



	<p>Director Zimmer: That’s where it’s a little confusing being a Program C Expansion Well and it being a District Project.</p> <p>Mr. Miller: Like the Golden State Expansion Well #1 was drilled and done as a Golden State Project, we viewed this as a CSD effort, but we can certainly communicate more clearly.</p> <p>Director Gibson: Since the last time we met, the Board of Supervisors has taken a couple of actions. One in particular on the Los Osos Waste Water Project, to finalize our enforcement with a graduated tiered approach. We still have about 73 properties still not in the process of connecting. Once we have the structure to communicate, we will have a little bit more leverage to make those connections.</p> <p>Director Ochylski: To follow up with that, the LOCSO still has some funding available for low-income people, if any of those 73 met the criteria, there is money available for them.</p> <p>Acting Director Cote: On 5b the budget items on row two and five, there seems to be some budget overrun.</p> <p>Mr. Miller: Those cost incurred to include invoices to be approved today, so there is no overrun.</p> <p>Director Zimmer: Motion to accept the consent agenda and minutes.  Director Cote: Second the Motion.</p> <p><b>Ayes: Director Gibson, Director Zimmer, Acting Director Cote and Chairperson Ochylski</b>  <b>Nays: None</b>  <b>Abstain: None</b>  <b>Absent: None</b></p>
<p><b>6. Executive Director’s Report</b></p>	<p>Executive Director, Rob Miller, provided a verbal overview of the written content of the Executive Director’s report.</p> <p>Director Gibson: You’re estimating \$800 – \$1,000 an acre ft of just O&amp;M for nitrate removal or is that factoring in some amortization of capital costs.</p> <p>Mr. Miller: That is just O&amp;M, and that depends on the nitrate levels in the well since that drives the amount of brine created.</p> <p>Director Gibson: That seems to be in line with the other water costs.</p> <p>Mr. Miller: Yes, particularly for people who have surface water in other basins. It’s not an unreasonable cost. It is a lot more compared to the cost of just drilling a deeper well that doesn’t require treatment.</p> <p>Director Gibson: Denitrification is seen as aquifer management cleanup, is there a way to categorize it as a cleanup project?</p> <p>Mr. Miller: We had a hard time trying that with sea water intrusion mitigation through new wells, I think nitrate removal will be viewed as a multi benefit.</p> <p>Director Gibson: The IRWM process, what is the process on that?</p>

	<p>Mr. Miller: There are multiple rounds and there is future implementation round that will come next year as well as continuing Prop 1 rounds that have elements of aquifer cleanup and chemical removal. I think we'd have a good shot at it.</p> <p>Director Gibson: Have you looked at anything in the Prop 3 Water Bond coming this November?</p> <p>Mr. Miller: The regulatory framework on the back end determines the category they put those dollars in, but we will keep an eye on that.</p> <p>Director Zimmer: We recently started our Ion Exchange for nitrate removal at Rosina and the brine disposal is the number one concern. There is the cost aspect of it but also the viability of long-term disposal since brine disposal is becoming more challenging. We need to look at the immediate costs today but also the viability of that technology. Also, Prop 68 that was approved is that something that might open more opportunities for us?</p> <p>Mr. Miller: I haven't had a look at that yet but possibly.</p> <p>Director Zimmer: Regarding the Los Osos waste water agreements, the District and Golden State have both approved those so hopefully we will get those in soon.</p> <p><u>Public Comment</u></p> <p>Mr. Cesena: I know we weren't supposed to see any reduction in nitrate levels for many years, but should we expect some reduction to start showing up by now?</p> <p>Ms. Owen: Can we get a sense of how much are we taking off of lower aquifer pumping by having the several nitrate treatments and blending projects already underway?</p> <p>Mr. Miller: Regarding nitrate removal, certainly we are all hoping to see that trend to begin its downward progression. However, in the minds of our groundwater experts it is too early to make any conclusions on a large scale. We will continue to watch it and if we see any signs of changes of concentration we will bring those forward at least twice a year. Regarding the nitrate removal and its benefits to the lower aquifer, in round numbers we have around 200-acre feet being denitrified right now that is offsetting our pumping on the lower aquifer.</p>
<p><b>7b. Discussion of CHG Report on Los Osos Basin Plan Metric Trends Review and Infrastructure Program C Evaluation</b></p>	<p>Mr. Miller: Gave a detailed overview of the CHG Report on Los Osos Basin Plan Metric Trends Review and Infrastructure Program C Evaluation.</p> <p>Acting Director Cote: On page 6 of the report, it says "the chloride metric data may be influenced by freshwater delusion flow from upper to lower aquifer in one or more of the well bores", can we get a clarification for that?</p> <p>One of the phenomena that Golden State and CSD have seen in our basin, is that some of our lower aquifer wells when they sit dormant for extended periods of time, they develop some nitrates. That to us is evidence that there is some slow leakage through the borehole down to the lower aquifer from the upper aquifer.</p> <p>Acting Director Cote: In this comment he's talking about chloride migration and I'm curious about that because normally chloride is a higher density fluid and having it migrate up into the upper aquifer would be a surprise to me.</p>

Mr. Miller: Yes, the pressure is higher in the upper aquifer than that in the lower aquifer.

Director Zimmer: Thanks for the report and I think we need to come back to it from time to time. I think the chart that we look at for these projects, I think we need to work on clarifying some of them. Such as saying well 2 and 3 are not needed.

Mr. Miller: Yes, we decided to clarify that. Well 1 is drilled, 2 is under consideration, and Well 3 is not needed at this point.

Director Zimmer: Jumping to Program A, we talked about the Blending Project for Skyline, that project should be identified as completed at this point.

Mr. Miller: Are you referring to an appendix in the Cleath Report?

Director Gibson: I think we skipped Item 7a, we're into 7b.

Staff greatly apologizes I took it out of order. If we could come back to that item.

Director Ochylski: Let's hold off, we'll do 7b and come back to 7a.

Director Gibson: I would like to add my thanks for the work done on this report. It was a very helpful report. There was one little bit of confusion, I'm looking at page 7 of the memo that's talking about the ranking of the highest level of mitigation for seawater intrusion to the lowest. It goes on to say ag exchange involves offsetting agricultural pumping with recycled water combined with an equal amount of pumping from Program D wells. Is that because the Program D Wells water goes through the plant and augments the recycled water supply?

Mr. Miller: Program D was the drilling of Municipal Wells to the East of Los Osos Creek and since we are not currently pursuing that it has fallen off the radar. In this statement ag water would be taken, recycled water would be used, and there would be a municipal well on the East Side to bring that water back to the community.

Director Gibson: So, it would offset potable pumping?

Mr. Miller: Yes, on the west side.

Director Gibson: So, there is no net change in the production it's the location of the production.

Mr. Miller: Correct and perhaps that could be clarified in the text.

Director Gibson: Ag reuse with in lieu recharge is just offsetting agricultural pumping with recycled water. Where is the in-lieu recharge concept in that?

Mr. Miller: It's been carried over since the EIR was done for the Wastewater Project. It basically means because they're using recycled water to grow the crop, and there is less water being pumped out of the east side.

Director Gibson: So, it is simply reducing the production on the East Side.

Mr. Miller: Correct.

Acting Director Cote: My interpretation of this is that, the “in lieu” means those wells in that zone, benefit from recharge of surface use of that water in that location.

Mr. Miller: Some incidental deep perc of applied water is what you’re referring to and I think that is true. I know it is also the fact that the water is not being used.

Director Gibson: I think we should clarify that in the future.

#### Public Comment

Ms. Owen: When you talk about the nitrate readings, I wonder if we’re looking at all the different nitrate numbers overall. There are areas below Cabrillo Estates, the golf course and houses that aren’t hooked up yet that could be producing more nitrates in the water. Do we see a reduction in any areas? Do we have any farmers or ag that is doing the exchange for recycled water? Also, have we cancelled the contracts with dryland farmers since they don’t help our water basin in any way.

Mr. Brinkman: Regarding the Cleath Harris Report, it says Expansion Well #2 affects the water levels at the upper and lower aquifers and that it responds to pumping in a small way. Do we have any data on how those two aquifers are responding to that expansion well? Being an owner near the possible Andre well site is worrisome with a private well that may be affected. The Report also mentions a sharp decrease in basin yield metrics starting 2009-2017, a positive trend, and I’m wondering what factors led to that?

Ms. Adias: I am a resident on Hollister Lane, I have the same concerns, how will this affect our wells? If we did lose water because of this public well, will we receive County water?

Mr. Ward: Regarding Expansion Well #2, if it was originally planned for Buckskin, why did it get moved to where it is now? Regarding the proposed well on Andre, it was mentioned that it would be a lower aquifer well, when I thought it was supposed to be an upper aquifer well.

Mr. Knudsen: I am a business rep for Well Intel, I heard some concerns from the citizens about water level in the private wells. We have technology that tracks water levels in domestic wells.

Mr. Jasbinsek: I’m here to offer a free service. We recently got some geophysical equipment that does electrical resistivity monitoring. It allows you to make two dimensional cross sections of the subsurface where you can fingerprint fresh water versus saline water. It would clarify the geometry of the seawater intrusion and the general aquifer structure.

#### Board Comments

Mr. Miller: Regarding nitrate concentrations in different parts of the basin, we have sampling data on those, but it has been some time since this committee has seen how that spatially varies so we can bring that back. Currently no water is being provided to any recycled water users agriculture or otherwise. A lot of people are concerned about our Program C wells, particularly the Andre Site among the others, and if there are any impacts to private wells, those impacts must be mitigated. Well siting is very challenging, Los Olivos was an existing water management site and having a lower aquifer well there did result in a benefit to the basin yield and does qualify as that first completed Program C

Well. Also, for the next well we are pursuing a lower aquifer well. One of the four sites we may also screen it in the upper aquifer, but not at the other wells. And I am interested in the free data that was offered to us.

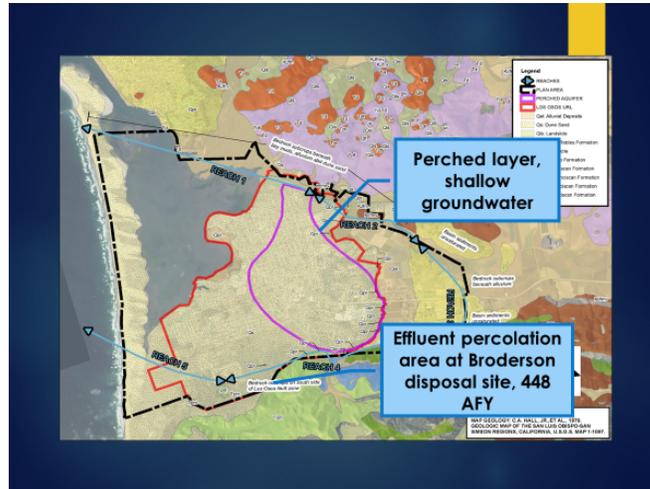
Director Ochylski: Then we'll just submit written comments to Mr. Miller and he'll bring them back.

Director Gibson: This report is fundamental. This trend analysis should be incorporated into every annual report. We should use it to better our adaptive management as we review these trends. And I am fully supportive of the electrical resistivity monitoring.

<p><b>7a. Update on Status of Basin Plan Infrastructure Projects</b></p>	<p>Mr. Miller: Gave a detailed Update on Status of Basin Plan Infrastructure Projects.</p> <p>Director Zimmer: Maybe we can have staff work on these specific items to really clean them up so it's a littler easier for the public to read. Project A should be listed as completed, we should also add the creek discharge as one of the projects listed.</p> <p><u>Public Comment</u></p> <p>Ms. Owen: In the Paso Robles Basin, the land owners around the fringe area of the basin lose their wells and the only option was to spend money to dig new wells. So, I think we need some solutions if that is going to happen here. So, Cuesta by the Sea is the new well going in that to see if Broderson is overflowing yet? Also, regarding Broderson we are pumping that water a long way, so it is expensive, when we can do creek discharge which is cheaper and possibly more effective.</p> <p><u>Board Comments</u></p> <p>Mr. Miller: The Cuesta by the Sea is primarily to look at a gap in our basin monitoring that is in that area. We don't know how the shape of the seawater front interfaces in that area.</p>
<p><b>7c. Update on Status of Creek Discharge and Storm/Perched Water Recovery Projects</b></p>	<p>Mr. Miller gave a detailed Update on the Status of Creek Discharge and Storm/Perched Water Recovery Projects</p> <p>Acting Director Cote: I am very interested in seeing the Storm Water project that you mentioned. I think as you are putting estimates of cost together for that you should bring that back to the committee that is something that we could potentially advance for self-funding. Also, I wonder if these monitoring wells could be used for multiple monitoring purposes.</p> <p>Director Zimmer: The Storm Water is an interesting project, I kind of missed the conveyance of that. We would use the waste water collection system to convey it and it would ultimately go to the waste water plant and then come back?</p> <p>Mr. Miller: Yes, and the reason I brought that up is we (Wallace Group) have a significant grant in Pacific Grove, to do just that.</p> <p>Director Zimmer: That would be using the piping that's in place for their irrigated recycled water? How will it come back?</p> <p>Mr. Miller: The Purple Pipe. It could also go into the creek at some point in the future even during the dry season. I know the flows at night go almost to zero, so there may be some benefit to nighttime flows. This would require County involvement.</p> <p>Director Zimmer: Some of the recaptured water today goes to the creek?</p> <p>Mr. Miller: Yes, downstream of any benefit.</p> <p><u>Public Comment</u></p> <p>Ms. Owen: Can you clarify perched water; how does that compare to upper aquifer water?</p>

Mr. Ward: As far as recapturing some of that storm water is it possible or cost effective to fill up the catch basins in town?

Mr. Miller: This perched aquifer is well above the upper aquifer. This water is almost at the surface. Regarding filling up empty basins, anywhere outside of the gourd shape shown on the map, where the water won't be going to the right place, that idea can work.



Director Gibson: I think this idea is intriguing and we will look forward to sketching out this idea in the future. On the budget table you had for creek discharge, for Pilot Studies, Treatment Evaluation and the Feasibility Report we are nearing \$200,000, I wonder if we need to be spending all of that on those items?

Mr. Miller: We are producing tertiary recycled water, but the State has identified a higher standard than tertiary for this discharge. It's primarily focused on dissolved carbon, Total Organic Carbon, the purpose of these pilot studies would be to vet out the different carbon-based technologies necessary to further cleanup the existing water to meet the higher standards.

Director Gibson: Do we have a general sense of the Total Organic Matter in the effluent stream?

Mr. Miller: I've looked at that data and no we don't meet it.

**7d. Water Conservation Program Update**

Mr. Miller: Gave a detailed Update on the Water Conservation Program Update

**8. PUBLIC COMMENTS ON ITEMS NOT APPEARING ON THE AGENDA**

Public Comment

Ms. Owen: Regarding washing machine rebates through the conservation program, but that conflicts with new development water credits since that's what their trying to sell. Will we ever get these two programs together? Also, we should be monitoring all water coming out of the basin.

**9. ADJOURNMENT**

Meeting was adjourned at 3:00 pm.  
The next meeting will be on October 17<sup>th</sup> at the South Bay Community Center in Los Osos at 1:30 pm.

**TO: Los Osos Basin Management Committee**

**FROM: Rob Miller, Interim Executive Director**

**DATE: November 14, 2018**

**SUBJECT: Item 5b – Approval of Budget Update and Invoice Register through November 14, 2018**

### **Recommendations**

Staff recommends that the Committee review and approve the report.

### **Discussion**

Staff has prepared a summary of costs incurred as compared to the adopted budget through November 14, 2018 (see Attachment 1). A running invoice register is also provided as Attachment 2. Staff recommends that the Committee approve the current invoices, outlined in Attachment 3. Payment of invoices will continue to be processed through Brownstein Hyatt as noted in previous meetings.

**Attachment 1: Cost Summary (Year to Date) for Calendar Year 2018**

<b>Item</b>	<b>Description</b>	<b>Budget Amount</b>	<b>Costs Incurred</b>	<b>Percent Incurred</b>	<b>Remaining Budget</b>
1	Monthly meeting administration, including preparation, staff notes, and attendance	\$50,000	\$39,327.12	78.7%	\$10,673
2	Meeting expenses - facility rent (if SBCC needed for larger venue)	\$1,000	\$375.00	37.5%	\$625
3	Meeting expenses - audio and video services	\$6,000	\$2,975.00	49.6%	\$3,025
4	Adaptive Management - Groundwater Modeling	\$10,000	\$9,985.00	99.9%	\$15
5	Semi annual seawater intrusion monitoring	\$26,400	\$12,096.30	45.8%	\$14,304
6	Annual Report - not including Year 1 start up costs	\$29,600	\$29,565.00	99.9%	\$35
7	Grant writing (outside consultant)	\$5,000	\$0.00	0.0%	\$5,000
8	Creek Recharge and Replenishment Studies	\$15,000	\$0.00	0.0%	\$15,000
9	Cuesta by the Sea Monitoring well	\$115,000	\$3,150.00	2.7%	\$111,850
10	Conservation programs (not including member programs)	\$10,000	\$4,305.46	43.1%	\$5,695
	Subtotal	\$268,000	\$101,779		\$166,221
	10% Contingency	\$26,800			
	<b>Total</b>	<b>\$294,800</b>	<b>\$101,779</b>	<b>34.5%</b>	<b>\$193,021</b>
	LOCSA (38%)	\$112,024			
	GSWC (38%)	\$112,024			
	County of SLO (20%)	\$58,960			
	S&T Mutual (4%)	\$11,792			
Notes	Last update October 30, 2018				

**Attachment 2: Invoice Register for Los Osos BMC for Calendar Year 2018 (through October 30, 2018)**

Vendor	Invoice No.	Amount	Month of Service	Description	Budget Item	Previously Approved
CHG	20180203	\$11,095.00	Feb-18	Annual Report	6	Yes
Wallace Group	45523	\$5,325.00	Jan-18	Administration	1	Yes
CHG	20180303	\$10,260.00	Mar-18	Annual Report	6	Yes
CHG	20180304	\$1,320.00	Mar-18	Semi-annual groundwater monitoring	5	Yes
CHG	20180305	\$840.00	Mar-18	Cuesta-By-The-Sea Monitoring Well	9	Yes
Wallace Group	45731	\$3,475.47	Feb-18	Administration	1	Yes
Wallace Group	45911	\$4,456.16	Mar-18	Administration	1	Yes
SBCC	99	\$120.00	Jul-18	Meeting Expenses-Facility Rent	2	Yes
SBCC	113	\$120.00	Mar-18	Meeting Expenses-Facility Rent	2	Yes
AGP	7383	\$750.00	May-18	Meeting expenses - audio and video services	3	Yes
CHG	20180402	\$5,340.00	Apr-18	Annual Report	6	Yes
CHG	20180403	\$5,874.80	Apr-18	Semi-annual groundwater monitoring	5	Yes
CHG	20180504	\$2,870.00	May-18	Annual Report	6	Yes
CHG	20180505	\$3,316.50	May-18	Semi-annual groundwater monitoring	5	Yes
Wallace Group	46110	\$2,033.00	Apr-18	Administration	1	Yes
Wallace Group	46301	\$6,511.61	May-18	Administration	1	Yes
AGP	7414	\$1,450.00	Jun-18	Meeting Expenses-Audio/Video Services	3	Yes
CHG	20180604	\$625.00	Jun-18	Semi-annual groundwater monitoring	5	Yes
CHG	20180605	\$6,860.00	Jun-18	Adaptive Management-Groundwater Modeling	4	Yes
Wallace Group	46487	\$5,868.91	Jun-18	Administration	1	Yes
Wallace Group	46487	\$3,919.41	Jun-18	Water Conservation	10	Yes
Wallace Group	46715	\$1,292.00	Jul-18	Administration	1	Yes
Wallace Group	46715	\$1.39	Jul-18	Water Conservation	10	Yes
CHG	20180705	\$1,400.00	Jul-18	Adaptive Management-Groundwater Modeling	4	Yes
AGP	7498	\$775.00	Aug-18	Meeting Expenses-Audio/Video Services	3	
SBCC	117	\$135.00	Aug-18	Meeting Expenses-Facility Rent	2	
CHG	20180807	\$1,725.00	Aug-18	Adaptive Management-Groundwater Modeling	4	
CHG	20180932	\$900.00	Sep-18	Cuesta-By-The-Sea Monitoring Well	9	
CHG	20180903-Rev	\$960.00	Sep-18	Semi-annual groundwater monitoring	5	
CHG	20180806-Rev	\$1,410.00	Aug-18	Cuesta-By-The-Sea Monitoring Well	9	
Wallace Group	46853	\$4,767.91	Aug-18	Administration	1	
Wallace Group	46853	\$70.13	Aug-18	Water Conservation	10	
Wallace Group	47048	\$5,597.00	Sep-18	Administration	1	
Wallace Group	47048	\$314.53	Sep-18	Water Conservation	10	
<b>Total</b>		<b>\$101,779</b>				
				Not yet approved		

**ATTACHMENT 3**

**Current Invoices Subject to Approval for Payment (Warrant List as of November 14, 2018):**

<b>Vendor</b>	<b>Invoice #</b>	<b>Amount of Invoice</b>	<b>Date of Services</b>
AGP	7498	\$775.00	Aug-18
SBCC	117	\$135.00	Aug-18
CHG	20180807	\$1,725.00	Aug-18
CHG	20180932	\$900.00	Sep-18
CHG	20180903-Rev	\$960.00	Sep-18
CHG	20180806-Rev	\$1,410.00	Aug-18
Wallace Group	46853	\$4,767.91	Aug-18
Wallace Group	46853	\$70.13	Aug-18
Wallace Group	47048	\$5,597.00	Sep-18
Wallace Group	47048	\$314.53	Sep-18

**TO: Los Osos Basin Management Committee**

**FROM: Rob Miller, Interim Executive Director**

**DATE: November 14, 2018**

**SUBJECT: Item 6 – Executive Director’s Report**

### **Recommendations**

Staff recommends that the Committee receive and file the report, and provide staff with any direction for future discussions.

### **Discussion**

This report was prepared to summarize administrative matters not covered in other agenda items and also to provide a general update on staff activities.

#### Funding and Financing Programs to Support Basin Plan Implementation

As indicated in the January 2018 meeting the State Board confirmed that sea water intrusion mitigation projects under Program C are eligible for low interest loans but are not currently eligible for grants under Proposition 1. New wells in the upper and lower aquifer are viewed as aquifer management, not aquifer clean-up as defined by the State, therefore we will need to look for future funding rounds and other opportunities. Staff has engaged in the IRWM process with SLO County for the Los Osos Creek Replenishment and Recharge Project (IRWM Project ID 2017 NT-07). In addition, LOCSD is pursuing IRWM funds for the final equipping of its 8<sup>th</sup> Street upper aquifer well, which was previously drilled and cased (see Item 7a). Under Item 7d, Staff recommends a 2019 budget allocation to pursue funding for the Creek Discharge project. In addition, the concept of urban storm water recovery at 8<sup>th</sup> and El Moro was ranked in the draft Stormwater Resource Plan, and future grant opportunities may be available. The draft plan can be found here:

<https://www.slocounty.ca.gov/Departments/Public-Works/Forms-Documents/Committees-Programs/Stormwater-Resource-Plan/Documents/2018-09-10-SWRP-Public-Draft.aspx>

#### Status of Zone of Benefit Analysis

Similar to previous updates, no special tax measure is being pursued by staff to fund BMC administrative or capital costs. This item has been removed from the BMC budget for 2018. The Zone of Benefit approach can be initiated at any time as directed by the BMC.

#### Sustainable Groundwater Management Act (SGMA) and Basin Boundary Modification Request (BBMR) Updates

*BBMR Update:* The California Department of Water Resources (DWR) is responsible for defining basin boundaries but recognizes that refined scientific data or jurisdictional information may warrant boundary modifications. On June 5, 2018, the County Board approved the submittal of the Los Osos Basin boundary modification request to DWR. As depicted in Figure 1

below, the County’s basin boundary modification submittal includes a request to create two new subbasins in the Los Osos Basin (“Los Osos Area subbasin” and “Warden Creek subbasin”), and to remove two areas (Montana de Oro State Park and one minor fringe area). On September 26, DWR notified the County that the request to modify boundaries was complete and posted on the State’s online SGMA portal (<https://sgma.water.ca.gov/basinmod/modrequest/comments/238>), which initiated the 30-day public comment period (closed on October 26, 2018). One letter of support was received during the public comment period on the application for Los Osos Basin boundary modifications.

DWR’s basin boundary modification request and re-prioritization timelines/ key milestones are shown on Table 1 below.

**Table 1. 2018 Basin Boundary Modification Request and Re-prioritization Timelines**

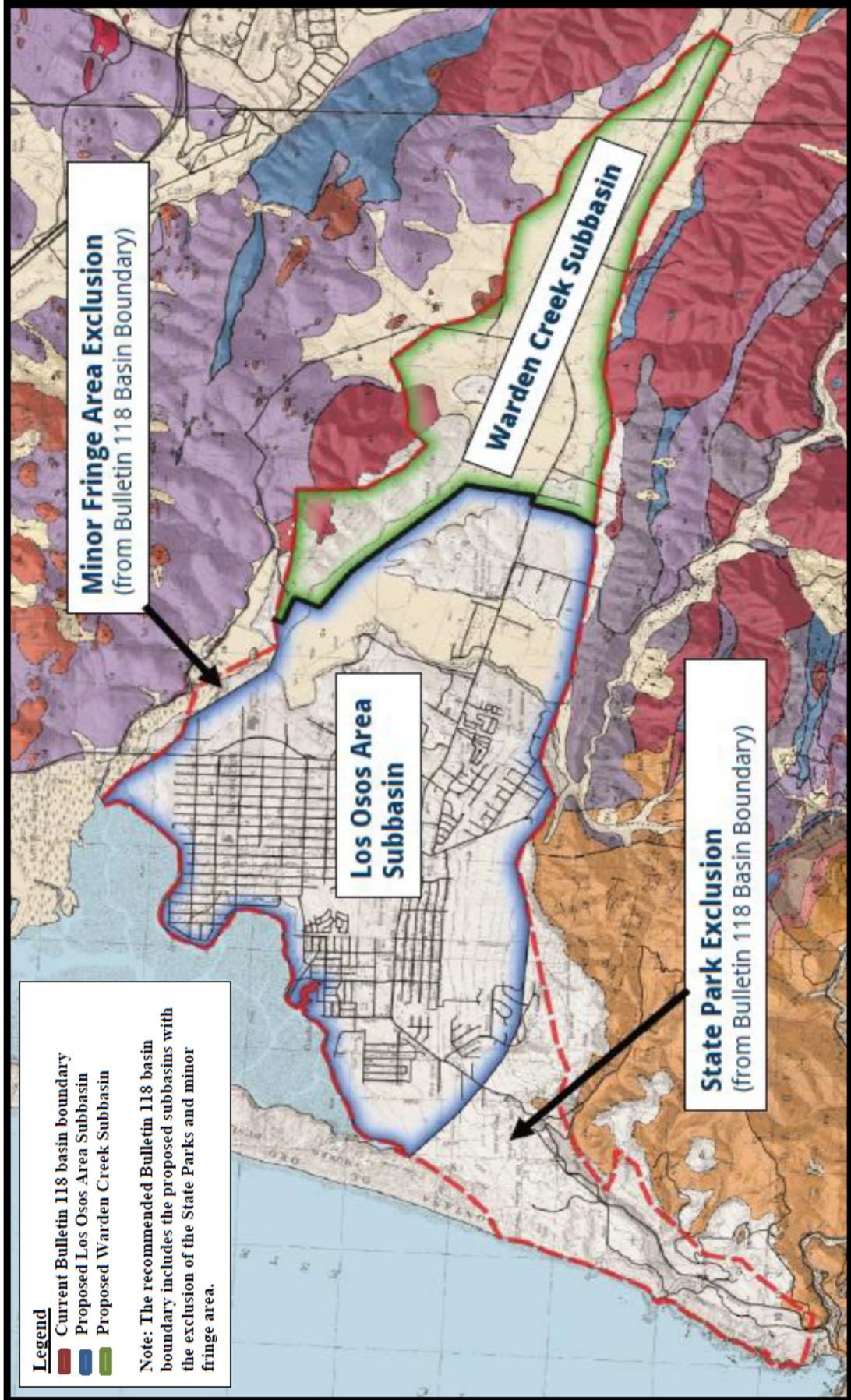
<b>Key Milestones</b>	<b>DATES</b>
<b>Basin Boundary Modifications – Revised Timeline</b>	
DWR posted the Los Osos Basin Boundary Modification Application	September 26, 2018
Public Comments closed on the Los Osos Basin Boundary Application	October 26, 2018
DWR Releases <b>Draft Basin Boundary Modifications</b>	Mid - November 2018
Public Comment Period on the <b>Draft Basin Boundary Modifications</b>	November to December 2018
DWR Releases Final <b>Basin Boundary Modifications</b>	Mid - February 2019
<b>Re-prioritization for 2018 SGMA Basin Boundary Modifications</b>	
DWR Releases Draft Re-prioritization for Modified Basins	Late - February 2019
Public Comments on <b>Draft</b> Re-prioritization for Modified Basins	February to March 2019
DWR Releases Final Re-prioritization	May 2019

More information on DWR’s basin boundary modification process and DWR’s 2018 SGMA Basin Prioritization process, please visit:

<https://water.ca.gov/Programs/Groundwater-Management/Basin-Boundary-Modifications>

<https://water.ca.gov/Programs/Groundwater-Management/Basin-Prioritization>

Figure 1. Proposed Los Osos Basin Boundary Modification



### Los Osos Wastewater Project Flow and Connection Update

Influent flows into the treatment facility are peaking at 0.50 mgd. No recycled water deliveries have been made to irrigation users yet. Effluent is being disposed to both Broderson and Bayridge leachfields. The cumulative effluent disposal for the calendar year as of 9/30/2018 was 394 AF of which 378 AF went to Broderson, and 16 AF went to Bayridge.

As of 10/24/2018, the sewer service area has a 96.9% connection status.

No. of Non-compliant laterals				Total		
	Phase 1	Phase 2	Phase 3		% connections	
10/24/2018	37	80	27	144	4438	96.9%
					4582	

Of the 144 unconnected properties, 30 are waiting for the County/LOCSD low-income grant program to pay for their connection leaving 114 properties that may require enforcement. Of the 114 properties, 35 are in the process of connecting (ie: obtained a building permit). Subtracting households with permits leaves 79 properties (1.7% of 4582<sup>1</sup> total parcels) that are the focus of the Code enforcement process. Note that the denominator number of connections decreased from 4,583 to 4,582 because a property was identified as not required to connect.

### Water Conservation Update

Rebate activity continues to be light, with only 1 washer rebate application received since the last BMC meeting.

### Option to Bring Morro Bay Wastewater to Los Osos WWRF

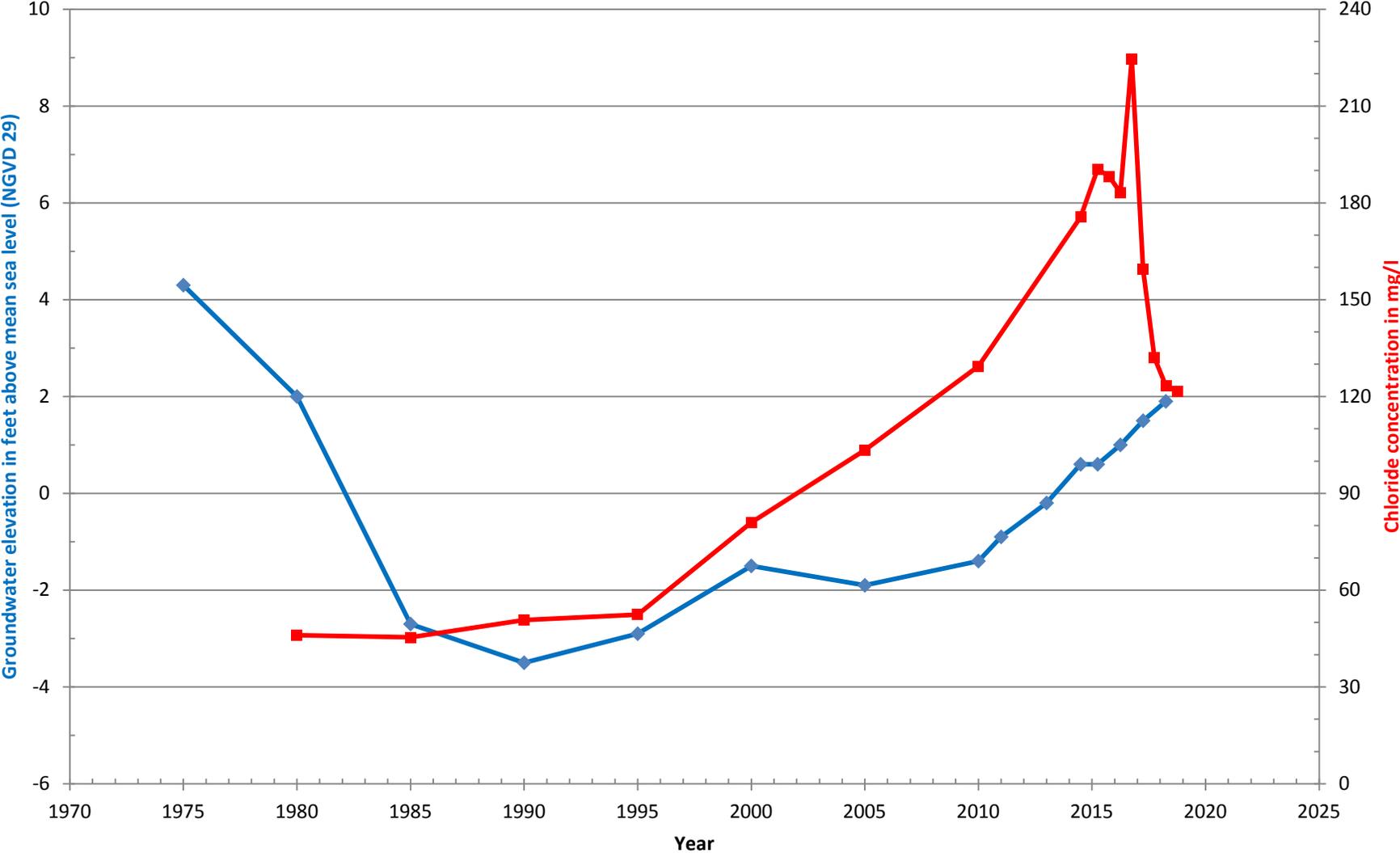
Similar to staff's last update, it was determined that both summer and winter peak day flows at the City of Morro Bay are expected to exceed the available capacity in the Los Osos Wastewater Reclamation Facility, and therefore an expansion would be required to accommodate the higher flows. A number of peak day flows of over 3 mgd have been observed at the existing Morro Bay facility. Additional information on the Morro Bay project can be found here: <http://morrobaywrf.com/>.

### Preview of Fall Water Quality Data

The fall water quality monitoring event is complete, and data will be incorporated into the 2018 Annual Report. The data is summarized in the attached tables and charts which demonstrate an optimistic trend of increasing water levels and decreasing chlorides.

DRAFT

# Chloride and Water Level Metric Lower Aquifer



◆ Key well spring water level composite      ■ Key well average chloride composite

## Water Quality Results - Lower Aquifer Monitoring

Station ID	Well Name	Basin Plan Well ID	Aquifer Zone	Date	HCO3	Total Hardness	Cond	pH	TDS	Cl	NO3	SO4	Ca	Mg	K	Na
					mg/l	mg/l	umhos/cm		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
30S/10E-11A2	Sand Spit #1 East	LA2	D	3/14/2005	180	4600	16000	7.3	8900	5400	ND	430	770	640	20	1300
				10/21/2015	150	6640	17700	7.4	13100	6300	ND	740	1030	990	31	1560
30S/10E-12J1	MBO5 DWR Obs.	LA11	E	2/14/2005	350	370	1300	8.1	840	77	ND	190	51	58	6.1	110
				11/20/2009	300	360	1150	7.5	732	83	ND	190	51	58	4.4	95
				7/24/2014	360	489	1290	7.7	780	105	ND	212	69	77	5	88
				4/22/2015	360	475	1290	7.8	810	112	ND	189	65	76	5	88
				10/1/2015	250	486	1280	7.3	840	117	ND	188	68	77	4	85
				4/20/2016	330	524	1370	n/a	840	151	ND	193	73	40	5	83
				10/10/2016	350	497	1370	7.1	930	173	ND	189	69	79	4	81
				4/11/2017	350	541	1380	7.5	880	167	ND	186	75	86	4	81
				10/4/2017	300	543	1370	7	850	162	ND	191	76	86	5	90
				4/10/2018	350	595	1390	7.6	820	173	ND	192	85	93	5	97
				10/2/2018	350	497	1340	7.4	870	160	ND	160	69	79	3	87
30S/10E-13J1*	GSWC Rosina	LA10	D	12/20/2004	72	230	720	7.1	410	150	7	14	38	33	1.4	29
				1/14/2010	35	260	778	6	435	200	7.1	13	41	38	1.5	33
				7/24/2014	80	418	1200	7.3	910	303	7.6	16	67	61	2	39
				4/22/2015	80	431	1230	7.1	750	331	8.3	20	69	63	2	39
				10/5/2015	70	460	1280	7	950	329	7.3	19	74	67	2	41
				4/26/2016	80	412	1170	7.1	840	299	8	18	66	60	2	37
				10/12/2016	60	509	1430	6.8	1100	389	8	26.7	82	74	2	44
				4/10/2017	80	327	957	6.9	720	231	11.7	14.7	52	48	2	35
				10/12/2017	80	245	702	6.9	510	164	15	12.5	39	36	2	33
				4/24/2018	70	188	620	7.4	400	136	19	12.3	29	28	1	29
				10/9/2018	70	265	730	7.1	450	152	14.2	12.7	42	39	2	34
30S/10E-13M2	Howard East	LA31	C,D	11/22/2004	51	810	2900	7.3	1500	810	2.4	140	60	120	4.7	210
				12/9/2009	55	1100	3740	7.1	2170	1100	2.2	220	160	160	4.8	370
				8/4/2014	60	757	3340	7.1	2450	990	2.5	178	117	113	5	382
				4/21/2015	60	739	3430	7.3	1930	950	2.5	178	117	113	5	382
				10/6/2015	30	756	3370	7.1	2140	960	2.4	185	115	114	5	342
				4/20/2016	50	726	3520	7.2	2190	941	3.1	179	113	108	5	400
				10/19/2016	70	722	3420	7.4	2190	943	2.8	182	113	107	4	398
				4/17/2017	60	733	3380	6.8	2060	907	2.6	178	114	109	4	413
				10/5/2017	60	738	3350	7.5	2190	960	3.1	160	116	109	5	411
				4/24/2018	70	664	3370	7.2	2020	946	2.8	2.8	103	99	4	367
				10/17/2018	60	740	3400	7.3	2180	834	2.7	153	115	110	5	414

## Water Quality Results - Lower Aquifer Monitoring

Station ID	Well Name	Basin Plan Well ID	Aquifer Zone	Date	HCO3	Total Hardness	Cond	pH	TDS	Cl	NO3	SO4	Ca	Mg	K	Na
					mg/l	mg/l	umhos/cm		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
30S/10E-13N	S&T #5	LA8	D	11/23/2004	42	80	390	6.9	200	67	26	9.2	13	12	1.7	38
				11/19/2009	41	89	386	6.8	267	73	27	11	15	13	1.4	38
				7/24/2014	50	100	438	7.4	270	76	31	10	17	14	2	38
				4/21/2015	50	98	445	6.9	280	77	33.9	11	16	14	2	38
				10/6/2015	40	98	422	7.2	310	75	30	10	16	14	1	38
				4/20/2016	20	97.5	446	7	320	76	32	12	16	14	1	38
				10/13/2016	50	104	470	8	320	79	31.9	12	17	15	1	40
				4/11/2017	50	100	434	7.4	270	77	32.4	12.4	17	14	1	38
				10/2/2017	30	95	438	7.2	290	78	33.5	13.2	15	14	1	36
				4/11/2018	60	104	440	7	260	79	34.8	13.5	17	15	1	39
10/3/2018	60	107	430	6.5	340	66	29.5	12.9	18	15	2	40				
30S/10E-14B2**	Sand Spit #3 Deep	LA3	D	3/15/2005	100	3600	30000	8	17000	8500	ND	960	1200	130	34	4300
				10/21/2015	ND	7140	29500	11	24700	10000	ND	530	2830	20	80	4040
30S/10E-24C1	GSWC Cabrillo	LA9	D	12/20/2004	64	130	610	7	310	110	20	19	22	19	1.6	50
				11/20/2009	60	150	611	7.1	347	130	18	22	23	22	1.6	52
				7/24/2014	40	69	339	7.6	240	46	37	6	11	10	1	32
				4/22/2015	70	117	530	7.3	320	95	24.2	16	19	17	2	45
				10/5/2015	50	75	349	7.6	270	50	33.4	7	12	11	1	34
				4/26/2016	70	115	499	7	300	90	24.6	16	18	17	2	44
				10/12/2016	70	111	506	7.1	320	93	24.4	15.1	18	16	1	44
				4/10/2017	70	111	490	7	310	89	25.1	15.9	18	16	1	43
				10/12/2017	70	117	484	7	270	89	26.7	16.3	19	17	2	46
				4/24/2018	70	115	486	7.8	300	90	27.2	16.7	18	17	1	43
10/9/2018	60	135	477	6.9	280	76	25.7	17.2	21	20	2	50				
30S/11E-7Q3	LOCSD 8th St.	LA12	D	11/18/2004	250	270	790	7.5	410	73	ND	39	44	40	2.3	48
				11/19/2009	220	290	782	7.4	465	92	ND	46	46	42	1.9	53
				7/23/2014	290	303	876	7.6	460	91	ND	43	49	44	2	54
				4/21/2015	290	305	897	7.7	500	101	ND	55	48	45	2	59
				10/6/2015	280	298	828	7.4	490	91	ND	46	47	44	2	55
				4/20/2016	190	307	907	7.7	520	91	ND	49	49	45	2	54
				10/11/2016	280	278	827	4.9	490	93	ND	46.2	44	41	2	52
				4/10/2017	300	294	839	7.3	480	91	ND	49.5	47	43	2	54
				10/4/2017	220	305	826	6.5	470	92	ND	45	48	45	2	56
				4/10/2018	300	319	814	7.7	440	93	ND	46.2	52	46	2	56
10/2/2018	290	283	822	7.3	470	78	ND	50.1	46	41	1	53				

## Water Quality Results - Lower Aquifer Monitoring

Station ID	Well Name	Basin Plan Well ID	Aquifer Zone	Date	HCO3	Total Hardness	Cond	pH	TDS	Cl	NO3	SO4	Ca	Mg	K	Na
					mg/l	mg/l	umhos/cm		mg/l							
30S/11E-17E8	So. Bay Obs. Middle	LA22	D	1/14/2005	150	150	440	7.5	290	34	9.7	11	24	22	1.4	28
				11/20/2009	120	160	455	7.3	255	42	19	12	25	23	1.3	29
				7/23/2014	150	166	500	7.6	270	43	28	10	27	24	2	28
				4/21/2015	150	157	481	7.6	270	49	31.4	13	25	23	1	28
				10/1/2015	120	164	475	7.4	290	44	29.2	10	26	24	1	28
				4/19/2016	150	164	476	6.9	290	45	30.5	12	26	24	1	29
				10/13/2016	140	161	521	7.3	290	46	30.6	11.9	25	24	1	29
				4/13/2017	150	164	466	7.3	300	46	29.7	13.2	26	24	1	29
				10/11/2017	150	168	476	7.7	260	47	32	14	26	25	1	29
				4/16/2018	150	165	473	6.4	310	47	29.7	14.2	25	25	1	29
10/10/2018	150	160	471	7.5	250	43	26.9	15	26	23	1	28				
30S/11E-17N10	GSWC So. Bay #1	LA20	C,D,E	Jan 2003	250	--	510	7.1	290	37	ND	21	41	25	1.3	35
				11/20/2009	230	220	638	7.3	357	41	2.4	30	35	33	1.7	37
				7/24/2014	280	232	646	7.7	370	37	2.3	24	37	34	2	41
				4/22/2015	290	234	653	7.4	360	43	2.5	27	36	35	2	42
				10/5/2015	280	227	614	7.2	370	38	2.4	23	35	34	2	41
				4/26/2016	230	227	629	7.1	360	39	2.6	27	35	34	2	40
				10/12/2016	290	221	631	7	370	40	2.5	25.2	34	33	2	40
				4/10/2017	280	227	624	7.2	380	39	2.7	26.7	35	34	2	40
				10/12/2017	260	240	583	6.6	320	41	2.9	27.9	37	36	2	43
				4/24/2018	200	166	515	7.4	330	43	14.1	23.2	27	24	2	31
10/9/2018	290	273	632	7.2	340	38	2.8	29.2	42	41	3	47				
30S/11E-18K8	10th St. Obs. East (Deep)	LA18	E	1/19/2005	260	290	650	7.5	370	33	ND	38	62	33	2.5	28
				11/20/2009	230	220	620	7.5	378	32	ND	40	51	24	1.8	23
				7/24/2014	290	271	647	7.5	380	28	ND	34	56	32	2	27
				4/21/2015	290	265	634	7.7	400	33	ND	39	55	31	2	27
				10/19/2015	230	256	621	7.3	370	29	ND	33	53	30	2	26
				4/20/2016	190	265	700	7.5	390	31	ND	38	55	31	2	26
				10/18/2016	290	256	615	6.8	370	31	ND	35.9	53	30	2	26
				4/12/2017	290	274	616	7.5	450	31	ND	38	57	32	2	27
				10/10/2017	220	271	619	7.8	350	30	ND	35.5	56	32	2	27
				4/17/2018	290	260	625	7.3	390	33	ND	39.9	53	31	2	27
10/10/2018	290	254	608	7.5	360	31	ND	39.8	54	29	2	26				

## Water Quality Results - Lower Aquifer Monitoring

Station ID	Well Name	Basin Plan Well ID	Aquifer Zone	Date	HCO3	Total Hardness	Cond	pH	TDS	Cl	NO3	SO4	Ca	Mg	K	Na
					mg/l	mg/l	umhos/cm		mg/l							
30S/11E-18K9	LOCS D 10th St.	LA32	C,D	May 2002	250	--	550	6.9	320	37	1	26	31	32	--	39
				11/20/2009	180	160	539	7.2	307	36	4.6	27	27	24	1.3	32
				7/23/2014	220	190	546	7.7	300	32	4.3	20	30	28	1	35
				4/21/2015	190	108	504	7.6	270	38	7	20	17	16	1	
				10/6/2015	50	62	248	7.2	190	31	26.2	3	10	9	ND	21
				4/20/2016	130	121	382	7.5	220	32	14.6	12	19	18	1	27
				10/11/2016	200	168	511	6.6	270	36	5.3	21.5	26	25	1	34
				4/10/2017	190	155	461	7.3	270	35	8.4	19.1	24	23	1	31
				10/9/2017	200	168	493	7.6	270	36	6.3	23.1	26	25	1	33
				4/10/2018	50	75.2	256	7.7	150	35	28.6	28.6	12	11	ND	23
				10/2/2018	210	168	492	7.3	270	36	5.9	22	26	25	ND	33
30S/11E-18L2***	LOCS D Palisades	LA15	D,E	11/18/2004	220	330	880	7.3	420	120	ND	31	54	48	2.2	40
			D,E	11/19/2009	200	590	1460	7.2	890	360	1.8	39	94	86	2	44
			D	7/23/2014	250	293	783	7.8	390	90	1.8	26	48	42	2	40
			D	4/29/2015	80	78	348	7.4	230	43	22	10	13	11	ND	30
			D	10/28/2015	230	288	782	7.4	420	104	2.8	29	46	42	ND	36
			D	4/27/2016	230	264	796	7.3	450	93	4.1	28	43	38	2	43
			D	10/11/2016	200	221	694	7	380	91	7.3	25.5	36	32	1	35
			D	10/5/2017	180	306	768	7.6	400	102	3.3	27	50	44	2	40
			D	4/10/2018	250	311	767	7.3	420	100	3.4	32.4	52	44	2	40
				10/23/2018	250	288	772	7.7	440	83	2.8	30.7	48	41	1	38

ND = Not Detected

Chloride Metric Wells in Green (13J1 weighted x2); current chloride concentrations in red

\*Chloride concentrations at 13J1 have varied seasonally by 100+ mg/l, and are affected by well production, so fluctuations are expected.

\*\*\*Water from 18L2 affected by borehole leakage/upper aquifer influence when inactive

**Table 2 Legend and Detection Limits**

Constituent	Description	Practical Quantitation Limit*
HCO3	Bicarbonate Alkalinity in mg/L CaCO3	10.0
Total Hardness	Total Hardness in mg/L CaCO3	--
Cond	Electrical Conductance in umhos/cm	1.0
pH	pH in pH units	--
TDS	Total Dissolved Solids in mg/L	20.0
Cl	Chloride concentration in mg/L	1.0
NO3	Nitrate concentration in mg/L	0.5
SO4	Sulfate concentration in mg/L	2.0
Ca	Calcium concentration in mg/L	1.0
Mg	Magnesium concentration in mg/L	1.0
K	Potassium concentration in mg/L	1.0
Na	Sodium concentration in mg/L	1.0

\*where dilution not required

**TO: Los Osos Basin Management Committee**

**FROM: Rob Miller, Interim Executive Director**

**DATE: November 14, 2018**

**SUBJECT: Item 7A. – Update on Status of Basin Plan Infrastructure Projects**

### **Recommendations**

Receive report and provide input to staff for future action.

### **Discussion**

The Basin Management Plan for the Los Osos Groundwater Basin (Plan) was approved by the Court in October 2015. The Plan provided a list of projects that comprise the Basin Infrastructure Program (Program) that were put forth to address the following immediate and continuing goals:

#### Immediate Goals

1. Halt or, to the extent possible, reverse seawater intrusion into the Basin.
2. Provide sustainable water supplies for existing residential, commercial, community and agricultural development overlying the Basin.

#### Continuing Goals

1. Establish a strategy for maximizing the reasonable and beneficial use of Basin water resources.
2. Provide sustainable water supplies for future development within Los Osos, consistent with local land use planning policies.
3. Allocate costs equitably among all parties who benefit from the Basin's water resources, assessing special and general benefits.

The Program is divided into five parts, designated Programs A through D and Program M. Programs A and B shift groundwater production from the Lower Aquifer to the Upper Aquifer, and Programs C and D shift production within the Lower Aquifer from the Western Area to the Central and Eastern Areas, respectively. Program M was also established in the Basin Management Plan for the development of a Groundwater Monitoring Program (See Chapter 7 of the BMP), and a new lower aquifer monitoring well in the Cuesta by the Sea area was recommended in the 2015 Annual Report. Program U is the Urban Water Reinvestment Program that addresses the use of recycled water within the Basin. The Creek Discharge project was added under this heading. The attached table provides a comprehensive project status and summary.

<b>Project Name</b>	<b>Parties Involved</b>	<b>Funding Status</b>	<b>Capital Cost</b>	<b>Status</b>
<b>Program A</b>				
Water Systems Interconnection	LOCSD/ GSWC	Completed		
Upper Aquifer Well (8 <sup>th</sup> Street)	LOCSD	Fully Funded	\$250,000	Well was drilled and cased in December 2016. Budget remaining \$250,000 to equip the well. Design is 100% complete and District is pursuing IRWM matching funds. If available, it is hoped that matching funds will be available by Q1 of 2019. Completion of construction is expected by August 2019.
South Bay Well Nitrate Removal	LOCSD	Completed		
Palisades Well Modifications	LOCSD	Completed		
Blending Project (Skyline Well)	GSWC	Completed		
Water Meters	S&T	Completed		
<b>Program B</b>				
LOCSD Wells	LOCSD	Not Funded	BMP: \$2.7 mil	Project not initiated
GSWC Wells	GSWC	Not Funded	BMP: \$3.2 mil	Project not initiated
Community Nitrate Removal Facility	LOCSD/GSWC	Partial	First phase combined with GSWC Program A	GSWC's Program A Blending Project allows for incremental expansion of the nitrate facility and can be considered a first phase in Program B.

Project Name	Parties Involved	Funding Status	Capital Cost	Status
<b>Program C</b>				
Expansion Well No. 1 (Los Olivos)	GSWC			Completed
Expansion Well No. 2	GSWC/LOCSO	Cooperative Funding	BMP: \$2.0 mil	Property acquisition phase is on-going through efforts of LOCSO. Four sites are currently being reviewed and a community workshop was held on 8/30/2018. Due to community concerns over siting, environmental review and permitting is expected to be on going through Q1 of 2020, with construction complete by Q1 of 2021. The LOCSO authorized the preparation of bid documents for a test well at Site A (Los Osos Middle School) at their 11/1/18 meeting. The scope of work and staff report is attached.
Expansion Well 3 and LOVR Water Main Upgrade	GSWC/LOCSO	Cooperative Funding	BMP: \$1.6 mil	This project has been deferred under Adaptive Management.
LOVR Water Main Upgrade	GSWC	May be deferred	BMP: \$1.53 mil	Project may not be required, depending on the pumping capacity of the drilled Program C wells. It may be deferred to Program D.
S&T/GSWC Interconnection	S&T/GSWC	Pending	BMP: \$30,000	In conceptual design
<b>Program M</b>				
New Zone D/E lower aquifer monitoring well in Cuesta by the Sea	All Parties	Funded through BMC Budget	\$115,000 (2018 BMC Budget Item 9)	A wetlands delineation was completed in July 2018. A Minor Use Permit Application was submitted and awaiting County determination for completeness. Anticipated to go to hearing in Q1 of 2019. Construction is expected in Q2 of 2019.
<b>Program U</b>				
Creek Discharge Program	All Parties	Funded through BMC Budget/grants	\$582,000 through feasibility phase	The 2019 draft Work Plan includes funding for limited baseline monitoring and Soil Aquifer Treatment evaluation

Los Osos Basin Management Committee  
Basin Plan Infrastructure Projects

ID	Task Name	2018				2019				2020				2021			
		Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	
1	<b>Program A: Upper Aquifer Well (8th Street)</b>																
2	Engineering																
3	Matching Funds Available																
4	Bidding and Construction																
5	<b>Program C: Expansion Well #2</b>																
6	Land Acquisition Phase																
7	Environmental Studies and Coastal Development Permit																
8	Engineering																
9	Bidding and Construction																
10	<b>Program M: New Zone D/E lower aquifer monitoring well in Cuesta by the Sea</b>																
11	Design																
12	Permitting/Planning Commission Hearing																
13	Bidding and Construction																



November 1, 2018

**TO:** LOCSO Board of Directors  
**FROM:** Rob Miller, PE, District Engineer  
**SUBJECT:** **Agenda Item 12A – 11/1/2018 Board Meeting**  
Test Well for Basin Management Plan Program C, Site A  
Adjacent to Los Osos Middle School

**President**  
Vicki L. Milledge

**Vice President**  
Marshall E. Ochylski

**Directors**  
Charles L. Cesena  
Louis G. Tornatzky  
Christine M. Womack

**General Manager**  
Renee Osborne

**District Accountant**  
Robert Stilts, CPA

**Unit Chief**  
Scott M. Jalbert

**Battalion Chief**  
Greg Alex

**Mailing Address:**  
P.O. Box 6064  
Los Osos, CA 93412

**Offices:**  
2122 9<sup>th</sup> Street, Suite 102  
Los Osos, CA 93402

**Phone:** 805/528-9370  
**FAX:** 805/528-9377

[www.lososocsd.org](http://www.lososocsd.org)

### **DESCRIPTION**

Section 10.4 of the Basin Plan describes Basin Infrastructure Program C as a production shift in the lower aquifer from the Western Area to the Central Area. As discussed in a public workshop on August 30, 2018, the District is pursuing one additional lower aquifer well to the east of South Bay Boulevard. Four alternative sites are under consideration as described below. Site A (Los Osos Middle School) may be suitable, but additional subsurface field testing must be performed to confirm that adequate water production can be achieved. Staff is recommending that the Board contract with Cleath Harris Geologists (CHG) to prepare bid documents for the proposed test well and bring back construction bids for Board consideration.

### **STAFF RECOMMENDATION**

Staff recommends that the Board authorize staff to prepare bid documents and secure construction bids for subsequent Board approval for the installation of a temporary test well at Site A (adjacent to Los Osos Middle School). Staff further recommends that the Board authorize staff to retain CHG in an amount not to exceed \$9,500.

### **DISCUSSION**

Section 10.4 of the Basin Plan describes Infrastructure Program C as follows:

*Program C includes a set of infrastructure improvements that would allow the Purveyors to shift some groundwater production within the Lower Aquifer from the Western Area to the Central Area. Since groundwater production from the Central Area induces less seawater intrusion than the same amount of production from the Western Area, this landward shift increases the Sustainable Yield of the Basin. Program C consists of three wells located on the eastern side of the Central Area, an upgrade to GSWC's water main located along Los Osos Valley Road and pipelines to connect each of the expansion wells to that main.*

*The three wells in Program C would be located to prevent or minimize impacts to private wells already producing groundwater from the Central Area. That is expected to be possible because the new wells would penetrate the Lower Aquifer, whereas existing domestic wells are concentrated in the Upper Aquifer.*

In general, the three wells (Expansion Wells 1, 2, and 3) were intended to be located to the west of Los Osos Creek, and in the central portion of the Basin.

Golden State Water Company (GSWC) previously completed Expansion Well No. 1 at its Los Olivos tank site. CHG recently prepared a draft supplemental evaluation of the current status of the basin entitled "Los Osos Basin Plan Metric Trends Review and Infrastructure Program C Evaluation" dated August 17, 2018. The document concludes that with current water demands no additional Program C Expansion Wells are required. However, the report notes that other factors including reliability, drought impacts and recycled water distribution support the installation of one additional Expansion Well.

The District is currently considering four alternative sites for a second Expansion Well. The sites are shown on Figure 1 on the following page. In its community workshop in August 2018, the District received substantial public input in opposition to Well Sites B and C, and subsequent input from the public has been in general opposition to Site D. At this time, Site A (Los Osos Middle School) appears to be the least challenging location from the perspective of community acceptance. However, the lower aquifer is expected to have a reduced thickness at Site A compared to the three other sites, and water production may therefore be insufficient to warrant an investment in a municipal supply well. A minimum annual volume of 100 acre-feet per year should be available to justify a permanent well.

Initial geologic review indicates that Site A may produce the minimum volume required. However, only a physical test hole drilled to the required depth of 300 feet can confirm this assumption before additional funds are invested. Staff recommends that a test well be constructed at Site A and analyzed prior to environmental review or additional discussion of alternatives. The attached proposal from CHG includes the preparation of bidding documents for the proposed test well. If possible, the 5-inch diameter casing will remain in place for future monitoring. If not, the casing will be removed and the temporarily well will be backfilled as required by State guidelines.

Staff is recommending that the District contract with CHG as noted in the attached proposal (Attachment A) in an amount not to exceed \$9,500. Firm bids from well drillers would be brought back for Board action, though the cost is expected to be in the range of \$50,000. CHG may also require some hourly assistance from the District Engineer to address the exact siting of the test hole, discussions with the School District and County, and any permits that may be required.

**FINANCIAL IMPACT**

The proposed contract with CHG includes an hourly fee that will not exceed \$9,500. The District Engineer will provide supporting services as necessary, and firm bids will be brought back to the Board prior to entering into a contract with a drilling company for the Site A test.

Attachment

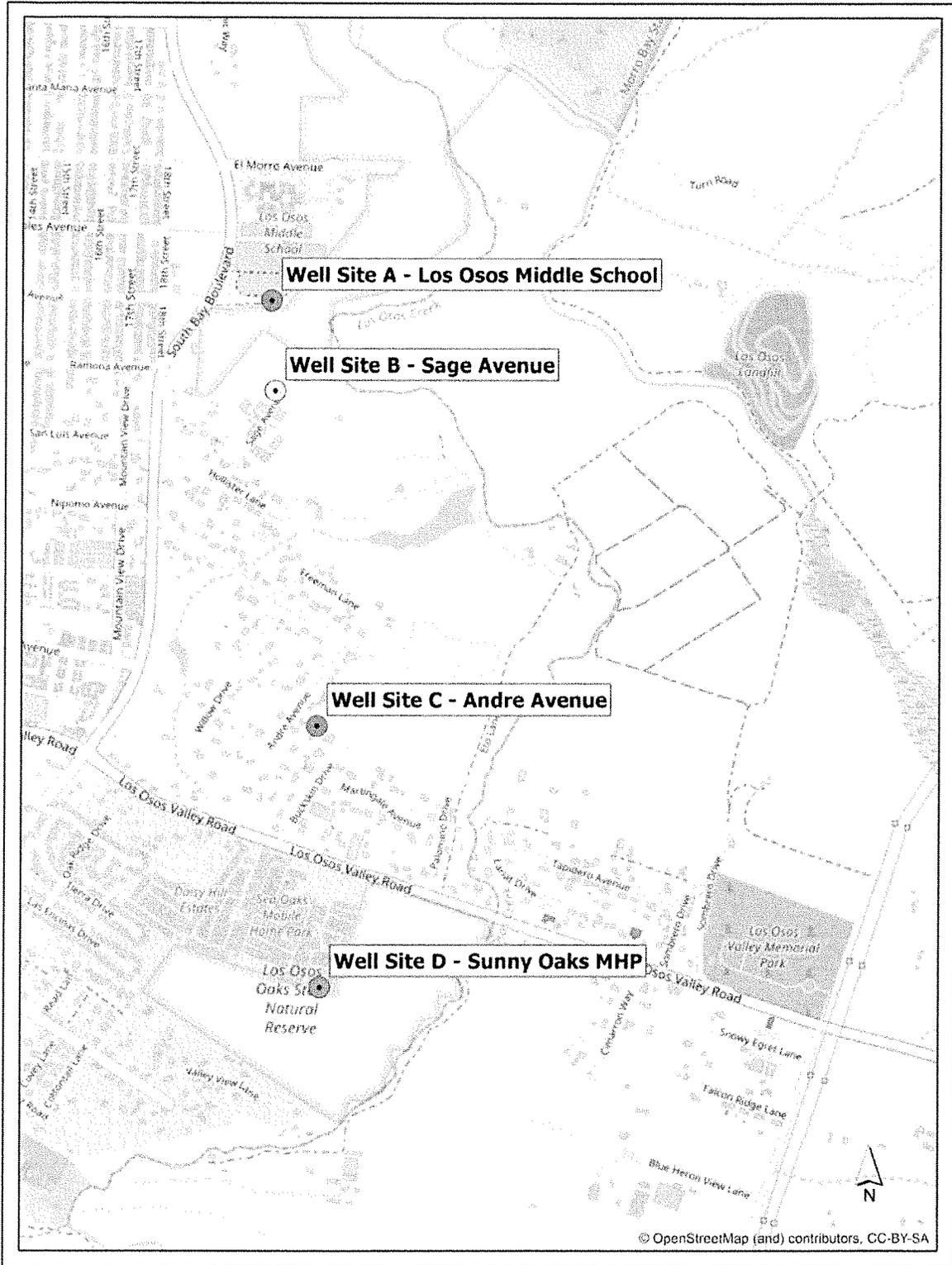


Figure 1

Cleath-Harris Geologists, Inc.  
71 Zaca Lane, Suite 140  
San Luis Obispo, California 93401  
(805) 543-1413



September 28, 2018

Mr. Robert S. Miller, P.E.  
District Engineer  
Los Osos Community Services District  
2122 9<sup>th</sup> Street, Suite 102  
Los Osos, CA 93402

**SUBJECT: Proposal for Hydrogeologic Services for Expansion Well Program C Test Well,  
Los Osos, California.**

Dear Mr. Miller:

Cleath-Harris Geologists (CHG) proposes to provide hydrogeologic services to assist with completing a 5-inch diameter, PVC test well at Program C Expansion Well Site A (Los Osos Middle School). The purpose of the test well would be to evaluate the potential capacity and water quality of a future municipal supply well at Site A. The test well would then convert to a lower aquifer monitoring well for the basin groundwater monitoring program. This proposal presents a scope of work and estimated cost for these services.

### **SCOPE OF WORK**

The tasks that CHG will perform include the following:

- Stake proposed well location(s) and obtain GPS coordinates. The anticipated location is at the east end of the dirt parking lot for the school play fields.
- Provide specification and bid sheet for soliciting bids from drillers (5-inch diameter PVC well completed to a depth of 300 feet). Attend pre-bid site meeting (optional) and pre-construction meeting with selected driller, as needed.
- Coordinate drilling rig mobilization and on-site activities.
- Log test hole, interpret geophysical logs.
- Provide final design and well construction monitoring. If test hole results are considered unsatisfactory (insufficient aquifer thickness), no well would be completed.
- Coordinate well development and testing, including 12-hour pumping test and pneumatic slug test. Collect water samples and submit to analytical laboratory for water quality analyses (general minerals, general physical and inorganic constituents).
- Provide report documenting well construction and testing, including interpretation of test results. Estimate discharge capacity and water quality for a full-diameter production well at the site.



## ESTIMATED COSTS

CHG proposes to perform the above scope of work on an hourly rate plus expenses basis in accordance with the attached terms of fees and conditions and hourly rate schedule. The estimated cost for professional services is **\$9,500**. Laboratory analytical cost for water quality testing is estimated at \$500. Drilling contractor cost for the test well is estimated at \$40,000, including geophysics and test pumping. Total project costs are estimated at \$50,000.

This proposal is for professional hydrogeologic services only. Los Osos CSD may contract directly with the driller and analytical laboratory for services. CHG will provide services in a timely manner to expedite the project, subject to County well permit application approval and drilling contractor availability.

## SCHEDULE OF HOURLY RATES

Principal Hydrogeologist	\$ 160
Senior Hydrogeologist	\$ 150
Project Geologist	\$ 130
Staff Geologist II	\$ 120
GIS Specialist/Environmental Scientist	\$ 120
Staff Geologist I	\$ 110

## EXPENSES

Mileage \$0.54/mile  
Other expenses at cost plus 10 percent handling.

## AGREEMENT

If the above described work scope and fees and conditions are acceptable, this proposal will serve as the basis for agreement with your signature affixed below.

**Cleath-Harris Geologists, Inc.**

---

Spencer J. Harris  
Vice President



## SCHEDULE OF FEES AND CONDITIONS

- Invoices will be submitted monthly. The invoice is due and payable upon receipt.
- In order to defray carrying charges resulting from delayed payments, simple interest at the rate of ten percent (10%) per annum (but not to exceed the maximum rate allowed by law) will be added to the unpaid balance of each invoice. The interest period shall commence 30 days after date of original invoice and shall terminate upon date of payment. Payments will be first credited to interest and then to principle. No interest charge would be added during the initial 30 day period following date of invoice.
- The fee for services will be based on current hourly rates for specific classifications and expenses. Hourly rates and expenses included in the attached schedule are reevaluated on January 1 and July 1 of each year.
- Documents including tracings, maps, and other original documents as instruments of service are and shall remain properties of the consultant except where by law or precedent these documents become public property.
- If any portion of the work is terminated by the client, then the provisions of this Schedule of Fees and Conditions in regard to compensation and payment shall apply insofar as possible to that portion of the work not terminated or abandoned. If said termination occurs prior to completion of any phase of the project, the fee for services performed during such phase shall be based on the consultant's reasonable estimate of the portion of such phase completed prior to said termination, plus a reasonable amount to reimburse consultant for termination costs.
- If either party becomes involved in litigation arising out of this contract or the performance thereof, the court in such litigation shall award reasonable costs and expenses, including attorney's fees, to the party justly entitled thereto. In awarding attorney's fees the court shall not be bound by any court fee schedule, but shall, if it is in the interest of justice to do so, award the full amount of costs, expenses, and attorney's fees paid or incurred in good faith.
- All of the terms, conditions and provisions hereof shall inure to the benefit of and be binding upon the parties hereto and their respective successors and assigns, provided, however, that no assignment of the contract shall be made without written consent of the parties to the agreement.

**TO: Los Osos Basin Management Committee**

**FROM: Rob Miller, Interim Executive Director**

**DATE: November 14, 2018**

**SUBJECT: Item 7b – Discussion of CHG Report on Los Osos Basin Plan Metric Trends Review and Infrastructure Program C Evaluation**

**Recommendation**

Receive draft report and provide input to staff for future action.

**Discussion**

In March 2018, the BMC retained Cleath Harris Geologists (CHG) to prepare a study evaluating Basin Infrastructure Program C in the context of current water demand and basin metrics. The draft results of this study were released as part of the August 2018 BMC meeting. While the content and conclusions remain the same in the attached refined draft, CHG and staff elected to clarify the naming convention of the Program C Expansion Wells. In this new draft, each of the three wells are identified by location (northern, central, southern) as opposed to number (Well 1, 2, etc..). The previous numbering sequence could be confused with the order of Expansion Well installation.

While the study concludes that Expansion Well No. 1, which was previously installed by GSWC, is sufficient to meet Basin Plan metrics for the existing population, it is also clear that one additional well is recommended for the following reasons:

1. Water system reliability and flexibility
2. Drought impacts, given that the Basin Plan model is based on 17.5” of average rainfall
3. Efficient use of recycled water

Now that BMC members have had additional time to review the concepts in the document, additional substantive discussion of the draft can be conducted at the meeting. It is our understanding that formal comments from the LOCSB Board may be forthcoming, so staff is not currently recommending final adoption of the report.

Cleath-Harris Geologists, Inc.  
71 Zaca Lane, Suite 140  
San Luis Obispo, CA 93401  
(805) 543-1413



## Technical Memorandum

**Date:** August 27, 2018

**From:** Spencer Harris, HG 633

**To:** Rob Miller, P.E., Interim Executive Director  
Los Osos Groundwater Basin Management Committee

**SUBJECT:** **Los Osos Basin Plan Metric Trends Review and Infrastructure Program C Evaluation (DRAFT).**

Dear Mr. Miller:

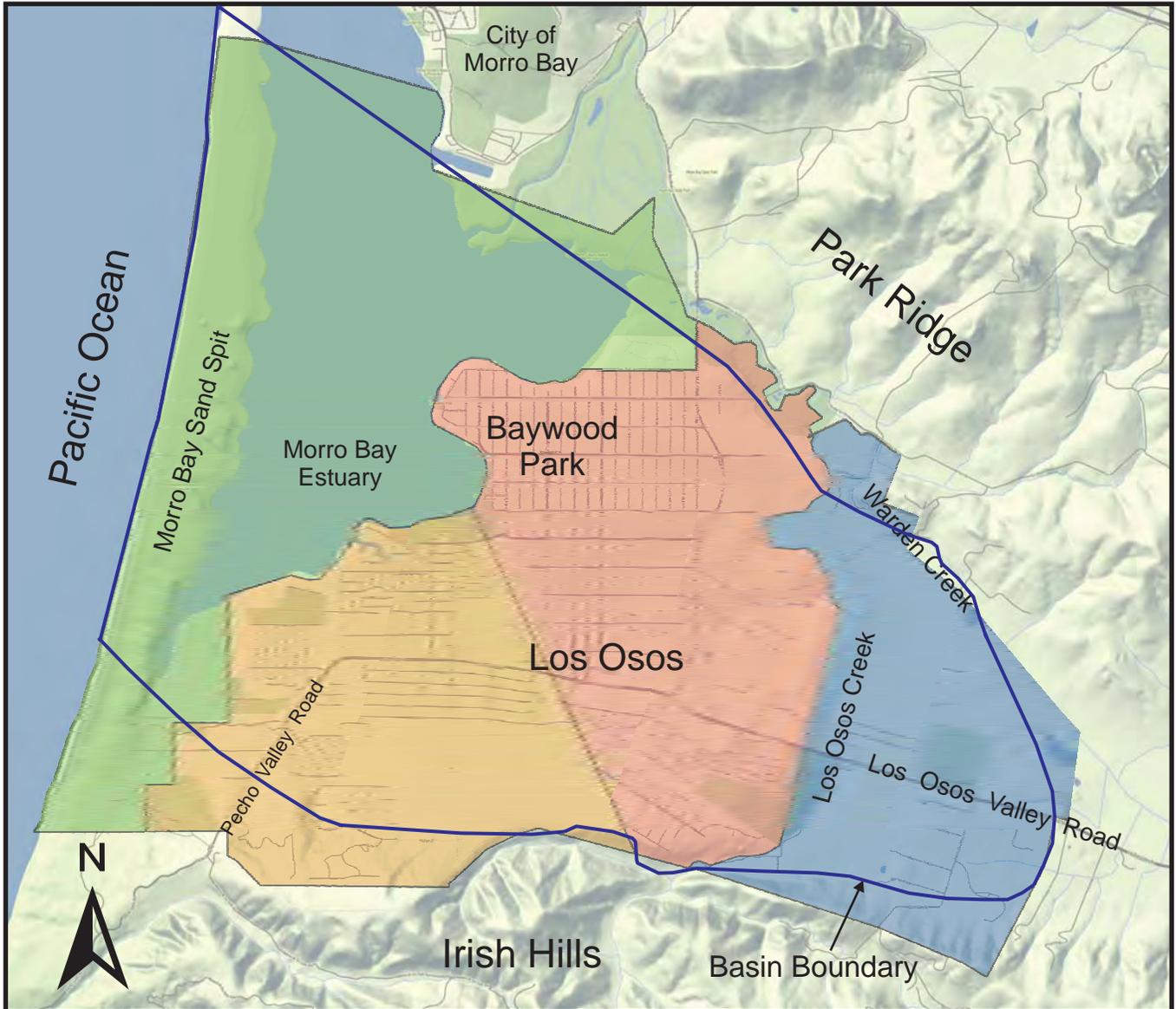
Cleath-Harris Geologists (CHG) has performed a metric trends review and basin infrastructure Program C evaluation as part of adaptive management for 2018. The purpose of this effort was to provide the Los Osos Basin Management Committee (BMC) with information and recommendations for making adjustments to the Los Osos Basin Plan (LOBP), as appropriate, based on a comparison of current basin metric trends with the anticipated trends, along with an evaluation of Program C using an updated existing population scenario. This memorandum presents the results of the adaptive management review.

### Background

BMC members include water purveyors Golden State Water Company (GSWC), Los Osos Community Services District (LOCSD), and S&T Mutual Water Company, along with the County of San Luis Obispo. The basin refers to the adjudicated portion of the Los Osos Valley Groundwater Basin (DWR Basin 3-8), for which a Stipulated Judgment and the LOBP were approved by the San Luis Obispo Superior Court in October 2015. Figure 1 shows the basin and associated plan area boundaries. A brief overview of Program C and the basin metrics is provided below.

### Basin Infrastructure Program C

Program C includes a set of infrastructure improvements that would allow the water purveyors to shift some groundwater production within the Lower Aquifer from the Western Area to the Central Area (Figure 1). Groundwater production from the Central Area generally results in less seawater intrusion than the same amount of production from the Western Area, which increases the sustainable yield of the Basin. Program C consists of three Expansion Wells located on the eastern side of the Central Area and associated pipelines. Implementation of Program C would have a direct, beneficial impact on mitigating seawater intrusion. (LOBP; ISJ, 2015).



Base Image: Stamen-Terrain

Explanation

Los Osos Basin Plan Areas:

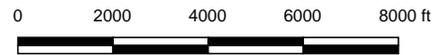
 Dunes and Bay Area

 Western Area

 Central Area

 Eastern Area

 Basin Boundary from Los Osos Basin Plan



Scale: 1 inch ≈ 4,000 feet

Figure 1  
Basin Location and Plan Areas  
Los Osos Groundwater Basin  
2018 Adaptive Management TM

Cleath-Harris Geologists



General areas for the Program C Expansion Wells were described in the LOBP. These areas, with some adjustments noted below, are shown in Figure 2.

*South Expansion Well Area* - Vicinity of the mobile home parks south of Los Osos Valley Road in the GSWC service area.

*Central Expansion Well Area* - Vicinity of Andre Avenue and Buckskin Avenue in the GSWC service area, similar to the original area identified for Expansion Well No. 2 in the LOBP.

*North Expansion Well Area* - Vicinity of north end of Sage Avenue east of the LOCSO service area. The area also includes a site currently under consideration in the south parking lot of the Los Osos Middle School play fields.

*Expansion Well No. 1 (COMPLETED)* - Originally planned in the vicinity of Buckskin Avenue north of Los Osos Valley Road and within the GSWC service area. GSWC relocated Expansion Well No. 1 to Los Olivos Avenue, and constructed a new Lower Aquifer well there in 2016.

The Program C evaluation for adaptive management considers whether additional Expansion Wells are needed, under current basin water demand, to achieve a Basin Yield Metric targeted value of 80 (BYM 80) or lower, and a distribution of pumping that reverses the historical seawater intrusion trend and maintains a stationary intrusion front at a location closer to the coast in accordance with LOBP goals. The seawater intrusion front for the basin is defined as the 250 mg/L chloride concentration contour.

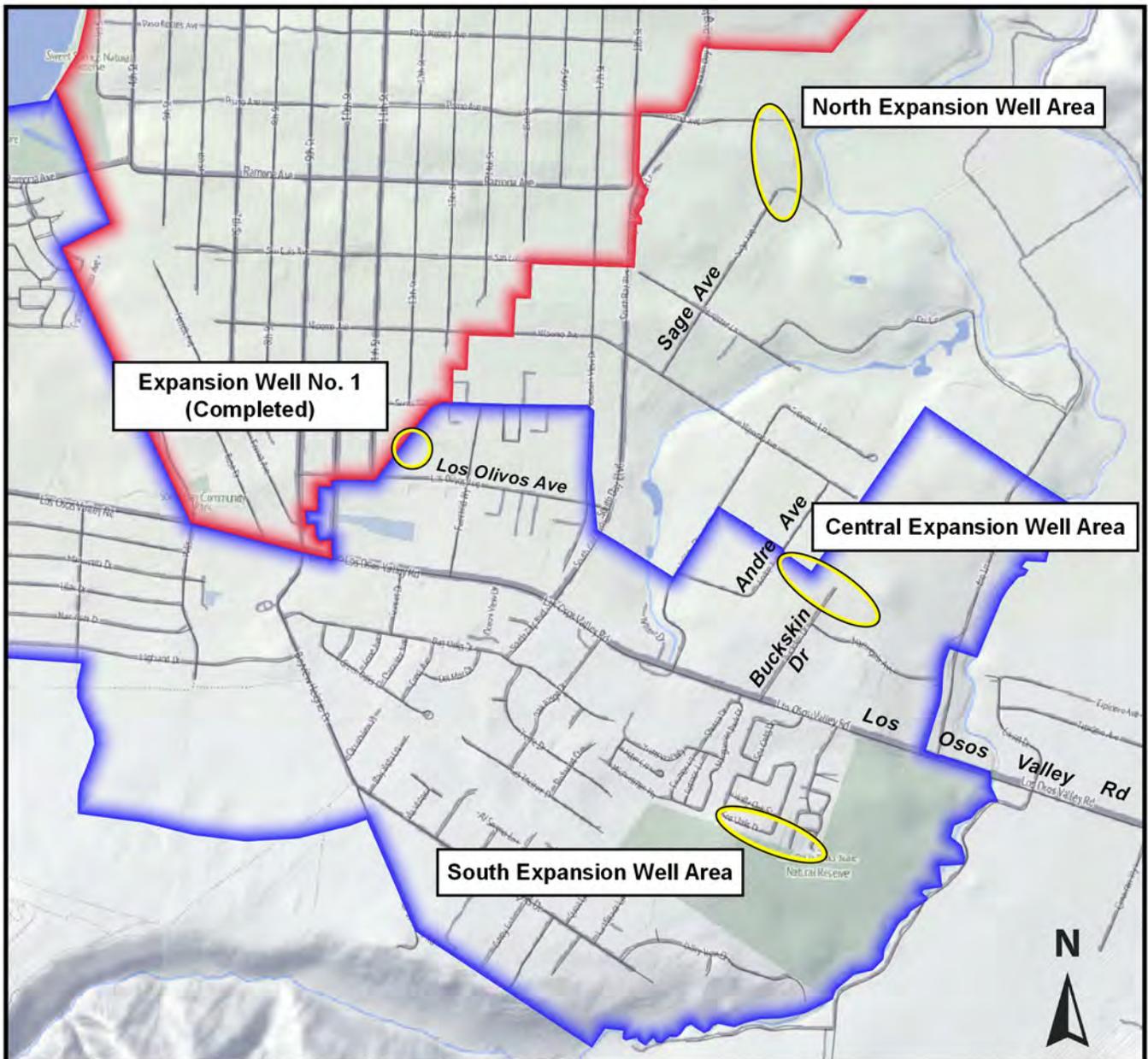
## Basin Metrics

The LOBP established two methods for measuring progress on seawater intrusion mitigation, one based on comparing annual groundwater extractions with the estimated sustainable yield of the basin as calculated by the basin numerical groundwater model, and one based on evaluating water level and water quality data from the Groundwater Monitoring Program. The first method involves the Basin Yield Metric and the Basin Development Metric, while the latter method involves the Water Level Metric, The Chloride Metric, and the Nitrate Metric. A fourth monitoring-based measure, the Water Level Profile, was introduced in the 2017 Annual Groundwater Monitoring Report (CHG, 2018).

The metrics based on groundwater extractions are management tools. The Basin Yield Metric is used for comparing different infrastructure and pumping distribution combinations with respect to seawater intrusion mitigation and sustainable yield. The Basin Development Metric is a representation of the percentage of the Basin's maximum potential sustainable yield that has been developed, and is useful for identifying infrastructure programs needed to meet current and future water demands.

Only the Basin Yield Metric has a nexus with some of the physical metrics based on groundwater monitoring data. Both the Water Level Metric and the Chloride Metric are

# DRAFT



Base Image: Stamen-Terrain

0 750 1500 2250 3000 ft



Scale: 1 inch ≈ 1,500 feet

## Explanation

 Potential Expansion Well Areas

## Water Systems

 Golden State Water Company - Los Osos

 Los Osos CSD

Figure 2  
Program C Potential Well Locations  
Los Osos Groundwater Basin  
2018 Adaptive Management TM

Cleath-Harris Geologists



measures of effectiveness for Lower Aquifer seawater intrusion mitigation, and can be correlated to changes in the Basin Yield Metric. The Basin Development Metric tracks infrastructure program development relative to maximum potential sustainable yield, which does not correlate in real time with changes in groundwater monitoring data.

There is no also correlation between the Basin Yield Metric and the Nitrate Metric. Sustainable yield in the basin is constrained primarily by the need to prevent Lower Aquifer seawater intrusion. Nitrate concentrations in the Upper Aquifer play a major role in basin infrastructure, and are the primary focus of Program B, but the Nitrate Metric itself is independent of Lower Aquifer seawater intrusion mitigation.

### **Basin Metric Trends Review**

Trends in the basin metrics are indicators of whether basin conditions are improving or deteriorating over time, and can be compared to anticipated trendlines for adaptive management. Metric trends from the 2017 Annual Groundwater Monitoring Report are included in Attachment A. Anticipated trendlines for the Water Level Metric, Chloride Metric and Nitrate Metric from the LOBP are included in Attachment B. Note that actual basin metric trends are not expected to follow straight lines, but the trendlines shown in Attachment B are useful to depict the general nature of the anticipated trends.

#### Basin Yield Metric and Water Level Metric

A comparison between Basin Yield Metric and Water Level Metric trends over time is shown in Figure 3. The Basin Yield Metric compares the actual amount of groundwater extracted in a given year with the sustainable yield of the basin under then-current conditions. For example, the Basin Yield Metric for 2017 is a ratio expressed as follows:

$$\frac{\text{Year 2017 Groundwater Production}}{\text{Year 2017 Sustainable Yield}} * 100$$

A Basin Yield Metric of 100 (BYM 100) indicates that production is equal to the estimated sustainable yield. The LOBP established the Basin Yield Metric target at 80 (BYM 80) or less, so that at least 20 percent of the yield of the basin can be used as a buffer against uncertainty.

As shown in Figure 3, the Basin Yield Metric and the Water Level Metric are closely correlated due to the relationship between groundwater production and water levels. Between 1973 and 1988, a relatively sharp increase in the Basin Yield Metric (and associated groundwater production) is accompanied by a sharp decrease in the Water Level Metric. The trends for both metrics are reversed between 1989 and 2009, with flatter trendline slopes. Between 2009 and 2017 there was a relatively sharp decrease in the Basin Yield Metric (and associated groundwater production), accompanied by a sharp increase in the Water Level Metric.

DRAFT

### Basin Yield Metric and Water Level Metric

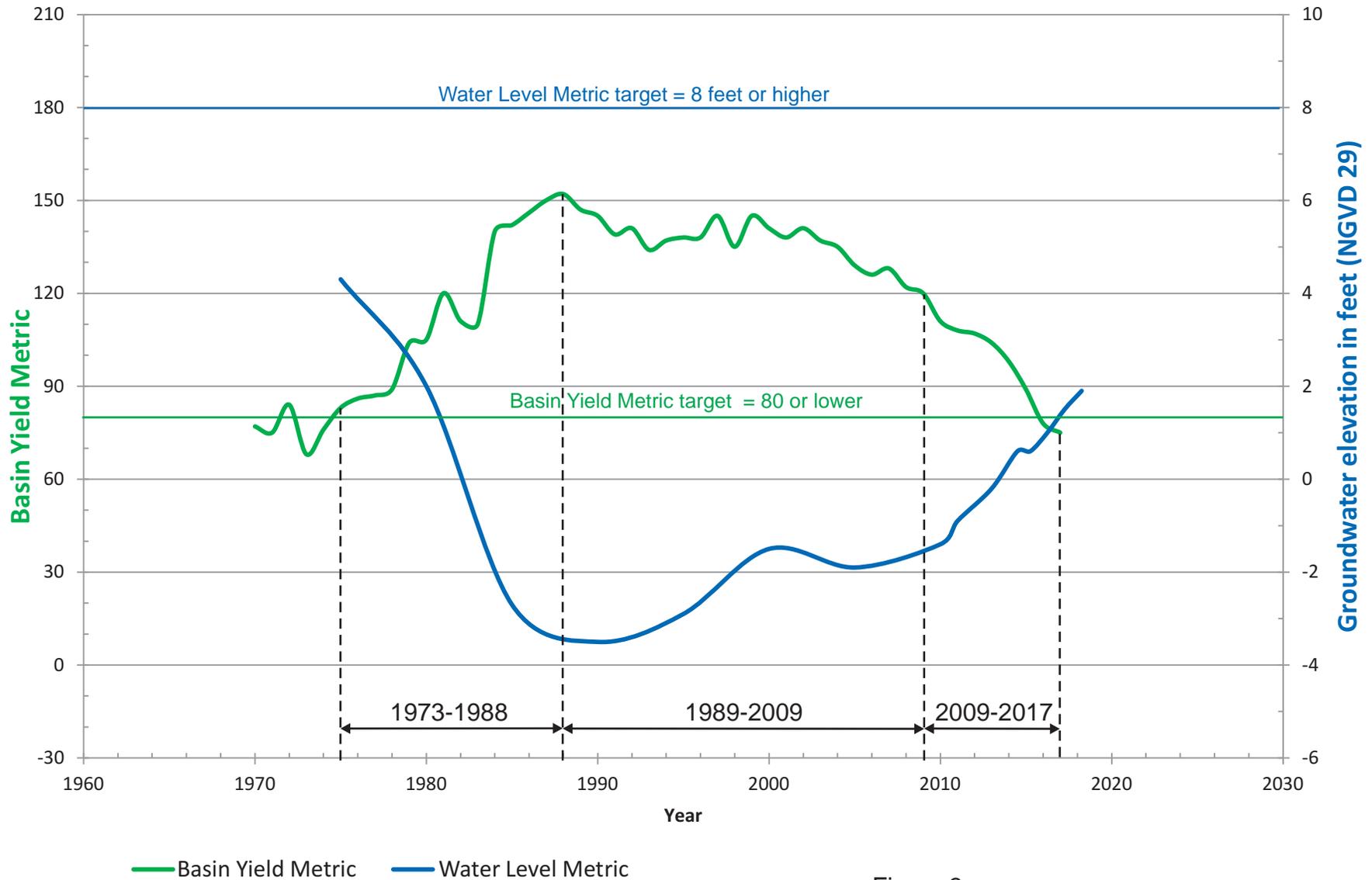


Figure 3  
Basin Yield Metric and Water Level Metric  
Los Osos Groundwater Basin  
2018 Adaptive Management TM

Cleath-Harris Geologists



The anticipated trendline for the Water Level Metric was rising to reach the targeted value of 8 feet above mean sea level within approximately 10 years of achieving the targeted Basin Yield Metric value (LOBP, 2015; Attachment B). The current Water Level Metric trend direction is consistent with the anticipated trend, although the timeline for reaching the target is extended. In Spring 2018, the Water Level Metric measured 1.9 feet elevation, compared to 1.5 feet elevation in Spring 2017 (NGVD 29 datum). If the metric continues to rise at the current rate of approximately 0.4 feet per year, the target threshold of 8 feet above sea mean sea would be reached in 2033, or approximately 18 years after achieving BYM 80.

In 2016, adjustments were made to some of the Water Level Metric well reference point elevations, along with removal of the density correction for water levels on the sandspit, which lowered the Water Level Metric compared to prior calculations. Reevaluation of the metric target is recommended following confirmation of reference point elevations by a licensed surveyor (CHG, 2018).

#### Basin Yield Metric and Chloride Metric

A comparison between Basin Yield Metric and Chloride Level Metric trends over time is shown in Figure 4. There is a correlation between these two metrics, although it is not as straightforward, compared to the Water Level Metric correlation.

Sustainable yield is the denominator for the Basin Yield Metric calculation. Estimates of sustainable yield are provided by the Basin Model, and are the maximum amount of groundwater that may be extracted from the basin while maintaining a stationary seawater intrusion front, and with no active well producing water with chloride concentrations above 250 milligrams per liter.

If the Basin Yield Metric is above 100, then production exceeds sustainable yield (an overdraft condition), the Chloride Metric rises, and seawater intrusion is projected by the Basin Model to advance inland and impact active drinking water wells. A Basin Yield Metric below 100, however, does not necessarily indicate a sustainable condition, as the distribution of pumping also affects movement of the seawater intrusion front. In other words, the same annual volume of groundwater may be pumped from different aquifers in different locations and would result in the same Basin Yield Metric value for that year, but would not necessarily be equally sustainable.

By 1979, the Basin Yield Metric had exceeded 100, but the Chloride Metric did not respond until almost two decades later, beginning to rise between 1995 and 2000. The reason for the delay is interpreted to be due to the travel time required for seawater intrusion precursors (including steadily increasing chloride concentrations) to reach the metric wells.

The anticipated trendline for the Chloride Metric was a continued rise in the metric up to approximately 220 mg/L chloride, followed by decline, reaching the targeted value of 100 mg/L chloride within approximately 30 years of achieving the targeted Basin Yield Metric value (LOBP, 2015; Attachment B). The current Chloride Metric trend direction is consistent with the

DRAFT

### Basin Yield Metric and Chloride Metric

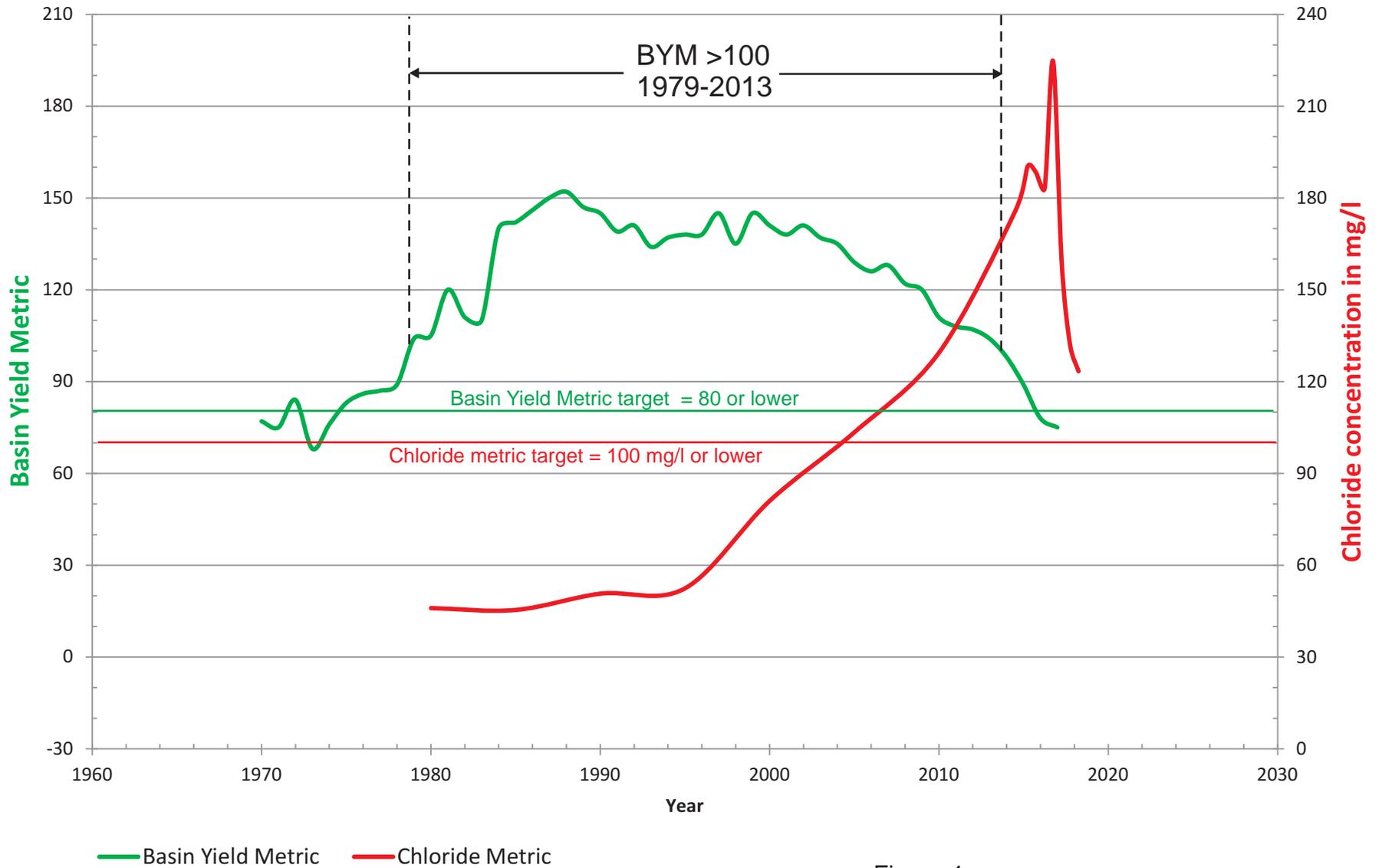


Figure 4  
Basin Yield Metric and Chloride Metric  
Los Osos Groundwater Basin  
2018 Adaptive Management TM

Cleath-Harris Geologists



anticipated trendline, although the timeline for reaching the target is reduced. Chloride Metric values reached a maximum of 225 mg/L chloride in 2016, and have declining to 123 mg/L chloride through Spring 2018. If the metric continues to decline at the current rate of approximately 30 mg/L per year, the targeted value of 100 mg/L chloride or lower would be reached by 2019, approximately 4 years after the Basin Yield Metric moved below the targeted value of BYM 80.

A portion of the recent decline in the Chloride Metric is interpreted to be influenced by wellbore flow from the Upper Aquifer at one of the metric wells, although the majority of chloride concentration decline at the well appears to be occurring in the Lower Aquifer. Further evaluation of Upper Aquifer influence on the Chloride Metric is recommended as new data becomes available (CHG, 2018).

### Nitrate Metric

Nitrate Metric trends through 2017 are shown in Figure 22 of the 2017 Annual Groundwater Monitoring Report (Attachment A). The five-year average for metric values increased by approximately 7 mg/L nitrate-nitrogen (NO<sub>3</sub>-N) between 2002-2006 and 2013-2017. Individual year metric values reached 32 mg/L NO<sub>3</sub>-N in 2017, over three times the Maximum Contaminant Level of 10 mg/L (the drinking water standard).

Elevated Nitrate concentrations in the urban area are attributable to historical wastewater discharges to high-density septic systems (LOBP, 2015), which are now conveyed to the Los Osos Wastewater Recycling Facility (LOWRF) for treatment and disposal. Recycled water being delivered to community leach field disposal sites from LOWRF contains approximately 2 mg/L total nitrogen, based on a 30-day average concentration reported for September 2017 (CHG, 2018).

The anticipated trendline for the Nitrate Metric was for values to remain stable through 2020, followed by a gradual decline, and reaching the targeted metric value of 10 mg/L by 2050 (Attachment B). The current Nitrate Metric trend is inconsistent with the anticipated trend, although a shift in the nitrate monitoring schedule may have influenced the 2016 and 2017 Nitrate Metric results and increased the metric compared to prior years (CHG, 2018).

Nitrate removal systems are in place at two locations, and provisions for additional nitrate removal capacity are planned during Upper Aquifer development under Program B. More time is needed for observing the effects of decreased nitrate loading to the basin under current conditions with the Los Osos Wastewater Project completed.

### **Infrastructure Program C Evaluation**

The Program C evaluation for adaptive management considers whether additional Expansion Wells under LOBP Program C are needed, under current basin water demand, to achieve both a



Basin Yield Metric target value of 80 (BYM 80) or lower, and a distribution of pumping that maintains a stationary seawater intrusion front closer the coast, similar to the position shown in LOBP Figure 38 (Attachment B). Program C calls for three expansion wells to be constructed to meet the LOBP goals of halting or reversing seawater intrusion and providing a sustainable water supply under the existing population scenario. Basin water demand for the existing population scenario was originally estimated at 2,230 AFY (Table 46 of the LOBP; ISJ, 2015). The updated existing population scenario assumes a water demand of 2,070 AFY, based on the estimated basin water use in 2017 (CHG, 2018).

### 2017 Basin Yield Metric

Water supply infrastructure at year-end 2017 included the following LOBP elements:

- Los Osos Wastewater Project
- Urban Water Reinvestment Program (U)
- Infrastructure Program A
- Partial completion of infrastructure Program C

The sustainable yield of program combination U+A is 2,650 acre-feet per year (AFY), as reported in Table 43 of the LOBP (ISJ, 2015). Program C was partially completed in 2016 with the construction of Expansion Well No. 1 by GSWC at Los Olivos Avenue (Figure 2). The contribution of Program C to basin sustainable yield is the difference between the yield of program combination U+A (2,650 AFY) and program combination U+AC (3,000 AFY), which is 350 AFY. Close to one-third, or an estimated 110 AFY of the sustainable yield contribution from Program C was developed in 2016, bringing the total estimated sustainable yield for year-end 2017 conditions to 2,760 AFY (CHG, 2017; 2018).

Groundwater production in 2017 was estimated at 2,070 acre-feet, including 1,050 acre-feet of community purveyor production and 1,020 acre-feet of other production (golf course, community park, memorial park, non-purveyor domestic, and agriculture). The corresponding Basin Yield Metric for 2017 was 75, which met the LOBP target of BMV 80 or less for the second consecutive year (CHG, 2018).

### Program C Evaluation

Basin Model results indicate no additional Expansion Wells would be required under the existing population scenario, based on the current basin water demand of 2,070 AFY, to achieve both a Basin Yield Metric targeted value of 80 (BYM 80) and a stationary seawater intrusion front closer the coast. The current 2017 Basin Yield Metric is 75, which meets the targeted value. A stationary seawater front can also be maintained at a position closer to the coast with the existing Expansion Well, assuming long-term precipitation averages 17.5 inches per year. There are other factors, however, which support construction of an additional Program C Expansion Well. These include water system reliability, drought impacts, and recycled water distribution.



## Water System Reliability

Each purveyor well has a maximum annual production potential, based on historical performance and pumping tests. Nine of the 14 active purveyor wells are simulated to be pumping at maximum capacity in the Basin Model under the sustainable yield scenario for 2017 conditions. Some of the wells may need rehabilitation and other water system improvements may be required to provide the maximum capacity assumed in sustainable yield scenarios. For example, the LOCSD South Bay site has two supply wells, but needs a dedicated water supply main to the District's main pressure zone to convey the full capacity that the two wells are capable of. Municipal supply wells will also eventually require replacement, and not all of the well sites may be suitable for drilling a new well, such as the LOCSD 3rd Street site. A second Expansion Well would provide greater system redundancy and flexibility for adjusting the pumping distribution, should any of the existing wells lose full capacity.

## Drought Impacts

The recent exceptional drought (2012-2016) demonstrated that seawater intrusion can occur with a basin yield metric below BYM 100. The Chloride Metric continued to increase overall between 2012 and 2016, despite the Basin Yield Metric dropping below 100 in 2013, and below 80 in 2016 (Figure 4). Similar to the water reliability benefit, a second Expansion Well would provide greater flexibility for adjusting the pumping distribution, should any of the wells become temporarily impacted by seawater intrusion during exceptional drought.

## Recycled Water Distribution

Recycled water flow from the Los Osos Water Recycling Facility (LOWRF) is estimated to be 580 AFY under the updated existing population scenario, which is 200 AFY less than anticipated (LOBP Table 32; ISJ, 2015). As a result, there is currently insufficient recycled water for all the reuse projects identified in the Urban Water Reinvestment Program.

Evaluation of seawater intrusion mitigation during prior studies have ranked various recycled water uses in terms of seawater intrusion mitigation and associated benefit to basin sustainable yield (Carollo Engineers, 2007; CHG, 2014). The ranking, from highest level of mitigation to lowest, is summarized as follows:

- 1) Urban reuse or agricultural exchange (equal benefit)
- 2) Broderson community leachfield
- 3) Agricultural reuse with in-lieu recharge (Eastern Area)
- 4) Los Osos Creek recharge
- 5) Agricultural reuse without exchange or in-lieu recharge (Eastern Area)
- 6) Spray fields or agricultural reuse out of Basin.

Agricultural exchange involves offsetting agricultural pumping with recycled water, combined with an equal amount of pumping from infrastructure Program D wells (Los Osos Creek valley



wells; not currently being considered). Agricultural reuse with in-lieu recharge is just offsetting agricultural pumping with recycled water use, without Program D wells.

Program C wells can improve the potential seawater intrusion mitigation benefit and purveyor yield from agricultural reuse with in-lieu recharge. For example, with the 2017 infrastructure in place, shifting recycled water from Broderson leachfield disposal to agricultural reuse with in-lieu recharge results in an estimated loss in purveyor yield of approximately 30 percent of the amount shifted. With a new Program C well, the loss in purveyor yield is reduced to an estimated 10 percent of the amount shifted. A new Program C well increases the ability of purveyors to capture any future in-lieu recharge occurring in the Los Osos Creek Valley.

### **Pumping Distribution and Basin Yield under Program C**

The Basin Model is a tool to assist with the understanding of basin dynamics and to compare different pumping distributions for maximizing yield while mitigating seawater intrusion. General guidelines for optimizing the pumping distribution include the following:

- Maximize Upper Aquifer production (nitrate removal or blending may be required). Implementing infrastructure Program B meets this guideline.
- Shift Lower Aquifer production away from the coast. Implementing Program C meets this guideline.

The basin sustainable yield with three Program C wells completed was estimated at 3,000 AFY (ISJ, 2015). With Expansion Well No. 1 completed, the estimated sustainable yield for 2017 is 2,760 AFY (CHG, 2018). The Basin Model has been used to estimate the increased sustainable yield with a new program C well in each of the potential areas shown in Figure 2. Results are summarized below in Table 1.

<b>Table 1 - Program C Sustainable Yield Estimates</b>		
Program C Description	Estimated Sustainable Yield	Increase over 2017
	Acre-Feet per Year	
2017 Infrastructure (Expansion Well No. 1)	2,760	0
Add Expansion Well No. 2 in North Area	2,850	90
Add Expansion Well No. 2 in Central Area	2,900	140
Add Expansion Well No. 2 in South Area	2,950	190
Maximum for Program C (add two wells)	3,000	240



As shown in Table 1, constructing Expansion Well No. 2 in the south area would potentially add the greatest amount of sustainable yield (190 AFY), followed by the Central area 4 (140 AFY), and the north area (90 AFY). A combination of two new Expansion Wells (south and central areas or south and north areas) would potentially add an estimated 240 AFY of sustainable yield.

## Conclusions and Recommendations

The following conclusions were reached during the basin metric review and Program C evaluation:

- Expectations are generally being met when comparing Water Level Metric and Chloride Metric trends to the anticipated trends. Both metrics are trending in the direction of improvement, as anticipated. The Water Level Metric trend is projected to reach the targeted value later than anticipated, however, while the Chloride Metric is anticipated to reach the targeted value sooner than anticipated.
- Expectations are not being met when comparing the Nitrate Metric trend to the anticipated trend. The Nitrate Metric is not improving, but is deteriorating. More time is needed for observing the effects of decreased nitrate loading to the basin under current conditions with the Los Osos Wastewater Project completed.
- No additional Program C wells are needed under the updated existing population scenario to achieve a Basin Yield Metric below 80 and a distribution of pumping that maintains a stationary seawater intrusion front closer to the coast. There are other considerations, however, that would support adding one additional Program C well, including water system reliability, drought protection, and recycled water reuse.
- The potential increases in sustainable yield from the addition of one new Program C Expansion Well are estimated to be 90 AFY in the north area, 140 AFY in the central area, and 190 AFY in the south area. The addition of two new Program C wells could potentially add an estimated 240 AFY of sustainable yield.

The following adaptive management recommendations are based on the above conclusions:

- No adjustments to the LOBP are recommended in response to the metric trends review. Although the Nitrate Metric is not meeting expectations, nitrate removal systems are in place and there are provisions for additional nitrate removal for Upper Aquifer development under Program B. It is also too early to observe the effects of decreased nitrate loading to the basin under Los Osos Wastewater Project conditions.
- A reduction in infrastructure Program C from three Expansion Wells to two Expansion Wells is recommended to meet LOBP objectives for the updated existing population



scenario. One of the Expansion Wells has been completed, so only one additional well would be needed, rather than two more per the current LOBP.

## References

Carollo, 2007, Viable Project Alternatives Fine Screening Analysis Final, prepared for San Luis Obispo County Los Osos Wastewater Project development, August 2007.

<http://archive.slocounty.ca.gov/Assets/PW/LOWWP/document+library/Final+Fine+Screening+Report-Stamped.pdf>

Cleath-Harris Geologists, 2014, Recycled Water Discharges to Los Osos Creek, Draft Technical Memorandum prepared for the Los Osos ISJ Group, March 18, 2014.

<https://www.losososcsgd.org/files/1d22a4813/Item+3+DRAFT+Technical+Memo+-+Recycled+Water+Discharges+to+Los+Osos+Creek.pdf>

Cleath-Harris Geologists, 2017, Basin Yield Metric Response to reduced long-term precipitation in the Los Osos Groundwater Basin, Technical Memorandum prepared for the Los Osos Groundwater Basin Management Committee and Morro Bay National Estuary program, March 3, 2017.

<http://www.slocountywater.org/site/Water%20Resources/LosOsos/pdf/TM%20Basin%20Yield%20Metric%20Los%20Osos%20GW%20Basin%2020170303.pdf>

Cleath-Harris Geologists, 2018, Los Osos Basin Plan, Groundwater Monitoring Program 2016 Annual Monitoring Report, prepared for the Los Osos Groundwater Basin Management Committee, June 2018.

<http://www.slocountywater.org/site/Water%20Resources/LosOsos/pdf/2017%20Annual%20Report%20Final.pdf>

ISJ Group, 2015, Updated Basin Plan for the Los Osos Groundwater Basin, January 2015.

<http://www.slocountywater.org/site/Water%20Resources/LosOsos/pdf/Los%20Osos%20Groundwater%20Basin%20Plan%20January%202016.pdf>



## **ATTACHMENTS**



ATTACHMENT A:

Basin Metric Trends  
2017 Annual Groundwater Monitoring Report

# Chloride and Water Level Metric Lower Aquifer

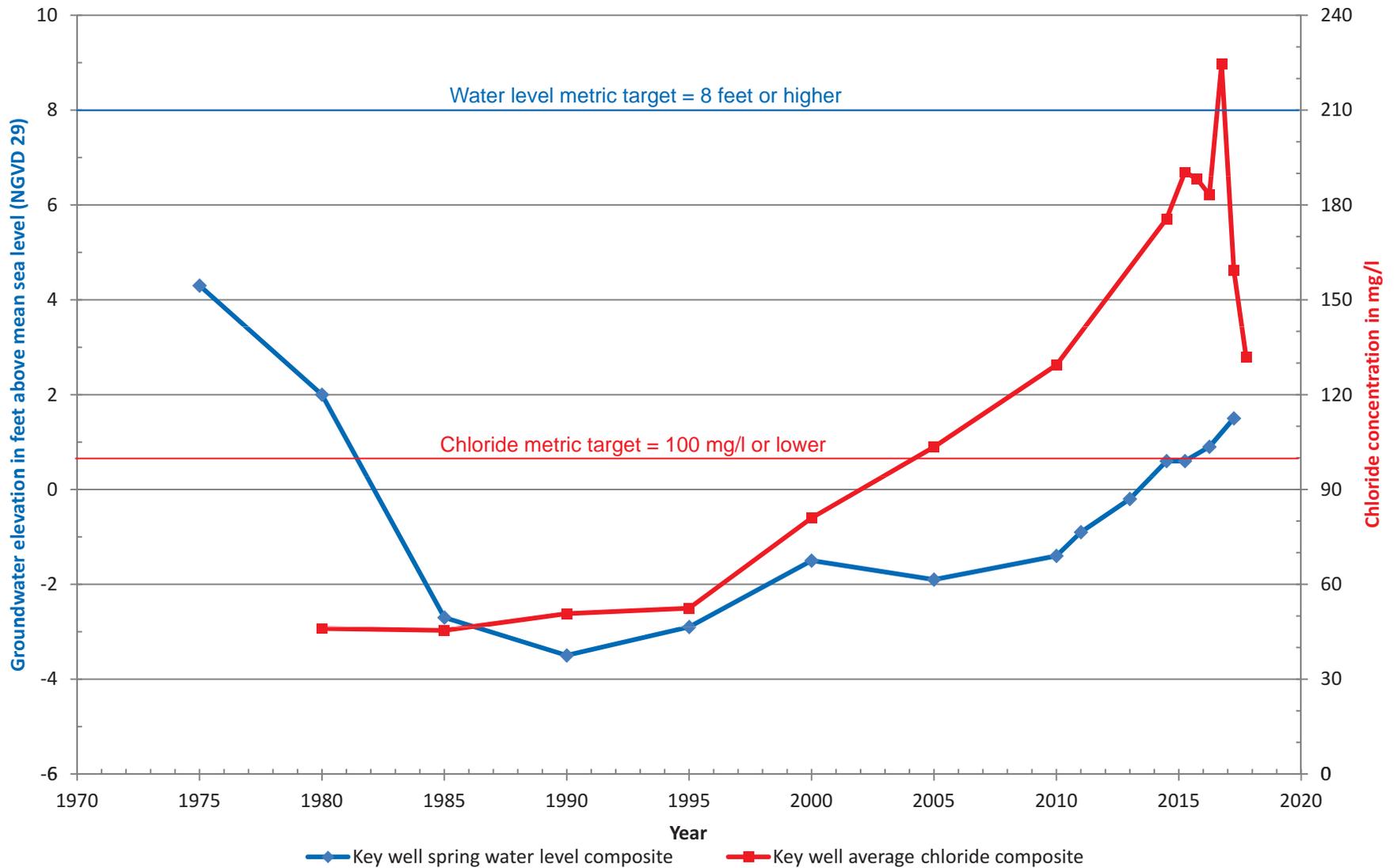


Figure 21  
Chloride and Water Level Metric  
Los Osos Groundwater Basin  
2017 Annual Report

Reference: 2017 Annual Groundwater Monitoring Report (CHG, 2018)

Cleath-Harris Geologists

# Nitrate Metric First Water



- Key well composite (Average of seasonal data)
- ◆ Key well composite (Fall sampling schedule in 2015)
- ▲ Key well composite (Winter sampling schedule beginning 2016)
- 2002-2006 average    — 2013-2017 average

NOTE: Nitrate metric plots for 2013 and 2014 corrected to apply January 2014 data set to Winter 2013 season.

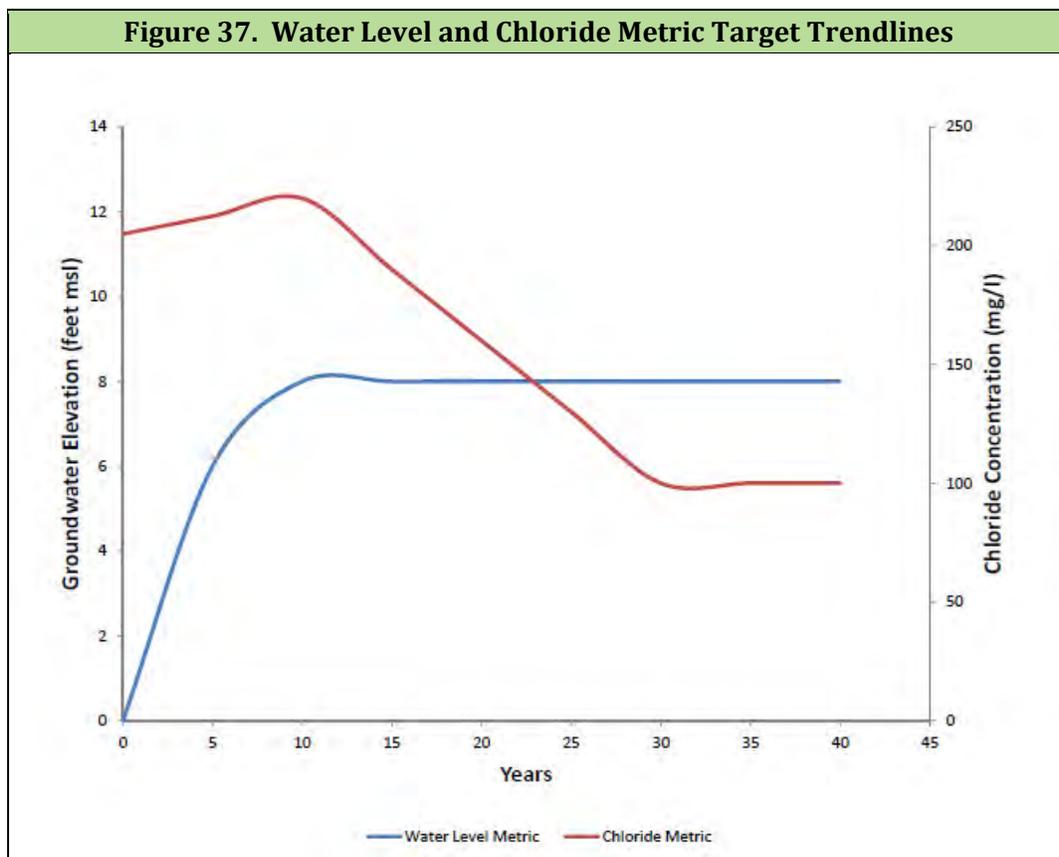
Figure 22  
Nitrate Metric  
Los Osos Groundwater Basin  
2017 Annual Report

Cleath-Harris Geologists



ATTACHMENT B

Anticipated Metric Trends  
Predicted Seawater Intrusion for Basin Metric Targets  
2015 Los Osos Groundwater Basin Plan Update



Based on the actions recommended in this Basin Plan, the Model predicts that the freshwater-seawater interface will be pushed seaward from its current location to that shown in Figure 38. As seen on that map, a Basin Yield Metric of 100 would maintain seawater intrusion (250 mg/l) at an equilibrium line underneath the landed portion of the Basin. This Basin Plan does not recommend allowing seawater intrusion to remain in the Basin to that extent, but rather to reverse the present location of seawater in the Basin (see Figure 26) to a position further seaward. In order to attain seawater intrusion at the seaward position, the Parties would need to achieve a Basin Yield Metric of 80 or below. Maintaining a buffer of 20 percent would shift seawater intrusion to a more favorable location than simply achieving a Basin Yield Metric of 100.

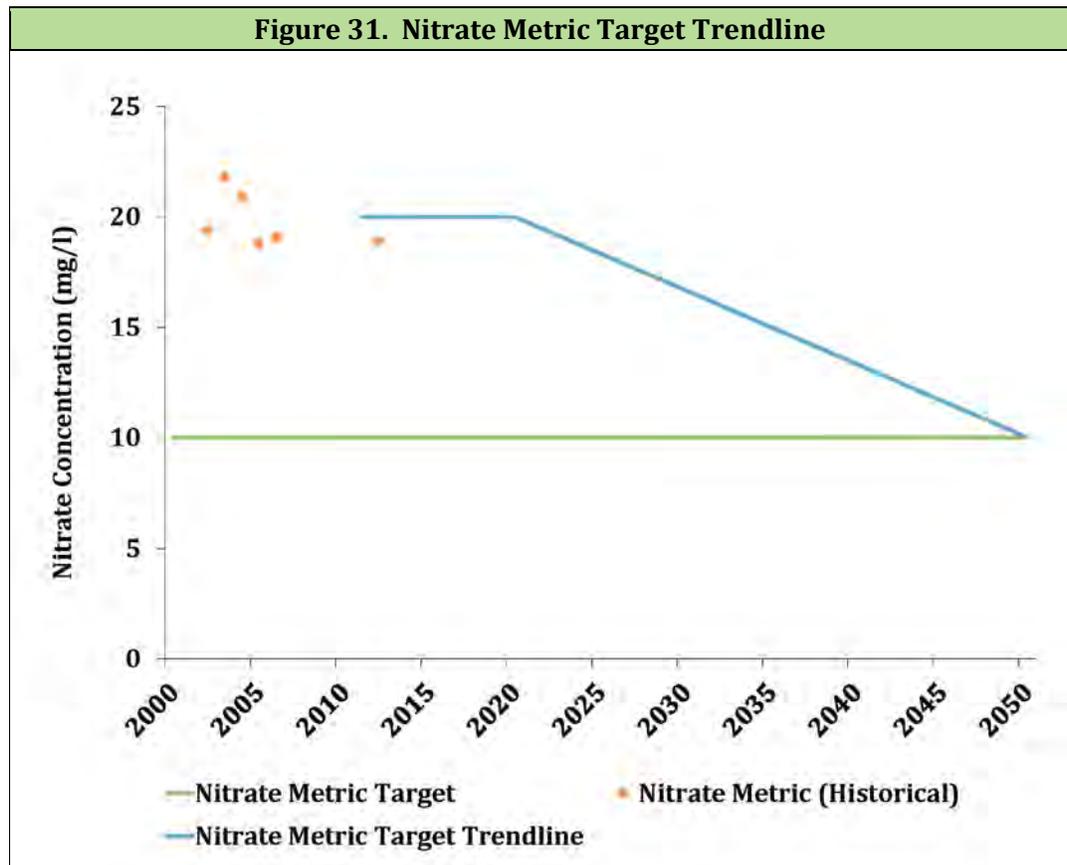
#### 6.4 The Challenge of Uncertainty

The prior sections of this chapter have addressed the two greatest threats to the Basin, namely, nitrate impacts to the Upper Aquifer and seawater intrusion into the Lower Aquifer. Those sections establish metrics for evaluating the twin threats and actions that will be taken to defend against them. In addition to past and present threats, however, there are also potential future threats. Future threats are particularly challenging to address because of their inherent uncertainty. Because these threats share that common condition, they are analyzed together as the single threat of uncertainty. Several sources of uncertainty are discussed below.

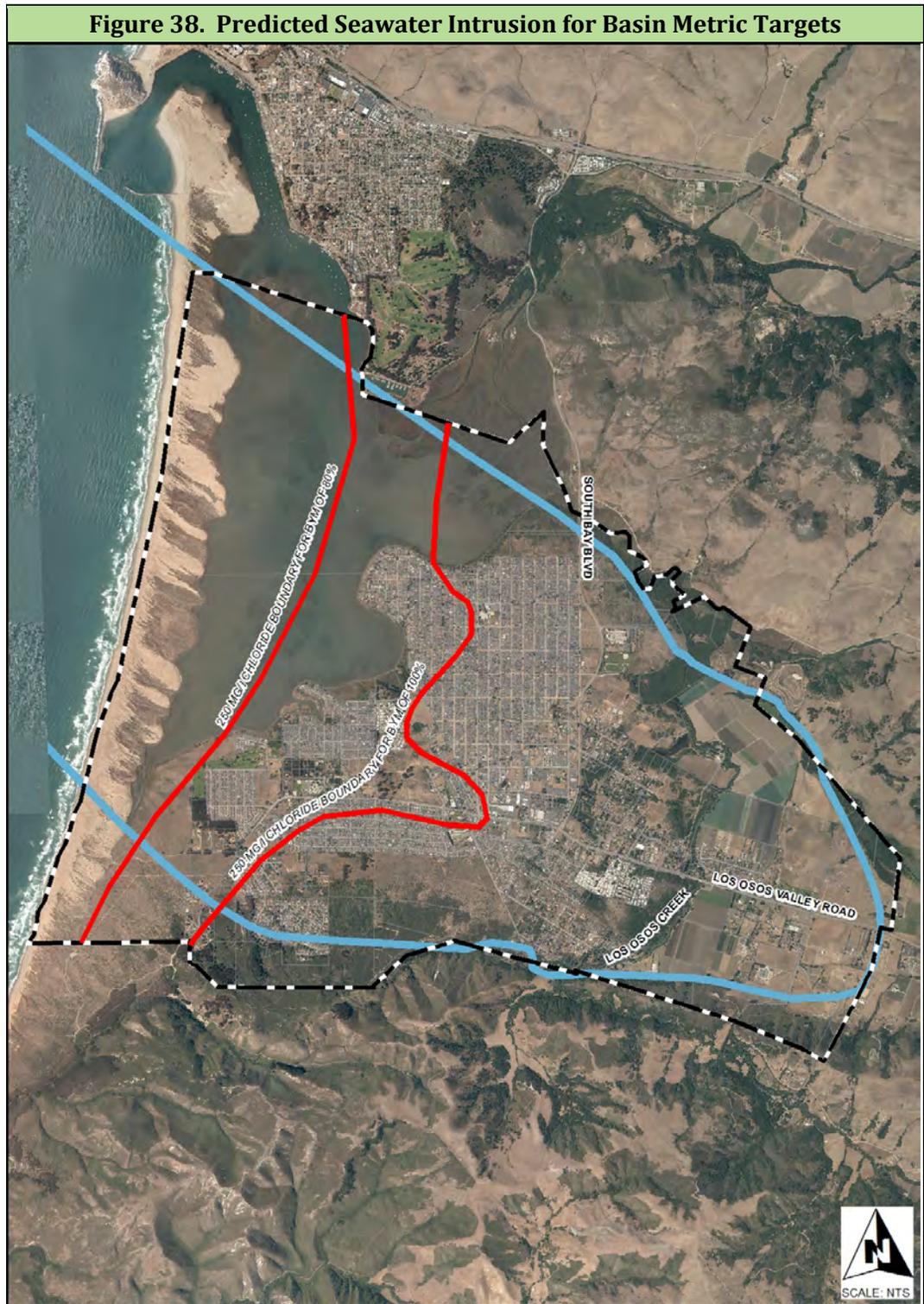
reducing the overall quantity of nitrate in the Basin. Nitrate removal facilities are components of the Basin Infrastructure Program set forth in Chapter 10.

Lastly, through the Basin Management Committee, the Parties will implement the Wellhead Protection Program set forth in Chapter 13. That program will ensure proper construction of new wells and abandonment of existing wells to prevent further impacts to either the Upper Aquifer or Lower Aquifer.

It is likely to take approximately 30 years for the Upper Aquifer to equilibrate to a change in nitrate loading, although the Nitrate Metric Target can potentially be achieved within a shorter time frame.<sup>54</sup> In the intervening years, nitrate removal or blending with other sources with lower nitrate levels will be required for extensive use of the Upper Aquifer as a source of drinking water. Figure 31 depicts a Nitrate Metric Target Trendline that will be used to measure progress toward the ultimate Nitrate Metric Target of 10 mg/l. The Parties will periodically evaluate the progress of the Nitrate Metric in relation to the trendline in Figure 31 in order to determine whether actions taken in the Basin are having the desired impacts on nitrate levels.



<sup>54</sup> See Yates & Williams, *Simulated Effects of a Proposed Sewer Project on Nitrate Concentrations in the Los Osos Valley Groundwater Basin* (2003).



**TO: Los Osos Basin Management Committee**

**FROM: Rob Miller, Interim Executive Director**

**DATE: November 14, 2018**

**SUBJECT: Item 7c – Los Osos Seawater Intrusion Imaging – Partnership with Cal Poly**

**Recommendation**

Receive report and provide input to staff for future action.

**Discussion**

In August 2018, Mr. John Jasbinsek of the Cal Poly Physics Department offered to partner with the BMC to perform periodic electrical resistivity imaging (ERI) to aid in assessing the location and progress of the sea water intrusion front. This service would be provided annually for some period of time at no cost to the community, and it would provide an educational opportunity for Cal Poly students. Mr. Jasbinsek subsequently prepared the attached summary report and conducted a field review with staff on the potential locations. The test procedure is non-invasive and leaves no permanent footprint. During the test, steel electrodes are inserted into the ground to a depth of 1 foot with a spacing of approximately 30 feet between stakes. As detailed in the report, the test areas must be quite long in order for the test equipment to penetrate to a meaningful depth. Staff also prepared a summary of the various land ownerships involved in the test area, since permission will need to be granted for access. If the BMC is interested in pursuing this effort, various BMC members could perhaps assist in obtaining permission from the various parties. Mr. Jasbinsek is currently planning to attend the November 14 meeting, and if so, he will be available to answer detailed questions.

9/19/2018

John Jasbinsek, Physics Department, Cal Poly SLO

jjasbins@calpoly.edu

805.756.2013 (office) 805.295.9425 (mobile)

# Los Osos Electrical Resistivity Imaging

Proposed profile locations and goals

## Goal

At each profile (see below) perform periodic electrical resistivity imaging (ERI) over a long-time horizon to aid in assessment of changes to the seawater intrusion front and its severity.

## Periodic Imaging

At least twice a year, but more often would be useful.

## Time Horizon

15 years (an initial estimate based on simply how much longer I will be at Cal Poly).

## Data Products

Two-dimensional cross sections of aquifer properties, in particular the salt/fresh water interface and estimates of the saltwater concentration using well samples as a calibration.

Field data will be collected, processed, and interpreted by myself and Cal Poly students who will use the data for senior projects. Students also just interested in gaining geophysical survey experience will also be welcome to participate. All data products will be archived at Cal Poly and will be freely available to the Los Osos Community Services District.

The collected data over such a long-time span will be, to my knowledge, a unique type of hydrological data set. After some initial time, the project data results will be publishable in an environmental geology journal. The experience of remediating a seawater intruded aquifer and the insight this dataset can provide will be useful to other localities with similar water issues.



9/19/2018

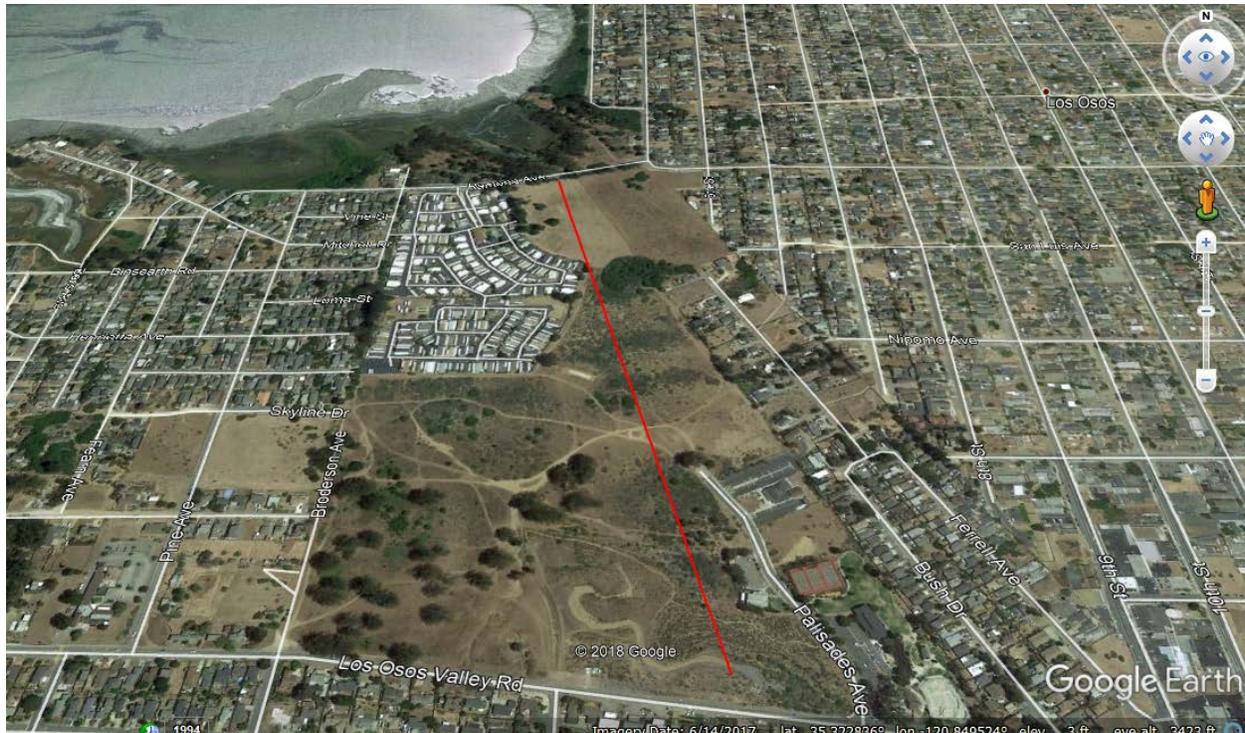
John Jasbinsek, Physics Department, Cal Poly SLO

jjasbins@calpoly.edu

805.756.2013 (office) 805.295.9425 (mobile)

### Community Center Profile

This profile is ~ 900 m long which will provide imaging depth of ~180 m = 590 feet. The exact orientation of the profile could be adjusted from what is shown here. This location is **very important** because it is near existing monitoring wells that indicate the contour of the seawater intrusion front is in this region. This profile area is thus in a region that may be the first to respond to the aquifer remediation. Two-dimensional subsurface profiles in this region have the potential to image details about the remediation such as preferred pathways of salinity changes.



9/19/2018

John Jasbinsek, Physics Department, Cal Poly SLO

jjasbins@calpoly.edu

805.756.2013 (office) 805.295.9425 (mobile)

### Monarch Grove Profile

This profile is 1,100 m = 1.1 km long. It will provide subsurface images up to 250 m = 825 feet deep. This profile will provide information about changes to the aquifer water near the coast, where a longer time line of remediation might be expected.



9/19/2018

John Jasbinsek, Physics Department, Cal Poly SLO

jjasbins@calpoly.edu

805.756.2013 (office) 805.295.9425 (mobile)

## Electrical Resistivity Imaging Procedure

Collecting a profile of data is minimally invasive and leaves no permanent footprint. The time to collect a profile as envisioned for this project is approximately one day. Most of the time and effort is spent laying out the cables and electrodes, and then pulling it all out.

The field procedure involves inserting stainless steel electrodes into the ground, about 1-ft deep. Our equipment has 112 electrodes which can be spaced a maximum of 10 meters apart.



9/19/2018

John Jasbinsek, Physics Department, Cal Poly SLO

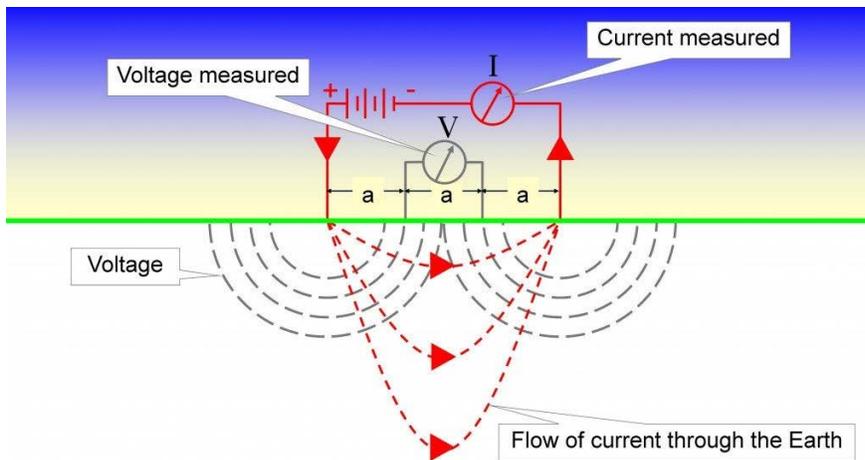
jjasbins@calpoly.edu

805.756.2013 (office) 805.295.9425 (mobile)

Electrodes are all connected by cables to a central unit that controls the survey.



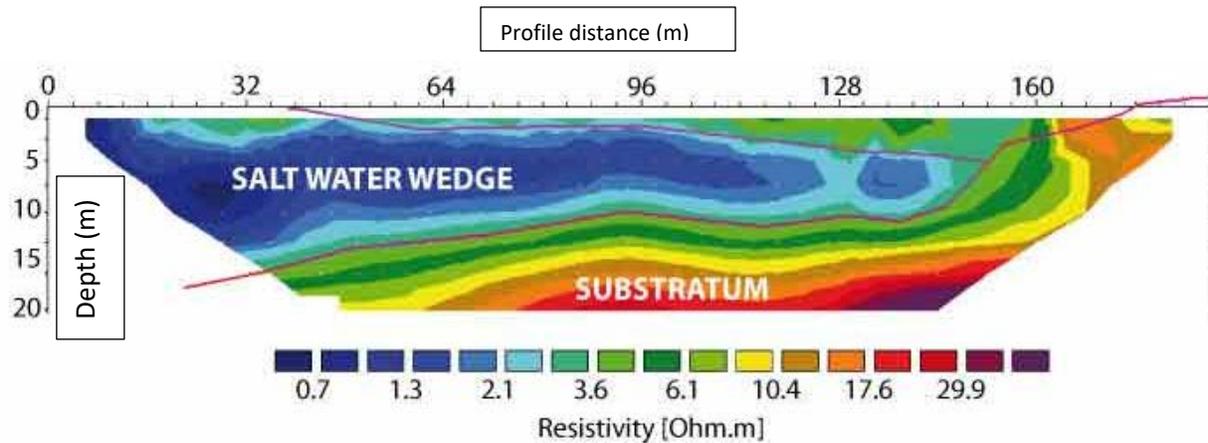
The central machine uses two electrodes to inject current, and two electrodes to measure voltage in the ground:



The machine automates these measurements along the profile to build up a two-dimensional cross section of the subsurface.

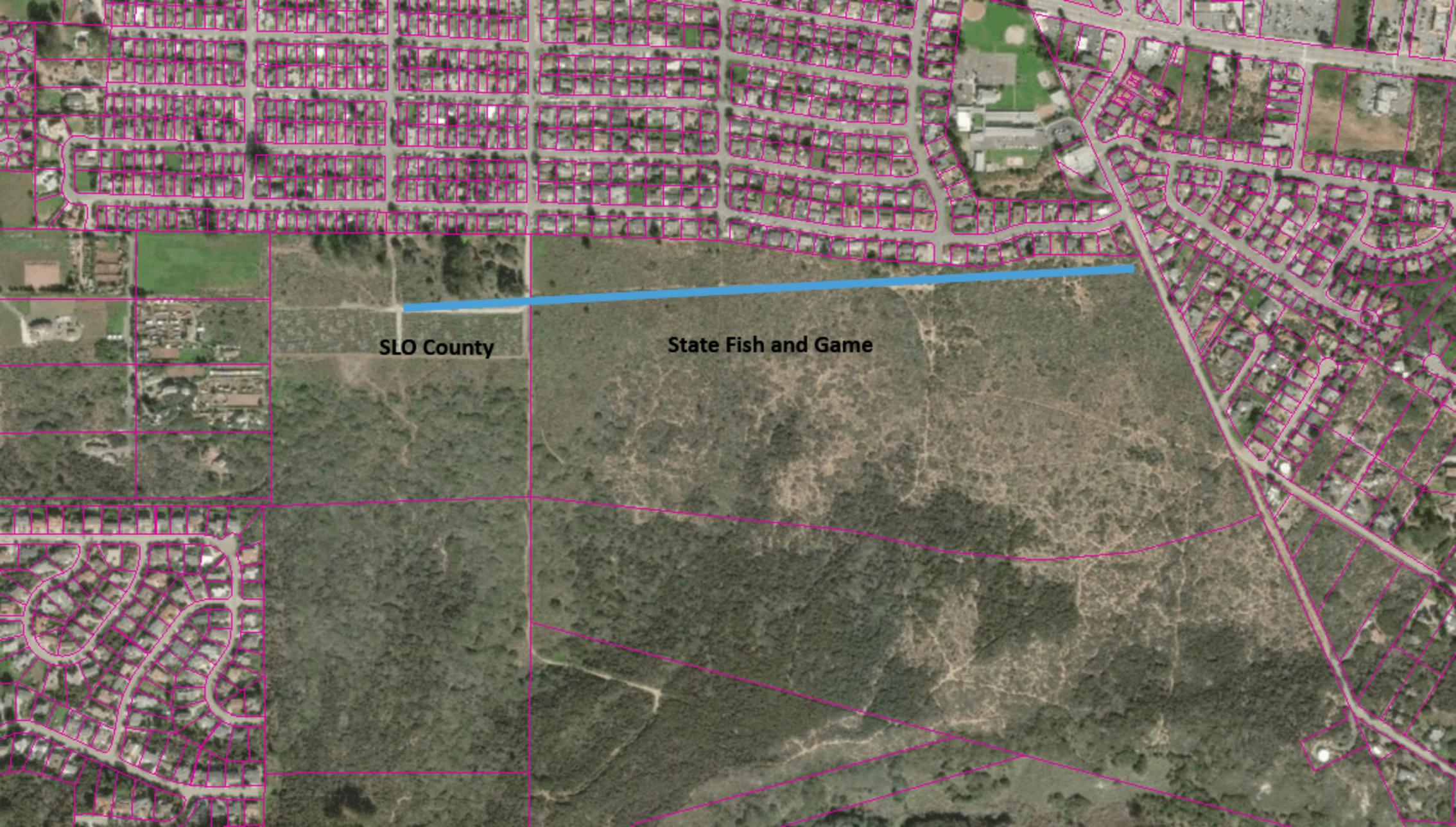
9/19/2018  
John Jasbinsek, Physics Department, Cal Poly SLO  
jjasbins@calpoly.edu  
805.756.2013 (office) 805.295.9425 (mobile)

The end results will look like this:



In this project the images would be much deeper than the 20 meters shown above.

A similar but even larger scale project to image seawater intrusion was performed in Monterey Bay by Stanford University a few years ago: <https://gemcenter.stanford.edu/research/imaging-saltwater-intrusion-using-electrical-resistivity-tomography>



**SLO County**

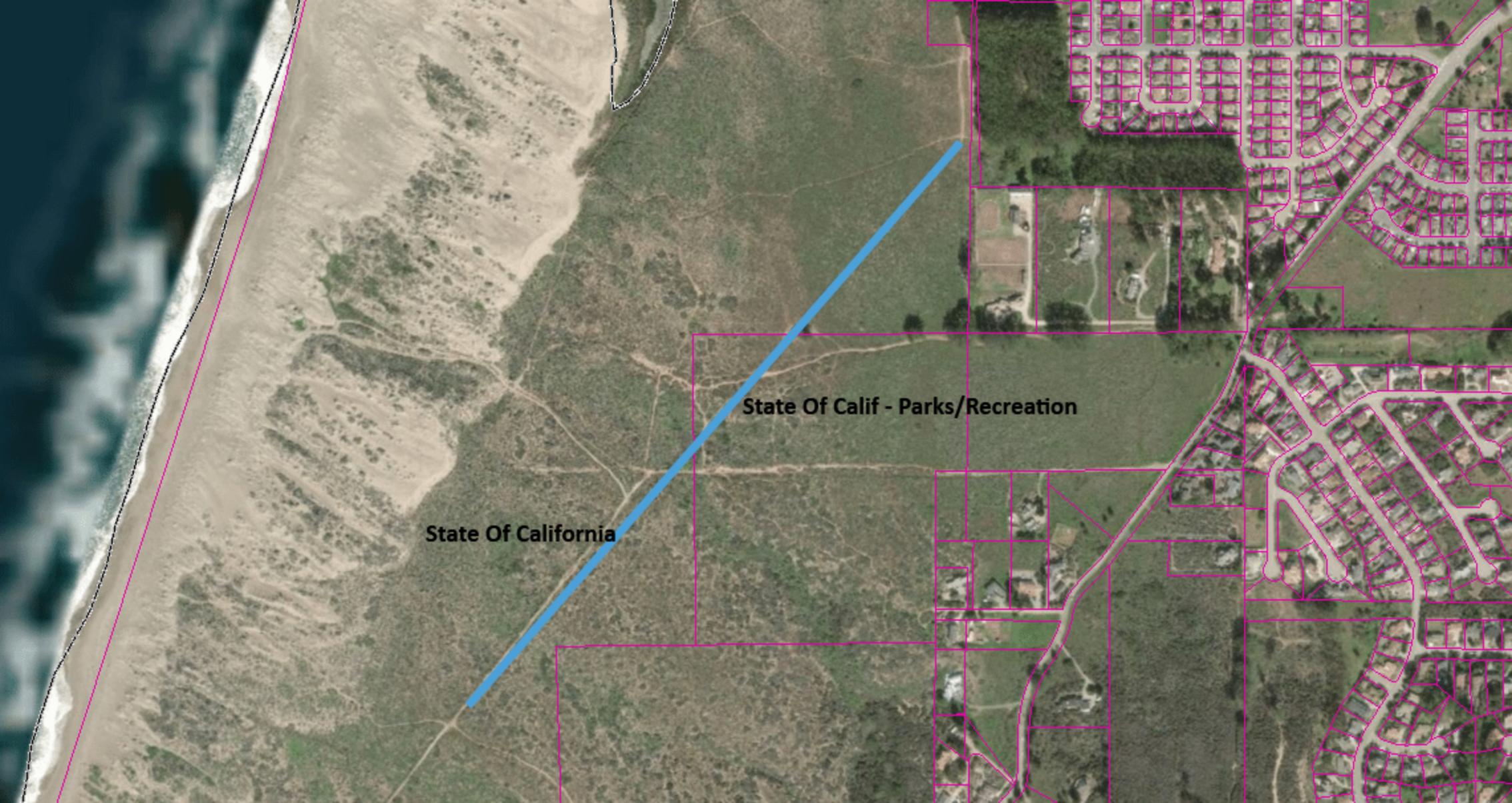
**State Fish and Game**



**Morro Shores Mhp LLC**

**Morro Shores Co**

**SLO County**



**State Of California**

**State Of Calif - Parks/Recreation**

**TO: Los Osos Basin Management Committee**

**FROM: Rob Miller, Interim Executive Director**

**DATE: November 14, 2018**

**SUBJECT: Item 7d – Discussion of 2019 Priorities and Budget**

**Recommendation**

Receive report and provide input to staff for future action.

**Discussion**

The BMC has historically adopted a calendar year budget each year, with the presentation of a draft budget in January of each year. Key items that have been accomplished since the BMC held its initial meeting in December 2015 include the following:

- Consistent monitoring of all production aquifer zones has been implemented on a semiannual cycle, with metrics and/or measurements to address seawater intrusion in both the upper and lower aquifer.
- The BMC has developed a template for annual reporting to the Court, with complete annual reports for each calendar year.
- The approved Basin Infrastructure Plan has been substantially completed, and regular updates on project progress are provided to the community.
- Adaptive management principals have been employed along with use of the basin model to refine the required infrastructure and basin management approach.
- New rebates and water conservation information have been distributed to the community, though with limited success beyond the mandated fixture replacement in the wastewater service area.
- Measurable benefits to the Basin have been detected, including a trend of increasing water levels and reduced chlorides in the lower aquifer.

In preparation for 2019, staff has assembled a list of potential priorities as shown in the attached table. It should be noted that these efforts are in addition to typical BMC business which includes:

- Final completion of Program A and C projects through construction.
- Monitoring and annual reports

The purpose of the attached table is to facilitate Committee discussion. Staff will then bring back a draft budget based on the input received.

**2019 Draft Work Plan**

<b>Item No.</b>	<b>Work Plan Item</b>	<b>Description</b>	<b>Recommended 2019 Budget</b>
1	Cuesta by the Sea Monitoring Well	Zone D, E, and possibly Zone C monitoring well	\$110,000
2	Creek Discharge Feasibility & Permitting	Perform limited baseline sampling, soil aquifer treatment analysis, and grant research	\$50,000
3	Stormwater and Perched Water Recovery Project	Feasibility report for recapture of urban stormwater at 8th/EI Moro and shallow perched water, initial investigation of other stormwater opportunities	\$15,000
4	Field Survey of Existing Wells in Monitoring Program	Survey of 17 wells to establish consistent datum (1988 datum) as recommended in the 2017 Annual Report	\$5,000
5	Water Conservation	Participate in update of Title 19, consider pilot program for septic tank conversion (20 rebates)	\$10,000
6	Los Osos Community Plan Review and Input	Review and comment on draft Los Osos Community Plan, which is due to be released in 2019	N/A
7	Recruit and Train Permanent Executive Director	Recruit permanent replacement for Interim Executive Director by January 2020	Included in Administrative Budget