



*Rancho Murieta*  
*Community Services District*

# Recycled Water Program

## Preliminary Design Report

January 30, 2017 Workshop



# Topics of Discussion (Recycled Water)

- Purpose and Status
- Development and Timelines
- Production and Demand Projections
- Conveyance Systems and Use Areas
- Recommendations, Schedule and Costs
- Questions, Answers and Discussion
- Next Steps

# Purpose and Status

*Describe Phase 1 and Buildout of 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.*

- Draft Report: Review and comment
- Board Approval: February or March, 2017

# Proposed Developments and Timelines

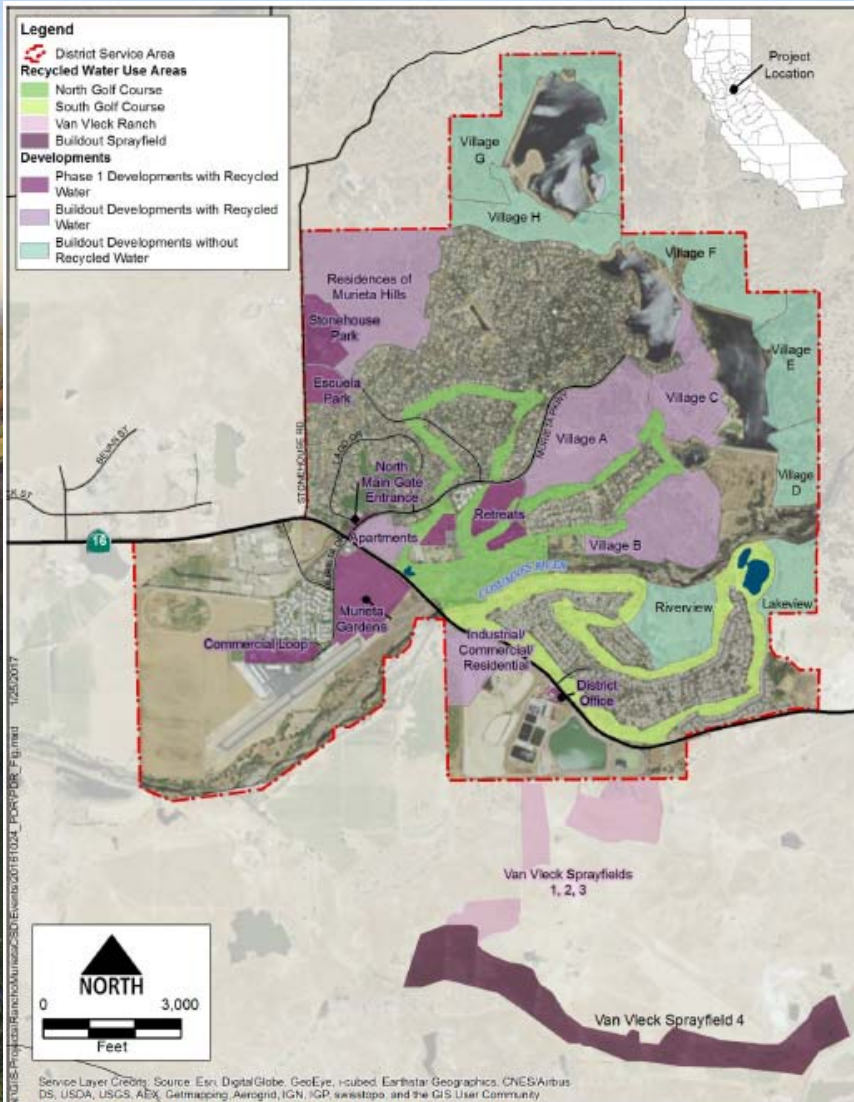


Figure 1. Proposed Phase 1 and Buildout Developments

Table 2. Summary of Future Development Timelines<sup>10</sup>

Development and Phase <sup>1</sup>	Percent of Future Homes Occupied (%) <sup>1</sup>						
	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							

<sup>1</sup>Values 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.

## Timeline Data Sources

- Sewer Studies & Responses (*thru 2016*)
  - The Retreats
  - Retreats
  - *Murieta Gardens*
  - Rancho Murieta North
- Discussions with Developer's Engineer
- Water Supply Assessment
- Title XVI Report

# Proposed Developments and Use Areas

*Table 1. Proposed Developments and Recycled Water Use Areas*

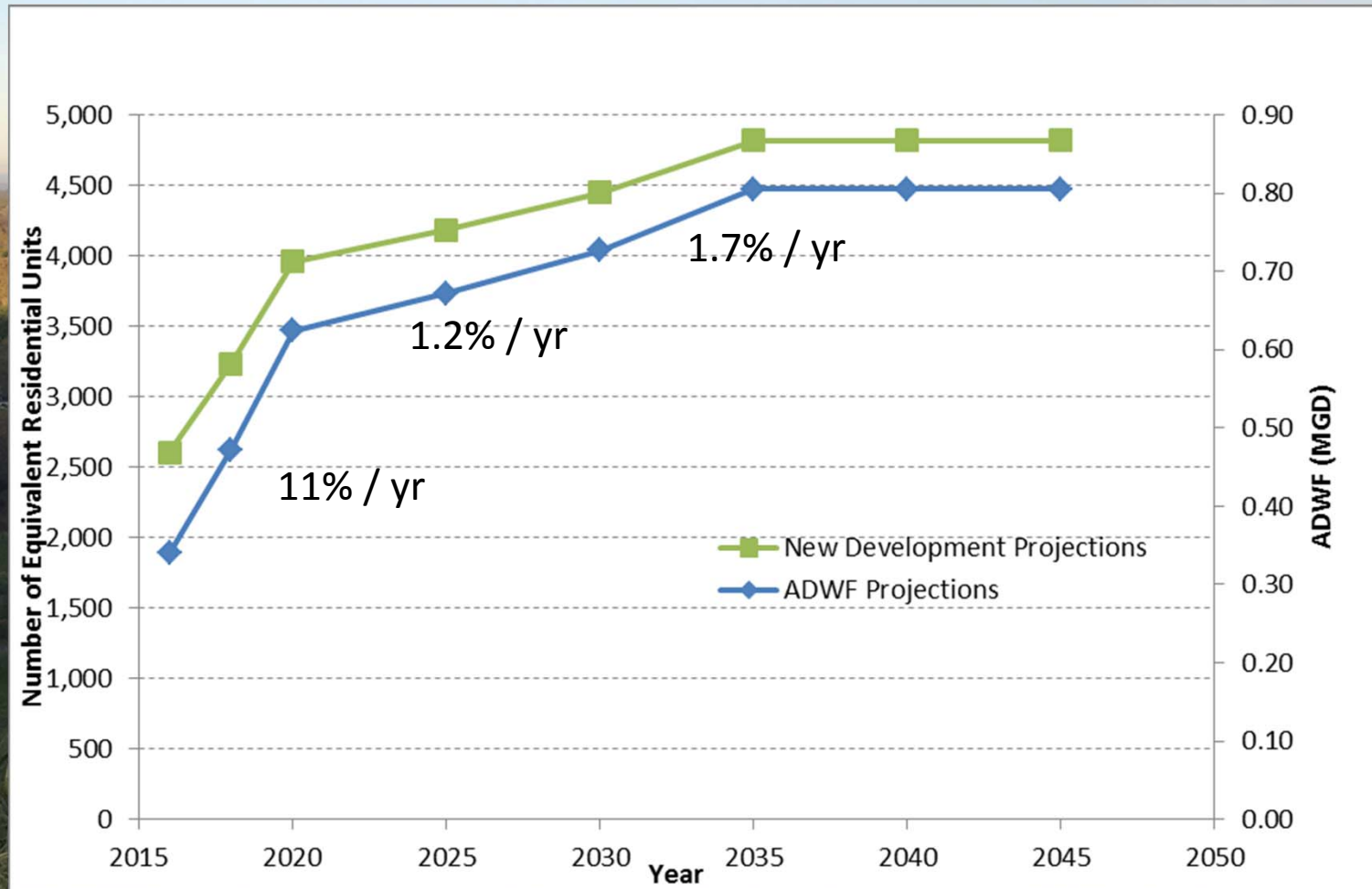
Phase	Proposed Developments	Proposed Recycled Water Use Areas
Phase 1	Murieta Gardens Retreats (North, West and East)	Murieta Gardens <sup>a</sup> [U, R] Retreats <sup>a</sup> (North, West and East) [U] Stonehouse Park <sup>b</sup> (existing) [U] Escuela Park <sup>b</sup> (existing) [U] Main Northgate <sup>b</sup> (existing) [U] District Office <sup>b</sup> (existing) [U] Commercial Loop <sup>c</sup>
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 <sup>a</sup> [U,R] Apartments <sup>a</sup> [U] Industrial/Commercial/Residential <sup>a</sup> [U,R] Village A <sup>a</sup> [R] Village B <sup>a</sup> [R] Village C <sup>a</sup> [R]

(U) = Future recycled water irrigation of existing parks, common areas and other landscaping

(R) = Future recycled water front and backyard irrigation of residential developments

# Development and ADWF Projections

Figure 2



# Recycled Water Production and Demand Projections

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)
<b>Existing Recycled Water Use Areas</b>			
<b>Existing Development</b>			
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	
<b>Sub Total</b>		<b>550* / 765**</b>	<b>380</b>
<b>Phase 1 Proposed Expanded Recycled Water Use Areas (~2016-2020)</b>			
Infill	0.05 MGD allocation assumed	0	56.0
Main Northgate	Conversion to recycled water	2.8	0.0
District Office <sup>a</sup>	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
Commercial Loop (to be developed)	<i>Potential conversion to recycled water; could be 20 to 30 AFY demand; require coordination with Owner to proceed</i>		
<b>Phase 1 Sub Total</b>		<b>102</b>	<b>148</b>
<b>Sub Total</b>		<b>650* / 865**</b>	<b>530</b>
<b>Phase 2 Proposed Expanded Recycled Water Use Areas (~2020-2025)</b>			
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	
<b>Phase 2 Sub Total</b>		<b>320* / 730**</b>	<b>355</b>
<b>Grand Total</b>		<b>970* / 1,595**</b>	<b>885</b>
* Beneficial reuse			
** Beneficial reuse plus Van Vleck sprayfield disposal demands			

Current Capacity: 3,265 ERUs

Existing 2,604 ERUs

Development (Sewer Studies)

Murieta Gardens

Residential 78 ERUs

Commercial 227 ERUs

Retreats 84 ERUs

Subtotal 389 ERUs

Remaining 272 ERUs

Infill (PDR assumption) 238 ERUs

(0.05 MGD)

# Production and Demand Projections

## Sources of Data:

- Sewer Studies & Responses (thru 2016)
  - The Retreats
  - Retreats
  - Murieta Gardens
  - Rancho Murieta North
- Discussions with Developer's Engineer
- Title XVI Report



Figure 6.

**SEWER STUDY FOR MURIETA GARDENS I & II**

**SEWER STUDY FOR The Retreats North & East**

**SEWER STUDY FOR THE RETREATS WEST**

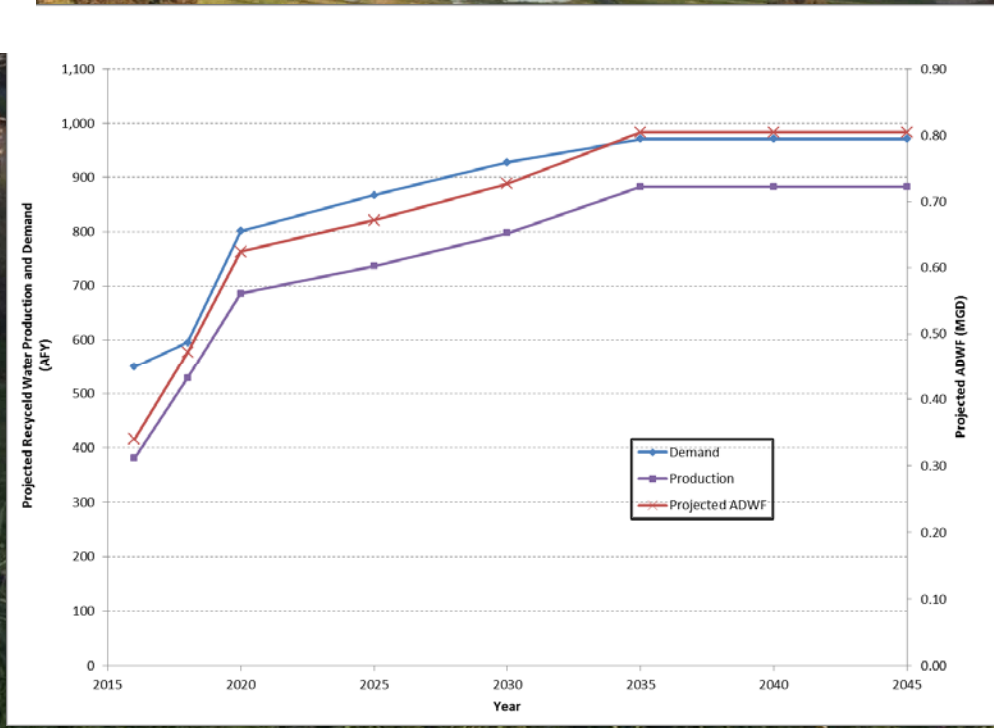
**PRELIMINARY SEWER STUDY FOR RANCHO MURIETA NORTH**

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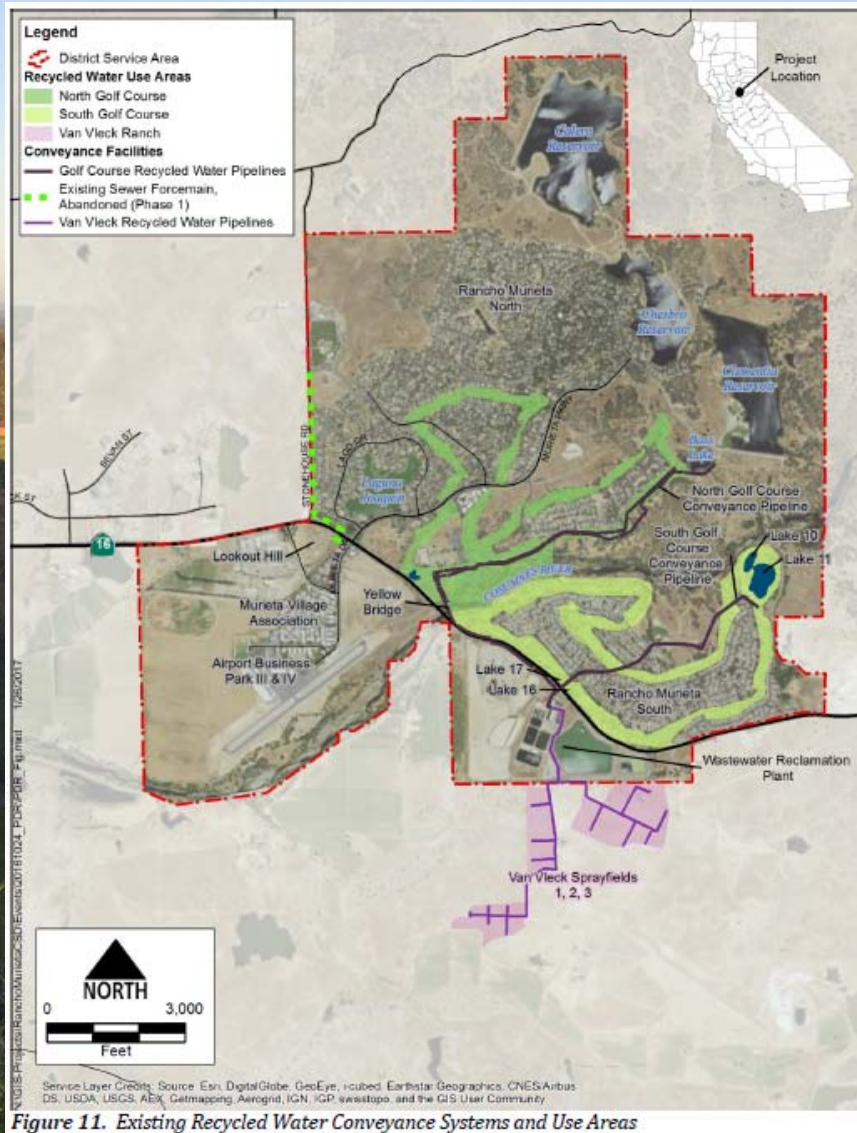
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# Existing Recycled Water Conveyance Systems and Use Areas



**Table 6. Recycled Water Conveyance System Roles and Responsibilities<sup>a</sup>**

System and Facility	Ownership and O&M Costs		
	District	RMPI <sup>b</sup>	RMCC
Equalization Basin	X		
<b>South Golf Course</b>			
Equalization Basin – Lakes 16 & 17 Pipeline	c		c
Lake 16 & 17 – Lake 10 & 11 Pipeline		D	d
<b>North Golf Course</b>			
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

<sup>a</sup> 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)

<sup>b</sup> Rancho Murieta Properties, Inc. (RMPI) was the original owner, current owner is Rancho North Properties, LLC.

<sup>c</sup> RMCCSD to own, operate and maintain; operation and maintenance costs to be split 50/50 between RMCCSD and RMCC.

<sup>d</sup> RMPI to own, RMCC to operate and maintain; operation and maintenance costs to be split 50/50 between RMPI and RMCC.

<sup>e</sup> RMPI to own, RMCC to operate and maintain.

Condition Assessment: *High Risk*

Other Concerns: Location or condition unknown, potential change in ownership

Impacts rehabilitation strategy for existing 12-inch sewer force main

# Hydraulic Modeling (Buildout Only)

Condition Assessment; Not PDR

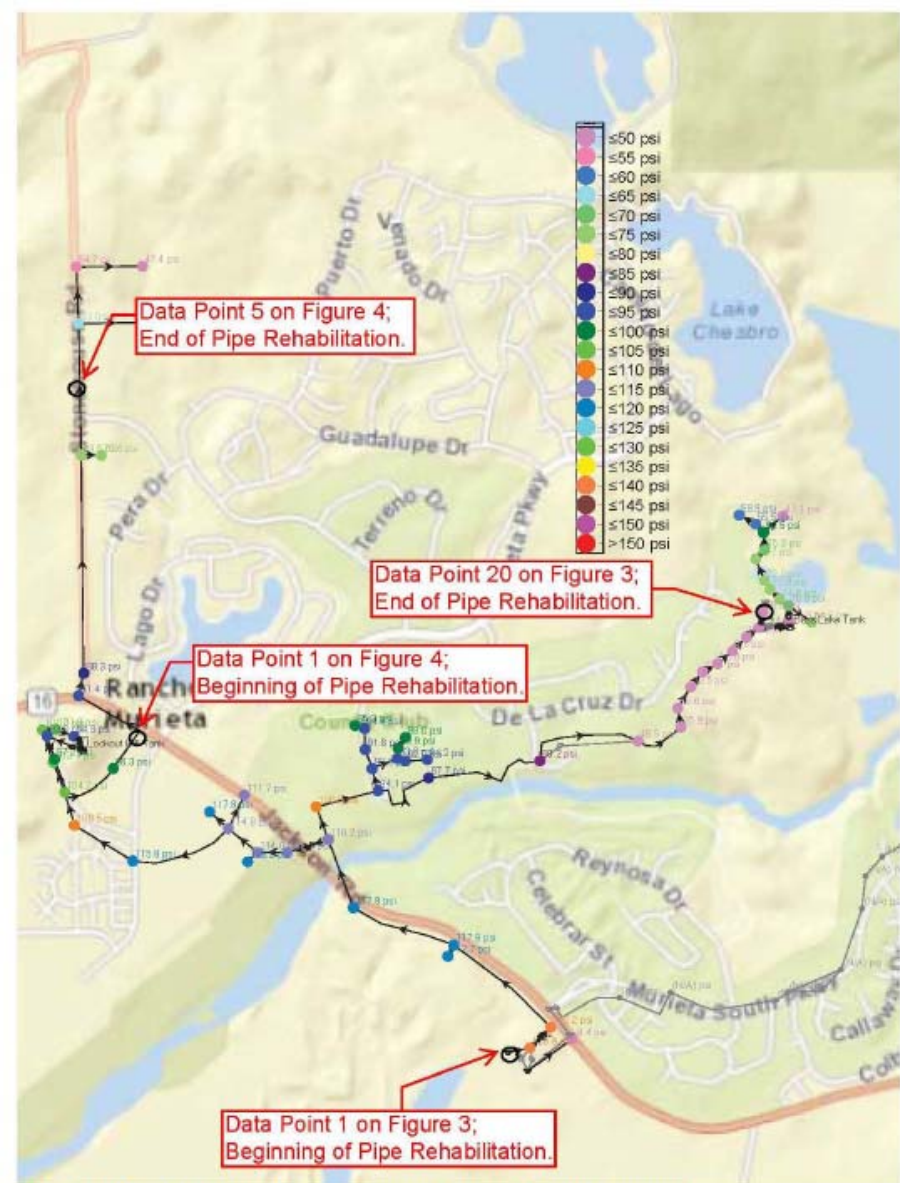
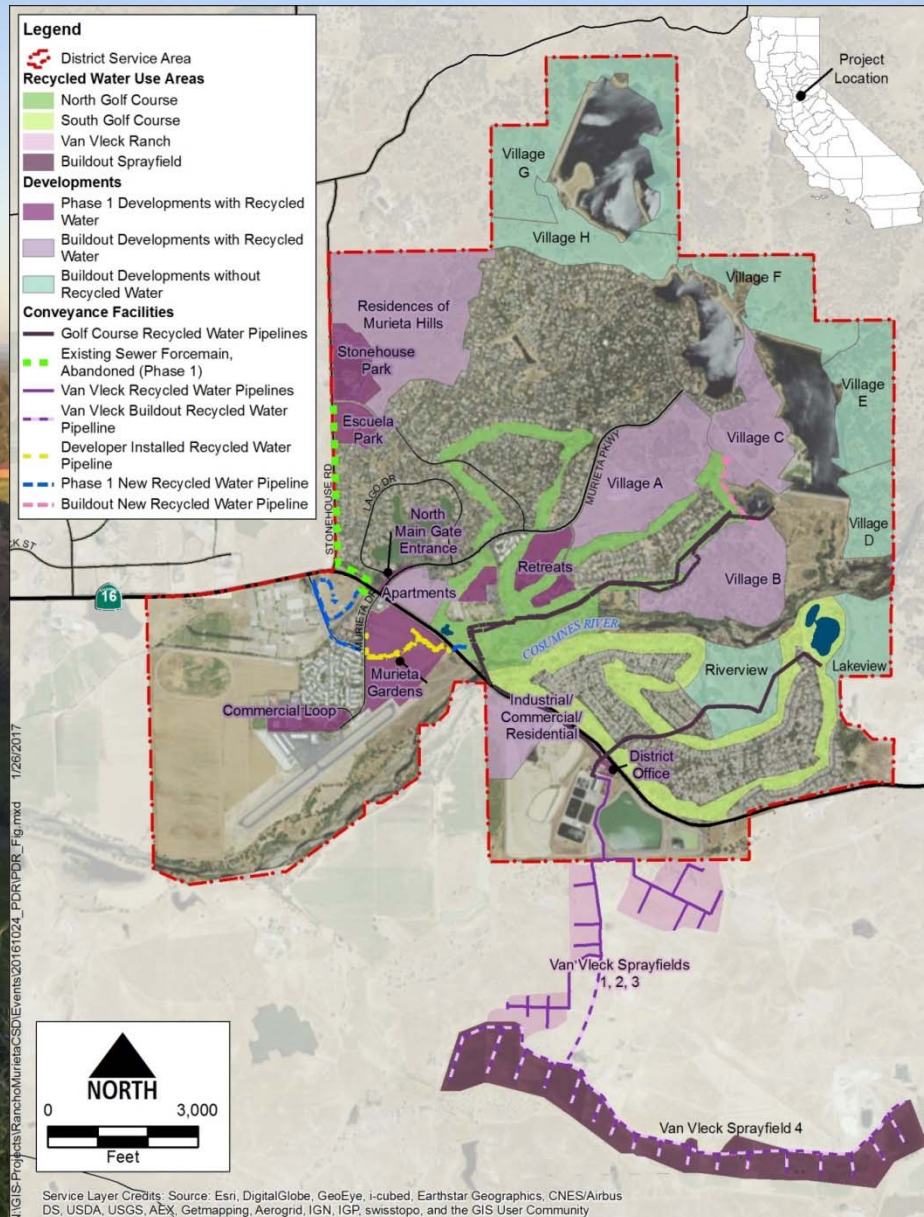


Figure 1. Proposed Buildout Recycled Water System and Estimated Pressures

Impacts both condition assessment & PDR

*Next Steps (Separate from PDR):* Expand model capabilities, optimize system, surge & detail design

# Recycled Water Conveyance Future



## Use of System (limitations)

- Separate timeframes for golf course supply and U & R irrigation
- Dictates max operating pressures & flow
- Requires additional supplies (storage tanks) and controls
- Unknown condition, location & potential change in ownership

*Next Step: Phase 2 condition assessment*

# Recommended Improvements – Phase 1

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

Process / Element	Criteria / Feature
<b>1. Recycled Water SCADA Control System</b>	
Number of SCADA Terminals	1
Location	WWRP
Type	Programmable Logic Controller (PLC) Remote Terminal Units
Lookout Hill Control Valves	
Communication	Radio*
Control	Pressure
<b>2. Equalization Basin Potable Water Air Gap Connection</b>	
Flow Rate (maximum)	900 gpm
Diameter	8-inch
Material	Ductile Iron
Air Gap (90° Bend)	16 inches per RW-17
<b>3. Rehabilitate Existing Recycled Water Pumping Station</b>	
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
<b>4. District Headquarters Conversion - Recycled Water Irrigation System Connection</b>	
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
<b>5. Northwest Recycled Water Transmission Main</b>	
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
<b>6. Lookout Hill Booster Pumping Station</b>	
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
<b>7. Escuela Park Conversion - Recycled Water Irrigation System Connection</b>	
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
<b>8. Stonehouse Park Conversion - Recycled Water Irrigation System Connection</b>	
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
<b>9. Lookout Hill Recycled Water Storage Tank</b>	
Number of Tanks	1
Diameter	40
Height (maximum at sidewall)	26
Volume (nominal)	200,000 gallons
Materials of Constructed	Bolted Steel
<b>10. North Maingate Conversion - Recycled Water Irrigation System Connection</b>	
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

# Recommended Improvements – Phase 1



Figure 12. Proposed Phase 1 WWRP Improvements

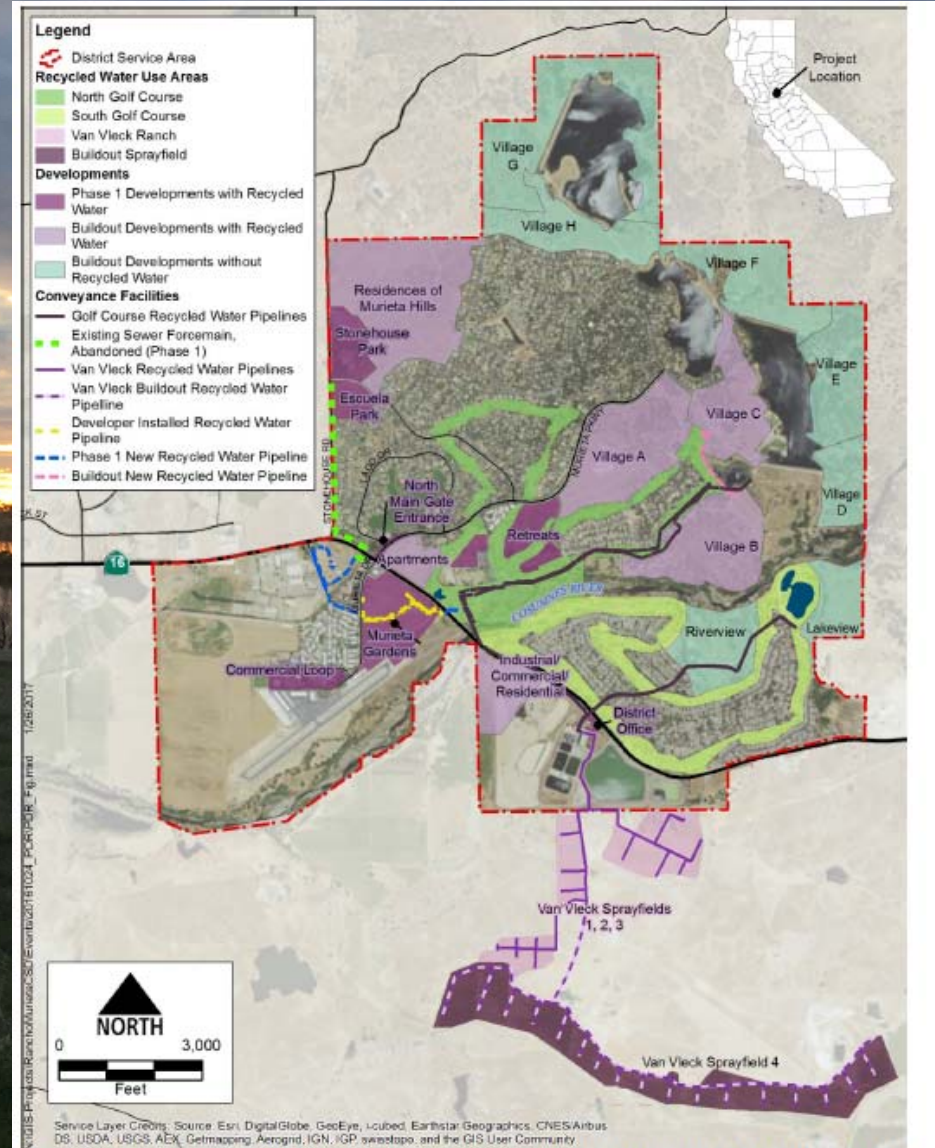
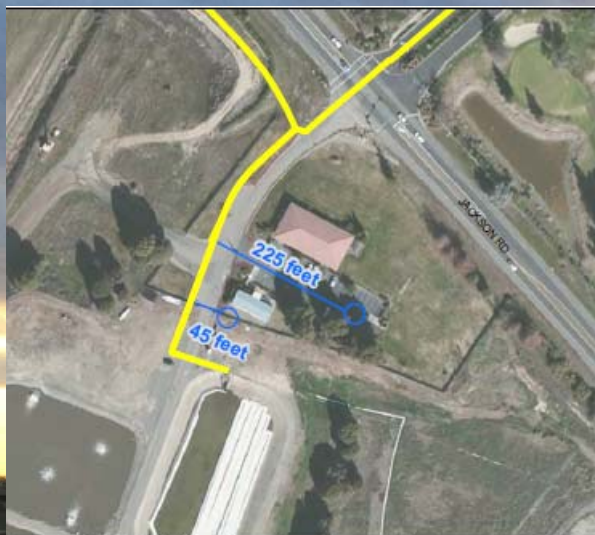


Figure 15. Recommended Phase 1 and Buildout Recycled Water Conveyance System Improvements

# Conversions from Potable to Recycled Water

Figure 14



Proposed District Headquarters Conversion



Proposed Stonehouse and Escuela Park Conversions



Proposed North Main Gate Conversion

# Recommended Improvements – Buildout

**Table 11. Recommended Buildout Recycled Water Improvements Features and Components**

Process / Element	Criteria / Feature
<b>A. Disinfection Facilities Upgrade</b>	
Existing Contact Basin Modal Contact Time	27 minutes at 3.0 MGD <sup>1</sup>
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>B. North Golf Course Conveyance System Rehabilitation</b>	
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
<b>C. Bass Lake Recycled Water Storage Tank</b>	
Number of Tanks	1
Diameter	70
Height (maximum at sidewall)	22
Volume (nominal)	500,000 gallons
Materials of Constructed	Bolted Steel
<b>D. Bass Lake Booster Pumping Station</b>	
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
<b>E. Seasonal Storage Reservoir</b>	
Existing Storage Capacity	728.2 AF
Required Storage Capacity (Buildout)	765 AF
Incremental Capacity Upgrade	40 AF
<b>F. Van Vleck Sprayfield No. 4</b>	
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
<b>G. Dissolved Air Flotation Feed Pump Improvements</b>	
Replacement of 3 <sup>rd</sup> Feed Pump	\$100,000 Allocation

<sup>1</sup> See Figure 1-3 of WWRP Modified Chlorine Contact Disinfection System Compliance Report (HSE, July 2006). Equivalent volume of 56,250 gallons





# Estimated of Probable Construction Costs

*Table 15. Recommended Recycled Water Improvements and Estimated Costs*

No.	Improvement	Estimated Cost (\$) <sup>a</sup>
<b>Phase 1 Recycled Water Improvements</b>		
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)		<b>4,060,000</b>
12	Soft Costs - 32.5% (Admin., Reg., Eng., Construct Man.)	1,319,500
Phase 1 Total (Project Cost)		<b>5,380,000<sup>b</sup></b>
<b>Buildout Recycled Water Improvements</b>		
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)		<b>6,030,000<sup>c</sup></b>
21	Soft Costs - 32.5% (Admin., Reg., Eng., Construct Man.)	1,960,000
Buildout Total (Project Cost)		<b>7,990,000</b>
<b>Phase 1 and Buildout Recycled Water Improvements</b>		
Grand Total (Phase 1 and Buildout)		<b>13,400,000<sup>d</sup></b>
Estimated Number of New Equivalent Residential Units		2,213
Estimated Cost per Connection (\$/ERU)		<b>\$6,055</b>

Phase 1 (\$M):

Construction: 4.06

Project: 5.38

Buildout (\$M)

Construction: 6.03

Project: 7.99

Total Combined (\$M): 13.40

Future ERUs: 2,213

Est. Cost per ERU: \$6,055

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

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

<sup>c</sup> Compared to \$15,055,000 as described previously in the District's Title XVI Recycled Water Feasibility Study

<sup>d</sup> Compared to \$25,070,000 as described previously in the District's Title XVI Recycled Water Feasibility Study

## Recommended Next Steps

Obtain Board feedback and adoption  
(February / March, 2017)

Input regarding the following next:

- Phase 2 condition assessment
- Hydraulic modeling
- Environmental review and detailed design timeline

# Questions, Answers and Discussion

- Comments due?

# Commercial Loop



- Approx. 9 acres total
- Min. 2 connections required
  - OE3 7.8 ac along Cantova Way
  - 1 ac Plaza Shopping Center
- 26 AFY demand in 2013

*Recommended Next Step:* Discuss with Owner, obtain and review as-builts; field verify. Assess cost effectiveness

# Proposed System Controls & Time of Use

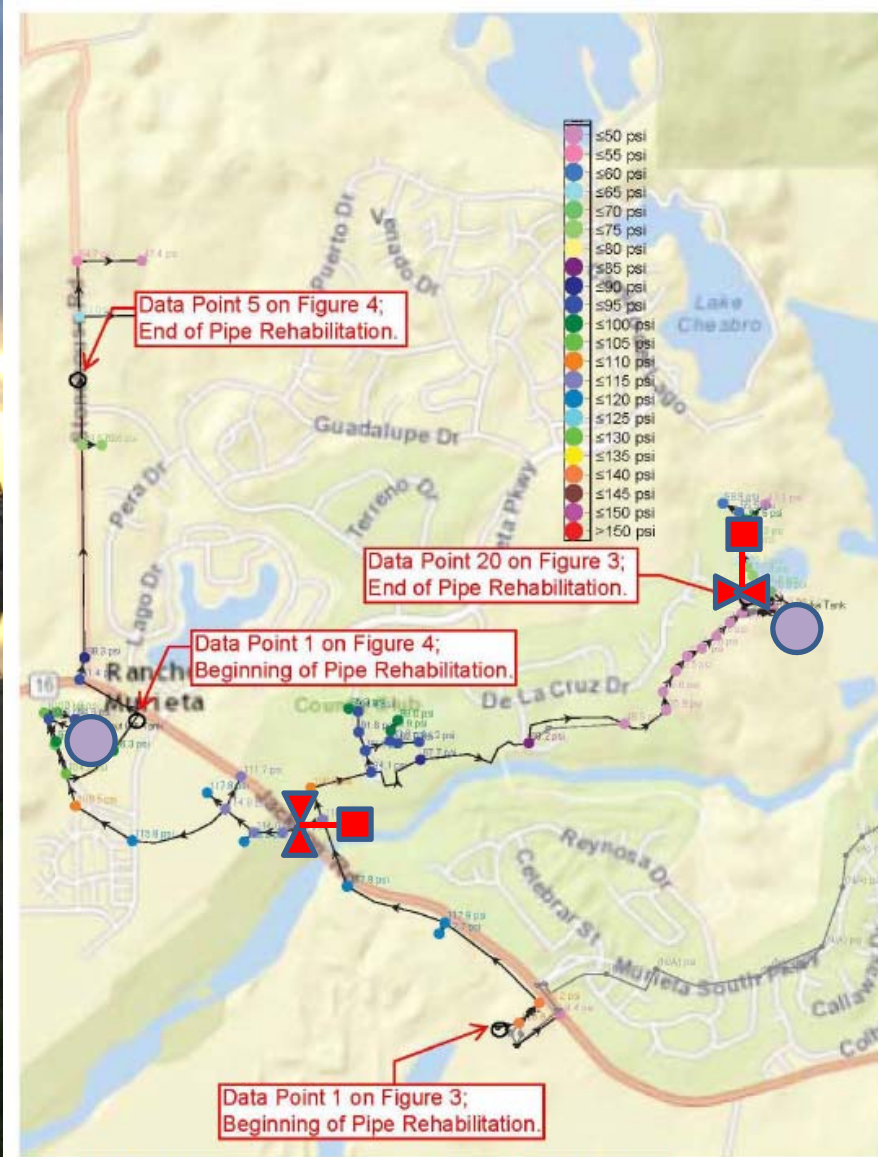


Figure 1. Proposed Buildout Recycled Water System and Estimated Pressures

# Sewer Studies

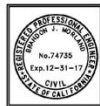
– Preliminary Sewer Study for Rancho Murieta North –

PRELIMINARY SEWER STUDY  
FOR  
RANCHO MURIETA NORTH  
Ranch Murieta- County of Sacramento,  
California

March 31, 2016



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Baker-Williams Engineering Group

## SEWER STUDY

FOR  
MURIETA GARDENS I & II

IN

Rancho Murieta  
County of Sacramento,  
California

May 15, 2016

## SEWER STUDY

FOR

The Retreats North & East

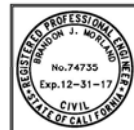
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## SEWER STUDY

FOR  
THE RETREATS WEST

IN

Rancho Murieta  
County of Sacramento,  
California

May 3, 2016

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