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

TECHNICAL ADVISORY COMMITTEE
OF THE
SEASIDE BASIN WATER MASTER

DATE: Wednesday, March 13, 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) 739-1015. 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

There will be no April meeting. The next regular meeting will be held on Wednesday May 8, 2019 at 1:30 p.m. at the M1W Board Room.

SEASIDE BASIN WATER MASTER TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	March 13, 2019
AGENDA ITEM:	2.A
AGENDA TITLE:	Approve Minutes from the February 13, 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
February 13, 2019

Attendees: TAC Members

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

Watermaster
Technical Program Manager - Robert Jaques

Consultants
Montgomery & Associates - Georgina King (via telephone)

Others
California American Water – Lori Girard
MCWD – Patrick Breen

The meeting was convened at 1:42 p.m. after a quorum had been established. Mr. Lear opened the meeting as Nina Miller had been detained. Ms. Miller assumed leadership of the meeting at the end of Item 1 of the agenda.

1. Public Comments
There were no public comments.

2. Administrative Matters:

A. Approve Minutes from the January 9, 2019 Meeting
On a motion by a Mr. Gomez, seconded by Ms. Voss, the minutes were unanimously approved as presented.

3. CONTINUED DISCUSSION OF UPDATED BASIN MANAGEMENT ACTION PLAN
Mr. Jaques summarized the agenda packet materials for this item.

Ms. Miller commented that there would be changes in the future that would impact the Basin as a result of implementation of the Monterey Peninsula Water Supply Project. She asked if those changes would affect the Natural Safe Yield that is reported in the Updated Basin Management Action Plan. Ms. King responded that the Natural Safe Yield would not be affected, because it only reflects naturally occurring inputs and outputs of water to and from the Basin.

3.A. Approve the Draft Updated Basin Management Plan
Mr. Jaques summarized the agenda packet materials for this item.

Mr. Lear posed two questions:

3 If the recommendation was made to lower the Natural Safe Yield, would it change the existing California American Water pay-back agreement? Mr. Jaques responded that he did not know the answer to that question at this time and that it would likely take a legal review and opinion to make that determination.

4 If the recommendation was made to lower the Natural Safe Yield, would it impact the existing storage agreements between California American Water, Monterey Peninsula Water Management District, and the Watermaster? Mr. Jaques responded that he did not believe there would be any impact on those storage agreements by changing the Natural Safe Yield, because Natural Safe Yield is not mentioned or involved in the storage agreements. In response to a related question, Mr. Jaques reported that water that is lost through lateral movement to other subbasins, after being stored, is addressed in the language of the existing storage agreements which states that due to hydrogeologic characteristics of the Seaside Basin, naturally occurring losses of stored water may result in the Watermaster reducing the percentage of stored water that may be extracted.

Ms. Voss asked if the concept of changing from Natural Safe Yield to Sustainable Yield would be covered as a separate topic for discussion and Mr. Jaques responded that it would.

On the understanding that the concept the changing from Natural Safe Yield to Sustainable Yield would be separately addressed, Ms. Voss moved for approval of the Updated Basin Management Plan. This motion was seconded by Mr. Gomez and unanimously approved.

3.B. Discuss Draft Updated BMAP Recommendations to: (1) Reduce the Basin's NSY to 2,370 AFY and (2) to Use Sustainable Yield Rather Than NSY for Basin Management

Mr. Jaques summarized the agenda packet materials for this item

Mr. Gomez said he concurred with Mr. Jaques' recommendations on how to proceed with these issues, since the issues are complex and warrant continued discussion.

Ms. Voss commented that 3,000 acre-feet per year as the Natural Safe Yield is no longer correct in view of the most recent data and that even though pursuing the Sustainable Yield approach would be a complex undertaking, it should be undertaken if warranted.

Mr. Costa asked if less than 3,000 acre-feet per year had been pumped in any prior years. Mr. Jaques responded that total production from the Basin was less than 3,000 acre-feet per year at least once in a recent year, but even in that year water levels continued to fall.

There was much further discussion on both the issues of Natural Safe Yield and Sustainable Yield.

Ms. King recommended waiting until adjacent basins have developed their Groundwater Sustainability Plans before performing a Sustainable Yield analysis, because such an analysis would need to include information from those plans.

There was consensus to proceed with further discussion of these issues as outlined on page 21 of the agenda packet.

4. Proposed Drainage Improvements at the Del Monte Manor in Seaside

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

Ms. Miller noted that percolation of water can move potential contaminants into underlying aquifers. Mr. Jaques commented that the shallowest aquifer is several hundred feet below the ground surface (Mr. Lear said he believed it was 300 or more feet below the ground surface at that location). Ms. King commented that because the depth to groundwater was that large there would be considerable soil

filtering of any contaminants and said she felt that there would be no adverse effects on the underlying aquifers.

In response to a question, Mr. Lear reported that there were no monitoring wells close to the location of the Del Monte Manor. Ms. King reported that some of California American Water's wells may be in this vicinity. Mr. Lear added that Mission Memorial Park has a well in this general location. He also mentioned that the previously prepared cross-aquifer contamination study but might provide some information on this.

Ms. Miller asked if Monterey County Environmental Health or the State had given its approval for the project, and also asked if they had performed a source water evaluation. Mr. Jaques said he did not have that information. Unfortunately, because of other commitments, Mr. Ottmar of the city of Seaside was not able to participate in today's meeting to provide that information.

There was consensus to continue discussion of this agenda item at the next TAC meeting before taking any action on it, so that Mr. Ottmar could provide information in response to these issues.

5. Schedule

Mr. Jaques highlighted the activities that had been updated in the schedule and there was no other discussion.

6. Other Business

No other business was discussed.

The meeting adjourned at 2:52 PM

SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	March 13, 2019
AGENDA ITEM:	2.B
AGENDA TITLE:	MPWMD Letter Regarding Need to Maintain the PCA-East Monitoring Well in Service
PREPARED BY:	Robert Jaques, Technical Program Manager

SUMMARY:

At the TAC's July 12. 2017 meeting Mr. Riedl commented that since the PCA-East Multiple well is screened across two aquifers and is no longer used for monitoring purposes, it should be considered for abandonment and destruction to prevent aquifer cross-contamination. Mr. Lear said he agreed with that, and noted that it is an MPWMD-owned well. Mr. Lear recommended that the Watermaster formally ask MPWMD to abandon and destroy that well. A letter was sent to MPWMD dated August 23, 2017 requesting that this well be abandoned and destroyed.

MPWMD's letter in response to the August 23, 2017 Watermaster letter is attached. The letter provides justification for keeping this monitoring well in service, but that the status of this well should be reexamined if seawater intrusion is detected in that area of the Seaside Basin.

ATTACHMENTS:	March 4, 2019 letter from MPWMD
RECOMMENDED ACTION:	Approve keeping this monitoring well in service as recommended in the MPWMD letter

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT

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POST OFFICE BOX 85
MONTEREY, CA 93942-0085 • (831) 658-5600
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March 4, 2019

Bob Jaques
Technical Program Manager
Seaside Groundwater Basin Watermaster
83 Via Encanto
Monterey, CA 93940

Subject: Status of Pacific Coast Aggregate East Dual Monitoring Well

Dear Mr. Jaques:

Monterey Peninsula Water Management District (District) received a letter from the Seaside Groundwater Basin Watermaster (Watermaster) on August 23, 2017 referencing the Pacific Coast Aggregate East (PCAE) Dual Completion Monitor Well. In the letter, the Watermaster is requesting the District destroy the monitor well to avoid cross contamination of the Seaside Groundwater Basin aquifer system. PCAE-Dual was drilled for the District by Stall, Gardner, and Dunn in 1990 and is screened in both the Paso Robles Aquifer and the Santa Margarita Sandstone. The District monitored this well for water levels and water quality until the mid-2000's after which monitoring became more intermittent. Until this year, the well had not been monitored for over a decade.

In 2012 the District performed a Cross-Aquifer Contamination Investigation for the Watermaster and found that out of 176 wells in the Coastal Sub-Areas of the Basin, 18 are screened over multiple aquifers. All 18 of the cross-screened wells are either production or monitor wells owned by CalAm, the District, or the City of Seaside. PCAE-Dual is one of the monitor wells that were identified by this study. The study determines that these wells could be a possible conduit for cross contamination should seawater intrusion be identified in the Seaside Groundwater Basin. The study recommends that the wells should not be immediately destroyed, but rather destruction may become necessary if seawater intrusion is detected in the vicinity of one of these wells in one aquifer zone and not the other.

In 2019 the District and Monterey One Water will begin operation of the Pure Water Monterey (PWM) Project which will inject 3,500 AF of advanced treated water into the Seaside Groundwater Basin to be used as water supply for CalAm. PWM injects water in both the Paso Robles Aquifer and the Santa Margarita Sandstone. PCAE-Dual has been identified as a far field monitor well that is screened in both of the aquifer zones. PCAE-Dual will provide composite water quality samples for comparison with production wells pulling from both the Paso Robles and the Santa Margarita Sandstone.

Water quality and water level data will be taken at PCAE-Dual related to PWM operations, therefore the well will not be sampled on the schedule outlined in the Monitoring and Maintenance Plan for the Watermaster's water level and water quality program. In addition, the scope of the RFS between the Watermaster and the District does not cover the monitoring and reporting of data from PCAE-Dual, so the Watermaster will not be charged for this work. In accordance with the Cross-Aquifer Contamination Report, if seawater intrusion is discovered in this area of the Seaside Groundwater Basin, the status of this well will be re-evaluated. If you have any questions, please phone me at (831) 227-6001.

Sincerely,

Jonathan Lear PG, CHg
Senior Hydrogeologist

SEASIDE BASIN WATER MASTER TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	March 13, 2019
AGENDA ITEM:	2.C
AGENDA TITLE:	Progress Report on Geochemical Modeling
PREPARED BY:	Robert Jaques, Technical Program Manager

SUMMARY:

Jon Lear of MPWMD provided the progress report below 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.

We have completed the bench testing of the ATW water with Aquifer matrix. There was no leaching of transition metals that occurred during the test. This means there is not a current need to pursue the mixing modeling as the very low total dissolved water from the treatment facility did not leach and mixing of the water would only increase TDS thus decreasing leaching potential. I can give an update at the next TAC and we will have a Tech Memo for the April TAC Meeting to present to the TAC.

As for the rest of the geochemical study, Pueblo is recommending to hold off until we have desalinated water quality or if we know there is not going to be a desalination plant. If there is desalinated water, we can perform bench testing and will have all of the water quality and can perform the full mixing analysis. I asked if we could perform the mixing analysis now and then again when we received the desalinated water quality and was informed the same level of effort is required for each modeling run regardless if there are 3 or 4 water types. Running the model now and then again will require an increase in scope. MPWMD will produce a Tech Memo and cover letter to attach to the storage agreement and then pick back up the effort when the future of Desal comes more in focus.

Mr. Lear will amplify his progress report and respond to TAC questions at today's meeting. The Technical Memo he refers to for presentation at the April TAC meeting will instead be presented at the May TAC meeting, since no April TAC meeting will be necessary.

ATTACHMENTS:	None
RECOMMENDED ACTION:	None required – information only

SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	March 13, 2019
AGENDA ITEM:	2.D
AGENDA TITLE:	Change-in-Storage Memo for Sustainable Groundwater Management Act Reporting
PREPARED BY:	Robert Jaques, Technical Program Manager

SUMMARY:

Each year under the Sustainable Groundwater Management Act adjudicated basins are required to report certain information. One of the items to be reported is the estimated change-in-storage of groundwater in the basin during the most recent Water Year.

Attached is the Technical Memorandum prepared for the Watermaster by Montgomery & Associates which provides that information for Water Year 2018.

ATTACHMENTS:	
RECOMMENDED ACTION:	None required – information only

MONTGOMERY
& ASSOCIATES
Water Resource Consultants

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510.903.0458

TECHNICAL MEMORANDUM

DATE: March 6, 2019 **PROJECT #**: 9150.01

TO: Bob Jaques, Technical Program Manager
Seaside Basin Watermaster

FROM: Georgina King

SUBJECT: Seaside Basin Change in Groundwater Storage between Water Years 2017 and 2018

Introduction

Under the Sustainable Groundwater Management Act, adjudicated groundwater basins are required to report the overall change in groundwater storage volume that takes place each year starting April 1, 2016. Thus far, the Seaside Basin Watermaster has submitted three reports: for Water Year 2015, Water Year 2016, and Water Year 2017. The annual change in groundwater storage in the Seaside Groundwater Basin is estimated using groundwater elevation data collected and interpolated for the annual Seawater Intrusion Analysis Reports (SIAR). This technical memorandum provides the change in groundwater storage volume for Water Year 2018, using the same method of estimation used in the previous estimates.

The Seaside Basin Watermaster has prepared annual Seawater Intrusion Analysis Reports (SIAR) for the Seaside Basin since water year 2007. In addition to a thorough chemical analysis, groundwater elevation conditions are evaluated and reported on groundwater elevation contour maps. Contour maps are produced for the 2nd and 4th quarter of each water year for both the shallow and deep aquifer zones. These maps are prepared by manually drawing elevation contours based upon observed groundwater elevations in wells screened in each aquifer zone. Wells assigned to the shallow depth zone generally correlate to the Paso Robles Formation where it exists in the Seaside Basin. Wells assigned to the deep zone correlate with the Santa Margarita Sandstone where it exists in the Seaside Basin.

Groundwater storage change was estimated between water years 2017 and 2018 using the following steps:

1. Interpolate contour levels over the entire basin;
2. Calculate groundwater level change over the water year;
3. Multiply the change in groundwater level by aquifer storage coefficients to determine change in storage;
4. Aggregate change in storage for each aquifer zone; and
5. Add shallow and deep zone change in storage to arrive at change in storage for the entire basin.

In step 1, the contour levels from the 4th quarter of water year 2017 (already completed as part of last year's submission to DWR), and 2018 for both shallow and deep aquifer zones were separately interpolated onto regular grids covering the adjudicated area of the Seaside Groundwater Basin.

For the second step, gridded 2017 groundwater levels were subtracted from the gridded 2018 levels to calculate the change in groundwater elevations between water year 2017 and 2018.

In step 3, the change in groundwater level at each grid cell was multiplied by the storage coefficient from the groundwater model for that cell; with the specific yield from model layer 2 used for the shallow zone and specific storage from model layer 5 used for the deep zone. Specific yield is the storage coefficient used for unconfined aquifers such as the shallow zone and specific storage is the storage coefficient used for confined aquifers such as the deep zone. This yielded a volumetric storage change for each cell in the grid produced in the first step.

In step 4, all of these individual cell values were added together to produce separate volumetric change in storage values for the shallow zone and the deep zone. Finally, all the change in storage volumes for all cells in both the shallow and deep zones were added together to produce a total change in storage for the entire Seaside Groundwater Basin. The results of these calculations are shown in **Table 1**.

The method described above uses data that is already being prepared on an annual basis for the Watermaster. Due to the lack of data over a large portion of the Northern Inland subarea, there is some degree of uncertainty in this method.

Table 1: Estimated Annual Change in Groundwater Storage

Time Period	Change in Storage (AF)
Water Year 2015 10/1/14 – 9/30/15	-1,580
Water Year 2016 10/1/15 – 9/30/16	-510
Water Year 2017 10/1/16 – 9/30/17	+290
Water Year 2018 10/1/17 – 9/30/18	+110

SEASIDE BASIN WATER MASTER TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	March 13, 2019
AGENDA ITEM:	3.A
AGENDA TITLE:	Allocation of Water Rights After Decision-Required Pumping Ramp-Downs Have Been Completed
PREPARED BY:	Robert Jaques, Technical Program Manager

SUMMARY:

At its February 13, 2019 meeting the TAC approved the Draft Updated Basin Management Action Plan (Updated BMAP). One of the findings in the Updated BMAP is that the Natural Safe Yield (NSY) of the Basin is 2,370 AFY, which is lower than the Adjudication Decision's initially-established 3,000 AFY. The agenda transmittal for that item in the February 13 TAC agenda packet included the projected approximate impact on water rights for California American Water and the City of Seaside, if the NSY was reduced to 2,370 AFY.

Attached is a Memo titled "Seaside Groundwater Basin Natural Safe Yield Allocations to Producers." The Memo describes how the Adjudication Decision allocated water rights to each of the Producers (both Standard and Alternative Producers), and the water rights that each Producer would have after all of the Decision-required ramp-downs in pumping have been completed. The Memo also briefly describes the water rights impacts that would result from lowering the NSY of the Basin from 3,000 AFY to 2,370 AFY.

As discussed in the Memo, the approach used to make these calculations is based on the assumption that the Decision contemplated that all of the Basin's NSY comes from the Laguna Seca and the Coastal Subareas, and that none of it comes from the Northern Inland Subarea. Two options for arriving at the water rights for each Producer are presented in the Memo.

As noted in the Memo, there are some inconsistencies in the Decision which complicate the calculation of water rights after the ramp-downs are completed.

The TAC is invited to ask questions about the calculations described in the Memo, and to provide direction on which of the two Options described in it should be used to establish water rights after all of the ramp-downs have been completed.

Revisions will be made to the Memo, if necessary, to address input from the TAC. The Memo will then be used to discuss these issues with the Producers to solicit their input.

ATTACHMENTS:	Memo titled "Seaside Groundwater Basin Natural Safe Yield Allocations to Producers"
RECOMMENDED ACTION:	Provide input to the Technical Program Manager regarding the establishment of water rights to the Producers after all pumping ramp-downs have been completed

MEMORANDUM

TO: Interested Parties

FROM: Robert S. Jaques, Technical Program Manager, Seaside Basin Watermaster

DATE: March 6, 2019

SUBJECT: Seaside Groundwater Basin Natural Safe Yield Allocations to Producers

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As required by the Amended Seaside Groundwater Basin Adjudication Decision dated February 2007 (referred to herein simply as the "Decision"), ramp-downs in pumping are to be performed triennially until the initially authorized Operational Yield (OY) of 5,600 acre-feet per year is reduced to the initially established Natural Safe Yield (NSY) of 3,000 acre-feet per year.

The purpose of this Memorandum is to describe how the allocation of NSY water rights to each of the Producers that are parties to the Decision could be calculated once these ramp-downs to achieve NSY production levels have been completed. These NSY allocations will be the amounts that each Producer can pump on an ongoing basis and be in compliance with the Decision.

The Memorandum also provides information on the water rights impacts if the 3,000 AFY initial NSY were to be reduced to 2,370 AFY as recommended in the recently completed Updated Basin Management Action Plan (Updated BMAP).

The Decision used the NSY approach to establish the total quantity of water that Producers may ultimately pump from the Basin on an ongoing basis, and laid out how the NSY is to be allocated amongst the various Producers. Under the NSY approach used in the Decision, Alternative Producers have first rights to the NSY, and Standard Producers share in the amount of NSY remaining after the Alternative Producer allocations have been made. The 5,600 AFY Basinwide OY consisted of an OY of 4,611 AFY for the Coastal Subarea and an OY of 989 AFY for the Laguna Seca Subarea.

Section III.A.17 of the Decision states that for the Basin as a whole, the NSY is between 2,581 and 2,913 AFY, for the Coastal Subarea the NSY is between 1,973 and 2,305 AFY, and for the Laguna Seca Subarea the NSY is 608 AFY.

However, Section III.A.20 of the Decision states that the initially assumed Basinwide NSY is 3,000 AFY. In the range of values stated in the Decision for the Coastal Subarea (1,973 to 2,305 AFY) , if the upper value of 2,305 AFY is added to the 608 AFY for the Laguna Seca Subarea, the resultant NSY is only 2,913 AFY for these two Subareas. This is slightly less than the Basinwide NSY of 3,000 AFY cited in Section III.A.20. This suggests that the Decision may (1) simply have rounded up the 2,913 AFY figure to 3,000 AFY, recognizing that further study might arrive at an updated set of NSYs for each of these subareas, or (2) may have contemplated that a portion of the Basinwide NSY comes from the other of the Basin's four subareas, namely the Northern Inland Subarea. Persons who participated in the legal process that led to the Decision tend to believe that the 3,000 AFY figure was simply a rounding-up of the 2,913 AFY. Since there are no Producers with wells in the Northern

Inland Subarea, it would have been impossible to allocate any portion of the Northern Inland Subarea's NSY to any of the Producers.

The NSY for the Coastal Subarea is not broken down between the Southern Coastal Subarea and the Northern Coastal Subarea, which together constitute the Coastal Subarea. Therefore, it is not possible to allocate the Coastal Subarea NSY within these two subareas.

Table 2 on page 21 of the Decision sets forth the initial Alternative Producer allocations in the Coastal and Laguna Seca Subareas. These are shown below in Table 1.

In 2015 Alternative Producer Calabrese converted 8 AFY of its Alternative Production allocation to a Standard Production allocation, leaving it with 6 AFY of Alternative Production. As a result of this the Alternative Production allocations were revised to those shown below in Table 2.

Table 1 on page 19 of the Decision sets forth the initial Standard Producer percentages of OY in the Coastal and Laguna Seca Subareas as shown below in Table 3. Shown in the right-hand column of Table 3 are the percentages of the total Standard Producer allocation for each of these Standard Producers.

As a result of Producer Calabrese's 2015 partial conversion of its Alternative Production allocation to a Standard Production allocation, giving it 8 AFY of Standard Production, the Standard Production OY allocation percentages were revised to those shown below in Table 4.

The Decision requires only Standard Producers to ramp-down in order for pumping to be reduced to the NSY level, unless all Standard Producers are ramped-down to zero production, in which case ramp-downs are also required of Alternative Producers.

A lengthy discussion between Russ McGlothlin (Watermaster's legal counsel), Lori Girard (California American Water's legal counsel), Laura Paxton and me on March 6 led to the conclusion that there were two viable Options that could be used to allocate water rights after the ramp-downs have been completed, and be consistent with the intent of the Decision:

Option 1:
If one assumes that the Basinwide NSY was intended by the Decision to be 2,913 AFY and was to be allocated to just the Coastal and Laguna Seca Subareas, then the NSY allocated to the Coastal Subarea would be 2,305 AFY and the NSY allocated to the Laguna Seca Subarea would be 608 AFY. (Note that this is slightly lower than the 3,000 AFY of NSY cited in Section III.A.20 of the Decision.)

Section III.B.2 of the Decision states that the OYs for both subareas (the Coastal Subarea and the Laguna Seca Subarea) are to be reduced by ramp-downs until the OY in each subarea is equivalent to the NSY for that subarea.

Ramping down the OYs in the Coastal Subarea to reach the NSY of 2,305 AFY, with a total allocation to Alternative Producers in the Coastal Subarea of 735 AFY, would require the Standard Producers to ramp-down to 2,305 – 735 = 1,570 AFY. No ramp-down by Alternative Producers would be necessary.

Ramping down the OYs in the Laguna Seca Subarea would require a 100% ramp-down of the one Standard Producer's (California American Water) allocation, and partial ramp-downs for each of the Alternative Producers, to reach the NSY of 608 AFY.

Using Option 1 the allocations to all of the Producers would be as shown below in Table 5.

As a result of the ramp-downs that have already been implemented, current OY allocations Basinwide total 3,360 AFY. Achieving a Basinwide OY of 2,913 AFY would only require a partial ramp-down of 447 AFY in 2021.

Option 2:

The Updated BMAP found that the NSY for the Basin is lower than the values listed in the Decision. As a further step toward reaching OYs that will achieve a lower NSY value, a full 560 AFY ramp-down, rather than a partial ramp-down, could be taken in 2021. This would achieve a lower NSY of 2,800 AFY. If this were done, the NSY for the Coastal Subarea would be 2,192 AFY, the NSY for the Laguna Seca Subarea would remain at 608 AFY, and the Basinwide NSY would be 2,192 + 608 = 2,800 AFY. The allocations to all of the Producers would be as shown below in Table 6.

The Updated BMAP, which developed the 2,370 AFY NSY figure for the Basin as a whole, found that 2,570 AFY of this amount was in the Coastal and Inland Subareas, and that -200 AFY was in the Laguna Seca Subarea. Having a negative NSY for the Laguna Seca Subarea would mean that all pumping in that subarea would have to be eliminated. This would be untenable. The negative NSY of 200 AFY for that subarea will hopefully be mitigated in conjunction with the development of the Salinas Valley Basin's Groundwater Sustainability Plan (GSP) for the adjacent Monterey Subarea of the Salinas Valley Basin. That GSP must be completed by January 31, 2022. Once that GSP has been developed, it would be appropriate to determine what changes in Producer allocations should be made in the Laguna Seca subarea to achieve NSY.

At this time it would not be appropriate to reduce Producer allocations below the levels described above under either Option 1 or Option 2.

TABLES

Table 1. Initial Alternative Production Allocations

Coastal Subarea	
Producer	**Allocation, AFY**
Seaside Golf Courses	540
SNG	149
Calabrese	14
Mission Memorial	31
Sand City	9
Subtotal Coastal Subarea	**743**
Laguna Seca Subarea	
Producer	**Allocation, AFY**
Pasadera	251
Bishop	320
York School	32
Laguna Seca County Park	41
Subtotal Laguna Seca Subarea	**644**

Table 2. Revised Alternative Production Allocations

Coastal Subarea	
Producer	**Allocation, AFY**
Seaside Golf Courses	540
SNG	149
Calabrese	6
Mission Memorial	31
Sand City	9
Subtotal Coastal Subarea	**735**
Laguna Seca Subarea	
Producer	**Allocation, AFY**
Pasadera	251
Bishop	320
York School	32
Laguna Seca County Park	41
Subtotal Laguna Seca Subarea	**644**

Table 3. Initial Percentages of Operating Yield Allocated to Standard Producers

Coastal Subarea		
Producer	**Percentage of Total Subarea OY**	**Percentage of Subarea Standard Producer Allocation**
California American Water	77.55	90.6
City of Seaside (Municipal)	6.36	7.43
Granite Rock Company	0.6	0.7
D.B.O. Development No. 27	1.09	1.27
Subtotal Coastal Subarea	**85.60**	**100.00**
Laguna Seca Subarea		
Producer	**Percentage of Total Subarea OY**	**Percentage of Subarea Standard Producer Allocation**
California American Water	45.13	100
Subtotal Laguna Seca Subarea	**45.13**	**100.00**

Table 4. Revised Percentages of Operating Yield Allocated to Standard Producers

Coastal Subarea		
Producer	**Percentage of Total Subarea OY**	**Percentage of Subarea Standard Producer Allocation**
California American Water	77.55	90.44
City of Seaside (Municipal)	6.36	7.42
Granite Rock Company	0.6	0.7
D.B.O. Development No. 27	1.09	1.27
Calabrese	0.15	0.17
Subtotal Coastal Subarea	**85.75**	**100.00**
Laguna Seca Subarea		
Producer	**Percentage of Total Subarea OY**	**Percentage of Subarea Standard Producer Allocation**
California American Water	45.13	100
Subtotal Laguna Seca Subarea	**45.13**	**100**

Table 5. Total NSY Available to Each Producer After Ramp-downs Are Complete Using Option 1, if the NSY is 2,913 AFY

Producer	Percentage of Available OY Multiplied by Amount of NSY Available	NSY Available, AFY
Coastal Subarea		
Standard Producers		
California American Water	90.44 x 1,570	1420
City of Seaside (Municipal)	7.42 x 1,570	116
Granite Rock Company	0.7 x 1,570	11
D.B.O. Development No. 27	1.27 x 1,570	20
Calabrese	0.17 x 1,570	3
Alternative Producers		
Seaside Golf Courses		540
SNG		149
Calabrese		6
Mission Memorial		31
Sand City		9
	Coastal Subarea Total	**2305**
Laguna Seca Subarea		
Alternative Producers		
Pasadera	251/644 x 608	237
Bishop	320/644 x 608	302
York School	32/644 x 608	30
Laguna Seca County Park	41/644 x 608	39
	Laguna Seca Subarea Total	**608**
	Basinwide Total	**2913**

Table 6. Total NSY Available to Each Producer After Ramp-downs Are Complete Using Option 2, if the NSY is 2,800 AFY

Producer	Percentage of Available OY Multiplied by Amount of NSY Available	NSY Available, AFY
Coastal Subarea		
Standard Producers		
California American Water	90.44 x 1,457	1318
City of Seaside (Municipal)	7.42 x 1,457	108
Granite Rock Company	0.7 x 1,457	10
D.B.O. Development No. 27	1.27 x 1,457	19
Calabrese	0.17 x 1,457	2
Alternative Producers		
Seaside Golf Courses		540
SNG		149
Calabrese		6
Mission Memorial		31
Sand City		9
	Coastal Subarea Total	**2192**
Laguna Seca Subarea		
Alternative Producers		
Pasadera	251/644 x 608	237
Bishop	320/644 x 608	302
York School	32/644 x 608	30
Laguna Seca County Park	41/644 x 608	39
	Laguna Seca Subarea Total	**608**
	Basinwide Total	**2800**

SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	March 13, 2019
AGENDA ITEM:	3.B
AGENDA TITLE:	Informational Presentation on the Sustainable Yield Approach for Basin Management
PREPARED BY:	Robert Jaques, Technical Program Manager

At the TAC's February 13, 2019 meeting there was consensus to continue discussion of the topic of using the Sustainable Yield (SY) approach in place of the Natural Safe Yield (NSY) approach for Basin management purposes.

To facilitate that discussion an informational presentation on the SY approach will be made by Georgina King of Montgomery & Associates. Ms. King's PowerPoint slides will be emailed out for use by those who cannot attend the TAC meeting in person, so they can follow along with the presentation.

ATTACHMENTS:	PowerPoint slides to be used in this presentation.
RECOMMENDED ACTION:	None required – information only

SEASIDE GROUNDWATER BASIN

SUSTAINABLE YIELD

MONTGOMERY & ASSOCIATES

Presented to the Seaside Basin Technical Advisory Committee

February 13, 2019

1

SAFE YIELD

- Assumes the "safe" amount to pump cannot be more than the rate of natural recharge
- This is referred to as the "Water-Budget Myth"
- It is an oversimplification of information needed to understand the effects of using a groundwater system
- As human activities change the system, the components of the water budget (inflows, outflows, and changes in storage) change and must be accounted for in any management decision

2

2

GROUNDWATER (1988 – 2017) BUDGET

3

NATURAL FLOW SYSTEM CHANGES

- We change the natural flow system by pumping water for use, changing recharge patterns by irrigation and urban development, changing the type of vegetation, and other activities

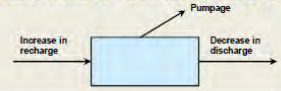
4

4

BALANCED SYSTEM

- Pumping starts and the groundwater system readjusts
- Initial response to pumping is change in storage
- If system comes to equilibrium, changes in storage stop and inflows will again balance outflows:

Pumpage = Increased recharge + Decreased discharge



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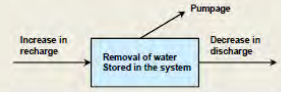
5

UNBALANCED SYSTEM

- If system does not comes to equilibrium, changes in storage continue (i.e. falling groundwater levels):

Pumpage = Increased recharge + Decreased discharge + Decreased storage



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6

SUSTAINABLE YIELD

- How much ground water available for use depends upon how changes in inflow and outflow affect the surrounding environment and what the users define as undesirable effects on the environment or groundwater system
  - Changes to inflows and outflows are very complex
  - Not possible to use the water budget to determine how much groundwater is available for use
  - Groundwater model is the best tool to use because it allows for spatial effects

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SUBSURFACE FLOWS BETWEEN SUBAREAS, OCEAN & OTHER BASINS

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8

LOCALIZED EFFECTS

- Localized effects of pumping need to be accounted for

Greater impact on local groundwater levels

Lesser impact on local groundwater levels

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9

MODELING APPROACH FOR DETERMINING SUSTAINABLE YIELD

Task 1: Develop Operational Parameters & Management Targets

- Operational parameters include how each well is expected to be pumped in the future
- Management targets are groundwater levels that the basin should be managed to. Examples are:
  - Meet protective groundwater elevations at the coast
  - To stop declining groundwater levels
  - Recover groundwater levels in the basin to a certain level

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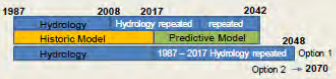
10

MODELING APPROACH FOR DETERMINING SUSTAINABLE YIELD

Task 2: Extend Predictive Model Climate

- Extend Historical Hydrology Baseline Scenario



- Convert Historical Climate Baseline Scenario Model to Future Climate Condition Model (Optional)

Task 3: Incorporate Sea Level Rise at Ocean Boundaries (Optional)

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11

MODELING APPROACH FOR DETERMINING SUSTAINABLE YIELD

Task 4: Incorporate All Existing & Approved/Planned Supplemental Supply Projects into Baseline Model

Task 5: Optimization Scenario Simulations

- Use Sustainable Optimization Model to optimize pumping to achieve management targets
- Prepare Scenario Inputs - Need TAC input Two yield numbers will result
  - Interim Yield needed to achieve management targets (lower than Sustainable Yield)
  - A Sustainable Yield that maintains targets (this will be a higher yield than the Interim Yield

Task 6: Prepare Technical Memo

Task 7: Attend TAC and Board Meetings

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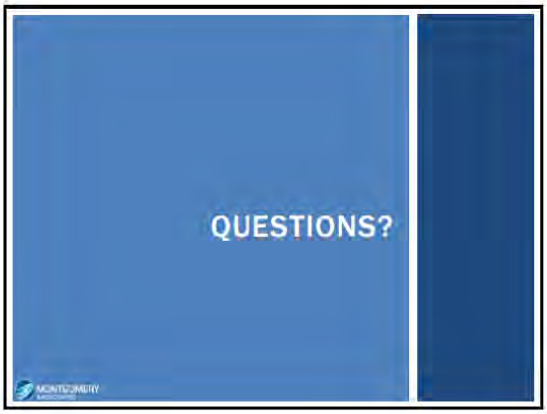
12



13

SEASIDE BASIN WATER MASTER TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	March 13, 2019
AGENDA ITEM:	3.C
AGENDA TITLE:	Pros and Cons of Using the Sustainable Yield Approach in Place of the Natural Safe Yield (NSY) Approach for Basin Management
PREPARED BY:	Robert Jaques, Technical Program Manager

At the TAC's February 13, 2019 meeting there was consensus to continue discussion of the topic of using the Sustainable Yield (SY) approach in place of the Natural Safe Yield (NSY) approach for Basin management purposes.

Attachment 1 contains the Proposal received from Montgomery & Associates to perform an SY analysis. As briefly discussed at the February 13 TAC meeting, performing the analysis will be a complex and costly undertaking, and will require considerable interaction with the TAC to develop basin-wide operational parameters and management targets. The underlying assumptions of the predictive portion of the Seaside Basin groundwater model will need to be updated for the model to be comparable to groundwater models being used in the larger Salinas Valley and to incorporate assumptions that reflect current science and Basin understanding.

Undertaking this work was not included in the 2019 M&MP Operations Budget, so funding would need to be approved by the Board, presumably in the 2020 M&MP Budget.

Attachment 2 contains a summary of pertinent information gained from previous groundwater modeling work. From this modeling work it seems apparent that the Basin cannot sustain pumping at any level without the injection of a new source of water to raise groundwater levels to protective elevations.

Attachment 3 contains a discussion of potential Pros and Cons of developing and using the SY approach.

The TAC is asked to discuss these topics, propose additional items for inclusion in the listing of Pros and Cons, and provide direction to the Technical Program Manager on how best to provide this information to the Board for their consideration.

ATTACHMENTS:	1. Proposal from Montgomery & Associates to Perform a Sustainable Yield Analysis of the Seaside Basin 2. Summary of pertinent information from previous groundwater modeling work 3. Discussion of potential Pros and Cons of staying with the NSY approach vs. developing and using the SY approach
RECOMMENDED ACTION:	Provide direction to the Technical Program Manager on proceeding with further discussion and/or action on these issues

Attachment 1

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Water Resource Consultants

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February 1, 2019

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

SUBJECT: COST PROPOSAL FOR SEASIDE BASIN SUSTAINABLE YIELD ANALYSIS

Dear Mr. Jaques:

Montgomery & Associates (M&A) appreciates the opportunity to present this scope of work and cost for estimating the Sustainable Yield of the Seaside Basin (Basin).

As described in the recent BMAP Update, the simplified method used to estimate Natural Safe Yield is now recognized as not being complete enough to take into account the complexities of inflows and outflows that are occurring in the Basin, and which ultimately affect the amount of groundwater that can be sustainably pumped from the Basin without causing negative effects. A more complete approach to managing the Basin is to use the Seaside Basin Watermaster model (model) to optimize the amount of pumping that can be sustained (Natural Sustainable Yield) at existing and/or new wells. This Natural Sustainable Yield acknowledges management targets such as stopping declining groundwater levels or meeting protective groundwater elevations. The model is the appropriate tool for integrating the effects of various pumping rates with operating or planned projects in the Basin. It is important that the Technical Advisory Committee (TAC) provide input for determining all the operational parameters and management targets to include in the analysis of Sustainable Yield.

This scope of work outlines tasks to estimate the Natural Sustainable Yield. Tasks include developing management targets and updating the predictive portion of the model. Additional tasks include simulating and optimizing a combination of management actions and supplemental water supply projects to estimate the Natural Sustainable Yield.

The tasks described below may be more than the TAC would like to include in the modeling for the Natural Sustainable Yield analysis, and therefore some tasks are identified as optional tasks in the task heading.

TASK 1. DEVELOP OPERATIONAL PARAMETERS & MANAGEMENT TARGETS

M&A will support the TAC in developing basin-wide operational parameters and management targets to be used in the Natural Sustainable Yield optimization modeling runs. Examples of potential management targets would include managing the Basin's groundwater levels to meet the protective groundwater elevations at the coast, or setting a groundwater elevation target at Laguna Seca wells to halt declining groundwater levels at a level acceptable to the groundwater users.

We anticipate attending and participating in up two TAC meetings in person for this task. The costs for TAC meetings are included in Task 7.

TASK 2. EXTEND PREDICTIVE MODEL CLIMATE

The analysis of Natural Sustainable Yield relies entirely on the predictive portion of the model. There are a number of aspects and underlying assumptions of the predictive model that need to be updated for the model to be comparable to groundwater models being used in the larger Salinas Valley. These updates were not part of the recent model update as that effort was purely to update and calibrate the historical Model.

When the model was developed in 2009, the TAC provided substantial input on assumptions related to how long the predictive period was to be, what future climate to use, and what future pumping to include over the predictive period. We acknowledge that some of these are impossible to forecast exactly, but it is important to use assumptions that reflect current science and Basin understanding and therefore some updates are necessary.

TASK 2.1. EXTEND HISTORICAL HYDROLOGY BASELINE SCENARIO

Since 2009, all predictive simulations using the model have been based on repeating the historical hydrology from the 22-year model calibration period of 1987 – 2008. The current predictive simulation runs from 2009 through 2042. While maintaining this approach allows for direct comparison between new simulations and previous simulations, it does not take advantage of the additional nine years of hydrologic and climatic data that have been incorporated into the historical model. The historical model was updated in 2014 and 2018, and now includes a continuous 31 year hydrologic record from 1987 through 2017. Significantly, this 31-year hydrologic record includes the recent 2012-2015 drought. We propose that this full 31-year historical hydrology and climate dataset be used as basis for all predictive modeling, as this incorporates a broader range of potential climate variability.

There are two options for extending the hydrology for the historical predictive baseline:

1. Simply repeat the 31-year hydrology from 1987 – 2017, so that the baseline scenario is extended out 31-years from 2018 to 2048.

2. Extend the predictive model, based on repeating the new extended historical climate record out to 2070, which is more consistent with the long-term planning horizon that will be used in neighboring basins under SGMA compliance.

From the perspective of the Natural Sustainable Yield analysis, there is a strong benefit to having a longer extended predictive simulation period (e.g. out to 2070 instead of 2048). As will be further discussed below in Task 5, the analysis consists of first identifying a shorter-term Basin yield which allows groundwater levels to reach their management targets within a defined time-frame, and then estimating an increased longer-term Natural Sustainable Yield that keeps levels at these targets into the future. Having a longer extended simulation period allows for more flexibility on selecting a reasonable time-frame over which management targets can be met without having to ramp production down too quickly, and it also provides a longer period over which to evaluate the longer-term Natural Sustainable Yield, taking into account historical variability in hydrology and climate.

The updated and extended baseline model will be run and processed to produce a baseline water budget and hydrographs to be used for comparison against subsequent simulations.

TASK 2.2. CONVERT HISTORICAL CLIMATE BASELINE SCENARIO MODEL TO FUTURE CLIMATE CONDITION MODEL (OPTIONAL)

Previous predictive model simulations for the basin have not taken the effects of likely climate change into account: including projected changes in precipitation, temperature, and evapotranspiration. These are projected future conditions that would impact the magnitude and timing of both natural groundwater recharge and surface water deliveries to the Basin. If the TAC feels that management of the Basin should take into account climate change, we propose modifying the baseline predictive simulation model with projected future climate conditions.

For this task we will leverage new California-specific climate change datasets, data preparation tools, and guidance that have been developed by DWR in support of SGMA Groundwater Sustainability Plan development (DWR, 2018). DWR provides basin-specific climate change factors that allow historical hydrology and climatological data to be converted into datasets representative of projected near-future climate conditions in 2030, and late-future climate conditions in 2070. Depending on the degree of climate change uncertainty to be considered, datasets can be chosen that represent three different climate scenarios including Central Tendency, Drier with Extreme Warming, and Wetter with Moderate Warming. A single climate change scenario will be selected in consultation with the TAC, and the DWR climate change factors will be applied to inputs of the historical climate model to represent future climate conditions and hydrology.

TASK 3. INCORPORATE SEA LEVEL RISE AT OCEAN BOUNDARIES (OPTIONAL)

In this task we will incorporate estimates of projected sea level rise over the next century into the predictive model simulation by adjusting the head boundary conditions specified along the ocean boundary. Generally speaking, sea level rise is expected to increase seawater intrusion and/or the risk of sea water intrusion in coastal aquifers, though the magnitude of the effects due to sea level rise alone are highly dependent on local conditions. The sea level rise estimates will be based on the projected levels for Monterey Bay from the 2018 update of the State of California Sea-Level Rise Guidance document recently released by the California Ocean Protection Council (OPC, 2018). It should be noted that adjustments to the sea level elevations will also entail simple equivalent adjustments to the protective head elevations as they are tied to sea level.

TASK 4. INCORPORATE ALL EXISTING AND APPROVED/PLANNED SUPPLEMENTAL SUPPLY PROJECTS INTO BASELINE MODEL

We will update the predictive model to include various supplemental supply projects likely to be, or are in the process of being, constructed, as described in the 2019 BMAP Update. TAC involvement will be crucial to developing a predictive model that incorporates all of the projects envisioned over the predictive period, such as the Monterey Peninsula Water Supply Project (MPWSP), the Regional Urban Water Augmentation Project (RUWAP), Carmel River water ASR, and potentially other projects such as stormwater recharge projects. M&A will work with the TAC to finalize a list of projects and their planned implementation schedule. For costing purposes we have assumed incorporating up to three new projects not previously modeled and extending previously modeled projects.

The Pure Water Monterey project and existing phases of the Carmel River water ASR have already been modeled through 2041 but operational assumptions will need to be extended through the end of the predictive model period if it is extended, and other operational changes may be incorporated, such as increasing recharge if additional water sources such as RUWAP are included. We assume we will receive technical support from MPWMD who will provide recharge volumes based on climate, similar to what they have provided us before.

TASK 5. OPTIMIZATION SCENARIO SIMULATIONS

TASK 5.1. PREPARE SCENARIO INPUTS AND SETUP SUSTAINABLE OPTIMIZATION MODEL

M&A will work with the TAC to identify production wells that will be used in optimization. This may include only the Standard Producers, or a combination of Standard and Alternate Producers. There are other potential management actions such as installing new wells in either the Southern Coastal Subarea or the Northern Inland Subarea, or shifting a portion of production to these new wells, but this will likely require development of a separate scenario and therefore additional budget. Costs for development of additional scenarios are provided as an optional line item in the budget.

Given the management targets from Task 1 and wells identified for use in optimization, the USGS MODFLOW Groundwater Management Optimization process (GWM) will be configured to optimize average production rates at a predetermined set of wells such that the defined management targets at specific locations (e.g. groundwater levels) are met within a specified time frame and then maintained at those levels in the future. There will be two different Basin yields estimated. The first will be the yield that allows the Basin to achieve its management targets, and the second will be the Natural Sustainable Yield. Reaching management targets will require pumping less than the Natural Sustainable Yield until targets are achieved, thereafter, the Basin yield can be increased to the Natural Safe Yield that keeps groundwater levels at Basin management targets.

For costing purposes, we assume that a single set of management targets to be met within a single defined time frame will be used for the scenario, and that if multiple scenarios are developed, they will be based on the same baseline climate model (e.g. either Historical Climate or Climate Change Baseline).

TASK 5.2. RUN AND PROCESS OPTIMIZATION SCENARIO

In this task we will run the optimization model and process the model results, and document the scenario and the results with hydrographs and maps, along with a brief text summary.

TASK 6. PREPARE TECHNICAL MEMORANDUM

We will prepare a technical memorandum which documents Task 1 through 5, with a synthesis of the model optimization results and water budgets and Natural Sustainable Yield analysis for the Basin based on the identified management targets. 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 MSWord and PDF formats.

TASK 7. ATTEND TAC AND BOARD MEETINGS

In support of Tasks 1 – 5, to get input and direction from the TAC, and to report on progress and findings, we will prepare presentations and attend those monthly TAC meetings at which this work will be discussed. For costing purposes we assume preparing for and attending up to five TAC meetings. One in-person Board meeting is also included to present the findings of the analysis. Should the number of meetings be more than those assumed above, additional budget will be required to prepare for and attend those meetings.

MODELING CONTINGENCY

Modeling the long-term optimization of integrated groundwater management at a basin-wide scale is a complex process with several technical challenges that can arise and can lead to additional effort not originally scoped out. For this reason we have allocated a contingency budget corresponding to 40 additional hours of modeling effort (11% of the lead modeling effort for Tasks 2- 5) to address unexpected model integration or optimization issues that may arise during the modeling components of the project. This contingency task budget will not be used without prior consultation and approval from the client.

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PROJECT BUDGET AND SCHEDULE

We anticipate that this work can be completed within an eight 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 estimate costs for these tasks is $133,035 as detailed in the attached cost table. As mentioned previously, there are a few optional tasks that we have included which may need to be discussed at the Technical Advisory Committee level.

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

Sincerely,

Derrik Williams

Derrik Williams, Principal Hydrogeologist
E.L. MONTGOMERY & ASSOCIATES

Georgina King, Senior Hydrogeologist
E.L. MONTGOMERY & ASSOCIATES

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Cost Estimate for Seaside Basin Watermaster Sustainable Yield Modeling Analysis									
		Montgomery & Associates Labor						Other Direct Costs	TOTALS
		Scientist VIII	Scientist VI	Scientist V	Scientist III	Labor Total			
		D. Williams	G. King	P. Benito	N. Byler				
Task	Hourly Rates	$225	$200	$185	$145	Hours	($)	($)	
1.0	**Develop Operational Parameters & Management Targets**								
	Support TAC in developing Operational Parameters & Management Targets	8	32	36	0	76	$14,860	$0	$14,860
	Task 1 Subtotal	*8*	*32*	*36*	*0*	*76*	*$14,860*	*$0*	*$14,860*
2.0	**Extend Predictive Model Climate**								
2.1	Option 1: Extend Historical Hydrology Baseline Scenario to 2048	0	2	24	0	26	$4,840	$0	$4,840
	Option 2: Extend Historical Hydrologic Baseline Scenario to 2070	0	2	32	0	34	$6,320	$0	$6,320
	Run and Process Model Results	0	0	12	0	12	$2,220	$0	$2,220
	Document Results and Water Budget	1	1	12	4	18	$3,225	$0	$3,225
2.2	Convert Historical Climate Baseline Model to Future Climate Condition Model (Optional)	2	4	60	0	66	$12,350	$0	$12,350
	Run and Process Model Results	0	0	12	0	12	$2,220	$0	$2,220
	Document Results and Water Budget	1	1	12	4	18	$3,225	$0	$3,225
	Task 2 Subtotal (with Option 2 for Task 2.1)	*4*	*8*	*140*	*8*	*160*	*$29,560*	*$0*	*$29,560*
3.0	**Incorporate Sea Level Rise at Ocean Boundaries (Optional)**								
	Adjust General Head Boundaries to account for predicted sea level rise rate over model period	2	4	16	0	22	$4,210	$0	$4,210
	Optional Task 3 Subtotal	*2*	*4*	*16*	*0*	*22*	*$4,210*	*$0*	*$4,210*
4.0	**Incorporate All Existing and Approved/Planned Supplemental Supply Projects Into Baseline Predictive Model**								
	Set up modified input files including projects	2	4	32	4	42	$7,750	$0	$7,750
	Run and Process Model Results	0	0	12	0	12	$2,220	$0	$2,220
	Document Results and Water Budget	1	1	12	4	18	$3,225	$0	$3,225
	Task 4 Subtotal	*3*	*5*	*56*	*8*	*72*	*$13,195*	*$0*	*$13,195*
5.0	**Optimization Scenario Simulations**								
5.1	Prepare Scenario Inputs and Setup Sustainable Optimization Model	2	8	40	0	50	$9,450	$0	$9,450
5.2	Run and Process Optimization Scenario								
	Run and Process Model Results	0	1	12	0	13	$2,420	$0	$2,420
	Document Results and Water Budget	2	2	12	4	20	$3,650	$0	$3,650
	Task 5 Subtotal	*4*	*11*	*64*	*4*	*83*	*$15,520*	*$0*	*$15,520*
6.0	**Prepare Technical Memorandum**								
	Synthesize Simulation Results and Develop Sustainable Yield	8	30	40	32	110	$19,840	$0	$19,840
	Task 6 Subtotal	*8*	*30*	*40*	*32*	*110*	*$19,840*	*$0*	*$19,840*

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		Montgomery & Associates Labor						Other Direct Costs	TOTALS
		Scientist VIII	Scientist VI	Scientist V	Scientist III	Labor Total			
		D. Williams	G. King	P. Benito	N. Byler				
Task	Hourly Rates	$225	$200	$185	$145	Hours	($)	($)	
7.0	**TAC and Board Meetings**								
	Prepare for and attend up to five onsite TAC meetings and one Board meeting	16	80	16	0	112	$22,560	$1,050	$23,610
	Task 7 Subtotal	*16*	*80*	*16*	*0*	*112*	*$22,560*	*$1,050*	*$23,610*
	Modeling Contingency (11%)								
	Contingency for Modeling Tasks 2-5	0	0	40	0	40	$7,400	$0	$7,400
	Task 9 Subtotal	*0*	*0*	*0*	*0*	*40*	*$7,400*	*$0*	*$7,400*
	Total (with Option 2 for Task 2.1)	**45**	**172**	**392**	**52**	**701**	**$131,985**	**$1,050**	**$133,035**
	Total without Optional Task 2.2. and 3	**40**	**163**	**292**	**48**	**583**	**$109,980**	**$1,050**	**$111,030**

Additional Optimization Scenarios								
Prepare for and Setup Optimization Model	2	8	32	0	42	$7,970	$0	$7,970
Run and Process Optimization Scenario								
Run and Process Model Results	0	1	12	0	13	$2,420	$0	$2,420
Document Results and Water Budget	2	2	12	4	20	$3,650	$0	$3,650
Additional Optimization Scenario Total	*4*	*11*	*56*	*4*	*75*	*$14,040*	*$0*	*$14,040*

Attachment 2

Summary of Pertinent Information from Previous Groundwater Modeling Work

The information provided below comes from modeling reports prepared for the Watermaster by HydroMetrics.

Report Title: *Seaside Groundwater Basin Modeling and Protective Groundwater Elevations*
Report Date: November 2009
Pertinent Findings/Conclusions:

1. The Decision-required triennial pumping reductions will result in a slow increase in most groundwater elevations. They will decrease, but not eliminate, inflow from the ocean into the Basin.
2. The "Physical Solution" required in the Decision, consisting of triennial pumping reductions until pumping has been reduced to a Natural Safe Yield of 3,000 AFY, by itself will not achieve protective groundwater level elevations.
3. Significant injection of water that is left in storage and not taken out through pumping is the most successful means of raising groundwater elevations to protective water level elevations.
4. It will take a long time for the Santa Margarita aquifer to achieve protective water levels without artificial recharge. This is because the Santa Margarita aquifer is highly confined and does not receive significant deep percolation recharge near the coastline.
5. The amount of water in storage is highly dependent on rainfall. Artificial recharge will increase the amount of groundwater in storage.
6. New wells in the Paso Robles aquifer will be required in order to recover much of the stored groundwater.
7. Moving California American Water's major production wells inland has little benefit and is therefore a not a good option to pursue.
8. The quantity of groundwater flowing into and out of the Seaside Basin, from or to the Salinas Valley Basin, is highly dependent on groundwater elevations in the Salinas Valley Basin.

Report Title: *Groundwater Modeling Results of Temporary Suspension of Triennial Pumping Reductions*
Report Date: September 2012
Pertinent Findings/Conclusions:

1. Skipping one triennial pumping reduction for a three-year period from 2011 to 2014 would have a negligible effect on the rate of advance of seawater intrusion (less than 0.001 feet per day of change).
2. Groundwater levels would reach the same levels by 2031 as they would if the pumping reduction had not been skipped.

Report Title: *Groundwater Modeling Results of Replenishment Repayment in the Seaside Basin*
Report Date: April 2013
Pertinent Findings/Conclusions:

1. The protective water level elevations developed in 2009 remain reasonable targets for groundwater management and should not be lowered.
2. California American Water's 25-year, 700 AFY, replenishment payback plan raises shallow aquifer groundwater levels by about 1 to 1.5 feet, and deep aquifer groundwater levels by about 3 feet, but does not achieve protective water level elevations in any of the six protective water

level wells, except PCA-West-Shallow, which is already above its protective water level elevation.
3. Stopping all Standard and Alternative Production pumping beginning in 2017 (which would reduce Basinwide pumping by approximately 2,000 AFY) would finally achieve protective water level elevations in all six of the protective water level wells by 2041 (the assumed end of the 25 year payback used for this scenario.)
4. Assuming the 25-year, 700 AFY, repayment plan began in 2017, and 1,000 AFY of water was injected at the four ASR wells near General Jim Moore Boulevard and left stored in the Basin and not pumped back out, protective water levels would be achieved in all six of the protective water level wells by 2041.

Report Title: *Groundwater Modeling Results of Coastal Injection in the Seaside Basin*
Report Date: July 2013
Pertinent Findings/Conclusions:

1. All of the findings and conclusions listed below are based on the assumption that Cal Am's replenishment repayment program of forgoing 700 AFY of pumping for a period of 25 years is being carried out.
2. Coastal groundwater levels in the Santa Margarita aquifer reach protective groundwater level elevations one to ten years faster, and with less injected water, if injection is performed near the coast rather than inland at the General Jim Moore Boulevard ASR well locations.
3. Coastal groundwater levels in the Paso Robles aquifer reach protective water level elevations at similar times with injection at either the coastal or General Jim Moore Boulevard locations.
4. In order to achieve protective water level elevations in all six of the coastal wells for which protective water levels were developed, over a 25-year injection period only 850 AFY of injection is required using coastal injection wells compared to 1,000 AFY required at the General Jim Moore Boulevard ASR well locations.
5. Injection rates higher than those mentioned in item 3 above would shorten the time needed to achieve protective water level elevations.
6. After coastal protective water level elevations are achieved, injection of 850 AFY would need to be continued indefinitely at coastal injection wells in order to keep groundwater levels above protective water level elevations.

Report Title: *Results of Laguna Seca Safe Yield Analysis (Revised)*
Report Date: July 2014
Pertinent Findings/Conclusions:

1. The Laguna Seca Subarea Natural Safe Yield was estimated to be 240 AFY. The Decision used 608 AFY with no explanation of the basis for that value.
2. Stopping all California American Water Laguna Seca Subarea pumping stabilizes groundwater level elevations in the western portion of the subarea, but they continue to decline in the central and eastern portions of the subarea.
3. Stopping all Laguna Seca Subarea pumping (pumping by California American Water and all Alternative Producers) results in stable or rising groundwater levels in the western and central portions of the subarea, but groundwater level declines continue in the eastern portion of the subarea.
4. There is significantly more pumping just east of the Laguna Seca Subarea (within the Salinas Valley Basin and outside of the Seaside Basin boundary) than the total pumping that occurs within the Laguna Seca Subarea itself.
5. Groundwater levels in the eastern portion of the Laguna Seca Subarea are heavily influenced by pumping from outside of the Seaside Basin.

Report Title: *Groundwater Flow Divides Within and East of the Laguna Seca Subarea*
Report Date: January 2016
Pertinent Findings/Conclusions:

1. Under anticipated future pumping conditions, groundwater elevations in the Laguna Seca Subarea will continue to decline. The eastern portion of the Laguna Seca Subarea will suffer the greatest and most persistent declines.
2. Pumping by wells located to the east of the Laguna Seca Subarea, outside of the Seaside Basin boundary and in the Salinas Valley Basin, affect groundwater levels in the Laguna Seca Subarea by diverting groundwater which would otherwise flow into, and thus recharge, the Laguna Seca Subarea. This diversion results in lowering groundwater levels in the Laguna Seca Subarea.
3. Flow currently goes into the Laguna Seca Subarea from the southeast (from the adjacent portion of the Salinas Valley Basin outside of the Seaside Basin boundary), and flows through the Laguna Seca Subarea to the west into the Southern Coastal Subarea and to the northeast into the Northern Inland Subarea.
4. With reduced pumping in the Laguna Seca Subarea in the future, groundwater levels will rise within this subarea and the flow divide between this subarea and the adjacent Salinas Valley Basin will move west.
5. Because of this flow divide movement, reduced pumping in the Laguna Seca Subarea in the future will result in some flow leaving the Laguna Seca subarea and flowing into the Corral de Tierra subbasin of the Salinas Valley Basin.

Attachment 3

Discussion Paper of Potential Pros and Cons of Using the Sustainable Yield Approach in Place of Using Natural Safe Yield for Basin Management

Natural Safe Yield Approach

Discussion. The Adjudication Decision ("Decision") uses the Natural Safe Yield (NSY) approach to establish the total quantity of water that producers may pump from the Seaside Basin, and to allocate that quantity amongst the various producers. Under the NSY approach used in the Decision, Alternative Producers have first rights to the NSY, and Standard Producers share in the amount of NSY remaining after the Alternative Producer allocations have been made. The Decision established an initial Basin-wide NSY at 3,000 AFY, and allocated 1,387 AFY of this NSY to Alternative Producers. That left 3,000 – 1,387 = 1,613 AFY to be divided among the Standard Producers. Subsequent to the date of the Decision, one of the Alternative Producers converted part of its allocation to a Standard Producer allocation, which had the effect of increasing the 1,613 AFY figure to 1,621 AFY. If the lower NSY of 2,370 AFY reported in the Updated BMAP were to replace the Decision's initial NSY of 3,000 AFY, the Standard Producers would need to reduce their collective annual pumping to 2,370 – 1,379 = 991 AFY. This means the Standard Producers would have to reduce their pumping by an additional 630 AFY.

It would likely be very difficult if not impossible for some of the Standard Producers, particularly Cal Am and the Seaside Municipal system, to accomplish making these additional pumping reductions while still supplying the water demands of their customers.

Pros and Cons of Continuing to Use the NSY Approach for Basin Management.

PROS	CONS
1. This is the approach prescribed by the Decision, so no change from the current approach would be required.	1. There are some oversights in the numbers included in the Decision which slightly complicate the calculation of Producers' water rights after the pumping ramp-downs are all completed. However, this should be fairly easy to work through.
2. If the 3,000 AFY NSY figure in the Decision continues to be used, no action will be required.	2. The Watermaster's hydrogeologic consultants report that using the NSY approach in the Decision is no longer appropriate for estimating yield. The NSY figure in the Decision was developed in 2005 based on a simplified water balance equation that accounted for some, but not all, flows in the groundwater system. It has now become apparent that there are significant flows across the Basin's boundaries that were not accounted for in the 2005 analysis. Unless those flows are also accounted for, the relationship between pumping, intrusion and storage identified in 2005 will be incorrect.

PROS	CONS
3. If the lower NSY figure of 2,370 AFY is used, the recalculation of water rights to each Producer will be relatively straightforward by following the same calculation approach set forth in the Decision. As noted in Con No. 1, however, there are some oversights in the Decision which will need to be resolved.	3. The Watermaster's hydrogeologic consultants recommend that Basin management use a "sustainable" or "operational" yield approach that takes advantage of the Seaside Basin groundwater model. This would allow the maximum pumping rate to reflect all of the system boundaries as well as the locations of wells and the introduction of new sources of recharge (injection, stormwater percolation, etc.). They feel that making this change from using the NSY approach is essential to linking long-term Basin management to reality.
	4. Given the modeling done to date, and evidenced by continuing declining groundwater levels even in years where pumping has been close to 3,000 AFY, Material Damage is more likely to occur if the 3,000 AFY NSY continues to be used rather than using the lower NSY of 2,370 AFY.

Sustainable Yield Approach

Discussion. As described in the recent BMAP Update, the simplified method used in the Adjudication Decision to estimate Natural Safe Yield is now recognized as not being complete enough to take into account the complexities of inflows and outflows that are occurring in the Basin. These ultimately affect the amount of groundwater that can be sustainably pumped from the Basin without causing negative effects (Material Damage). A more complete approach to managing the Basin would be to use the Seaside Basin groundwater model to optimize the amount of pumping that can be sustained (the Sustainable Yield) at existing and/or new wells. The Sustainable Yield would take into account management targets such as stopping declining groundwater levels or meeting protective groundwater elevations.

The SY analysis would involve making numerous assumptions and evaluations. These could include such things as alternative pumping scenarios and redistribution of pumping locations and quantities. The SY for the entire Basin would be the sum of the production quantities that each well could produce and still prevent Material Damage from occurring.

Pros and Cons of Changing to Using the Sustainable Yield Approach for Basin Management.

PROS	CONS
1. This approach would more realistically reflect the characteristics of the Basin and more accurately predict how much pumping could be sustainably supported without causing Material Damage in the Basin.	1. Performing an SY analysis would be costly. The cost proposal from Montgomery & Associates to do this work is well over $100,000. The proposal notes that modeling the long-term optimization of integrated groundwater management at a basin-wide scale is a complex process with several technical challenges that could arise and could lead to additional effort (and cost) not anticipated in the cost proposal.
	2. Changing from the NSY approach to the SY approach would first have to be approved by the Court. Documentation justifying making this change would have to be prepared and submitted to the Court. This would involve considerable staff, consultant, and legal counsel time and effort.
	3. The SY analysis would then need to be prepared and submitted to the Court for its review and approval before it could be used to replace the NSY approach used in the Decision. If the Court approved the SY analysis, then the Decision would need to be amended to reflect this. All of this would involve considerable staff and legal counsel time and effort.
	4. If SY were used instead of NSY, a new method of allocating pumping rights to each producer would have to be developed. This could be a contentious and time-consuming undertaking.
	5. It is very likely that greater pumping reductions will be required of many of the Producers if the Sustainable Yield approach is used in place of the NSY approach. It may be difficult if not impossible for some Producers to make these additional pumping reductions while still supplying the water demands of their customers.

PROS	CONS
	6. Because of the historical overpumping from the Basin, regardless of the approach that is used for Basin management, be it NSY or SY, it is very likely that even the reduced NSY pumping levels recommended in the Updated Basin Management Action Plan will not achieve protective groundwater levels. The Basin would therefore still be at risk of seawater intrusion at some time in the future. An additional source(s) of water that can be injected into the Basin to raise groundwater levels, and to maintain them at protective water levels, will be necessary regardless of which approach is used for Basin management. Therefore, the expense and complexity of changing to the SY approach may not be justified.

SEASIDE GROUNDWATER BASIN

SUSTAINABLE YIELD

MONTGOMERY & ASSOCIATES

Presented to the Seaside Basin Technical Advisory Committee

February 13, 2019

SAFE YIELD

- Assumes the “safe” amount to pump cannot be more than the rate of natural recharge
- This is referred to as the “Water-Budget Myth”
- It is an oversimplification of information needed to understand the effects of using a groundwater system
- As human activities change the system, the components of the water budget (inflows, outflows, and changes in storage) change and must be accounted for in any management decision

GROUNDWATER (1988 – 2017) BUDGET

Recharge Source	Northern Coastal Subarea	Northern Inland Subarea	Southern Coastal Subarea	Laguna Seca Subarea	Total
	Acre-feet per Year				
Basin Inflows					
Percolation from streams	0	0	0	0	0
Deep Percolation					
Rainfall	510	1,670	130	900	3,210
Irrigation & System Losses	150	20	100	10	280
Injection wells	260	0	0	0	260
Groundwater inflow					
From adjacent subareas	2,900	1,520	520	360	5,300
From adjacent basins	130	400	50	770	1,350
From offshore area	490	0	10	0	500
Total inflows	4,440	3,610	810	2,040	10,900
Basin Outflows					
Wells	3,660	70	170	680	4,580
Groundwater outflow					
To adjacent subareas of the Basin	290	2,710	550	1,750	5,300
To adjacent basins	280	1,310	70	490	2,150
To offshore area	260	0	60	0	320
Total outflows	4,490	4,090	850	2,920	12,350
Storage Change					
Based on Inflows-Outflows	-50	-480	-40	-880	-1,450

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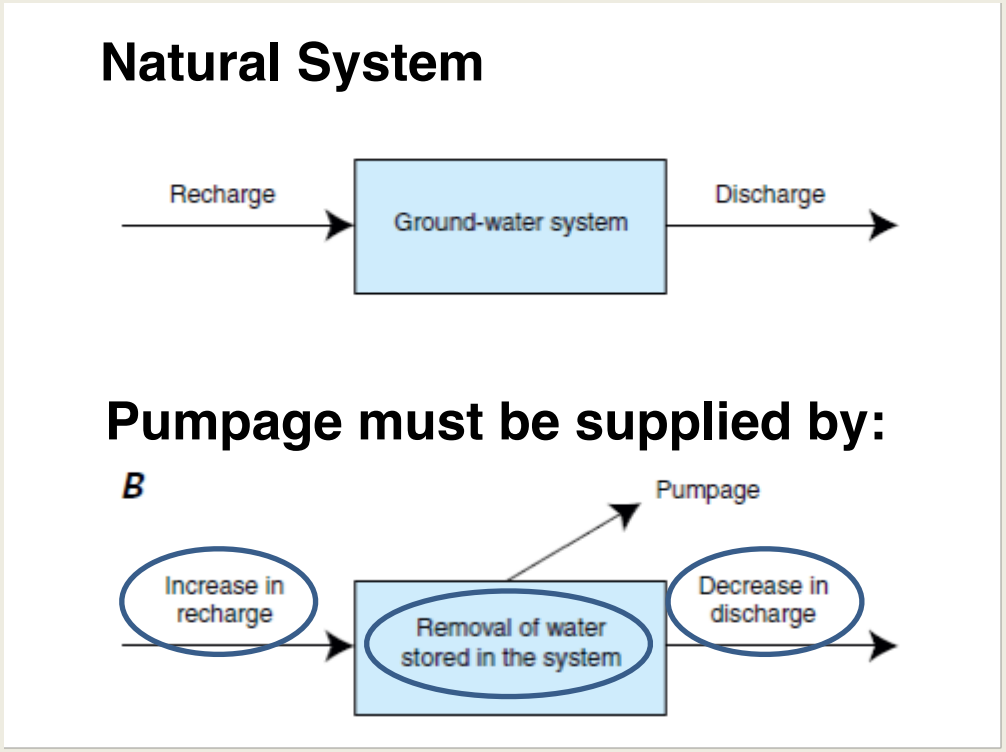
NATURAL FLOW SYSTEM CHANGES

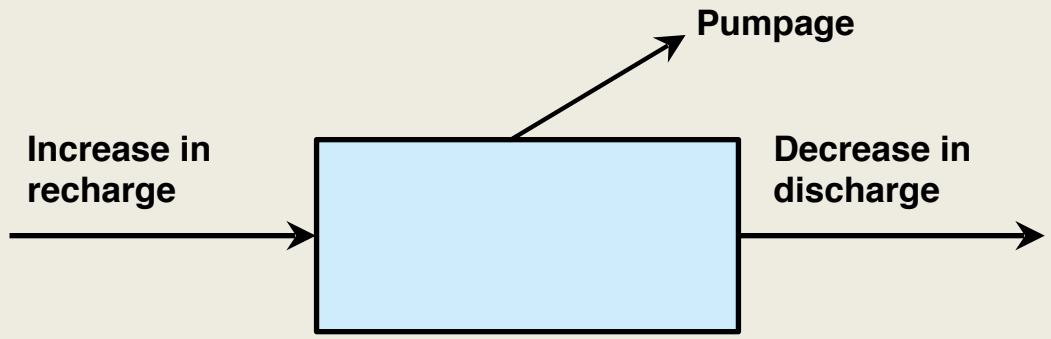
- We change the natural flow system by pumping water for use, changing recharge patterns by irrigation and urban development, changing the type of vegetation, and other activities



BALANCED SYSTEM

- Pumping starts and the groundwater system readjusts
- Initial response to pumping is change in storage
- If system comes to equilibrium, changes in storage stop and inflows will again balance outflows:

  Pumpage = Increased recharge + Decreased discharge



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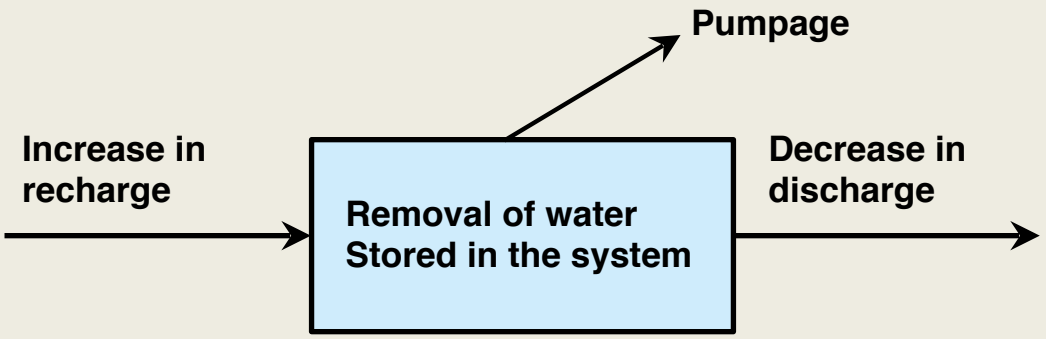
UNBALANCED SYSTEM

- If system does not comes to equilibrium, changes in storage continue (i.e. falling groundwater levels):

  Pumpage = Increased recharge + Decreased discharge + Decreased storage



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SUSTAINABLE YIELD

- How much ground water available for use depends upon how changes in inflow and outflow affect the surrounding environment and what the users define as undesirable effects on the environment or groundwater system

  - Changes to inflows and outflows are very complex
  - Not possible to use the water budget to determine how much groundwater is available for use
  - Groundwater model is the best tool to use because it allows for spatial effects

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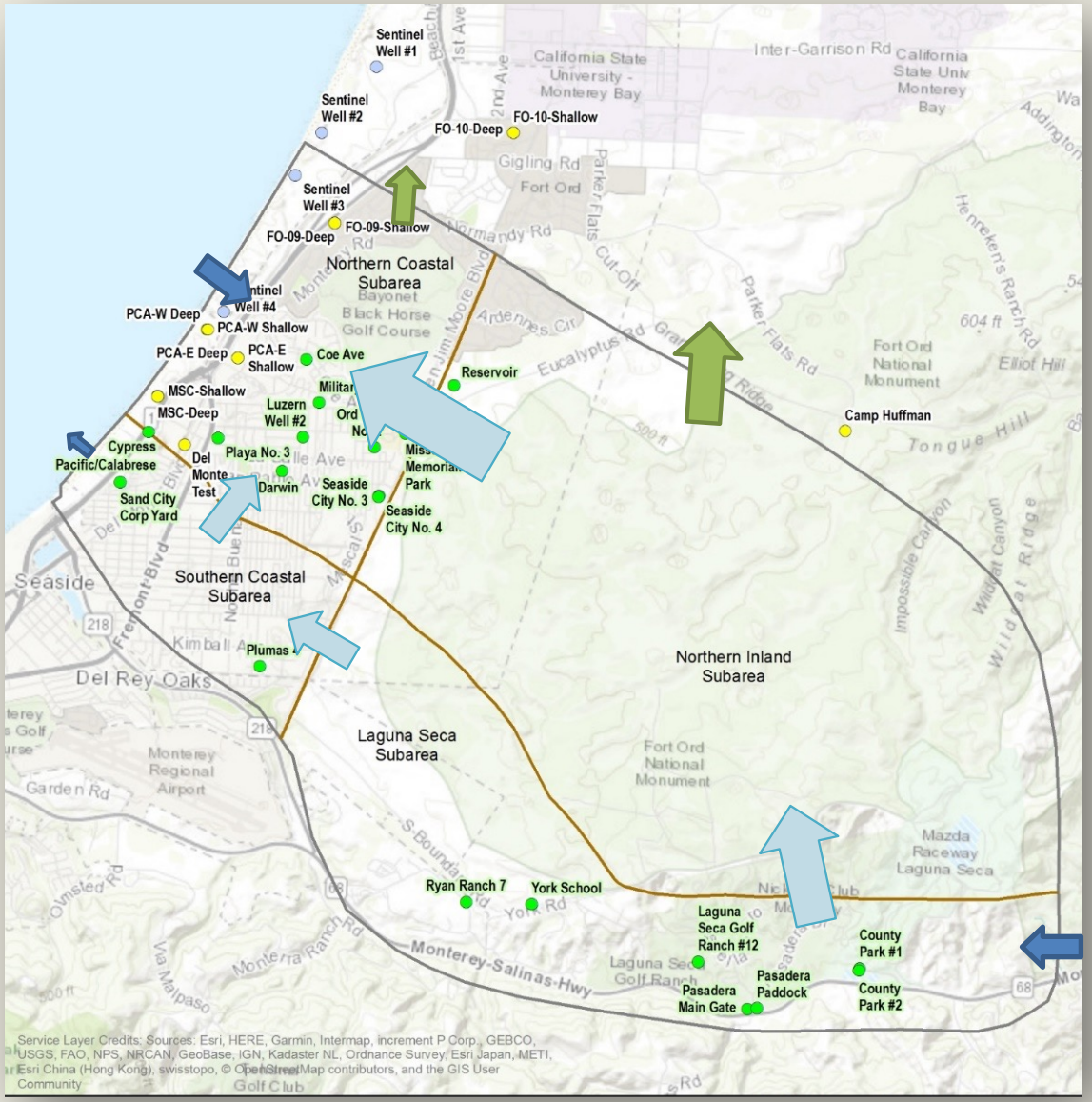
SUBSURFACE FLOWS BETWEEN SUBAREAS, OCEAN & OTHER BASINS



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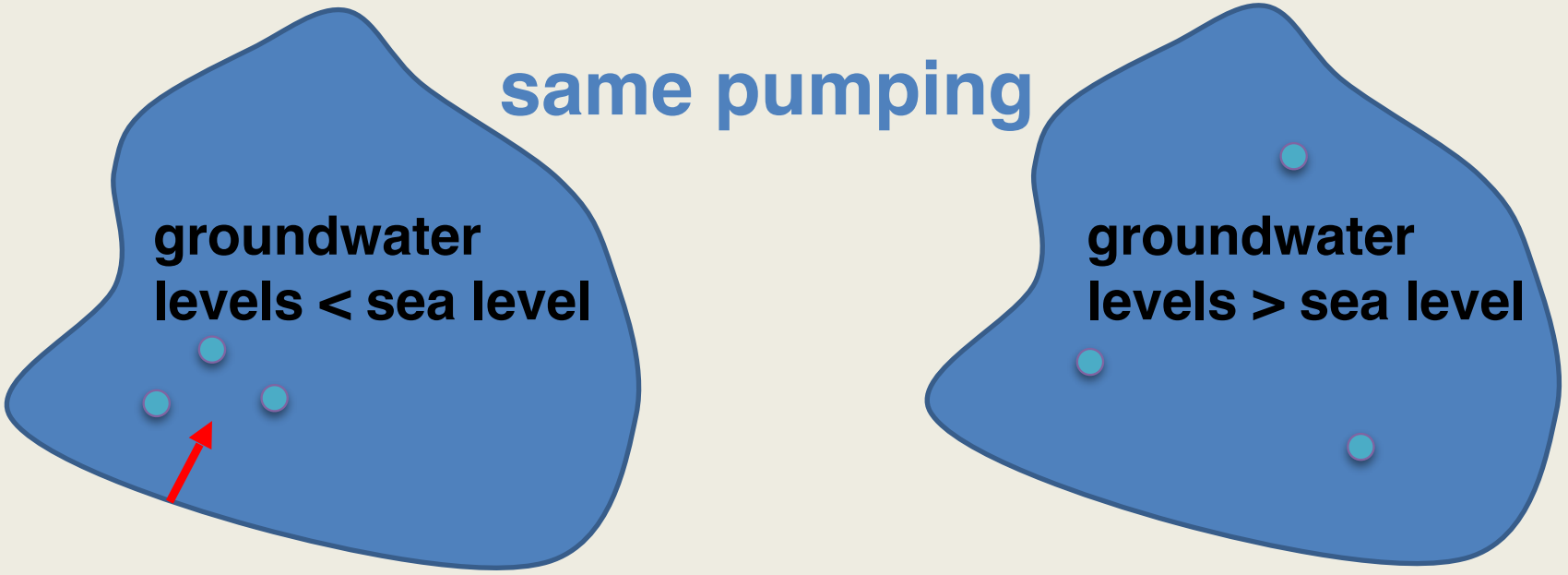
LOCALIZED EFFECTS

- Localized effects of pumping need to be accounted for

same pumping



Greater impact on local groundwater levels

Lesser impact on local groundwater levels

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MODELING APPROACH FOR DETERMINING SUSTAINABLE YIELD

Task 1: Develop Operational Parameters & Management Targets

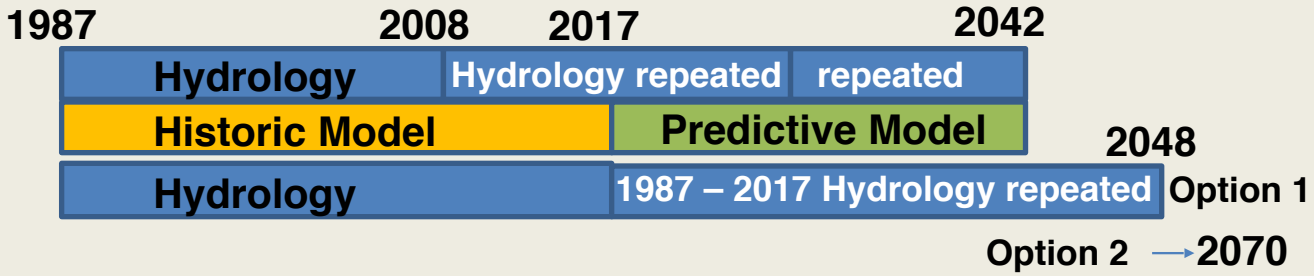
- Operational parameters include how each well is expected to be pumped in the future

- Management targets are groundwater levels that the basin should be managed to. Examples are:
  - Meet protective groundwater elevations at the coast
  - To stop declining groundwater levels
  - Recover groundwater levels in the basin to a certain level

MODELING APPROACH FOR DETERMINING SUSTAINABLE YIELD

Task 2: Extend Predictive Model Climate

- Extend Historical Hydrology Baseline Scenario



- Convert Historical Climate Baseline Scenario Model to Future Climate Condition Model (Optional)

Task 3: Incorporate Sea Level Rise at Ocean Boundaries (Optional)

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MODELING APPROACH FOR DETERMINING SUSTAINABLE YIELD

Task 4: Incorporate All Existing & Approved/Planned Supplemental Supply Projects into Baseline Model

Task 5: Optimization Scenario Simulations

- **Use Sustainable Optimization Model to optimize pumping to achieve management targets**
- **Prepare Scenario Inputs - Need TAC input Two yield numbers will result**
  - **Interim Yield needed to achieve management targets (lower than Sustainable Yield)**
  - **A Sustainable Yield that maintains targets (this will be a higher yield than the Interim Yield**

Task 6: Prepare Technical Memo

Task 7: Attend TAC and Board Meetings

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QUESTIONS?

MONTGOMERY
& ASSOCIATES

SEASIDE BASIN WATER MASTER TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	March 13, 2019
AGENDA ITEM:	4
AGENDA TITLE:	Proposed Drainage Improvements at the Del Monte Manor in Seaside
PREPARED BY:	Robert Jaques, Technical Program Manager

SUMMARY:

Note: This item is continued over from the February 13th TAC meeting in order for Scott Ottmar of the City of Seaside to respond to questions and concerns raised by TAC members at that meeting.

Background Information (from the February 13 TAC agenda packet): The City of Seaside is submitting a grant application to the local Integrated Regional Water Management Plan (IRWMP) to construct drainage improvements at the Del Monte Manor Park housing complex located at 1466 Yosemite Street in Seaside. The goal of the project is to increase the quantity of runoff retained and infiltrated within an open space drainage easement at the Del Monte Manor. Mr. Ottmar reports that the grant application requires the Seaside Groundwater Basin Watermaster TAC to review the project for conformance to the adjudication requirements. He asked that this review be conducted as soon as possible. Mr. Ottmar provided this link where one can download the preliminary design and drainage analysis for the project: https://fs.ci.seaside.ca.us:5001/sharing/gDf0ogTLV. He noted that this information is still subject to review and subject to minor alterations.

The 30% Design Review Report prepared for the City for this project, which was attached to the Agenda transmittal for this item at the February 13 TAC meeting along with some information about water quality impacts from stormwater infiltration, states that on average an estimated 2.9 AFY is currently being infiltrated into the ground from the existing onsite stormwater retention pond, and that on average the proposed modifications would increase this to approximately 14 AFY. At the February 13 TAC meeting some questions and concerns regarding water quality impacts and permit requirements were raised that the TAC wanted responded to by the project proponent. Mr. Ottmar has provided the attached information and will be present at today's meeting to respond to any further questions and concerns.

Due to the shallow depth of the proposed infiltration facilities they do not constitute a Class V Injection Well as defined in the attached EPA fact sheet, and therefore do not require a permit. Because of that, and the small volume of water that will be infiltrated, I believe that the proposed facilities will not have any adverse effect on water quality in the aquifers of the Seaside Basin. I did not find any language in the Adjudication Decision that addresses this type of project, and I am not aware of any language in the Adjudication Decision with which it would be in conflict. Therefore, I believe that the project is in conformance with the Adjudication Decision.

ATTACHMENTS:	Responsive information provided by Mr. Ottmar
RECOMMENDED ACTION:	Find that the proposed Del Monte Manor Park L.I.D. storm drainage improvements are in conformance with the Adjudication Decision

Responsive Information Provided by Mr. Ottmar

Mr. Ottmar provided the following information which is attached:

- Information and emails from the Regional Water Quality Control Board.
- FAQ sheets from CASQA and EPA regarding regulations and risk.

He also provided slides from a presentation made by A presentation from a study in LA that looked at possible contaminant migration.

In summary Mr. Ottmar reports that:

1. As long as the sub-surface infiltration feature is not deeper than it is wider and does not include distribution piping, it is not a dry well.
2. Surface bioswales or vegetated swales are not regulated
3. No permits are required to install the features proposed at Del Monte Manor.
4. Studies completed so far do not show contaminants migrating further than a few inches in the soil.

Excerpts from RWQCB Emails to Mr. Ottmar in Response to His Questions

First Email

Scott,

Sorry I did have a response and look like I forgot to send it. Here you go.

Your welcome Scott. True, no approvals are necessary through the water boards. I am not familiar with any DWR requirements related to drinking water, however, I know they only supply water, not require it be clean. The Division of Drinking Water (DDW) at State Board may have some ideas related to drinking water, but there is no regulatory oversight, until water gets pumped out and delivered. That means, the protection of drinking water sources goes to Regional Water Boards. Including groundwater. I will offer that our regional board is encouraging efforts to put stormwater into the ground and re-use stormwater etc.

I know this is not a dry-well, however there is some overlap. Drywells for stormwater are generally accepted to not pose a threat to groundwater, depending on potential level of pollutants in the watershed and the level of pre-treatment. The link here is to EPA's review of drywells and risk to groundwater. The attached is a fact sheet related to California dry well registrations. As biofilters are designed to capture pollutants within the soil media, they provide better filtration than drywells. The pollutants are captured within the media, and thought to have a long lifespan (20 yrs plus) before replacement is needed. If nitrogen species are your concern, I would suggest reduced organic matter in the media, as some researchers have been concerned with leaching nutrients from the media while the media stabilizes over the initial few storms.

https://www.epa.gov/uic/stormwater-drainage-wells

Hopefully this helps.

Lucas

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Lucas J. Sharkey, P.E. | Water Resource Control Engineer
Central Coast Water Board | 895 Aerovista Place, Suite 101 | San Luis Obispo, CA 93401
P: (805) 594-6144
P Think before you print

From: Scott Ottmar <SOttmar@ci.seaside.ca.us>
Sent: Wednesday, February 20, 2019 4:22 PM
To: Sharkey, Lucas@Waterboards <Lucas.Sharkey@waterboards.ca.gov>
Subject: RE: Urban runoff infiltration projects- State or Regional Board Approval?

Lucas
Realize you are busy. If you had a link to studies that evaluate migration (or lack thereof) of contaminants from bioswales to ground water, that would be appreciated. I will follow up with Jeff Condit regarding the approval of our Storm Water Resource Plan. Thank you.

Scott Ottmar, P.E.
Senior Civil Engineer
City of Seaside

Second Email

From: "Sharkey, Lucas@Waterboards" <Lucas.Sharkey@waterboards.ca.gov>
To: Scott Ottmar <SOttmar@ci.seaside.ca.us>
Date: 2/14/2019 1:47 PM
Subject: RE: Urban runoff infiltration projects- State or Regional Board Approval?

Thank you Scott,
Are you submitting this for IRWM funding? Or what? The scope is not fully clear to me from your attachments, however, I will say there are no approvals you need from the Regional Board as this is considered a grant project to construct something new. It looks like you stay under 1 acre, so no CGP permit required either. You are not altering within a waterbody so no 401/404 certification needed. It is not associated with new development, so seaside does not have to permit it as a post-construction project. Maybe they wanted to know your Stormwater Resource Plan was approved at State Board? I believe that is true, yes? State Board keeps the approved SWRPs listed on their website here: https://www.waterboards.ca.gov/water_issues/programs/grants_loans/swrp/
and I don't see Monterey cities listed. Contact this guy to verify they have approved it.
Daman Badyal, P.E.
Senior Water Resources Control Engineer
Storm Water Grant Program
Damanvir.Badyal@waterboards.ca.gov
(916) 319-9436

That said, I am glad to look through the proposed design for any potential issues, or improve the likelihood you will receive funding. I am curious how the existing condition differs from the proposed, as it looks like stormwater already routes through the park/detention basin. Maybe the intent is to increase infiltration? and allow fully dedicated use of the park, which may be unusable now during certain seasons? You will want the application to quantify the increase level of retention/water quality treatment.

As far as contaminant migration, any contaminates would enter the same way they do any other stormwater control measure. Soil media for biofilters retain the contaminates in upper layers (6-12 inches) which if found to be saturated (maybe 20 years?) with pollutants, can be removed and replaced. If there was a spill in the watershed, this would localize a spill, and actually lead to easier clean up. There are resources available which speak to likelihood of contaminates leaving stormwater treatments. EPA has one related to dry wells, I assume this would fall in the same level of potential contaminates and discharge to groundwater. In all actuality, the SCM will remove contaminates from the environment, and improve groundwater by putting more clean stormwater into the ground. If there is true concern of a pollutant, the system could be outfitted with pre-treatments (but I think your biofilter already performs that), before collection in the chambers.

I can talk more if you'd like,

Lucas

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Lucas J. Sharkey, P.E. | Water Resource Control Engineer
Central Coast Water Board | 895 Aerovista Place, Suite 101 | San Luis Obispo, CA 93401
P: (805) 594-6144
P Think before you print

From: Scott Ottmar <SOttmar@ci.seaside.ca.us>
Sent: Thursday, February 14, 2019 11:21 AM
To: Sharkey, Lucas@Waterboards <Lucas.Sharkey@waterboards.ca.gov>
Subject: Urban runoff infiltration projects- State or Regional Board Approval?

Lucas
The City of Seaside is moving forward with a project and grant application to improve how urban runoff is managed at an existing low income housing complex called the Del Monte Manor. This project actually was identified and received 10% preliminary design as part of the Stormwater Resource Plan development. (10% study attached)

As you may or may not know, the Seaside groundwater basin is adjudicated and overseen by the Seaside Groundwater Basin Water master (Water Master). The Storm Water Resource Plan indicated the Del Monte Manor infiltration project shall be consistent with the Water Master. The proposed project was submitted to the Technical Advisory Committee for the Water Master and that committee asked if the project had received approval from the State. They also inquired about contaminant migration.

So I am hoping you can help me answer the question about whether a project such as this requires approval from the State (or Regional Board)?

Please find attached the grant application and sketch showing the preferred design. Any help is appreciated on potential permit/approval requirements at regional board or state level. The proposed project will return to the Watermaster TAC in middle of March.

Thanks

Scott Ottmar, P.E.
Senior Civil Engineer
City of Seaside
831-899-6885 (office)
831-899-6311 (fax)

EPA United States Environmental Protection Agency | Region 9 Ground Water Office (WTR-9) | draft month 2002

Municipal Storm Water and Ground Water Discharge Regulations in California

Inside:

- Do I need to get a Permit?
- How do I Comply?

GUIDELINES FOR RULE AUTHORIZATION

1. All wastes are managed.
2. Dilution is not a method of treatment.
3. All disposal points are known.
4. All receiving waters are known.
5. Safe operation of well(s) is assured with routine inspection, maintenance and monitoring.
6. Close wells which cannot demonstrate compliance.

According to the 1996 National Water Quality Inventory, a biennial summary of State surveys of water quality, approximately 40 percent of surveyed U.S. waterbodies are impaired by pollution and do not meet water quality standards. A leading source of this impairment is polluted runoff. To reduce the impacts of polluted runoff, the Environmental Protection Agency (EPA) Storm Water program has developed a series of rules for municipalities and construction sites, requiring prevention of contamination of runoff, and retention of runoff where possible.

Urban and construction-related runoff has been documented to contain numerous substances known to have toxic or pathogenic properties, such as motor vehicle fluids, pesticides, heavy metals, and fecal coliform. Spilled fuel, solvents, waste oil, paints, and other maintenance fluids pose a risk to the environment but may be especially harmful if they enter someone's drinking water supply. Small amounts of some substances may cumulatively degrade an aquifer, if a significant proportion of contaminated runoff is percolated to the water table.

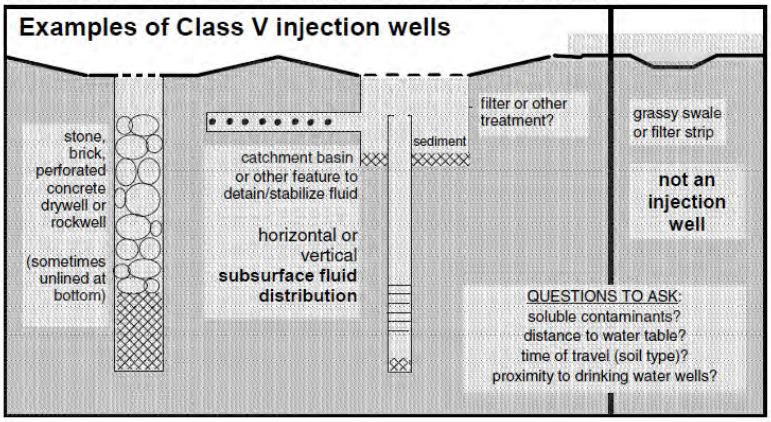
The percolation of contaminated runoff can cause unacceptable consequences to ground water resources. To prevent the trading of pollution from surface water to ground water, EPA Region 9 has prepared this fact sheet for municipalities contemplating the use of injection wells as a means of managing storm water.

The UIC regulations were promulgated to regulate subsurface disposal of fluids through drains, pipes, and other constructed conveyances that are intended to permanently emplace fluid below ground surface. Drywells, unlined sumps, seepage pits, and infiltration galleries are some of the terms used to describe the subcategory of injection wells known as shallow Class V injection wells. Municipalities who utilize injection wells as a means of storm water management need to be cognizant of the regulations applicable to this practice.

Storm water wells can be a community asset or liability. One incident of contamination could cause millions of dollars of damage to the public water system and to the local economy. Complying with the regulation may be as simple as reporting the number of wells you operate. Implementing additional management measures could prevent pollution and protect precious water resources.

What is a Class V injection well?

STORM WATER MANAGEMENT DEVICES



All percolation, deep or shallow, poses some environmental risk. Best management practices, pretreatment, and exposure to the elements all have a role in reducing storm water conntaminants, but they provide no guarantee. Storm water programs can't eliminate risk, but they can significantly reduce it.

What are the requirements in California for owners and operators of Class V injection wells?

1. **Submit an Inventory Form** to EPA for all Class V injection wells. The inventory form registers the ownership and liability for the wells and notes their approximate location. Complying with the inventory requirement means you are "authorized by rule" to continue injecting unless EPA requires more information, a permit, or closure of your well(s). For a copy of the inventory form, contact EPA Region 9. *40 CFR 144.26*

2. Respond to requests for additional information about your well(s). If EPA suspects that your well(s) may be threatening an underground source of drinking water, it may require you to further investigate the location and use of your well(s) relevant to area aquifers and land uses. *40 CFR 144.27*

3. If requested by EPA, apply for and comply with an injection permit. *40 CFR 144.25*

4. Close any wells that are suspected or likely to cause contamination of underground sources of drinking water. 40 *CFR part 144.89*

5. No owner or operator shall construct, operate, maintain, convert, plug, abandon, or conduct any other injection activity in a manner that allows the movement of fluid containing any contaminant into underground sources of drinking water, if the presence of that contaminant may cause a violation of any drinking water regulation under 40 CFR part 142 or may otherwise adversely affect the health of persons. *40 CFR 144.12*

...FROM THE REGULATIONS

(Injection) Well means: A bored, drilled, or driven shaft whose depth is greater than the largest surface dimension; or, a dug hole whose depth is greater than the largest surface dimension; or, an improved sinkhole; or, a subsurface fluid distribution system.

Subsurface fluid distribution system means an assemblage of perforated pipes, drain tiles, or other similar mechanisms intended to distribute fluids below the surface of the ground. *40 CFR 144.3*

DO I NEED A PERMIT?

EPA is the direct implementation agency for Class V injection wells in California. This means that they have the responsibility for collecting inventory data and determining which wells pose a risk that warrants further federal action, up to and including closure of endangering wells. The EPA office in San Francisco collects and maintains a database of all submitted inventory information.

Currently EPA does not have any permits for municipal storm water injection wells in California. This fact sheet is the first step in alerting municipalities of their legal obligations. Factors influencing EPA's decision to require a permit could include whether or not area ground water is a drinking water supply; its hydrogeologic susceptibility; land use practices and population density; or any documented contamination incidents linked to storm water injection wells.

Although California does not have delegation for the UIC program (like the NPDES program), the Water Code enables the Regional Water Quality Control Boards to prepare Waste Discharge Requirements for any discharge that may impair beneficial uses of waters of the state.

Local governments may set standards that are more stringent than EPA regulations.

Evaluating Storm Drain Failure

Injection/infiltration contaminates receiving ground water or surface water. Possible causes: receives human or animal waste, or chemical waste, through normal road use or illicit disposal. Constructed in a manner that there is inadequate time of travel between the "bottom" of the injection well/infiltration device and the receiving water body. Not maintained, so that heavily contaminated sediment from dry weather flow is flushed to the water table when wet season begins. Constructed hydrogeologically close to water body (inadequate setbacks.)

Clogs/doesn't percolate. Possible causes: Not maintained, clogged with solids. Illicit use for grease trap, waste oil or other viscous substance disposal. Constructed in soils with percolation rates less than 0.5 minutes per inch. Heavy clay, silty, or saturated soils. Constructed with too little setback to other fluid sources such as septic systems, leaking sewer lines, or "losing" streams (where surface water recharges ground water.)

IF AN INJECTION WELL NEEDS TO BE CLOSED:

The regulations specify minimum requirements for closure of an injection well: §144.89. You must plug or otherwise close the well in a manner that complies with the prohibition of fluid movement standard in §144.12 and summarized in §144.82(a). If the Regional Water Quality Control Board or other local agency has more stringent closure requirements, you should comply with those requirements as well. You must dispose or otherwise manage any soil, gravel, sludge, liquids, or other materials removed from or adjacent to your well in accordance with all applicable Federal, State, and local regulations and requirements, as in §144.82 (b).

EPA Region 9 requires that site characterization and closure of shallow injection wells where hazardous or toxic materials may be present be overseen and approved by a hazardous materials regulator from the local or state government (or EPA) and be performed by a qualified environmental professional.

Federal closure guidance is available. Contact EPA Region 9's Ground Water Office (see back page for numbers.)

Best Management Practices

Standard program elements recommended for storm drains leading to surface waters include:

- Public education and public involvement
- Illicit discharge detection and elimination
- Construction/post-construction site runoff control
- Pollution prevention/Good housekeeping

The same concepts apply to ground water discharges; **the cleaner the runoff, the safer the disposal.** Additional considerations for protecting underground sources of drinking water should be based on the value and vulnerability of the resource.

Is ground water a source of drinking water, through wells or through discharge to a surface water body that is tapped? Has the area been designated as a wellhead protection area, sole source aquifer, or source water area by the public water system?

Structural BMPs:

EPA has no design requirements for storm water injection wells that inject into or above the water table. Deeper injection through and below drinking water supply aquifers generally requires a permit to insure mechanical integrity and pollution prevention.

Shallow infiltration is generally environmentally safer than deep, but it is no guarantee that contamination will be prevented.

Pretreatment is needed where soluble contaminants are a concern. Sedimentation and absorbent materials may not remove dissolved pesticides, solvents, and some motor vehicle fluids.

Every injection well and infiltration device should be accessible for routine inspection and maintenance.

Non-structural BMPs

Evaluate the soils, geology, and water table. Develop an understanding of how much water can safely be land-applied to reflect natural recharge patterns. Account for other sources of infiltration that might affect subterranean flow and cause "breakouts" in low spots, or landslides.

Establish setbacks that provide sufficient time of travel in unsaturated soils for pollutant removal (and/or capture if materials spill occurs.)

Map all injection wells/infiltration devices; keep design and maintenance records for each one. Layer maps with land uses, sewer maps, and other data that might influence drainage system performance.

Assess regional or watershed impacts from injected/infiltrated fluid through monitoring programs. Depending on the proximity of drained areas to drinking water wells, collaborate with drinking water suppliers to analyze raw well water quality for early detection of runoff impacts.

For more information:

EPA National Stormwater NPDES program:
http://cfpub.epa.gov/npdes/stormwater/swfinal.cfm?program_id=6 **or**
http://www.epa.gov/npdes/menuofbmps/

BMPs specifically for ground water:
http://www.epa.gov/reg3wapd/uic/pdf/stormwater.pdf

Drinking Water Source Protection BMPs:
http://www.epa.gov/safewater/protect/swpbmp.html

For 1999 EPA summary of stormwater injection practices nationally:
http://www.epa.gov/safewater/uic/classv/volume3.pdf

For EPA's Environmental Technology Verification (ETV) project, which is testing stormwater treatment technologies:
http://www.epa.gov/etv/index.htm

California State Water Resources Control Board website: www.swrcb.ca.gov

To obtain EPA inventory form, write to EPA at the return address below, or forms can be emailed: send email to janes.elizabeth@epa.gov

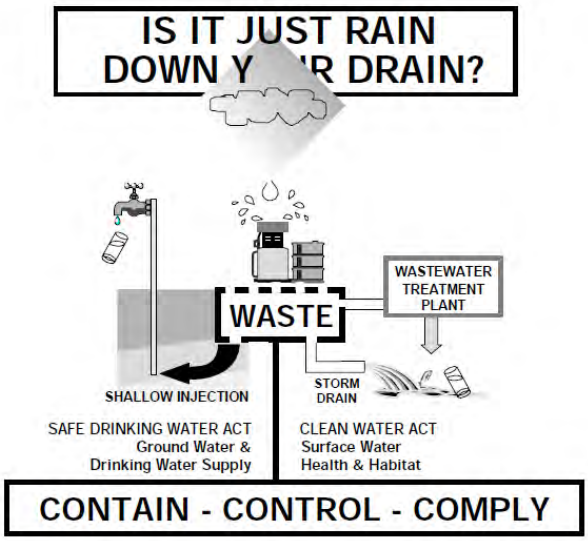
Questions about this guidance?
Call (415) 972-3537

WHAT IF IT'S NOT THE DEPARTMENT'S INJECTION WELL?

Injection wells on private property (except for those strictly intended for roof runoff, or less than 2000 gpd sewage treatment) are subject to these regulations. Injection wells have been used at certain facilities to evade sewer pretreatment restrictions and other discharge limits. If you know or suspect of ground water problems arising from illicit (or hazardous) injection wells, please call the number above or your local/county hazardous materials agency. City departments are also recommended to seek their own authority to require abatement of such systems.

U.S. Environmental Protection Agency, Region 9
Underground Injection Control Program (WTR-9)
75 Hawthorne Street
San Francisco, California 94105-3109
OFFICIAL BUSINESS - PENALTY FOR PRIVATE USE $300

FIRST CLASS MAIL
U.S. POSTAGE
PAID
U.S. EPA
Permit No. G-35



CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

Water Quality NEWSFLASH

DEDICATED TO THE ADVANCEMENT OF STORMWATER QUALITY MANAGEMENT, SCIENCE AND REGULATION

March 16, 2015 **Number 2015-06**

Stormwater infiltration wells – *Studies, regulations, EPA registration* - The statewide effort to capture and use stormwater may create an incentive to use infiltration wells, also called "dry wells" to recharge groundwater. Post-construction limits on runoff are also a possible incentive. Infiltration wells can be useful where upper soil layers are clayey making infiltration basins impractical or where space is limited. Dry wells have traditionally been used in many communities in California for stormwater disposal. Modesto, for example, has 11,000 dry wells (USGS Modesto groundwater study). However, in recent years the use of dry wells has been limited because of perceived risks.

To assess the environmental hazards associated with the use of dry wells, the California Office of Environmental Health Hazard Assessment (OEHHA) is sponsoring a project in Elk Grove using Proposition 84 funds. The purpose is to determine whether dry wells in combination with other LID practices (e.g., swales) are a cost-effective way to infiltrate stormwater and recharge the aquifer without negatively affecting groundwater quality (slide presentation). The project description notes that "*Although two studies conducted in California suggest the risk of groundwater contamination is minimal, in many cases regulators and stormwater/groundwater managers have been reluctant to use or permit these types of wells*." OEHHA Dry Well Fact Sheet.

The LA Basin Water Augmentation Study found that infiltration via various methods appeared to have very limited impact on groundwater quality (Phase II Final Report). A USGS report on the large scale Fresno recharge basins did not find contaminant transport to the water table. Limited information appears available specifically on dry wells, although locations with many drywells such as Maricopa County, AZ (approx. 40,000 drywells) have few problems "*if modern drywell designs are used and the drywells are properly operated and maintained*" (article).

EPA regulates stormwater drainage (dry) wells as Class V injection wells as part of the Underground Injection Control Program authorized by the Safe Drinking Water Act. A regulated well is defined as being deeper than its widest surface dimension (EPA clarification of which infiltration practices are regulated). In California Class V wells must be registered with EPA Region 9 (information/ registration). These wells are "authorized by rule," which means they may be operated without an individual permit so long as they are registered and the injection does not endanger an underground source of drinking water. EPA Region 9 contact: Leslie Greenberg, (415) 972-3349.

At the state level, dry wells can be regulated by waste discharge requirements (WDR) issued by Regional Water Boards although this appears to be rare. Individual counties may also have applicable requirements. California Department of Water Resources well standards appear to preclude stormwater dry wells, although this may be inadvertent (Bulletin 74-81). Dry wells are often identified in MS4 programs as infiltration BMPs. The Small MS4 General Permit Model Urban Runoff Program (MURP), however, does not include dry wells in the list of treatment controls. MS4 programs also appear to differ in the minimum vertical distance from the base of any infiltration device to the seasonal high groundwater level.

Other information: LA Stormwater LID guidance (see Dry Well Fact Sheet); San Diego Dry Well O&M Fact Sheet; Modesto Guidance Manual with dry well specifications.

Water Quality NewsFlash is a bi-weekly update of stormwater and related news for CASQA members, co-sponsored by Caltrans Stormwater Program as a public education and outreach partnership. *Verify information before taking action on these bulletins*. Contact CASQA at info@casqa.org or (650) 366-1042 with questions. Posted online in the members-only section at: www.casqa.org.

United States
Environmental Protection
Agency

WHEN ARE STORM WATER DISCHARGES REGULATED AS CLASS V WELLS?

Audience: This fact sheet is for storm water managers that implement the National Pollutant Discharge Elimination System (NPDES) program.

Purpose: To increase awareness that storm water drainage wells are regulated as Class V injection wells and to ensure that NPDES regulators understand the minimum federal requirements under the Safe Drinking Water Act (SDWA) for the Underground Injection Control (UIC) program.

ARE STORM WATER DRAINAGE WELLS REGULATED BY THE UIC PROGRAM?

Yes. These wells are regulated by EPA and primacy states through the UIC program as Class V injection wells with requirements to protect underground sources of drinking water (USDWs). A USDW is defined as an aquifer that contains less than 10,000 mg/L total dissolved solids and is capable of supplying water to a public drinking water system.

Class V storm water drainage wells are typically shallow disposal wells designed to place rain water or melted snow below the land surface. By definition, a Class V injection well is any bored, drilled, or driven shaft, or dug hole that is deeper than its widest surface dimension, or an improved sinkhole, or a subsurface fluid distribution system.

Storm water management strategies that include subsurface drainage must comply with UIC program regulations.

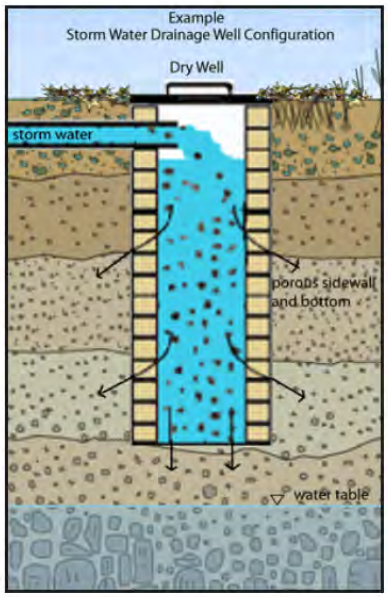
WHY ARE STORM WATER DRAINAGE WELLS A CONCERN?

State and federal UIC program representatives are concerned that there may be a dramatic increase in the use of Class V wells as an NPDES Best Management Practice (BMP) to dispose of storm water. Infiltration through storm water drainage wells has the potential to adversely impact USDWs. The runoff that enters storm water drainage wells may be contaminated with sediments, nutrients, metals, salts, fertilizers, pesticides, and microorganisms.

WHAT ARE SOME EXAMPLES OF STORM WATER DRAINAGE WELLS?

The broad definition of Class V wells covers a variety of storm water injection well configurations, including:

- Dry wells
- Bored wells
- Infiltration galleries



The underground injection well definition applies to any subsurface drainfields that release fluids underground. These can include French drains, tile drains, infiltration sumps, and percolation areas with vertical drainage. Improved sinkholes designed for storm water management are also considered Class V storm water drainage wells. These wells are natural karst depressions or open fractures that have been intentionally altered to accept and drain storm water runoff. The pictures on the back page illustrate an example of a Class V injection well that is subject to UIC requirements.

WHAT INFILTRATION SYSTEMS ARE NOT STORM WATER DRAINAGE WELLS?

Two types of infiltration systems are not considered storm water drainage wells:

- **Infiltration trenches** are excavated trenches filled with stone (no piping or drain tile) to create an underground reservoir. They are usually wider than they are deep.
- **Surface impoundments or ditches** are excavated ponds, lagoons, and ditches (lined or unlined, without piping or drain tile) with an opened surface. They are used to hold storm water. These devices **would be** considered Class V injection wells, however, if they include subsurface fluid distribution systems.

Picture and schematic drawing of parking lot infiltration (Source: Louisiana Department of Transportation)

Storm water drainage well designs can be as varied as the engineers who design them. A fluid distribution system that discharges underground through piping is typically the defining characteristic. If you are unsure about the classification of your infiltration system, contact your UIC program representative for clarification.

HOW ARE STORM WATER DRAINAGE WELLS REGULATED?

Under the minimum federal requirements, storm water drainage wells are "authorized by rule" (40 CFR 144). This means that storm water drainage wells do not require a permit if **they do not** endanger USDWs **and they comply with** federal UIC program requirements. The prohibition on endangerment means the introduction of any storm water contaminant must not result in a violation of drinking water standards or otherwise endanger human health. Primacy states may have more stringent requirements.

Federal program requirements include:

- Submitting basic inventory information about the storm water drainage wells to the state or EPA. (Contact your UIC program to learn what inventory information must be submitted and when.) In some cases, the information may be required prior to constructing the well.
- Constructing, operating, and closing the drainage well in a manner that does not endanger USDWs.
- Meeting any additional prohibitions or requirements (including permitting or closure requirements) specified by a primacy state or EPA region.

HOW CAN I HELP PREVENT NEGATIVE IMPACTS FROM STORM WATER DRAINAGE WELLS?

As an NPDES storm water manager, you can help to ensure that current and future storm water systems using Class V wells meet regulatory requirements under the UIC program. You can also help identify storm water drainage systems that may affect USDWs, and recommend BMPs to protect USDWs. BMPs for storm water drainage wells may address well siting, design, and operation, as well as education and outreach to prevent misuse.

FOR MORE INFORMATION...

EPA's Office of Ground Water and Drinking Water Web Site:
http://www.epa.gov/safewater

UIC Program Contacts:
http://www.epa.gov/safewater/uic/primacy.html

EPA's NPDES Web Site:
http://www.epa.gov/NPDES/Stormwater

Safe Drinking Water Hotline:
1-800-426-4791

Office of Ground Water and Drinking Water (4606M)

EPA 816-F-03-001

June 2003

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Stormwater Drainage Wells

On this page:

This page will help owners and operators:

- Determine whether you have a stormwater drainage well
- Learn how to comply with regulations for stormwater drainage wells
- Find out how to reduce the threat to ground water from your injection well.

The general information may also be useful to state, tribal, and local regulators.

In general, owners and operators of stormwater drainage wells include:

- State, tribes, and local governments
- Public and private institutions
- Commercial and industrial facilities
- Community associations
- Private citizens

What is a stormwater drainage well?

Class V stormwater drainage wells are use subsurface infiltration to manage surface water runoff (rainwater or snow melt). Stormater drainage wells may have a variety of designs and are often refered to by names that include:

- Dry wells
- Bored wells
- Infiltration galleries

The names can be misleading so it is important to note that storm water drainage wells like any well is defined in the UIC regulations (40 DFR144.3) as:

A bored, drilled, or driven shaft whose depth is greater than the largest surface dimension; or, dug hole whose depth is greater than the largest surface dimension; or, an improved sinkhole; or, a subsurface fluid distribution system.

Stormwater infiltration systems with piping to enhance infiltration capabilities meet the UIC definition of a Class V well.

Stormwater flows into a concrete chamber. The chamber allows time for the settling for solids. Stormwater is passed through an oil absorbent matrix prior to entering an infiltration chamber where it may be subjected to additional pretreatment.

Learn More

Read EPA's Class V Underground Injection Control Study to learn more about stormwater drainage wells.

In 1999, EPA completed a study of Class V wells to develop background information for use by the Agency to evaluate the risks to underground sources of drinking water (USDWs) posed by Class V wells. The study describes 23 categories of Class V wells, including stormwater drainage wells, and characterizes their:

- Use
- Location
- Number
- Potential impacts to USDWs
- Regulatory requirements

What is not a stormwater drainage well?

Some types of infiltration systems do not meet the definition of Class V stormwater drainage wells. These generally:

- Are larger at their widest surface point than they are deep
- Do not contain any perforated pipes or drain tiles to distribute and/or facilitate subsurface fluid infiltration

Surface impoundments do not include dug, drilled, or driven shafts and are not Class V wells.

Answer the following questions to determine if you have a Class V storm water drainage well.

Questions:	**If Your Answer Is Yes...**	**If Your Answer Is No...**
1. Do you operate a stormwater collection system that relies on infiltration to collect and dispose of storm water runoff?	Go to question 2.	You do not have a Class V stormwater drainage well. **Stop here.**
2. Does your infiltration system discharge to the subsurface?	Go to question 3.	You do not have a Class V stormwater drainage well. **Stop here**.
3. Does your stormwater infiltration system consist of a drilled or driven shaft, or dug hole that is deeper than it is wide? Does it rely on a naturally occurring sinkhole? Does it include any subsurface piping?	**You have a Class V stormwater drainage well** and are subject to Class V requirements.	You do not have a Class V stormwater drainage well. **Stop here**.

Why does EPA regulate stormwater drainage wells?

The Safe Drinking Water Act requires that EPA protect USDWs from injection activities. EPA has set minimum standards to address the threats posed by all injection wells, including stormwater drainage wells.

Stormwater injection is a concern because storm water may contain petroleum or other organic compounds that could harm USDWs. Other potential harmful contaminants include:

- Sediment
- Nutrients
- Metals
- Salts
- Microorganisms

- Fertilizers
- Pesticides

What are the minimum federal requirements for stormwater drainage wells?

This section outlines the minimum federal requirements for stormwater drainage wells. Some states have applied for and been granted authority to implement the Class V UIC Program in their state, including oversight of stormwater drainage wells, and may have more stringent requirements.

Visit the permitting authority page to find out what agency oversees Class V wells in your state. It is your responsibility to find out what the specific requirements are in your state.

Class V stormwater drainage wells are "authorized by rule," which means they may be operated without an individual permit so long as:

- The injection does not endanger a USDW
- The owner or operator of the well submits basic inventory information about the well to their permitting authority

Inventory submission requirements vary by state. The required inventory information typically includes:

- Facility name and location
- Name and address of a legal contact
- Ownership of property
- Nature and type of injection well(s)
- Operating status of the well(s)

For more information, visit the page on minimum requirements, or contact your permitting authority.

If you have a new stormwater drainage well, you must contact your permitting authority before you begin construction.

For existing stormwater drainage wells, you must stop using the well immediately and contact your permitting authority to find out what you must do. In most cases, you will need to:

- Submit an inventory form
- Wait up to 90 days to allow the UIC program to authorize your well, after which you may continue using it (unless you are told otherwise)

Authorization to use the well expires once you have properly closed the well. Proper well closure, also referred to as well abandonment, is a procedure to ensure that the well will not endanger USDWs in the future. Depending on the well's design, proper well closure could include:

- Backfilling with clean fill material
- Soil excavation
- Casing removal

- Grouting

Contact your permitting authority for specific instructions on properly closing the well.

What are stormwater drainage well best management practices?

Best management practices (BMPs) are physical, structural, and managerial practices that prevent or reduce the contamination of USDWs. The proper design and siting of a stormwater drainage well minimizes the likelihood of accidental or routine contamination resulting from either poor operational practices or misuse.

There are five general categories of BMPs for stormwater drainage well BMPs that can be implemented alone or in combination. The five general categories relate to:

- Siting
- Design
- Operation and maintenance
- Education and outreach
- Proper closure (plugging and abandonment)

The appropriateness and effectiveness of BMPs vary according to the type, design, setting, and operation of the well. Consult your permitting authority for additional information and to learn about location-specific BMPs.

LAST UPDATED ON OCTOBER 31, 2016

SEASIDE BASIN WATER MASTER
TECHNICAL ADVISORY COMMITTEE

** * * AGENDA TRANSMITTAL FORM * * **

MEETING DATE:	March 13, 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.

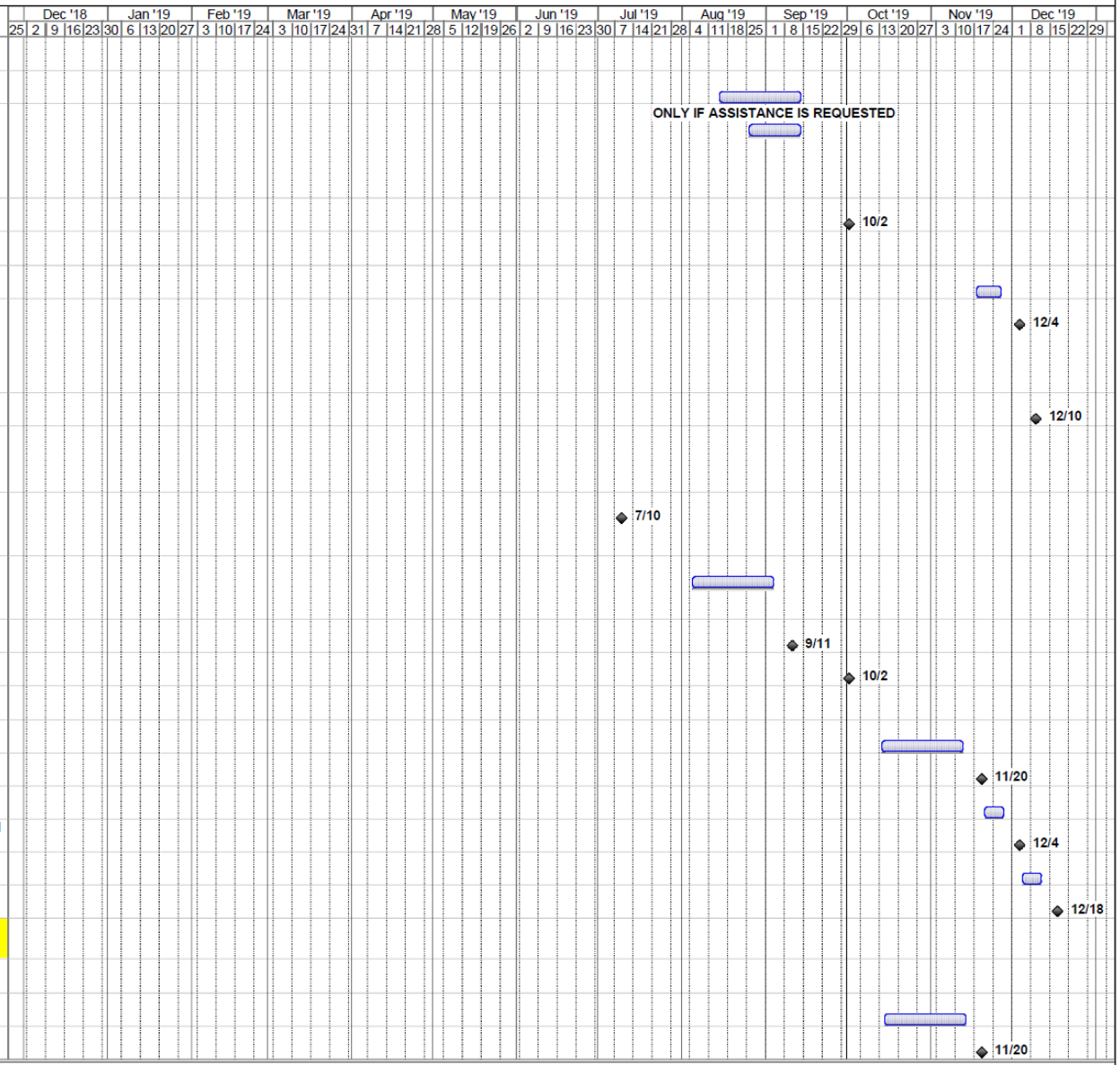
Attached is the proposed Work Schedule for FY 2019.

Principle updates from the last version of this schedule consist of revising the dates for performing geochemical testing on the PWM AWT water and the MPWSP desalination water per the Progress Report contained in Agenda Item No. 2.C.

There will not be a need to have an April TAC meeting, so the next TAC meeting will be on May 8, 2019.

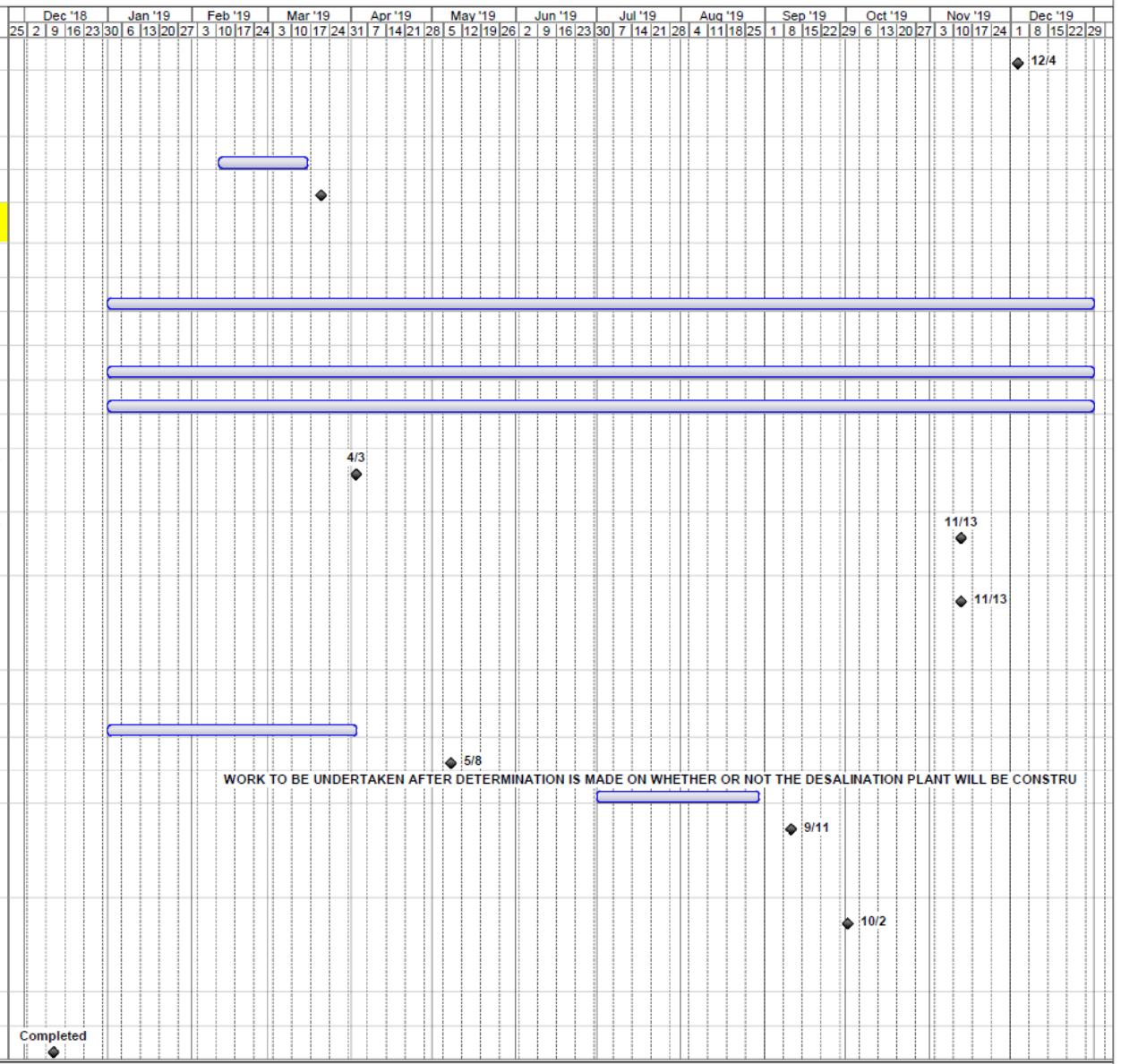
ATTACHMENTS:	Schedule of Work Activities for FY 2019
RECOMMENDED ACTION:	Provide Input to Technical Program Manager Regarding Any Corrections or Additions to the Schedule

Seaside Basin Watermaster
2019 Monitoring and Management Program
Work Schedule

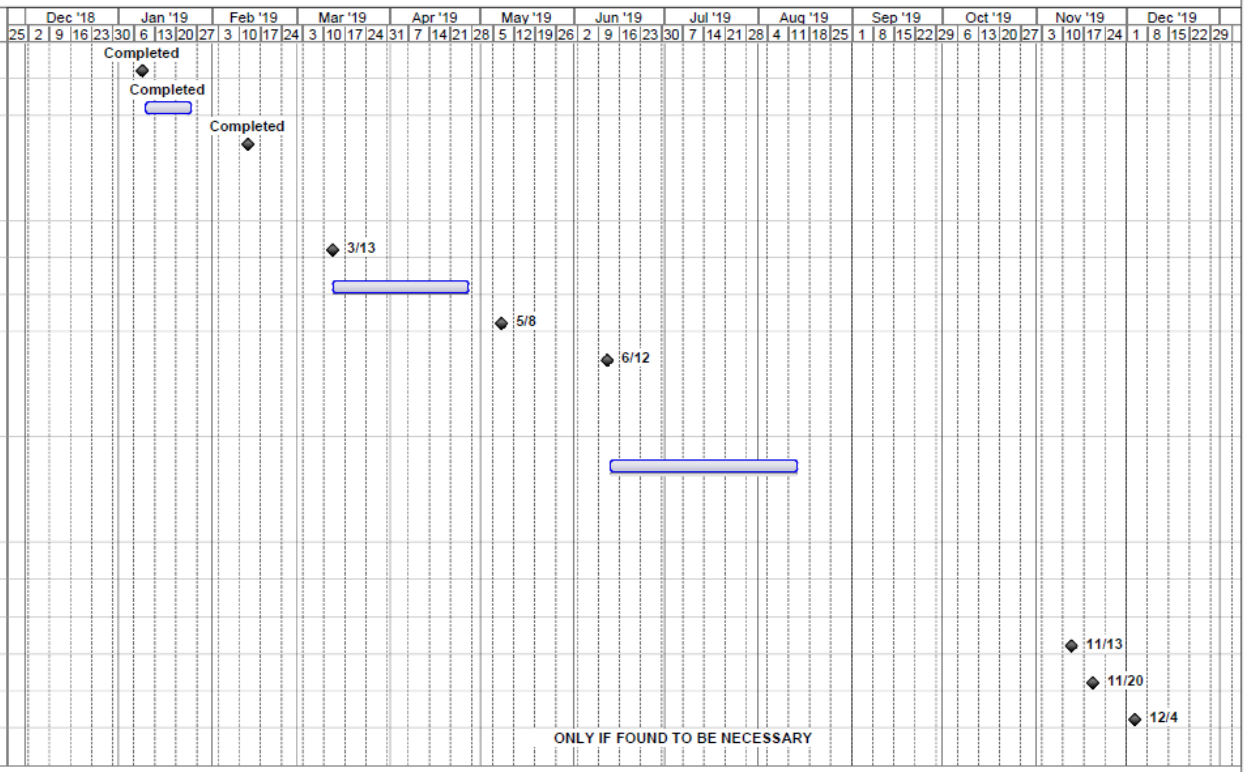


ID	Task Name
1	**Replenishment Assessment Unit Costs for Water Year 2020**
2	B&F Committee Develops Replenishment Assessment Unit Cost for 2020 Water Year
3	If Requested, TAC Provides Assistance to B&F Committee in Development of 2020 Water Year Replenishment Assessment Unit Cost
4	Board Adopts and Declares 2020 Water Year Replenishment Assessment Unit Cost
5	**Replenishment Assessments for Water Year 2019**
6	Watermaster Prepares Replenishment Assessments for Water Year 2019
7	Watermaster Board Approves Replenishment Assessments for Water Year 2019 (At December Meeting)
8	Watermaster Levies Replenishment Assessment for 2019
9	**Monitoring & Management Program (M&MP) Budgets for 2020 and 2021**
10	Preliminary Discussion of Potential Scope of Work for 2020 M&MP
11	Prepare Draft 2020 M&MP Work Plan and 2020 and 2021 O&M and Capital Budgets
12	TAC approves Draft 2020 M&MP Work Plan and 2020 and 2021 O&M and Capital Budgets
13	Board approves 2020 M&MP O&M and Capital Budgets
14	**2019 Annual Report**
15	Prepare Preliminary Draft 2019 Annual Report
16	TAC Provides Input on Preliminary Draft 2019 Annual Report
17	Prepare Draft 2019 Annual Report (Incorporating TAC Input)
18	Board Provides Input on Draft 2019 Annual Report (At December Board Meeting)
19	Prepare Final 2019 Annual Report (Incorporating Board Input)
20	Watermaster Submits Final 2019 Annual Report to Judge
21	***MANAGEMENT***
22	**M.1 PROGRAM ADMINISTRATION**
23	Prepare Initial Consultant Contracts for 2020
24	TAC Approval of Initial Consultant Contracts for 2020

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:	March 13, 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