**LOS OSOS GROUNDWATER BASIN, BASIN MANAGEMENT COMMITTEE**

**NOTICE OF MEETING**

**NOTICE IS HEREBY GIVEN** that the Los Osos Groundwater Basin, Basin Management Committee Board of Directors will hold a **Board Meeting** at **1:30 P.M.** on **Wednesday, March 15, 2017** at the South Bay Community Center, 2180 Palisades Ave, Los Osos, CA, 93402**.**

*Directors: Agenda items are numbered for identification purposes only and may not necessarily be considered in numerical order.*

*NOTE: The Basin Management Committee reserves the right to limit each speaker to three (3) minutes per subject or topic. In compliance with the Americans with Disabilities Act, all possible accommodations will be made for individuals with disabilities so they may attend and participate in meetings.*

**BASIN MANAGEMENT COMMITTEE BOARD OF DIRECTORS AGENDA**

1. **CALL TO ORDER**

2. **PLEDGE OF ALLEGIANCE**

3. **ROLL CALL**

4. **BOARD MEMBER COMMENTS.** Board members may make brief comments, provide project status updates, or communicate with other directors, staff, or the public regarding non-agenda topics.

5. **CONSENT AGENDA**

   The following routine items listed below are scheduled for consideration as a group. Each item is recommended for approval unless noted and may be approved in their entirety by one motion. Any member of the public who wishes to comment on any Consent Agenda item may do so at this time. Consent items generally require no discussion. However, any Director may request that any item be withdrawn from the Consent Agenda and moved to the "Action Items" portion of the Agenda to permit discussion or to change the recommended course of action. The Board may approve the remainder of the Consent Agenda on one motion.

   a. **Approval of Minutes from January 18, 2017 Meeting.**
   b. **Approval of Warrants, Budget Update and Invoice Register through February, 2017.**
   c. **Approval of Proposals for Hydrogeologic Services for Calendar Year 2017, to be provided by Cleath Harris Geologists**
   d. **Approval of Proposal for Consulting Services related to Creek Discharge for Calendar Year 2017, to be provided by MK Nunley and Associates**

6. **EXECUTIVE DIRECTOR'S REPORT**

7. **ACTION ITEMS**

   a. **Update on Status of Basin Plan Infrastructure Projects**

      Recommendation: Receive report and provide input to staff for future action.

   b. **Update and Discussion of Los Osos Community Plan**

      Recommendation: Review and approve draft letter to the Coastal Commission.

**c. Review and Discussion of Hydrogeologic Studies on Climate Change and Fall, 2016 Monitoring Data**

Recommendation: Receive reports and provide input to staff for future action.

**d. Water Conservation Program Update**

Recommendation: Receive update and provide input to staff for future action.

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

The Basin Management Committee will consider public comments on items not appearing on the agenda and within the subject matter jurisdiction of the Basin Management Committee. The Basin Management Committee cannot enter into a detailed discussion or take any action on any items presented during public comments at this time. Such items may only be referred to the Executive Director or other staff for administrative action or scheduled on a subsequent agenda for discussion. Persons wishing to speak on specific agenda items should do so at the time specified for those items. The presiding Chair shall limit public comments to three minutes.

## 9. ADJOURNMENT

**BASIN MANAGEMENT COMMITTEE BOARD OF DIRECTORS**

**Agenda Item 5a: Minutes of the Meeting of January 18th, 2017**

| Agenda Item | Discussion or Action |
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| **1. CALL TO ORDER**<br><br>**2. PLEDGE OF ALLIGANCE** | Director Ochylski serving as chair called the meeting to order at 1:35pm and asked Mr. Miller to lead the Pledge of Allegiance. |
| **3. ROLL CALL** | Mr. Miller, acting Clerk, called roll to begin the meeting. Director Garfinkel, Director Zimmer, Director Gibson, and Chairperson Ochylski, were all present. |
| **4. Board Member Comments** | Director Garfinkel: The State Water Board is proposing to extend the State drought measures, even with the recent rainfall. No date provided for the meeting but it will be held in Sacramento. They want to extend drought regulations further until it is known how much water we received with the recent rainfall.<br><br>Director Gibson – The County Public Works and Planning staff had a good meeting with Coastal Commission on Friday when they were in town. The focus of the meeting was to bring Coastal staff up to date on the conservation efforts of this committee. Mr. Miller was on the phone for the meeting. We made progress on educating the Coastal staff on our progress in the community and how that will relate to the Community Plan. Coastal staff now has a better understanding of the efforts being made by this committee. The Coastal staff could see the water conservation efforts that this committee is making and how it relates to the Sewer Project conservation, and Community Plan. It will bode well for the upcoming Community Plan update.<br><br>Director Ochylski: Since there are not many parking spaces at this location, I think we should move these meetings back to the Community Center, unless the committee has any objection to that.<br><br>(There was no Objection) |
| **5a. Minutes of the Meeting of November 16th, 2016**<br><br>**5b. Approval of Budget update and Invoice Register through December 31,2017** | Committee Accepted Items 5a and 5b.<br><u>Public Comment</u><br>No public comment on consent agenda.<br><br>Director Gibson: Motion to approve consent agenda.<br>Director Zimmer: Second..<br><br>**Ayes: Unanimous**<br>**Nays: None**<br>**Abstain: None**<br>**Absent: None** |

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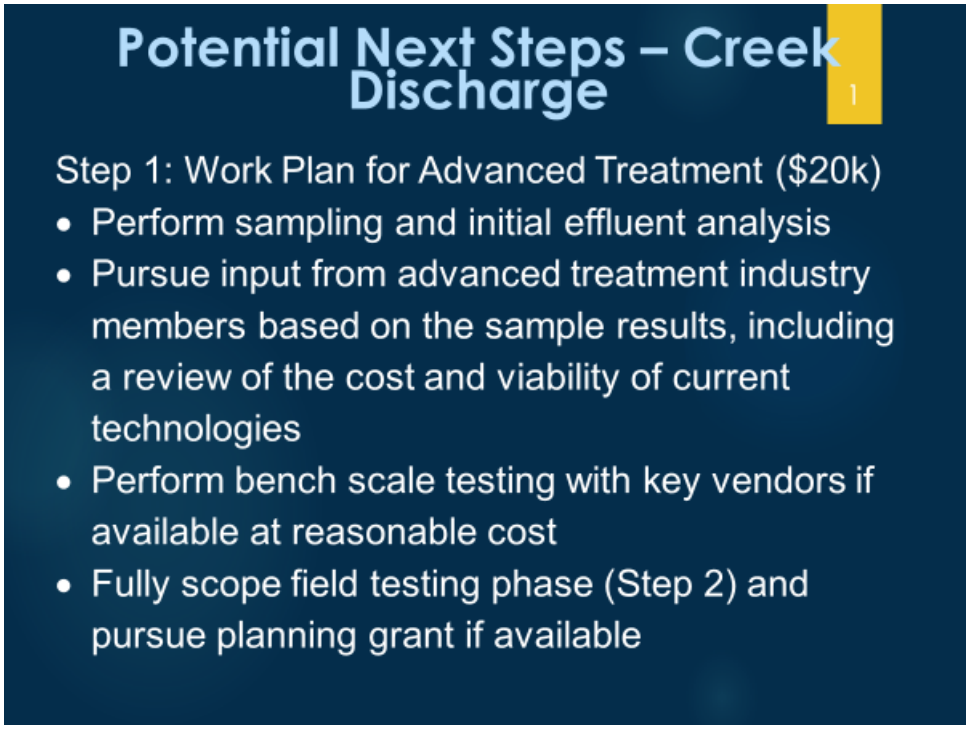
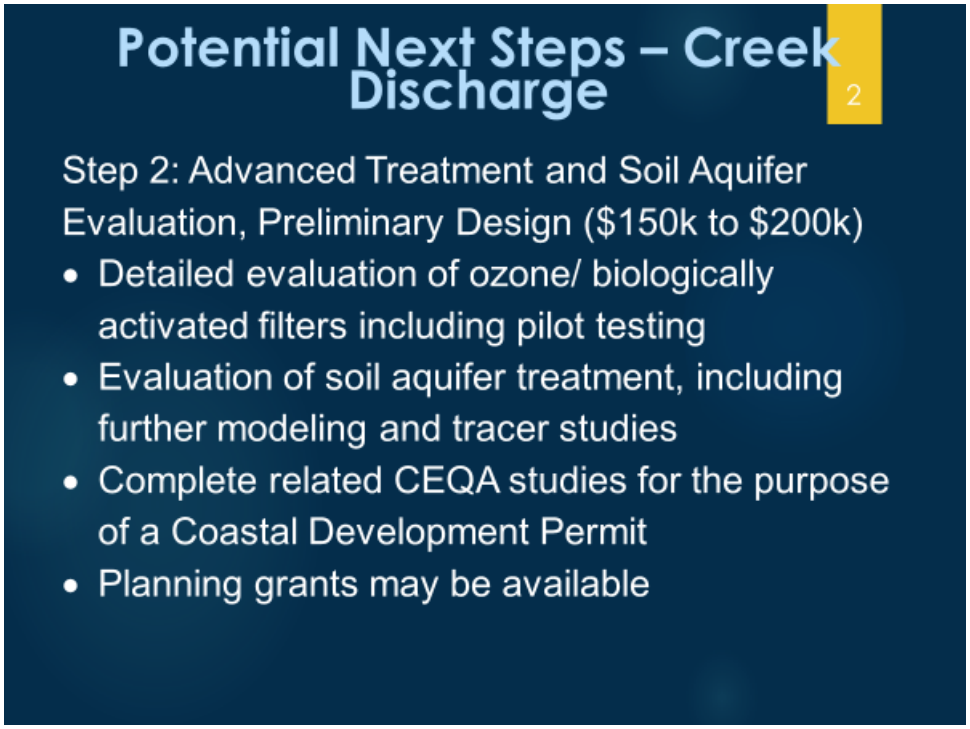
| **6. Executive Director's Report** | Executive Director, Rob Miller, provided a verbal overview of the written content of the Executive Director's report.<br><br>Mr. Miller: Provided a PowerPoint to present information in his report.<br><br>  <br><br>  <br><br><u>Questions from the Board</u><br>Q: Director Garfinkel: A gentleman asked if the Broderson site is actually draining into the aquifer. Do we have any test wells to show where that water is going?<br><br>A: Mr. Miller: Would let the County respond to that but there are downgradient test wells and monitoring wells, that are looking to track the mound that would develop |

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| | as the water is percolating. They should be able to track and confirm that mound.<br><br>Director Gibson: From the modeling we know that the water is going into the upper aquifer, the question is, is that water transferring to the lower aquifer?<br><br>Mr. Miller: Was the question specific to Zone C, the upper aquifer, or Zone D the lower aquifer?<br><br>Director Garfinkel: The lower aquifer. The gentleman suggested that we put a tracer in there and follow. Do we have the wells that would tell us that?<br><br>Mr. Miller: Both Zone C and Zone D have wells that are downgradient.<br><br>Director Ochylski: It would be helpful if we had an update on next month's agenda.<br><br>Director Zimmer: The SGMA compliance, where are we at with the fringe? Are we getting an update? Will that be part of the Community Plan?<br><br>Ms. Martin: The County is planning on another community meeting for the fringe areas in late February for SGMA compliance. The County is the only eligible entity for SGMA in the fringe area.<br><br>Mr. Miller: I would like to mention, If you are within the plan area, being the area subject to the Basin Plan, we are exempted from SGMA. We don't follow the same steps that are in SGMA. Our plan is intended to be SGMA compliant, and it has been transmitted to DWR, but it is not the same process that the fringe areas will have to follow.<br><br>Ms. Martin: Correct, the fringe areas will have to follow a different process.<br><br>Director Gibson: We will work together with this committee and the County as the GSA for the non-adjudicated area and put together the necessary SGMA compliance which should be a thin volume, given what we expect to understand from the hydrogeology for the fringe areas. I would like some kind of SGMA compliant seal of approval from DWR for the adjudicated area. I think that will be helpful as we work with other state agencies, that it is formally recognized to the extent that we are complying not only with the spirit but also the letter of SGMA . Given the work that we've already done. It would be nice to have an update in the next meeting or two of BMC. We have until June to declare our intention.<br><br>Ms. Martin: Yes the meeting is on June 30th.<br><br>Director Garfinkel: Would the BMC have any responsibility for the fringe areas?<br><br>Mr. Miller: Not to my knowledge.<br><br>Director Zimmer: In response to the June 30th deadline, if we don't have responsibilities, that's fine, however I think there should still be some type of alignment or cohesiveness between the two groups to some degree, but no commitment or obligation. I would like an update as well in the next meetings. I know that DWR is holding a workshop on adjudicated basins. Are we planning to attend that? |

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| | Mr. Miller: It's a teleconference and I am planning to attend. Are any of the other Director's planning to attend?<br><br>Director Garfinkel: I haven't heard of it until now.<br><br>Director Zimmer: Not sure that I will attend, but someone from Golden State will be attending.<br><br>Director Ochylski: Mr. Miller if you could, send out the teleconference information again so we all have that.<br><br>Director Zimmer: Regarding the creek discharge and the initial first step, the funds needed for that are in the proposed budget. Based on the results of step one, we'll decide on how we move forward with step two and look at potential grant funding. Is it our objective to get set up with the funding?<br><br>Mr. Miller: Yes, it's been easier getting planning grants, than it has been to get the implementation grants for construction. We'll be looking at planning level grants to try to fund the initial work in step two.<br><br>Director Ochylski: In regards to the groundwater monitoring, we are now testing four times a year?<br><br>Mr. Miller: Twice a year.<br><br>Director Ochylski: So we are doing fall and spring. And Mr. Miller you were talking about the fall so you said we should have that at the next meeting?<br><br>Mr. Miller: If we meet in February, yes we would have it.<br><br><u>Public Comment</u><br>Mr. Wimer: Does the water quality report include both testing in the upper aquifer, as well as the semi-annual seawater intrusion report? This report is delayed, effective contingency plan regarding seawater intrusion requires a faster release of data. Will this coming report be final and will the public have input in it? I would be interested in it having an adjusted sustainable yield and targets for basin storage capacity. The capacity is the best indicator if the basin can withstand climate change. Will the committee be spending more money to change the basin boundary, or will the focus be on the County creating the SGMA plan for that and the committee coordinating it? Regarding creek discharge, the Sierra Club and the LOSG sees that method of recharge only worthwhile if you can establish a significant amount of water can be extracted from downstream wells. Do the tests show the quantity of water that can be extracted in addition to the quality, and the time it takes for the water to get to those wells? A lot of money is spent on these studies, this is money that could go to other recycling options. Will the BMC consider using the funds on these recycle options in the future?<br><br>Mr. McGibney: Regarding Mr. Miller's report and creek discharge, when we receive rain like we have recently, what happens when the recycled water is not able to be discharged while it's flowing? Would also like to know if there were any talks with the Coastal Commission concerning the $5 million dollars the County was responsible to put forth for conservation, and how would those funds will be raised? Also, for people who are hooking up to the sewer, what steps will be taken to |

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| | ensure compliance is being met?<br><br>Mr. Edwards: Does the climate study take in to account both wet and dry years? Regarding SGMA compliance, our basin is outside the SGMA compliance, so the committee should not be using any funds or time on it when it does not apply. My understanding is our creek discharge will be a seasonal discharge, which is widely supported across the state, and it is important to battle seawater intrusion. What is the timeline for the first initial steps? Has a Regional Board staff member been assigned to this project?<br><br>Mr. Best: What is the quality of the water that is being released into the Broderson leach field? Can that water be made available to commercial/residential/mixed use properties for irrigation to lower well production requirements?<br><br>Ms. Owen: Title 19 rebates and water credits are only through private developers. The recycled water that is going to Broderson, when will we see some of it released to the community? Since the water has reached requirements, will we see availability of home deliveries? With the concerns of new wells installed outside the prohibition zone, where can we see the monitoring results on private well use?<br><br><u>Response from the BMC</u><br>Mr. Miller: The fall study will show available water levels and there is a hope that the spring results will be made available sooner. We do need to discuss the status of Contingency Plans and some of the elements that will be in the Community Plan. No further money has been budgeted for basin boundary modification at this time. Creek discharge is a dry weather discharge that is proposed, so it will only be used if there is space in the basin during dry weather. We will come back with a consultant proposal to discuss creek discharge. Recycled water may be available for school use as soon as this summer. I have done some research on the side, availability of recycled water for trucked irrigation use. There has been progress locally in Goleta and San Simeon in achieving more recycled water uses. Public Works does have the ability to require monitoring on private well uses, but I have not seen any data. Perhaps the County staff could get back to us with more information on that. Any new wells outside of the sewer zone would be of interest to the committee. |

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| **7a. Update on Status of Basin Plan Infrastructure Projects** | Mr. Miller: Gave a brief overview and updates on projects under Programs A & C.<br>  <br><br>  <br><br><u>Response from the BMC</u><br>Director Zimmer: Can we have program B as an ongoing item so we can have an update.<br><br>Mr. Miller: We have no further progress on programs B & D but I can add them to the updates if it would be helpful as placeholders.<br><br>Director Zimmer: That is why I mentioned that. There has always been a conceptual idea of an Upper Aquifer well at Rosina to utilize that ion exchange at its capacity. |

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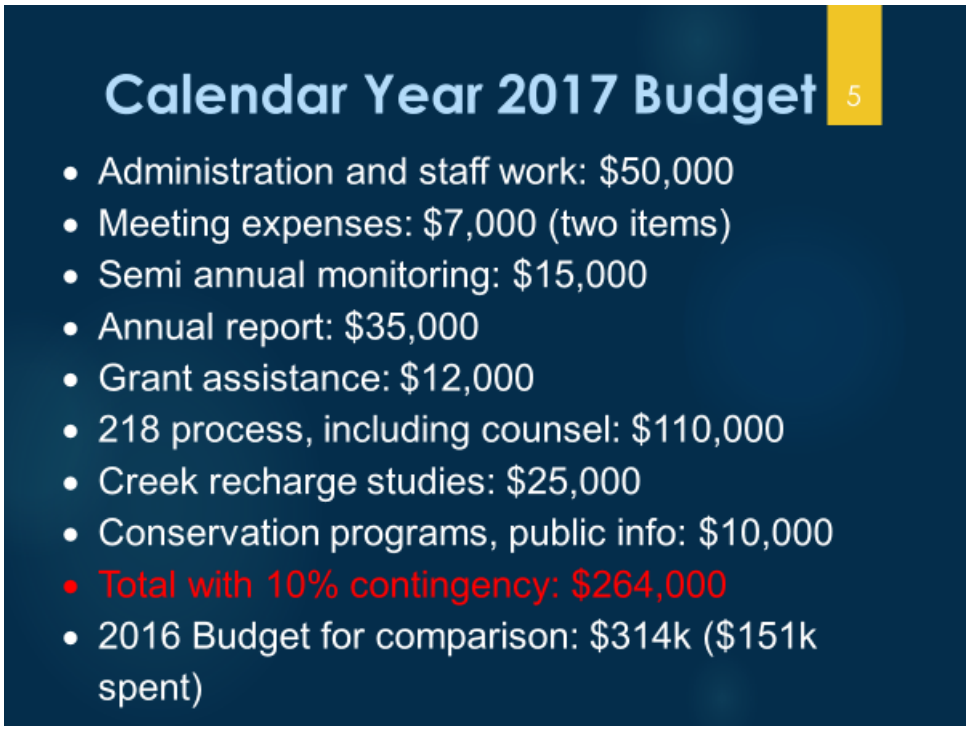
| | Director Gibson: I agree, having it all in front of us as updates is very helpful.<br><br><u>Public Comment</u><br>Mr. Edwards: Regarding Program B, Basin Management Plan contemplates a centralized nitrogen removal facility. We are beginning to see many local satellite nitrogen removal facilities. Monica Hunter is a Regional Water Quality Control Board member and is a strong local advocate. She might be able to help with grants and loans. Would also like to see dollar amounts listed as a column relative to the water projects.<br><br>Mr. Wimer: Receiving other funding and having it dispersed between the water purveyors may be our best solution for achieving the funding. With a strong conservation effort Program B may not be needed. The Basin Plan envisions shifting the conservation and recycled water programs to basin wide funding, but I don't feel that is necessary with the County needing to provide funding through the Los Osos Waste Water Project. If there is basin wide funding it could fund conservation efforts outside the prohibition zone, with the possibility of these funds crediting back the people within the prohibition zone for any general benefit.<br><br><u>Response from the BMC</u><br>Director Ochylski: Would also like the dollar amounts added to the project chart. |
| **7b. Adoption of Basin Management Committee Annual Budget** | Mr. Miller: Gave a brief overview of the 2017 budget with a PowerPoint included.<br><br>  <br><br><br>Director Ochylski: I would like to make it clear on Table 1 that the projected total fiscal year budget is for all 4 parties, not just the LOCSD as it appears in the header.<br><br><u>Public Comment</u> |

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| | Mr. Wimer: The past budget included nearly $100,000 in studies. This budget includes over $100,000 on studies including the 218 process which may not be needed, this funding could be used towards other efforts to reverse seawater intrusion. I encourage the full funding of the conservation program and to have it fully implemented within the next year to show the progress the BMC is making. The annual report mentioned the possibility of additional funding for well monitoring. Do we have an update on the County well that would be placed near the estuary? I would also like to see some funding to research other recycled water options.<br><br>Mr. Best: Presented an option of the BMC using a type of social media (Next Door) that might bring in more of the public and may be able to keep the public more informed.<br><br>Ms. Owens: Regarding the conservation efforts by the water companies, Golden State and the CSD, is the $10,000 additional funding coming from BMC budget? Are the water purveyors funding their own conservation and that money would be in addition to?<br><br><u>BMC Comments</u><br>Mr. Miller: We do use mailers to communicate with the public, but in regards to social media, that would be a fun way to reach out and provide information. However, the rebates would likely remain on the individual purveyor sites. Regarding the monitoring well, we did apply for that as part of our pre-application for Prop 1. It would be nice to partner with the County and join in their monitoring well installation process.<br><br>Director Gibson: I agree that a monitoring well is an important part of our Adaptive Management, and it is a BMC expense. While it is not included in Programs A-D we should keep it on the table until we figure out how to mobilize the resources to do it. Note that this is the committee adopting the budget; the actual appropriation of these monies will require the appropriate action in each of the four partners. I would like to motion to approve the budget.<br><br>Director Garfinkel: Second the motion for approval.<br><br>**Ayes: Unanimous**<br>**Nays: None**<br>**Abstain: None**<br>**Absent: None**<br><br>Director Ochylski: All are in favor. Passed unanimously.<br><br>Director Ochylski: Regarding Mr. Best's comment on social media, I agree that we should join the efforts of the County, Golden State, and the CSD as far as social media goes. It is a good tool and the CSD may look at the possibility of having an intern work with our social media.<br><br>Mr. Miller: I think an intern would be a great asset for our social media outreach. |
| **7c. Update and Discussion of Los Osos Community Plan** | Mr. Miller: Since we are seeking to provide input to the County Planning Commission by April and staff hasn't come forward with any firm recommendation, I thought it would be helpful to collect more input. We have taken into account what the committee members have said and are trying to narrow it down to some key |

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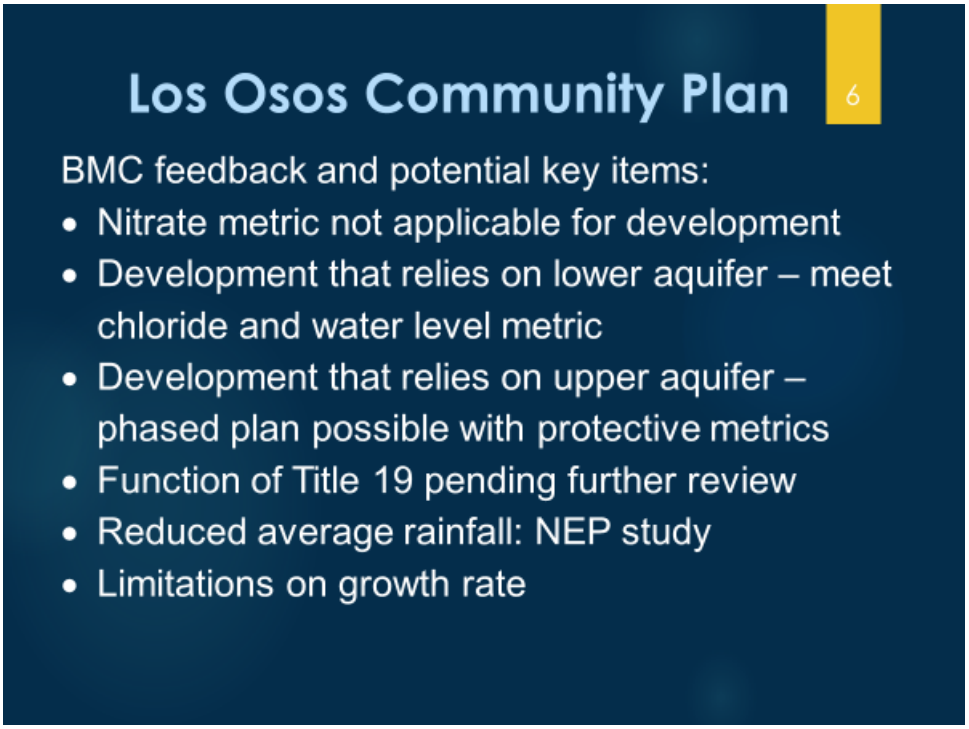
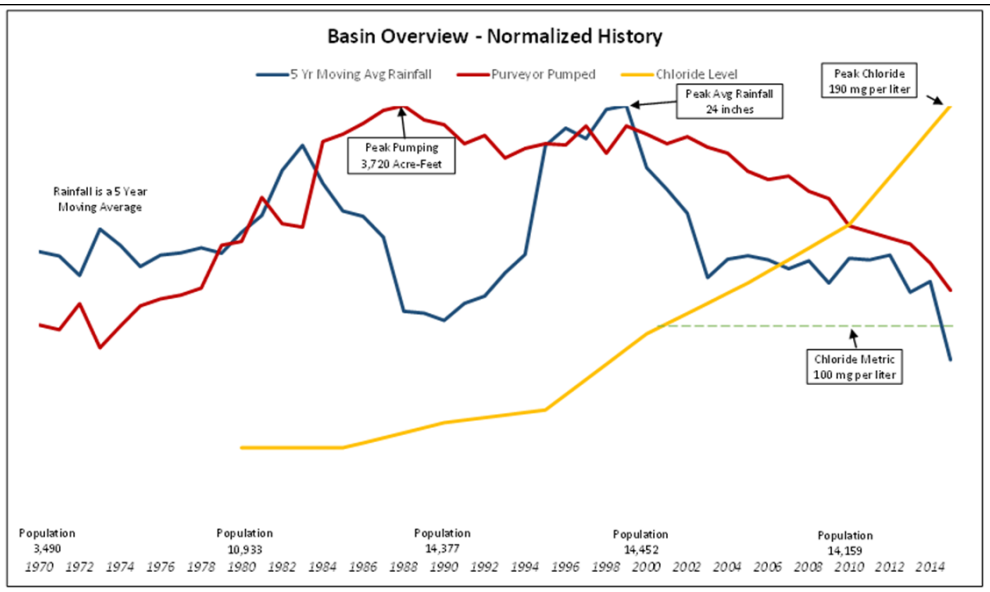
| | bullets that reflect committee input. Hopefully we can get some firm input from committee members and come back at our February or March meeting with a letter of recommendation for the County. The County would decide then if it would be passed to the Coastal Commission. A list compiled committee input is provided in the PowerPoint slide. This is open for feedback or input.<br><br>  <br><br><br>Director Ochylski: It would be helpful if we had that last round of monitoring before coming up with objective criteria for this list.<br><br>Mr. Miller: In the absence of that monitoring we thought the principal for any development that relies on the lower aquifer would continue to meet the metric. And we will have the monitoring at the next meeting.<br><br>Director Garfinkel: Provided a brief explanation of his graph and presentation which showed a normalized history. The timeline is all based on 100%, showing a period from 1970 – 2015 of the rainfall, pumping, and chloride metric. |




Public Comment

Mr. Edwards: I would like to note that the Community Plan will probably not go to the Planning Commission until around summer time. Regarding Title 19, we need a next generation program and that requires an amendment for Title 19. Regarding the graph and analysis by Director Garfinkel, the information is limited due to climate change. The historical data is not going to be very revealing. The data from now and for the next couple of decades will be more helpful. The most important consideration to the Community Plan, in regards to growth, needs to be framed by Title 26, the Growth Management Ordinance. I would encourage the committee to the look into the community growth rate going forward, our goal should be one half of 1 percent. I would like to see some of the stale data from the Basin Plan reviewed or corrected before having adding it to the Community Plan. We also need to have real build out projections relative to the water demand.

Mr. Wimer: We do not know if there is enough water for the existing population to move forward with projection numbers. We need to first implement the Recycled Water Program and the Conservation Program and get real measurements that are not based on projections. We need to see there is enough storage in the aquifers and a decrease and reversal of seawater intrusion before we allow building.

Ms. Owen: The matrix should be how much water exists in both the upper and lower aquifers and how many years will that water last at the current rate of use. Regarding affordability, new development housing is unaffordable and we need smaller affordable housing options as well.

Mr. Best: I am not seeing how much water is being consumed outside of the prohibition zone. Also, for the people that have to put in sewers, I would like to know in regards to their costs, how that will balance with the people outside the zone? Will that burden be equalized?

Ms. Brown: In regards to the delayed update, we won't be going to the Planning Commission in April, it will be more like the summer of 2017, but we do still want to get those comments in.

Director Ochylski : I would like to say the list we have now is good, and defer until we get that water monitoring report.

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| | Mr. Gibson: It's important to understand this is a LCP update it is not an exploration of Title 19 or the Growth Management Ordinance which sets growth rates in the County. While those will play a role, the LCP is a forward looking document talking about the future development of the community of Los Osos. I suggest the comments this committee submits should remain relatively simple to the Planning Department. The Planning Department, Planning Commission, Coastal Commission, and Board of Supervisors are the proper groups who decide the policy of growth, not this committee. I feel we should submit a simple statement for the Planning Department to be passed on that this Committee has a plan for a sustainable long term water supply. The plan is SGMA compliant which should mean something to the Coastal Commission. This plan is based on adaptive management and as well as accepted climate change models. We also need to communicate that we are monitoring and will have a set of metrics available. In terms of our comments let's lay out the basics and offer a study session at the first Planning Commission meeting so they have a good understanding.<br><br>Director Zimmer: I agree with a lot of what Director Gibson is saying, right now we cannot really make a comment and we need to have the information in front of us. We need to understand our role and leave the County to work through what is in their discretion. Since we have more time we have a better opportunity to have staff to go back and look at the items in this list and keep our comments in line with our Basin Plan objectives. We also want to make sure the County has the ability to revise any of these standards we make today.<br><br>Director Ochylski: Maybe Mr. Miller could consult with Kerry, and Bruce provide them with big picture information that would give them a good understanding, and you could bring that back at the next meeting.<br><br>Mr. Miller: Yes, we can bring that back at our next meeting. |
| **7d. Water Conservation Program Update** | Mr. Miller gave a brief update on the Water Conservation Program.<br><br><u>Public Comment</u><br>Mr. Edwards: What is the reluctance of this committee to amend Title 19 when it can be so beneficial to the cause of this committee?<br><br>Mr. Wimer: Could we receive an update on the remaining $3.5 Million of County funds from the Los Osos Wastewater, and how it will be used? Also, considering recent reports saying DWR grant funding has been depleted, could we receive an update of the status Los Osos Wastewater funds?<br><br><u>BMC Comment</u><br>Director Gibson: Funds in the Wastewater project budget right now are difficult to the point of not being feasible to move over to fund this updated Conservation Plan. However, the County is working on another source of funding to get it going.<br><br>Director Zimmer: I think we should find a way to relieve the staff time spent going over all of the plans the various agencies have by forming a volunteer Community Group for conservation and outreach.<br><br>Director Ochylski: Mr. Miller maybe you and I can work on this and bring it back at the next meeting. |

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| | Director Gibson exited the meeting with no alternate member. |
| **8. PUBLIC COMMENTS ON ITEMS NOT APPEARING ON THE AGENDA** | Ms. Owens: Until we know how much water is being used on private land outside the Prohibition Zone, we will never know the total water pumped. |
| **9. ADJOURNMENT** | Meeting was adjourned at 3:25 pm.<br>The next meeting will be on March 15th at the South Bay Community Center in Los Osos at 1:30pm. |

**TO:** **Los Osos Basin Management Committee**

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

**DATE:** **March 15, 2017**

**SUBJECT:** **Item 5b – Approval of Budget Update and Invoice Register through February 28, 2017**

## 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 February 28, 2017 (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.

Several items should be noted as the attachments are reviewed:

- State Water Board invoice RW-1008149 appears as $837.20 for review of the creek discharge studies. The total invoice of $1,159.20 includes some activities related to the Los Osos Wastewater Project, but these costs have been paid directly by the County of San Luis Obispo Public Works Department. They made a payment of $322.00, see attachment 4, leaving a remaining balance of $837.20 to be approved and paid by the BMC.
- Note that the recently-approved 2017 budget has been entered into the summary.

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 2017 (updated through XXXX 2017) | | | | | |
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| **Item** | **Description** | **Budget Amount** | **Costs Incurred Through December 31** | **Percent Incurred** | **Remaining Budget** |
| 1 | Monthly meeting administration, including preparation, staff notes, and attendance | $50,000 | $6,056.77 | 12.1% | $43,943 |
| 2 | Meeting expenses - facility rent (if SBCC needed for larger venue) | $1,000 | $0.00 | 0.0% | $1,000 |
| 3 | Meeting expenses - audio and video services | $6,000 | $675.00 | 11.3% | $5,325 |
| 4 | Legal counsel (special counsel for funding measure) | $10,000 | $0.00 | 0.0% | $10,000 |
| 5 | Semi annual seawater intrusion monitoring | $15,000 | $0.00 | 0.0% | $15,000 |
| 6 | Annual report - not including Year 1 start up costs | $35,000 | $0.00 | 0.0% | $35,000 |
| 8 | Grant writing (outside consultant) | $12,000 | $0.00 | 0.0% | $12,000 |
| 9 | Creek Recharge and Replenishment Studies | $25,000 | $837.20 | 3.3% | $24,163 |
| 10 | Funding measure including Proposition 218 process | $100,000 | $0.00 | 0.0% | $100,000 |
| 11 | Conservation programs (not including member programs) | $10,000 | $0.00 | 0.0% | $10,000 |
| | Subtotal | $264,000 | | | $256,431 |
| | 10% Contingency | $26,400 | | | |
| | **Total** | **$290,400** | **$7,568.97** | **2.6%** | **$282,831** |
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| | LOCSD (38%) | $110,352 | | | |
| | GSWC (38%) | $110,352 | | | |
| | County of SLO (20%) | $58,080 | | | |
| | S&T Mutual (4%) | $11,616 | | | |
| Notes | | | | | |
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**Attachment 2: Invoice Register for Los Osos BMC for Calendar Year 2017(through XXXX 2017)**

| Vendor | Invoice No. | Amount | Month of Service | Description | Budget Item | Previously Approved |
|---|---|---|---|---|---|---|
| Wallace Group | 43235 | $6,056.77 | Jan-17 | BMC admin services | 1 | |
| State Water Resources | RW-1008149 | $837.20 | Jan-17 | Creek Discharge | 9 | |
| AGP | 6849 | $675.00 | Jan-17 | Audio services | 3 | |
| **Total** | | **$7,568.97** | | | | |

**ATTACHMENT 3**

**Current Invoices Subject to Approval for Payment (Warrant List as of February 28, 2017):**

| Vendor | Invoice # | Date of Services | Amount of Invoice |
|---|---|---|---|
| Wallace Group | 43235 | January 2017 | $6,056.77 |
| State Water Resources | RW-1008149 | January 2017 | $837.20 |
| AGP | 6849 | January 2017 | $675.00 |
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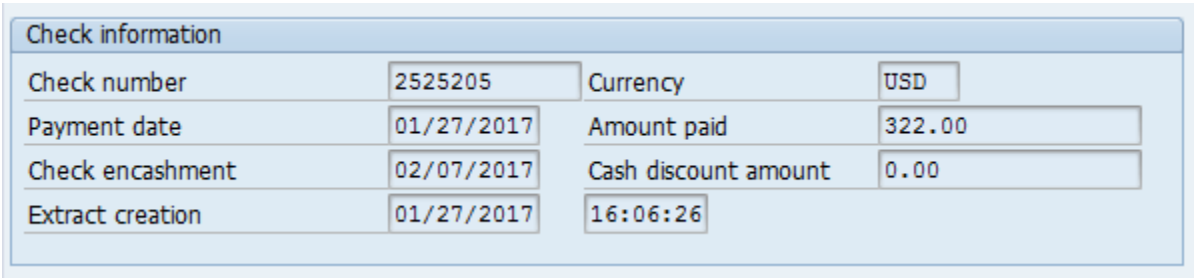
**ATTACHMENT 4**

**County of San Luis Obispo payment information related to State Water Resources Invoice RW-1008149.**

LOWRF construction project number 300448.08.02 portion is $322.00 for 2.0 hours of review by Brian Bernados, the Water Board's UV expert, for reviewing the UV operational protocol for the recycled water on June 27, 2016



| Check information | | | |
|---|---|---|---|
| Check number | 2525205 | Currency | USD |
| Payment date | 01/27/2017 | Amount paid | 322.00 |
| Check encashment | 02/07/2017 | Cash discount amount | 0.00 |
| Extract creation | 01/27/2017 | 16:06:26 | |

**TO:** **Los Osos Basin Management Committee**

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

**DATE:** **March 11, 2017**

**SUBJECT:** Item 5c: Approval of Proposals for Hydrogeologic Services for Calendar Year 2017, to be provided by Cleath Harris Geologists

**Recommendations**

Staff recommends that the Committee approve the proposed scope and fee for hydrogeologic services for calendar year 2017, to be provided by Cleath Harris Geologists, in an amount not to exceed $50,000

**Discussion**

In the January, 2017 meeting, the Committee approved a working budget for calendar year 2017. The budget included the following two line items that relate to groundwater monitoring:

- Budget Item 5: Annual seawater intrusion monitoring: $15,000
- Budget Item 6: Annual report: $35,000
- Total: $50,000

The above two items are addressed in the attached proposals from Cleath Harris Geologists (CHG). It should be noted that these proposals have a combined total that is approximately $11,000 less than the equivalent work performed in 2016. The current effort is expected to be more efficient given that the 2015 Annual Report will provide a helpful template for the 2016 Annual Report. The work will be completed in time for BMC consideration and adoption prior to the end of June, 2016. While the Committee may choose to consider the proposals separately, staff is recommending that both be approved concurrently, and if approved, a single contract would be prepared for the work, similar to last year.

**Financial Considerations**

The draft Committee budget for calendar year 2017 includes specific line items for the proposed work as described above.

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

March 7, 2017

Los Osos Basin Management Committee
c/o Mr. Rob Miller, P.E.
Wallace Group
612 Clarion Court
San Luis Obispo, CA 93402

**SUBJECT: Proposal for 2016 Annual Monitoring Report for the Los Osos Groundwater Basin.**

Dear Mr. Miller:

Cleath-Harris Geologists (CHG) proposes to perform hydrogeologic services related to completing the 2016 Annual Monitoring Report for the Los Osos Basin Plan (LOBP) Groundwater Monitoring Program. This proposal presents a scope of work, schedule, and the estimated costs for these services.

## Scope of Work

- Update databases with 2016 groundwater level and quality data for LOBP monitoring network wells.
- Prepare the 2016 Annual Monitoring Report. The report will include data reporting and interpretation for the period from January 1 through December 31, 2016. The report shall follow the 2015 Annual Monitoring Report format as a template, with updates to content for changed conditions.
- Provide a draft report for Basin Management Committee (BMC) review, and a final report that incorporates BMC comments.
- Assist BMC with preparing CASGEM datasets and contingency planning.

## Schedule

The draft report will require approximately three months to complete. The final report would be available approximately 3-4 weeks following receipt of BMC comments.

**Fees and Conditions**

CHG proposed 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 the hourly rate schedule listed below. The estimated cost for hydrogeologic services is estimated at $24,600.

**SCHEDULE OF HOURLY RATES**

| | |
|---|---|
| Principal Hydrogeologist | $ 150 |
| Senior Hydrogeologist | $ 140 |
| Project Geologist | $ 125 |
| Environmental Scientist | $ 110 |
| GIS Specialist | $ 110 |
| Staff Geologist Level II | $ 110 |
| Staff Geologist Level I | $ 95 |

**EXPENSES**

Mileage $0.53/mile
Other expenses at cost plus 10 percent handling.

If the herein described work scope, fees and conditions are acceptable, this proposal will serve as the basis for agreement.

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.

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

March 6, 2017

Los Osos Basin Management Committee
c/o Mr. Rob Miller, P.E.
Wallace Group
612 Clarion Court
San Luis Obispo, CA 93402

**SUBJECT: Proposal for Los Osos Basin Plan Groundwater Monitoring.**

Dear Mr. Miller:

Cleath-Harris Geologists (CHG) proposes to provide hydrogeologic services related to groundwater monitoring for the Los Osos Basin Plan (LOBP). This proposal describes existing monitoring data collection and presents a scope of work, schedule, and the estimated costs for hydrogeologic services to complete the semi-annual LOBP monitoring program recommendations, including semi-annual seawater intrusion monitoring.

## Background

The groundwater monitoring program in Chapter 7 of the LOBP includes 73 monitoring well locations within the basin. Twelve additional wells with monitoring data used during 2015 Annual Groundwater Monitoring Report preparations have been added to the LOBP network.

There are two existing, ongoing monitoring programs that historically overlapped with the LOBP monitoring program: the San Luis Obispo County Water Level Monitoring Program and the Los Osos Water Recycling Facility (LOWRF) Groundwater Monitoring Program. Beginning in winter 2016, the LOWRF monitoring schedule was shifted from spring and fall monitoring to summer and winter monitoring. As a result, data from the LOWRF monitoring program no longer coincides with the monitoring schedule adopted in the LOBP. A total of 22 LOBP network wells, including all five nitrate metric wells, were switched to the summer and winter monitoring schedule.

CHG monitored water levels at selected LOWRF monitoring wells in October 2016, but did not conduct nitrate water quality testing, which was performed by others in December 2016. CHG plans to continue measuring water levels in April and October at LOBP network wells that overlap with the LOWRF program. Water quality testing, however, will not be duplicated in the schedule, and data from LOWRF monitoring in June and December 2017 will be used for reporting purposes.

## Scope of Work

CHG will perform the following tasks under the 2017 Basin Plan groundwater monitoring program, per the attached tables.

- Contact selected private well owners for permission to access wells for LOBP monitoring.
- Conduct/coordinate semi-annual water level monitoring in April and October at up to 35 locations.
- Download and process pressure transducer data at up to 8 wells.
- Conduct/coordinate groundwater sampling in April 2017 from up to 11 wells for general mineral analyses.
- Conduct/coordinate groundwater sampling in October 2017 from up to 17 wells for general mineral analyses.
- Conduct groundwater sampling in October 2017 from up to two wells for CEC's analyses, include two equipment blanks and one travel blank.

## Deliverables

Tables with results of water level and water quality monitoring will be provided upon completion of the April and October 2017 monitoring events. Data interpretation and reporting is not included in this scope of work, but will be performed during 2018 Annual Report preparations.

## Schedule

The scope of work would be completed per the Basin Plan monitoring schedule (April and October monitoring).

## Fees and Conditions

CHG proposed 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 the hourly rate schedule listed below. Laboratory analytical services are estimated at $8,400. The cost for hydrogeologic services related to water level monitoring, groundwater sampling, transducer downloading, and CHG assistance with private well owner contacts is estimated to be $17,000. The total cost for the 2017 groundwater monitoring scope of work is estimated at **$25,400**.

## SCHEDULE OF HOURLY RATES

| | |
|---|---|
| Principal Hydrogeologist | $ 150 |
| Senior Hydrogeologist | $ 140 |
| Project Geologist | $ 125 |
| Environmental Scientist | $ 110 |
| GIS Specialist | $ 110 |
| Staff Geologist Level II | $ 110 |
| Staff Geologist Level I | $ 95 |

## EXPENSES

Mileage $0.53/mile
Other expenses at cost plus 10 percent handling.

If the herein described work scope, fees and conditions are acceptable, this proposal will serve as the basis for agreement.

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.

## Los Osos Basin Plan
## Monitoring Well Network 2017
## FIRST WATER

| Program Well ID | Well Owner | Basin Plan Monitoring Code | County Water Level Program | LOWRF Groundwater Monitoring Program[1] | **2017 Basin Plan Monitoring Program[2]** |
|---|---|---|---|---|---|
| FW1 | PRIVATE | L | | | **L** |
| FW2 | LOCSD | L, G | | L, G | **L** |
| FW3 | LOCSD | L | | L | **L** |
| FW4 | LOCSD | L | | L | **L** |
| FW5 | LOCSD | L | | L | **L** |
| FW6 | LOCSD | TL, G, CEC | | G | **TL, CEC** |
| FW7 | LOCSD | L | | | **L** |
| FW8 | LOCSD | L | | L | **L** |
| FW9 | LOCSD | L | | L | **L** |
| FW10 | LOCSD | TL, G | | G | **TL** |
| FW11 | LOCSD | L | | L | **L** |
| FW12 | LOCSD | L | | L | **L** |
| FW13 | LOCSD | L | | L | **L** |
| FW14 | PRIVATE | L | | L | **L** |
| FW15 | LOCSD | L, G | | L,G | **L** |
| FW16 | LOCSD | L | | L | **L** |
| FW17 | LOCSD | L, G | | L,G | **L** |
| FW18 | SLCUSD | L | | | **L** |
| FW19 | LOCSD | L | | L | **L** |
| FW20 | LOCSD | L, G | | L, G | **L** |
| FW21 | LOCSD | L | | L | **L** |
| FW22 | PRIVATE | L, G | | L, G | **L** |
| FW23 | PRIVATE | L | | L | **L** |
| FW24 | PRIVATE | L | L | | |
| FW25 | PRIVATE | L | L | | |
| FW26 | PRIVATE | L, G, CEC | | | **L, G, CEC** |
| FW27 | PRIVATE | TL | | | **TL** |
| FW28 | PRIVATE | L, G | L | | |
| FW29[3] | PRIVATE | L | L | | |
| FW30[3] | PRIVATE | L | | L | **L** |
| FW31[3] | LOCSD | L | | | **L** |

**L = WATER LEVEL**
**G = GENERAL MINERAL**
**CEC = CONSTITUENTS OF EMERGING CONCERN**
**TL = TRANSDUCER WATER LEVEL**

**LOCSD = Los Osos Community Services District**
**SLCUSD = San Luis Coastal Unified School District**

**NOTES:**
**1 - Summer and winter monitoring schedule**
**2 - Spring and fall monitoring schedule**
**3 - Well added to LOBP program**

## Los Osos Basin Plan
## Monitoring Well Network 2017
## UPPER AQUIFER

| Program Well ID | Well Owner | Basin Plan Monitoring Code | County Water Level Program | LOWRF Groundwater Monitoring Program[1] | **2017 Basin Plan Monitoring Program[2]** |
|---|---|---|---|---|---|
| UA2 | SLO CO. | L | L | | |
| UA3 | GSWC | L, G | | | **L, G** |
| UA4 | S&T | TL | | | **TL** |
| UA5 | LOCSD | L | | L | **L** |
| UA6 | SLO CO. | L | L | | |
| UA7 | SLO CO. | L | L | | |
| UA8 | LOCSD | L | | | **L** |
| UA9 | GSWC | L, G | | | **L, G** |
| UA10 | LOCSD | TL | | | **TL** |
| UA11 | PRIVATE | L | | L | **L** |
| UA12 | LOCSD | L | | L | **L** |
| UA13 | LOCSD | L, G | | | **L, G** |
| UA14 | PRIVATE | L | | | **L** |
| UA15 | PRIVATE | L | | | **L** |
| UA16[3] | PRIVATE | L | L | | |
| UA17[3] | PRIVATE | L | L | | |
| UA18[3] | PRIVATE | L | L | | |

**L = WATER LEVEL**
**G = GENERAL MINERAL**
**TL = TRANSDUCER WATER LEVEL**

**LOCSD = Los Osos Community Services District**
**SLO CO = San Luis Obispo County**
**GSWC = Golden State Water Company**
**S&T = S&T Mutual Water Company**

**NOTES:**
**1 - Summer and winter monitoring schedule**
**2 - Spring and fall monitoring schedule**
**3 - Well added to LOBP program**

## Los Osos Basin Plan
## Monitoring Well Network 2017
## LOWER AQUIFER

| Program Well ID | Well Owner | Basin Plan Monitoring Code | County Water Level Program | **2017 Basin Plan Monitoring Program** |
|---|---|---|---|---|
| LA2 | SLO CO. | L | L | |
| LA3 | SLO CO. | L | L | |
| LA4 | PRIVATE | L, GL | | **L** |
| LA5 | S&T | L | L | |
| LA6 | GSWC | L , G[1] | L | |
| LA7 | PRIVATE | TL | | **TL** |
| *LA8* | S&T | L, G | | **L , G** |
| *LA9* | GSWC | L | | **L, G[2]** |
| *LA10* | GSWC | L, G | | **L , G** |
| *LA11* | SLO CO. | L, G | | **L , G** |
| *LA12* | LOCSD | L, G | | **L , G** |
| LA13 | LOCSD | TL | | **TL** |
| LA14 | SLO CO. | L | L | |
| *LA15* | LOCSD | L, G | | **L , G** |
| LA16 | PRIVATE | L | L | |
| LA17 | SLO CO. | L | L | |
| *LA18* | LOCSD | L, G | | **L , G** |
| LA19 | SLO CO. | L | L | |
| *LA20* | GSWC | L, G | | **L , G** |
| LA21 | LOCSD | L | L | |
| *LA22* | LOCSD | L | L | **G[2]** |
| LA23 | PRIVATE | L, G | | **L, G** |
| LA24 | PRIVATE | L | L | |
| LA25 | PRIVATE | L | | **L** |
| LA26 | PRIVATE | L | L | |
| LA27 | PRIVATE | TL | | **TL** |
| LA28 | PRIVATE | L, G | | **L, G** |
| LA29 | PRIVATE | L | L | |
| LA30 | PRIVATE | L, G | | **L** |
| *LA31*[3] | PRIVATE | G | | **G** |
| *LA32*[3] | LOCSD | G | | **G** |
| LA33[3] | PRIVATE | L | | **L** |
| LA34[3] | SLO CO. | L | L | |
| LA35[3] | SLO CO. | L | | **L** |
| LA36[3] | PRIVATE | L | | **L** |

**L = WATER LEVEL**
**G = GENERAL MINERAL**
**GL = GEOPHYSICAL LOG (2018)**
**TL = TRANSDUCER WATER LEVEL**

**LOCSD = Los Osos Community Services District**
**SLO CO = San Luis Obispo County**
**GSWC = Golden State Water Company**
**S&T = S&T Mutual Water Company**

**NOTES:**

**1 - Remove G from LA6 - out of service.**

**2 - Add G to LA9 and LA22**

**3 - Well added to LOBP program**

***Well IDs with both April and October water quality monitoring in Italics***

**TO:** **Los Osos Basin Management Committee**

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

**DATE:** **March 11, 2017**

**SUBJECT:** Item 5d: Approval of Proposal for Consulting Services related to Creek Discharge for Calendar Year 2017, to be provided by MK Nunley and Associates

**Recommendations**

Staff recommends that the Committee approve the proposed scope and fee for engineering services for calendar year 2017, to be provided by MK Nunley and Associates (MKN), in an amount not to exceed $24,935.

**Discussion**

In the January, 2017 meeting, the Committee approved a working budget for calendar year 2017. The budget included the Line Item 9 for Creek Recharge and Replenishment Studies in an amount not to exceed $25,000. The attached proposal from MKN is consistent with the phased planning approach described in the January, 2017 meeting.

**Financial Considerations**

The draft Committee budget for calendar year 2017 includes a specific line item for the proposed work as described above.

P.O. Box 1604
Arroyo Grande CA 93421
805 904 6530 tel
www.mknassociates.us

March 9, 2017

Rob Miller, PE
Executive Director
Los Osos Basin Management Committee
Submitted via email

**RE: Proposal for Los Osos Creek GRRP Work Plan Development**

Dear Rob,

Michael K. Nunley & Associates, Inc. (MKN) is pleased to submit this proposal for developing a Work Plan to further evaluate requirements associated with discharge of treated effluent from the Los Osos Water Recycling Facility (LOWRF) to Los Osos Creek. This proposal includes the scope of work, budget, and schedule anticipated for this project.

## PROJECT UNDERSTANDING

The Los Osos Basin Management Committee (Committee) has completed a feasibility study for discharging LOWRF tertiary treated wastewater to Los Osos Creek. The study concluded that the discharge will likely be considered a Groundwater Replenishment Reuse Project (GRRP), as defined by the State Water Resources Control Board Department of Drinking Water (DDW). Designation as a GRRP triggers application of a number of water quality and treatment requirements for the discharge. The project may require treatment beyond tertiary disinfected recycled water levels achieved at the LOWRF. To some extent these requirements may be fulfilled by time spent transiting the aquifer between the points of application and extraction. The extent of this depends upon the water quality, transit time, as well as composition of the aquifer structure.

DDW regulates GRRPs, establishing treatment requirements, specific water quality criteria, and monitoring and reporting requirements for each GRRP. Determining these criteria requires information on the quality of the reclaimed water as well as the expected Soil Aquifer Treatment (SAT). SAT processes are likely to occur within the native creekbed and underlying vadose zone sediments and may induce reductions in the TOC concentration of the applied recycled water, thereby helping to meet the DDW permit requirements. Accurate information during the planning and design stages is important to avoid implementation of unnecessary, expensive treatment processes, and reduce the risk of constructing facilities unable to meet the GRRP discharge requirements. An early understanding of the project alternatives will allow for refinement of the project design.

This Project is intended to develop a plan that will produce a robust and cost-effective design for the Los Osos Creek discharge project. Specifically, the work plan will be designed to evaluate SAT and predict advanced treatment requirements, since SAT and treatment are both required to meet effluent requirements. Constructing this plan will require investigation of existing and anticipated LOWRF effluent characteristics, potential treatment methods and their effectiveness, and the specific data needs of the DDW.

This Project is proposed as Phase 1 of the Advanced Treatment Evaluation for the Los Osos Creek Discharge Project. Its output will be the Work Plan for Phase 2 of the Study, which will consist of the Advanced Treatment and Soil Aquifer Evaluation and Preliminary Design of the project facilities. The Work Plan will include information review, investigations, and outreach to equipment vendors; development of the scope for the Phase 2 work; development of a budget and schedule for Phase 2; and a memorandum to summarize the findings and recommendations.

## SUMMARY OF PROPOSED SERVICES

If selected to perform this work, the MKN team, will perform the following tasks:

- Identify goals for the Advanced Treatment and Soil Aquifer Evaluation
- Plan and conduct workshop with stakeholders
- Perform research review and outreach to vendors
- Provide recommendations for effluent testing to evaluate existing recycled water quality
- Develop scope for Advanced Treatment and Soil Aquifer Evaluation
- Develop estimated budget and schedule for Advanced Treatment and Soil Aquifer Evaluation
- Prepare draft, revised draft and final Technical Memorandum summarizing findings and recommendations
- Present findings to Basin Management Committee and attend miscellaneous project meetings.

## SCOPE OF WORK

### Task Group 100 – Project Meetings and Coordination

MKN will attend a kickoff meeting with Committee staff to establish communications and to identify the goals of the Advanced Treatment and Soil Aquifer Evaluation. MKN will present known requirements of the DDW for GRRPs. Any requirements for specific data not already on hand will be presented and discussed.

Following development and acceptance of the Draft Final Work Plan (Task Group 300), MKN will attend a meeting to present the Draft Final Work Plan to the Basin Management Committee.

MKN will prepare agendas prior to meetings and will record and distribute meeting minutes to all attendees. The meeting minutes will document the discussions and decisions made.

**Deliverables:**

- Meeting graphics and other materials
- Meeting agendas and minutes
- Work Plan presentation (Powerpoint)

**Task Group 200 – Information Development**

MKN will gather existing information on LOWRF effluent quality as well as Los Osos Creek water quality. In addition, a high-level review of potentially impacted groundwater wells will be performed, and information on water quality from these wells will be solicited.

MKN's subconsultant, GSI Water Solutions, Inc. (GSI), will conduct a technical evaluation of the GRRP, including water quality, travel time of the water introduced in the creek to the nearest water supply well (Retention Time), probable effectiveness of TOC removal, and blending considerations. This information will be used to direct further investigation into advanced water treatment requirements.

MKN will solicit proposals for bench and pilot scale evaluations of TOC reduction processes to be implemented in Phase 2. Both GAC adsorption (RSSCT) and ozone/BAC treatment processes will be considered.

MKN will coordinate with DDW staff to determine the specific information and permit requirements necessary for implementation of a GRRP. All work will be directed at finding cost-effective means of complying with regulations for GRRP projects.

**Task Group 300 – Develop Phase 2 Work Plan**

Based upon the discussions in the workshop, MKN will prepare a Draft Technical Memorandum, which will include the Work Plan scope, anticipated budget, and schedule for Phase 2. The Technical Memorandum will be finalized after presentation to the Basin Management Committee and comments are received.

MKN will perform a concept-level cost evaluation of GAC adsorption and ozone/BAC treatment to help the Committee evaluate the cost/benefit of these two processes.

MKN will use information developed in Tasks 1 and 2 to develop the Phase 2 Work Plan. This plan will describe:

- Additional water quality and hydrogeological testing necessary to meet DDW requirements for implementation of a GRRP
- Long-term pilot testing requirements for ozone / BAC and GAC adsorption testing of LOWRF effluent
- Scope for further hydrogeological modeling and/or tracer studies to determine residence times and potential impacts of soil aquifer treatment
- Scope for development of Title 22 report
- Proposed schedule for Phase 2 work
- Anticipated budget for Phase 2 work

**Deliverables:**

- Draft Work Plan Technical Memorandum (electronic in Word and Adobe PDF formats)

- Final Work Plan Technical Memorandum (electronic in Adobe PDF format)

**FEE AND SCHEDULE**

The anticipated schedule is summarized in the table below. It assumes a review period of four weeks for each submittal.

| Task | Weeks from Notice-to-Proceed |
|---|---|
| Kickoff Meeting | 1 week |
| Deliver Draft Phase 2 Work Plan TM | 14 weeks |
| Deliver Final Phase 2 Work Plan TM | 2 weeks after receipt of comments |

MKN proposes to complete this project on a time and materials basis, with a total budget that will not be exceeded without written authorization. The budget is summarized below and a detailed breakdown is provided in the attached spreadsheet.

| Project Task | MKN Labor & Other Direct Costs | Subconsultant (GSI) | Total Proposed Budget |
|---|---|---|---|
| Task Group 100 Project Meetings and Coordination | $2,220 | $1,100 | $3,320 |
| Task Group 200 Information Development | $6,165 | $5,720 | $11,885 |
| Task Group 300 Prepare Phase 2 Work Plan | $6,200 | $2,530 | $8,730 |
| **Total Base Budget** | **$14,585** | **$9,350** | **$24,935** |

Thank you for providing MKN with the opportunity to provide professional engineering services for your project. If you have any questions regarding this proposal, please contact me at eshields@mknassociates.us or by phone at (805) 904-6530 x105.

Sincerely,

Eileen Shields, PE
Senior Engineer

Michael Nunley, PE
Principal Engineer

Attachments: Proposed Engineering Fee, 2017 Fee Schedule

## Proposal for Los Osos Creek GRRP Work Plan Development

| | Principal Engineer | Project Engineer | Assistant Engineer | Administrative Assistant | Total MKN Hours | ODCs | Subconsultant (GSI) | Total MKN Labor | **Total Cost** |
|---|---|---|---|---|---|---|---|---|---|
| **Task Group 100 - Project Meetings and Coordination** | | | | | | | | | |
| Kickoff Meeting | 2 | 2 | | 2 | 6 | $ 200 | $ 550 | $ 750 | $ 1,500 |
| Work Plan Presentation | 3 | 3 | | 2 | 8 | $ 200 | $ 550 | $ 1,070 | $ 1,820 |
| **Subtotal** | **5** | **5** | **0** | **4** | **14** | **$ 400** | **$ 1,100** | **$ 1,820** | **$ 3,320** |
| | | | | | | | | | |
| **Task Group 200 - Information Development** | | | | | | | | | |
| Compile water quality data | 2 | | 6 | | 8 | | | $ 1,100 | $ 1,100 |
| Soil aquifer treatment analysis | 2 | 2 | | | 4 | | $ 5,720 | $ 640 | $ 6,360 |
| Prepare advanced treatment pilot testing plan and budget | 2 | 8 | 10 | | 20 | $ 200 | | $ 2,760 | $ 2,960 |
| Develop cost/benefit of GAC adsoprtion and ozone/BAC treatment | 1 | 2 | 8 | | 11 | $ - | | $ 1,465 | $ 1,465 |
| **Subtotal** | **7** | **12** | **24** | **0** | **43** | **$ 200** | **$ 5,720** | **$ 5,965** | **$ 11,885** |
| **Task 300 - Develop Phase 2 Work Plan** | | | | | | | | | |
| Prepare draft Phase 2 Work Plan | 8 | 8 | 16 | | 32 | | $ 1,980 | $ 4,560 | $ 6,540 |
| Prepare final Phase 2 Work Plan | 2 | 2 | 8 | | 12 | | $ 550 | $ 1,640 | $ 2,190 |
| **Subtotal** | **10** | **10** | **24** | **0** | **44** | **$ -** | **$ 2,530** | **$ 6,200** | **$ 8,730** |
| **Total** | **22** | **27** | **48** | **4** | **101** | **$ 600** | **$ 9,350** | **$ 13,985** | **$ 23,935** |

| **Billing Rates** | **$/hr** |
|---|---|
| Principal Engineer | 175 |
| Senior Engineer | 165 |
| Project Engineer | 145 |
| Assistant Engineer | 125 |
| Drafting | 92 |
| Administrative Assistant | 55 |

Mileage to be reimbursed at IRS rate

mkn
WATER - WASTEWATER - REUSE

MKN & Associates, Inc.
PO Box 1604
Arroyo Grande, CA 93421
805 904 6530

# FEE SCHEDULE FOR PROFESSIONAL SERVICES

## ENGINEERS AND TECHNICAL SUPPORT STAFF

| | |
|---|---|
| Principal Engineer | $175/HR |
| Senior Project Engineer | $165/HR |
| Project Engineer | $145/HR |
| Water Resources Planner | $135/HR |
| Assistant Engineer | $125/HR |
| GIS Specialist | $125/HR |
| GIS Technician | $105/HR |
| Senior Design Technician | $92/HR |
| Administrative Assistant | $55/HR |

*Routine office expenses such as computer usage, telephone charges, office equipment and supplies, incidental postage, copying, faxes, etc., are included in the hourly rates.*

## DIRECT PROJECT EXPENSES

| | |
|---|---|
| Outside Reproduction | Cost + 10% |
| Subcontracted or Subconsultant Services | Cost + 10% |
| Travel & Subsistence (other than mileage) | Cost |
| Auto Mileage | Current IRS Rate - $.54/mi. |

**TO:** **Los Osos Basin Management Committee**

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

**DATE:** **March 11, 2017**

**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

Similar to the January 2017 update, staff continues to await confirmation from the State Water Resources Control Board regarding the Proposition 1 pre-application.

Status of Zone of Benefit Analysis

At this time, no special tax measure is being pursued by staff to fund BMC administrative or capital costs, though some funding has been set aside in the 2017 BMC budget to advance a funding measure if needed. Discussions are ongoing with SLO County Public Works staff to review other funding alternatives for the County's share of administration. Staff's current approach to capital projects under the Basin Plan Infrastructure Program is to advance the needed projects through the property acquisition, environmental review, and Coastal Development Permit phases. These efforts are currently being funded by the LOCSD for the remaining two Program C wells.

Sustainable Groundwater Management Act (SGMA) Compliance and Pending Deadlines

The Plan Area defined in the Basin Plan and adopted by the Court is not subject to the requirements of SGMA, including the pending deadline to form a Sustainable Groundwater Management Agency by June 30, 2017. However, given that DWR did not approve the basing boundary modification in 2016, the fringe areas between the defined Plan Area in the Basin Plan and the DWR Bulletin 118 boundary are subject to SGMA, and must comply with the June deadline.

The County of San Luis Obispo hosted a second public outreach meeting on February 27, 2017 to discuss SGMA and GSA formation in the Los Osos Basin fringe areas. Discussions to-date indicate that one GSA will form over the Los Osos Basin fringe areas. The County of San Luis Obispo is the only eligible entity to manage over these fringe areas.

To address the fast-approaching, regulatory deadline, the County Board of Supervisors will hold a public hearing on April 4, 2017, to consider executing a Resolution to form a GSA over the fringe areas. Upon GSA formation, the County would form an advisory committee.
The next critical step will be understanding the fringe area conditions and connectivity to the main basin. Concurrent with the GSA formation process, the County will prepare a basin characterization study for the fringe areas. The study is anticipated to start in early summer. If the study provides adequate justification, the County could use this study to support a 2018 DWR basin boundary modification request. For more information, please visit: https://www.slocountywater.org/site/Water%20Resources/SGMA/lososos/

Salt and Nutrient Plan Update

In February 2009, the State Water Resources Control Board (SWRCB) adopted Resolution No. 2009-011, which established a statewide Recycled Water Policy (Policy). The Policy requires the development of a Salt and Nutrient Management Plan (SNMP) for the Los Osos Groundwater Basin, as it relates to the Los Osos Wastewater Project's Recycled Water Permit. The objective of the SNMP is to manage salts/nutrients in a manner that ensures attainment of water quality objectives and protection of beneficial uses. County Staff is preparing the draft SNMP pursuant the State's Recycled Water Policy and subsequent discussions with the Central Coast Regional Water Quality Control Board (RWWCB) staff. County staff anticipates publication of the Draft SNMP to be completed in April 2017, followed by a 21-day public comment period. During this timeframe, County staff will host a community meeting (date/location - TBD). After the SNMP is finalized, it will go through necessary processes for submittal to the RWQCB.

Los Osos Wastewater Project Flow and Connection Update

Staff plans to provide periodic updates on the status of connections and flows from the LOWWP. The following is an update on the status:

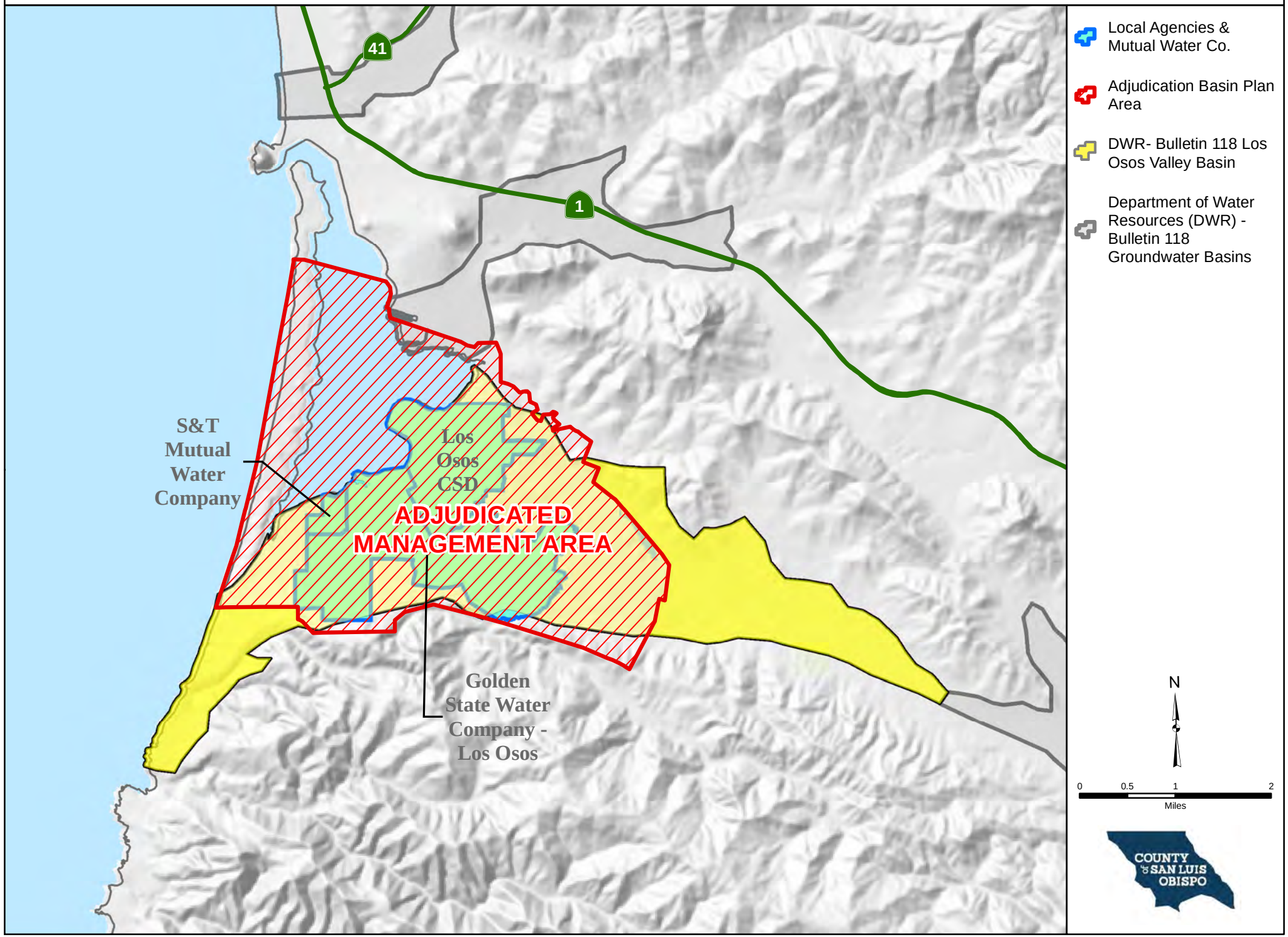
- 3,150 connections out of 4,200 laterals have been made, including neighborhood systems and mobile home parks.
- Flows are averaging approximately 380,000 gallons per day, with weekend peaks of 420,000 gallons per day
- Effluent has been discharged to the Broderson percolation site since August 10th. It is filtered and disinfected, which meets the WDR requirements of 7mg/L total nitrogen. The County has completed the process verification procedure with SWB Division of Drinking Water, and the effluent has been deemed Title 22 disinfected tertiary recycled water.
- The County released a groundwater monitoring report in December, 2016, which includes wells downgradient from Broderson. The anticipated groundwater mound has not yet been detected in these wells.

Potential New Legislation of Interest to the BMC

Senate Bill 252 (Dodd) was introduced in February, 2017. The bill will require applicants within a critically drafted basin, such as Los Osos, to comply with certain requirements when applying for a new well. The requirements include a notification process for neighboring properties,

opportunity for comment and public discussion, and a requirement for offsets such that no increase in extractions would result. This bill is still early in the legislative process, but its evolution may be of continuing interest to the BMC.

# DWR Bulletin 118 - Los Osos Valley Groundwater Basin - Local Agencies




Date Printed: 1/11/2017

**TO:** **Los Osos Basin Management Committee**

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

**DATE:** **March 15, 2017**

**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 four parts, designated Programs A through D. 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. The following Table provides an overview of status of the Projects that are currently moving forward or have been completed.

| Project Name | Parties Involved | Funding Status | Capital Cost | Status |
|---|---|---|---|---|
| **Program A** | | | | |
| Water Systems Interconnection | LOCSD/ GSWC | Fully Funded | Construction Value: $103,550 | Project completed February 2017, with final approval in March 2017 |
| Upper Aquifer Well (8th Street) | LOCSD | Fully Funded | $250,000 | Well was drilled and cased in December 2016. Budget remaining $250,000 to equip the well. Project to be completed by June 2018 |
| South Bay Well Nitrate Removal | LOCSD | Completed | | |
| Palisades Well Modifications | LOCSD | Completed | | |
| Blending Project (Skyline Well) | GSWC | Fully Funded | Previously funded through rate case | Blending of Skyline Well and Rosina Well Project was completed. Project required modifications to include a new nitrate removal unit. Permits and equipment secured, and construction completed anticipated in Fall, 2017. |
| Water Meters | S&T | Completed | | |
| **Program 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. |
| **Program C** | | | | |
| Expansion Well No. 1 (Los Olivos) | GSWC | Fully Funded | Previously funded through rate case | Well has been drilled and cased. GSWC is in the equipping phase. Well can be used, if needed, using on-site generator. |
| Expansion Well No. 2 | GSWC | Pending Funding Vote | BMP: $2.0 mil | Property acquisition phase is on-going through efforts of LOCSD. Two sites are currently being reviewed, and both appear to be viable for new east side lower aquifer wells, Environmental studies initiated in December 2016 for expansion well #2. |

| Project Name | Parties Involved | Funding Status | Capital Cost | Status |
|---|---|---|---|---|
| Expansion Well 3 and LOVR Water Main Upgrade | GSWC | Pending Funding Vote | BMP: $1.6 mil | Property acquisition phase is on-going through efforts of LOCSD. Two sites are currently being reviewed, and both appear to be viable for new east side lower aquifer wells. |
| LOVR Water Main Upgrade | GSWC | Pending Funding Vote | BMP: $1.53 mil | Project not initiated |
| S&T/GSWC Interconnection | S&T/ GSWC | Pending | BMP: $30,000 | Conceptual design |
| **Program M** | | | | |
| New Zone D/E lower aquifer monitoring well in Cuesta by the Sea | All Parties | Not funded | $100,000 | Pending funding plan |

**TO:** **Los Osos Basin Management Committee**

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

**DATE:** **March 11, 2017**

**SUBJECT:** **Item 7B – Update and Discussion of the Los Osos Community Plan**

**Recommendations**
Review and approve draft letter to the Coastal Commission.

**Discussion**
The County of San Luis Obispo Planning and Building Department is updating the Los Osos Community Plan. A draft letter has been prepared for BMC review to provide a broad overview of the Basin Plan, mention the plan's relationship to SGMA, and comment on future water demands.

Draft language for BMC letter to SLO Co. Department of Planning and Building, and California Coastal Commission

In January 2015, the Los Osos Water Purveyors and the County of San Luis Obispo released the Updated Basin Plan for the Los Osos Groundwater Basin (Basin Plan), detailing a series of strategies to manage and protect groundwater water resources in the basin. The Basin Plan is the conclusion of a multi-year planning process that first began in 2008 following the initiation of the basin adjudication.

The updated Basin Plan establishes goals, timeframes, milestones, and metrics to address basin management. The Los Osos Community Services District, Golden State Water Company and S&T Mutual Water Company, as well as the County of San Luis Obispo worked together to develop the immediate and continuing goals, and to create a framework that defines the fiscal and management authority to finance and implement the Basin Plan projects. Both the Basin Plan and the cooperative authority described in the plan were approved by the Superior Court in October, 2015. The area covered under the adjudication is termed the Plan Area in the Basin Plan (see Basin Plan Figure 10), and it fully encompasses the Urban Reserve Line.

The primary goals of the Basin Plan include halting seawater intrusion into the basin and providing sustainable water supplies for existing and future needs. Strategies outlined include:

- Implement conservation measures to minimize basin demand
- Shift pumping away from the coast and lower aquifer to halt seawater intrusion and maximize basin yield
- Beneficially use recycled water to minimize seawater intrusion
- Reserve 20 percent of basin safe yield to create a buffer to proactively protect the basin

In September 2014, California State Governor Jerry Brown signed groundwater management legislation to strengthen local management and monitoring of groundwater basins, called the Sustainable Groundwater Management Act (SGMA). Since the Los Osos Groundwater Basin is adjudicated, it was specifically excluded from the requirements of SGMA in the final version of the legislation. However, the Basin Plan is compliant with the substantive requirements of SGMA, and shares common goals for basin monitoring, management, and sustainability.

**Basin Management Committee Activities**

Pursuant to the court-approved Stipulated Judgment approved in October, 2015, the water purveyors and the County of San Luis Obispo formed a Basin Management Committee (BMC) in December, 2015. In September 2016, the BMC released its first Annual Report documenting the monitoring performed and Basin Plan progress made in 2015. The 2015 Annual Report includes:

- 2015 Groundwater Production
- The status of the basin based on the metrics set in the Basin Plan
- Framework for an Adaptive Management Plan
- Update on the basin infrastructure programs identified in the Basin Plan

The BMC meets regularly to discuss progress, establish upcoming priorities, and evaluate adaptive management measures. In November, 2016, the BMC updated the current and future water projections based on current production data. A copy of the staff note is attached for reference, but the key conclusions are summarized as follows:

- The Basin Plan projected a build-out purveyor water demand of 2,100 acre feet per year (AFY)
- Based on implemented water efficiency measures and community use patterns, the current range of estimated water demands is 1,100 to 1,500 AFY, depending on the future per capital demand and total population

**Status of Basin Infrastructure Program**

The Basin Plan provides 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 four parts, designated Programs A through D. Programs A and B are designed to 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. The following Table provides an overview of the status, as of March 2017, of the Projects that are currently moving forward or have been completed. Programs A and C are currently intended to balance the basin with the current population, and Programs B and D are generally intended for future development.

The BMC is available to provide periodic input and updates concerning groundwater basin conditions and project status. The 2016 Annual Report is expected to be released by June, 2017. Please let us know if you have any questions, or if you need more information.

| Project Name | Parties Involved | Funding Status | Capital Cost | Status |
|---|---|---|---|---|
| **Program A** | | | | |
| Water Systems Interconnection | LOCSD/ GSWC | Fully Funded | Construction Value: $103,550 | Project completed February 2017, with final approval in March 2017 |
| Upper Aquifer Well (8th Street) | LOCSD | Fully Funded | $250,000 | Well was drilled and cased in December 2016. Budget remaining $250,000 to equip the well. Project to be completed by June 2018 |
| South Bay Well Nitrate Removal | LOCSD | Completed | | |
| Palisades Well Modifications | LOCSD | Completed | | |
| Blending Project (Skyline Well) | GSWC | Fully Funded | | Blending of Skyline Well and Rosina Well Project was completed. Project needed modifications to include a new nitrate removal unit. Construction is expected to commence in Spring,2017. |
| Water Meters | S&T | Completed | | |
| **Program 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 | Not Funded | Pending further review | GSWC's Program A project allows for incremental expansion of the nitrate facility and can be considered a first phase in Program B. |
| **Program C** | | | | |
| Expansion Well No. 1 (Los Olivos) | GSWC | Fully Funded | Pending Completion | Well has been drilled and cased. GSWC is in the equipping phase. Well can be used, if needed, using on-site generator. |
| Expansion Wells No. 2 | GSWC | Pending Funding Vote | BMP: $2.0 mil | Property acquisition phase is on-going through efforts of LOCSD. Two sites are currently being reviewed, and both appear to be viable for new east side lower aquifer wells, Environmental studies initiated in December 2016 for expansion well #2. |
| **Project Name** | **Parties** | **Funding** | **Capital Cost** | **Status** |

| | Involved | Status | | |
|---|---|---|---|---|
| Expansion Wells 3 and LOVR Water Main Upgrade | GSWC | Pending Funding Vote | BMP: $1.6 mil | Property acquisition phase is on-going through efforts of LOCSD. Two sites are currently being reviewed, and both appear to be viable for new east side lower aquifer wells. |
| LOVR Water Main Upgrade | GSWC | Pending Funding Vote | BMP: $1.53 mil | Project not initiated |
| S&T/GSWC Interconnection | S&T/ GSWC | Pending | BMP: $30,000 | Conceptual design |

**TO:** **Los Osos Basin Management Committee**

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

**DATE:** **March 11, 2017**

**SUBJECT:** **Item 7c – Review and Discussion of Hydrogeologic Studies on Climate Change and Fall, 2016 Monitoring Data**

**Recommendations**
Received update and provide input to staff for future action.

**Discussion**
In September, 2016, Director Garfinkel presented information to the BMC concerning a potential climate metric relating to future development. The Morro Bay National Estuary Program staff subsequently offered to support the Committee's efforts by funding a follow up study regarding the effects of climate change on basin yield. The completed study is attached for your review and discussion. In addition, the results of the fall, 2016 seawater intrusion monitoring event are provided. As discussed in previous meetings, short term trends in the chloride metric can be highly volatile, and so the focus should be on longer term changes. It should also be noted that the chloride metric is configured to respond to changes in the deepest portion of the lower aquifer, Zone E. While no west side production is currently being drawn from this zone, it provides the best advanced warning into the potential future intrusion in Zone D. Staff will provide further input during the presentation of the material at the meeting.

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

**Technical Memorandum**

**Date:** March 3, 2017

**From:** Spencer Harris, HG 633

**To:** Los Osos Groundwater Basin Management Committee
Morro Bay National Estuary Program

**SUBJECT: Basin Yield Metric response to reduced long-term precipitation in the Los Osos Groundwater Basin.**

Dear Mr. Miller:

Cleath-Harris Geologists (CHG) has evaluated the response of the Basin Yield Metric (BYM) to reduced precipitation in the Los Osos groundwater basin. The purpose of this effort is to understand how reduced precipitation would affect basin sustainable yield, and what the corresponding level of groundwater production would be at 80 percent of the BYM (BYM 80), which is the target for safe operation of the basin, as recommended in the Los Osos Basin Plan (LOBP; ISJ Group, 2015).

## Background

The Los Osos Basin Management Committee (BMC) and Morro Bay National Estuary Program (Morro Bay NEP) have requested an analysis to evaluate the BYM under 2016 conditions and LOBP program combination U+AC if average annual precipitation were reduced from the current long-term average. The LOBP evaluated a variety of programs related to basin management, and program combination U+AC was recommended for immediate implementation.

The BYM compares the actual amount of groundwater pumped in a given year with the sustainable yield of the basin under then-current conditions. For example, the BYM for 2016 is a ratio expressed as follows:

$$\frac{\text{Calendar Year 2016 Groundwater Production}}{\text{Calendar Year 2016 Sustainable Yield}} * 100$$

Groundwater production in the numerator is based on measured and estimated values, while sustainable yield in the denominator is based on a value simulated using the basin model. The LOBP established the BYM target at 80 percent or less, so that at least 20

percent of the yield of the basin can be used as a buffer against uncertainty. Climate variability is one of the sources of uncertainty.

Sustainable yield in the equation above is not simply a volume of water, but is also the distribution of groundwater pumping across the basin that maintains a stationary seawater front, with no active well producing water with chloride concentrations above 250 milligrams per liter (mg/l). Evaluation of sustainable yield for various LOBP water supply program combinations was conducted using the basin model, and model results are listed in LOBP Table 46: Most Likely Program Combinations (attached).

CHG performed a climate change analysis of the Los Osos groundwater basin sustainable yield under 2012 basin conditions and population buildout conditions (Model Results for Los Osos Climate Ready Water Utilities Project, Appendix B *in* USEPA, 2013). The analysis included a sustainable yield evaluation in response to global warming, which simulated air temperature rise, sea level rise, and reduced precipitation. Baseline, mid-century, and late-century scenarios were analyzed under two levels of global greenhouse gas emissions.

Most global climate models reviewed during the USEPA study indicated a reduction in the long-term precipitation rate. The average annual precipitation value used in the basin model is equivalent to the long-term precipitation rate through cycles of dry, normal, and wet years. The basin model simulates the average annual precipitation rate across multiple years until a steady-state condition is achieved. The historical long-term precipitation rate used in the basin model is equivalent to an average annual precipitation of 17.5 inches (USEPA, 2013).

**2016 Basin Yield Metric**

Water supply infrastructure at year-end 2016, for the purposes of estimating sustainable yield, include the following LOBP programs:

- Los Osos Wastewater Project
- Urban Water Reinvestment Program (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). Program C was also partially completed in 2016 with the construction of the first expansion well (Golden State Water Company's Los Olivos Well No. 5). 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 110 AFY of the sustainable yield contribution

from Program C was developed in 2016, bringing the simulated total estimated sustainable yield for year-end 2016 conditions to 2,760 AFY (confirmed using basin model with long-term average precipitation).

The estimated basin groundwater production in 2016 is 2,160 acre-feet, which includes 1,005 acre-feet of measured community purveyor production and 1,155 acre-feet of other estimated production (golf course, community park, memorial park, non-purveyor domestic, and agriculture). Using the equation above, the corresponding BYM for 2016 is 78 percent, which does not exceed the LOBP target of 80 percent, although not all of the infrastructure programs used for the 2016 sustainable yield estimate and related BYM calculation were operational during 2016. For comparison, the 2015 BYM was 89 percent (CHG, 2016).

The actual distribution of pumping in 2016 was not sustainable due to drought and excess Lower Aquifer pumping in the Western Area (confirmed using basin model). As previously mentioned, sustainable yield values incorporate both pumping volume and location.

**Program Combination U+AC Basin Yield Metric**

LOBP program combination U+AC refers to the following elements:

- Los Osos Wastewater Project
- LOBP Urban Water Reinvestment Program (U)
- Basin Infrastructure Program A
- Basin Infrastructure Program C

The difference between year-end 2016 infrastructure and U+AC infrastructure is that the U+AC programs include two additional expansion wells. These expansion wells are located in the eastern Central Area, toward Los Osos Creek (LOBP Figure 55: Basin Infrastructure Program Map, attached).

With the above programs in place, the estimated sustainable yield of the basin is 3,000 AFY. Basin demand under no further development is estimated at 2,230 AFY (LOBP Table 46: Most Likely Program Combinations, attached), which would result in a BYM of 74 percent. The basin groundwater production value which meets the BYM 80 target, and is linked to the 3,000 AFY sustainable yield, is 2,400 AFY.

## Basin Model Input

Precipitation and groundwater production were the two primary model inputs adjusted in simulations performed for the BYM response analysis. A third related component, groundwater recharge from Los Osos Creek, was maintained below a maximum value. Each of these items are discussed below.

Precipitation Adjustments

Most global circulation models reviewed for the Los Osos Climate Ready Water Utilities Project predict reduced average annual precipitation in the Morro Bay area (USEPA, 2013). Projections of changes in precipitation were derived from the results of global circulation models for Intergovernmental Panel on Climate Change (IPCC) Scenario A2 (medium high emissions) and Scenario B1 (lower emissions).

IPCC emission scenario results from four global circulation models are available from Cal-Adapt (http://www.cal-adapt.org). These results have been used to characterize climate change projections in California. The four models are a subset of 16 global circulation models contained in the EPA Climate Resilience Evaluation and Awareness Tool (CREAT) used for the Los Osos Climate Ready Water Utilities Project (CREAT Version 1.0). A comparison of model results provided by CREAT and Cal-Adapt indicates that the four models used by Cal-Adapt include some of the lowest long-term precipitation rate projections.

Among the four Cal-Adapt models, the Centre National de Recherches Meteorologiques (CNRM) global circulation model provided the lowest overall long-term precipitation rate projections, which would be considered worst-case for analysis of impacts due to low precipitation. The lowest average annual precipitation is estimated at 67 percent of the long-term average of 17.5 inches per calendar year (Table 1). For correlation purposes, the BYM response analysis was performed using 100 percent, 90 percent, 80 percent, and 67 percent of the long-term average precipitation. Table 1 presents the average monthly precipitation for each precipitation reduction scenario. Precipitation reductions were calculated by multiplying long-term precipitation values by the percent of long-term average for each scenario.

**Table 1**
**Precipitation Reduction Scenarios**

| Month | Precipitation Reduction Scenarios (percent of long-term average precipitation) | | | |
|---|---|---|---|---|
| | 100% of average | 90% of average | 80% of average | 67% of average |
| | Inches of precipitation | | | |
| January | 3.57 | 3.21 | 2.86 | 2.39 |
| February | 3.77 | 3.39 | 3.02 | 2.53 |
| March | 3.29 | 2.96 | 2.63 | 2.20 |
| April | 1.10 | 0.99 | 0.88 | 0.74 |
| May | 0.43 | 0.39 | 0.34 | 0.29 |
| June | 0.08 | 0.07 | 0.06 | 0.05 |
| July | 0.01 | 0.01 | 0.01 | 0.01 |
| August | 0.05 | 0.05 | 0.04 | 0.03 |
| September | 0.24 | 0.22 | 0.19 | 0.16 |
| October | 0.82 | 0.74 | 0.66 | 0.55 |
| November | 1.40 | 1.26 | 1.12 | 0.94 |
| December | 2.72 | 2.45 | 2.18 | 1.82 |
| Annual | 17.5 | 15.7 | 14.0 | 11.7 |

Groundwater Production Adjustments

The volume and physical distribution of purveyor groundwater production was adjusted for each model scenario to provide the sustainable yield value. Annual production from domestic and agricultural wells was assumed to remain constant at current (2016) production levels and distribution. No significant increase in future private well production is anticipated by the LOBP.

Declines in purveyor groundwater production, and the associated declines in customer water use, also reduce the amount of recycled water available for recharge in the basin. Reductions in available recycled water from San Luis Obispo County's LOWRF have been simulated by a corresponding reduction in recycled water disposal volumes applied to the Broderson leach field, which is located south of Highland Drive and west of Broderson Avenue in Los Osos.

Recharge from Los Osos Creek

Recharge to the groundwater basin comes directly or indirectly from precipitation. Stream flow in Los Osos Creek, which originates as precipitation in the watershed, directly recharges the creek valley alluvial deposits, which, in turn, recharge the Upper and Lower Aquifers in the Eastern Area. The amount of potential recharge available

from Los Osos Creek under reduced precipitation scenarios is a key assumption for the BYM response analyses.

County stream gage #751 is located on Los Osos Creek at the Los Osos Valley Road bridge. The gage measures runoff from the portion of the watershed upstream of Los Osos Valley Road, which covers an area of 7.27 square miles. Stream flow records are available for 19 years between 1976 and 2002 (attached, San Luis Obispo County, 2005). Table 2 presents the available annual flow records for Los Osos Creek.

**Table 2**
**Los Osos Creek Stream Flow Records**

| Runoff Year with flow record | Stream Flow[1] (acre-feet) | Precipitation[2] (inches) |
|---|---|---|
| 1976 | 110 | 7.57 |
| 1977 | 0 | 13.24 |
| 1978 | 8,810 | 30.08 |
| 1979 | 1,240 | 19.01 |
| 1980 | 3,890 | 22.33 |
| 1981 | 1,630 | 12.9 |
| 1982 | 2,390 | 21.01 |
| 1984 | 2,110 | 10.57 |
| 1985 | 1,920 | 10.56 |
| 1986 | 11,850 | 17.83 |
| 1994 | 497 | 11.63 |
| 1995 | 19,270 | 41.8 |
| 1996 | 1,740 | 16.24 |
| 1997 | 3,020 | 19.51 |
| 1998 | 7,340 | 36.53 |
| 1999 | 505 | 13.73 |
| 2000 | 2,540 | 20.97 |
| 2001 | 2,470 | 15.95 |
| 2002 | 0 | 10.25 |
| Average | 3,750 | 18.5 |

The historical recharge to groundwater from Los Osos Creek stream seepage, during years with flow records listed in Table 2, is estimated to average 600 AFY, based on a review of groundwater production records and comparison with the stream seepage estimate for 2012 (610 AFY, LOBP Figure 73: 2012 Water Balance, attached).

[1] Stream flow gage #751. Some years have partial records (see attachment). Stage data is available for recent years, but no rating curve is available, and no associated flow records have been published (CHG, 2015).
[2] Rain gage #152 (Morro Bay Fire Department), adjusted for the Los Osos area through correlation with local rain gages.

Groundwater production in the creek valley, where stream seepage occurs, averaged 790 AFY for the years listed in Table 2, similar to 2012 production (800 AFY).

The stream gage is located one mile downstream of where Los Osos Creek enters the groundwater basin (attached Figure 1). The seepage capacity of the creek bed between the basin boundary and the stream gage has been documented at up to 10 cubic feet per second, and an estimated two thirds of groundwater recharge from Los Osos Creek occurs along this reach (CHG, 2014). Therefore, the estimated average surface flow entering the groundwater basin for the years listed in Table 2 would be 4,150 AFY (3,750 AFY measured at stream gage plus 400 AFY of seepage upstream of the gage).

A maximum 800 acre-feet of groundwater recharge from Los Osos Creek is assumed to be available for sustainable yield scenarios. This value is based on maintaining the 600 AFY of historical recharge, and adding up to 200 AFY of recharge that would be partially offset by in-lieu groundwater recharge from recycled water use in the Los Osos Creek valley (196 AFY, LOBP Table 32: Urban Water Reinvestment program Recycled Water Uses, attached). In-lieu recharge in the creek valley would occur when recycled water is used for memorial park and agricultural irrigation to reduce groundwater pumping.

Stream flow entering the groundwater basin on Los Osos Creek will decline as long-term precipitation is reduced. The lowest projected average annual precipitation is 11.7 inches (Table 1), or 63 percent of the average precipitation for years with stream flow records in Table 2. By comparison, less than 20 percent of the 4,150 AFY average stream flow entering the groundwater basin during those years would be needed to provide 800 AFY of recharge to the basin. Sufficient available stream flow is expected under reduced precipitation scenarios to support 800 AFY of groundwater recharge from Los Osos Creek.

**BYM Response Analysis Results**

The basin model was used to evaluate BYM response to reduced precipitation. The model utilizes the U.S. Geological Survey's SEAWAT program, which was developed to simulate three-dimensional, variable-density, transient groundwater flow in porous media. SEAWAT combines MODFLOW (modular flow) and MT3D (mass transport) code, and adds variable fluid density capability specifically for seawater intrusion simulations.

Several scenarios were analyzed for the two infrastructure programs considered: year-end 2016 infrastructure and for LOBP infrastructure program combination AC. These two programs were selected for analysis by the BMC to represent current infrastructure (year-end 2016), and the most effective program combination (AC) identified in the LOBP for use with the current population. Prior to analyzing year-end 2016 infrastructure

scenarios, a pre-LOWRF scenario was also prepared to evaluate the sustainability of groundwater production during drought, immediately prior to LOWRF operation.

2016 Infrastructure Scenarios

A pre-LOWRF operation scenario was prepared with septic systems in place and with the actual 2016 production distribution. The purpose of this evaluation was to determine whether the basin model predicted continued increases in the chloride metric through fall 2016.

The chloride metric is one of the measures of effectiveness for basin management, and tracks changes in Lower Aquifer water quality related to seawater intrusion mitigation. In 2016, despite a calculated BYM of below 80 percent, the chloride metric continue to rise, indicating continued advance of seawater intrusion. The pre-LOWRF scenario was a performed to test whether the basin model would simulate a chloride metric rise under 2016 conditions. The results indicated that the pre-LOWRF scenario was not sustainable, therefore the continuation of historical increases in the chloride metric during 2016 would be expected, even with the BYM below 80 percent.

The estimated sustainable yield for year-end 2016 infrastructure was analyzed using the current long-term precipitation rate and reduced precipitation scenarios. A long-term precipitation rate is appropriate for simulating sustainable yield because multiple years of basin pumping and recharge are involved. Table 3 below presents the results of the BYM analyses, with groundwater production shown for each basin area/aquifer. Basin areas and aquifers are shown in the attached Figure 1 and Figure 2 from the Los Osos Groundwater Monitoring Program 2015 Annual Report (CHG, 2016).

**Table 3**
**Sustainable Yield for 2016 Scenarios**

| BASIN AREA | SUSTAINABLE YIELD SCENARIO Infrastructure and % of long-term average precipitation | | | |
|---|---|---|---|---|
| | 2016 (100%) | 2016 (90%) | 2016 (80%) | 2016 (67%) |
| | Simulated Sustainable Yield (acre-feet per year) | | | |
| Upper Western | 100 | NC[1] | NC | NC |
| Lower Western | 190 | 50 | 30 | 0 |
| Upper Central | 690 | NC | 650 | 560 |
| Lower Central | 860 | 730 | 520 | 290 |
| Eastern Alluvium | 130 | NC | NC | NC |
| Eastern Lower | 790 | NC | NC | NC |
| BASIN TOTAL (SUSTAINBLE YIELD) | 2,760 | 2,490 | 2,220 | 1,870 |
| PURVEYOR TOTAL[2] | 1,640 | 1,370 | 1,000 | 750 |
| 2016 BYM[3] | 78 | 87 | 97 | 116 |
| BYM 80 PRODUCTION | 2,210 | 1,990 | 1,780 | 1,500 |

[1]NC = No Change in value from 100 percent long-tem average precipitation scenario.
[2]Purveyor total (simulated) = Basin total - 1,120 AFY for golf, private domestic, and agricultural uses.
[3] BYM based on 2016 basin groundwater production of 2,160 AFY

U+AC Infrastructure Scenarios

The estimated sustainable yield for LOBP program combination U+AC was analyzed for the current long-term precipitation rate and reduced precipitation scenarios. Table 4 below presents the results of the analyses, with production shown for each basin area/aquifer.

**Table 4**
**Sustainable Yield for U+AC Scenarios**

| BASIN AREA | SUSTAINABLE YIELD SCENARIO Infrastructure and % of long-term average precipitation | | | |
|---|---|---|---|---|
| | AC (100%) | AC (90%) | AC (80%) | AC (67%) |
| | Simulated Sustainable Yield (acre-feet per year) | | | |
| Upper Western | 100 | NC[1] | NC | NC |
| Lower Western | 110 | 70 | 20 | 0 |
| Upper Central | 790 | 720 | 670 | 560 |
| Lower Central | 1,080 | 830 | 580 | 290 |
| Eastern Alluvium | 130 | NC | NC | NC |
| Eastern Lower | 790 | NC | NC | NC |
| BASIN TOTAL (SUSTAINBLE YIELD) | 3,000 | 2,640 | 2,290 | 1,870 |
| PURVEYOR TOTAL[2] | 1,880 | 1,520 | 1,170 | 750 |
| BYM[3] | 74 | 84 | 97 | 119 |
| BYM 80 Production | 2,400 | 2,110 | 1,830 | 1,500 |

[1]NC = No Change in value from 100 percent long-tem average precipitation scenario.
[2]Purveyor total (simulated) = Basin total - 1,120 AFY for golf, private domestic, and agricultural uses.
[3] BYM based on projected demand (i.e. groundwater production) of 2,230 AFY (LOBP Table 46).

## Discussion

Interpretation of the results of basin model scenarios is discussed below with respect to the BYM response analysis and pumping distribution.

### BYM Response to Reduced Precipitation

For year-end 2016 infrastructure scenarios, the decline in sustainable yield and the BYM 80 value is essentially proportional to the decline in precipitation. For the U+AC scenarios, there is a slightly greater decline in sustainable yield and the BYM 80 value than the actual decline in precipitation. Table 5 shows these correlations.

**Table 5**
**BYM 80 Sensitivity to Reduced Precipitation**

| Infrastructure Program Combinations | Percent of Long-Term Precipitation[1] | BYM 80 (AFY) | Percent BYM 80 |
|---|---|---|---|
| 2016 | 100 | 2,210 | 100 |
| | 90 | 1,990 | 90 |
| | 80 | 1,780 | 80 |
| | 67 | 1,500 | 68 |
| U+AC | 100 | 2,400 | 100 |
| | 90 | 2,100 | 88 |
| | 80 | 1,830 | 76 |
| | 67 | 1,500 | 62 |

[1]17.5 inches average annual precipitation

Pumping Distribution

As stated previously, sustainable yield is not just the amount of groundwater that can be pumped, but is also the distribution of groundwater pumping across the basin that maintains a stationary seawater front, with no active well producing water with chloride concentrations above 250 mg/l. This means the location of pumping, both vertically and horizontally in the basin, is an important aspect of any BYM.

The results of basin model scenarios show that with decreased precipitation, groundwater production in the Lower Aquifer must be reduced to avoid seawater intrusion (Tables 3 and 4). Central Area expansion well production must also be reduced, however, to avoid exceeding the available recharge (800 AFY) from Los Osos Creek.

Potential increases to the purveyor water supply from the addition of two more expansion wells under LOBP Program C will vary based on precipitation projections. Water supply increases range from 190 AFY for continued long-term precipitation, to no increase (0 AFY) for 67 percent of long-term precipitation. At 67 percent precipitation, the year-end 2016 and U+AC scenarios result in identical BYM 80 values, because neither of the two additional expansion wells included in the U+AC program combination can be used without exceeding the available recharge from Los Osos Creek.

Upper aquifer pumping is not reduced to the extent that Lower Aquifer pumping is reduced (Tables 3 and 4). This is mainly due to production declines required at mixed aquifer wells (those screened in both the Upper and Lower Aquifer) to help mitigate Lower Aquifer seawater intrusion. Most upper aquifer wells continue pumping at maximum capacity.

**References**


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

Cleath-Harris Geologists, 2016, Los Osos Basin Plan Groundwater Monitoring Program 2015 Annual Report, prepared in association with Wallace Group, September 2016.
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ISJ Group, 2015, Updated Basin Plan for the Los Osos Groundwater Basin, January 2015.
https://www.slocountywater.org/site/Water%20Resources/LosOsos/pdf/Los%20Osos%20Groundwater%20Basin%20Plan%20January%202015.pdf

San Luis Obispo County Public Works Department, 2005, Hydrologic Report, Water Years 2001-2002 and 2002-2003, May 16, 2005.
https://www.slocountywater.org/site/Water%20Resources/Reports/pdf/Hydrologic%20Report%202002.pdf

San Luis Obispo County Public Works Department stream gage and rain gage sites
https://wr.slocountywater.org/list.php

USEPA, 2013, Climate Resilience Evaluation and Awareness Tool Exercise with Los Osos Water Purveyors and the Morro Bay National Estuary Program (EPA 817-B-13-003, June 2013).
https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P100KKZX.TXT

# ATTACHMENTS

2015 Los Osos Groundwater Basin Plan Update:

Table 32: Urban Water Reinvestment Program Recycled Water Uses
Table 46: Most Likely Program, Combinations
Figure 55: Basin Infrastructure Program Map
Figure 73: Water Balance 2012 Baseline

SOURCE: 2015 LOS OSOS BASIN PLAN UPDATE



## 9.3 Urban Water Reinvestment Program

The Water Reinvestment Program set forth in this chapter is divided into two parts. The first part, known as the Urban Water Reinvestment Program, is intended to beneficially use all recycled water produced by the LOWWP under the Existing Population Scenario. The second part, known as the Agricultural Water Reinvestment Program, is intended to use all marginal recycled water produced under the Buildout Population Scenario. Although a limited quantity of agricultural reuse is planned as part of the Urban Water Reinvestment Program, the bulk of agricultural reuse will occur under the Agricultural Water Reinvestment Program.

The proposed uses of recycled water under the Urban Water Reinvestment Program are listed in Table 32. Not all potential uses will start at the commencement of LOWWP operations, or occur in their full quantities. For example, irrigation at Sea Pines Golf Course is likely to occur only if the Monarch Grove subdivision connects to the LOWWP. Any produced water that is not used for one of the potential uses listed in Table 32 will likely be reinvested in agricultural reuse. In addition, the quantity of water produced by the LOWWP may vary from 780 AFY, requiring reinvestment of either more or less recycled water for the various potential uses. Despite these uncertainties, the Urban Water Reinvestment Program is expected to deliver all recycled water produced by the LOWWP to one of the categories of reuse shown in Table 32.

**Table 32. Urban Water Reinvestment Program Recycled Water Uses**

| Potential Use | Quantity (AFY) | Percent of Total |
|---|---|---|
| Broderson Leach Fields | 448 | 57.4 |
| Bayridge Estates Leach Fields | 33 | 4.2 |
| Urban Reuse | 63 | 8.1 |
| Sea Pines Golf Course | 40 | 5.1 |
| Los Osos Valley Memorial Park | 50 | 6.4 |
| Agricultural Reuse | 146 | 18.7 |
| Total | 780 | 100 |

Some of the recycled water to be reinvested pursuant to the Urban Water Reinvestment Program—e.g., that delivered to the schools and community park—will offset water that would have otherwise been produced from the Basin and sold by the Purveyors to their potable water customers. The County will deliver recycled water to users within the LOCSD and GSWC service areas pursuant to agreements with the Purveyors, in order to prevent a loss of water utility revenue while still facilitating the reinvestment of recycled water in the Basin. The agreements between the County, LOCSD and GSWC will determine the respective obligations of the parties.

LOCSD and GSWC will each follow their required processes for the establishment of rates or tariffs for recycled water service. For LOCSD, that will involve commissioning a rate study and following the process of Proposition 218. For

For the Existing Population Scenario, it is apparent that certain programs must be completed in order to achieve a sustainable Basin, including the Urban Water Use Efficiency Program, Urban Water Reinvestment Program and Basin Infrastructure Program A. In addition, the Parties must implement either Basin Infrastructure Program B or C or the Supplemental Water Program at 250 AFY. It is clear that Basin Infrastructure Program D is unnecessary to achieve a sustainable Basin under the Existing Population Scenario. A summary of the most likely combinations is presented in Table 46, along with the expected Basin Yield Metric, Water Level Metric and Chloride Metric that would result from each. These combinations were selected for further consideration because they are expected to satisfy the Basin Plan goals, with relatively lower costs than other combinations.

**Table 46. Most Likely Program Combinations**

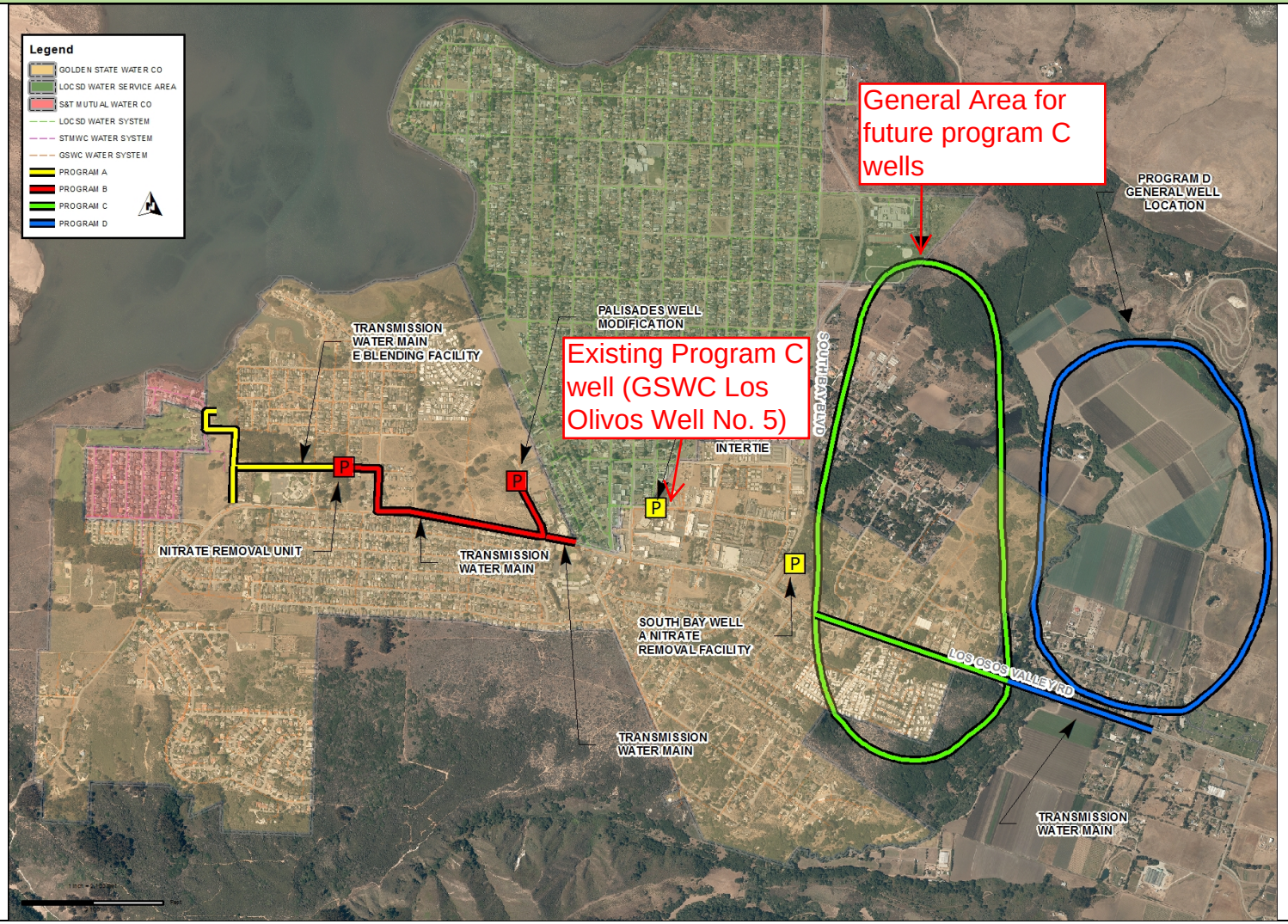
| Combination | Water Demand† | Sustainable Yield$_X$† | Basin Yield Metric | Water Level Metric‡ | Chloride Metric* |
|---|---|---|---|---|---|
| **Existing Population Scenario** | | | | | |
| E+U+AB | 2,230 | 3,170 | 70 | 10 | 60 |
| E+U+AC | 2,230 | 3,000 | 74 | 10 | 65 |
| E+U+A+S | 1,980 | 2,650 | 75 | 10 | 65 |
| **Buildout Population Scenario** | | | | | |
| E+UG+ABC | 2,380 | 3,350 | 72 | 9 | 70 |
| E+U+ABCD | 2,880 | 3,500 | 82 | 8 | 85 |
| E+UG+ABCD | 2,380 | 3,500 | 68 | 10 | 60 |
| E+U+A+S | 2,130 | 2,650 | 80 | | |

† Expressed in AFY. ‡ Expressed in feet msl. * Expressed in mg/l.

For the Buildout Population Scenario, the selection of a combination would depend heavily on whether the Supplemental Water Program were implemented under the Existing Population Scenario. If a groundwater desalination plant were previously constructed to produce 250 AFY (the assumed level for the Existing Population Scenario), then it would be reasonable for the Parties to simply install additional desalination capacity (500 AFY, for a total of 750 AFY of produced water) to achieve a sustainable Basin under Combination E+U+A+S.

If, on the other hand, the Supplemental Water Program were not to have been initiated under the Existing Population Scenario, the Parties would be unlikely to construct and operate a new desalination facility for the Buildout Population Scenario, because the costs associated with such a facility would exceed those of implementing further portions of the Basin Infrastructure Program. In order to achieve a sustainable Basin in that circumstance, the Parties would need to implement the Urban Water Use Efficiency Program, Urban Water Reinvestment Program and Basin Infrastructure Programs A, B and C. The Parties would also need to implement either Basin Infrastructure Program D or the Agricultural Water

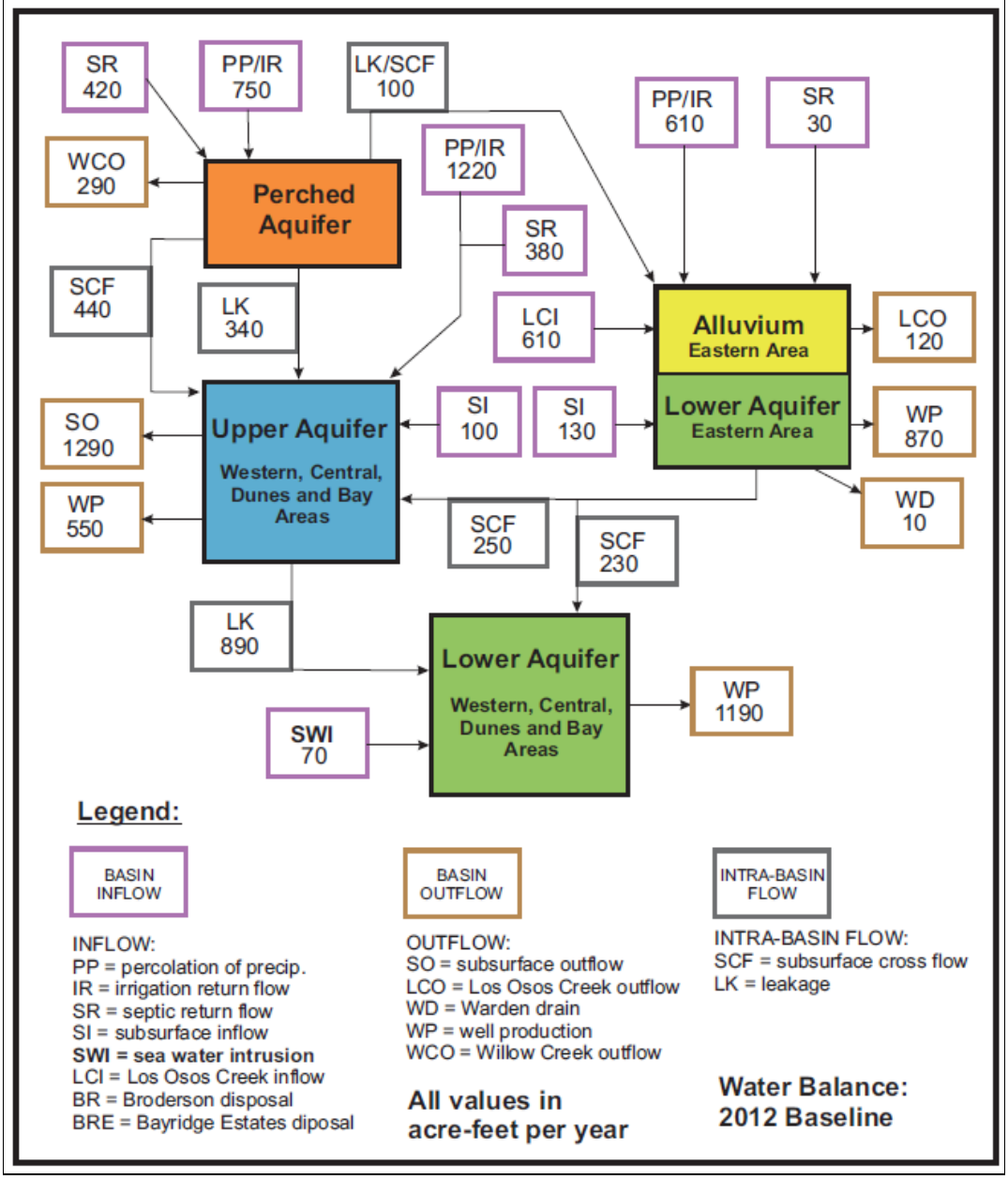
**Figure 55. Basin Infrastructure Program Map**



SOURCE: 2015 LOS OSOS BASIN PLAN UPDATE



**Figure 73. Water Balance: 2012 Baseline**

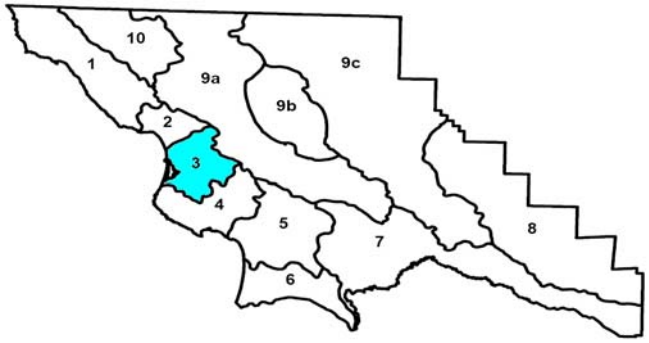


San Luis Obispo County Public Works
Hydrologic Report, Water Years 2001-2002 and 2002-2003:

Los Osos Creek Stream Flow

SOURCE: SAN LUIS OBISPO COUNTY PUBLIC WORKS HYDROLOGY REPORT (2005)

# Stream Flow




Stream Gage Name: **Los Osos Creek (#6)**
Water Planning Area: **3**

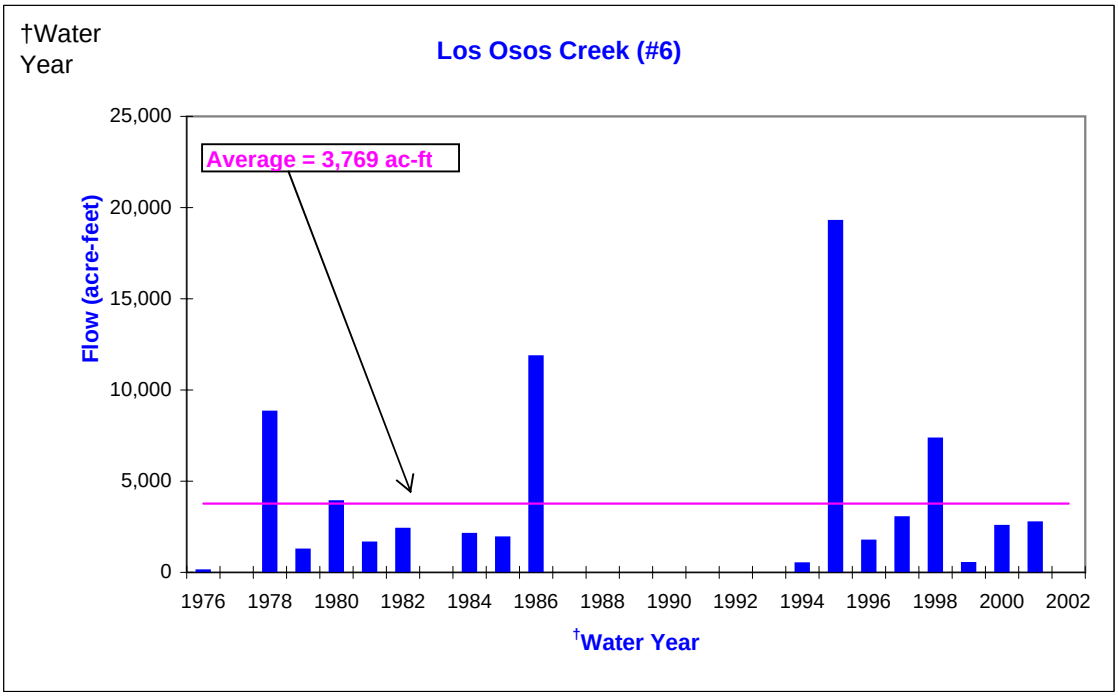
| Water Year† | Annual Stream Flow (acre-feet) | | Water Year† | Annual Stream Flow (acre-feet) | |
|---|---|---|---|---|---|
| 1976 | 110 | [1] | 1990 | | [9] |
| 1977 | 0 | | 1991 | | [10] |
| 1978 | 8,810 | | 1992 | | [11] |
| 1979 | 1,240 | | 1993 | | [12] |
| 1980 | 3,890 | [2] | 1994 | 497 | |
| 1981 | 1,630 | | 1995 | 19,270 | |
| 1982 | 2,390 | [3] | 1996 | 1,740 | |
| 1983 | | [4] | 1997 | 3,020 | |
| 1984 | 2,110 | | 1998 | 7,340 | |
| 1985 | 1,920 | | 1999 | 505 | |
| 1986 | 11,850 | [5] | 2000 | 2,540 | |
| 1987 | | [6] | 2001 | 2,470 | |
| 1988 | | [7] | 2002 | 0 | |
| 1989 | | [8] | 2003 | NA | [13] |

| From Annual Stream Flow Records | |
|---|---|
| Average Flow: | 3,769 AFY |
| Median Flow: | 2,110 AFY |
| Minimum Flow (2002): | 0 AFY |
| Maximum Flow (1995): | 19,270 AFY |

[1] gage put into operation in February
[2] missing data for one day in February
[3] missing data for various days in February, March, and April
[4] only visual observations were available for this year
[5] missing data for the end of February and beginning of March

[6-12] no data available for this time period
[13] Data not available at the time the report was published

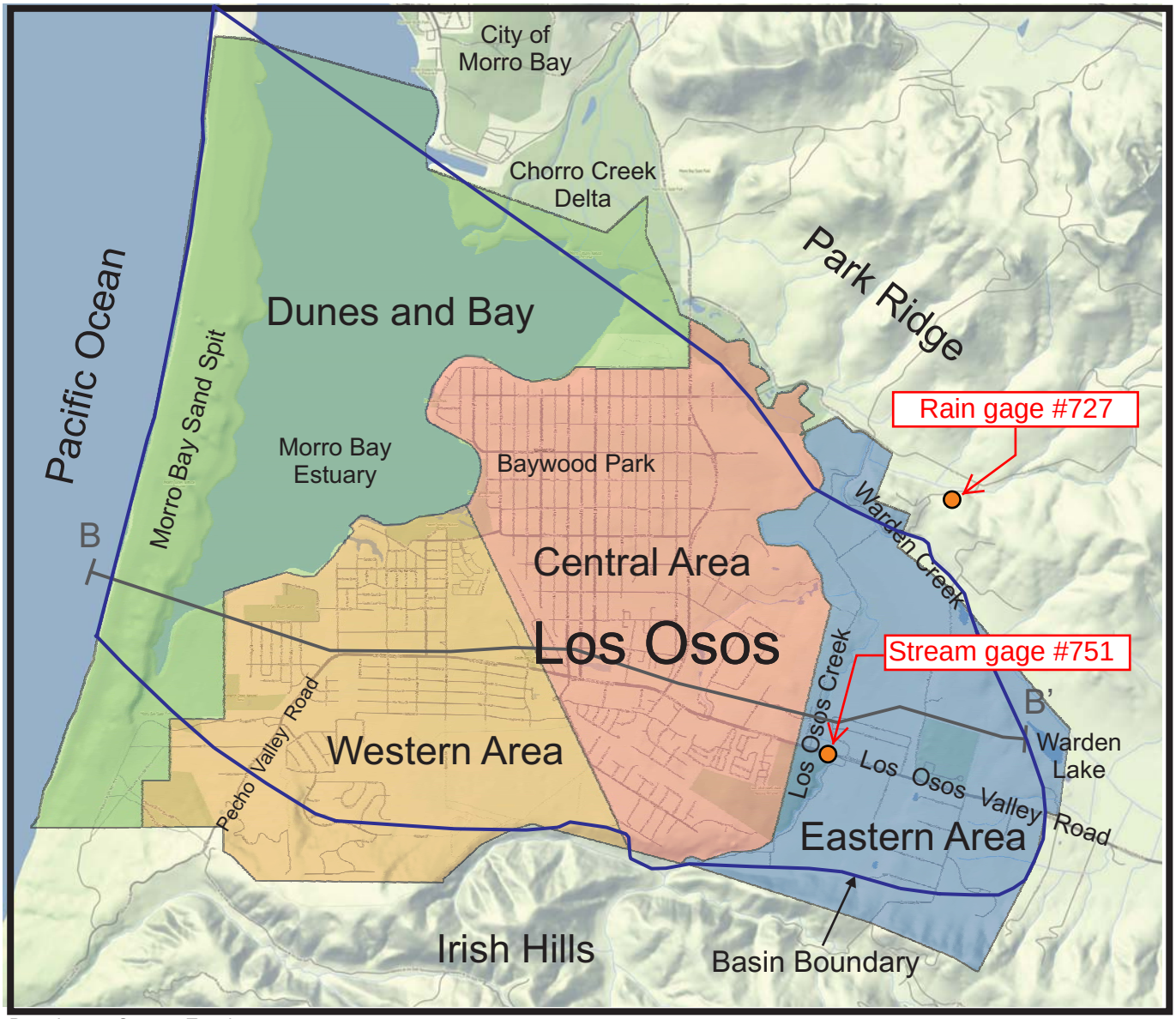
(notations as recorded in San Luis Obispo County stream flow log books)




† October 1 - September 30

Los Osos Groundwater Monitoring Program
2015 Annual Report

Figure 1: Basin Location and Plan Areas
Figure 5: Basin Aquifers




Base Image: Stamen-Terrain

0 2000 4000 6000 8000 ft

Scale: 1 inch ≈ 4,000 feet

## Explanation

Basin Plan Areas:

- Dunes and Bay Area
- Western Area
- Central Area
- Eastern Area

B — B' Cross-section alignment (Figures 5 and 20). Labeled B-B' to be consistent with Basin Plan.

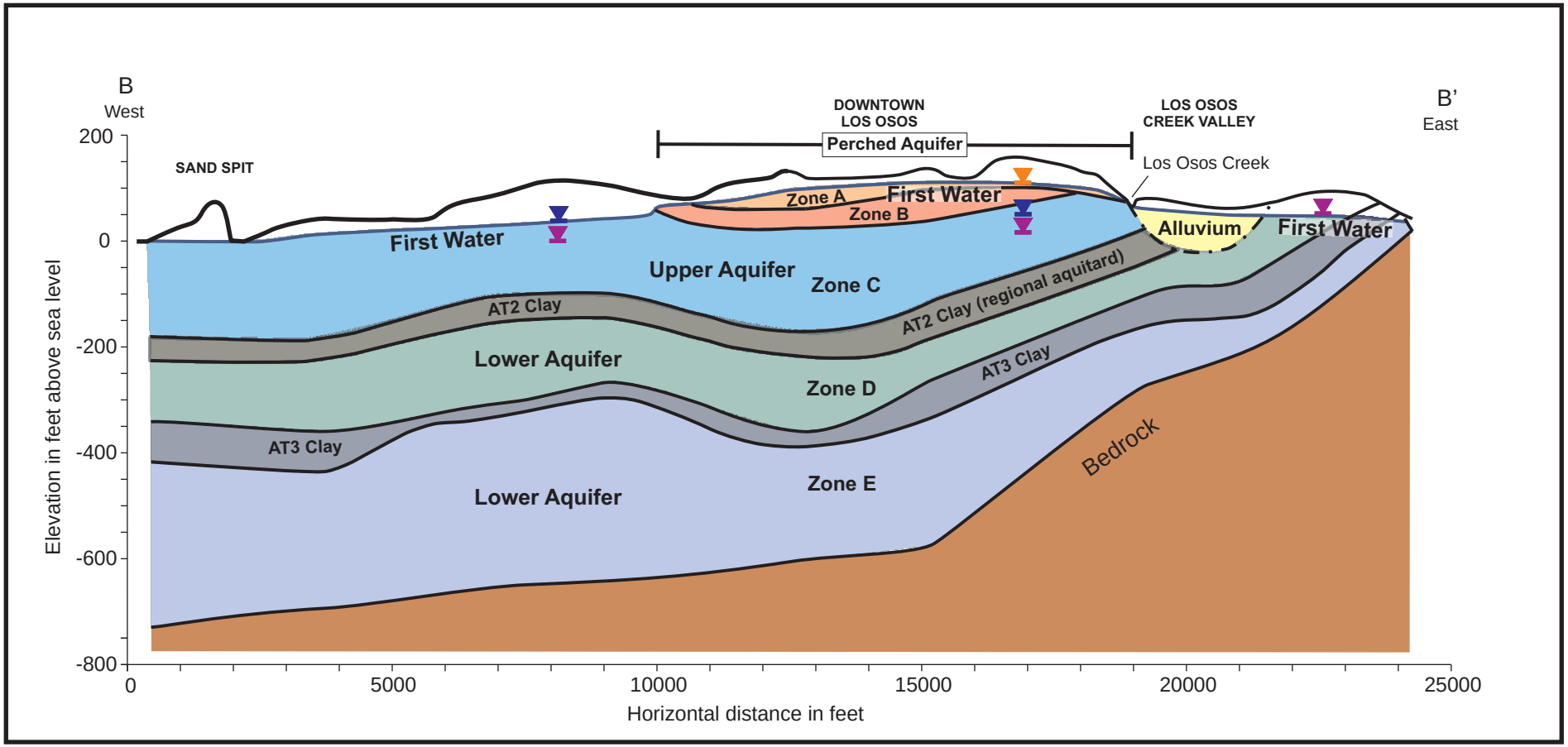
Basin Boundary from Basin Plan

Figure 1
Basin Location and Plan Areas
Los Osos Groundwater Basin
2015 Annual Report

Cleath-Harris Geologists

Added text in red

SOURCE: LOS OSOS GROUNDWATER BASIN 2015 ANNUAL REPORT




Cross-section alignment shown in Figure 1

**Explanation**

- Perched Aquifer Water level
- Upper Aquifer Water level
- Lower Aquifer Water level

Figure 5
Basin Aquifers
Los Osos Groundwater Basin
2015 Annual Report

Cleath-Harris Geologists

SOURCE: LOS OSOS GROUNDWATER BASIN 2015 ANNUAL REPORT

# 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-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 | 7.3 | 840 | 151 | ND | 193 | 73 | 83 | 5 | 83 |
| | | | | 10/10/2016 | 350 | 497 | 1370 | 7.1 | 930 | **173** | ND | 189 | 69 | 79 | 4 | 81 |
| **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 |
| 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 |
| **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 |
| 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 |
| **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 | 7.8 | 490 | **93** | ND | 46.2 | 44 | 41 | 2 | 52 |
| 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 |
| 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 |
| 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 |
| | | | | 4/19/2016 | 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 |
| 30S/11E-18K9 | LOCSD 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 | 27 |
| | | | | 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 |
| 30S/11E-18L2*** | LOCSD 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 | 36 |
| | | | D | 10/11/2016 | 200 | 221 | 694 | 7 | 380 | **91** | 7.3 | 25.5 | 36 | 32 | 1 | 35 |

ND = Not Detected

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

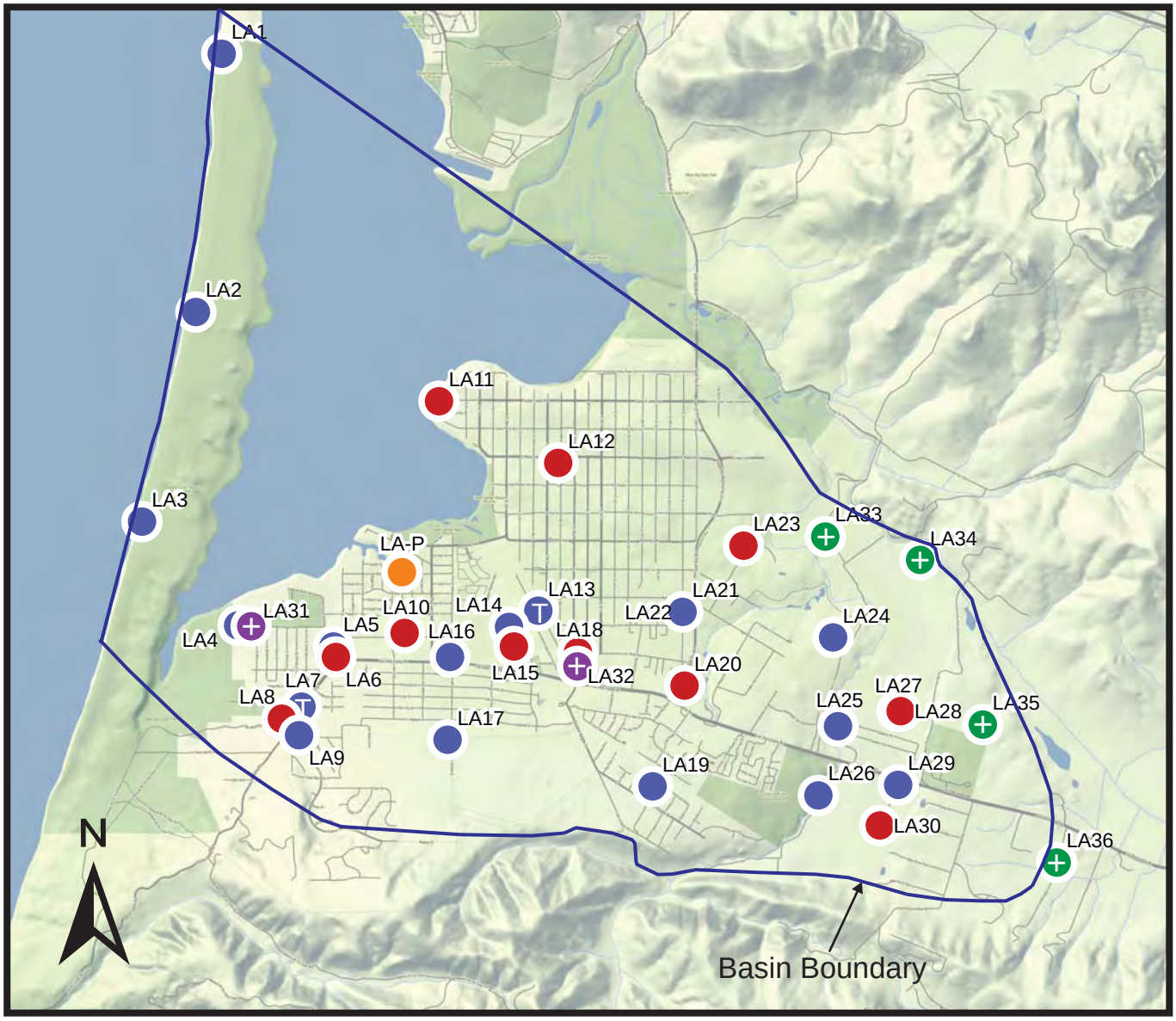
*Chloride concentrations at 13J1 have varied seasonally by 100+ mg/l, and are affected by well production, so fluctuations are expected.

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

## Water Quality Results - 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 μmhos/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




Base Image: Stamen-Terrain

0 2000 4000 6000 8000 ft

Scale: 1 inch ≈ 4,000 feet

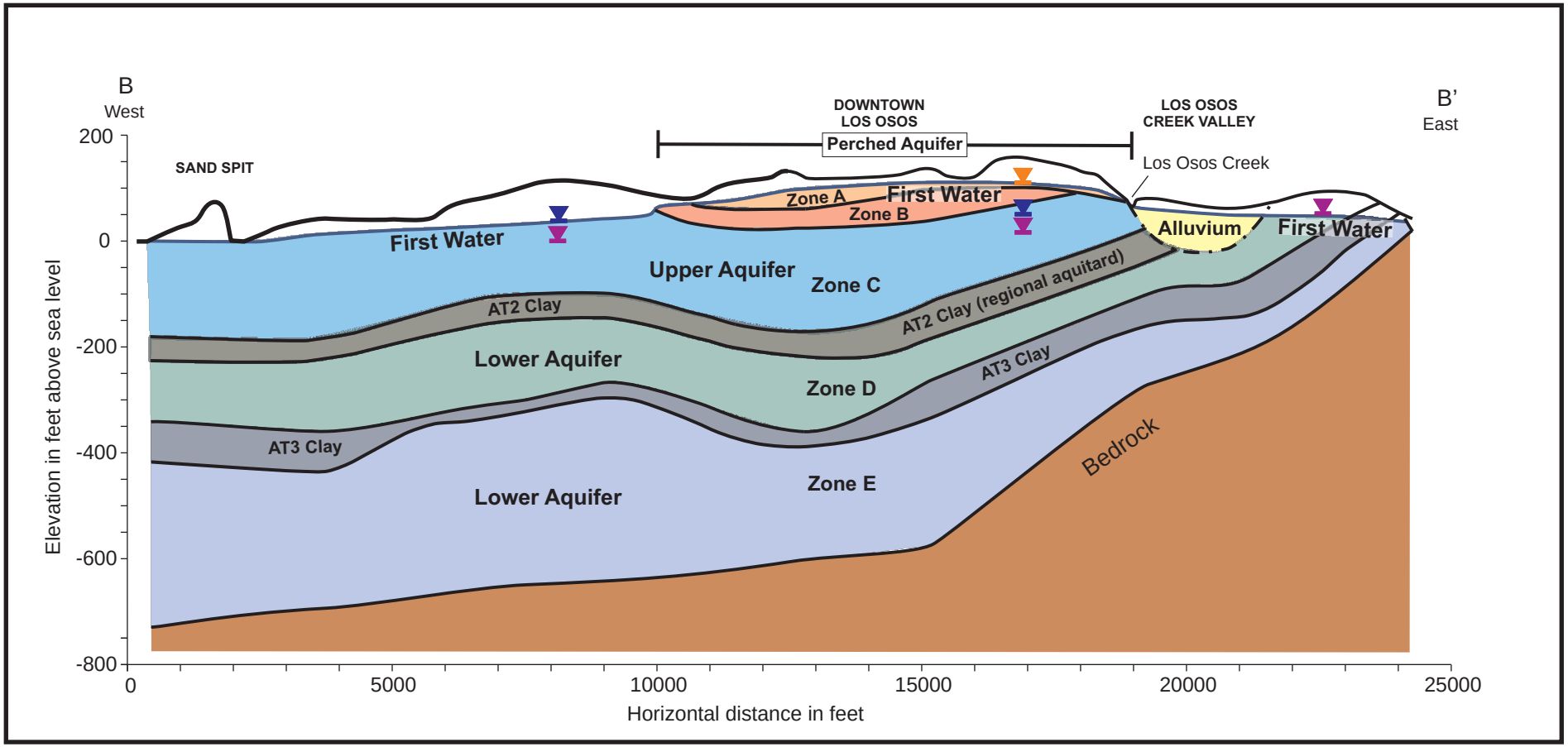
## Explanation

- Water Level Monitoring Well
- Recommended Water Level Monitoring Well Addition (existing well)
- Water Level Transducer
- Water Level and Water Quality Monitoring Well
- Water Level Transducer and Water Quality Monitoring Well
- Recommended Water Quality Monitoring Well Addition (existing well)
- Planned New Monitoring Well Construction

Note: LA24 and FW24 are nested wells (same location)

Figure 4
Groundwater Monitoring Program
Lower Aquifer Wells
Los Osos Groundwater Basin
2015 Annual Report

Cleath-Harris Geologists




Cross-section alignment shown in Figure 1

**Explanation**

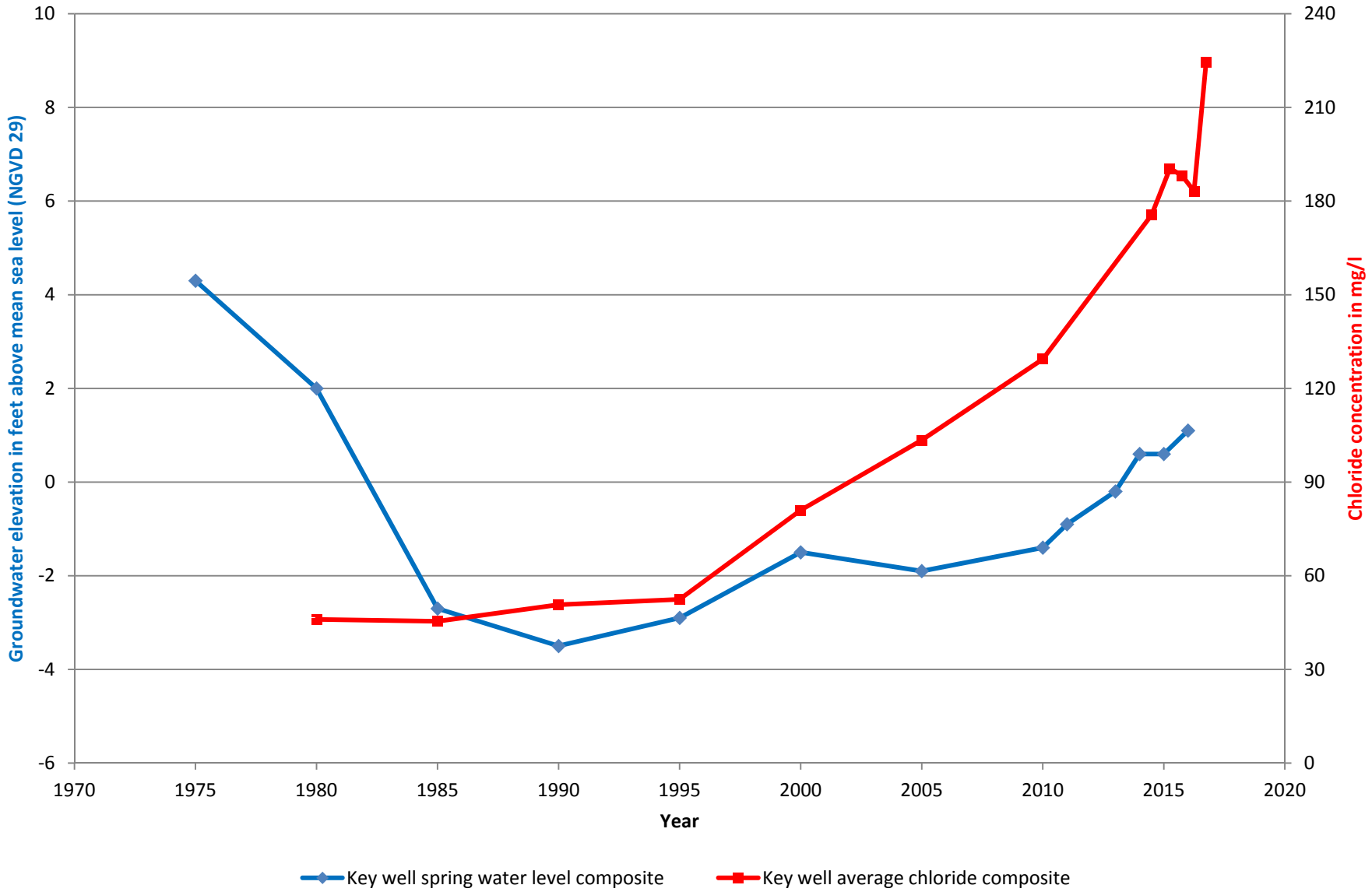
- Perched Aquifer Water level
- Upper Aquifer Water level
- Lower Aquifer Water level

Figure 5
Basin Aquifers
Los Osos Groundwater Basin
2015 Annual Report

Cleath-Harris Geologists

PRELIMINARY REPORT - JANUARY 2017

# Chloride and Water Level Metric
# Lower Aquifer Composite Values



**TO:** **Los Osos Basin Management Committee**

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

**DATE:** **March 11, 2017**

**SUBJECT:** **Item 7d – Water Conservation Program Update**

**Recommendations**
Received update and provide input to staff for future action.

**Discussion**
In November, 2016, the BMC reviewed and endorsed an Addendum to the Water Conservation Implementation Plan for the Los Osos Wastewater Project. The document can be found at the following web address:

http://slocountywater.org/site/Water%20Resources/LosOsos/pdf/WCIP_Addendum%201_rev.pdf

The County's next step is to incorporate the Basin Management Committee's recommended changes into the approved Water Conservation Implementation Plan, while also seeking Board of Supervisors approval for funding. At this time, County staff is planning to recommend funding for the indoor retrofit rebates. County staff is also exploring the feasibility of including rebates for conversion of outdoor irrigation from potable to recycled water use and may include this additional element in the revisions. After the Board of Supervisors approves the changes, the revisions will then be forwarded to the Executive Director of the Coastal Commission pursuant to Special Condition 5 of the Wastewater Project's Coastal Development Permit. Staff expects this item to be on the Board of Supervisors Agenda in early April, dependent on schedule and Board availability. The Morro Bay National Estuary Program (MBNEP) staff has also indicated that some initial funding may be immediately available in the range of $5,000 to $9,000.

Title 19 retrofits are pursued by private parties in order to facilitate development within the community. In recent years, the County has found that minimal retrofit opportunities are available through pre-approved measures with published values for water savings. This situation primarily impacts new development that is either outside of the prohibition zone, or not subject to Special Condition 6 of the Los Osos Wastewater Project's Coast Development Permit. The County currently considers retrofits on a case by case basis, including the installation of high-efficiency clothes washers. Since such retrofits are expected to continue irrespective of rebate funding, the BMC may wish to recommend to the County inclusion of measures from the Addendum to the Water Conservation Implementation Plan within an updated version of Title 19.