Appendix H.

Questa Engineering Corporation

Wastewater Disposal Investigation

This Page Intentionally Left Blank

QUESTA
ENGINEERING CORP.

Wastewater Disposal Investigation

for

Heritage Oaks Memorial Park

San Jose, California

Prepared for:

Denise Duffy & Associates, Inc.
Monterey, California

Prepared by:

Questa Engineering Corporation
1220 Brickyard Cove Road, Suite 206
Point Richmond, California 94801

May 2014

Civil,
Environmental
& Water
Resources

WASTEWATER DISPOSAL INVESTIGATION

FOR

HERITAGE OAKS MEMORIAL PARK

SAN JOSE, CALIFORNIA

Prepared For

Denise Duffy & Associates, Inc.
Monterey, California

Prepared By

Questa Engineering Corporation
1220 Brickyard Cove Road, Suite 206
Point Richmond, California 94801

Project #1300096

Norman N. Hantzsche, R.C.E. #24750
Principal/ Managing Engineer

May 2014

TABLE OF CONTENTS

INTRODUCTION **1**
PROJECT SITE CONDITIONS **1**
PROJECTED WASTEWATER FLOWS **2**
REGULATORY REQUIREMENTS **4**
Wastewater System Size 4
Treatment 4
Effluent Dispersal 5
Soil Depth 5
Soil Percolation 5
Groundwater Separation 5
Ground Slope 6
Setbacks 6
Dual Leachfield Systems 6
Cumulative Impact Considerations 6
General Use of Dispersal Areas 6
Disposal Site Evaluation **8**
Ground Slope 8
Watercourses 8
Soils 8
Groundwater 9
Percolation Tests 9
OPERATIONS, MAINTENANCE, AND MONITORING **12**
Operation and Maintenance 12
Monitoring and Reporting 13
WASTEWATER DISPOSAL IMPACTS **14**
Public Health Hazards and Nuisances 14
Water Quality 14
REFERENCES **15**

ATTACHMENT: SOIL PROFILE AND PERCOLATION TEST DATA

FIGURES

INTRODUCTION

This report presents an analysis of the feasibility, potential impacts and recommended mitigations for onsite wastewater treatment and disposal facilities to serve the proposed Heritage Oaks Memorial Park, located off Bailey Avenue at the southern extent of the City of San Jose (**Figure 1**). This analysis was prepared by Questa Engineering under a sub-contracting agreement with Denise Duffy & Associates for incorporation into the Environmental Impact Report for the project. This report also provides supporting information for wastewater system design and eventual review and permitting by the Santa Clara County Department of Environmental Health in connection with building permit application(s).

The project site does not have public sewers available now or in the foreseeable future. The analysis and report provided herein was completed to: (a) estimate wastewater generation volumes and disposal needs for the Memorial Park; (b) determine and evaluate pertinent site conditions and physical capabilities of the property along with regulatory standards applicable to onsite wastewater disposal; (c) present a suitable plan for onsite wastewater treatment and disposal facilities, including operation and maintenance needs; and, (d) identify potential impacts of the projected wastewater disposal facilities for the site, along with appropriate mitigations, if required.

PROJECT SITE CONDITIONS

The overall project site (Rezone Area) consists of approximately 275 acres of rolling hills located immediately south of Bailey Avenue, along either side of the watershed divide between Coyote Valley (to the east) and the watershed area tributary to Calero Reservoir on the west (**Figure 1**). The majority of the site drains to the east and then north through farmland via several unnamed tributary drainages, eventually reaching Coyote Creek near the Metcalf Energy Center south of Metcalf Road. The western portion of the site drains via several seasonal drainages that flow westerly and then north through Calero County Park and eventually enter Pine Creek Canyon and the east arm of Calero Reservoir near McKean Road. Elevations range from about 300 feet (above mean sea level, msl) along the eastern boundary (edge of Coyote Valley), to about 700 feet msl along the highest parts of the ridgeline. The site is estimated to receive average annual rainfall of about 23 inches, occurring mainly between the months of November through April.

The geology of the site is dominated by the Franciscan formation, which includes a mix of sandstone, shale, chert and other sedimentary rocks. According to the U.S.D.A. Soil Conservation Service's (SCS) Soil Survey of Eastern Santa Clara Area (1974), nearly the entire site is mapped as Vallecitos rocky loam. These soils occur in hilly areas over sedimentary rocks. They are well to very well drained and moderately to slowly permeable. The main constraints for sewage disposal associated with these soils are the steep slopes and limited soil depth, which can be as little as two to three feet on hillslopes; greater soil depth is found at toe slope locations and in the intervening small valleys. Areas of deeper soil are not specifically delineated in the Soil Survey; they require detailed field investigations to determine their occurrence and extent.

The vegetation throughout the site is primarily large expanses of grass with scattered oaks and brush. The site has historically been used for cattle grazing.

PROJECTED WASTEWATER FLOWS

The proposed memorial park will generate wastewater (i.e., sewage wastes) requiring onsite treatment and disposal. The main source of wastewater will be from restrooms and sinks at the administration building, which will be used by park employees and will also be available for use by daily visitors to the park, including groups attending memorial services. In the future there is a possibility that additional "satellite" restrooms may be located in other areas of the site. They would also require appropriate measures for onsite wastewater treatment and disposal, which could potentially be provided by tie-in to the main facilities for the administrative building or could be an independent system(s). Because of the uncertainty regarding the potential location of future satellite restroom facilities, this report focuses on the wastewater facility needs for the main system that would serve the administration building. Facilities for satellite restrooms would be of a much smaller size and capacity than the system needed for the administration building, but would likely be of a similar design (septic tank and subsurface leach field) and addressed through similar investigation and analysis as presented in this report.

Projected wastewater flows for the memorial park at build-out have been estimated based on the expected number of people at the site for different activities, including committal services, memorial services, general visitation, onsite employees (office and grounds staff) and construction workers. Information contained in the Traffic Study for Heritage Oaks Memorial Park (Hexagon Transportation Consultants, Inc., February 2014) provides estimates of the expected daily maximum number of vehicle trips to the memorial park for the various activities. These estimates (translated into number of people) were combined with applicable unit wastewater generation factors (i.e., gallons per day per person) to derive total daily wastewater flow projections for: (1) typical maximum day activities; and (2) single peak day activities. The estimates are presented in **Table 1** and **Table 2**, respectively. The following assumptions were used in the analysis:

- "Typical maximum day" is assumed to include all activities at capacity, including one memorial service with an attendance of 120 people. This level of activity and wastewater generation could occur routinely at build-out, and would be the appropriate basis for system design.

- "Single peak day" is distinguished from the typical maximum day in that it is assumed to include multiple (three) memorial services (120 people each) on the same day. This would be an occasional occurrence, probably no more than once a week or once a month. For the wastewater system design it would be handled as a short-term "surge" condition, and would be best accommodated using flow equalization[1] storage, with the accumulated wastewater metered into the system over several days. An allowance of 100 gpd for surge flows (metered-in) is included in **Table 1** to account for single day peak activities.

[1] "Flow equalization is the process of controlling the rate of wastewater flow through an onsite wastewater treatment system (OWTS) by providing surge capacity storage and timed-dosing of the incoming flow. Installed following the septic tank, it allows peak surges in wastewater flow (e.g., from a weekend event) to be temporarily stored and metered into the treatment system and/or dispersal field at a relatively even ("average") rate over an extended number of days (e.g., during the subsequent week)." (Santa Clara County, September 2013)

- Projected number of people visiting the site for committal services, memorial services and general visitation assumes an average of three (3) persons per vehicle.

- Estimated percentage of daily visitors using the restroom facilities is 50%.

- Portable toilets will be provided for construction crews and will not contribute to the demand for onsite wastewater treatment and disposal.

- Unit wastewater flow estimates for park visitors and employees is from Santa Clara County *Draft Onsite Systems Manual* (*September 2013).*

Table 1
Estimated Normal Maximum Daily Wastewater Flow at Build-out
Heritage Oaks Memorial Park

Usage Factor	Number of People	Assumed People Using Restroom Facilities	Unit Wastewater Flow (gpd/person)	Projected Daily Wastewater Flow (gpd)
Daily Visitors				
Committal Services	210	105	5	525
Memorial Services (1)	120	60	5	300
General Visitation	60	30	5	150
Employees*	15	15	15	225
Construction Workers	20	0**	0**	0
Allowance for Peak Flow	-	-	-	100
Total	**425**	**210**	**-**	**1,300**

*Includes administrative office and grounds staff
**Assumes construction crews use portable toilets

Table 2
Estimated Single Day Peak Wastewater Flows at Build-out
Heritage Oaks Memorial Park

Usage Factor	Number of People	Assumed People Using Restroom Facilities	Unit Wastewater Flow (gpd/person)	Projected Daily Wastewater Flow (gpd)
Daily Visitors				
Committal Services	210	105	5	525
Memorial Services (3)	360	180	5	900
General Visitation	60	30	5	150
Employees*	15	15	15	225
Construction Workers	20	0**	0**	0
Total	**665**	**330**	**-**	**1,800**

*Includes administrative office and grounds staff
**Assumes construction crews use portable toilets.

Based on the above analysis, wastewater facilities should be designed to accommodate maximum

daily flows of 1,300 gpd, with provisions for single peak day surges of up to 1,800 gpd. On most days the wastewater flow will likely be much less than these projected amounts, as will the long-term average daily wastewater flow. During the build-out of the memorial park further refinement of wastewater flows can be determined through monitoring of activities, usage and system performance, and these data used as a basis for any adjustments to the wastewater facilities design and/or operation.

REGULATORY REQUIREMENTS

Although the project site lies within the City of San Jose, the City has no authority for regulation of onsite wastewater systems, and instead defers all matters regarding onsite wastewater systems to the Santa Clara County Department of Environmental Health. This is the common practice of all municipalities in Santa Clara County. County requirements for onsite wastewater systems are contained in Division B11 of the County Code, and in an accompanying *Onsite Systems Manual*, which provides policies, procedures and technical details related to permitting, design, construction and operation of onsite wastewater systems. The County Code was most recently updated in December 2013, incorporating several changes aimed at bringing County requirements up to date with industry standards, incorporating flexibility for application of newer "alternative" wastewater treatment and dispersal methods, and compliance with a newly enacted State Policy for Onsite Wastewater Treatment Systems adopted by the State Water Resources Control Board in June 2012. Key regulatory requirements for onsite wastewater systems are summarized below.

Wastewater System Size

County Code applies to systems with design wastewater flows of up to 10,000 gallons per day (gpd). Systems with flows greater than 10,000 gpd must obtain approval from the applicable Regional Water Quality Control Board (RWQCB), which is the San Francisco Bay Region in this case. The RWQCB also is notified and provided information for any onsite wastewater system with flows of 2,500 gpd or greater for review and comment. The onsite wastewater system for the Heritage Oaks Memorial Park would be of a size that would be regulated entirely by the County.

Treatment

Treatment of sewage prior to subsurface disposal must, at a minimum, include primary treatment (i.e., sedimentation) as provided by a septic tank. Additional or "supplemental" treatment, such as sand filtration or a proprietary treatment system (e.g., aerobic treatment unit or filtration system), can be provided to overcome certain soils constraints, space limitations, steep slopes or shallow groundwater conditions. An aerobic treatment unit typically consists of a below ground tank with air injected via a blower or compressor, which is located above ground near the tank. Filtration systems commonly consist of a below ground tank with a pump unit that circulates wastewater effluent through filtration media (sand or synthetic material) assembled in a tank or similar containment structure located at or slightly above grade. Where used, supplemental treatment is required to meet basic secondary effluent standards for reduction of biochemical oxygen demand (BOD) and total suspended solids (TSS). Disinfection (e.g., chlorination or ultraviolet light) is not required for subsurface wastewater disposal.

Effluent Dispersal

The conventional method for effluent dispersal is a gravity-fed, gravel-filled disposal (leaching) trench, 18 to 36 inches wide and up to 8-feet deep. Use of other types of filter material or chambers in place of gravel is permitted. Additionally, under the newly adopted code, the County allows for the use of several types of "alternative" dispersal system designs to overcome particular site constraints, in particular shallow soils and/or high groundwater conditions. The alternative dispersal system options include: shallow pressure-distribution trenches; mound systems; at-grade systems; pressure-dosed sand-filled trenches, and subsurface drip dispersal systems. Where alternative treatment or dispersal systems are used, the County requires the issuance of a renewable "operating permit" to ensure routine inspection and maintenance of the system along with periodic reporting of results to the County.

Soil Depth

Conventional disposal trenches require a minimum of five feet of soil below the trench bottom. This amounts to a total minimum soil depth of about eight feet, accounting for a typical trench depth of three feet. For alternative systems, the minimum soil depth (below trench bottom) may be reduced to two feet or three feet, depending on the type of alternative design. For example a shallow pressure distribution trench system requires a minimum soil depth of three feet below trench bottom; mounds and subsurface drip dispersal systems require a minimum of two feet of soil depth below the field.

Soil Percolation

Soil percolation must be within the range of 1 to 120 minutes per inch (MPI) for conventional and alternative systems. The percolation rate is used for sizing the dispersal system and also affects the groundwater separation requirement (below).

Groundwater Separation

For conventional systems, the minimum depth to groundwater (below trench bottom) ranges from five feet to 20 feet, depending on the percolation rate as indicated below. Soils with faster percolation rates require greater groundwater separation due to the potential for less absorption and treatment of effluent by the soil.

Percolation Rate, MPI	Depth to Groundwater, ft
1-5	20
6-30	8
31-120	5

For alternative systems, minimum depth to groundwater may be reduced from the above requirements applicable to conventional systems, and varies according to the particular type of alternative system and percolation rate. For example a shallow pressure distribution trench system in soils with a percolation rate of 6-120 MPI requires a minimum groundwater separation of three feet below trench bottom. With the addition of supplemental treatment, the minimum separation distance can be reduced to two feet. Mounds and subsurface drip dispersal systems

require a minimum two feet separation to groundwater for soils with percolation rates of 6-120 MPI.

Ground Slope

Maximum ground slope in the disposal area for conventional disposal trenches is 30 percent. For slopes between 30 and 40 percent the use of a shallow pressure distribution trench system or subsurface drip dispersal is required. Slopes over 40 percent require the use of a subsurface drip dispersal system. Additionally, any dispersal system located on slopes exceeding 20 percent requires completion of a geotechnical analysis and report addressing slope stability.

Setbacks

Minimum horizontal setbacks between septic tank and leachfield systems and various physical site features are listed in **Table 2**.

Dual Leachfield Systems

The County requires the installation of dual disposal fields, each 100 percent of total size, so that effluent can be alternated from one to another. This is for periodic resting and as a back-up in the event of failure.

Cumulative Impact Considerations

In addition to the above specifications, large flow onsite wastewater systems require evaluation of groundwater mounding hydraulics, nitrate loading or other possible cumulative effects. Per County policy, the types of systems falling in this category are community-type systems serving several dwellings, commercial establishments or an entire community where the wastewater design flow exceeds 1,500 gpd, or where the system is located on a small parcel (< 1 acre). This is part of the design analysis, and is done to assure that the site conditions (e.g., soil depth, groundwater depth, and percolation) are adequate for the proposed wastewater application rate. This analysis may dictate certain adjustment in the layout, sizing or wastewater flow to ensure that the soils are not overloaded with wastewater, and to prevent area-wide water quality impacts. Based on the projected wastewater flows (**Table 1**) and the large acreage of the project site, the proposed project would not require additional study of cumulative wastewater disposal impacts.

General Use of Dispersal Areas

Activities and construction in the disposal field area must be limited to those that will not interfere with the operation or maintenance of the subsurface trenches. Roads, paved surfaces, buildings and fills of more that 12-inches deep may not be constructed over disposal fields since they may cause unnecessary soil compaction and restrict maintenance access to the system. Use of disposal field areas for playgrounds, parks, open space, golf course fairways and driving range, etc. is allowed, as these uses do not generally pose problems for subsurface drainfield operation.

Table 2.
Minimum Horizontal Setback Distances for Onsite Wastewater Systems

Site Feature	Minimum Setback Distance, feet	
	To Dispersal Field	To Septic Tank
All wells and springs	100	100
Public water supply wells	150	150
Watercourses		
• General (from top of bank)	100	100
• Between 1,200 to 2,500 feet from a public water system intake[1]	200	100
• Within 1,200 feet from a public water system intake[1]	400	100
Reservoirs (from highwater mark)		
• General	200	200
• Within 1,200 feet from a public water supply intake[1]	400	400
Cuts or steep embankments (from top of cut)	4 x h[2,3]	10 feet
Steep slopes (from break of slope)[4]	4 x h[2,3]	10 feet
Unstable land mass	100[3]	100[3]
Drainageway/drainage swale (from edge of flow path)	50	50
Foundation	10	5
Property line	10	10
Septic tanks	6	N/A
Swimming pool	25	25
Road easement, pavement, or driveway	5	5

[1] For areas tributary to and upstream of water supply intake; setback distance measured from high water mark. Exceptions allowed per SWRCB OWTS Policy, as follows: (a) for replacement OWTS, comply to the maximum extent practicable and incorporate supplemental treatment unless director finds no impact or significant threat to water source; (b) for new OWTS on pre-existing lot of record (pre-May 2013), comply to maximum extent practicable and incorporate supplemental treatment for pathogens per sections 10.8 and 10.10 of SWRCB OWTS Policy as detailed in the *Onsite Systems Manual*.

[2] h equals the height of cut or embankment, in feet. The required setback distance shall not be less than twenty five feet nor more than one hundred feet.

[3] Setback distance may be reduced in accordance with recommendations provided in a geotechnical report prepared by a civil engineer or professional geologist consistent with section B11-83 and guidelines contained in the *Onsite Systems Manual.*

[4] Steep slope is considered to be land with a slope of >50% and distinctly steeper (at least 20% steeper) than the slope of the adjacent tank or dispersal field area.

Source: Santa Clara County Code Chapter, Division B-11

DISPOSAL SITE EVALUATION

Following review of background maps and project plans a reconnaissance field investigation, including probing of soils, was made of the project site to identify areas potentially suitable for onsite wastewater disposal. A potentially viable area was identified for formal testing and is indicated in **Figure 2**. The candidate area was selected based on several factors, including: (a) reasonable proximity to the planned location of the administrative building; (b) avoidance of areas to be used for burial plots, access roads and other site development features; (c) avoidance of areas where grading (cut and fill) is proposed; (d) preliminary evidence of suitable slopes, soil conditions and horizontal setbacks in compliance with minimum requirements per County Code; and (e) an area of several thousand square feet, as estimated to be necessary to meet anticipated wastewater disposal needs for build-out of the memorial park.

The identified wastewater disposal site is a gentle, grassy east-facing knoll located about 1,200 feet southeast of the proposed administrative building site (**Figure 3**). The site lies entirely on the east side of the ridgeline, within the Coyote Creek watershed. Site conditions determined from field studies are presented below.

Ground Slope

Ground slope along the axis of the knoll ranges from about 15 to 20 percent. To the northeast and southeast the ground slopes steepen up to a maximum of about 30 to 35 percent in the area considered for wastewater disposal. Beyond this the slopes steepen further to more than 40 percent, including some limited areas with slopes of 50 to 60 percent. Wastewater disposal fields must maintain a prescribed horizontal setback from slopes greater than 50 percent ("steep slope"), equal to 4 times the height of the steep slope feature, 25 feet minimum. In this case the height of the >50% slope areas was determined to range from 5 to 10 feet, requiring horizontal setbacks of up to 40 feet in some locations, which are indicated in **Figure 3.**

Watercourses

There are no watercourses or drainage swales on or adjacent to the proposed wastewater disposal area. The convex shape of the disposal site promotes broad overland "sheet-flow" runoff. The nearest watercourse is located approximately 200 feet to the southeast; this is a dry channel that flows only in response to rainfall-runoff events. Minimum horizontal setback to a watercourse is 100 feet. Also, a drainage swale is located in a wooded area about 200 feet to the northeast; and there is a very small hillside drainage swale about 75 feet to the southeast. A minimum setback of 50 feet is required for these drainage features.

Soils

On January 8 and 9, 2014 two backhoe test pits were excavated in the prospective disposal area and logged following procedures of the Santa Clara County Department of Environmental Health (DEH). The profiles were logged and soils were classified in accordance with U.S.D.A. Soil Conservation Service methods. Percolation testing (described below) was also carried out in conjunction with soil profile work. The work was conducted under the supervision of Questa's Managing Engineer and was witnessed by a representative of the Santa Clara County DEH (Ann

Peden, REHS). The location of soil profile trenches and associated percolation test holes are shown in **Figure 3**; soil profile logs are attached at the end of this report.

Observed soil conditions were very similar in the two profiles.

- **Surface Soils.** Clay loam to light clay surface soils were found to a depth of 21 inches, with a minimum depth of 15 inches in T-1 and 17 inches in T-2. These soils were soft, friable with moderate blocky structure, having less than 15% rock content, common roots throughout and no mottles (groundwater indicator).

- **Subsoils.** Underlying subsoils (below 21 inches) were found to consist of differentially weathered and fractured sandstone, with random pockets of light clay soils and noticeable soil accumulation and roots throughout the rock fractures. Estimated rock content was 35% to 50%, ranging in size from pea gravel to 2-inch diameter. Weathered materials were friable, slightly hard, with no evidence of mottles to the depth excavated (5.5 feet).

Both profiles indicated suitable soil depth and characteristics for subsurface wastewater disposal utilizing a relatively shallow (<3-feet deep) dispersal system.

Groundwater

No groundwater was observed in either of the two pits to the maximum depth excavated, nor was there any evidence of soil mottling that might be indicative of seasonal saturation. Based the high topographic position of the disposal site (just down from the ridgeline), and very limited contributing drainage area that might be a source of water, groundwater is not likely to occur at a depth that would interfere with the functioning of a wastewater disposal system. According to the well completion log (see Water Supply Analysis by Questa Engineering, April 2014), groundwater was first encountered at a depth of 100 feet at the onsite water well (about 1,000 feet away at a similar elevation), which was drilled in 2003. Nevertheless, since the soils investigation was conducted during a particularly dry winter, a piezometer (perforated standpipe) was installed in each of the two test pits to allow later inspection and monitoring for any evidence of soil saturation during a wetter period.

Percolation Tests

A total of nine percolation test were conducted on the project site in the proposed wastewater disposal site. Testing was conducted at three different depths, 12, 24 and 28 inches, to assess the feasibility for shallow disposal system designs, including pressure distribution trenches and subsurface drip dispersal. The test holes were set up and presoaking was conducted on January 8, 2014; testing was conducted the following day (January 9th). Test results are summarized in **Table 3** below. As noted above, testing was observed by a representative from Santa Clara County DEH (Ann Peden, REHS).

As indicated in the table, all test results fell within the acceptable range of 1 to 120 minutes per inch (MPI), verifying the suitability of the site for subsurface wastewater disposal. The design of a wastewater disposal system would be based on the average rate determined for the pertinent soil depth of the dispersal system, as follows:

- Shallow pressure distribution trench (28-inch minimum trench depth) would be designed based on the average rate for 24 and 28-inch deep tests – 27.5 MPI.

- Subsurface drip dispersal system (8 to 12 inches deep dripline) would be designed based on the average rate for 12 and 24-inch deep tests – 24.2 MPI.

Table 3
Percolation Test Results
Heritage Oaks Memorial Park
January 8-9, 2014

Test Hole Number	Test Hole Depth (inches)	Adjusted Percolation Rate (minutes per inch, mpi)
P -1	28	18.7
P -2	24	42.0
P -3	12	4.9
P -4	24	21.0
P -5	28	7.1
P -6	12	5.1
P -7	24	67.2
P-8	12	4.8
P -9	28	8.7
Average Percolation Rate - All depths combined: - 12 and 24 inches only - 24 and 28 inches only		19.9 24.2 27.5

Notes:

- Percolation tests conducted by Questa Engineering Corporation following procedures in Santa Clara County Code, as revised December 2013.
- Test holes were 12-inch diameter with 4-inch pipe and gravel pack; adjustment factor of 1.4 for water displacement from gravel pack.

WASTEWATER SYSTEM SUITABILITY AND RECOMMENDATIONS

Based on findings of the site evaluation, the identified wastewater disposal site is suitable for either a shallow pressure distribution trench design or a subsurface drip dispersal system. With either option, a supplemental (alternative) treatment unit would also need to be incorporated in the system.

- **Pressure Distribution Trench**. A pressure distribution trench system consists of a variation of a conventional gravity drainfield that uses a pump and small-diameter pressure piping to achieve broad, uniform distribution of wastewater in the shallow soil zones for improved soil absorption and enhanced treatment of percolating effluent. It can be used with only a septic tank for treatment; or it can incorporate a supplemental treatment unit to increase the dispersal capacity. County design guidelines allow higher ("enhanced") wastewater loading rates for dispersal of higher quality effluent, as provided by a supplemental treatment unit. The dispersal field sizing is based on four (4) square feet of infiltrative surface (i.e., trench bottom and sidewalls) per lineal foot (lf) of trench. As indicated in **Figure 4**, a preliminary layout shows the proposed wastewater disposal area has sufficient area to accommodate approximately 615 lineal feet of trench. As shown in **Table 4**, this equates to a total disposal capacity of 700 gpd for septic tank effluent, and 1,400 gpd if a supplemental treatment system is incorporated. Based on projected wastewater flow of 1,300 gpd at build-out, a pressure distribution trench system including supplemental treatment would be required and could be accommodated in the identified disposal area.

- **Drip Dispersal**. Subsurface drip dispersal provides an alternative method for releasing treated wastewater to the soil for final treatment and dispersal via small diameter flexible plastic tubing manufactured with emitters spaced uniformly along its length. The drip field is designed and installed such that the drip tubing is placed directly in the shallow surface soils, typically 8 to 12 inches below finished grade; no drain rock is required. This type of system includes the use of a supplemental treatment system as a required part of the design. The disposal system sizing is based on the surface area of the disposal site. As indicated in **Figure 4**, the proposed disposal site has an available area of approximately 6,150 ft^2. This equates to a total estimated disposal capacity of approximately 2,150 gpd as shown in **Table 4**; this is more than sufficient to accommodate the projected wastewater flows at build-out conditions.

Table 4 provides a comparative summary of the available wastewater disposal options and the associated capacity provided.

Table 4
Wastewater Disposal Site Options Summary

Option	Dispersal Method	Treatment	Design Percolation Rate (MPI)	Design Wastewater Loading Rate[1] (gpd/ft^2)	Available Trench Length, or Area	Available Capacity[2] (gpd)
1	Pressure Distribution	Septic Tank	27.5	0.57	615 lf	700
2	Pressure Distribution	Supplemental Treatment	27.5	1.14	615 lf	1,400
3	Drip Dispersal	Supplemental Treatment	24.2	0.7	6,150 ft^2	2,150

[1] Per design requirements contained in Santa Clara County Onsite Systems Manual, Part 4
[2] Includes allowance for dual (200%) capacity disposal field, per Santa Clara County Code

Based on the estimated wastewater flows for the memorial park (**Table 1**), either Option 2 (supplemental treatment with pressure distribution trenches) or Option 3 (supplemental treatment with subsurface drip dispersal) would be suitable onsite wastewater system alternatives compliant with recently updated Santa Clara County Code. Option 1 (septic tank with pressure distribution trenches) although feasible, would not provide sufficient capacity for projected build-out conditions, and therefore would not be a viable long-term wastewater facility option for the project. Between Options 2 and 3, the pressure distribution trench alternative would have the advantage of typically lower maintenance requirements as compared with subsurface drip dispersal. However, the drip dispersal alternative would offer greater overall disposal capacity, should that be needed in the future to accommodate the activities and wastewater generation rates beyond the estimates provided here for build-out conditions. Based on the projected activities and estimated wastewater flows for the Memorial Park, Option 2 would be the apparent best wastewater system alternative.

Regardless of the alternative selected, it is anticipated that the septic tank and supplemental treatment system would be located near the administrative building to facilitate operation and maintenance. Following the treatment unit, the effluent would be collected in a pump tank and from there pumped to the dispersal area. The pump system would be designed to accommodate: (1) the elevation difference between the administrative building site and disposal site (estimated 50 to 75 feet); (2) frictional losses in the pipeline from the pump tank to the dispersal field; and (c) residual pressure head in the pressure distribution or drip dispersal network. **Figure 4** shows a tentative route for the effluent pipeline from the administrative building site to the disposal field. It is recommended that the pump system be a duplex system (i.e, two pumps for redundancy), provide sufficient emergency storage capacity for at least 1.5 days of sewage flow, and include provisions for operation using a portable generator during periods of extended power outage.

OPERATIONS, MAINTENANCE, AND MONITORING

Operation and Maintenance

It is anticipated that on a day-to-day basis wastewater treatment and disposal facilities will be operated, maintained, and managed by onsite grounds staff at the memorial park. Onsite staff will be assisted as necessary by a qualified onsite wastewater service provider according to County Code requirements. At a minimum, alternative onsite wastewater systems require (through the operating permit) periodic inspection, monitoring and reporting by a qualified wastewater maintenance provider.

Per County Code, an operation and maintenance manual will be prepared at the time of system design and installation, including specific operation and maintenance instructions for all system components and equipment, as well as inspection, monitoring and reporting required per terms of the operating permit issued by the County DEH.

Briefly, operation and maintenance work is expected to include the following minimum scope of activities:

Septic Tanks

- Annual inspection of all septic tanks, to check tank conditions and measure sludge and scum levels.
- Annual/as needed cleaning of effluent filters.
- As needed pump-out of accumulated solids in septic tanks.

Pump System(s)

- Semi-annual/as needed inspection and evaluation of all pump systems, including tank condition, pump operations, valves, piping, float controls and alarms.
- Respond to alarms and emergency conditions as needed.
- Repair/replace equipment components as needed.

Supplemental Treatment System

- Semi-annual inspection and servicing of supplemental treatment system per manufacturer recommendations, including tank/pump conditions, valves, control system and appurtenances.
- Inspection and monitoring of water level conditions, vegetation and dosing system; weeding/vegetation management as needed.
- Respond to alarms and emergency conditions as needed.
- Repair/replace equipment components as needed.

Pressure Distribution Trenches or Drip Dispersal System

- Semi-annual inspection of disposal field area, including surface conditions, valve boxes, and measurement of water level in trenches/monitoring wells.
- Switch diversion valves semi-annually to alternate flow between primary and secondary disposal fields.
- Annually inspect, flush and adjust (as needed) pressure distribution system.
- Inspect and service subsurface drip dispersal systems per manufacturer's recommendations, including supply lines, air relief valves, filters and flush return lines.
- Repair/replace disposal field and drip field components (e.g., valves, utility boxes, risers) as needed.

Monitoring and Reporting

The wastewater system will be monitored to verify compliance with performance objectives and to ensure safe and proper operation of the collection, treatment, and disposal facilities. The specific monitoring requirements will be established in the operating permit issued by the Santa Clara County DEH. They are anticipated to include the following recommendations.

Wastewater Flow. Wastewater flows will be monitored and recorded to verify conformance with system design assumptions and permit conditions. Flows are typically measured using in-line flow meters and/or pump event counts, dose volume and pump run-time data.

Septic Tank(s). The septic tank(s) will be inspected and monitored for scum and sludge accumulation on a routine basis to determine the need for pump-out. All pump-outs and the associated volume will be recorded.

Wastewater Effluent Sampling. Wastewater effluent from the supplemental treatment system would be sampled periodically (typically from the pump tank) to monitor and assess the performance of the treatment process and to verify conformance with operational objectives and permit conditions. Annual sampling frequency is anticipated.

Reporting. Routine reporting of monitoring results will be required for the facility, expected to be either annually or semi-annually.

WASTEWATER DISPOSAL IMPACTS

Following is an overview of potential impacts associated with an onsite wastewater system for the proposed memorial park, along with suggested mitigations where appropriate.

Public Health Hazards and Nuisances

Public health hazards and nuisances can occur as a result of the failure and surfacing of sewage effluent along with its associated contaminants and nuisance odors. Such hazards occur when a system is improperly sited, designed, constructed or maintained, or if it is overloaded. The purpose of industry guidelines and County regulations is to direct the proper placement and sizing of the wastewater system to prevent system failures. The soils investigation has shown the identified wastewater disposal site to have excellent conditions for sub-surface absorption and dispersal of wastewater, consistent with current County requirements and guidelines. Additionally, the remote location of the recommended wastewater disposal site on the east edge of the project boundary, outside of and draining away from planned burial areas will greatly limit the potential for impact to burial activities or visitors or in the event of any soil saturation or other problem with the disposal field. Proper sizing, design, construction and maintenance will be assured through compliance with County testing requirements and on-going monitoring and maintenance specifications.

Special note should be made of the anticipated need for pump systems for the project. Such systems have greater complexity and maintenance needs than the traditional gravity septic tank-leachfield system. However, pump systems have come into very common usage for onsite systems in the past 25 to 30 years; and the reliability of such systems has also increased. Typical pump systems are equipped with automatic controls, alarm systems, and redundant (i.e., duplex) pumps. Having replacement parts on-hand, reserve emergency storage capacity in the pump chamber, and a portable emergency generator are other measures used to add reliability and safety in the event of equipment failure or power outage and should be considered for the project.

Water Quality

Potential water quality concerns for onsite wastewater disposal arise from the possible effects on groundwater supplies from the downward leaching of wastewater effluent, runoff affecting surface water supplies and recreational uses, and potential cumulative loading of nitrates in the watershed.

Groundwater. The project site does not overlie a groundwater basin; groundwater occurs

discontinuously in fracture zones in the Franciscan formation. The normal siting requirements (i.e., soil depth, depth to groundwater and water well setbacks) are established to protect groundwater supplies from any wastewater contaminants. The nearest water well is the onsite drinking water well for the project, which is located more than 1,000 feet to the north, well beyond the required minimum horizontal setback distance (150 feet). The depth to water encountered in the onsite well was reported at 100 feet during well installation. The threat of any wastewater impact on groundwater quality or groundwater uses is negligible.

Surface Water. Potential impacts on surface water quality could arise if surfacing sewage were to be carried into a nearby watercourse by overland seepage flow or runoff during a rain event. This could occur in the treatment area, along any pipeline routes, or in the disposal field area. The treatment tanks and most of the effluent pipelines will be located on the western portions of the site, within the watershed of Calero Reservoir, which supports recreational uses and is a key source of drinking water for Santa Clara County. The identified site for wastewater disposal is in an area that drains through proposed open space, Coyote Valley farmland and eventually to Coyote Creek. The planned areas where onsite wastewater facilities will be located are well away from any natural watercourses, which will provide substantial horizontal buffer exceeding the minimum required horizontal setback distances per County Code. Proper sizing, design, construction and on-going monitoring and maintenance of the wastewater facilities in accordance with County requirements will provide reasonable assurance against surfacing sewage failures and impacts to local surface waters and downstream receiving waters in the area.

Nitrate Loading. Nitrate loading from onsite wastewater disposal systems, even when operating properly, can potentially degrade groundwater supplies and contribute to nutrient enrichment of surface water bodies. This tends to be associated with large flow systems and/or high density of onsite wastewater systems in concentrated areas. While the projected wastewater flows from the memorial park will be greater than those from a typical single family residential system, the total is not anticipated to reach the level considered a "large flow" system (>1,500 gpd). Also, considering the large acreage of the project site and adjoining open space area of the property (nearly 500 acres), the volume of wastewater contributed by the memorial park would not pose a nitrate loading threat of any consequence, and the impact would be insignificant.

REFERENCES

County of Santa Clara. December 2013. Onsite Wastewater Systems Ordinance, Division B11 of Santa Clara County Code.

County of Santa Clara. September 2013. Draft Onsite Systems Manual.

State Water Resources Control Board. June 2012. Final Draft Water Quality Control Policy for Siting, Design, Operation and Maintenance of On-site Wastewater Treatment Systems.

United States Department of Agriculture, Soil Conservation Service. 1974. Soil Survey of Eastern Santa Clara Area, California.

Attachment

Soil Profile and Percolation Test Data

Questa Engineering Corporation

SOIL PROFILE DESCRIPTION

Project Number:	1300096	**Project Name:**	Heritage Oaks Memorial Park	**Date:**	1/8 and 1/9/2014
Project Location:	San Jose	**Boring Method:**	Backhoe	**Logged By:**	MFW
Notes:					

Test Hole No: T-1 **Water Table:** **Slope:** 16-18%

Graphic Log	Depth (inches)	Texture	Structure	Color	Rock	Pores	Consistency	Remarks
	0 - 15/21	Clay Loam to Light Clay Topsoil	Moderate, Subangular Blocky		<15% BE	Few Coarse & Common Very Fine to Medium Sized	Soft, Very Friable, Sticky, Plastic	Common Very Fine to Coarse Roots No Mottles Diffuse Boundary
	15/21 - 64+	Differentially weathered & fractured sandstone with soil matrix between fractures	Angular Blocky		>35% Bird's eye pea gravel to 2" diameter		Slightly Hard, Friable	Common Very Fine to Coarse Roots No Mottles
	-							
	-							

Notes:
1/8/2014

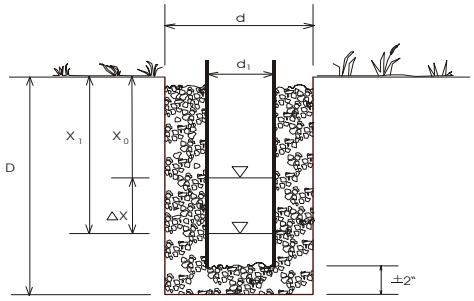
Test Hole No: T-2 **Water Table:** **Slope:** 16-18%

Graphic Log	Depth (inches)	Texture	Structure	Color	Rock	Pores	Consistency	Remarks
	0 - 17/21	Clay Loam to Light Clay	Moderate, Subangular Blocky		<15%	Few Coarse & Common Very Fine to Medium Sized	Soft, Very Friable, Sticky, Plastic	Common Very Fine to Coarse Roots No Mottles Diffuse Boundary
	17/21 - 64+	Differentially weathered & fractured sandstone with soil matrix between fractures	Angular Blocky		>35% BE - 2			Common Very Fine to Coarse Roots No Mottles

Notes:
1/9/2014

QUESTA ENGINEERING CORP.

PERCOLATION TEST DATA



Project Number: **1300096** Date: **1/9/2014**
Project Name: **Heritage Oaks** Test by: **MFW**
Location: **Gentleback** Checked by: **Ann Peden**

Test Hole: **1** Hole Diameter (d): **12"** Pipe Diameter (d_1): **4"** Depth (D): **28"** Soil Type:

Trial Number	Start Time (T_0)	Initial Water Level (inches) (X_0)	Time Read (T_1)	Final Water Level (Inches) (X_1)	Time Interval (minutes) (T)	Water Drop (inches) (ΔX)	Percolation Rate	
							Inches per Hour	Minutes per Inch
1	11:06:00 AM	8.750	11:36:00 AM	11.500	30.00	2.750	5.500	10.9
2	11:37:00 AM	9.000	12:07:00 PM	11.500	30.00	2.500	5.000	12.0
3	12:08:00 PM	8.250	12:39:00 PM	11.500	31.00	3.250	6.290	9.5
4	12:40:00 PM	9.000	1:10:00 PM	11.250	30.00	2.250	4.500	13.3
5	1:11:00 PM	9.000	1:41:00 PM	11.250	30.00	2.250	4.500	13.3
6	1:42:00 PM	9.000	2:12:00 PM	11.250	30.00	2.250	4.500	13.3

Adjustment Factor: **1.40** Adjusted Stabilized Rate: **18.7** Maximum Application Rate:

Adjustment Rate Method: Notes:

Remaining Presoak: **0**

Test Hole: **2** Hole Diameter (d): **12"** Pipe Diameter (d_1): **4"** Depth (D): **24"** Soil Type:

Trial Number	Start Time (T_0)	Initial Water Level (inches) (X_0)	Time Read (T_1)	Final Water Level (Inches) (X_1)	Time Interval (minutes) (T)	Water Drop (inches) (ΔX)	Percolation Rate	
							Inches per Hour	Minutes per Inch
1	11:09:00 AM	4.875	11:37:00 AM	6.875	28.00	2.000	4.286	14.0
2	11:38:00 AM	6.000	12:08:00 PM	7.000	30.00	1.000	2.000	30.0
3	12:09:00 PM	6.000	12:41:00 PM	7.000	32.00	1.000	1.875	32.0
4	12:42:00 PM	5.875	1:12:00 PM	6.875	30.00	1.000	2.000	30.0
5	1:13:00 PM	6.000	1:43:00 PM	7.000	30.00	1.000	2.000	30.0

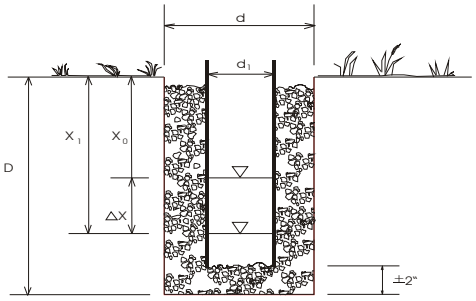
Adjustment Factor: **1.40** Adjusted Stabilized Rate: **42.0** Maximum Application Rate:

Adjustment Rate Method: Notes:

Remaining Presoak: **0**

QUESTA ENGINEERING CORP.

PERCOLATION TEST DATA



Project Number: **1300096** Date: **1/9/2014**
Project Name: **Heritage Oaks** Test by: **MFW**
Location: **Gentleback** Checked by: **Ann Peden**

Test Hole: **3** Hole Diameter (d): **12"** Pipe Diameter (d_1): **4"** Depth (D): **12"** Soil Type:

Trial Number	Start Time (T_0)	Initial Water Level (inches) (X_0)	Time Read (T_1)	Final Water Level (Inches) (X_1)	Time Interval (minutes) (T)	Water Drop (inches) (ΔX)	Percolation Rate Inches per Hour	Percolation Rate Minutes per Inch
1	11:10:00 AM	6.000	11:38:00 AM	12.000	28.00	6.000	12.857	4.7
2	11:39:00 AM	6.000	12:09:00 PM	12.000	30.00	6.000	12.000	5.0
3	12:10:00 PM	6.000	12:42:00 PM	12.000	32.00	6.000	11.250	5.3
4	12:43:00 PM	6.000	12:58:00 PM	11.000	15.00	5.000	20.000	3.0
5	12:59:00 PM	6.000	1:14:00 PM	11.000	15.00	5.000	20.000	3.0
6	1:15:00 PM	6.000	1:31:00 PM	11.125	16.00	5.125	19.219	3.1

Adjustment Factor: **1.40** Adjusted Stabilized Rate: **4.4** Maximum Application Rate:

Adjustment Rate Method: Notes:

Remaining Presoak: **0**

Test Hole: **4** Hole Diameter (d): **12"** Pipe Diameter (d_1): **4"** Depth (D): **24** Soil Type:

Trial Number	Start Time (T_0)	Initial Water Level (inches) (X_0)	Time Read (T_1)	Final Water Level (Inches) (X_1)	Time Interval (minutes) (T)	Water Drop (inches) (ΔX)	Percolation Rate Inches per Hour	Percolation Rate Minutes per Inch
1	11:12:00 AM	2.875	11:39:00 AM	5.500	27.00	2.625	5.833	10.3
2	11:40:00 AM	3.000	12:11:00 PM	5.250	31.00	2.250	4.355	13.8
3	12:12:00 PM	2.875	12:45:00 PM	5.125	33.00	2.250	4.091	14.7
4	12:46:00 PM	3.000	1:16:00 PM	5.000	30.00	2.000	4.000	15.0
5	1:17:00 PM	3.000	1:47:00 PM	5.000	30.00	2.000	4.000	15.0
6	1:48:00 PM	3.000	2:18:00 PM	5.000	30.00	2.000	4.000	15.0

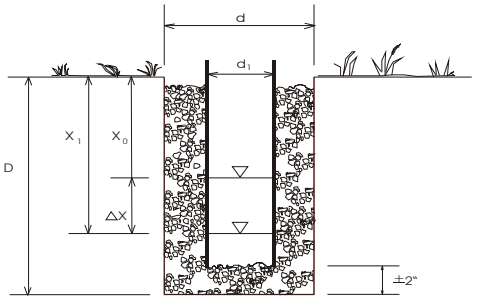
Adjustment Factor: **1.40** Adjusted Stabilized Rate: **21.0** Maximum Application Rate:

Adjustment Rate Method: Notes:

Remaining Presoak: **0**

QUESTA ENGINEERING CORP.

PERCOLATION TEST DATA



Project Number: **1300096** Date: **1/9/2014**
Project Name: **Heritage Oaks** Test by: **MFW**
Location: **Gentleback** Checked by: **Ann Peden**

Test Hole: **5** Hole Diameter (d): **12"** Pipe Diameter (d_1): **4"** Depth (D): **28"** Soil Type:

Trial Number	Start Time (T_0)	Initial Water Level (inches) (X_0)	Time Read (T_1)	Final Water Level (Inches) (X_1)	Time Interval (minutes) (T)	Water Drop (inches) (ΔX)	Percolation Rate Inches per Hour	Percolation Rate Minutes per Inch
1	11:13:00 AM	6.000	11:41:00 AM	12.000	28.00	6.000	12.857	4.7
2	11:42:00 AM	6.000	12:12:00 PM	12.000	30.00	6.000	12.000	5.0
3	12:13:00 PM	6.000	12:46:00 PM	12.000	33.00	6.000	10.909	5.5
4	12:48:00 PM	6.000	1:18:00 PM	11.875	30.00	5.875	11.750	5.1
5	1:18:00 PM	6.000	1:48:00 PM	11.875	30.00	5.875	11.750	5.1

Adjustment Factor: **1.40** Adjusted Stabilized Rate: **7.1** Maximum Application Rate:

Adjustment Rate Method: Notes:

Remaining Presoak: **0**

Test Hole: **6** Hole Diameter (d): **12"** Pipe Diameter (d_1): **4"** Depth (D): **12** Soil Type:

Trial Number	Start Time (T_0)	Initial Water Level (inches) (X_0)	Time Read (T_1)	Final Water Level (Inches) (X_1)	Time Interval (minutes) (T)	Water Drop (inches) (ΔX)	Percolation Rate Inches per Hour	Percolation Rate Minutes per Inch
1	11:15:00 AM	6.000	11:44:00 AM	12.000	29.00	6.000	12.414	4.8
2	11:46:00 AM	6.000	12:15:00 PM	12.000	29.00	6.000	12.414	4.8
3	12:16:00 PM	6.000	12:48:00 PM	12.000	32.00	6.000	11.250	5.3
4	12:49:00 PM	6.000	1:09:00 PM	11.750	20.00	5.750	17.250	3.5
5	1:10:00 PM	6.000	1:30:00 PM	11.625	20.00	5.625	16.875	3.6
6	1:31:00 PM	6.000	1:51:00 PM	11.500	20.00	5.500	16.500	3.6

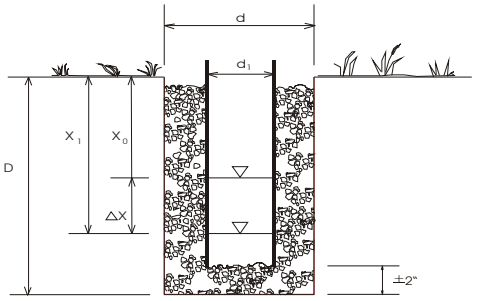
Adjustment Factor: **1.40** Adjusted Stabilized Rate: **5.1** Maximum Application Rate:

Adjustment Rate Method: Notes:

Remaining Presoak: **0**

QUESTA ENGINEERING CORP.

PERCOLATION TEST DATA



Project Number: **1300096** Date: **1/9/2014**
Project Name: **Heritage Oaks** Test by: **MFW**
Location: **Gentleback** Checked by: **Ann Peden**

Test Hole: **7** Hole Diameter (d): **12"** Pipe Diameter (d_1): **4"** Depth (D): **24"** Soil Type:

Trial Number	Start Time (T_0)	Initial Water Level (inches) (X_0)	Time Read (T_1)	Final Water Level (Inches) (X_1)	Time Interval (minutes) (T)	Water Drop (inches) (ΔX)	Percolation Rate Inches per Hour	Percolation Rate Minutes per Inch
1	11:16:00 AM	13.750	11:43:00 AM	14.375	27.00	0.625	1.389	43.2
2	11:44:00 AM	14.000	12:16:00 PM	14.750	32.00	0.750	1.406	42.7
3	12:17:00 PM	14.000	12:50:00 PM	14.625	33.00	0.625	1.136	52.8
4	12:51:00 PM	14.000	1:21:00 PM	14.625	30.00	0.625	1.250	48.0

Adjustment Factor: **1.40** Adjusted Stabilized Rate: **67.2** Maximum Application Rate:

Adjustment Rate Method: Notes:

Remaining Presoak: **0**

Test Hole: **8** Hole Diameter (d): **12"** Pipe Diameter (d_1): **4** Depth (D): **12"** Soil Type:

Trial Number	Start Time (T_0)	Initial Water Level (inches) (X_0)	Time Read (T_1)	Final Water Level (Inches) (X_1)	Time Interval (minutes) (T)	Water Drop (inches) (ΔX)	Percolation Rate Inches per Hour	Percolation Rate Minutes per Inch
1	11:19:00 AM	6.000	11:47:00 AM	12.000	28.00	6.000	12.857	4.7
2	11:48:00 AM	6.000	12:18:00 PM	12.000	30.00	6.000	12.000	5.0
3	12:18:00 PM	6.000	12:51:00 PM	12.000	33.00	6.000	10.909	5.5
4	12:52:00 PM	6.000	1:07:00 PM	10.500	15.00	4.500	18.000	3.3
5	1:08:00 PM	6.000	1:23:00 PM	10.500	15.00	4.500	18.000	3.3
6	1:24:00 PM	6.000	1:39:00 PM	10.375	15.00	4.375	17.500	3.4

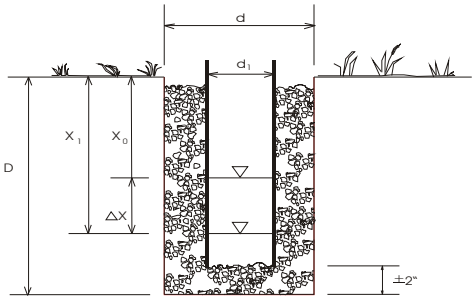
Adjustment Factor: **1.40** Adjusted Stabilized Rate: **4.8** Maximum Application Rate:

Adjustment Rate Method: Notes:

Remaining Presoak: **0**

QUESTA ENGINEERING CORP.

PERCOLATION TEST DATA



Project Number: **1300096** Date: **1/9/2014**
Project Name: **Heritage Oaks** Test by: **MFW**
Location: **Gentleback** Checked by: **Ann Peden**

Test Hole: **9** Hole Diameter (d): **12"** Pipe Diameter (d_1): **4"** Depth (D): **28"** Soil Type:

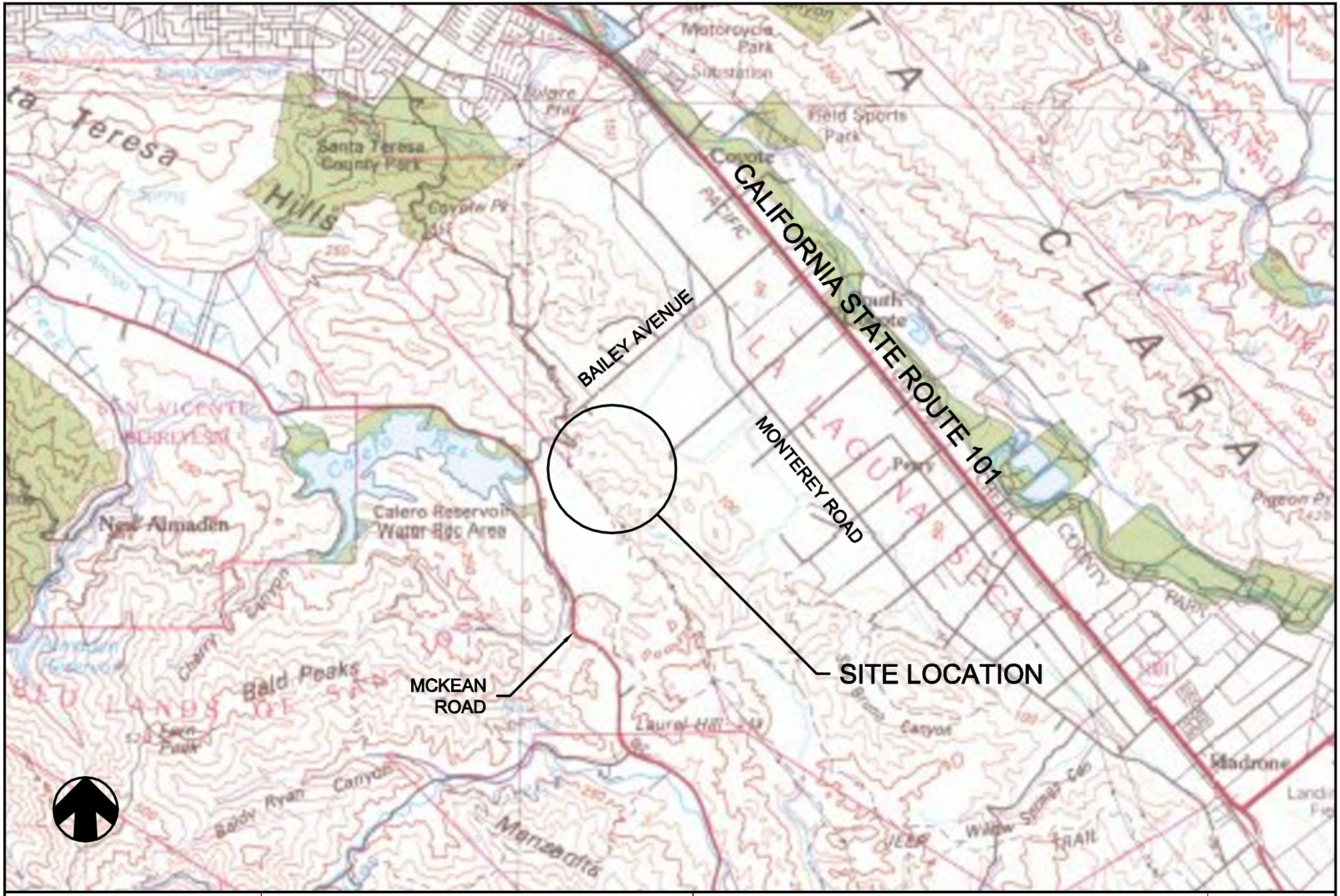
Trial Number	Start Time (T_0)	Initial Water Level (inches) (X_0)	Time Read (T_1)	Final Water Level (Inches) (X_1)	Time Interval (minutes) (T)	Water Drop (inches) (ΔX)	Percolation Rate Inches per Hour	Percolation Rate Minutes per Inch
1	11:21:00 AM	2.000	11:50:00 AM	5.375	29.00	3.375	6.983	8.6
2	11:51:00 AM	3.000	12:20:00 PM	5.375	29.00	2.375	4.914	12.2
3	12:21:00 PM	3.000	12:54:00 PM	5.250	33.00	2.250	4.091	14.7
4	12:55:00 PM	2.875	1:25:00 PM	5.125	30.00	2.250	4.500	13.3
5								
6								

Adjustment Factor: **1.40** Adjusted Stabilized Rate: **18.7** Maximum Application Rate:

Adjustment Rate Method: Notes:

Remaining Presoak: **0**

Figures



Date:	4/24/2014
Drn by:	AM
App by:	NH
Dwg:	1300096_Conceptual Plan.dwg

QUESTA ENGINEERING CORP.
Civil Environmental & Water Resources
P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807
(510) 236-6114
FAX (510) 236-2423
questa@questaec.com

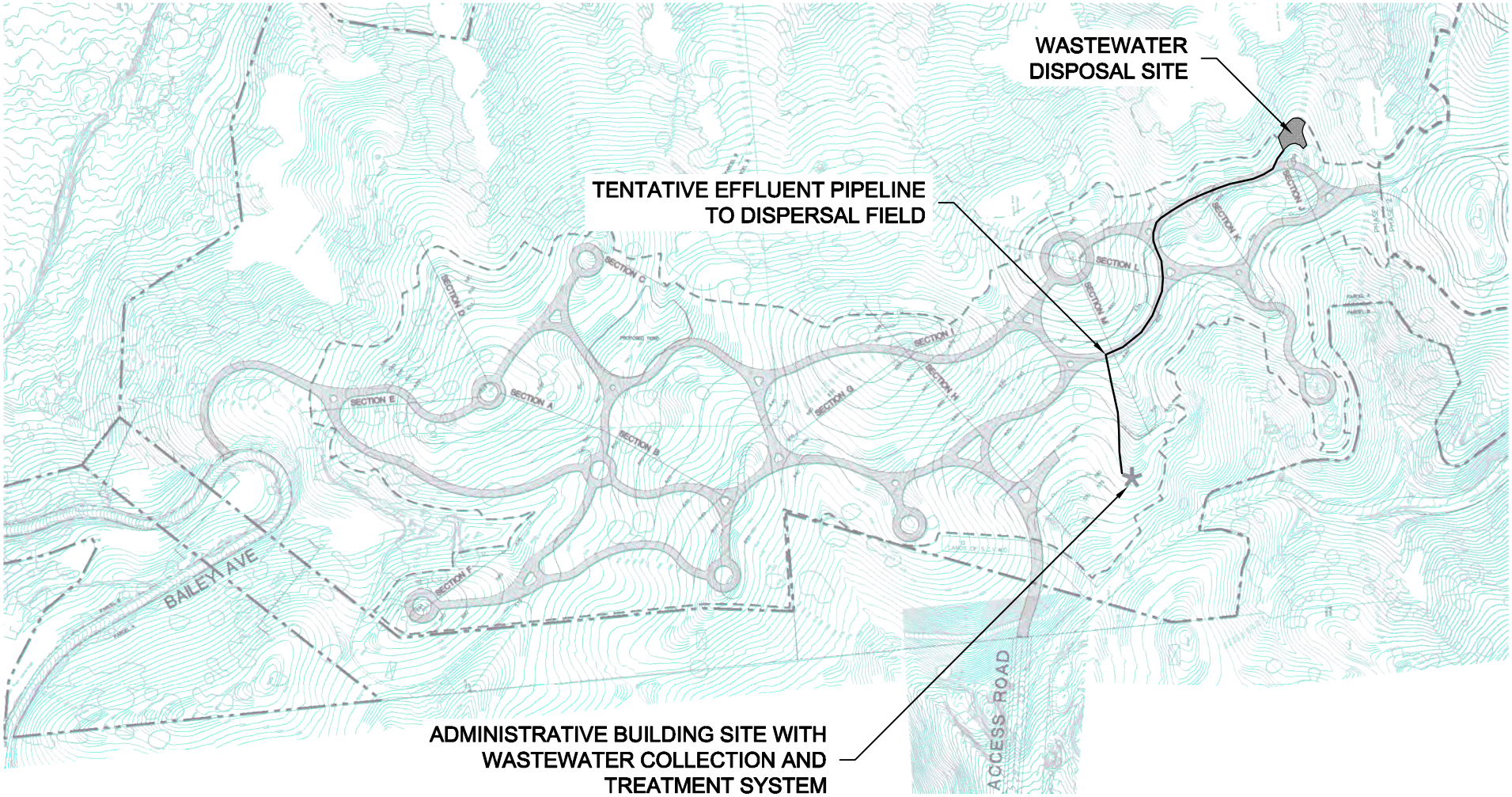
LOCATION MAP

HERITAGE OAKS MEMORIAL PARK

WASTEWATER FEASIBILITY STUDY

FIGURE

1



Date:	4/24/2014
Drn by:	AM
App by:	NH
Dwg:	1300096_Conceptual Plan.dwg

QUESTA ENGINEERING CORP.
Civil
Environmental
& Water Resources
P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807
(510) 236-6114
FAX (510) 236-2423
questa@questaec.com

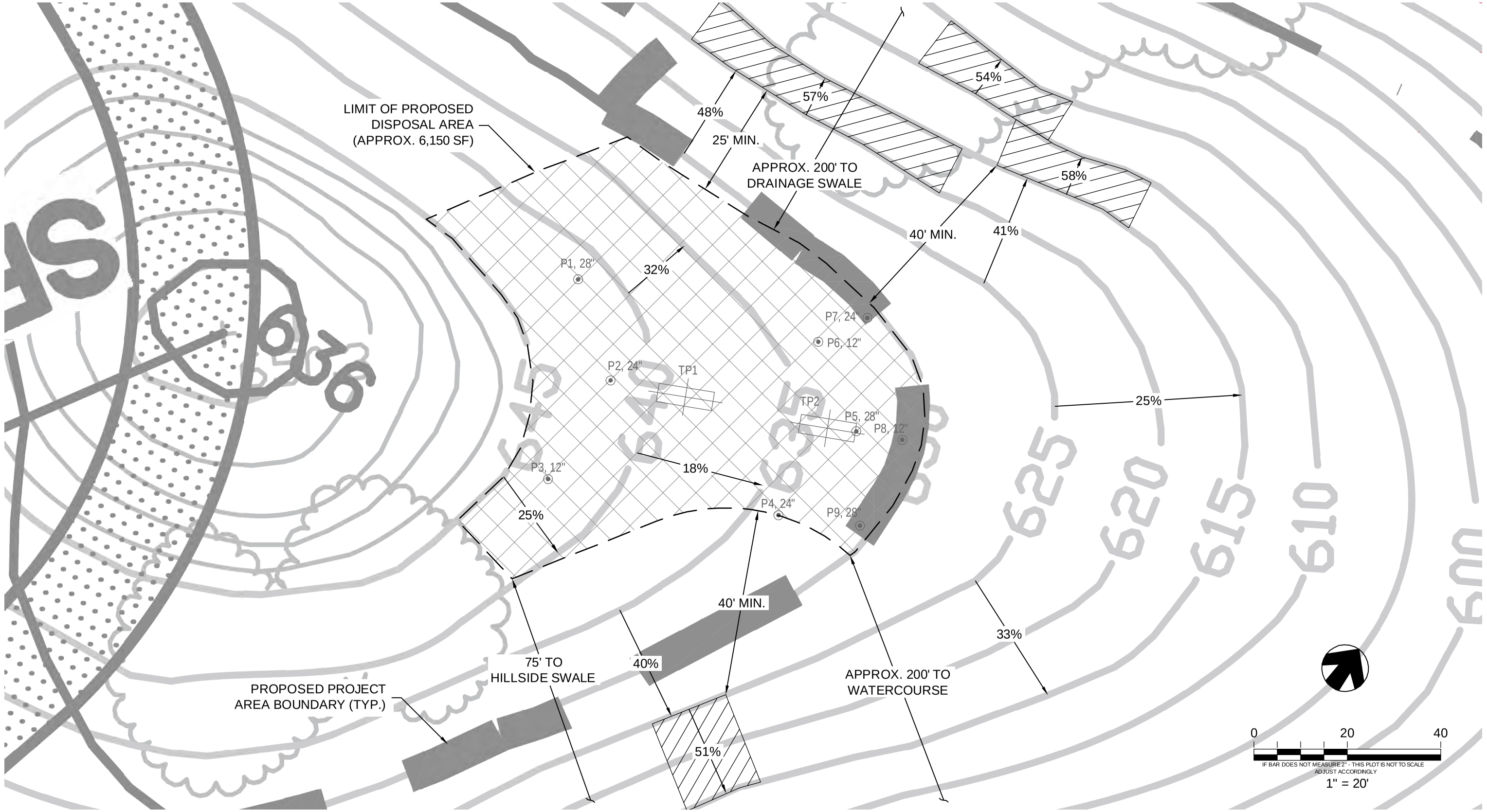
SITE MAP

HERITAGE OAKS MEMORIAL PARK

WASTEWATER FEASIBILITY STUDY

FIGURE

2



HERITAGE OAKS MEMORIAL PARK

SANTA CLARA COUNTY
CALIFORNIA

QUESTA ENGINEERING CORP.
Civil Environmental & Water Resources
(510) 236-6114
FAX (510) 236-2423
questa@questaec.com
P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807

Sht:	Rev:	Date:	By:	Description:	App'd:

Design: NH
Drawn: AM
Checked: NH
Appr'd: NH

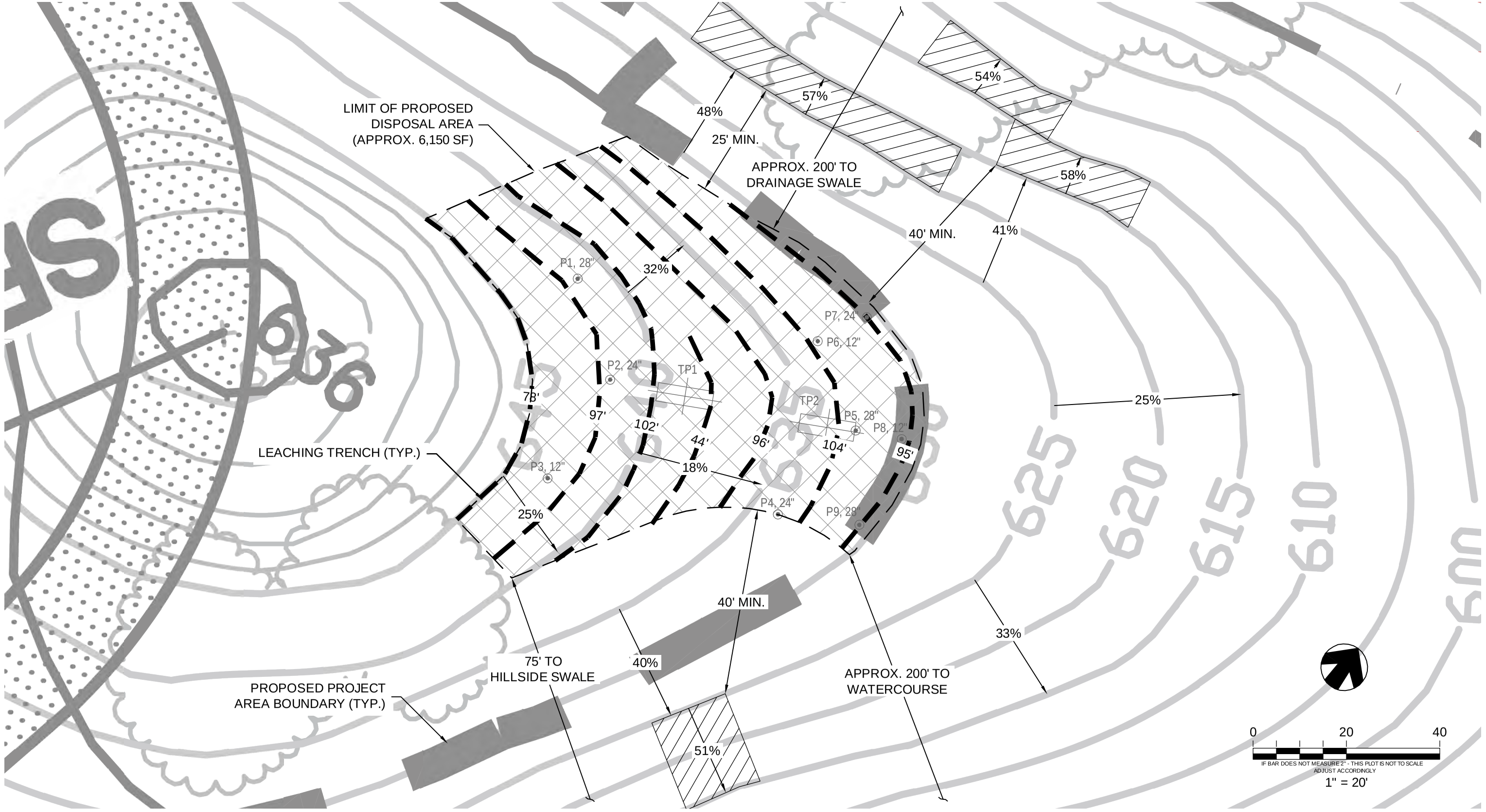
DISPOSAL SITE TEST LOCATION MAP

MORGAN HILL, CALIFORNIA

FIGURE 3

IF BAR DOES NOT MEASURE 1" DRAWING IS NOT TO SCALE – ADJUST ACCORDINGLY

LAST SAVED: 2/26/2014 PLOT DATE: 2/26/2014 PLOT STYLE: ----
P:\2013\13000096_HERITAGE_OAKS_MEMORIAL_PARK\CAD\13000096_CONCEPTUAL PLAN.DWG



LAST SAVED: 2/26/2014 PLOT DATE: 2/26/2014 PLOT STYLE: ----

P:\2013\1300096_HERITAGE_OAKS_MEMORIAL_PARK\CAD\1300096_CONCEPTUAL PLAN.DWG

HERITAGE OAKS MEMORIAL PARK

SANTA CLARA COUNTY
CALIFORNIA

QUESTA ENGINEERING CORP.
Civil Environmental & Water Resources
(510) 236-6114
FAX (510) 236-2423
questa@questaec.com
P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807

Sht:	Rev:	Date:	By:	Description:	App'd:

Design: NH
Drawn: AM
Checked: NH
Appr'd: NH

TENTATIVE DISPOSAL FIELD TRENCH LAYOUT

MORGAN HILL, CALIFORNIA

FIGURE 4

IF BAR DOES NOT MEASURE 1" DRAWING IS NOT TO SCALE – ADJUST ACCORDINGLY