APPENDIX WW

WASTEWATER FEASIBILITY STUDY

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Revised October 15, 2019
Originally Submitted July 31, 2019

Chris Meredith
Kirsty Shelton
Maha Development

Transmittal: **Wastewater Feasibility Study for Maha Resort at Guenoc Valley**

Dear Chris and Kirsty:

Sherwood Design Engineers, Inc. (SDE) is pleased to present the revised Administrative Confidential Internal Draft Wastewater Feasibility Study ("Study") for Maha Resort at Guenoc Valley.

The primary purpose of this Study is to evaluate the available technical information to ascertain if there is a means to collect, treat, and dispose or reuse the wastewater generated for both the first and future phases of the Maha Resort at Guenoc Valley ("Project"). The study provides a compilation and review of critical information and data that will be needed to demonstrate the viability of the project to both local and state water regulators and to secure water related permits for the project.

The result of our analysis of the currently available data and information indicate that the proposed project is viable to manage and reuse treated wastewater at the site. The wastewater management plans will be permitted by the California Regional Water Quality Control Board and can be permitted within the State's permitting framework without any special requirements. The project is also consistent with the State's water recycling policies and regulations.

Thank you for the opportunity to assist you with this intriguing and complex project. Please contact me if you have any questions or require any additional information.

Sincerely,

Peter Haase

PETER HAASE, MS, PE
Principal Engineer

Enclosures

Wastewater Feasibility Study
For
Maha Resort at Guenoc Valley

October 15, 2019

Prepared for

Lotusland Investment
Holdings

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Table of Contents

List of Figures

List of Tables

1. Introduction

The Maha Resort at Guenoc Valley has applied to the County of Lake for a development application. Pursuant to the California Environmental Quality Act (CEQA) the application will include an Environmental Impact Report (EIR). The EIR will include a programmatic analysis of the impacts to rezone the 16,000-acre Guenoc Ranch to "Guenoc Valley District (GVD)". In addition to the programmatic level EIR to allow the rezone, the EIR will include a detailed, project level analysis of the impacts at a Project level review of the first phase (Phase I) of development, submitted as the Specific Plan of Development (SPOD).

The Programmatic review of the overall project will occur in the EIR to assess the environmental impacts of the entire project proposal. Project level review will analyze the specific objectives and environmental impacts of the proposed first phase of development, as outlined in the SPOD. The Project Level review EIR will analyze the environmental changes caused by a development including the construction and operation, whereas the programmatic EIR will look at the impacts of the rezone classification rather than a project specific analysis. Future phases of the project will require additional CEQA review.

The SPOD identified Phase I as the construction of the roads and the utility infrastructure, approximately 255 hotel rooms, 144 resort residential units, and 411 Residential villas ("Total Units")[1], workforce and staff housing, and the accessory to resort commercial structures. This report looks at the wastewater feasibility of these operations relating to the phase one development. Future phases or future development will include additional hotel rooms, resort residential units, residential villas, new roads and utility infrastructure; however, the exact number and location of the anticipated improvements are unknown at this time.

This report presents the wastewater feasibility study in detail for the first phase and in concept for the future phases. The primary purpose of this study is to evaluate both phases of the Project on wastewater generation and the methods for collection, treatment, and disposal or reuse of the wastewater. The study evaluates the potential impacts the wastewater systems could have on adjacent properties and to sensitive cultural, historical and biotic resources on the property. The study provides a compilation and review of critical information and data that will be needed to demonstrate the viability of the project to both local and state water regulators and to secure water related permits for the project.[2]

[1] Since the publication of this study, the total units have been updated to be less than the number indicated here based on the tentative map lot analysis; therefore, the total analysis is conservative.
[2] General Plan of Development submitted December 2018. SPOD & Tentative Maps submitted May 2019.

2. Site and Project Description

The Maha Resort at Guenoc Valley (Project) is situated on a 16,000 acre property within the Guenoc Valley in Lake County, California. The project is located approximately three miles southeast of Middletown on the southeast border of Lake County, bordering Yolo and Napa Counties to the south and east. Figure 1 presents a site vicinity map. The Project site is approximately 95 miles northeast from San Francisco, 85 miles southwest from Sacramento, 40 miles east of Santa Rosa and 25 miles southeast from Clearlake.

The Guenoc Valley is a small inland valley set on an alluvial fan, isolated from surrounding areas by rocky ridges and volcanic outcroppings and rock. As part of the inner coastal range of Northern California, the site is characterized by varied topography, with rolling hills, oak woodlands, irrigated vineyards, grazing corridors, open spaced, meadows and lakes. Ground elevation ranges from 600 to over 1,600 feet above sea level. The average rainfall is 35 inches a year.

The Project proposal presented to Lake County is to transform the property into a state-of-the-art hospitality, rural residential and recreational facilities set into the rural landscape. The Project is organized into individual resort communities, defined by low impact designs that prioritize low density and clustered development, preserving surrounding open space and agricultural cultivation. The resort communities have been designed to be built with and into the landscape to minimize construction impacts to the natural landscape and habitats.

The Project preserves the long history of agricultural use by maintaining the vineyards and grazing lands while enhancing and diversifying agricultural production to include gardens, culinary education, farmers markets, agricultural retail sales, and resale opportunities for local artisans and business.

The Project commercial elements will include small boutique hotels, commercial shops, and small artisanal food and winery production facilities, small farm and integrative animal husbandry elements and spa and restaurants. The key recreational facilities will include an equestrian center, an 18-hole golf course, rural recreation and camping facilities.

Each resort community or cluster will include a mixture of hotel units, resort residential and residential villas. The clustering of development reduces the sprawl of the development and results in the consolidated hubs for critical utilities, while preserving the rural landscape and agricultural qualities of the property. The Project plans result in a very low-density development, an average of 0.1 unit per acre, with the average lot size of 5 acres for the residential villas with portions of each lot held in conservation.

The Project will also include essential operational facilities including workforce housing, central back-of-the-house operations, and emergency response center.

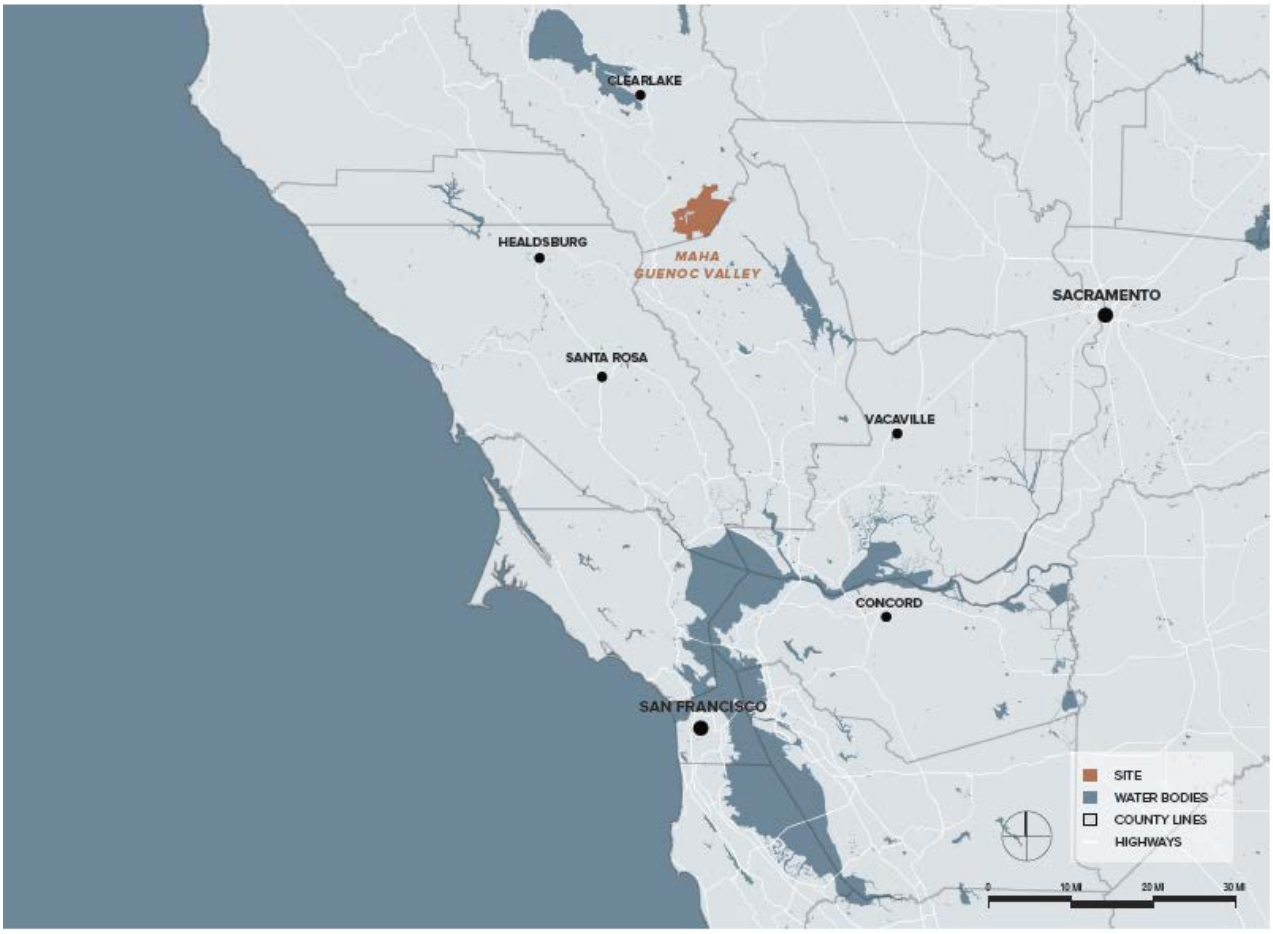

Figure 1. Site Vicinity Map

3. Land Use and Physical Setting

3.1. Existing Land Use

The Guenoc Valley is a small inland valley comprised of varying landscape and vegetation characteristics. The natural landscape includes grasslands, chaparral and oak woodlands. The property also includes vineyards, grazing lands and rural residential developments. A unique and rich feature of the property are the various lakes and creeks and associated wetlands and riparian habitat.

Historically, Guenoc Valley has been grazed by cattle and sheep for centuries. In 1925 William F. Detert constructed Deterted Reservoir and the valley floor irrigation project, which is still in use today. After irrigation was introduced into the Guenoc Valley it became possible to grow vegetables, vineyards and forage crops to support the existing grazing operations. The Guenoc Ranch has been farmed for more than a century. At present there is still a significant cattle and sheep operation in conjunction with the vineyards.

Vineyards. The property includes some of the oldest vineyards planted in Lake County, which were part planted by the famous actress Lili Langtry. Since this early period of time the vineyards have slowly expanded. Beginning in the later 1970's expansion of the vineyard began and in 1980 construction started on the Guenoc Winery, which is still in production today. Most of the valley floor is now vineyard and vineyards are being planted throughout the property, irrigated from numerous lakes on the site. There are approximately 909 acres of vineyards currently planted most of which are managed by an existing leasor.

Grazing. Animal husbandry will continue to be an important economic, management and aesthetic experience of the Project. Cattle will continue to be rotated throughout the site within larger open and pasture areas. Sheep and goats will be used close to development areas to aid in reducing vegetation cover and fire risk.

Ranch Center. The main ranch center includes the ranch manager's home and several other homes, as well as barns and shed which are proposed to be relocated as part of this project. An older ranch home, known as the Gebhard Lodge, located to the northeast of the ranch center is used as a guesthouse and hunting lodge as it has been used for the past 100 year.

3.2. Surface Features

The property extends over many square miles and extends over both moderately steep rolling hills and the nearly level valley floor. Rubbly outcrops and boulders are common throughout the property. In general, the ground surface is soft and spongy. This is a condition generally associated with weak, porous surface soil. In some places, the surface soil is disturbed by randomly arrayed shrinkage cracks generally associated with expansive soil. Locally, expansive soil shrinks and swells with the weather cycle. The cyclic shrinking and swelling tends to disturb the upper portion of the expansive clay. This zone is defined hereinafter as the active layer. Natural drainage consists of sheet flow over the ground surface and slopes that concentrates in manmade surface drainage elements such as roadside ditches, and natural drainage elements such as swales, ravines, and creeks. There are several springs throughout the property.

3.3. Topography

The valley floors within the Guenoc area are fairly level, while the surrounding ridge and hill slopes are moderately steep. Elevation with the project site ranges from approximately 600 feet to 1,600 feet above mean sea level (msl). The Guenoc Valley region in the western portion of the property consists of relatively flat irrigated lands comprised of alluvial deposits within the 1) Bucksnort Creek drainage basin, with hills along the perimeter with approximate elevations ranging from 1,000 to 1,200 feet above msl in this area. 2) The Tephra Ridge region, located in the hills upstream from Cassidy Reservoir in the southwestern portion of the property, contains existing vineyard with elevations up to 1,200 feet above msl. 3) The Lower Bohn Valley region located in the central portion of the property includes irrigated and irrigable lands on the valley floor and gentle hillsides, with moderately steep slope ridges encircling the valley with elevations ranging from 800 to 1,200 feet above msl. Irrigated and irrigable land in the 4) Big Basin region includes alluvial deposits adjacent to Putah Creek and the lower reaches of Bucksnort Creek with elevations ranging from 600 to 800 feet above msl, and the area is surrounded by moderately steep slopes. 5) The Northern Ranch region includes more rugged land, with high plateau and mountainous areas with elevations ranging from 800 to 1,200 feet.

3.4. Soils

The soils over the project site are variable and typically range from very thin less than 2 feet thick to 10 feet in thickness above bedrock. Soil types in the Maha Resort Property include over 30 different soil series including, but not limited to: Benridge Variant loam, Bressa-Millsholm loam, Cole clay loam, drained; Forward Variant-Kidd; Henneke-Montara-Rock outcrop complex; Jafa complex; Konocti-Hambright complex, and Konocti complex.

3.5. Geology

Lake County is located within the California Coast Range geomorphic province. This province is a geologically complex and seismically active region characterized by sub-parallel northwest-trending faults, mountain ranges and valleys. The oldest bedrock units are the Jurassic-Cretaceous Franciscan Complex and Great Valley sequence sediments originally deposited in a marine environment. Subsequently, younger rocks such as the Tertiary-age Sonoma Volcanics group, the Plio-Pleistocene-age Clear Lake Volcanics and sedimentary rocks such as the Guinda, Domengine, Petaluma, Wilson Grove, Cache, Huichica and Glen Ellen formations were deposited throughout the province. Extensive folding and thrust faulting during late Cretaceous through early Tertiary geologic time created complex geologic conditions that underlie the highly varied topography of today. In valleys, the bedrock is covered by thick alluvial soil. The project area is in Lake county and borders Napa county.

The property is underlain by Quaternary terrace deposits and olivine basalt, as well as older units such as Cretaceous-Jurassic Franciscan sandstone, shale, mélange, serpentinite, and greenstone. There are also localized outcrops of Cretaceous-Jurassic Great Valley Sequence and Jurassic Knoxville Formation.

A substantial thickness of sand and gravel alluvial deposits occurs along Putah Creek on the northeast side of the property. Similar deposits to a thickness of 5-15 feet occur along Bucksnort Creek and in other large drainages. Thinner alluvium, mixed with silt and clay is common along smaller drainages.

3.6. Existing Wastewater Infrastructure

Lake County has three utility areas focused mainly in providing water and wastewater services in more densely populated areas. To service these areas, the County has 5 regional wastewater facilities. The nearest wastewater facility to the Project has the capacity to serve almost 500 residential connections in the Middletown and the Harbin Hot Springs areas. The wastewater system is located in Utility Area 3 and consists of over 10 miles of gravity collection system, 3 lift stations, and over 3 miles of force main to the Middletown Wastewater Treatment Plant. The treatment facility was constructed in the 1990s and currently operating near capacity. The facility has a facultative pond with a dry/wet flow of 0.128/0.24 MGD.[3] Middletown is located 5 miles west from the Project property boundary.

Lake County also has a wastewater recycling system. The treated effluent is used for geothermal power production (injection/re-use). There is 50 miles of effluent pipeline with an average flow rate of 5,800 gpm recycling about 85% of the wastewater collected from the County wastewater systems. The recycling program uses solar powered treatment and pumping and creates geothermal power through injection wells just south of Cobb Mountain.

The developed areas within the Project area have existing onsite wastewater system that consists primarily of septic tanks with leachfield disposal. These wastewater systems would remain in place unless development is proposed in the vicinity or is necessary in which case they will be modified as part of this proposal.

[3]http://www.lakecountyca.gov/Government/Directory/Special_Districts/About_Us/Wastewater_Systems/Middletown_Wastewater_System.htm

4. Water Regulations and Agency Approvals

4.1. Overview of Local and State Regulations Related to Wastewater

This section provides a brief summary of the relevant regulations pertaining to wastewater management and reuse for the project. Additional information will be addressed in the Tentative Map, the development agreement and the SPOD.

4.2. Lake County Code, Chapter 9 – Health and Sanitation

The Lake County Code that pertains to wastewater is Chapter 9 – Health and Sanitation, Article 3 – Sanitary Disposal of Sewage.

Chapter 9. Article 3 – Sanitary Disposal of Sewage. These requirements specify that any construction, addition to, alteration of, or modification of a wastewater system for the disposal, treatment or discharge of sewage requires securing a sanitation permit from the County Health Officer. Costs incurred by the County shall be borne by the sub-divider and shall be paid to the Director of Public Works prior to final approval of any improvement work, and inspection fees deposits as determined by the Public Works Department and adopted by the Board of Supervisors.

Under this Article the sub-divider must obtain approval of a new wastewater system from the County health officer demonstrating that the new wastewater system will comply with the local permitting requirements.

4.3. Lake County Code, Chapter 17 – Subdivision Regulations

The Lake County Codes that pertain to sanitary sewer includes several sections of Chapter 17 – Subdivision Regulations and Article 5 – General Design.

Chapter 17. Article 5 – General Design and Improvement Standards. These requirements specify that all sanitary sewer improvement shall conform to the County's "Standard Improvement Specifications". These requirements also state that all sanitary sewer facilities shall not be installed until all plans for such work have been submitted to, approved and signed by the Director of Public Works and by local and state agency. All sanitary sewer improvements shall be installed under the inspection of the, and to the approval of, the Director of Public Works or his duly authorized representative. Costs incurred by the County shall be borne by the sub-divider and shall be paid to the Director of Public Works prior to final approval of any improvement work, and inspection fees deposits as determined by the Public Works Department and adopted by the Board of Supervisors.

Under this Article the sub-divider must obtain approval of a new sanitary sewer system from the County health officer demonstrating that the new wastewater system will comply with the local permitting requirements. When a new wastewater system is proposed the sub-divider shall demonstrate that the proposed design has been approved by the County Health Office and the Director of Public Works.

When connection to an existing sanitary sewer system is not feasible, the sub-divider shall provide evidence to the County Health Officer certifying that the site has ground slopes and soil conditions for satisfactory disposal by septic tanks or other approved method.

The Article further states that the SWRCB requirements for proposed waste discharge shall be complied with pursuant to Section 13260 of the State Water Code, where applicable, before the Planning Commission approves the tentative map for the project.

Wastewater system plans and related technical reports will be submitted to all required County and the State agencies for approval, prior to installing the wastewater system improvements. Maha Development Corporation will pursue approval from the SWRCB once the project has been approved under the requirements of the California Environmental Quality Act (CEQA).

Some portions of the project, such as the large parcels may pursue individual onsite septic systems, and in this circumstance the individual landowner would pursue a permit from Lake County. In other circumstances a landowner of a residential lot may connect to the sanitary sewer system if the soil conditions are not suitable for an individual onsite septic system.

4.4. Lake County Rules and Regulations (LCR) for On-site Sewage Disposal

The Lake County Rules and Regulations for On-site Sewage Disposal are rules adopted in 2010 per the County Code referenced above to prescribe the requirements for on-site sewage disposal systems. This document provides design criteria for standard on-site sewage disposal subsurface systems (LCR 1-130) as well as alternative systems that maybe used in the Project area including subsurface drip disposal systems (LCR 1-155), pressurized distribution systems (LCR 1-160), aerobic systems (LCR 1-195), sand filter systems (LCR 1-190 & LCR 1-200), other media filter (LCR 1-210-215) systems, steep slope systems (LCR 1-220), holding tanks (LCR 1-270), and experimental systems (LCR 1-290).

4.5. Applicable Public Utilities Code (PUC)

The Maha Resort in the Guenoc Valley is planning to form a privately held public utility company that will operate and maintain the water and sewer facilities at the property. Regulated water utilities are considered to be professional water service providers that own water and wastewater utilities, partner with municipalities to form public-private partnerships, or operate and maintain water and wastewater systems as contracted services providers.

In California, these professional water service providers who own and operate utilities are regulated by the California Public Utilities Commission (CPUC). The CPUC establishes rates and terms of service, as well as provides safety and security oversight and, with the State Water Resources Control Board, shares water quality and compliance responsibilities. In the course of regulating these public utilities, the CPUC reviews company costs, audits system needs, holds hearings on general rate cases, applications for capital projects and other formal proceedings, and render decisions that govern the utility's relationship with its customers. The new utility will be regulated by the California Public Utilities Commission. The new water and wastewater utility will initially be a Class C system serving less than 2,000 service connections, and eventually when the Future Phase of development occurs it will likely be a Class B system that will serve between 2000 to 10,000 service connections in the long-term.

Regulated water utilities have more than two centuries of experience providing drinking water to communities of all sizes and in all areas of the United States. Today, nearly 73 million Americans —one of every four people in this country—receive water service from a regulated water utility or a municipal utility operating under a public-private partnership. In California, the regulated water utilities, alone, serve nearly 6 million people, or about one in six Californians. When you add partnerships and contract operations to this total, the percentage grows substantially. There are 138 public utilities in California, including eight Class A utilities with more than 10,000 customers. Many of the larger public utilities own more than one water system, so that the 138 companies own a total of 255 separate systems. Together, public utilities serve almost 5.5 million people in California, 15 percent of the state's population. The largest public utility is California Water Service Company, which serves approximately 1.8 million people through 48 systems.

Public utilities are organized as private corporations, with their stock owned by shareholders for investment purposes. Of the 138 companies operating in California, four are publicly traded, two are owned by investment funds, and the remainder are closely-held businesses. Public utilities are subject to comprehensive regulation by the California Public Utilities Commission regarding water supplies, capital improvements, service quality and water rates.

The Maha Development Corporation will form a privately held water and wastewater public utility company to own, operate and maintain the systems. The Maha Development Corporation will prepare the necessary legal, technical and financial reports needed to form the new utility entity. The new utility company will be permitted and regulated by the CPUC, the SWRCB-DDW, and the CRWQCB.

4.6. State Water Reclamation Requirements for Recycled Water Use

In 2016 the State Water Resources Control Board adopted the State's first General Permit (Order WQ 2016-0068-DDW) for Water Reclamation Requirements for Recycled Water Use. The General Order provides the guidelines and instruction for both public and private parties permit water recycling projects under this streamlined permitting process. The General Permit includes general prohibitions, specifications, administrative requirements, general provisions and instructions for seeking coverage under the General Permit. The General Permit is promulgated under the California Regional Water Quality Control Board and the State Resources Water Control Board-Division of Drinking Water.

The Maha Developments will prepare the necessary plans and technical documents to permit all planned water recycling facilities under the General Water Recycling Permit.

4.7. California Water Code

Several sections of California Water Code, Division 7. Water Quality pertain to the project. Chapter 4, Article 4. Waste Discharge Requirements specify the general requirements for the project to obtain Wastewater Discharge Requirements for the proposed discharge of wastewater. Article 4. Regulation of Reclamation provides regulations pertaining to the use of recycled water. Article 7. Water Reuse specifies the use of recycled water in lieu of potable water for various water demands, such as, landscape irrigation, irrigation of golf courses and other uses.

The Maha Development will be required to prepare and submit a Report of Waste Discharge for the planned wastewater facilities on the property.

4.8. California Code of Regulations – Title 17

Article 2. Protection of Water System sets requirements for back flow preventers to prevent cross-connection or contamination of water systems. The regulations include the requirements for back flow preventer approval, construction of backflow preventers, location of backflow preventers, the type of protection required and the testing and maintenance of backflow preventers.

The Maha Development will need to employee backflow protection measures to prevent the cross-connection and/or contamination of surface water resources or non-domestic water wells. In most cases a reduced pressure principal backflow prevention (RP) type backflow prevention assembly can be used to isolate the recycled water from the other sources of non-potable.

4.9. California Code of Regulations – Title 22, Division 4. Environmental Health

Chapter 3. Water Recycling Criteria defines the type of recycled water and other related topics. Article 3 specifies the water quality requirements for the use of recycled water for irrigation. Article 4. Defines the use area requirements where recycled water can be applied and the setbacks from domestic supply wells for landscape irrigation and for storage of recycled water. Article 6 outlines sampling and analysis requirements. Article 7 outlines the requirement for an engineering report and operational requirements. Article 8 outlines general requirements of design and Article 10 specify requirements for reliability requirements for full treatment.

The Maha Development project will be required to prepare and submit an engineering report that describes the proposed recycled water system and what provisions for reliability and safety will be incorporated in the recycled water system.

The Maha Development project will need to install a water reclamation system that will need to be designed to provide disinfected tertiary recycled water that has filter effluent that does not exceed 2 NTU and influent turbidity does not exceed 5 NTU for more than 15 minutes and never exceeds 10 NTU, and there is a capability to automatically activate chemical addition or diver wastewater should the filter influent turbidity exceed 5 NTU for more than 15 minutes.

4.10. Required Governmental Agency Approvals

- Wastewater System Plan and Technical Reports approved by Lake County and California Regional Water Quality Control Board – Central Valley Region (CRWQCB), State Water Resource Control Board-Division of Drinking Water (SWRCB_DDW). These technical reports should be submitted once the CEQA documents have been approved and certified.
- Operation and Maintenance Plan Approved by CRWQCB and SWRCB-DDW. The O&M Plan should be completed and submitted prior to the startup and commissioning of the new systems.
- Public Water Utility Formation approved by the CPUC and LAFCO. The process to forma private water and wastewater utility should start as soon as the draft CEQA document has been published.
- Water Recycling Permit issued by the CRWQCB (with review by the SWRCB-DDW). Securing the permit should occur after the final CEQA document is certified and prior to occupying the property.

5. Wastewater Flow Analysis

Due to the location of the existing sanitary sewer districts in Lake County (the nearest about 5 miles from the property boundary), the steep slopes and the soil conditions of much of the Project development areas, and the need for reclaimed water for irrigation for the Project, most of the wastewater generated from Phase 1 and future phases will need to be treated in decentralized reclamation plants throughout the Project area. In order to quantify the impacts from the wastewater from the Project, SDE performed a wastewater flow analysis based on an estimate of the various potable water demands at the site. The Project will be designed with onsite collection and pump tanks that feed to both gravity and pressure wastewater lines to convey wastewater to decentralized wastewater reclamation facilities throughout the site.

The following sections include a description of the methodology used to calculate the wastewater flows for the project and results of the calculations.

5.1. Wastewater Flows Calculation Methodology and Results

SDE has completed wastewater flow calculations for both the Phase 1 and future phases projects. The results indicate the amount of recycled or reclaimed wastewater that could potentially be available for non-potable reuse for the project areas (primarily for irrigation). The following section describes the methods used to calculate the projected wastewater flows for the project.

5.2. Wastewater Flows

SDE calculated the projected wastewater flows for the project using the following water demand calculations[4,5] for:

- Domestic and commercial water needs for drinking, cooking, bathing, toilet flushing, and laundry.
- Clean–in-place (wash) water for wineries and other food related production facilities.

Hotel, Resort Villa and Residential Villa Potable Water Demands. SDE employed two methods to calculate the potable water demands for the project: the first method employed unit flow values for hotel rooms and villas based on similar flows obtained from other projects completed by the owner. The second method employed water use values published in technical references for similar types of uses and the expected occupancy rates.

Commercial Retail Space. Water demand values for commercial retail spaces has been calculated based on values published based on the area or square footage of retail and commercial space employed in different jurisdictions in California. [6]

Winery Process Water Demands. Water demand calculations for the winery production is based on the amount of water used per case of wine produced at the winery. SDE used 16 gallons of water required to produce a case or 2.4 gallons of wine.

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[4] USEPA. 1980. *Design Manual: Onsite Wastewater Treatment and Disposal Systems*
[5] R. Crites and G. Tchobanoglous. 1998. *Small & Decentralized Wastewater Management Systems*. WCB/McGraw-Hill
[6] San Francisco Public Utility Commission, *Water Use Calculator*

Table 1 present the potable unit water demands used to calculate the potable water demands and the equivalent wastewater flows for each use. Table 2 presents the estimated daily average and daily maximum wastewater flows for the Phase 1.

Table 1. Unit Water Demands

Description	Unit	Unit Demand	Reference Number
Restaurant			
Staff	gpd	15	3,4
Guest	gpd	10	3,4
Pool			
Staff	gpd	15	3,4
Guest	gpd	15	
Hotel			
Staff	gpd	15	3,4
Guest	god	75	3,4
Resort Villa Resident	gpd	75	3,4
Villa Resident	gpd	75	3,4
Pool Evaporative Loss	gpsf	0.1175	
Winery Production	gpc	16	4
Notes:			
gpd - gallons per day			
gpsf - gallons per square foot of water area			
gpc - gallons per case			

Table 2. Phase I Wastewater Flow Estimates

Description	Daily Average Flows	Maximum Daily Flows
Onsite Workforce Housing	8,064	11,520
Equestrian Center	29,805	65,535
Red Hill Estates	30,240	58,620
Bohn Ridge Resort	16,305	26,265
Resort at Trout Flat	14,280	23,060
Spa	4,785	7,355
Golf Course	3,360	6,780
Tented Camp	3,960	6,360
Central Back-of-House Facilities	17,100	17,100
Emergency Center & Short Term Staff Accomodations	4,140	6,540
Maha Farm	38,829	85,315
Total Wastewater Flow (Gallons per Day)	**170,868**	**314,450**
Total Wastewater Flow (Acre-Feet per Day)	**0.52**	**0.96**
Total Annual Wastewater Flow (Ac-Ft per Year)	**191.37**	NA

Future Phased Wastewater Flows

Future phased development will include additional hotel rooms, resort residential units, residential villas, expanded sport facilities and recreation opportunities. Based on preliminary programming for this future development the wastewater flows estimates have been calculated to be approximately 163 acre-feet of wastewater per year at full buildout and full occupancy as shown in Table 3. The future wastewater flow is estimated to increase the total amount of wastewater to approximately 354 acre-feet per year and will increase the overall wastewater generated by approximately 40 percent.

Table 3. Future Phased Wastewater Flows

Use	Unit	Quantity	Water Demand (gallons)	Average Occupancy Rate (percent)	Average Annual Water Demand (gallons/yr)	Average Annual Water Demand (ac-ft/yr)
1. Resort Facilities	EA	415	300	60%	27265500	83.66
2. Residential Estate Villas	EA	986	280	40%	40307680	123.68
3. Workforce Co-Housing	EA	200	75	70%	5748750	17.64
4. Resort Amenities						
4.1. Outdoor Entertainment	Seats	200	5.5	60%	25840	0.05
4.2. Spa and Wellness Area	Visitors	70	25	60%	383250	1.18
4.3. Sports and Recreation	Visitors	100	30	60%	657000	2.02
4.4. Equestrian Area	Visitors	105	18	100%	413910	1.27
4.5. Golf	Visitors	44	21	100%	202356	0.62
4.6. Camping Area						
4.7. Commercial and Retail	Visitors	60	23	60%	302220	0.93
5. Agricultural Production Facilities						
5.1. Wineries	CASES	250,000	16	100%	4000000	12.27
5.2. Agricultural Production Facilities	EA	16	35	60%	204400	0.63
6. Essential Accessory Use						
6.1. Back of House Facilities	EA	1	5000	60%	1825000	5.60
6.2. Emergency Response Center	EA	1	1500	60%	547500	1.68
6.3. Alternative Energy Production	EA	1	168	60%	61320	0.19
6.4. Float Plane Doce and Heli Pad	EA	2	20	60%	14600	0.04
Total Potable Water Demand						**251**
Total Wastewater Flows						**163**

5.2.1. Recycled Water

It is planned that wastewater from all clusters and related areas of development will be collected in sanitary sewer systems and conveyed to a series of small decentralized wastewater reclamation plants. Each plant will be designed to treat wastewater so it can be reused to supply all or a fraction of the landscape irrigation demand in the vicinity to the cluster. Some recycled water will also be reused as makeup water for ornamental ponds and water features. lakes, as 4 presents the amount of recycled that will be available after the Phase I project has been fully developed. The calculations indicate that approximately 162 acre-feet of water will be available to be used for non-potable water use at the property. This will represent between 17% to 18% of the total non-potable water supply for the Phase I project needs.

Table 4. Estimated Recycled Water Supply for Phase I Project

Area	Daily Average Demand (gallons/day)	Annual Demand (gallons/yr)	Annual Volume (ac-ft/yr)	Percent Reuse	Available Recycled Water (ac-ft/yr)
Onsite Workforce Housing	8,064	2,943,360	9.0	0.85	7.68
Equestrian Center	29,805	10,878,825	33.4	0.85	28.37
Red Hill Estates	30,240	11,037,600	33.9	0.85	28.79
Bohn Ridge Resort	16,305	5,951,325	18.3	0.85	15.52
Resort at Trout Flat	14,280	5,212,200	16.0	0.85	13.59
Spa	4,785	1,746,525	5.4	0.85	4.56
Golf Course	3,360	1,226,400	3.8	0.85	3.20
Tented Camp	3,960	1,445,400	4.4	0.85	3.77
Central Back-of-House Facilities	17,100	6,241,500	19.2	0.85	16.28
Emergency Center & Short Term Staff Accomodations	4,140	1,511,100	4.6	0.85	3.94
Maha Farm	38,829	14,172,635	43.5	0.85	36.96
Total Annual Volume of Recycled Water					**162.66**

6. Wastewater Management

New wastewater supply infrastructure is being planned for the Maha Resort that will include collecting wastewater from a mixed-use plan of both residential and commercial uses on the property. To accommodate the varied uses and parcel sizes on the project there will be different types of wastewater systems required to manage wastewater flows in the project area. In general, the commercial areas will use a combination of sanitary sewer, wastewater treatment and recycled water systems. The residential areas may include onsite wastewater systems.

6.1. Residential Wastewater Systems

Because of the requirements to conduct site assessment studies for each residential lot including percolation tests and determination of groundwater separation the current project accommodates for both an onsite wastewater solution and/or the option to connect the residential lots to the community wastewater systems. The following sections describe the type of onsite residential systems that are planned for the project.

There are three (3) types of wastewater systems that are acceptable to be implemented at the residential properties on the site. The type of system used will depend on the type of land use, site specific soil and groundwater conditions, and distance or adjacencies to other properties or land uses. The types of wastewater systems that are under consideration for the residential areas at this time include the following:

- Residential System Type 1A – Standard Septic System
- Residential System Type 1B – Onsite Enhance Treatment System
- Residential System Type 1C – Septic Tank Effluent Sewer System

The following provides a brief description of the different types of wastewater **residential** systems planned for the project.

6.1.1. Residential System Type 1A – Standard Septic System

A Type 1A system is a standard septic system that will be used on residential parcels that have suitable soil and groundwater conditions and meets setback requirements that would allow for the installation of a standard septic system (septic tank and subsurface disposal system) that conforms to Lake County Rules and Regulations (LCR) for on-site Sewage Disposal and the State of California's Onsite Wastewater Treatment Systems (OWTS) Policy.

6.1.2. Residential System Type 1B – Onsite Enhanced Treatment System.

A Type 1B system will include an onsite enhanced treatment system (such as an aerobic treatment, textile filter, sand filter or other alternative treatment system) that will provide pretreatment of the wastewater before it is disposed on site in a subsurface disposal system. The enhanced treatment system will be required to address site specific issues, such as marginal soil conditions, high groundwater or other site constraints that will not allow for a standard septic system to be utilized. The enhanced treatment system will designed and operated to comply with both the LCR and the State's OWTS policy.

6.1.3. Residential System Type 1C – Septic Tank Effluent Sewer Systems.

A Type 1C system will include an effluent sewer system to connect a residential parcel to a community wastewater treatment and recycled water system. The effluent sewer system is made up of an interceptor tank (septic tank) and a small-diameter collection pipeline that are designed to convey only the liquid portion of the household wastewater for off-site treatment and disposal or reuse. The septic tank is located close to the house and is used to remove solids from the wastewater and these tanks are periodically pumped by a vacuum truck and the solids are taken to a municipal treatment plant. The settled wastewater can either flow by gravity to the main collection system or a second pump tank with a pump system can be installed and the effluent can be pumped under pressure to the main collection system. The Septic Tank Effluent Gravity (STEP) and the Septic Tank Effluent pumping (STEP) systems would conform with Lake County and State of California's standards.

6.2. Sanitary Sewer, Wastewater Treatment and Recycled Water Systems.

The project is spread out over 16,000 acres and will include at least twelve (12) discrete areas that will require either individual and/or combined wastewater systems. These systems will collect wastewater from commercial and some residential areas.

Several areas will include mixed use developments including hotels, restaurants, commercial centers, pools and other related facilities. Wastewater management systems for these areas will include sanitary sewer collection system to collect the wastewater, small natural or package styled wastewater treatment and reuse systems, and recycled water distribution and reuse systems. The majority of recycled water will be used for landscape irrigation, make up water for water features, and potentially for indirect groundwater recharge via infiltration basins or trenches in selected areas on the property.

Some areas including the main back of the house area, the staff housing area, the fire center and the golf course areas will be smaller areas that are relatively remote from the larger development clusters. These areas will be served by small onsite wastewater systems that will include small sewer collection systems, a small enhanced treatment system and small reuse systems, such as, a subsurface drip dispersal irrigation system to reuse treated water to irrigate landscape around the buildings.

Table 5 presents a list of main project areas, the planned activities in each area, and the wastewater management approach for the area.

~~**Sanitary Sewer Systems.** Based on the variable topography and distances between facilities a combination of pressure and gravity sewer systems will be utilized. The pressurized sewer systems will include small lift stations located in strategic locations to pump wastewater to the main treatment system. Pressure sewers will be small diameter pressure lines that will likely be installed in the road right-of-way or in a utility easement. Gravity sewers will generally be larger diameter pipelines that will also be located in the road right-of-way or a utility easement.~~

~~**Wastewater Treatment and Recycling Systems.** The wastewater treatment and reuse system will include either a natural wastewater treatment system or a small biological package styled treatment system. The wastewater treatment systems will be energy efficient, easy to operate and maintain. The natural wastewater treatment that will be used will include a combined pond~~

~~and wetland treatment system or a small multi-stage trickling filter and wetland treatment system. The small biological package style treatment system will include either a multi-stage trickling filter with a membrane filtration system or packed-bed textile filter and membrane filtration system. All of the wastewater systems will also include advance filtration and disinfection system and inline water quality monitoring system to comply with the State of California's Recycled Water Laws.~~

Recycled Reuse Storage and Distribution Systems. Once the recycled water has been treated it will be stored in small water tanks or ponds. Small booster pumps will pump the recycled water into a purple pipe recycled water distribution system that will convey recycled water to the final point of use, such as a landscape irrigation system, the golf course or polo fields. Anywhere that water recycled water is reused will be posted to inform the visitors and staff that recycled water is being used.

There are several recycled water reuses at the site including but not limited to the following:

- Landscape irrigation;
- Vineyard and orchard irrigation and frost protection;
- Make up water for water features (fountains and reflecting pools);
- Dust control;
- Fire protection;
- Vehicle washing;
- Indoor reuse (toilet flushing, laundry washing, cooling system makeup water)

Table 5. Wastewater Management Approach for Each Cluster Area

Area	Planned Use	Wastewater Management Approach
Hill Hotel	Hotel, restaurant, conference center, sales center, back of house (BOH), central garden, water feature	Sanitary Sewer Collection System, Wastewater Treatment Recycling System and recycled water distribution and reuse
Maha Farm Village	Artisan workshop, restaurants, open air market, post office, bakery, hotel, reception, tasting rooms, public restrooms, winery, pools, gardens	Sanitary sewer collection system, wastewater treatment and recycling system and recycled water distribution and reuse
Spa & Recreational Center	Spa treatment building, male/female day spa, treatment rooms, Beauty and hair saloon, food services, water feature (pond), gardens Indoor & outdoor pools, public restrooms and showers, gym and yoga rooms	Sanitary sewer collection system, wastewater treatment and recycling system and recycled water distribution and reuse
Main Back of House (BOH)	Central laundry, maintenance and service areas, restrooms	• Laundry water graywater recycling system (closed loop) • Onsite wastewater treatment and reuse/disposal system
Staff Housing	Staff Apartments	Onsite wastewater treatment and reuse/disposal system
Fire Center	Staff housing, restrooms, kitchen	Onsite wastewater treatment and reuse/disposal system
Winery	Winery building, crush pad and restroom	Onsite wastewater treatment and reuse/disposal system
Golf Course and Club Houses	Club houses (three at different locations) and golf cart storage and service area, restrooms	Onsite wastewater treatment and reuse/disposal system
Red Hill Hotel	50 room hotel, reception and restroom, two restaurants, bar, winetasting room, pools, boutique, administrative offices, BOH and garden	Sanitary sewer collection system, wastewater treatment and recycling system and recycled water distribution and reuse
Polo Equestrian Center & Villas	Lodge, clubhouse, stables, and villas	Sanitary sewer collection system, wastewater treatment and recycling system and recycled water distribution and reuse
Bohn Ridge Resort	Reception and administration, hotel rooms, restaurant, yoga center, pool and changing room, gardens	Sanitary sewer collection system, wastewater treatment and recycling system and recycled water distribution
Camping Area	Reception, Dining Hall and Bath House	Sanitary sewer collection system, wastewater treatment and recycling system

Each wastewater system will include gravity and pressure collection mains and lift stations to convey the wastewater to a treatment system. Each lift station will include a pump system to convey water where gravity conveyance is not possible. Each treatment system will be a multi-stage treatment system that will treat the water for reuse on the Project site.

Collection System Lift Stations. A series of collection system lift stations will be installed at strategic locations throughout the wastewater systems. The lift stations will be below ground concrete or fiberglass tanks with access risers. The lift stations will be fitted with self-priming sewage pumps. The lift stations storage tanks will be sized to collect and convey the maximum day sewage flows for each area.

The lift stations will be placed in topographically low-lying areas to allow sewage to gravity flow to the tanks. The lift stations will be placed near roads to allow for good access and servicing as required. The location of the tank sites can be selected and planned so that their installation and operation does not impact sensitive cultural, historic, and biotic resources at the site.

Wastewater pump systems will be located at the lift stations and used to convey wastewater to the treatment plants. It is anticipated that each wastewater pump system will include at least two (2) duplex sewage pumps plumbed in parallel. Under low or normal flow conditions it is likely that a single wastewater pump is operating and as the wastewater flow increases the standby pumps will turn on to convey the wastewater to the treatment plant. The wastewater pump systems will be installed in small enclosures and in small areas that should not impact sensitive cultural, historical or biotic resources at the site. The wastewater pumping systems will be connected to the area-wide system control and data acquisition (SCADA) system to allow for both local and remote operation and continuous monitoring.

Wastewater Collection System. The wastewater systems will consist of both gravity and pressurized lines. The wastewater systems will consist primarily of 4-inch to 12-inch diameter sewer mains and 3- and 4-inch laterals to collect wastewater from the commercial building and residential parcels. The majority of the sewer mains and laterals will be installed in the planned roadways and driveways and will not be installed in undisturbed areas on the site. The installation of the wastewater collection system should not result in any additional impacts to cultural, historic or biotic resources related to the installation of the new roads.

Water Reclamation (Recycled) Plants. Based on the decentralized and clustered development plan several small package type water recycling plants will be installed to treat wastewater from the development areas. Seven (7) small package plants are current planned to serve the Phase I project and will include small treatment works at the Maha Farm, Redhill/Renaissance Golf Course, Resort at Trout Flat, Central Back of the House, Equestrian Center, staff housing, and a small system at the Wildlife Camp. Figure 2 shows the approximate location of the seven systems.

The treatment systems will be designed to meet State Title 22 recycled water regulations for tertiary level disinfected recycled water that can be used for unrestricted irrigation and recreational use of the water.

At each water reclamation facility there will be a recycled water tank and booster pump system that will pump recycled water into the non-potable water distribution system for landscape irrigation, fire protection and make up water to ornamental water features.

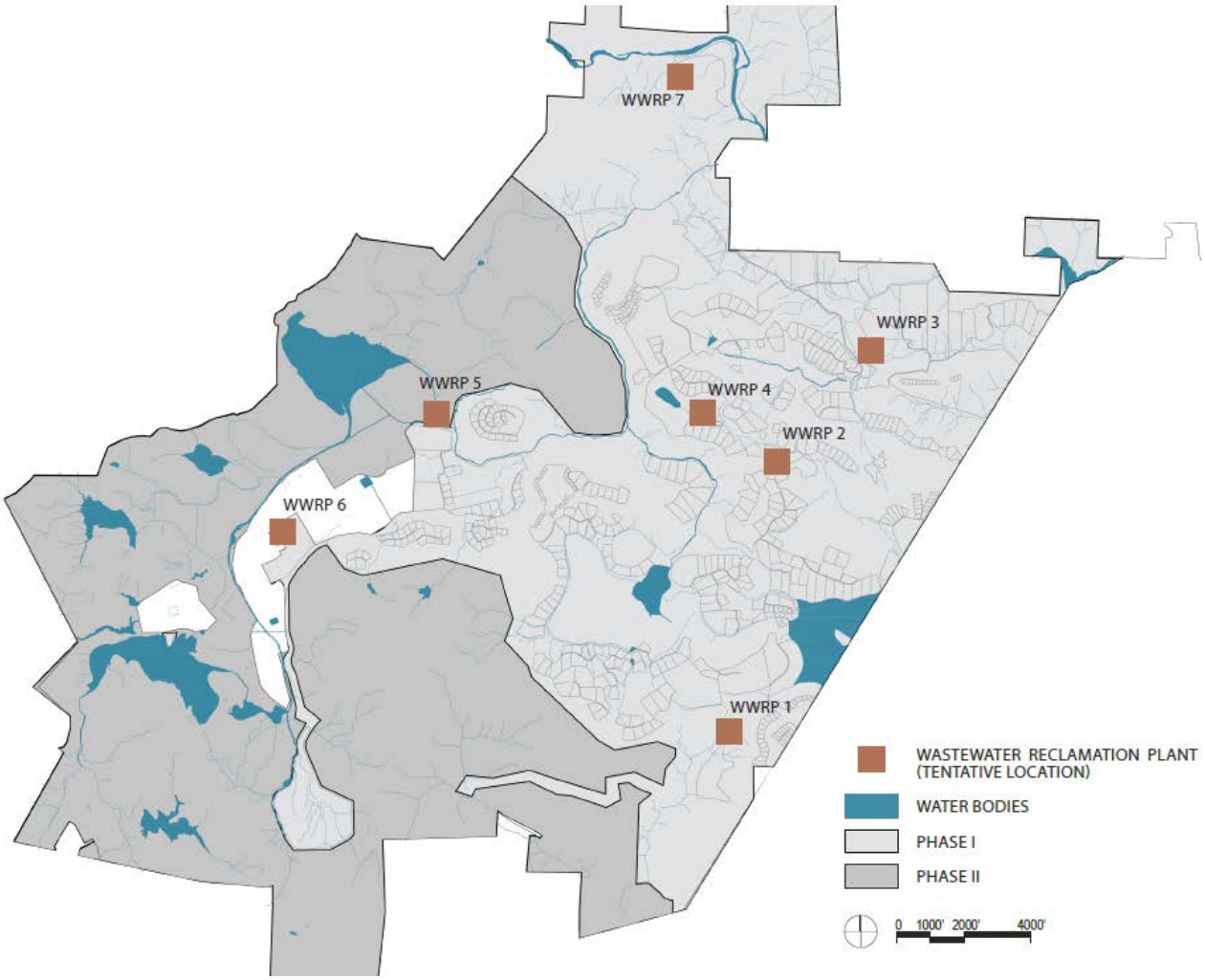

Figure 2. Proposed Approximate Location of Water Reclamation Facilities

Each water reclamation plant will cover a relatively small area ranging from less than 1,500 square feet at the Camping Area to the largest area of 12,500 square feet for the largest system that will serve the Maha Farms area. Figures 3 and 4 shows the typical layout of water reclamation plant facilities serving different flow requirements. Each facility will include a treatment plant, storage tank, booster pump system, and related parking area.

The water reclamation plants will be placed in areas that are set back from the cluster developments to avoid potential odor and noise issues. The plants will be located close to planned roads to provide easy access to them and to avoid the need to construct long driveways or access roads to serve them. The plants will also be placed in areas that will minimize grading and ground disturbance to the extent practical and to avoid impacts to sensitive cultural, historical and biotic resources.

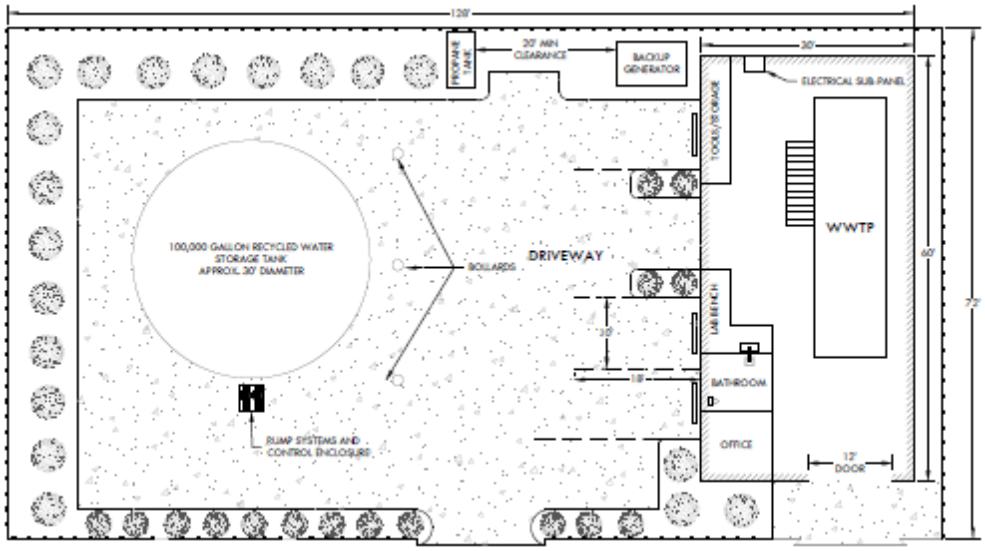

Figure 3. Typical Water Reclamation Facility Layout
- Capacity up to 85,000 Gallon Per Day

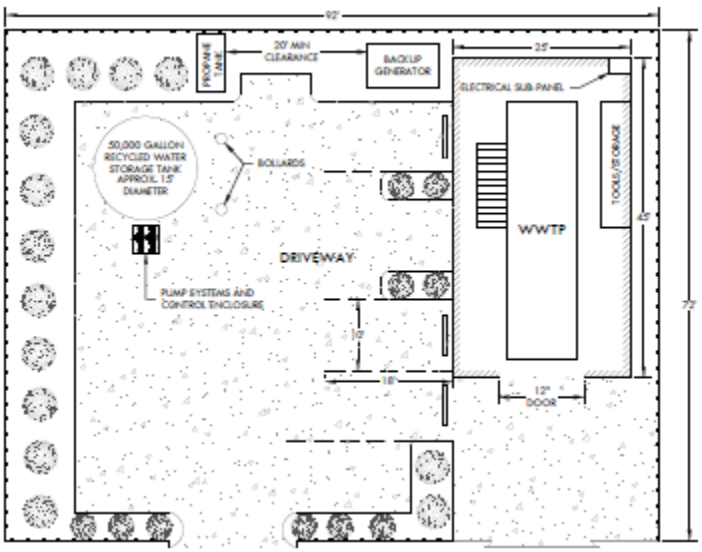

Figure 4. Typical Water Reclamation Facility Layout
- Capacity up to 30,000 Gallons Per Day

7. Analysis of Potential Impacts under the California Environmental Quality Act (CEQA)

This section presents an analysis of the potential impacts related to wastewater systems for the proposed project. In summary, the potential environmental impacts for new wastewater systems should to consider the following issues

1. Can the wastewater improvements be operated and maintain in a manner that does not impact the adjoining properties.

2. Will the propose wastewater facilities and discharge of wastewater be done in a manner that does not impact surface and groundwater at the site.

3. Will the wastewater management practices planned at the project site be consistent with the local and state wastewater management policies for the area? And can the wastewater infrastructure be constructed, operated and maintained to meet the local and state requirements without special conditions of approval?

4. Will the construction and operation of the wastewater systems result in significant environmental impacts to cultural, historical and/or biotic resources.

The following sections address each issue based on the information proved in the previous sections of this wastewater management feasibility study.

7.1. Potential Impacts to Adjoining Properties

All the proposed residential and commercial wastewater facilities are in areas that are remote for adjoining parcels and as planned will not have any potential impacts to the adjoining properties. The design and locations of these facilities will not result in any potential noise or odor nuisance conditions to adjoining property.

7.2. Consistency with Local and State Water Policies and Regulations

The proposed residential and commercial wastewater systems will be designed and operated in accordance with both local and state regulations and standards. The project will not seek any special conditions or variances to meet both local and state standards.

7.3. Recycled Water Policy and Rules

The State Water Resources Control Board supports and encourages the sustainable use of recycled water to promote conservation of water resources. The State's Water Quality Control Policy for Recycled Water was first adopted in 2009 and amended in 2013 and 2018. The project as planned will be consistent with the State's Water Recycling Policy.

The recycled water systems will also be permitted under the State's Water Reclamation Requirements for Recycled Water Use (Order WQ 2016-0068-DDW). The recycled water systems as planned will be consistent with the regulations and standard covered under the State's recycled regulations and associated standards contained in Title 22 Public health rules. The projects will be designed, constructed and operated in accordance with these requirements and as planned will not require any special consideration or variance for approval and permitting.

7.4. Avoidance of Potential Impacts to Cultural, Historical and Biotic Resources

As described in Section 7 the overall wastewater systems will result in decentralized and very localized and small improvements placed at strategic locations of the project site. The majority of improvements will be co-located in areas of other existing and planned improvements, such as installing the sewer collection and conveyance pipelines in the existing and proposed roads and driveways. In some instances, such as the small water reclamation plants and water storage tanks will be placed in small areas typically less than a quarter acre or 12,5000 square feet. These areas will require some site improvements including limited grading and drainage improvements, paving, utilities, and small buildings to house treatment and pumping equipment and related appurtenances.

Based on the amount of land available for these planned facilities, and the studies already conducted, these improvements will be planned to be set back from any significant cultural, historical and biotic resources to avoid any impacts to these resources, if required.

7.5. Avoidance of Potential Impacts to Surface Water and Groundwater Resources

The new commercial wastewater systems will be designed and operated to avoid any potential impacts to both surface and groundwater resources at the site. The majority of wastewater generated at the site will be treated to meet the State's recycled water requirements for tertiary treated wastewater that will produce an effluent with a total nitrogen concentration less than 10 mg/L and the effluent will be disinfected prior to reuse for primary for landscape irrigate purposes. The reuse of high-quality effluent at the site will not impact surface or groundwater resources.

Recycled wastewater will be distributed through a "non-potable" water distribution system. The "non-potable" water distribution system will also convey untreated surface water from the reservoirs on the site and groundwater. A permitted recycled water system will be required by the State to incorporate and maintain reliability features to ensure the safe performance of the recycled water system, such as State approved back flow to prevent cross-connection and contamination of the surface reservoirs and wells by recycled water.

Residential onsite wastewater systems will rely on shallow subsurface disposal systems that will be designed to meet local and state standards for setbacks to surface and separation to groundwater in order to protection these resource on the site.

These measures for both commercial and residential wastewater systems will protection surface and groundwater resources at the site.

8. Summary of Findings and Conclusions

The section provides a summary of the key findings and conclusions related to the project's water supply and feasibility.

1. The wastewater systems will be designed, constructed and operated to comply with local and state water rules for reclaimed water. A reclaimed water permit is required to reuse the wastewater for irrigation.

2. All wastewater systems will be installed and operated so they will not impact water resources on the project site, on the adjacent properties, and will not result in significant impacts as defined under CEQA.

3. All wastewater facilities can be installed and operated in a manner that will avoid any significant impacts to cultural, historical and biotic resources, and will not result in any significant impact as defined under CEQA.

4. The residential lots will have an onsite wastewater system if the results of the site-specific assessment study indicate that an onsite system is feasible. If an onsite system is not feasible the parcel will be connected to a community wastewater system.

5. Future phase of development will require project level CEQA review for final project approval and permitting.

9. References

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