

TECHNICAL MEMORANDUM



Pilot Project

PREPARED FOR: City of Santa Rosa

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Background and Purpose

The Santa Rosa Urban Reuse Pilot Project provides for expansion of the existing urban reuse facilities located at the City of Santa Rosa's West College Utilities Facility. The purpose of the Pilot Project is to provide for the retrofit of a small number of existing users to recycled water with an opportunity to evaluate the customer outreach and retrofit process on a small scale, and identify and implement improvements if necessary, before implementing the Santa Rosa Urban Reuse Project (SRURP) on a larger scale. The Pilot Project is anticipated to be the first contract completed under Phase 1 of the SRURP.

This TM includes the following sections:

- Conclusions and Recommendations
- Scope
- Distribution Area and Demands
- Facilities
- Site Plan
- Cost Estimate

Additional information regarding the Pilot Project facilities is available in the following SRURP documents:

- *Recycled Water User's Guide, November 2007*
- *Recycled Water Standards, October 2007*

- *Water Quality and Treatment, October 2007*
- *Preliminary Pipeline Drawings, November 2007*

Conclusions and Recommendations

The SRURP Pilot Project would provide recycled water for urban reuse to 3 existing customers and up to 15 additional customers. The potential customers have existing irrigation accounts and are candidates for retrofit to recycled water for approved applications. The total demand from customers along Stony Point Road between West College Avenue and Glenbrook Drive that could be served by the Pilot Project is 30 million gallons per year. Upgrade of the existing recycled water facilities located at the West College Utilities Facility is required to serve this demand. The upgraded facilities would be relocated on the site to facilitate construction of the Phase II improvements at the West College Utilities Facility. The estimated total project cost for implementing the Pilot Project is \$3,370,000. Proposition 50 and Local Recycled Water Tier 2 Conservation (LRT2) grant funding could be available to offset a portion of the total project cost.

Scope

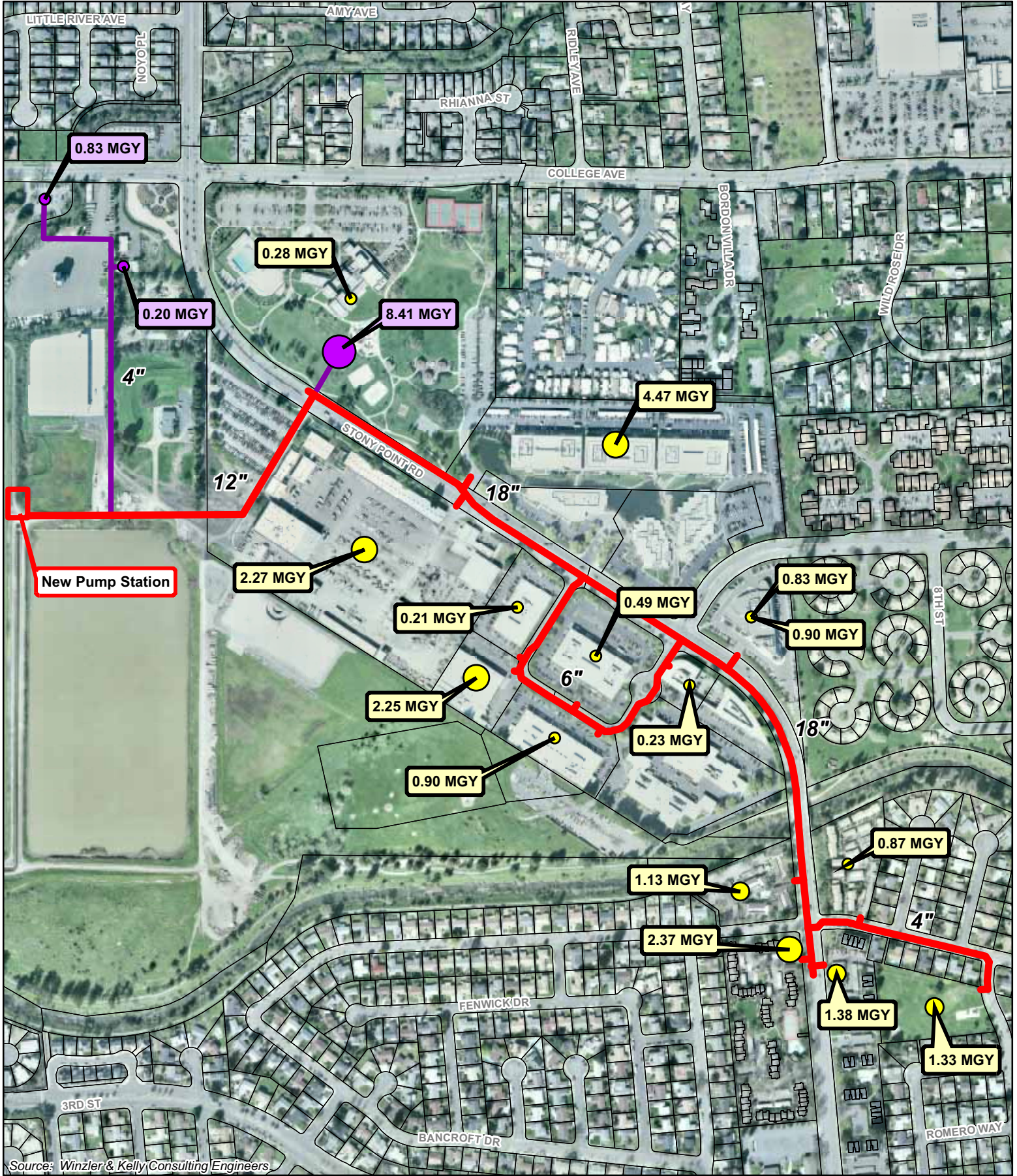
The City of Santa Rosa has a small urban reuse system at the West College Utilities Facility serving three customers. The SRURP Pilot Project scope includes upgrading these facilities to serve additional customers along Stony Point Road between West College Avenue and Glenbrook Drive. Fifteen potential connections have been identified in this distribution area with potential for recycled water use. The preliminary design of the SRURP Pilot Project includes the following facilities:

- Upgrade and relocation of West College pump station and algae removal facilities (filtration and chlorination);
- New recycled water pipeline traversing the West College Utilities Facility;
- New transmission and distribution piping in Stony Point Road from West College Avenue to Glenbrook Drive, and in Stony Circle and Glenbrook Drive; and
- Service retrofits for 15 potential customer connections.

The City is also in the process of designing improvements at the West College Utilities Facility and moving the existing West College pump station and filter facilities to a new location on the property to improve the site layout. As the SRURP is implemented over time, and the Stony Point Road transmission main is connected with the rest of the transmission system, the West College pump station and algae removal facilities would no longer be required.

Distribution Area and Demands

The Pilot Project distribution area includes potential customers along Stony Point Road between West College Avenue and Glenbrook Drive, as shown in Figure 1. Pipelines are



Source: Winzler & Kelly Consulting Engineers

Legend

Existing Urban Reuse Demands	Potential Retrofit Demands
MG per Yr	MG per Yr
● 0 - 1	● 0 - 1
● 1 - 2	● 1 - 2
● 2 - 5	● 2 - 5
● 5 - 10	

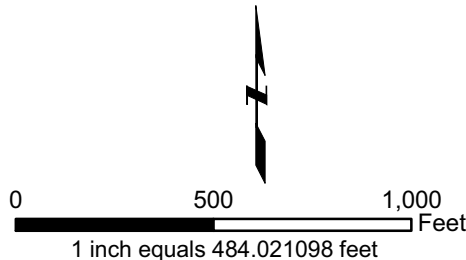


Figure 1
Pilot Project Distribution Area and Demands

IRWP MASTER PLAN
Urban Reuse

IRWP
Sonoma County, California

W&K 02059 06 012
November 2007

required in Stony Point Road, Stony Circle, Glenbrook Drive and Westgate Drive to serve all of the accounts. The potential Pilot Project demands are summarized below in Table 1.

TABLE 1
Potential Demands for Pilot Project
IRWP Santa Rosa Urban Reuse Project – Pilot Project

Description	Annual Demand ^a
Existing Urban Reuse Customers	10 MGY
<u>Potential Recycled Water Users (Retrofits)</u>	<u>20 MGY</u>
Total Potential Demand for Pilot Project	30 MGY

^a MGY = million gallons per year.

The existing demand for Finley Park and the potential demand for Westgate Park represent large turf irrigation demands. The remaining demands are small turf areas and drip irrigation of landscaping, or process water. The existing West College pump station has a peak flow rate of 600 gallons per minute (GPM) which is more than 30 times greater than the average day flow rate. Applying this peaking factor to the total potential demand of 30 MGY would result in a peak flow of 1,900 GPM for the Pilot Project. Scheduling sequential irrigation for the customers would reduce the overall peak flow required at any given time. A peak flow of 1,500 GPM is achievable utilizing this operating strategy and is assumed for sizing the SRURP Pilot Project facilities.

Facilities

The Pilot Project includes upgrading and relocating the West College pump station and algae removal facilities and constructing new distribution piping and customer retrofits. The new location of facilities at the West College Utilities Facility would be coordinated with the Phase II improvements that are currently under design for construction beginning in 2008.

Pump Station

The existing pump station includes two 25-horsepower vertical turbine pumps with variable frequency drives (VFDs). The pumps are installed in cans and draw water from a common wet well that is connected to the two recycled water storage ponds. The wet well includes a screen to protect the pumps from potential damage from debris in the pond water. A 2,100-gallon hydropneumatic tank maintains pressure in the system with air provided by an existing pneumatic air distribution system at the West College Utilities Facility. The pumps, motors, VFDs, starters, and hydropneumatic tank would be relocated and used in the new pump station location. New oversized cans would be provided for the existing pumps to allow for future upgrades, if desired. The power service and electrical equipment would also be oversized to allow for future upgrades.

In addition to the existing pumps and hydropneumatic tank, two new 100-horsepower pumps with VFDs would be needed to meet the peak flow rate of 1,500 gpm. One of the pumps is a redundant backup unit provided for reliability. A second, 2,500-gallon hydropneumatic tank would be required to maintain pressure in the system and minimize

pump starts during peak flows. The pneumatic air system would be extended to the new pump station site. New controls, similar to the existing controls, would be provided at the pump station. Pump operation would be based on pressure and level in the hydropneumatic tanks. Underground electrical service would also be extended from the existing pump station to the new location.

A new wet well would be constructed over the existing 18-inch pipe from Pond #2. The existing wet well would remain in place as a manhole so that water stored in Pond #1 can feed the new pump station. The screen in the existing wet well would be reused in the new wet well. The new pump station would be constructed and made operational while the existing pump station remains in service. When the new pump station is operational, the existing facility would be decommissioned and the equipment relocated to the new pump station.

Filters

Analysis of the water in the seasonal storage ponds at the West College Utilities Facility, described in the SRURP technical memorandum *Water Quality and Treatment, October 2007*, indicates the need for algae removal facilities for urban reuse. The existing West College pump station has always operated filters to serve this purpose but performance of the filters has historically been less than satisfactory. New 140-mesh disc-type filters with automatic backwash (Netafim™) were recently installed at the existing pump station to replace previous filter facilities, and the new filters provide acceptable performance. These filters would be relocated to the new pump station, and additional filters would be added to meet the peak flow rate of 1,500 gpm. Backwash water would be discharged to Pond #1 as it is with the current system.

Chlorination

Chlorination of the recycled water with sodium hypochlorite would be provided for algae control. The chlorination facilities would be sized for a maximum dosage to achieve a residual of 2 milligrams per Liter (mg/L) in the water for shocking the system, but would normally operate at a dosage rate to achieve 1 mg/L or less residual in the recycled water. The chlorination facilities include a 190-gallon HDLPE (Spell out) storage tank (42" diameter by 48" high) with secondary containment, a chemical metering pump and a magnetic flow meter on the recycled water line. The hypochlorination dosing rate would be paced off the flow rate to achieve a desired concentration selected by operations staff.

Pipelines and services

At a maximum velocity of 5 feet per second (fps) and a peak flow rate of 1,500 gpm, a 12-inch diameter pipeline is needed to convey water from the pump station to Stony Point Road. A 12-inch pipe could accommodate peak flows up to 1,750 gpm without the velocity exceeding 5 fps. The existing 4-inch pipeline serving the existing customers north of the existing pump station would remain in service and would be connected to the new 12-inch pipeline.

The transmission pipeline in Stony Point Road would be 18-inch diameter. This pipeline would have a gate valve and blind flange at each end to provide for future connections as the SRURP transmission mains are constructed to the south and north of the Pilot Project

distribution area. From the transmission main, laterals would serve customers near the location of their irrigation meters to facilitate the retrofit process. Pipelines, service laterals and service retrofits would be provided in accordance with the City's *Recycled Water Standards, October 2007* and *Recycled Water User's Guide, November 2007*.

Site Plan

Figure 2 shows a conceptual facilities layout of the new recycled water pump station, and Figure 3 shows the location of the existing and new facilities on the West College Utilities Facility site. The preliminary design shown is flexible and could be modified to meet the requirements of the Phase II Improvements of the West College Utilities Facility. Coordination between the Pilot Project and the Phase II Improvements during detailed design is critical, particularly with the timing of underground work for the Pilot Project.

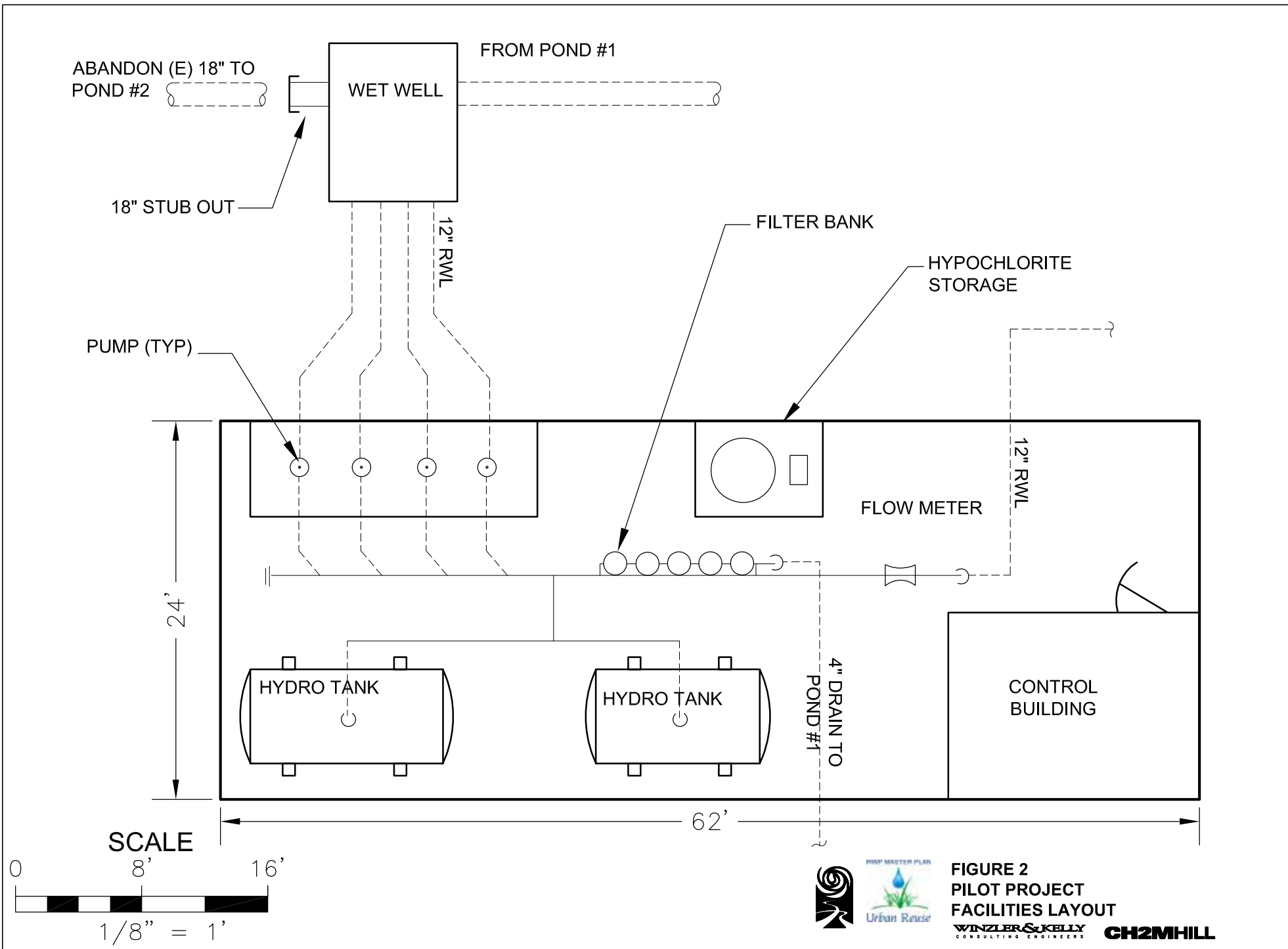
Cost Estimate

The total project cost for the Pilot Project, including service retrofits, is estimated to be \$3,370,000 including engineering, administration, construction and contingencies. A summary of the estimated costs is provided in Table 2.

TABLE 2
Estimate of Probable Cost for Pilot Project
IRWP Santa Rosa Urban Reuse Project – Pilot Project

Facility Description	Estimated Cost^a
Transmission and distribution mains in public right-of-way	\$1,765,000
On-site retrofits	\$105,000
West College Utilities Facility pipeline	\$500,000
Upgrade and relocate West College PS and Algae Facilities	\$1,000,000
Total Pilot Project Facilities	\$3,370,000

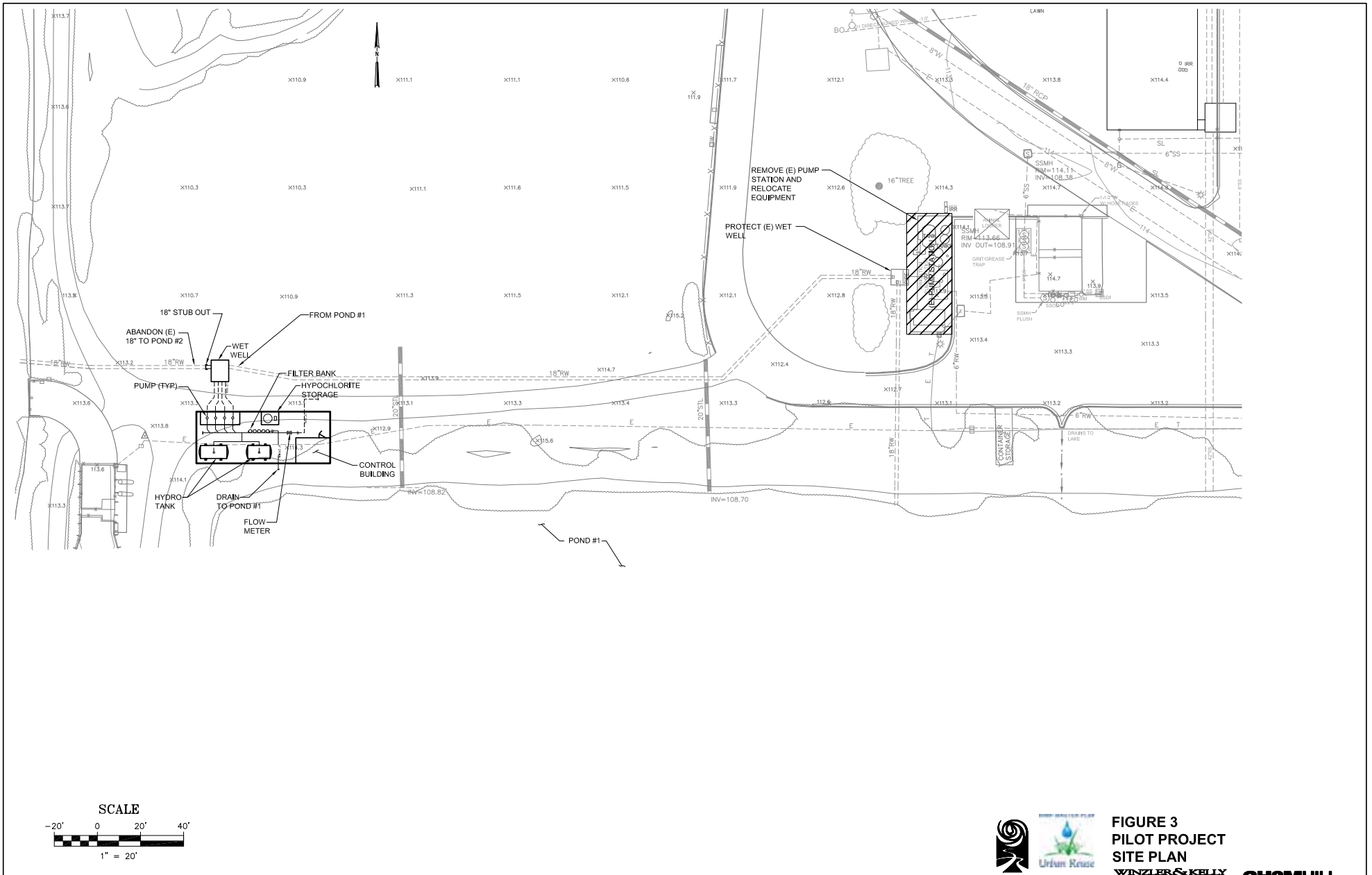
^a Includes 15% construction contingency and 25% engineering/administration allowance; ENRCCI = 9100.



PUMP MASTER PLAN
 Urban Reuse

FIGURE 2
PILOT PROJECT
FACILITIES LAYOUT

WINZLER & KELLY
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**FIGURE 3
 PILOT PROJECT
 SITE PLAN**

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 CONSULTING ENGINEERS

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