

Final

Valiano Conceptual Water and Recycled Water Study

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1. Introduction

The proposed Valiano development (project) is located on approximately 239 acres within an area called Eden Valley, which is an unincorporated area of northern San Diego County. The property is located approximately one mile south of State Route 78 (SR-78) and the Nordahl Road exit along Country Club and Hill Valley Drives. When fully developed, the project will develop 326 residential units on varying lot sizes within five neighborhoods. The project is being processed as a General Plan Amendment and Specific Plan with the County of San Diego (County).

The purpose of this Conceptual Water and Recycled Water Study (Study) is to develop preliminary potable and recycled water systems to serve the proposed project within the Rincon del Diablo Municipal Water District (District) in support of the processing of a Tentative Map within the County.

2. Potable Water Source

The project is located in the District's Improvement District 1 South (ID-1) water system which serves existing development within the City of Escondido and the County of San Diego, generally south of SR-78 and west of Interstate 15 (I-15). The District maintains north and south water systems that operate at slightly varying pressures. The north water system is established by two reservoirs (R-3A and R-3B) which operate at high water levels of 1,000 feet and is supplied by one San Diego County Water Authority (SDCWA) connection. The southerly system includes four reservoirs with slightly varying high water levels with the highest being the R-1A and R-1B reservoirs at 959 feet.

The project is just north of the R-1A and R-1B reservoirs and the Harmony Grove Village development and will be served by the 959 Pressure Zone in this area. Potable water service for the project will be primarily provided by a connection to an existing 14-inch water main along the southern boundary, near Country Club Lane. Secondary sources of water supply are necessary for the project; a new 12-inch main is recommended to connect to Eden Valley Lane, and a 16-inch main to the north at Hill Valley Drive. The 16-inch main can be extended in the future to the District's planned reservoir and transmission projects.

The existing site includes several waterlines that will be abandoned and removed or replaced during various construction phases. It may be necessary to maintain water service to existing customers along the southerly boundary during construction.

Based on a proposed graded pad elevation range of 880 feet in the southwest portion, to 630 feet in the southeast, static pressures within the proposed on-site water system will range between 34 psi to 142 psi based on the high water level of 959 feet at the R-1A reservoir. Because of the low static water pressures along the western boundary, a small boosted pressure zone will be required to serve lots above approximately 800 feet in elevation.

3. Project Land Use and Water Demands

This section of the report presents information regarding the District's land use and potable water planning criteria and projected water demands for the project.

The project has a gross acreage of 239 acres and will develop 326 residential units, with lot sizes ranging from 6,000 square feet (sf) to 40,000 sf. A summary of the proposed land uses are presented in **Table 1**.

Table 1 Project Land Uses

Site	Gross Acreage	Dwelling Units
Single Family Residential		277
Condominium Residential (detached)		49
Open Space	31.6	0
Parks ⁽¹⁾	6.46	0
Landscape Irrigation ⁽¹⁾	28	0
Total		326

⁽¹⁾ Assumed served by recycled water system.

The District's 2011 Harmony Grove Potable Water Study presented unit demand criteria for residential and non-residential land uses based on a gross acreage basis and residential density ranges.

The project components include 277 single-family residential units and 49 condominium-mapped detached units encompassing approximately 239 acres located in the unincorporated area known as Eden Valley, just west of the City of Escondido. Based on a gross area application of the design criteria this equates to an average water duty factor of 510 gallons per day per dwelling unit (gpd/DU) for single-family residential and 400 gpd/DU for condominium-mapped residential units. Projected water demands for the project are shown in **Table 2**. The total average day demand for the project is 160,870 gpd (112 gallons per minute [gpm] or 180 acre-feet per year [AFY]).

Based on District design criteria, the peaking factors are 2.6 for max day and 3.9 for peak hour. These equate to a maximum day demand of approximately 416,850 gpd (290 gpm) and a peak hour demand of 440 gpm for the potable water system.

Table 2 Potable Water Demand Criteria

Site	Units/ Acres	Unit Demand (gpd/unit)	Average Demand		Max Day Demand		Peak Hour Demand
			gpd	gpm	gpd	gpm	gpm
Condominium Residential (detached)	49	400	19,600	14	50,960	35	55
Single Family Residential	277	510	141,270	98	365,889	254	382
Total	326		160,870	112	416,850	290	440

4. Potable Water System

This section of the report presents the on-site potable water system based on a review of District facility criteria and the Harmony Grove Village Study.

4.1 Fire Flow Requirements

Effective January 1, 2011, the State of California has adopted changes to the Building Code as it relates to fire protection in residential areas. The changes that impact the project include:

1. All new residential structures will be required to be sprinklered.
2. A minimum fire flow of 2,500 gpm is required in “high risk” or “high severity” areas, mostly notable wildland urban-interface areas.

On December 14, 2010, the District Board adopted the new fire flow requirements as the majority of the District service area is within the High/Very High Fire Severity Zone. Since the project is also located within this high risk area, it will be assigned a minimum fire flow of 2,500 gpm for a 2-hour duration. In addition, the Board also adopted a new policy to provide for a maximum of two simultaneous fires. Accordingly, the project water system was conceptually sized to accommodate two simultaneous fire flows within the project area.

4.2 Storage Requirements

In-District water storage is needed to provide operational, fire, and local emergency water distribution system needs. Since existing potable water storage is located near the project with the R-1B reservoir, it is assumed that the fire storage portion is available and can be used for

Valiano. The adjacent R-1A reservoir is proposed to be converted to recycled water as part of the Harmony Grove Village project and be used by Rincon for operational storage for an expanded system recycled water system. Water storage required for the Valiano can be estimated based on the District's criteria of approximately 3.33 times the average annual demand (0.16 MG per day for Valiano). Therefore, a total of approximately 0.53 MG is recommended to meet the in-District storage needs, exclusive of fire storage which is assumed available in existing storage reservoirs.

Table 3 below presents the storage balance picture for the year 2035. Based on the estimated development growth in the District from 2015 to 2035, the District will need approximately 3 MG of additional potable water storage to meet a regional increase in water demand.

Table 3 Summary of District Treated Water Storage Criteria

Storage Type	Volume (as duration)	2013 Volume Required ⁽¹⁾ (MG)	2035 Volume Required ⁽²⁾ (MG)	Description / Notes
Emergency	3.0 average days	18.7	20.9	Emergency reserve for use during supply interruption
Fire Flow	2 at 2,500 gpm for 2 hours, for each of ID-1 & ID-A	2.4	2.4	District policy is to provide facilities to supply two concurrent fires
Operational	ID-1: 0.33 average days ID-A: 0.40 average days	2.1	2.4	Operational storage addresses time-of-day variation in demands
Total Storage Volume per Criteria		23.2	25.7	
Actual Existing (2013) ⁽³⁾ – Percent of Criteria Total		22.9 99%	22.9 89%	R-1A reservoir volume not included in total
Surplus (Deficit)⁽⁴⁾		(0.3)	(2.8)	2013 volume deficit is not significant. 2035 deficit will require new storage.

MG = million gallons; MGD = million gallons per day

⁽¹⁾ 2013 Volume based on average potable demand of 7,000 AF/yr, or 6.25 MGD

⁽²⁾ 2035 Volume based on average potable demand of 7,900 AF/yr, or 7.05 MGD. Future potable demand could be less if the District elects to pursue an expansion of its recycled water distribution system as part of its New Local Supply initiative.

⁽³⁾ Potable storage volume does not include the R-1A reservoir (3.1 MG), which is planned to be converted to the recycled water system.

⁽⁴⁾ The totals and surplus/deficit data shown here is for the District system as a whole, and does not account for the distribution of storage among pressure zones.

Source: Rincon del Diablo Municipal Water District Water Master Plan Update June 2014

Rincon MWD owns a future reservoir site within the ID 1 South service area, within but not part of the northern portion of the Proposed Project. The 2014 Water Master Plan recommended a 3.0 MG Reservoir, referred to as the “R7 Reservoir” as part of the District’s proposed 5-year capital improvement program to improve regional water capacity.

The R7 Reservoir would provide multiple benefits for the community service area including:

- Operational storage and fire flow capacity needs for existing and planned development in the ID South service area; and
- Upgrades and improvements to the existing ID South service area to the new fire flow standard by providing increased available supply and pressure.

The Proposed Project would provide an opportunity to facilitate earlier construction of the regional R7 Reservoir that would be used to increase fire flow capacity to enhance regional and area fire safety.

A detailed water system analysis would be required by Rincon MWD prior to recordation of the Final Map, to determine at a minimum:

- The final sizing of all on-site water distribution pipelines;
- Phasing of the on-site water system through the Project;
- Connection points to the existing water system;
- Booster pump station sizing; and
- Confirmation of the necessity of the R7 Reservoir.

Based on the findings of the water system analysis, Rincon MWD would work with the Applicant to address the timing and schedule for the R7 Reservoir and pipeline to ensure, the most efficient process for implementation.

5. Conceptual Water System

Figure 1 shows the proposed conceptual on-site water distribution system for the project. A 16-inch water main loops the core development area to support the new fire flow requirements. The primary water supply will initially be from the south and the infrastructure that is currently being constructed by Harmony Grove Villages, which was designed to the new fire flow standard. Because of the high fire flow requirements a large portion of the system will be constructed with 12-inch mains. Shorter water main extensions can be reduced to the District's minimum of 8-inch, if only serving one or two hydrants.

The project will be required to construct a water booster pump station to serve lots above elevation 800 feet. It is estimated that approximately 75 lots along the western boundary would need to be pumped. **Figure 1** illustrates a new 1130 Pressure Zone that would be supplied by the pump station. The proposed pump station would be owned and operated by the District and would be sized for domestic and maximum day plus fire flow demands. A preliminary design report would need to be prepared as part of the final design.

As a condition of development and preparation of final improvement plans, and prior to the Final Map, the District will conduct a detailed hydraulic study to verify the final sizing of the proposed water system.

6. Conceptual Recycled Water System

The primary source of recycled water for the project will be the on-site wastewater treatment and water reclamation facility (WTWRF) (assumed County owned and operated) located at the southeast corner of the development. The WTWRF will produce Title 22 water and provide a recycled water supply for on-site irrigation demands. At build-out, the WTWRF is estimated to produce 70,100 gpd or 50 gpm of average daily recycled water supply.

The District currently purchases recycled water from the City of Escondido. The City of Escondido's Hale Avenue Resource Recovery Facility (HARRF) is an 18-million gallons per day (mgd) activated sludge, secondary treatment facility and has been expanded to provide full Title 22 recycled water capacity. The permitted tertiary treatment capacity is 9.0 mgd and peak day summer demands have approached 7 to 8 mgd in the City's system. The District will soon purchase all the recycled water supplied by the proposed Harmony Grove WRP currently under construction (180,000 gpd or 125 gpm). The County (Valiano) WTRWP recycled water supply will be integrated into the District's recycled water system.

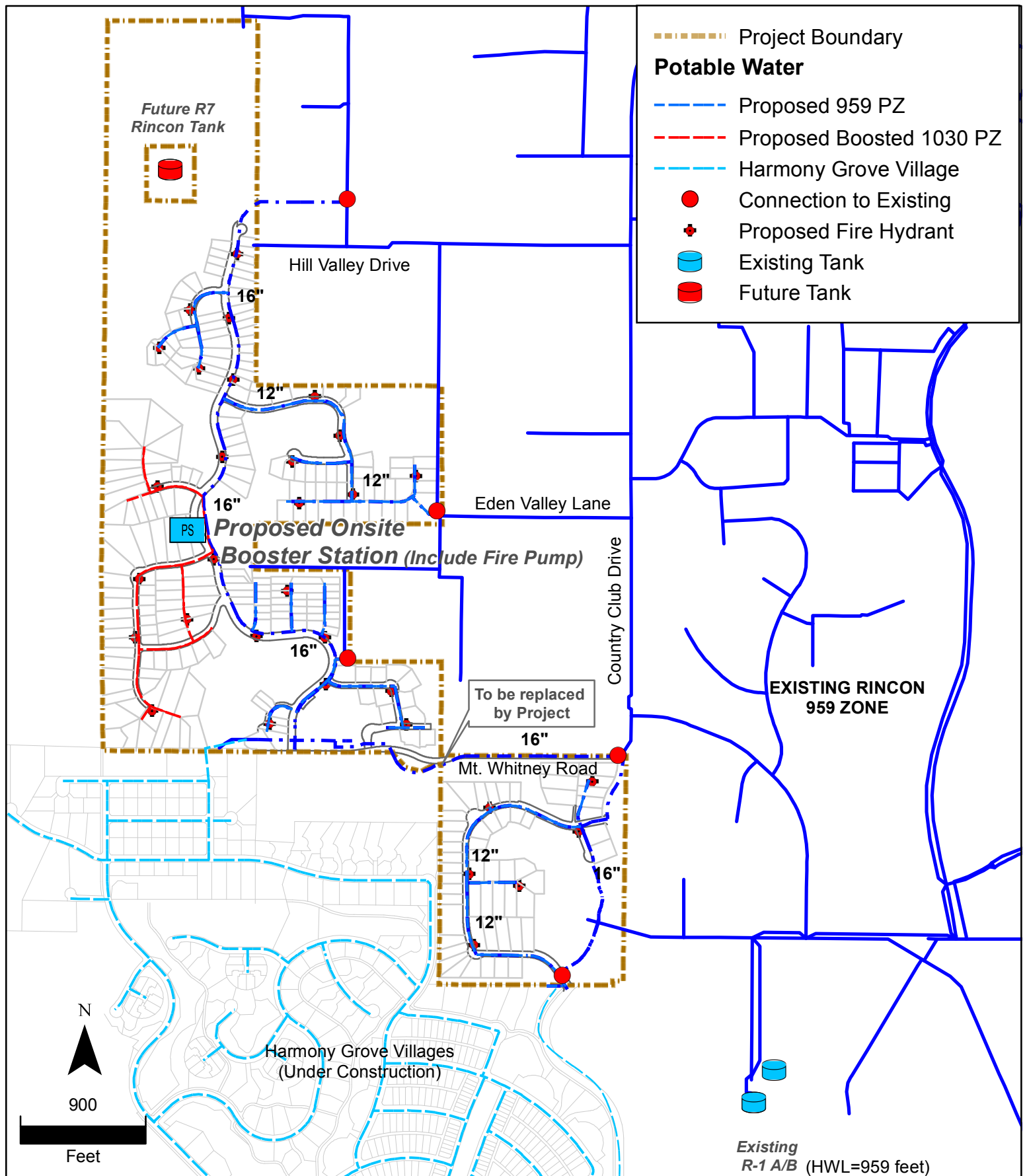
The proposed Valiano project will develop sufficient on-site landscape irrigation demand to beneficially reuse all the effluent from the WTRWF on an average annual demand basis. This will be accomplished through development of significant common area landscape irrigation for streetscapes, manufactured slopes, and public and private parks. In total, it is estimated that approximately 36 acres of permanent landscape area will be irrigated. Except for the parks, the slopes and streetscapes will be a Mediterranean-type landscape requiring between 2.2 and 2.5 acre-feet per year (afy) per acre of irrigation. In comparison, the Harmony Grove Villages landscape irrigation was based on average of approximately 3.0 afy per acre for similar effluent disposal requirements from their on-site water reclamation plant. In summary, with a WTRWF disposal requirement of approximately 70,100 gpd, an average irrigation rate of 1,950 gpd/acre (2.2 afy per acre is required) is well within the proposed landscaping irrigation rate. During final design a detailed water balance and irrigation master plan will be developed to confirm the effluent disposal requirements are satisfied.

Proposed recycled water system will originate at the new WTWRF, which will require a dedicated recycled water pump station to serve the distribution system and also supply the wet weather storage site, via the recycled distribution system, if needed, during the winter months. Given the small booster pump station capacity, no operational storage is recommended on-site at the WTWRF, since operational storage will exist in the District's system. A converted existing potable

reservoir R-1A (3.1 MG) to recycled water is being required by the Harmony Grove Village development.

The recycled water pump station would be sized for the maximum day irrigation demands and similar to Harmony Grove WRP operated by the County as part of the wastewater plant operations. The estimated capacity for the recycled water pump station at the WTWRF is about 150 gpm.

The project will require approximately 6 MG of wet weather storage, as part of the design of the Valiano WTWRF, to satisfy the permit requirements (minimum 84 days of storage) of the San Diego Water Quality Control Board. This study assumes this storage is dedicated to the WTWRF operations during wet weather events. Surplus recycled water generated by the WTWRF during winter months would be stored in the wet weather storage facility for future use by the project. This study recommends that the District coordinate this operation as part of its agreement with the County. Recycled water storage in the wet weather storage site will likely need to be retreated or filtered at the WTWRF and this should be properly designed into the WTWRF. The sewer collection system could be used to convey the recycled water from storage back to the WTWRF. **Figure 2** includes the recommended recycled water system to serve the proposed irrigated areas and to achieve the minimum 36 acres of irrigated area.



Note: All Pipeline 8-inch Unless Otherwise Noted

Conceptual Onsite Water System

Figure 2

LEGEND

SEWER TREATMENT PLANT



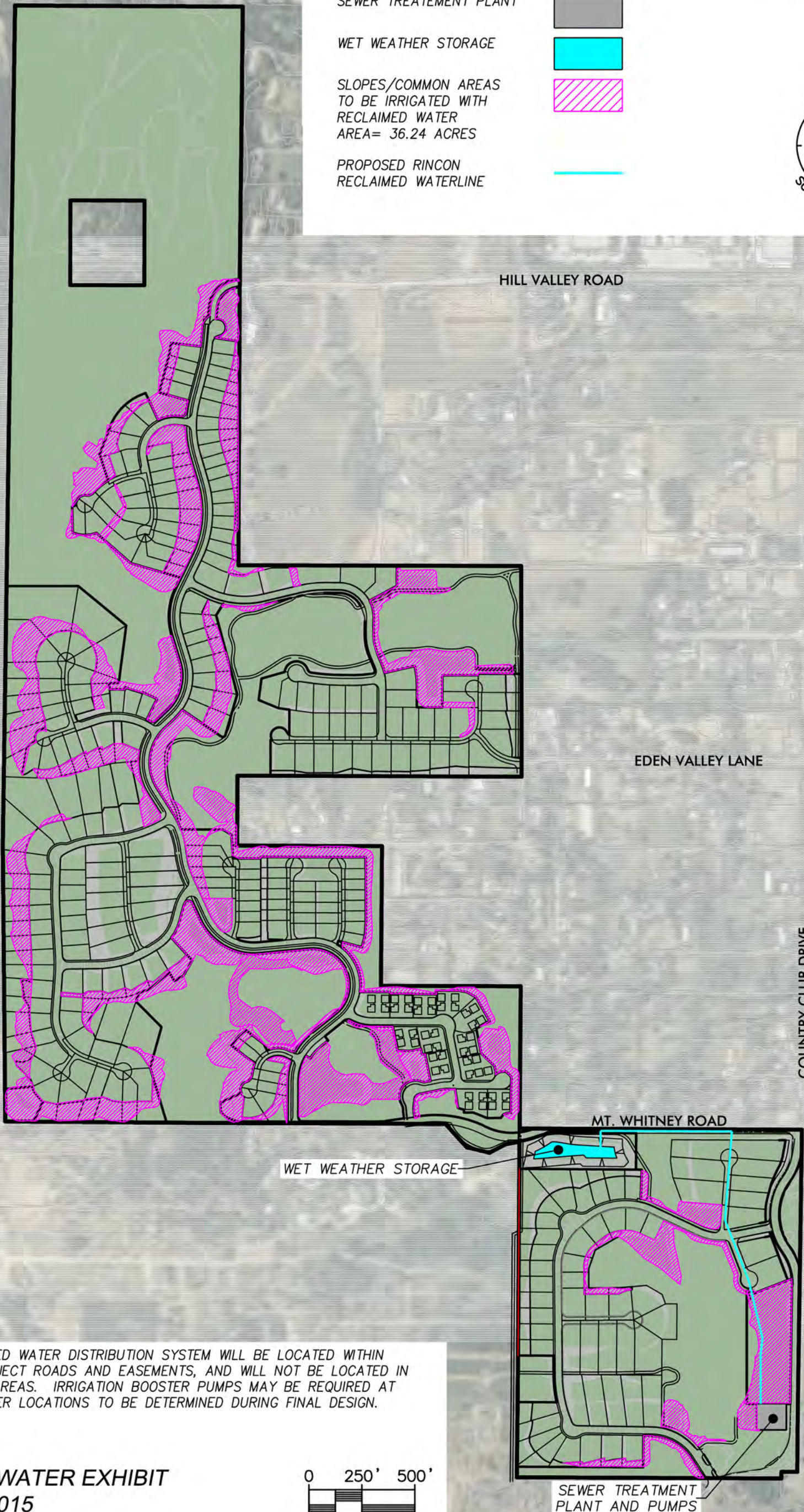
WET WEATHER STORAGE



SLOPES/Common Areas
TO BE IRRIGATED WITH
RECLAIMED WATER
AREA= 36.24 ACRES



PROPOSED RINCON
RECLAIMED WATERLINE



NOTE: RECLAIMED WATER DISTRIBUTION SYSTEM WILL BE LOCATED WITHIN PROPOSED PROJECT ROADS AND EASEMENTS, AND WILL NOT BE LOCATED IN UNDEVELOPED AREAS. IRRIGATION BOOSTER PUMPS MAY BE REQUIRED AT INDIVIDUAL METER LOCATIONS TO BE DETERMINED DURING FINAL DESIGN.

