



SAN LUIS OBISPO COUNTY
DEPARTMENT OF PUBLIC WORKS

Wade Horton, Director

County Government Center, Room 206 • San Luis Obispo CA 93408 • (805) 781-5252

Fax (805) 781-1229

email address: pwd@co.slo.ca.us



May 23, 2016

Mr. Timothy Godwin
California Department of Water Resources
1419 9th Street
Sacramento, California 95814

Subject: County of San Luis Obispo's Response to the State Water Resource Control Board's Statement of Opposition to the Los Osos Valley Groundwater Basin (3-08) Basin Boundary Modification Request

Dear Mr. Godwin:

The County of San Luis Obispo (County) appreciates the opportunity to respond to the State Water Resource Control Board's (SWRCB) Statement of Opposition to the Los Osos Valley Groundwater Basin (3-08) Basin Boundary Modification Request (BBMR), submitted to the California Department of Water Resources (DWR) on April 29, 2016. The County respectfully disagrees with the SWRCB's recommendation that DWR should "reject the basin boundary modification proposed for the Los Osos Valley", and submits this letter to provide related clarifications. We urge DWR to continue its review of the proposed Los Osos Valley Groundwater Basin boundary modification application, and support the boundary modification to ensure sustainable groundwater management.

This letter is structured to reiterate and/or clarify BBMR contents, and is organized by major topics: (1) immediate actions towards sustainable groundwater management, (2) lateral boundaries– geological separation and hydrogeology of Eastern Valley Area, and (3) baseline water balance.

1. Immediate Actions Towards Sustainable Groundwater Management

It is crucial to start with the BBMR's underlying intent: approval of the BBMR will greatly improve basin users' ability to achieve sustainable groundwater management. The BBMR ensures scientifically-based boundary alignment with the areas subject to implementing the Basin Management Plan, consistent with the October 2015 final court order (litigation referenced in Water Code Section 10720.8(d)). The Basin Management Plan aims at taking bold, decisive and immediate actions to solve basin challenges and protect basin sustainability by halting seawater intrusion and providing water supplies for existing and future demands. Better boundary alignment also reduces potential governance conflicts that might inhibit sustainable management by increasing competition for limited institutional resources and delaying necessary actions by basin users and the court-established Basin Management Committee to achieve sustainability.

2. Baseline Water Balance

The SWRCB's opposition included comments related to inflows described in the water balance. The following reiterates points made in the Basin Boundary Technical Memorandum regarding the referenced Basin Management Plan water balance (i.e. Figure 73. Water Balance: 2012 Baseline in Appendix C, enclosed). The Basin Management Plan Figure 73 illustrates the *water balance for the final court order's adjudicated basin area*, which includes an "eastern area" that is not the same as the Eastern Valley Area referenced by the SWRCB. Enclosed is the Basin Management Plan Figure 1 to illustrate the eastern area (of the adjudicated basin area) discussed in the plan's water balance. The Eastern Valley Area removed from the proposed basin boundary is an entirely different area that lies further east, beyond the "eastern area"/ outside of the adjudicated basin area. Therefore, the SWRCB's related comments are immaterial, as it was simply a misunderstanding of the area described in the water balance.

3. Lateral Boundaries

The proposed basin boundary application includes removing the Eastern Valley Area from the Los Osos Groundwater Basin, as shown on the enclosed Figure 1¹. This action is based on the best available scientific data. The SWRCB's opposition included comments related to geologic separation and thickness of the proposed Los Osos Basin Boundary and the Eastern Valley Area. The County understands that DWR intends to review the proposed boundary modification request and has discretion to determine whether the Eastern Valley Area is a subbasin or not. To assist with DWR's review of SWRCB comments, this section reiterates geologic and hydrogeologic support for the proposed BBMR.

a. Geological Separation

The following reiterates points made in the Los Osos Valley Groundwater Basin Boundary Modification Request Technical Memorandum (Basin Boundary Technical Memorandum) regarding lateral boundaries (§ 344.12(2)).

The Basin Boundary Technical Memorandum Figure 2 shows the lateral boundaries (enclosed), which references numerous geologic cross-sections, and rock outcrops along the proposed basin boundary perimeter. Cleath Harris Geologists interpreted well logs, metavolcanic outcrops, geologic rock formations and bedrock to create geologic cross sections and to form the basis for the proposed BBMR boundary segments. Boundary Segments 2 and 3 delineate the proposed Los Osos Basin Boundary from the Eastern Valley Area. As shown in Figure 2, cross-sections G-G' and I-I' traverse Boundary Segment 2 (refer to Appendix A, Figures A8 and A10, enclosed) and cross-sections A-A', B-B' and C-C' traverse Boundary Segment 3 (refer to Appendix A, Figures A2, A3 and A4, enclosed). Refer to Basin Boundary Technical Memorandum § 344.12(2) for descriptions of each segment relative to rock outcrops, etc.

As SWRCB notes, the Boundary Technical Memorandum references several past studies, including reports by U.S. Geological Survey (Yates and Wiese, 1988),² DWR (1989)³, and Morro Group (1987).⁴ It is important to note that these past reports also excluded the Eastern Valley Area alluvial deposits from the Los Osos Groundwater Basin, which are referenced in the Basin Boundary Technical Memorandum (§ 344.14 (a)(2)). As noted in the referenced 1989 DWR report, "*Only in areas less than 4 miles from the coast do water-bearing sediments of significant thickness occur. Farther east, bedrock is overlain by sediments of low permeability, which are less than 30 feet thick. Thus, the groundwater basin begins about 4 miles inland and deepens to the west.*" This is consistent with the County's proposed BBMR, and proposed removal of the Eastern Valley Area.

The following reiterates points made in the Basin Boundary Technical Memorandum regarding the thickness of the alluvial deposits in the Eastern Valley Area. Well completion reports were reviewed by the consultant and reported in order to convey information known about the Eastern Valley Area. The *depth of the alluvium* from ground surface ranged between 15 feet and 80 feet, with an average thickness of 48 feet, based on 23 reports for wells within the eastern valley alluvial deposits. *Saturated alluvial aquifer thickness*, based on water levels reported following well completion, averaged 30 feet above sea level. Eastern Valley Area wells were also completed an average of 39 feet into bedrock beneath the alluvium, for an average completed well depth of 87 feet. Neither the application nor the technical memorandum claim what alluvium thickness is negligible, but rather focuses on describing the geologic setting.

b. Hydrogeology of Eastern Valley Area

The SWRCB's opposition included comments related to interactions between the proposed Los Osos Basin Boundary and the Eastern Valley Area. The Basin Boundary Technical Memorandum (§ 344.14) describes the water supply/ flow of the Eastern Valley Area, and focuses on its limited connectivity with the proposed Los Osos Groundwater Basin. Several key points are highlighted below relating to eastern

¹ Figure 1 – Reference: Cleath-Harris Geologist, Los Osos Valley Groundwater Basin Boundary Modification Request Technical Memorandum, March 2016.

² Reference: Yates, E.G., and Wiese, J. H., 1988, Hydrogeology and Water Resources of the Los Osos Valley Ground-Water Basin, San Luis Obispo County, California, U. S. Geological Survey, Water-Resources Investigations Report 88-4081.

³ Reference: Department of Water Resources (DWR), 1989, Geohydrology and Management of Los Osos Valley Ground Water Basin, San Luis Obispo County, Southern District Report, July 1989.

⁴ Reference: Morro Group, 1987, Los Osos Wastewater Project Environmental Impacts Report, SCH# 84121914, August 1987.

valley yield/ supply source, lack of connectivity to proposed BBMR, and supportive water quality data. Of course, the Basin Boundary Technical Memorandum § 344.14 should be reviewed for a more comprehensive review of information.

The Eastern Valley Area alluvial deposits are relatively thin (average unconfined saturated thickness of 30 feet) with generally low yields (less than 50 gallons per minute). Local growers can combine the yields from multiple shallow wells to sustain agricultural operations on the north side of Los Osos Valley Road in the Eastern Valley Area. Local bedrock aquifers provide a significant contribution to groundwater production in the area. Agricultural irrigation on the south side of Los Osos Valley Road is supplied by groundwater wells producing from bedrock aquifers along the base of the Irish Hills, where metavolcanics have been fractured by movement along the Los Osos fault zone.

The Eastern Valley Area does not contribute significantly, if any, to groundwater recharge within the proposed BBMR. The eastern valley watershed, approximately nine square miles, is drained by an unnamed tributary into the Warden Lake marsh, from which Warden Creek flows along approximately 3,700 feet of the northern proposed basin boundary, at low invert elevations in an area underlain by shallow bedrock.

The Basin Boundary Technical Memorandum offers water quality data to further support the lack of connectivity (§ 344.12(2)(A,B,C)). The technical memorandum describes differences in several neighboring wells' stiff diagrams (shown on cross section B-B', Appendix A Figure A3), a lack of detectable nitrate concentrations in the proposed basin area well, and available water level data. These differences support prior investigators' conclusions that alluvial groundwater from the eastern valley does not flow west in significant quantities across the proposed basin boundary.

Therefore, the County believes existing geologic/ hydrogeologic evidence supports the proposed BBMR and its separation from the Eastern Valley Area.

The scientific geological, hydrogeologic, and water quality data, as well as prior reports from the DWR, U.S. Geological Survey and Morro Group support the proposed Los Osos Groundwater Basin boundary modification's removal of the Eastern Valley Area. We urge DWR to continue its review of the proposed Los Osos Valley Groundwater Basin boundary modification application, and to support the boundary modification to ensure sustainable groundwater management. Please feel free to contact Cathy Martin, Water Resources Engineer, at (805) 781-5275 or Carolyn Berg, Senior Water Resources Engineer, at (805) 781-5536 with any questions.

Sincerely,



Wade Horton
DIRECTOR OF PUBLIC WORKS

Enclosures:

Letter from the State Water Resource Control Board, dated April 29, 2016
Referenced figures (excerpts from Proposed Los Osos Basin Boundary Modification Technical Memorandum Figures 1 and 2; Appendix A (applicable figures); Basin Management Plan Figures 1 and 73)

c: Erik Ekdahl, Director, State Water Resources Control Board (via email only)
Mark Hutchinson, County Public Work Deputy Director (via email only)

File: CF 340.300.01 SGMA



EDMUND G. BROWN JR.
GOVERNOR



MATTHEW RODRIGUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

State Water Resources Control Board

April 29, 2016

Mr. Timothy Godwin
California Department of Water Resources
1416 9th Street
Sacramento, California 95814

Subject: Statement of Opposition to Basin Boundary Modification Request for Los Osos Valley Groundwater Basin (3-08)

Dear Mr. Godwin:

San Luis Obispo County has submitted a basin boundary modification request (BBMR) for the Los Osos Valley Groundwater Basin (basin number 3-08). This request consists of a scientific external modification to extend the basin boundary to the west to include coastal sand dunes, and move the southern and eastern boundaries of the groundwater basin to exclude the southern beach and eastern valley areas. The State Water Resources Control Board (State Water Board) has reviewed the proposal and has significant concerns regarding the exclusion of the eastern valley area. The State Water Board has not reviewed the merits of the proposed modifications to the western and southern boundaries.

The two-fold rationale for excluding the eastern valley area to the east of Warden Lake is 1) the permeable alluvium tapers to a negligible thickness (less than 40 feet) at this location, and 2) the mesa-like terrace at the east end of the basin possibly creates a local groundwater mound that would limit inflow from the east. The State Water Board has reviewed the BBMR along with the associated technical information and believes the following issues are grounds for rejection of the proposal.

The proposed modification is predicated on the argument that 40 feet of alluvium is negligible, and that areas underlain by 40 feet or less of permeable alluvium may be excluded from the groundwater basin. This position is inconsistent with the county's own information, which states that the depth of alluvium in the eastern valley area ranges from 15 to 80 feet, with an average thickness of 48 feet (*Los Osos Valley Groundwater Basin Boundary Modification Request, Technical Memorandum*, March 2016, prepared by Cleath-Harris Geologists). Saturated thickness is postulated at approximately 30 feet. Based on these values, the technical literature, requirements set forth by the Groundwater Basin Boundaries regulations, and current and historical definitions of Bulletin 118 boundaries do not support the county's BBMR.

FELICIA MARCUS, CHAIR | THOMAS HOWARD, EXECUTIVE DIRECTOR

1001 I Street, Sacramento, CA 95814 | Mailing Address: P.O. Box 100, Sacramento, CA 95812-0100 | www.waterboards.ca.gov

The BBMR package cites previous reports claiming that little or no groundwater enters the basin from the east end of Los Osos Valley due to shallow slopes and thin, low-permeability soils. The BBMR also posits that the mesa-like terrace inside the east end of the basin creates a groundwater mound that limits inflow from the east (Yates and Wiese, 1988). Groundwater water level information used to establish the presence of a groundwater mound near Warden Lake is based on comparison of data from only three wells: two located within the proposed basin boundary (30S/11E-21Ba and 30S/11E-21Bb), and one located in the eastern valley area (30S/11E-16Ra). Not only is this small sample set insufficient to draw defensible conclusions regarding basin-wide groundwater flow patterns, but the groundwater data used were not generated concurrently. Water levels used to construct the groundwater mound were generated in 1988 for well 30S/11E-16Ra, 1995 for 30S/11E-21Ba, and 2015 for 30S/11E-21Bb.

Additionally, a water balance baseline for 2012 presented in the *Updated Basin Plan for the Los Osos Groundwater Basin* (January 2015) indicates that the combined subsurface inflow to the upper and lower aquifers in the eastern area is 230 acre feet per year (AFY), as compared with 4,090 AFY total subsurface outflow from both aquifers. This baseline evaluation considers the basin to be in hydrologic balance, with 70 AFY of inflow from seawater intrusion. In this context, inflows from the eastern area constitute approximately 6 percent of the groundwater balance, and should not be considered negligible. There are also numerous production wells within the eastern valley area, which the BBMR fails to recognize or quantify in the context of the basin's water budget.

The contention that water chemistry can be used to demonstrate that the eastern valley area is hydrogeologically distinct from the remainder of the basin is also not substantiated by the data. As with the water level data, information from only three wells was provided (30S/11E-21Ba, 30S/11E-16Ra, and 30S/11E-16Ca), and the sampling events from which the data were generated were conducted more than four years apart (30S/11E-16Ra and 30S/11E-16Ca in May 2008; 30S/11E-21Ba in September 2012).

Finally, cross-sections provided to support the BBMR do not adequately characterize geologic conditions in the excluded area. A limited number of wells are provided for geologic control outside of the newly proposed boundary but within the existing Bulletin 118 boundary. The uncertainty created by this lack of data may be addressed during future opportunities to request basin boundary changes.

Based upon the lack of geologic evidence in the boundary modification request, inconsistencies in the technical application of well data related to the presence of a water mound, and evidence of extractions present in the eastern alluvium, the State Water Board recommends that the Department of Water Resources reject the basin boundary modification proposed for the Los Osos Valley.

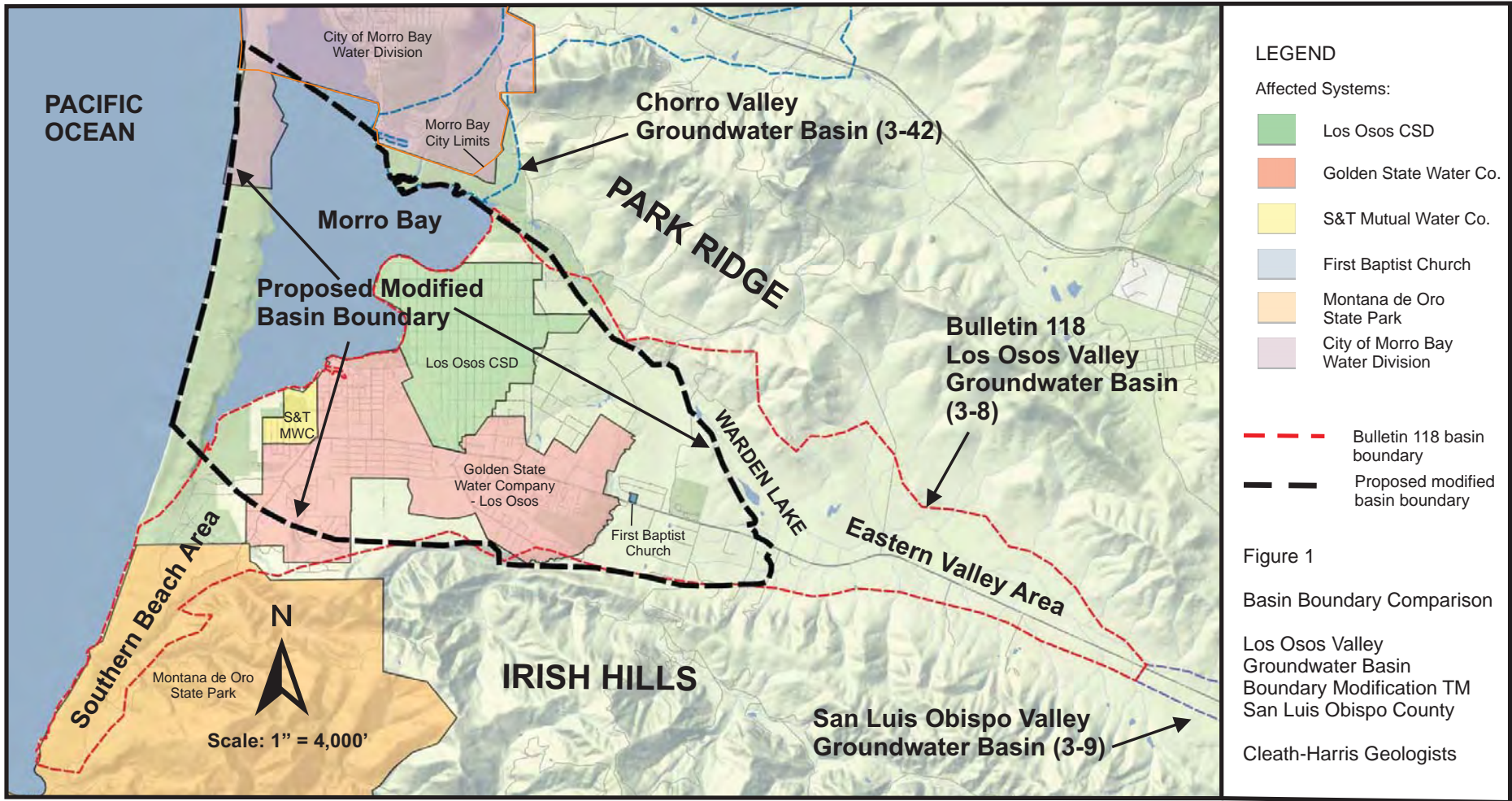
Should you have any questions or require additional information, please contact Garrett Weiss at (916) 341-5336 or Garrett.Weiss@waterboards.ca.gov.

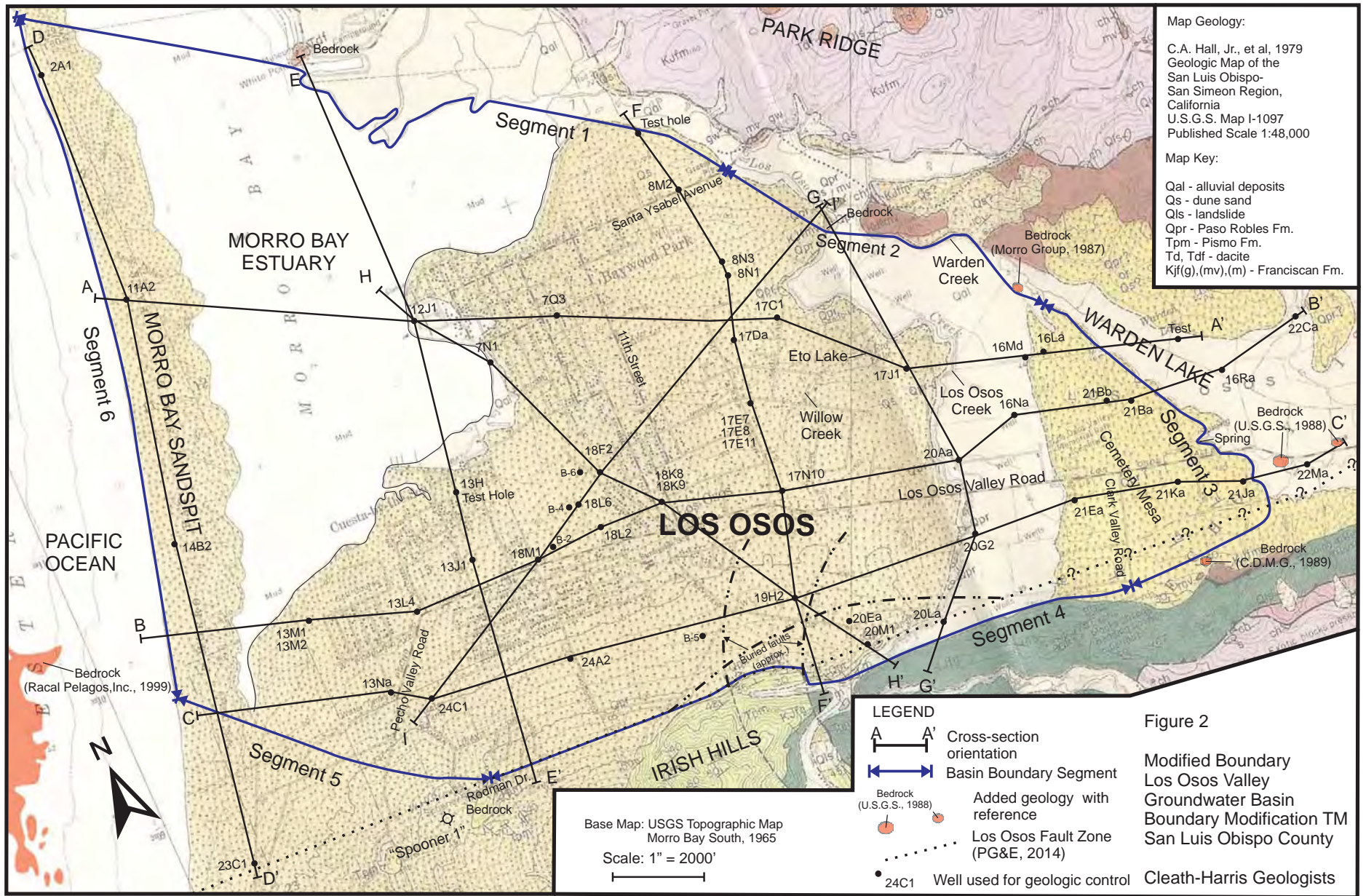
Sincerely,

A handwritten signature in black ink, appearing to read "Erik Ekdahl". The signature is fluid and cursive, with a large, prominent loop at the end of the last name.

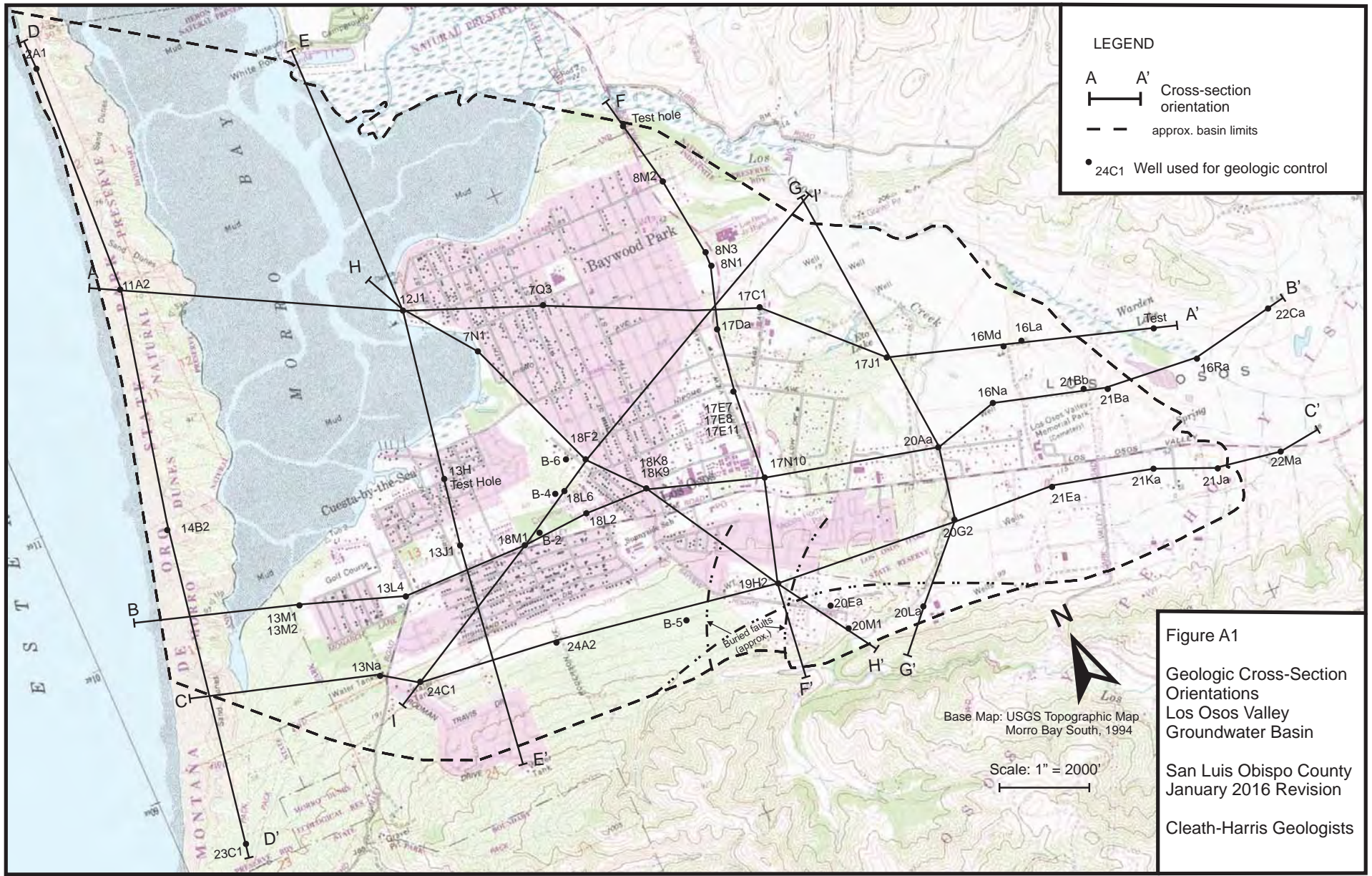
Erik Ekdahl, Director
Office of Research, Planning, and Performance
State Water Resources Control Board

County of San Luis Obispo
Referenced Figures





APPENDIX A
Geologic Cross-Sections



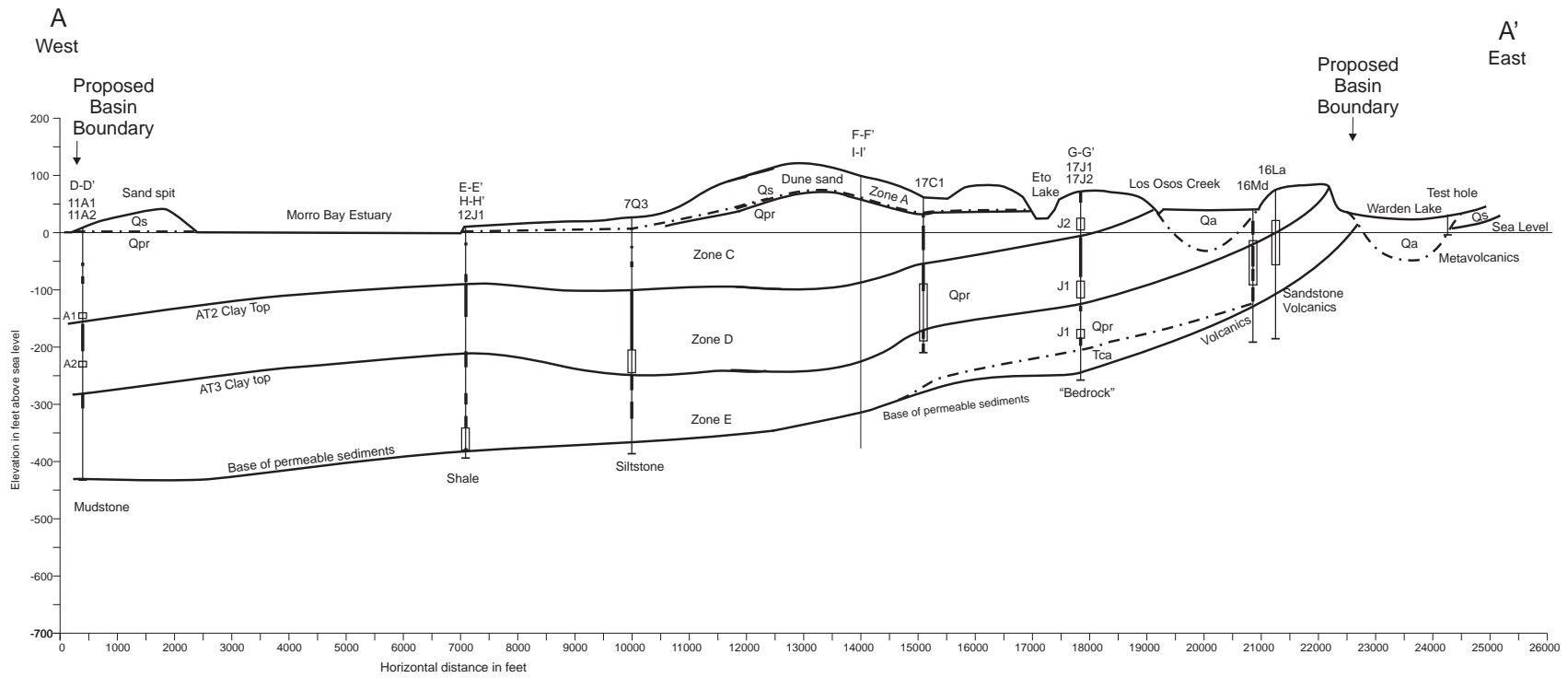


Figure A2

Cross-Section A-A'
Los Osos Valley
Groundwater Basin

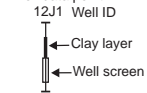
San Luis Obispo County
January 2016 Revision

Cleath-Harris Geologists

Aquifer Zones:

- Zone A - Perched Aquifer
- Zone B - Transitional Aquifer
- Zone C - Upper Aquifer
- Zone D - Lower Aquifer (shallow)
- Zone E - Lower Aquifer (deep)

Well data point



Formation:

- Qa - alluvium
- Qs - dune sand
- Qpr - Paso Robles Formation
- Tca - Careaga Formation

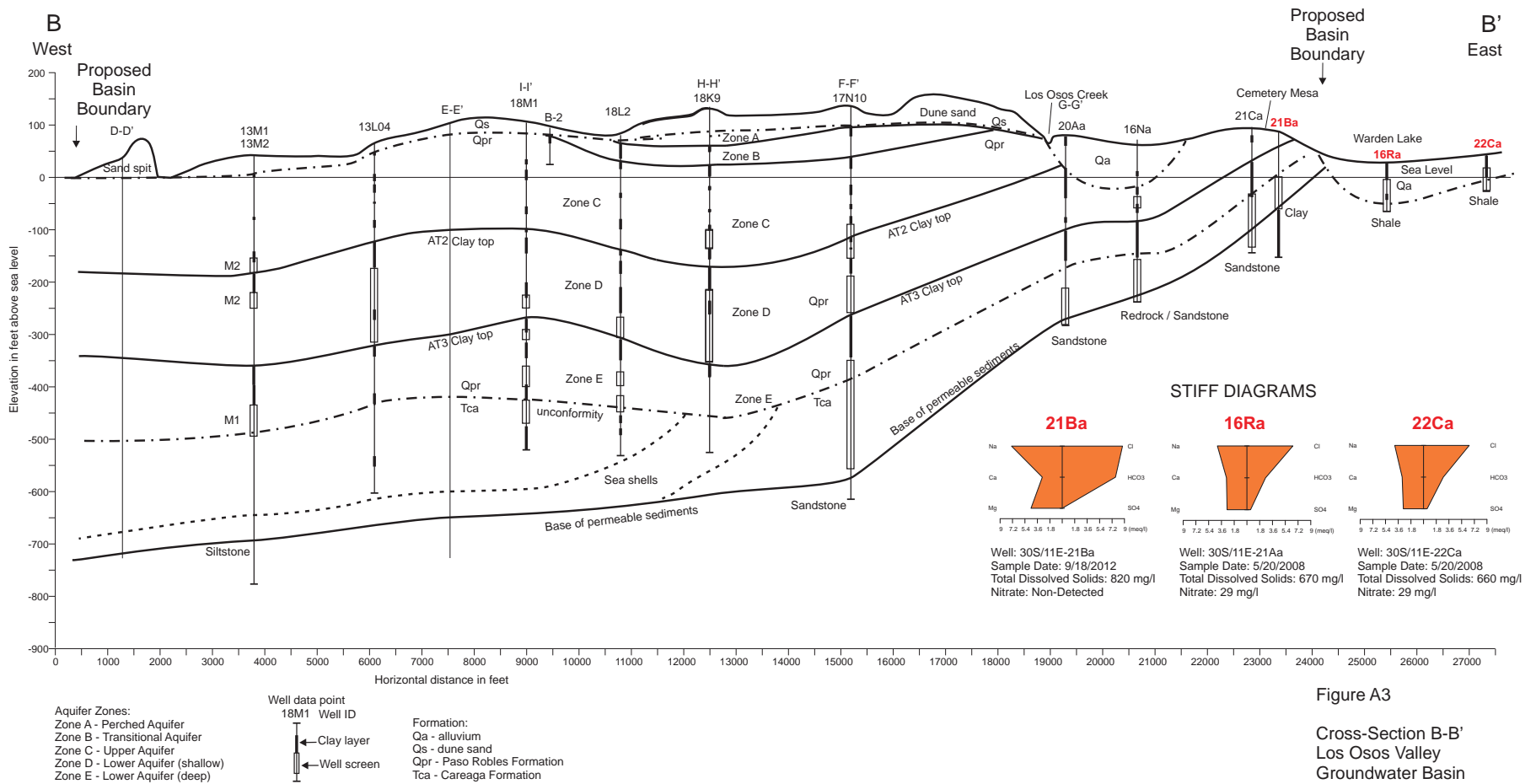
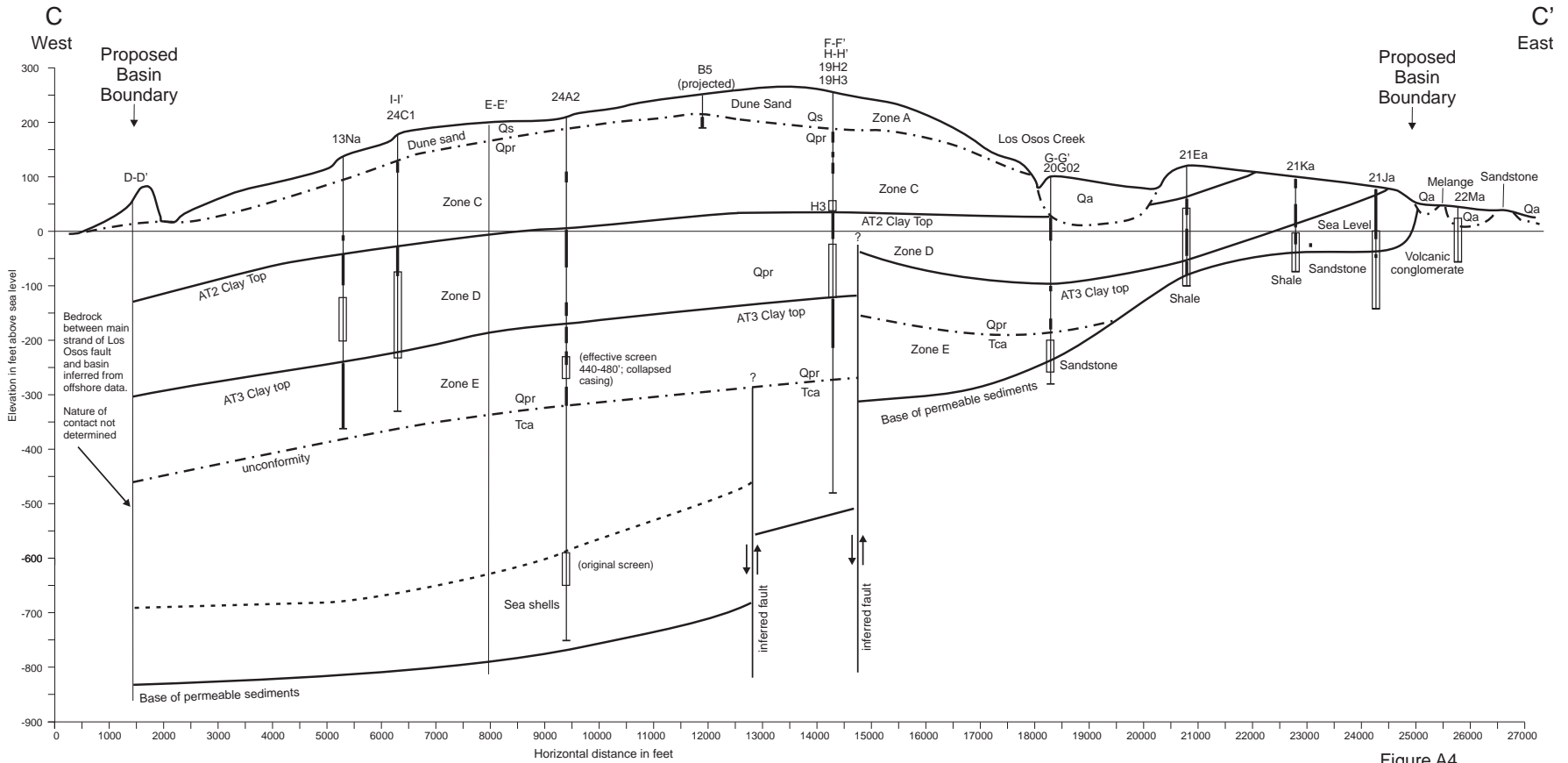


Figure A3

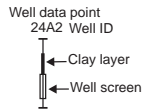
Cross-Section B-B'
 Los Osos Valley
 Groundwater Basin

San Luis Obispo County
 January 2016 Revision

Cleath-Harris Geologists



Aquifer Zones:
 Zone A - Perched Aquifer
 Zone B - Transitional Aquifer
 Zone C - Upper Aquifer
 Zone D - Lower Aquifer (shallow)
 Zone E - Lower Aquifer (deep)



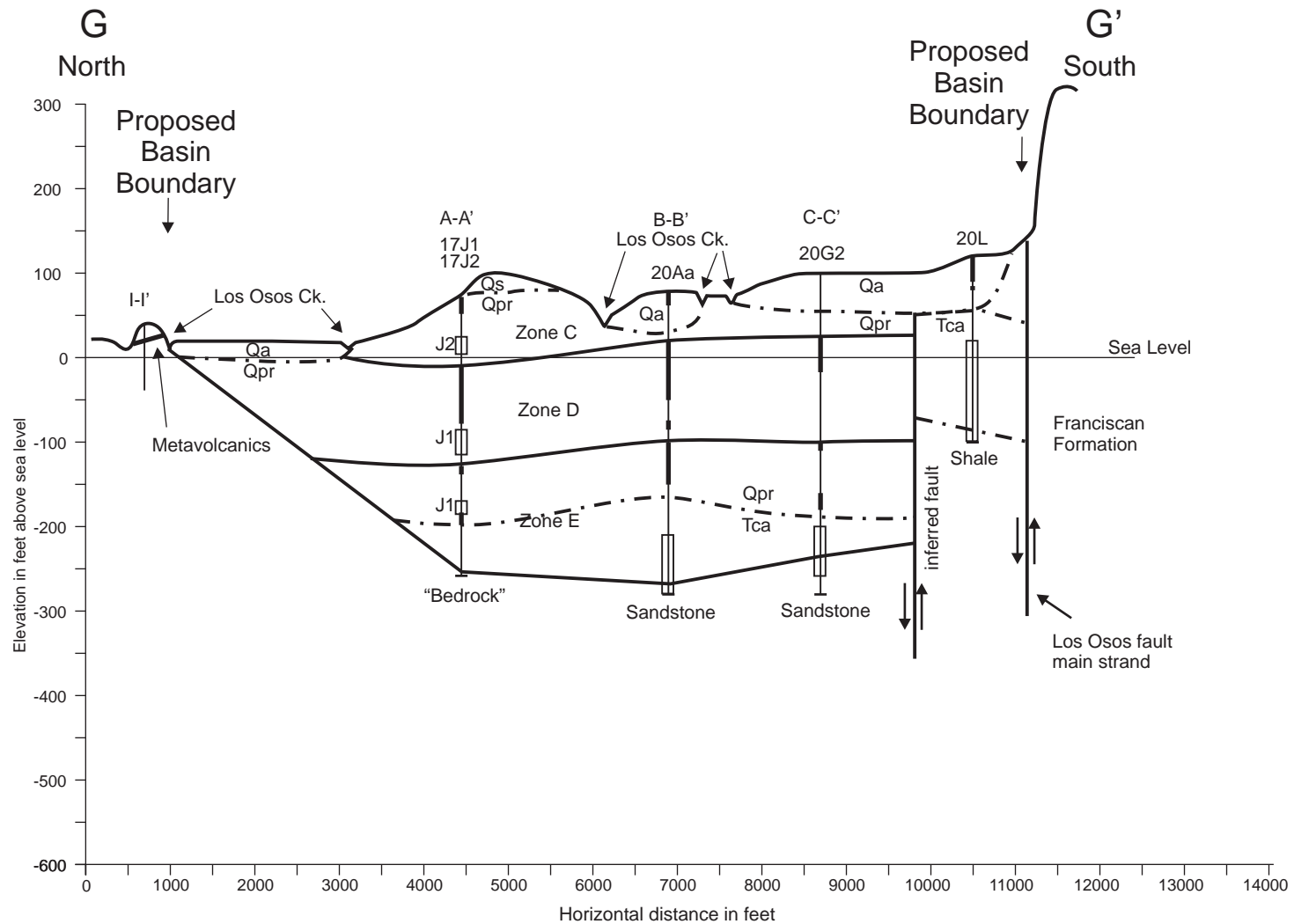
Formation:
 Qa - alluvium
 Qs - dune sand
 Qpr - Paso Robles Formation
 Tca - Careaga Formation

Figure A4

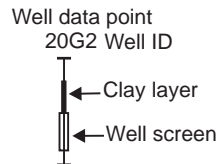
Cross-Section C-C'
 Los Osos Valley
 Groundwater Basin

San Luis Obispo County
 January 2016 Revision

Cleath-Harris Geologists



Aquifer Zones:
 Zone A - Perched Aquifer
 Zone B - Transitional Aquifer
 Zone C - Upper Aquifer
 Zone D - Lower Aquifer (shallow)
 Zone E - Lower Aquifer (deep)



Formation:
 Qa - alluvium
 Qs - dune sand
 Qpr - Paso Robles Formation
 Tca - Careaga Formation

Figure A8

Cross-Section G-G'
 Los Osos Valley
 Groundwater Basin

San Luis Obispo County
 January 2016 Revision

Cleath-Harris Geologists

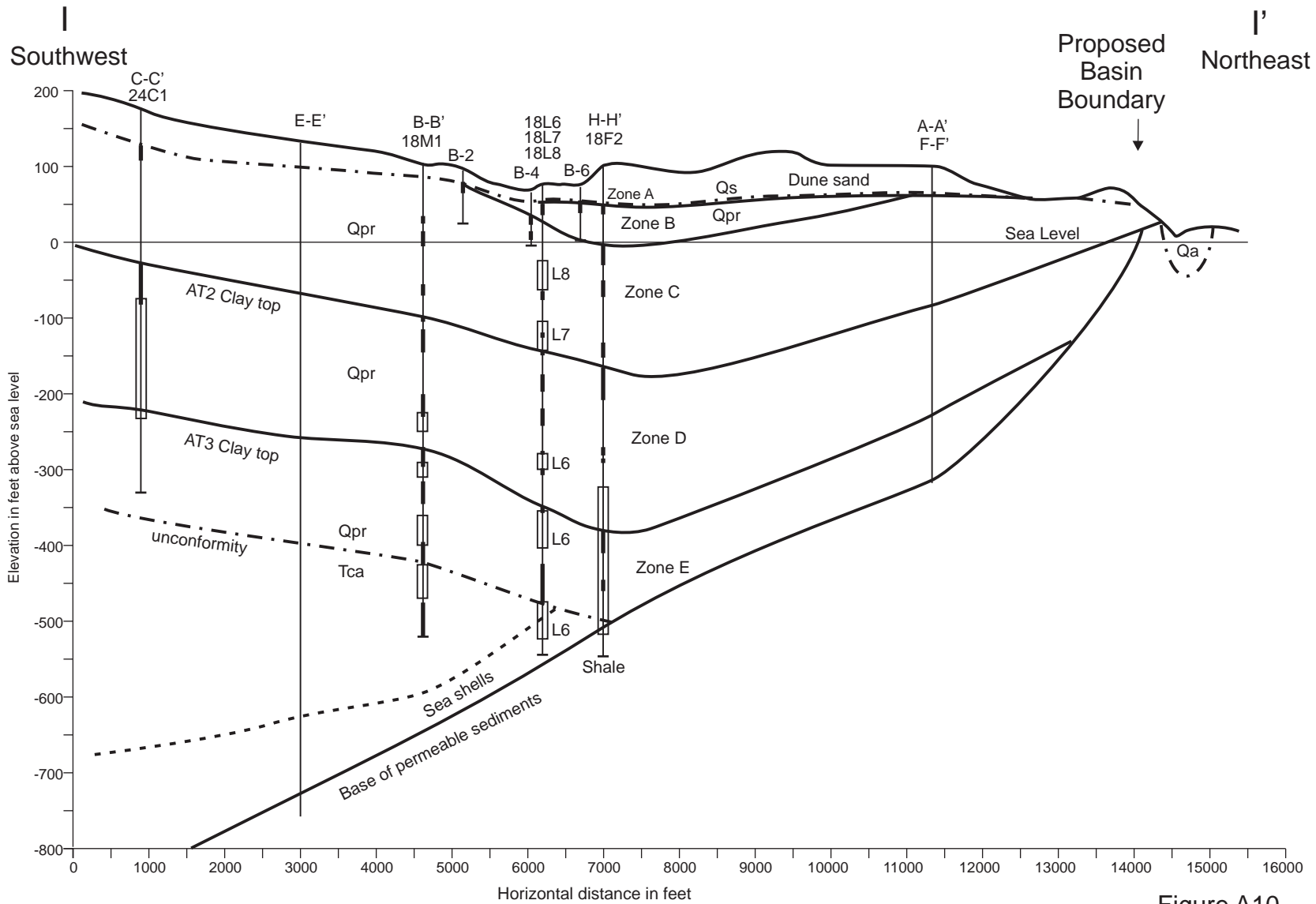


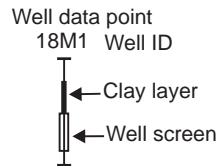
Figure A10

Cross-Section I-I'
 Los Osos Valley
 Groundwater Basin

San Luis Obispo County
 January 2016 Revision

Cleath-Harris Geologists

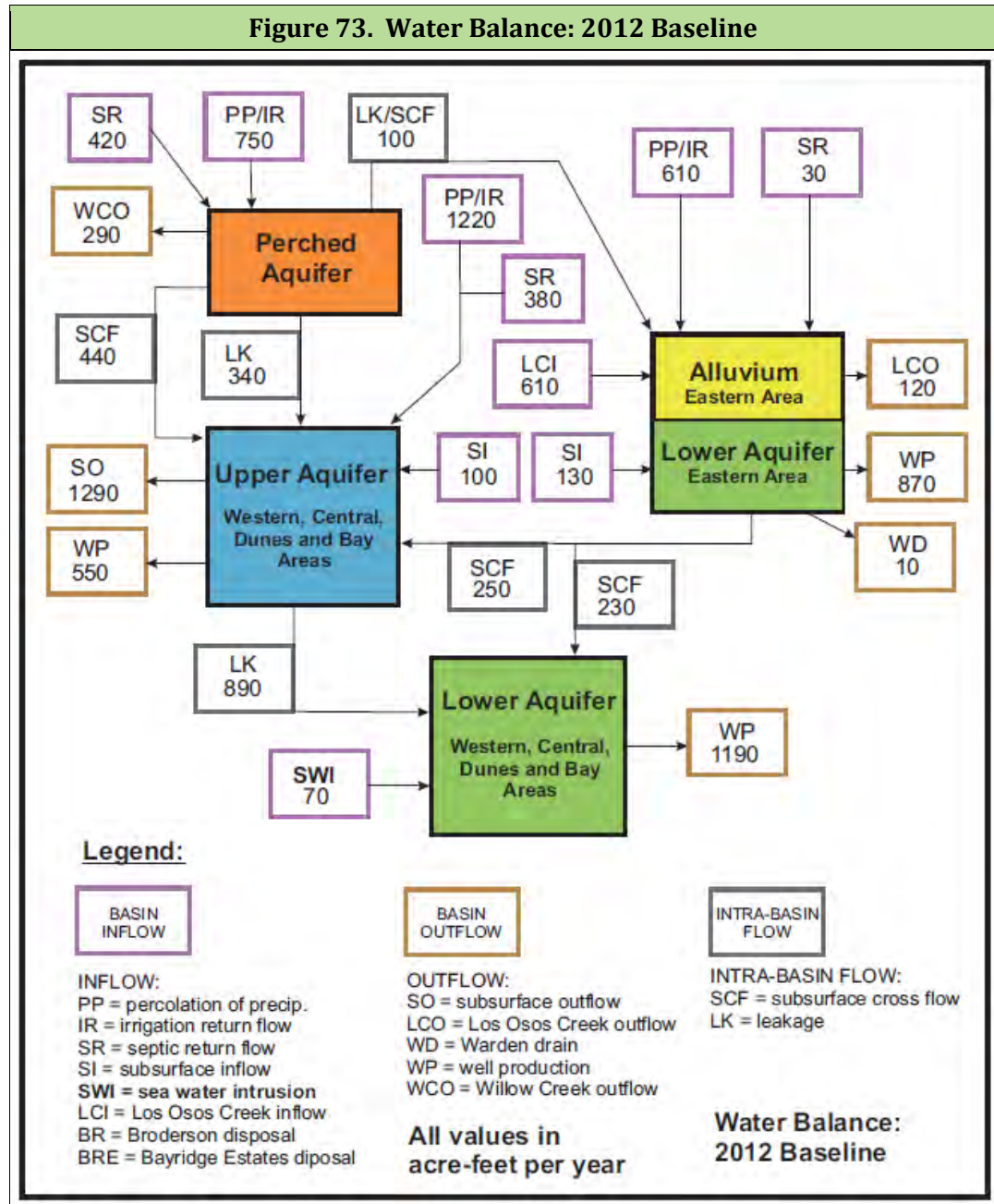
Aquifer Zones:
 Zone A - Perched Aquifer
 Zone B - Transitional Aquifer
 Zone C - Upper Aquifer
 Zone D - Lower Aquifer (shallow)
 Zone E - Lower Aquifer (deep)



Formation:
 Qa - alluvium
 Qs - dune sand
 Qpr - Paso Robles Formation
 Tca - Careaga Formation

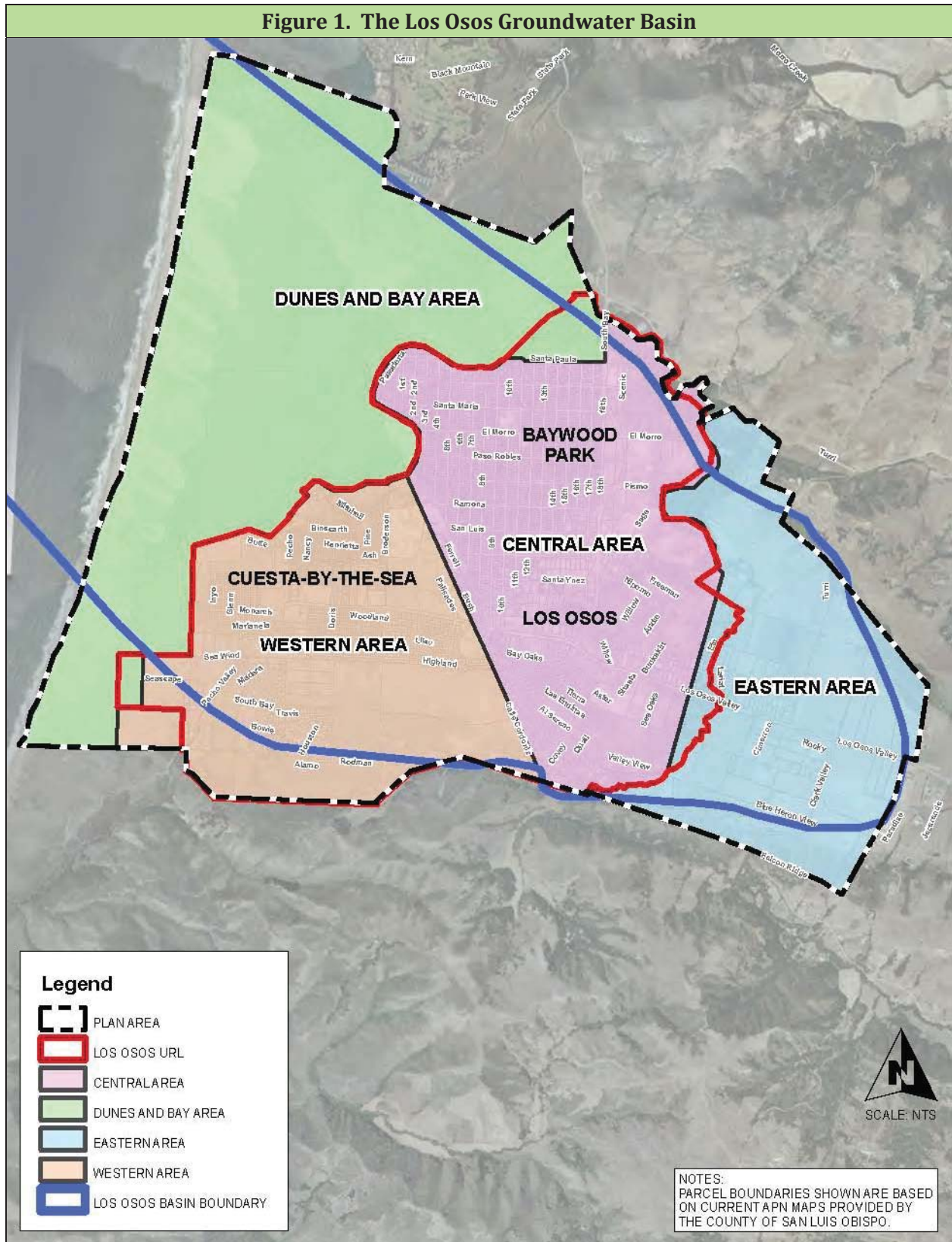
Figures

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

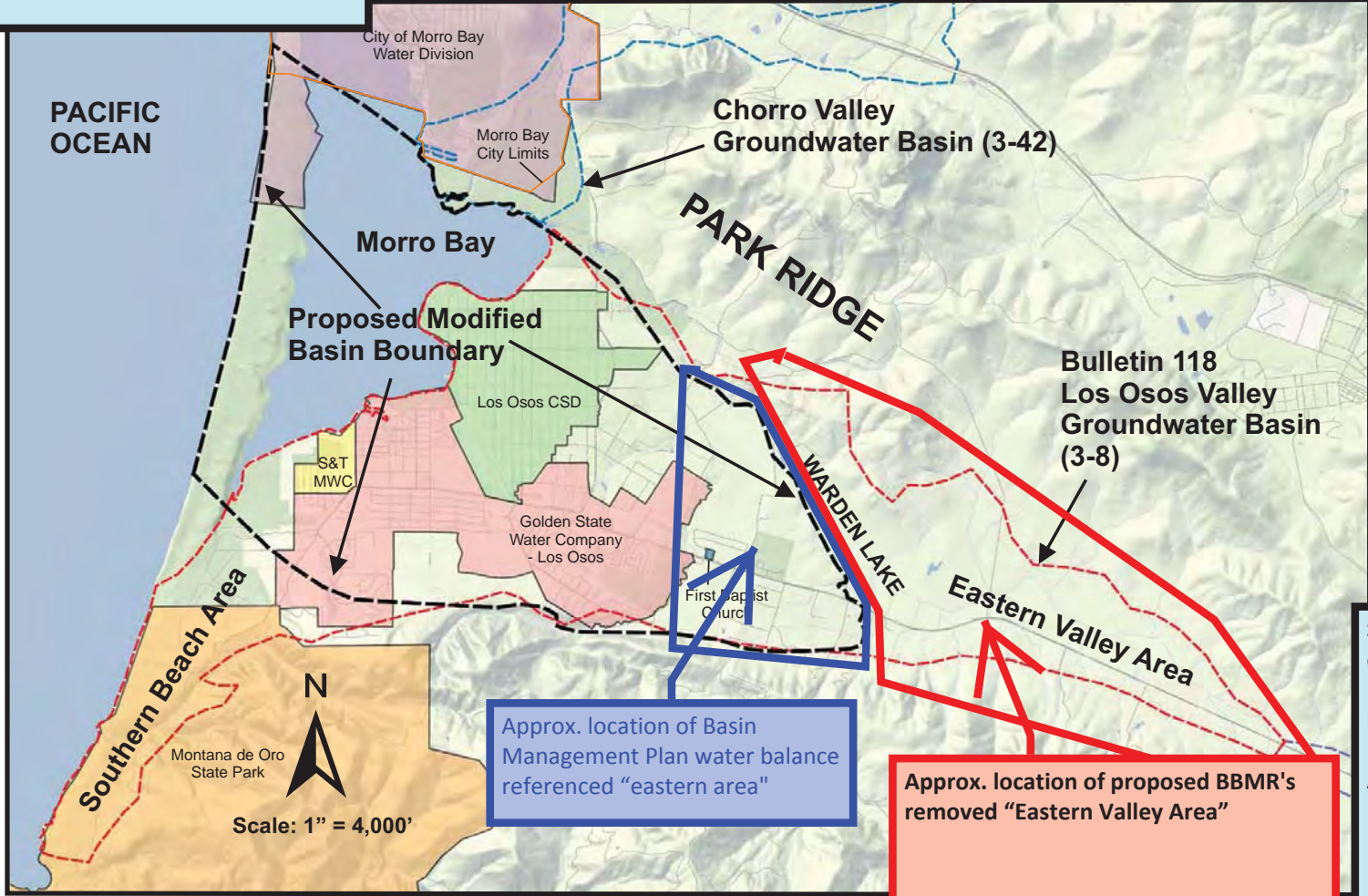


REFERENCE: ISJ Group, 2015, Updated Basin Plan for the Los Osos Groundwater Basin, January 2015

Figure 1. The Los Osos Groundwater Basin



Sketch



LEGEND

- Affected Systems:
- Los Osos CSD
 - Golden State Water Co.
 - S&T Mutual Water Co.
 - First Baptist Church
 - Montana de Oro State Park
 - City of Morro Bay Water Division
- Basin Boundaries:
- Bulletin 118 basin boundary
 - Proposed modified basin boundary

Approx. location of Basin Management Plan water balance referenced "eastern area"

Approx. location of proposed BBMR's removed "Eastern Valley Area"

Sketch of Approximate Location of "eastern area" referenced in Basin Management Plan water balance, compared to Proposed BBMR's removed "Eastern Valley Area"

N
Scale: 1" = 4,000'