APPENDIX 4.9

CECorps Design Report for Hudson Landing Road

December 2016

APPENDIX 4.9 HUDSON LANDING DESIGN REPORT

This addendum summarizes the results of the design report prepared by a five-person Community Engineering Corps (CECorps) project team of professional engineers dated December 7, 2016 as well as additions to the original report prepared by Peter Waugh, consulting engineer, and the Salinas Valley Water and Wastewater Planning Project Team. Table 1 summarizes the results of the combined work with the intent of providing important cost information for the property owner and residents of the Hudson Landing Road neighborhood.

Table 1 Summary of Capital Construction and Operation/Maintenance Costs for Hudson Landing Road

	Alt 1: Consolidation	Alt 2: New Well	Alt 3a: Wellhead Treatment for All Wells[1]	Alt 3b: Wellhead Treatment for All Wells[2]
Source of Information	CECorps	CECorps	CECorps	Project Team
Capital Cost	$4,089,771	$2,899,285	$1,275,300	$1,226,298
Annual O&M Cost	$93,686[3]	$156,780	$166,725	$582,963
Net Present Value	$5,730,700	$5,646,285	$4,196,300	$11,440,298
Estimated average monthly cost/home	$98[4]	$163	$174	$607

Notes:

[1] See Appendix 8, Page 2 of Hudson Landing Design Report for more detail on this cost estimate. Capital cost based on quote from Evoqua for 50 wellhead treatment systems and associated costs. O&M costs include $1500 per treatment system for "annual maintenance cost," energy cost, and cost for well testing.

[2] See pages 2-3 of this coversheet/addendum and Appendix 4.14 Engineer's Memorandum for more information. Capital cost based on quote from Culligan for 50 wellhead treatment systems and associated costs. O&M costs include cost for waste disposal, hauling, and operator.

[3] The operation and maintenance cost was calculated by multiplying the estimated annual water cost per home by the number of homes. In the CECorps report, consolidation was listed as alternative 5.

[4] Based upon 4 residents using 100 gallons per person per day and Pajaro Sunny Mesa CSD 2018 rate schedule ($15.29 for 5/8" water meter charge plus $5.13 per CCF).

Summary of CECorps Design Report

Hudson Landing Road is an unincorporated community of about 80 homes located in north Monterey County approximately one mile west of Las Lomas, California. The homes in the area are served by about 50 individual wells. Many wells serve just one home while several wells serve more than one residence. Many of the wells in the neighborhood have elevated levels of nitrate and/or chromium 6. Five alternative solutions were considered for bringing the water supply into compliance with applicable water quality standards: 1) treatment for all wells, 2) treatment for selected wells, 3) installation of a new deep well, 4) blending water from select wells and 5) consolidation with a nearby municipal water system. The preferred alternative is consolidation with the Pajaro/Sunny Mesa Community Service District water system. A summary of costs for three of the alternatives is presented in Table 1 above.

Additions/Revisions to the Original Design Report

a) Standardized Water Demand

A standard method for calculating water demand has been developed for use in the water supply system analysis for each community. This method is summarized in Appendix 4.14 Engineer's Memorandum. Table 2 shows the water demand for each alternative in Hudson Landing Rd.

Table 2 Water Demand for Hudson Landing Road Alternative Water System Improvements

Alternative	Design Water Demand[1,2]
Alternative 1 – Consolidation	ADD = 25,920 gpd, MDD = 58,320 gpd, PHD = 3,645 gph
Alternative 2 – New deep well	ADD = 25,920 gpd, MDD = 58,320 gpd, PHD = 3,645 gph
Alternative 3 – Treatment for all wells	Single residence well: 3 gpm Two residence wells: 6 gpm Seven residence wells: 21 gpm 13 residence wells: 39 gpm

Notes:

[1] ADD = average daily demand, MDD = maximum daily demand, PHD = peak hour demand, gpd = gallons per day, gph = gallons per hour, gpm = gallons per minute

[2] Note that consolidation water demand may be modified by the consolidation partner if they have historic water demand data to support using a different value.

b) Wellhead Treatment

The wellhead treatment cost (Alternative 3b) for each existing well was recalculated using the same criteria as the Middlefield Road and Santa Teresa water systems. Each new treatment system would include an ion exchange treatment facility, a small shed to house the facility, a 3,000 gallon plastic storage tank to accept the waste brine and a 50 gpm pump to transfer the water to the hauling truck. The operation and maintenance costs include weekly visits by an operator, hauling the waste stream to a treatment facility (approximately monthly) and disposal at the treatment facility. Additional information about this scenario is included in Appendix 4.14 Engineer's Memorandum. A summary of treatment costs in provided in Table 3 below. This includes the capital construction cost as well as the monthly operation and maintenance cost.

Table 3 Summary of Capital Construction Cost and Operation/Maintenance Cost for Hudson Landing Wellhead Treatment Option

Alternative	No. of Wells	Homes per Well	Cost per Home[4]		
			Capital Construction Cost	Monthly O/M Cost	Annual O/M Cost
No 3b – Treatment for individual wells	41	1	$21,358	$872	$10,470
	6	2	$32,036[1]	$1,308	$15,696
	2	7	$36,917[2]	$1,836	$22,032
	1[3]	13	$84,570	$1,288	$15,453
	Total = 50		$1,226,298	$48,560	$582,963

Notes:

[1] The cost shown is the average of the two example systems with two homes each shown Appendix 4.14 Engineer's Memorandum

[2] Use the same value as for Middlefield Road #3 system that also has 7 homes.

[3] This system has chromium-6 removal only. There is no nitrate removal required.

[4] Cost are from Appendix 4.14 Engineer's Memorandum. Note that the single-family treatment is calculated as 2/3 of the two residence wells.

c) Net Present Value and Monthly Cost Per Household

The economic evaluation for Hudson Landing Road was updated to include net present value and projected monthly cost per household using the Johnson Road CECorps team's methodology. Page 20 of Appendix 4.2 Johnson Road CECorps Design Report describes this methodology:

> "The economic evaluation also includes a comparison of the Net Present Value (NPV) of each alternative, which assumes an O&M inflation rate of 1.9% and annual discount rate of 3.1% over a 20 year term. The costs presented in this evaluation are in 2016 dollars, and the backup for these cost estimates can be found in Appendix F... To evaluate each alternative's cost impact on the community members, the estimated annual O&M costs were divided to show the amount that would be paid by each household on a monthly basis."

SALINAS VALLEY WATER SUPPLY PROJECTS

HUDSON LANDING ROAD (HLR) COMMUNITY

Monterey County, California

FEASIBILITY STUDY

Prepared for:

Environment Justice Coalition for Water

229 Pajaro Street, Suite 204

Salinas, CA 93901

Prepared by:

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7 December 2016

FEASIBILITY STUDY
Salinas Valley Water Supply Projects
Hudson Landing Road Community
Monterey County, California

This report was prepared by the EWB-CEC-HLR Project Team under the supervision of the Engineer of Record whose seal and signature appear hereon.

The findings, recommendations, or professional opinions are presented within the limits described by the client and available data, in accordance with generally accepted professional engineering and geologic practices. No warranty is expressed or implied. This work is intended solely for Environment Justice Coalition for Water (EJCW). Any use which a third party makes of the work, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Decisions made or actions taken as a result of our work shall be the responsibility of the parties directly involved in the decisions or actions.

Phuc H. Vu, PE
Engineer of Record

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EXECUTIVE SUMMARY

Environment Justice Coalition for Water is working with EWB-CEC to conduct feasibility studies and preliminary engineering for the Salinas Valley Water Supply Projects. The Hudson Landing Road (HLR) community project is a water quality and quantity improvement project to assist one of eight underserved and limited resources communities in Monterey County, California. The goal of the project is to provide safe drinking water to a community of approximately 80 residences. The proposed alternatives will be long-term sustainable and at the most cost effective to the community. All proposals described in this report will be evaluated for compliance with the all applicable safe drinking water codes. This Feasibility Study Report will be developed into grant applications and later resulted in design and implementation.

Summary of Alternatives

Alternative	Summary
Alternative 1: Treatment for individual residential wells	Each wellhead would be fitted with a treatment package. Each would be tailored to the specific contaminants to be removed to meet the water quality requirements.
Alternative 2: Treatment for select wells	Same as Alternative 1 but only select wells will be treated to meet community's needs. A distribution system is needed.
Alternative 3: Installation of new deep well	Install new wells within the HLR community and treat the water from the well to meet the water quality requirements. A distribution system is needed.
Alternative 4: Blending of water from select wells	Several wells that tested satisfactory would be blended with other wells that do not have satisfactory water quality.
Alternative 5: Interconnect with the municipal water system	The community water demand will be part of the Pajaro/Sunny Mesa Community Service District service area. A distribution system is needed.

Recommended Alternative

The long term and reasonable option for the residents of the Hudson Landing Road community is the installation of a water distribution system interconnected with the Pajaro/Sunny Mesa Community Service District (CSD). Inter-connect with the municipal water system is the only viable option for this community at this time. CSD is a central managing authority to maintain and monitor the system and to collect reasonable revenues to keep the system well maintained and up to date with ever changing regulations and standards. Alternative 5 of this report is the recommended option.

1. INTRODUCTION

Project Background

Community Engineering Corp (CECorps) is working with eight small, underserved and limited resources communities in the Salinas River Valley in California at the request of the partner NGO, the Environmental Justice Coalition for Water. The CECorps project teams are helping the communities to identify and evaluate solutions to water supply and sanitation problems. A project team (Team) was assigned to work with the Hudson Landing Road community.

Scope of Work

The following is the proposed scope of work by EJCW:

- Gather Community-specific Information
- Evaluate Three Primary Solutions:
    1. Consolidation (Tie-in to Nearby Existing System)
    2. Well Improvements or New Well
    3. Wellhead Treatment
- For Each Potential Solution:
    1. Draft Potential Layout for Community-specific Application
    2. Develop preliminary equipment and/or sizing of solution components
    3. Develop ballpark planning budget estimates for each potential solution
    4. Identify the advantages and disadvantages for each potential solution
- Compare Solution Alternatives
- Identify the Preferred Solutions

Site Visit

The Team conducted a site visit in July of 2016 to assess the community and conduct the resources inventory (See Appendix 1 – Site Visit Notes). A meeting was held with EJCW to discuss the work plan. Afterward a meeting was also held with a community representative, Terry Martinez (319 Hudson Landing Rd.), to discuss the ongoing water problems.

2. DESCRIPTION OF COMMUNITY

Hudson Landing Road (HLR) community is an unincorporated community in North Monterey County. The HLR community is located one mile west of Las Lomas, California. HLR is at the headwaters of the Elkhorn Slough and Preserve which is a very biologically productive and environmentally sensitive seawater estuary. This is a rural community situated in an active agricultural area with predominately row crops such as strawberries and confined livestock operations (cattle,

sheep, goats, & poultry). HLR is made up of approximately 80 households (3.24 persons per household, 2010 US Census) and the residents are likely to be agricultural workers or workers in the agricultural industry.

3. DESCRIPTION OF WATER QUALITY PROBLEMS

When agricultural fertilizers applied to fields, Nitrates easily leach into soil and ultimately into water aquifers. Also, the HLR community has concentrated belowground sewage disposal fields, Nitrate-rich seepage from septic systems is a significant contributor to the problem of groundwater pollution. HLR's close proximity to these activities is most likely the cause of these contamination and health code issues.

The HLR community is served primarily by individual domestic wells with several locations where multiple residents are served from a single well, forming a small water system. The well water primarily use for food preparation and personal hygiene as well as landscape irrigation. Operation and Maintenance (O&M) is not being performed on a regular basis or none at all for the treatment systems (possibly due to cost). One resident reported of disintegrating fabrics with laundered clothing. Due to the lack of treatments and contaminations, bottled water is the only viable option at this time with grant assistance from EJCW. These systems are a significant financial burden on the community.

A number of the multi-resident wells are currently out of compliance with Monterey County regulations related to nitrates in their water supply. The nitrates levels found are upward of 3 times the allowable for drinking water. In addition, the water is potentially being influenced by other contaminants (e.g. Chromium-6 (Cr-6) and seawater intrusion).

4. GOALS and OBJECTIVES

The primary goal of the overall program is to develop plans that provide the community with a clean, safe, and affordable potable water supply that meets all Federal and State of California drinking water standards. The goals and objectives of this report focus on three items of work:

1. Assess existing site conditions and compile all available data.
2. Analyze the information and provide alternatives to EJCW and the HLR community that will be sustainable and achievable.
3. Assist the community identify and evaluate solutions to water supply.

5. SITE CONDITION

Topography

Topography of the project site and adjacent areas is shown below. The data is derived from a

USGS 7.5-minute quad Map and Google Map service. The community is at relative elevation 10 feet, the sounding hills are at relative elevation 110 feet, and the highest ground is at elevation +300 feet to the northeast. (See Figure 1)

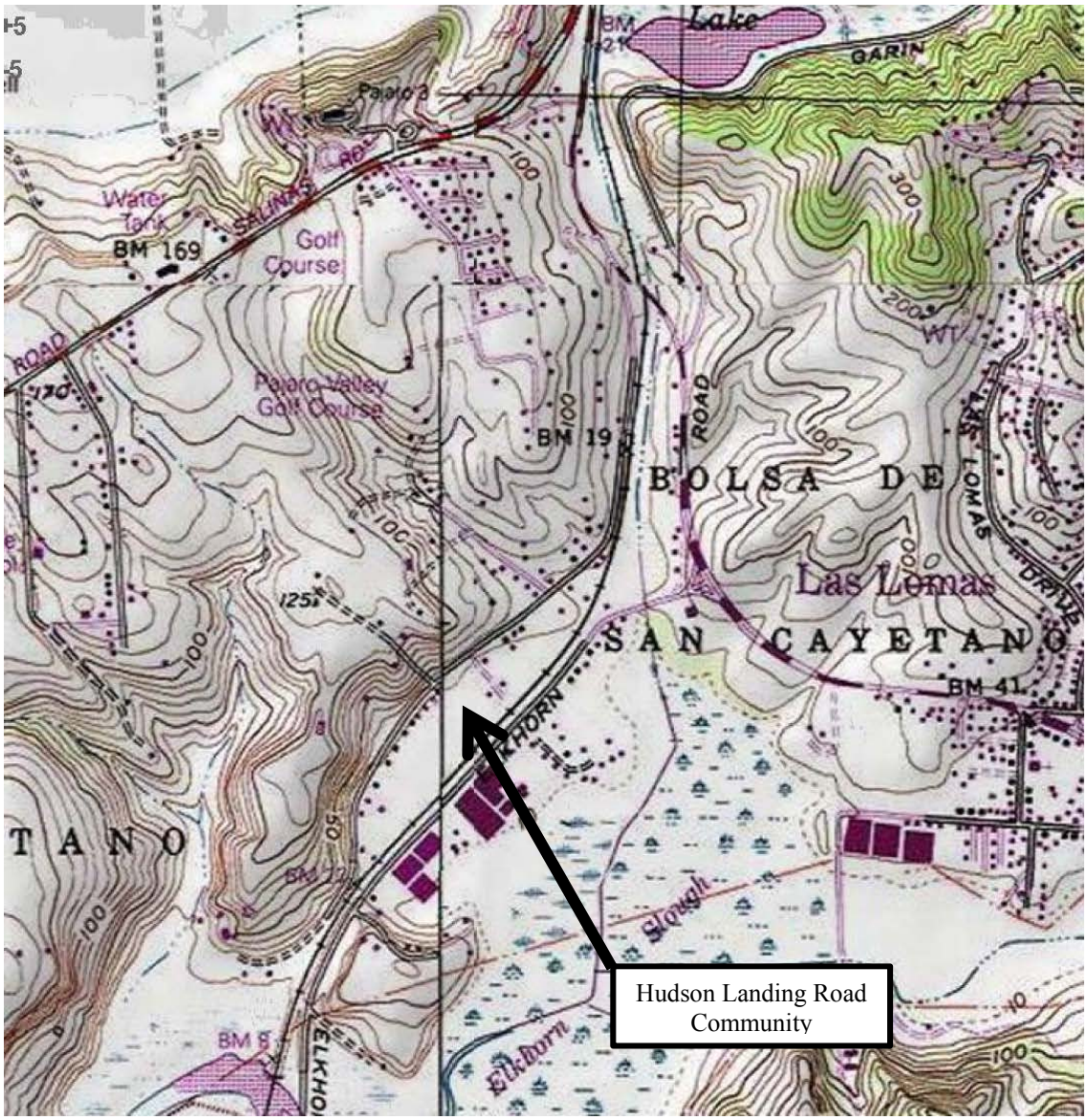

Figure 1 – Topography Map, Hudson Landing Road area

Landscape

The HLR community is at the head of the Elkhorn Slough Estuary with freshwater enters Elkhorn Slough from Carneros Creek. The community is bordered by Hall Road to the east, Elkhorn Road to the southwest, and a golf course to the northwest on top of the hill overlooking the community (See Figure 2). The landscape is intermittent mix of houses with pastures and row crops.

Figure 2 – Aerial View, Hudson Landing Road area

Landscape Geologic Setting and Soils

The Elkhorn Slough Estuary is a tidal estuary that opens to the Pacific Ocean in northern Monterey County, just south of Watsonville. The area is characterized by old sand dunes, tidal wetlands along Elkhorn Slough, and inter dune areas that have a seasonal high water table. Much of the housing development has occurred on a soil mapped as wetland (map unit symbol – Af) along Hudson Landing Road.

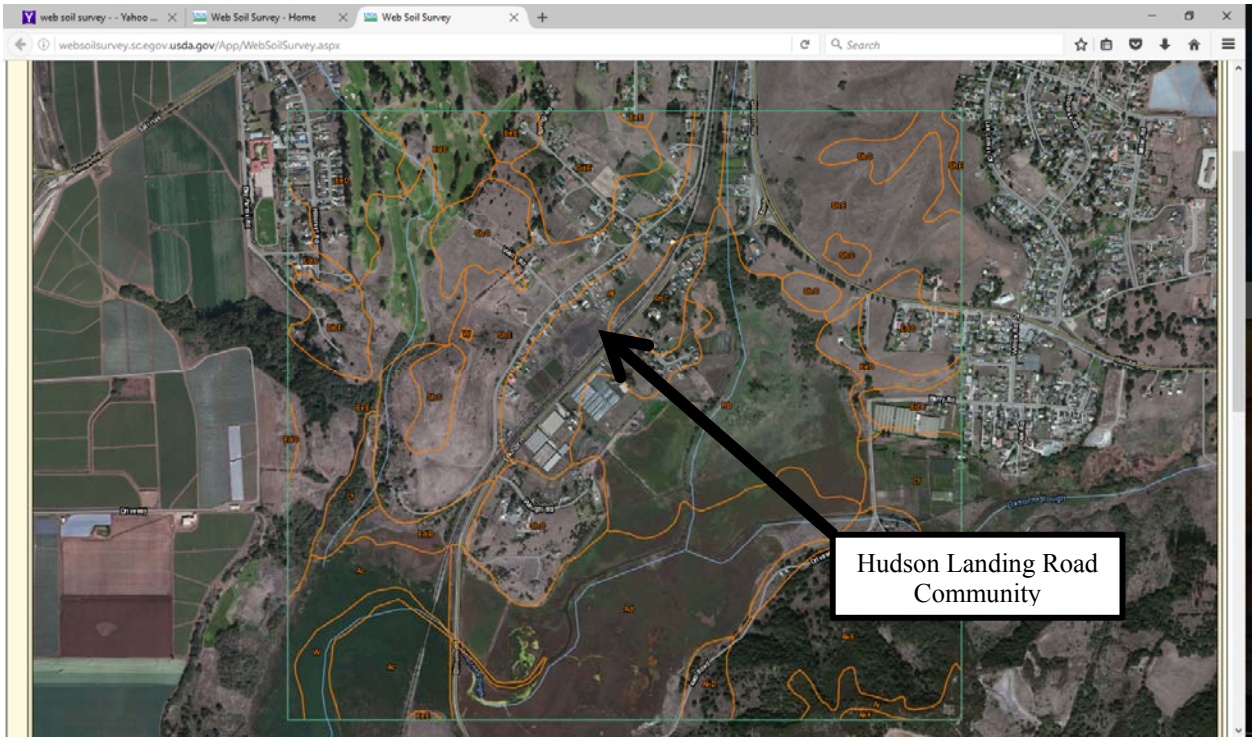

Figure 3 – NRCS Web Soil Survey Map, Hudson Landing Road area

Geology and Groundwater

The Aromas Sand Aquifer consists of an upper and lower sand unit that yields water to wells in the area. These sands are exposed in the uplands east of the project area, but are below the ground surface in the Hudson Landing area. The sand units are described in the well logs in the Hudson Landing area and are the principal water-bearing strata in many of the local wells. The geologic map below is an excerpt from USGS publication:

GEOLOGIC MAP OF THE MONTEREY 30'x60' QUADRANGLE
AND ADJACENT AREAS, CALIFORNIA
Compiled by
David L. Wagner[1], H. Gary Greene[2], George J. Saucedo[1]
and Cynthia L. Pridmore[1]
2002
Digitized by
Sarah E. Watkins[1], Jason D. Little[1] and Joseph J. Bizzarro[2]

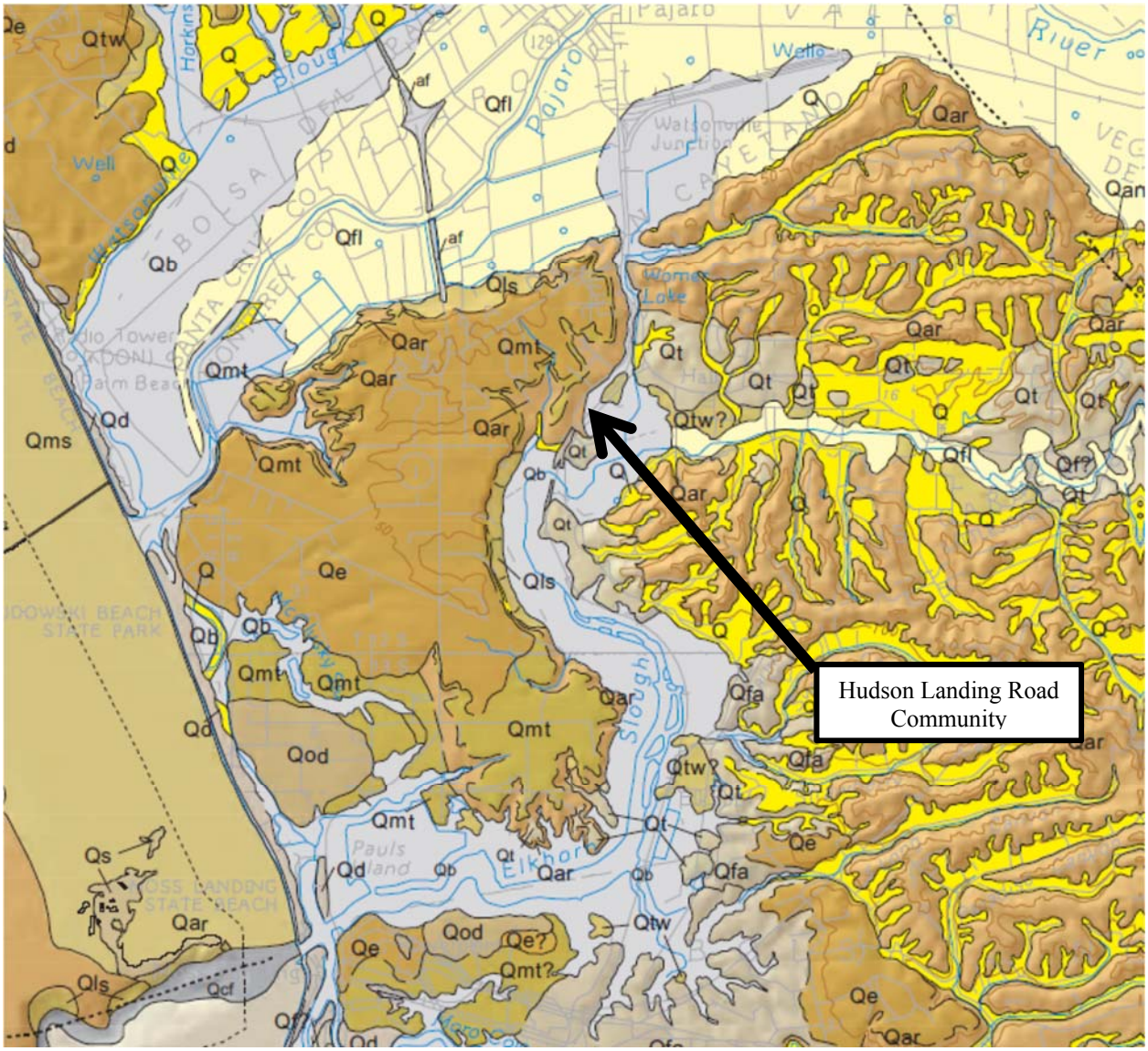

Figure 4 – Geologic Map, Elkhorn Slough Estuary

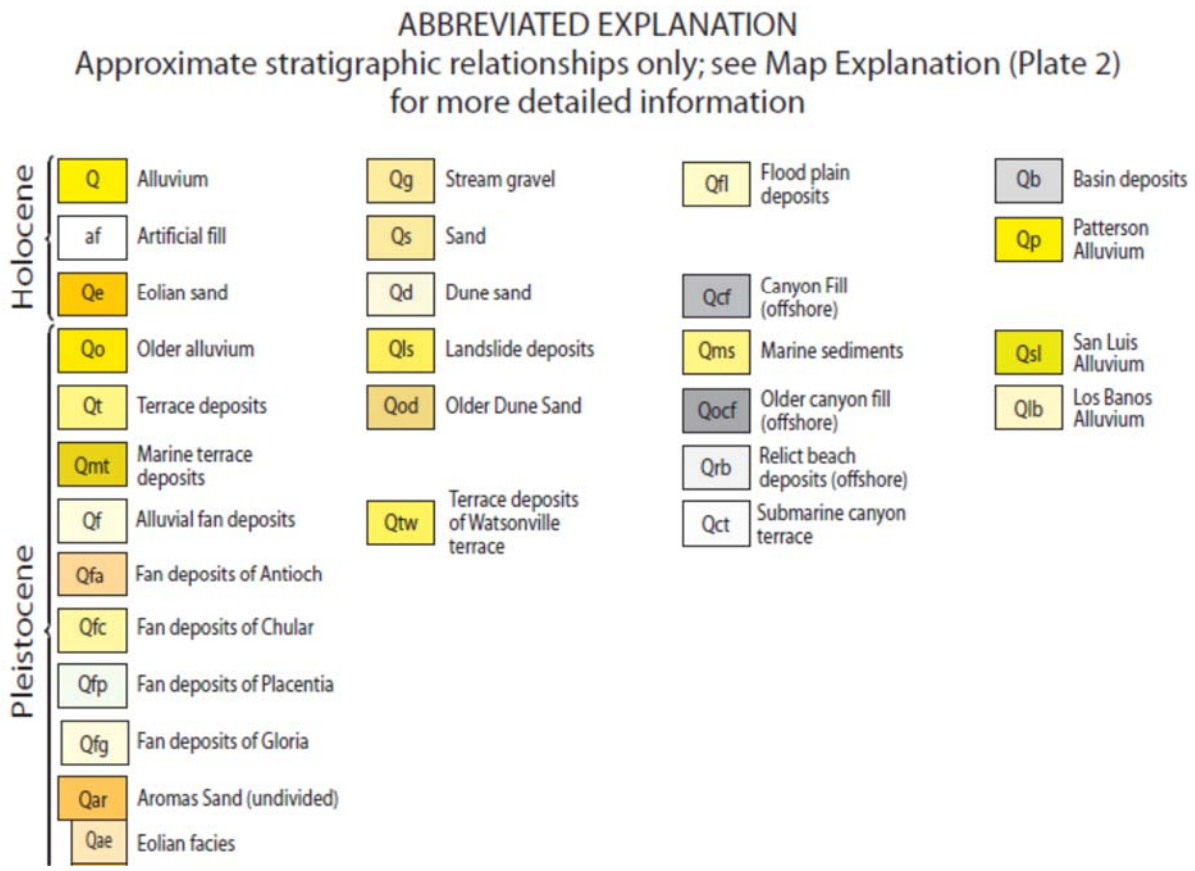

Figure 5 – Legends, Geologic Map

Water Quality

As part of this study, two wells are scheduled to be tested for water quality parameters. A comprehensive testing was performed at well HL WS#8 and a second test is planned for well HL WS#1 (See Appendix 3: Wells Location Map). The laboratory results for well HL WS#8 confirmed a high Cr-6 level of 22, or twice the Maximum Contaminant Level. All other parameters are within the allowable limits (See Appendix 4: Well Test Data). Appendix 4 is to be updated upon well HL WS#1 test completion.

6. PROJECT EVALUATION AND ANALYSIS

As stated previously, a number of wells are currently out of compliance. Many of these wells have a long history of nitrate (NO_3) contamination. These marginal systems are a serious health risk to the users and a significant financial burden on the community.

Another serious water quality problem is the recently discovered Chromium-6 (Cr-6) which is naturally present in the geological formations of the area. The local municipal water utility, Pajaro/Sunny Mesa Community Service District, confirmed the existence of Cr-6 and is implementing a treatment process for two of their wells located just north of HLR across from Elkhorn Road.

In addition, there is evidence that there is some seawater intrusion affecting some wells. The close proximity of the community to the salt water slough is the likely cause (Figure 3).

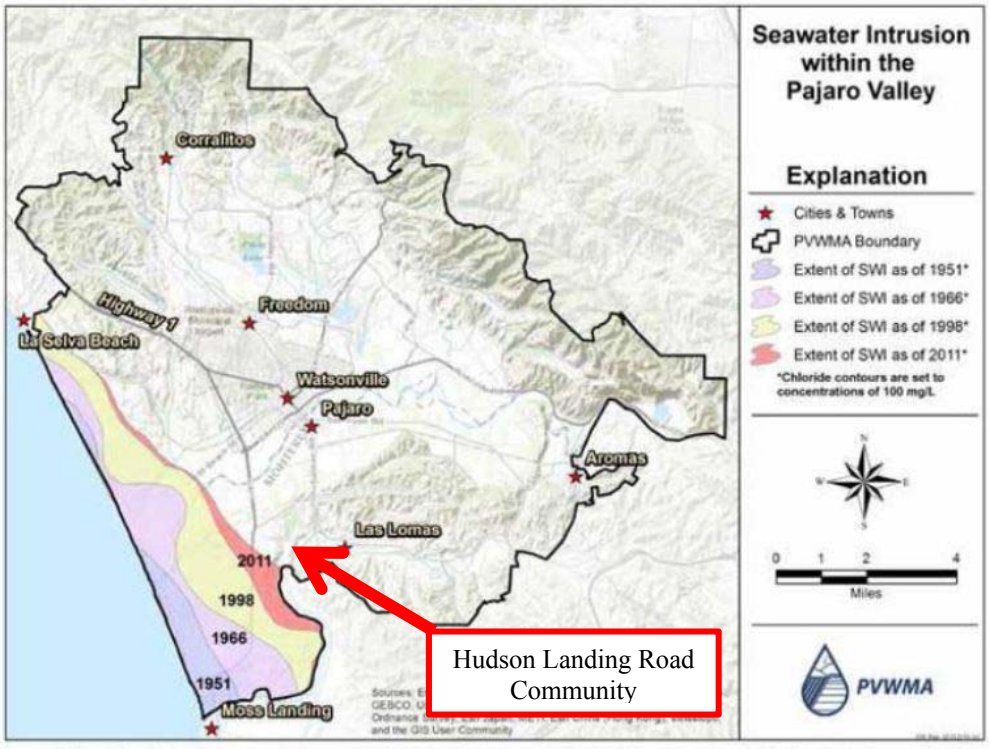

Figure 6 – Seawater Intrusion Map (Source: Pajaro Valley Water Management Agency, 2/2014)

There are serious ongoing and long-term problems with continued use of the wells in the HLR community for human consumption. There are other constituents that are being tested for safe drinking water that have not been included in Monterey County periodic testing that are regulated or tentatively set for regulation. Treatment solutions for individual wells or for select community wells are evaluated and identified as part of this study, but in order for any ongoing maintenance and monitoring to be successful with these options, there must be a single administrative entity to manage the system. No continued well use alternative can succeed with the assumption that individual residents would perform the required functions. Interviews with residents confirmed that they may initially be conscientious in checking their water quality and changing filters as needed, but these tasks soon become low priority and eventually are abandoned. It is unreasonable to expect continuous monitoring by residents of the ever changing drinking water standards and requirements of clean water regulations. The residents are friendly and communicative with one another, but in spite of decades of dealing with serious well problems, there has been no continuous, effective effort to address these issues on a community-wide basis.

The Pajaro/Sunny Mesa Community Services District (CSD) provides the water services to the Watsonville area & areas adjacent to the Hudson Landing Road community. In 2006, a detailed water engineering feasibility study was prepared for the CSD with regard to the HLR community being incorporated into the CSD (See Appendix 6: 2006 Engineer's Report for Hudson Landing Assessment District). It is understood that the proposed cost allocation and the overall magnitude of the costs prevented the implementation of the study recommendations in the past. Two primary benefits for the community if the community interconnect with the municipal water system are:

1. Being a municipal water purveyor, CSD must meet Federal & State ongoing clean water standards as they change.
2. CSD is in the process of implementing a treatment process for Cr-6 for their wells near the HLR intersection.

A community of 80 households will not likely be able to keep pace with the maintenance of their system or the ever changing standards. Connection to the municipal network is the only viable long term solution.

7. PROJECT ALTERNATIVES

Five water treatment alternatives were considered for this study. The alternatives are listed below.

Alternative	Summary
Alternative 1: Treatment for all wells	Each wellhead would be fitted with a treatment package. Each would be tailored to the specific contaminants to be removed to meet the water quality requirements.
Alternative 2: Treatment for select wells	Same as Alternative 1 but only select wells will be treated to meet community's needs. A distribution system is needed.
Alternative 3: Installation of new deep wells	Install new wells within the HLR community and treat the water from the well to meet the water quality requirements. A distribution system is needed.
Alternative 4: Blending of water from select wells	Several wells that tested satisfactory would be blended with other wells that do not have satisfactory water quality.
Alternative 5: Interconnect with the municipal water system	The community water demand will be part of the Pajaro/Sunny Mesa Community Service District service area. A distribution system is needed.

Table 1 - Summary of Alternatives

Alternative 1 through 4 required additional well testing. This will provide a more accurate estimates of the treatment methods and cost.

A storage tank is needed for Alternative 2 due to a minimum flow condition for the proposed treatment system. The proposed treatment facility requires a minimum of 25 gallons per minute (gpm) flow and without a storage tank demands less than 25 gpm would be difficult to treat.

The capital and O&M costs for Alternative 2 is significantly higher than Alternative 1 is due to Alternative 2 involves construction of a distribution system comprising of 9,650 linear feet of 6-inch pipe.

Alternative 4 cost estimate is not being considered at this time due to the high degree of uncertainty with the water quality of existing wells and marginal benefits compare to other alternatives.

Alternative 2-5 would require a distribution system in order to service all 80 residents (See .0Appendix 7: Conceptual Water Distribution System Layouts).

Alternative	Total Cost ($)	Annual O & M	Potential for Grant/Loan*
Alternative 1: Treatment for all wells	$1,275,300	$166,725	Not likely
Alternative 2: Treatment for select wells	$3,191,049	$434,109	Not likely
Alternative 3: Installation of new deep well	$2,899,285	$156,780	Likely
Alternative 4: Blending of water from select wells	NA	NA	NA
Alternative 5: Interconnect with the municipal water system	$4,089,771	NA	Likely

Table 2 – Cost Comparison of Alternatives

* Funding determinations based on previously funded USDA projects and discussion with the USDA field representative in the USDA Santa Maria field office.

<u>Alternative 1</u> – Wellhead treatment for all wells

There are approximately 50 active wells in the study area. At several locations, there are multiple connections to these wells and several households use the water from these sources. There are seven properties at the end of Fruitland Road connected to a single well. There is one property near the intersection of Hudson Landing and Elkhorn Roads that has four connections to their well. There are several other locations where there are multiple users on one well. Since many of the wells are located on private property and there was no access for the Team, the exact number of connections could not be

precisely determined; therefore this analysis will assume that there are 50 individual wells to be considered. For this alternative, each wellhead would be fitted with a treatment package of filters and chemicals. Each would be tailored to the specific constituents to be removed.

Since the contaminants vary from well to well as do the concentrations, it is highly unlikely that one specific package would satisfy every location. The cost per well for testing is $2,500 or $125,000 for all 50 well sites. It is estimated that the unit cost for the individual treatment packages would be approximately $10,000 or $500,000 for 50 locations. The total cost for testing and implementation of the system is $1,275,399. In addition, the annual maintenance costs are estimated to be approximately $2,084 per household for 80 residents. The cost summary is shown in Appendix 8 – Alternative 1. The pros and cons are as follows:

Pros:

- the treatment system could be implemented in a relatively short time frame
- there would be very limited engineering design costs
- residents would maintain their independent control over their water source
- residents would have relatively minor cost increases for their system maintenance

Cons:

- each well would have to be tested to determine the specific treatment regiment
- this option would be an interim program, pushing any long term permanent solution into the future
- it is unlikely that the community would be eligible for a cost-share loan/grant since this option is not a long term solution
- while the new costs associated with this option would be relatively small in comparison with the other alternatives, there is still be an increase above their current costs
- without a single authority to maintain and monitor the 50 wells, there is no guarantee that the wells will be operated in accordance with clean water requirements
- each property owner would be bill for the principle and interest on the loan for the system
- no fire protection would be included since there is no distribution system

Alternative 2 – Wellhead treatment for select wells

This option would require the testing of several wells to establish 2 new locations to tap for a distribution system serving all residents. The seven households at the end of Fruitland Road would continue to use their existing well, but a treatment package would be installed. It would be included in the management authority.

For the three wells serving properties on Hudson Landing Road, Wells Road, and Spring Road, a distribution network of approximately 9,650 linear feet of pipe would have to be designed and

installed. Treatment packages would also be required for these three wells. The cost summary is shown in Appendix 8 – Alternative 2. The pros and cons are as follows:

Pros:

- this option would necessitate the establishment of an administrative authority to maintain and monitor the system, thus giving the residents a role in monitoring the operation
- residents would have a more secure water supply above their existing system and Alternative 1

Cons:

- while this option is an improvement over Alternative 1, this is most likely not a long term solution - it has limitations on addressing changing water quality conditions and clean water requirements
- a detailed engineering design would be required
- the implementation period could be longer because of the testing and evaluation process to select the candidate wells
- processing of agreements with the property owners whose wells were selected could be prolong
- there would be an ongoing maintenance and operations fee
- each property owner would be bill for the principle and interest on the loan for the system
- this is a more expensive option because of the need for a distribution system
- no fire protection would be included since the pumping systems would be designed to accommodate domestic use only
- it is unlikely that this alternative would qualify for cost-share funding based on previously funded USDA projects (see page 14 Table 2, *Note)

Alternative 3 – Installation of new deep wells

Deep wells offer the advantage of eliminating nitrate and fecal intrusion from ground and surface water, but there is still the potential for seawater intrusion and the presence of Cr-6, both of which would require a treatment package if and when these constituents were present. A distribution system of approximately 13,110 linear feet of pipe would be required to serve the entire community, including the seven properties at the end of Fruitland Road. The cost summary is shown in Appendix 8 – Alternative 3. The pros and cons are as follows:

Pros:

- this alternative would necessitate the establishment of an administrative authority to maintain and monitor the system, thus giving the residents a role in monitoring the operation

- this alternative could offer a longer term solution with the establishment of an administrative authority to manage the system. Since individual wells would not be the source of the community's potable water, an operating entity would be required to provide the service
- residents would have a more secure water supply above their existing system and Alternatives 1 and 2

Cons:

- it is unlikely that this alternative would qualify for cost-share funding based on previously funded USDA projects (see page 14 Table 2, *Note), therefore, the 20-year conventional loan would most likely be required
- no fire protection would be included since the pumping system would be designed to accommodate domestic use only
- there would be an ongoing maintenance and operation fee
- each property owner would be bill for the principle and interest on the loan for the system
- new well drilling sites would have to be acquired and water quality established

Alternative 4 – Blending of water from select wells

This is a high-bred alternative with the assumption that several wells would test satisfactory to blend with other wells that do not have satisfactory water quality. Similar to Alternatives 2 and 3, a distribution system would be required to serve the entire community. The selected wellheads would require treatment packages. While this alternative offers an improvement over existing conditions, it is only marginally better in the sense of a long term solution. This is a costly alternative to achieve marginal benefits. The Team will not provide a cost estimate for this alternative at this time.

Alternative 5 – Interconnect with the municipal water system

Of the four previous alternatives, this is the most secure system because the community would receive water treated by the municipal utility, Pajaro/Sunny Mesa Community Service District. The alternative is the most beneficial to the area, providing high quality water that meets all Federal and state drinking water standards and requirements. The Service District is the authority to manage and maintain the system. Treatment is closely monitored. This alternative is very similar to the system studied and proposed in 2006 for the Service District. A larger area of coverage with additional properties is included in this alternative with a distribution system of 13,110 linear feet. It is the most costly alternative of the five considered by the Team, but the project has a very good potential of being funded with a cost-share loan/grant. The cost summary is shown in Appendix 8 – Alternative 5. The pros and cons are as follows:

Pros:

- no new administrative authority would have to be established
- a fire protection system is included
- it is likely that the project would be eligible for cost-share funding based on previously funded USDA projects (see page 14 Table 2, *Note)
- a municipal water system is superior to all the other alternatives
- while the domestic uses will be satisfied by the system, residents will still be able to use their wells for landscaping and cleaning purposes

Cons:

- this is the most costly alternative considered
- there will be a monthly water bill that included the principle and interest payments on the system loan
- a comprehensive engineering design would be required
- several easements across private property would have to be acquired
- the implementation period could be longer due to agreements, contracting, and design

8. RECOMMENDED ALTERNATIVE

The only viable long term option for the residents of the Hudson Landing Road community is the installation of a water distribution system interconnected with the Pajaro/Sunny Mesa Community Service District.

Treatment of individual wellheads (Alternative 1) is not practical given the lack of a unified neighborhood organization that could properly maintain and monitor 50 wells. Even a contract service would be costly and problematic without a central authority to insure payments. The alternatives for wellhead treatment at select wells (Alternative 2), installation of new wells (Alternative 3), or blending water from select wells (Alternative 4) would have the same issues related to the system O&M due to the lack of an administrative authority or system manager to insure proper maintenance and monitoring. Probably the most negative aspect of Alternative 2, 3, and 4 is the fact that they would require a water distribution system very similar to the network studied in Alternative 5 (Note: Alternative 1 does not require a distribution system). There would be no infrastructure cost saving and it is unlikely that the cost-share entity would provide funding for system with such tentative long term viability.

Therefore, Alternative 5, interconnect with the municipal water system, is the only long term option for this community. There will be a central managing authority to maintain and monitor the system and to collect reasonable revenues to keep the system well maintained and up to date with ever changing regulations and standards. Alternative 5 is the recommended option.

9. FUNDING SOURCES

Selection of the water distribution system Alternative 5 connecting to the Pajaro/Sunny Mesa Community Service District is the most expensive option of those considered, but for a long term standpoint, it is the only approach that ensures a safe and acceptable potable water supply for the families along Hudson Landing Road and adjacent residential properties. This was the same conclusion of the comprehensive CSD study conducted in 2006 for this area. However, the recommendations were never implemented primarily due to the lack of acceptable funding options. Over the last decade, cost for all types of utility design and construction has risen significantly. While a detailed project design will be necessary to obtain permits and to implement the project, at this time, the Team estimated that the design, permitting, and implementation for this project will be approximately $4,089,771. The following is the breakdown of costs assuming interest rates of 2% and 3% over a 30-year period and no cost-sharing:

- Monthly payments for $4,089,771 @ 3% is about $17,243/month or $216/month/household
- Monthly payments for $4,089,771 @ 2% is about $15,117/month or $189/month/household

Considering the moderate to low income levels of the majority of the households in the HLR community, it is evident as to why the earlier study recommendations were not implemented. Depending on the household income survey that will be conducted before the end of 2016 by EJCW, there is a good chance that this community will be eligible for some alternative funding for a portion of the project costs.

There are multitude of other possible funding sources that are available to the community through either grants or loan. Potential funding sources are:

- California Department of Public Health (CDPH)
- State Water Resources Control Board (State Water Board)
- Department of Water Resources (DWR)
- California Infrastructure and Economic Development Bank (I-Bank)
- United States Department of Agriculture (USDA)
- US Department of Housing and Urban Development (HUD)
- U.S. Economic Development Administration (EDA)
- Rural Community Assistance Corporation (RCAC)
- The Housing Assistance Council (HAC)
- Cooperative Bank (CoBank)

Funding Scenarios

The Team has limited working knowledge of funding options. Hence, only the known options will be discussed here.

There are several US Department of Agriculture (USDA) water related programs for rural areas such as Northern Monterey County. The two most likely programs to fit the conditions in the HLR community are the Water and Waste Disposal Loan and Grant Program and/or the Emergency and Imminent Community Water Assistance Grant. In other California communities such as Salmon Creek in Sonoma County, the USDA provided 100% of the project funds in the form of 50/50, loan and grant.

Two other supplemental funding possibilities are: 1) State of California's Proposition 1- Water Bond 2014 and 2) through Monterey County government in the form of assistance with the loan document preparation and the associated legal fees.

While it is unknown at this time how much the State or County might be willing to assist financially, the following breakdown of 50% cost share with USDA loan/grant assistance for 2% and 3% over 30 years shows a substantial decrease in the impact on the residents even without a financial value for State and County assistance.

- Monthly payments for $2,044,886 @ 3% = $8621/month or $108/month/household
- Monthly payments for $2,044,886 @ 2% is about $7,558/month or $94/month/household

These cost estimates are only part of the monthly costs that the residents would be required to pay. Since they are currently paying only the electric costs for pumping from their wells, any new expenses would be viewed as substantial. There would be a monthly meter charge (a water availability charge) and the cost of the water they use. Most likely, residents who have wells will continue to use the water for landscaping, and cleaning (exterior washing) which will result in a lower than average household usage.

Upon acceptance of Alternative 5 proposal by the Pajaro/Sunny Mesa Community Service District, the Hudson Landing Road community will be asked to vote to pursue cost-share funding for the design and implementation of a new distribution water system for the.

10. REFERENCES

1. Engineer's Report for Assessment District, 2006
2. Well Logs of the Hudson Landing Road Community, 2016
3. Feasibility Study - San Lucas County Water District Water Supply Project, 2015
4. California Nitrate Project, 2012

LIST OF APPENDICES

- Appendix 1: Site Visit Notes
- Appendix 2: Site Photos
- Appendix 3: Wells Location Map
- Appendix 4: Well Test Data
- Appendix 5: Geology Opinion
- Appendix 6: 2006 Engineer's Report for Hudson Landing Assessment District
- Appendix 7: Conceptual Water Distribution System Layouts
- Appendix 8: Cost Estimates

APPENDIX 2

Site Photos

by Saurabh Shekhar and Thomas O'Kane

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Photo 1 – End or Spring Road

Photo 2 – Resident at 250 Hudson Landing Road

Photo 3 – Pajaro Sunny Mesa CSD wells

Photo 4 – Strawberry Field in the HLR community

Photo 5 – Private Well site

Photo 6 – Existing water system. Hudson Landing road

APPENDIX 3

Wells Location Map

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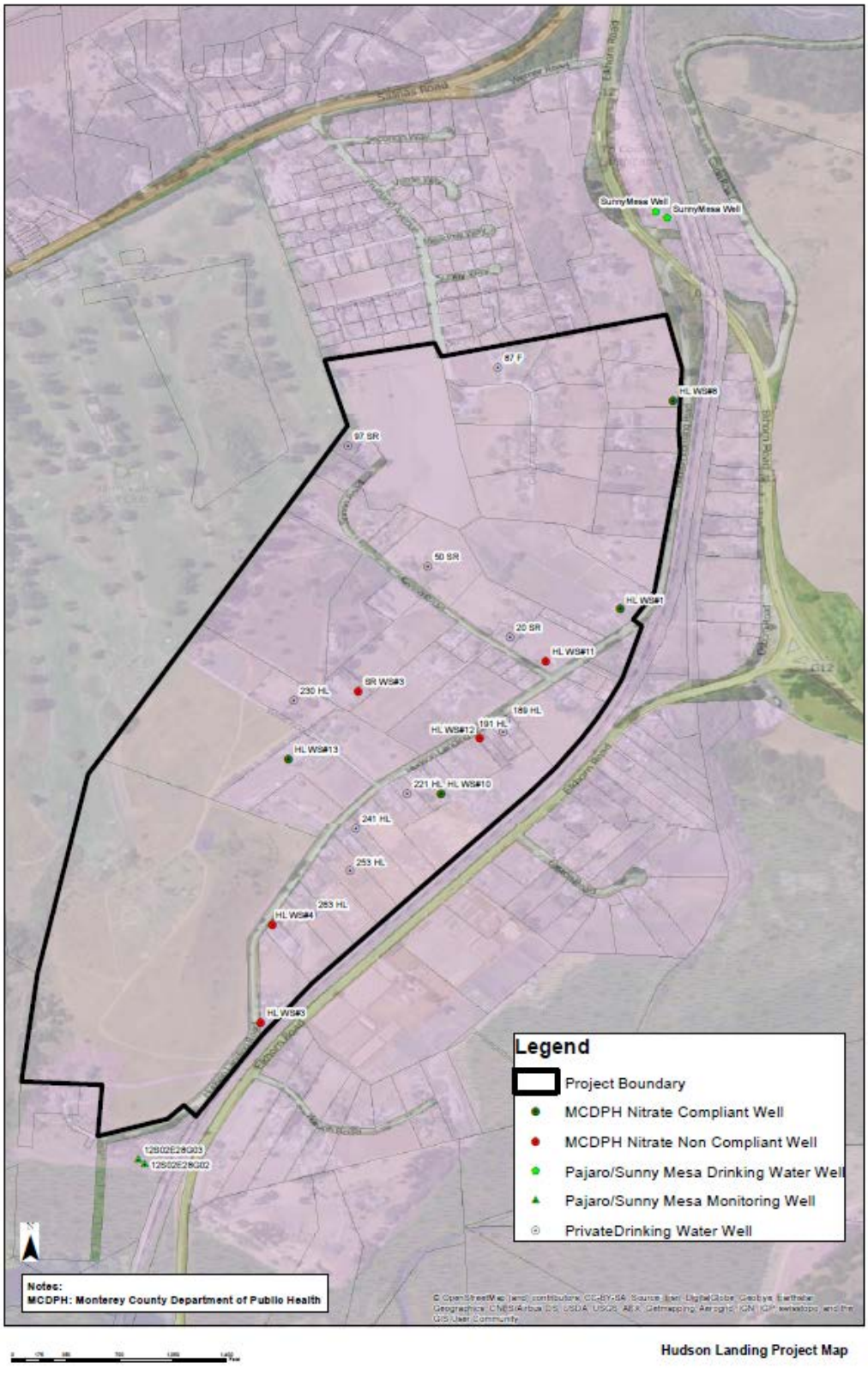
Wells Location



Hudson Landing Project Map

APPENDIX 4

Well Test Data

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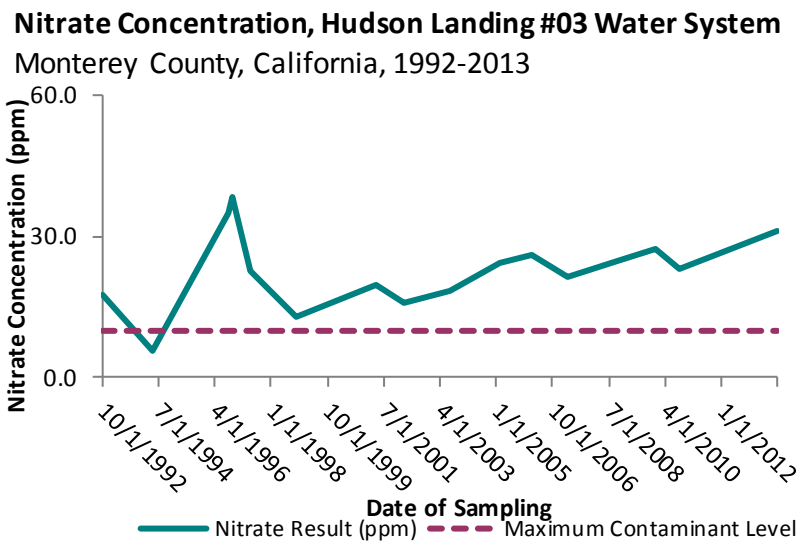
Nitrate Sampling History – Well HL WS#3

Name:	Hudson Landing 03		
Nitrate Sampling History			ID# 2700918
Nitrate Maximum Contaminant Level = 10 ppm			
Date	Sample Address	Nitrate Result (ppm)	Maximum Contaminant Level
10/2/1992	YT	17.4	10
4/1/1994	319 YT	5.4	10
9/30/1996	319 OT	34.8	10
10/29/1996	319 YT	38.4	10
5/29/1997	319YT	22.6	10
10/28/1998	319 YT	12.7	10
4/17/2001	319 YT	19.4	10
2/26/2002	319 YT	15.8	10
7/22/2003	319 OT	18.5	10
2/3/2005	319 YT	24.4	10
2/1/2006	319 YT	26.0	10
3/21/2007	319 YT	21.5	10
10/27/2008	319 YT	24.6	10
12/1/2009	319 YT	27.1	10
9/8/2010	319 YT	22.8	10
9/25/2013	319 YT	30.9	10



Well HL WS#8 Test Results

Engineers Without Borders USA
Lauren Butner
1031 33rd St, Suite 210
Denver, CO 80205
Lauren.Butner@EWB-USA.org

MBAS
Monterey Bay Analytical Services
4 Justin Court Suite D, Monterey, CA 93940
831.375.MBAS
www.MBASinc.com
ELAP Certification Number: 2385

 Friday, August 12, 2016

Lab Number: AB51003

Collection Date/Time:	7/27/2016	14:52	Sample Collector:	WEIDNER-HOLLAND, MASON	Client Sample #:
Submittal Date/Time:	7/27/2016	16:17	Sample ID	HUDSON LANDING WS #8	Coliform Designation: Special

Sample Description: Hudson Landing WS #8, Well

Analyte	Method	Unit	Result	Qual	PQL	MCL	Date Analyzed	Analyst:
Aggressivity Index	Calculation		**11.8**				8/2/2016	MW
Alkalinity, Total (as CaCO3)	SM2320B	mg/L	**178**		10		7/28/2016	BS
Aluminum, Total	EPA200.8	µg/L	**Not Detected**		10	1000	7/28/2016	SM
Antimony, Total	EPA200.8	µg/L	**Not Detected**		1.0	6	7/28/2016	SM
Arsenic, Total	EPA200.8	µg/L	**Not Detected**		1	10	7/28/2016	SM
Barium, Total	EPA200.8	µg/L	**26**		10	1000	7/28/2016	SM
Beryllium, Total	EPA200.8	µg/L	**Not Detected**		1	4	7/28/2016	SM
Bicarbonate (as HCO3-)	SM2320B	mg/L	**217**		10		8/1/2016	MP
Biochemical Oxygen Demand	SM5210B	mg/L	**Not Detected**		2		7/29/2016	LJMP
Bromide	EPA300.0	mg/L	**Not Detected**	IA	0.4		7/28/2016	HM
Cadmium, Total	EPA200.8	µg/L	**Not Detected**		0.5	5	7/28/2016	SM
Calcium	EPA200.7	mg/L	**33**		0.5		8/1/2016	MW
Carbonate as CaCO3	SM2320B	mg/L	**Not Detected**		10		8/1/2016	MP
Chloride	EPA300.0	mg/L	**38**		4.0	250	7/28/2016	HM
Chlorine Residual (Field Test)	SM4500-Cl G	mg/L	**Not Detected**		0.05	4.00	7/27/2016	MWH
Chromium VI	EPA 218.6	µg/L	**22**	E	0.2	10	8/9/2016	BSK
Chromium, Total	EPA200.8	µg/L	**26**		2	50	7/28/2016	SM
Color, Apparent (Unfiltered)	SM2120B	Color Units	**Not Detected**		3	15	7/28/2016	MP
Copper, Total	EPA200.8	µg/L	**Not Detected**		4	1300	7/28/2016	SM
Cyanide	QuikChem 10-20	µg/L	**Not Detected**		5	200	8/1/2016	LRH
E. Coli (Quantitray)	SM9223B	MPN/100mL	**<1**		1		7/27/2016	MW
Fluoride	EPA300.0	mg/L	**0.3**		0.4	2.0	7/28/2016	HM
Hardness (as CaCO3)	SM2340B/Calc	mg/L	**177**		10		8/2/2016	MW
Hydroxide	SM2320B	mg/L	**Not Detected**		10		8/1/2016	MP
Iron	EPA200.7	µg/L	**Not Detected**		10	300	8/1/2016	MW
Langlier Index, 15°C	SM2330B		**-0.12**				8/4/2016	SM
Langlier Index, 60°C	SM2330B		**0.48**				8/4/2016	SM
Lead, Total	EPA200.8	µg/L	**Not Detected**		5	15	7/28/2016	SM
Magnesium	EPA200.7	mg/L	**23**		0.5		8/1/2016	MW
Manganese, Total	EPA200.7	µg/L	**Not Detected**		10	50	8/1/2016	MW
MBAS (Surfactants)	SM5540C	mg/L	**Not Detected**		0.05	0.50	7/28/2016	HM
Mercury, Total	EPA200.8	µg/L	**Not Detected**		0.5	2	7/28/2016	SM

mg/L: Milligrams per liter ug/L : Micrograms per liter PQL : Practical Quantitation Limit MCL: Maximum Contamination Level
H = Analyzed ouside of hold time E = Analysis performed by External Laboratory; See Report attachments. T = Temperature Exceedance

Lab Number: AB51003

Collection Date/Time: 7/27/2016 14:52 Sample Collector: WEIDNER-HOLLAND, MASON Client Sample #:

Submittal Date/Time: 7/27/2016 16:17 Sample ID HUDSON LANDING WS #8 Coliform Designation: Special

Sample Description: Hudson Landing WS #8, Well

Analyte	Method	Unit	Result	Qual	PQL	MCL	Date Analyzed	Analyst:
Nickel, Total	EPA200.8	µg/L	Not Detected		10	100	7/28/2016	SM
Nitrate as NO3	EPA300.0	mg/L	3		4.0	45	7/28/2016	HM
Nitrate as NO3-N	EPA300.0	mg/L	0.6		0.4	10	7/28/2016	HM
Nitrate+Nitrite as N	EPA300.0	mg/L	0.6		0.40		7/28/2016	HM
Nitrite as NO2-N	EPA300.0	mg/L	Not Detected		0.4	1.0	7/28/2016	HM
Odor Threshold at 60 C	SM2150B	TON	1		1	3	7/27/2016	MP
o-Phosphate-P, Dissolved	EPA300.0	mg/L	Not Detected		0.4		7/28/2016	HM
Perchlorate	EPA314	µg/L	Not Detected	E	2.0		8/8/2016	BSK
pH (Laboratory)	SM4500-H+B	pH (H)	7.6		0.1		7/27/2016	BS
Potassium	EPA200.7	mg/L	1.5		0.5		8/1/2016	MW
QC Anion Sum x 100	Calculation	%	103%				8/1/2016	MP
QC Anion-Cation Balance	Calculation	%	4				8/2/2016	MW
QC Cation Sum x 100	Calculation	%	112%				8/2/2016	MW
QC Ratio TDS/SEC	Calculation		0.62				8/2/2016	MP
Selenium, Total	EPA200.8	µg/L	Not Detected		2	50	7/28/2016	SM
Silica as SiO2, Total	EPA200.7	mg/L	46		0.5		8/1/2016	MW
Silver, Total	EPA200.8	µg/L	Not Detected		10	100	7/28/2016	SM
Sodium	EPA200.7	mg/L	37		0.5		8/1/2016	MW
Specific Conductance (E.C)	SM2510B	µmhos/cm	464		1	900	7/29/2016	LJ
Sulfate	EPA300.0	mg/L	5		4.0	250	7/28/2016	HM
Synthetic Organic Compounds - Mont		µg/L	Not Detected	E			8/11/2016	BSK
TCP Low Level	SRL524M-TCP	ug/L	Not Detected	E			8/4/2016	BSK
Thallium, Total	EPA200.8	µg/L	Not Detected		1.0	2	7/28/2016	SM
Total Coliform (Quantitray)	SM9223B	MPN/100mL	<1		1		7/27/2016	MW
Total Diss. Solids	SM2540C	mg/L	286		10	500	7/28/2016	MP
Turbidity	EPA180.1	NTU	Not Detected		0.05	5.0	7/28/2016	BS
Volatile Org. Compounds (524)	EPA524	µg/L	Not Detected	E			8/1/2016	BSK
Zinc	EPA200.7	µg/L	Not Detected		10		8/1/2016	MW

Sample Comments:

Report Approved by:

David Holland, Laboratory Director

mg/L: Milligrams per liter ug/L : Micrograms per liter PQL : Practical Quantitation Limit MCL: Maximum Contamination Level

H = Analyzed ouside of hold time E = Analysis performed by External Laboratory; See Report attachments. T= Temperature Exceedance

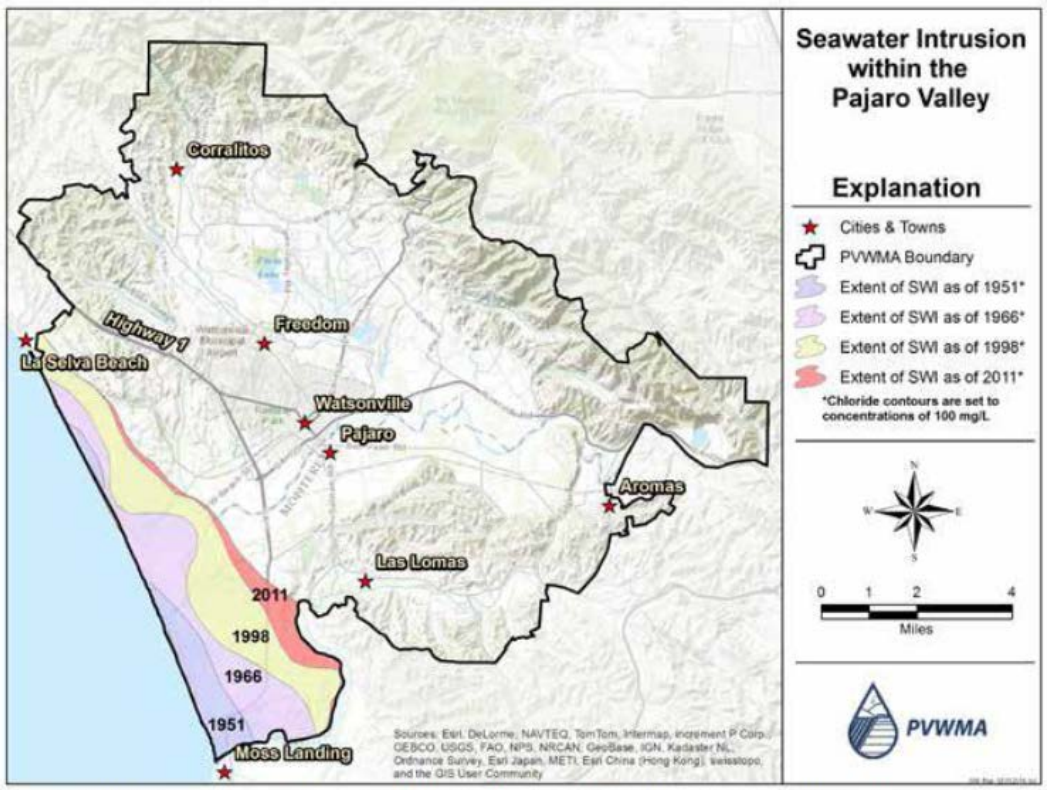
HL WS#12 (CA-DWR #074582)—Owner: Ammon Builders; well located at 195 Hudson Landing Road. Well was completed in 1978 and is 195 feet deep. Estimated yield at that time was 100 gpm. Data are limited in the well report.

Recommendation: Do not consider this as a primary candidate for a community well, primarily based on its moderate depth and lack of a thick confining clay layer.

Seawater intrusion: The problem of seawater intrusion has been identified in this region and information can be obtained about this issue with the following link: http://waterfoundation.net/wp-content/uploads/PDF/1407267913-CentralCoastGroundwaterReport-Aug2014(00258176xA1C15).pdf

The image below is extracted from that report since it is relevant to the project area. Note that the 2011 extent of seawater intrusion is shown as being very close to the southwest project boundary.

Another useful document is the USGS fact sheet for this issue in this part of California (http://pubs.usgs.gov/fs/fs-044-03/).



Source: Pajaro Valley Water Management Agency (PVWMA). Basin Management Plan Update – Final. Prepared by Carollo Engineers. February 2014.

APPENDIX 7

Conceptual Water Distribution System Layouts

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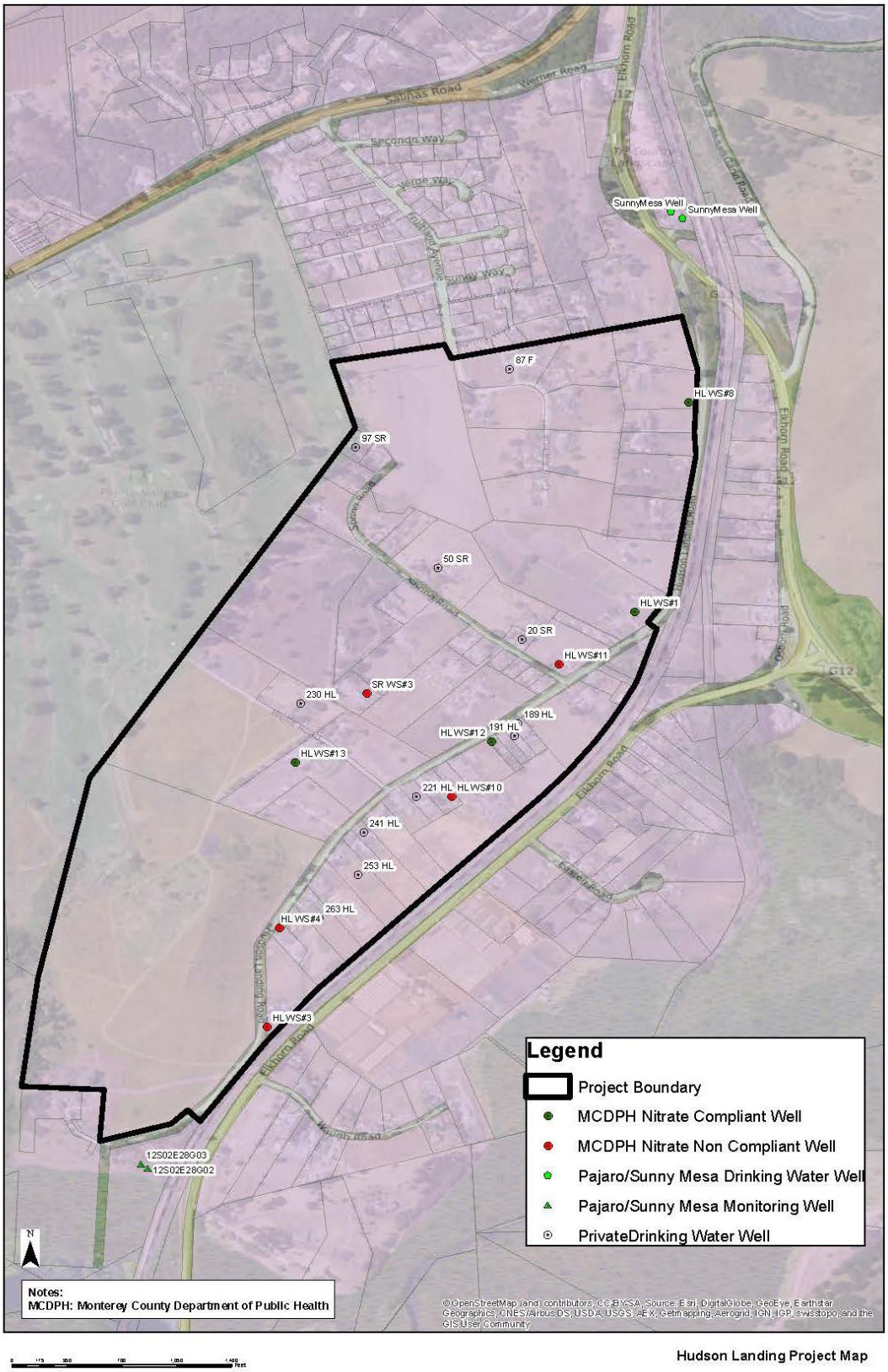
Alternative 1: Wellhead Treatment for All Wells



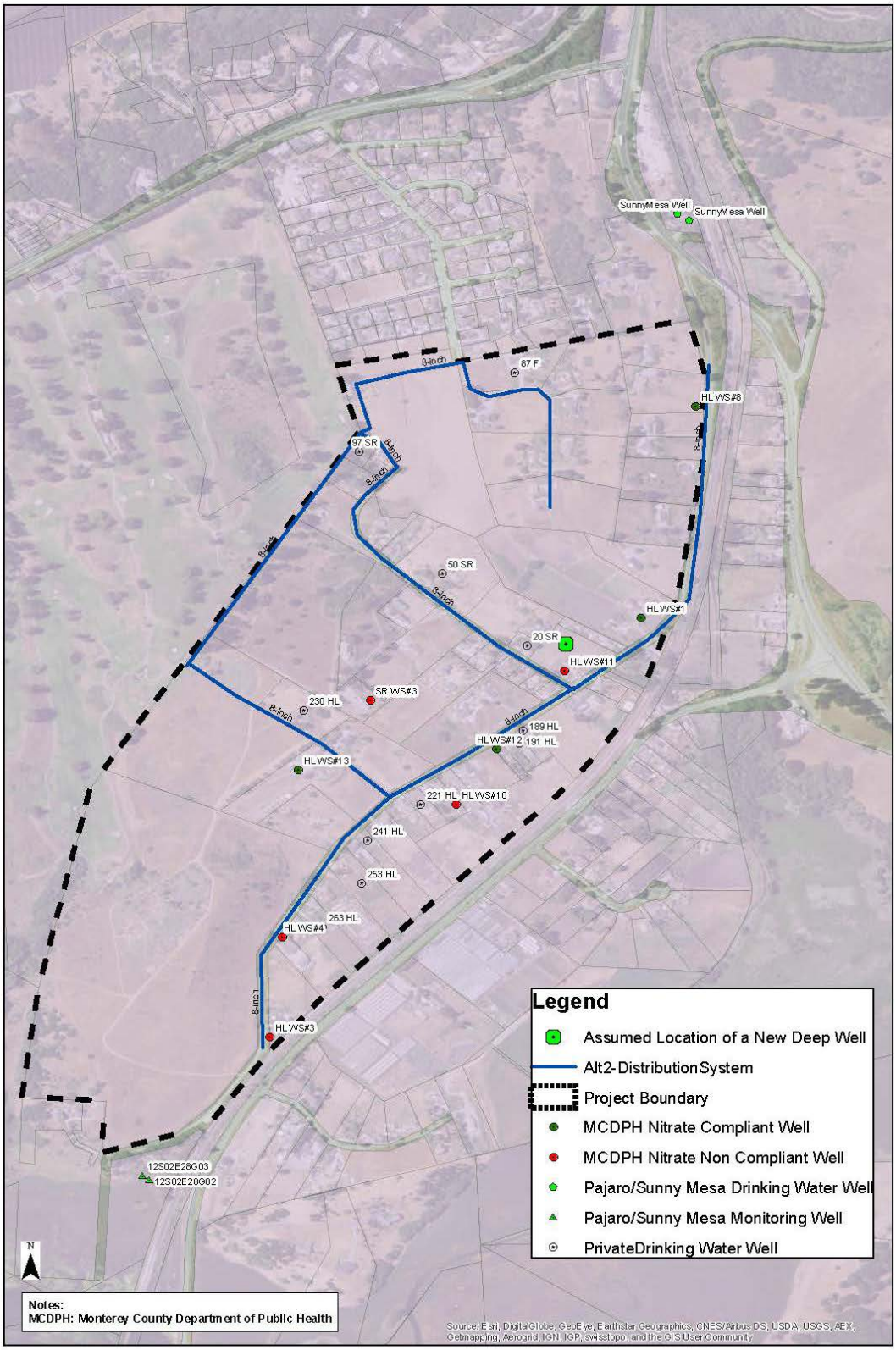
Hudson Landing Project Map

Alternative 2: Wellhead treatment for select wells

Conceptual Water Distribution System Layout

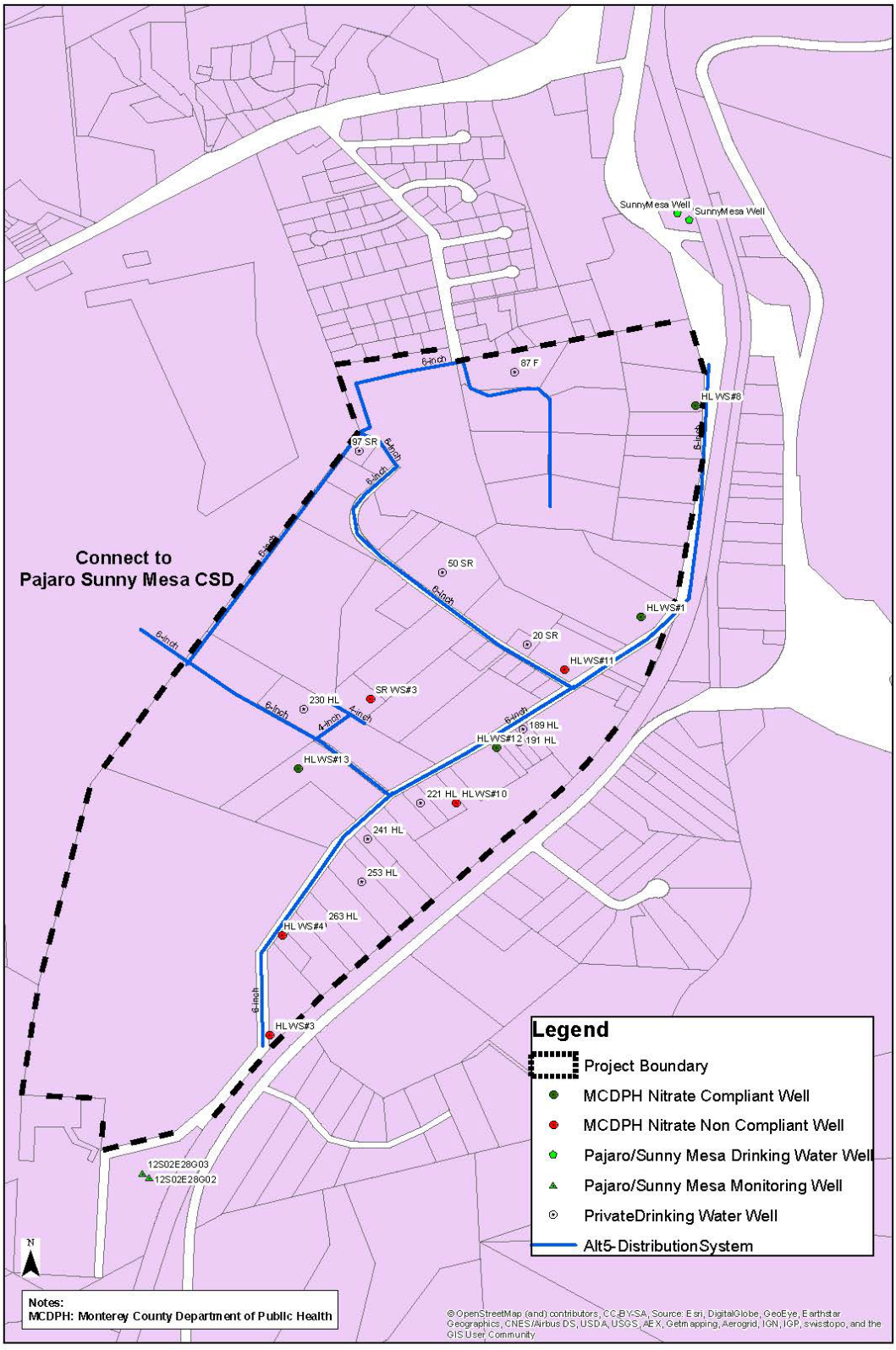
2

Alternative 3: Installation of new deep wells



Alternative 3 - Conceptual Water Distribution System Layout

Alternative 5: Interconnect with the municipal water system



Alternative 5 - Conceptual Water Distribution System Layout

APPENDIX 8

Cost Estimates

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Alternative 2
Wellhead Treatment for All Wells

The costs for this alternative are related primarily to the individual well testing and the treatment package for each location. There will be some engineering design costs related to the analysis of the test results and determination of the treatment method. Residents would have ongoing maintenance and monitoring costs for their systems. No water distribution system is required.

Project Costs:

Alternative 1 - Wellhead Treatment for all wells					
Item	**Units**	**Quantity**	**Unit Cost**	**Total Cost YR 2016 Dollars ($)**	**Notes**
Construction Cost Estimate					
Treatment at Well	EA	50	$ 10,000	$ 500,000	Asssumed 50 total wells (permitted and private) within Project Boundary
1-inch piping from well to houses	LF	5000	$ 30	$ 150,000	
1-inch piping from well to septic tank	LF	5000	$ 30	$ 150,000	
Construction Subtotal				**$ 800,000**	
Estimate Indirect Costs					
Well Testing	EA	50	$ 2,500	$ 125,000	
Design Engineering		5%		$ 40,000	
Legal and Permits		2%		$ 16,000	
Subtotal Indirect Costs				**$ 181,000**	
Contingency		30%		$ 294,300.00	
Total Estimate Project Cost				**$ 1,275,300**	
Item	**Units**	**Quantity**	**Unit Cost**	**Total Cost YR 2016 Dollars ($)**	
Operation and Maintenance Cost Estimate					
Annual Maintenance Cost	EA	50	$ 1,500	$ 75,000	
Energy Cost - Well Pumping	kWh	25,000	$ 0.130	$ 3,250	500 kWh at each well x 50 wells
Regulatory Cost fo Well Testing	EA	50	$ 1,000	$ 50,000	
Contingency		30%		$ 38,475	
Total Estimate Annual O&M Cost				**$ 166,725**	

Alternative 2
Wellhead Treatment for Select Wells

1. Project Costs - The distribution system would be for domestic use only without fire hydrants; therefore a 6" PVC system would be satisfactory. It is assumed that 3 wells would be identified for treatment packages. One recommended well is the existing well serving the 7 properties at the end of Fruitland Road, but this well would not be connected to the Hudson Landing Road network thus saving considerable water line installation costs. The following are the estimated project costs and annual O&M cost:

Alternative 2 - Wellhead treatment for selected 3 wells					
Item	**Units**	**Quantity**	**Unit Cost**	**Total Cost YR 2016 Dollars ($)**	**Notes**
Construction Cost Estimate					
Hexavalent Chromium Well Head Treatment	LS	2	$ 105,000	$ 210,000	Quote from Evoqua; 25 gpm facility each; Two Sites
Nitrate Well Head Treatment	LS	1	$ 384,000	$ 384,000	Quote from Evoqua; 25 gpm facility each; One Site
New submersible pumps	LS	3	$ 5,000	$ 15,000	35 gpm each pump
Site grading, foundation and yard piping	LS	1	$ 100,000	$ 100,000	
Install 6" Water Line within Hudson Landing Project Boundary	LS	9,650	$ 90	$ 868,500	Assuming the new distrubtution system can be tied to the distribution system for well WS #8.
Install new 6-inch gate valves	LS	16	$ 1,700	$ 27,200	
Install new 1-inch service connection tie-in	LS	80	$ 2,800	$ 224,000	
Install PRV with vault	LS	2	$ 10,000	$ 20,000	
Storage Tank (50,000 gallon)	LS	1	$ 130,000	$ 130,000	Storage to equalize peak. $100,000 (escalated to $130,000) - RS Means 2007
Construction Subtotal				**$ 1,978,700**	
Estimate Indirect Costs					
Geotechnical Engineering	LS	1	$ 75,000	$ 75,000	
Surveying	LS	1	$ 25,000	$ 25,000	
Design Engineering		10%		$ 197,870	
Construction Services and Startup		7%		$ 138,509	
Legal and Permits		2%		$ 39,574	
Subtotal Indirect Costs				**$ 475,953**	
Contingency		30%		$ 736,395.90	
Total Estimate Project Cost				**$ 3,191,049**	
Item	**Units**	**Quantity**	**Unit Cost**	**Total Cost YR 2016 Dollars ($)**	
Annual Operation and Maintenance Cost Estimate					
Annual Maintenance Cost	LS	1	$ 30,000	$ 30,000	
Labor Cost for Treatment and Distribution System	hr	1248	$ 100	$ 124,800	24hrs/week from a certified operator
Energy Cost - Well Pumping	kWh	30000	$ 0.130	$ 3,900	3 pumps - Each 35 gpm @ 200' TDH pumping 24x7
Resin Replacement - Hexavalent Chrominum	LS	1	$ 7,230	$ 7,230	Quote from Evoqua for 25 gpm facility
Resin Replacement - Nitrate	LS	1	$ 163,000	$ 163,000	Quote from Evoqua for 25 gpm facility
Regulatory Cost for Well Treatment Facility	LS	1	$ 5,000	$ 5,000	
Contingency		30%		$ 100,179	
Total Estimate Annual O&M Cost				**$ 434,109**	

2. Loan Costs – Since it is doubtful that this alternative would be eligible for a USDA loan/grant, it is assumed that the residents would be responsible for paying off the loan. Since it would be an unsecured loan, it can be assumed that it would be some form of conventional loan for 20 years. There could be some cost-share funding from a state program, but for this analysis, it is assumed that there would be none. The cost for the loan

repayment is as follows:

- The rates for unsecured conventional loans could range between 5% - 7.5%. A 5% rate is used in these calculations.
- Monthly payments approximately $3,191,049 @ 5% = $21,060/month or $263/month/household

3. Ongoing Maintenance and Operations - An administrative authority would have to be established to maintain and monitor the system. Residents would be charged a monthly fee for the administration and operation of their system. A monthly O&M payment for approximately $434,109 = $36,176/month or $452/month/household.

Alternative 3

Installation of New Deep Wells

1. Project Costs - The distribution system would be for domestic use only without fire hydrants; therefore a 6" PVC system would be satisfactory. It is assumed that 1 deep well locations would be identified for treatment packages. All 80 properties would be served by this system. No fire service would be included so 6" PVC water mains would be satisfactory. The following are the project costs:

Alternative 3 - Installation of a new deep well					
Item	**Units**	**Quantity**	**Unit Cost**	**Total Cost YR 2016 Dollars ($)**	**Notes**
Construction Cost Estimate					
Drill, install and test one (1) new deep well - 30	LS	1	$ 24,000	$ 24,000	$60.5/LF (escalated to 80/LF) - RS Means 2007
Submersible Pump	EA	1	$ 5,000	$ 5,000	$3,875/ea (escalated to $5000/LF) - RS Means 2007
Hexavalent Chromium Well Head Treatment	LS	1	$ 105,000	$ 105,000	Quote from EvoquaTreat 36 gpm avg day demand;
Site grading, foundation and yard piping	LS	1	$ 75,000	$ 75,000	
Install 6" Water Line within Hudson Landing Project Boundary	LF	13,110	$ 90	$ 1,179,900	
Install new 6-inch gate valves	EA	16	$ 1,700	$ 27,200	
Install new 1-inch service connection tie-in	EA	80	$ 2,800	$ 224,000	
Install PRV with vault	EA	2	$ 10,000	$ 20,000	
Storage Tank (50,000 gallon)	EA	1	$ 130,000	$ 130,000	Storage to equalize peak. $100,000 (escalated to 2=$130,000) - RS Means 2007
Construction Subtotal				**$ 1,790,100**	
Estimate Indirect Costs					
Geotechnical Engineering	LS	1	$ 75,000	$ 75,000	
Surveying	LS	1	$ 25,000	$ 25,000	
Design Engineering		10%		$ 179,010	
Construction Services and Startup		7%		$ 125,307	
Legal and Permits		2%		$ 35,802	
Subtotal Indirect Costs				**$ 440,119**	
Contingency		30%		$ 669,065.70	
Total Estimate Project Cost				**$ 2,899,285**	
Item	**Units**	**Quantity**	**Unit Cost**	**Total Cost YR 2016 Dollars ($)**	
Operation and Maintenance Cost Estimate					
Annual Maintenance Cost	LS	1	$ 20,000	$ 20,000	
Labor Cost for Treatment and Distribution System	hr	830	$ 100	$ 83,000	16hrs/week from a certified operator
Energy Cost - Well Pumping	kWh	20,000	$ 0.130	$ 2,600	35 gpm @ 250' TDH pumping 24x7
Resin Replacement	LS	1	$ 10,000	$ 10,000	Quote from Evoqua for 36 gpm facility
Regulatory Cost for Well Treatment Facility	LS	1	$ 5,000	$ 5,000	
Contingency		30%		$ 36,180	
Total Estimate Annual O&M Cost				**$ 156,780**	

2. Loan Costs – It is unlikely that this alternative would be eligible for a USDA loan/grant. The residents would be responsible for paying off the loan. Since it would be an unsecured loan, it can be assumed that it would be some form of conventional loan for 20 years. There could be some funding from a state program, but for this analysis, it is assumed that there would be none. The cost for the loan repayment is as follows:

- The rates for unsecured conventional loans could range between 5% - 7.5%. A 5% rate is used in these calculations.
- Monthly payments $2,899,285 @ 5% = $19,134/mo. or $239/mo./household

3. Ongoing Maintenance and Operations Costs - An administrative authority would have to be established to maintain and monitor the system. Residents would be charged a monthly fee for the administration and operation of their system. It is estimated that this monthly fee would be $163.

Alternative 4

Blending of Water from Select Wells

The distribution system would be for domestic use only without fire hydrants; therefore a 6" PVC system would be satisfactory. It is assumed that 2 deep well locations would be identified for treatment packages. All 80 properties would be served by this system. No fire service would be included so 6" PVC water mains would be satisfactory. It is assumed that 4 wells with the highest quality water in compliance would be selected.

No estimate will be conducted at this time due to the high degree of uncertainty in the water quality of the existing wells, the new well (s), and the blending requirements. In addition, the cost and benefits is marginal at best when considering the other alternatives.

Alternative 5

Interconnect With the Municipal Water System

1. Project Costs – This alternative is very similar to the 2006 engineering study conducted for the Pajaro/Sunny Mesa Community Service District (CSD). All 80 properties would be served by this system. The following are the project costs:

Alternative 5 - Interconnect with Pajaro/Sunny Mesa Municipal Water System					
Item	**Units**	**Quantity**	**Unit Cost**	**Total Cost YR 2016 Dollars ($)**	**Notes**
Construction Cost Estimate					
Install 8" Water Line from Pajaro Sunny Mesa to Hudson Landin	LF	3,200	$ 100	$ 320,000	
Install 8" Water Line within Hudson Landing Project Boundary	LF	13,110	$ 100	$ 1,311,000	
Install new fire hydrants	EA	13	$ 8,000	$ 104,000	Typically, spaced one every 400 ft
Install new 8-inch gate valves	EA	16	$ 1,700	$ 27,200	
Install new 1-inch service connection tie-in	EA	80	$ 2,800	$ 224,000	One per household
Connection fees	EA	80	$ 5,000	$ 400,000	
Install PRV with vault	EA	2	$ 20,000	$ 40,000	
Water System Tie-Ins	EA	2	$ 10,000	$ 20,000	
Construction Subtotal				**$ 2,446,200**	
Estimate Indirect Costs					
Geotechnical Engineering	LS	1	$ 60,000	$ 60,000	
Surveying	LS	1	$ 25,000	$ 25,000	
Design Engineering		10%		$ 244,620	
Construction Services and Startup		7%		$ 171,234	
Legal and Permits		2%		$ 48,924	
District Formation Cost	LS	1	$ 150,000	$ 150,000	
Subtotal Indirect Costs				**$ 699,778**	
Contingency		30%		$ 943,793	
Total Estimate Project Cost				**$ 4,089,771**	
Item	**Units**	**Quantity**	**Unit Cost**	**Total Cost YR 2016 Dollars ($)**	
Operation and Maintenance Cost Estimate					
Annual Water Fee					
Typical usage rate per household	household	80	$ 1,950	$ 156,019	$24.82 connection fee and $5.10/ccf usage @ 27 ccf/household - 2016 Rates
Total Estimate Annual Cost				**$ 156,019**	

2. Loan Costs – It is probable that this alternative would be eligible for a cost share USDA loan/grant with the assumption that the residents would be responsible for paying off the loan portion. The USDA requires extensive guarantees that the loan will be paid back in 30 years. Interest rates are generally lower in the 3% range. There could be some funding from a State program and the Monterey County could cover some of the start costs, but for this analysis, it is assumed that there would be none. The following cost breakdowns assume a 50% USDA cost-share and for comparison purposes, the alternative cost without the grant.

1) With 50% USDA grant -

A 3% rate is used in these calculations:

Monthly payments$4,089,771 @ 3% = $17243/month or $216/month/household

2) Loan without the USDA grant -

A 3% rate is used in these calculations:

Monthly payments$2,044,886 @ 3% = $12650/mo. or $718/month/household

3. **Ongoing Maintenance and Operations Costs –** All operations and maintenance would be managed by the Pajaro/Sunny Mesa Community Service District as well as all administrative functions. Using current water rates for the District plus the service fees, the average customer would pay $163/month (based on average consumption & the meter charge of $24.82 connection fee and $5.10/ccf usage @ 27 ccf/household - 2016 Rates).