

Appendix E

Recycled Water Program Engineering Report

Town of Yountville/Veterans Home of California
Joint Wastewater Treatment Plant

Recycled Water Program Engineering Report

The Town of Yountville/Veterans Home of California Joint Wastewater Treatment Plant (JTP) operates under Regional Board Order No. R2-2004-0017, NPDES Permit No. CA0038121. Under these permit conditions, the JTP can discharge dechlorinated, secondary effluent to the Napa River during the wet season (October 1st through May 15th). During the remainder of the year (May 16th through September 30th), the Town of Yountville operates a recycled water program. Disinfected Secondary-2.2 effluent is used for irrigation of a golf course and three vineyards.

The following paragraphs describe the Town of Yountville Recycled Water Program in terms of the methods employed to ensure adequate wastewater treatment and to prevent health hazards at the use sites. Specific information on the Town's legal authority, monitoring requirements, reporting methods, compliance program, and cross-connection control is included in the "Town of Yountville Recycled Water Program Manual and Notice of Intent."

WASTEWATER TREATMENT PLANT OPERATIONS

The following sections include a description of the influent characteristics, an overview of the treatment plant design and capacity, and a discussion of treatment plant operation and reliability.

Influent Characteristics

Wastewater received at the JTP is from residences, commercial facilities, and institutions. There are no industries located in the Town of Yountville or that discharge to the treatment plant. Based on land use data supplied by the Town in 1994 and projected to 2020, a breakdown of wastewater sources is presented in **Figure 1**. The residential sources of wastewater include single family homes, multiple family dwellings, and mobile homes. The institutional sources include the Veterans Home of California, hotels, schools, and government facilities. The commercial sources are retail establishments such as stores and restaurants. Because the Town discharges less than 5 mgd to the Napa River (during the wet season) and there are no industries, the Town does not have an industrial pretreatment program.

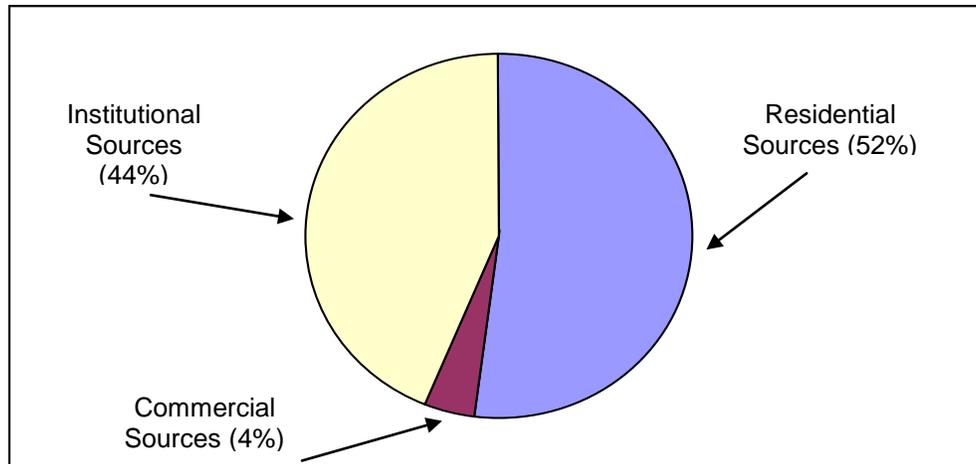


Figure 1. Sources of Wastewater at the Joint Treatment Plant (2020 projections)

The influent flowrate is measured with a magnetic flowmeter manufactured by Fisher Porter. The totalizer-type flowmeter records the number of gallons passing through the Joint Influent Sampling Site. (The sampling sites and treatment processes used at the JTP are presented in **Figure 2** on the following page.) The Joint Influent Sampling Site represents the combined wastewater discharged to the JTP from the Veterans Home of California and the Town of Yountville. The quantity of wastewater received is recorded by JTP personnel on a weekly and monthly basis. A comparison of the measured flows and the design capacities of the treatment plant is presented in **Table 1**. Over the past 5 years (1998-2003), the average dry weather flow has been 0.42 mgd, significantly below the design capacity of 0.55 mgd. The average wet weather flow has been 0.51 mgd with a peak daily flow of 1.6 mgd measured during January of 2002.

Table 1. JTP Inflow Design Capacity Compared to Actual Influent Flowrates

Flow Measurement	Design Capacity (mgd)	Actual Flows ¹ (mgd)
Average Dry Weather Inflow	0.55	0.42
Average Wet Weather Inflow	---	0.51
Maximum Daily Inflow	2.0	1.6
Peak Wet Weather Inflow (max. hourly hydraulic inflow)	2.83	---

¹Based on influent flow data recorded from 5/98 to 4/03.

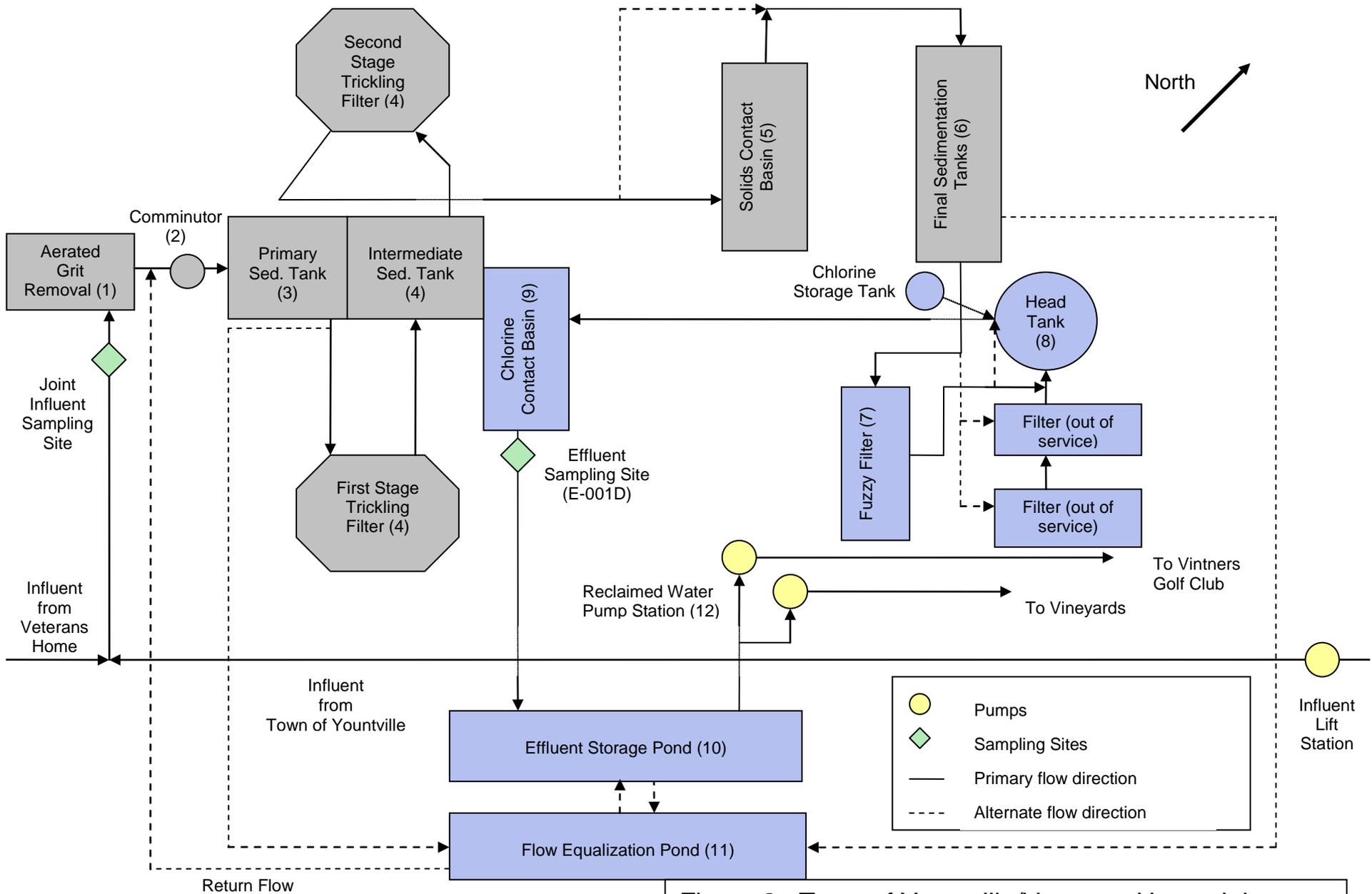


Figure 2. Town of Yountville/Veterans Home Joint Wastewater Treatment Plant Process Flow Schematic

The quality of the JTP influent is monitored weekly by collecting 24-hour composite samples from the Town of Yountville waste stream and 24-hour composite samples from the Veterans Home waste stream. The samples are analyzed for BOD₅ and TSS and flow-weighted to determine the concentration of the JTP influent. Dry season BOD₅ and TSS concentrations averaged from 1998 to 2003 are presented in **Table 2**.

Table 2. JTP Influent Wastewater Quality (1998 to 2003 dry season only)

Criteria	BOD ₅ (mg/L)	TSS (mg/L)
Median	478	370
Range	188 to 995	160 to 852
95 th Percentile	767	639

Description of Treatment Processes and Equipment

The numbering system used to identify the following treatment processes is based on the sequence of flow through the JTP and the numbers shown for each process in **Figure 2**.

(1) Aerated Grit Removal

The aerated grit removal chamber is a proprietary system designed and manufactured by the Air-O-Gest Corporation. Its purpose is to remove the relatively large and heavy non-biodegradable solids which would otherwise settle during subsequent treatment processes. Examples of the grit materials removed by this process are sand, gravel, and coffee grounds. The design and operational criteria are presented in **Table 3**.

Table 3. Design and/or Operational Criteria for Aerated Grit Removal (1)

Design Criteria	Value
Power Requirements	2 hp
Oxygen Transfer Rate	6 to 12 ft ³ /min per diffuser (2 total)
Detention Time	52 seconds
Rated Capacity	2.63 mgd
Peak Capacity	2.83 mgd

(2) Comminutors

Two comminutors are located in the influent channel just upstream of the primary sedimentation tank. The grinders were manufactured by Franklin Miller and installed in September 2003. The comminutors grind the larger solids in the wastewater to reduce plugging and other operational problems in the downstream processes. The design and operational criteria are presented in **Table 4**.

Table 4. Design and/or Operational Criteria for the Comminutors (2)

Design Criteria	Value
Power Requirements (each)	5 hp
Rated Capacity (each)	1.5 mgd

(3) Primary Sedimentation Tank

After grit removal and comminution, the influent enters the primary sedimentation tank. Preliminary solids settling occurs within the 73,000 gallon basin and the clarified effluent is directed to the primary trickling filter. The design and operational criteria are presented in **Table 5**.

Table 5. Design/Operational Criteria for the Primary Sedimentation Tank (3)

Design Criteria	Value	
	Dry Weather Conditions	Wet Weather Conditions
Surface Loading	650 gal/day-ft ²	3,900 gal/day-ft ²
Hydraulic Detention Time	2.8 hrs (average flow)	37 min. (peak flow)
Hydraulic Capacity	0.63 mgd	3.8 mgd

(4) First Stage Trickling Filter/Intermediate Sedimentation Tank/Second Stage Trickling Filter

The next three processes work in conjunction with each other to achieve a stable, high quality effluent under a wide range of conditions and loadings.

The trickling filters have a 50 ft diameter and use a synthetic media packed to a depth of 6 ft. The wastewater is first delivered to the top of the primary trickling filter and distributed over the media surface through a rotary distributor. Microorganisms attached to the filter media degrade the organic materials present in the wastewater. The treated wastewater flows into the underdrains and is directed to the intermediate settling basin. Additional BOD removal is achieved in the 73,000 gallon intermediate sedimentation tank.

Clarified effluent is then directed to the second stage trickling filter which is identical in design and operation to the first stage trickling filter. The design and operational criteria for the intermediate settling tank and trickling filters are presented in **Tables 6 and 7**.

Table 6. Design and/or Operational Criteria for the Intermediate Sedimentation Tank (4)

Design Criteria	Value	
	Dry Weather Conditions	Wet Weather Conditions
Surface Loading	646 gal/day-ft ²	2,050 gal/day-ft ²
Hydraulic Detention Time	2.8 hrs (average flow)	52 min. (peak flow)
Hydraulic Capacity	0.63 mgd	2.0 mgd

Table 7. Design and/or Operational Criteria for the Trickling Filters (4)

Design Criteria	Value	
	Dry Weather Conditions	Wet Weather Conditions
Organic Loading	1 st stage: 5 lbBOD/day-1000ft ³ 2 nd Stage: 92 lbBOD/day-1000ft ³	1 st Stage: 10 lbBOD/day-1000ft ³ 2 nd Stage: 205 lbBOD/day-1000ft ³
Surface Loading	1019 gal/day-ft ²	2039 gal/day-ft ²
Application Rate	2.0 mgd	4.0 mgd

(5) Solids Contact Basin

The solids contact basin consists of three cells. The first cell contains an activated sludge mixture utilizing return sludge from the final sedimentation tank. The second cell is a mixing chamber for integration of the mixed liquor suspended solids from the first cell and effluent from the second stage trickling filter. Aeration of this mixture occurs in the third cell. The volume of each cell is 21,780 gallons. The design and operational criteria for the solids contact basin are presented in **Table 8**.

Table 8. Design and/or Operational Criteria for the Solids Contact Basin

Design Criteria	Value	
	Dry Weather Conditions	Wet Weather Conditions
Blowers (2 @ 250 ft ³ /min @ 8 psi)	15 hp	15 hp
Oxygen Transfer Rate (Efficiency)	3.12 lb O ₂ /hp-hr (10%)	3.12 lb O ₂ /hp-hr (10%)
Solids Contact Time	57 min./cell	15.7 min./cell

(6) Final Sedimentation Tank

After aeration and solids contact, the treated wastewater enters the final sedimentation tank. There are two sedimentation tanks, each with a volume of 95,700 gallons and a surface area of 1,280 ft². The design and operational criteria for the final sedimentation tank are presented in **Table 9**.

Table 9. Design and/or Operational Criteria for the Final Sedimentation Tank (6)

Design Criteria	Value	
	Dry Weather Conditions	Wet Weather Conditions
Surface Loading	490 gal/day-ft ²	780 gal/day-ft ²
Hydraulic Detention Time	3.6 hours (average flow)	1.4 hours (peak flow)
Hydraulic Capacity	1.3 mgd	3.3 mgd

(7) Fuzzy Filter

The Fuzzy Filter is operated for wastewater reclamation only and just during the dry season. Two multi-media sand filters were used in the past, but due to the many operational problems encountered, they were retired from service. The Fuzzy Filter contains a compressible plastic filter media packed to a depth of about 30 inches. The media is compressible and highly porous with a uniformity coefficient of 1.5. During filtration, a pressure plate compacts the media to a fraction of its original volume while effluent is forced upward through the media. During backwashing, the pressure is released and the media expands, releasing the filtered particles trapped within the media.

The turbidity of the filter influent during the 2003 irrigation season averaged 10.8 NTU. Filter effluent turbidity averaged 5.2 NTU. The total filter volume is 2,620 gallons with a filter surface area of approximately 25 ft². The design and operational criteria for the fuzzy filter are presented in **Table 10**.

Table 10. Design and/or Operational Criteria for the Fuzzy Filter (7)

Design Criteria	Value	
	Minimum Filtration Rate	Maximum Filtration Rate
Filtration Rate	5 gal/ft ² -min	30 gal/ft ² -min
Hydraulic Capacity	0.18 mgd	1.08 mgd

(8) Head Tank and Chlorine Mixing

During the wet season, chlorine mixing occurs in the 11,000 gallon head tank. During the dry season, the head tank is not in service. Dry season chlorine mixing occurs in-line using an inductor located between the chlorine storage tank and the chlorine contact basin. A 12.5% sodium hypochlorite solution is pumped from the double-walled 2,500 gallon storage tank and mixed with filter effluent prior to entering the chlorine contact basin.

(9) Chlorine Contact Basin

The chlorine contact basin volume is 23,700 mgal. When operated with the head tank, the total detention time at peak flow is 30 minutes. Chlorine residual is measured continuously with an in-line meter located just downstream of the chlorine contact basin. The residual is maintained at 5 to 8 mg/L. Secondary-2.2 recycled water requirements are consistently met during this disinfection routine. Design and operational criteria for the chlorine contact basin are presented in **Table 11**.

Dechlorination of the treated wastewater with sulfur dioxide is conducted only during the wet season, prior to discharge to the Napa River.

Table 11. Design and/or Operational Criteria for the Chlorine Contact Basin (9)

Design Criteria	Value	
	Dry Weather Conditions	Wet Weather Conditions
Chlorine Contact Time (Measured Values)	150 to 200 min.	70 to 100 min.
Chlorine Detention Time (Design)	-----	30 min. (peak flow)
Average Flow	0.42 mgd	0.54 mgd

(10) Effluent Storage Pond

After disinfection, the treated effluent is stored in the Effluent Storage Pond. The available storage in this pond is 2.7 mgal. Effluent flows by gravity to the Napa River during the wet season and is pumped from the pond to the recycled water user sites during the dry season.

(11) Flow Equalization Pond

The Flow Equalization Pond is used during periods of high influent flow and to receive the filter backwash. When influent flows are greater than 2 mgd, the primary settling tank overflows to the equalization pond. The available storage in this pond is 3.8 mgal. Two wastewater return pumps (0.25 mgd each) are located at the equalization pond to convey the partially treated effluent back to the headworks of the plant when sufficient treatment capacity is available. Two 5 hp aerators (supplying 15 lb O₂/hour) are also available for odor control and/or interim treatment.

(12) Reclaimed Water Pump Station

The reclaimed water pumps are operated only during the dry season. The pump station consists of two 40 hp pumps, each rated at 0.46 mgd at 135 ft of head. One of the pumps feeds the vineyard recycled water users. This pump is run at least 8 hrs/day during the irrigation season as needed to maintain water levels in the vineyard storage ponds. The other pump is dedicated for use at the Vintner's Golf Club. The golf club uses the water to maintain the water features and to run their sprinkler system.

Plant Reliability

The Town of Yountville and the operators of the JTP have recently updated the O&M Manual for the treatment facility. The following discussion of plant reliability features and contingency plans is from communication with the JTP operators and the draft O&M Manual update. The JTP is staffed from 7:30 am to 4:00 pm Monday through Friday. The operators alternate weekend shifts to cover one weekend day per month. The Wastewater Systems Supervisor and a backup operator are available by phone 24 hours a day, 7 days a week to respond to emergencies.

Automated Monitoring Systems

Continuous water quality monitoring is conducted for turbidity and chlorine residual to monitor treatment process performance. Turbidity is measured in the filter influent and effluent with a Hach 1720D turbidimeter. The turbidimeter is verified daily using a hand-held meter and test kit. Chlorine residual is measured in the effluent from the chlorine contact basin with an Analytical Technology Inc.

chlorine residual analyzer. A second chlorine analyzer (Hach CL17 meter) is located at the Effluent Storage Pond. This meter is used to ensure that no chlorine residual is present in the effluent discharged to the Napa River. The measurements are verified daily using test kits. The turbidimeter and both chlorine analyzers are calibrated annually by a certified technician.

Alarms

There are numerous alarms connected to the pump stations and treatment processes at the JTP. All of the alarms have visual and audible notification signals and are located on the alarm panel in the Control Building. The alarms are tested monthly (at a minimum) to ensure proper operation. Each alarm is listed and described in **Table 12**.

Table 12. Location of Alarms at the Joint Treatment Plant

Alarm Location	Purpose
Influent Lift Station	Pump station failure
Influent Lift Station Generator	Generator failure
JTP Power Source	Power failure
JTP Generator	Generator failure
JTP Water Source	Low pressure at source of plant water
JTP Air Source	Low pressure at source of plant air
Primary Sedimentation Tank	Sludge collector torque overload
Inter. Sedimentation Tank	Sludge collector torque overload
First Stage Trickling Filter	High and low sump levels
Second Stage Trickling Filter	High and low sump levels
Final Sedimentation Tank	Water level is 3 inches from overflow
Final Sedimentation Tank	Sludge collector torque overload
Filter Feed Chamber	Low level indicator
Filter	Power failure, elevator failure, incomplete backwash, & reset failure
Chlorine Contact Chamber	Chlorine residual is below normal level
Chlorine Contact Chamber	Low water level indicator
Effluent Storage Pond	High water level indicator (6 inches from overflow)
Effluent Storage Pond	Low water level indicator
Flow Equalization Pond	High water level indicator (5 inches from overflow)
Flow Equalization Pond	Low water level indicator
Reclaimed Water Pump Station	Pump Station Failure

Standby Power

Wastewater is pumped from the Town of Yountville to the JTP. An engine driven generator is available to deliver emergency power to the influent lift station and continue delivery of wastewater to the treatment plant. The pump station generator can provide 92 kW of electricity. An additional diesel fuel generator, sized to power all equipment at the JTP, is provided as standby power for the treatment plant operations. The JTP generator can provide 350 kW of electricity.

Emergency Storage and Disposal

Excess wastewater, resulting from peak wet weather flows or from emergency conditions, will overflow at the effluent end of the Primary and Final Sedimentation Tanks to the Flow Equalization Pond. Water stored in the Flow Equalization Pond can then be returned to the headworks for additional treatment. The Flow Equalization Pond will also be recruited into use if inadequately treated wastewater is produced at the JTP. When alarms sound indicating a treatment process failure, wastewater will be diverted to the Flow Equalization Pond. If water quality concerns prevent distribution to Users from the Effluent Storage Pond, it will also overflow to the Flow Equalization Pond.

During the dry season (when river discharge is prohibited), the ponds will be operated to provide at least 3.4 days of emergency storage. When the Users require irrigation water, the Effluent Storage Pond is maintained at a high level to ensure an adequate supply of recycled water. However, the Flow Equalization Pond can be operated so that at least 50% of the pond volume is available at any time for emergency storage. Under these conditions, there will be $(0.5 \times 3.8 \text{ mgal})$ 1.9 mgal of storage available. Under the ADWF of 0.55 mgd, this emergency storage volume represents 3.4 days of influent flow.

The JTP has backup capacity, alarms, and replacement equipment available for all of its unit processes. As such, "short-term retention" is all that is required as a reliability feature (Title 22, Article 10, Section 60341). The emergency storage capacity of 3.4 days complies with the requirement of at least 24-hours of storage needed under emergency conditions. If by chance any inadequately treated wastewater is sent to the Users before a problem is recognized at the JTP, the Users will be notified immediately and mandatory precautions will be stipulated for the User sites (see page 29 of the Recycled Water Program Manual and NOI). This situation is also explained more thoroughly in the following section.

Contingency Plan

The specific conditions under which flow would be diverted to emergency storage are detailed in **Figure 3**. If an emergency develops at the JTP and partially treated wastewater is produced, alarms will sound and the treatment plant operators will respond on-site or be notified through the automatic paging system. Short-term retention of partially treated effluent will occur in the Flow Equalization Pond. In this case, the Recycled Water Users will be notified that the JTP is temporarily ceasing delivery of recycled water. Every attempt will be made to complete the necessary repairs prior to full utilization of the on-site emergency storage.

If inadequately treated water was already distributed to the Users, the Users will be notified and required to implement specific precautions. JTP staff will visit each site and collect samples of water in the storage ponds to determine if Title 22 “disinfected secondary-2.2” recycled water standards are being met. This determination will include measurement of dissolved oxygen concentrations (must be 1.0 mg/L or greater) and laboratory analysis of Total Coliform concentrations. If dissolved oxygen or Total Coliform concentrations do not meet the Title 22 criteria, on-site aeration and/or disinfection equipment will be installed. Authorization for irrigation use of the water will not be given until the Title 22 water quality criteria are met.

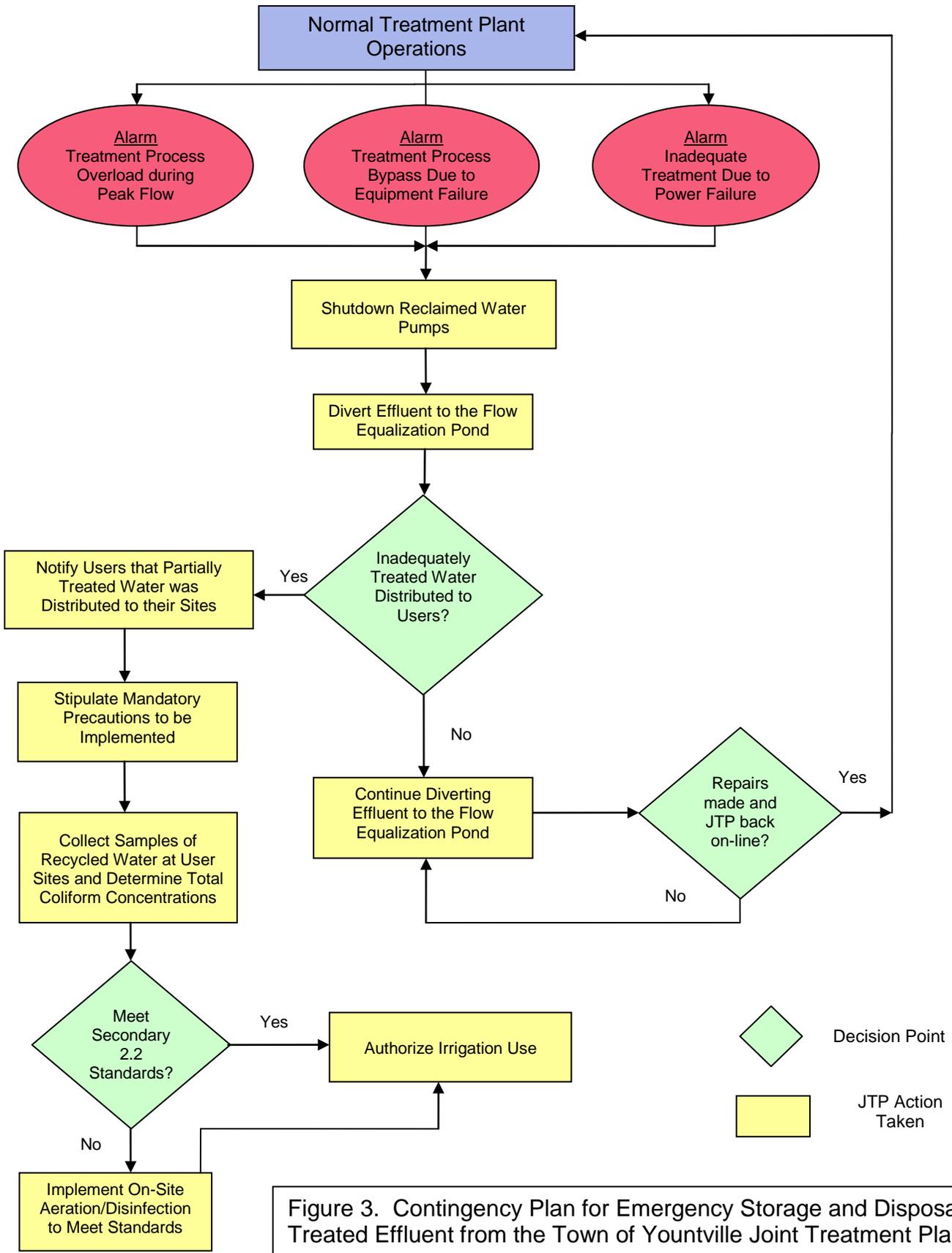


Figure 3. Contingency Plan for Emergency Storage and Disposal of Treated Effluent from the Town of Yountville Joint Treatment Plant

SUPPLEMENTAL WATER SUPPLIES

Potable water is supplied by the Veterans Home of California and enters the JTP site at the southwest corner of the property. The water is piped to the operations building at the JTP and is used in the laboratory, the kitchen, and the restrooms. Potable water is also available near the chlorine storage tank for the eye wash and safety shower. Backflow prevention devices are located at the point where potable water enters the JTP site and also at the chemical storage facilities. These devices are tested annually every March.

Process water is used onsite for treatment process operation and wash-down activities. The process water is pumped from the chlorine contact basin and used for sprayers in the sedimentation tanks, periodic wash-down of the sedimentation tanks, cleaning of the digester transfer box, and carrier water during chlorine mixing. There are two 15 hp plant water pumps available for distribution of process water. Each pump is rated at 0.15 mgd at 240 ft of head.

RECYCLED WATER DISTRIBUTION SYSTEM

During the irrigation season, water is pumped at the Reclaimed Water Pump Station to the Recycled Water User sites. The Recycled Water Distribution System is shown in **Figure 4**. Recycled water delivered to the Vintners Golf Club is through a dedicated pump and a 450 ft distribution line. A second pump serves the three vineyards located on the east side of the valley. The distribution line runs across the valley through road and flood control easements and then south along the Silverado Trail to the various users.

Sewer lines, potable water lines, and residences located along the distribution system are also shown in **Figure 4**. Potable water for the JTP and the Vintners Golf Club is supplied by the Veterans Home of California. Potable water for the adjacent Fire Station is supplied by the City of Napa water line that follows the St. Helena Highway (State Route 29). Wastewater from the Town of Yountville is pumped to the JTP, entering the plant along the southeast access driveway. All of the private residences along the distribution line are utilizing onsite systems for water and wastewater treatment.

Figure 4 was submitted to the Water Board and Department of Health Services in April 2004.

RECYCLED WATER USER OPERATIONS

Recycled water is used to irrigate the public golf course adjacent to the JTP and three vineyards located on the east side of the valley. Operation of the recycled water system at the golf course (Vintners Club Golf Course) and at two of the vineyards (Stag's Leap and Clos du Val) are described in the following sections. The third vineyard user, Chimney Rock Winery, is applying for an individual water reuse permit from the San Francisco Bay Regional Water Quality Control Board (Regional Water Board). Operation of Chimney Rock's recycled water system will be monitored by Chimney Rock Winery, the Regional Water Board, and Napa County Department of Environmental Management. However, if desired by the Regional Water Board, the Town of Yountville will notify Chimney Rock of their responsibilities to conduct annual cross-connection control investigations and backflow prevention device testing. A description of Chimney Rock's operating procedures has been submitted separately to the Regional Water Board.

Groundwater wells located within 1000ft of the recycled water use areas were researched with the Napa County Department of Environmental Management. Details on the locations of those wells are presented in **Attachment 4**.

Vintner's Golf Club

The Vintner's Golf Club is located on land owned by the State of California adjacent to the Veterans Home of California and the JTP. The property is leased to R.B. Imo Corporation for operation of a 9-hole public golf course. Recycled water is used to irrigate the golf course greens and fairways as well as some outlying non-landscaped areas. Recycled water is also used to maintain the water level in three decorative ponds located within the fairways. Site maps showing recycled water use areas and details of the irrigation system are included in **Attachment 1**.

Operational Measures to Protect the Public and Site Employees

Protective Measures. Large warning signs (1.5 ft x 2 ft) are posted every 75 yards along the lake edges to announce the presence and use of recycled water. The wording on the signs is "Golf Course Irrigated with Reclaimed Water – AVOID CONTACT." A photo of these warning signs is included in **Attachment 1**. A warning regarding recycled water use is also presented on the score cards. Above the drawing of the golf course layout are the words, "Golf Course irrigated with effluent water – Not For Consumption." Water from an on-site irrigation well is used to irrigate landscaping near the clubhouse and restaurant. Areas irrigated with well water are highlighted in **Attachment 1**. Well water is also used to wash down golf carts.

Potable water and cups are provided for the golfers. Coolers of water are filled daily and located in covered sheds along the fairways. The sheds prevent contact of the drinking water with recycled water during irrigation. A photo of one of these sheds is presented in **Attachment 1**.

Degree of Access by Public and Employees. Public access to the golf course is limited to the daylight hours. Employee shifts are from 5:30am to dark.

Measures to Protect Onsite Residences and Domestic Wells. There are no onsite residences or domestic wells located on the Vintner's Golf Club property. There is one irrigation well located on the golf course property. The well is located behind the Fire Station (see **Attachment 1**) and is run periodically (as needed) to augment the recycled water supply.

Irrigation Type and Schedule. Sprinklers are used to irrigate the golf course and surrounding areas. Irrigation is completed before 5am and after 10pm to provide ample drying time before opening the course to golfers.

Recycled Water Runoff Prevention

No irrigation is conducted during rainfall events or during the wet winter months. All runoff is directed to the lakes. Prior to the beginning of the irrigation season, the entire distribution system is checked for leaks to prevent losses of recycled water. During irrigation periods, the irrigated areas are continuously monitored for leaks or system malfunctions.

Operation of Recycled Water Impoundments

The three lakes are operated as recycled water supply impoundments and serve as decorative features for the golf course. Lake A has a total volume of 16 acre-ft, Lake B has a total volume of 8 acre-ft, and Lake C has a total volume of 3 acre-ft. All of the lakes are lined and maintained to preserve 2 ft of freeboard year-round. Lake overflows are only possible during heavy, winter rainfall events. Overflow is directed to Hinman Creek. Hinman Creek flows to the southeast through the golf course, under Solano Avenue, and eventually to the Napa River.

Stag's Leap Winery

The Stag's Leap Winery is located at 5766 Silverado Trail. The Stag's Leap vineyards are situated to the north, south, and east of the winery building. A detailed site map is included in **Attachment 2**.

Operational Measures to Protect the Public and Site Employees

Protective Measures. A sample of the caution signage which will be located at all hose bibs and vineyard blocks is presented in **Attachment 2**. The reclaimed water storage reservoir is also delineated with caution signs. There is currently no purple pipe, or purple tape delineation of equipment or pipes but all hose bibs have quick-connect couplers.

All maintenance, facilities, and landscape staff are regularly trained in the precautionary use of latex gloves, goggles, and protective clothing when handling recycled water. Showers and VioNex antibacterial soap are available and recommended for use after contact or working around recycled water.

There are no drinking fountains or outdoor eating areas.

Degree of Access by Public and Employees. The general public is restricted to the visitor parking lot and the tasting room located in Building 2. By appointment, visitors may attend a guided tour through the production facility and caves, but would not come in contact with the reclaimed water systems. Vineyards are only accessed by the public when accompanied by staff.

Measures to Protect Onsite Residences and Wells. All of the wells located on Stag's Leap and neighboring properties are shown on the site map in **Attachment 2**. Each of the wells have the required 100 ft setback from recycled water use areas. Domestic wells that serve onsite residences have backflow prevention equipment and are totally separated from the recycled water system.

Irrigation Type and Schedule.

Vineyard Irrigation: The vineyards are irrigated with drip emitters fed from underground piping systems. Irrigation is conducted seasonally as required.

Landscape Irrigation: Landscaping is irrigated with a sprinkler system and drip emitters on time clocks daily or semi-daily from late Spring to early Fall. Occasionally as required, irrigation may be conducted from late Fall through Spring. Hand watering via hose bibs may also occur as required to maintain plant viability. Most landscaping irrigation is scheduled for early morning watering prior to the arrival of visitors. Vineyard irrigation is generally at night, but can take place around the clock and is always supervised.

Recycled Water Runoff Prevention

For runoff protection, there are perforated french drain systems at the upper and lower perimeters of many of the vineyards. Water collected in these drains flows into holding tanks and is pumped pump back to the reclaimed water storage ponds. The process wastewater system has a perimeter drain separating it from the vineyards.

Irrigation of landscaping and vineyards does not take place during rainfall events. Seasonably, to protect on site streambeds, erosion control systems are strategically placed where needed.

Operation of Recycled Water Impoundments

Design Characteristics. An 1.8 million gallon reclaimed water reservoir was recently constructed (see **Attachment 2** for location). The reservoir is constructed of native, compacted, engineered soils with a 60 mil H.D.P.E. liner.

Operational Description. Two feet of free board is maintained in the reservoir, with overflow piping directed to the adjacent process wastewater ponds. In winter, if the water levels need to be lowered, excess water is delivered to the vineyards via drip irrigation for broad dispersal. During summertime irrigation of vineyards, the reservoir may be pumped down to within two or three feet of empty. Annual inspections of the reservoir take place at that time.

Clos Du Val Winery

The Clos du Val Winery is located at 5330 Silverado Trail. The Clos du Val vineyards are situated around the winery building and up the Silverado Trail to the north. A site map is included in **Attachment 3**. The Clos du Val property contains a recycled water storage pond, a process water reservoir, two domestic wells, and one agricultural well. Process water is used to irrigate the landscaped areas around the winery. A mixture of recycled water and groundwater is used to irrigate the vineyards.

Operational Measures to Protect the Public and Site Employees

Protective Measures. The perimeter of the recycled water storage pond and the process water reservoir are fenced with either chain link or no-climb wire. Warning signs, indicating the presence and use of recycled water, will be posted on all four sides of the recycled water storage pond and at the recycled water meter, 5584 Silverado Trail. Additional signs will be posted in front of the winery tasting room and employee parking area at 5330 Silverado Trail. All above ground recycled water outlets will be color-coded purple and keyed for employee access only. All hose bibs have quick-connect couplers.

There are no drinking fountains or outdoor eating areas located within the recycled water use area. All employees that are directly involved in operation or repair of the irrigation system will undergo recycled water safety training before being allowed to operate or repair the system.

Degree of Access by Public and Employees. Public and employee access to the vineyards is possible only during the hours of 8am to 5pm.

Measures to Protect Onsite Residences and Domestic Wells. There is a private residence with a domestic well between field A-5 and Chimney Rock Driveway (see **Attachment 3**). All vines located within a 100 ft radius of that well will be removed before the 2004 irrigation season. A 100 ft irrigation buffer zone is in place around the domestic well to the east of Field B and around the domestic well located just south of the Clos du Val Winery building.

Groundwater is used to supplement vineyard irrigation when necessary. The groundwater is introduced into the irrigation system through the storage pond. There is no direct connection between the recycled water piping and the well water piping, therefore, recycled water would not be able to contaminate the well. Treated process water is used to irrigate landscaped areas near the winery building. A one-way check valve is installed where the process water piping intersects with the groundwater distribution system.

Irrigation Type and Schedule. The irrigation system is a drip type with each vine receiving one gallon per hour when irrigated. Approximately 1,160 gal/acre per hour is delivered from a pressure compensated emitter. Operation of the irrigation system is on an as-needed basis. Irrigation may take place any time during the day or night except in publicly sensitive areas. Areas open to access by the public are only irrigated after the normal business hours of 8am to 5pm.

Recycled Water Runoff Prevention

No irrigation is conducted during rainfall events or during the wet winter months and no water is applied in amounts greater than the soil can absorb. Prior to the beginning of the irrigation season, the entire distribution system is checked for leaks to prevent losses of recycled water. During irrigation periods, the irrigated areas are continuously monitored for leaks or system malfunctions.

Operation of Recycled Water Impoundments

Design Characteristics. The volume of the Recycled Water Storage Pond is approximately 60 acre-ft. It is an off-stream, clay lined, "turkey nest" style pond. The inflow piping is located on the west side of the pond and consists of 6-inch schedule 80 PVC rated at 140 psi. The shutoff valve and recycled water meter are located at ground level on the property boundary.

The 10-inch steel outflow piping is located on the south side of the pond. At the outflow location; there is a 10-inch gate valve, a 40 hp electric pump, and two pressurized sand media filters. The pond water is pumped through the filters and dispersed through an 8-inch Schedule 80 PVC irrigation piping system. Filter backwashing occurs every 2 to 4 hours and the backwash is returned to the pond. A one-way check valve is located at the start of the irrigation system.

Overflow piping is located on the west side of the pond near the inflow point. The 10-inch pipe is constructed of corrugated steel and concrete and set at 2 ft above the normal pond water level. This position of the overflow pipe was designed to accommodate a 100-year flood event. However, there is an additional 3 ft of freeboard above the overflow inlet. The overflow pipe discharges to a drainage canal along Silverado Trail. The drainage canal flows across the valley for approximately one mile before entering the Napa River. Pond overflows are only possible during heavy, winter storm events when there is very little (if any) recycled water remaining in the pond.

Operational Description. The pond is operated for irrigation purposes from May to October. During the wet season, the pond is left partially full to accommodate rainfall collection. Water samples are often collected during the irrigation season to determine if any supplements must be added to the water to improve plant health or soil penetration. Aqua Shade is sometimes added during the hottest months to prevent algae growth. Other maintenance activities may include removal of cattails or weeds from the banks of the pond with a backhoe.

ATTACHMENT 1

Vintner's Golf Club Site Information



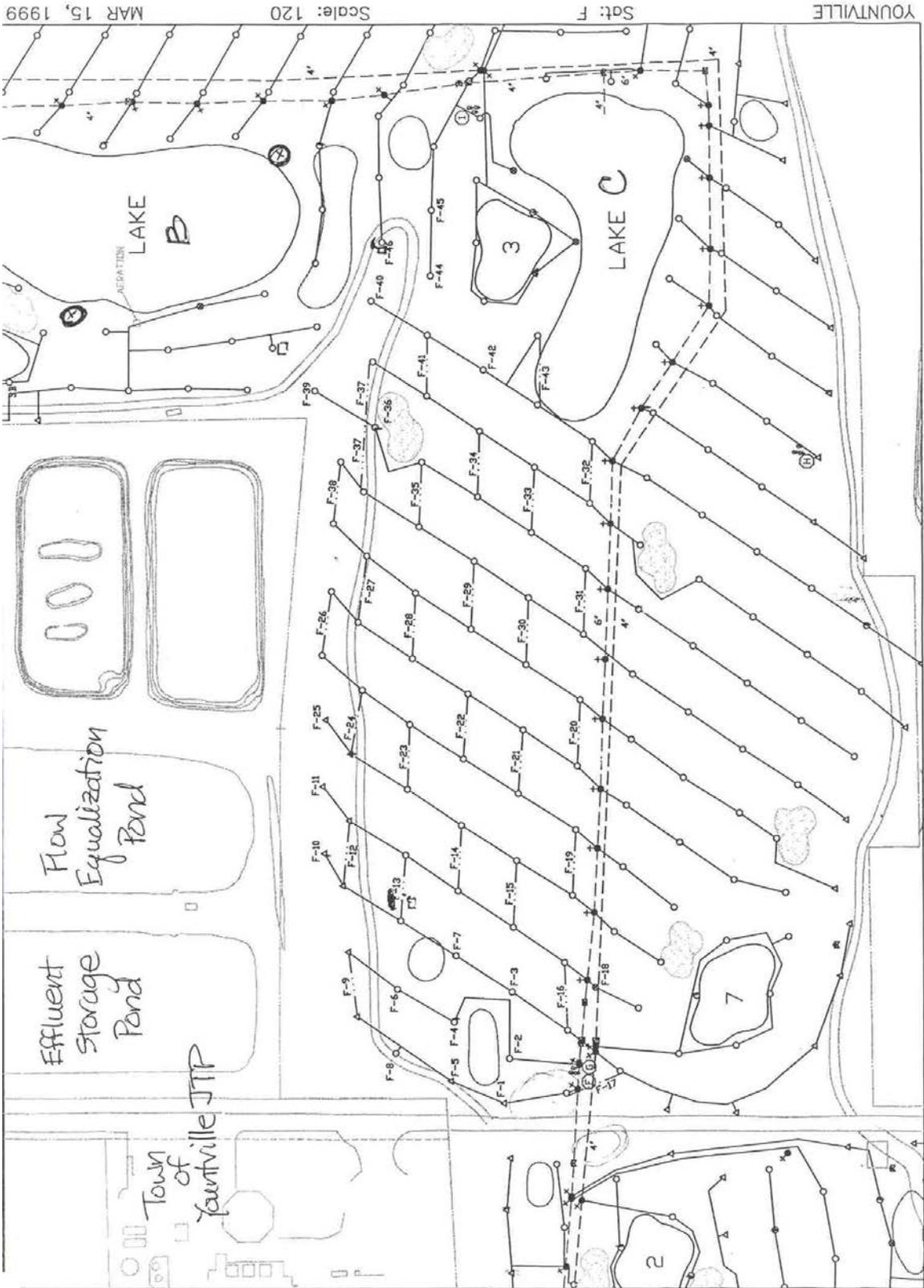
Vintner's Golf Club: Warning Signs Posted at all Recycled Water Impoundments

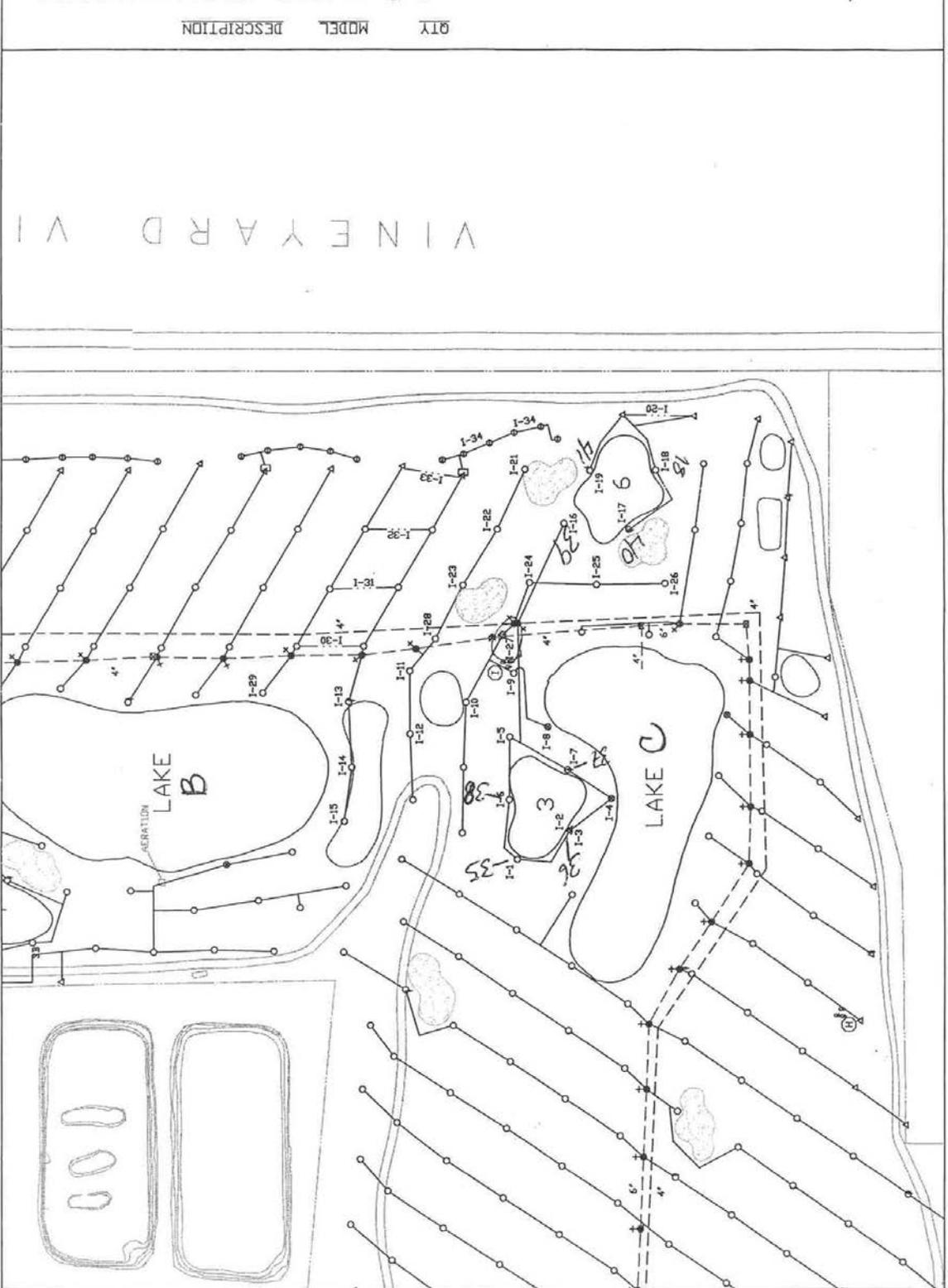


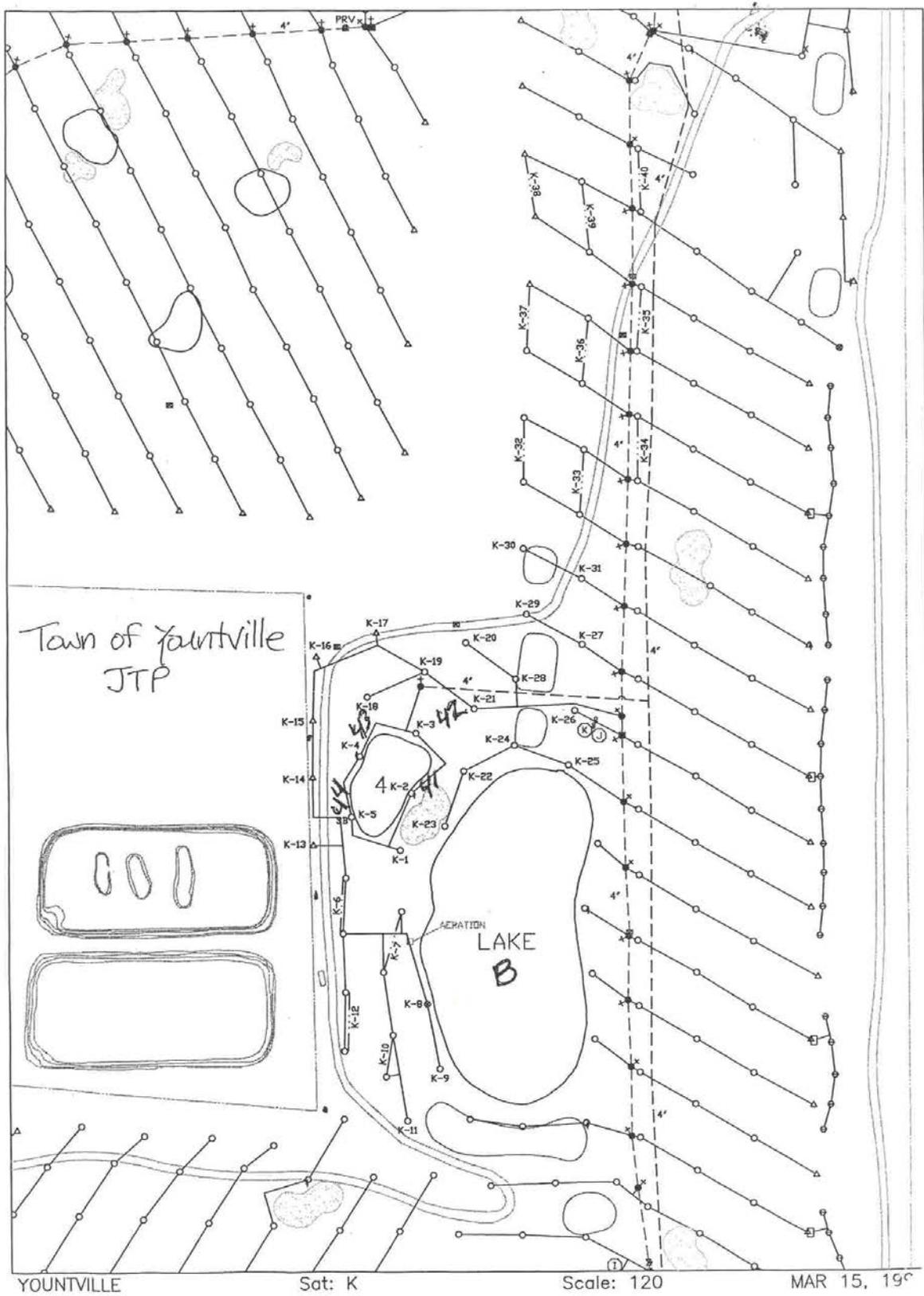
Vintner's Golf Club: Covered Sheds Provided for Protection of Drinking Water

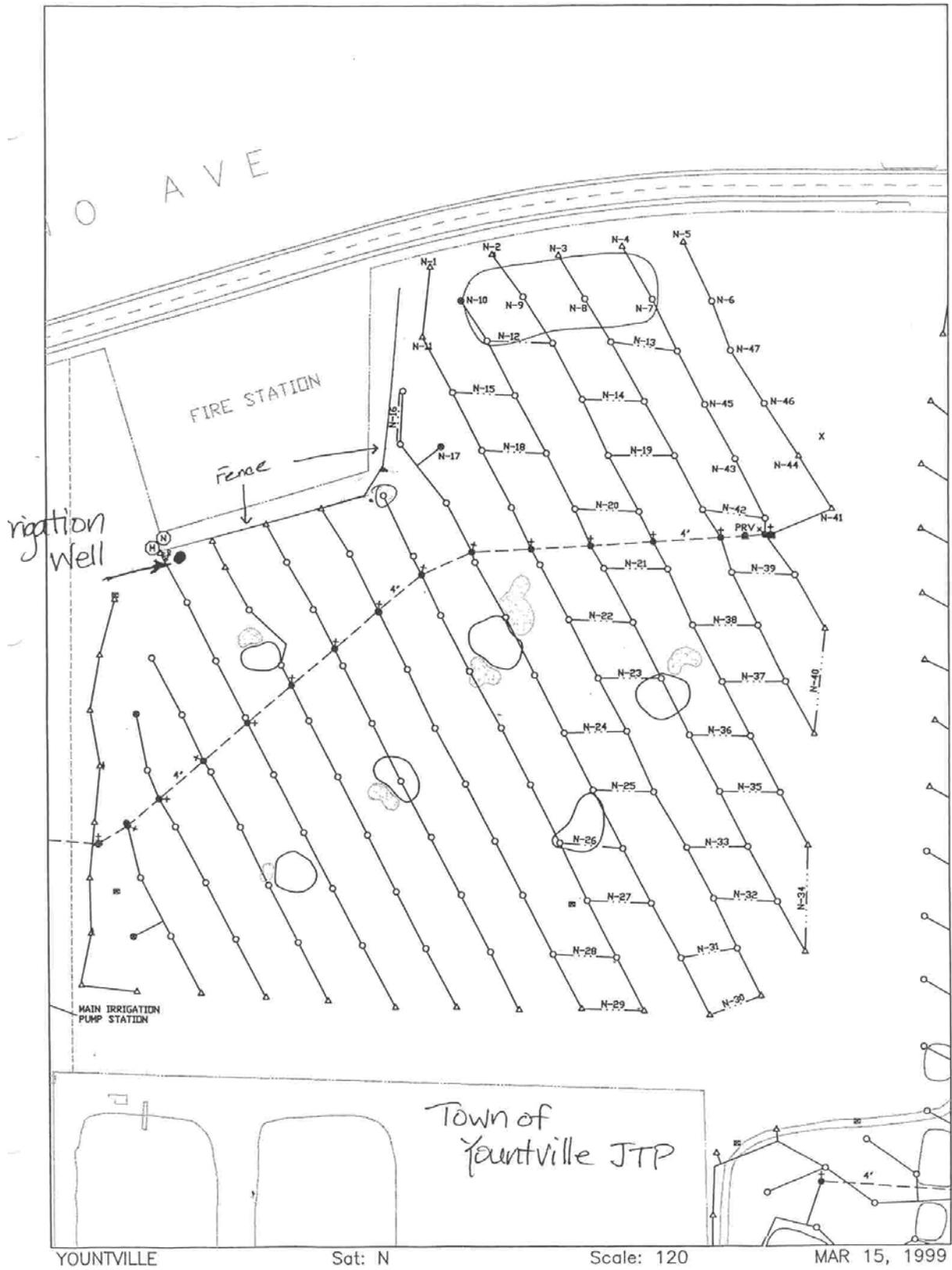


Vintner's Golf Club: Irrigation Well and Pump House

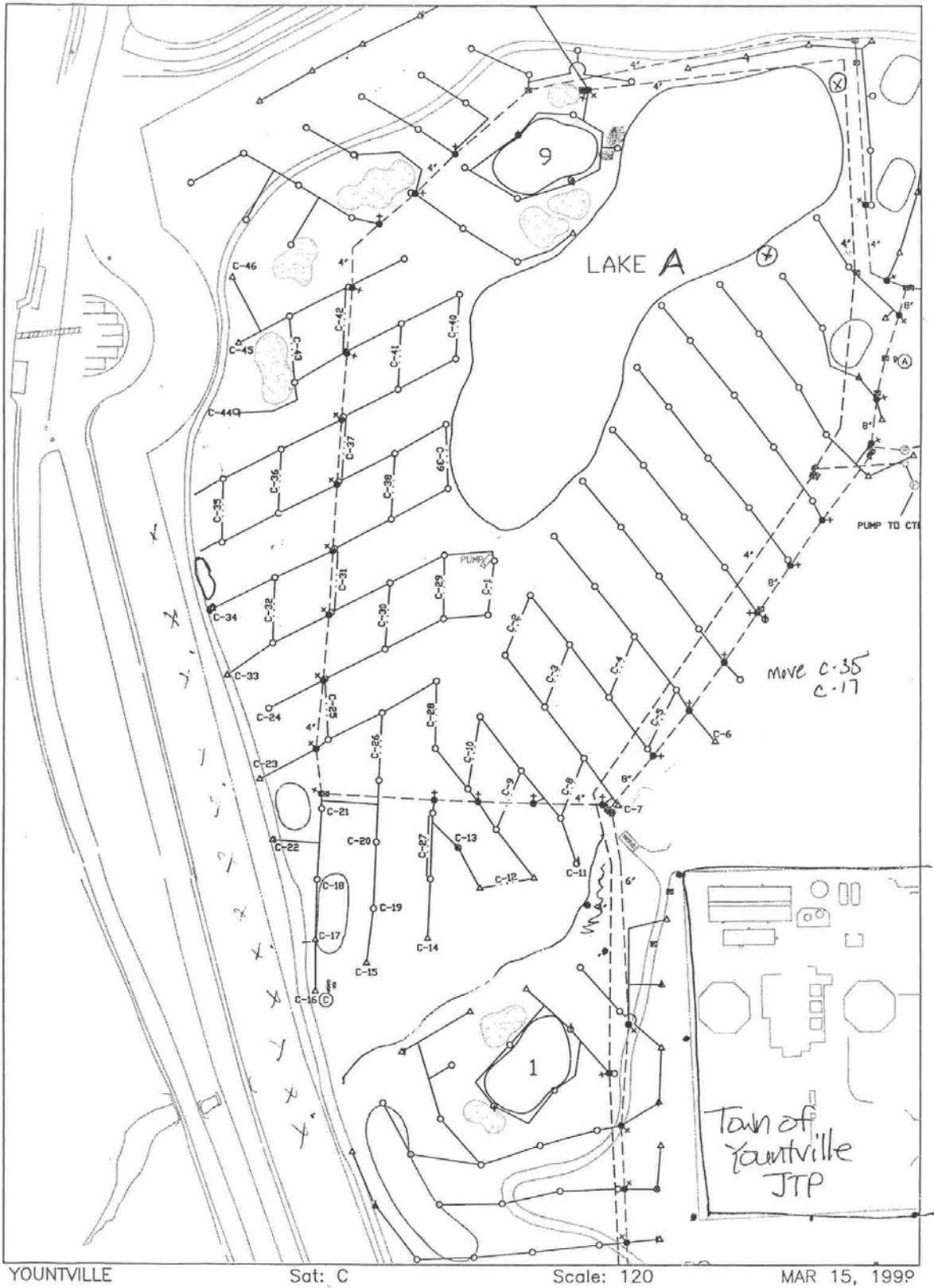


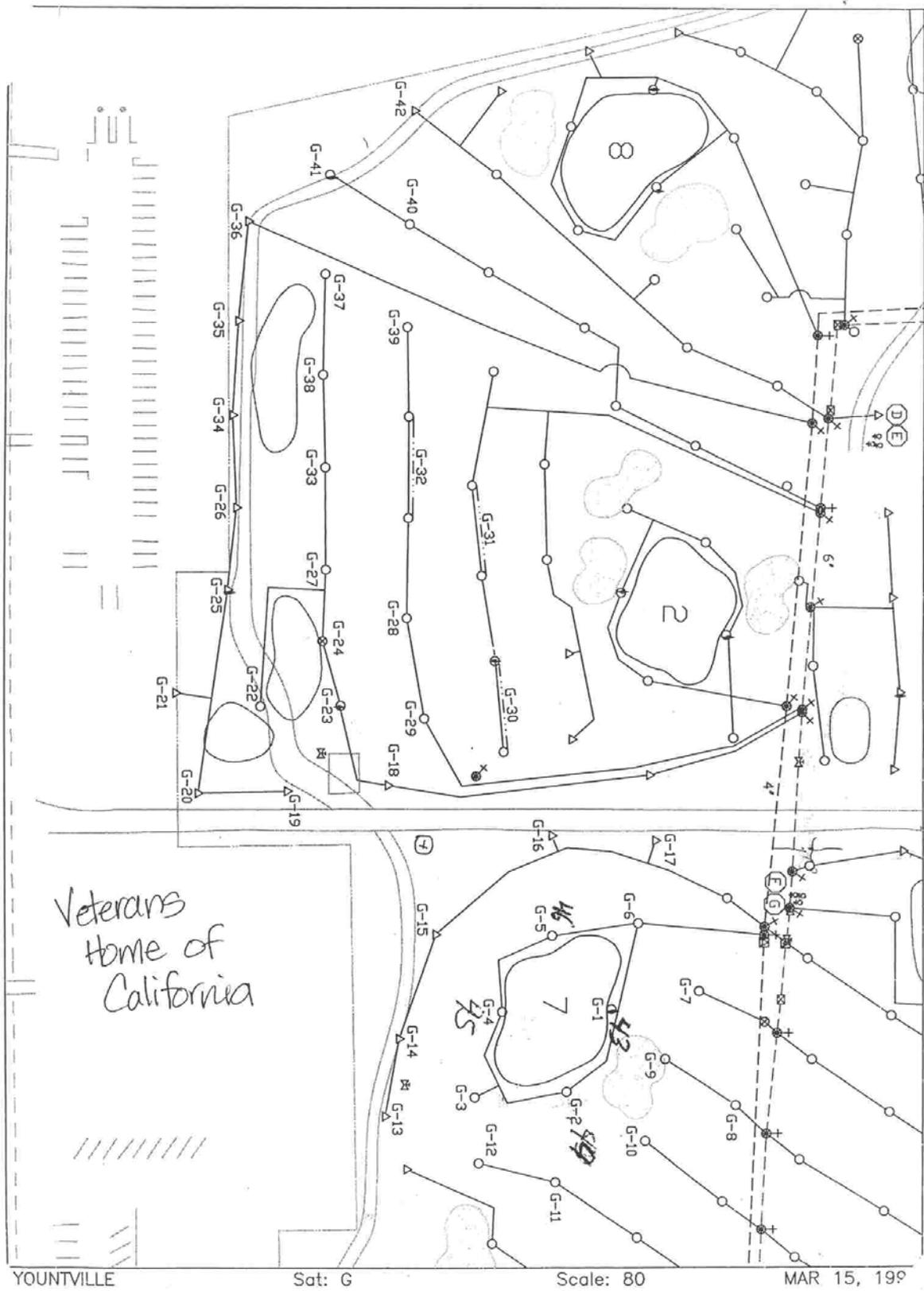












ATTACHMENT 2

Stag's Leap Winery Site Information



Stag's Leap Winery: Examples of Recycled Water Use Warning Signs Posted at Hose Bibs and Vineyard Blocks

The site map showing recycled water use areas of Stag's Leap Winery is being submitted as a separate file, "Attachment 2 – Stag's Leap Site Map."

ATTACHMENT 3

Clos du Val Winery Site Information

*The Clos Du Val site map was submitted to the Water Board and
Department of Health Services in April 2004.*

ATTACHMENT 4

Locations of Water Supply Wells near User Areas

All wells within 1000 ft of the Town of Yountville recycled water use areas were identified for presentation in the Engineering Report. Napa County Department of Environmental Management (NCDEM) researched well locations within the defined area, based on parcel numbers supplied by the Town of Yountville and its consultant. The location of the wells, identified by parcel number, is presented in the **Table 4-1**. These parcels were identified by NCDEM as having existing wells, test pits, and/or proposed wells. The parcel maps were included in the original submittal to the Water Board/DHS along with a letter from NCDEM verifying the search protocols.

Table 4-1. List of Wells Located within 1000ft of the Recycled Water Use Areas

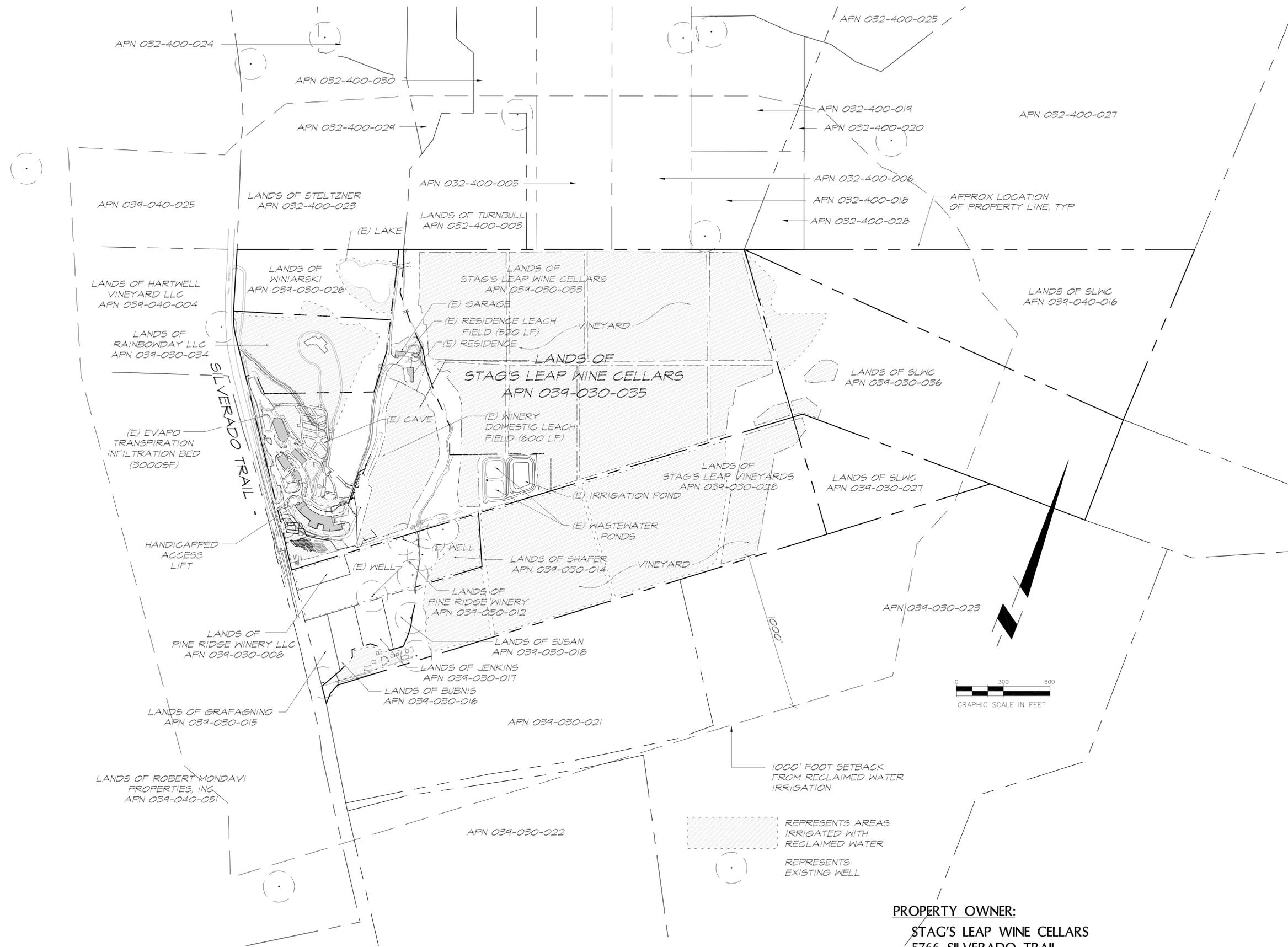
Parcel Number	Neighboring Recycled Water Use Site	Number of Wells
32-060-27	Stag's Leap	1
32-080-12	Stag's Leap	1
32-400-06	Stag's Leap	1
32-400-17	Stag's Leap	1
32-400-18		
32-400-05	Stag's Leap	1
32-400-29	Stag's Leap	2
32-400-19	Stag's Leap	2
32-400-20		
32-400-24	Stag's Leap	1
32-400-23	Stag's Leap	2
32-400-03	Stag's Leap	2
39-040-04	Stag's Leap	1
39-040-25	Stag's Leap	1
39-040-34	Stag's Leap	2
39-640-07	Stag's Leap	1
39-640-01	Stag's Leap	1
34-150-08	Vintner's Golf Club	2
34-150-26	Vintner's Golf Club	1
36-010-13	Vintner's Golf Club	1
39-030-23	Clos du Val	1
39-030-14	Clos du Val & Stag's Leap	2
39-030-18	Clos du Val & Stag's Leap	1
39-030-18		1

Table 4-1 (Continued). List of Wells Located within 1000ft of the Recycled Water Use Areas

Parcel Number	Neighboring Recycled Water Use Site	Number of Wells
39-030-12	Clos du Val & Stag's Leap	1
39-030-15	Clos du Val & Stag's Leap	2
39-040-17	Clos du Val & Stag's Leap	1
39-040-51	Chimney Rock & Clos du Val	2
39-040-51	Chimney Rock & Clos du Val	2
39-051-03	Chimney Rock & Clos du Val	1
39-051-07	Chimney Rock & Clos du Val	2
39-051-08	Chimney Rock & Clos du Val	3
39-630-12	Chimney Rock & Clos du Val	1
39-051-18	Chimney Rock	1
39-051-11	Chimney Rock	1
39-620-03	Chimney Rock	1
39-620-01	Chimney Rock	1
39-630-06	Chimney Rock	1
39-640-08	Chimney Rock	1

The parcel maps and letter from Napa County Dept. of Environmental Management were submitted to the Water Board and Department of Health Services in April 2004.

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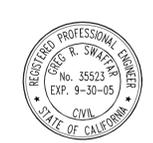
PROPERTY OWNER:
STAG'S LEAP WINE CELLARS
5766 SILVERADO TRAIL
NAPA COUNTY, CALIFORNIA 95448
(707) 935-3000

SUMMIT ENGINEERING INC.
 463 AVIATION BLVD. #200
 SANTA ROSA, CA 95403
 Phone 707.527.0775 Fax 707.527.0212

STAG'S LEAP WINE CELLARS
 5766 SILVERADO TRAIL
 NAPA, CALIFORNIA
 APN 039-030-035

PW SYSTEM IMPROVEMENTS
REUSE AREA SITE PLAN

10-27-04 ISSUED PER COUNTY COMMENTS
 12-22-04 REVISED POND #3 TO IRRIG ONLY



DATE: 6-17-04
 JOB NO: 03039
 SCALE: AS SHOWN
 DRAWN: MW
 CHECKED: CC
 SHEET

PW5