

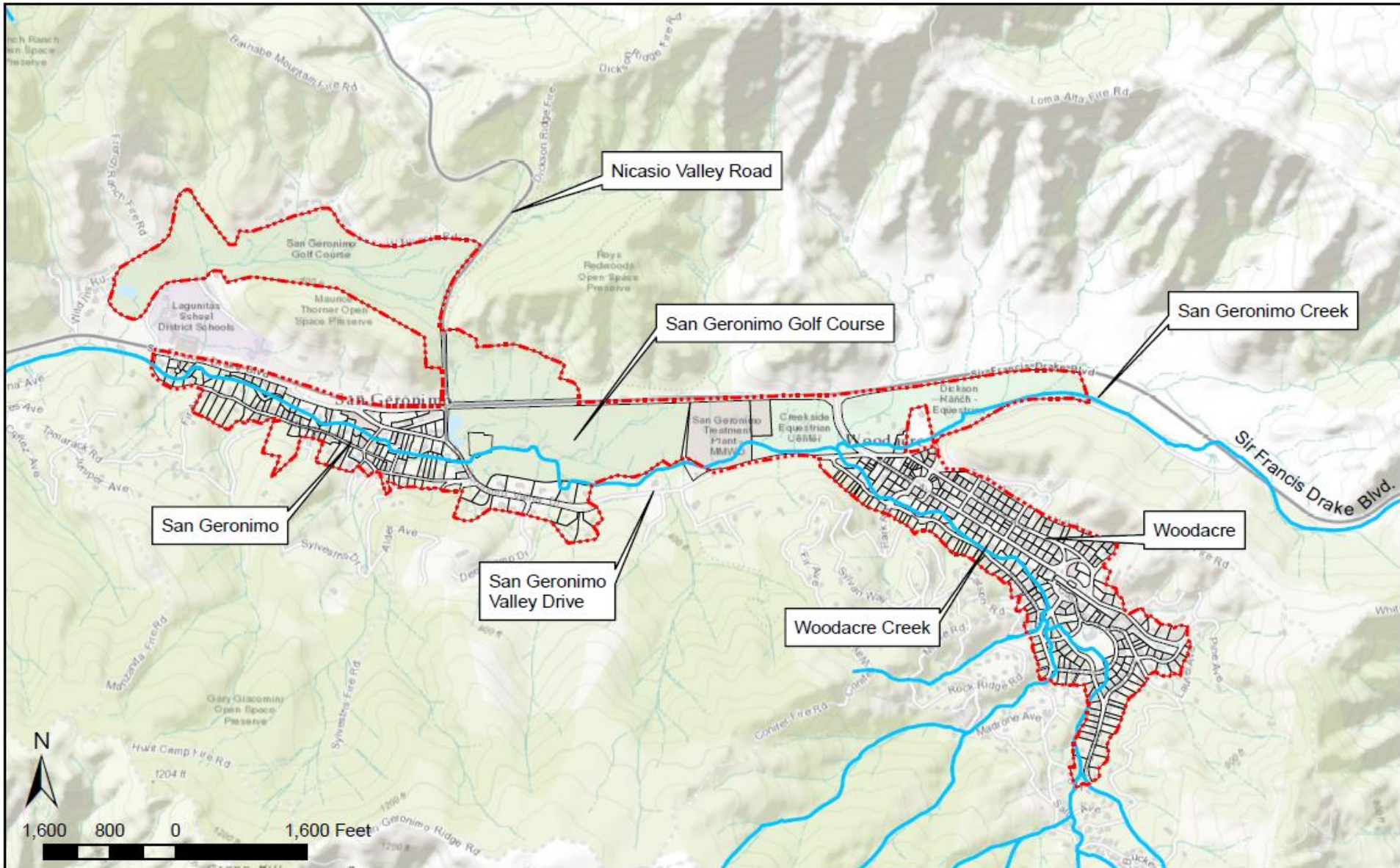
**Final Project Report (Draft)**

**Woodacre – San Geronimo  
Wastewater Recycling  
Study**

**February 19, 2019**

# Report Contents

1. Introduction and Project Background
2. Study Area Conditions
3. Existing Wastewater Disposal Practices
4. Service Area Characteristics
5. Regulatory Requirements
6. Project Alternatives
7. Comparative Analysis of Alternatives
8. Recommended Facilities and Project Plan



DATE:	12/12/2016
PROJECT:	WOODACRE WW
PROJECT NO.:	1600073
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**STUDY AREA**

**FIGURE  
2-1**

# Project Alternatives

## **Non-Water Recycling Alternatives**

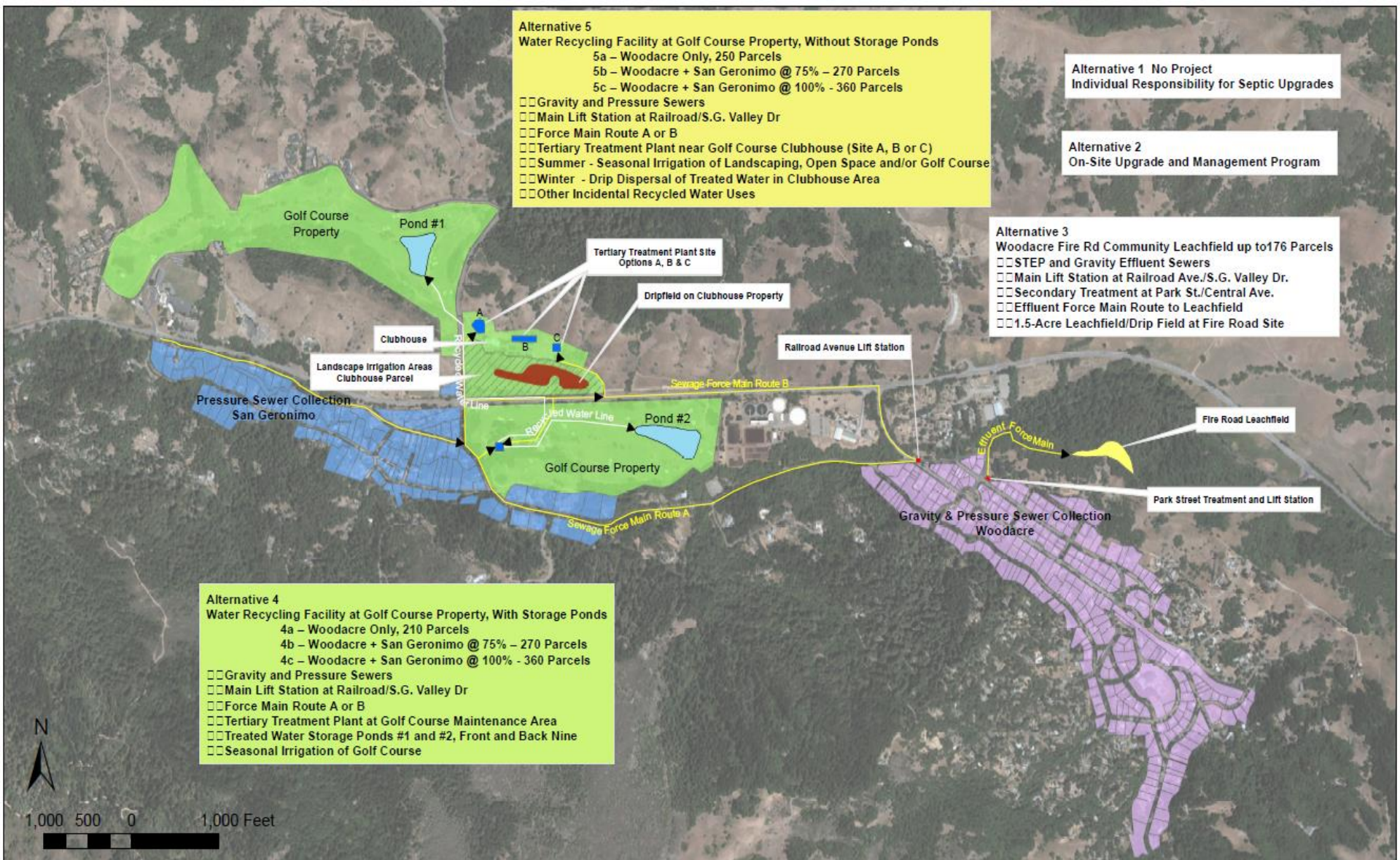
1. No Project – Status Quo
2. Onsite Upgrades and Management Program
3. Woodacre Community Leachfield – Fire Road

## **4. Water Recycling, With Holding Ponds**

- 4a Woodacre Only (210 parcels)
- 4b. 75% Woodacre & San Geronimo (270 parcels)
- 4c. 100% Woodacre & San Geronimo (360 parcels)

## **5. Water Recycling, Without Holding Ponds**

- 5a. Woodacre Only (250 parcels)
- 5b. 75% Woodacre & San Geronimo (270 parcels)
- 5c. 100% Woodacre & San Geronimo (360 parcels)



**Alternative 5**  
 Water Recycling Facility at Golf Course Property, Without Storage Ponds  
 5a – Woodacre Only, 250 Parcels  
 5b – Woodacre + San Geronimo @ 75% – 270 Parcels  
 5c – Woodacre + San Geronimo @ 100% - 360 Parcels

- Gravity and Pressure Sewers
- Main Lift Station at Railroad/S.G. Valley Dr
- Force Main Route A or B
- Tertiary Treatment Plant near Golf Course Clubhouse (Site A, B or C)
- Summer - Seasonal Irrigation of Landscaping, Open Space and/or Golf Course
- Winter - Drip Dispersal of Treated Water in Clubhouse Area
- Other Incidental Recycled Water Uses

**Alternative 1** No Project  
 Individual Responsibility for Septic Upgrades

**Alternative 2**  
 On-Site Upgrade and Management Program

**Alternative 3**  
 Woodacre Fire Rd Community Leachfield up to 176 Parcels

- STEP and Gravity Effluent Sewers
- Main Lift Station at Railroad Ave./S.G. Valley Dr.
- Secondary Treatment at Park St./Central Ave.
- Effluent Force Main Route to Leachfield
- 1.5-Acre Leachfield/Drip Field at Fire Road Site

**Alternative 4**  
 Water Recycling Facility at Golf Course Property, With Storage Ponds  
 4a – Woodacre Only, 210 Parcels  
 4b – Woodacre + San Geronimo @ 75% – 270 Parcels  
 4c – Woodacre + San Geronimo @ 100% - 360 Parcels

- Gravity and Pressure Sewers
- Main Lift Station at Railroad/S.G. Valley Dr
- Force Main Route A or B
- Tertiary Treatment Plant at Golf Course Maintenance Area
- Treated Water Storage Ponds #1 and #2, Front and Back Nine
- Seasonal Irrigation of Golf Course

# Project Alternatives

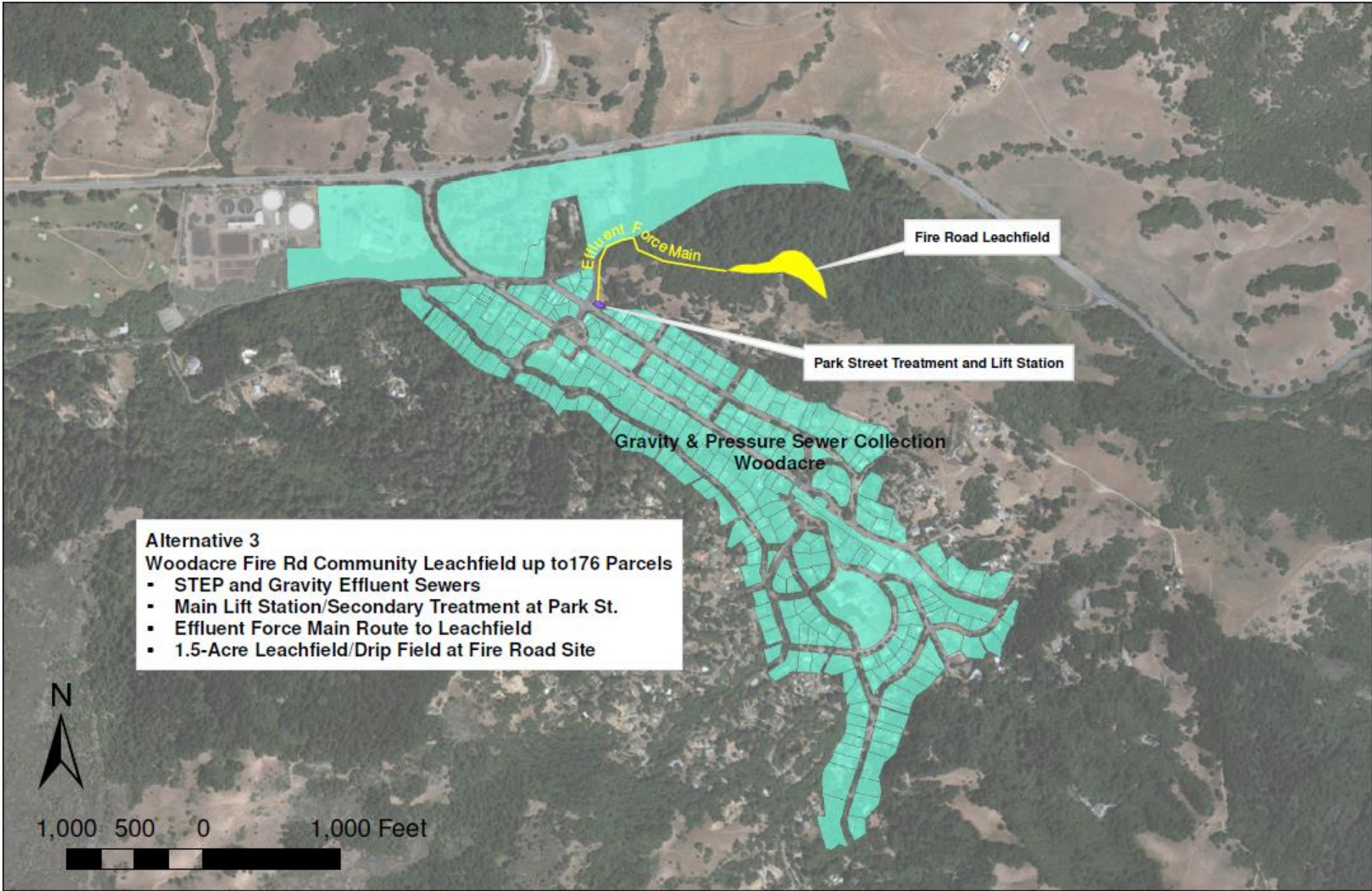
# Key Regulatory Requirements

## **Onsite Wastewater Systems & Community LF**

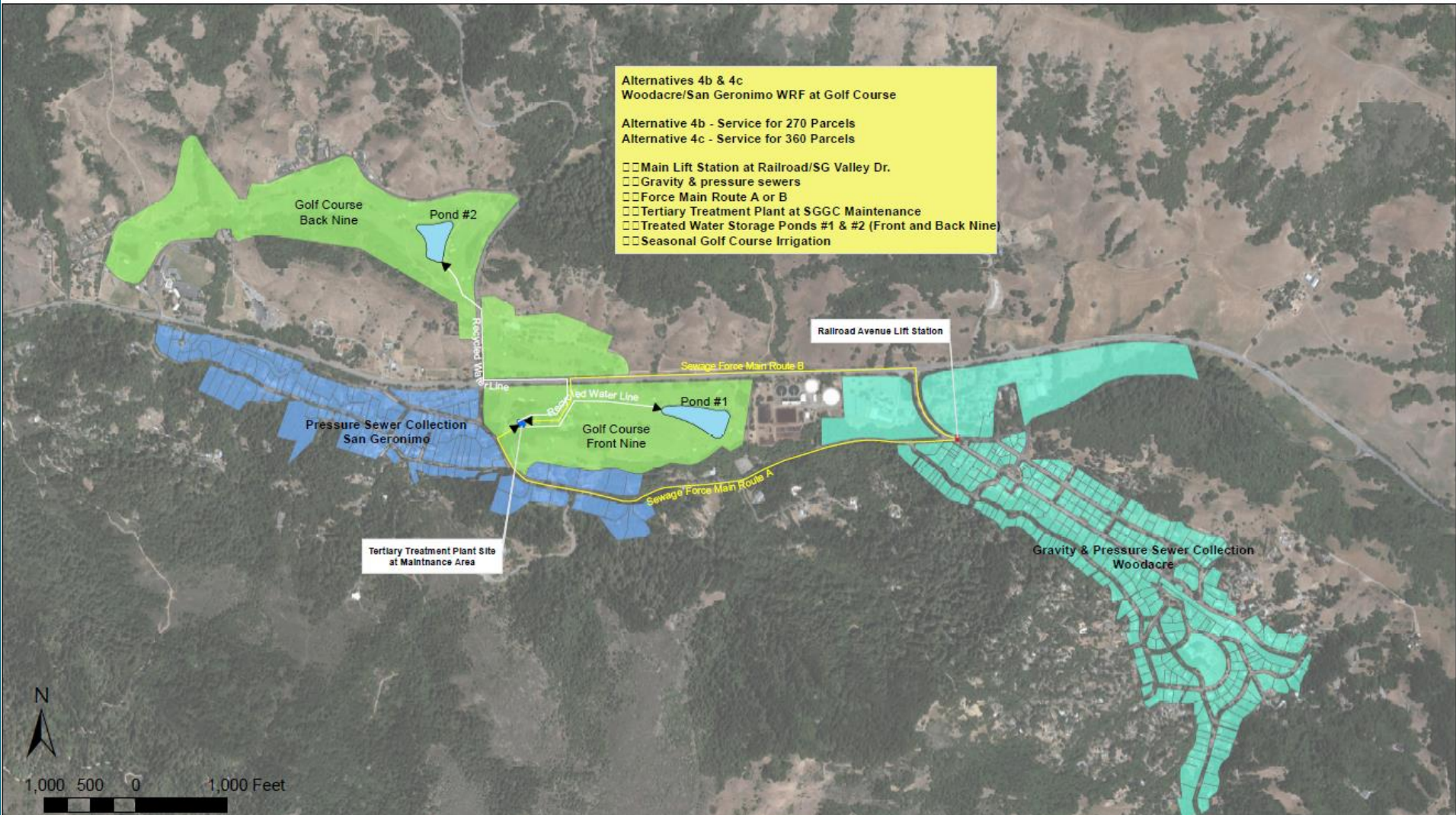
- Marin County Onsite System Regulations, Repair Standards & Remodel Policy
- Advanced Protection Management Program - Tomales Bay and Lagunitas Creek impairments for pathogens and nutrients

## **Water Recycling – Title 22 Code of Regulations**

- Tertiary treatment – filtration & disinfection
- System redundancies, reliability and oversight
- 100-yr wet season storage capacity for ponds
- 100% sub-surface dispersal for non-irrigation periods
- Use area restrictions, setbacks and monitoring



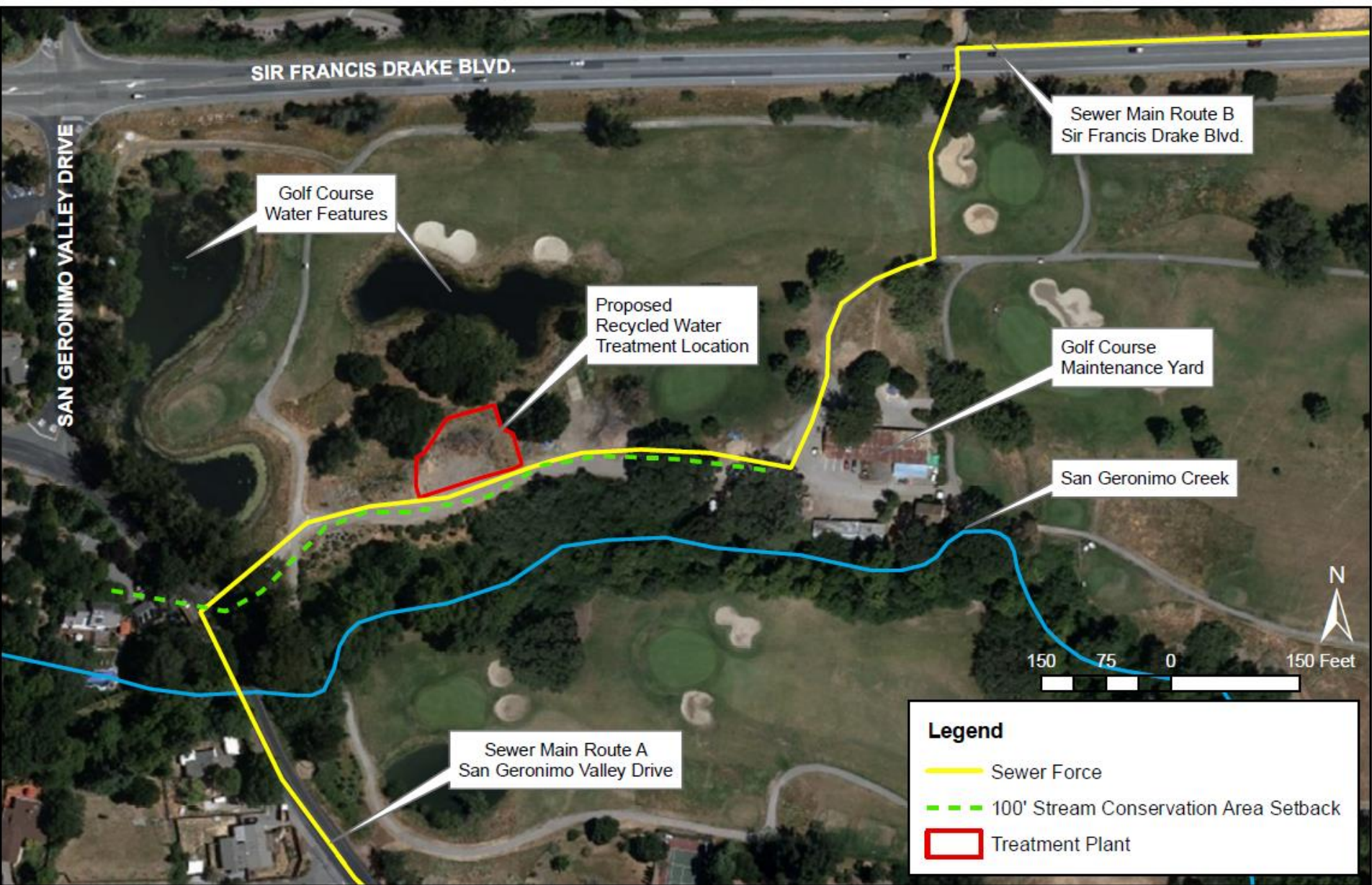
# Project Alternative 3 – Fire Road



# Water Recycling with Holding Ponds

## Alternatives 4a, b, c





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**RECYCLED WATER TREATMENT LOCATION**

**FIGURE 6-6**

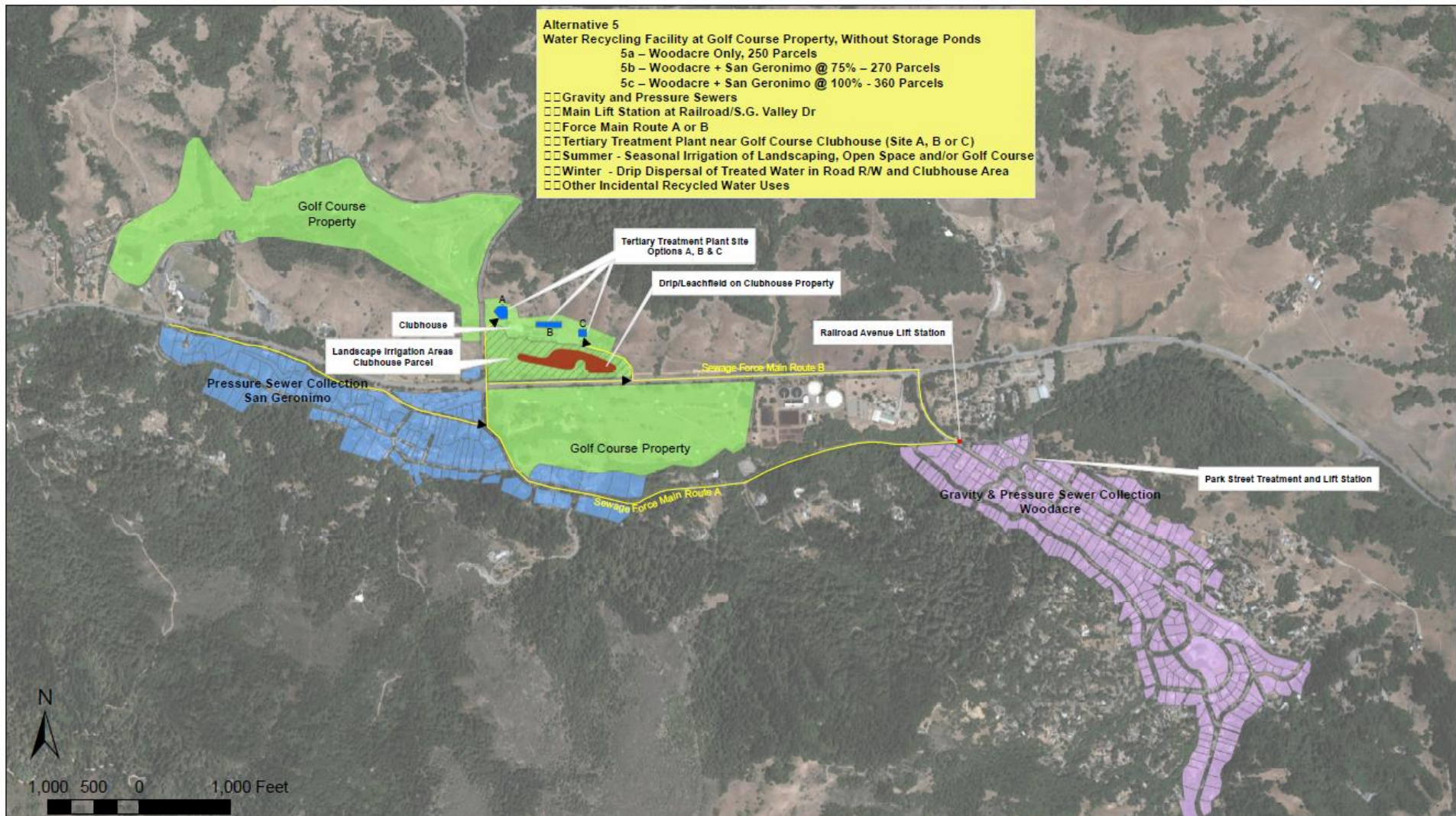


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**TERTIARY TREATMENT FACILITY PLAN**

**FIGURE 8-5**



# Water Recycling without Holding Ponds Alternatives 5a, b, c

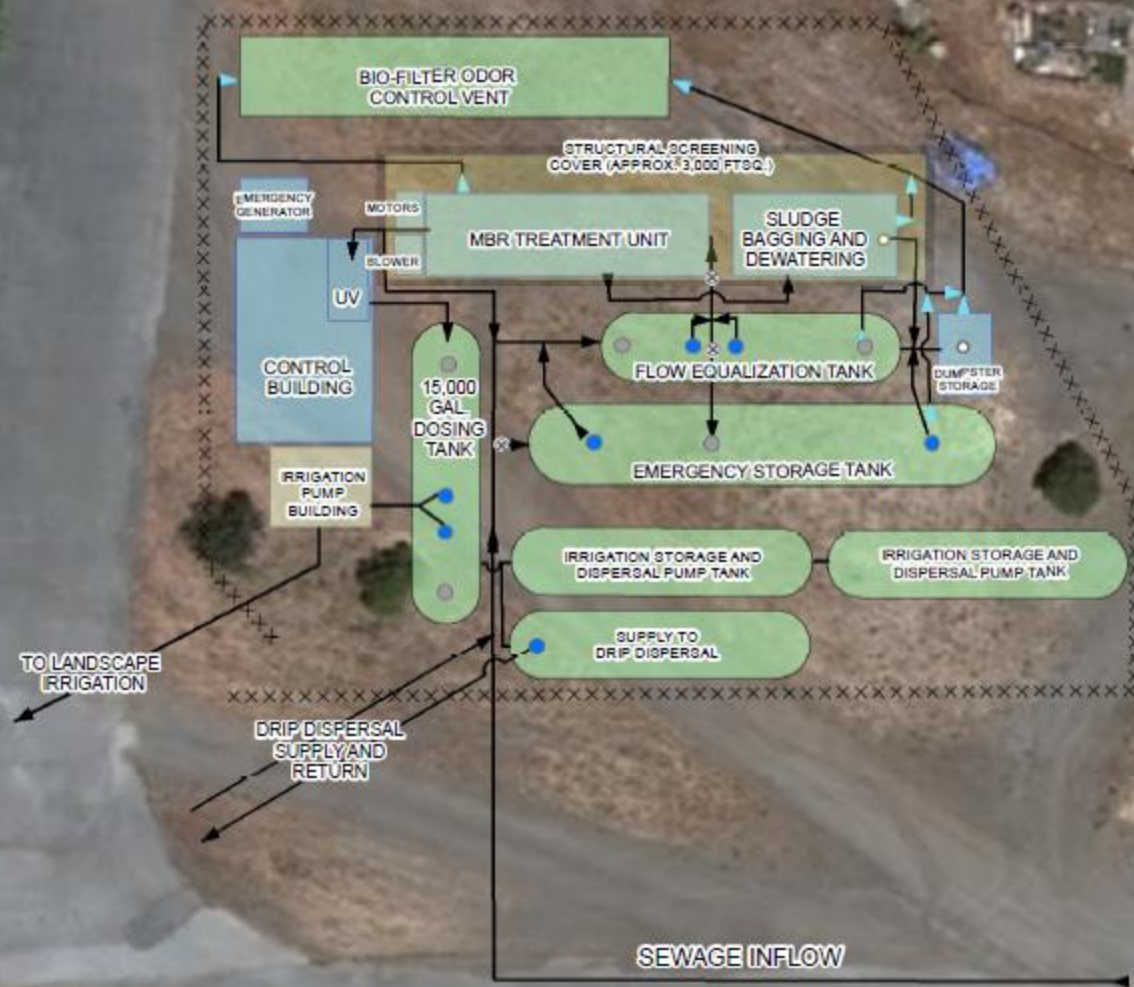


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 PROJECT: WOODACRE WW  
 PROJECT NO: 1600073  
 DRAWN: MF  
 APPROVED: NH

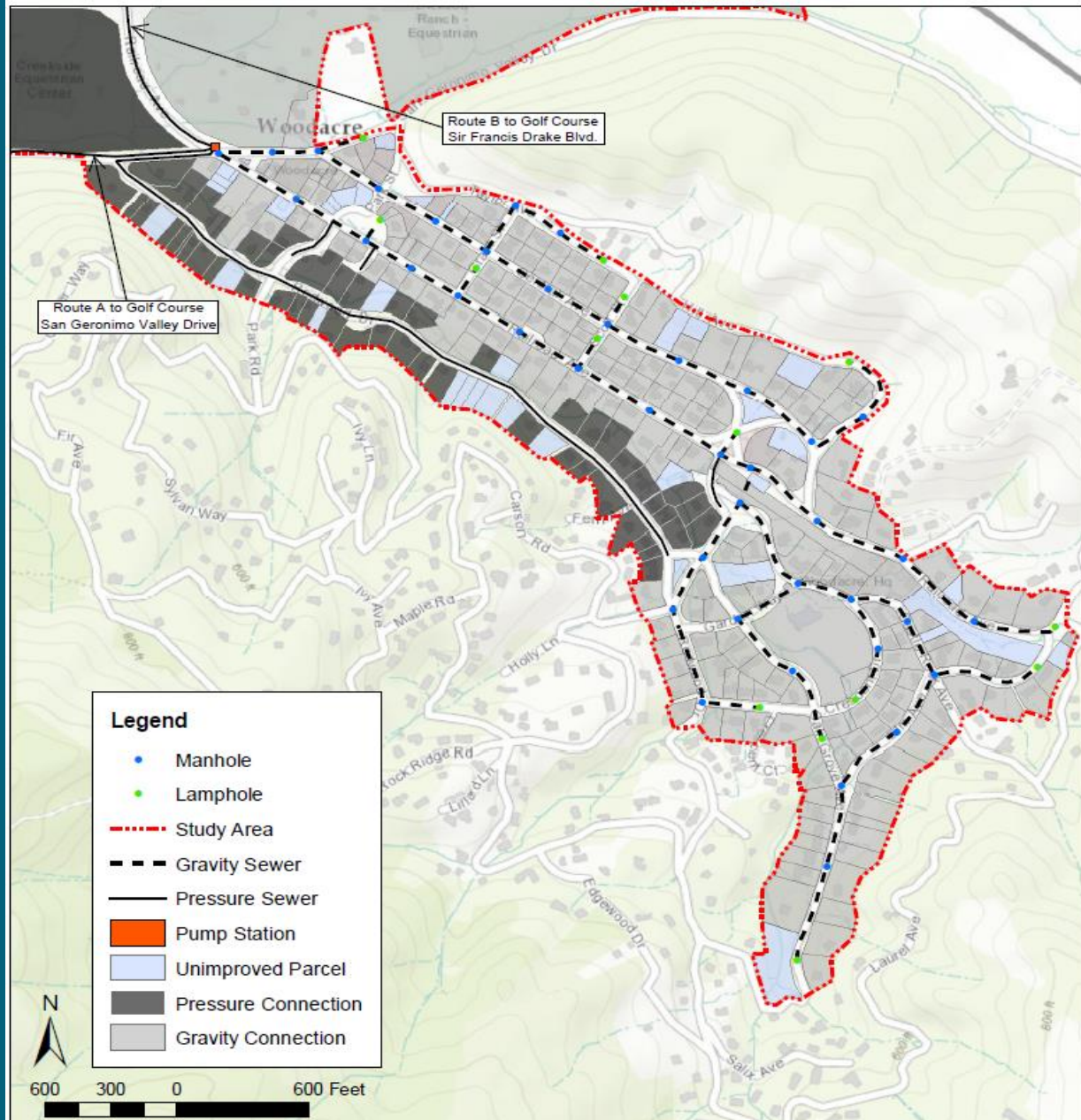


**WASTEWATER FACILITIES  
 ON CLUBHOUSE PARCEL**

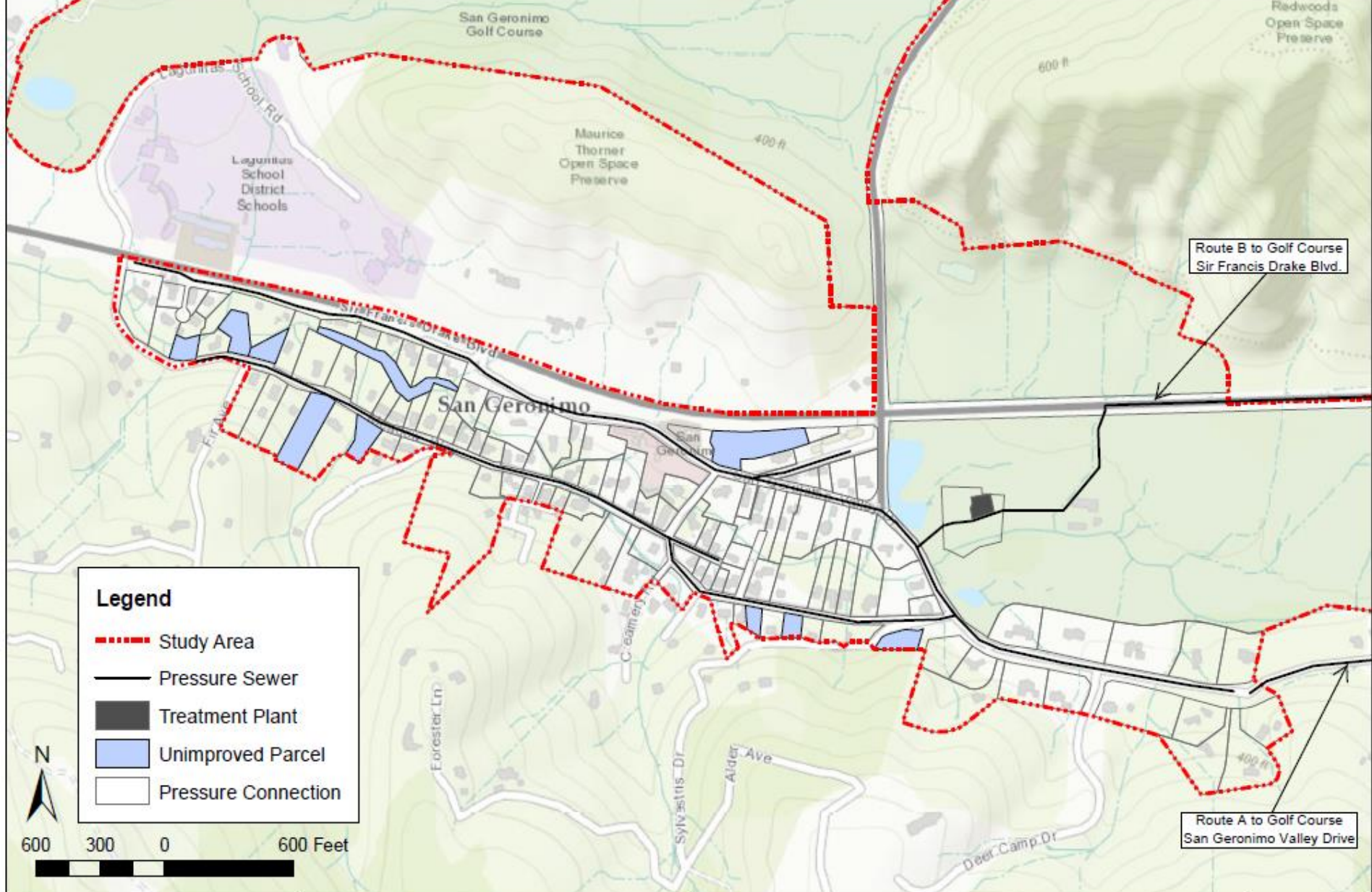
**FIGURE  
 8-5**



- VENT
- PIPE WITH FLOW DIRECTION
- FENCE
- PUMP
- MANHOLE
- VALVE
- DRAIN
- ABOVEGROUND STRUCTURE
- BELOWGROUND STRUCTURE
- STRUCTURAL SCREEN



# Woodacre Wastewater Collection



# San Geronimo Wastewater Collection

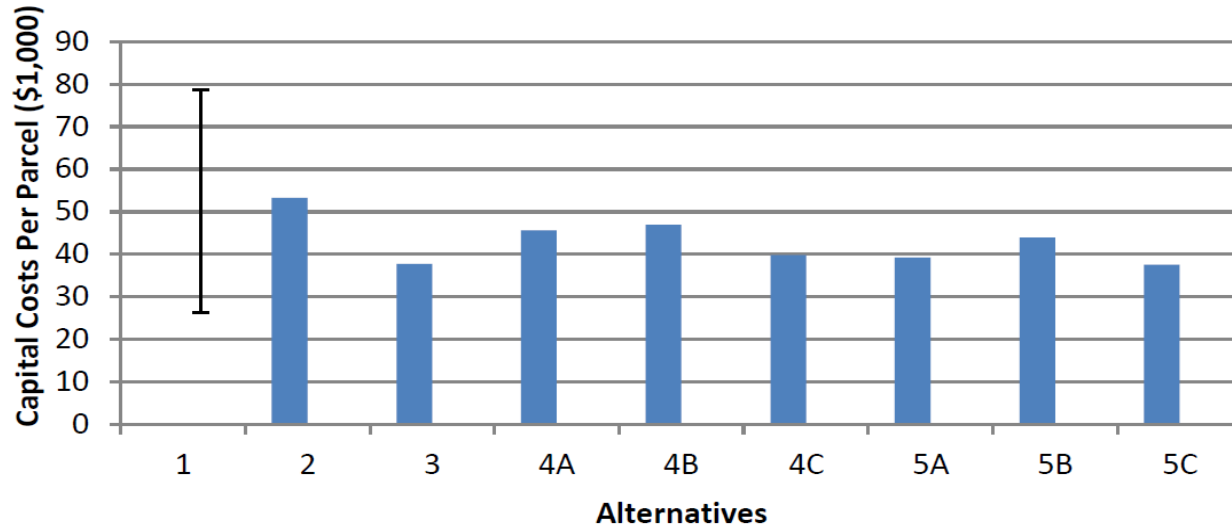
**Table ES-3. Summary of Estimated Costs**

Alternative	No. of Equivalent Connections	Capital Costs (\$)		Annual O&M Costs (\$)		
		Total (\$ million)	Per Parcel	Total	Per Parcel <sup>1</sup>	
<b>Non-Water Recycling Alternatives</b>						
1	No Project	-	-	35,000 to 70,000	-	500 to 1,500
2	Onsite Upgrades & Management Program	360	19.2	53,300	348,480	968
3	Woodacre Fire Road Community Leachfield	176	6.6	37,700	159,610	907
<b>Golf Course Property Water Recycling Alternatives – With Ponds</b>						
4a	Woodacre Only One Storage Pond	210	9.6	45,600	291,540	1,356
4b	Woodacre-San Geronimo, Partial (75%)	270	12.7	46,900	346,560	1,260
4c	Woodacre-San Geronimo, Full (100%)	360	14.3	39,800	366,470	1,004
<b>Golf Course Property Water Recycling Alternatives – Without Ponds</b>						
5a	Woodacre Only	250	9.8	39,200	348,810	1,368
5b	Woodacre-San Geronimo, Partial (75%)	270	11.7	43,900	365,860	1,330
5c	Woodacre-San Geronimo, Full (100%)	360	13.5	37,500	417,580	1,144

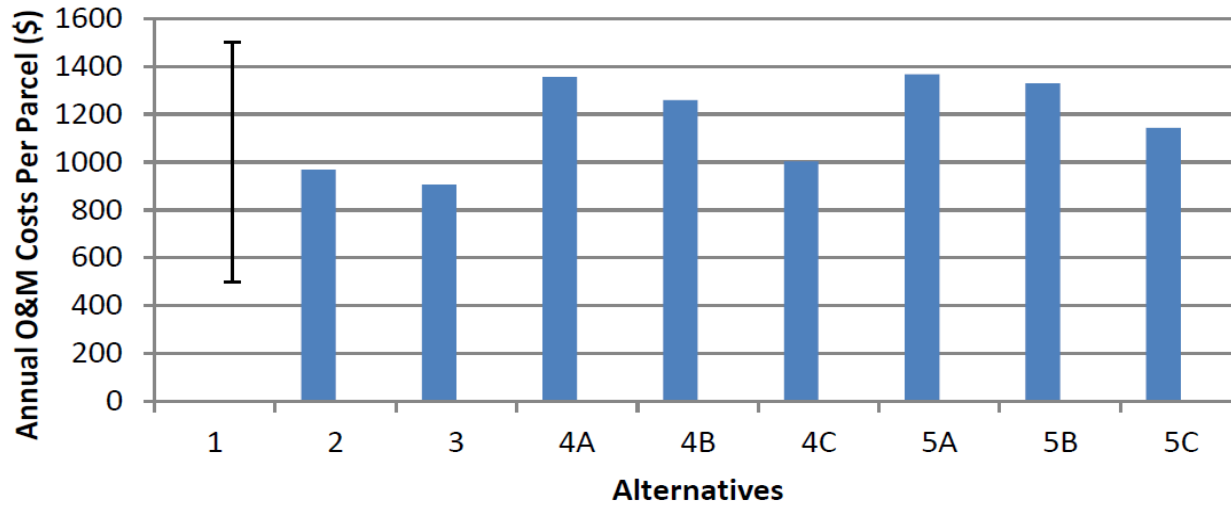
<sup>1</sup> Per parcel costs for Alternatives 4(a-c) and 5(a-c) account for 5 ESDs assigned to Clubhouse Parcel.



## Capital Costs



## O&M Costs



**Table 7-3. Recycled Water Produced – Average Annual Volumes**

Alternative	Recycled Water Produced			
	Irrigation Season (Apr-Oct)		Annual Total <sup>1</sup>	
	Acre-feet	Mgal	Acre-feet	Mgal
<b>Alternative 4a</b>	28.8	9.2	28.8	9.2
<b>Alternative 4b</b>	37.6	12.3	37.6	12.3
<b>Alternative 4c</b>	50.0	16.3	50.0	16.3
<b>Alternative 5a</b>	18.0	5.9	32.4	10.6
<b>Alternative 5b</b>	19.4	6.3	34.8	11.3
<b>Alternative 5c</b>	25.6	8.3	46.0	15.0

<sup>1</sup> For Alternatives 5a-5c, annual total includes recycled water for normal dry season irrigation, plus the amount produced during the normal wet season (November-March) that could be made available in dry winter periods for landscape/turf irrigation and other uses such as construction water, sewer cleaning, and certain types of water-dependent habitat restoration.

**Table 7-7. Numerical Rating of Alternatives\***

	Non-Recycling Alternatives			Water Recycling Alternatives San Geronimo Golf Course Property					
	1 No Project	2 Onsite Mgmt	3 Fire Road	With Ponds			Without Ponds		
				4a	4b	4c	5a	5b	5c
				Woodacre Only	Partial (75%)	Full (100%)	Woodacre Only	Partial (75%)	Full (100%)
<b>Regulatory Compliance</b>	1	2	3	4	7	9	5	7	9
<b>Environmental Impacts</b>	1	2	3	6	5	4	9	8	7
<b>Reliability</b>	1	2	3	4	7	9	5	7	9
<b>Energy Use &amp; GHG</b>	9	8	7	2	1	4	6	5	3
<b>Water Conservation</b>	1	3	2	7	8	9	4	5	6
<b>Land Area Needs</b>	2	1	3	6	4	5	8	7	9
<b>Capital Cost</b>	2	2	8	4	3	6	7	5	9
<b>Annual O&amp;M Cost</b>	8	8	9	2	4	6	1	3	5
<b>TOTAL</b>	<b>25</b>	<b>28</b>	<b>38</b>	<b>35</b>	<b>39</b>	<b>52</b>	<b>45</b>	<b>43</b>	<b>53</b>
<b>RANKING**</b>	<b>9</b>	<b>8</b>	<b>6</b>	<b>7</b>	<b>5</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>1</b>

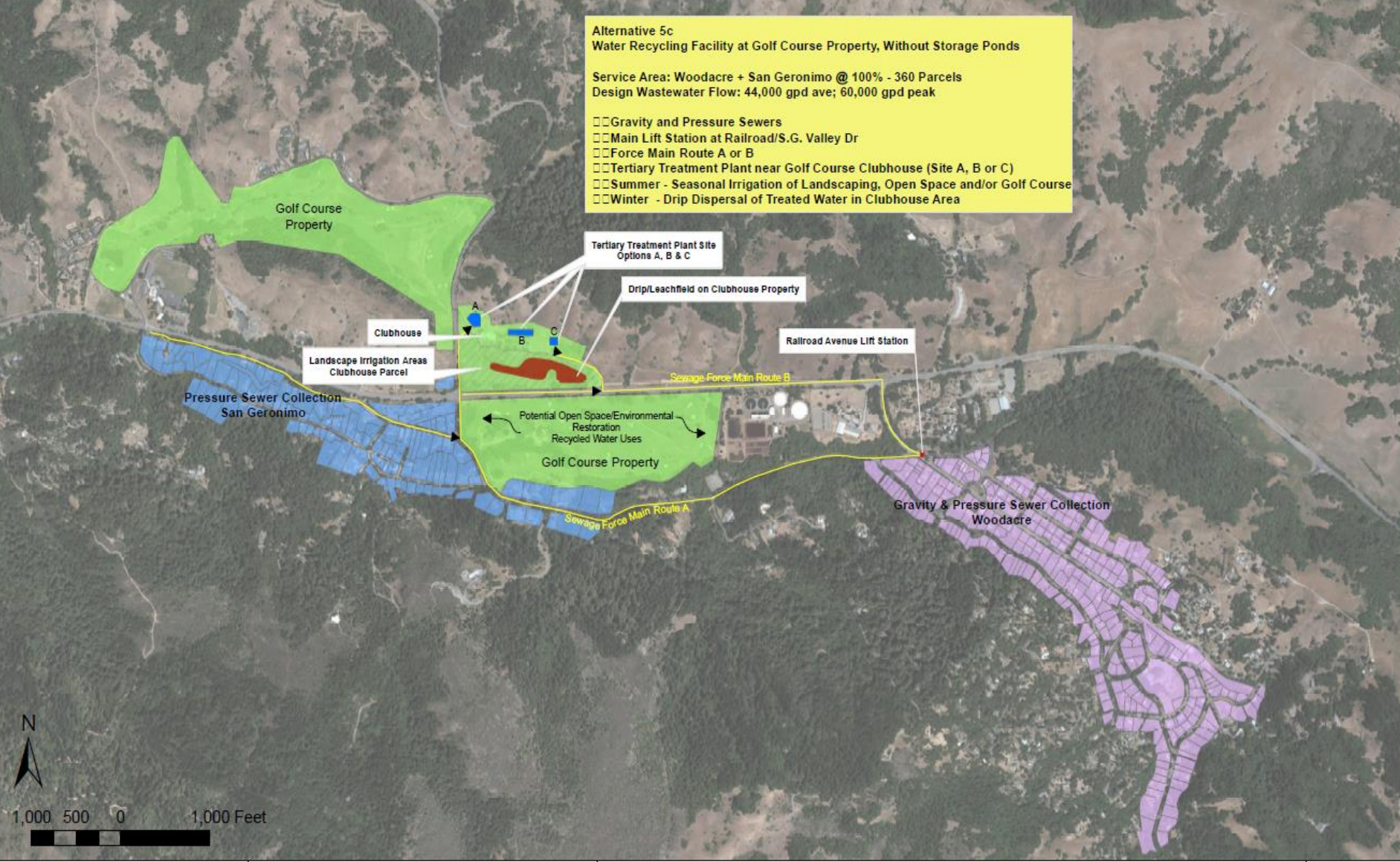
\*Points assigned from 1 to 9, low to high for each factor

\*\*Ranking with 1 as best (highest point score)

**Alternative 5c**  
 Water Recycling Facility at Golf Course Property, Without Storage Ponds

Service Area: Woodacre + San Geronimo @ 100% - 360 Parcels  
 Design Wastewater Flow: 44,000 gpd ave; 60,000 gpd peak

- Gravity and Pressure Sewers
- Main Lift Station at Railroad/S.G. Valley Dr
- Force Main Route A or B
- Tertiary Treatment Plant near Golf Course Clubhouse (Site A, B or C)
- Summer - Seasonal Irrigation of Landscaping, Open Space and/or Golf Course
- Winter - Drip Dispersal of Treated Water in Clubhouse Area



# Project Alternative 5c

**Table 8-2: Capital Cost Summary**

Cost Item	Estimated Cost (\$)
Collection System – Woodacre	\$4,216,575
Collection System – San Geronimo	\$1,956,800
Tertiary Treatment Plant	\$1,688,000
Recycled Water Irrigation and Drip Dispersal	\$1,022,500
Land/Easement Costs*	-
Mobilization/Demobilization	100,000
Permit Fees & Encroachment Fees	50,000
<b>Subtotal</b>	<b>\$9,033,875</b>
Contingency @ 15%	\$1,355,081
<b>Subtotal</b>	<b>\$10,388,956</b>
Engr & Environ Studies @ 15%	\$1,558,343
Construction Management @ 10%	\$1,038,896
Admin, Dist Formation, Financing @ 5%	\$519,448
<b>Total Estimated Cost</b>	<b>\$13,505,643</b>
<b>Estimated Cost Per Connection (360 parcels)</b>	<b>\$37,516</b>

**Table 8-3: Estimated Annual O&M Cost**

<b>Category</b>	<b>Items</b>	<b>Cost (\$)</b>
<b>District/Program Administration</b>	Insurance, legal, financial, administration	\$18,000
	RWQCB Permits	\$10,000
<b>Labor – Collection &amp; Treatment</b>	Systems Control Technician	\$14,000
	Grade III Operator (1/4 time)	\$46,800
	Grade I Operator (1/3 time)	\$57,000
	Field Technician (1/3 time)	\$62,400
	Engineering Consultation	\$15,000
	On-call Monitoring & Response Allowance	\$12,000
<b>Sludge Handling</b>	Bagging, Materials and Disposal Fees	\$4,800
<b>Sewer Lines</b>	Maintenance Cleaning	\$4,500
<b>Equipment</b>	Materials & Replacement	\$66,000
<b>Vehicle</b>	Lease and mileage	\$4,800
<b>Laboratory and Expenses</b>	Laboratory	\$24,000
	Cleaning Chemicals & Supplies	\$3,600
<b>Electrical</b>	Lift Station	\$661
	MBR Treatment Plant	\$25,730
	UV Disinfection	\$3,212
	Treated Water Distribution	\$3,212
	Misc electrical, phone, internet	\$600
<b>Sub-total</b>		<b>\$379,613</b>
10% Contingency		\$37,961
<b>Estimated Total Annual Cost</b>		<b>\$417,575</b>
<b>Estimated Annual Cost per Connection (365 ESDs)*</b>		<b>\$1,144</b>

\*Includes assumed 5 ESDs for Golf Course property

# Project Implementation

- Environmental Impact Report
- Agreement with Recycled Water User(s)
- Governance – District Formation
- Financing – Assessment District, Loans and Grants
- Ordinances
- Design, Permitting, Construction

# Wastewater Treatment Equipment and Facilities

## Examples





# Marshall Community Wastewater System



**Typical MBR Units**



**Compatible with Building Enclosure**

# UV Disinfection

TROJAN **UV**FIT™



**Proven TrojanUV Closed-Vessel Chambers for Reuse Disinfection.**  
Validated, chemical-free disinfection from the industry leader

# Sludge Bagging System



ISO 9001:2008 CERTIFIED

ENVIRODYNE SYSTEMS INC.

*Custom Water & Wastewater Treatment Equipment - Since 1971*



# Tiburon Sanitary District #5



# Tiburon Sanitary District #5



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