

RANCHO MURIETA COMMUNITY SERVICES DISTRICT

15160 JACKSON ROAD
RANCHO MURIETA, CALIFORNIA 95683



SPECIAL BOARD MEETING

January 30, 2017 at 1:00 p.m.

NOTICE IS HEREBY GIVEN that the President of the Board of Directors of the Rancho Murieta Community Services District has called a Special Meeting of the Board to be held on January 30, 2017 at 1:00 p.m. at the Rancho Murieta Community Services District Board Room at 15160 Jackson Road, Rancho Murieta.

AGENDA

1. **CALL TO ORDER, ROLL CALL** - Determination of Quorum - President Pecotich (**Roll Call**) 1:00
2. **ADOPT AGENDA** (**Motion**)
3. **COMMENTS FROM THE PUBLIC**
*For this Special Meeting, members of the public may **ONLY** comment on items specifically agendized. Members of the public wishing to address a specific agendized item are encouraged to offer their public comment during consideration of that item. With certain exceptions, the Board may not discuss or take action on items that are not on the agenda.*

If you wish to address the Board at the time of the agendized item, as a courtesy, please state your name and address, and reserve your comments to no more than 3 minutes so that others may be allowed to speak. (5 min.)
4. **REVIEW RECYCLED WATER PLAN AND PRE-DESIGN REPORT** (Discussion/Action) (**Motion**)
5. **DIRECTOR COMMENTS/SUGGESTIONS**
6. **ADJOURNMENT** (**Motion**)

"In accordance with California Government Code Section 54957.5, any writing or document that is a public record, relates to an open session agenda item and is distributed less than 72 hours prior to a regular meeting, will be made available for public inspection in the District offices during normal business hours. If, however, the document is not distributed until the regular meeting to which it relates, then the document or writing will be made available to the public at the location of the meeting."

In compliance with the Americans with Disabilities Act, if you are a disabled person and you need a disability-related modification or accommodation to participate in this meeting, please contact the District Office at 916-354-3700 or fax 916-354-2082. Requests must be made as soon as possible and at least two (2) full business days before the start of the meeting.

Note: This agenda is posted pursuant to the provisions of the Government Code commencing at Section 54950. The date of this posting is January 27, 2017. Posting locations are: 1) District Office; 2) Rancho Murieta Post Office; 3) Rancho Murieta Association; 4) Murieta Village Association.

MEMORANDUM

Date: January 27, 2017
To: Board of Directors
From: Darlene J. Thiel, General Manager
Subject: Review Recycled Water Plan and Pre-Design Report

RECOMMENDED ACTION

No action.

BACKGROUND

The purpose of this Recycled Water Plan Workshop is to briefly review the history behind the District's activity in establishing the use of recycled water and the policy decisions to implement the use of recycled water for outside irrigation for new development. We will also review and discuss the preliminary Pre-Design Report developed by Kevin Kennedy, Kennedy/Jenks. Kevin will make a presentation on the Pre-Design Report at the workshop and will be available for questions and discussion regarding the report.

The goal is to bring a final version of the Pre-Design Report to the Board of Directors for adoption at either the February or March 2017 Regular Board Meeting.



Rancho Murieta
Community Services District

DRAFT

Recycled Water Program Preliminary Design Report



Kennedy/Jenks Consultants

January 2017

Recycled Water Program Preliminary Design Report

January 2017

Draft



Prepared under the responsible charge of

Kevin Kennedy
Registration No. C61206

Kennedy/Jenks Consultants

10850 Gold Center Drive, Suite 350
Rancho Cordova, California 95670

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List of Abbreviations and Acronyms

ac	Acres
ACP	asbestos cement pipe
ADWF	average dry weather flow
AFY	acre-feet per year
CCB	chlorine contact basin
CCP	chlorine contact pipe
DAF	dissolved air flotation
DIP	ductile iron pipe
District	Rancho Murieta Community Services District
ENR	Engineering News Record
ft	Feet
gpm	gallons per minute
HGL	Hydraulic Grade Line
In	Inch
IPR	Indirect Potable Recharge
IS/MND	Initial Study/Mitigated Negative Declaration Rancho Murieta Recycled Water System Expansion Project (AECOM, June 2014)
LF	linear feet
MCCs	motor control centers
MGD	million gallons per day
mm	Millimeter
NOA	Naturally Occurring Asbestos
NPDES	National Pollution Discharge Elimination System
PDR	Preliminary Design Report (this document)
PLC	Programmable Logic Controller

PRV	pressure reducing valve
psi	pounds per square inch
RMA	Rancho Murieta Association
RMCC	Rancho Murieta Country Club
RMPI	Rancho Murieta Properties, Inc.
RVs	recreational vehicles
SCADA	Supervisory Control and Data Acquisition
TDH	Total dynamic head
WDR	Waste Discharge Requirements
WWRP	Wastewater Reclamation Plant
WWTF	Wastewater Treatment Facility

Executive Summary

The purpose of this Preliminary Design Report (PDR) is to describe Phase 1 and Buildout of Rancho Murieta Community Services District's (District's) Recycled Water Program with respect to existing and future conditions; development projections, phasing and recycled water use areas; recommended improvements and descriptions (including costs and timeline) and implementation plan. This PDR will also serve as the basis for subsequent environmental, regulatory permitting activities and detailed design and construction efforts associated with the recommended Phase 1 Recycled Water Improvements Project. In addition, this PDR also describes the approximate timeline for the improvements required for Buildout of the District's Recycled Water Program. Refinements and adjustment to the recommended Buildout improvements are expected to be conducted later as the implementation timeline draws closer and/or if development plans change.

Existing recycled water use areas can accommodate the equivalent of roughly 3,265 residential homes based on the 0.5 MGD ADWF capacity described in the WDR.¹ Review and comparison of the 3,265 equivalent residential homes to the development projections indicate the need to expand recycled water use beyond the North and South Golf Courses in the near future to accommodate growth. The projected average dry weather flow (ADWF) at Buildout is 0.8 MGD. The ADWF is currently about 0.34 MGD.

Development projections obtained from the District's Water Supply Assessment Technical Memorandum (Maddaus Water Management, Inc., January 18, 2016) and updated information obtained from developers indicate that the District's current rated ADWF of 0.5 MGD is projected to be exceeded in 2019. However this development timeline is consider both aggressive and optimistic compared to historic growth patterns. Actual development rates will likely be lower and the development timeline extended beyond the year 2035.

A series of improvements is recommended to provide the capacity needed to accommodate growth. Table ES-1 presents a summary of the recommended improvements and estimated costs.

Figure ES-1 presents a summary of recommended implementation activities, timelines and deadlines for Phase 1 improvements. Buildout improvements are anticipated to require about 3 years to complete. Flows are projected to approach the rated ADWF capacity of the existing seasonal storage reservoirs around 2023. Therefore, the District should initiate the expansion of the seasonal storage reservoirs no later than January 2020.

¹ 0.5 MGD flow includes allocations for infill (0.05 MGD), Murieta Gardens (residential and commercial) and The Retreats (residential) for a total of 3,265 total equivalent residential units.

Table ES-1. Recommended Recycled Water Improvements and Estimated Costs

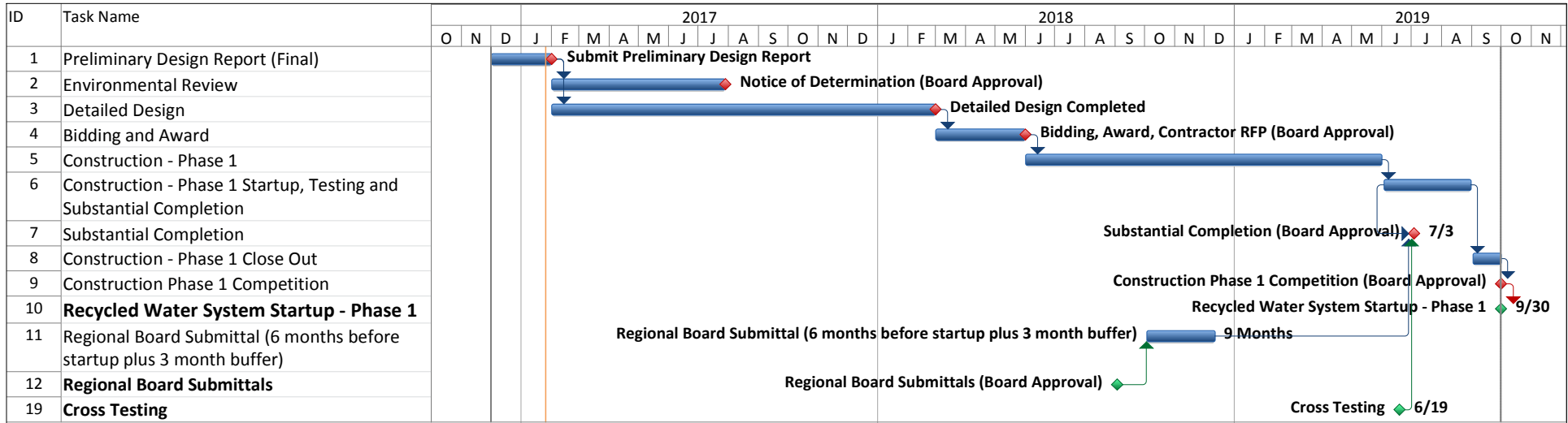
No.	Improvement	Estimated Cost (\$) ^a
Phase 1 Recycled Water Improvements		
1	Recycled Water SCADA Control System	250,000
2	Equalization Basin Potable Water Air Gap	76,000
3	Recycled Water Pumping Station	1,045,000
4	District Headquarters Conversion	20,000
5	Northwest Recycled Water Transmission Main	1,441,000
6	Lookout Hill Booster Pumping Station	612,000
7	Escuela Park Conversion	16,000
8	Stonehouse Park Conversion	36,000
9	Lookout Hill Recycled Water Storage Tank	545,000
10	North Main Gate Conversion	18,000
11	Commercial Loop Conversion	TBD
	Phase 1 Subtotal (Estimated Construction Cost)	4,060,000
12	Soft Costs – 32.5% (Admin., Reg., Eng., Construct Man.)	1,319,500
	Phase 1 Total (Project Cost)	5,380,000^b
Buildout Recycled Water Improvements		
13	SCADA Upgrades	82,000
14	Disinfection Facilities Upgrade	665,000
15	North Golf Course Conveyance System	1,620,000
16	Bass Lake Tank	1,216,000
17	Bass Lake Booster Pumping Station	625,000
18	Seasonal Storage Reservoir Expansion	830,000
19	Van Vleck Sprayfield 4	890,000
20	DAF Pumping Replacement	100,000
	Buildout Subtotal (Estimated Construction Cost)	6,030,000^c
21	Soft Costs – 33% (Admin., Reg., Eng., Construct Man.)	1,960,000
	Buildout Total (Project Cost)	7,990,000
Phase 1 and Buildout Recycled Water Improvements		
	Grand Total (Phase 1 and Buildout)	13,400,000^d
	Estimated Number of New Equivalent Residential Units	2,213
	Estimated Cost per Connection (\$/ERU)	\$6,055

^a Estimated costs based upon Engineering News Record (ENR) 20 City Average Construction Cost Index (CCI) at 10,385 (August 2016)

^b Compared to \$10,014,000 (\$9,100,000 adjusted for inflation) as described previously in the District’s Title XVI Recycled Water Feasibility Study

^c Compared to \$15,055,000 as described previously in the District’s Title XVI Recycled Water Feasibility Study

^d Compared to \$25,070,000 as described previously in the District’s Title XVI Recycled Water Feasibility Study



Project: 1670011.00 - RMCS D Date: Thu 1/26/17	Task		External Tasks		Manual Task		Finish-only	
	Split		External Milestone		Duration-only		Deadline	
	Milestone		Inactive Task		Manual Summary Rollup		Progress	
	Summary		Inactive Milestone		Manual Summary			
	Project Summary		Inactive Summary		Start-only			

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Section 1: Introduction

This Preliminary Design Report (PDR) describes Phase 1 and Buildout of Rancho Murieta Community Services District's (District's) Recycled Water Program with respect to existing and future conditions; development projections, phasing and recycled water use areas; recommended improvements and descriptions (including costs and timeline) and implementation plan.

This section presents and describes the Recycled Water Program background, objectives, benefits, PDR organization, development projections, and acknowledgements.

1.1: Background and Objectives

The District's existing recycled water use areas (i.e., the North and South Golf Courses) can accommodate roughly 3,265 equivalent residential units² based on the 0.5 million gallons per day (MGD) average dry weather flow (ADWF) capacity described in the District's Waste Discharge Requirements (WDR). Review and comparison of this 3,265 equivalent residential units limitation to the current development projections indicate the need to expand recycled water use to accommodate projected development within Rancho Murieta. Recycled water use provides disposal and beneficial reuse of the treated wastewater effluent required to accommodate future planned development.

The District's Board of Directors adopted the Recycled Water Standards (October, 2013) in response to the adoption of District Policy No. 2011-07, Authorized and Mandated Use of Recycled Water (Recycled Water Policy) and the adoption of District Code, Chapter 17, Recycled Water Code (Recycled Water Code). The Recycled Water Policy requires the use of recycled water wherever economically and physically feasible as determined by the Board and identified, in general, that the lands subject to mandatory recycled water use are the undeveloped parcels within the existing District service area. Specific future developments areas were further designated³ within the existing District service area and the District's off-site disposal area on the neighboring Van Vleck Ranch. Expanded recycled water use at specific future sites is estimated and anticipated to provide the District with the increased disposal and beneficial reuse of treated wastewater effluent required to serve future developments, accommodate growth within Rancho Murieta, provide an offset to potable water demands, and comply with the WDR.

The objectives of this PDR are to describe Phase 1 and Buildout needs/requirements of the District's Recycled Water Program with respect to existing and future conditions; development projections, phasing and recycled water use areas; recommended improvements and descriptions (including costs and timeline) and implementation plan. Table 1 presents a listing of the proposed Phase 1 and Buildout future developments and recycled water use areas. Figure 1 shows existing developments along with proposed developments for Phase 1 and Buildout.

This PDR will serve as the basis for subsequent environmental, regulatory permitting activities, and detailed design and construction efforts associated with the recommended Phase 1 Recycled Water Improvements Project described in Section 3 of this PDR. In addition, this PDR also describes the approximate timeline for the improvements required for Buildout of the District's Recycled Water Program. Refinements and adjustment to the recommended Buildout improvements are expected

² 0.5 MGD flow includes allocations for infill (0.05 MGD), Murieta Gardens (residential and commercial) and The Retreats (residential) for a total of 3,265 total equivalent residential units.

³ Within the District's submittal of the Report of Waste Discharge and subsequent adoption of the Master Reclamation Permit (December 20, 2013).

to be conducted later as the implementation timeline draws closer and/or if development plans change.

Table 1. Proposed Developments and Recycled Water Use Areas

Phase	Proposed Developments	Proposed Recycled Water Use Areas
Phase 1	Murieta Gardens Retreats (North, West and East)	Murieta Gardens ^a [U, R] Retreats ^a (North, West and East) [U] Stonehouse Park ^b (existing) [U] Escuela Park ^b (existing) [U] Main Northgate ^b (existing) [U] District Office ^b (existing) [U] <i>Commercial Loop^c</i>
Buildout	Residences of Murieta Hills Apartments Industrial/Commercial/Residential Village A Village B Village C Village D Village E Village F Village G Village H Riverview Lakeview	Residences of Murieta Hills ^a [U,R] Apartments ^a [U] Industrial/Commercial/Residential ^a [U,R] Village A ^a [R] Village B ^a [R] Village C ^a [R]

^a As requested by the District Board at the December 16, 2015 Board meeting.

^b As requested by District staff for October 10, 2016 Improvements Committee presentation *and if deemed to be cost effective by the District Board.*

^c Recycled water service to these existing urban irrigation areas appears to be cost effective. However, discussions with the owner are recommended prior to moving forward.

U = urban recycled water irrigation, see definition below

R = residential recycled water irrigation, see definition below

Phase 1 and Buildout of the District’s Recycled Water Program consists of a series of improvements to the District’s existing Wastewater Reclamation Plant (WWRP) and North Golf Course recycled water conveyance system⁴ to serve future residential developments, existing parks, common areas and other landscaping consistent with the District’s adopted Recycled Water Code, Recycled Water Standards and Waste Discharge Requirements. Ultimately, the District’s expanded Recycled Water Program will provide the disposal capacity needed to accommodate future developments and offset (reduce) potable water demands by approximately 335 acre-feet per year (AFY).

For the purposes of this report, future reuse areas have been categorized in Table 1 according to the following definitions:

- Residential Recycled Water Irrigation [R]: Future recycled water front and backyard irrigation of future residential development landscaping consistent with the District’s adopted Recycled Water Code, Recycled Water Standards and Waste Discharge Requirements. As indicated in Table 1, there are six developments that have use areas which fall within this category.

⁴ Originally owned by RMPI, now Rancho Murieta Properties, LLC., and operated by Rancho Murieta Country Club (RMCC) as described in Section 2.

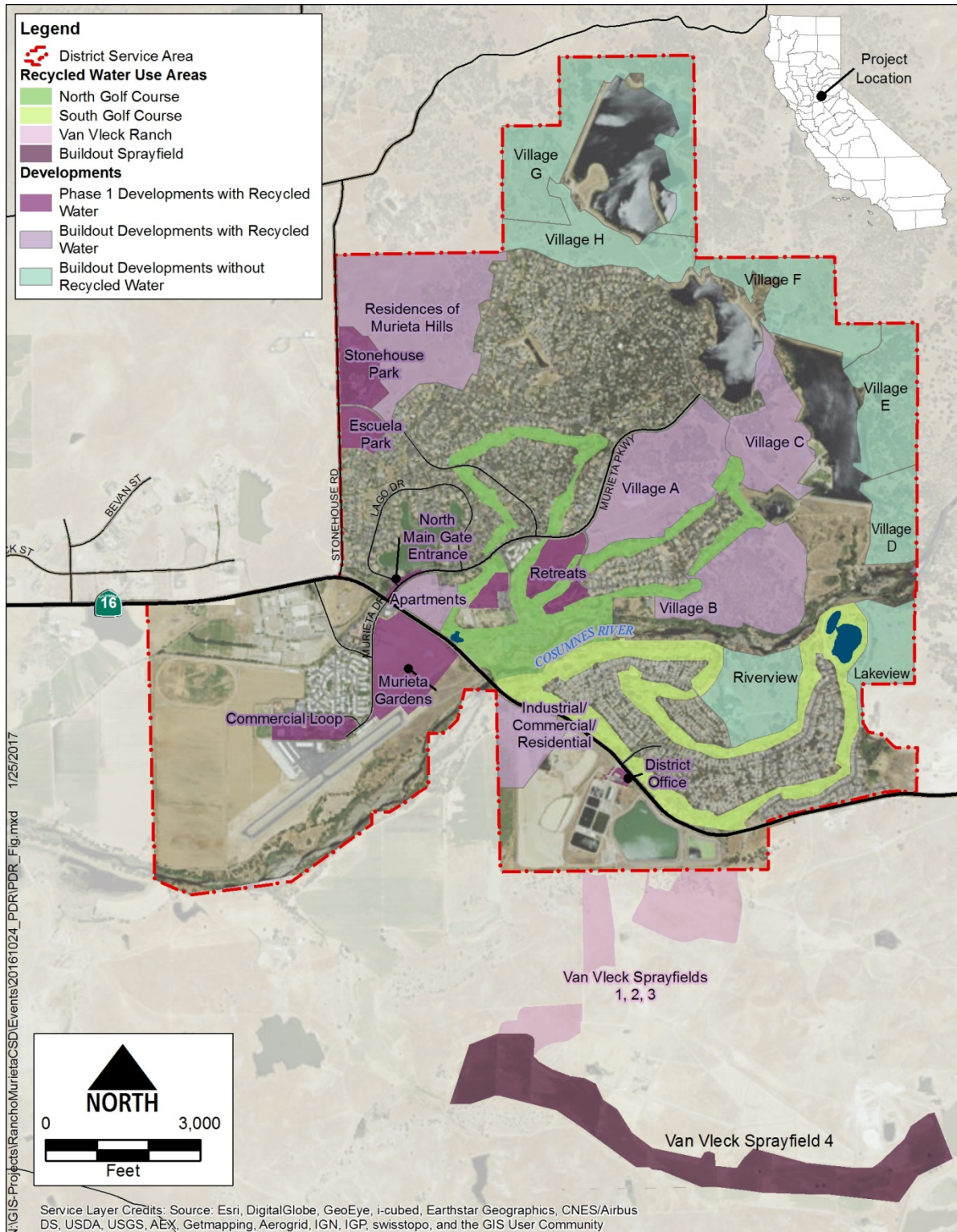


Figure 1. Proposed Phase 1 and Buildout Developments

- Urban Recycled Water Irrigation [U]: Future recycled water irrigation of existing parks, common areas and other landscaping consistent with the District's adopted Recycled Water Code, Recycled Water Standards and Waste Discharge Requirements. As indicated in Table 1, there are nine developments that have use areas which fall within this category.

Phase 1 of the District's Recycled Water Program could be initiated as early as mid-2019 as described later in the last section of the PDR. According to development projections provided by developers/owners of the remaining undeveloped parcels within the District's service area, Buildout is projected to occur in the 2035 timeline as described later in Section 2.3.

The following documents, reports, studies, etc., (presented in sequence) were used in the development of this PDR:

- Agreement for Availability and Use of Reclaimed Wastewater, May 17, 1988
- Amendment to Agreement for Availability and Use of Reclaimed Wastewater, May 4, 1994
- Rancho Murieta North Infrastructure Master Plan (MacKay & Soms, May 2003)
- Recycled Water Code, District Code Chapter 17 (Rancho Murieta Community Services District, January 8, 2012)
- Title XVI Recycled Water Feasibility Study (AECOM, June 2014)
- Initial Study/Mitigated Negative Declaration Rancho Murieta Recycled Water System Expansion Project (AECOM, June 2014)
- California Regional Water Quality Control Board, Central Valley Region Order No. R5-2014-149 Wastewater District Requirements and Master Recycling Permit (WDR)
- USBR Funding Application (AECOM, January 13, 2016)
- Water Supply Assessment Technical Memorandum (Maddaus Water Management, Inc., January 18, 2016)
- Retreats West Capacity Certification Letter (Kennedy/Jenks Consultants, May 4, 2016)
- Draft Sewer Study for the Retreats North & East (Baker-Williams Engineering Group, May 6, 2016)
- Draft Sewer Study for Murieta Gardens I & II (Baker-Williams Engineering Group, May 15, 2016)
- Preliminary Sewer Study for Rancho Murieta North (Baker-Williams Engineering Group, May 31, 2016)
- Draft Recycled Water Modeling Study (AECOM, June 2016)

1.2: Development Projections

Buildout is projected to occur around 2035 based on the latest development projections and result in roughly 4,817 equivalent residential units⁵ within the District's service area. Figure 2 graphically illustrates a summary of development and associated ADWF projections. The level of development reflects an increase of roughly 85 percent above the current number of equivalent residential units.

Review and analyses of the development projections indicate the following distinct periods of different projected rates of growth:

- 2016 through 2020: Approximately 1,355 new equivalent residential units (11%/yr. growth rate)
- 2020 through 2030: Approximately 490 new residential homes (1.2%/yr. growth rate)

⁵ Value includes future commercial and/or industrial connections and is based on 2,604 existing equivalent residential units.

- 2030 through 2035: Approximately 370 new residential homes (1.7%/yr. growth rate)
- 2035 through 2045: At Buildout, no new homes (0%/yr. growth rate thereafter)

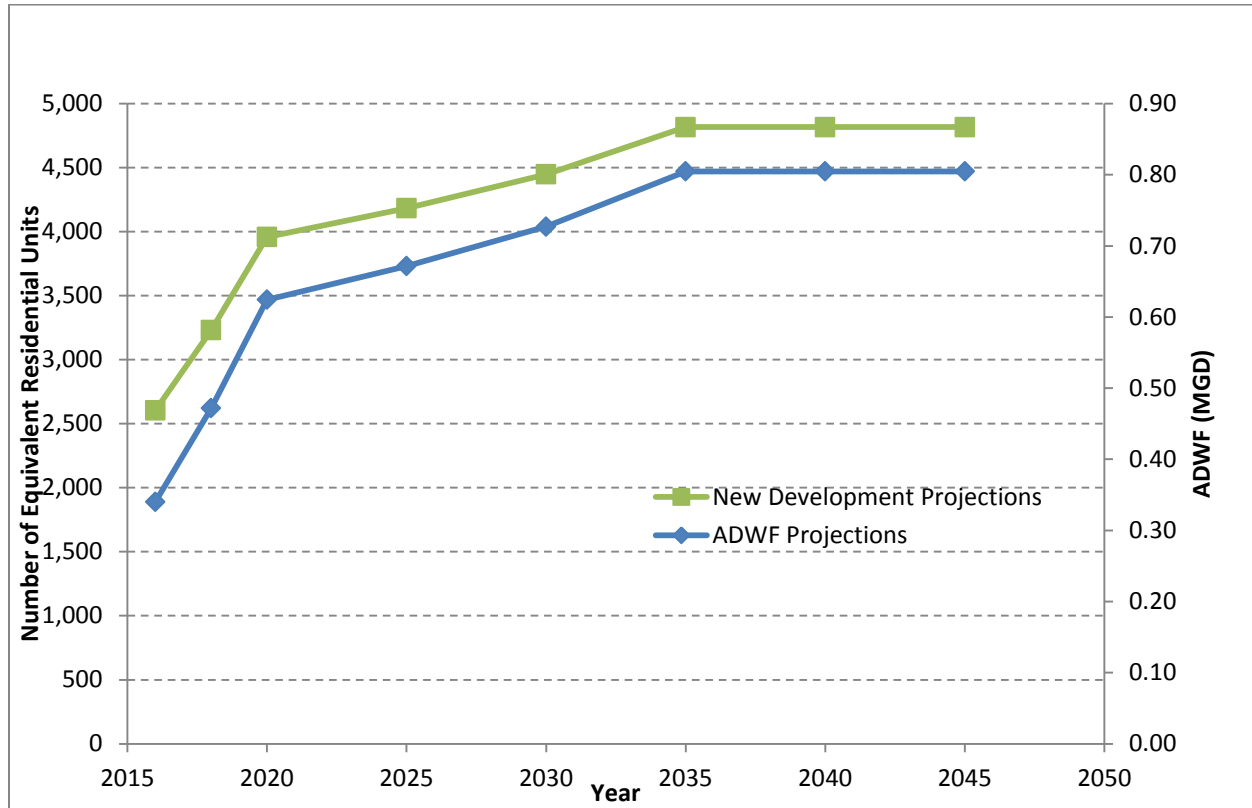


Figure 2. Phase 1 and Buildout Development and ADWF Projections

Existing recycled water use areas (i.e., North and South Golf Courses) can accommodate roughly 3,265 equivalent residential units based on the 0.5 MGD ADWF capacity described in the WDR⁶. Review and comparison of the 3,265 equivalent residential units to the development projections shown in Figure 2 indicate the need to expand recycled water use beyond the North and South Golf Courses in the future to support the level of development currently projected for Rancho Murieta.

1.3: Program Benefits

The District’s Recycled Water Program is aligned with the actions needed to (1) provide additional water to help offset California’s dwindling water supplies, (2) aggressively promote and demonstrate water programs that stretch California’s available potable water supplies, and (3) contribute to the long-term recovery of the Canal Basin and Delta and Cosumnes River ecosystems. The District’s Recycled Water Program will:

- Leverage and apply the District’s Recycled Water Program Codes, Standards, requirements, etc.
- Offset potable water demands, conserve surface water supplies and reduce Cosumnes River diversions (335 AFY).
- Provide a beneficial, sustainable and long-term means for treated effluent disposal.
- Help the District meet their 20x2020 Water Conservation Goals.
- Increase water supply reliability and reduce drought deficits.

⁶ 0.5 MGD flow includes allocations for infill (0.05 MGD), Murieta Gardens (residential and commercial) and The Retreats (residential) for a total of 3,265 total equivalent residential units.

- Maximize use of existing infrastructure.
- Provide opportunities to serve other potential users along the recycled water transmission pipeline alignments.
- Reduce the potential need to upgrade the District's existing Wastewater Treatment Facility (WWTF) and WWRP to more modern and conventional facilities that may have been otherwise required for surface water discharge via request and approval of a National Discharge Elimination System (NPDES) permit or Indirect Potable Reuse (IPR).

1.4: Preliminary Design Report Organization

This PDR has been organized as follows:

- Executive Summary
- Section 1. Introduction (this section)
- Section 2. Basis of Design
- Section 3. Recommended Improvements
- Section 4. Project Implementation

1.5: Acknowledgements

We appreciate and would like to thank the Rancho Murieta Community Services District for providing the opportunity to develop this PDR and work on their Recycled Water Program. We appreciate and acknowledge the efforts of the District staff, most notably Darlene Thiel, General Manager and Paul Siebensohn, Director of Field Operations, along with the Board of Directors. Without their input and support, this PDR could not have been developed to its current point of completion.

Section 2: Basis of Design

This section presents the basis of design, assumptions and a summary of the system requirements recommended for Phase 1 and Buildout of the District's Recycled Water Program. Development projections, wastewater production and recycled water demand estimates, hydraulic modeling and other calculations used to establish design criteria can be found in the Appendix.

2.1: Service Area

Rancho Murieta is located approximately 20 miles east of Sacramento on State Highway 16. The area served by the District is illustrated in Figure 3 and encompasses approximately 3,500 acres. Land uses within the District service area include approximately 2,000 acres for single family residences, townhouses, apartments, duplexes and mobile homes. In January 2016, when the District's Water Supply Assessment was adopted by the Board, the District served 2,604 metered connections comprised of 2,502 residential, 97 commercial and 5 park connections.⁷ Local parks are currently being irrigated with potable water. According to Sacramento County's approved Planned Unit Development Plan at Buildout, the development of the District's service area potentially represents roughly 5,189 residential units. However as described in the previous section, recent development plans reflect a lower number of connections at Buildout than Sacramento County's approved Planned Unit Development Plan.

2.2: District Recycled Water Code and Standards

With respect to wastewater collections treatment and disposal, the District falls within the jurisdiction of the Central Valley Regional Water Quality Control Board (Regional Board), whose mission is to preserve, enhance, and restore the quality of California's water resources and to ensure their proper allocation and efficient use for the benefit of present and future generations. A specific goal of the Regional Board is to promote and expand the beneficial use of recycled water. In an effort to support this goal, where applicable, the District has chosen to serve recycled water to future customers, where deemed to be cost effective and to protect, preserve, and conserve ground and surface water resources within the District's service area.

The District's Board of Directors adopted the Recycled Water Standards (October, 2013) in response to the adoption of District Policy No. 2011-07 Authorized and Mandated Use of Recycled Water (Recycled Water Policy) and the adoption of District Code, Chapter 17, Recycled Water Code (Recycled Water Code). The Recycled Water Policy requires the use of recycled water wherever economically and physically feasible as determined by the Board and identified, in general, that the lands subject to mandatory recycled water use are the undeveloped parcels within the existing District service area. Specific future developments areas were further designated⁸ within the existing District service area and the District's off-site disposal area on the neighboring Van Vleck Ranch. Expanded recycled water use at specific future sites is estimated and anticipated to provide the District with the increased disposal and beneficial reuse of treated wastewater effluent required to serve future developments, accommodate growth within Rancho Murieta, provide an offset to potable water demands, and comply with the WDR.

The District's Recycled Water Standards were developed to establish procedures and minimum standards, specifications and limitations to ensure the health, safety, and general welfare of the citizens of Rancho Murieta when installing infrastructure for, and the use of, recycled water, consistent with the laws and regulations of the State of California, as well as to ensure uniformity in

⁷ Since January 2016, there has been an increase of 32 residential units; equivalent to roughly a 0.12% per year growth rate.

⁸ With the District's submittal of the Report of Waste Discharge and subsequent adoption of the Master Reclamation Permit (December 20, 2013).

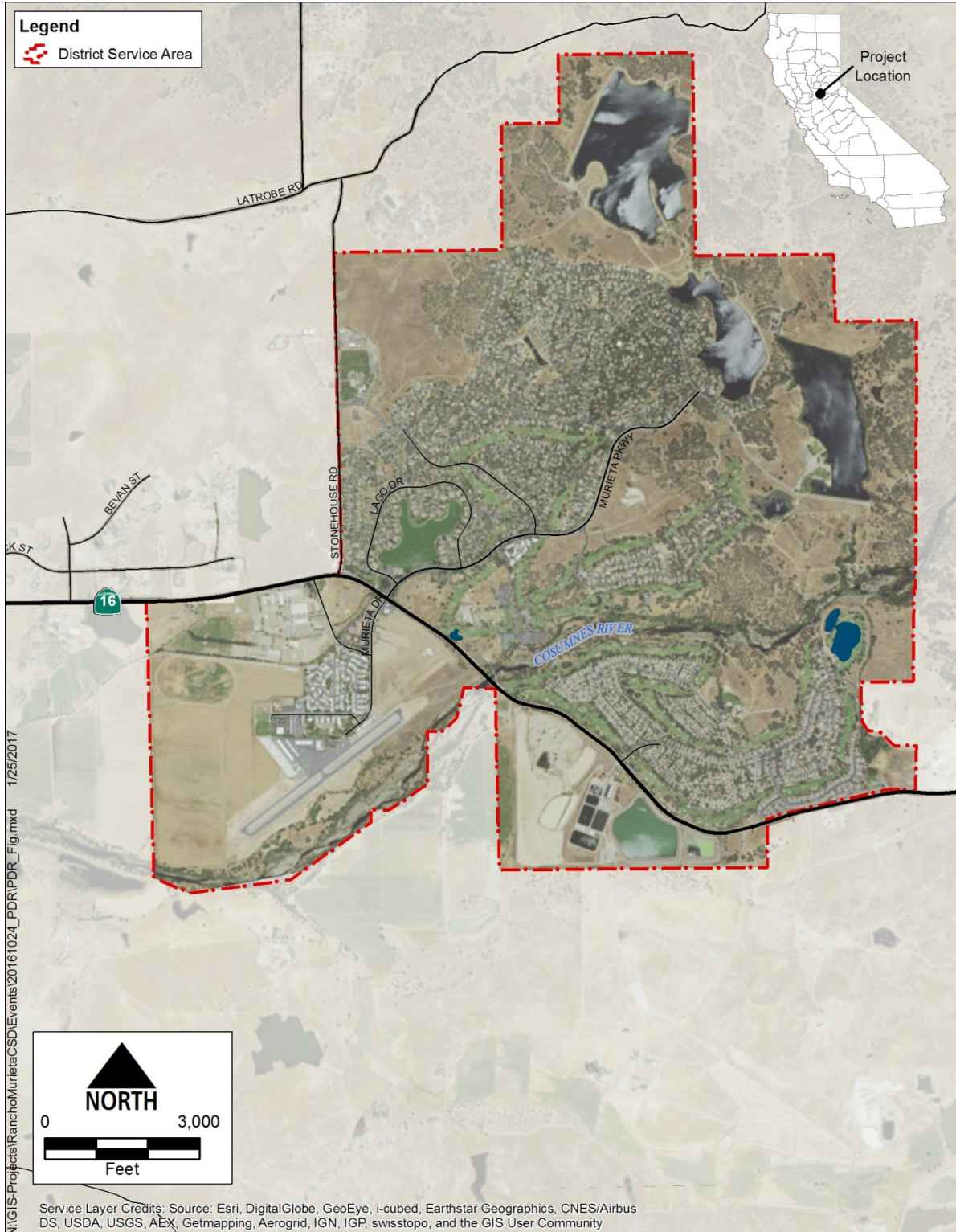


Figure 3. District Service Area Boundary

infrastructure design, format, methodology, construction materials, and quality of work products of the facilities associated with the expanded recycled water system. The Recycled Water Standards are intended to assist recycled water use applicants, authorized contractors, customers, and design consultants with the planning, design, repair, and construction of the expanded recycled water system and were intended to be consistent and ensure compliance with the District’s Recycled Water Code and other governing policies, instructions, and regulations related to the use of recycled water. Aspects of the District’s Recycled Water Standards applicable to the expanded recycled water system include the general guidelines (e.g., general requirements, system responsibilities, user liability and responsibility, recycled water infrastructure and service, etc.), design and construction standards⁹ and standard details.

2.3: Existing and Proposed Developments

Existing and future proposed Phase 1 and Buildout developments are shown in Figure 4 and Figure 5, respectively, and their assumed timelines are provided below in Table 2. The following sections describe proposed future developments. Estimated wastewater production and recycled water demand estimates were either obtained from the latest development-specific sewer studies or the Title XVI Recycled Water Feasibility Study.

Table 2. Summary of Future Development Timelines¹⁰

Development and Phase ¹		Percent of Future Homes Occupied (%) ¹						
		2018	2020	2025	2030	2035	2040	2045
Murieta Gardens (305)	Phase 1	100						
The Retreats (88)	Phase 1	100						
Village A (167)	Buildout		70	15	7	8		
Village B (167)	Buildout		10	30	30	30		
Village C (130)	Buildout		10	40	40	10		
Village D (42)	Buildout			25	25	50		
Village E (43)	Buildout				20	80		
Village F (95)	Buildout			2	38	60		
Village G (53)	Buildout				10	90		
Village H (122)	Buildout			10	25	65		
Apartments (170)	Buildout		70	15	7	8		
Residences of Murieta Hills (198)	Buildout		100					
Lakeview (99)	Buildout		100					
Riverview (140)	Buildout		100					
Industrial/Commercial/ Residential (160)	Buildout		15	30	30	25		
		Developments to be served recycled water						
		Developments not to be served recycled water						

¹Values shown are percentages and represent the percent of total number of equivalent residential units estimated to be constructed and/or occupied by the referred date. Values shown in parentheses () represent the number of equivalent residential units to be added.

⁹ Where applicable given the expectation of reusing or re-purposing existing pipelines.

¹⁰ Village A through H, Apartments and Industrial/Commercial/Residential timelines obtained from the District’s Water Supply Assessment. Lakeview, Riverview, and Residences of Murieta Hills development timelines based on discussions with Les Hock of Hock Construction Management Inc. Timelines for Murieta Gardens and The Retreats obtained from Murieta Gardens I & II Sewer Study and The Retreats North & East and The Retreats West Sewer Studies.

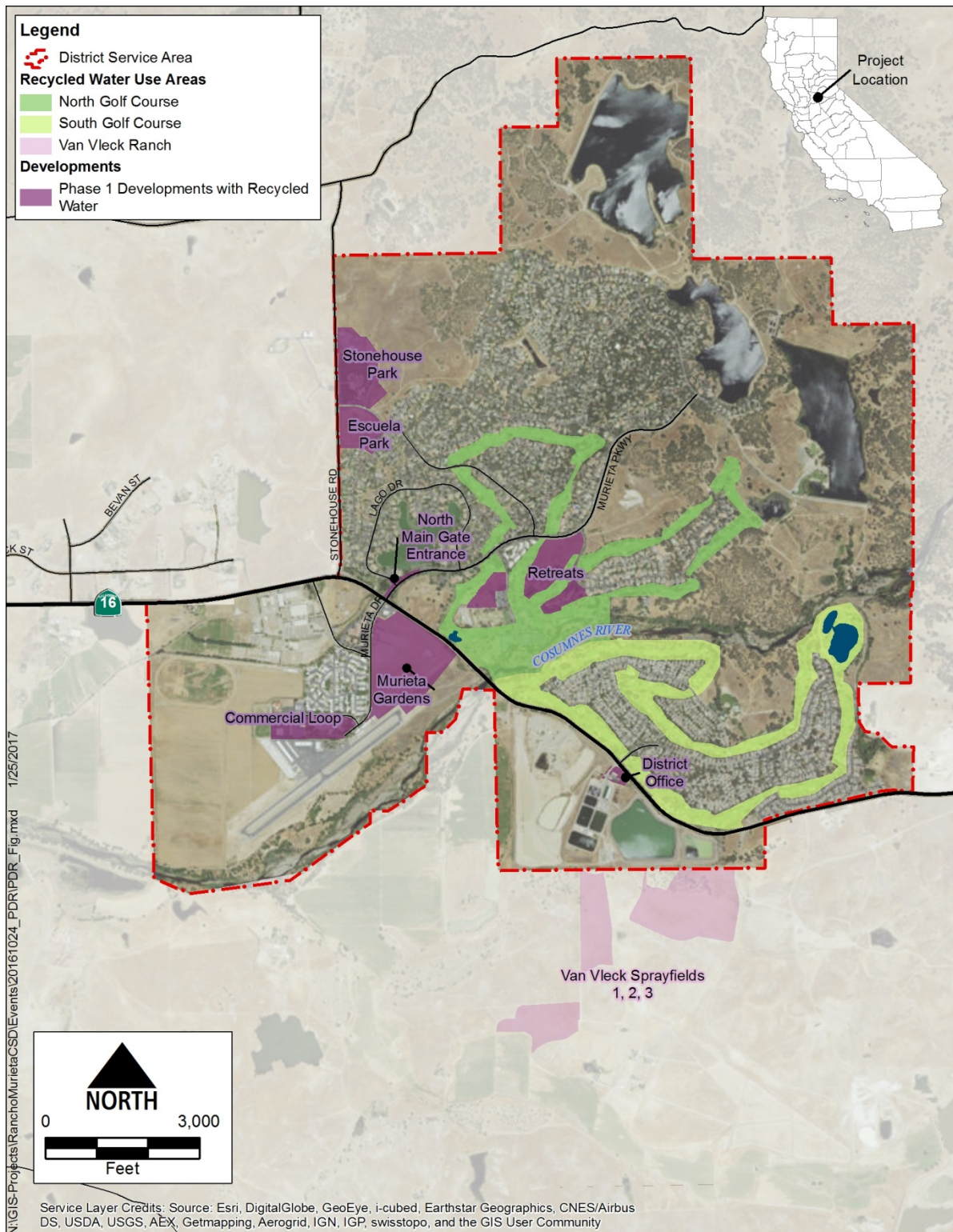


Figure 4. Existing and Planned Phase 1 Developments

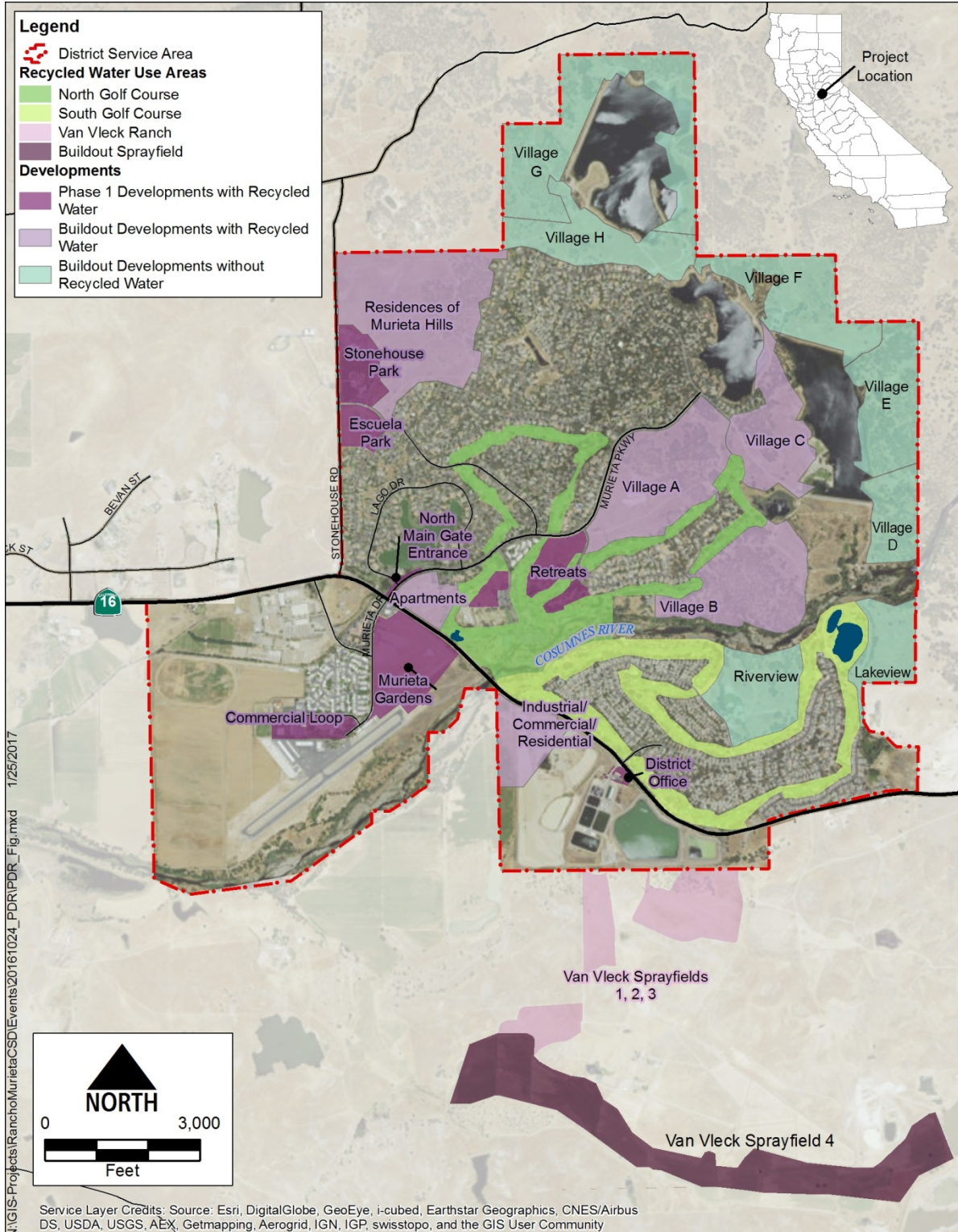


Figure 5. Existing and Planned Phase 1 and Buildout Developments

2.3.1: Murieta Gardens (Phase 1)

As described in the May 15, 2016 Sewer Study, Murieta Gardens is a Phase 1 development consisting of mixed use commercial development (Murieta Gardens I) and a residential development (Murieta Gardens II) located southeast of the intersection of Highway 16 (Jackson

Highway) and Murieta Drive. The Murieta Gardens I phase will consist of roughly 36.5 AC of commercial development that will include a hotel, an extended stay, commercial shops/pads, potential restaurants, one acre park, a self-storage facility and a 5.4 AC detention basin area. The Murieta Gardens II phase will consist of 78 single family residential homes on roughly 16.4 acres. Estimated wastewater production and recycled water demand for Murieta Gardens are 71.9 and 30.5 AFY, respectively. These values as well as the others described in this section were obtained from the latest developer submitted sewer studies.

The hotel is currently under construction and is expected to be completed Spring 2017. Construction of the other development phases and components are scheduled to be completed by Fall 2018.

2.3.2: The Retreats (Phase 1)

As described in the May 3 and 6, 2016 Sewer Studies, The Retreats is a Phase 1 development consisting of the following three elements located near the intersection of De La Cruz Drive and Murieta Parkway:

- Retreats West: 22 single family residential homes
- Retreats North: 52 single family residential homes
- Retreats East: 10 single family residential homes

Total estimated wastewater production and recycled water demand for The Retreats (North, West, and South) are 19.8 and 15.1 AFY, respectively.

The Retreats West is currently under construction and is expected to be served with potable water for irrigation purposes on an interim basis until recycled water is available. Construction of the Retreats North and East are scheduled to be completed by Fall 2018.

2.3.3: Village A (Buildout)

Development densities for Villages A through H are based on the Preliminary Sewer Study for Rancho Murieta North. These densities are undergoing further evaluation and revision that will more likely result in lower densities.

Village A will encompass approximately 94.5 acres of which 59.0 acres are proposed for the development of 167 residential homes. This Buildout development is scheduled to receive recycled water. Estimated wastewater production and recycled water demand for Village A are 39.3 and 61.4 AFY, respectively.

2.3.4: Village B (Buildout)

Village B will encompass approximately 81.7 acres of which 63.8 acres are proposed for the development of 167 residential homes. This Buildout development is scheduled to receive recycled water. Estimated wastewater production and recycled water demand for Village B are 39.3 and 64.6 AFY, respectively.

2.3.5: Village C (Buildout)

Village C will encompass approximately 63.3 acres of which 40.8 acres are proposed for the development of 130 residential homes. This Buildout development is scheduled to receive recycled water. Estimated wastewater production and recycled water demand for Village C are 30.6 and 49.6 AFY, respectively.

2.3.6: Village D (Buildout)

Village D will encompass approximately 28.5 acres of which 24.7 acres are proposed for the development of 42 residential homes. This Buildout development is NOT currently scheduled to receive recycled water. Estimated wastewater production for Village D is 9.9 AFY.

2.3.7: Village E (Buildout)

Village E will encompass approximately 79.0 acres of which 6.3 acres are proposed for the development of 43 residential homes. This Buildout development is NOT currently scheduled to receive recycled water. Estimated wastewater production for Village E is 10.1 AFY.

2.3.8: Village F (Buildout)

Village F will encompass approximately 77.1 acres of which 36.8 acres are proposed for the development of 95 residential homes. This Buildout development is NOT currently scheduled to receive recycled water. Estimated wastewater production for Village F is 15.3 AFY.

2.3.9: Village G (Buildout)

Village G will encompass approximately 114.6 acres of which 28.7 acres are proposed for the development of 53 residential homes. This Buildout development is NOT currently scheduled to receive recycled water. Estimated wastewater production for Village G is 12.5 AFY.

2.3.10: Village H (Buildout)

Village H will encompass approximately 67.6 acres of which 49.5 acres are proposed for the development of 122 residential homes. This Buildout development is NOT currently scheduled to receive recycled water. Estimated wastewater production for Village H is 28.7 AFY.

2.3.11: Apartments (Buildout)

The Apartments will be located just east of the intersection of Highway 16 and Murieta Parkway. The Apartments encompass approximately 17.8 acres proposed for the development of 170 residential units. This Buildout development is scheduled to receive recycled water. Estimated wastewater production and recycled water demand for the Apartments are 23.3 and 23.8 AFY, respectively.

2.3.12: Residences of Murieta Hills (Buildout)

The Residences at Murieta Hills will be located in the northwest corner of the service area. This development will encompass approximately 146.1 acres of which 74.4 acres are proposed for the development of 198 residential homes. This Buildout development is scheduled to receive recycled water. Estimated wastewater production and recycled water demand for Residences of Murieta Hills are 46.6 and 73.8 AFY, respectively.

2.3.13: Lakeview (Buildout)

The Lakeview subdivision will be located in Rancho Murieta South, just west of Lakes 10 and 11. It encompasses approximately 41.6 acres proposed for development of 99 residential homes. This Buildout development is NOT currently scheduled to receive recycled water. Estimated wastewater production for Lakeview is 21.4 AFY.

2.3.14: Riverview (Buildout)

The Riverview subdivision will be located in Rancho Murieta South, just east of Lakes 10 and 11. It encompasses approximately 57.4 acres proposed for development of 140 residential homes. This Buildout development is NOT currently scheduled to receive recycled water. Estimated wastewater production for Lakeview is 32.9 AFY.

2.3.15: Industrial/Commercial/Residential (Buildout)

This development consists of a 40 acre undeveloped commercial site located on the south side of Highway 16 just west of the District’s WWTP. The proposed specific uses for this site have not been determined by the developer at this time. However, according to the Preliminary Sewer Study for Rancho Murieta North, the sewer demand for the 40 acre development is anticipated to be equivalent to approximately 160 residential units, which is the value used for the development of this PDR.

2.4: Wastewater Production and Recycled Water Demand Estimates

Recycled water is produced through treatment of the community’s wastewater at the District’s WWTF and WWRP. Existing recycled water use within the community is currently limited to irrigation of the North and South Golf Courses and during above average levels of annual precipitation, the Van Vleck Ranch Sprayfield. Historical raw and recycled water deliveries for the North and South Golf Courses and Van Vleck Ranch Sprayfield are summarized in Table 3 and Table 4. As indicated, current and future golf course recycled water deliveries for a typical year (i.e., average levels of precipitation) are estimated to be about 550 AFY.

Table 3. Historic and Projected Recycled Water North and South Golf Course Demands

Golf Course	Historic Golf Course Irrigation Demand (AFY)	Recycled Water Supply (AFY)	Max Month / Max Day Demand (MGD)	Maximum Irrigation Rate	
				8-hr Irrigation (gpm) ^d	9-hr Irrigation (gpm) ^e
North	640 ^a	550 ^b	1.01 ^c	2,105	1,870
South			0.92 ^c	1,915	1,705
Total			1.93	4,020	3,575

^a Average of historic 2007 through 2015 golf course irrigation demands (raw plus recycled water deliveries) shown in Table 4

^b As described in the District’s WDR

^c Derived from historic records and discussed with RMCC

^d Daily 8 hour irrigation period

^e Daily 9 hour irrigation period

Table 4. Historic Golf Course and Van Vleck Ranch Water Deliveries

Year	Golf Course Deliveries (AFY) ^a		Deliveries to Van Vleck Ranch (AFY) ^{b,c}
	Historic Golf Course Irrigation Demand (AFY)	Deliveries Recycled Water (AFY) ^c	
2007	561.4	586.1	104.8
2008	596.5	487.9	18.2
2009	644.6	451.4	25.1
2010	556.4	418.2	70.7
2011	562.9	335.5	134.1
2012	681.3	416.3	1.6
2013	754.2	435.3	0.0
2014	708.4	390.2	0.0
2015	676.5	329.0	10.4
Average	640	430	40
Maximum	755	585	135
Minimum	555	330	0

^a Raw and recycled water deliveries.

^b Limited to 215 AFY and permitted either as part of the District’s current WDR or NPDES Order No. R5-2007-0109 prior to 2015.

^c Recycled water deliveries.

Wastewater production estimates shown in Table 5 and illustrated in Figure 6 are based on the development timelines and projections previously described, and 210 gallons per day per residential home connection (gpd/connection) unit flow factor. Recycled water demand estimates were obtained from the latest information; either developer submitted sewer studies¹¹ or the Title XVI Recycled Water Feasibility Study¹².

North Maingate, Stonehouse and Escuela Parks and the District office reuse areas shown in Table 5 reflect conversion from potable to recycled water. Wastewater production shown in Table 5 for these areas is already included as part of a previous line item and thus wastewater production estimates for these particular conversions have been set to 0.

At Buildout, projected wastewater production, based on average levels of precipitation and evaporation, is estimated to be limited to about 885 AFY, which is roughly 85 AFY less than the sum of the projected recycled water demands of 970 AFY. Of this amount, the North and South Golf Courses have the highest priority for recycled water service. The total combined disposal capacity (irrigation demand) of the existing and proposed recycled water use areas, including Van Vleck, is 1,340 AFY.¹³ However, this amount of disposal capacity is only anticipated to be required following periods of unusually high levels of precipitation (e.g., 100-yr level of annual precipitation).

2.5: Design Criteria

The following are criteria that will serve as the basis for the development of the District's recommended Recycled Water Program.

2.5.1: Historic Golf Course Irrigation Demands

Historic North and South Golf Course irrigation demands were obtained from District staff and reviewed. As shown in Figure 7, the overall average irrigation demand for the last nine years (i.e., 2007 through 2016) was about 630 AFY (640 AFY without 2006 as indicated in Table 4). The average golf course irrigation demand for the last 4 years was 705 AFY or 12 percent higher than the average of the last 10 years due primarily to the affects and impacts of the recent drought. The District's WDR provides for an estimated total combined golf course recycled water demand of 550 AFY.

Monthly trends were also reviewed and are shown in Figures 8 and 9. Monthly recycled water demands in terms of AF per month are presented graphically in Figure 8 with each point representing the average of two irrigation seasons. As expected, demands are highest during the summer months due to the hotter, drier weather conditions. Monthly recycled water demands presented as percentages of the total annual irrigation season demands are shown in Figure 9. The peak month irrigation demand of 40 percent shown in Figure 9 is considered abnormal given that (1) this value is much higher compared to the others and (2) it was not repeated and thus historic peak monthly demands are expected to represent 20 to 25 percent of the annual irrigation demand. This 20 to 25 percent derived from review of historic data is slightly lower than the 31 percent described in the District's Recycled Water Standards.¹⁴ Discussions with District staff indicated their preference to continue to use 31% as the basis for maximum month/peak day demands.

¹¹ Limited to Murieta Gardens and The Retreats for both wastewater production and recycled water demand estimates.

¹² Title XVI Recycled Water Feasibility Study, Table 2-1 (p. 2-5) and Table 5-1 (p. 5-3).

¹³ See Provision 17 of the District's Waste Discharge Requirements.

¹⁴ See Article 2.1.1 of the District's Recycled Water Standards.

Table 5. Existing and Proposed Recycled Water Production and Demand Projections

Development/Proposed Recycled Water Use Area	Description	Projected RW Demand (AFY)	Wastewater Production (AFY)
Existing Recycled Water Use Areas			
Existing Development			
Rancho Murieta North & South Golf Courses	18-hole golf courses (~250 ac)	550	380.9
Van Vleck Ranch	Field 1 (~49ac), Field 2 (~25ac), Field 3 (~22 ac)	215	
Sub Total		550* / 765**	380
Phase 1 Proposed Expanded Recycled Water Use Areas (~2016-2020)			
Infill	0.05 MGD allocation assumed	0	56.0
Main Northgate	Conversion to recycled water	2.8	0.0
District Office ^a	Conversion to recycled water	5.4	0.0
Retreats (North, East and West)	84 residential units	15.1	19.8
Murieta Gardens	78 residential units, commercial equivalent to 227 residential units	30.5	71.9
Stonehouse Park (4-acre park)	Conversion to recycled water	36.2	0.0
Escuela Park (4-acre park)	Conversion to recycled water	12.1	0.0
<i>Commercial Loop (to be developed)</i>	<i>Potential conversion to recycled water; could be 20 to 30 AFY demand; require coordination with Owner to proceed</i>		
Phase 1 Sub Total		102	148
Sub Total		650* / 865**	530
Phase 2 Proposed Expanded Recycled Water Use Areas (~2020-2025)			
Village A	167 residential units	56.5	39.3
Village B	167 residential units	64.6	39.3
Village C	130 residential units	49.6	30.6
Village D	42 residential units	0	9.9
Village E	43 residential units	0	10.1
Village F	95 residential units	0	22.3
Village G	53 residential units	0	12.5
Village H	122 residential units	0	28.7
Riverview	140 residential units	0	32.9
Lakeview	99 residential units	0	21.4
Apartments	170 residential units	23.8	23.3
Residences of Murieta Hills	198 residential units	73.8	46.6
Industrial/Commercial/Residential	160 equivalent residential units	50.9	37.6
Van Vleck Ranch	Sprayfield 4	410	
Phase 2 Sub Total		320* / 730**	355
Grand Total		970* / 1,595**	885
* Beneficial reuse			
** Beneficial reuse plus Van Vleck sprayfield disposal demands			

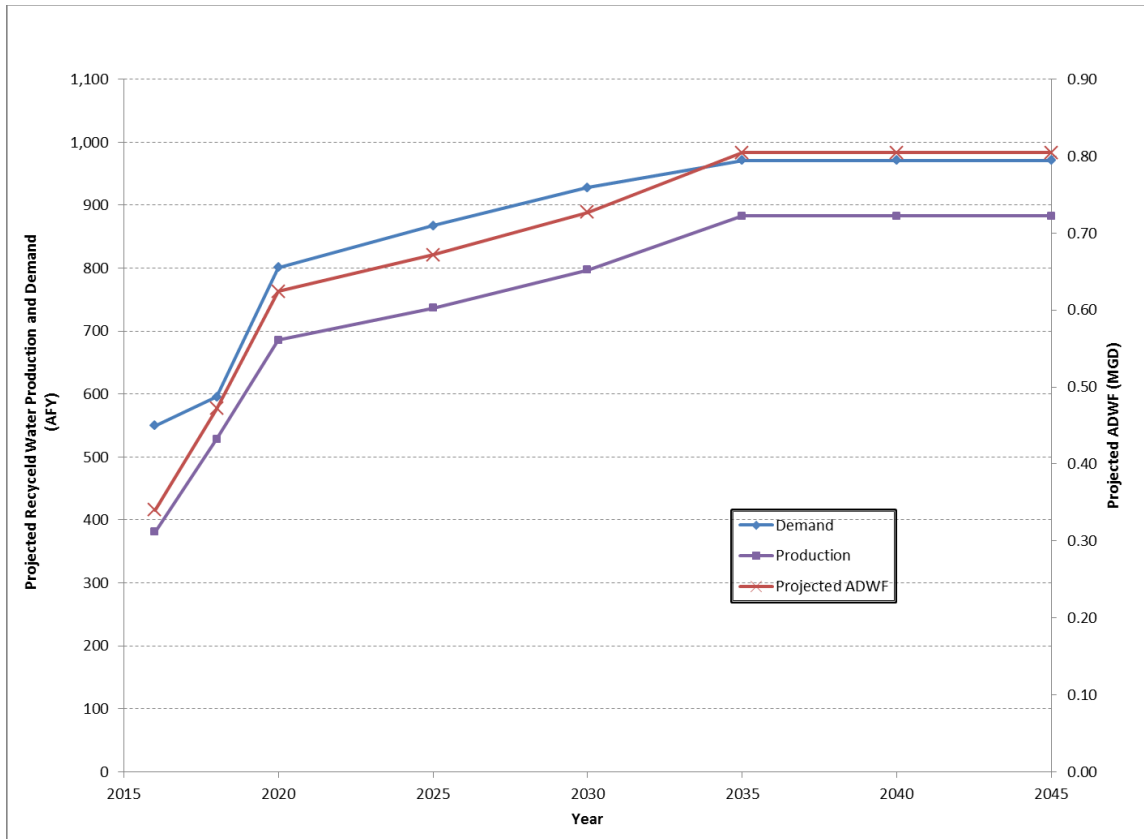


Figure 6. Recycled Water Production and Demand Estimates

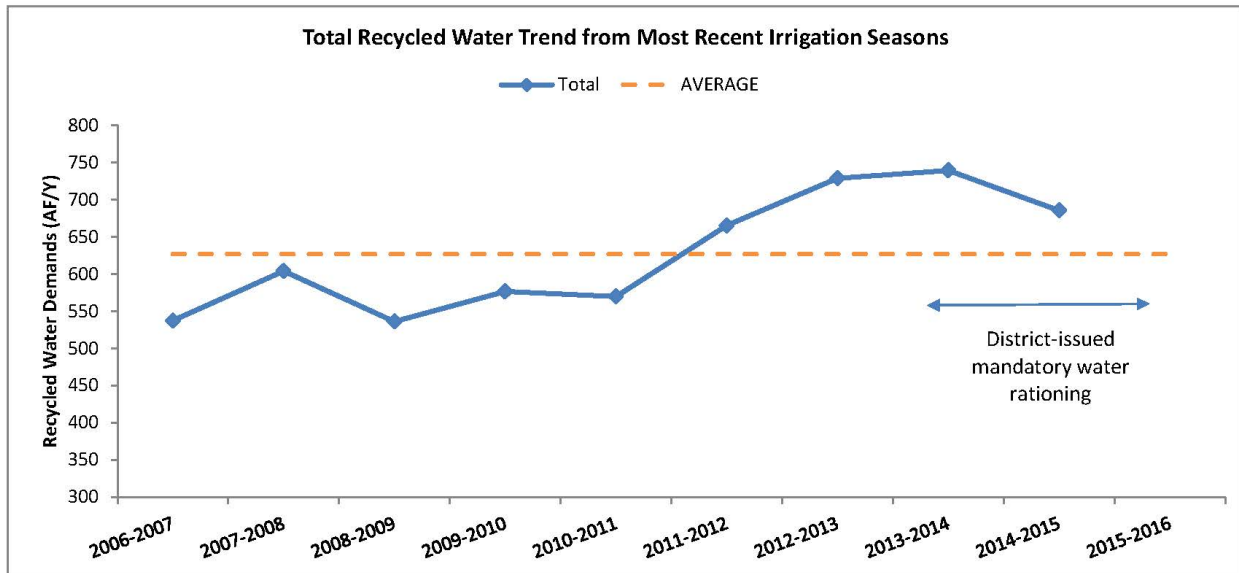


Figure 7. Historic Annual Golf Course Irrigation Demands (Raw and Recycled Water)

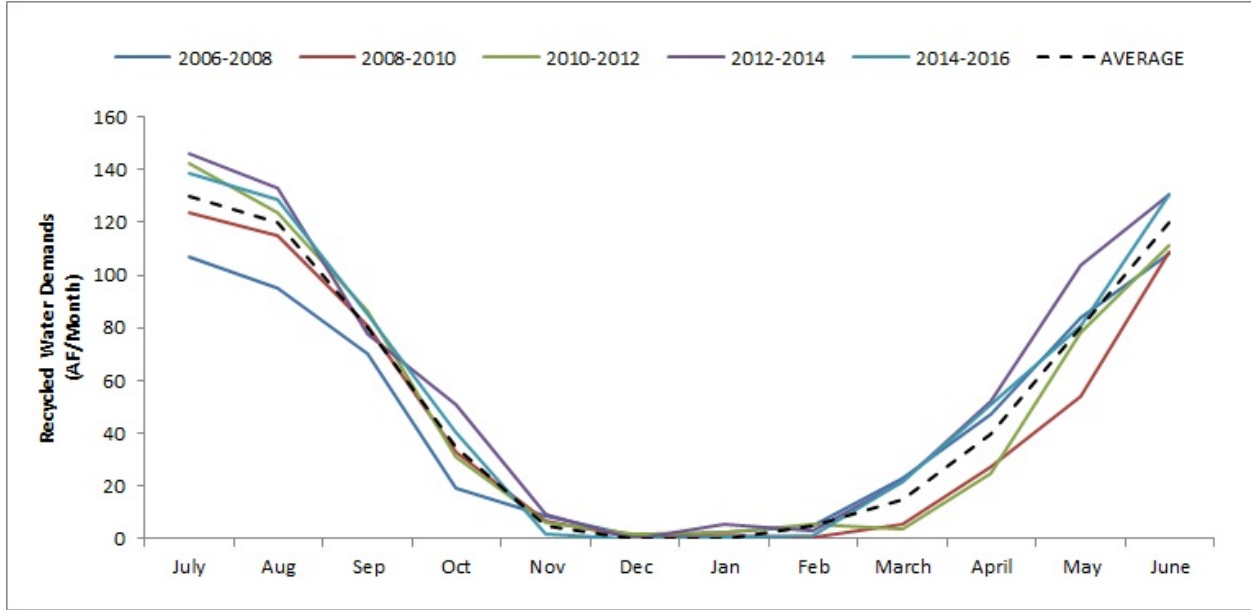


Figure 8. Historic Monthly Golf Course Recycled Water Irrigation Demands (AF per Month)

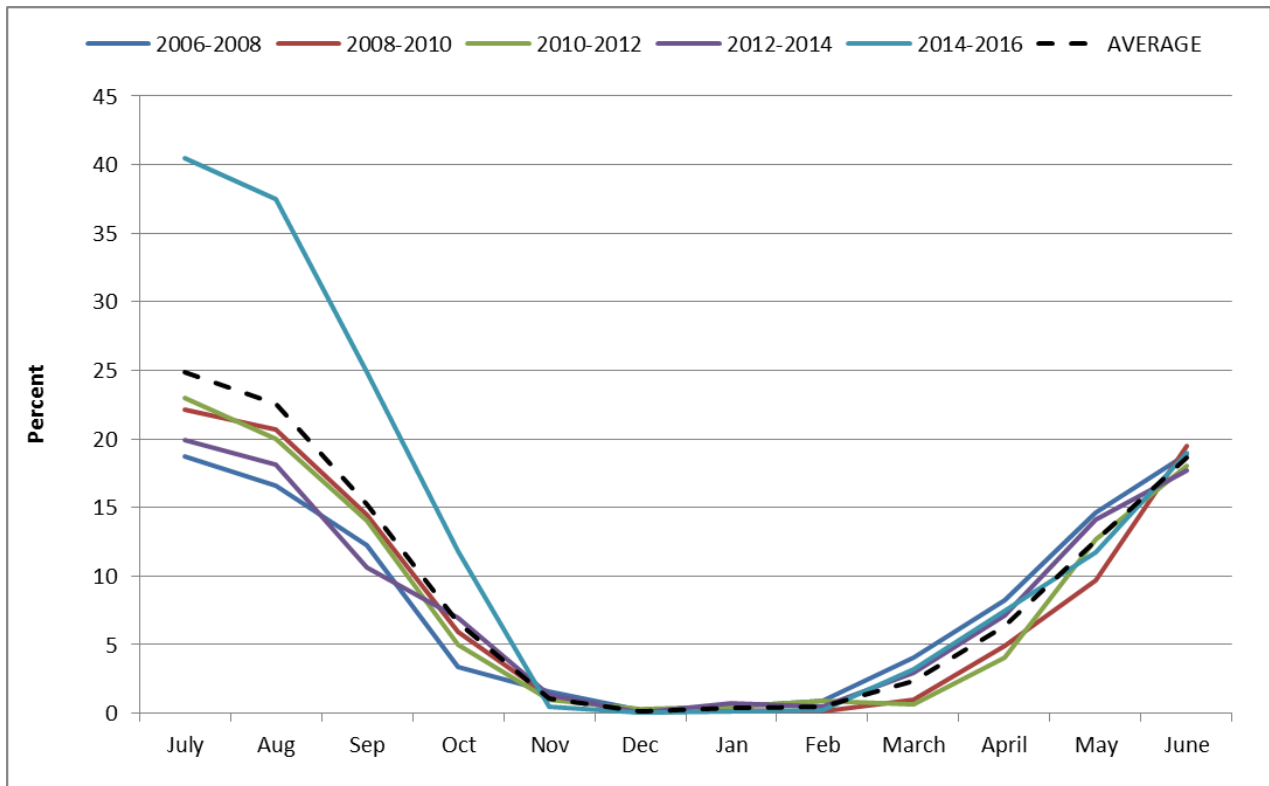


Figure 9. Historic Monthly Golf Course Recycled Water Irrigation Demands (Percent of Total Annual Demand)

2.6: Wastewater Treatment Facility and Reclamation Plant

The existing WWRP receives domestic wastewater and a relatively small amount of commercial wastewater from the community of Rancho Murieta as well as recreational vehicles (RVs) sewage

from two RV dump stations. There are no industries or industrial activities that discharge wastewater to the WWRP.

Raw wastewater is pumped to the WWTF and WWRP through three main pumping stations located throughout Rancho Murieta. The WWTF and WWRP provide secondary and tertiary treatment suitable for the production of *disinfected tertiary recycled water* as defined by Title 22 of the California Code of Regulations. Treatment processes and their locations are shown in Figure 10.

The secondary wastewater treatment plant has a permitted ADFW capacity of 1.55 MGD and a 3.0 MGD peak wet weather flow capacity. Secondary treatment takes place in a series of five clay-lined aerated facultative ponds (Aeration Ponds 1 through 5). Secondary effluent is stored in two clay-lined storage reservoirs (Reservoirs 1 and 2) with a combined storage capacity of approximately 747 AF, with two feet of freeboard, prior to tertiary treatment and disinfection. Wastewater is stored in the reservoirs during the rainy season (typically between the months of mid to late October and March) until needed for irrigation of the golf courses during the dry season. Tertiary treatment and disinfection, typically operated from April through mid-October, consists of two dissolved air floatation units, two rapid sand filters, a chlorine gas feed system, chlorine contact basin, and 6,600 linear feet of chlorine contact pipe installed in a concrete lined equalization basin. The design capacity of the tertiary treatment plant is 3.0 MGD, however the disinfection system (i.e., modal contact time) currently has a rated capacity of only 2.3 MGD. After going through tertiary and disinfection facilities, the final effluent is stored in the equalization basin prior to reuse.



Figure 10. Existing WWTF and WWRP

The existing WWTF, WWRP, and recycled water conveyance system serving the North Golf Course are to be leveraged to reduce costs associated with the Phase 1 and Buildout Recycled Water Program.¹⁵ The existing WWRP is designed to produce up to 3.0 MGD provided that the modal contact time is increased through the implementation of a future chlorine contact basin improvement and/or some other means as described in Section 3. The existing Recycled Water Pump Station, which draws recycled water from the equalization basin, requires expansion to satisfy projected increased recycled water demands and pressure requirements. Moreover, this station currently serves two purposes, to pump recycled water to either the North Golf Course and/or the Van Vleck Ranch Sprayfield. To maximize long term pumping efficiency and minimize costs, it is recommended that these two requirements be served by two separate pump stations in the future, if sufficient funding is available as described later in this report.

2.7: Recycled Water Use Areas and Conveyance Systems

The District produces and distributes *disinfected tertiary recycled water* to the Rancho Murieta Country Club (RMCC) for subsequent use via irrigation of two 18-hole golf course properties, the North and South Golf Courses (250 acres combined area). Both golf courses are operated by the RMCC. The locations of these golf courses are shown in Figure 11. Recycled water is pumped to the golf courses and stored in five unlined irrigation storage reservoirs (Lake 10, Lake 11, Lake 16, Lake 17, and Bass Lake) situated around the golf courses prior to beneficial reuse. The two golf courses are expected to have a combined total annual recycled water irrigation demand of 550 AF during a typical year (e.g., average levels of precipitation) as described in the District's WDR.

Disinfected tertiary recycled water can also be used to irrigate three separate pasture lands (sprayfields) on the Van Vleck Ranch. However, the District limits Van Vleck recycled water deliveries to those following wet seasons with above average levels of precipitation because those deliveries do not offset potable water demands. Distribution and use of recycled water at the Van Vleck Ranch is managed by the District. The approximate locations of Sprayfield 1 (49 ac), Sprayfield 2 (25 ac), and Sprayfield 3 (22 ac) are shown on Figure 11. The existing Van Vleck Ranch Sprayfields have a combined total irrigation demand of 215 AFY. An above ground and mobile spray irrigation system is used to apply the recycled water to the sprayfields. A similar system is assumed to be installed to accommodate future development requirements associated with above average levels of precipitation.

The following sections describe the conveyance systems associated with the golf courses and Van Vleck Ranch Sprayfields.

2.7.1: North and South Golf Courses

Recycled water conveyance and transmission systems associated with the two golf courses were installed in approximately 1983. Since that time, recycled water has been successfully used in accordance with regulatory requirements to meet golf course irrigation demands. Tertiary treated recycled water is pumped from the equalization basin located at the WWRP to Bass Lake by the Recycled Water Pump Station, which is located adjacent to the equalization basin. Recycled water to be delivered to the North Golf Course is conveyed through a 12-inch asbestos cement pipe (ACP) from the WWRP, across Highway 16, over the foot bridge (Yellow Bridge), to the 10th hole of the North Golf Course. From this point, the pipeline is reduced to an 8-inch ACP and runs east along the golf course fairways to Bass Lake. The exact alignment and/or location of this pipeline appears to be unknown at this time, as does its depth and condition.

¹⁵ Considering construction, operating and maintenance related (e.g., net present worth) items.

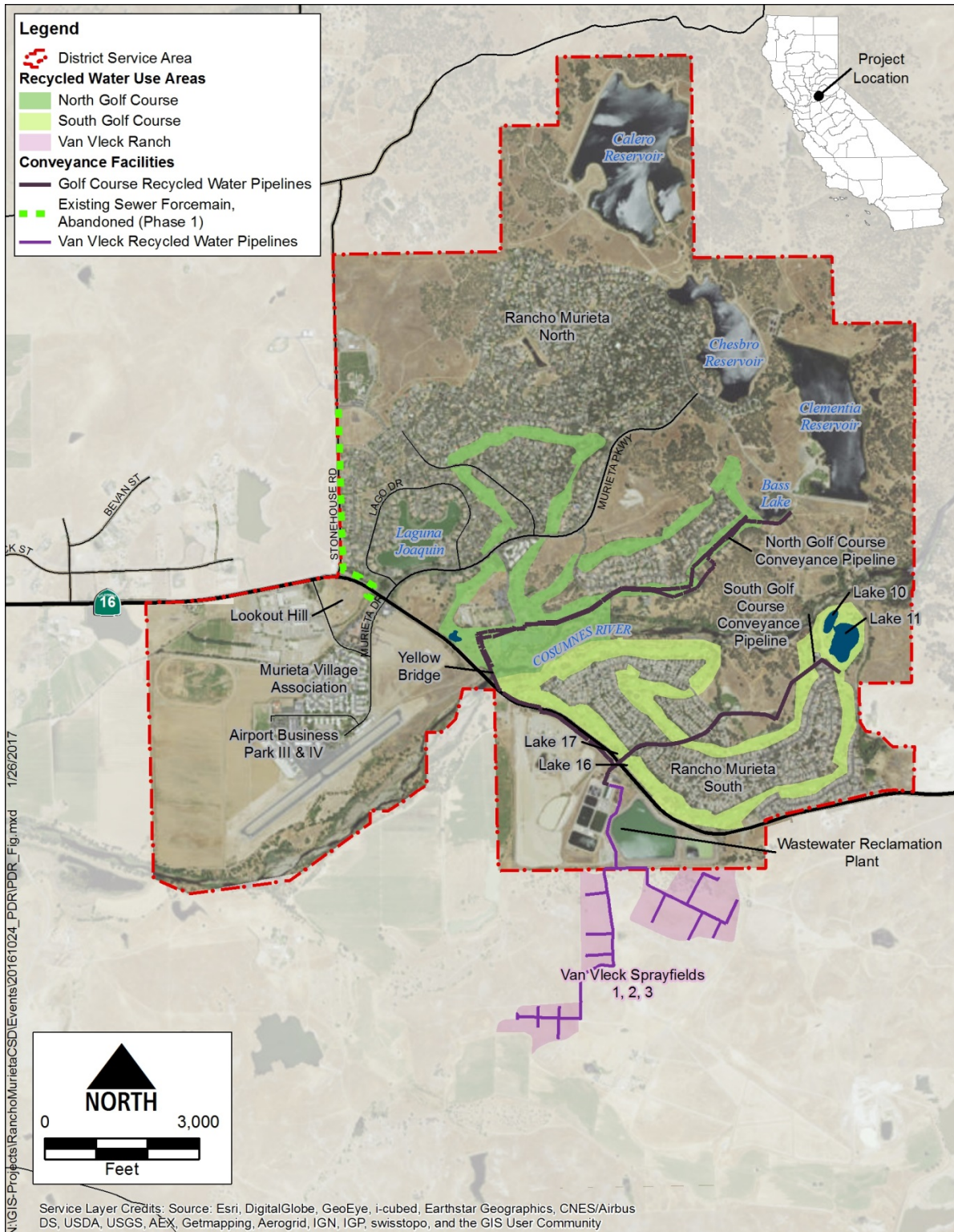


Figure 11. Existing Recycled Water Conveyance Systems and Use Areas

Tertiary treated recycled water is also conveyed by gravity from the WWRP to Lake 16 of the South Golf Course through another 12-inch ACP pipeline. Lakes 16 and 17 of the South Golf Course are interconnected by a culvert. From these lakes, recycled water is pumped to Lakes 10 and 11. The pipeline from Lake 17 to Lake 11 also runs along the golf course fairways and is 8-inch, Class 150 ACP.

Irrigation pump stations are located adjacent to both Bass Lake and Lake 11 and are controlled and operated by the RMCC. These stations continuously pump recycled water from the lakes and pressurize the golf course irrigation systems. Multiple pumps are used to meet varying demands, and fertilizer injection systems are also present. The piping material for the irrigation system is PVC and varies in size from 2- to 6-inch in diameter. The main irrigation distribution pipelines run along the golf course fairways with branches for the sprinkler heads. Irrigation valves are located throughout the golf courses to control the operation of the sprinkler heads. Most valves in the fairways control 3 to 4 sprinklers, while each sprinkler on the greens is generally controlled by individual control valves.

Table 6 presents a summary of roles and responsibilities for specific recycled water conveyance system assets. This table was derived from the Agreement for Availability and Use of Reclaimed Water (May 17, 1988) and the Amendment to Agreement for Availability and Use of Reclaimed Water (May 4, 1994).

Table 6. Recycled Water Conveyance System Roles and Responsibilities^a

System and Facility	Ownership and O&M Costs		
	District	RMPI ^b	RMCC
Equalization Basin	X		
South Golf Course			
Equalization Basin – Lakes 16 & 17 Pipeline	c		c
Lake 16 & 17 – Lake 10 & 11 Pipeline		D	d
North Golf Course			
Recycled Water Pump Station	c		c
North Golf Course Force Main to Yellow Bridge Pipeline	c	C	
North Golf Course Force Main from Yellow Bridge to Bass Lake Pipeline		E	e
^a Adapted from Agreement for Availability and Use of Reclaimed Water (May 17, 1988) and the Amendment to Agreement for Availability and Use of Reclaimed Water (May 4, 1994) ^b Rancho Murieta Properties, Inc. (RMPI) was the original owner, current owner is Rancho North Properties, LLC. ^c RMCCSD to own, operate and maintain; operation and maintenance costs to be split 50/50 between RMCCSD and RMCC. ^d RMPI to own, RMCC to operate and maintain; operation and maintenance costs to be split 50/50 between RMPI and RMCC. ^e RMPI to own, RMCC to operate and maintain.			

2.7.2: Van Vleck Ranch Pipelines

Recycled water can also be pumped from the existing Recycled Water Pump Station to Van Vleck Ranch. Typically, this is only done during years of above average levels of precipitation but is also done at least once every two years to maintain the associated easement rights. Recycled water can be transmitted to Van Vleck Ranch through approximately 1,800 linear feet of aboveground piping. Both 12- and 8-inch Certa-Lok™ PVC irrigation pipes are used to convey recycled water to the Van Vleck Ranch boundary, and about 4,050 linear feet (LF) of aboveground 8-, 6-, 4-, and 3-inch Certa-Lok™ PVC irrigation pipe is used to convey recycled water to three spray irrigation systems. The 12- and 8-inch PVC pipeline was installed in 2007 and is owned and operated by the District. One of the

three existing pumps within the Recycled Water Pump Station is used to convey recycled water through the transmission pipeline to three sprayfields. There are no potable water or sewer pipelines along the transmission or distribution pipeline alignment.

The distribution system consists of approximately 29 strings of K-line irrigation systems, which are in turn composed of movable sprinklers and 40 millimeter (mm) piping. Each movable sprinkler is housed within a plastic pod. The connecting piping is flexible and the entire string of sprinklers can be moved within each sprayfield.

2.7.3: Existing 12-inch Sewer Force Main

As described in the District's Initial Study/Mitigated Negative Declaration (AECOM, June 2014), an existing 12-inch ACP sewer force main may be used in some fashion to convey recycled water to Stonehouse Park (Phase 1), Escuela Park (Phase 1) and Residences of Murieta Hills (Buildout) for recycled water irrigation. As shown in Figure 11, this pipeline extends from the District's Main Lift North Pumping Station to the Stonehouse Park. The District is currently conducting a condition assessment of this pipeline to determine how best to leverage this asset in the future. Future condition assessment is expected to be conducted for the 8- and 12-inch ACPs that convey recycled water from the WWRP to Bass Lake. Information drawn from this Phase 2 assessment will be helpful in refining costs for rehabilitating the 12-inch sewer force main.

Preliminary pipeline risk assessment results developed by Kennedy/Jenks predict the 12-inch sewer force main (FM) to fall within the "moderate range of likelihood of failure" range. However, because of the aggressive recycled water quality, the pipeline has been elevated into the "High Range". The recommended action plan for the High Range is a "proactive and detailed assessment of the pipe", which justifies the rehabilitation plan currently underway for all existing recycled water pipelines.

Considering both cost, access and constructability, the recommended rehabilitation technique is a thin wall, non-structural liner solution in locations where the 12-inch sewer force main is deemed to be structurally viable. The renovation techniques anticipated and included within the cost estimate described later in the PDR for other areas of the force main are either a spray on cement lining, or a cure-in-place liner solution. Both techniques are similar in cost per linear foot and provide similar rehabilitation to the pipe.

Where a structural solution is deemed necessary, the renovation/replacement techniques anticipated and included within the cost estimate are either open-cut pipe replacement or a pull in pipe-bursting solution. Open-cut pipe replacement, considered the more expensive of the two options in terms of cost per linear foot, is the technique included in the cost estimate at this time.

2.8: Conveyance System Requirements

The hydraulic model developed by AECOM was updated and modified to reflect the proposed configuration of the Buildout recycled water system and setup to provide separate irrigation cycles to accommodate golf course and urban and residential recycled water demands. The model and other data sources (i.e., drawings) served as the means of determining the conveyance system operating requirements, limitations, etc. described below in Sections 2.8.1 through 2.8.5.

2.8.1: Recycled Water Supplies and Demands

Recycled water demands shown in the draft AECOM hydraulic model were adjusted to reflect those described in this PDR. Supplies were limited to the production from the WWRP. Tanks and golf course lakes were used to provide operational storage to help satisfy diurnal and instantaneous demands. Demands were limited to existing and proposed reuse areas.

2.8.2: Pressure Limitations of Existing Pipelines

The District’s ability to convey recycled water both now and in the future relies heavily upon existing Class 150 ACP pipelines, which are close to 33 years old and have rated pressure limitations of about 150 pounds per square inch (psi). The updated model was configured to limit pipeline pressures to below this limitation by:

- Adding a pressure reducing valve (PRV) immediately downstream of the proposed Recycled Water Pumping Station. The downstream PRV setting was 150 psi.
- Verifying that the modeled pressures in the entire system do not exceed the maximum operations pressure of 150 psi.

2.8.3: Recycled Water Tank Locations and Elevations

The proposed Lookout Hill Recycled Water Tank was assumed to be configured relatively the same as the abandoned existing tank with respect to size, elevation and maximum water level as assumed and described in the District’s Initial Study/Mitigated Negative Declaration.

The location of the Bass Lake Tank was also reviewed using the updated hydraulic model. Modeling results indicate that:

- Bass Lake Tank should be located at an elevation that will maintain the Hydraulic Grade Line (HGL) in the existing 8-inch ACP pipeline above the topography’s high point to avoid negative pressures in the pipeline; the tank should be set at a base elevation of at least 225.
- Bass Lank Tank should be located relatively close to the existing 8-inch ACP pipeline and uphill, where elevations are increasing (as opposed to on the downside of a hill).

The following are summaries of recommended tank criteria to be used for developing preliminary layouts and costs:

Table 7. Recycled Water Storage Tank Design Criteria (Preliminary)

Recommend Criteria / Requirements	Lookout Hill Tank	Bass Lake Tank
Number of Tanks	1	1
Nominal Volume, gal	200,000	500,000
Diameter, ft	40	70
Working Depth, ft	4 to 22	4 to 18
Tank Base Elevation	244	≥225

2.8.4: System Controls

The use of the existing ACP conveyance pipelines and their associated hydraulic capacities, limitations, etc. dictate the need to replenish golf course lakes separately from urban and residential recycled water irrigation demands with respect to time. It has been assumed that urban and residential irrigation will occur over an 8- or 9-hour period between the hours of 9 or 10 pm and 6 am. The refilling of the golf course lakes will take place between the hours of 6 am and 9 or 10 pm, during the periods when urban and residential irrigation are not occurring. The following is a summary of the irrigation cycle times used for system modeling:

- Urban and Residential Irrigation: 8- or 9-hour period between 9 or 10 pm and 6 am
- Refilling of Golf Course Lakes: 6 am and 9 or 10 pm (non-urban and residential irrigation hours)
- Golf Course Irrigation: May occur at any time and be drawn from Lakes 10, 11, 16, 17 and Bass Lake

Timing of recycled water deliveries is anticipated to require the installation of the following process, flow, etc., control elements. These items were incorporated into the hydraulic model and will serve as the basis for developing the instrumentation and control cost estimates described in Section 4.

1. **Recycled Water Pumping Station Pressure Reducing Valve (Phase 1).** To be located immediately downstream of proposed Recycled Water Pumping Station. Limit pressurization of pipelines to below the maximum operations pressure.
2. **Recycled Water Pumping Station Flow Meter (Phase 1).** To be located immediately downstream of proposed Recycled Water Pumping Station. Meter demands and records in Supervisory Control and Data Acquisition (SCADA).
3. **Recycled Water Pumping Station Pressure Gauge (Phase 1).** To be located downstream of proposed Recycled Water Pumping Station along existing 12-inch ACP pipeline or at critical (i.e., location experiencing highest pressure) location near Yellow Bridge.

Measures pipeline operating pressure and records in SCADA. The speed of the pumps within the Recycled Water Pumping Station will be reduced upon a high pressure reading or shutdown if needed.

4. **Lookout Hill Flow Control (Open / Close) Valve (Phase 1).** To be installed and used to isolate the 12-inch pipeline leading to Murieta Gardens (and ultimately Stonehouse and Escuela Parks and Residences of Murieta Hills) from the existing North Golf Course Transmission Main. This leg will be shut off and refilled from the Lookout Hill Tank and pressurized by the Lookout Hill Booster Pumping Station when Bass Lake is being filled for golf course irrigation.

This flow control valve should be configured to open based on time - when urban and residential irrigation begins at 9 or 10 pm - and close once urban and residential irrigation has been completed and the Lookout Hill Tank is full; which is anticipated to be around 6 am.

5. **Bass Lake Flow Control (Open/Close) Valve (Phase 1).** To be installed to control recycled water conveyance into Bass Lake. The valve is recommended to be located on the existing Bass Lake pipeline downstream of the split to Bass Lake Tank connection. The Bass Lake fill pipeline will essentially be isolated (shut off) from the remaining system during urban and residential irrigation.

This flow control valve should be configured to close based on time - when urban and residential irrigation begins at 9 or 10 pm and remain closed through 6 am.

6. **Lookout Hill Tank Altitude Valve (Phase 1).** To be installed to automatically shutoff recycled water source once the tank has reached a predetermined maximum operating level (assumed to be 266 in the hydraulic model).
7. **Bass Lake Tank Altitude Valve (Buildout).** To be installed to automatically shutoff recycled water source once the tank has reached a predetermined maximum operating level (assumed to be 243 in the hydraulic model).

8. **Lookout Hill Booster Pumping Station (Phase 1).** To be installed downstream of the proposed tank and have a nominal capacity of 1,000 gpm. In order to support the delivery of recycled water for drip irrigation throughout the day, the Lookout Hill Booster Pumping Station will be configured to maintain pressure within the 12-inch pipeline serving Murieta Gardens, Stonehouse and Escuela Parks, Main Northgate and Residences of Murieta Hills to a predetermined set point during the golf course irrigation cycle.
9. **Bass Lake Tank Booster Pumping Station (Buildout).** To be installed downstream of the proposed tank and have a nominal capacity of 1,200 gpm.
10. **Lookout Hill Pressure Gauge (Phase 1).** To be installed downstream of Lookout Hill Flow Control Valve along 12-inch pipeline, potentially at critical location (i.e., location experiencing highest pressure) near Main Lift North Pumping Station.

This pressure gauge will continuously monitor pipeline pressure and send this data to SCADA. If operating pressures above the pipeline’s capacity are experienced, SCADA will lower the pump speed or shut down the Recycled Water Pumping Station pumps. In order to support the delivery of recycled water irrigation throughout the day, the Lookout Hill Booster Pumping Station will be configured to maintain pressure within the 12-inch pipeline serving Murieta Gardens, Stonehouse and Escuela Parks, Main Northgate and Residences of Murieta Hills if needed to a predetermined set point during the golf course irrigation cycle.

2.8.5: Proposed Operating Strategy

The following tables provide a summary of the proposed statuses and actions of the system elements during urban and golf course irrigation cycles.

Table 8. Proposed Strategy - Phase 1 Operations

System Element		Urban and Residential Irrigation	Golf Course Supply
Approximate Timeframe		9 or 10 pm to 6 am	6 am to 9 or 10 pm
1	RWPS PRV	Measure , SCADA Monitors, ≥ 150 psi lower speed, shutdown pumps if required	≥ 150 psi; lower speed, shutdown pumps if required
2	RWPS Flow Meter	Measure and Record	Measure and Record
3	RWPS Pressure Gage	Measure, SCADA Monitor	Measure, SCADA Monitor
4	Lookout Hill Flow Control Valve	Open	Closed
5	Bass Lake Flow Control Valve	Closed	Open
6	Lookout Hill Tank Altitude Valve	Open; Periodically Closed w/Fill	Closed
7	Bass Lake Tank Altitude Valve	<i>Future</i>	<i>Future</i>
8	Lookout Hill Booster Pumping Station	1,000 gpm @ 150 ft TDH to maintain minimum 40 psi to downstream service	Configured to maintained nominal pressure
9	Bass Lake Booster Pumping Station	<i>Future</i>	<i>Future</i>
10	Lookout Hill Pressure Gauge	Measure, SCADA Monitors; ≥ 150 psi shutdown Recycled Water Pumping Station pumps	Measure, SCADA Monitor; Turn on Lookout Hill Booster Pumping Station on low pressure set point

Table 9. Proposed Strategy - Buildout Operations

System Element		Urban and Residential Irrigation	Golf Course Supply
Approximate Timeframe		9 or 10 pm to 6 am	6 am to 9 or 10 pm
1	RWPS PRV	Measure , SCADA Monitors, ≥ 150 psi shutdown pumps	≥ 150 psi; shutdown pumps
2	RWPS Flow Meter	Measure and Record	Measure and Record
3	RWPS Pressure Gage	Measure, SCADA Monitor	Measure, SCADA Monitor
4	Lookout Hill Flow Control Valve	Open	Closed
5	Bass Lake Flow Control Valve	Closed	Open
6	Lookout Hill Tank Altitude Valve	Open; Periodically Closed w/Fill	Closed
7	Bass Lake Tank Altitude Valve	Open	Open until tank filled, then Closed
8	Lookout Hill Booster Pumping Station	1,000 gpm @ 150 ft TDH to maintain minimum 40 psi to downstream service	Configured to maintained nominal pressure notaries
9	Bass Lake Booster Pumping Station	1,200 gpm @ 120 ft TDH to maintain minimum 40 psi to downstream service	<i>Configured to maintained nominal pressure</i>
10	Lookout Hill Pressure Gauge	Measure, SCADA Monitors; ≥ 150 psi shutdown Recycled Water Pumping Station pumps	Measure, SCADA Monitor; Turn on Lookout Hill Booster Pumping Station on low pressure set point

2.9: Regulatory Compliance

The following describe the status of the District’s Recycled Water Program with respect to environmental (California Environmental Quality Act) and regulatory (Regional Board) review.

2.9.1: Environmental Compliance

The final IS/MND determined that expanding the District’s recycled water areas to serve new development within the District’s service area would not have any significant adverse effects on the environment based on a specific system configuration and after implementing the following mitigation measures¹⁶:

AESTHETICS

- **Mitigation Measure AES-1: Replace Landscaping.** District to coordinate with affected landowners to restore or replace plantings consistent with pipeline safety, maintenance, and easement requirements in affected landscape areas.

AIR QUALITY

- **Mitigation Measure AQ-1: Implement Applicable SMAQMD Basic Construction Emission Control Practices.** District to comply with prescribed measures to reduce fugitive dust and construction equipment exhaust emissions.
- **Mitigation Measure AQ-2: Implement SMAQMD Requirements to Reduce Construction-Related NOX Emissions.** District and/or contractor to submit to SMAQMD comprehensive inventory of all off-road diesel construction equipment, equal to or greater than 50 horsepower, that will be used in aggregate of 40 or more hours during any portion of construction.

¹⁶ Complete listing of mitigation measures is provided in this PDR along with brief descriptions. More complete descriptions and information can be obtained from the IS/MND.

BIOLOGY

- **Mitigation Measure BIO-1: Protect Special-status Plant Species.** District and its primary construction contractor shall implement prescribed measures to reduce impacts on special-status plant habitat.
- **Mitigation Measure BIO-2: Protect Valley Elderberry Beetle.** District and its primary construction contractor shall implement prescribed measures to reduce impacts on valley elderberry beetles.
- **Mitigation Measure BIO-3: Protect Western Pond Turtle.** District and its primary construction contractor shall implement Mitigation Measures HYD-1 and HYD-3 to ensure no construction area erosion, sedimentation, or pollution enters any western pond turtle habitat.
- **Mitigation Measure BIO-4: Conduct Pre-Construction Surveys for Swainson's Hawk and Implement Avoidance and Minimization Measures.** District and its primary construction contractor shall implement specific prescribed measures to protect nesting Swainson's hawks.
- **Mitigation Measure BIO-5: Conduct Pre-Construction Surveys for Nesting Raptors and Other Migratory Birds and Implement Avoidance and Minimization Measures.** District and its primary construction contractor shall implement specific prescribed measures to protect nesting raptors and other nesting migratory birds.
- **Mitigation Measure BIO-6: Worker Environmental Awareness Program.** Before start of each new construction season, a worker environmental awareness training program shall be conducted by a qualified biologist.
- **Mitigation Measure BIO-7: Protect Wetlands and Drainages.** District and its primary construction contractor shall implement specific prescribed measures to reduce impacts to wetlands and drainages.
- **Mitigation Measure BIO-8: Comply with Tree Preservation Ordinance.** District and its primary construction contractor shall implement specific prescribed measures to reduce impacts to protected oaks and other native trees.

CULTURAL RESOURCES

- **Mitigation Measure CUL-1: Immediate Halt Construction Activities If Any Cultural Materials Are Discovered.**
- **Mitigation Measure CUL-2: Conduct Construction Personnel Education, Stop Work if Paleontological Resources Are Discovered, Assess the Significant of the Find, and Prepare and Implement a Recovery Plan Required.** To minimize potential adverse impacts on important paleontological resources, District, where construction would occur along or in the immediate vicinity of Stonehouse Road, shall retain qualified paleontologist to train all construction personnel and immediately cease work in the vicinity of the find and notify the Sacramento County Planning and Community Development Department.
- **Mitigation Measure CUL-3: Immediately Halt Construction Activities if Any Human Remains Are Discovered.**

GEOLOGY

- **Mitigation Measure GEO-1: Prepare a Site-Specific Landslide Hazard Evaluation and Implement Engineering Recommendations.** District to hire licensed geotechnical or civil engineer to perform site-specific evaluation of the landslide potential in areas of moderate or steep slopes where each of the proposed storage tanks would be placed.

- **Mitigation Measure GEO-2: Prepare and Implement a Grading and Erosion Control Plan.** Before start of earthmoving activities greater than one acre of disturbance, District to prepare grading and erosion control plan and submit to Sacramento County Planning and Development Department for review before issuance of any grading permit for on-site work.

HAZARDS

- **Mitigation Measure HAZ-1: Implement a Site Investigation to Determine the Presence of Naturally Occurring Asbestos (NOA) and, if necessary, Prepare and Implement Asbestos Dust Control Plan.** District to conduct site investigation to determine whether and where NOA is present in the construction area. If site investigation determines that NOA is present within the proposed construction area then the District to prepare an Asbestos Dust Control Plan for approval by SMAQMD.
- **Mitigation Measure HAZ-2: Prepare and Implement a Construction Traffic Control Plan.** District and its primary construction contractor to prepare and implement traffic control plan for construction activities.

HYDROLOGY AND WATER QUALITY

- **Mitigation Measure HYD-1: Prepare and Implement a Storm Water Pollution Prevent Plan and Associated Best Management Practices.** For activities disturbing 1 or more acres (including phased construction of smaller areas that are part of the District's Recycled Water Program), District and its primary construction contractor to obtain coverage under the SWRCB's NPDES stormwater permit for general construction activities (Order No. 2009-0009-DWQ).
- **Mitigation Measure HYD-2: Evaluate and Implement Construction Site Dewatering Controls.** If construction dewatering is required, District shall evaluate reasonable options for dewatering management and ensure that controls on construction site dewatering are implemented during construction dewatering activities.
- **Mitigation Measure HYD-3: Prepare and Implement a Fac-Out and Undercrossing Contingency Plan.** If drilling mud is needed during construction, the District will develop and follow procedures to prevent the mix that is used during drilling from being discharged onto the ground surface when installing pipelines using trenchless construction methods.

NOISE POLLUTION

- **Mitigation Measure NOI-1: Provide Noise Shielding for Pump Stations.** District to design the proposed pump station with shielding, as needed, to achieve noise levels below 55 dBA at 50 feet. .
- **Mitigation Measure NOI-2: Implement Feasible Noise Abatement Measure for Construction Equipment.** District to require contractors to implement feasible noise abatement measures for noise-producing equipment.

RECREATION

- **Mitigation Measure REC-1: Coordinate with RMCC Prior to Construction.** District to coordinate with RMCC at least 30 days prior to construction activities that could affect golf course operations, including access to the course and course play.

2.9.2: Regulatory Requirements

As previously described, the District falls under the jurisdiction of the Regional Board with respect to wastewater and recycled water. A summary of specific requirements related to the District's need to provide sufficient seasonal storage capacity, approval of proposed future WWRP and recycled water system improvements and use areas are described below and were obtained from the District's WDR:

- **Seasonal Storage Capacity:** On or about 1 October of each year, available storage capacity shall at least equal the volume necessary to provide sufficient capacity to accommodate allowable wastewater flow, design seasonal precipitation, and ancillary inflow and infiltration during the winter while ensuring continuous compliance with all WDR requirements. Design seasonal precipitation shall be based on total annual precipitation using a return period of 100 years, distributed monthly in accordance with historical rainfall patterns.
- **Recycled Water System Improvements and Future Recycled Water Use Areas:** The District shall submit an *Improvements Completion Report* upon completion of any improvements, which may include expansion of the disinfection system, effluent storage, and/or recycled water distribution system and infrastructure improvements to deliver recycled water to the new and expanded recycled water use areas as described in the District's WDR. The *Improvements Completion Report* shall be submitted to the Regional Board for review and approval at least 60 days prior to operational use of such improvements, facilities and/or systems. The report shall document the construction of the improvements, certify that improvements are fully functional, and certify that any new or expanded recycled water use areas are ready to receive recycled water in compliance with the requirements of the District's WDR. The report shall include design parameters (for treatment system), final dimensions and volume at 2-feet of freeboard (for ponds), as-built drawings of the WWRP improvements, and a map showing new recycled water use areas.
- **WWRP:** The District shall submit a *Capacity Increase Report* documenting that the WWRP has sufficient storage and disposal capacity for increasing the WWRP ADWF influent flow to more than 0.5 MGD while being in compliance with all applicable specifications, limitations, and provisions of the District's WDR. The report shall certify that the new recycled water use areas (e.g., existing parks and common area, recycled water residential irrigation developments and/or expanded Van Vleck Ranch Use Area (Sprayfield 4)) are ready to receive recycled water in compliance with the requirements of the WDR. The *Capacity Increase Report* shall be submitted to the Regional Board for review and approval at least 60 days prior to increasing the WWRP influent flow beyond 0.5 MGD.

Section 3: Recommended Improvements

This section presents design features and descriptions for the recommended Phase 1 Recycled Water Improvements Project which is comprised of Phase 1 WWRP Improvements and Phase 1 Recycled Water Conveyance System Improvements. Recommended future Buildout Recycled Water Improvements have also been identified and recommended. The features described in the tables below were developed from the criteria described in Section 2 of this PDR. A summary of Phase 1 and Buildout Recycled Water Improvements are presented in Tables 10 and 11, respectively.

Table 10. Recommended Phase 1 Recycled Water Improvements Features and Components

Process / Element	Criteria / Feature
1. Recycled Water SCADA Control System	
Number of SCADA Terminals	1
Location	WWRP
Type Lookout Hill Control Valves	Programmable Logic Controller (PLC) Remote Terminal Units
Communication	Radio*
Control	Pressure
2. Equalization Basin Potable Water Air Gap Connection	
Flow Rate (maximum)	900 gpm
Diameter	8-inch
Material	Ductile Iron
Air Gap (90° Bend)	16 inches per RW-17
3. Rehabilitate Existing Recycled Water Pumping Station	
Pump Type	Vertical Turbine
Number of Pumps	Two (2) duty; one (1) stand by
Total Dynamic Head	325 feet
Pump Flow	1,500 gpm
Motor Horsepower	200 HP
Backup Power	200 KW Standby Diesel Generator
Control Method	Pressure
4. District Headquarters Conversion – Recycled Water Irrigation System Connection	
Site Supervisor	District (Paul Siebensohn)
Type of Landscape	Grass in front yard and medians
Type of Irrigation	Spray and drip
Area (approximate)	168 acres
Water Demand (estimated)	5.4 AFY
Pipe Diameter	4-inch
Pipe Material	PVC
5. Northwest Recycled Water Transmission Main	
Pipeline Length (total)	11,600 lineal feet, total
Highway 16 Undercrossing	1,000 lineal feet (approximately)
Legacy Lane to Lookout Hill Tank	2,800 lineal feet (approximately)
Lookout Hill Tank to 12-inch Force Main	2,400 lineal feet (approximately)
12-inch Force Main along Stonehouse Road to Stonehouse and Escuela Parks	5,400 lineal feet (approximately)
Replace	1,200 lineal feet of 12-inch
CIPP Rehabilitation	2,400 lineal feet of 12-inch
Diameter	12 inch

Process / Element		Criteria / Feature
	Buried Pipeline Materials	PVC or HDPE pipe
	Above Grade Pipeline Materials	Steel or Ductile Iron pipe
	Pipeline Labeling	"Recycled Water, Do Not Drink"
	Pipe Color or Wrapping	Purple or wrapped with purple tape
	Air and Blowoff Valves	District Standards
	Others	See District Standards
6. Lookout Hill Booster Pumping Station		
	Pump Type	Vertical Turbine
	Number of Pumps	One (1) duty; one (1) stand by
	Total Dynamic Head	150 feet TDH
	Pump Flow	1,000 gpm (maximum)
	Motor Horsepower	50 HP
	Pump Housing	Not required
	Backup Power	50 KW Standby Diesel Generator
	Control Method	Pressure
7. Escuela Park Conversion – Recycled Water Irrigation System Connection		
	Site Supervisor	Rancho Murieta Association (RMA) (TBD)
	Type of Landscape	Plantings and flowers now
	Type of Irrigation	Spray and drip
	Area (approximate)	4 acres
	Water Demand (estimated)	12.1 AFY
	Pipe Diameter	4-inch
	Pipe Material	PVC
8. Stonehouse Park Conversion – Recycled Water Irrigation System Connection		
	Site Supervisor	RMA (TBD)
	Type of Landscape	Grass primarily (fields)
	Type of Irrigation	Spray and drip
	Area (approximate)	4 acres
	Water Demand (estimated)	36.2 AFY
	Pipe Diameter	4-inch
	Pipe Material	PVC
9. Lookout Hill Recycled Water Storage Tank		
	Number of Tanks	1
	Diameter	40
	Height (maximum at sidewall)	26
	Volume (nominal)	200,000 gallons
	Materials of Constructed	Bolted Steel
10. North Maingate Conversion – Recycled Water Irrigation System Connection		
	Site Supervisor	RMA (TBD)
	Type of Landscape	Grass, flower beds, plantings
	Type of Irrigation	Spray and drip
	Area (approximate)	121 acres
	Water Demand (estimated)	2.8 AFY
	Pipe Diameter	4-inch
	Pipe Material	PVC

* Wireless I/O can be used alternatively

Table 11. Recommended Buildout Recycled Water Improvements Features and Components

Process / Element		Criteria / Feature
A. Disinfection Facilities Upgrade		
Existing Contact Basin Modal Contact Time		27 minutes at 3.0 MGD ¹
Required Modal Contact Time		90 minutes (minimum)
Additional Modal Contact Time Required		63 minute (minimum)
New Contact Basin Efficiency (Assumed Baffling Factor)		90%
Required Contact Basin Volume		145,835 gal, minimum; 146,610 gal actual
Length to Width to Depth Ratios		Target 40:1:1.5; Actual 40:1:1.4
Length (without walls)		280 ft total (3 passes, each at 93.33 ft long)
Width (without walls)		21 ft total (3 passes, each at 7 ft wide)
Depth (without walls)		10 ft
B. North Golf Course Conveyance System Rehabilitation		
WWRP to Bass Lake		11,200 lineal feet (12- and 8-inch)
Replacement		4,300 lineal feet, 12-inch
CIPP Rehabilitation		3,800 lineal feet, 8-inch
Replacement		1,900, 8-inch
C. Bass Lake Recycled Water Storage Tank		
Number of Tanks		1
Diameter		70
Height (maximum at sidewall)		22
Volume (nominal)		500,000 gallons
Materials of Constructed		Bolted Steel
D. Bass Lake Booster Pumping Station		
Pump Type		Vertical Turbine
Number of Pumps		One (1) duty; one (1) stand by
Total Dynamic Head		120 feet
Pump Flow		1,200 gpm
Motor Horsepower		50 HP
Pump Housing		Not required
Backup Power		50 KW Standby Diesel Generator
Control Method		Pressure
E. Seasonal Storage Reservoir		
Existing Storage Capacity		728.2 AF
Required Storage Capacity (Buildout)		765 AF
Incremental Capacity Upgrade		40 AF
F. Van Vleck Sprayfield No. 4		
Extension of Recycled Water Transmission Main		1,000 lineal feet of 12-inch Certa-Loc™
Sprayfield 4 Transmission Main		5,000 lineal feet of 8-inch Certa-Loc™
Sprayfield 4 Transmission Main		5,000 lineal feet of 6-inch Certa-Loc™
Sprayfield 4 Transmission & Distribution Mains		16,250 lineal feet of 4-inch Certa-Loc™
Irrigation System		55 K-line Strings
Depth of Cover		None, all located aboveground
G. Dissolved Air Flotation Feed Pump Improvements		
Replacement of 3 rd Feed Pump		\$100,000 Allocation

¹ See Figure 1-3 of *WWRP Modified Chlorine Contact Disinfection System Compliance Report* (HSe, July 2006). Equivalent volume of 56,250 gallons

3.1: Recommended Phase 1 WWRP Improvements

The four recommended Phase 1 WWRP improvements are illustrated in Figure 12. Descriptions of each recommended improvement are provided after Figure 12.

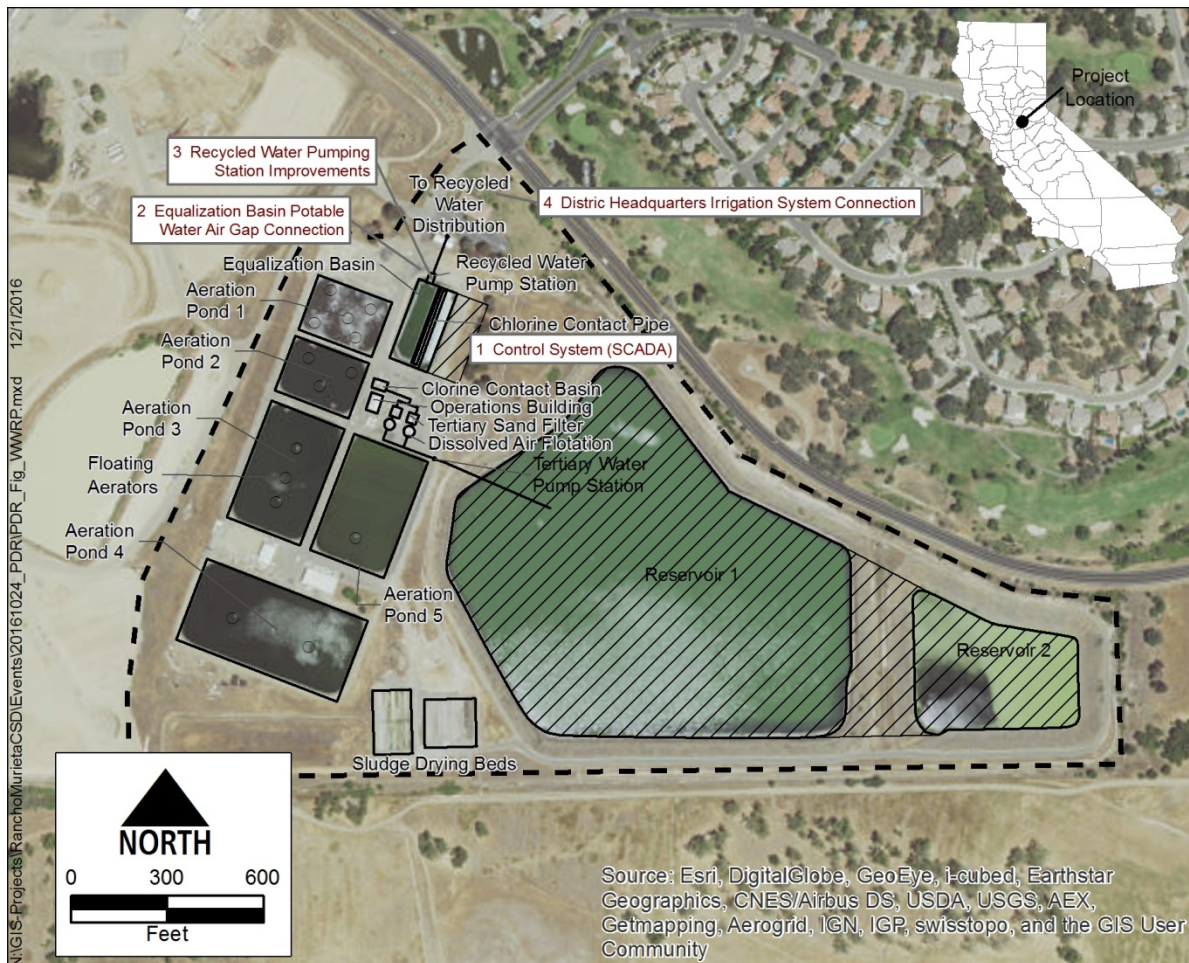


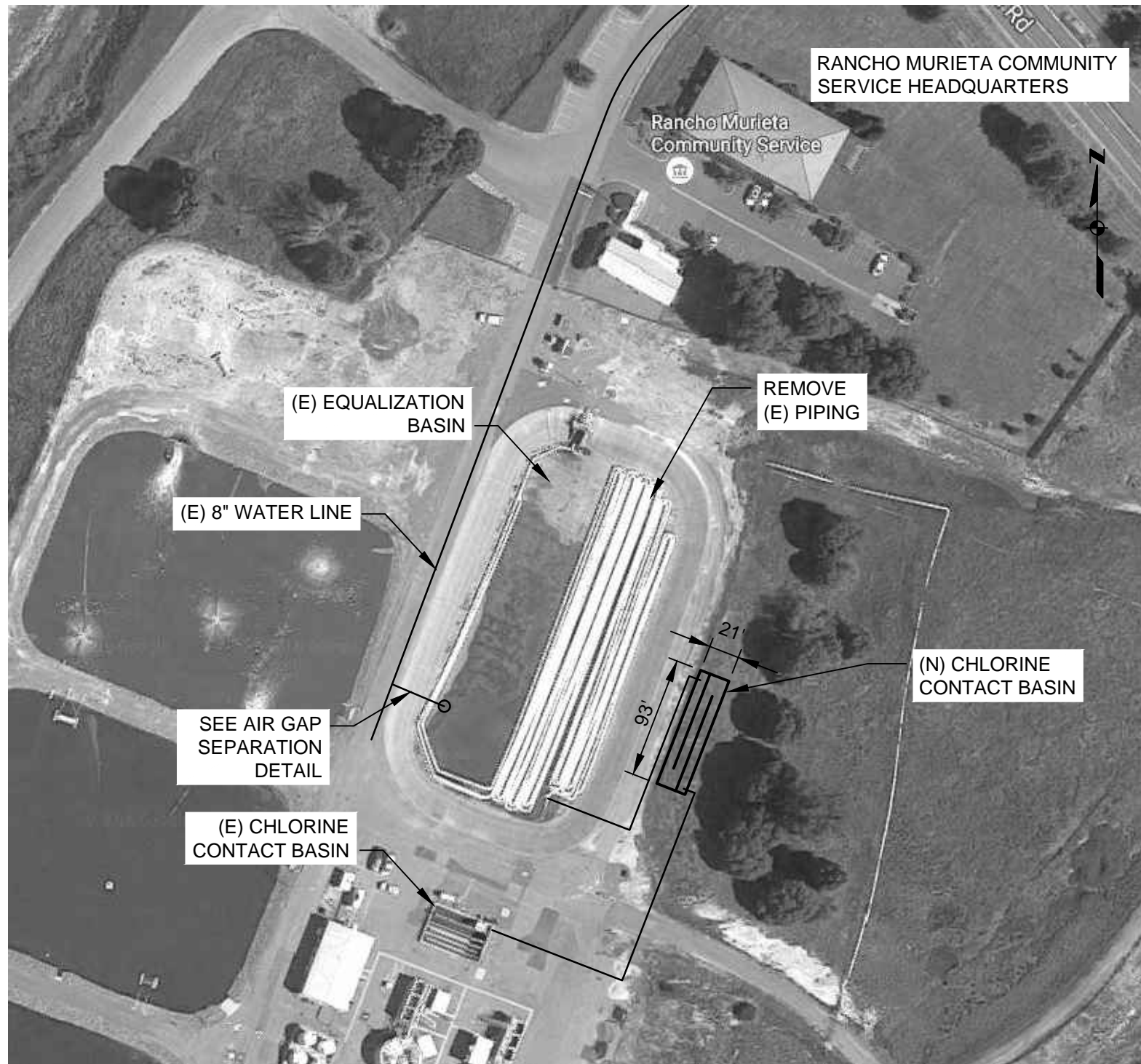
Figure 12. Proposed Phase 1 WWRP Improvements

3.1.1: Control System for Recycled Water Conveyance and Storage System

A SCADA system and telemetry is recommended to control delivery of recycled water throughout the existing and proposed recycled water conveyance and storage system. This also includes the installation of the control valves and elements previously described in Section 2.8.4 to manage and monitor recycled water storage, conveyance and distribution.

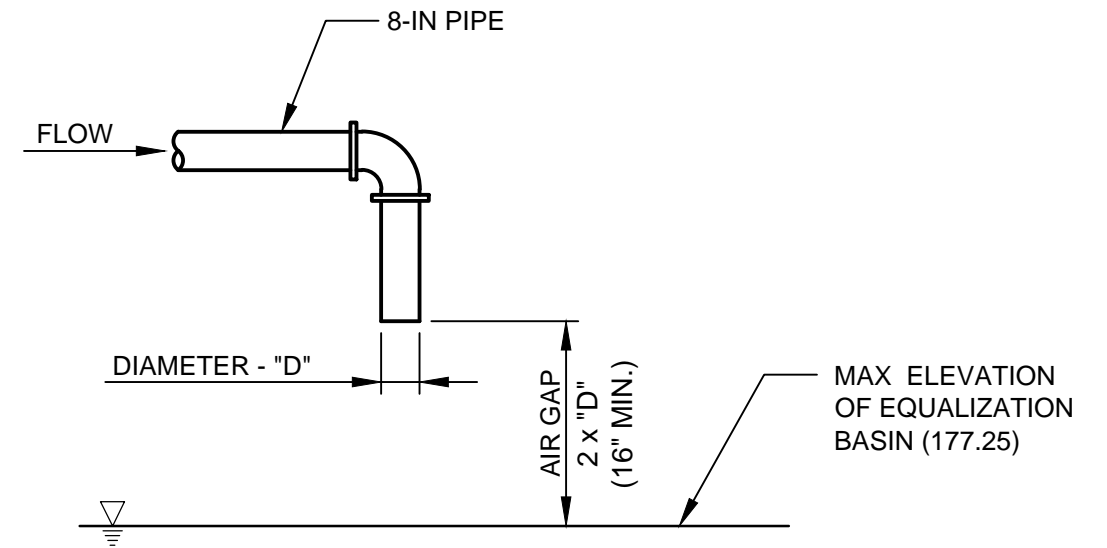
3.1.2: Equalization Basin Potable Water Air Gap Connection

This improvement is required to supplement recycled water with potable water and meet peak recycled water demands while maximizing the use of recycled water within the community. This improvement requires connection to the existing 8-inch (in) potable water pipeline located immediately north of the equalization basin at the WWRP, installing an 8-inch extension to the equalization basin, and installing an 8-in air gap connection to deliver potable water to the equalization basin. Figure 13 shows the proposed pipeline and air gap separation. The connection between the existing potable water pipeline and the air gap will require approximately 20 feet (ft) of 8-in ductile iron pipe (DIP) and a flow meter, isolation and control valves and bends. The existing 8-inch potable water pipeline is assumed to have a capacity of 900 gpm or greater.



PLAN

SCALE: NONE

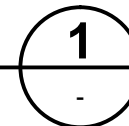


NOTE:

1. THE TERM "AIR GAP" SHALL MEAN A PHYSICAL SEPARATION BETWEEN THE FREE FLOWING DISCHARGE END AND A RECYCLED WATER SUPPLY PIPELINE AND AN OPEN OR NON-PRESSURE RECEIVING VESSEL. AN "APPROVED AIR GAP" SHALL BE AT LEAST DOUBLE THE DIAMETER OF THE SUPPLY PIPE MEASURED VERTICALLY ABOVE THE OVERFLOW RIM OF THE VESSEL - IN NO CASE LESS THAN 1 INCH.

AIR GAP SEPARATION

SCALE: NONE



Kennedy/Jenks Consultants

RANCHO MURIETA COMMUNITY SERVICE DISTRICT

PROPOSED POTABLE WATER AIR GAP AND CHLORINE CONTACT IMPROVEMENTS

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DEC 2016

Figure 13

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Projected average and maximum month/maximum day potable water supplementation requirements are summarized in Table 12:

Table 12. Projected Recycled and Supplemental Potable Water Demands^b

Condition	Recycled Water Demands			Supplemental Potable Water Requirements ^b		
	Avg Annual (AFY) ^a	Max Month/Max Day (MGD)	Instan Urban / Golf Course (gpm)	Avg Annual (AFY) ^a	Max Month/Max Day (MGD)	Instan Urban / Golf Course (gpm)
Phase 1	650	2.27	715 ^c / 2,010 ^d	120	0.30	900 / 310
Buildout	970	3.35	2,955 ^c / 2,010 ^d	110	0.35	900 / 0

^a Values rounded to the nearest 5
^b Derived from calculations; actual supplementation requirements might vary depending on operations and when Phase 1 recycled water system is put into service
^c Value based on 8-hour urban irrigation demand
^d Golf course supply assumed to occur over 16 hour period between 6 am and 10 pm

3.1.3: Rehabilitate Recycled Water Pumping Station

The objective of this improvement is to provide adequate pumping capabilities to the North Golf Course Transmission Main through the rehabilitation of the existing Recycled Water Pumping Station. Currently, this facility is configured to pump recycled water to either the North Golf Course or Van Vleck Ranch. Following rehabilitation, this station will continue to operate in this fashion, but with an increased firm capacity to satisfy maximum month / maximum day demands of the North Golf Course and new recycled water use areas with no or minimal booster pumping.

The rehabilitated Recycled Water Pumping Station will be designed to deliver up to 3,000¹⁷ gallons per minute (gpm) to the North Golf Course, new recycled water use areas, Lookout Hill Tank, and other future developments and the future Bass Lake Recycled Water Storage Tank. Each of the new pumps will be equipped with VFDs to minimize energy use and provide the ability to function efficiently under both operating scenarios (urban, residential and golf course irrigation).

Following rehabilitation, the Recycled Water Pumping Station will be used to transport recycled water from the equalization basin to the North Golf Course and to the following other recycled water use areas:

- Phase 1: District Office, Main Northgate, Stonehouse and Escuela Parks, Murieta Gardens and The Retreats
- Buildout: Phase 1, Villages A, B and C, Residences of Murieta Hills, Apartments and Industrial/Commercial/Residential

The pumping station will continue to have 3 vertical turbine pumps (2 duty, one standby). All 3 pumps will be equipped with VFDs to adjust pump speed. The pumping station will be designed to operate efficiently at anticipated modes of operation (i.e., Phase 1 and Buildout;). It has been assumed that the existing electrical service is sufficient to support the increased load, and that the existing motor control centers (MCCs) can house the MCCs for the new pumps. A new electrical service, upgrade or MCC building or structure is not anticipated to be required or included in the cost estimate.

¹⁷ Equal to estimated maximum month / peak day urban recycled water demands. Modeling results indicate that lower capacity pumping station or recycled water storage tanks could be installed. System optimization was considered outside of the scope of work given the amount of work required to update the hydraulic model.

3.1.4: District Headquarters Connection Irrigation System

As shown in Figure 14, the two existing potable water irrigation services associated with the District's Administration Building will be disconnected at their Points of Service and connected to the Recycled Water Pumping Station for irrigation supply. Following modification, cross-connection testing will be conducted to verify that only the irrigation system is receiving recycled water and to ensure that potable water facilities are not connected to the recycled water system. As shown in Figure 14, 270 lineal ft of new 4-in PVC pipeline and associated appurtenances are anticipated to be required for this improvement.

3.2: Recommended Phase 1 Conveyance System Improvements

Recommended Phase 1 and Buildout Conveyance System Improvements are illustrated in Figure 15. Descriptions of the recommended Phase 1 Recycled Water Conveyance System Improvements are provided after Figure 16.

3.2.1: Northwest Recycled Water Transmission Main

The Northwest Recycled Water Transmission Main will convey recycled water from the Yellow Bridge (approximately) to Stonehouse and Escuela Parks and will be comprised of the following components (see Figure 15):

- a. **Highway 16 Undercrossing and Connection to Existing 12-inch ACP :** A new 12-inch pipeline and Highway 16 undercrossing are required to connect the recently installed 12-inch recycled water pipeline located along Legacy Lane within the Murieta Gardens development. Approximately length of this pipeline is 1,000 feet.
- b. **12-inch Legacy Lane Pipeline, Lookout Hill Storage Tank and Booster Pumping Station:** The recently installed Legacy Lane pipeline will be extended northwest, towards Lookout Hill through the installation of a new 12-in pipeline which is proposed to follow Lone Pine Drive then up Lookout Hill to the existing tank site (along the existing roadway). This new pipeline (approximately 2,800 ft, PVC), in conjunction with other 12-inch pipelines shown in Figure 15 will be used to convey recycled water to the new Lookout Hill Tank shown in Figure 16. A new booster pumping station is needed to deliver recycled water to Stonehouse and Escuela Parks, the Main Northgate and in the future Residences of Murieta Hills from the tank. This new pumping station is proposed to be located near the base of Lookout Hill along Highway 16 near the District's Main Lift North and proposed to house two new booster pumps.
- c. **Interconnecting Piping Between Booster Pump Station and Existing Force Main:** A new transmission force main (approximately 2,400 ft, PVC) will be installed to connect the new Booster Pumping Station to the existing 12-inch sewer force main near the Main Lift North Station site. The proposed alignment of this new pipeline between Lone Pine Drive and the North Main Lift Station is between the hillside and the existing CIA Ditch.



Proposed North Main Gate Conversion



Proposed Stonehouse and Escuela Park Conversions



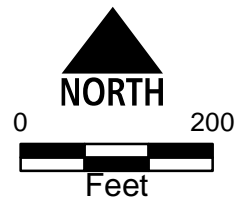
Proposed District Headquarters Conversion

Legend

- Recycled Water Transmission Main
- Proposed Recycled Water Service Line (4 inch)
- Proposed Recycled Water Irrigation Connection*

*Circle represents:

To be designed and constructed per RMCS D Recycled Water Standards



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Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Figure 14: Irrigation System Conversions to Recycled Water

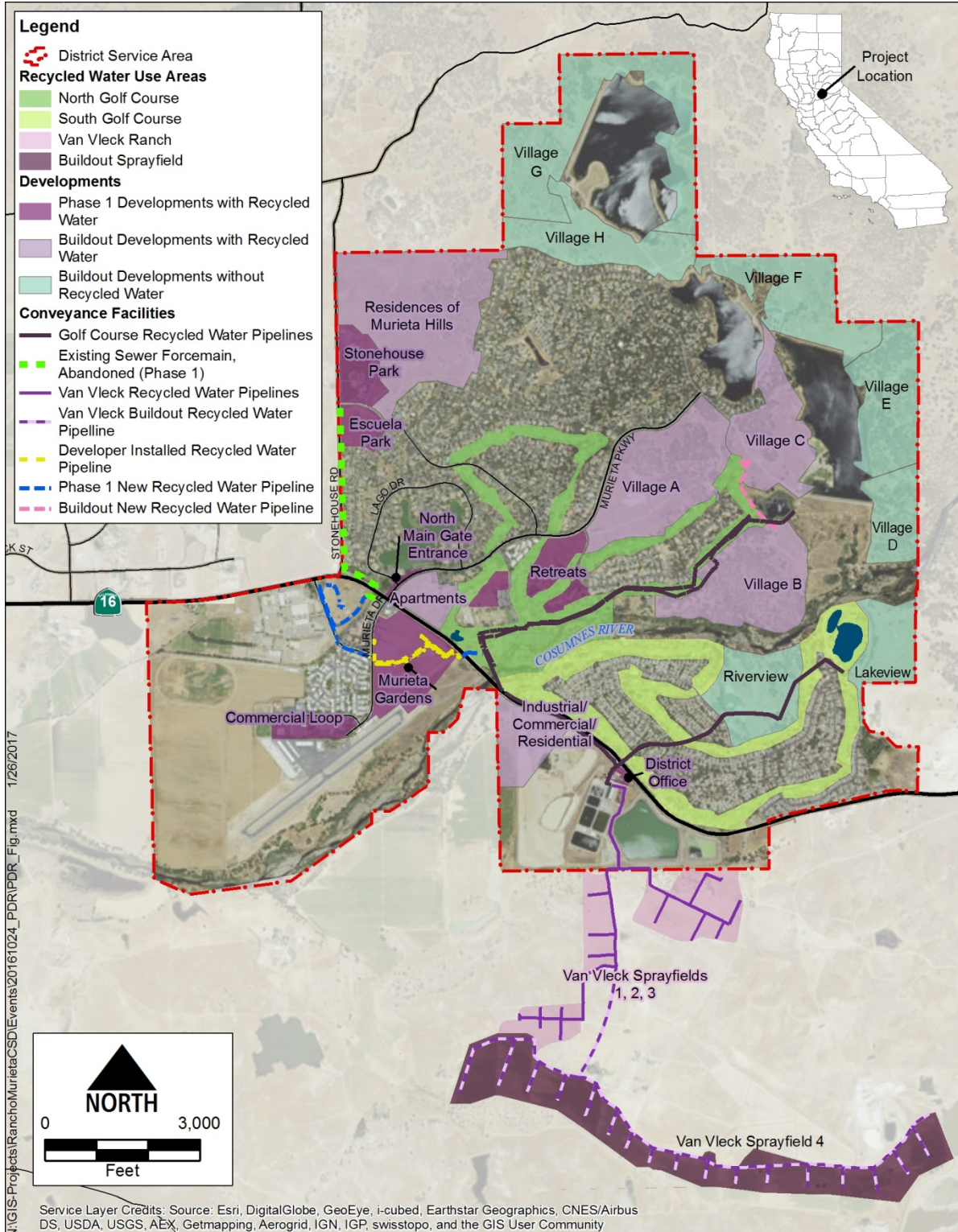
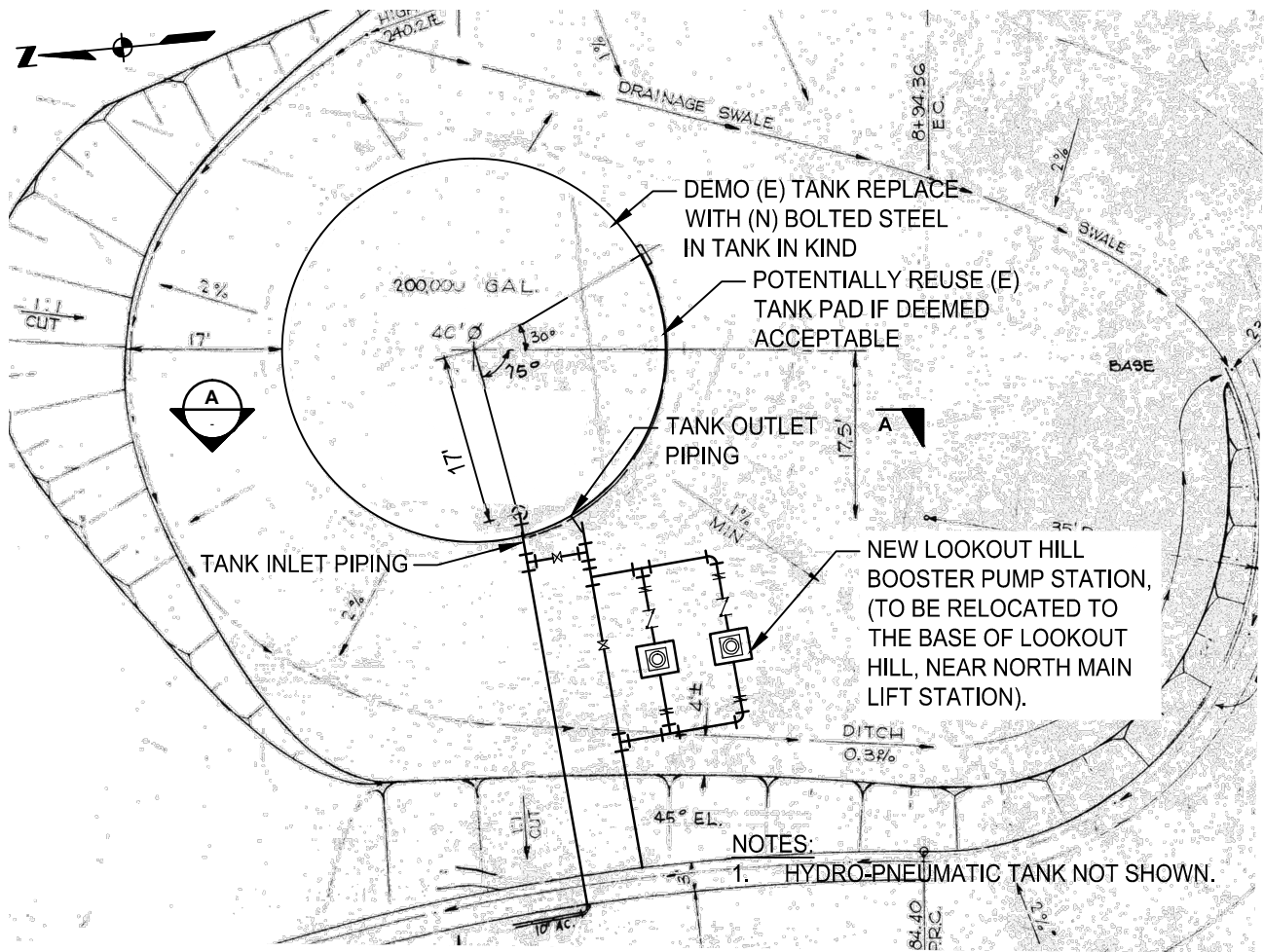
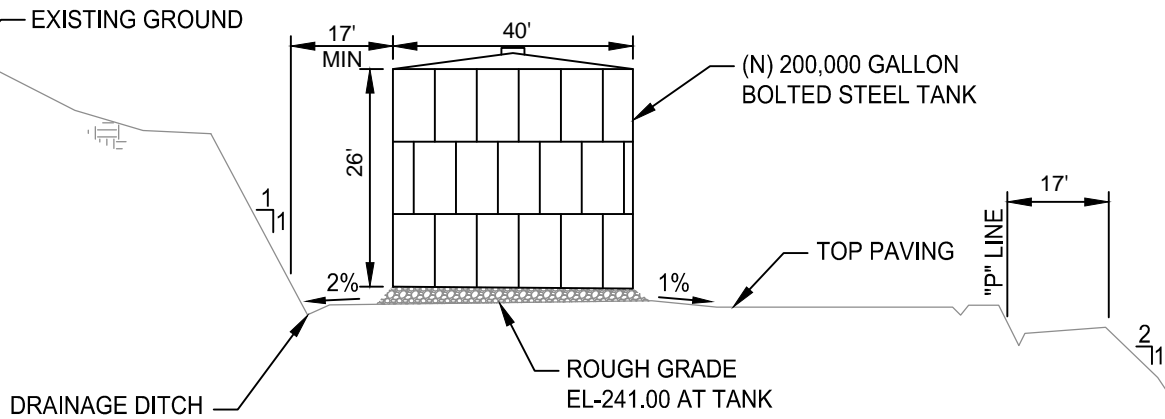
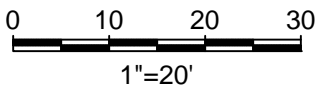


Figure 15. Recommended Phase 1 and Buildout Recycled Water Conveyance System Improvements

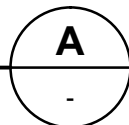


RECYCLED WATER STORAGE TANK SITE PLAN



SECTION A-A

HORIZ. 1"=20'
VERT. 1"=10'



Kennedy/Jenks Consultants

RANCHO MURIETA COMMUNITY SERVICE DISTRICT

LOOKOUT HILL STORAGE TANK

K/J 1670011*00
JAN 2017

Figure 16

- d. **Existing 12-inch Force Main:** The existing 12-inch force main (5,400 ft abandoned sewer force main, not in use) that parallels Stonehouse Road and crosses under Highway 16 will be used for recycled water conveyance.

Considering both cost and constructability, a thin wall, non-structural liner solution in locations where the 12-inch sewer force main is deemed to be structurally viable is recommended. The renovation techniques anticipated and included within the cost estimate described in Section 4 are either a spray on cement lining, or a cure-in-place liner solution. Both techniques are similar in cost per linear foot and provide similar rehabilitation to the pipe.

Where a structural solution is deemed necessary, the recommended renovation/replacement techniques are either open-cut pipe replacement or a pull in pipe-bursting solution (replacement). Open-cut pipe replacement is considered the more expensive of the two options in terms of cost per linear foot and is the technique assumed in the cost estimate.

3.2.2: Lookout Hill Water Storage Tank

Recycled water storage is required to supplement production capacities and satisfy peak irrigation demands. At this time, it is recommended that a total capacity of 200,000 gallons be provided to satisfy Phase 1 demands. System optimization should be performed using the updated hydraulic model (or something similar) to minimize cost of ownership during detailed design. Clear and specific objectives (e.g., reduce storage tank, operating and/or net present costs) and scenarios (e.g., Buildout, Phase 1, etc.) should be identified, defined and documented prior to initiating hydraulic modeling work.

The existing tank located near the top of Lookout Hill will be demolished and a new tank made of bolted panels with powder coated finish will be erected in its place or next to the existing tank. The external dimensions of this tank are approximately 40 foot diameter and 26 feet side wall height (see Figure 16). A booster pumping station will be located near the base of Lookout Hill to (1) provide adequate pressure to serve Stonehouse and Escuela Parks and Residences of Murieta Hills, in the future, and (2) maintain pressure above a minimum set point (e.g., 40 psi) when recycled water is only being supplied to the golf courses.

3.2.3: Escuela Park Conversion

The irrigation system for Escuela Park will be disconnected at the Point of Service and reconnected to the Northwest Recycled Water Transmission Main for recycled water irrigation supply (see Figure 14). It is assumed that the RMA, or other agency responsible for Escuela Park irrigation and management, will work with the District and submit an Application for Recycled Water Permit and Recycled Water Plan for review, consideration of approval and recycled water service in accordance with the District's Recycled Water Standards. As described in the District's Standards, the Recycled Water Plan shall describe how the proposed system is consistent with District Standards. It has also been assumed that RMA will relocate the Point of Service for recycled water irrigation to that shown in Figure 14 and make improvements necessary to improve their system and comply with recycled water requirements.

Cross connection testing is to be conducted prior to service to verify that only the irrigation system is receiving recycled water and to ensure that any potable water facilities within the proposed reuse area are not connected to the recycled water system. Costs for this conversion are based on installing a portion (up to 200 ft) of the new 4-in PVC pipeline shown in Figure 14 for Stonehouse

and Escuela Parks. It is assumed that this pipeline will be supplied by the common 4-inch pipeline located in Escuela Drive and described below in Stonehouse Park Conversion.

3.2.4: Stonehouse Park Conversion

The existing Stonehouse Park potable water irrigation service will be disconnected at the Point of Service and connected to the Northwest Recycled Water Transmission Main for recycled water irrigation supply (see Figure 14). It is assumed that the RMA, or other agency responsible for Stonehouse Park irrigation and management, will work with the District and submit an Application for Recycled Water Permit and Recycled Water Plan for review, approval and recycled water service in accordance with the District's Recycled Water Standards. As described in the District's Standards, the Recycled Water Plan shall describe how the proposed system is consistent with District Standards. Specific items of relevance to this proposed reuse area include protection of public health through (a) separate and continued potable water service to applicable buildings, structures, etc. (e.g., faucets, urinals, toilets, etc.) and (b) adequate setback for picnic tables, drinking fountains, etc. It has also been assumed that RMA will relocate the Point of Service for recycled water irrigation to that shown in Figure 14 and will make the improvements necessary to improve their system and comply with recycled water requirements.

Cross connection testing will also be required to verify that the irrigation system is only receiving recycled water and to ensure that the potable water system is not connected to the recycled water system. Approximately 275 ft of new 4-in PVC pipeline has been included in the cost estimate for this conversion. This pipe length assumes that the 4-inch recycled water pipeline is routed from Stonehouse Road along Escuela Drive and into Stonehouse Park as indicated in Figure 14.

3.2.5: Main Northgate Conversion

The existing irrigation system for the North Maingate will be disconnected from the potable water system and reconnected to the Northwest Recycled Water Transmission Main (see Figure 14). It is assumed that the RMA, or other agency responsible for irrigation and management at this particular location, will work with the District and submit an Application for Recycled Water Permit and Recycled Water Plan for review, approval and recycled water service in accordance with the District's Recycled Water Standards. As described in the District's Standards, the Recycled Water Plan shall describe how the proposed system is consistent with District Standards. Specific items of relevance to this proposed reuse area include protection of public health by (a) ensuring that storm drains, basins, etc. are located outside of the reuse area and (b) that overspray, runoff, etc. does not have the ability to enter surface water bodies. It has also been assumed that RMA will relocate the Point of Service for recycled water irrigation to that shown in Figure 14 and make other improvements, if necessary, to improve their system and comply with recycled water requirements.

Cross connection tests will be used to verify that only the irrigation system is receiving recycled water and to ensure that potable water facilities are not connected to the recycled water system. Up to 200 ft of new 4-in PVC pipeline and associated appurtenances has been allocated for this effort.

3.2.6: Murieta Gardens

Recycled water infrastructure and irrigations systems to serve the Murieta Gardens development is to be proposed by the developer and submitted to the District in a Recycled Water Plan for review and comment as described in the District's Recycled Water Standards (Section 1.3.4). Specific design requirements, components and elements will be identified as part of the Murieta Gardens Recycled Water Plan review and approval process and are not described in this PDR.

3.2.7: The Retreats

Recycled water infrastructure and irrigations systems to serve The Retreats development is to be proposed by the developer and submitted to the District in a Recycled Water Plan for review and comment as described in the District's Recycled Water Standards (Section 1.3.4). Specific design requirements, components and elements will be identified as part of The Retreats Recycled Water Plan review and approval process and are not described in this PDR.

3.3: Recommended Buildout Improvements

The following are descriptions of the recommended improvements to accommodate Buildout.

3.3.1: Disinfection Facilities Upgrade

Currently, the disinfection facilities have a rated capacity of 2.3 MGD and consist of an existing chlorine contact basin (CCB) and chlorine contact pipe (CCP). The CCP will be removed and an additional chlorine contact chamber will be added to increase disinfection facilities capacity from 2.3 to 3.0 MGD. The proposed chlorine contact chamber is shown in Figure 13.

As described in *WWRP Modified Chlorine Contact Disinfection System Compliance Report* (HSe, July 2006), the CCB was tested in 2003 for actual modal contact time at a flow of 1 and 3 MGD. The estimated modal contact time through the CCB at 3 MGD is 27 minutes. In accordance with Title 22, *disinfected tertiary recycled water* requires a minimum 90 minute modal contact time, therefore the proposed chlorine contact chamber is to have minimum modal contact time of 63 minutes.

A new concrete chlorine contact chamber is proposed to be installed next to the existing equalization basin at the WWRP to increase disinfection capacity. A 90 percent efficiency (e.g., baffling factor) was assumed for sizing of the new contact chamber. The new chlorine contact chamber will provide approximately 146,610 gallons for additional disinfection contact time and will consist of three passes following a serpentine configuration. The proposed chamber dimensions are 280 ft long, 7 ft wide and 10 ft deep,¹⁸ which equate to a length to width to depth ratio of 40:1:1.4, which is close to the target length to width to depth ratio of 40:1:1.5.

The water surface elevation of the new chlorine contact chamber will approximately match the elevation of the existing chlorine contact basin. The water surface elevation immediately downstream of the new chlorine contact chamber will approximately match the elevation of the existing equalization basin.

This improvement also includes the removal and disposal of the existing 20-inch CCP located inside the equalization basin.

Replacement of the third Tertiary Pump Station feed pump to the dissolved air flotation (DAF) units (\$100,000 allocation indicated in Table 11) is also required to increase WWRP production capacity from 2.3 to 3.0 MGD.

3.3.2: Existing North Golf Course Conveyance System Rehabilitation

The 12- and 8-inch conveyance pipelines that serves the North Golf Course represents the backbone of the existing recycled water system and are proposed to convey recycled water to additional reuse areas in the future (see Figure 15). Both ACP pipelines have been in service for over 30 years. It is necessary to conduct a condition assessment of these conveyance system assets to determine rehabilitation needs and ensure future performance and continued, uninterrupted service. Condition assessment is recommended to be conducted in two phases. Phase 1 would focus on the existing 12-inch ACP pipeline from WWRP to Yellow Bridge while Phase 2 focused on the existing 8-

¹⁸ Dimensions do not include thickness of contact chamber walls.

inch ACP Pipeline to Bass Lake. Although these improvements have been designated as Buildout, the District should conduct assessments as soon as possible to better understand their condition and plan accordingly. Results specific to these pipelines will likely have ramifications to condition assessment recommendations proposed for the 12-inch sewer force main.

3.3.3: Bass Lake Recycled Water Storage Tanks:

Recycled water storage is required to supplement recycled water production capacities needed to satisfy projected Buildout peak irrigation demands. At this time, it has been recommended that a total capacity of 500,000 gallons be provided to satisfy Buildout demands.

3.3.4: Seasonal Storage Reservoir

A minimum of 40 AF of additional seasonal storage for secondary treated effluent is required to accommodate future development through Buildout. This addition could easily be met through expansion of the existing reservoir. Review of the existing ponds and levee system indicate the potential for cost effective expansion. Seasonal storage reservoir cost estimates presented in this PDR are based upon increasing the capacity of the existing storage reservoirs by 40 AF.

3.3.5: Van Vleck Sprayfield No. 4

Additional effluent disposal capacity will be required to accommodate above average levels of precipitation. As described in Table 11, additional recycled water transmission, distribution and irrigation system improvements are proposed into order increase sprayfield capacity on an additional 187 acres to accommodate wet weather scenarios for future growth.

3.3.6: Villages A, B, and C Developments

Recycled water infrastructure and irrigations systems to serve Villages A, B and C developments are to be proposed by the developers and submitted to the District in Recycled Water Plans for review and comment as described in the District's Recycled Water Standards (Section 1.3.4). Specific design requirements, components and elements will be identified as part of the review and approval process and are not described in this PDR.

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Section 4: Project Implementation

This section presents the proposed construction sequencing and project scheduling. An estimate of probable construction costs is also included, along with a preliminary table of contents for the Phase 1 Recycled Water Improvements Project specifications and list of drawings.

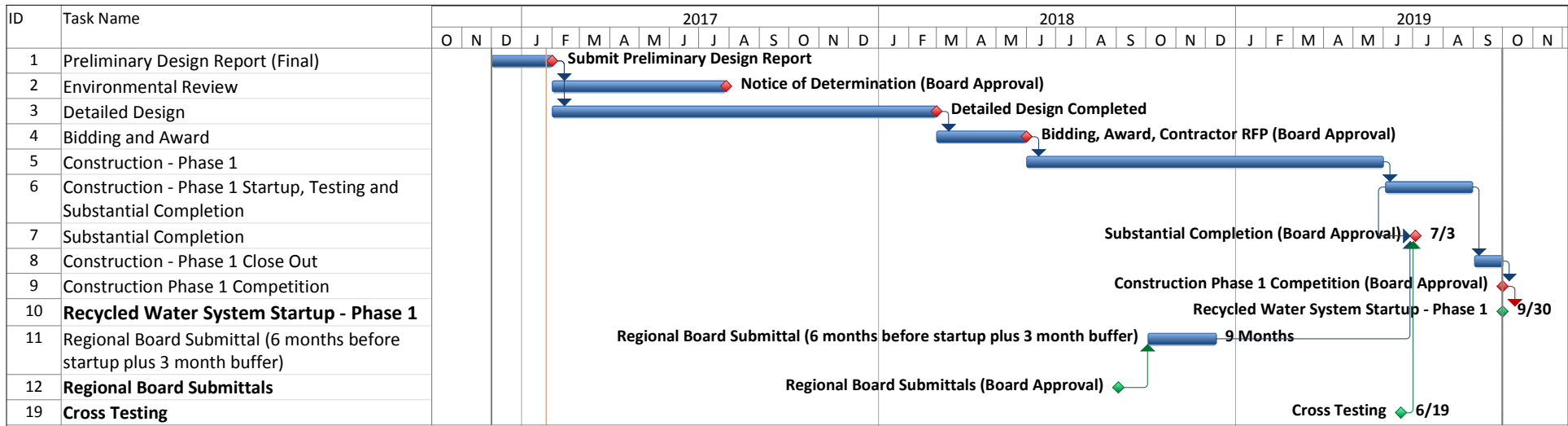
4.1: Construction Sequencing

The sequence of construction for the majority of the Phase 1 Recycled Water Improvements Project is expected to be relatively straightforward provided that the following tie-ins / connections into existing recycled water infrastructure are conducted during the wet season, when recycled water production and conveyance system are not in operation (typically between October 15 through April). If designed, planned and coordinated properly, each of these tie-ins are expected to be relatively short in duration and can be scheduled during the wet season.

- WWRP Improvements (Wet Season Tie-Ins and Critical Activities)
 - Recycled Water Pumping Station
 - Rehabilitation.
 - Tie into existing Equalization Basin at WWRP.
 - Tie into existing 12-inch ACP North Golf Course Conveyance pipeline at WWRP.
 - Tie in (2) into existing District Headquarters irrigation system and conduct cross-connection testing.
- Northwest Recycled Water Transmission Main (Wet Season Tie Ins and Critical Activities)
 - New Highway 16 undercrossing pipeline tie ins (2) to existing 12-inch ACP North Golf Course Pipeline and recently installed 12-inch Legacy Lane pipeline.
 - New 12-inch Lone Pine Drive / Murieta Drive pipeline tie in to recently installed 12-inch Legacy Lane pipeline.
 - New 12-inch Lone Pine Drive / Murieta Drive pipeline tie in to new Lookout Hill Recycled Water Storage Tank.
 - New 12-inch Lone Pine Drive / Murieta Drive pipeline tie in to new Recycled Water Booster Pump Station.
 - New 12-inch recycled water pipeline tie in to abandoned 12-inch Force Main.
 - Abandoned 12-inch Force Main tie ins (3) to existing Escuela and Stonehouse Park and Main North Gate Entrance irrigation systems.
- Reuse Areas Conversions
 - Existing Main Northgate Irrigation System Modifications
 - Existing District Headquarters Irrigation System Modifications
 - Existing Escuela Park Irrigation System Modifications
 - Existing Stonehouse Park Irrigation System Modifications

4.2: Project Implementation Schedule

A project implementation schedule for Phase 1 Recycled Water Improvements Project is presented in Figure 17. The proposed schedule is based on anticipated timelines for completion of major tasks and activities required for implementation and not on meeting a specific timeline or deadline. The implementation schedule indicates that the Phase 1 recycled water system could be initiated for service mid-2019 and that the Phase 1 improvements are estimate to require about 30 months to complete once this PDR has been finalized. This timeline, which should be verified with an environmental consultant, assumes a maximum 6-month timeline for environment consultation and review.



Project: 1670011.00 - RMCS Date: Thu 1/26/17	Task		External Tasks		Manual Task		Finish-only	
	Split		External Milestone		Duration-only		Deadline	
	Milestone		Inactive Task		Manual Summary Rollup		Progress	
	Summary		Inactive Milestone		Manual Summary			
	Project Summary		Inactive Summary		Start-only			

Buildout improvements are anticipated to require approximately 3 years for completion of all major activities such as preliminary design, environmental review, detailed design, construction, startup and testing and close out. Similar to what is illustrated in Figure 17, it is recommended that future Buildout reuse areas obtain District approval no less than 12 months before system startup. Cross connection testing should be conducted just before startup of the Buildout system startup.

The rated ADWF capacity of the existing seasonal storage reservoirs has been established at 0.65 MGD in the WDR. Review of Figure 6 indicates that the ADWF is projected to approach 0.65 MGD around 2023. The District should initiate the expansion of the seasonal storage reservoir no later than January 2020 based on this development schedule. A construction sequencing plan should be established early in the project to determine the best and most cost effective means for increasing the height of the existing secondary storage reservoir berms while maintaining the District’s ability to continuously operate and store secondary effluent.

4.3: Construction Documents

A preliminary list of drawings is shown in Table 13 following by a preliminary list of specifications in Table 14. for the Phase 1 Recycled Water Improvements Project Improvements.

Table 13. Preliminary List of Drawings – Phase 1 Recycled Water

Drawing No.	Discipline	Drawing Title
1	General	Title Sheet, Vicinity Map and Drawing List
2		General Notes and Abbreviations
3		Mechanical Legend, Schedules and Notes
4		Electrical Legend, Schedules and Notes
	1	Recycled Water SCADA Control System
5		P&ID 1
6		P&ID 2
7		P&ID 3
8		PLC
	2	Equalization Basin Potable Water Air Gap Connection
9		Civil Plan and Profile
10		Civil Detail
	3	Recycled Water Pump Station
11		Civil - Site Plan
12		Civil Discharge Piping
13		Mechanical - Recycled Water Booster Pump Station
14		Mechanical - Details
15		Electrical - Power, Control, and Instrumentation
	4	District Headquarters Conversion - Recycled Water Irrigation System Connection
16		Civil - Site Plan
17		Civil - Details
	5	Northwest Recycled Water Transmission Main
18		Civil - Plan and Profile 1
19		Civil - Plan and Profile 2
20		Civil - Plan and Profile 3

Drawing No.	Discipline	Drawing Title
21		Civil - Plan and Profile 4
22		Civil - Plan and Profile 5
23		Civil - Plan and Profile 6
24		Civil - Plan and Profile 7
25		Civil - Plan and Profile 8
26		Civil - Plan and Profile 9
27		Civil - Plan and Profile 10
28		Civil - Plan and Profile 11
29		Civil - Plan and Profile 12
30		Civil - Plan and Profile 13
31		Civil - Plan and Profile 14
32		Civil - Details 1
33		Civil - Details 2
34		Civil - Details 3
	6	Recycled Water Booster Pumping Station
35		Civil - Site Plan
36		Civil Discharge Piping
37		Mechanical - Lookout Hill Booster Pump Station
38		Mechanical - Details
39		Electrical - Power, Control, and Instrumentation
	7	Escuela Park Conversion - Recycled Water Irrigation System Connection
40		Civil - Site Plan
41		Civil - Details
	8	Stonehouse Park Conversion - Recycled Water Irrigation System Connection
42		Civil - Site Plan
43		Civil - Details
	9	Lookout Hill Recycled Water Storage Tank
44		Civil - Site Piping Detail Plan
45		Civil - Storage Tank Plan and Section
46		Civil - Storage Tank Details 1
47		Civil - Storage Tank Details 2
48		Mechanical - Storage Tank Details 1
49		Mechanical - Storage Tank Details 2
	10	Main North Gain Entrance Conversion - Recycled Water Irrigation System Connection
50		Civil - Site Plan
51		Civil - Details

Table 14. Preliminary List of Specifications – Phase 1 Recycled Water Improvements

Spec. No.	Description
Bidding Requirements	
00010	Invitation to Bid
00100	Instructions to Bidders
00200	Information Available to Bidders
00300	Bid Form
00410	Bid Security
00414	Security for Compensation Certificate – California Requirement
00416	Bidder's References
00420	Bidder's Qualifications
00430	Subcontractor List
00480	Noncollusion Affidavit – California Requirement
Contract Forms	
00500	Agreement
00610	Performance Bond – California Version
00620	Payment Bond – California Version
Contract Conditions	
00700	General Conditions – Pre-defined Standard
00800	Supplementary Conditions – California Version
Division 1 – General Requirements	
01010	Summary of the Work and Contract Considerations
01040	Coordination and Project Requirements
01140CA3	Environmental Protection
001300	Submittals
01500	Construction Facilities and Temporary Controls
01550	Traffic Regulation
01650	Facility Startup
01700	Contract Closeout
Division 2 – Site Work	
02050	Demolition
02200	Site Preparation
02302	Earthwork – For Pipelines
02370	Slope Protection
02700	Paving and Surfacing
02775	Concrete Curb, Gutters and Sidewalks
02820	Fences and Gates
02905	Landscape Planting and Irrigation
Division 3 – Concrete	
03200	Reinforcing Steel
03300	Cast-In-Place Concrete
Division 5 – Metals	
05722	Aluminum Handrails, Guardrails and Related Items
Division 9 – Finishes	
09900	Painting
09960	High Performance Coatings
09960A	Appendix A: Standards and References and Mandatory Quality Control Testing
009960B	Appendix B: Coating Detail Sheets, High Performance Coatings
Division 11 – Equipment	
11215	Vertical Turbine Pumps
Division 13 – Special Construction	
13212	Bolted Steel Tank

Spec. No.	Description
Division 15 - Mechanical	
15050	Piping, Valves and Accessories
Division 16 - Electrical	
16000	Electrical Work
16010	General Electrical Requirements
16110	Conduit, Raceways and Fittings
16120	Low Voltage Wire and Cable
16122	Medium Voltage Cable
16124	Signal Cable
16130	Boxes
16140	Wiring Devices
16155	Motor Starters
16160	Panelboards
16165	Load Centers
16180	Protective Devices and Switches
16205	Standby Diesel Engine-Generator Sets
16250	Automatic and Non-Automatic Transfer Switches
16325	Step Voltage Regulator
16330	Capacitor Switchgear
16401	Overhead Electrical Work
16402	Underground Electrical Service System
16405	Switchboards
16406	Medium Voltage Switchgear
16450	Electrical Grounding
16520	Exterior Lighting
16611	Uninterruptible Power Supply (UPS)
16613	Regulated Power Supplies
16615	Power Distribution Units
16760	Plant Communications Systems
16762	Telephone and Paging Systems
16800	Modifications to Existing Facilities
16890	Electric Heaters
16920	Motor Control Center(s)
16923	Slip Energy Recovery Drives (SER)
16929	Medium Voltage Motor Starter(s)
16930	Power Factor Control Equipment
16945	Contactors/Remote Control Relays
16955	Control Devices
16999	Intrinsically Safe Systems
Division 17 - Instrumentation and Controls	
17010	Instrumentation and Controls, General Requirements
17010.1	Figure 1 - Loop Diagram
17010.2	Figures 2 (Interconnection Diagram), 3 (Elementary Diagram), and 4 (Equipment Wiring Diagrams)
17015	Operational Availability Demonstration
17018	Performance (Availability) Warranty
17110	Analytical Instruments
17120	Flow Measurement
17140	Level Measurement
17150	Pressure Measurement
17200	Panel Mounted and Miscellaneous Field Instruments
17320	Process Control System

Spec. No.	Description
17321	Microcomputer Based SCADA System
17330	Programmable Logic Controller
17330.1	Appendix - PLC Process Control Strategies
17335	Process Control Unit
17340	Data Acquisition and Logging System
17341	Data Acquisition and Logging System - Microcomputer Type
17421	Tone Telemetry System
17423	Remote Telemetry Units
17425	Radio Telemetry System
17430	Intelligent Multiplexing System
17510	Panels

4.4: Estimate of Probable Construction Cost

The estimated probable construction and project costs for the recommended Phase 1 improvements are \$4,060,000 and \$5,380,000, respectively as shown in Table 15. A detailed breakdown of this cost estimate is included in the Appendix.

Phase 1 costs exceed the District’s budget discussed at the December 16, 2016 Board meeting (i.e., \$4 million). Potential ways to reduce Phase 1 costs and deliver the project within budget include:

- Postpone 12-inch sewer force main improvements (potential impact could be a delay in providing recycled water to Stonehouse and Escuela Parks, and Residences of Murieta Hills)

As shown at the bottom of Table 15, Recycled Water Program costs are estimated to be about \$6,055 per equivalent residential home. The following is a listing of current connection fees for other nearby and/or similar agencies for comparison purposes:

- Sacramento Regional CSD: \$3,358 infill; \$5,523 new areas
- City of Roseville: \$7,802
- Calaveras County Water District: \$5,500-\$17,293 depending on service area

Table 15. Recommended Recycled Water Improvements and Estimated Costs

No.	Improvement	Estimated Cost (\$) ^a
Phase 1 Recycled Water Improvements		
1	Recycled Water SCADA Control System	250,000
2	Equalization Basin Potable Water Air Gap	76,000
3	Recycled Water Pumping Station	1,045,000
4	District Headquarters Conversion	20,000
5	Northwest Recycled Water Transmission Main	1,441,000
6	Lookout Hill Booster Pumping Station	612,000
7	Escuela Park Conversion	16,000
8	Stonehouse Park Conversion	36,000
9	Lookout Hill Recycled Water Storage Tank	545,000
10	Main Northgate Conversion	18,000
11	Commercial Loop Conversion	TBD
	Phase 1 Subtotal (Estimated Construction Cost)	4,060,000
12	Soft Costs – 32.5% (Admin., Reg., Eng., Construct Man.)	1,319,500
	Phase 1 Total (Project Cost)	5,380,000^b
Buildout Recycled Water Improvements		
13	SCADA Upgrades	82,000
14	Disinfection Facilities Upgrade	665,000
15	North Golf Course Conveyance System	1,620,000
16	Bass Lake Tank	1,216,000
17	Bass Lake Booster Pumping Station	625,000
18	Seasonal Storage Reservoir Expansion	839,000
19	Van Vleck Sprayfield 4	890,000
20	DAF Pumping Replacement	100,000
	Buildout Subtotal (Estimated Construction Cost)	6,030,000^c
21	Soft Costs – 32.5% (Admin., Reg., Eng., Construct Man.)	1,960,000
	Buildout Total (Project Cost)	7,990,000
Phase 1 and Buildout Recycled Water Improvements		
	Grand Total (Phase 1 and Buildout)	13,400,000^d
	Estimated Number of New Equivalent Residential Units	2,213
	Estimated Cost per Connection (\$/ERU)	\$6,055

^a Estimated costs based upon Engineering News Record (ENR) 20 City Average Construction Cost Index (CCI) at 10,385 (August 2016)

^b Compared to \$10,014,000 (\$9,100,000 adjusted for inflation) as described previously in the District’s Title XVI Recycled Water Feasibility Study

^c Compared to \$15,055,000 as described previously in the District’s Title XVI Recycled Water Feasibility Study

^d Compared to \$25,070,000 as described previously in the District’s Title XVI Recycled Water Feasibility Study

Appendix

KENNEDY/JENKS CONSULTANTS

OPINION OF PROBABLE CONSTRUCTION COST

BASIS OF ESTIMATE

PROJECT INFORMATION

Client: Rancho Murrieta
Project: Recycled Water System
KJ Job No.: 1670011*00
Estimate Date: 12/2/2016
Prepared By: JLH
Reviewed By: KAK
Estimate Type: Preliminary
AACEI Estimate Classification Class 4

PROJECT DESCRIPTION:

The scope of work for this project includes: Recycled Water System components including water storage tanks, pump stations, new recycled water conveyance, connections to convert existing irrigation systems to recycled water use, and control features as described in the report.

ESTIMATE DOCUMENTS:

DRAWINGS: N/A

DOCUMENTS: Predesign Report & Figures

SOURCE OF COST DATA:

Published cost estimating data, engineers experience on similar projects.

ESTIMATE ASSUMPTIONS:

The followings assumptions were made in the preparation of this estimate:

Project will be publicly bid project.

Native backfill will be suitable for use in utility trenches.

No significant dewatering of groundwater in excavation will be required.

Additional detail of assumed items is included in detailed estimate breakdown.

SPECIFIC INCLUSIONS:

Soft costs have been included with the following percentages allocations: Administration (5%), Regulatory/ CEQA Compliance(2.5%), Engineering & Construction Management (15%), Soft Cost Contingency (10%)

SPECIFIC EXCLUSIONS:

The estimate does not include the following:

Asbestos / Lead abatement.

Hazardous or Special Waste removal or disposal

Soil remediation

MAJOR CHANGES FROM PREVIOUS ESTIMATE:

DESIGN CONTINGENCY:

A design contingency of 30 % has been included.

Note: This allowance is intended to provide a Design Contingency allowance. It is not intended to provide for a Construction Contingency for change orders during construction or to cover unforeseen conditions.

ESCALATION:

An escalation factor has not been included. The owner is cautioned that the project cost should be adjusted for the project schedule.

Current ENR CCI	<u>Aug-16</u>	<u>10385</u>	
Annual Inflation Escalation Factor:		<u>3.0%</u>	
Time Until Project Midpoint (Months)		<u> </u>	Number of months

ACCURACY:

The level of accuracy is commensurate with levels developed by the AACEI, the Association for the Advancement of Cost Engineering International. At increasing levels of design completion, the narrower the range between upper and lower limits and the greater the accuracy of the estimate. This estimate is considered a Class 4 level estimate in accordance with AACEI guidelines. Typically this level of estimate has an expected accuracy range of +50%, -30%. This estimate is based upon competitive bidding, which assumes receipt of multiple bids from five or more General Contractors. Without competitive bidding, pricing can vary significantly from the prices assumed in this estimate.

The enclosed Engineer's Estimate of Probable Construction Cost is only an opinion of possible items that maybe considered for budgeting purposes. This Project Estimate is limited to the conditions existing at issuance and is not a guaranty of actual construction cost or schedule. Uncertain market conditions such as, but not limited to, local labor or contractor availability, wages, other work, material market fluctuations, price escalations, force majeure events and developing bidding conditions, etc. may affect the accuracy of this review. Kennedy/Jenks is not responsible for any variance from this Project Estimate or actual prices and conditions obtained.

OTHER COMMENTS:

OPINION OF PROBABLE CONSTRUCTION COST

KENNEDY/JENKS CONSULTANTS

Project: Rancho Murrieta

Prepared By: JLH

Building, Area: Recycled Water

Date Prepared: 25-Jan-17

K/J Proj. No.: 1670011*00

Estimate Type: Preliminary

SUMMARY BY AREA

ITEM NO.	ITEM DESCRIPTION		TOTAL
Phase 1			
1	Recycled Water SCADA Control System		250,000
2	Equalization Basin Potable Water Air Gap connection		76,000
3	Recycled Water Pumping Station		1,045,000
4	District Headquarters Conversion Irrigation Connection		20,000
5	NW Recycled Water Transmission Main		1,441,000
6	Lookout Hill Booster Pumping Station		612,000
7	Escuela Park Conversion - Recycled Water Irrigation Connection		16,000
8	Stonehouse Park Conversion - Recycled Water Irrigation Connection		36,000
9	Lookout Hill Water Storage Tank		545,000
10	North Main Gate Conversion - Recycled Water Irrigation Connection		18,000
	Phase 1 Subtotal		4,060,000
	Soft Costs (Admin, Regulatory, Engineering, CM, Contingency)	33%	1,319,500
	Phase 1 Subtotal		5,380,000
Build out			
1B	SCADA Control System Bass Lake Tank Items		82,000
11	Disinfection Facilities Upgrade		665,000
12	North Golf Course Conveyance System Rehabilitation		1,620,000
13	Bass Lake Recyled Water Storage Tank		1,216,000
14	Bass Lake Booster Pump Station		625,000
15	Seasonal Storage Reservior		831,000

ITEM NO.	ITEM DESCRIPTION		TOTAL
16	Van Vleck Sprayfield 4		890,000
17	DAF Pump Replacement		100,000
	Buildout Subtotal		6,030,000
	Soft Costs (Admin, Regulatory, Engineering, CM, Contingency)	33%	1,959,750
	Phase 1 Subtotal		7,990,000
	TOTAL		13,400,000

Estimate Accuracy	
+50%	-30%

50%	Total Est.	-30%
\$20,100,000	\$13,400,000	\$9,380,000

OPINION OF PROBABLE CONSTRUCTION COST

KENNEDY/JENKS CONSULTANTS

Project: Rancho Murrieta

Prepared By: _____

Building, Area: Recycled Water SCADA Control System

Date Prepared: JLH

K/J Proj. No. 1670011*00

Estimate Type Conceptual
 Preliminary (w/o plans)
 Design Development @

Construction
 Change Order
 _____ % Complete

Current at ENR _____
 Escalated to ENR _____
 Months to Midpoint of Construct _____

Spec. No.	Item No.	Description	Qty	Units	Materials		Installation		Sub-contractor		Total
					\$/Unit	Total	\$/Unit	Total	\$/Unit	Total	
Phase 1											
		PLC System at Lookout Hill Booster Pump Station	1	EA							
		RTU/ Wireless I/O	2	LOC					25,000	50,000	50,000
Control Valves and Control System Elements:											
		Recycled Water Pump Station Pressure Reducing Valve 12"	1	EA	12,000.00	12,000	500.00	500			12,500
		Recycled Water Pump Station Flow Meter 12"	1	EA	8,000.00	8,000	4,500.00	4,500			12,500
		Recycled Water Pump Station Pressure Transmitter	1	EA	3,500.00	3,500	4,500.00	4,500			8,000
		Lookout Hill Flow Control Valve 12" Actuated Valve	1	EA	4,500.00	4,500	4,500.00	4,500			9,000
		Lookout Hill Tank Altitude Valve 12"	1	EA	13,400.00	13,400	500.00	500			13,900
		Lookout Hill Booster Pump Station Pressure Transmitter	1	EA	3,500.00	3,500	4,500.00	4,500			8,000
		Power Drop / Meter at Actuated Valve at Branch	1	EA					5,000	5,000	5,000
		Power to Above Items	6	EA					5,000	30,000	30,000
Subtotals						44,900		19,000		85,000	148,900
Division 1 Costs			@	10%		4,490		1,900		8,500	14,890
Subtotals						49,390		20,900		93,500	163,790
Taxes - Materials Costs			@	8.75%		4,322					4,322
Subtotals						53,712		20,900		93,500	168,112
Taxes - Labor Costs			@	5.00%				1,045			1,045
Subtotals						53,712		21,945		93,500	169,157
Contractor Markup for Sub			@	12%						11,220	11,220
Subtotals						53,712		21,945		104,720	180,377
Contractor OH&P			@	15%		8,057		3,292			11,348
Subtotals						61,768		25,237		104,720	191,725
Estimate Contingency			@	30%							57,518
Subtotals											249,243
Escalate to Midpoint of Construct (per year)			@	3%							-
Estimated Bid Cost											249,243
Total Estimate											250,000

Estimate Accuracy	
+50%	-30%

Estimated Range of Probable Cost		
+50%	Total Est.	-30%
\$375,000	\$250,000	\$175,000

OPINION OF PROBABLE CONSTRUCTION COST

KENNEDY/JENKS CONSULTANTS

Project: Rancho Murrieta

Prepared By: _____

Building, Area: Equalization Basin Potable Water Air Gap connection

Date Prepared: JLH

K/J Proj. No. 1670011*00

Estimate Type: Conceptual Construction
 Preliminary (w/o plans) Change Order
 Design Development @ _____ % Complete

Current at ENR _____
 Escalated to ENR _____
 Months to Midpoint of Construct _____

Spec. No.	Item No.	Description	Qty	Units	Materials		Installation		Sub-contractor		Total
					\$/Unit	Total	\$/Unit	Total	\$/Unit	Total	
		Tapped Connection to Existing Pipe	1	EA	1,475.00	1,475	510.00	510			1,985
		8" DI Pipe incl Trenching	20	LF	34.50	690	30.00	600			1,290
		8" FCA	2	EA	500.00	1,000	200.00	400			1,400
		8" Fittings	4	EA	450.00	1,800	150.00	600			2,400
		8" Butterfly Valve	2	EA	1,000.00	2,000	250.00	500			2,500
		8" Flow Meter	1	EA	6,000.00	6,000	800.00	800			6,800
		8" Actuated Valve	1	EA	5,000.00	5,000	500.00	500			5,500
		Paving Restoration	13	SY					75	1,000	1,000
		Electrical for Meter/ Valve	1	LS					15,000	15,000	15,000
		Underground Electrical Conduit	200	LF					35	7,000	7,000
Subtotals						17,965		3,910		23,000	44,875
Division 1 Costs			@	10%		1,797		391		2,300	4,488
Subtotals						19,762		4,301		25,300	49,363
Taxes - Materials Costs			@	8.75%		1,729					1,729
Subtotals						21,491		4,301		25,300	51,092
Taxes - Labor Costs			@	5.00%				215			215
Subtotals						21,491		4,516		25,300	51,307
Contractor Markup for Sub			@	12%						3,036	3,036
Subtotals						21,491		4,516		28,336	54,343
Contractor OH&P			@	15%		3,224		677			3,901
Subtotals						24,714		5,193		28,336	58,244
Estimate Contingency			@	30%							17,473
Subtotals											75,717
Escalate to Midpoint of Construct			@	3%							-
Estimated Bid Cost											75,717
Total Estimate											76,000

Estimate Accuracy	
+50%	-30%

Estimated Range of Probable Cost		
+50%	Total Est.	-30%
\$114,000	\$76,000	\$53,200

OPINION OF PROBABLE CONSTRUCTION COST

KENNEDY/JENKS CONSULTANTS

Project: Rancho Murrieta

Prepared By: _____

Building, Area: Recycled Water Pumping Station

Date Prepared: JLH

K/J Proj. No. 1670011*00

Estimate Type: Conceptual
 Preliminary (w/o plans)
 Design Development @

Construction
 Change Order
 _____ % Complete

Current at ENR _____
 Escalated to ENR _____
 Months to Midpoint of Construct _____

Spec. No.	Item No.	Description	Qty	Units	Materials		Installation		Sub-contractor		Total
					\$/Unit	Total	\$/Unit	Total	\$/Unit	Total	
		Modification to Existing Pump Station Structure	1	LS			50,000.00	50,000			50,000
		Generator Slab	11	CY	250.00	2,667	250.00	2,667			5,333
		Vertical Turbine Pumps	3	EA	47,200.00	141,600	10,000.00	30,000			171,600
		Pump Discharge Piping:									
		10" Fittings/ Spools	12	EA	500.00	6,000	200.00	2,400			8,400
		10" Flex Connector	3	EA	800.00	2,400	250.00	750			3,150
		10" Check Valve	3	EA	3,700.00	11,100	250.00	750			11,850
		10" Butterfly Valve	3	EA	1,200.00	3,600	200.00	600			4,200
		10" FCA	3	EA	800.00	2,400	250.00	750			3,150
		Pipe Supports	6	EA	150.00	900	100.00	600			1,500
		CARV	3	EA	400.00	1,200	200.00	600			1,800
		Tee	3	EA	800.00	2,400	350.00	1,050			3,450
		12" Discharge Header	40	LF	60.00	2,400	25.00	1,000			3,400
		Pressure Gage	3	EA	250.00	750	150.00	450			1,200
		Electrical / I&C for Pumps (from Existing MCC's)	1	LS					180,000	180,000	180,000
		VFD's 250HP (in Existing MCCs)	3	EA	26,000.00	78,000	3,000.00	9,000			87,000
		Level Transmitter	1	EA	4,000.00	4,000	2,500.00	2,500			6,500
		Emergency Generator 250KW w/ ATS & Fuel Tank	1	EA	53,500.00	53,500	11,000.00	11,000			64,500
		Subtotals				312,917		114,117		180,000	607,033
		Division 1 Costs @ 10%				31,292		11,412		18,000	60,703
		Subtotals				344,208		125,528		198,000	667,737
		Taxes - Materials Costs @ 8.75%				30,118					30,118
		Subtotals				374,327		125,528		198,000	697,855
		Taxes - Labor Costs @ 5.00%						6,276			6,276
		Subtotals				374,327		131,805		198,000	704,131
		Contractor Markup for Sub @ 12%								23,760	23,760
		Subtotals				374,327		131,805		221,760	727,891
		Contractor OH&P @ 15%				56,149		19,771			75,920
		Subtotals				430,476		151,575		221,760	803,811
		Estimate Contingency @ 30%									241,143
		Subtotals									1,044,954
		Escalate to Midpoint of Construct @ 3%									
		Estimated Bid Cost									1,044,954
		Total Estimate									1,045,000

Estimate Accuracy	
+50%	-30%

Estimated Range of Probable Cost		
+50%	Total Est.	-30%
\$1,567,500	\$1,045,000	\$731,500

OPINION OF PROBABLE CONSTRUCTION COST

KENNEDY/JENKS CONSULTANTS

Project: Rancho Murrieta

Prepared By: _____

Building, Area: District Headquarters Conversion Irrigation Connection

Date Prepared: JLH

K/J Proj. No. 1670011*00

Estimate Type: Conceptual Construction
 Preliminary (w/o plans) Change Order
 Design Development @ _____ % Complete

Current at ENR _____
 Escalated to ENR _____
 Months to Midpoint of Construct _____

Spec. No.	Item No.	Description	Qty	Units	Materials		Installation		Sub-contractor		Total
					\$/Unit	Total	\$/Unit	Total	\$/Unit	Total	
		Connection Piping appurtenances	2	LS	500.00	1,000	500.00	1,000			2,000
		4" PVC Pipeline	270	LF	8.00	2,160	17.00	4,590			6,750
		Lanscaping Restoration	180	SY					10	1,800	1,800
		Cross Connection Testing	1	LS			1,000.00	1,000			1,000
Subtotals						3,160	6,590		1,800		11,550
Division 1 Costs			@	10%		316		659		180	1,155
Subtotals						3,476	7,249		1,980		12,705
Taxes - Materials Costs			@	8.75%		304					304
Subtotals						3,780	7,249		1,980		13,009
Taxes - Labor Costs			@	5.00%				362			362
Subtotals						3,780	7,611		1,980		13,372
Contractor Markup for Sub			@	12%						238	238
Subtotals						3,780	7,611		2,218		13,609
Contractor OH&P			@	15%		567		1,142			1,709
Subtotals						4,347	8,753		2,218		15,318
Estimate Contingency			@	30%							4,595
Subtotals											19,913
Escalate to Midpoint of Construct			@	3%							-
Estimated Bid Cost											19,913
Total Estimate											20,000

Estimate Accuracy	
+50%	-30%

Estimated Range of Probable Cost		
+50%	Total Est.	-30%
\$30,000	\$20,000	\$14,000

OPINION OF PROBABLE CONSTRUCTION COST

KENNEDY/JENKS CONSULTANTS

Project: Rancho Murrieta

Prepared By: JLH

Building, Area: NW Recycled Water Transmission Main

Date Prepared: JLH

K/J Proj. No.: 1670011*00

Estimate Type: **Conceptual** **Construction**
 Preliminary (w/o plans) **Change Order**
 Design Development @ _____ **% Complete**

Current at ENR _____
Escalated to ENR _____
Months to Midpoint of Construct _____

Spec. No.	Item No.	Description	Qty	Units	Materials \$/Unit	Materials Total	Installation \$/Unit	Installation Total	Sub-contractor \$/Unit	Sub-contractor Total	Total
Highway 16 Undercrossing and Connection to Existing 12"ACP											
		Connection to Existing	1	EA	500.00	500	500.00	500			1,000
		12" PVC Pipeline	1,000	LF	23.50	23,500	57.50	57,500			81,000
		12" Fittings Rest Jnt	8	EA	635.00	5,292	125.00	1,042			6,333
		AAV Assembly	1	EA	2,500.00	2,500	500.00	500			3,000
		Paving Removal (legacy lane/ Lor		SY					10		
		Paving Restoration		SY					75		
		Traffic Control		DY	250.00		1,040.00				
Interconnecting piping between Legacy Lane & Lookout Hill Storage Tank (Along Legacy Lane, Lone Pine Drive at											
		Connection to Existing	1	EA	500.00	500	500.00	500			1,000
		12" PVC Pipeline (along Legacy &	2,500	LF	23.50	58,750	26.00	65,000			123,750
		12" PVC Pipeline (up hill)	300	LF	23.50	7,050	26.00	7,800			14,850
		12" Fittings Rest Jnt	21	EA	635.00	13,229	125.00	2,604			15,833
		AAV Assembly	1	EA	2,500.00	2,500	500.00	500			3,000
		Paving Removal (legacy lane/ Lor	1,667	SY					10	16,667	16,667
		Paving Restoration	1,667	SY					75	125,000	125,000
		Traffic Control	25	DY	250.00	6,250	1,040.00	26,000			32,250
Lookout Hill Booster pump Station to Existing FM Connection (down hill , along Lone pine drive, through CIA ditch)											
		Connection at Pump Station	1	EA	500.00	500	500.00	500			1,000
		12" PVC Pipeline	1,550	LF	23.50	36,425	26.00	40,300			76,725
		12" PVC Pipeline (along cia ditch)	850	LF	23.50	19,975	26.00	22,100			42,075
		12" Fittings	20	EA	635.00	12,700	125.00	2,500			15,200
		AAV Assembly	1	EA	2,500.00	2,500	500.00	500			3,000
		Connection to Existing FM	1	EA	500.00	500	500.00	500			1,000
		Ditch Restoration	567	SY			5.00	2,833			2,833
		Traffic Control	16	DY	250.00	3,875	1,040.00	16,120			19,995
Existing 12" Forcemain Rehabilitation (along Stonehouse Road)											
		Pipeline Assesment	5,400	LF					10	54,000	54,000
		Pipeline Repair - CIPP (66%)	2,400	LF					59	142,200	142,200
		12" PVC Pipeline (33% replaced)	1,200	LF	23.50	28,200	26.00	31,200			59,400
		12" Pipe Removal	1,200	LF			8.00	9,600			9,600

		Traffic Control		DY	250.00		1,040.00				
		Subtotals				224,746		288,099		337,867	850,712
		Division 1 Costs	@	10%		22,475		28,810		33,787	85,071
		Subtotals				247,220		316,909		371,653	935,783
		Taxes - Materials Costs	@	8.75%		21,632					21,632
		Subtotals				268,852		316,909		371,653	957,415
		Taxes - Labor Costs	@	5.00%				15,845			15,845
		Subtotals				268,852		332,755		371,653	973,260
		Contractor Markup for Sub	@	12%						44,598	44,598
		Subtotals				268,852		332,755		416,252	1,017,858
		Contractor OH&P	@	15%		40,328		49,913			90,241
		Subtotals				309,180		382,668		416,252	1,108,099
		Estimate Contingency	@	30%							332,430
		Subtotals									1,440,529
		Escalate to Midpoint of Construct	@	3%							-
		Estimated Bid Cost									1,440,529
		Total Estimate									1,441,000

Estimate Accuracy	
+50%	-30%

Estimated Range of Probable Cost		
+50%	Total Est.	-30%
\$2,161,500	\$1,441,000	\$1,008,700

OPINION OF PROBABLE CONSTRUCTION COST

KENNEDY/JENKS CONSULTANTS

Project: Rancho Murrieta

Prepared By: _____

Building, Area: Lookout Hill Booster Pumping Station

Date Prepared: JLH

K/J Proj. No. 1670011*00

Estimate Type: Conceptual Construction
 Preliminary (w/o plans) Change Order
 Design Development @ _____ % Complete

Current at ENR _____
 Escalated to ENR _____
 Months to Midpoint of Construct _____

Spec. No.	Item No.	Description	Qty	Units	Materials		Installation		Sub-contractor		Total
					\$/Unit	Total	\$/Unit	Total	\$/Unit	Total	
		Misc Sitework	1	LS			60,000.00	60,000			60,000
		Pump Station Foundation(Cans)	12	CY	400.00	4,741	400.00	4,741			9,481
		Pump Station SOG	11	CY	250.00	2,778	250.00	2,778			5,556
		Generator Slab	6	CY	250.00	1,481	250.00	1,481			2,963
		Vertical Turbine Pumps	2	EA	33,002.00	66,004	8,400.00	16,800			82,804
		* Pumps outdoor, no enclosure or building included.									
		10" Butterfly Valve w/ Ext Op	2	EA	1,300.00	2,600	300.00	600			3,200
		10" FCA	2	EA	800.00	1,600	250.00	500			2,100
		Pump Discharge Piping:									
		10" Fittings/ Spools	12	EA	500.00	6,000	200.00	2,400			8,400
		10" Flex Connector	2	EA	800.00	1,600	250.00	500			2,100
		10" Check Valve	2	EA	3,700.00	7,400	250.00	500			7,900
		10" Butterfly Valve	2	EA	1,200.00	2,400	200.00	400			2,800
		10" FCA	2	EA	800.00	1,600	250.00	500			2,100
		Pipe Supports	4	EA	150.00	600	100.00	400			1,000
		CARV	2	EA	400.00	800	200.00	400			1,200
		Tee	2	EA	800.00	1,600	350.00	700			2,300
		12" Discharge Header	20	LF	60.00	1,200	25.00	500			1,700
		Pressure Gage	2	EA	250.00	500	150.00	300			800
		Power Feed to Pump Station	1	LS					25,000	25,000	25,000
		Electrical / I&C	1	LS					80,000	80,000	80,000
		VFD's 50HP	2	EA	10,000.00	20,000	3,000.00	6,000			26,000
		Emergency Generator 50kW w/ ATS & Fuel Tank	1	EA	22,000.00	22,000	6,900.00	6,900			28,900
		Subtotals				144,904		106,400		105,000	356,304
		Division 1 Costs	@	10%		14,490		10,640		10,500	35,630
		Subtotals				159,394		117,040		115,500	391,934
		Taxes - Materials Costs	@	8.75%		13,947					13,947
		Subtotals				173,341		117,040		115,500	405,881
		Taxes - Labor Costs	@	5.00%				5,852			5,852
		Subtotals				173,341		122,892		115,500	411,733
		Contractor Markup for Sub	@	12%						13,860	13,860
		Subtotals				173,341		122,892		129,360	425,593

Contractor OH&P	@	15%	26,001	18,434		44,435
Subtotals			199,343	141,326	129,360	470,028
Estimate Contingency	@	30%				141,009
Subtotals						611,037
Escalate to Midpoint of Construct	@	3%				-
Estimated Bid Cost						611,037
Total Estimate						612,000

Estimate Accuracy	
+50%	-30%

Estimated Range of Probable Cost		
+50%	Total Est.	-30%
\$918,000	\$612,000	\$428,400

OPINION OF PROBABLE CONSTRUCTION COST

KENNEDY/JENKS CONSULTANTS

Project: Rancho Murrieta

Prepared By: _____

Building, Area: Escuela Park Conversion - Recycled Water Irrigation Connection

Date Prepared: JLH

K/J Proj. No. 1670011*00

Estimate Type: Conceptual Construction
 Preliminary (w/o plans) Change Order
 Design Development @ _____ % Complete

Current at ENR _____
 Escalated to ENR _____
 Months to Midpoint of Construct _____

Spec. No.	Item No.	Description	Qty	Units	Materials \$/Unit	Materials Total	Installation \$/Unit	Installation Total	Sub-contractor \$/Unit	Sub-contractor Total	Total
		Connection Piping appurtenances	2	LS	500.00	1,000	500.00	1,000			2,000
		4" PVC Pipeline	200	LF	8.00	1,600	17.00	3,400			5,000
		Lanscaping Restoration	133	SY					10	1,333	1,333
		Paving Restoration									
		Cross Connection Testing	1	LS					1,000	1,000	1,000
		Subtotals				2,600		4,400		2,333	9,333
		Division 1 Costs @ 10%				260		440		233	933
		Subtotals				2,860		4,840		2,567	10,267
		Taxes - Materials Costs @ 8.75%				250					250
		Subtotals				3,110		4,840		2,567	10,517
		Taxes - Labor Costs @ 5.00%						242			242
		Subtotals				3,110		5,082		2,567	10,759
		Contractor Markup for Sub @ 12%								308	308
		Subtotals				3,110		5,082		2,875	11,067
		Contractor OH&P @ 15%				467		762			1,229
		Subtotals				3,577		5,844		2,875	12,296
		Estimate Contingency @ 30%									3,689
		Subtotals									15,984
		Escalate to Midpoint of Construct @ 3%									-
		Estimated Bid Cost									15,984
		Total Estimate									16,000

Estimate Accuracy	
+50%	-30%

Estimated Range of Probable Cost		
+50%	Total Est.	-30%
\$24,000	\$16,000	\$11,200

OPINION OF PROBABLE CONSTRUCTION COST

KENNEDY/JENKS CONSULTANTS

Project: Rancho Murrieta

Prepared By: _____

Building, Area: Stonehouse Park Conversion - Recycled Water Irrigation Connection

Date Prepared: JLH

K/J Proj. No. 1670011*00

Estimate Type: Conceptual Construction
 Preliminary (w/o plans) Change Order
 Design Development @ _____ % Complete

Current at ENR _____
 Escalated to ENR _____
 Months to Midpoint of Construct _____

Spec. No.	Item No.	Description	Qty	Units	Materials		Installation		Sub-contractor		Total
					\$/Unit	Total	\$/Unit	Total	\$/Unit	Total	
		Connection Piping appurtenances	1	LS	500.00	500	500.00	500			1,000
		4" PVC Pipeline	475	LF	8.00	3,800	17.00	8,075			11,875
		Paving Removal	43	SY					10	433	433
		Paving Restoration	43	SY					75	3,250	3,250
		Lanscaping Restoration	345	SY					10	3,450	3,450
		Cross Connection Testing	1	LS					1,000	1,000	1,000
Subtotals						4,300		8,575		8,133	21,008
Division 1 Costs			@	10%		430		858		813	2,101
Subtotals						4,730		9,433		8,947	23,109
Taxes - Materials Costs			@	8.75%		414					414
Subtotals						5,144		9,433		8,947	23,523
Taxes - Labor Costs			@	5.00%				472			472
Subtotals						5,144		9,904		8,947	23,995
Contractor Markup for Sub			@	12%						1,074	1,074
Subtotals						5,144		9,904		10,020	25,068
Contractor OH&P			@	15%		772		1,486			2,257
Subtotals						5,915		11,390		10,020	27,325
Estimate Contingency			@	30%							8,198
Subtotals											35,523
Escalate to Midpoint of Construct			@	3%							-
Estimated Bid Cost											35,523
Total Estimate											36,000

Estimate Accuracy	
+50%	-30%

Estimated Range of Probable Cost		
+50%	Total Est.	-30%
\$54,000	\$36,000	\$25,200

OPINION OF PROBABLE CONSTRUCTION COST

KENNEDY/JENKS CONSULTANTS

Project: Rancho Murrieta

Prepared By: JLH

Building, Area: Lookout Hill Water Storage Tank

Date Prepared: JLH

K/J Proj. No.: 1670011*00

Estimate Type: **Conceptual** **Construction**
 Preliminary (w/o plans) **Change Order**
 Design Development @ _____ **% Complete**

Current at ENR _____
Escalated to ENR _____
Months to Midpoint of Construct _____

Spec. No.	Item No.	Description	Qty	Units	Materials		Installation		Sub-contractor		Total
					\$/Unit	Total	\$/Unit	Total	\$/Unit	Total	
		Demo Existing Steel Tank	1	EA			40,000.00	40,000			40,000
		Demo Existing Tank foundation	84	CY	75.00	6,332	50.00	4,222			10,554
		New Storage Tank 200,000 gal	1	EA					135,000	135,000	135,000
		Tank Foundation	84	CY	250.00	21,108	250.00	21,108			42,216
		Excavation	84	CY			15.00	1,266			1,266
		Misc Sitework	1	LS			75,000.00	75,000			75,000
		Connection Piping Tank to Booste	1	LS	5,000.00	5,000	5,000.00	5,000			10,000
		Overflow Piping	1	LS	5,000.00	5,000	5,000.00	5,000			10,000
		Subtotals				37,440		151,596		135,000	324,036
		Division 1 Costs @ 10%				3,744		15,160		13,500	32,404
		Subtotals				41,184		166,755		148,500	356,440
		Taxes - Materials Costs @ 8.75%				3,604					3,604
		Subtotals				44,788		166,755		148,500	360,043
		Taxes - Labor Costs @ 5.00%						8,338			8,338
		Subtotals				44,788		175,093		148,500	368,381
		Contractor Markup for Sub @ 12%								17,820	17,820
		Subtotals				44,788		175,093		166,320	386,201
		Contractor OH&P @ 15%				6,718		26,264			32,982
		Subtotals				51,506		201,357		166,320	419,183
		Estimate Contingency @ 30%									125,755
		Subtotals									544,938
		Escalate to Midpoint of Construct @ 3%									-
		Estimated Bid Cost									544,938
		Total Estimate									545,000

Estimate Accuracy	
+50%	-30%

Estimated Range of Probable Cost		
+50%	Total Est.	-30%
\$817,500	\$545,000	\$381,500

OPINION OF PROBABLE CONSTRUCTION COST

KENNEDY/JENKS CONSULTANTS

Project: Rancho Murrieta

Prepared By: _____

Building, Area: North Main Gate Conversion - Recycled Water Irrigation Connection

Date Prepared: JLH

K/J Proj. No. 1670011*00

Estimate Type: Conceptual Construction
 Preliminary (w/o plans) Change Order
 Design Development @ _____ % Complete

Current at ENR _____
 Escalated to ENR _____
 Months to Midpoint of Construct _____

Spec. No.	Item No.	Description	Qty	Units	Materials \$/Unit	Materials Total	Installation \$/Unit	Installation Total	Sub-contractor \$/Unit	Sub-contractor Total	Total
		Connection Piping appurtenances	1	LS	500.00	500	500.00	500			1,000
		4" PVC Pipeline	200	LF	8.00	1,600	17.00	3,400			5,000
		Paving Removal	33	SY			10.00	333			333
		Paving Restoration	33	SY					75	2,500	2,500
		Landscaping Restoration	33	LS					20	667	667
		Cross Connection Testing	1	LS					1,000	1,000	1,000
		Subtotals				2100.00		4233.33		4166.67	10500.00
		Division 1 Costs @ 10%				210.00		423.33		416.67	1050.00
		Subtotals				2310.00		4656.67		4583.33	11550.00
		Taxes - Materials Costs @ 8.75%				202.13					202.13
		Subtotals				2512.13		4656.67		4583.33	11752.13
		Taxes - Labor Costs @ 5.00%						232.83			232.83
		Subtotals				2512.13		4889.50		4583.33	11984.96
		Contractor Markup for Sub @ 12%								550.00	550.00
		Subtotals				2512.13		4889.50		5133.33	12534.96
		Contractor OH&P @ 15%				376.82		733.43			1110.24
		Subtotals				2888.94		5622.93		5133.33	13645.20
		Estimate Contingency @ 30%									4093.56
		Subtotals									17738.76
		Escalate to Midpoint of Construct @ 3%									
		Estimated Bid Cost									17,738.76
		Total Estimate									18,000

Estimate Accuracy	
+50%	-30%

Estimated Range of Probable Cost		
+50%	Total Est.	-30%
\$27,000	\$18,000	\$12,600

OPINION OF PROBABLE CONSTRUCTION COST

KENNEDY/JENKS CONSULTANTS

Project: Rancho Murrieta

Prepared By: _____

Building, Area: Recycled Water SCADA Control System

Date Prepared: JLH

K/J Proj. No. 1670011*00

Estimate Type Conceptual
 Preliminary (w/o plans)
 Design Development @

Construction
 Change Order
 _____ % Complete

Current at ENR _____
 Escalated to ENR _____
 Months to Midpoint of Construct _____

Spec. No.	Item No.	Description	Qty	Units	Materials		Installation		Sub-contractor		Total
					\$/Unit	Total	\$/Unit	Total	\$/Unit	Total	
Buildout:											
		Bass Lake Flow Control Valve 8" Actuated Butterfly Valve	1	EA	4,300.00	4,300	4,500.00	4,500			8,800
		Bass Lake Tank Altitude Valve 8"	1	EA	800.00	800	500.00	500			1,300
		Power Drop / Meter at Bass Lake	1	EA					25,000	25,000	25,000
		Power to Above Items	2	EA					5,000	10,000	10,000
		Cell Communication	1	LOC					5,000	5,000	5,000
Subtotals						5,100		5,000		40,000	50,100
Division 1 Costs			@	10%		510		500		4,000	5,010
Subtotals						5,610		5,500		44,000	55,110
Taxes - Materials Costs			@	8.75%		491					491
Subtotals						6,101		5,500		44,000	55,601
Taxes - Labor Costs			@	5.00%				275			275
Subtotals						6,101		5,775		44,000	55,876
Contractor Markup for Sub			@	12%						5,280	5,280
Subtotals						6,101		5,775		49,280	61,156
Contractor OH&P			@	15%		915		866			1,781
Subtotals						7,016		6,641		49,280	62,937
Estimate Contingency			@	30%							18,881
Subtotals											81,818
Escalate to Midpoint of Construct			@	3%							-
Estimated Bid Cost											81,818
Total Estimate											82,000

Estimate Accuracy	
+50%	-30%

Estimated Range of Probable Cost		
+50%	Total Est.	-30%
\$123,000	\$82,000	\$57,400

OPINION OF PROBABLE CONSTRUCTION COST

KENNEDY/JENKS CONSULTANTS

Project: Rancho Murrieta

Prepared By: _____

Building, Area: Disinfection Facilities Upgrade

Date Prepared: JLH

K/J Proj. No. 1670011*00

Estimate Type: Conceptual Construction
 Preliminary (w/o plans) Change Order
 Design Development @ _____ % Complete

Current at ENR _____
 Escalated to ENR _____
 Months to Midpoint of Construct _____

Spec. No.	Item No.	Description	Qty	Units	Materials \$/Unit	Materials Total	Installation \$/Unit	Installation Total	Sub-contractor \$/Unit	Sub-contractor Total	Total
		Demo Existing 20" CCP	6,600	LF			8.00	52,800			52,800
		Demo Concrete Anchors for CCP	207	CY			150.00	30,979			30,979
		New Chlorine Contact Tank :									
		Excavation	1,441	CY			10.00	14,406			14,406
		Shoring	2,440	VSF	10.00	24,400	12.00	29,280			53,680
		Base Slab	92	CY	250.00	23,111	200.00	18,489			41,600
		Tank Exterior Walls	136	CY	300.00	40,667	400.00	54,222			94,889
		Tank Center Walls	71	CY	300.00	21,333	400.00	28,444			49,778
		Backfill	516	CY			5.00	2,581			2,581
		Chlorine Injection Systems									
		Misc Sitework	1				40,000.00	40,000			40,000
		Subtotals				109,511		271,201		-	380,713
		Division 1 Costs @ 10%				10,951		27,120		-	38,071
		Subtotals				120,462		298,322		-	418,784
		Taxes - Materials Costs @ 8.75%				10,540					10,540
		Subtotals				131,003		298,322		-	429,324
		Taxes - Labor Costs @ 5.00%						14,916			14,916
		Subtotals				131,003		313,238		-	444,240
		Contractor Markup for Sub @ 12%								-	-
		Subtotals				131,003		313,238		-	444,240
		Contractor OH&P @ 15%				19,650		46,986			66,636
		Subtotals				150,653		360,223		-	510,876
		Estimate Contingency @ 30%									153,263
		Subtotals									664,139
		Escalate to Midpoint of Construct @ 3%									-
		Estimated Bid Cost									664,139
		Total Estimate									665,000

Estimate Accuracy	
+50%	-30%

Estimated Range of Probable Cost		
+50%	Total Est.	-30%
\$997,500	\$665,000	\$465,500

OPINION OF PROBABLE CONSTRUCTION COST

KENNEDY/JENKS CONSULTANTS

Project: Rancho Murrieta

Prepared By: _____

Building, Area: North Golf Course Conveyance System Rehabilitation

Date Prepared: JLH

K/J Proj. No.: 1670011*00

Estimate Type: **Conceptual** **Construction**
 Preliminary (w/o plans) **Change Order**
 Design Development @ _____ % Complete

Current at ENR _____
Escalated to ENR _____
Months to Midpoint of Construct _____

Spec. No.	Item No.	Description	Qty	Units	Materials \$/Unit	Materials Total	Installation \$/Unit	Installation Total	Sub-contractor \$/Unit	Sub-contractor Total	Total
Wastewater Reclamamtion Plant to Bass Lake - 11,200 ft, of which 9,000 ft will be improved. WWRP to Yellow Bridge (12-in, 4,300 ft) to be replaced. Remaining pipe is assumed to be 8-inch; 1/3 of which is to be replaced, the											
		Condition Assessment 12" AC Pipe	1	LS			5,000.00	5,000	25,000	25,000	30,000
		12" PVC Pipe (100% Replaced)	4,300	LF	24.00	103,200	26.00	111,800			215,000
		12" Fittings	36	EA	635.00	22,754	125.00	4,479			27,233
		Connection to Existing Pipes	2	EA	500.00	1,000	500.00	1,000			2,000
		12" PVC Pipe (CIPP lined)		LF					59		
		Remove Existing Pipe	4,300	LF			8.00	34,400			34,400
		Paving Removal	1,911	SY			10.00	19,111			19,111
		Paving Replacement over trench	1,911	SY					75	143,333	143,333
		Traffic Controls	43	DY	200.00	8,600	1,040.00	44,720			53,320
		Condition Assessment 8" AC Pipe	1	LS			10,000.00	10,000	45,000	45,000	55,000
		8" PVC Pipe Replaced	1,900	LF	14.00	26,600	22.00	41,800			68,400
		Remove Existing Pipe	1,900	LF			8.00	15,200			15,200
		Paving Removal	844	SY			10.00	8,444			8,444
		Paving Replacement over trench	844	SY					75	63,333	63,333
		Traffic Controls	19	DY	200.00	3,800	1,040.00	19,760			23,560
		8" PVC Pipe (CIPP Repair)	3,800	LF					55	209,000	209,000
		Subtotals				165954.17		315,715		485,667	967,336
		Division 1 Costs @ 10%				16595.42		31,571		48,567	96,734
		Subtotals				182549.58		347,286		534,233	1,064,069
		Taxes - Materials Costs @ 8.75%				15973.09					15,973
		Subtotals				198522.67		347,286		534,233	1,080,042
		Taxes - Labor Costs @ 5.00%						17,364			17,364
		Subtotals				198522.67		364,651		534,233	1,097,407
		Contractor Markup for Sub @ 12%								64,108	64,108
		Subtotals				198522.67		364,651		598,341	1,161,515
		Contractor OH&P @ 15%				29778.40		54,698			84,476
		Subtotals				228301.07		419,348		598,341	1,245,990
		Estimate Contingency @ 30%									373,797

Subtotals				1,619,788
Escalate to Midpoint of Construct @ 3%				-
Estimated Bid Cost				1,619,788
Total Estimate				1,620,000

Estimate Accuracy	
+50%	-30%

Estimated Range of Probable Cost		
+50%	Total Est.	-30%
\$2,430,000	\$1,620,000	\$1,134,000

OPINION OF PROBABLE CONSTRUCTION COST

KENNEDY/JENKS CONSULTANTS

Project: Rancho Murrieta

Prepared By: _____

Building, Area: Bass Lake Recycled Water Storage Tank

Date Prepared: JLH

K/J Proj. No. 1670011*00

Estimate Type: Conceptual Construction
 Preliminary (w/o plans) Change Order
 Design Development @ _____ % Complete

Current at ENR _____
 Escalated to ENR _____
 Months to Midpoint of Construct _____

Spec. No.	Item No.	Description	Qty	Units	Materials \$/Unit	Materials Total	Installation \$/Unit	Installation Total	Sub-contractor \$/Unit	Sub-contractor Total	Total
		Site Prep	1	LS			10,000.00	10,000			10,000
		New Storage Tank 500,000 gal	1	EA					450,000	450,000	450,000
		Foundation	141	CY	250.00	35,180	250.00	35,180			70,359
		Overflow Piping	1	LS			10,000.00	10,000			10,000
		Misc Sitework:	1	ALL			195,000.00	195,000			195,000
		Subtotals				35,180		250,180		450,000	735,359
		Division 1 Costs @ 10%				3,518		25,018		45,000	73,536
		Subtotals				38,698		275,198		495,000	808,895
		Taxes - Materials Costs @ 8.75%				3,386					3,386
		Subtotals				42,084		275,198		495,000	812,281
		Taxes - Labor Costs @ 5.00%						13,760			13,760
		Subtotals				42,084		288,957		495,000	826,041
		Contractor Markup for Sub @ 12%								59,400	59,400
		Subtotals				42,084		288,957		554,400	885,441
		Contractor OH&P @ 15%				6,313		43,344			49,656
		Subtotals				48,396		332,301		554,400	935,097
		Estimate Contingency @ 30%									280,529
		Subtotals									1,215,626
		Escalate to Midpoint of Construct @ 3%									-
		Estimated Bid Cost									1,215,626
		Total Estimate									1,216,000

Estimate Accuracy	
+50%	-30%

Estimated Range of Probable Cost		
+50%	Total Est.	-30%
\$1,824,000	\$1,216,000	\$851,200

OPINION OF PROBABLE CONSTRUCTION COST

KENNEDY/JENKS CONSULTANTS

Project: Rancho Murrieta

Prepared By: _____

Building, Area: Bass Lake Booster Pump Station

Date Prepared: JLH

K/J Proj. No. 1670011*00

Estimate Type: Conceptual Construction
 Preliminary (w/o plans) Change Order
 Design Development @ _____ % Complete

Current at ENR _____
 Escalated to ENR _____
 Months to Midpoint of Construct _____

Spec. No.	Item No.	Description	Qty	Units	Materials		Installation		Sub-contractor		Total
					\$/Unit	Total	\$/Unit	Total	\$/Unit	Total	
		Misc Sitework	1	LS			60,000.00	60,000			60,000
		Pump Station Foundation(Cans)	12	CY	400.00	4,741	400.00	4,741			9,481
		Pump Station SOG	11	CY	250.00	2,778	250.00	2,778			5,556
		Generator Slab	9	CY	250.00	2,222	250.00	2,222			4,444
		Vertical Turbine Pumps	2	EA	34,371.00	68,742	10,000.00	20,000			88,742
		* Pumps outdoor, no enclosure or building included.									
		10" Butterfly Valve w/ Ext Op	2	EA	1,300.00	2,600	300.00	600			3,200
		10" FCA	2	EA	800.00	1,600	250.00	500			2,100
		Pump Discharge Piping:									
		10" Fittings/ Spools	12	EA	500.00	6,000	200.00	2,400			8,400
		10" Flex Connector	2	EA	800.00	1,600	250.00	500			2,100
		10" Check Valve	2	EA	3,700.00	7,400	250.00	500			7,900
		10" Butterfly Valve	2	EA	1,200.00	2,400	200.00	400			2,800
		10" FCA	2	EA	800.00	1,600	250.00	500			2,100
		Pipe Supports	4	EA	150.00	600	100.00	400			1,000
		CARV	2	EA	400.00	800	200.00	400			1,200
		Tee	2	EA	800.00	1,600	350.00	700			2,300
		12" Discharge Header	20	LF	60.00	1,200	25.00	500			1,700
		Pressure Gage	2	EA	250.00	500	150.00	300			800
		Power Feed from Street up to Lookout Hill	1	LS					25,000	25,000	25,000
		Electrical / I&C	1	LS					80,000	80,000	80,000
		VFD's 50HP	2	EA	10,000.00	20,000	3,000.00	6,000			26,000
		Emergency Generator 50KW w/ATS and f	1	EA	22,000.00	22,000	6,900.00	6,900			28,900
		Subtotals				148,383		110,341		105,000	363,723
		Division 1 Costs @ 10%				14,838		11,034		10,500	36,372
		Subtotals				163,221		121,375		115,500	400,096
		Taxes - Materials Costs @ 8.75%				14,282					14,282
		Subtotals				177,503		121,375		115,500	414,378
		Taxes - Labor Costs @ 5.00%						6,069			6,069

Subtotals			177,503	127,444	115,500	420,446
Contractor Markup for Sub	@	12%			13,860	13,860
Subtotals			177,503	127,444	129,360	434,306
Contractor OH&P	@	15%	26,625	19,117		45,742
Subtotals			204,128	146,560	129,360	480,048
Estimate Contingency	@	30%				144,015
Subtotals						624,063
Escalate to Midpoint of Construct	@	3%				-
Estimated Bid Cost						624,063
Total Estimate						625,000

Estimate Accuracy	
+50%	-30%

Estimated Range of Probable Cost		
+50%	Total Est.	-30%
\$937,500	\$625,000	\$437,500

OPINION OF PROBABLE CONSTRUCTION COST

KENNEDY/JENKS CONSULTANTS

Project: Rancho Murrieta

Prepared By: _____

Building, Area: Seasonal Storage Reservoir

Date Prepared: JLH

K/J Proj. No. 1670011*00

Estimate Type: Conceptual Construction
 Preliminary (w/o plans) Change Order
 Design Development @ _____ % Complete

Current at ENR _____
 Escalated to ENR _____
 Months to Midpoint of Construct _____

Spec. No.	Item No.	Description	Qty	Units	Materials \$/Unit	Materials Total	Installation \$/Unit	Installation Total	Sub-contractor \$/Unit	Sub-contractor Total	Total
		Site Prep	1	LS			30,000.00	30,000			30,000
		Cut		CY			5.00				
		Import Fill & Backfill with Compact	8,750	CY	20.00	175,000	3.00	26,250			201,250
		Grading	243,442	SY			1.00	243,442			243,442
		Stormdrainage									
		Paving									
		Site Lighting									
		Fencing									
		Connection Piping									
		Overflow Piping									
		Electrical Service									
		Subtotals				175,000		299,692	-		474,692
		Division 1 Costs @ 10%				17,500		29,969	-		47,469
		Subtotals				192,500		329,661	-		522,161
		Taxes - Materials Costs @ 8.75%				16,844					16,844
		Subtotals				209,344		329,661	-		539,005
		Taxes - Labor Costs @ 5.00%						16,483			16,483
		Subtotals				209,344		346,145	-		555,488
		Contractor Markup for Sub @ 12%							-		-
		Subtotals				209,344		346,145	-		555,488
		Contractor OH&P @ 15%				31,402		51,922			83,323
		Subtotals				240,745		398,066	-		638,812
		Estimate Contingency @ 30%									191,643
		Subtotals									830,455
		Escalate to Midpoint of Construct @ 3%									-
		Estimated Bid Cost									830,455
		Total Estimate									831,000

Estimate Accuracy	
+50%	-30%

Estimated Range of Probable Cost		
+50%	Total Est.	-30%
\$1,246,500	\$831,000	\$581,700

OPINION OF PROBABLE CONSTRUCTION COST

KENNEDY/JENKS CONSULTANTS

Project: Rancho Murrieta

Prepared By: _____
 Date Prepared: JLH
 K/J Proj. No. 1670011*00

Building, Area: Van Vleck Sprayfield

Estimate Type: Conceptual Construction
 Preliminary (w/o plans) Change Order
 Design Development @ _____ % Complete

Current at ENR _____
 Escalated to ENR _____
 Months to Midpoint of Construct _____

Spec. No.	Item No.	Description	Qty	Units	Materials		Installation		Sub-contractor		Total
					\$/Unit	Total	\$/Unit	Total	\$/Unit	Total	
		Above ground 12" Irrigation pipe	1,000	LF	20.08	20,075	8.91	8,910			28,985
		Above ground 8" Irrigation pipe	5,000	LF	9.90	49,500	6.27	31,350			80,850
		Above ground 6" Irrigation pipe	5,000	LF	6.44	32,175	5.21	26,070			58,245
		Above ground 4" Irrigation pipe	5,000	LF	3.34	16,720	4.33	21,670			38,390
		Above ground 4" Irrigation pipe	11,250	LF	3.34	37,620	4.33	48,758			86,378
		K Line Irrigation Systems	55	EA	2,600.00	143,000	320.00	17,600			160,600
		Valves	30	EA	1,500.00	45,000	150.00	4,500			49,500
Subtotals						344,090	158,858	-	502,948		
Division 1 Costs			@	10%		34,409	15,886	-	50,295		
Subtotals						378,499	174,743	-	553,242		
Taxes - Materials Costs			@	8.75%		33,119			33,119		
Subtotals						411,618	174,743	-	586,361		
Taxes - Labor Costs			@	5.00%			8,737		8,737		
Subtotals						411,618	183,480	-	595,098		
Contractor Markup for Sub			@	12%				-	-		
Subtotals						411,618	183,480	-	595,098		
Contractor OH&P			@	15%		61,743	27,522		89,265		
Subtotals						473,360	211,002	-	684,363		
Estimate Contingency			@	30%					205,309		
Subtotals									889,672		
Escalate to Midpoint of Construct			@	3%					-		
Estimated Bid Cost									889,672		
Total Estimate									890,000		

Estimate Accuracy	
+50%	-30%

Estimated Range of Probable Cost		
+50%	Total Est.	-30%
\$1,335,000	\$890,000	\$623,000

Rancho Murieta -
Phase 1 - Proposed Recycled Water Use
Conveyance System



Initial PS Capacity Estimate from Demands

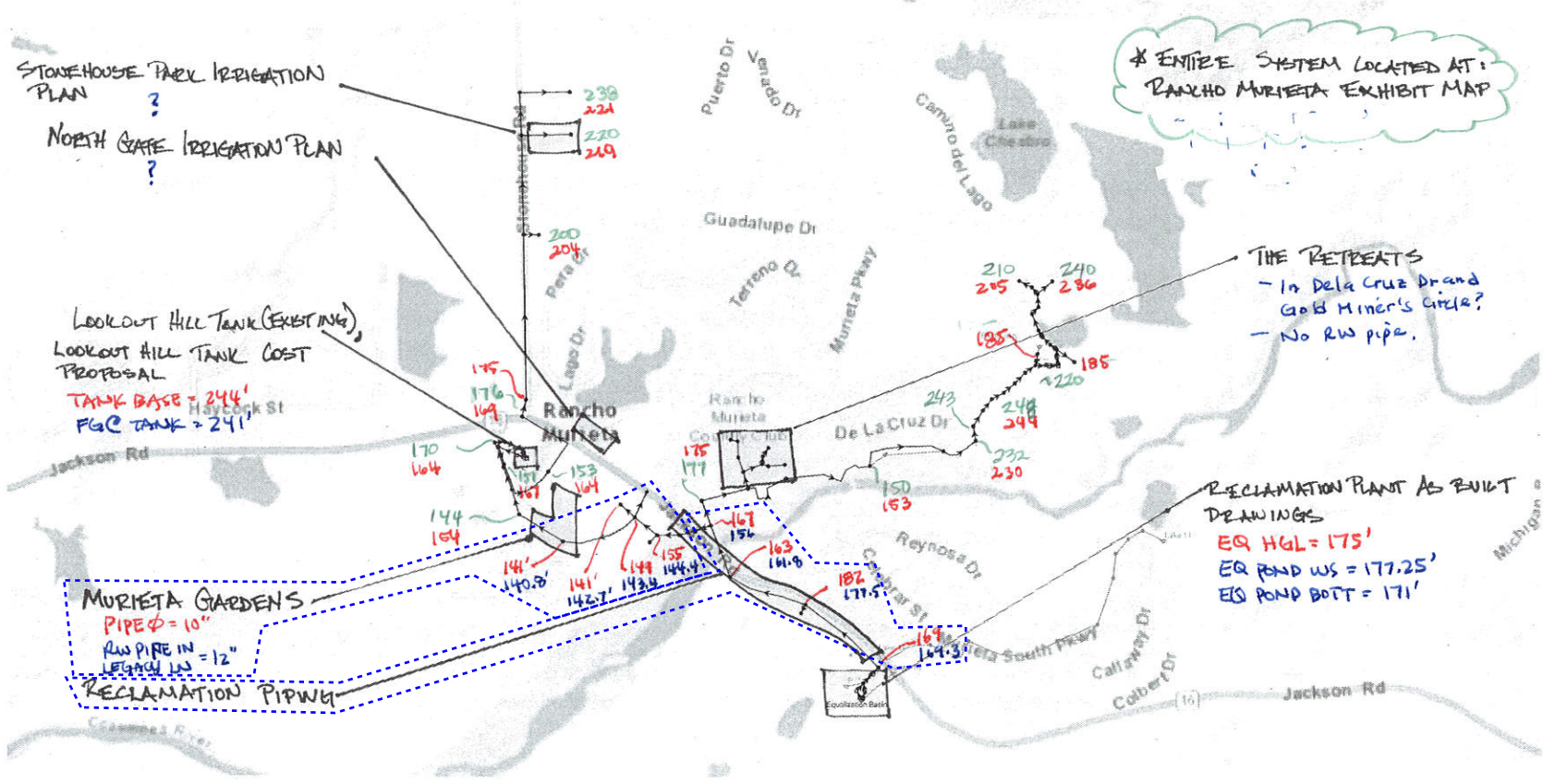
- Based on meeting the demands (not including the North and South GC demands) within the 8-hr irrigation window, the pump station capacity needed is **2,955 gpm** (~1480 gpm per pump, assuming 2 duty pumps).
- If Bass Lake Tank is filled outside the 8-hr irrigation period (i.e., during the hours when Bass Lake is filled for the North GC demands), then the Village A, B, and C demands can be removed from this total. The minimum RWPS capacity needed would then be **1,758 gpm** (~880 gpm per pump, assuming 2 duty pumps).
- The capacity of the RWPS is expected to be between 1,760 and 2,960 gpm.

Modeling Results

- Because of pressure limitation of the pipe (criteria is to maintain pressure at Junction N_3 below 150 psi), the flow rate to Bass Lake and Bass Lake Tank is limited to ~1380 gpm. If filling Bass Lake at 1,052 gpm (North GC demand spread over 16 hrs), the maximum rate of filling Bass Lake Tank is 328 gpm (=1,380 gpm - 1,052 gpm) over the 16-hr window.
- Based on the demand downstream of Bass Lake Tank, the tank would need to be filled at a rate of at least 542 gpm during the 8-hr irrigation window. Therefore the RWPS capacity needs to be at least 2,300 gpm (=1,758 gpm + 542 gpm).
- There are two design points for the RWPS, one during the 8-hr irrigation window and one during the 16-hr non-irrigation period. Here are the proposed design points:
 - **2,600 gpm @ 195 ft** for the 8-hr period
 - **1,400 gpm @ 345 ft** for the 16-hr period

① CHECK PHYSICAL ATTRIBUTES

Rancho Murieta Recycled Water System:
AS-BUILT DRAWING LOCATIONS



* ENTIRE SYSTEM LOCATED AT:
RANCHO MURIETA EXHIBIT MAP

THE RETREATS
- In De La Cruz Brand
Gold Miner's Circle?
- No RW pipe.

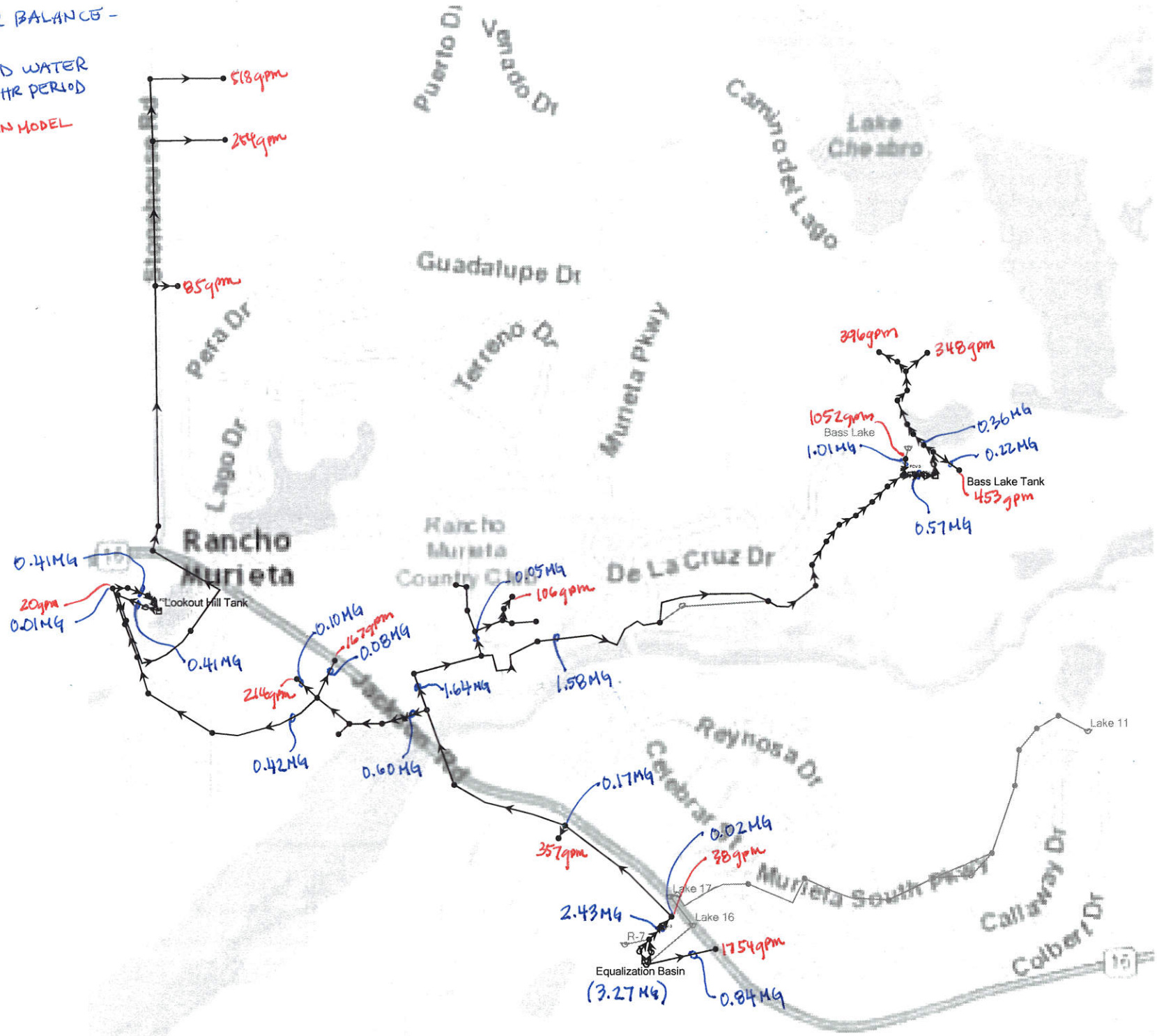
RECLAMATION PLANT AS BUILT
DRAWINGS
EQ HGL = 175'
EQ POND WS = 177.25'
EQ POND BOT = 171'

• ALL FOLDERS ARE LOCATED AT:
J:/1670011*00/9.09/BACKGROUND INFORMATION

- Model
- Drawing
- Exhibit Map

② WATER BALANCE -

- TOTALIZED WATER OVER 24-HR PERIOD
- DEMANDS IN MODEL



06 Dec 2016

Kennedy Jenks
Sacramento, CA

Quotation number: 480863
Revision:

Attn: Ryan Young

Project: Rancho Murieta
Your reference:

We thank you for your above referenced inquiry, and are pleased to submit our quotation for your consideration.

The following is a budget price summary for this quotation. Please see item specific pages for more details.

Item number	Service	Size	Unit Price	Unit Freight	Qty	Extended Price
010	RW Booster PS (1480 GPM)	14DOL - 5 stage Product lube - Sump Pump	\$ 46,167	\$ 1,000	3	\$ 141,501
011	Lookout Hill BPS (860 GPM)	11JKH - 2 stage Product lube - Barrel Pump	\$ 32,002	\$ 1,000	2	\$ 66,004
012	Bass Lake BPS (1200 GPM)	12JKH - 2 stage Product lube - Barrel Pump	\$ 33,371	\$ 1,000	2	\$ 68,742
Grand Total						\$ 276,247

COMMENTS:

- a. Pricing is for budget purposes only.
- b. Quote does not include: Installation, Oil or Grease, Valves, Gauges, Anchor Bolts, Soleplates, Spare Parts, Sales Tax.

SHIPMENT AND FREIGHT TERMS: Shipment is quoted with freight term: Per the freight term listed in the Comments and Clarifications Section. Partial shipment allowed. Shipment & invoicing will occur upon shipment of equipment. Shipment schedules are based on factory loading at time of order. Should shipment be postponed due to project or site delays Weir Floway will invoice and hold the shipment. Shipment delays exceeding 30 days from the completed date may be subject to reasonable storage charges.

LEADTIME: Submittal will be approximately 6-8 weeks after order receipt, contingent upon order acceptance within 10 business days of receipt. Orders will be accepted subject to buyer's credit approval and subject to Weir Floway, Inc.'s Terms and Conditions of Sale.

Shipment lead time will be approximately 20-22 weeks after written release to manufacture. Shipment lead times are an estimate at time of quotation and subject to change based on quote validity.

SCOPE OF SUPPLY: Please note any requirements not outlined in the referenced specification sections as noted on the cover page of this quotation will not be the responsibility of Weir Floway. Any separate specifications made reference to within the noted specifications, whether in part or whole, will not be considered in this quotation.

Weir Floway, Inc. Terms and Conditions of Sale per attached will apply to this quotation. If this is not acceptable, mutually agreeable terms and conditions may be negotiated at time of order placement.

SPECIFICATIONS: Written request. No detailed specifications received.

VALIDITY: This offer is valid for 30 days from date issued. Quoted prices will be held firm thru shipment if order is released for manufacture within 60 days from order entry date. Otherwise, a price adjustment may be applied.

In the event that Weir Floway, Inc. is successful in the tender based on this Scope Letter, please issue the formal Purchase Order to the following address:

Weir Floway, Inc.
2494 S. Railroad Ave.
Fresno, CA 93706

PRICE: Quoted prices will be held firm through shipment if order is released for manufacture within 60 days from order entry date, and approved for shipment within the leadtime quoted. Otherwise, a price adjustment may be applied. Price quoted is for all items purchased and shipped at one time. In the event of a partial order, we will review and adjust the freight price accordingly. Freight charges will be those in effect at time of shipment. Due to volatility in the commodities markets, Weir Floway reserves the right to add a material surcharge on pipe, plate, and other materials in line with the commodity indices. Cost surcharges must be agreed to prior to order acceptance.

PAYMENT TERMS: Orders & contracts are subject to approval by Weir Floway prior to acceptance. Standard terms for orders <= \$150,000 are net thirty (30) days from date of invoice. For orders >=\$150,000, progress payments will apply. Weir Floway's standard progress payment schedule is attached for consideration. Start-up services are included and will be invoiced when services are completed or eight (8) weeks from pump shipment whichever occurs first.

PACKAGING: For domestic shipment via commercial carrier. Export boxing and documentation requirements are an option with price adder.

START-UP: Start-up/assistance by authorized Rep. included. Invoice for start-up services will be issued when services are complete or 8 weeks from pump shipment whichever occurs first.

QUALITY STANDARDS: All our manufacturing locations are ISO 9001-2008 certified.

TERMS AND CONDITIONS: This quotation is based solely upon the terms and conditions set forth herein including attachments. They supersede and reject any conflicting terms and conditions of Purchaser. Any other terms and conditions that Purchaser may propose are subject to quotation.

We hope you find our quotation in line with your requirements. However, if you have any questions, please do not hesitate to contact us.

Sincerely,

Mike Burns
G3 Engineering, Inc.

CC: Jim Billings, G3 Engineering

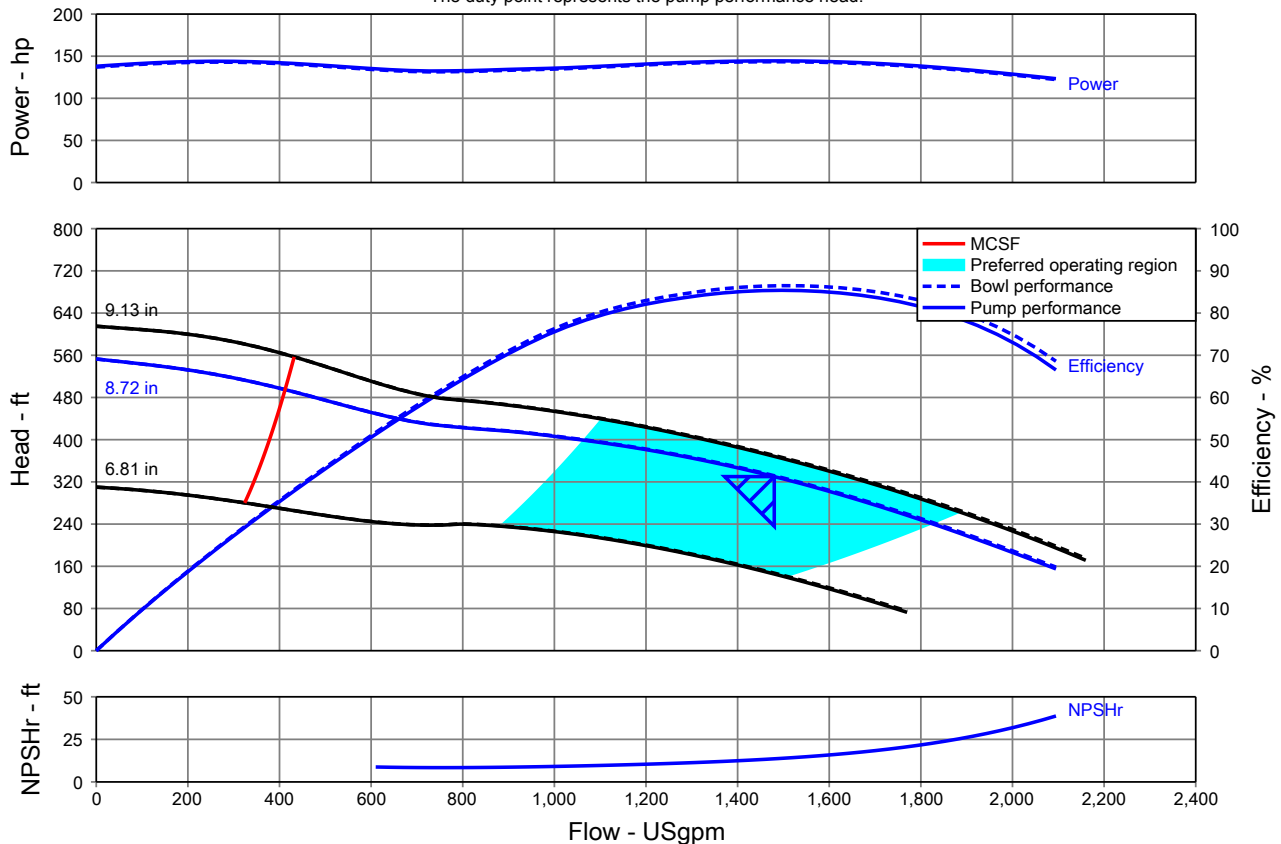
Richard Plitt, Floway

Pump Performance Datasheet

Customer : Kennedy Jenks	Quote number : 480863
Customer reference :	Size : 14DOL
Item number : 010	Stages : 5
Service : RW Booster PS (1480 GPM)	Based on curve number : 14DOL 1770 Rev. 0
Quantity : 3	Date last saved : 01 Dec 2016 11:10 AM

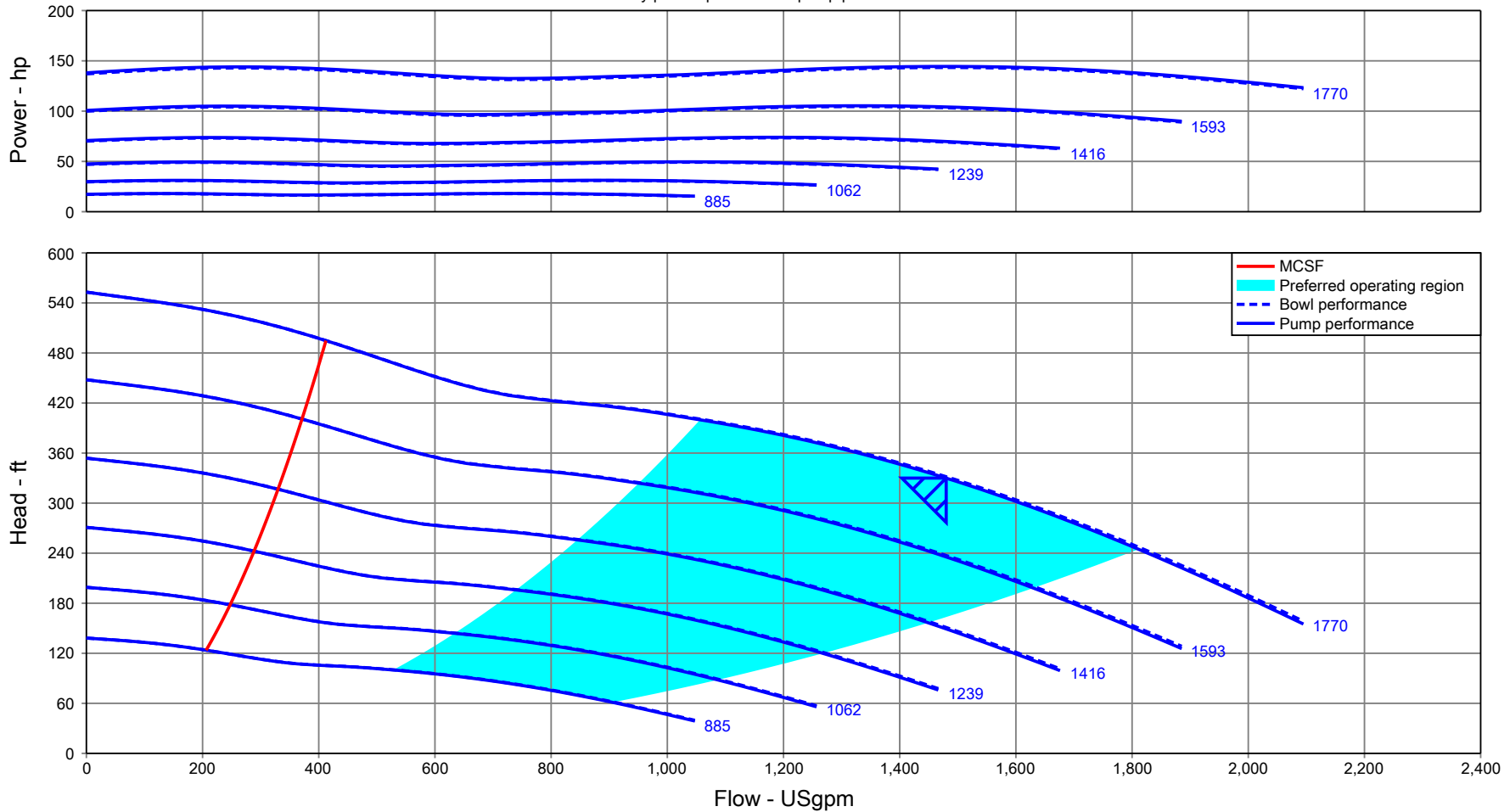
Operating Conditions	Liquid
Flow, rated : 1,480.0 USgpm	Liquid type : Water - Potable
Differential head / pressure, rated (requested) : 330.0 ft	Additional liquid description :
Differential head / pressure, rated (actual) : 331.3 ft	Solids diameter, max : 0.00 in
Suction pressure, rated / max : 0.00 / 0.00 psi.g	Solids concentration, by volume : 0.00 %
NPSH available, rated : Ample	Solids concentration, by weight : 0.00 %
Frequency : 60 Hz	Temperature, max : 68.00 deg F
	Fluid density, rated / max : 1.000 / 1.000 SG
	Viscosity, rated : 1.00 cP
	Vapor pressure, rated : 0.00 psi.a
Performance	
Speed, rated : 1770 rpm	
Impeller diameter, rated : 8.72 in	
Impeller diameter, maximum : 9.13 in	
Impeller diameter, minimum : 6.81 in	
Efficiency (bowl / pump) : 86.46 / 85.38 %	
NPSH required / margin required : 13.58 / 0.00 ft	
Ns (imp. eye flow) / Nss (imp. eye flow) : 2,908 / 9,030 US Units	
MCSF : 412.4 USgpm	
Head, maximum, rated diameter : 553.0 ft	
Head rise to shutoff (bowl / pump) : 66.70 / 67.56 %	
Flow, best eff. point (bowl / pump) : 1,509.2 / 1,496.6 USgpm	
Flow ratio, rated / BEP (bowl / pump) : 98.07 / 98.89 %	
Diameter ratio (rated / max) : 95.55 %	
Head ratio (rated dia / max dia) : 89.62 %	
Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010] : 1.00 / 1.00 / 1.00 / 1.00	
Selection status : Acceptable	
Material	
Material selected : Cast Iron/Bronze	
Pressure Data	
Maximum working pressure : See the Additional Data page	
Component pressure limit : See the Additional Data page	
Maximum allowable suction pressure : N/A	
Hydrostatic test pressure : See the Additional Data page	
Driver & Power Data	
Driver sizing specification : Max power + 4%	
Margin over specification : 0.00 %	
Service factor : 1.15	
Power, hydraulic : 124 hp	
Power (bowl / pump) : 143 / 144 hp	
Power, maximum, rated diameter : 144 hp	
Minimum recommended motor rating : 200 hp / 149 kW	

Pump and bowl (dashed) performance. Bowl adjusted for construction and viscosity.
Pump further adjusted for friction and power losses of lineshaft and thrust bearings. Pump is not adjusted for any static lift.
The duty point represents the pump performance head.



Multi-Speed Performance Curve

Pump and bowl (dashed) performance. Bowl adjusted for construction and viscosity.
Pump further adjusted for friction and power losses of lineshaft and thrust bearings. Pump is not adjusted for any static lift.
The duty point represents the pump performance head.

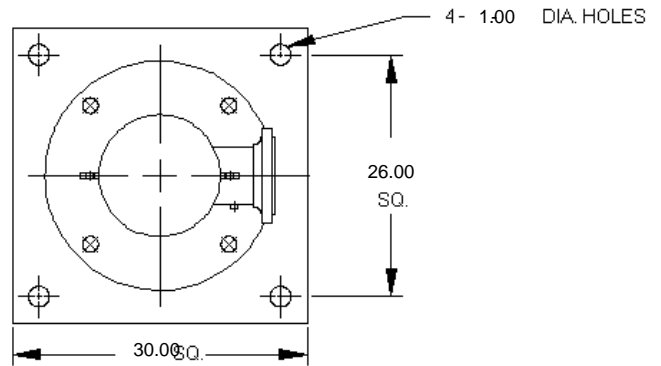
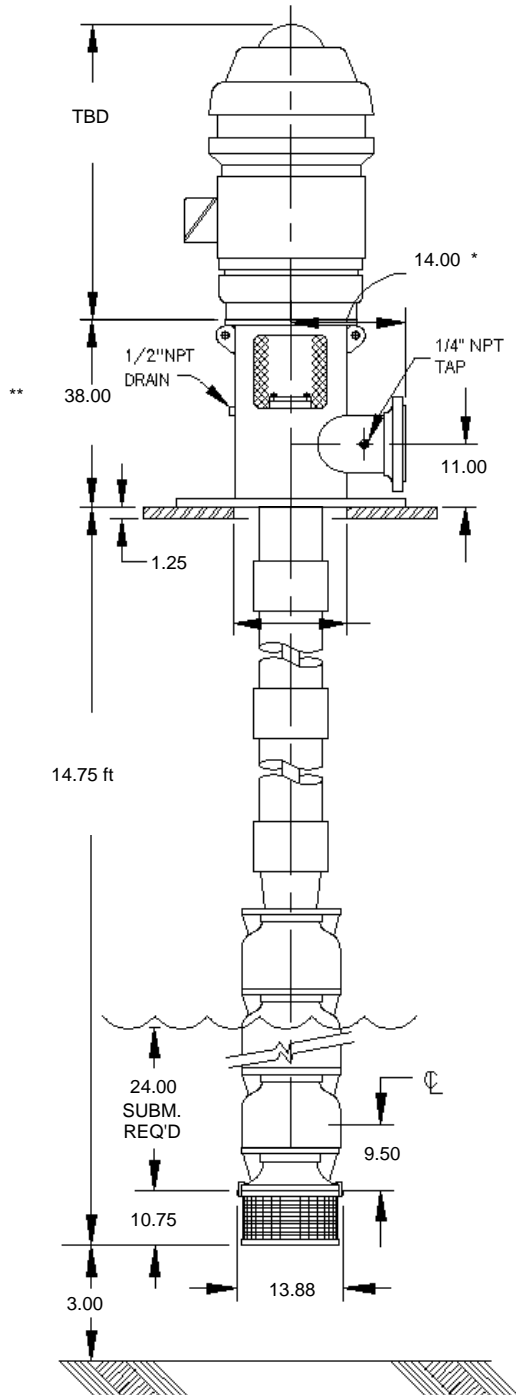


Customer	: Kennedy Jenks	Pump Type	: 14DOL	Quote number	: 480863
Address	: , Sacramento, CA	# of Stages	: 5	Customer PO #	:
Location	:	Quantity	: 3	CO #	:
Project	: Rancho Murieta	Flow	: 1,480.0 USgpm	Item #	: 010
Tag	:	Head	: 330.0 ft	JOL #	:
Bowl/Pump	:	Speed	: 1770 rpm	Serial #	:
Eff (bowl / pump)	: 86.46 / 85.38 %	Fluid Density	: 1.000 / 1.000 SG	Drawing #	:
Power (bowl / pump)	: 143 / 144 hp	Viscosity	: 1.00 cP	Drawn By	:
NPSH required	: 13.58 ft	Impeller Trim	: 8.72 in	Last Modified	: 01 Dec 2016 11:10 AM

The head and power may be different than that shown in accordance with Hydraulic Institute / API 610 Standards
Additional Notes:

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VERTICAL TURBINE PUMP
 1,480.0 USgpm 331.7 ft TDH
 5 STAGE TYPE 14DOL
 10x16.5F DISCHARGE HEAD



Discharge
 10 in. 150#RF - ANSI Flange
 16 in. Dia. Flange
 12 - 1 in. Dia. holes
 14.25 in. Bolt circle

* TYPICAL LOCATION FOR DISCHARGE NOZZLE
 ** FINAL HEAD HEIGHT WILL BE DETERMINED BASED ON INTERNAL ANALYSIS AND SPECIFICATION REVIEW
 NOT TO BE USED FOR CONSTRUCTION UNLESS CERTIFIED.

NOTES:
 ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED.
 DRAWING NOT TO SCALE.

REV.	BY	DATE	DESCRIPTION

Customer: Kennedy Jenks Customer Reference: Item Number: 001 Curve Number: 14DOL 1770 Date: 01 Dec 2016	OUTLINE DRAWING
DRAWING	



Item number	010	Size / Stages	14DOL / 5
Quote number	480863	Nominal pump speed	1770 rpm

Totals

Grand Total	\$ 141,502
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Pump

Qty	Description
3	<p>Units - 14DOL - 5 stage Product lube - Sump Pump</p> <p>Pump selection criteria Speed operation: Variable speed operation</p> <p>Lubrication type Lubrication type: Product lube</p> <p>Bowl Assembly - 5 Stage Bowl size: 14DOL bowl assembly - 5 stage Bowl Materials: Cast iron (ASTM A48 cl 30-enamel lined) Bowl connection type: Flanged Bowl Bolting Material: 304SS (ASTM F593 Gr CW1), Floway material code - 106 Bowl bearing material: Bismuth tin bronze bowl bearings (UNS C89835) Impeller Material: Bronze (ASTM B584 C90300) Collet Material: Steel (ASTM A108-90a Gr 1215) Bowl Shaft Size: 1.9375" (Standard) Bowl Shaft Material: 416SS (ASTM A582-88a Type 416) Suction type: Suction bell Suction type bearing: Bismuth tin bronze (UNS C89835) Suction Strainer: Clip on basket strainer 14DO Suction Strainer Material Strainer material - Galvanized steel</p> <p>Bowl assembly type: Fully assembled</p> <p>Column assembly - 1.5 x 10 in. - Threaded</p> <p>Column Column Size: Column 10" - (0- 20' and 0- 10' and 1- 5' and 1 - 2.58' Top) Column pipe material: ASTM A53 Gr. B rolled and welded steel Column pipe schedule: Floway standard .279" wall thickness Column Connection Type: Threaded Bearing Retainer material: Ductile iron (ASTM A536-84 Gr 60-40-18)</p> <p>Lineshaft Lineshaft Size: 1.5" Lineshaft Material: 416SS (ASTM A582-88a Type 416) Lineshaft Coupling Material: 416SS (ASTM A582-88a Type 416) Line shaft bearing material: Styrene Butadiene Rubber(SBR) (Qty 1 per pump)</p> <p>Discharge head assembly - 10x16.5 "F" Discharge head material: Steel (A36 plt, A105 flg, A53-Gr B pipe) Discharge Head Size: 10x16.5 "F" Discharge size: 10" Discharge Connection Type/Rating: 150# flange (Stl. std.) Shaft sealing arrangement: Mechanical seal Mechanical seal construction: Single unbalanced mechanical seal</p>



Pump

Qty	Description
-----	-------------

Mechanical seal type: John Crane type 5611 mechanical seal
Seal flush piping plan-Primary: Plan 13 Seal flush piping
Seal flush piping material - primary seal: 316SS tubing-Primary SFP
Top Line Shaft Straightness: Floway Standard
Stuffing box / Seal housing bearing material: Bismuth tin bronze seal housing bearing (UNS C89835)
Head shaft couplings: Type CPAT flanged adjustable spacer coupling
Coupling guard material / construction: Aluminum

Protective coatings

Protective coating - Discharge head: Carboguard 891 epoxy coating - Disch. head - interior and exterior
Protective coating - Column: Carboguard 891 epoxy coating - Column - interior and exterior
Protective coating - Bowl assembly: Carboguard 891 epoxy coating - Bowls, exterior only
Protective coating - Soleplate: Carboguard 891 epoxy coating - Soleplate top side only
Miscellaneous coating options
NSF certified

Assembly type - Unit

Assembly type - Unit: Factory assembled (bowl, head, and column only) shipped assembled

Start-up/Overage

Start-up options
Start up by Distributor/Manufacturer's Rep.

Packaging and Shipping

Packaging options
Domestic packaging

Testing

Qty	Description
-----	-------------

3	Testing and Inspection options
---	---------------------------------------

Performance / NPSH testing

Factory performance test acceptance criteria for rated condition per: ANSI/HI 14.6 grade 1U (Floway standard)
Performance test options
Bowl assembly performance test - 3 units
Performance test witnessing
Non-witnessed

Hydro testing

Hydrotest - Discharge Head options: Non witnessed hydrotest - discharge head - 3 units

Inspection and Analysis

Analysis
Seismic analysis of anchorage
Structural natural frequency analysis (head/motor only), stamped by Floway P.E. - 1 units

Sole Plate

Qty	Description
-----	-------------

3	Discharge head assembly - 10x16.5 "F"
---	--

Soleplate type: Fabricated steel
Soleplate size: 30"x30"x1.25"



Anchor Bolt

Qty	Description
3	Discharge head assembly - 10x16.5 "F" Soleplate anchor bolts with nuts: No soleplate anchor bolts

Driver

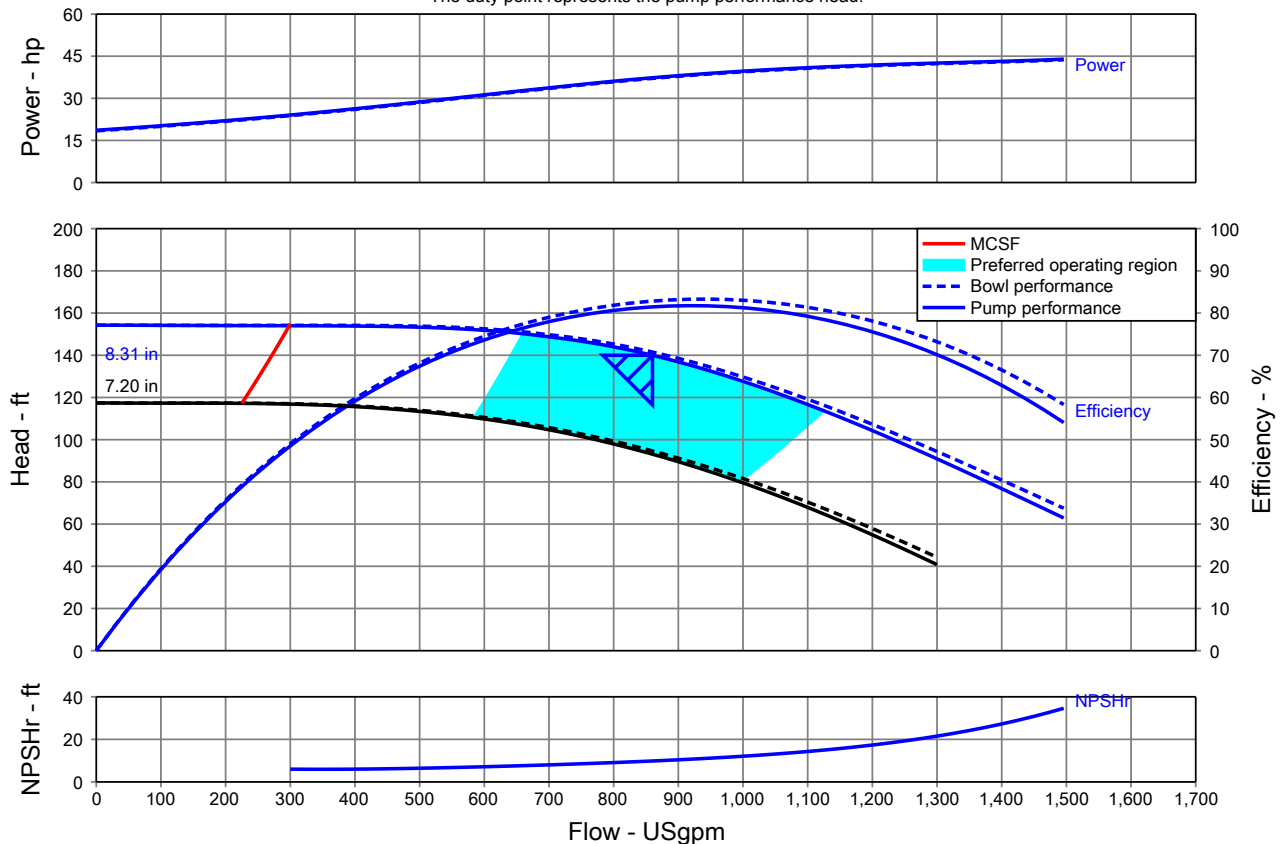
Qty	Description
3	Driver Electric motor driver Motor size selection: US 200HP 460v/3ph/60hz 1800 RPM WPI Motor efficiency type: Premium efficient Motor shaft Motor shaft type: Motor vertical solid shaft Reference head shaft diameter: For reference:1.5" Top line shaft diameter Motor thrust design High thrust Motor bearing life options: 1 yr. min. / 5 yr. average Motor enclosure: WPI Motor service factor: 1.15 Starting method: Across the line starting Motor BD: Motor BD 16.5 in. Miscellaneous motor options Thermostats Inverter duty motor Non-reverse device: No non-reverse device on motor Motor testing options Motor complete test - unwitnessed Conduit box size: Standard conduit box Elevation: Motor suitable for elevation <= 3300' Ambient temperature: Motor suitable for ambient temperature <= 104 F (40 C) UL labeled motor: Not UL labeled Motor packaging options: Motor domestic packaging Driver design: NEMA Driver shipping options: Motor NOT to be shipped to Floway factory

Pump Performance Datasheet

Customer : Kennedy Jenks	Quote number : 480863
Customer reference :	Size : 11JKH
Item number : 011	Stages : 2
Service : Lookout Hill BPS (860 GPM)	Based on curve number : 11JKH 1770 Rev. 0
Quantity : 2	Date last saved : 06 Dec 2016 7:07 AM

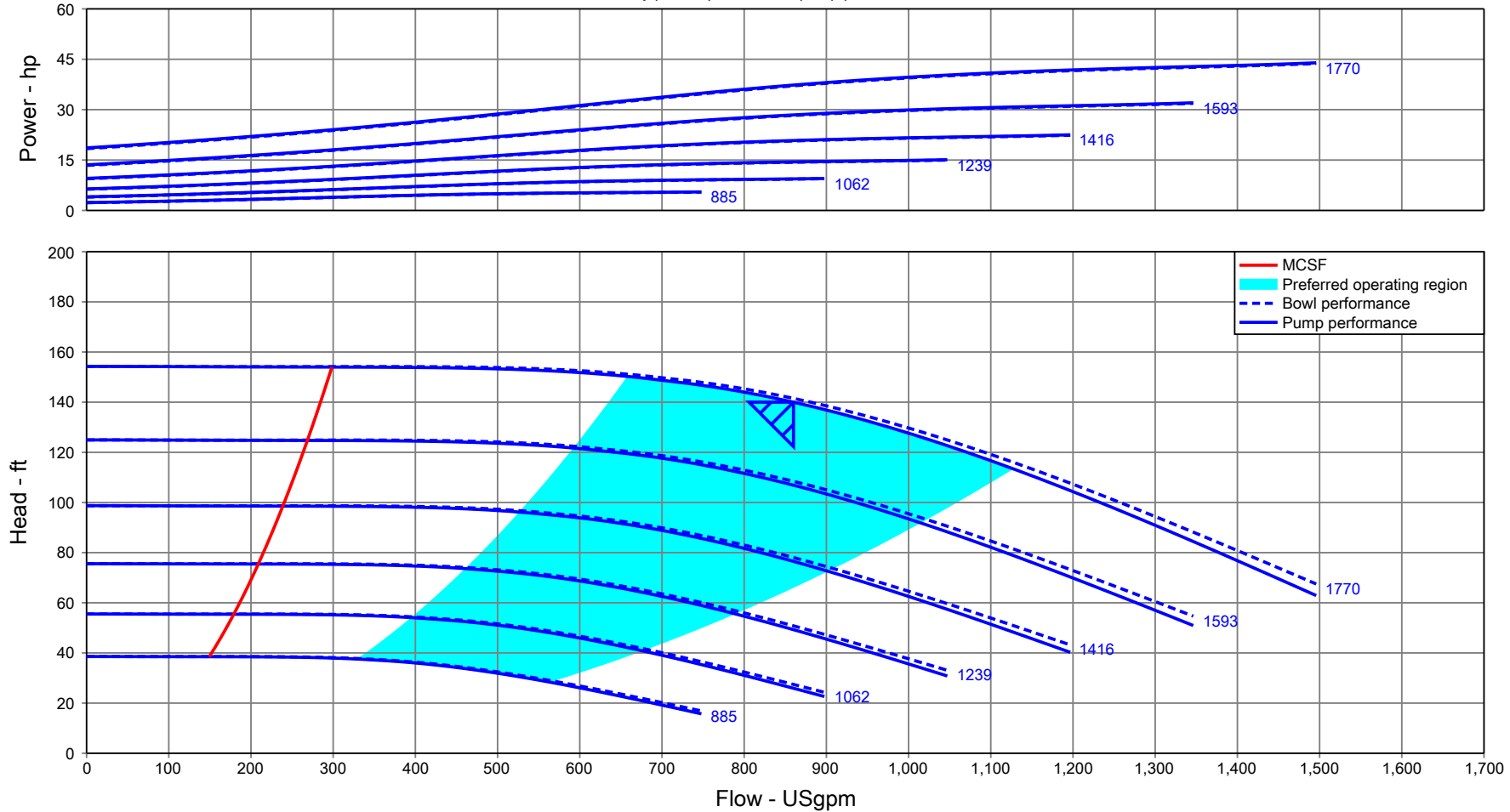
Operating Conditions	Liquid
Flow, rated : 860.0 USgpm	Liquid type : Water - Potable
Differential head / pressure, rated (requested) : 140.0 ft	Additional liquid description :
Differential head / pressure, rated (actual) : 141.1 ft	Solids diameter, max : 0.00 in
Suction pressure, rated / max : 0.00 / 0.00 psi.g	Solids concentration, by volume : 0.00 %
NPSH available, rated : Ample	Solids concentration, by weight : 0.00 %
Frequency : 60 Hz	Temperature, max : 68.00 deg F
	Fluid density, rated / max : 1.000 / 1.000 SG
	Viscosity, rated : 1.00 cP
	Vapor pressure, rated : 0.00 psi.a
Performance	
Speed, rated : 1770 rpm	
Impeller diameter, rated : 8.31 in	
Impeller diameter, maximum : 8.31 in	
Impeller diameter, minimum : 7.20 in	
Efficiency (bowl / pump) : 82.84 / 81.47 %	
NPSH required / margin required : 9.84 / 0.00 ft	
Ns (imp. eye flow) / Nss (imp. eye flow) : 2,285 / 8,978 US Units	
MCSF : 298.4 USgpm	
Head, maximum, rated diameter : 154.3 ft	
Head rise to shutoff (bowl / pump) : 9.00 / 10.18 %	
Flow, best eff. point (bowl / pump) : 939.7 / 921.6 USgpm	
Flow ratio, rated / BEP (bowl / pump) : 91.52 / 93.31 %	
Diameter ratio (rated / max) : 100.00 %	
Head ratio (rated dia / max dia) : 99.22 %	
Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010] : 1.00 / 1.00 / 1.00 / 1.00	
Selection status : Acceptable	
Material	
Material selected : Cast Iron/Bronze	
Pressure Data	
Maximum working pressure : See the Additional Data page	
Component pressure limit : See the Additional Data page	
Maximum allowable suction pressure : N/A	
Hydrostatic test pressure : See the Additional Data page	
Driver & Power Data	
Driver sizing specification : Max power + 4%	
Margin over specification : 0.00 %	
Service factor : 1.15	
Power, hydraulic : 30.74 hp	
Power (bowl / pump) : 37.10 / 37.32 hp	
Power, maximum, rated diameter : 43.94 hp	
Minimum recommended motor rating : 50.00 hp / 37.29 kW	

Pump and bowl (dashed) performance. Bowl adjusted for construction and viscosity.
Pump further adjusted for friction and power losses of lineshaft and thrust bearings. Pump is not adjusted for any static lift.
The duty point represents the pump performance head.



Multi-Speed Performance Curve

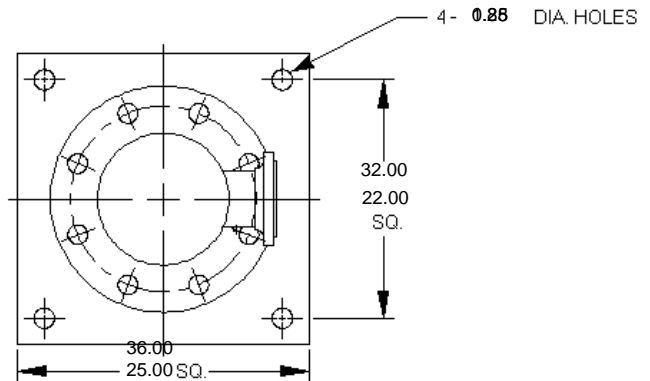
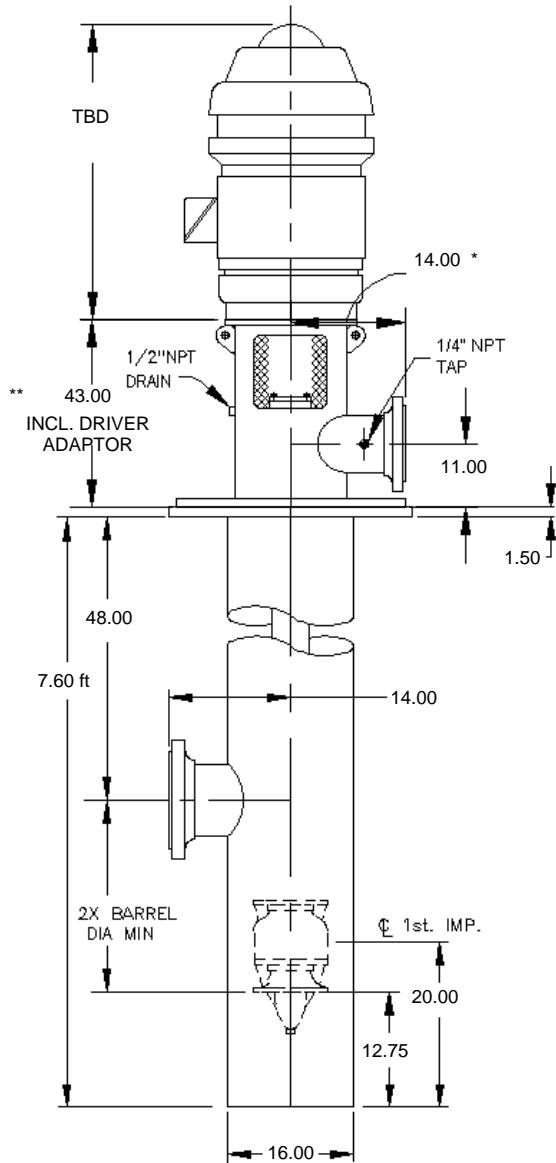
Pump and bowl (dashed) performance. Bowl adjusted for construction and viscosity.
Pump further adjusted for friction and power losses of lineshaft and thrust bearings. Pump is not adjusted for any static lift.
The duty point represents the pump performance head.



Customer : Kennedy Jenks	Pump Type : 11JKH	Quote number : 480863
Address : , Sacramento, CA	# of Stages : 2	Customer PO # :
Location :	Quantity : 2	CO # :
Project : Rancho Murieta	Flow : 860.0 USgpm	Item # : 011
Tag :	Head : 140.0 ft	JOL # :
Bowl/Pump :	Speed : 1770 rpm	Serial # :
Eff (bowl / pump) : 82.84 / 81.47 %	Fluid Density : 1.000 / 1.000 SG	Drawing # :
Power (bowl / pump) : 37.10 / 37.32 hp	Viscosity : 1.00 cP	Drawn By :
NPSH required : 9.84 ft	Impeller Trim : 8.31 in	Last Modified : 06 Dec 2016 7:07 AM

The head and power may be different than that shown in accordance with Hydraulic Institute / API 610 Standards
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VERTICAL TURBINE PUMP
 860.0 USgpm 141.5 ft TDH
 2 STAGE TYPE 11JKH
 10x16.5x16VF DISCHARGE HEAD



Discharge	Suction
10 in. 150#RF - ANSI Flange	10 in. 150#RF - ANSI Flange
16 in. Dia. Flange	16 in. Dia. Flange
12 - 1 in. Dia. holes	12 - .75 in. Dia. holes
14.25 in. Bolt circle	14.25 in. Bolt circle

* TYPICAL LOCATION FOR DISCHARGE NOZZLE
 ** FINAL HEAD HEIGHT WILL BE DETERMINED BASED ON INTERNAL ANALYSIS AND SPECIFICATION REVIEW

NOT TO BE USED FOR CONSTRUCTION UNLESS CERTIFIED.

NOTES:
 ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED.
 DRAWING NOT TO SCALE.

REV.	BY	DATE	DESCRIPTION

Customer: Kennedy Jenks	OUTLINE DRAWING
Customer Reference:	
Item Number: 011	
Curve Number: 11JKH 1770	
Date: 06 Dec 2016	
DRAWING	



Item number	011	Size / Stages	11JKH / 2
Quote number	480863	Nominal pump speed	1770 rpm

Totals

Grand Total	\$ 66,004
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Pump

Qty	Description
2	<p>Units - 11JKH - 2 stage Product lube - Barrel Pump</p> <p>Pump selection criteria Speed operation: Variable speed operation</p> <p>Lubrication type Lubrication type: Product lube</p> <p>Bowl Assembly - 2 Stage Bowl size: 11JKH bowl assembly - 2 stage Bowl Materials: Cast iron (ASTM A48 cl 30-enamel lined) Bowl connection type: Flanged Bowl Bolting Material: 304SS (ASTM F593 Gr CW1), Floway material code - 106 Bowl bearing material: Bismuth tin bronze bowl bearings (UNS C89835) Impeller Material: Bronze (ASTM B584 C90300) Collet Material: Steel (ASTM A108-90a Gr 1215) Bowl Shaft Size: 1.6875" (Standard) Bowl Shaft Material: 416SS (ASTM A582-88a Type 416) Suction type: Suction bell Suction type bearing: Bismuth tin bronze (UNS C89835) Suction Strainer: Clip on basket strainer 11JK Suction Strainer Material Strainer material - Galvanized steel</p> <p>Bowl assembly type: Fully assembled</p> <p>Column assembly - 1 x 8 in. - Threaded</p> <p>Column Column Size: Column 8" - (0- 20' and 0- 10' and 0- 5' and 1 - 3.48' Top) Column pipe material: ASTM A53 Gr. B rolled and welded steel Column pipe schedule: Schedule 30 .277" wall thickness Column Connection Type: Threaded</p> <p>Lineshaft Lineshaft Size: 1" Lineshaft Material: 416SS (ASTM A582-88a Type 416) Lineshaft Coupling Material: 416SS (ASTM A582-88a Type 416) Line shaft bearing material: Styrene Butadiene Rubber(SBR) (Qty 0 per pump)</p> <p>Discharge head assembly - 10x16.5x16 "VF" Discharge head material: Steel (A36 plt, A105 flg, A53-Gr B pipe) Discharge Head Size: 10x16.5x16 "VF" Discharge size: 10" Discharge Connection Type/Rating: 150# flange (Stl. std.) Shaft sealing arrangement: Mechanical seal Mechanical seal construction: Single unbalanced mechanical seal Mechanical seal type: John Crane type 5611 mechanical seal</p>



Pump

Qty	Description
	<p>Seal flush piping plan-Primary: Plan 13 Seal flush piping</p> <p>Seal flush piping material - primary seal: 316SS tubing-Primary SFP</p> <p>Top Line Shaft Straightness: Floway Standard</p> <p>Stuffing box / Seal housing bearing material: Bismuth tin bronze seal housing bearing (UNS C89835)</p> <p>Head shaft couplings: Type CPAT flanged adjustable spacer coupling</p> <p>Coupling guard material / construction: Aluminum</p> <p>Protective coatings</p> <p>Protective coating - Discharge head: Carboguard 891 epoxy coating - Disch. head - interior and exterior</p> <p>Protective coating - Column: Carboguard 891 epoxy coating - Column - interior and exterior</p> <p>Protective coating - Bowl assembly: Carboguard 891 epoxy coating - Bowls, exterior only</p> <p>Protective coating - Barrel: Carboguard 891 epoxy coating - Barrel - interior only (exterior Carboline 635 primer)</p> <p>Protective coating - Soleplate: Carboguard 891 epoxy coating - Soleplate top side only</p> <p>Miscellaneous coating options</p> <p>NSF certified</p> <p>Assembly type - Unit</p> <p>Assembly type - Unit: Factory assembled (bowl, head, and column only) shipped assembled</p> <p>Start-up/Overage</p> <p>Start-up options</p> <p>Start up by Distributor/Manufacturer's Rep.</p> <p>Packaging and Shipping</p> <p>Packaging options</p> <p>Domestic packaging</p>

Testing

Qty	Description
2	<p>Testing and Inspection options</p> <p>Performance / NPSH testing</p> <p>Factory performance test acceptance criteria for rated condition per: ANSI/HI 14.6 grade 1U (Floway standard)</p> <p>Performance test options</p> <p>Bowl assembly performance test - 2 units</p> <p>Performance test witnessing</p> <p>Non-witnessed</p> <p>Hydro testing</p> <p>Hydrotest - Discharge Head options: Non witnessed hydrotest - discharge head - 2 units</p> <p>Hydrotest - Suction barrel options: Non witnessed hydrotest - suction barrel - 2 units</p> <p>Inspection and Analysis</p> <p>Analysis</p> <p>Seismic analysis of anchorage</p> <p>Structural natural frequency analysis (head/motor only), stamped by Floway P.E. - 1 units</p>

Sole Plate

Qty	Description
2	<p>Discharge head assembly - 10x16.5x16 "VF"</p> <p>Soleplate type: Fabricated steel</p> <p>Soleplate size: 36"x36"x1.25"</p>



Anchor Bolt

Qty	Description
2	Discharge head assembly - 10x16.5x16 "VF" Soleplate anchor bolts with nuts: No soleplate anchor bolts

Barrel

Qty	Description
2	Suction barrel 16 in. x 7.6 ft. Suction barrel: Standard pressure suction barrel Barrel diameter: 16" diameter suction barrel x 7.6 ft. Barrel material: Steel barrel - ASTM A53 pipe A240 plate Barrel suction nozzle: 10" suction nozzle and flange on barrel Barrel suction flange rating: 150# suction flange

Driver

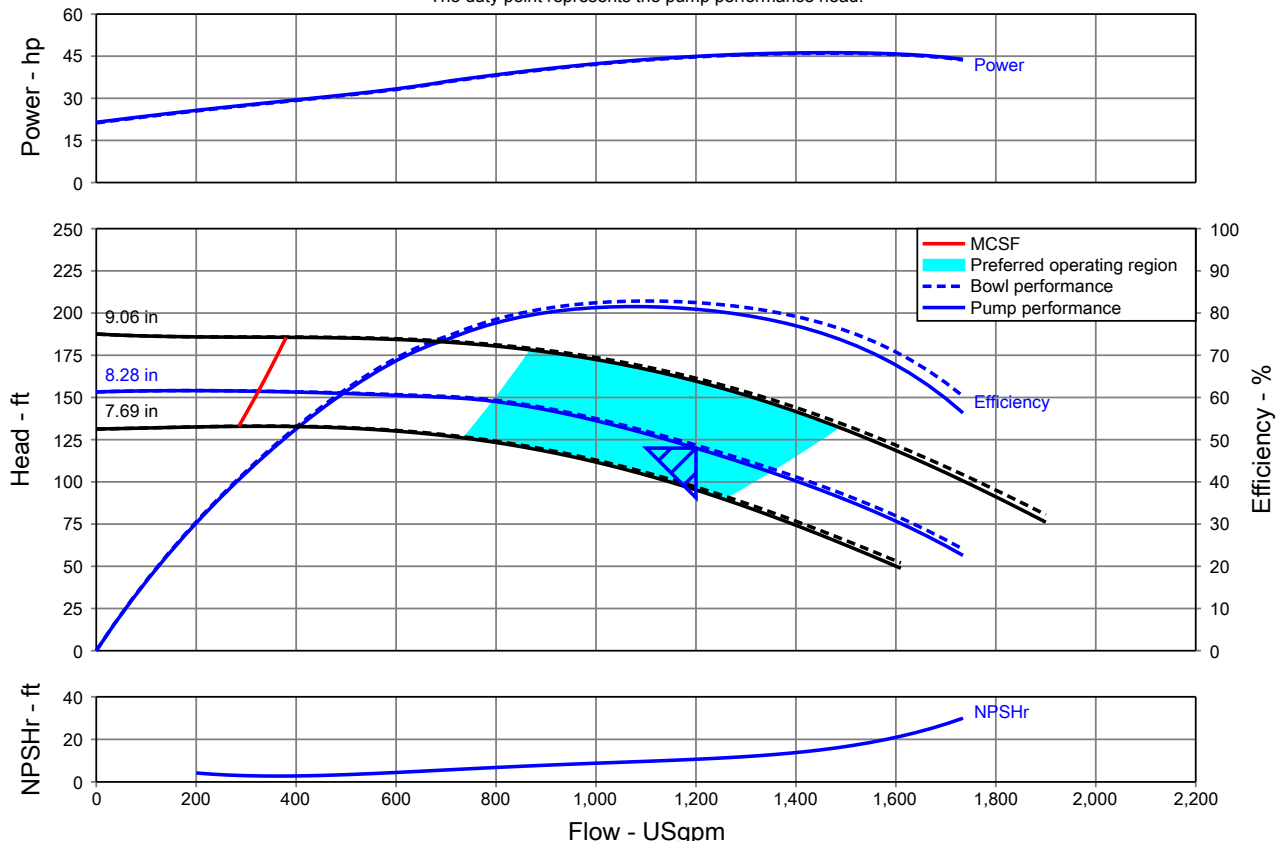
Qty	Description
2	Driver Electric motor driver Motor size selection: US 50HP 460v/3ph/60hz 1800 RPM WPI Motor efficiency type: Premium efficient Motor shaft Motor shaft type: Motor vertical solid shaft Reference head shaft diameter: For reference:1" Top line shaft diameter Motor thrust design High thrust Motor bearing life options: 1 yr. min. / 5 yr. average Motor enclosure: WPI Motor service factor: 1.15 Starting method: Across the line starting Motor BD: Motor BD 12 in. Miscellaneous motor options Thermostats Inverter duty motor Non-reverse device: No non-reverse device on motor Motor testing options Motor complete test - unwitnessed Conduit box size: Standard conduit box Elevation: Motor suitable for elevation <= 3300' Ambient temperature: Motor suitable for ambient temperature <= 104 F (40 C) UL labeled motor: Not UL labeled Motor packaging options: Motor domestic packaging Driver design: NEMA Driver shipping options: Motor NOT to be shipped to Floway factory

Pump Performance Datasheet

Customer : Kennedy Jenks	Quote number : 480863
Customer reference :	Size : 12JKH
Item number : 012	Stages : 2
Service : Bass Lake BPS (1200 GPM)	Based on curve number : 12JKH 1770 Rev. 0
Quantity : 2	Date last saved : 06 Dec 2016 7:36 AM

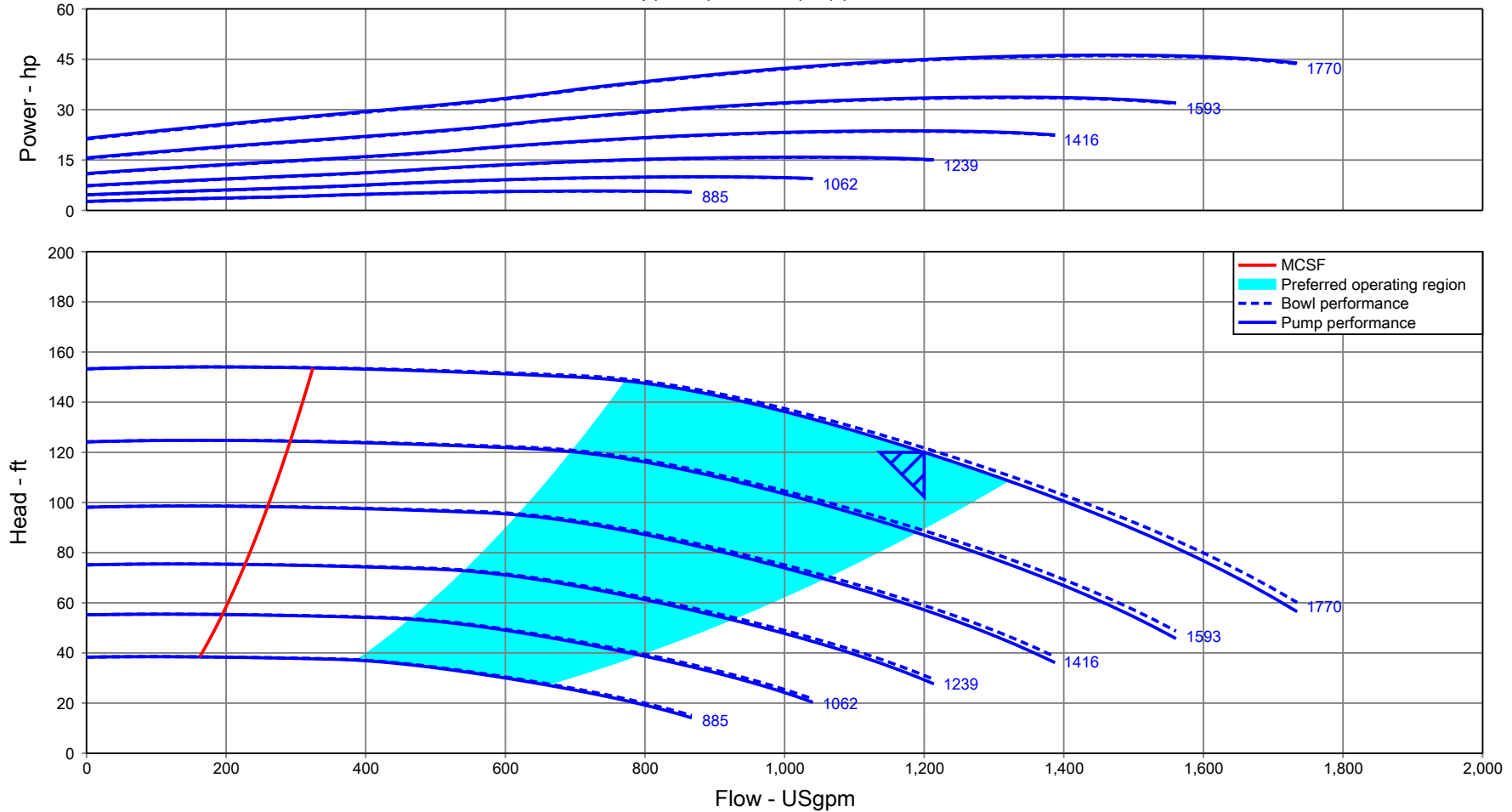
Operating Conditions	Liquid
Flow, rated : 1,200.0 USgpm	Liquid type : Water - Potable
Differential head / pressure, rated (requested) : 120.0 ft	Additional liquid description :
Differential head / pressure, rated (actual) : 121.2 ft	Solids diameter, max : 0.00 in
Suction pressure, rated / max : 0.00 / 0.00 psi.g	Solids concentration, by volume : 0.00 %
NPSH available, rated : Ample	Solids concentration, by weight : 0.00 %
Frequency : 60 Hz	Temperature, max : 68.00 deg F
	Fluid density, rated / max : 1.000 / 1.000 SG
	Viscosity, rated : 1.00 cP
	Vapor pressure, rated : 0.00 psi.a
Performance	
Speed, rated : 1770 rpm	
Impeller diameter, rated : 8.28 in	
Impeller diameter, maximum : 9.06 in	
Impeller diameter, minimum : 7.69 in	
Efficiency (bowl / pump) : 82.49 / 80.90 %	
NPSH required / margin required : 10.64 / 0.00 ft	
Ns (imp. eye flow) / Nss (imp. eye flow) : 2,348 / 10,219 US Units	
MCSF : 324.3 USgpm	
Head, maximum, rated diameter : 154.1 ft	
Head rise to shutoff (bowl / pump) : 25.88 / 27.74 %	
Flow, best eff. point (bowl / pump) : 1,101.5 / 1,075.2 USgpm	
Flow ratio, rated / BEP (bowl / pump) : 108.94 / 111.61 %	
Diameter ratio (rated / max) : 91.44 %	
Head ratio (rated dia / max dia) : 75.44 %	
Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010] : 1.00 / 1.00 / 1.00 / 1.00	
Selection status : Acceptable	
Material	
Material selected : Cast Iron/Bronze	
Pressure Data	
Maximum working pressure : See the Additional Data page	
Component pressure limit : See the Additional Data page	
Maximum allowable suction pressure : N/A	
Hydrostatic test pressure : See the Additional Data page	
Driver & Power Data	
Driver sizing specification : Max power + 4%	
Margin over specification : 0.00 %	
Service factor : 1.15	
Power, hydraulic : 36.90 hp	
Power (bowl / pump) : 44.73 / 44.95 hp	
Power, maximum, rated diameter : 46.26 hp	
Minimum recommended motor rating : 50.00 hp / 37.29 kW	

Pump and bowl (dashed) performance. Bowl adjusted for construction and viscosity.
Pump further adjusted for friction and power losses of lineshaft and thrust bearings. Pump is not adjusted for any static lift.
The duty point represents the pump performance head.



Multi-Speed Performance Curve

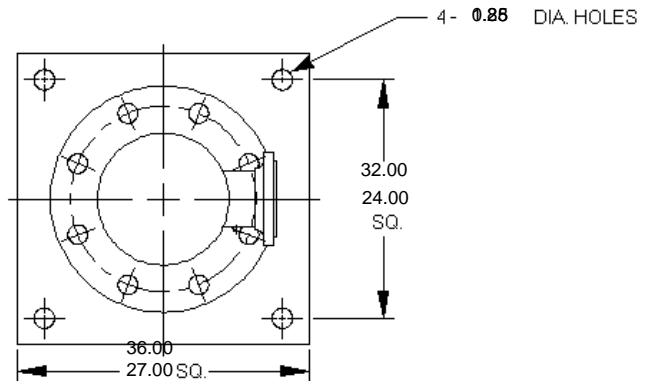
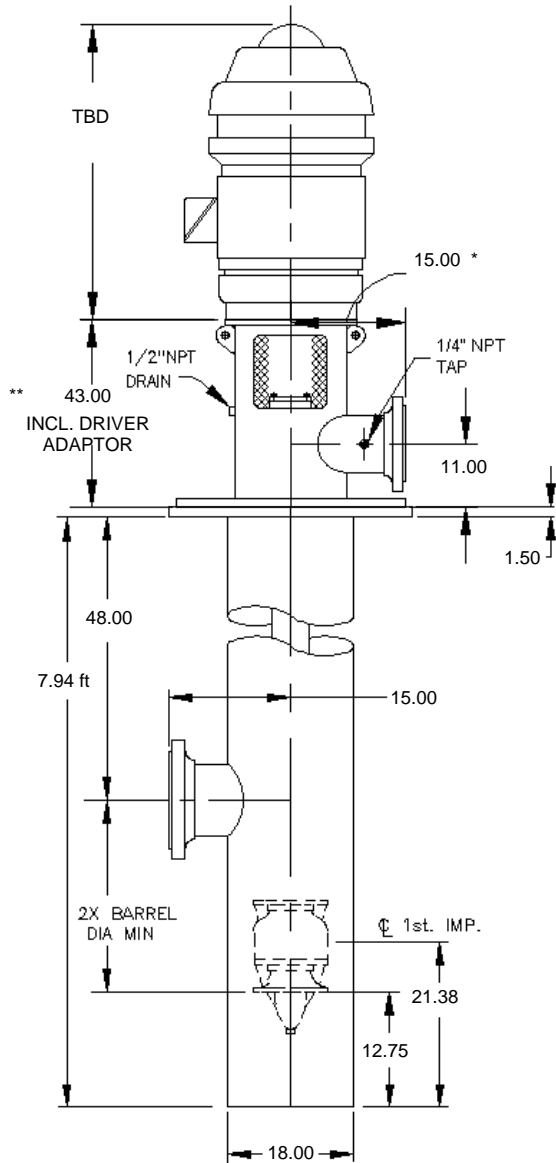
Pump and bowl (dashed) performance. Bowl adjusted for construction and viscosity.
Pump further adjusted for friction and power losses of lineshaft and thrust bearings. Pump is not adjusted for any static lift.
The duty point represents the pump performance head.



Customer : Kennedy Jenks	Pump Type : 12JKH	Quote number : 480863
Address : , Sacramento, CA	# of Stages : 2	Customer PO # :
Location :	Quantity : 2	CO # :
Project : Rancho Murieta	Flow : 1,200.0 USgpm	Item # : 012
Tag :	Head : 120.0 ft	JOL # :
Bowl/Pump :	Speed : 1770 rpm	Serial # :
Eff (bowl / pump) : 82.49 / 80.90 %	Fluid Density : 1.000 / 1.000 SG	Drawing # :
Power (bowl / pump) : 44.73 / 44.95 hp	Viscosity : 1.00 cP	Drawn By :
NPSH required : 10.64 ft	Impeller Trim : 8.28 in	Last Modified : 06 Dec 2016 7:36 AM

The head and power may be different than that shown in accordance with Hydraulic Institute / API 610 Standards
Additional Notes: Copyright © Weir Floway, Inc. All Rights Reserved

VERTICAL TURBINE PUMP
 1,200.0 USgpm 121.8 ft TDH
 2 STAGE TYPE 12JKH
 10x16.5x18VF DISCHARGE HEAD



Discharge	Suction
10 in. 150#RF - ANSI Flange	12 in. 150#RF - ANSI Flange
16 in. Dia. Flange	19 in. Dia. Flange
12 - 1 in. Dia. holes	12 - .75 in. Dia. holes
14.25 in. Bolt circle	17 in. Bolt circle

* TYPICAL LOCATION FOR DISCHARGE NOZZLE
 ** FINAL HEAD HEIGHT WILL BE DETERMINED BASED ON INTERNAL ANALYSIS AND SPECIFICATION REVIEW

NOT TO BE USED FOR CONSTRUCTION UNLESS CERTIFIED.

NOTES:
 ALL DIMENSIONS IN INCHES UNLESS OTHERWISE NOTED.
 DRAWING NOT TO SCALE.

REV.	BY	DATE	DESCRIPTION

Customer: Kennedy Jenks	OUTLINE DRAWING
Customer Reference:	
Item Number: 012	
Curve Number: 12JKH 1770	
Date: 06 Dec 2016	
DRAWING	



Item number	012	Size / Stages	12JKH / 2
Quote number	480863	Nominal pump speed	1770 rpm

Totals

Grand Total	\$ 68,741
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Pump

Qty	Description
2	<p>Units - 12JKH - 2 stage Product lube - Barrel Pump</p> <p>Pump selection criteria Speed operation: Variable speed operation</p> <p>Lubrication type Lubrication type: Product lube</p> <p>Bowl Assembly - 2 Stage Bowl size: 12JKH bowl assembly - 2 stage Bowl Materials: Cast iron (ASTM A48 cl 30-enamel lined) Bowl connection type: Flanged Bowl Bolting Material: 304SS (ASTM F593 Gr CW1), Floway material code - 106 Bowl bearing material: Bismuth tin bronze bowl bearings (UNS C89835) Impeller Material: Bronze (ASTM B584 C90300) Collet Material: Steel (ASTM A108-90a Gr 1215) Bowl Shaft Size: 1.6875" (Standard) Bowl Shaft Material: 416SS (ASTM A582-88a Type 416) Suction type: Suction bell Suction type bearing: Bismuth tin bronze (UNS C89835) Suction Strainer: Clip on basket strainer 12JK Suction Strainer Material Strainer material - Galvanized steel</p> <p>Bowl assembly type: Fully assembled</p> <p>Column assembly - 1 x 8 in. - Threaded</p> <p>Column Column Size: Column 8" - (0- 20' and 0- 10' and 0- 5' and 1 - 3.85' Top) Column pipe material: ASTM A53 Gr. B rolled and welded steel Column pipe schedule: Schedule 30 .277" wall thickness Column Connection Type: Threaded</p> <p>Lineshaft Lineshaft Size: 1" Lineshaft Material: 416SS (ASTM A582-88a Type 416) Lineshaft Coupling Material: 416SS (ASTM A582-88a Type 416) Line shaft bearing material: Styrene Butadiene Rubber(SBR) (Qty 0 per pump)</p> <p>Discharge head assembly - 10x16.5x18 "VF" Discharge head material: Steel (A36 plt, A105 flg, A53-Gr B pipe) Discharge Head Size: 10x16.5x18 "VF" Discharge size: 10" Discharge Connection Type/Rating: 150# flange (Stl. std.) Shaft sealing arrangement: Mechanical seal Mechanical seal construction: Single unbalanced mechanical seal Mechanical seal type: John Crane type 5611 mechanical seal</p>



Pump

Qty	Description
	<p>Seal flush piping plan-Primary: Plan 13 Seal flush piping</p> <p>Seal flush piping material - primary seal: 316SS tubing-Primary SFP</p> <p>Top Line Shaft Straightness: Floway Standard</p> <p>Stuffing box / Seal housing bearing material: Bismuth tin bronze seal housing bearing (UNS C89835)</p> <p>Head shaft couplings: Type CPAT flanged adjustable spacer coupling</p> <p>Coupling guard material / construction: Aluminum</p> <p>Protective coatings</p> <p>Protective coating - Discharge head: Carboguard 891 epoxy coating - Disch. head - interior and exterior</p> <p>Protective coating - Column: Carboguard 891 epoxy coating - Column - interior and exterior</p> <p>Protective coating - Bowl assembly: Carboguard 891 epoxy coating - Bowls, exterior only</p> <p>Protective coating - Barrel: Carboguard 891 epoxy coating - Barrel - interior only (exterior Carboline 635 primer)</p> <p>Protective coating - Soleplate: Carboguard 891 epoxy coating - Soleplate top side only</p> <p>Miscellaneous coating options</p> <p>NSF certified</p> <p>Assembly type - Unit</p> <p>Assembly type - Unit: Factory assembled (bowl, head, and column only) shipped assembled</p> <p>Start-up/Overage</p> <p>Start-up options</p> <p>Start up by Distributor/Manufacturer's Rep.</p> <p>Packaging and Shipping</p> <p>Packaging options</p> <p>Domestic packaging</p>

Testing

Qty	Description
2	<p>Testing and Inspection options</p> <p>Performance / NPSH testing</p> <p>Factory performance test acceptance criteria for rated condition per: ANSI/HI 14.6 grade 1U (Floway standard)</p> <p>Performance test options</p> <p>Bowl assembly performance test - 2 units</p> <p>Performance test witnessing</p> <p>Non-witnessed</p> <p>Hydro testing</p> <p>Hydrotest - Discharge Head options: Non witnessed hydrotest - discharge head - 2 units</p> <p>Hydrotest - Suction barrel options: Non witnessed hydrotest - suction barrel - 2 units</p> <p>Inspection and Analysis</p> <p>Analysis</p> <p>Seismic analysis of anchorage</p> <p>Structural natural frequency analysis (head/motor only), stamped by Floway P.E. - 1 units</p>

Sole Plate

Qty	Description
2	<p>Discharge head assembly - 10x16.5x18 "VF"</p> <p>Soleplate type: Fabricated steel</p> <p>Soleplate size: 36"x36"x1.25"</p>



Anchor Bolt

Qty	Description
2	Discharge head assembly - 10x16.5x18 "VF" Soleplate anchor bolts with nuts: No soleplate anchor bolts

Barrel

Qty	Description
2	Suction barrel 18 in. x 7.94 ft. Suction barrel: Standard pressure suction barrel Barrel diameter: 18" diameter suction barrel x 7.94 ft. Barrel material: Steel barrel - ASTM A53 pipe A240 plate Barrel suction nozzle: 12" suction nozzle and flange on barrel Barrel suction flange rating: 150# suction flange

Driver

Qty	Description
2	Driver Electric motor driver Motor size selection: US 50HP 460v/3ph/60hz 1800 RPM WPI Motor efficiency type: Premium efficient Motor shaft Motor shaft type: Motor vertical solid shaft Reference head shaft diameter: For reference:1" Top line shaft diameter Motor thrust design High thrust Motor bearing life options: 1 yr. min. / 5 yr. average Motor enclosure: WPI Motor service factor: 1.15 Starting method: Across the line starting Motor BD: Motor BD 12 in. Miscellaneous motor options Thermostats Inverter duty motor Non-reverse device: No non-reverse device on motor Motor testing options Motor complete test - unwitnessed Conduit box size: Standard conduit box Elevation: Motor suitable for elevation <= 3300' Ambient temperature: Motor suitable for ambient temperature <= 104 F (40 C) UL labeled motor: Not UL labeled Motor packaging options: Motor domestic packaging Driver design: NEMA Driver shipping options: Motor NOT to be shipped to Floway factory

RMCC RECLAIMED/RAIN/RIVER WATER Used FOR GOLF COURSE IRRIGATION														
	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	TOTAL	AC Feet
2004	0	0	0	0	0	0	0	32,271,664	24,124,682	12,042,621	0	0	68,438,967	210.0
2005	0	0	0	0	16,630,838	26,814,512	36,402,337	34,133,912	22,205,988	8,775,311	0	0	144,962,898	444.9
2006	0	0	0	0	6,766,725	33,466,274	34,890,191	29,922,670	25,027,177	4,124,965	251,454	0	134,449,456	412.6
2007	0	0	8,028,234	12,384,053	25,061,082	35,457,957	34,901,154	31,926,322	20,635,416	8,307,235	5,527,905	677,308	182,906,666	561.4
2008	1,659,642	3,416,483	7,124,928	18,287,541	29,461,199	34,964,198	33,603,413	31,014,257	24,379,703	9,898,221	558,332	0	194,367,917	596.5
2009	52,784	0	2,975,658	16,717,552	22,729,582	32,833,243	46,776,756	43,909,242	28,182,762	11,666,411	3,933,034	262,164	210,039,188	644.6
2010	597,420	531,726	519,342	1,149,164	12,408,766	37,970,917	46,140,605	40,058,609	27,082,893	11,123,674	3,537,359	175,506	181,295,981	556.4
2011	872,560	713,619	1,313,020	8,984,949	18,274,385	27,470,149	46,391,726	40,394,603	29,335,909	9,066,660	597,141	995,453	183,414,721	562.9
2012	878,154	2,778,006	1,196,596	7,361,960	32,770,815	45,143,654	47,147,006	42,805,041	28,569,713	12,850,329	492,614	15,155	221,993,888	681.3
2013	106,349	1,341,286	8,606,675	18,332,384	35,468,226	41,821,801	48,030,013	43,806,357	22,120,481	20,445,260	5,670,447	156,796	245,749,279	754.2
2014	3,376,895	770,891	5,676,877	15,768,648	32,126,458	43,082,072	45,349,608	44,684,082	26,637,494	12,584,964	757,116	148,932	230,815,105	708.4
2015	328,082	431,985	7,101,232	16,684,761	26,270,887	42,472,558	45,059,817	39,039,324	28,975,721	13,805,881	256,034	33,022	220,426,282	676.5
2016	13,823	0	0	0	0	0	0	0	0	0	0	0	13,823	0.0

From Master Wastewater Data Spreadsheet

Irrigation Season	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	March	April	May	June	Total
2004-2005	0	32,271,664	24,124,682	12,042,621	0	0	0	0	0	0	16,630,838	26,814,512	111,884,317
2005-2006	36,402,337	34,133,912	22,205,988	8,775,311	0	0	0	0	0	0	6,766,725	33,466,274	141,750,547
2006-2007	34,890,191	29,922,670	25,027,177	4,124,965	251,454	0	0	0	8,028,234	12,384,053	25,061,082	35,457,957	175,147,783
2007-2008	34,901,154	31,926,322	20,635,416	8,307,235	5,527,905	677,308	1,659,642	3,416,483	7,124,928	18,287,541	29,461,199	34,964,198	196,889,331
2008-2009	33,603,413	31,014,257	24,379,703	9,898,221	558,332	0	52,784	0	2,975,658	16,717,552	22,729,582	32,833,243	174,762,745
2009-2010	46,776,756	43,909,242	28,182,762	11,666,411	3,933,034	262,164	597,420	531,726	519,342	1,149,164	12,408,766	37,970,917	187,907,704
2010-2011	46,140,605	40,058,609	27,082,893	11,123,674	3,537,359	175,506	872,560	713,619	1,313,020	8,984,949	18,274,385	27,470,149	185,747,328
2011-2012	46,391,726	40,394,603	29,335,909	9,066,660	597,141	995,453	878,154	2,778,006	1,196,596	7,361,960	32,770,815	45,143,654	216,910,677
2012-2013	47,147,006	42,805,041	28,569,713	12,850,329	492,614	15,155	106,349	1,341,286	8,606,675	18,332,384	35,468,226	41,821,801	237,556,579
2013-2014	48,030,013	43,806,357	22,120,481	20,445,260	5,670,447	156,796	3,376,895	770,891	5,676,877	15,768,648	32,126,458	43,082,072	241,031,195
2014-2015	45,349,608	44,684,082	26,637,494	12,584,964	757,116	148,932	328,082	431,985	7,101,232	16,684,761	26,270,887	42,472,558	223,451,701
2015-2016	45,059,817	39,039,324	28,975,721	13,805,881	256,034	33,022	13,823						
Average	42,829,029	38,756,051	26,094,727	11,387,360	2,158,144	246,434	788,571	1,109,333	4,726,951	12,852,335	26,063,489	37,912,950	

AF/Month

Irrigation Season	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	March	April	May	June	Total
2004-2005	0	99	74	37	0	0	0	0	0	0	51	82	343
2005-2006	112	105	68	27	0	0	0	0	0	0	21	103	435
2006-2007	107	92	77	13	1	0	0	0	25	38	77	109	538
2007-2008	107	98	63	25	17	2	5	10	22	56	90	107	604
2008-2009	103	95	75	30	2	0	0	0	9	51	70	101	536
2009-2010	144	135	86	36	12	1	2	2	2	4	38	117	577
2010-2011	142	123	83	34	11	1	3	2	4	28	56	84	570
2011-2012	142	124	90	28	2	3	3	9	4	23	101	139	666
2012-2013	145	131	88	39	2	0	0	4	26	56	109	128	729
2013-2014	147	134	68	63	17	0	10	2	17	48	99	132	740
2014-2015	139	137	82	39	2	0	1	1	22	51	81	130	686
2015-2016	138	120	89	42	0.786	0.101	0.042						
Average	131	119	80	35	7	1	2	3	15	39	80	116	627

Irrigation Season	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	March	April	May	June	Total
2004-2005	0	99	74	37	0	0	0	0	0	0	51	82	343
2005-2006	112	105	68	27	0	0	0	0	0	0	21	103	435
2006-2007	107	92	77	13	1	0	0	0	25	38	77	109	538
2007-2008	107	98	63	25	17	2	5	10	22	56	90	107	604
2008-2009	103	95	75	30	2	0	0	0	9	51	70	101	536
2009-2010	144	135	86	36	12	1	2	2	2	4	38	117	577
2010-2011	142	123	83	34	11	1	3	2	4	28	56	84	570
2011-2012	142	124	90	28	2	3	3	9	4	23	101	139	666
2012-2013	145	131	88	39	2	0	0	4	26	56	109	128	729
2013-2014	147	134	68	63	17	0	10	2	17	48	99	132	740
2014-2015	139	137	82	39	2	0	1	1	22	51	81	130	686
2015-2016	138	120	89	42	0.786	0.101	0.042						

Average of last 10 yr	130	120	80	35	5	0	0	5	15	40	80	115	625
Maximum	145	135	90	65	15	5	10	10	25	55	110	140	740
Minimum	105	90	65	15	0	0	0	0	0	5	40	85	535

AVERAGE

2006-2008	107	95	70	19	9	1	3	5	23	47	84	108	571
2008-2010	123	115	81	33	7	0	1	1	5	27	54	109	557
2010-2012	142	123	87	31	6	2	3	5	4	25	78	111	618
2012-2014	146	133	78	51	9	0	5	3	22	52	104	130	734
2014-2016	139	128	85	40	2	0	1	1	22	51	81	130	686
AVERAGE	130	120	80	35	5	0	0	5	15	40	80	120	635
Maximum	146	133	87	51	9	2	5	5	23	52	104	130	734
Minimum	107	95	70	19	2	0	1	1	4	25	54	108	557

SUM

2006-2008	214	190	140	38	18	2	5	10	47	94	167	216	1,142
2008-2010	247	230	161	66	14	1	2	2	11	55	108	217	1,113
2010-2012	284	247	173	62	13	4	5	11	8	50	157	223	1,236
2012-2014	292	266	156	102	19	1	11	6	44	105	207	261	1,469
2014-2016	277	257	171	81	3	1	1	1	22	51	81	130	686
AVERAGE	265	240	160	70	15	0	5	5	25	70	145	210	1,130
Maximum	292	266	173	102	19	4	11	11	47	105	207	261	1,469
Minimum	214	190	140	38	3	1	1	1	8	50	81	130	686

*Peak month is July according to the Averages outlined in blue

Irrigation Season	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	March	April	May	June	Total
PERCENTAGE													
2006-2008	18.76	16.62	12.27	3.34	1.55	0.18	0.45	0.92	4.07	8.24	14.66	18.93	
2008-2010	22.16	20.66	14.49	5.95	1.24	0.07	0.18	0.15	0.96	4.93	9.69	19.52	
2010-2012	22.98	19.98	14.01	5.01	1.03	0.29	0.43	0.87	0.62	4.06	12.68	18.03	
2012-2014	19.89	18.10	10.59	6.96	1.29	0.04	0.73	0.44	2.98	7.13	14.12	17.74	
2014-2016	40.46	37.47	24.89	11.81	0.45	0.08	0.15	0.19	3.18	7.47	11.76	19.01	
AVERAGE	24.85	22.57	15.25	6.61	1.11	0.13	0.39	0.51	2.36	6.36	12.58	18.65	
Maximum													
Minimum													

NUMBER OF CONNECTIONS TIMELINE

Developments	Number of Connections		Development Timeline							
	Residential	Commercial	2016	2018	2020	2025	2030	2035	2040	2045
Existing (Current)	2,502									
Phase 1										
Infill	238			238	0.05					
Retreats North and East	62			62	0.01302					
Retreats West	22			22	0.00462					
Murieta Gardens	78	227		78	0.06416					
Phase 1 Alone	400				0.1318					
Total (Phase 1)	2,902				0.4718					
% Increase from Current	16%									
Phase 2										
Village A	167				117	25	12	13		
Village B	167				17	50	50	50		
Village C	130				13	52	52	13		
Village D	42				0	11	11	21		
Village E	43				0	0	9	34		
Village F	95				0	2	36	57		
Village G	53				0	0	5	48		
Village H	122				0	12	31	79		
Riverview	140				140					
Lakeview	99				99					
Apartments	170				119	26	12	14		
Residences of Murieta Hills	198				198					
Industrial/Commercial/Residential	160				24	48	48	40		
Phase 2 Alone	1,586		2,502	400	727	225	265	369	0	0
Total (Phase 2)	4,488		2,502	2,902	3,629	3,854	4,119	4,488	4,488	4,488
% Increase from Current	79%									
ADWF (MGD)			0.3400	0.4718	0.624346	0.671649	0.727233	0.80482	0.80482	0.80482

Source

See AD Demand and Sources; 0.5 MGD allocation for infill
 Draft Sewer Study May 6, 2016 & Preliminary Sewer Study May 31, 2016
 Final Sewer Study, May 3, 2016
 Draft Sewer Study, May 15, 2016; Commercial connections based on 0.04774 MGD and 210 gpd/connection (Table 2)

Prelim Sewer Study, March 31, 2016, Section 5. Development Timeline per page 4 of RMCS D Water Supply Assessment TM
 Prelim Sewer Study, March 31, 2016, Section 5. Development Timeline per page 4 of RMCS D Water Supply Assessment TM
 Prelim Sewer Study, March 31, 2016, Section 5. Development Timeline per page 4 of RMCS D Water Supply Assessment TM
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 Prelim Sewer Study, March 31, 2016, Section 5. Development Timeline per page 4 of RMCS D Water Supply Assessment TM
 Prelim Sewer Study, March 31, 2016, Section 5. Development Timeline per page 4 of RMCS D Water Supply Assessment TM
 Title XVI Recycled Water Feasibility Study, June 2014. Page 2-5, Table 2-1
 Title XVI Recycled Water Feasibility Study, June 2014. Page 2-5, Table 2-2
 Title XVI Recycled Water Feasibility Study, June 2014. Page 2-5, Table 2-3
 Preliminary Sewer Study, March 31, 2016, Section 5
 Title XVI Recycled Water Feasibility Study, June 2014. Page 2-5, Table 2-3

RECYCLED WATER DEMAND TIMELINE

	RW Annual Demand (AFY)	Development Timeline							
		2016	2018	2020	2025	2030	2035	2040	2045
North & South Golf Courses (Current)	550	550	550	550	550	550	550	550	550
Infill	0	0	0	0	0	0	0	0	0
North Main Gate Entrance (Phase 1)	2.8			2.8	2.8	2.8	2.8	2.8	2.8
District Office	5.4			5.4	5.4	5.4	5.4	5.4	5.4
Retreats (Phase 1)	15.1		15.1	15.1	15.1	15.1	15.1	15.1	15.1
Murieta Gardens (Phase 1)	30.5		30.5	30.5	30.5	30.5	30.5	30.5	30.5
Stonehouse Park (Phase 1)	36.2			36.2	36.2	36.2	36.2	36.2	36.2
Escuela Park (Phase 1)	12.07			12.07	12.07	12.07	12.07	12.07	12.07
Phase 1 Alone	102.07	550.00	595.60	652.07	652.07	652.07	652.07	652.07	652.07
Total (Phase 1)	652.07								
Village A (Phase 2)	56.5			39.56107	8.477373	3.956107	4.521266		
Village B (Phase 2)	64.6			6.457333	19.372	19.372	19.372		
Village C (Phase 2)	49.6			4.963636	19.85455	19.85455	4.963636		
Village D (Phase 2)	0.00			0	0	0	0		
Village E (Phase 2)	0.00			0	0	0	0		
Village F (Phase 2)	0.00			0	0	0	0		
Village G (Phase 2)	0.00			0	0	0	0		
Village H (Phase 2)	0.00			0	0	0	0		
Riverview	0.00			0	0	0	0	0	
Lakeview	0.00			0	0	0	0	0	
Apartments (Phase 2)	23.8			16.66	3.57	1.666	1.904		
Residences of Murieta Hills (Phase 2)	73.8			73.8	0	0.00	0.00	0	0
Industrial/Commercial/Residential (Phase 2)	50.9			7.64	15.27	15.27	12.73		
Phase 2 Alone	319.2	0.0	0	149.077	66.54392	60.12	43.49	0	0
Total (Phase 2)	971.29								
SUM		550	595.60	801.14	718.61	712.19	695.55	652.07	652.07
COMPOUNDING SUM		550	595.60	801.14	867.69	927.81	971.29	971.29	971.29

	2020	2025	2030	2035	2040	2045
Village A	70%	15%	7%	8%		
Village B	10%	30%	30%	30%		
Village C	10%	40%	40%	10%		
Village D	0%	25%	25%	50%		
Village E	0%	0%	20%	80%		
Village F	0%	2%	38%	60%		
Village G	0%	0%	10%	90%		
Village H	0%	10%	25%	65%		
Riverview	100%	0%	0%	0%	0%	0%
Lakeview	100%	0%	0%	0%	0%	0%
Apartments	70%	15%	7%	8%		
Residences of Murieta Hills	100%	0%	0%	0%	0%	0%
Industrial/Commercial/Residential	15%	30%	30%	25%		

Existing Wastewater Flow (ADWF MGD) 0.3400

WASTEWATER PRODUCTION TIMELINE

	Waswater Production (AFY)	Development Timeline							
		2016	2018	2020	2025	2030	2035	2040	2045
North & South Golf Courses (Current)	380.87	380.87	380.87	380.87	380.87	380.87	380.87	380.87	380.87
Infill	56.0		56.0	56.0	56.0	56.0	56.0	56.0	56.0
North Main Gate Entrance (Phase 1)	0.0			0.0	0.0	0.0	0.0	0.0	0.0
District Office	0.0			0.0	0.0	0.0	0.0	0.0	0.0
Retreats (Phase 1)	19.8		19.8	19.8	19.8	19.8	19.8	19.8	19.8
Murieta Gardens (Phase 1)	71.9		71.9	71.9	71.9	71.9	71.9	71.9	71.9
Stonehouse Park (Phase 1)	0.0			0.0	0.0	0.0	0.0	0.0	0.0
Escuela Park (Phase 1)	0.0			0.0	0.0	0.0	0.0	0.0	0.0
Phase 1 Alone	147.6	380.87	528.51	528.51	528.51	528.51	528.51	528.51	528.51
Total (Phase 1)	528.5								
Village A (Phase 2)	39.3			27.50	5.89	2.75	3.14		
Village B (Phase 2)	39.3			3.93	11.79	11.79	11.79		
Village C (Phase 2)	30.6			3.06	12.23	12.23	3.06		
Village D (Phase 2)	9.9			0.00	2.47	2.47	4.94		
Village E (Phase 2)	10.1			0.00	0.00	2.02	8.09		
Village F (Phase 2)	22.3			0.00	0.45	8.49	13.41		
Village G (Phase 2)	12.5			0.00	0.00	1.25	11.22		
Village H (Phase 2)	28.7			0.00	2.87	7.18	18.66		
Riverview	32.9			32.93	0.00	0.00	0.00	0.00	
Lakeview	21.4			21.40	0.00	0.00	0.00	0.00	
Apartments (Phase 2)	23.3			16.30	3.49	1.63	1.86		
Residences of Murieta Hills (Phase 2)	46.6			46.58	0.00	0.00	0.00	0.00	0.00
Industrial/Commercial/Residential (Phase 2)	37.6			5.65	11.29	11.29	9.41		
Phase 2 Alone	354.5	0.0	0.00	157.35	50.48	61.10	85.58	0.00	0.00
Total (Phase 2)	883.0								
SUM		380.87	528.51	685.86	578.99	589.61	614.09	528.51	528.51
COMPOUNDING SUM		380.87	528.51	685.86	736.34	797.44	883.02	883.02	883.02

Table 1. Projected Average Annual Recycled Water Demands and Scenarios

Proposed Developments and Reuse Area	Projected RW Demand (AFY)	Scenarios (AFY)		
		1- WDR and RW Standards	2- Public Area Focus, Limited to Most Cost Effective	3-Scenario 2 Plus Riverview and Lakeview
North and South Golf Courses (Current)	550	550	550	550
North Main Gate Entrance (Phase 1)	2.8	2.8	2.8	2.8
District Office (Phase 1)	5.4	5.4	5.4	5.4
Stonehouse Park (Phase 1)	36.2	36.2	36.2	36.2
Escuela Park (Phase 1)	12.1	12.1	12.1	12.1
Commercial Loop (TBD)			10	10
Retreats (Phase 1)	15.1	15.1	15.1	15.1
Murieta Gardens (Phase 1)	30.5	30.5	30.5	30.5
Village A (Phase 2)	56.5	56.5		
Village B (Phase 2)	64.6	64.6		
Village C (Phase 2)	49.6	49.6	49.6	49.6
Apartments (Phase 2)	23.8	23.8	23.8	23.8
Residences of Murieta Hills (Phase 2)	73.8	73.8	73.8	73.8
Industrial/Commercial/Residential (Phase 2)	50.9	50.9	50.9	50.9
Village D				
Village E				
Village F				
Village G				
Village H				
Riverview	22.4			22.4
Lakeview	15.8			15.8
Sum of Proposed Reuse Area Demands		971	860	898
Projected Recycled Water Production		883	883	883
Difference (Excess Recycled Water)		-88	23	-15

Notes:

Developments with phase descriptions (i.e., Phase 1 and 2) reflect proposed reuse areas described in the District's Waste Discharge Requirements and Recycled Water Standards

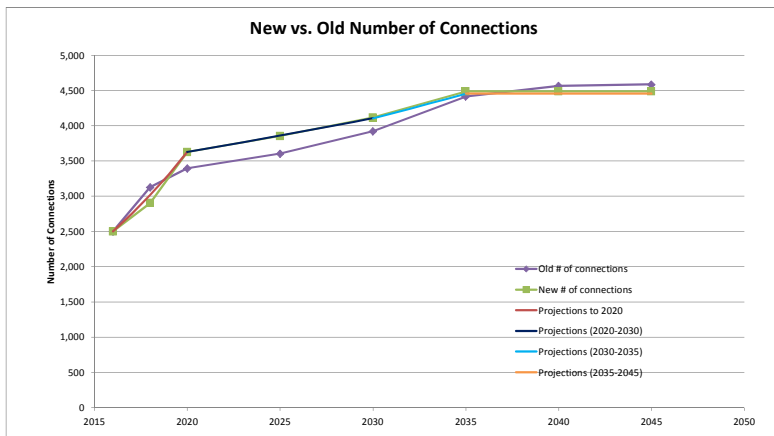
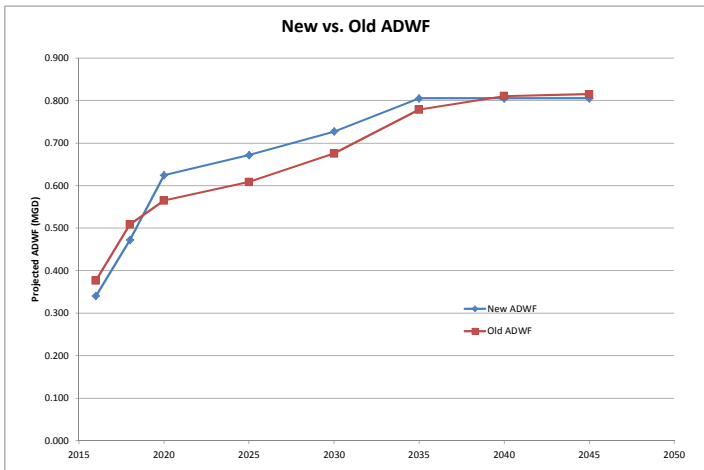
ADWF and Developments Comparison

OLD - From Park and Common Area Irrigation Demands spreadsheet

Conditions	Source	Number of Connections	Wastewater Flow, (ADWF MGD)	Recycled Water Demand (AFY)					
Existing	District Engineer RFP	2500	0.37653	0					
Phase 1 - Connected Prior to 2020	Current Activities								
Murieta Gardens		305							
The Retreats		84							
infill - 0.05 MGD ADWF		238							
Phase 2 - Per WSA	per Water Supply Assessment, Table 2-1								
	2016	2018	2020	2025	2030	2035	2040	2045	
Village A			117	25	12	13		167	
Village B			17	50	50	50		167	
Village C			13	52	52	13		130	
Village D			0	10	11	21		42	
Village E			0	0	9	34		43	
Village F			0	2	36	57		95	
Village G			0	0	5	48		53	
Village H			0	13	32	85		130	
Industrial/Commercial/Residential			4	8	7	6		25	
Residences of MH			0	0	20	79	79	20	198
Riverview			0	14	42	42	42		140
Lakeview			0	9	30	30	30		99
Apartments			119	25	12	14		170	
	2500	627	270	208	318	492	151	20	
existing ADWF + Proposed Connection ADWF (compounded each 5 years)	0.37653	0.50825	0.56495	0.60863	0.67541	0.77873	0.81044	0.81464	

	connections	ADWF	Connections DIFFERENCE	ADWF DIFFERENCE
NEW	2,502	0.3400	-2	0.03653
	2,902	0.6243	-231	-0.05939
	3,629	0.6243	-249	-0.06302
	3,854	0.7272	-195	-0.05182
	4,119	0.8048	-73	-0.02609
	4,488	0.8048	78	0.00562
	4,488	0.8048	98	0.00982

Projections to 2020		Projections from 2020 to 2030		Projections from 2030 to 2035		Projections from 2035 to 2045	
assumption		assumption		assumprior		assumption	
9.75%		1.25%		1.65%		0.00%	
year	connections	year	connections	year	connections	year	connections
2016	2,502	2020	3,629.00	2030	4,107.00	2035	4,458.00
2017	2,745.95	2021	3,674.36	2031	4,174.77	2036	4,458.00
2018	3,013.67	2022	3,720.29	2032	4,243.65	2037	4,458.00
2019	3,307.51	2023	3,766.80	2033	4,313.67	2038	4,458.00
2020	3,629.99	2024	3,813.88	2034	4,384.84	2039	4,458.00
		2025	3,861.55	2035	4,457.19	2040	4,458.00
		2026	3,909.82			2041	4,458.00
		2027	3,958.70			2042	4,458.00
		2028	4,008.18			2043	4,458.00
		2029	4,058.28			2044	4,458.00
		2030	4,109.01			2045	4,458.00
difference	1,128	difference	480	difference	350		



Recycled Water Demands			8-hr	9-hr	
Phase 1	North	North Main Gate Entrance	9,428	37	33
	Equalization Basin	District Office	9,120	19	17
	North	Retreats	63,360	132	117
	North	Murieta Gardens	101,280	211	188
	North	Stonehouse Park	120,480	251	223
	North	Escuela Park	120,480	251	223
	North	North Golf Course		2,104	1,871
	South	South Golf Course		1,915	1,703
		Phase 1 Demand	4,920	4,375	
		Capacity	6,246	5,552	
Phase 2					
	North	Village A	214,080	446	396
	North	Village C	165,120	344	306
	North	Village B	188,160	392	348
	North	Apartments	80,160	167	148
	North	Residences of Murieta Hills	248,640	518	460
	North	Industrial/Commercial/Residential	171,360	357	317
		Phase 2 Subtotal	2,224	1,975	
		Phase 1 and 2 Total	7,144	6,350	
		Capacity	6,246	5,552	
		Difference (Supplemental Potable Water), gpm		898	798
		Difference (Supplemental Potable Water), gallons	431,258	430,718	

RW Production Sources			
	WWRP	2,082	2,082
Potable Water Supplementation		896	796
	Subtotal	2,978	2,878
Reduced GC Demand (assumed)		1000	1000
		943	496
		452,458	268,018 Phase 1
		3,167	2,471 Phase 2
		1,519,978	1,186,238

RW Annual and Average Day RW Demands and Wastewater Production

	RW Annual Demand (AFY)	RW Average Day Demand (AF/day)	RW Average Day Demand (MGD)	Waswater Production (AFY)	Area (AC)
1 North & South Golf Courses (Current)	550	2.782	0.9065	381	
2 Infill	0			56	
3 North Main Gate Entrance (Phase 1)	2.8	0.014	0.0046	0	
4 District Office	5.4	0.027	0.0089	0	
5 Retreats (Phase 1)	15.1	0.076	0.0249	19.8	
6 Murieta Gardens (Phase 1)	30.5	0.154	0.0503	71.9	
7 Stonehouse Park (Phase 1)	36.2	0.183	0.0597	0	
8 Escuela Park (Phase 1)	12.07			0	
Phase 1 Alone	102			148	
Total (Phase 1)	652		1.05	529	
% Increase from Current	19		16	39	
9 Village A (Phase 2)	56.5	0.286	0.0931	39.3	94.5
10 Village B (Phase 2)	64.6	0.327	0.1064	39.3	81.7
11 Village C (Phase 2)	49.6	0.251	0.0818	30.6	63.3
12 Village D (Phase 2)	0		0	9.9	107.6
13 Village E (Phase 2)	0		0	10.1	
14 Village F (Phase 2)	0		0	22.3	77.1
15 Village G(Phase 2)	0		0	12.5	182.3
16 Village H (Phase 2)	0		0	28.7	
17 Riverview	0	0.000	0	32.9	57.4
18 Lakeview	0	0.000	0	21.4	41.6
19 Apartments (Phase 2)	23.8	0.120	0.0392	23.3	17.8
20 Residences of Murieta Hills (Phase 2)	73.8	0.373	0.1216	46.6	168.7
21 Industrial/Commercial/Residential (Phase 2)	50.9	0.257	0.0839	37.6	39.5
Phase 2 Alone	319			355	
Total (Phase 2)	971		1.58	883	
% Increase from Current	77		74	132	

Balance of Average Day Demands and Sources

	MGD
WWRP Capacity (Current)	2.3
WWRP Capacity (Phase 1)	3.0
Min. Supplemental Potable Water Requirements (AFY)	
Current	169
Phase 1	124
Phase 2	88
WWRP Capacity Difference after Phase 1	1.95
WWRP Capacity Difference after Phase 2	1.42

Notes

- 1 Current golf course demands and ADWF of 0.34 MGD as described in Retreats West Capacity Certification Letter
 - 2 To be determined; 0.05 MGD ADWF allocation
 - 3 RW Demand obtained from Table 5 of the June 2016 Recycled Water Modeling Study Report
 - 4 RW Demand obtained from Table 5 of the June 2016 Recycled Water Modeling Study Report
 - 5 Values obtained from latest K/J comments on Retreats North and East Sewer Study (July 19, 2016) and Retreats West Capacity Certification Letter
 - 6 Values obtained from May 15, 2016 Murieta Gardens I & II Sewer Study currently under review
 - 7 Value obtained from Table 5 of the June 2016 Recycled Water Modeling Study Report
 - 8 RW obtained from Table 5; Escuela Park does not include any homes and occupies the entire site; wastewater production = 0
-
- 9 Recycled Water Demand derived from Table 5-1 of the Title XVI Recycled Water Feasibility Study and ratio of current (167) to previous (177) future number of residential homes. Wastewater production based on 210 gpd/connection
 - 10 Recycled Water Demand derived from Table 5-1 of the Title XVI Recycled Water Feasibility Study and ratio of current (167) to previous (120) future number of residential homes. Wastewater production based on 210 gpd/connection
 - 11 Recycled Water Demand derived from Table 5-1 of the Title XVI Recycled Water Feasibility Study and ratio of current (130) to previous (110) future number of residential homes. Wastewater production based on 210 gpd/connection
 - 12 N/A
 - 13 N/A
 - 14 N/A
 - 15 N/A
 - 16 N/A
 - 17 RW Demand obtained from Table 5 of the June 2016 Recycled Water Modeling Study Report. Wastewater production value obtained from Table 5
 - 18 RW Demand obtained from Table 5 of the June 2016 Recycled Water Modeling Study Report. Wastewater production value obtained from Table 5
 - 19 Values obtained from Table 5 of the June 2016 Recycled Water Modeling Study Report
 - 20 Values obtained from Table 5 of the June 2016 Recycled Water Modeling Study Report
 - 21 Values obtained from Table 5 of the June 2016 Recycled Water Modeling Study Report

Maximum Month/Day Demands

	MGD	AF/Month		
North&South Golf Courses (Current)	1.852	172.9		
North Main Gate Entrance (Phase 1)	0.009	0.9		
District Office	0.018	1.7		
Retreats (Phase 1)	0.051	4.7		
Murieta Gardens (Phase 1)	0.103	9.6		
Stonehouse Park (Phase 1)	0.122	11.4		
Escuela Park (Phase 1)	0.041	3.8		
Total (Phase 1)	2.20	205.0	6.73848	16 Percent increase over existing GC demands
Village A (Phase 2)	0.190	17.8	204.241	
Village B (Phase 2)	0.217	20.3		
Village C (Phase 2)	0.167	15.6		
Apartments (Phase 2)	0.080	7.5		
Residences of Murieta Hills (Phase 2)	0.248	23.2		
Industrial/Commercial/Residential (Phase 2)	0.171	16.0		
Total (Phase 2)	3.27	305	10.03737	43 Percent increase over existing GC demands
			304.2292	

Maximum Month/Day Sources

	MGD		
WWRP Capacity (Current)	2.3		
WWRP Capacity (Phase 1)	3.0		
Supplemental Potable Water Requirements (MGD)			
Current	0.000		No supplemental water required
Phase 1	0.00	0	Production (2.3 MGD) > Demand (2.2 MGD); no supplemental water required
Phase 2	0.27		Production (3.0 MGD) < Demand (3.27 MGD); supplemental water required -> 230,000 gallons per day or 21.5 AF/month
			430000
			1.319711 30.30966

IRRIGATION DEMANDS AND SOURCES

Sources of Recycled Water

Location	Volume (MG)	Capacity (MGD)		Notes
		8-hr IRR	9-hr IRR	
WWRP - Equalization Basin / North RW Pump Station (Current)	1.8	1,596	1,596	
WWRP - Equalization Basin / North RW Pump Station (Phase 1)	1.8	2,082	2,082	
Lookout Hill Tank (Phase 1)	0.1	104	93	Standards: 50% available for production/meeting IRR demand
Bass Lake Tank (Phase 2)	0.5	521	463	Standards: 50% available for production/meeting IRR demand
Supplemental Potable Water Supply (Phase 1)		898	798	
Golf Course Ponds (reduced rate of RW supply during IRR)				
Bass Lake (Phase 1)	12.1	2,104	1,870	6.2 acres, 6 ft average depth. Capacity based on 6 in draw down (happens to balance with feed rates)
Lakes 10, 11, 16 and 17 (Phase 2)	15.6	1,878	1,669	8.3 acres total, various depths. Capacity based on 4 inch draw down (close to balancing with feed rates)
	Total (Current)	1,596	1,596	
	Total (Future - Phase 1)	5,189	4,843	
	Total (Future - Phase 2)	7,588	6,975	

Peak Demands of Recycled Water

	Volume (gpd)	Demand (gpm)	
		8-hr IRR	9-hr IRR
North Golf Course (Current)	1,010,138	2,104	1,871
South Golf Course (Current)	841,782	1,754	1,559
North Main Gate Entrance (Phase 1)	9,428	20	17
District Office	18,182	38	34
Retreats (Phase 1)	50,844	106	94
Murieta Gardens (Phase 1)	102,697	214	190
Stonehouse Park (Phase 1)	121,890	254	226
Escuela Park (Phase 1)	40,630	85	75
	Total (Phase 1)	4,574	4,066
Village A (Phase 2)	190,296	396	352
Village B (Phase 2)	217,427	453	403
Village C (Phase 2)	167,132	348	310
Apartments (Phase 2)	80,138	167	148
Residences of Murieta Hills (Phase 2)	248,494	518	460
Industrial/Commercial/Residential (Phase 2)	171,387	357	317
	Total (Phase 1 and 2)	6,813	6,056

Kevin Kennedy

From: Paul Siebensohn <psiebensohn@ranchomurieta.csd.com>
Sent: Tuesday, July 19, 2016 3:46 PM
To: Kevin Kennedy
Subject: Pond volumes

fyi..I put this together a while ago for all of our bodies of water.

Name	Surface Area (acres)
1) Calero	110 -114 acres, 2622 acre-feet volume
2) Chesbro	62- 64 acres, 1130.7 acre-feet
3) Clementia	71-76 acres, 907.1 acre-feet
4) Laguna Joaquin	21.53 – 24.07 acres, 122 acre-feet
5) Basin 5	1.3 acres at 16.5 foot average depth
6) Guadalupe	1.3 acres
7) Bass Lake	6.2 acres, 6 foot average depth
8) Hole 10 North Pond	1.0 acres, 4 foot average depth
9) 6B Basin	0.2 acres, 4.6 foot average depth
10) South Hole 10 Pond	1.4 acres, 5 feet average depth
11) South Hole 11 Pond	6.3, 5.5 foot average depth
12) South Hole 6 North Pond	0.4 and 0.28 acres
13) South Hole 16 Pond	0.34 acres, >10 foot depth
14) South Hole 17 Pond	0.27 acres, >10 foot depth
15) North Hole 2 Pond	0.34 acres, 3.4 foot average depth

area, acres	ave depth,	vol, AF	vol, MG
6.2	6	37.2	12.1
1.4	5	7	2.3
6.3	5.5	34.65	11.3
0.34	10	3.4	1.1
0.27	10	2.7	0.9
8.3			15.6

Paul Siebensohn
 Director of Field Operations
 Rancho Murieta CSD
 ph. (916)354-3700

Obtained from Recycled Water Feasibility Study (HDR, June 2009) Figure 3

	Monthly AF Demand	% of Total Demand	AF/Mnth	# days/Mnth	MGD
15-Jan	0	0.0	0.0	31	0
14-Feb	0	0.0	0.0	28	0
15-Mar	2.5	1.8	15.3	31	0.160641
15-Apr	5	3.5	30.6	30	0.331991
15-May	15	10.6	91.7	31	0.963845
15-Jun	23	16.3	140.6	30	1.527159
15-Jul	27.5	19.5	168.1	31	1.767049
14-Aug	28	19.9	171.2	31	1.799177
14-Sep	20	14.2	122.3	30	1.327964
14-Oct	12.5	8.9	76.4	31	0.803204
14-Nov	7.5	5.3	45.9	30	0.497987
14-Dec	0	0.0	0.0	31	0
	141	100	862	365	



Rancho Murieta
Community Services District

