LAS VIRGENES - TRIUNFO
JOINT POWERS AUTHORITY
AGENDA

4232 Las Virgenes Road, Calabasas, CA 91302

CLOSING TIME FOR AGENDA IS 8:30 A.M. ON THE TUESDAY PRECEDING THE MEETING. GOVERNMENT CODE SECTION 54954.2 PROHIBITS TAKING ACTION ON ITEMS NOT ON POSTED AGENDA UNLESS AN EMERGENCY, AS DEFINED IN GOVERNMENT CODE SECTION 54956.5 EXISTS OR UNLESS OTHER REQUIREMENTS OF GOVERNMENT CODE SECTION 54954.2(B) ARE MET.

5:00 PM February 5, 2018

PLEDGE OF ALLEGIANCE

1 CALL TO ORDER AND ROLL CALL

2 CHAIR/VICE CHAIR

A Annual Transition of JPA Chair and Vice Chair (Pg. 3)

Recognize Las Virgenes Municipal Water District Director Glen Peterson as Chair, and Triunfo Sanitation District Director Michael Paule as Vice Chair of the Las Virgenes-Triunfo Joint Powers Authority for calendar year 2018.

3 APPROVAL OF AGENDA

4 PUBLIC COMMENTS

Members of the public may now address the Board of Directors **ON MATTERS NOT APPEARING ON THE AGENDA**, but within the jurisdiction of the Board. No action shall be taken on any matter not appearing on the agenda unless authorized by Subdivision (b) of Government Code Section 54954.2

5 CONSENT CALENDAR

A Minutes: Special Meeting of January 10, 2018 (Pg. 4)

Approve.

B Budget Planning Calendar for Fiscal Years 2018-19 and 2019-20 (Pg. 9)

Receive and file the Budget Planning Calendar for Fiscal Years 2018-19 and 2019-20.

C Financial Review: Second Quarter of Fiscal Year 2017-18 (Pg. 11)

Receive and file the financial review for the second quarter of Fiscal Year 2017-18.

6 ACTION ITEMS

A Pure Water Project Las Virgenes-Triunfo: Award Design and Support Services for the Demonstration Project (Pg. 19)

Accept the proposal from Carollo Engineers, Inc., including three optional tasks, and authorize the Administering Agent/General Manager to execute a professional services agreement, in the amount of $571,063, for project delivery services for the Pure Water Demonstration Project.

B Pure Water Project Las Virgenes-Triunfo: Advanced Water Treatment Plant Draft Preliminary Siting Study (Pg. 37)

Consider the Advanced Water Treatment Plant Draft Preliminary Siting Study and provide any feedback to staff.

7 BOARD COMMENTS

8 ADMINISTERING AGENT/GENERAL MANAGER REPORT

9 FUTURE AGENDA ITEMS

10 INFORMATION ITEMS

A Pure Water Project Las Virgenes-Triunfo: Modeling of Las Virgenes Reservoir for Indirect Potable Reuse through Surface Water Augmentation (Pg. 89)

B Annual Supply and Delivery of Ferric Chloride: Award (Pg. 101)

11 PUBLIC COMMENTS

Members of the public may now address the Board of Directors **ON MATTERS NOT APPEARING ON THE AGENDA**, but within the jurisdiction of the Board. No action shall be taken on any matter not appearing on the agenda unless authorized by Subdivision (b) of Government Code Section 54954.2

12 CLOSED SESSION

A Conference with Legal Counsel - Potential Litigation (Government Code Section 54956.9): One Case

In the opinion of Legal Counsel, disclosure of the identity of the litigants would be prejudicial to the JPA.

13 ADJOURNMENT

Pursuant to Section 202 of the Americans with Disabilities Act of 1990 (42 U.S.C. Sec. 12132), and applicable federal rules and regulations, requests for a disability-related modification or accommodation, including auxiliary aids or services, in order to attend or participate in a meeting, should be made to the Executive Assistant/Clerk of the Board in advance of the meeting to ensure availability of the requested service or accommodation. Notices, agendas, and public documents related to the Board meetings can be made available in appropriate alternative format upon request.

February 5, 2018 JPA Board Meeting

TO: JPA Board of Directors

FROM: General Manager

Subject : Annual Transition of JPA Chair and Vice Chair

SUMMARY:

The Joint Powers Authority (JPA), Joint Exercise of Powers Agreement, Section 4, states "The Chairs of the two (2) parties' governing boards will alternate annually as Chair and Vice Chair, respectively, of the meetings." Based on this provision, the Chair of the JPA for calendar year 2018 shall be the Chair of the Las Virgenes Municipal Water District Board, and the Vice Chair of the JPA shall be the Chair of the Triunfo Sanitation District Board. No action by the JPA Board is necessary other than the respective Chairs of the parties shall assume their roles on the JPA Board at this meeting.

RECOMMENDATION(S):

Recognize Las Virgenes Municipal Water District Director Glen Peterson as Chair, and Triunfo Sanitation District Director Michael Paule as Vice Chair of the Las Virgenes-Triunfo Joint Powers Authority for calendar year 2018.

FISCAL IMPACT:

No

ITEM BUDGETED:

No

Prepared by: Josie Guzman, CMC, Executive Assistant/Clerk of the Board

LAS VIRGENES – TRIUNFO
JOINT POWERS AUTHORITY
MINUTES
SPECIAL MEETING

5:00 PM January 10, 2018

PLEDGE OF ALLEGIANCE

The Pledge of Allegiance to the Flag was led by James Wall.

1. CALL TO ORDER AND ROLL CALL

The meeting was called to order at **5:00 p.m.** by Chair Wall in the Board Room at Las Virgenes Municipal Water District headquarters at 4232 Las Virgenes Road in Calabasas, California. Josie Guzman, Clerk of the Board, conducted the roll call.

Present: Directors Caspary, Lewitt, Orkney, Pan, Paule, Peterson, Polan, Renger, Tjulander, and Wall.
Absent: None.

2. APPROVAL OF AGENDA

Director Polan moved to approve the agenda. Motion seconded by Director Paule. Motion carried unanimously.

3. PUBLIC COMMENTS

Administering Agent/General Manager David Pedersen introduced Michael Congelliere, who was substituting for John Mathews, Triunfo Sanitation District Legal Counsel. He also introduced newly hired employee Michael McNutt, Public Affairs and Communications Manager.

4. CONSENT CALENDAR

A Minutes: Regular Meeting of December 4, 2017

Director Peterson moved to approve the Consent Calendar. Motion seconded by Director Caspary. Motion carried unanimously.

5. ILLUSTRATIVE AND/OR VERBAL PRESENTATION AGENDA ITEMS

A Pure Water Project Las Virgenes-Triunfo: Update

David Lippman, Director of Facilities and Operations, provided the following update:

Mixing Study: In February 2017, the Board approved a proposal from Trussell Technologies to prepare the Las Virgenes Reservoir Mixing and Dilution Study, which will be used to verify that the reservoir will meet the State Water Resources Control Board's (Water Board's) new surface water augmentation regulations and the required detention time and dilution factors. The proposal also included a review of the study by an independent advisory panel. The study is nearly completed and a draft will be presented at the February 5th Board meeting. The Water Board's new surface water augmentation regulations have not yet been finalized, and it is anticipated that the final regulations will be issued early this year.

Advanced Water Treatment Facility Siting Study: In February 2017, the Board approved a proposal from Woodard & Curran to prepare the Advanced Water Treatment Facility Siting Study. The study explores all potential sites for the Advanced Water Treatment Facility and narrows down the list of potential sites. The study is nearly completed and a draft will be presented at the February 5th Board meeting.

30800 Agoura Road Property: In August 2017, the Board adopted the Negative Declaration for the purchase of the property located at 30800 Agoura Road, and approved the option payment of $100,000 for the property. The option payment is not refundable; however, should the JPA purchase the property before March 12, 2018, the option payment will be applied to the purchase price. Staff will provide a recommendation regarding the purchase of the property at the March 5th Board meeting. Should the Board not move forward with purchasing the property prior to March 12th or should the Board decide on delaying a decision, the option payment will not be applied towards the purchase price.

Funding and Financing: In November 2017, the Board approved the proposal from Kennedy/Jenks Consultants to prepare a Bureau of Reclamation Title XVI Feasibility Study, which will be the first step to compete for Title XVI construction funds. This study will incorporate the results from the mixing study and the siting study, which will then become foundational for the project's environmental documents. The Bureau of Reclamation previously awarded a $150,000 grant for the preparation of the feasibility study.

Demonstration Project: In September 2017, the Board approved issuing a Request for Proposal for project support services, including design, preparation of testing and operational plans, and coordination with public outreach firms. The original proposal was based on the Preliminary Design Report; however, based on the

Board's input at the December 12, 2017 meeting when ideas were presented related to the public outreach aspect, the scope of work was changed to include holding a workshop with the Board in order to better define the parameters of the Demonstration Project. Staff will provide a recommendation regarding the proposal at the February 5th Board Meeting.

Administering Agent/General Manager David Pedersen reported that staff applied for a $75,000 planning grant from the State Water Resources Control Board - Water Recycling Funding Program; however, a legacy statute was enacted in 2000 as part of Proposition 13 prohibiting the use of these grant funds for surface water augmentation projects. He stated that it was likely at that time there was concern with toilet-to-tap projects. He also stated that staff believes this statute is outdated and the time has come to eliminate this statute due to the Water Board's new surface water augmentation regulations. He reported that he was working with Syrus Devers, the JPA's lobbyist, to prepare a legislative proposal to remove this statute. He noted that according to Mr. Devers, this would be a consensus type item, and it would likely not need to be a stand-alone bill. The legislative proposal could potentially be included in a Natural Resources Omnibus Bill. He stated that this would allow the JPA to be eligible for these types of grants in the future.

6. ACTION ITEMS

A Sewage Flow Monitoring from Triunfo Sanitation District: Award

Authorize the Administering Agent/General Manager to approve an initial one-year purchase order with five one-year renewal options to ADS Environmental Services, in the amount of $34,800, for sewage flow monitoring services.

Administering Agent/General Manager David Pedersen presented the report. He responded to a question regarding whether the sewage flow monitoring was computerized by stating that the monitors are computerized; however, they require calibration. Brett Dingman, Water Reclamation Manager, added that the area velocity meters measure depth and velocity of flow, and the monitors transmit the data via cellular technology to allow the contractor to compile the data.

Director Peterson moved to approve Item 6A. Motion seconded by Director Orkney. Motion carried unanimously.

7. BOARD COMMENTS

Director Orkney inquired whether any wastewater collection system issues were experienced during the recent rain. Brett Dingman, Water Reclamation Manager, responded that the Tapia Water Reclamation Facility received 2.8 inches of rain and the flow was 13 million gallons per day (MGD). He also reported that Malibu Creek showed an increased flow of 800 cubic feet per second (CFS) at noon earlier

in the day. He noted that no issues were experienced.

8. ADMINISTERING AGENT/GENERAL MANAGER REPORT

Administering Agent/General Manager David Pedersen reported that a copy of a comment letter was provided that was sent to the State Water Resources Control Board (Water Board) regarding concerns with its proposal to prohibit wasteful water use practices. He noted that the Water Board is proposing a prohibition on irrigating turf on public street medians and parkways, including prohibiting the use of recycled water for irrigating these areas. He stated that staff would continue to monitor the Water Board's proposed prohibition. He also stated that staff would meet with the surety company the following week to discuss the Centrate Equalization Tank Project.

9. FUTURE AGENDA ITEMS

None.

10. PUBLIC COMMENTS

None.

11. CLOSED SESSION

A Conference with Legal Counsel – Potential Litigation (Government Code Section 54956.9): One Case

In the opinion of Legal Counsel, disclosure of the identity of the litigations would be prejudicial to the JPA.

The Closed Session was not held.

12. ADJOURNMENT

Seeing no further business to come before the Board, the meeting was duly adjourned at **5:22 p.m**.

Glen Peterson, Chair

ATTEST:

Michael Paule, Vice Chair

February 5, 2018 JPA Board Meeting

TO: JPA Board of Directors

FROM: Finance & Administration

Subject : Budget Planning Calendar for Fiscal Years 2018-19 and 2019-20

SUMMARY:

This item provides the schedule for key activities associated with the development and adoption of the Fiscal Years 2018-19 and 2019-20 Budget.

RECOMMENDATION(S):

Receive and file the Budget Planning Calendar for Fiscal Years 2018-19 and 2019-20.

FISCAL IMPACT:

No

ITEM BUDGETED:

No

FINANCIAL IMPACT:

There is no financial impact associated with this action.

DISCUSSION:

This will be the second two-year budget the JPA has implemented. The attached schedule outlines the timeframe and process to review and adopt the Budget for Fiscal Years 2018-19 and 2019-20.

Prepared by: Angela Saccareccia, Finance Manager

ATTACHMENTS:

Budget Planning Calendar

Las Virgenes-Triunfo Joint Powers Authority
FY 2018-19 & FY 2019-20 Budget Planning Calendar

Date	Board Activity	Description
2/5/2018	Board Meeting	Budget Process review - distribute Budget Planning Calendar Quarterly Financial Review - Second Quarter
2/10/2018	-	Budget submissions from TSD due to Administering Agent
3/5/2018	Board Workshop	Budget Workshop
Tentative	Board Meeting	IIP Review
3/26/2018	-	Meetings with GM/Department staff, TSD staff
5/7/2018	Board Meeting	Quarterly Financial Review - Third Quarter Preliminary Budget provided to Board
6/4/2018	Board Meeting	Budget Adoption

February 5, 2018 JPA Board Meeting

TO: JPA Board of Directors

FROM: Finance & Administration

Subject : Financial Review: Second Quarter of Fiscal Year 2017-18

SUMMARY:

The second quarter financial review presents data as of December 31, 2017. It is important to note that due to the timing of various projects and payments, the second quarter report should primarily be used to identify areas where an emerging trend may affect the JPA's position at fiscal year-end.

RECOMMENDATION(S):

Receive and file the financial review for the second quarter of Fiscal Year 2017-18.

FISCAL IMPACT:

No

ITEM BUDGETED:

No

FINANCIAL IMPACT:

There is no financial impact associated with this action.

DISCUSSION:

The JPA's second quarter net uses of funds in Fiscal Year 2017-18 totaled $7.3 million, compared to $9.0 million for the same period in Fiscal Year 2016-17. There were year-over-year increases in operating revenues (12.7%) and an increase in operating expenditures (5.5%). The increases in revenues were primarily due to increased recycled water sales. Capital project expenditures were approximately $1.9 million less than the prior year.

When comparing to Fiscal Year 2017-18 budget estimates through the second quarter, actual operating expenditures were approximately $941,000 (11.1%) below budget estimates,

primarily due to lower than expected energy, chemical and sprayfield costs as well as decreased labor hours for maintenance. Capital project expenditures were approximately $287,000 (21.3%) below budget estimates, primarily due to the timing of expenditures for planned projects.

Prepared by: Angela Saccareccia, Finance Manager

ATTACHMENTS:

Second Quarter Financial Results
CIP Status

Joint Powers Authority Operations

Quarterly Update - Comparison to Budget & Prior Year at December 31, 2017

	FY 16-17 Actual YTD	FY 17-18 Budget YTD	FY 17-18 Actual YTD
Total Operating Revenues	$ 1,173,463	$ 1,435,185	$ 1,319,532
RW Pump Station	636,556	739,224	654,670
RW Tanks & Reservoirs	31,888	56,788	34,389
RW System Operations	18,363	19,755	12,809
RW Distribution	63,848	52,513	68,201
Sewer	52,131	125,109	43,545
Waste Water Treatment	3,470,022	4,070,029	3,862,351
Composting	2,079,979	2,634,687	2,239,180
Centrate Treatment	196,527	222,239	179,928
Adminstration	589,577	554,341	438,336
Total Operating Expenses	7,138,891	8,474,685	7,533,409
Net Operating (Expenses)	$ (5,965,428)	$ (7,039,500)	$ (6,213,877)

Joint Powers Authority Operations
Quarterly Update - Comparison to Budget & Prior Year at December 31, 2017
FY 17-18 Year To Date

	FY 16-17 Actual YTD	FY 17-18 Budget YTD	FY 17-18 Actual YTD
Las Virgenes Share:			
Total Revenues			
Operating Revenues	$ 828,465	$ 1,013,241	$ 931,590
Total Revenues	828,465	1,013,241	931,590
Total Expenses			
Operating Expenses	$ 4,918,696	$ 5,676,448	$ 5,190,519
Capital Project Expenses	2,146,088	950,556	747,929
Total Expenses	7,064,783	6,627,004	5,938,448
Net (Uses) of Funds - LV	$ (6,236,319)	$ (5,613,763)	$ (5,006,859)
Triunfo Share:			
Total Revenues			
Operating Revenues	$ 344,998	$ 421,944	$ 387,942
Total Revenues	344,998	421,944	387,942
Total Expenses			
Operating Expenses	$ 2,220,195	$ 2,798,237	$ 2,342,890
Capital Project Expenses	893,696	395,840	311,461
Total Expenses	3,113,892	3,194,077	2,654,351
Net (Uses) of Funds - TSD	$ (2,768,893)	$ (2,772,133)	$ (2,266,408)
Total JPA Net (Uses) of Funds	$ (9,005,212)	$ (8,385,896)	$ (7,273,267)

Joint Powers Authority Operations

Quarterly Update - Comparison to Budget & Prior Year at December 31, 2017

FY 17-18 Year To Date

	FY 16-17 Actual YTD	FY 17-18 Budget YTD	FY 17-18 Actual YTD
Total Revenues			
Operating Revenues	$ 1,173,463	$ 1,435,185	$ 1,319,532
Total Revenues	1,173,463	1,435,185	1,319,532
Total Expenses			
Operating Expenses	$ 7,138,891	$ 8,474,685	$ 7,533,409
Capital Project Expenses	3,039,784	1,346,396	1,059,390
Other	-	-	-
Net (Uses) of Funds	$ (9,005,212)	$ (8,385,896)	$ (7,273,267)
Las Virgenes Share	(6,357,680)	(5,613,763)	(5,323,177)
Triunfo Share	(2,647,532)	(2,772,133)	(1,950,090)

Las Virgenes - Triunfo Joint Powers Authority
Capital Improvement Project Status
December 31, 2017

Job # - Description	*LV %*	*TSD %*	*Total Project Appropriations*	*Prior Year Expenditures*	*Current Year Expenditures*	*Total Project Expenditures*	*Project Balance*	*LV Balance*	*TSD Balance*
Projects to complete by June 30, 2018									
10537 - Raw Sludge WetWell Mixing Impv	**70.6%**	**29.4%**	**$584,942**	**$104,801**	**$56,468**	**$161,269**	**$423,673**	**$299,113**	**$124,560**
Replace the existing raw sludge mixing pump at Tapia with a more suitable unit. Appropriate additional $240,328. Agenda Item 6A, 7/10/2017.									
10540 - Lost Hills Overpass RW Main	**70.6%**	**29.4%**	**$737,324**	**$115,601**	**$395,510**	**$511,111**	**$226,213**	**$159,706**	**$66,507**
Relocation of recycled water main due to demolition of Lost Hills overpass. In Progress / Construction									
10564 - Centrate Equalization Tank	**70.6%**	**29.4%**	**$2,343,008**	**$1,972,093**	**$73,502**	**$2,045,595**	**$297,413**	**$209,974**	**$87,439**
Construct a centrate equalization tank at the centrate treatment facility at Rancho.									
10565 - Rancho LV:Digester Cleang/Rpr	**70.6%**	**29.4%**	**$1,789,494**	**$271,561**	**$37,691**	**$309,252**	**$1,480,242**	**$1,045,051**	**$435,191**
Clean out and evaluate the condition of digesters that have been in service for more than 20 years. Appropriate additional $709,788. Agenda Item 7A, 8/7/2017.									
10589 - WIMS Software Implementation	**70.6%**	**29.4%**	**$32,350**	**$25,740**	**$0**	**$25,740**	**$6,610**	**$4,667**	**$1,943**
Purchase and installation of water information management solution (WIMS).									
10641 - Tapia Lighting EfficiencyUpgrd	**70.6%**	**29.4%**	**$469,920**	**$0**	**$0**	**$0**	**$469,920**	**$331,764**	**$138,156**
Replace internal and external lights at Tapia									
10643 - Rancho Reliability Imprv 17-18	**70.6%**	**29.4%**	**$132,000**	**$0**	**$343**	**$343**	**$131,657**	**$92,950**	**$38,707**
Miscellaneous repair or replacement of Rancho assets									
10646 - Tapia WRF Relib Imprv FY17-18	**70.6%**	**29.4%**	**$132,000**	**$0**	**$59,864**	**$59,864**	**$72,136**	**$50,928**	**$21,208**
Miscellaneous repair or replacement of Tapia assets									
Total Projects to complete by June 30, 2018			***$6,221,038***	***$2,489,796***	***$623,378***	***$3,113,174***	***$3,107,864***	***$2,194,152***	***$913,712***
Multi-Year Projects									

Job # - Description	LV %	TSD %	Total Project Appropriations	Prior Year Expenditures	Current Year Expenditures	Total Project Expenditures	Project Balance	LV Balance	TSD Balance
Multi-Year Projects									
10597 - Tapia E&I Upgrades	**70.6%**	**29.4%**	**$66,000**	**$0**	**$12,744**	**$12,744**	**$53,256**	**$37,599**	**$15,657**
Replace obsolete and malfunctioning mechanical protective relays for generators with new solid state controls. Planning/Design									
10608 - Rancho Amndmnt Bin&Convync Mod	**70.6%**	**29.4%**	**$428,650**	**$53,090**	**$96,765**	**$149,855**	**$278,795**	**$196,829**	**$81,966**
The project consists of installing a new smaller amendment bin and modification to the conveyor system to simplify the amendment conveyance process. Planning/Design									
10619 - Summer Season 2013 TMDL Compln	**70.6%**	**29.4%**	**$200,000**	**$0**	**$0**	**$0**	**$200,000**	**$141,200**	**$58,800**
Construction of a 1MGD "side stream" treatment facility at Tapia to treat stream flow augmentation discharges to the 2013 TMDL limits of 1 mg/L total nitrogen and 0.1 mg/L total phosphorous. The cost estimate is based on membrane technology.									
10621 - RW Tank Coating Evluatn/Repair	**70.6%**	**29.4%**	**$30,000**	**$0**	**$17,542**	**$17,542**	**$12,458**	**$8,795**	**$3,663**
The project consists of evaluating the coatings of three (3) steel tanks (Indian Hills, Parkway, Cordillera), that have been identified as needing possible rehabilitation based upon the annual diver's inspection report.									
10626 - Process Air Improvements	**70.6%**	**29.4%**	**$1,621,584**	**$143,131**	**$85,541**	**$228,672**	**$1,392,912**	**$983,396**	**$409,516**
The first phase is to replace the existing Roots blowers with new, high effiency, single stage blowers. To replace the air diffusers in the aeration basins with new full floor mounted fine bubble diffusers.									
10629 - Cny Oaks Prk RW Main Extension	**70.6%**	**29.4%**	**$399,780**	**$1,937**	**$2,967**	**$4,904**	**$394,876**	**$278,782**	**$116,094**
This extension will serve the City of Westlake Village's Oak Canyon Park and eliminate a long private service line to Yerba Buena School. from Proj 10602 Funding from Prop 84 IRWM 2015									
10635 - PURE WATER PROJECT	**70.6%**	**29.4%**	**$1,850,000**	**$0**	**$3,360**	**$3,360**	**$1,846,640**	**$1,303,728**	**$542,912**
This project funds preliminary studies, outreach, CEQA analysis, preliminary design and final design.									
10636 - Mixing & Dilution Study	**70.6%**	**29.4%**	**$0**	**$62,250**	**$79,498**	**$141,748**	**($141,748)**	**($100,074)**	**($41,674)**
sub project of 10635 Pure Water Project									
10637 - Facility Siting Study	**70.6%**	**29.4%**	**$0**	**$176,526**	**$65,208**	**$241,734**	**($241,734)**	**($170,664)**	**($71,070)**
sub project of 10635 Pure Water Project									
10638 - Demonstration Project	**70.6%**	**29.4%**	**$0**	**$80,607**	**$6,945**	**$87,552**	**($87,552)**	**($61,812)**	**($25,740)**
sub project of 10635 Pure Water Project									
10650 - Land Acquisition-PureWtr Proj	**70.6%**	**29.4%**	**$2,000,000**	**$0**	**$2,216**	**$2,216**	**$1,997,784**	**$1,410,436**	**$587,348**
sub project of 10635 Pure Water Project									

Job # - Description	LV %	TSD %	Total Project Appropriations	Prior Year Expenditures	Current Year Expenditures	Total Project Expenditures	Project Balance	LV Balance	TSD Balance
Multi-Year Projects									
10653 - Tapia Rehab FY17-18	**70.6%**	**29.4%**	**$1,549,100**	**$0**	**$63,226**	**$63,226**	**$1,485,874**	**$1,049,027**	**$436,847**
Combine projects 10647, 10648, 10649 for ease of administration of the projects.									
Concrete repair and installation of protective coatings									
Replace ten RAS gates									
Replace grit piping and grit valves as well as primary skimming pipe									
Total Multi-Year Projects			***$8,145,114***	***$517,541***	***$436,012***	***$953,553***	***$7,191,561***	***$5,077,242***	***$2,114,319***
Projects on Hold									
10520 - SCADA System Communictn Upgrd	**70.6%**	**29.4%**	**$93,100**	**$32,447**	**$0**	**$32,447**	**$60,653**	**$42,821**	**$17,832**
Upgrade the JPA owned portion of the supervisory control and data acquisition system (SCADA) system to an Ethernet based radio network and provide additional data paths for system redundancy.									
10567 - Progmble Logic Contrlr Upgrd	**70.6%**	**29.4%**	**$332,850**	**$0**	**$0**	**$0**	**$332,850**	**$234,992**	**$97,858**
Replace obsolete programmable logic controllers and upgrade other electrical equipment at Tapia.									
10611 - Tapia Duct Bank Infrstrc Upgrd	**70.6%**	**29.4%**	**$66,000**	**$0**	**$0**	**$0**	**$66,000**	**$46,596**	**$19,404**
Add new duct bank from the front gate to the chemical building with several intercept points along the way.									
10617 - Flow Meter Replacement - JPA	**70.6%**	**29.4%**	**$25,849**	**$0**	**$0**	**$0**	**$25,849**	**$18,249**	**$7,600**
Replace end of life flow meters at two (2) locations. Includes the purchase of wireless flow meters and installation.									
Monthly service includes maintenance and monitoring.									
Total Projects on Hold			***$517,799***	***$32,447***	***$0***	***$32,447***	***$485,352***	***$342,659***	***$142,693***
Totals			**$14,883,951**	**$3,039,784**	**$1,059,390**	**$4,099,174**	**10,784,777**	**$7,614,053**	**$3,170,724**
Totals: Las Virgenes MWD			**$10,508,069**	**$2,146,088**	**$747,929**	**$2,894,017**	**$7,614,053**		
Totals: Triunfo Sanitation District			**$4,375,882**	**$893,696**	**$311,461**	**$1,205,157**	**$3,170,724**		

February 5, 2018 JPA Board Meeting

TO: JPA Board of Directors

FROM: Facilities & Operations

Subject : Pure Water Project Las Virgenes-Triunfo: Award Design and Support Services for the Demonstration Project

SUMMARY:

On September 5, 2017, the JPA Board approved a request for proposals (RFP) for project delivery services for the Pure Water Demonstration Project. The scope of work consists of developing the project delivery model, scope of the architectural services, scope of the equipment design, procurement and integration methodology, operation and testing plans, schedule and cost estimate and transitional operations plan. Also, the scope includes coordinating with a public outreach firm. The RFP called for the use of the Demonstration Project Preliminary Design Report, presented to the Board on July 10, 2017, as a basis for the proposals.

In November 2017, five proposals were received with a wide range of fees and approaches. The proposed fees ranged from $178,570 to $1,859,828. The proposed approaches ranged from providing very basic service with additional work as-needed on a time and materials basis to full project management and operation of the facility for one year. The wide range of responses was likely due to the open-ended nature of the RFP, which was intended to spark creativity in the proposals.

Three of the five proposing firms were invited for interviews in mid-December 2017 to explain their approach and fee. However, on December 4, 2017, staff received feedback from the Board that lead to a refinement of the scope of work. Among the refinements was the plan to use the existing Board Room and restrooms in Building No. 8 rather than improving similar facilities in Building No. 1. Additionally staff realized that the best delivery method for this project would be the traditional design-bid-build model. Based on a refined scope of work, Carollo Engineers, Inc. (Carollo) and Trussell Technologies (Trussell) were asked to provide revised proposals. These two firms were selected based on the high quality of their original proposals, strong interviews, and extensive experience developing potable reuse demonstration facilities.

The revised scope of work included the following five basic tasks: design services; operations, testing and research assistance; services during construction; start-up and transitional operational assistance; and additional tasks applicable to all areas. Both firms included optional tasks in their revised proposals including operator training for the JPA's staff.

Both firms were responsive to the revised RFP; experienced in the design, start-up and operation of potable reuse demonstration projects; and well known leaders in the potable reuse community. Trussell's proposed fee without any optional tasks was $491,432. Carollo's proposed fee without any optional tasks was $533,055. The revised scope called for the inclusion of two additional months of start-up and operational assistance. Carollo included the cost of the start-up and operational assistance task in its base fee; Trussell included the cost as an optional task. When this optional task is included, Trussell's fee came to $549,372, compared to Carollo's fee of $533,055.

Although both proposals were excellent, Carollo's proposal stood out for several reasons. Carollo's approach was characterized by the phrase "THINK BIG build small," which most closely aligns with the direction received from the Board. Rather than construct a 100 gallon per minute facility, Carollo proposes a smaller facility that would still meet the goals of public outreach, treatment technique validation and operator training, while reducing the overall cost and shortening the schedule. The team proposes to use 3-D modeling for the layout of the demonstration project, allowing the JPA to make critical decisions before investing in the detailed design work. Further, in addition to operator training, Carollo included two other optional tasks that staff would recommend authorizing: enhanced interior lighting design and landscaping design. When the three optional tasks are included, Carollo's proposed fee is $571,063.

RECOMMENDATION(S):

Accept the proposal from Carollo Engineers, Inc., including three optional tasks, and authorize the Administering Agent/General Manager to execute a professional services agreement, in the amount of $571,063, for project delivery services for the Pure Water Demonstration Project.

FISCAL IMPACT:

Yes

ITEM BUDGETED:

Yes

FINANCIAL IMPACT:

Sufficient funds are available in the adopted Fiscal Year 2017-18 JPA Budget for this work. A budget of $1,850,000 was provided for the Pure Water Project Las Virgenes-Triunfo under CIP No. 10635, which is allocated 70.6% to LVMWD and 29.4% to Triunfo Sanitation District. As shown in the table below, a total of $1,622,155 will have been committed to-date with the Board's acceptance of this proposal. The potential purchase of the property at 30800 Agoura Road is funded from a separate CIP.

Plan of Action (MWH)	$174,716
Basis of Design Report (MWH)	$462,825
Basis of Design Report (MWH) Amendment 1	$17,000
Basis of Design Report (MWH) Amendment 2	$11,300
Encino Reservoir Investigation (RMC)	$ 52,820
Outreach (Katz & Associates)	$ 41,115
Outreach (Katz & Associates) Amendment 1	$15,383
Outreach (Katz & Associates) Amendment 2	$8,615
Financial Consultant (PFM Group)	$ 30,000
LADWP Contribution	$ (62,370)
Demo Project Preliminary Design (CDM)	$142,487
Mixing & Dilution Study (Trussell Tech)	$ 199,690
IAP Option for M&D Study (Trussell Tech)	$79,988
Siting Study (Woodard & Curran)	$157,648
Title XVI Feasibility Study (KJ)	$140,370
Bureau of Reclamation Research Grant (Demo Project)	$ (300,000)

Bureau of Reclamation Title XVI Feasibility Study Grant	$(150,000)
Outreach (New Water ReSources)	$ 29,505
Demo Project Design & Support Services (Carollo)	$ 571,063
Total	**$ 1,622,155**

DISCUSSION:

Background:

Most agencies that have undertaken indirect potable reuse projects have constructed and operated a pilot or demonstration project. These projects can vary in size and generally have three primary goals: research and treatment technique validation, public outreach/acceptance, and operator training. The JPA shares these goals for its Pure Water Demonstration Project.

The JPA successfully received a $300,000 WaterSMART grant from the U.S. Bureau of Reclamation to conduct additional research at the proposed demonstration facility. The grant deadline to complete the research is December 2019. Additionally, the JPA's Time Schedule Order for compliance with the winter season discharge requirements included deadlines for completion of design of the demonstration project by May 2018 and completion of construction and research by May 2019.

Request for Proposals:

Development of the demonstration project consists of four main elements: (1) architectural services for building renovations; (2) vendor and engineering services for treatment equipment; (3) design and development of public outreach features; and (4) transitional operation of the facility. There are a variety of ways these services could be obtained, ranging from a traditional design-bid-build model to vendor-lead procurement and installation. Given the options, the Board approved a request for proposals for project delivery services for the demonstration project on September 5, 2017. The scope of work consisted of the following items:

1. Selection and development of the project delivery method
2. Operations, testing and research assistance
3. Procurement and project delivery assistance
4. Start-up and transitional operations assistance
5. Tasks applicable to all areas

The proposers were encouraged to include optional tasks that were considered beneficial. The scope was purposely broad and open-ended to encourage creativity and harness the experience of the proposers.

The proposers were instructed to use the PDR for the Demonstration Project as the basis for the proposals. The PDR was presented to the Board on July 10, 2017, and on September 5, 2017, the Board determined the demonstration project was exempt from the requirements of the California Environmental Quality Act. The PDR envisioned a 100 gallon per minute facility housed in Building No. 1, using micro-filtration, reverse osmosis, UV disinfection and advanced oxidation. The old Board Room in Building No. 1 was proposed to be converted into a "learning center" where public tours would begin and end. The tours would follow the treatment process with the last stop including a tasting station. Signage, interactive displays and visual explanations of the process and science of potable reuse were proposed to enhance the visitor experience.

On December 4, 2017, New Water ReSources representatives gave a presentation to the Board on developing a visitor's experience for demonstration projects and outlined a preliminary vision of the potential visitor experience for the proposed Pure Water Demonstration Project. The Board provided feedback to staff that included using the existing Board Room and restrooms in Building No. 8 for public tours rather than creating these new spaces in Building No. 1. The Board's consensus was to create a "toned down" facility that would still meet the goals of treatment validation, operator training and public outreach. After additional research and discussing alternative delivery methods with several consulting firms, staff realized that a design-bid-build delivery method would be best for the project.

Proposals and Refined Scope of Work:

In November 2017, five proposals were received with a wide range of fees and approaches. The proposed fees ranged from $1,859,828 to $178,570. The proposed approaches ranged from full project management and operations of the facility for one year to providing very basic service with additional work as needed on a time and materials basis. This wide range of fees and proposed approaches were expected because the RFP was purposely broad and open-ended. However, the differences in the proposals were more significant than expected.

After review of the five proposals, three of the five firms were invited for interviews in mid-December to explain their approaches and proposed fees. The proposals were received before the December 2017 Board meeting, but the interviews were scheduled after the meeting when the Board provided additional feedback to staff. Based on the Board feedback and the decision to use a design-bid-build approach for the project delivery method, Carollo and Trussell were asked to provide a revised proposals based on a refined scope of work. The two firms were selected based on the high quality of their original proposals, strong interview results and extensive experience in developing potable reuse demonstration projects.

The revised RFP included five basic tasks: design services; operations, testing and research assistance; services during construction; start-up and transitional operations assistance; and tasks applicable to all areas. The revised scope of work also required that the successful firm conduct a workshop with the JPA Board to review the purpose, benefits and need for the demonstration project, along with further clarification of the Board's vision for the project. The revised RFP encouraged the firms to include optional tasks believed to be beneficial to the success of the project.

Both firms were responsive to the revised RFP; experienced in the design, start-up and operation of potable reuse demonstration projects; and recognized leaders in the potable reuse community. Trussell's proposed fee without any optional tasks was $491,432. Trussell's proposal included the following five optional tasks: basic operator training, two additional months of operational support, engagement of an Independent Advisory Panel, pre-qualification of the microfiltration process for full-scale, and support for the review of the operations and testing plans by the State's Division of Drinking Water and Regional Water Quality Control Board. The total fee, including all optional tasks at $339,934, was $831,366.

Carollo's proposed fee without optional tasks was $533,055. Carollo's proposal included the following four optional tasks: enhanced facility lighting design, landscaping design, operator training, and an analysis of low contact time of free chlorination. for $103,065. The total fee, including all options tasks at $103,065, was $636,120.

For comparison purposes, the revised RFP called for including two additional months of start-up and operational assistance. Carollo included the cost of the start-up and operational assistance task in its base fee; Trussell included the cost as an optional task. When the optional task is included, Trussell's fee was $549,372, compared to Carollo's fee of $533,055.

The table below provides more detail on the fee proposals.

		Trussell	Carollo
I	Design	$ 286,727	$ 292,590
II	Operations, testing & research assistance	$ 57,500	$ 40,746
III	Services During Construction	$ 45,916	$ 41,639
IV	Start-up & Ops assistance	$ 52,615	$ 99,905
V	Tasks applicable to all areas	$ 48,674	$ 58,175
	Totals	**$ 491,432**	**$ 533,055**
	Optional Tasks		
Trussell	Basic Operator Training	$ 47,200	
	Two additional months of operational support	$ 57,940	
	IAP Engagement	$ 21,441	
	MF Pre-qualification for Full Scale	$ 193,153	
	DDW & RWQCB Review of Ops & Testing Plan	$ 20,200	
Carollo	Enhanced Facility Lighting Design		$ 12,500
	Landscape Design		$ 12,500
	Operator Training Course		$ 13,008
	Low CT Chlorination		$ 65,057
	Totals with Optional Tasks	**$ 831,366**	**$ 636,120**

Recommendation:

Although both proposals were excellent, Carollo's proposal stood out for several reasons and is recommended. Carollo's approach was characterized by the phrase "THINK BIG build small," which most closely aligns with the direction received from the Board. Rather than constructing a 100 gallon per minute (gpm) facility, the Carollo team suggests a smaller facility that would still meets the goals of public outreach, treatment technique validation and operator training, while reducing costs and shortening the schedule. The facility would be sized with the microfiltration process at 60 to 80 gpm, the reverse osmosis at 30 gpm and the UV disinfection/advanced oxidation at 10 gpm. Carollo also proposes to use 3-D modeling for the layout of the demonstration project, allowing the JPA to make critical decisions before investing in detailed design work.

Staff recommends including three of Carollo's four optional tasks: (1) lighting design to highlight the process equipment and enhance the visitor experience; this approach reduces changes to the building's interior; (2) landscaping design to incorporate drought-tolerant California friendly plants irrigated by captured rainwater, recycled water and/or purified water; and, (3) operator training. The total fee including these three optional tasks is $571,063. The fourth optional task could result in efficiencies for the full-scale project but can be done at a later date when the demonstration project is operational.

Prepared by: David R. Lippman, P.E., Director of Facilities and Operations

ATTACHMENTS:

Carollo Proposal

Engineers...Working Wonders With Water®

3150 Bristol Street, Suite 500, Costa Mesa, California 92626
P. 714.593.5100 F. 714.593.5101

January 9, 2018

Mr. David R. Lippman, PE
Las Virgenes Municipal Water District
4232 Las Virgenes Road
Calabasas, CA 91302

Subject: Scope and Budget for the Pure Water Project Las Virgenes – Triunfo Demonstration Project

Dear Mr. Lippman:

We at Carollo have appreciated the opportunity to meet with you and your team, to listen, and to learn about your challenges. We envision a successful demonstration project, one that brings respect from regulators, understanding from the public, and training to your staff, while also meeting your USBR research needs. Within our proposal and interview process, we highlighted the five key goals of a demonstration project: **Regulatory**, **Engineering**, **Operations**, **Public Outreach**, and **Research & Development**. The challenges you face are embedded within each option; specifically, how to cost effectively achieve the goals. To that end, we highlight several key items below:

- **Our engineering efforts are focused on maximizing our internal efficiency**. That is done through leveraging our team's directly relevant experience designing demonstration systems, developing startup and operations plans, completing training manuals and materials. Every component of work for this project, that we are aware of, has already been completed by members of this team as part of other Carollo projects.
- **Our approach to demonstration projects brings the value of large grand projects, but at a reduced scale and cost**. The results of working with the Carollo team is the generation of practical solutions that cost you less to implement, while still hitting all of your demonstration goals. We use the phrase "**THINK BIG**, *BUILD SMALL*" to capture our approach. For example:
  - **Demonstration Equipment Size**. Prior work suggested a 100 gpm system, which comes with 100 gpm size and 100 gpm cost. Our approach is to minimize equipment capacity while maintaining 100 percent of the value of the demonstration. As we pointed out in our discussions, this means that the MF/UF system is sized for 60 to 80 gpm, RO that is 30 gpm, and UV AOP that is 10 gpm. Less equipment means smaller footprint, more space in the demonstration facility, and a demonstration treatment system that is more than 50 percent less in cost to purchase and construct.
  - **Public Education and Outreach**. In Ventura, we worked with Linda Macpherson and Ventura Water to develop websites, brochures, tour materials, banners, and education programs for a grand total of $25,000. The community broadly supported the potable water reuse program and demonstration system, even the concept of DPR! There may come a time where the JPA would benefit from a museum-style education center on water and water reuse, something that could be part of the full-scale future system. However, for now, the big ideas of water scarcity and water purification can be effectively told at a reasonable cost. Our proposed approach is to utilize our 3D modeling approach (shown in the interview) to work with Linda and your Board to refine the internal and external demonstration facility components.

- **Our approach to architectural and landscaping aesthetics reduces modifications to the existing administration building and reduces construction costs.** We have engaged El Dorado Inc. to bring an elegant simplicity to the architectural services. Using a combination of necessary repairs (walls, ceilings) with creative lighting (natural and engineered) and drought tolerant landscaping, we can create a direct engagement with the purification technology and focus on the human experience and connection with water:
  - **Structural Modifications.** These will be costly and can be avoided. Consider a crisp, simple, and clean upgrade to the interior facility.
  - **Creative Lighting.** Rather than focusing on high level finishes throughout the renovation, a spare, light industrial interior palette can allow lighting to emerge as a primary interior "material," organizing public circulation and experience while providing a precise illumination of the purification equipment.
  - **Landscaping.** Drought tolerant plantings, irrigated with captured stormwater and reclaimed (or purified) water, underscores the important role water recycling technology plays within a sustainable relationship to our environment.

In total, as you review our scope and budget proposal, our intent is to provide you with upfront value in engineering services with long-term value in your demonstration project. Therefore, we have highlighted optional tasks within the scope and fee estimate that may provide additional project benefits above and beyond the baseline project scope of work. Ultimately, we are eager to work with you and the JPA and excited to dedicate ourselves to your success.

One closing note: This month (January, 2018), Carollo welcomes Mr. Jeff Mosher to our Los Angeles office. Jeff was the Executive Director of NWRI for many years, leading all of their potable water reuse efforts. Should Carollo be selected, Jeff would be working with Adam, Andy, and the team in a quality control and brainstorming role for your project. We would be happy to introduce Jeff to you in person.

Once again, thank you.

Sincerely,

CAROLLO ENGINEERS, INC.

Adam Zacheis, PhD, PE
Vice President

Andrew Salveson, PE
Vice President

AZ:lmo

Enclosures: Carollo Scope of Work
Fee Estimate
Résumé

Carollo Scope of Work

1/8/2017

Carollo strives to understand the needs of our clients, be creative with our solutions, and efficiently and effectively respond. To that end, we encourage you to review and modify this scope and the corresponding budget so that it best meets your needs.

I. Demonstration System Design

The design will be a conventional Design-Bid-Build. The general layout in the Preliminary Design Report is assumed excluding the assembly room and bathroom rehabilitation. The existing boardroom and bathrooms in the headquarters building will be used for tours.

a. Conduct a JPA Board workshop to educate the Board on the purpose, benefits, and need of the Demonstration Project and to clarify their vision of the Pure Water Project Demonstration Project.

Work Effort: Development of questionnaire for Board and Staff to define and rank the priorities of the Demonstration Project. Evaluation of results in conjunction with Staff. Presentation of results and discussion of results in a JPA Board Workshop. Summary of the Board's primary goals for the Demonstration Project. Proposed survey approach follows the five values of a demonstration system (Regulatory, Engineering, Operations, Public Outreach, Research, and Development) with examples and results.

Deliverables: Questionnaire, presentation materials, Board workshop meeting summary.

b. Develop the plans and specifications for architectural services and equipment design, procurement and integration for the project including necessary procurement documents. (The JPA will provide the front end documents).

Work Effort: As listed above. It has been assumed that there will be three submittals (60 percent, 90 percent, 100 percent overall). Architectural and engineering services are contained on the inside of the building housing the Demonstration Project. For the architectural services, our assumptions on the level of effort are directly correlated to the building square footage and the use of 12,000 square feet; use of smaller components of the building will reduce our level of effort and thus cost. Two recommended cost adders are listed below pertaining to architectural services: for a creative lighting design that highlights the purification systems and for a landscape design focusing on drought tolerant native California plantings and the use of reclaimed water for irrigation. At a minimum, some architectural plans and specifications will be required, which will be stamped by Carollo's project manager.

In order to assist in the design of the demonstration facility, Carollo will work with various OEMs to obtain information on available unit process skids. If possible, it would be advantageous and simplify design and construction, if the JPA can pre-purchase equipment. This option will be explored at the project kick-off meeting. Expected work to be completed during the various design phases include:

i. Design Submittal – 60 percent: The major design concepts will be completed as part of the 60 percent design submittal. Carollo shall freeze major changes to the design after the 60 percent submittal. The 60 percent design submittal shall include the following sheets and supporting documents:
    1. Title Sheet.
    2. Vicinity and location maps with contacts.
    3. Drawing index with general notes, abbreviations, and legends.
    4. Site plan.
    5. Preliminary yard piping plan, if applicable.
    6. Structural plans and sections.
    7. Architectural plans.
    8. Equipment layout plans.
    9. Plumbing plans and isometrics.
    10. Preliminary equipment schedules.
    11. Electrical equipment layout plans.
    12. Plant electrical single line diagram.
    13. Panel elevations.
    14. OEM P&IDs.
    15. Alarm and SCADA controls.
    16. Preliminary front end specifications.
    17. Preliminary technical specifications.
    18. Preliminary construction cost estimate.

ii. Design Submittal – 90 percent: Drawings and specifications from the 60 percent design phase will be modified to account for any remaining design changes as a result of review comments. At the end of the 90 percent design phase, drawings and specifications should be nearly complete. The following tasks are to be completed:
    1. Finalize civil plans and details.
    2. Finalize structural drawings.
    3. Finalize architectural drawings.
    4. Finalize mechanical drawings.
    5. Finalize electrical drawings (equipment, instrumentation, single lines).
    6. Finalize P&ID's.
    7. Develop mark-ups showing special mounting requirements for instruments including wall penetrations, floor sleeves, pipe traps, etc.
    8. Finalize specifications.
    9. Finalize construction cost estimate.

iii. Final Design Submittal – 100 percent: During the 100 percent design phase, minor comments from the 90 percent design submittal shall be incorporated into the drawings and specifications. This final submittal will not be reviewed by the JPA and will be the bid set. Tasks include:
    1. Production of final engineering drawings.
    2. Production of final engineering specifications.
    3. Production of final front-end specifications.
    4. The Consultant shall prepare a Class 2 estimate of probable construction cost as defined by AACE for the 100 percent design package. The cost estimate shall be transmitted along with the final 100 percent design package.
    5. Final drawings shall be signed and sealed by a professional engineer registered by the State of California in the appropriate discipline.

6. The Consultant shall provide four (4) sets of 11" x 17" drawings, four sets of specifications, and one (1) electronic copy in PDF format of the final design package for the JPA.
7. All drawings shall be prepared using the latest version of Microstation.

Deliverables: Plans and Specifications, 60 percent, 90 percent, 100 percent.

Optional Task 1 (added by Carollo) - Lighting Design. Under this optional task, a lighting subconsultant would be hired to design lighting that focuses on the purification processes and engineering. The design would use lighting to highlight the purification and user experience. This approach deemphasizes changes to the admin building, resulting in construction costs savings, while providing the public with unique tour experience.

Optional Task 2 (added by Carollo) - Landscape Architecture. Drought tolerant landscaping, irrigated with captured stormwater (from the roof) and supplemented by reclaimed (or purified) water tells the story of working with, and helping, Mother Nature to meet the water needs of the community.

c. Refine the project schedule and cost estimate.

Work Effort: As listed above. The project schedule and cost estimate will be more refined as the design progresses; for bidding purposes, a Class 1 estimate will be developed.

Deliverables: Project Schedule and Cost Estimates with each Plans and Specifications package.

d. Identify and assist in procuring any regulatory requirements and/or any permits needed to implement the demonstration project. Please note that JPA counsel has determined that planning and building permits from the City of Calabasas are NOT required.

Work Effort: As listed above. Permits with DDW and the RWQCB are not required for this project. Given that building permits are not required, no additional permits should be required for this project. However, building modifications, equipment anchorage, or anchorage of piping to the existing building will be designed with current seismic code requirements in mind.

Deliverables: Code and permit requirements evaluation, which will be included in the preliminary design.

e. Participate and arrange at least two meetings with the RWQCB and DDW to present the Demonstration Project and receive their input. No approval of concept is necessary for a conventional RO-based purification train.

Work Effort: As listed above. Effort includes meeting preparation, meeting presentation, and meeting summary. Recommendation is to have both meetings at the project site. The first meeting would occur after construction and prior to testing to review the test plan. The second meeting would occur after ~2/3 of testing is complete to review results and gain input. A third meeting, upon completion, could be done with DDW via WebEx if needed.

Deliverables: Presentation materials, meeting summaries.

f. Coordinate with the selected Public Outreach firm.

Work Effort: As listed above, assuming two different levels of support. First, assuming 40 hours of time to generally work with Public Outreach firm to develop technical supporting materials and provide guidance. Second, assuming another 40 hours of time to develop 3-dimensional "walk-throughs" of different layouts of equipment and architecture for the Demonstration Project Room. These 3D models (similar, but refined from what was presented in the interview) would allow for the JPA Board and Staff to consider how to best construct the interior facilities. This budget does not include virtual reality.

Deliverables: 3D models for review (3 different models assumed), each with Draft and Final versions.

II. **Operations, Testing and Research Assistance**

The JPA will execute the testing plan and research, with the support of Carollo as defined here.

a. Develop Operation and Testing Plans.

Work Effort: As listed above. Carollo would develop an operation and testing plan for this demonstration facility that would mimic the wear and tear of a full-scale system operation, including seasonal operation. Detailed and brief "lookup" SOPs will be included in the Operations and Testing Plan.

Deliverables: Draft and Final Operations and Testing Plan.

b. Develop Research Protocol.

Work Effort: As listed above. Carollo would develop a research protocol based upon the following objectives: (a) regulated chemical pollutants, (b) unregulated CECs, (c) pathogens, and (d) USBR research targets.

Deliverables: Draft and Final Research Protocol.

c. Develop Transitional Operations Plan.

Work Effort: As listed above. The transitional operations plan would include the job assignments, necessary staffing level and attention, and a detailed training materials section. The latter would utilize the extensive training materials from CA/NV and WE&RF focused on the AWT operator. Previously developed SOPs would be rolled into the transitional operations plan including operational control narratives, which will be developed as part of the bidding documents.

Deliverables: Draft and Final Transitional Operations Plan.

d. Develop the necessary procurement documents for transitional operations.

Work Effort: As listed above. Develop procurement documents for an operations services firm that incorporates JPA's objectives and desired outcomes for the transitional operations period. Procurement documents will explicitly define the responsibilities of each party (JPA and service provider) during the operations period.

Deliverables: Draft and Final Procurement Documents for Transitional Operations.

e. Optional Task 3: Include a basic operator training course in the theory and operation of the Demonstration Project.

Work Effort: As listed above. Carollo and our project partners developed the entire Advanced Water Treatment training materials for WE&RF, including modules on MF/UF, RO, and UV AOP for potable water reuse. Training would cover each of the process components and would couple 3-hours of lecture with 3-hours of field time with process equipment. Budget is assumed for two training events led by three different process experts (MF/UF, RO, and UV). Training would also include a description the demo system controls and start-up/shutdown sequences.

Deliverables: Presentation Materials, CEU credits for attendees.

f. Optional Task 4 (added by Carollo): Analysis of low CT free chlorination for Title 22 applications and effluent discharge DBP compliance and NDMA minimization.

Work Effort: As listed above. CT values of 450 mg-min/L with free chlorine create high concentrations of disinfection byproducts. Replacement of free chlorine with chloramination solves the DBP concerns, but comes at a high chemical cost and results in increased levels of NDMA and other nitrosamines (formed by chloramination). In particular as it applies to potable water reuse, the reduced NDMA formation from a low CT free chlorination system allows for lower post RO UV dose.

CA DDW now allows for utilities, with proper proof, to utilize free chlorine CT values in the range of 20 to 30 mg-min/L at contact times as low as 10 minutes. Such reduced CT and contact time values will reduce DBP levels (THMs, HAAs, and NDMA). This work would include a series of bench-scale demonstrations of Title 22 disinfection compliance and DBP minimization. The results would be submitted to CA DDW for conditional acceptance of a reduced CT value. Note: the work would be done in steps, with the first tests looking entirely at DBP reduction to confirm concept viability for the JPA.

Deliverables: Low CT Test Plan. Preliminary DBP Formation Summary. Draft and Final Permitting Document (Addendum to Engineering Report).

III. Services During Construction

The JPA will be the construction manager.

a. Review submittals, RFIs and other required clarifications. Attend a pre-bid meeting and five to six additional meetings during construction.

Work Effort: As listed above. Carollo to visit the site weekly during construction to attend construction meetings and address any construction concerns or issues that may develop in the field.

Deliverables: Submittal and RFI responses, logs, and design clarifications.

IV. **Startup and Transitional Operation Assistance**

The JPA will operate the facility.

a. Assist in facility start-up.

Work Effort: As listed above. Carollo will assign our lead for Carollo's Applied Research Center, Justin Sutherland (Ph.D.) for two weeks of startup testing. Justin will be supported in the field by Adam, Andy, and Jacquelin as needed. Justin will compile all startup results, issues, and resolutions over that two week period into a Startup Report. Included in that report will be recommendations and modifications to SOPs.
Deliverables: Draft and Final Startup Report.

b. Assist in implementing transitional operations. Assume one month of assistance and provide an option for an additional two months.

Work Effort: As listed above. Our assumption is to have staff on site two days per week to assist operations, with several "floater" days in the budget to come as needed. In total, we are assuming 12 days of staff time for the first month and similar options for two additional months. For the additional two months, the budgeted time would be adjusted based upon 12 days per month of time.

Deliverables: Daily and weekly field notes.

V. **Tasks Applicable to All Areas**

a. Conduct JPA staff workshops to receive input/direction.

Work Effort: As listed above. Our assumption is to have workshops ***ahead of*** completion of key deliverables/actions. Our PM will be on-site for all such meetings, supported by experts and staff as needed. These meetings include: JPA Board Workshop Preparation, Draft Plans and Specifications (at 60 percent and 90 percent completion), RWQCB/DDW Meeting Preparation (2), and for Ops Plan/Research Protocol/Transitional Operations (done jointly). Further, one summary workshop is recommended after the completion of startup and the first month of operations is complete.

Deliverables: Presentation materials (as appropriate) and meeting summaries.

b. Review available materials, including the Basis of Design Report, Preliminary Design Report, and Bureau of Reclamation grant related to the project.

Work Effort: As listed above. Carollo's time and expense for reviewing these materials will be covered internally. The budgeted task is to meet with JPA staff to review our summary of these documents.

Deliverables: Summary of background materials with noted recommended changes.

c. Perform site visits as necessary.

Work Effort: As listed above. Our recommended tours focus on similar scale projects with similar technologies in California; Padre Dam, Pismo, Monterey, SFPUC (noting that Pismo

and SFPUC are both Carollo projects). Three tours are assumed for budgeting purposes. Tours would be scheduled at Pismo and SFPUC when Carollo staff is already on site for other efforts to minimize cost.

Deliverables: Photos and tour summaries.

d. Attend and/or present at JPA Board meetings as necessary.

Work Effort: As listed above. Three Board meeting presentations assumed.

Deliverables: Draft and final presentation materials.

e. Interface with regulatory agencies as necessary.

Work Effort: As listed above. Two meetings with the RWQCB/DDW are detailed previously and included the budget. Additional in-person meetings with RWQCB/DDW on site or at their offices will be part of related efforts, scope, and budget (thus no additional budget is included here). Our rational is simple, the necessary back and forth discussions with regulators are part of various other work efforts and are not done in isolation.

Deliverables: Summaries of all regulatory correspondence in a log.

f. Other tasks as necessary.

Work Effort: Carollo has noted two optional tasks previously in this scope of work.

Deliverables: not applicable.

g. Provide information needed for grant reporting including but not limited to billing information as required by the grant agreement.

Work Effort: As listed above. Carollo will prepare quarterly USBR project reports and invoices per their specific formatting requirements. Near the end of testing, Carollo will prepare the summary Technical Report and prepare for a trip to Denver to present findings to the USBR.

Deliverables: USBR invoices, quarterly reports, and technical report.

Assumptions

The following assumptions were made in preparing our fee estimate based on this scope of work:

1. The existing building will have adequate power supply to power all of the unit processes required for the demonstration project.
2. The existing building electrical room has adequate space for new panels and breakers.
3. The existing building has adequate fire protection equipment, which will ensure the safety of the general public when touring the facility.
4. Equipment drawings from OEMs will be used as part of the bid set design package.
5. The JPA will have 2 weeks to review each design submittal.
6. Security and surveillance systems will not be required for the administration building, and the design of such systems are not included in the scope of work or budget.

7. P/A systems and phone line communication systems will not be required for the administration building, and the design of such systems are not included in the scope of work or budget.
8. Inclusion of solar panel system will be integrated into the building power system by a third party designer and contractor.
9. The building is ADA compliant and will not require modifications to meet ADA requirements.

LAS VIRGENES - TRIUNFO JPA
WORK BREAKDOWN STRUCTURE AND FEE ESTIMATE - REVISED
CAROLLO ENGINEERS
PURE WATER DEMONSTRATION PROJECT

	ESTIMATED LABOR COSTS										TOTAL COSTS			
LAS VIRGENES - TRIUNFO JPA - PURE WATER DEMONSTRATION PROJECT - TASK	Gil Crozes/Lydia Holmes/Andy Salveson	Adam Zacheis/Jason Garside/Elisa Garvey	Senior Project Professional	Jacquelin Reed/Project E	Assistant Professional	Senior CAD Tech	CAD Technician/ Graphic Designer	Support Staff	Total Hours	eldorado/ADS/DC Eng	Carollo Labor Cost Excluding PECE	PECE	Other Direct Costs	Total Costs
Hourly Rate	$285	$250	$215	$180	$155	$140	$120	$100				$11.70	0%	
Task 1 - Demonstration System Design														
a: JPA Board Workshop	12	8	0	0	0	0	0	4	24		$5,820	$281	$0	$6,101
b: Develop Demonstration System Plans and Specifications	16	40	40	240	80	120	120	0	656	$125,000	$109,960	$7,675	$0	$242,635
c: Refine Project Schedule and Cost Estimate	2	4	0	24	40	0	0	0	70		$12,090	$819	$0	$12,909
d: Regulatory Requirements and Permits	2	8	0	4	0	0	0	0	14		$3,290	$164	$0	$3,454
e: RWQCB and DDW Meetings	16	16	0	8	0	0	0	4	44		$10,400	$515	$0	$10,915
f: Public Outreach Coordination	16	8	0	16	40	0	0	0	80		$15,640	$936	$0	$16,576
Sub-total - Task 1	**64**	**84**	**40**	**292**	**160**	**120**	**120**	**8**	**888**	**$125,000**	**$157,200**	**$10,390**	**$0**	**$292,590**
Task 2 - Operations, Testing, and Research Assistance														
a: Develop Operations and Testing Plans	4	4	0	24	8	0	0	4	44		$8,100	$515	$0	$8,615
b: Develop Research Protocol	4	16	0	16	8	0	0	4	48		$9,660	$562	$0	$10,222
c: Develop Transitional Operations Plan	8	16	0	16	8	0	8	4	60		$11,760	$702	$0	$12,462
d: Develop Procurement Documents for Transitional Operations	4	24	0	8	0	0	0	4	40		$8,980	$468	$0	$9,448
Sub-total - Task 2	**20**	**60**	**0**	**64**	**24**	**0**	**8**	**16**	**192**	**$0**	**$38,500**	**$2,246**	**$0**	**$40,746**
Task 3 - Services During Construction														
a: Submittals, RFI, Design Clarifications	0	8	8	60	80	0	0	8	164	$12,000	$27,720	$1,919	$0	$41,639
Sub-total - Task 3	**0**	**8**	**8**	**60**	**80**	**0**	**0**	**8**	**164**	**$12,000**	**$27,720**	**$1,919**	**$0**	**$41,639**
Task 4 - Start-up and Transitional Operation Assistance														
a: Assist in Facility Start-up	30	30	24	56	0	0	0	0	140		$31,290	$1,638	$5,000	$37,928
b: Assist in Implementing Transitional Operations	8	8	0	288	0	0	0	0	304		$56,120	$3,557	$2,300	$61,977
Sub-total - Task 4	**38**	**38**	**24**	**344**	**0**	**0**	**0**	**0**	**444**	**$0**	**$87,410**	**$5,195**	**$7,300**	**$99,905**
Task 5 - Tasks Applicable to all Areas														
a: JPA Board Workshops	16	16	0	8	0	0	0	4	44		$10,400	$515	$0	$10,915
b: Review Available Materials	0	0	0	0	0	0	0	0	0		$0	$0	$0	$0
c: Site Visits	16	16	0	0	0	0	0	0	32		$8,560	$374	$0	$8,934
d: Attend JPA Board Meetings	16	16	0	0	0	0	0	0	32		$8,560	$374	$500	$9,434
e: Interface with Regulatory Agencies	0	0	0	0	0	0	0	0	0		$0	$0	$0	$0
f: Other Tasks	0	0	0	0	0	0	0	0	0		$0	$0	$0	$0
g: Grant Reporting	4	16	0	80	24	0	0	24	148		$25,660	$1,732	$1,500	$28,892
Sub-total - Task 5	**52**	**64**	**0**	**88**	**24**	**0**	**0**	**28**	**256**	**$0**	**$53,180**	**$2,995**	**$2,000**	**$58,175**
TOTAL	174	254	72	848	288	120	128	60	1,944	$137,000	$364,010	$22,745	$9,300	$533,055
Optional Tasks														
a: Optional Task 1: Enhanced Demo Facility Lighting	0	0	0	0	0	0	0	0	0	$12,500	$0	$0	$0	$12,500
b: Optional Task 2: Landscape Architecture	0	0	0	0	0	0	0	0	0	$12,500	$0	$0	$0	$12,500
c: Optional Task 3: Operator Training Course	16	16	16	0	0	0	0	4	52		$12,400	$608	$0	$13,008
d: Optional Task 4: Low CT Chlorination	24	8	24	60	180	0	0	8	304		$53,500	$3,557	$8,000	$65,057
TOTAL WITH OPTIONAL TASKS	214	278	112	908	468	120	128	72	2,300	$162,000	$429,910	$26,910	$17,300	$636,120
PERCENT HOUR PER LABOR CATEGORY	9	13	4	44	15	6	7	3	100					

Education

MS Civil and Environmental Engineering, George Washington University, 1996

BS Chemistry, College of William and Mary, 1985

Professional Affiliations

Water Environment Foundation Disinfection and Public Health Committee

Water Environment Foundation Water Reuse Committee

AWWA Water Reuse Committee

International Water Association Water Reuse Specialty Group

Jeffrey J. Mosher

Jeff Mosher has 27 years of experience serving public and private-sector clients in the research and implementation of water, wastewater, and recycled water treatment systems. He serves as Carollo's Chief Technologist for Water Reuse and is a nationally recognized expert in water reuse, including potable reuse. Mr. Mosher has extensive experience with non-potable and potable reuse projects across the U.S. His experience spans technical, scientific, engineering, regulatory, and policy topics associated with water reuse. He has broad experience in working with utilities in planning, permitting, and implementing water reuse projects, and has extensive experience with the development and implementation of water reuse regulations in the U.S.

Mr. Mosher is experienced in the development, permitting, and implementation of potable recycled water projects. He has specific experience in collaborating with utilities and regulators (i.e., California State Water Board's Division of Drinking Water (DDW)) on compliance and permitting of projects under draft and final recycled water regulations. He supported the DDW in the development of new regulations for both indirect potable reuse and direct potable reuse. Mr. Mosher has managed over 15 independent advisory panel experts reviewing potable reuse projects.

Mr. Mosher is the former Executive Director of the National Water Research Institute, the former Chief Research Officer of the Water Environment & Reuse Foundation, and the former Director of Research for the WateReuse Foundation. In recognition of his contributions to the water reuse industry, including his extensive potable ruse activities, Mr. Mosher was honored with the 2017 WateReuse Person of the Year Award.

Potable Water Reuse Implementation / Regulatory Experience

→ Extensive experience in the development, permitting, and implementation of potable recycled water projects in California. Specific experience in collaboration with utilities and regulators (i.e., California State Water Board's Division of Drinking Water) on compliance and permitting of projects under draft and final recycled water regulations.

→ Supported the Division of Drinking Water in the development of new regulations for both indirect potable reuse and direct potable reuse.

→ Provided support on potable reuse projects with Orange County Water District, City of San Diego, Los Angeles Department of Water and Power, City of Santa Barbara, Padre Dam Municipal Water District, Santa Clara Valley Water District, and Soquel Creek Water District.

→ Assisted state agencies in Arizona, New Mexico, Nevada, Colorado, and Florida in the development of guidelines and/or regulations for potable reuse, including direct potable Reuse.

→ Outside California, supported potable reuse projects in Tucson (AZ), Reno (NV), Cloudcroft (NM), El Paso (TX), and Olympia (WA), and Virginia.

Water Policy and Science

→ Strong understanding of technical, scientific, engineering, and policy issues associated with drinking water, wastewater, recycled water, and water resources nationally and in the southwest.

→ Over two decades of experience in planning, water quality, technologies, policy, and regulations for drinking water, wastewater, and recycled water projects.

→ Noted leader in the areas of water reuse, groundwater recharge, and desalination.

Jeffrey J. Mosher

Awards

American Membrane Technology Association (AMTA) Member of the Year, 2015

WEF Presidents Award, 2017

WateReuse Person of the Year, WateReuse Association, 2017

Potable Reuse Expert Panels

→ Over 12 years of experience in planning, facilitating, and managing independent advisory panels and expert panels for water utilities, water districts, county governments, and state agencies on a variety of projects, including projects on recycled water (particularly potable reuse), drinking water, wastewater, desalination, and water resources. The panels addressed a wide range of topics, including feasibility, unit treatment processes and treatment train evaluation, water quality, public health, design, construction, operations, permitting, regulatory compliance, and outreach. The panels were predominantly for California projects, but panels were also conducted for projects in Washington State, Arizona, Nevada, Texas, New Mexico, and Virginia.

→ On behalf of the California State Water Resources Control Board, managed a high-visibility effort valued at $950,000 to administer:

- An Expert Panel in the feasibly of criteria for direct potable reuse (DPR), which was mandated by the California legislature; and
- An Advisory Group of stakeholders to provide recommendations to the State Water Board on DPR.

The State Water Board developed a report to the state legislature based on the Expert Panel and Advisory Group reports.

→ In support of the National Water Research Institute's Independent Advisory Panel program, participated in the independent advisory panel efforts for:

- The City of San Diego's Pure Water surface water augmentations program,
- The California State Water Board's expert panel on the use of Title 22 Water for consumption by domestic farm animals, and
- Hampton Roads Water District's (VA) Sustainable Water Initiative for Tomorrows (SWIFT).

→ In support of NWRI, has led the development of a direct potable reuse guidelines document for AZ Water and WateReuse Arizona in support of Arizona State regulatory activities.

Potable Reuse Research

→ Over a 15-year timespan, managed over 60 research projects addressing potable reuse topics addressing: regulations, water quality, advanced treatment technologies, membranes, advanced oxidation processes, pathogen removal, chemical control, public outreach, education, and acceptance.

→ Secured a $4.5-million grant from the California State Water Resources Control Board for recycled water research. The grant will address direct potable ruse research needs to establish regulations in California and will address knowledge gaps in technical, operational, and implementation aspects of potable reuse.

→ For the Water Environment & Reuse Foundation (WE&RF), managed the Integration of a $12M Research Program. After the 2016 merger of the Water Environment Research Foundation and the WateReuse Research Foundation, planned and managed the transition and integration of the two research programs into a cohesive WE&RF research program with a $12-million annual budget. Developed a Research Plan, approved by the Board of Directors, which provides the procedures and processes for the integrated research program that addressed emerging water quality issues, treatment technology evaluation and validation, intelligent water systems, sustainable integrated sustainable management, and energy management and production.

→ Provided the leadership, direction, and vision for achieving goals and objectives of WE&RF's $12 million a year research program. Responsible for developing the research agenda and the priorities for research program, managing 12 research managers, 8 issue areas including water reuse, and 90 active projects. Managed WE&RF's Research Advisory Committee comprised of 24 industry experts. Oversaw the Water Reuse Issue Area Team (IAT), which including 20 academics, utility staff, and consultants tasked with addressing a range of water reuse topics.

February 5, 2018 JPA Board Meeting

TO: JPA Board of Directors

FROM: Facilities & Operations

Subject : Pure Water Project Las Virgenes-Triunfo: Advanced Water Treatment Plant Draft Preliminary Siting Study

SUMMARY:

On February 6, 2017, the JPA Board accepted a proposal from Woodard & Curran to perform an advanced water treatment plant preliminary siting study. The siting study is intended to utilize a rigorous screening process and comparative analysis to develop a shortlist of sites, rather than to recommend a particular preferred site. The results of the siting study will be important elements of the Title XVI Feasibility Study and environmental documentation for the project.

Starting with over 13,000 potential sites, screening criteria was applied using five filters to develop a list of 26 sites. These 26 sites were scored based upon the following factors: construction cost, operational cost, proximity to sensitive receptors, the need to drive through residential streets, utility access, environmental considerations and acquisition timing. The comparative analysis resulted in a shortlist of six sites, two of which were included in the previous Basis of Design Report (Sites A and F). Following is a table that shows the six sites along with their overall scores. A higher overall score indicates a more suitable site for the project; the maximum possible score is five.

Site	Description	Overall Score
F	30800 Agoura Road (JPA has a purchase option)	3.90
A	At Las Virgenes Reservoir across the lake from the filter plant (owned by LVMWD)	3.80
D	Canwood Street west of Kanan Road (vacant property)	3.60
T	Canwood Street west of Kanan Road (vacant property)	3.50
K	Agoura Road east of Roadside Road (Brightview Landscape Yard)	3.40
Z	Rancho Las Virgenes Farm Sprayfields (owned by JPA)	3.30

RECOMMENDATION(S):

Consider the Advanced Water Treatment Plant Draft Preliminary Siting Study and provide any feedback to staff.

FISCAL IMPACT:

No

ITEM BUDGETED:

Yes

FINANCIAL IMPACT:

There is no financial impact associated with this recommendation.

DISCUSSION:

Background:

On February 6, 2017, the JPA Board accepted a proposal from Woodard & Curran to perform an advanced water treatment plant preliminary siting study. The siting study is intended to utilize a rigorous screening process and comparative analysis to develop a shortlist of sites, rather than to recommend a particular preferred site. The results of the siting study will be important elements of the Title XVI Feasibility Study and environmental documentation for the project.

Geographic Information System (GIS) software was used for the initial potential site identification, drawing information from parcels within the JPA's joint service area in Los Angeles and Ventura counties. Five filters were sequentially applied to over 13,000 potential sites through a screening process, narrowing the list to 26 sites that were further evaluated through a more detailed comparative analysis process.

Screening Process:

The initial site identification using GIS resulted in a list of over 13,000 parcels. Then, five filter criteria were sequentially applied to the parcels, resulting in 26 sites used in the comparative analysis. The first filter evaluated the proximity of the potential sites to critical facilities such as Las Virgenes Reservoir and the JPA's recycled water backbone system. A target zone focused on a swath of land one mile wide that generally traverses along the recycled water backbone system, beginning at the Rancho Las Virgenes Farm Sprayfields and continuing to Las Virgenes Reservoir. Parcels outside this zone were excluded, producing an initial list of 13,251 potential sites.

The second filter was designed to exclude parcels located in areas prone to earthquake-induced hazards such as liquefaction and/or landslides. United States Geological Survey seismic hazard maps were used to identify areas of concern, and parcels within these areas were excluded. This second filter narrowed the original list of potential sites to 11,256.

The third filter was based upon parcel size. Developed sites with gross areas of less than two acres or undeveloped sites with gross areas of less than five acres were excluded. The third filter narrowed the result to 182 sites.

The fourth filter involved a review of the parcels' land use designations. Developed sites designated as residential, park, lake, institutional, school, recreational, active parking lot or drainage were excluded. Undeveloped sites designated for planned development were also excluded. The fourth filter resulted in 141 sites.

The fifth filter involved a rapid-assessment of property improvements. Developed sites with assessed improvements greater than $2 million were excluded. Also, undeveloped sites with challenging topography were excluded. This final and fifth filter resulted in 26 parcels that were subsequently evaluated through the comparative analysis process.

Comparative Analysis Process:

Next, a comparative analysis was utilized to evaluate the remaining sites based upon the following seven criteria: construction cost, operational cost, proximity to sensitive receptors, access through residential neighborhoods, utility access, environmental implications and acquisition timing.

- *Construction Cost Factor:* This factor considered the estimated costs for pipelines (recycled water, purified water to the reservoir and brine), site acquisition and site preparation. The scoring was from 1 to 5 with a higher score indicating a lower estimated cost.
- *Operational Cost Factor:* This factor considered the estimated energy cost required to pump recycled water, purified water or brine to and/or from the site. The scoring was from 1 to 5 with a higher score indicating a lower estimated cost.
- *Proximity to Sensitive Receptors:* This factor considered the distance of the site from residential areas or schools. The scoring was from 1 to 5 with a higher score indicating a larger separation from sensitive receptors.
- *Residential Driving Required:* This factor considered the need to drive through residential streets to access the site. The scoring was 5 equals no, 3 equals potentially in the future, and 1 equals yes.
- *Utility Access:* This factor considered whether the site had immediate access to basic utilities. The scoring was 5 equals yes and 1 equals no.
- *Environmental Considerations:* This factor considered the level of effort anticipated for environmental compliance. The scoring was from 1 to 5 with a higher score indicating a more straightforward environmental review process.
- *Acquisition Timing:* This factor considered the ability of the JPA to acquire the site in a timely manner. The score was 5 equals the JPA currently owns or has an option to purchase the site, 3 equals the site is actively listed for sale, and 1 equals other.

The 26 sites were scored using the comparative analysis criteria. Using seven different weighting scenarios, the scores for the 26 sites were compared, and 17 sites consistently scored the highest. Comprehensive field visits were conducted for the 17 sites by JPA staff and representatives of Woodard & Curran to verify the initial scores, physically inspect the sites and gain local knowledge from staff familiar with the areas.

Following the field visits, an additional ten sites were eliminated, and the remaining seven sites were scored using the following weighting factors: 20% construction cost, 10% operational cost, 10% proximity to sensitive receptors, 10% access through residential streets, 10% utility access, 20% environmental considerations and 20% acquisition timing. The results of the comparative analysis process are provided in the table below. Table 14 of the draft Siting Study provides details on the comparative criteria scoring for each site. Site Y is proposed to be eliminated from the final shortlist because of its low score.

Site	Description	Overall Score
F	30800 Agoura Road (JPA has a purchase option)	3.90
A	At Las Virgenes Reservoir across the lake from the filter plant (owned by LVMWD)	3.80
D	Canwood Street west of Kanan Road (vacant property)	3.60
T	Canwood Street west of Kanan Road (vacant property)	3.50
K	Agoura Road east of Roadside Road (Brightview Landscape Yard)	3.40
Z	Rancho Las Virgenes Farm Sprayfields (owned by JPA)	3.30
Y	End of Liberty Canyon Road (private parcel within State Park)	1.90

Next Steps:

The results of the siting study will be important elements of the Title XVI Feasibility Study and future environmental documentation for the Pure Water Project Las Virgenes-Triunfo. The study provides a rigorous review of potential sites for the advanced water treatment plant, allowing various alternatives to be considered in future studies. The top scoring sites were Site F, 30800 Agoura Road, and Site A, at Las Virgenes Reservoir, both of which were identified in the Basis of Design Report. The JPA has a purchase option for Site F, and a decision to exercise the option needs to be made by March 12, 2018. Staff will present a recommendation to the Board regarding the purchase option at the March JPA meeting.

Prepared by: David R. Lippman, P.E., Director of Facilities and Operations

ATTACHMENTS:

Advanced Water Treatment Plant Draft Preliminary Siting Study

AWTP Preliminary Siting Study Report

Pure Water Project - AWTP Preliminary Siting Study

Subject:	**AWTP Preliminary Siting Study Report**
Prepared For:	David Lippman, Las Virgenes Municipal Water District John Zhao, Las Virgenes Municipal Water District Eric Schlageter, Las Virgenes Municipal Water District
Prepared By:	Brian Dietrick, P.E., Woodard & Curran Jehan Anketell, Woodard & Curran
Reviewed by:	Tom Richardson, P.E., Woodard & Curran
Date:	January 26, 2018
Reference:	0254-004

1 Background

The Las Virgenes-Triunfo Joint Powers Authority (JPA) between Las Virgenes Municipal Water District (LVMWD) and the Triunfo Sanitation District (TSD) is seeking to diversify its water resources portfolio, reduce the use of imported water, and more proactively manage treated effluent from the Tapia Water Reclamation Facility (WRF) while reducing discharges to Malibu Creek. Based on the *Las Virgenes-Triunfo Joint Powers Authority Recycled Water Seasonal Storage Basis of Design Report* (BODR) and associated stakeholder outreach process completed in 2016, the JPA determined that a Reservoir Water Augmentation (RWA) project that introduces purified water into the Las Virgenes Reservoir (LVR) would best address these water supply and effluent management issues. The JPA has embarked on a series of investigations to further refine this project, referred to as the Pure Water Project

As part of this effort, Woodard & Curran is performing a Siting Study to determine a set of candidate sites for a new Advanced Water Treatment Plant (AWTP), which would produce the purified water to be discharged to LVR. The objective of this Siting Study is to identify an initial broad set of candidate sites, screen for technical and institutional considerations, and then conduct a comparative analysis on the remaining sites to identify the best candidate sites that would receive further consideration as the project moves forward. AWTP components and capacities identified in the BODR serve as the basis for this Siting Study.

This Siting Study was conducted in three general steps:

- Initial Site Identification and Screening Process
- Comparative Analysis
- Final Recommendation of Candidate Sites

This report compiles the background, methodology, and findings from these three general steps.

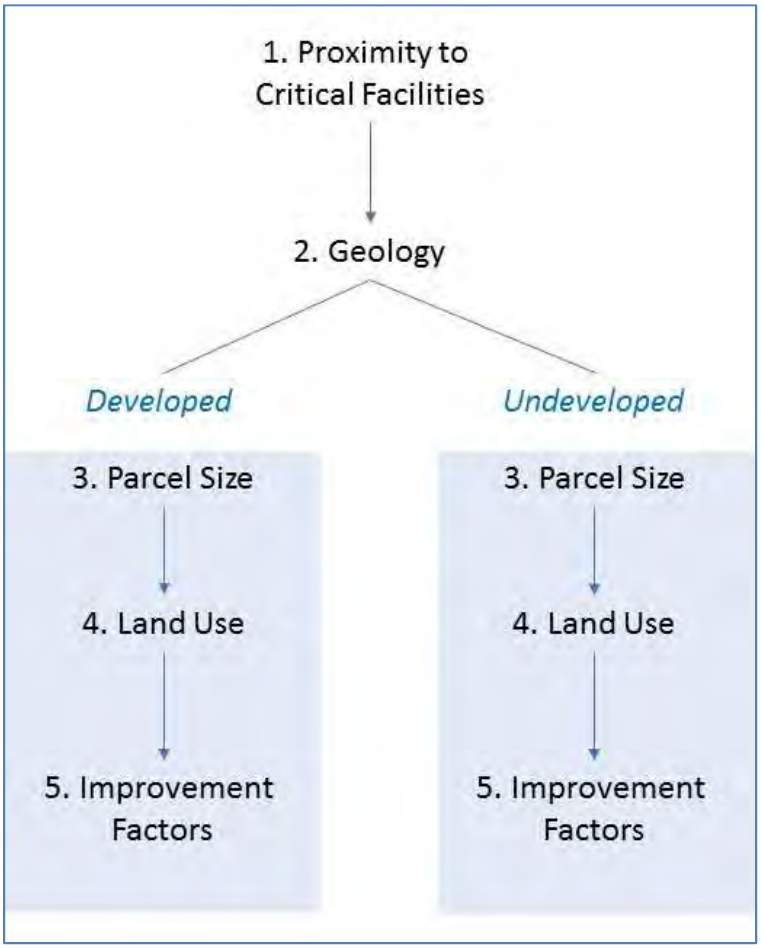
2 Initial Site Identification and Screening Methodology

The initial site identification and screening was conducted with Geographic Information System (GIS) software using shapefiles which contain Los Angeles and Ventura County parcel data, including parcel size, land use designations, building age, and dollar value of improvements. Five filter criteria were applied

sequentially to screen the number of parcels from many thousands of sites in the study area to a "shortlist" of 26: (1) proximity to critical facilities, (2) geology, (3) parcel size (acreage), (4) land use, and (5) improvement factors.

A diagram illustrating the use of the five filter criteria is shown in **Figure 1**, including separate, parallel pathways for developed (graded) and undeveloped (greenfield) candidate sites. Each step is described in more detail in the sections that follow.

Figure 1: **Initial Site Identification and Screening Methodology**



2.1 Proximity to Critical Facilities

The BODR identified critical facilities that would factor into locating the AWTP. These facilities include Tapia WRF, LVR, the Salinity Management Pipeline (SMP), and the existing recycled water distribution system. Siting the AWTP near the existing recycled water system allows for use of existing infrastructure to deliver tertiary feed water a portion of the distance from Tapia WRF to the new AWTP. Per the 2016 BODR, the 24-inch diameter backbone pipeline of the existing recycled water system should have adequate capacity to carry AWTP influent flows of 7.4 million gallons per day (MGD), sufficient source flow for a target AWTP production of 6.0 mgd. The AWTP is expected to operate during the off-peak demand season

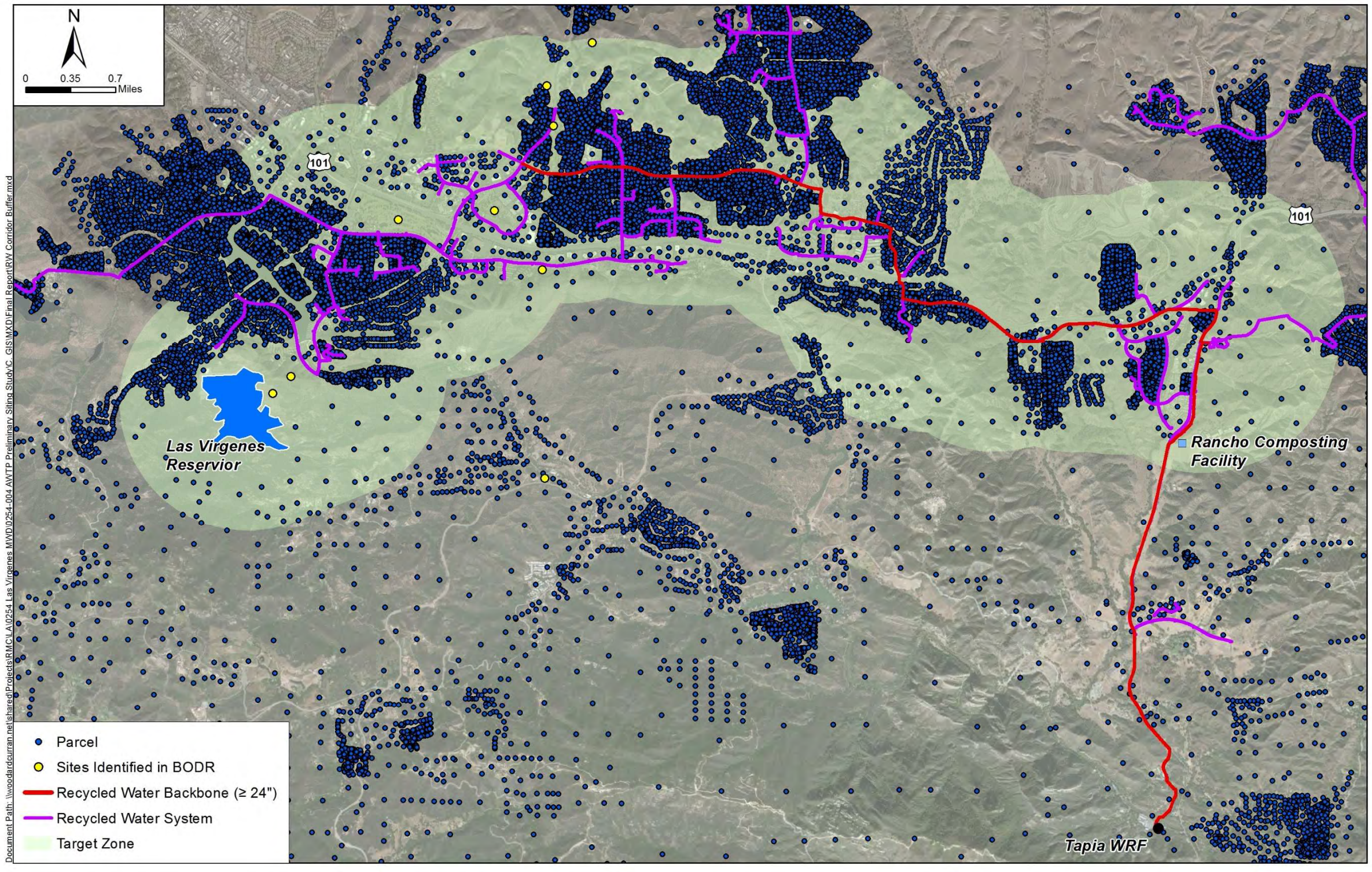
(November to April), and it is assumed that the existing recycled water system will have the capacity to carry the AWTP influent flows in addition to the flows for non-potable demands.[1] Construction of a new pipeline would be required to deliver the tertiary water from the closest feasible tie-in point on the existing 24-inch diameter backbone pipeline to the AWTP.

Considering the LVR location, the proposed location of the SMP extension, and the available capacity of the backbone recycled water system closest to LVR, a corridor extending one mile from either side of the 24-inch diameter backbone pipeline was selected as the candidate site target zone. The target zone extends past the western terminus of the backbone pipeline to include LVR. A two-mile width was chosen to provide an adequate set of sites to assure a robust analysis, while limiting the candidate field to a manageable number.

Figure 2 illustrates the project area, the recycled water distribution system (with backbone pipeline), key facilities, the limits of the candidate site target zone, and the potential sites both inside and outside of the zone. As part of the BODR, a preliminary evaluation of nine potential sites was conducted. These nine sites are specifically denoted in the figure and in subsequent screening and candidate site assessment.

[1] Appendix C describes a preliminary hydraulic analysis that was performed to support this assumption.

Figure 2: Candidate Sites Target Zone



2.2 Geology

Siting an AWTP in areas prone to earthquake-induced hazards such as liquefaction and landslides could require expensive and difficult construction methods, as well as an extensive permitting process. Due to these issues, seismic hazards were selected as the next screening criterion. United States Geologic Survey (USGS) seismic hazard maps were used to identify zones of concern for landslide and liquefaction, and parcels located in these liquefaction or landslide zones were removed from further consideration.

2.3 Parcel Size (Acreage)

The 2016 BODR report included descriptions and sizing information for facilities required for the proposed AWTP. The AWTP facility footprint developed in the report estimated the required footprint to be approximately 2 acres including the process building, parking and access roads.

In July 2017, Woodard & Curran performed an evaluation of one of the parcels of interest at 30800 Agoura Road. Although the Agoura Road site gross acreage is 7.1 acres, the actual space available for an AWTP is limited due to issues with oak tree removal, grading, and unusable riparian areas, among other concerns. Using the 2016 BODR as a reference for facility components, an example site layout for the Agoura Road site was developed. To minimize space requirements, underground wet wells were assumed. The total footprint of the Agoura Road AWTP site layout was 1.7 acres.

As the Agoura Road site analysis suggests, for undeveloped sites, the amount of usable space is often much smaller than the gross acreage of the parcel. For developed sites, this issue is less significant because the parcels are already graded to accommodate building improvements. To accommodate the differences in acreage needs between developed and undeveloped sites, two separate, parallel acreage screens were developed. For developed sites that have a high percentage of usable acreage, parcels with a gross acreage of two acres or more were deemed adequate to accommodate an AWTP footprint. For undeveloped sites, the percentage of usable acreage on a given parcel can be highly variable. To examine the gross acreage necessary to accommodate the AWTP footprint, a sample of sites was selected upon which the Agoura Road site footprint was placed. Using this process, it was concluded that undeveloped parcels with a size of less than five acres are unlikely to accommodate an AWTP footprint.

Below is a summary of criteria for the Parcel Size (Acreage) screen:

- Developed sites - exclude sites with gross areas less than two acres
- Undeveloped sites - exclude sites with gross areas less than five acres

2.4 Land Use

Building upon the parcel size criterion, the objective of the land use screening criterion was to eliminate sites which have land use designations that are incompatible with an AWTP. For developed parcels, a residential designation clearly fits in the category of non-compatible land use. These parcels were screened out. Developed parcels with other incompatible land uses were also screened out, including parks, lakes, institutional, schools, recreational, active parking lots, and drainage canals. The land uses types that were not eliminated in this step included commercial and industrial.

For undeveloped parcels, designations that indicated “planned development” were screened from further consideration. Furthermore, it is recognized that undeveloped residential sites that are not currently planned for development could nonetheless face public opposition. Any candidate sites with this land use designation would need to undergo additional scrutiny concerning public acceptance viability. This additional scrutiny was undertaken at the comparative analysis phase of the Siting Study.

Below is a summary of criteria for the Land Use screen:

- Developed sites - exclude sites designated as residential, parks, lakes, institutional, schools, recreational, active parking lots, and drainage canals
- Undeveloped sites - exclude sites designated for planned development

2.5 Improvement Factors

For the final screening step, the sites remaining through the previous screening steps were analyzed using high resolution aerial views and available parcel records. The purpose of this step was to more closely examine the remaining sites and remove undeveloped sites which were deemed "undevelopable" (i.e., un-improvable) or developed commercial/industrial sites with improvement values above a specified assessed value.

Older commercial and industrial sites can be suitable locations for an AWTP; especially where there are businesses that are underutilizing a particular space. For developed sites, assessed valuation of the existing improvements was used as a metric to identify appropriate parcels. Those parcels with improvements that are equal to or greater than the value of a typical vacant lot (estimated to be $2 million) were deemed financially infeasible and were removed from consideration. The rationale is that the JPA would not likely be willing to pay more than twice the value of a vacant lot, then demolish the improvements at additional cost and construct an AWTP.

For undeveloped sites, parcels with extremely difficult topographic conditions (identified with high resolution aerial views) were removed from further consideration.

Below is a summary of criteria for the Improvement Factors screen:

- Developed sites - exclude sites with assessed improvement values that are greater that the value of a typical empty lot ($2 million)
- Undeveloped sites - exclude sites with difficult topographic conditions

2.6 Screening Results

The screening process described in this Section resulted in the identification of 26 potential sites. **Table 1** provides an overview of each screening step, and **Figure 3** illustrates the number of candidate sites remaining after each step. **Figures A1** through **A5** in **Appendix A** show the remaining sites following each screening step, and a detailed final list of remaining sites for the Land Use and Improvement Factors screens is included in **Appendix B**. The 26 site locations that remain for the comparative analysis are shown in Figure4. Letters have been assigned to each site to simplify identification.

A preliminary hydraulic analysis was also conducted to validate the hydraulic feasibility of siting an AWTP at these locations (included as **Appendix C**).

Figure 3: **Initial Site Identification and Screening Methodology (with Remaining Parcels)**

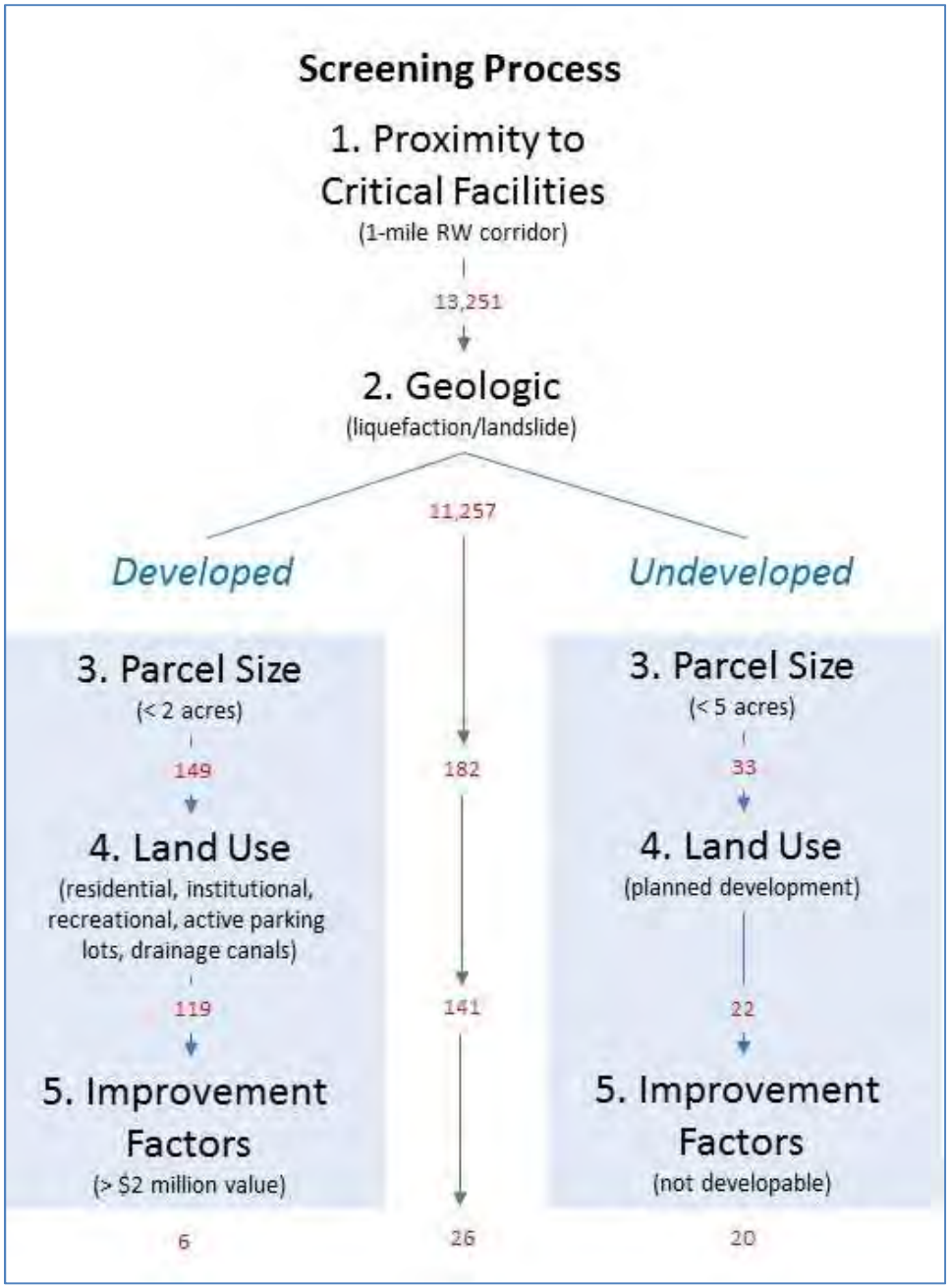
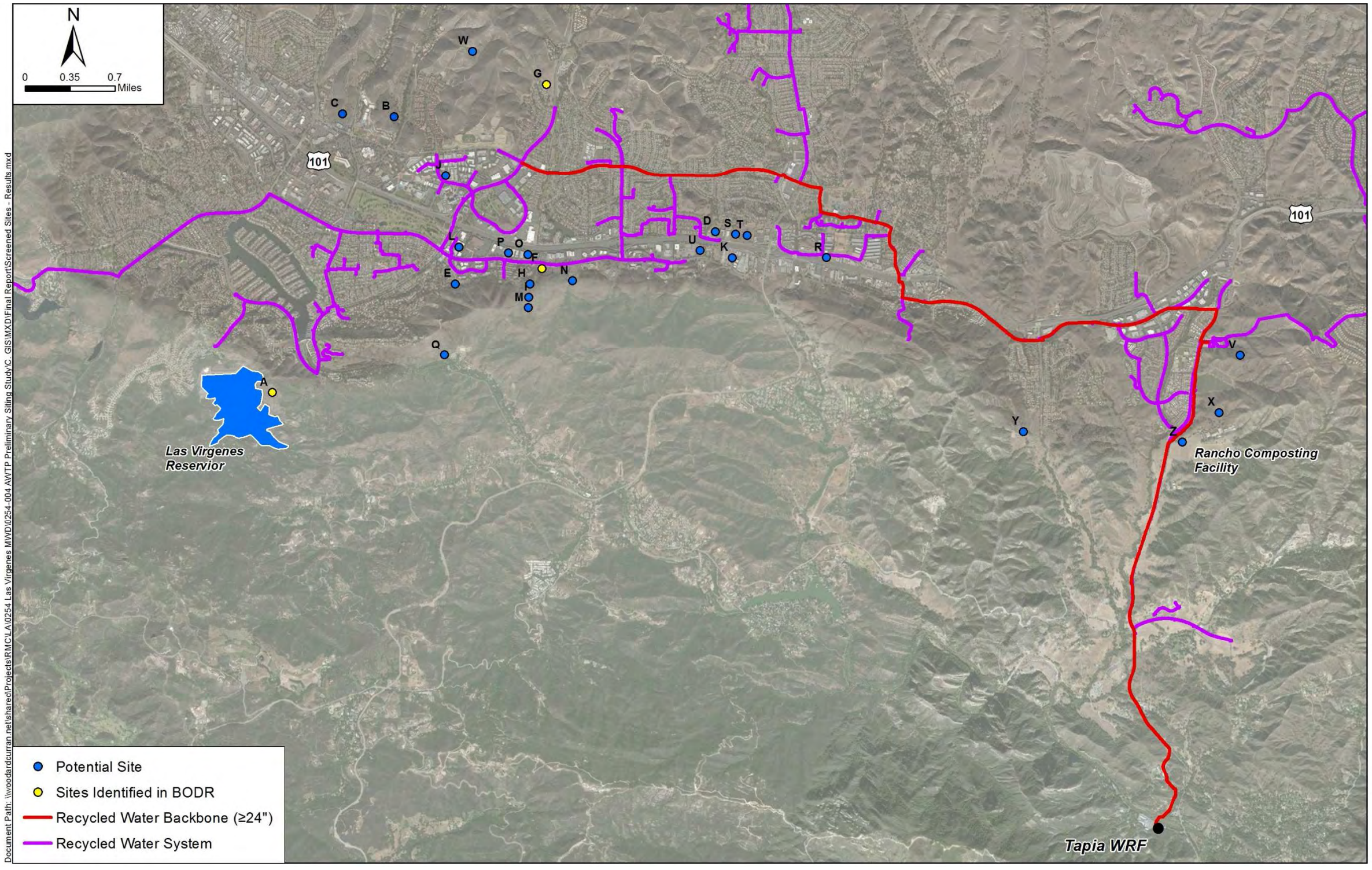


Table 1: Overview of Screening Methodology

Screen #	# Sites	# BODR Sites	Screening Criteria	Rationale	BODR Sites Remaining
1	13,251	8	1 mi distance from RW backbone, extended to include LVR – exclude parcels outside target zone	Parcels located further than 1 mile will present increasing cost challenges for JPA. Per kickoff, defined as 24" RW backbone alignment spanning from LVR to District's Rancho Composting facility.	Lindero Cyn, Lindero Country Club, Triunfo Cyn Rd, Westlake Golf Course, Mortuary, Agoura Rd, Las Virgenes Reservoir, Lindero Cyn (Ventura Cty)
2	11,257	7	Exclude Liquefaction and Landslide	Parcels located in liquefaction or landslide zones will require expensive and difficult construction methods and will require extensive permitting.	Lindero Cyn, Lindero Country Club, Westlake Golf Course, Mortuary, Agoura Rd, Las Virgenes Reservoir, Lindero Cyn Ventura Cty
3	182	6	Developed – exclude less than 2 acres Undeveloped – exclude less than 5 acres	Parcels less than 2 or 5 acres in size, respectively, are unlikely to have space to accommodate a 1.7 acre AWTP footprint based on an initial examination of available area and stringent development requirements in these locations.	Lindero Cyn, Westlake Golf Course, Mortuary, Agoura Rd, Las Virgenes Reservoir, Lindero Cyn Ventura Cty
4	141	5	Developed - exclude residential, institutional, parks, lakes, recreational, active parking lots, drainage canals Undeveloped – exclude planned development	Parcels with the stated land use designations are unlikely to be compatible with operation of an AWTP.	Lindero Cyn, Westlake Golf Course, Mortuary, Agoura Rd, Las Virgenes Reservoir
5	26	3	Developed – exclude sites with assessed improvement values greater than the value of an empty lot ($2 million) Undeveloped – exclude un-developable sites	Developed parcels with existing improvements that have assessed values greater than the value of a typical vacant lot ($2 million) are unlikely to be financially feasible. Undeveloped parcels with difficult topographic conditions are unlikely to be financially feasible.	Lindero Cyn, Agoura Rd, Las Virgenes Reservoir

*BODR sites in red indicate site is removed based on that screening criterion.

Figure 4: Results of Screening Methodology (26 Sites Remaining)



3 Comparative Analysis

A comparative analysis of sites was conducted to further narrow the field of candidate sites. This section describes the assumptions and methodology used for the comparative analysis of the 26 remaining sites. To develop meaningful differentiations between the sites, seven criteria and associated metrics were identified. These criteria are:

- Construction Cost Factor
- Operational Cost Factor
- Proximity to Sensitive Receptors
- Access through Residential Neighborhoods
- Utility Access
- Environmental Implications
- Acquisition Timing

This section describes these criteria and the scoring methodology applied. Note that for each criterion, a "1" to "5" scoring system is employed, with 5 representing the best score and highest ranking. Aerial photos for each of the 26 sites with important features shown are included in **Appendix D**.

3.1 Construction Cost Factor

One of the most important criteria for comparing potential sites is construction cost. To achieve the best comparison, this analysis focuses only on those costs components that would vary between sites, rather than total construction costs. At this level of comparison, AWTP components and layouts are assumed to be similar for all sites, so associated costs are not considered in this comparison. This criterion is referred to as the "Construction Cost Factor" to clarify that it is differential construction costs that are being compared, not total construction costs.

The following construction cost categories are considered differentiators. The methodologies for developing scores are described in the sections that follow:

- Conveyance construction costs
- Site acquisition costs
- Site preparation costs
- Access road construction costs

3.1.1 Conveyance Construction Costs

This category includes construction costs for the three main conveyance systems that will be necessary for operation of the AWTP. First, a pipeline will be needed to convey tertiary-treated source water from the LVMWD recycled water distribution system to the AWTP; second, a pipeline will be needed to convey purified water from the AWTP to LVR; third, a pipeline will be needed to convey concentrate from the reverse osmosis (RO) process to the Salinity Management Pipeline in Ventura County for disposal. Sanitary sewer (which would accommodate AWTP residuals other than RO concentrate) and storm drain connection differentiation between the sites is addressed under a separate criterion, Utility Access.

Conveyance construction costs were estimated by laying out preliminary alignments for each of the three pipelines described above, corresponding to each of the 26 potential sites. Preliminary alignments were selected based on shortest distance and use of major streets, when possible.

An example set of alignments is shown in **Figure 5** for Site "L". In the figure, the LVMWD existing recycled water system is shown in purple, with the large 24-inch diameter backbone pipeline shown in red. Alignments for the source water, purified water, and RO concentrate are shown in green, yellow, and orange, respectively. RO concentrate pipeline alignments are based on Alternative Alignment 1 from the BODR. A map similar to **Figure 5** was developed for each of the 26 potential sites.

To estimate construction costs, each of the alignments was measured and the lengths were multiplied by an estimated unit cost. The source water pipeline was assumed to be a 24-inch diameter conduit; the purified water pipeline was assumed to be a 20-inch diameter conduit; and the RO concentrate pipeline was assumed to be an 8-inch diameter conduit, also based on the 2016 BODR. Major crossings, defined for the purposes of this analysis as freeways or major flood control channels, were identified and included in the cost estimates, assuming trenchless construction. It should be noted that, when feasible, a dual crossing was assumed for multiple pipelines (using the same conduit).

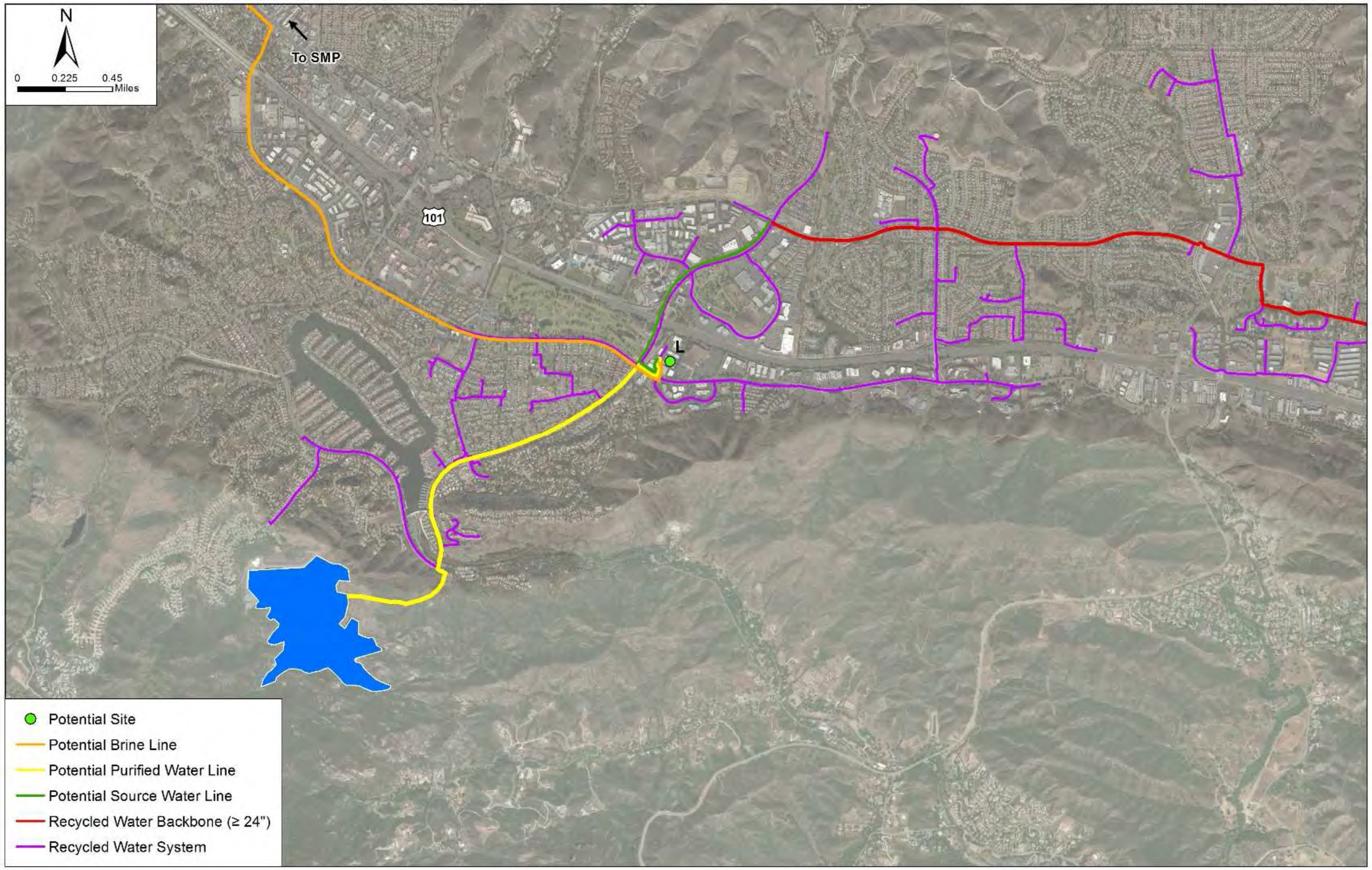
A summary of the conveyance design basis is shown in **Table 2,** including the cost basis information for pipeline construction unit costs and major crossings.

Table 2: Conveyance Pipeline Design Basis

Conveyance Pipeline	Estimated Flow Requirement	Assumed Diameter	Cost Basis
Source water to AWTP	7.4 mgd (5,140 gpm)	24-inch	$16.7/in-dia./linear foot
Purified water to LVR	6.0 mgd (4,170 gpm)	20-inch	$18/in-dia./linear foot
RO concentrate to Salinity Management Pipeline	1.1 mgd (760 gpm)	8-inch	$20/in-dia./linear foot
Major Crossings (freeway or flood control)	n/a	n/a	$1 million per single pipe crossing
			$1.5 million per dual pipe crossing

Source for flow data: 2016 BODR

Figure 5: Sample Pipeline Alignment Map for Site "L"



3.1.2 Site Acquisition Costs

Of the 26 sites, twenty are undeveloped and six are developed. Site acquisition costs were estimated for all sites using market data and other online resources. Unit costs were developed for land (dollars per acre) and for existing buildings (dollars per square foot) and were applied to the reported parcel acreages and building areas for both developed and undeveloped sites.[2] Parcels that were on the market at the time of this analysis were assigned a purchase value based on the asking price.

Also, for developed sites, costs were included for demolition of existing buildings, based on building size, and for spot removal and disposal of asbestos (assumed for all structures due to the year constructed, as reported by the County Assessor's Office). The estimates do not include relocation costs, and clear titles are assumed for every site.[3] Cost basis information for these estimates is included in **Appendix E**.

3.1.3 Site Preparation Costs

Site preparation costs were estimated for all 26 sites using available geological and topographic data. Each site was characterized according to topography/terrain and potential for encountering difficult geotechnical conditions. Topography/terrain was characterized for each site on the basis of grade (e.g., gentle, moderate, steep); geotechnical conditions were characterized on the basis of soil (e.g., favorable bedding, possible difficult excavation, potential need for blasting). The combined features of topography and geotechnical conditions were then combined into an overall rating for site preparation that was assigned a cost value. Information on rankings and cost basis is included in **Appendix E**.

3.1.4 Access Road Costs

Access road construction costs were estimated for all sites that are not directly adjacent to a roadway. First, for these sits, the approximate distances from the nearest roadways to the likely AWTP locations were measured. Then, the *2010 Alternative Study for Access Road to 5.0 MG Tank Site C at the Las Virgenes Reservoir* was used as a basis for estimating construction costs (LVMWD, 2010). Using the average total cost for three alternative construction options, and adjusting for 2017 ENR/CCI factors, a unit cost was developed and applied to the measured distances. Information on cost basis is included in **Appendix E**.

3.1.5 Construction Cost Factor Scoring

The construction costs for each of the three pipelines, including major crossings, were summed with site acquisition, site preparation, and access road costs to obtain estimated values for the Construction Cost Factor criterion. These differential cost values ranged from approximately $22 million to over $40 million. The values for the estimated pipeline construction costs were by far the largest component of the Construction Cost Factor criterion, ranging from approximately 70 percent to 95 percent.

To provide context, the construction cost estimate from the 2016 BODR, including the AWTP facility, land acquisition, three pipelines, and a mixing system, was $95.3 million.

Finally, scores were assigned to each of the 26 sites according to the range of differential construction costs, as indicated in **Table 3**.

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[2] It should be noted that the land acquisition costs and existing building costs do not constitute appraisals and are not intended to be used as appraisals. Actual appraised values may vary.

[3] Although parcels currently owned by LVMWD were not assigned a site acquisition cost, it is acknowledged that currently owned sites do possess a "value" that could be considered as the preferred sites resulting from this comparative analysis are further evaluated.

Table 3: Construction Cost Factor Scoring

Differential Construction Costs	Assigned Score
$21.5 - $25.5 million	5
$25.5 - $29.5 million	4
$29.5 - $33.5 million	3
$33.5 - $37.5 million	2
$37.5 - $41.5 million	1

Note: Differential costs only (conveyance, site acquisition, site preparation, access road).

3.2 Operational Cost Factor

The second criterion used in the comparative analysis was operational costs. Similar to construction costs, this analysis focuses only on those operational costs that will vary between sites. For example, AWTP labor and chemical costs are assumed to be similar for any site and are not considered in this comparison.

The most significant operational cost differentiator for the planned AWTP is the cost of energy associated with conveyance. To estimate the differential energy needs for each of the 26 sites, representative elevations were determined by identifying likely locations for a 2-acre AWTP facility on each site. Then, lift requirements were determined for each of the three conveyance pipelines to move source water, purified water, and RO concentrate to the AWTP, LVR, and Salinity Management Pipeline, respectively. Regarding the source water feed, it is assumed that only site locations above the Indian Hills Tank elevation (1,200 feet) would exert an additional pumping/energy requirement to move recycled water to the site. Also, for lower elevation sites, and at this level of preliminary analysis, no energy recovery on the feed water was assumed. For the purified water and RO concentrate, lift requirements incorporated head loss calculations determined from the pipeline lengths, diameters, materials, and minor losses (using the Hazen-Williams equation), along with elevation differential. The annual energy requirement (in kWh) was calculated for each of the three conveyance pipelines and summed to obtain a total energy requirement for conveyance associated with each of the 26 sites. Finally, the present worth of a 30-year energy cost was calculated for each site using the annual energy requirement assuming a unit cost of $0.13/kWh and a 5.5% discount rate. Calculations for head loss and energy costs are included in **Appendix F**.

These values for 30-year energy present value were used to assign scores according to the ranges indicated in **Table 4**.

Table 4: Operational Cost Factor Scoring

30-Year Energy Cost	Assigned Score
0 - $1.5 million	5
$1.5 - $3.0 million	4
$3.0 – $4.5 million	3
$4.5 - $6.0 million	2
$6.0 million +	1

3.3 Proximity to Sensitive Receptors

The third criterion was proximity to sensitive receptors. This criterion was included to assess the distance between each of the 26 sites and the nearest residential area or school, recognizing the potential for public opposition. First, a Google Map search of all schools was conducted to confirm that all were captured. Residential areas were then identified on aerial photos and the distances were measured. Proximities were measured as "line of sight" distances. For settings with a ridgeline between the site and receptor, distances over a ridgeline were used. Scores for Proximity to Sensitive Receptors were assigned according to the following ranges in **Table 5.**

Table 5: Proximity to Sensitive Receptors Scoring

Proximity to Nearest Residential Area or School	Assigned Score
0.4 miles or greater	5
0.3 – 0.4 miles	4
0.2 - 0.3 miles	3
0.1 – 0.2 miles	2
Less than 0.1 mile	1

3.4 Access through Residential Neighborhoods

The fourth criterion, Access through Residential Neighborhoods, was included to assess whether truck access (for maintenance or chemical deliveries) to a given site requires driving on streets in a residential area. This criterion addresses the potential for public opposition due to increased truck traffic. Arterial streets with residential properties nearby (e.g., Agoura Road) were not considered as "residential streets" for the purpose of this analysis. Each site was scored a "1" or "5" based on whether access to the site required driving through a small residential street. Undeveloped sites zoned as "residential" were assumed to require truck traffic through areas that could transition to residential in the future, so were assigned a "3". Scores for Residential Driving Required were then assigned as indicated in **Table 6**.

Table 6: Access through Residential Neighborhood Scoring

Requires Driving on Residential Streets?	Assigned Score
No	5
Undeveloped but zoned as future residential	3
Yes	1

3.5 Utility Access

Utility access was included as the fifth criterion to assess a particular site's access to sanitary sewer, storm drain, electrical, gas, and other basic utilities. Sites in developed urban areas have readily available utilities, whereas remote sites may not. This criterion assesses the relative difficulty of a particular site accessing the array of utilities required to support an AWTP. Scores for Utility Access were then assigned as indicated in **Table 7**.

Table 7: Utility Access Scoring

Site Located in Developed Urban Corridor?	Assigned Score
Yes	5
No	1

3.6 Environmental Considerations

The sixth criterion considers potential environmental constraints associated with each site. To support this criterion, a series of investigations were conducted to assess the number of environmental hurdles that would be encountered. The following list summarizes these investigations:

- Biology (vegetation type) from general plans and from documentation of known endangered species
- Hydrology (stream/wetlands) from United States Geologic Survey (USGS, water features), United States Fish and Wildlife Service (USFWS, wetlands), and general plans (flood hazards)
- Cultural from general plans
- Geology (faults) from general plans - safety sections
- Fire Hazards from general plans (city sites) and California Department of Forestry and Fire Protection (Cal Fire, county sites); this aspect of the analysis did not differentiate between any of the 26 sites
- Environmental Justice from the Department of Water Resources (DWR) disadvantaged community and economically distressed area (DAC/EDA) mapping tool
- Hazardous Materials/Toxic – from GeoTracker and EnviroStor databases

Therefore, the Environmental criterion includes consideration of potential biological, hydrological, cultural, geological, and safety impacts. A site with five points has no known hurdles. Points are deducted for any hurdles under Biology (-1 point if sensitive vegetation exists and/or if known endangered species exist), Hydrology (-1 point if National Hydrography Dataset [NHD] flowline exists on parcel), Cultural (-1 point if located on culturally sensitive area), or HazMat/Toxics (-1 point if near Leaking Underground Storage Tank [LUST]). The other two environmental categories (Geology and Environmental Justice) are the same for all sites under consideration. Supporting information for the Environmental evaluation and scoring is included in **Appendix G**.

This analysis revealed that all 26 sites are located in fire hazard zones, so that factor is not a differentiator and was dropped as a factor in the scoring criterion. Also, only one site had a HazMat/Toxic finding, which turned out to be a closed LUST cleanup site. Therefore, this factor is not a differentiator either.

3.7 Acquisition Timing

The seventh and final criterion considers the likelihood of the JPA being able to acquire a site within a 6-month period. Sites that score highest are those that are already owned or optioned by the JPA. Sites that receive a middle-range score are those that are actively listed for sale. All other sites receive a low score for this criterion. The scoring for Acquisition Timing is shown in **Table 8**. Active listing documentation that was obtained for this analysis is included as **Appendix H**.

Table 8: Acquisition Timing

Status of Parcel	Assigned Score
JPA-owned or optioned	5
Active Listing	3
Other	1

3.8 Criteria and Scoring Summary

Table 9 presents a summary of the criteria, definition, and basis of scoring, with 5 representing the best score and highest ranking.

Table 9: Summary Table of Criteria and Scoring

Criterion	Measurement	Metric	Definition	Basis of Scoring
Construction Cost Factor	Costs for pipelines, crossings, site acquisition, site preparation, and access roads	$ million	Higher score indicates lower cost	$21.5 - $25.5 M: 5 $25.5 - $29.5 M: 4 $29.5 - $33.5 M: 3 $33.5 - $37.5 M: 2 $37.5 - $41.5 M: 1
Operational Cost Factor	Energy cost required to operate three conveyance pipelines over 30 years	$ million	Higher score indicates lower cost	$0 - $1.5 M: 5 $1.5-$3.0 M: 4 $3.0-$4.5 M: 3 $4.5-$6.0 M: 2 $6.0 M +: 1
Proximity to Sensitive Receptors	Distance to nearest residential area or school	Miles	Higher score indicates lower proximity	0.40 mi. + 5 0.30 – 0.39 mi. 4 0.20 - 0.29 mi. 3 0.10 – 0.19 mi. 2 Less 0.1 mi. 1
Residential Driving Required	Need to drive through residential streets for truck access to site	Yes/No (or zoned for future residential)	Higher score indicates access does not require residential streets	No 5 Future 3 Yes 1
Utility Access	Immediate access to basic utilities	Yes/No	Higher score indicates utilities are readily available	Yes 5 No 1
Environmental Considerations	Amount of effort required for environmental compliance	Number of environmental hurdles	Higher score indicates fewer environmental issues	No likely hurdles: 5 Minor hurdles: 4 Mod. hurdles: 3 Major hurdles: 2 Extreme hurdles: 1
Acquisition Timing	Likelihood of being able to acquire rapidly	District-owned or optioned vs. active listing vs. other	Higher score indicates greater likelihood of acquisition	District-Owned: 5 Active Listing: 3 Other: 1

Scores assigned for each of the 26 sites are shown in **Table 10**.

Table 10: Criteria Scores Assigned to 26 sites

Site ID	Parcel No.	Improved (Yes/No)	Year Built	Site Size (Acres)	Zoning Definition	Jurisdiction	Construction Cost Score	Operational Cost Score	Prox. to Sensitive Receptors Score	Residential Driving Required	Utility Access Score	Environmental Considerations Score	Acquisition Timing Score
A	2059025906	No		28.6	Open Space	Westlake Village	5	5	3	5	1	2	5
B	6800230755	No		27.6	Open Space	Thousand Oaks	5	5	1	1	5	3	1
C	6800230585	No		13.2	Open Space	Thousand Oaks	5	5	1	1	5	3	1
D	2053001008	No		3.2	Business Park/Office Retail	Agoura Hills	4	3	1	5	5	4	3
E	2057022902	No		6.9	Business Park	Westlake Village	5	4	1	1	5	4	1
F	2061001025	No		7.1	Business Park/Office Retail	Agoura Hills	4	4	1	5	5	3	5
G	2056002900	No		41.3	Open Space	Westlake Village	5	5	1	5	5	5	3
H	2061001903	No		15.3	Residential	Agoura Hills	4	5	1	3	1	3	1
I	2061001005	No		20.0	Residential	Agoura Hills	4	5	2	3	1	3	1
J	2054028047	Yes	1969	3.3	Business Park	Westlake Village	4	5	2	5	5	5	1
K	2061004036	Yes	1927	3.3	Business Park/Manufacturing	Agoura Hills	3	3	5	5	5	4	1
L	2057001021	Yes	1974	2.5	Business Park	Westlake Village	4	4	2	5	5	5	1
M	2061001007	No		74.4	Residential	Agoura Hills	4	4	3	3	1	3	1
N	2061002096	No		30.4	Commercial/Business Park	Agoura Hills	4	5	4	5	5	3	3
O	2057001014	Yes	1969	2.1	Business Park	Westlake Village	4	4	1	5	5	4	1
P	2057001005	Yes	1967	2.2	Business Park	Westlake Village	4	4	1	5	5	5	1
Q	2063001901	No		19.6	Rural Residential	Unincorporated LA County	4	4	1	3	1	3	1
R	2048011034	No		2.8	Business Park/Office Retail	Agoura Hills	3	3	3	5	5	5	1
S	2053001005	No		5.7	Business Park/Office Retail	Agoura Hills	3	3	2	5	5	5	3
T	2053001004	No		8.7	Business Park/Office Retail	Agoura Hills	2	3	2	5	5	5	3
U	2061003027	No		5.2	Business Park Manufacturing	Agoura Hills	2	3	5	5	5	4	3
V	2069011910	No		71.8	Open Space/Deed Restricted	Calabasas	1	3	3	5	1	3	5
W	6800052585	No		352.8	Open Space	Thousand Oaks	3	5	1	5	1	3	1
X	4455025902	No		14.5	Open Space/Deed Restricted	Calabasas	1	2	3	5	1	4	5
Y	2063048005	No		9.8	Light Ag/Residential	Unincorporated LA County	2	1	2	1	1	4	1
Z	4455026900	No		127.2		Calabasas	1	2	3	5	5	3	5

3.9 Criteria "Weighting" Scenarios

A key factor in comparison analysis is the relative importance of criteria used. Indication of relative importance is achieved through the assignment of relative "weights" to each criterion. Additionally, a comparative analysis can consider varying weightings for a set of criteria to assess the robustness of an outcome. For this analysis, where the desired outcome was to identify a "group" of preferred candidate sites to visit in the field, a series of weighting "scenarios" were considered to identify a robust set of preferred sites. This produced a weighted score for each site for each of the weighting scenarios.

Since overall costs are likely to be the most important consideration in site selection for the AWTP facility, four scenarios were developed that each weight the Construction Cost Factor criterion differently, progressing from a low weighting to a high weighting, then to a zero weighting. Three additional scenarios were developed to emphasize Proximity to Sensitive Receptors, Environmental Considerations, and Acquisition Timing. These seven scenarios are defined in **Table 11**, and the focus criterion for each scenario is shown in bold.

Table 11: Weighting Scenarios

Criterion	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7
Construction Cost Factor	**25%**	**50%**	**90%**	**0%**	1.7%	1.7%	1.7%
Operational Cost Factor	12.5%	8.3%	1.7%	16.7%	1.7%	1.7%	1.7%
Proximity to Sensitive Receptors	12.5%	8.3%	1.7%	16.7%	**90%**	1.7%	1.7%
Access through Residential	12.5%	8.3%	1.7%	16.7%	1.7%	1.7%	1.7%
Utility Access	12.5%	8.3%	1.7%	16.7%	1.7%	1.7%	1.7%
Environmental Considerations	12.5%	8.3%	1.7%	16.7%	1.7%	**90%**	1.7%
Acquisition Timing	12.5%	8.3%	1.7%	16.7%	1.7%	1.7%	**90%**

3.10 Preliminary Results and Final Screening

The application of the weighting scenarios produced a set of seven different overall rankings for the 26 sites. Detailed scoring/ranking tables for each of the seven scenarios may be found in **Appendix I.** Examination of the scoring/ranking tables revealed that seventeen (17) of the sites consistently appeared in the top portion of the rankings.

These 17 sites were selected for the final step in the comparative analysis, a screening based on site visits by JPA staff and the consultant team. These site visits enabled the project team to more closely view the conditions and status of the sites, and incorporate local knowledge offered by JPA staff.

The seventeen sites that consistently ranked high during the "weighting scenarios" analysis, along with the findings from the January 11th site visits, are presented in **Table 12**. As a result of these site visits (and as noted in the table), ten (10) additional sites were screened from further consideration.

Table 12: Findings Derived from 17 Site Visits

Site ID	Parcel No.	Improved (Yes/No)	Year Built	Site Size (Acres)	Description	Findings	Comments
A	2059025906	No		28.6	Las Virgenes Reservoir	Two potential routes for access road; two endangered species in habitat	
D	2053001008	No		3.2	Empty lot	Buffer road between site and freeway	
F	2061001025	No		7.1	Agoura Road		
G	2056002900	No		41.3	Lindero Canyon	Woodland Hills; previous community park denied	Remove from additional consideration
J	2054028047	Yes	1969	3.3	Commercial Park; Crossfit	Active business with building and parking lot	Remove from additional consideration
K	2061004036	Yes	1927	3.3	Brightview Landscaping	Site may be under-utilized; very small building; buffer road between site and freeway	
L	2057001021	Yes	1974	2.5	Commercial Park	Active business with building and parking lot	Remove from additional consideration
N	2061002096	No		30.4	Hilton property	Known cultural resources previously identified	Remove from additional consideration
O	2057001014	Yes	1969	2.1	Warner Communications	Active business with building and parking lot	Remove from additional consideration
P	2057001005	Yes	1967	2.2	Smith Pipe Company	Active business with building and parking lot	Remove from additional consideration
R	2048011034	No		2.8	Empty lot; freeway adjacent	Site has difficult shape and very little extra space; site abuts freeway directly	Remove from additional consideration
S	2053001005	No		5.7	Empty lot; freeway adjacent	Planned development is underway	Remove from additional consideration
T	2053001004	No		8.7	Empty lot; freeway adjacent	Buffer road between site and freeway	
U	2061003027	No		5.2	Site next to animal shelter	Planned development is underway	Remove from additional consideration
X	4455025902	No		14.5	Area behind Rancho Las Virgenes digesters	Fairly inaccessible; Site Z is preferred	Remove from additional consideration
Y	2063048005	No		9.8	Buddy Ebsen property	Very remote site	
Z	4455026900	No		127.2	Rancho Las Virgenes spray fields	Some liquefaction zones, but AWTP can be located outside these areas	

4 Final "Shortlist" of Preferred Sites

Seven (7) potential sites emerged from the sequence of screening and comparative analyses described in the sections above. These seven sites were then subjected to a traditional alternatives analysis with fixed weights for each of the seven criteria established previously (i.e., without use of different scenarios). The weights assigned for each criterion are shown in **Table 13.**

Table 13: Weightings for Alternatives Analysis of Final Seven Sites

Criterion	Weighting
Construction Cost Factor	20%
Operational Cost Factor	10%
Proximity to Sensitive Receptors	10%
Access through Residential	10%
Utility Access	10%
Environmental Considerations	20%
Acquisition Timing	20%

The sites and the scores assigned for each of the seven criteria are listed in

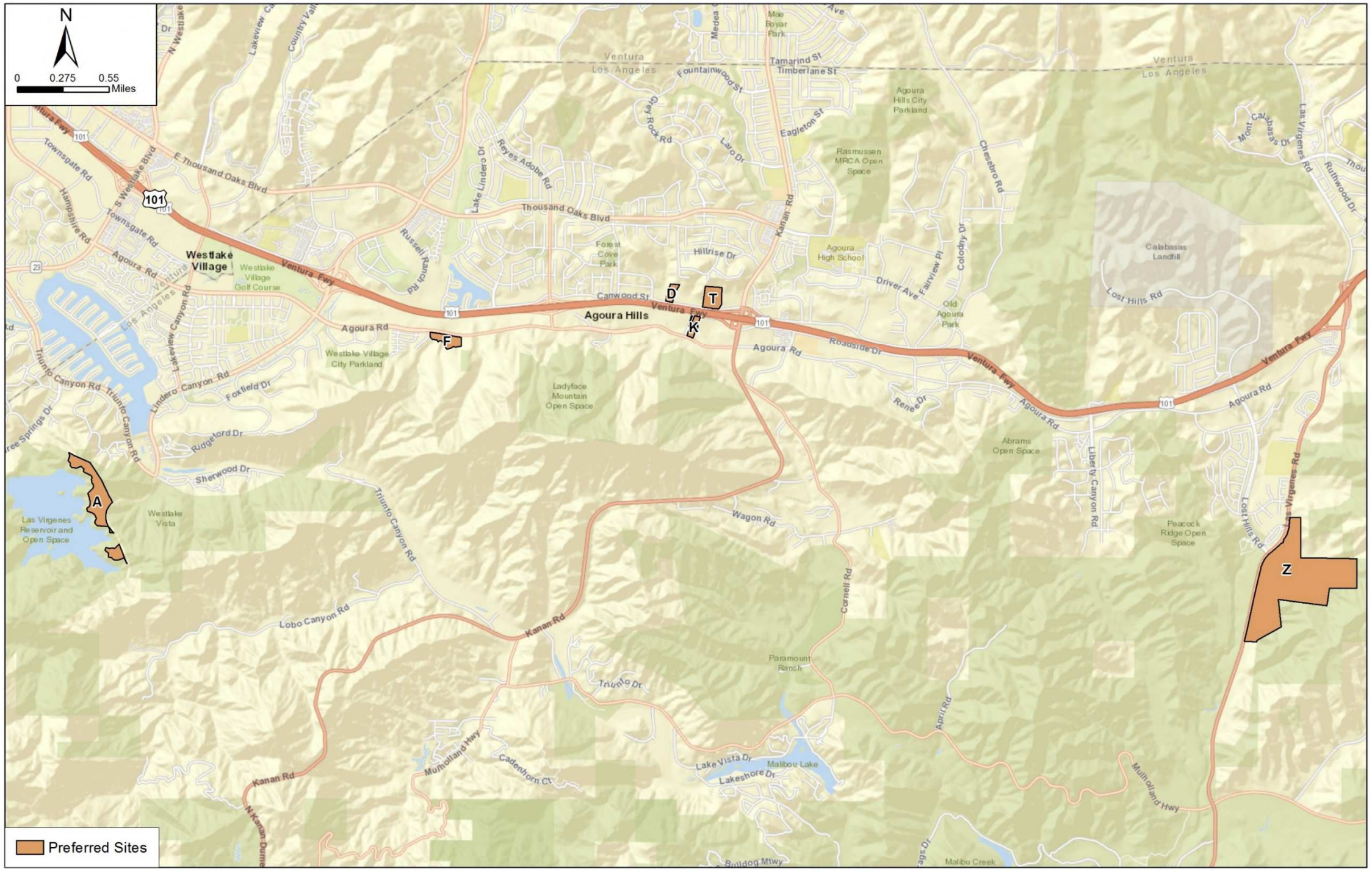
Table 14. One of the sites, Site Y, received a score substantially lower than the other six sites and is removed from further consideration. These remaining six (6) sites are presented here as the preferred sites for the proposed AWTP facility. A map of the six preferred sites is shown in **Figure 6**.

Table 14: Seven Preferred Sites and Criteria Scoring

Site ID	Parcel No.	Improved (Yes/No)	Year Built	Site Size (Acres)	Zoning Definition	Jurisdiction	LVMWD Parcel	Construction Cost Score	Operational Cost Score	Prox. to Sensitive Receptors Score	Access Thru Res Street Score	Utility Access Score	Environmental Score	Acquisition Timing Score	Overall Score
F*	2061001025	No		7.1	Business Park/Office Retail	Agoura Hills	OPTION	4	4	1	5	5	3	5	3.90
A*	2059025906	No		28.6	Open Space	Westlake Village	YES	5	5	3	5	1	2	5	3.80
D	2053001008	No		3.2	Business Park/Office Retail	Agoura Hills		4	3	1	5	5	4	3	3.60
T	2053001004	No		8.7	Business Park/Office Retail	Agoura Hills		2	3	2	5	5	5	3	3.50
Z	4455026900	Partial	n/a	133.4		Calabasas	YES	1	2	3	5	5	3	5	3.30
K	2061004036	Yes	1927	3.3	Business Park/Manufacturing	Agoura Hills		3	3	5	5	5	4	1	3.40
Y	2063048005	No		9.8	Light Ag/Residential	Unincorporated LA County		2	1	2	1	1	4	1	1.90

*Indicates a site that was identified in the 2016 BODR.
Note: Site Y was removed from further consideration because it received a much lower score compared to the other six sites.

Figure 6: Map of Six Preferred Sites



5 References

Alternative Study for Access Road to 5.0 MG Tank Site C at the Las Virgenes Reservoir, AECOM Technical Services, Inc., December 2010.

County of Ventura Assessor's Office (http://assessor.countyofventura.org).

Las Virgenes-Triunfo Joint Powers Authority Recycled Water Seasonal Storage Basis of Design Report, MWH/Stantec, September 2016.

Los Angeles County Office of the Assessor (http://maps.assessor.lacounty.gov).

National Wetlands Inventory: USFWS (https://www.fws.gov/wetlands/Data/State-Downloads.html).

National Hydrology Dataset: USGS (https://nhd.usgs.gov/data.html).

Preliminary Evaluation of 30800 Agoura Road Site, Woodard & Curran, July 2017.

RS Means Heavy Construction Cost Data 2017.

Appendix A – Screening Step Figures

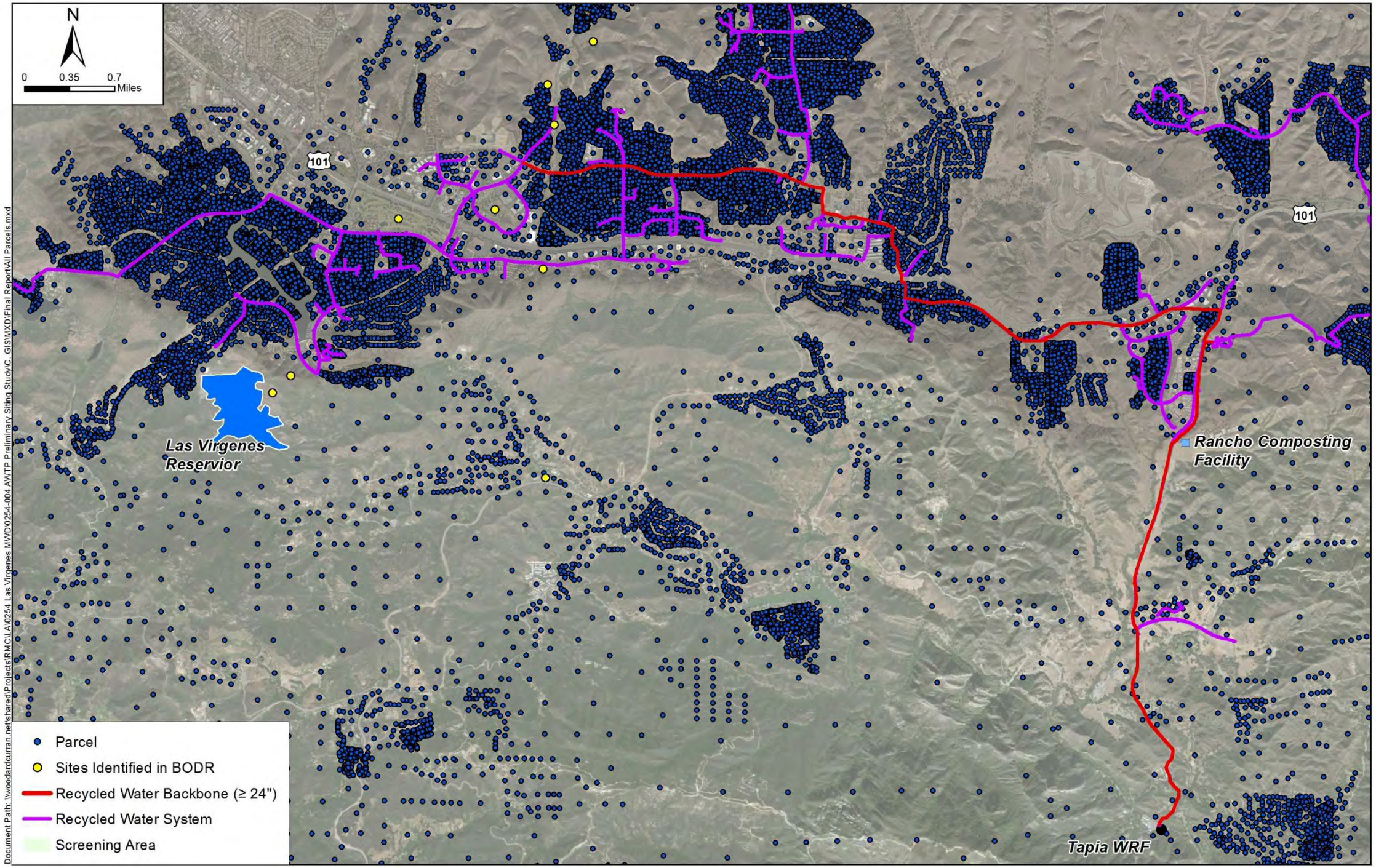


Figure A1: All Parcels in JPA Study Area

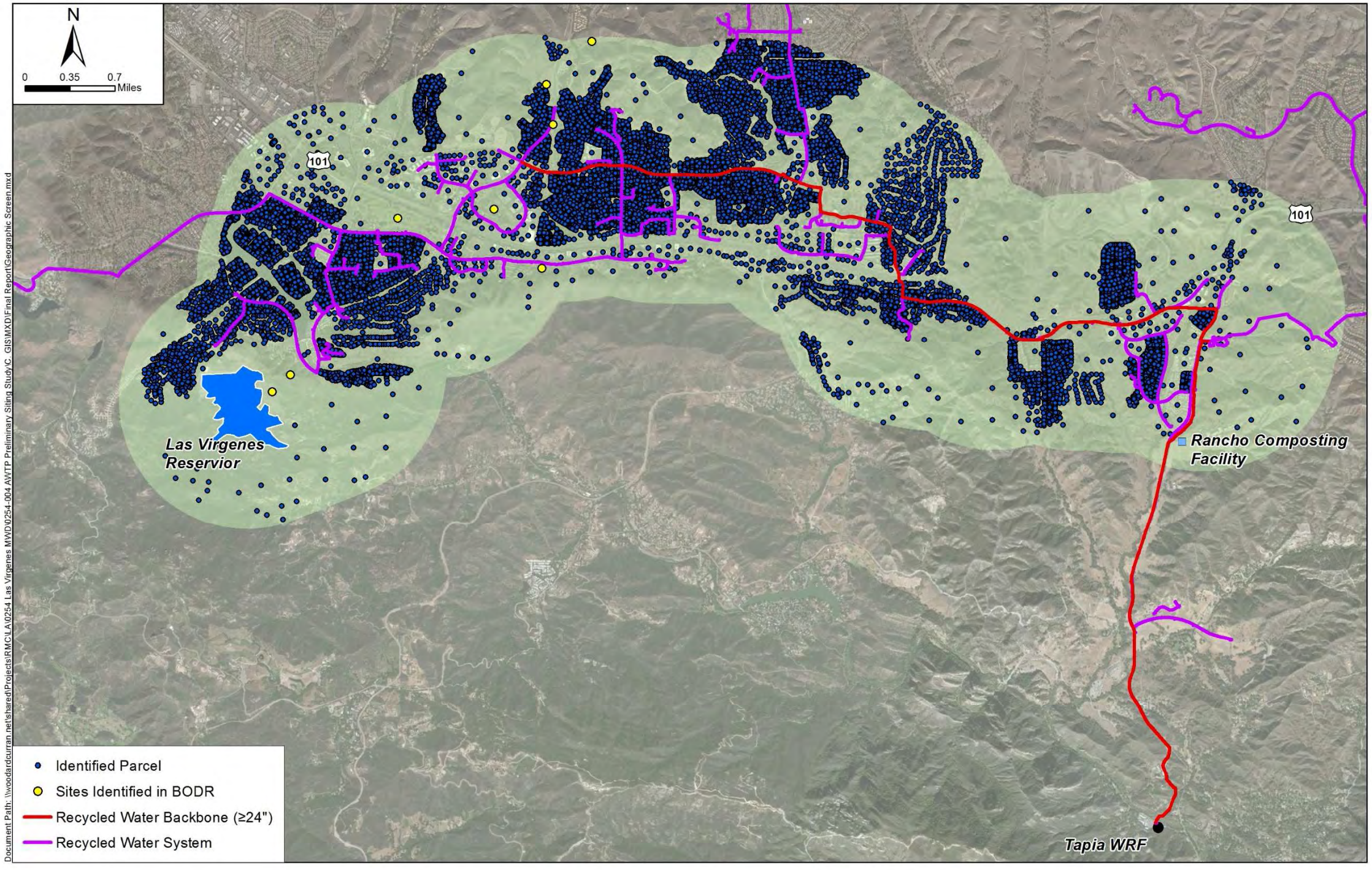


Figure A2: Proximity to Critical Facilities (Target Zone) Screen (13,251 Sites Remaining)

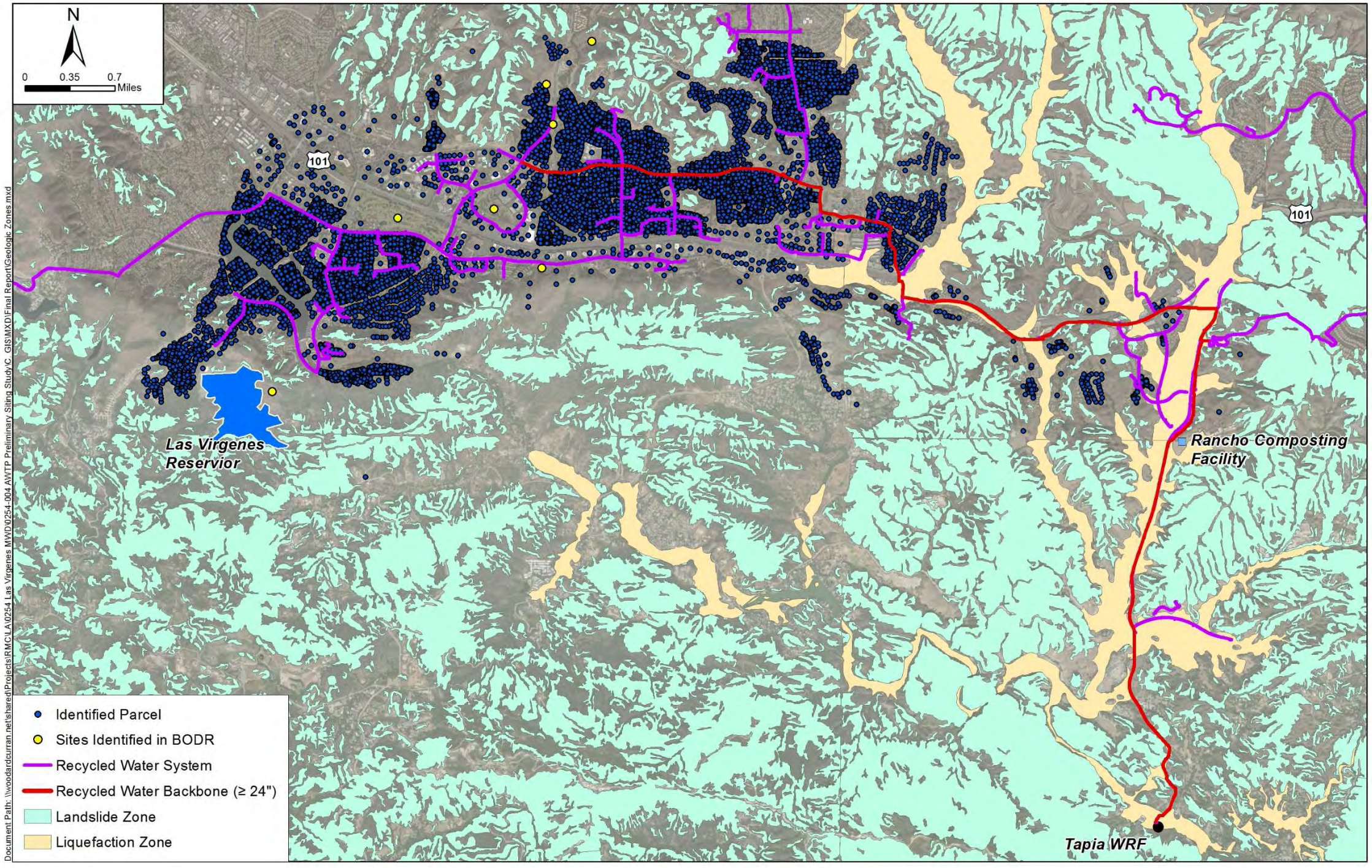


Figure A3: Geology Screen (11,257 Sites Remaining)

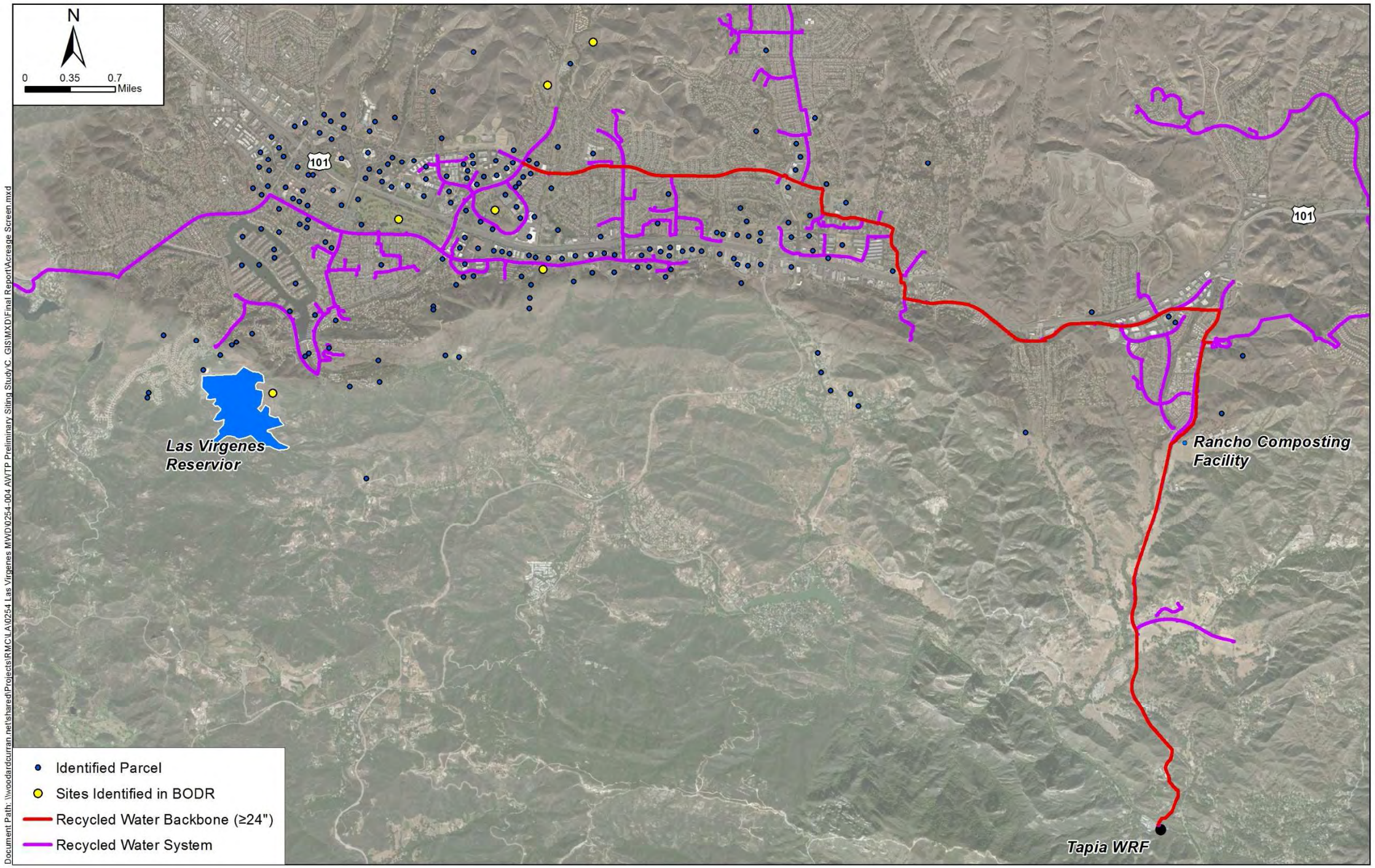


Figure A4: Parcel Size (Acreage) Screen (182 Sites Remaining)

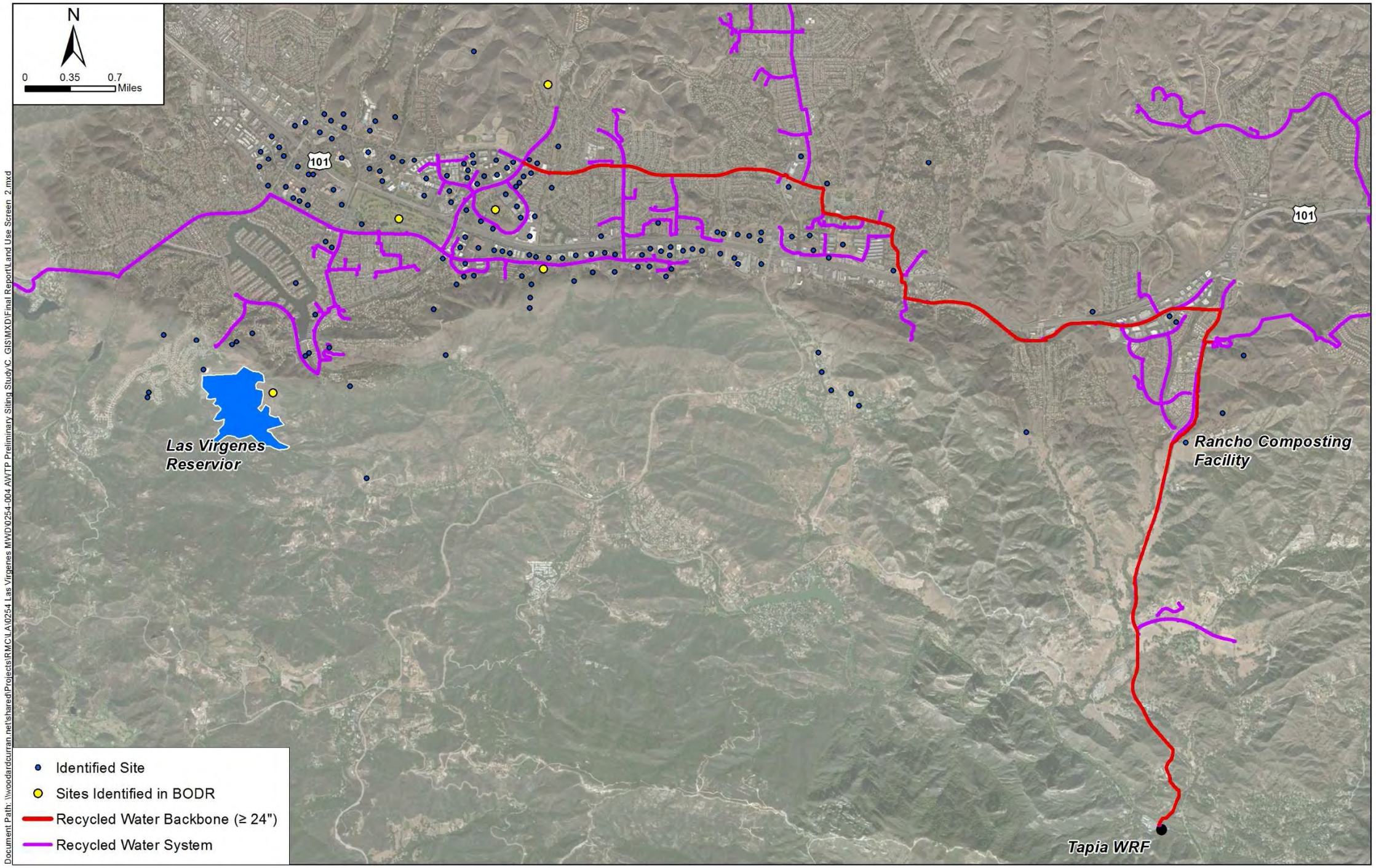


Figure A5: Land Use Screen (141 Sites Remaining)

Appendix B – List of Resulting Sites

(PLACEHOLDER FOR LIST OF SITES PDF)

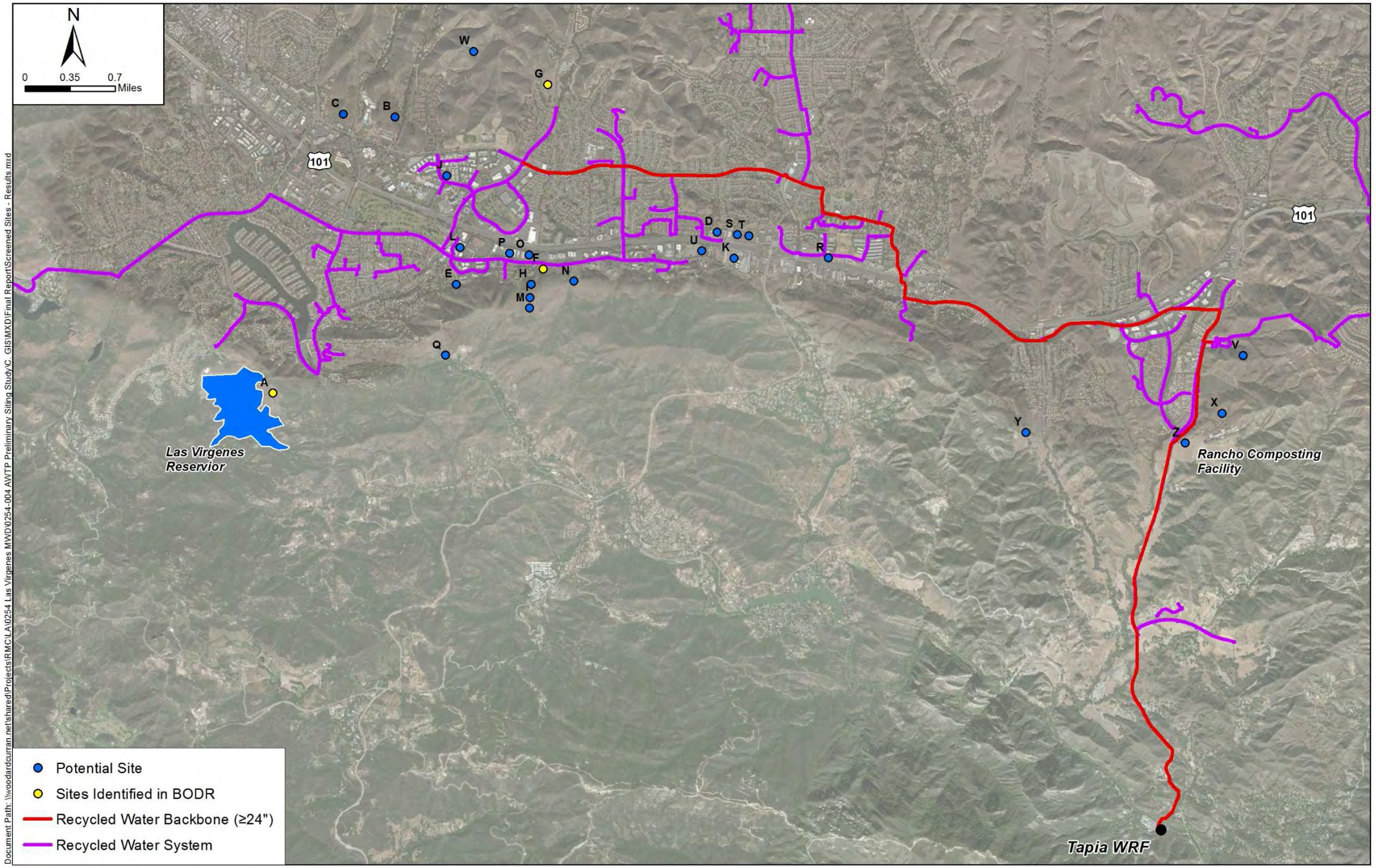


Figure 9: Improvement Factors Screen (26 Sites Remaining)

Appendix C – Results of Hydraulic Analysis

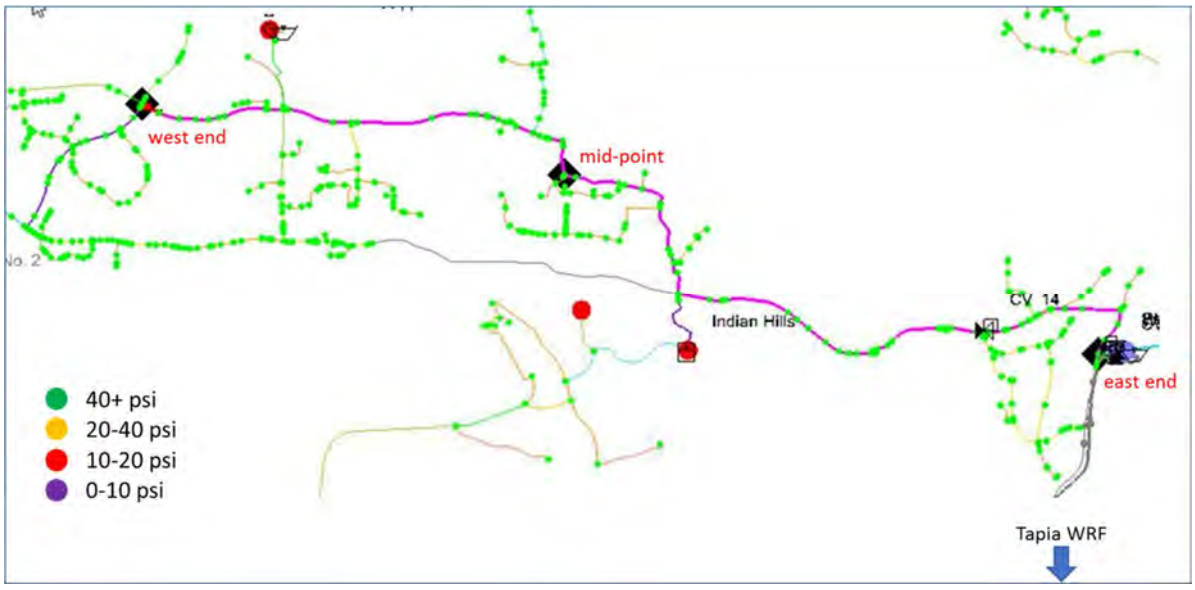
Preliminary Hydraulic Analysis

A preliminary hydraulic analysis was performed to confirm that placement of an AWTP with 7.4 mgd of influent demand (sufficient source flow for a target AWTP production of 6.0 mgd) is hydraulically feasible. For this analysis LVMWD's updated, calibrated WaterGEMS hydraulic model was used. In the model, a 7.4 mgd demand node was added at three locations in the recycled water distribution system that correspond to three "clusters" of the remaining candidate sites (see Figure 10): (1) western end of 24-inch backbone pipeline, (2) near the middle of the 24-inch backbone pipeline near Indian Hills High School (Kanan Road and Thousand Oaks Blvd.), (3) eastern end of the 24-inch backbone pipeline, near LVMWD headquarters. Average day demands (annual) and peak hour for the Western System were used to approximate an assumed "maximum winter day" (April) and associated peak hour demands.

With existing non-potable demands, connection of the AWTP at Node 1, Node 2, and Node 3 did not cause significant pressure issues. With the future demand scenario however, connection at Node 1 caused significant pressure issues, Node 2 caused minor pressure issues, and Node 3 caused no pressure issues. The model results are illustrated in the diagrams below.

Findings from the hydraulic analysis indicate that future expansion of non-potable customers may need to be curbed in order to operate the AWTP at capacity without affecting service to existing customers. The findings also validate the feasibility of the Pure Water Program and support three of the LVMWD-Triunfo JPA Recycled Water System Policy Principles, including:

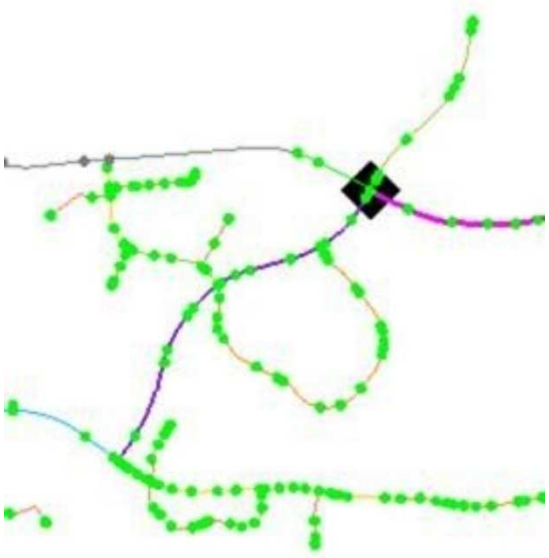
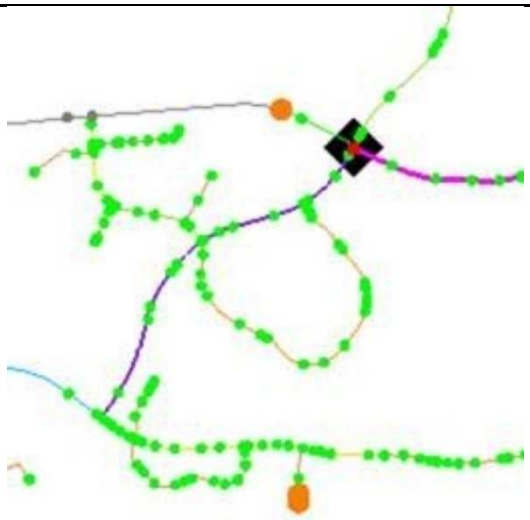
- Continue to supply recycled water to its member agencies such that they can maintain the current level-of-service to their existing customers.
- The JPA and member agencies will not pursue extension of the recycled water system for the sole purpose of increasing demand for recycled water; however, extensions may be considered to improve system redundancy and/or reliability.
- Strive to maximize the water available to the Pure Water Project Las Virgenes-Triunfo by considering additional sources, including not limited to, dry-weather urban runoff, groundwater and wastewater.

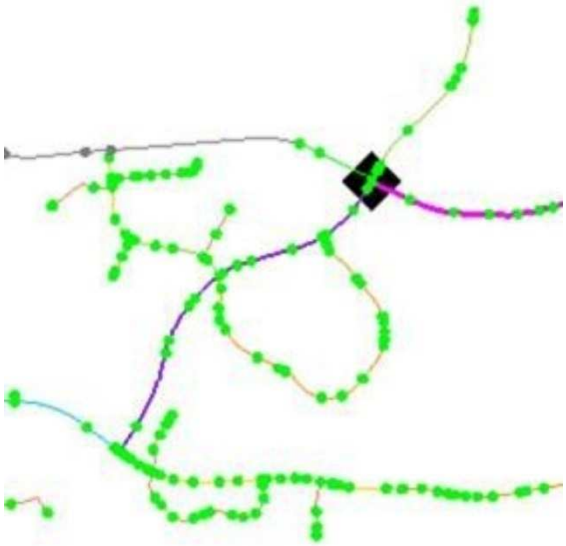
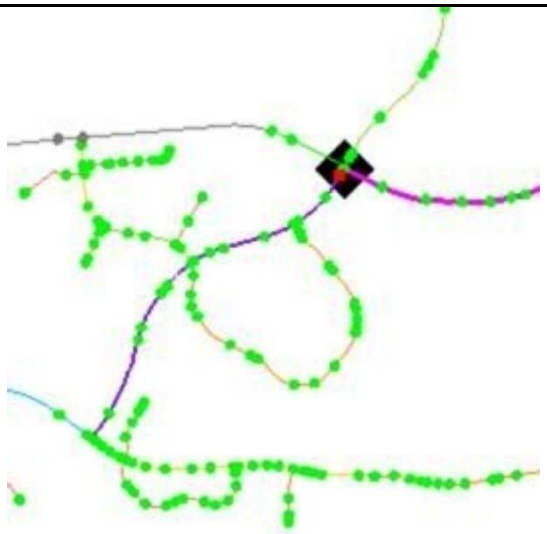


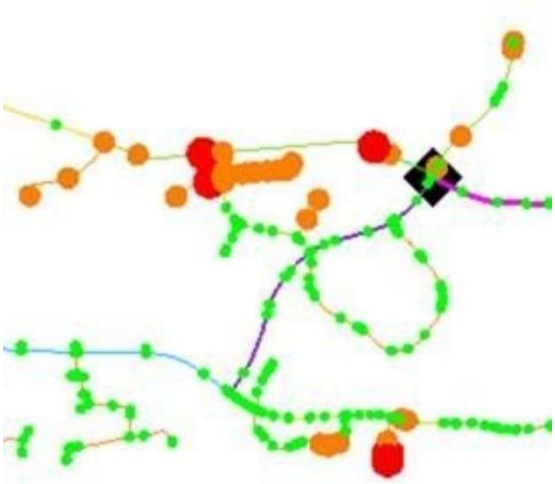
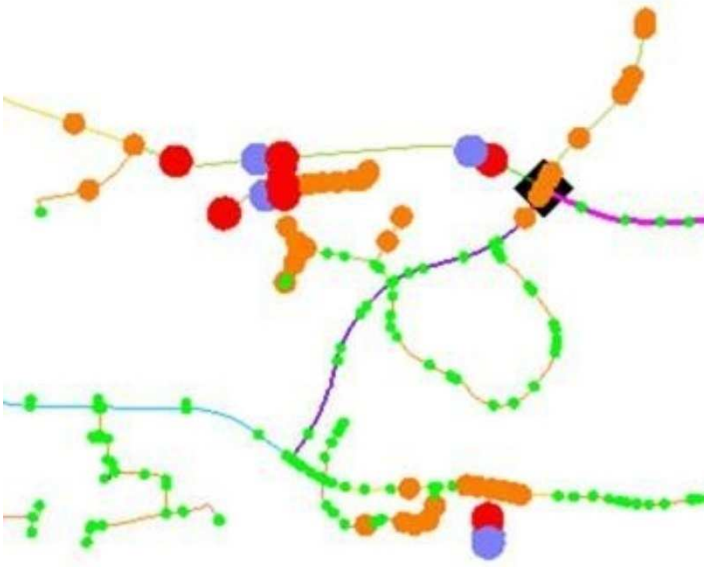
LVMWD Recycled Water System (Western) with 2014 Supplies and Demands

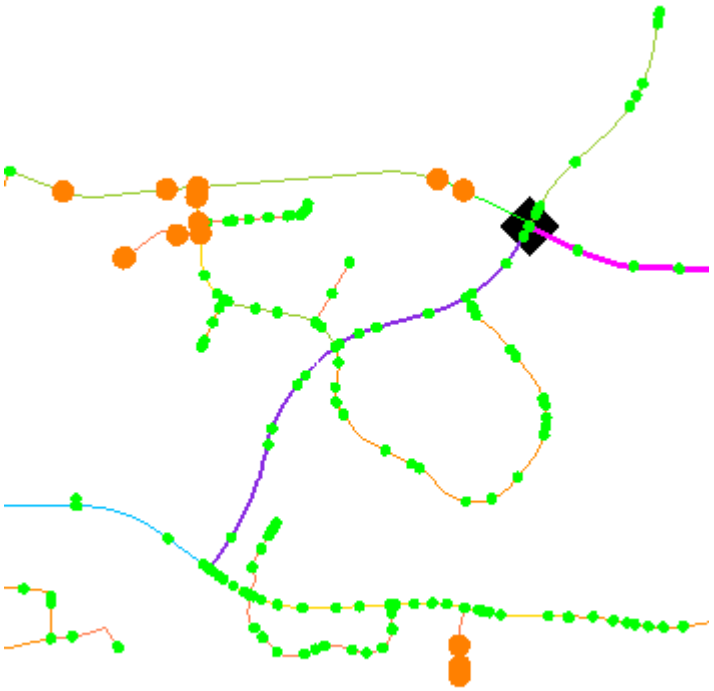
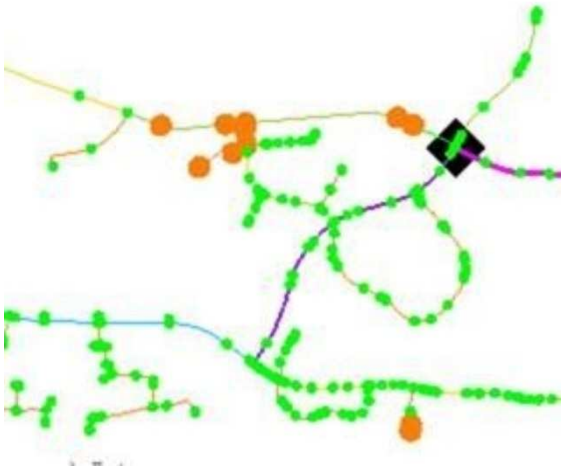
WaterGEMS Hydraulic Model Preliminary Results:

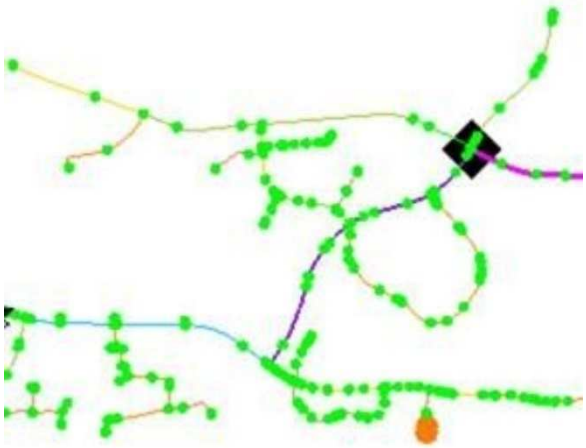
- 40+ psi
- 20-40 psi
- 10-20 psi
- 0-10 psi

Time Frame	Scenario	Results at Western End of 24-inch RW Pipeline
Existing	**Maximum Day (no 7.4 mgd connection)** Based on full year (Jan-Dec)	
	Average Day + 7.4 mgd at <u>west end</u> of 24" Pipe Based on Avg. Annual (Jan-Dec) assumed for April (max of winter months, Nov - Apr)	

	Average Day + 7.4 mgd at <u>mid-point</u> of 24" Pipe Based on Avg. Annual (Jan-Dec) assumed for April (max of winter months, Nov - Apr)	
	Average Day + 7.4 mgd at <u>east end</u> of 24" Pipeline Based on Avg. Annual (Jan-Dec) assumed for April (max of winter months, Nov - Apr)	

Future - Alternative 5 with improvements	**Maximum Day (no 7.4 mgd connection)**	
	Average Day + 7.4 mgd at <u>west end</u> of 24" Pipeline Based on Avg. Annual (Jan-Dec) assumed for April (max of winter months, Nov - Apr)	Average Day, Peak hour:  Average day, Average hour:

		
	Average Day + 7.4 mgd at <u>mid-point</u> of 24" Pipeline Based on Avg. Annual (Jan-Dec) assumed for April (max of winter months, Nov - Apr)	

	Average Day + 7.4 mgd at <u>east end</u> of 24" Pipeline Based on Avg. Annual (Jan-Dec) assumed for April (max of winter months, Nov - Apr)	

Appendix D – Site Maps/Aerial Photos

Appendix E – Construction Cost Factor Calculations

Appendix F – Operational Cost Factor Calculations

Appendix G – Environmental Considerations

Appendix H – Active Listings

Appendix I – Weighting Scenarios

ITEM 10A

INFORMATION ONLY

February 5, 2018 JPA Board Meeting

TO: JPA Board of Directors

FROM: Facilities & Operations

Subject : Pure Water Project Las Virgenes-Triunfo: Modeling of Las Virgenes Reservoir for Indirect Potable Reuse through Surface Water Augmentation

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SUMMARY:

On February 6, 2017, the JPA Board approved a proposal from Trussell Technologies, Inc. (Trussell), to preform 3-D hydrodynamic modeling of Las Virgenes Reservoir related for indirect potable reuse through surface water augmentation. The purpose of the modeling was to confirm that the project would comply with surface water augmentation regulations issued by the State Water Resources Control Board (SWRCB) and to provide recommendations for future modeling, studies and facility improvements.

Overall, the results of the modeling were favorable and demonstrate that the Pure Water Project Las Virgenes-Triunfo will meet the SWRCB's proposed surface water augmentation regulations, which are expected to be approved shortly. Trussell staff will present the results of the modeling effort at the Board meeting and will provide recommendations that could be considered to improve mixing in the reservoir.

FISCAL IMPACT:

No

ITEM BUDGETED:

Yes

FINANCIAL IMPACT:

The cost of the work is allocated 70.6% to LVMWD and 29.4% to Triunfo Sanitation with a portion reimbursed by the U.S. Bureau of Reclamation through a Title XVI Feasibility Study Grant.

DISCUSSION:

Background:

On February 6, 2017, the JPA Board approved a proposal from Trussell Technologies, Inc. (Trussell), to preform 3-D hydrodynamic modeling of Las Virgenes Reservoir related for indirect potable reuse through surface water augmentation. The purpose of the modeling was to confirm that the project would comply with surface water augmentation regulations issued by the State Water Resources Control Board (SWRCB) and to provide recommendations for future modeling, studies and facility improvements.

Proposed Surface Water Augmentation Regulations:

The final draft regulations state the following:

> *"Prior to augmentation and whenever requested to do so by the State Board, the [Surface Water Source Augmentation Project Public Water System] shall demonstrate to the State Board, utilizing tracer studies and hydrodynamic modeling, that at all times under all operating conditions, the volume of water withdrawn from the augmented reservoir to be ultimately supplied for human consumption contains no more than:*
>
> - *One percent by volume, of recycled municipal wastewater that was delivered to the surface water reservoir during any 24-hour period, or*
> - *Ten percent by volume, of recycled municipal wastewater that was delivered to the surface water reservoir during any 24-hour period, with the recycled water delivered by the [Surface Water Source Augmentation Project Public Water System] having been subjected to additional treatment producing no less that a 1-log reduction of virus, Giardia cysts and Cryptosporidium oocysts…"*

In simple terms, the SWRCB regulations require a minimum 100:1 dilution rate for purified water in the reservoir. However, if an additional log removal of treatment beyond the basic log removal requirement is provided, the minimum dilution rate may be reduced to 10:1.

Modeling Scenarios and Results:

Three scenarios were modeled as follows: (1) a routine year with purified water introduced in the reservoir only when the Westlake Filtration Plant (WLFP) is not in service, (2) a boundary year with purified water supply of 1.7 million gallons per (MGD) to the reservoir and 5.0 MGD treated through the WLFP, and (3) an emergency scenario with purified water supply of 6.0 MGD to the reservoir and 15.0 MGD treated through the WLFP.

Modeling of the routine year was not necessary because no water would be withdrawn from the reservoir when purified water is introduced to the reservoir. This would be the typical operating scenario for the Pure Water Project Las Virgenes-Triunfo because the advanced water treatment plant would be operational during the winter months, while the WLFP would be operational during the summer months.

The boundary year scenario considered minimum purified water releases and normal operating flows from the WLFP. For the boundary year, a total of 30 tracer releases were simulated, and the predicted lowest minimum dilution for all traces was 77:1. The shortest predicted lag time from the introduction of purified water to the inlet of the WFLP was 0.6 days.

The emergency scenario considered the situation when the advanced water treatment plant is in full production and the WLFP must come on-line at high capacity such as during an MWD shutdown. For the emergency scenario, a total of 32 traces were simulated, and the lowest predicted dilution was 69:1. The shortest predicted lag time was 0.6 days.

Conclusions:

Overall, the results of the modeling were favorable and demonstrate that the Pure Water Project Las Virgenes-Triunfo will meet the proposed SWRCB surface water augmentation regulations. For all tracer simulations, there were only three that resulted in values less than the minimum dilution of 100:1. In each case, a strong wind from the southeast pushed the warmer purified water from the point of introduction to the inlet of the WLFP along the surface of the reservoir.

Possible solutions to avoid the low dilution conditions include a submerged purified water discharge point (the model simulated a surface discharge) or improved aeration in the reservoir, which will have other water quality benefits. Alternatively, an additional log of removal capacity could be added to the treatment train to reduce the minimum dilution to 10:1.

The proposal from Trussell included evaluation of the model results by an Independent Advisory Panel. This review is currently underway and may result in additional modeling scenarios. In the meantime, staff is implementing a short-term recommendation to move the WLFP's weather station to a more favorable location.

Prepared by: David R. Lippman, P.E., Director of Facilities and Operations

ATTACHMENTS:

Las Virgenes Reservoir Modeling Results

Cover Letter Briefing

Las Virgenes – Triunfo Joint Powers Authority

Modeling Results for the Las Virgenes Reservoir for Pure Water Program

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1 INTRODUCTION

This letter provides an overview of the modeling report prepared by Flow Sciences, Inc. at the direction of Trussell Technologies, Inc. in support of the Las Virgenes-Triunfo Joint Powers Authority (JPA) proposed surface water augmentation project (Pure Water). The Pure Water project involves taking excess recycled wastewater as generated at the Tapia Water Reclamation Facility, treating it through an advanced water treatment facility (AWTF), and conveying it to the Las Virgenes Reservoir (Reservoir) for eventual reuse. As required by the draft surface water augmentation regulations, any proposed project requires a calibrated hydrodynamic model of the reservoir in order to understand the mixing and dilution criteria within the reservoir itself. This effort represents the calibration of the hydrodynamic model, modeled results for several operational scenarios, and recommendations for next steps.

2 MODEL CALIBRATION

The project team selected a 3-D numerical modeling platform known as the Estuary, Lake, and Coastal Ocean Model or ELCOM. ELCOM was developed by the Center for Water Research at the University of Western Australia and is widely used throughout the world for modeling aquatic environments. Several inputs are needed to tailor ELCOM to the Las Virgenes Reservoir and this process is known as the calibration of the model:

Bathymetric Survey
One of the first steps in calibrating the model is to incorporate the correct shape of the Reservoir. To do this, a bathymetric survey of the Reservoir was performed by collecting data with a boat-mounted multibeam swath-sounding sonar system. This survey provided accurate bathymetry for the model as of March 2017.

Weather Data
The JPA provided data from a weather station located on the downside of a slope from the Westlake Filtration Plant. This data consisted of solar radiation, air temperature, wind speed, wind direction, relative humidity, and rainfall between January 1, 2015 and December 31, 2016.

The project team noted that the location of the weather station may result in interferences from the slope. In order to have as few potential interferences as possible, the project team recommends moving the weather station to the island within the Reservoir to ensure weather data is more representative.

Inflows and Outflows

The Reservoir has two main inflows and one main outflow:

- Inflows
  - Imported water from Metropolitan Water District of Southern California
  - Recirculating flow for the Westlake Filtration Plant
- Outflow
  - Raw water supply to the Westlake Filtration Plant

Flows (in and out) occur at or nearby the inlet/outlet tower located in the northwest corner of the Reservoir (Figure 1).

Aerator Operation

The Reservoir has two aerators (Figure 1) which are operated in the summer to provide partial vertical mixing near the inlet tower to the filtration plant. The JPA provided the air flow rates of both aerators for January 1, 2015 to December 31, 2016.

In performing the bathymetric survey, the project team noted that the Reservoir has two distinct troughs (see Figure 3) and both aerators are located within the northwestern-most trough (Figure 1). To improve mixing throughout the entire Reservoir, the project team recommends adding an aerator within the second trough. Improving mixing would increase dilution and minimize the impact of the Pure Water project on the Westlake Filtration Plant operations.

Figure 1 – Las Virgenes Reservoir Map

Model Calibration

Flow Science incorporated these various inputs into the model and was then able to accurately simulate water movement within the Reservoir. Figure 2 shows that the simulated water temperature over the depth of the reservoir matches the measured data.

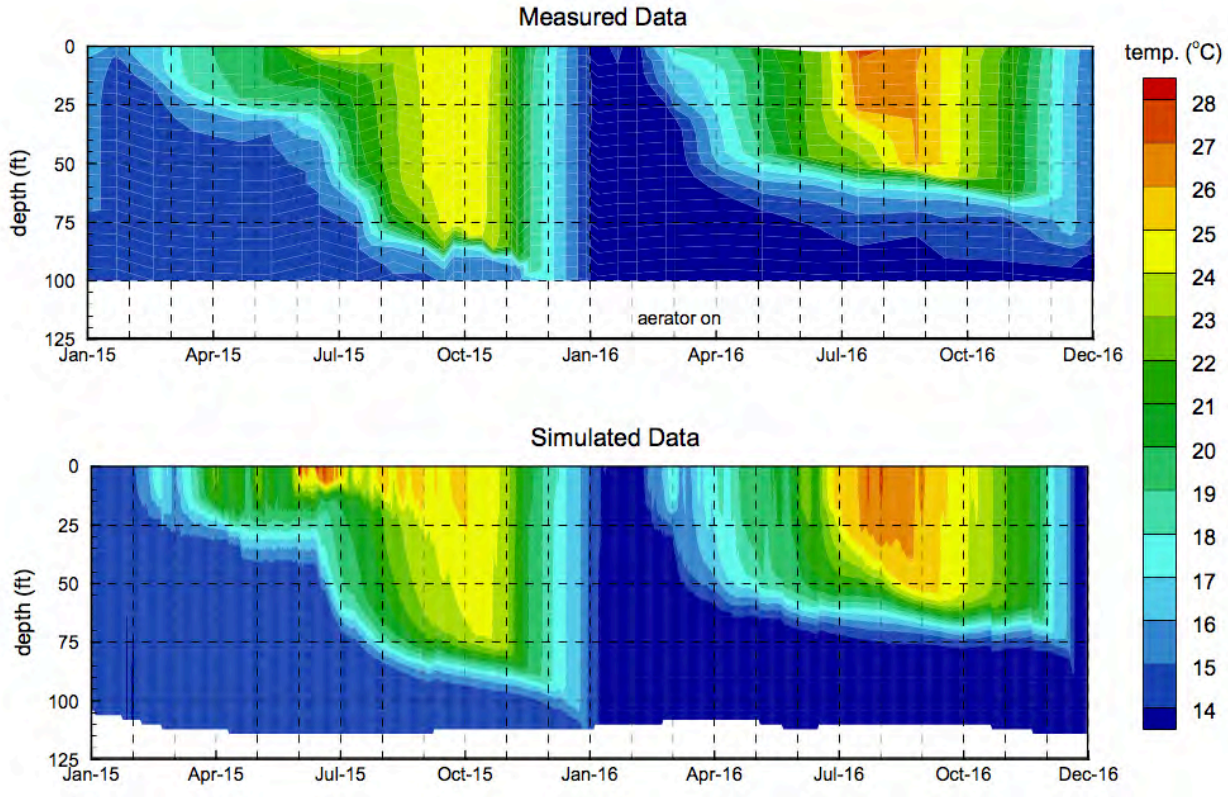

Figure 2 – Color Map Comparing Water Temperature over Depth with Time from Measured and Simulated Data

3 OPERATIONAL SCENARIOS

In order to understand how the Pure Water project will affect the Reservoir operations, the project team developed several scenarios to assess regulatory compliance.

Regulatory Compliance

The project team targeted two regulatory requirements as part of the modeling effort. The first is the theoretical retention time of the reservoir, as defined by the following equation:

$$Theoretical\ retention\ time = \frac{Volume\ of\ the\ Las\ Virgenes\ Reservoir}{Flow\ out\ of\ reservoir} \geq 6\ months$$

The regulations allow for some relaxing of this 6-month threshold. Retention times as low as 4 months can be approved with an additional log removal of pathogens with treatment and retention times as low as 2 months can be approved with written approval

from the State Board. All operational scenarios developed were in compliance with this regulation. In the case of the routine and boundary year scenarios, the 6-month retention time was met. In the case of the emergency scenario, a minimum 2-month retention time was targeted.

The second requirement in the regulation is in regard to dilution in the reservoir. Any withdrawal of water from the reservoir can comprise no more than 10% (10:1 dilution) of the potable reuse water discharged into the reservoir during any prior 24-hour period. If the dilution is between 10:1 and 100:1, an additional log removal of pathogens is required. Table 1 provides a summary of the dilution requirement. The dilution obtained within the reservoir is the key output from each modeled operational scenario.

Table 1. Draft Dilution Requirement

DILUTION	ENTERIC VIRUS REMOVAL	*CRYPTOSPORIDIUM* REMOVAL	*GIARDIA* REMOVAL
Dilution > 100:1	12-log	10-log	10-log
100:1 > Dilution > 10:1	13-log	11-log	11-log
Dilution < 10:1	Not classified as surface water augmentation		

Operational Scenarios

With the regulatory requirements as a guideline, three operational scenarios were developed to bracket the intended use of the Reservoir with the Pure Water project and maximize flexibility by considering 'boundary' conditions. These are conditions that still meet the draft regulations but are up against the boundary of the regulations or possible uses of the project. Table 2 provides a summary of the three scenarios.

Table 2. Summary of Considered Scenarios

SCENARIO	PURIFIED WATER INFLOW (MGD)	WFP WITHDRAWAL (MGD)	THEORETICAL RETENTION TIME (MONTHS)	THEORETICAL RETENTION TIME REGULATORY OBJECTIVE (MONTHS)
Routine	AWTF flows during winter and Filtration Plant flows during summer. No modeling required.			
Boundary	1.7	5.0	8.5	> 6.0
Emergency	6.0	15.0	2.4	> 2.0

Routine: The first operational scenario considers the Pure Water project as it was developed in the concept report. During winter months, available potable reuse water will be discharged to the Reservoir. Then during summer months, the Westlake Filtration Plant would operate (i.e., drawing water from the Reservoir). Because input of the potable reuse water is not occurring simultaneously with the operation of the

Westlake Filtration Plant, the primary regulatory parameters, dilution and retention time, are less applicable and no modeling was required.

Boundary: The second operational scenario considers operating the Westlake Filtration Plant through a full winter, while simultaneously providing potable reuse water to the reservoir. In this scenario, during the summer, irrigation demand is still prioritized and there is minimal input to the Reservoir. In addition, to represent a worst-case scenario in terms of dilution, no other water source enters the reservoir (e.g., no MWD water received). In effect, this scenario represents the most aggressive regular use of the Pure Water project by incorporating all available potable reuse water, including the shoulder months (in Spring and Fall) where reuse water is available and the filtration plant is online.

Emergency: The third and final scenario considers an emergency scenario, where the MWD feeder line to the Reservoir is inoperable, either for long-term maintenance or as a result of failure. In this scenario, the maximum amount of potable reuse water is produced by the AWTF, 6 MGD, and the Westlake Filtration Plant produced the maximum amount of drinking water, which is 15 MGD. Flow Science then ran the model for approximately 7.4 months and stopped when the water level in the reservoir hit the inlet/outlet towers minimum withdrawal level of 1,000 feet. This scenario has a theoretical retention time of 2.4 months—above the minimum allowable retention time of 2 months but below the 4-month threshold which triggers additional log removal of pathogens.

4 MODELING RESULTS

Once the model was calibrated and the operational scenarios were established, model runs were performed, and pulses of tracer were injected into the reservoir, at regular intervals. Each pulse of tracer lasted 24-hours, per the regulations. The potable reuse water was introduced into the reservoir as a surface discharge along the northwest bank of the reservoir and one aerator was moved to the second low point in the reservoir to improve mixing. Figure 3 shows the locations of the aerators and the potable reuse water entry point.

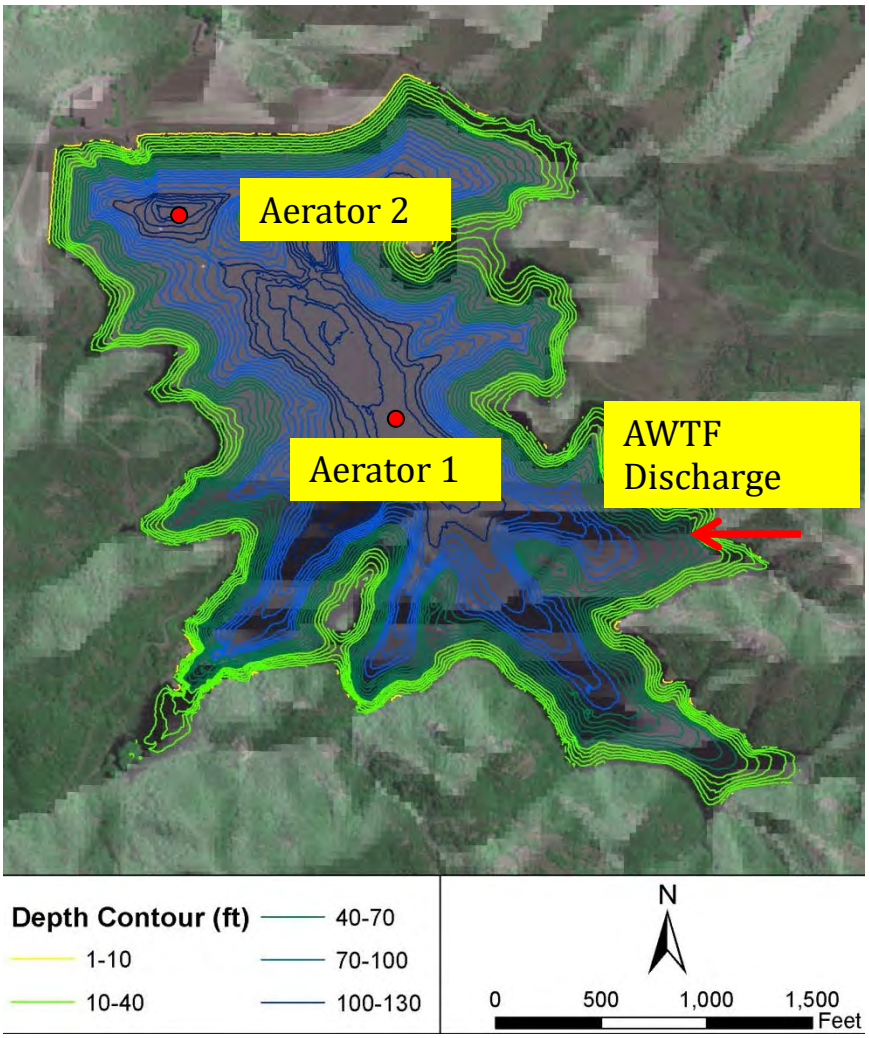

Figure 3 – Location of Potable Reuse Water Discharge and Aerators

Boundary Year Scenario

Figure 4 shows an example model run with the released tracer in the water. Modeling runs showed that when strong winds come from the southeast, the potable reuse water gets pushed along the water surface directly from the discharge point to the filtration plant's inlet tower. This phenomenon resulted in one exceedance beyond the 100:1 dilution threshold. The minimum dilution was 77:1, still well below the minimum 10:1 value that is required in the regulations. Figure 5 shows the modeled output of this tracer release that had a minimum dilution below the 100:1 dilution threshold.

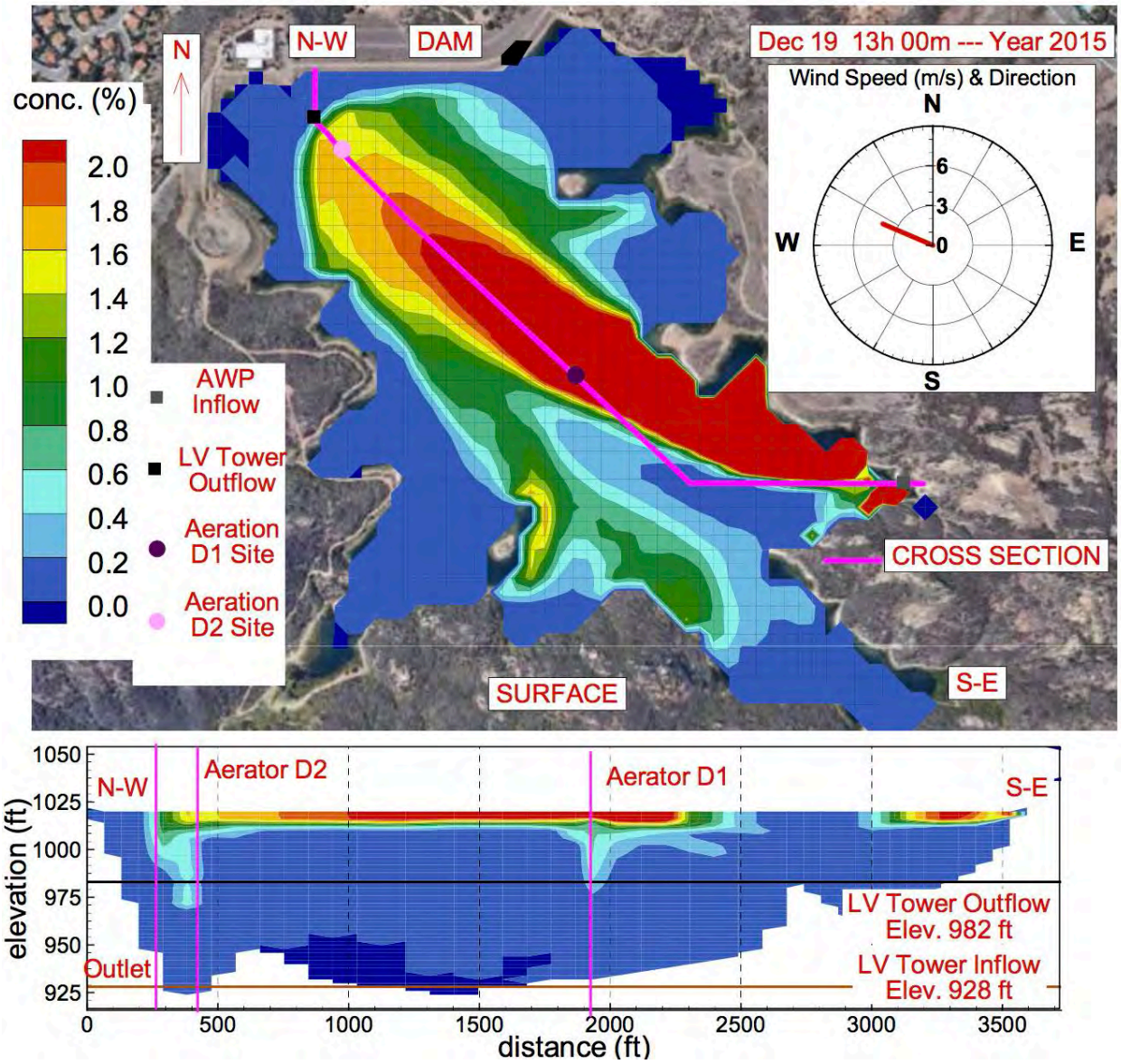

Figure 4 – Example model run with release of 24-hour tracer pulse

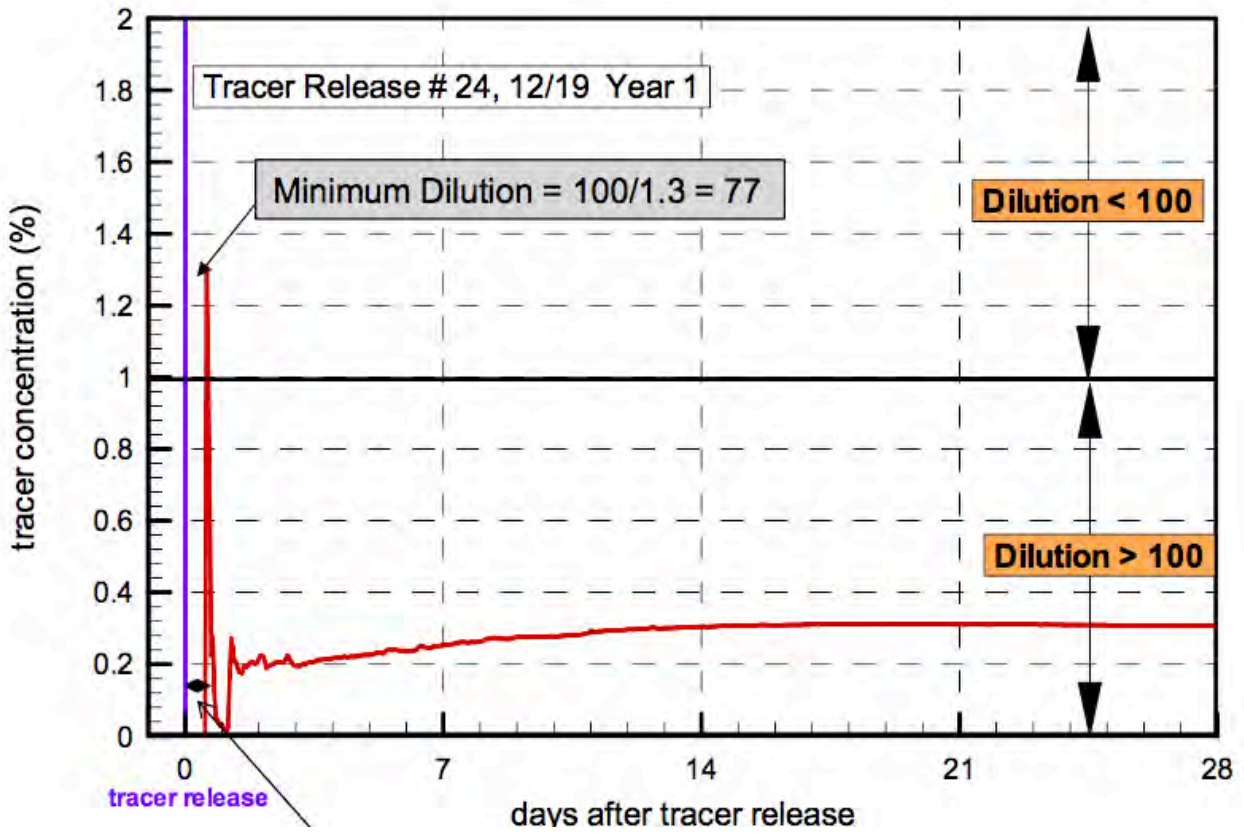

Figure 5 – Worse case modeled results for Boundary Condition (77:1 minimum dilution)

Emergency Scenario

The emergency scenario showed similar results as compared with the boundary condition scenario. Again, when winds come from the southeast, the potable reuse water short-circuits through the reservoir. In this case, two tracer releases exceeded the 100:1 dilution threshold. Again, none of these dilution values are above the minimum dilution of 10:1 as required by the regulations.

Potential Future Scenarios

The modeling results show a slight exceedance of the 100:1 dilution threshold. A potential solution includes the incorporation of a diffuser discharge at the bottom of the reservoir for the potable reuse water input. This would have the benefit of immediately mixing the warmer potable reuse water with the reservoir and lessen the impact of short circuiting. It is likely this would prevent any exceedance of the 100:1 dilution threshold, although future modeling runs with a diffuser should be performed to confirm this.

5 SUMMARY AND RECOMMENDATIONS

A range of operating scenarios were evaluated with the aim of maximizing the operational flexibility of the Pure Water project. The results of these conditions were favorable and indicate that the Pure Water project should be in compliance with the draft surface water augmentation regulations with all operational scenarios considered.

The following are recommendations and next steps for the Reservoir modeling:

- Move the weather station to ensure a representative location of wind speed and direction is obtained
- Move or add an aerator to the second trough in the Reservoir to improve mixing
- Perform a tracer release in the Reservoir and simulate the same tracer release in the model to validate the model (regulatory requirement)
- Assess the impact of a diffuser on the potable reuse water discharge to improve mixing and prevent short-circuiting to the Westlake Filtration Plant's inlet tower

References

State Water Resources Control Board, 2015. Regulations Related to Recycled Water. California Code of Regulations, Titles 22 and 17, Titles 22 and 17.

February 5, 2018 JPA Board Meeting

TO: Board of Directors

FROM: Finance & Administration

Subject : Annual Supply and Delivery of Ferric Chloride: Award

On January 9, 2018, the LVMWD Board, acting as the Administering Agent of the JPA, accepted a bid from Miles Chemical Company, Inc., and authorized the General Manager to approve an initial one-year purchase order, in the amount of $75,050, with four one-year renewal options, in the amount of $80,401 each, for the supply and delivery of ferric chloride.

SUMMARY:

On November 20, 2017, a request for bids for the annual supply and delivery of ferric chloride was released to establish an annual purchase order contract with four one-year renewal options to ensure favorable pricing for the chemical based on total volume. Ferric chloride is used to minimize the formation of hydrogen sulfide in raw sludge as it is pumped to the Rancho Las Virgenes Composting Facility for processing. Award of the bid ensures the JPA will receive competitive pricing throughout the contract period.

RECOMMENDATION(S):

FISCAL IMPACT:

Yes

ITEM BUDGETED:

Yes

FINANCIAL IMPACT:

The total estimated annual cost for ferric chloride is $80,401, resulting in an estimated cumulative total of $402,005 for five years. The cost for the initial 12-month period is $5,351 less than for subsequent years to account for one order placed after the bids were received. The proposed pricing is 1.5% higher than current; however, the JPA's previous vendor had proposed a 46% increase for renewal. Awarding the bid to Miles results in an annual savings of approximately $21,270, as compared to the renewal pricing offered by the JPA's existing vendor. Sufficient funds are available for this purpose in the adopted Fiscal Year 2017-18 JPA Budget and will be proposed in future year budgets.

DISCUSSION:

Background:

Ferric chloride is used to minimize the formation of hydrogen sulfide in raw sludge as it is pumped to the Rancho Las Virgenes Composting Facility for processing. The chemical contract was last put out for bid in December 2014. The previous contract expired on November 30, 2017. While there was one remaining renewal option available under the contract, the JPA was unable to reach agreement with the vendor on pricing as the incumbent was seeking a 46% increase. Therefore, a request for bids was issued on November 20, 2017. Additional chemical was needed after the contract expired, so a single order was placed with the low bidder, in the amount of $5,351, pending award of the contract.

Bid Process:

A request for bids was posted on the LVMWD website and advertised in *The Acorn*, and notification was sent to 10 different vendors that previously expressed interest in chemical bids. Four responses were received and publicly opened. Miles submitted the lowest responsive, responsible bid with a unit price of $489.50 per dry ton. The competitive bidding process resulted in a minimal increase of 1.5%, as compared to current pricing of $425 per dry ton. Awarding the bid to Miles will result in an annual savings of approximately $21,270, as compared to the renewal pricing offered by the JPA's existing vendor.

A copy of the bid from Miles is attached for reference.

Bid Summary:

Bidder	Unit Price per Dry Ton	Extended Total
Miles Chemical Company, Inc.	$489.50	$80,400.38
Pennco	$515.00	$84,588.75
Kemira	$619.00	$101,670.75
Univar	responded with no bid	

GOALS:

Ensure Effective Utilization of the Public's Assets and Money

This action will secure long-term pricing for ferric chloride using a volume discount.

Prepared by: Gretchen Bullock, Purchasing Supervisor

ATTACHMENTS:

Miles Chemical Company Bid

Las Virgenes Municipal Water District
Bid Form-Schedule
Ferric Chloride

The undersigned states and declares as follows: that the bidder has carefully read and examined the Bid Documents; Bid Notice; Instruction to Bidders; Bid Specifications including exhibits; Bid Form-Schedule; and that the bidder will comply with the bid terms and conditions. The undersigned agrees to supply and deliver materials in strict conformity with the specifications and instructions enclosed with the Invitation for Bids for the prices set forth below in this bid schedule.

It is understood that this bid shall remain open and shall not be withdrawn for a period of ninety (90) days from the date prescribed for the opening of the bid.

It is further agreed that the materials/services to be furnished under this bid shall be delivered at such time and in such quantities as called for by the Las Virgenes Municipal Water District. The District may extend the term of this contract by written notice to the supplier at the end of the contract period.

CONTRACT TERM as follows: initial contract term shall be good for one (1) year from date of contract execution. Four (4) additional one (1) year renewals may be negotiated at the District's option.

Materials to be furnished under this bid shall be delivered FOB Destination Freight Pre-Paid and Allowed to Las Virgenes Municipal Water District's Tapia Water Reclamation Facility, 731 Malibu Canyon Road, Calabasas, CA 91302 in the manner set forth in the Bid Scope and Specifications.

All bidders are required to submit the following information with their bid

- Completed Bid Form-Schedule *(2 pages)*
- Product information/technical data sheet
- Global Harmonized System-Safety Data Sheet (GHS-SDS)

The bidder's authorized officer identified below hereby declares that the representations in this bid are true and correct and of my own personal knowledge, and that these representations are made under penalty of perjury under the laws of the State of California, and that I am duly authorized to bind this bidder to this bid.

>>>continued on next page<<<

Bid Item No.	Quantity	Unit of Measure UOM	Description Refer to Bid Scope & Specifications for detailed description	Unit Price	Extended Price
1.	150	Dry ton	Ferric Chloride	489.50	73425.00
			CA Sales Tax	9.5%	6975.38
			Total Bid	$	80400.38

Written Total Bid Amount:
Eighty Thousand four hundred Dollars and Thirty Eight Cents

Notes or Exceptions:

Addendum Acknowledgement:

Addendum #1 [V] Signed:
if applicable
Addendum #2 [ ] Signed:

Bidder:

Miles Chemical Company Inc — Corporate Name of Bidder
12/12/17 — Date

By: — Authorized Signature
Title: Vice President Sales and Marketing

Dan Zinman — Print Name
dana mileschemical.com — E-mail

303 504 3355 — Phone

12801 Ruxton St Pacoima 91331 — Address
818 504 3366 — Fax