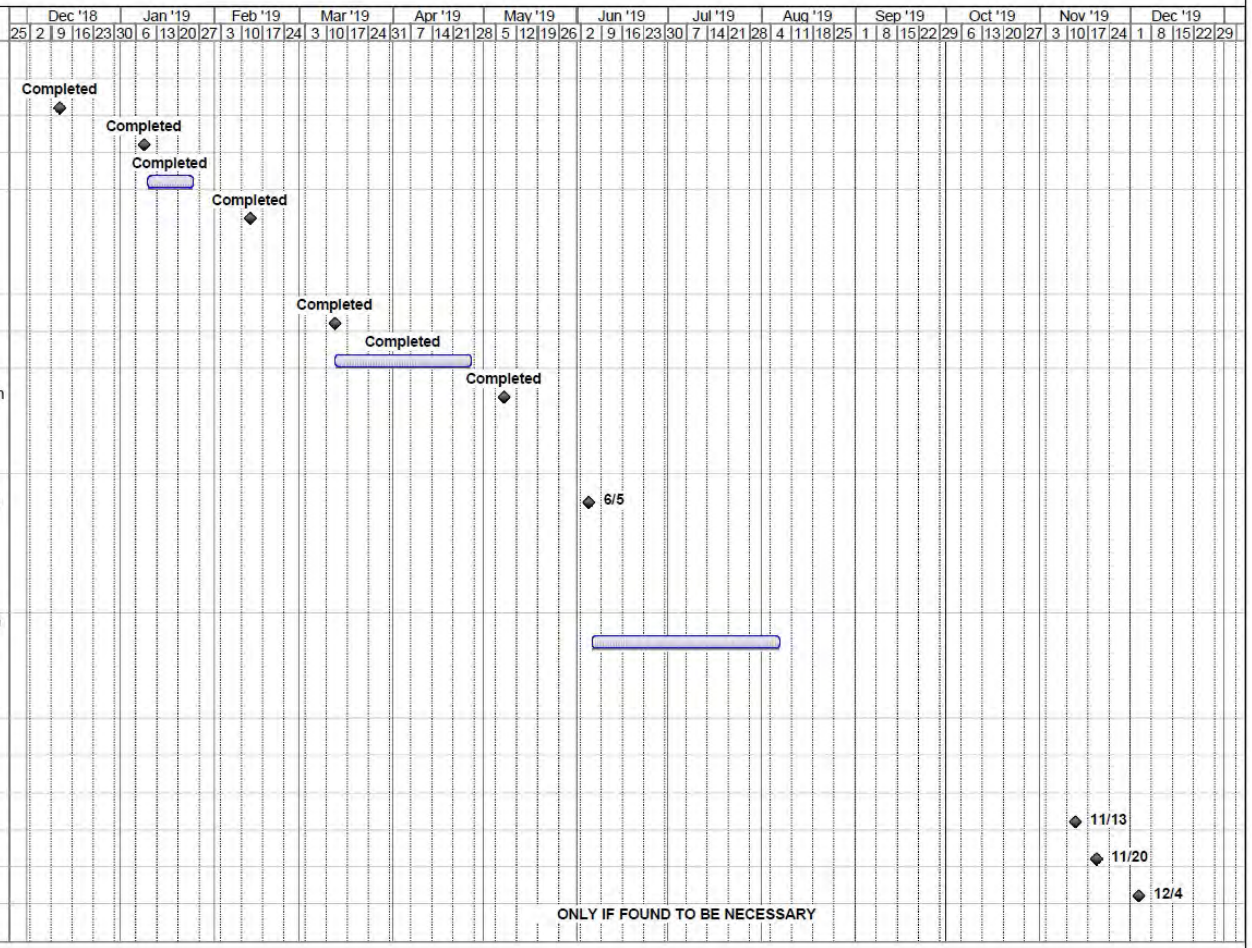


2019 Consultants Work Schedule 6-12-19.mpp

Seaside Basin Watermaster
2019 Monitoring and Management Program
Work Schedule



Seaside Basin Watermaster
2019 Monitoring and Management Program
Work Schedule



SEASIDE BASIN WATER MASTER TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	June 12, 2019
AGENDA ITEM:	6
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