DELTA CONSULTING & ENGINEERING
OF ST. HELENA

TRANSMITTAL SHEET

TO: Mary Doyle	FROM: Kristi Wagner
COMPANY: Napa County Planning Department	DATE: 05/15/09
ADDRESS:	DELIVERED VIA: Hand
PROJECT: H-125 Lake Ridge Winey Use Permit	

DESCRIPTION	PRINTING DATE	# OF PAGES	# OF COPIES
USE PERMIT PLANS	05/05/09	9	1
LETTER TO EMD	05/14/09	1	1
LETTER FROM ORENCO	04/23/09	1	1
SEPTIC FEASIBILITY REPORT	04/20/09	8	1
CD WITH USE PERMIT PLANS	05/15/09		1

NOTES/COMMENTS:

Mary –

Please find attached copies of the items re-submitted to Environmental Management. I have also included a revised set of the Use Permit Plans and a CD containing the PDFs. Once I complete the revisions to the Hydrology report, I will re-submit the report and Use Permit Plans to Public Works.

Let me know if you have any questions or comments.

Sincerely,

Kristi Wagner
Project Engineer

1104 ADAMS STREET, SUITE 203 – ST. HELENA, CALIFORNIA 94574
707-963-8456 TELE + 707-963-8528 FAX

DELTA CONSULTING & ENGINEERING
OF ST. HELENA

May 14, 2009

Christine Secheli.
Assistant Director
County of Napa, Department of Environmental Management
1195 Third Street, Suite 101
Napa, California 94559

Re: Incomplete Memorandum for Use Permit Review
Lake Ridge Winery
90 Long Ranch Road, St. Helena, APN 032-010-068
P09-00039

Dear Ms. Secheli:

The following is in response to the memorandum dated April 6, 2009 to the Napa County Planning Department regarding your review of the items submitted for the Lake Ridge Winery Use Permit.

1. Please find included a letter from Orenco, dated April 23, 2009 stating that the proposed AX-100 treatment unit will treat the process waste water to 160 BOD and 80 TSS.

2. Please find included the revised Septic Feasibility Report dated April 20, 2009. This report has been revised to include calculations and verification that enough space has been provided for the surface drip disposal of the process waste. Please see page 7 of the report for this information.

If you have any questions or comments on these items, or if you require anything more, please feel free to contact our office.

Sincerely,

Kristi Wagner
Project Engineer

1104 ADAMS STREET, SUITE 203 - ST. HELENA, CALIFORNIA 94574
707-963-8456 TELE + 707-963-8528 FAX

April 23, 2009

Delta Consulting & Engineering
Attn: Kristi Wagner
1104 Adams Street, Suite 203
St. Helena, California 94574

Subject: Lake Ridge Winery

Dear Kisti:

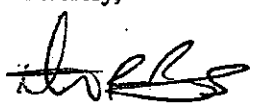
You have brought to our attention that the County of Napa would like some assurance that this process can produce effluent of a sufficient quality to use as irrigation water. The limits required are for Biochemical Oxygen Demand and Total Suspended Solids, and are 160 mg/L and 80 mg/L, respectively.

Aerobic biochemical remediation of winery process waste through lagoons, sand filters, leachfields and other methods has been employed for quite some time and is well accepted. AdvanTex® utilizes bacterial biochemical treatment in an aerobic, fixed-film process that has the capability to provide very high levels of treatment.

We feel confident that the process that AdvanTex® employs has the capability of reducing the winery process waste to the levels required. In fact, we have data to support that the AdvanTex® treatment process has the capability to produce effluent of a quality to exceed these limits. It is important to note that the basis for this letter is the Septic Feasibility Report completed by Delta Consulting & Engineering on April 20, 2009.

It is important to note that even though the process has the *capability* to exceed the needed treatment parameters, there is no way for us to guarantee a system that is not operated or used in a manner consistent with the plans or intended purpose of the system. If operated within the design parameters, we are confident that the required treatment parameters are achievable with the AdvanTex system design. If the design parameters are exceeded, the system can be easily expanded to accommodate such. It may also be necessary to include pH adjustment and pretreatment into the design in order to meet the required limits. The system must stay within the hydraulic and organic loads it was designed to handle if it is expected to perform properly, but the system is also designed to have the capability to expand if the necessity arises in the future. However, it is our intent to diligently work with the engineers and owner to ensure that the system will perform as intended, and that the goals of protecting the environment in a proper and cost-effective manner are achieved.

Sincerely,



Tristian Bounds, P.E.
Orenco Systems Inc.
tristianb@orenco.com
800-348-9843 x 236

Project: H-125
Lake Ridge Winery

DELTA CONSULTING & ENGINEERING
OF ST. HELENA

SEPTIC FEASIBILITY REPORT

FOR THE

LAKE RIDGE WINERY
USE PERMIT APPLICATION

PROJECT LOCATED AT

90 LONG RANCH ROAD
ST. HELENA, CA 94574

County: NAPA
APN: 032-010-068

DECEMBER 23, 2008
REVISED APRIL 20, 2009

PREPARED FOR REVIEW BY:

NAPA COUNTY PUBLIC ENVIRONMENTAL MANAGEMENT
1195 THIRD STREET, ROOM 101
NAPA, CA 94559

1104 ADAMS STREET, SUITE 203 - ST. HELENA, CALIFORNIA 94574
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DELTA CONSULTING & ENGINEERING
OF ST. HELENA

April 15, 2009

SEWAGE DISPOSAL FEASIBILITY REPORT
FOR
LAKE RIDGE WINERY

90 Long Ranch Road
St. Helena, CA 94574
APN 032-010-068

Introduction

The applicant is applying to the County of Napa for a Use Permit to operate a 10,000 gallon per year winery on the subject parcel. This report has been prepared to estimate the wastewater flows generated by the operation of the winery and to evaluate the feasibility of constructing a wastewater disposal system to serve the domestic and winery wastewater generated by the proposed project.

The winery will consist of a winery building and associated caves. It will be a full crushing, fermenting, and barrel aging facility. Bottling will be performed via mobile bottling vendors. The maximum staffing level will be seven employees during crushing or bottling days only. A typical day will consist of a single employee. The winery marketing plan calls for ten visitors per day.

All plumbing fixtures in the proposed winery shall be low flow, water-saving fixtures per the Uniform Plumbing Code as adopted by the Napa County Building Department.

Winery Sanitary Wastewater Flow

Peak daily domestic wastewater flows for the tasting room are based on ten visitors and seven employees during harvest or bottling. The values used for the projected wastewater are based on the Napa County Department of Environmental Management guidelines[1].

$$(10\,visitors/day)(3\,gallons/visitor) = 30\,gpd$$
$$(7\,employees/day)(15\,gallons/employee) = 105\,gpd$$

The total anticipated peak domestic flow is 135 gallons per day.

[1] Table 4, Napa County Environmental Management Regulations for Design, Construction, and Installation of Alternative Sewage Treatment System.

Winery Process Wastewater Flow

Using the Napa County method for determining the peak process effluent from a winery, the peak flow is estimated to be:

Harvet peak flow:

$$\frac{(10{,}000\,gal-wine/year)(1.5\,gal-water/gal-wine)}{30\,days-crush/year}=500\,gpd$$

Using a method which ties the amount of process wastewater generated to each gallon of wine produced, the average daily flow is estimated to be:

Average daily winery process wastewater flow:

$$\frac{(10{,}000\,gal-wine/year)(6\,gal-water/gal-wine)}{365\,days/year}=164\,gpd$$

The amount of wastewater generate per gallon of wine produced typically ranges from 3-10 gallons per gallon of wine produced. This variation is based on the individual winery water conservation practices. We have estimated, for this project, that six gallons of process effluent shall be produced for each gallon of wine produced. Using this method, it is estimated that 60,000 gallons of process wastewater shall be produced annually. This averages to 164 gallons per day.

The total peak flow of 500 gpd is estimated to occur during harvest with an average day producing 164 gallons of process wastewater.

Site Evaluation

This feasibility study is based on the site evaluation performed November 5th and 24th, 2008 by Delta Consulting and Engineering and field review by a member of the staff from Napa County Department of Environmental Management.

On November 5th, 2008, four test pits were excavated. Due to a surveying error (the parcel boundary was inaccurately marked in the field), two of the test pits (#3 and 4) were inadvertently located on the adjoining parcel. As such, two acceptable test pit were obtained from the November 5th evaluation (test pits #1 and 2).

Due to the surveying error, Delta subsequently evaluated two additional test pits (#5 and 6) on November 24th, 2008.

The acceptable test pits are #1, 2, 5, and 6. Due to soil conditions, the test pit depths were limited to an excavation of depth 24"-28". The soil texture for each horizon was determined in the field by the Feel Method and verified by laboratory testing.

Depending on the test pit, the gravel content ranged from 5%-10%. The attached site evaluation form describes the pits in greater detail. Based on the soil types encountered, Napa County design guidelines dictate the allowable wastewater application rate and the allowable soil depth dictates the allowable type(s) of distribution system to be constructed.

The field results were as follows:

Test Pit	Depth	Abbreviation	Texture	Structure	Grade	Application Rate (gal/ft²/day)*
1	0-24"	SCL	Sandy Clay Loam	Moderate	Subangular blocky	0.75
	24" +	-	Refusal	-	-	-
2	0-36"	SCL	Sandy Clay Loam	Moderate	Subangular blocky	0.75
	36"-48"	-	Very hard	-	-	-
5	0-26"	CL	Clay Loam	Moderate	Subangular blocky	0.5
	26" +	-	Refusal	-	-	-
6	0-28"	CL	Clay Loam	Moderate	Subangular blocky	0.5

*Pretreated effluent

Wastewater Disposal Recommendations

Due to the limited soil depths encountered in each test pit and the number of trees in the area of the test pits, the wastewater system will consist of a subsurface drip dispersal system with pretreatment for the domestic flows and a surface drip system with pretreatment for the winery process effluent. A combined at-grade dispersal field was eliminated from consideration due to the number of trees in the area which would need to be removed for the construction of the at-grade field.

Domestic Wastewater Treatment System Design Overview

The domestic effluent from the winery shall be treated via standard septic tank (primary treatment), an Orenco Systems AdvanTex filter (secondary treatment), and final disposal through a subsurface drip field. The primary treatment system will treat and remove settleable solids to acceptable concentration levels. The secondary treatment system is required to distribute the effluent via the subsurface drip system (final treatment). The septic tank shall be equipped with an effluent filter.

Required Subsurface Drip System Area:

$$primary\ disposal\ field: \frac{135 gpd}{0.5 gal/ft^2 - day} = 270 ft^2$$

The primary disposal area will consist of (2) 75 feet subsurface drip lines spaced two feet apart which yields 300 ft² of disposal area. The 200% reserve area will require an additional 540 ft².

The pump in the dosing tank shall be programmed to dose the field at regular intervals as specified by the Napa County design guidelines.

Due to the limited soil depth, the drip lines will be laid on the existing ground and covered with 6" of suitable soil. This provides a minimum of 24" of undisturbed acceptable soil below the disposal lines.

Following is a schematic of the proposed domestic wastewater treatment system:

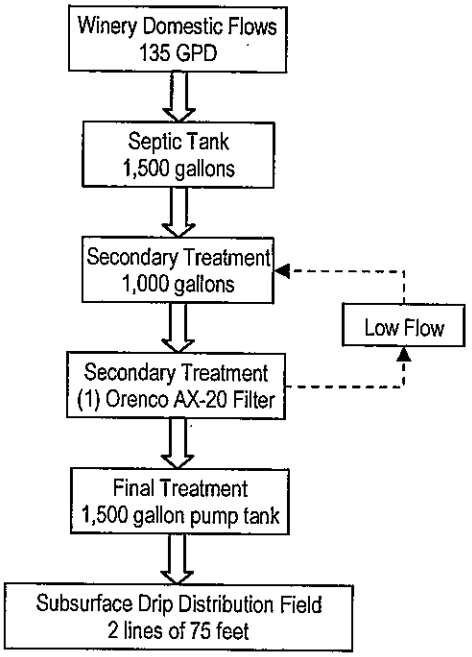


Figure 1: Proposed Domestic Wastewater Treatment System

Process Wastewater Treatment System Design Overview

The owner has two options for the process wastewater treatment system. The one of the options is not an on-site treatment system (hold and haul system) and the second is an on-site treatment system similar to the domestic wastewater treatment system described above.

Hold and Haul System

This system consists of the installation of two sets of standard septic tanks. Each set of tanks shall be considered a tank battery (Battery A & B). Each Battery is outfitted with a float tree to monitor the effluent levels in each battery. When a particular battery reaches 90% of capacity, the operator

calls an approved septage hauler for tank pumping. The septage hauler then disposes of the effluent at a municipal treatment plant (East Bay Municipal Utility District). To allow the system operator to direct the flows between the batteries, the process effluent flows from the winery to a distribution valve which allows the system operator to direct the flows to either Battery A or B.

For small wineries, the hold and haul system is beneficial as the winery process flows are typically less than the peak design flows. The alternative system (described below) is costly to construct and will require scheduled monitoring. The drawback to the hold and haul option is the periodic yet constant hauling of effluent which currently is 0.30 per gallon of effluent.

On-site Treatment System

The second option is similar to the domestic treatment system. The difference is the final disposal drip lines will be laid and secured on existing grade (no soil cover).

The design assumes a process effluent strength of:

Biochemical Oxygen Demand (BOD)	2,500 mg/L (small winery)
Total Suspended Solids (TSS)	250 mg/L (harvest)

The strength parameters for any winery are difficult to obtain as the BOD and TSS vary drastically during the winemaking year. The BOD is very low during the non-harvest months and varies during the harvest months as not every day during harvest does crushing occur. The primary treatment system provides six days of hydraulic detention time and shall reduce the BOD by approximately 30% to 1,750 mg/L as the effluent enters the secondary treatment tank. During secondary treatment, the BOD level shall be reduced by approximately 95% to 88 mg/L prior to entering the dosing tank (final disposal).

Total Suspended Solids (TSS) shall be reduced by approximately 60%-80%. Using a conservative removal rate of 60%, the TSS will be 125 mg/L entering the secondary treatment tank. The secondary treatment shall reduce approximately 85% of the remaining TSS to 13 mg/L prior to entering the dosing tank (final disposal).

The septic tanks shall be equipped with an effluent filter.

The final disposal design is based on soil infiltration and evaporation and plant uptake (evapotranspiration). During the rainy season, discharges are not allowed 48 hours prior to a forecast storm event, during a rain/storm event, 48 hours after a rain event, or when the soils are saturated.

As the rainy season (December through April) coincides with the non-harvest season, it is anticipated that the winery shall generate approximately 30% of its total annual process

wastewater during this period. Assuming the winery generates 60,000 gallons of process wastewater annually, during the rainy period, the winery will generate 30% of this amount per day or 18,000 gallons over the five month rain season (120 gallons/day). Assuming a two day storm event, two days prior to and after the event, the winery will need to storage capacity of:

$$Wet\ weather\ storage\ capacity: (120\,gallons/day)(5\,days) = 600\,gallons$$

The final design shall provide 1,500 gallons of wet weather storage. If, due to continued rain events and release to the distribution field is prohibited, the wet weather storage tank becomes fully loaded, the operator will need to 1) reduce winery process wastewater generating activities and 2) have the tank pumped by a septage hauler.

Based on the site evaluations performed, the soil's application rate was determined to be 0.5 gallon/ft^2 per day. This application rate is equivalent to a soil percolation rate of 38 minutes/inch or 1.58 inches/hour under saturated conditions. Based on 1) the fact that the peak flows will occur outside of the rainy season, the soil shall be unsaturated and thusly capable of handling the applied peak loading.

Required Subsurface Drip System Area:

$$primary\ disposal\ field: \frac{500\,gpd}{0.5\,gal/ft^2 - day} = 1000\,ft^2$$

The site slope for the distribution field is between 17%-20%. The drip distribution lines shall consist of (6) 100 foot long lines and shall be installed 3 feet apart for a total distribution area of 1,800 ft^2. Due to the lines being laid on the surface and on a slope, the spacing of the distribution lines was increased to allow for a larger disposal field. (6) 100 foot long lines at 2 foot separation would allow for a distribution area of 1,200 ft^2. The peak distribution of 500 gallons/day (66 ft^3) over the disposal field yields an application of 0.031 feet or 0.38 inches of treated effluent.

During the rainy season, the daily flow is anticipated to be 120 gallons/day (16 ft^3/day) or 0.007 feet (0.09 inches) over the distribution field. Based on the percolation rate above, the soils will accept this loading. The area is covered with annual grasses and native tree species (madrone, live oak, pine, bay). The numerous mature trees in the area shall take a significant amount of the applied effluent as well.

If the on-site distribution system is chosen for installation, the reserve area shall be the hold and haul alternative or there is adequate area on the parcel for relocation of the disposal field.

Following is a schematic of the proposed winery process wastewater treatment system:

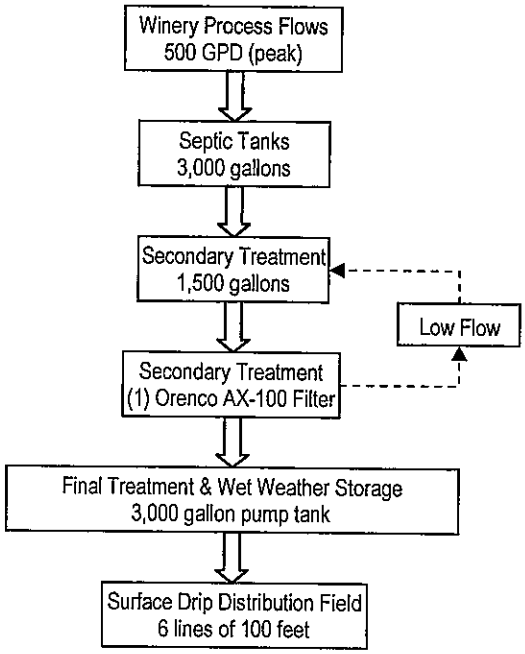


Figure 2: Proposed Process Wastewater Treatment System Schematic

Summary

Based on the previous narrative and calculations, the Lake Ridge Winery project is feasible with regard to wastewater disposal. Detailed calculations and construction plans will be submitted to the Napa County Department of Environmental Management for approval prior to the construction of the final disposal systems.

DELTA CONSULTING & ENGINEERING
OF ST. HELENA

HYDROLOGY REPORT

FOR THE

LAKE RIDGE WINERY

LOCATED AT

90 LONG RANCH ROAD
ST. HELENA, CA 94574

County: NAPA
APN: 032-010-068

JANUARY 30, 2009
Revised: MAY 14, 2009

PREPARED FOR:

ED FITTS, OWNER

1104 ADAMS STREET, SUITE 203 – ST. HELENA, CALIFORNIA 94574
707-963-8456 TELE + 707-963-8528 FAX

TABLE OF CONTENTS

1. Report Description & Background

This report shall address the site hydrology associated with the proposed development of a winery and associated caves with an annual production of 10,000 gallons to be located at 90 Long Ranch Road, St. Helena, CA also known as Napa County Assessor's parcel 032-010-068, a parcel of 40 acres.

2. General Location & Description

a. The winery shall be located near the summit of a hill, summit elevation 1365 feet. The caves shall be constructed into said hill. The finished floor of the main level of the winery shall be at an elevation of 1349 feet.

b. The parcel topography consists of a combination of gradual hillside and steep hillside.

c. The parcel current support native hillside vegetation typically found on the eastern side of the Napa Valley hills. In addition, the parcel has vineyards (approximately 10 acres) and a residence.

3. Drainage Basins and Sub-Basins

a. As shown on the Hydrology Exhibit which follows, the area of runoff to the site is from the nearby hill. Four watershed areas considered for this project. The runoff to Watersheds 1, 2 and 3 flow to the existing roadside swale along the driveway that accesses the site. The runoff to Watersheds 2 and 3 will remain unchanged. The runoff to Watershed 1 shall increase due to the proposed winery development. The runoff to watershed 4, approximately 0.4 acres, shall reach the winery site.

b. The historic drainage patterns of this site will not be changed. No existing surrounding or neighboring developments shall be affected by the proposed winery development.

4. Drainage Facility Design

a. For this preliminary design, drop inlets and area drains were designed to collect the storm water at the winery site. A combination of a swales and drop inlets behind the winery shall also be used to collect the runoff from Watershed 4. The access driveway and a portion of the service road shall sheet flow into the

vineyard areas and not be collected into the storm drain system. All storm water collected shall be conveyed via storm drain piping and released to a level swale within Watershed 1. The final design will be subject to change.

b. The post-construction flow is greater than the pre-construction flow of the proposed winery development site. The difference in flow will be detained.

5. Conclusion

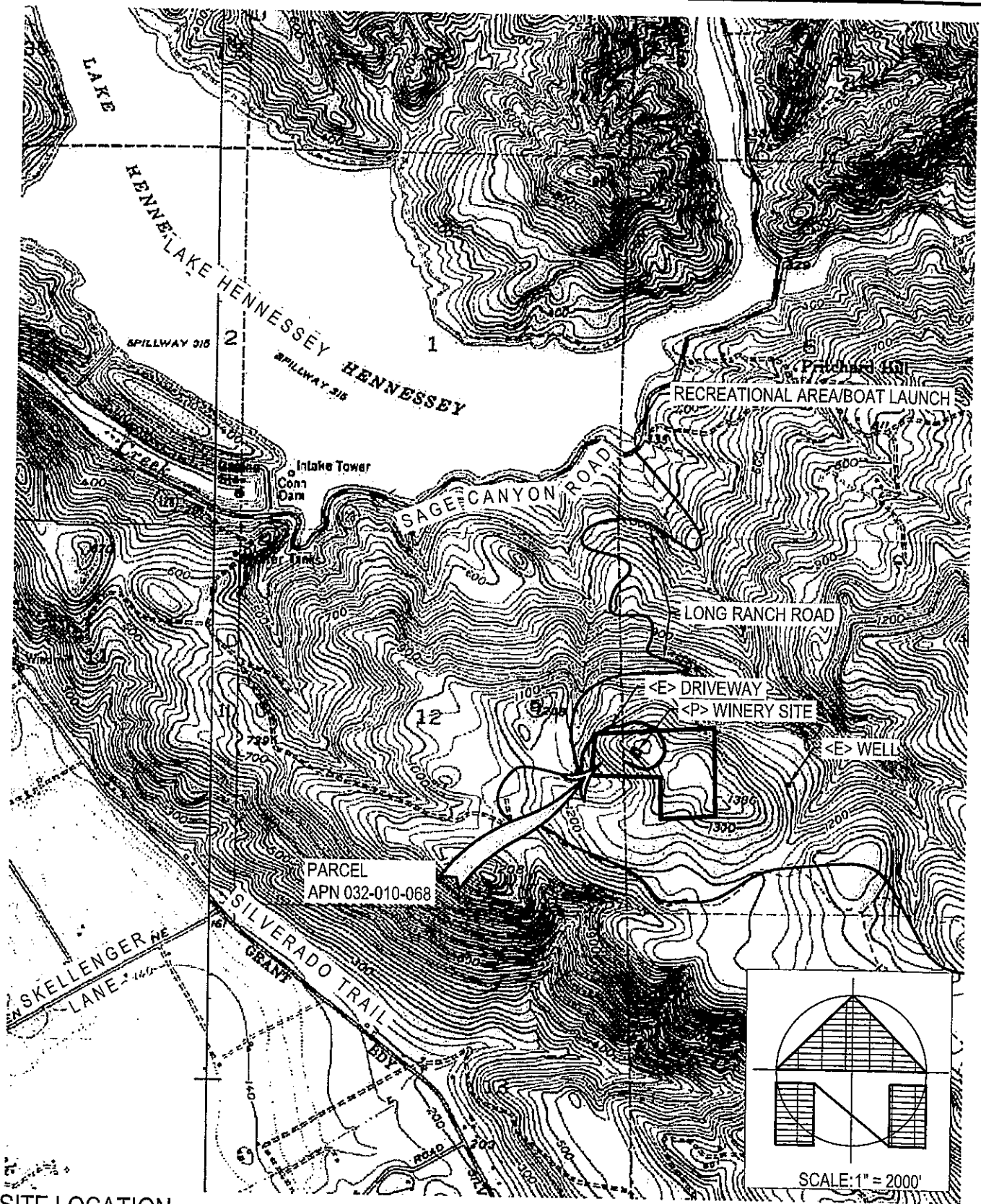
This hydrology report concludes that the existing swale of Watershed 1 and the preliminary storm drain system of the winery site if sufficient to contain the runoff of a 10-year storm.

The existing swale of Watershed 1 is on average 4 feet wide and 1 foot deep. This swale shall be sufficient to carry the current runoff of 6.6 cfs and the additional runoff of 1.5 cfs that will be added to this watershed due the proposed winery development and Watershed 4.

The storm drain system shall use a minimum of a 6" diameter PVC pipe for collection of the runoff from the winery site up to 0.7 cfs. As the total runoff for the winery site and Watershed 4 is 1.5 cfs, the pipe shall be increased to a minimum of 8" diameter, as needed when the combined flow increases above 0.7 cfs.

The pre-construction flow for the winery site is 0.66 cfs, where as the post-construction flow is 1.0 cfs. The difference of 0.34 cfs will be detained on-site. Hydrographs were prepared for the pre- and post- conditions. The difference in volume is 315 cu ft or 2400 gallons. A 2500 gallons storage tank will be provided on-site for detention.

Please see the Hydrology Calculations in Appendix 3 for each watershed, the winery development, verification of the swale of Watershed 1, verification of the storm drain system and the hydrographs for pre- and post-construction.



SITE LOCATION

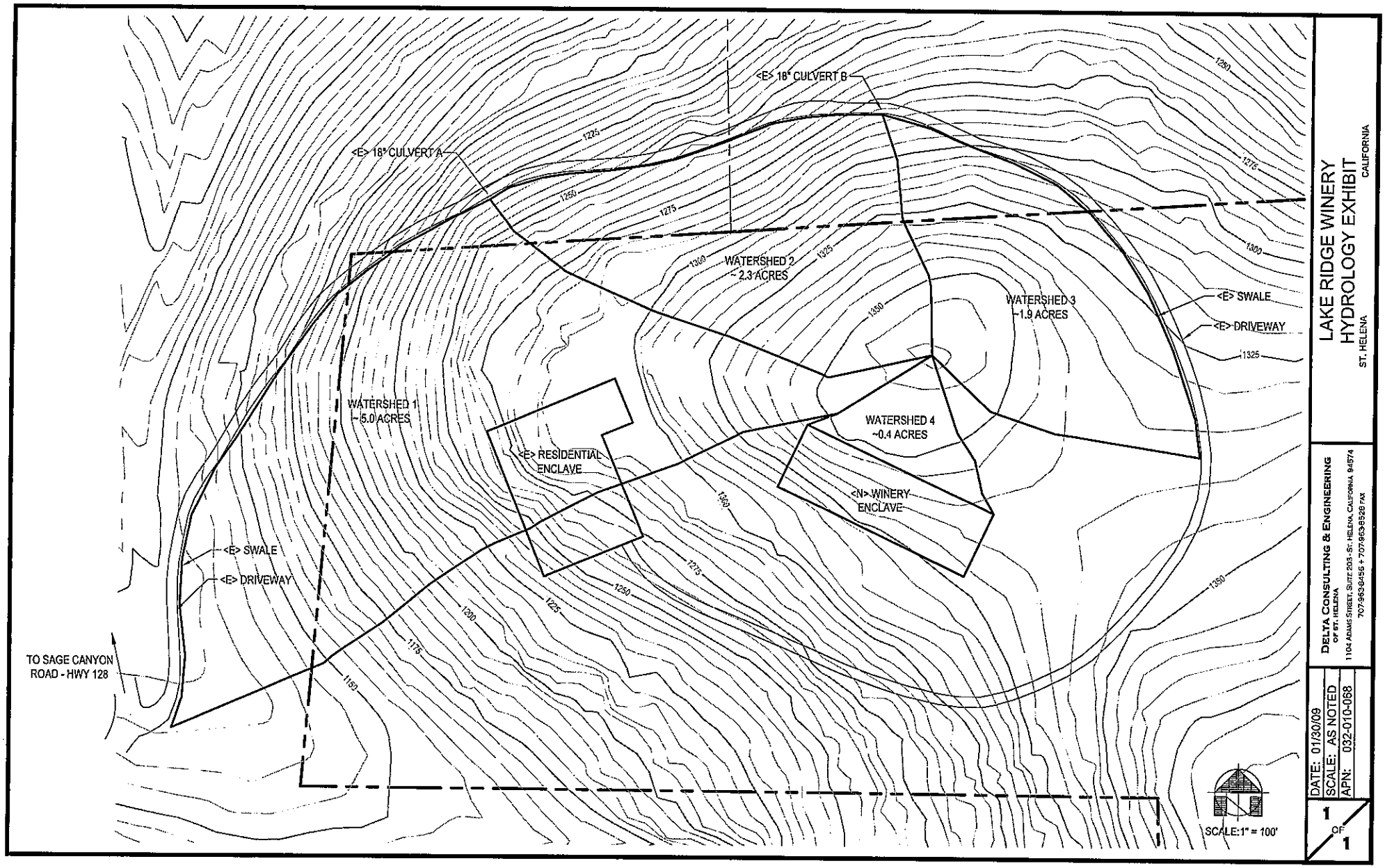
USGS QUAD MAP: YOUNTVILLE SCALE: 1"=2000'

LAKE RIDGE WINERY

DELTA CONSULTING & ENGINEERING
OF ST. HELENA
1104 ADAMS STREET, SUITE 203 - ST. HELENA, CALIFORNIA 94574
707-963-8456 + 707-963-8528 FAX

DATE:	JOB #
12/24/08	H-125
SCALE:	APN:
AS NOTED	032-010-068

SHEET 1 OF 1



LAKE RIDGE WINERY
HYDROLOGY EXHIBIT
ST. HELENA CALIFORNIA

DELTA CONSULTING & ENGINEERING
OF ST. HELENA
1104 ADAMS STREET, SUITE 203 - ST. HELENA, CALIFORNIA 94574
707-963-6456 • 707-963-6528 FAX

DATE: 01/30/09
SCALE: AS NOTED
APN: 032-010-068

1 OF 1

APPENDIX 3 - HYDROLOGY CALCULATIONS

All hydrology calculations are per Napa County Hydrology and Hydraulic Standards (NCHH). (See App 4.) The Rational Method was utilized for determining the peak runoff from the project site for a 10-year storm event.

ASSUMPTIONS:
Annual Rainfall: 32"

10-year/1 hour Rainfall: 1.0"

I_{10} (10-year Intensity): 2.2 in/hr

C (Runoff Coefficient): C = 0.60 (undeveloped)

A (Drainage area in acres): varies

T_c (Time of Concentration in minutes): ~12 minute average

$$T_c = 10\,\text{min} + 60\left(\frac{11.9L^3}{H}\right)^{0.385}$$

Kirpich formula for small mountainous basins in CA, Land Development Handbook, Dewberry and Davis. (see App 5)

where: L = flow path length (miles)
H = ΔH from highest to lowest watershed elevation (feet)
Initial 10 minute at start per NCHH

Q (flow in cubic feet per second): varies

$$Q_{10} = CI_{10}A$$

WATERSHED 1
A = 5.0 acres
Top elevation: 1365' Bottom elevation: 1130'
H = 235'
L = 1000 ft = 0.19 miles
T_c = 12.8 minutes
Q_{10} = **6.6 cfs**
Add Watershed 4 and Winery Enclave (post-construction): 6.6 + 0.5 + 1.0 = **8.1 cfs**

SWALE – WATERSHED 1
Top elevation: 1230' Bottom elevation: 1130'
Length: 780'
Slope: 13%
Manning's: 0.025
See Channel Report following for evaluation of swale capacity.

WATERSHED 2
A = 2.3 acres
Top elevation: 1365' Bottom elevation: 1230'
H = 135'
L = 590 ft = 0.11 miles
T_c = 11.8 minutes
Q_{10} = 3.0 cfs

WATERSHED 3
A = 1.9 acres
Top elevation: 1365' Bottom elevation: 1282'
H = 83'
L = 345' ft = 0.07 miles
T_c = 11.3 minutes
Q_{10} = 2.5 cfs

WATERSHED 4
A = 0.4 acres
Top elevation: 1365' Bottom elevation: 1345'
H = 20'
L = 200 ft = 0.04 miles
T_c = 11.2 minutes
Q_{10} = 0.5 cfs

WINERY ENCLAVE – PRE-CONSTRUCTION
A = 0.5 acres
Top elevation: 1345' Bottom elevation: 1320'
H = 25'
L = 80 ft = 0.015 miles
T_c = 10.3 minutes
Q_{10} = 0.66 cfs

WINERY ENCLAVE – POST-CONSTRUCTION

A = 0.5 acres
C = 0.95 – impervious area
Main Floor elevation: 1349' Lower Level elevation: 1334.5'
Longest Pipe run: 420'
Slope: 2%
Manning's n = 0.015
Q_{10} = 1.0 cfs
See Channel Report following for evaluation of system capacity.

Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. Tuesday, May 12 2009

Winery Enclave - Post-Construction

Circular

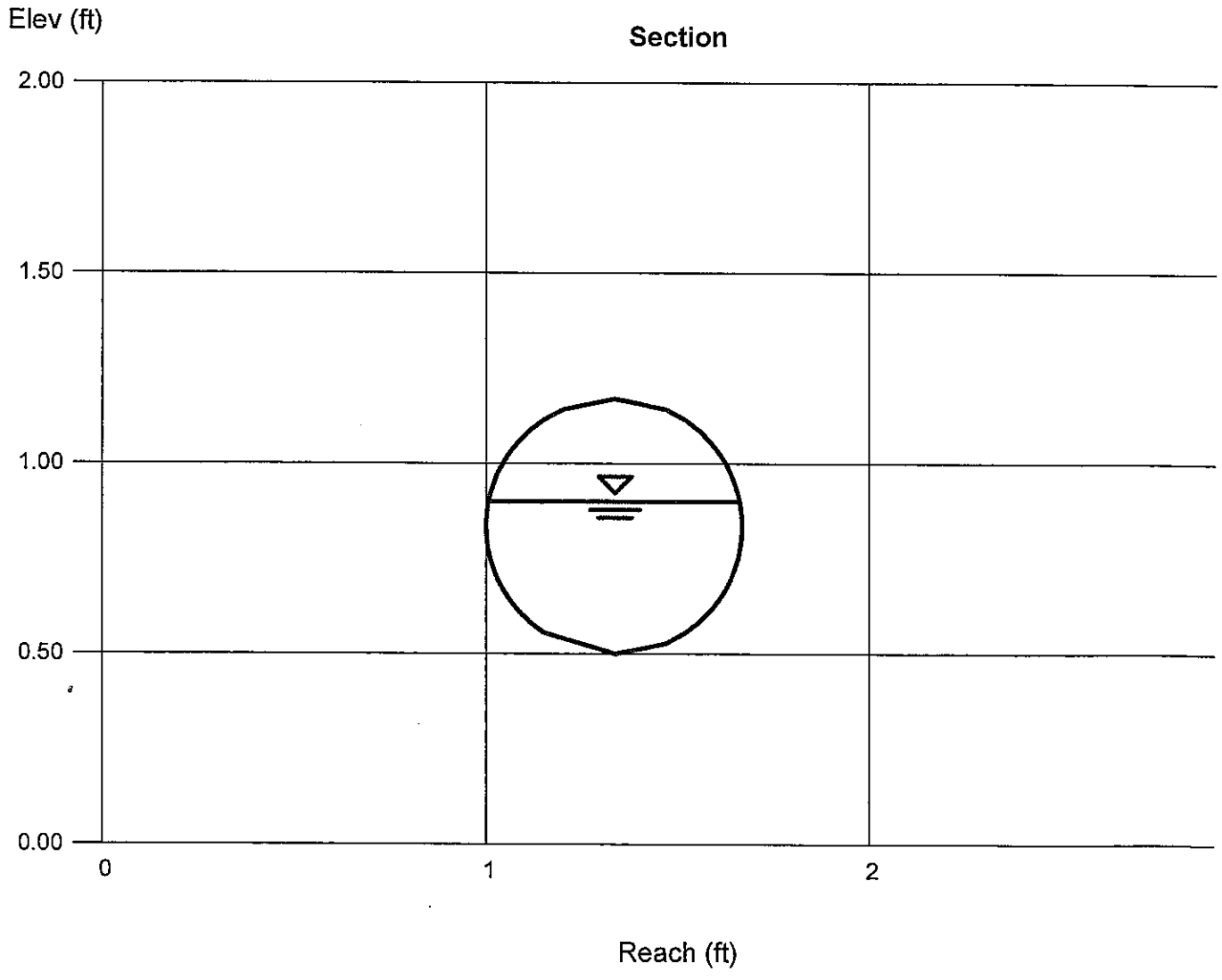
Diameter (ft)	= 0.67
Invert Elev (ft)	= 0.50
Slope (%)	= 2.00
N-Value	= 0.015

Calculations

Compute by:	Known Q
Known Q (cfs)	= 1.00

Highlighted

Depth (ft)	= 0.40
Q (cfs)	= 1.000
Area (sqft)	= 0.22
Velocity (ft/s)	= 4.54
Wetted Perim (ft)	= 1.19
Crit Depth, Yc (ft)	= 0.48
Top Width (ft)	= 0.66
EGL (ft)	= 0.72



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. Tuesday, May 12 2009

Winery Enclave - Post-Construction and Watershed 4

Circular

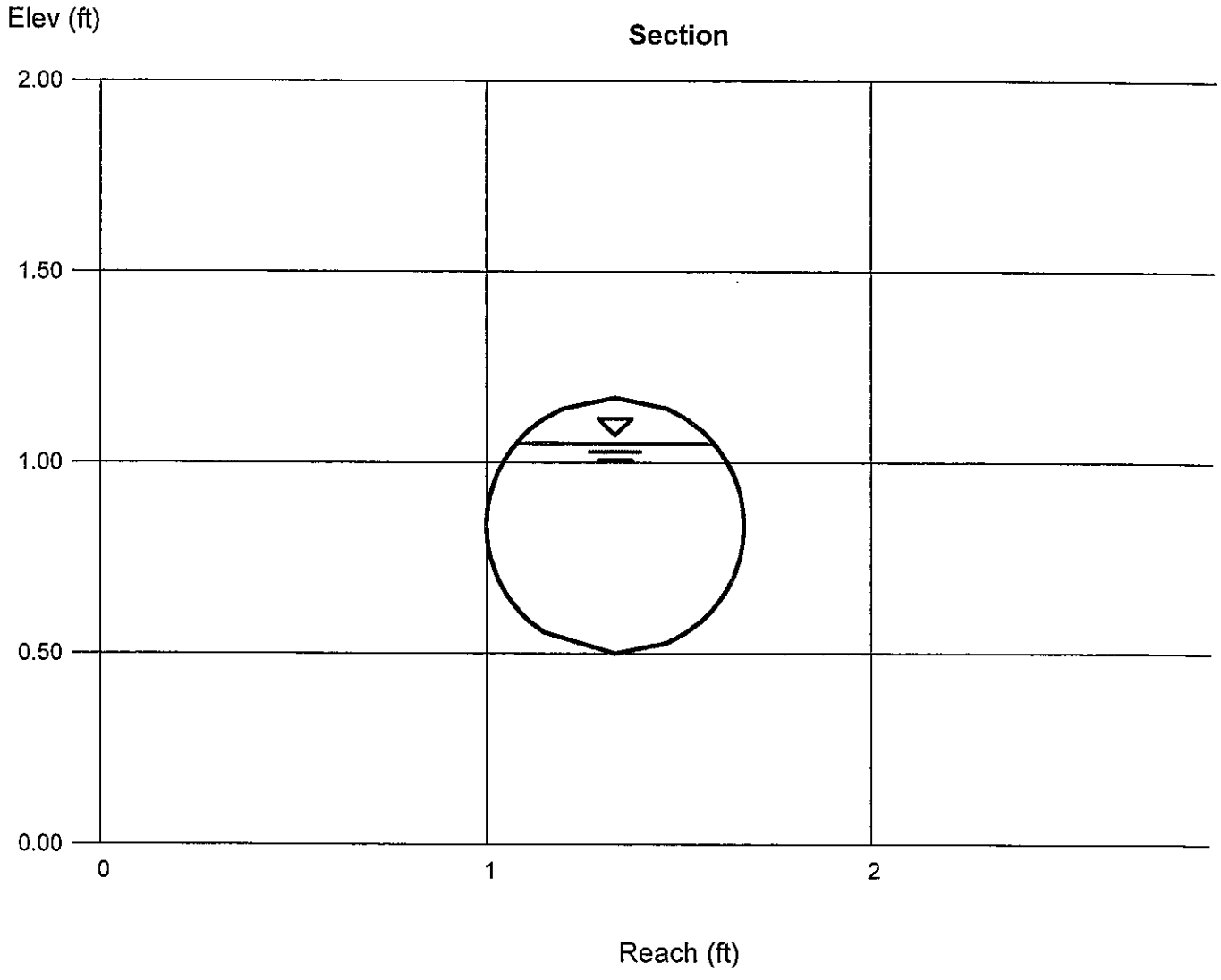
Diameter (ft)	= 0.67
Invert Elev (ft)	= 0.50
Slope (%)	= 2.00
N-Value	= 0.015

Calculations

Compute by:	Known Q
Known Q (cfs)	= 1.50

Highlighted

Depth (ft)	= 0.55
Q (cfs)	= 1.500
Area (sqft)	= 0.31
Velocity (ft/s)	= 4.84
Wetted Perim (ft)	= 1.52
Crit Depth, Yc (ft)	= 0.58
Top Width (ft)	= 0.51
EGL (ft)	= 0.91



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. Tuesday, May 12 2009

Swale - Watershed 1

Trapezoidal

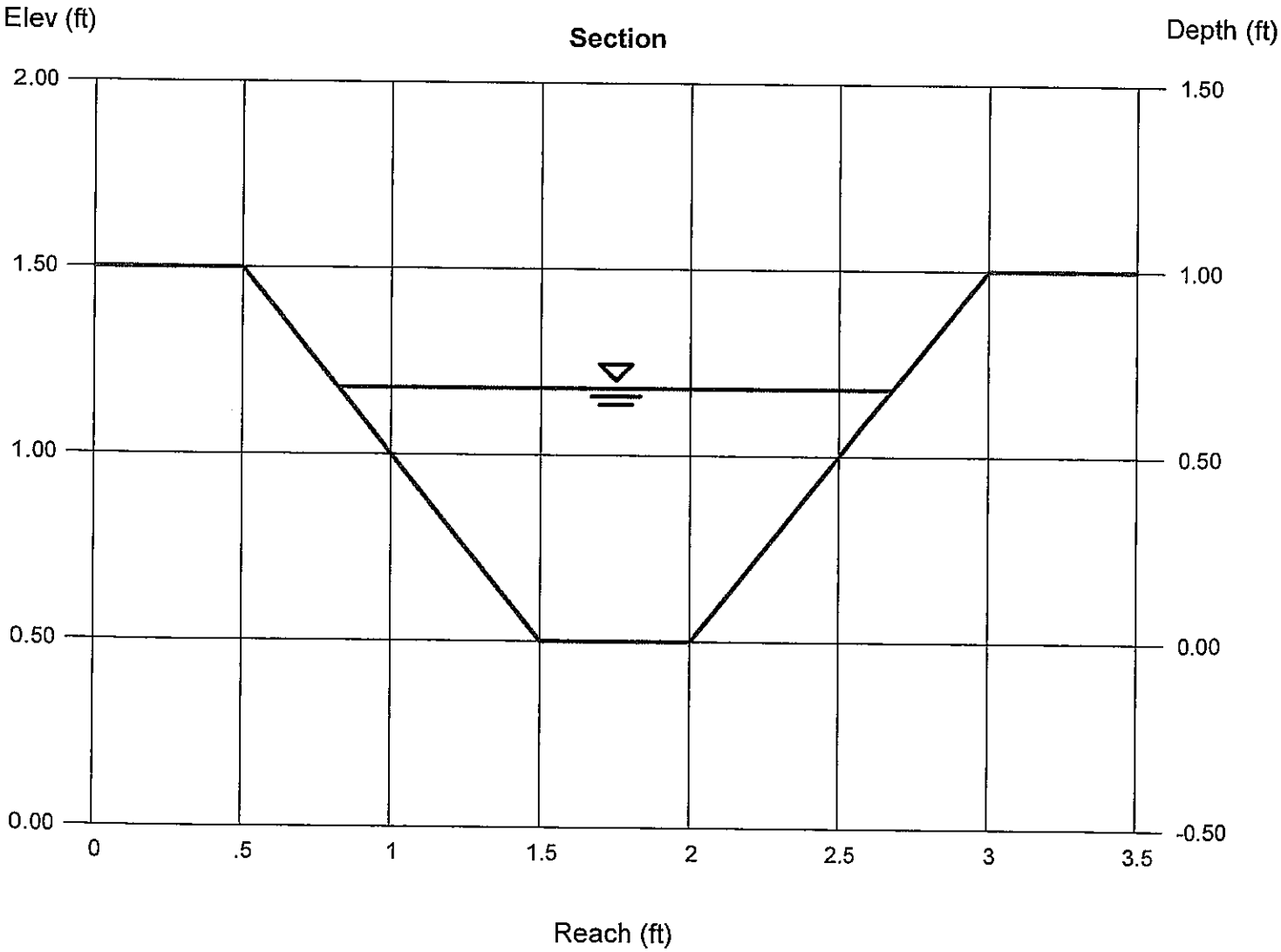
Bottom Width (ft)	= 0.50
Side Slopes (z:1)	= 1.00, 1.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 0.50
Slope (%)	= 13.00
N-Value	= 0.025

Calculations

Compute by:	Known Q
Known Q (cfs)	= 8.10

Highlighted

Depth (ft)	= 0.68
Q (cfs)	= 8.100
Area (sqft)	= 0.80
Velocity (ft/s)	= 10.09
Wetted Perim (ft)	= 2.42
Crit Depth, Yc (ft)	= 1.00
Top Width (ft)	= 1.86
EGL (ft)	= 2.26



Multi-Hydrograph Plot

Hyd. No. 1

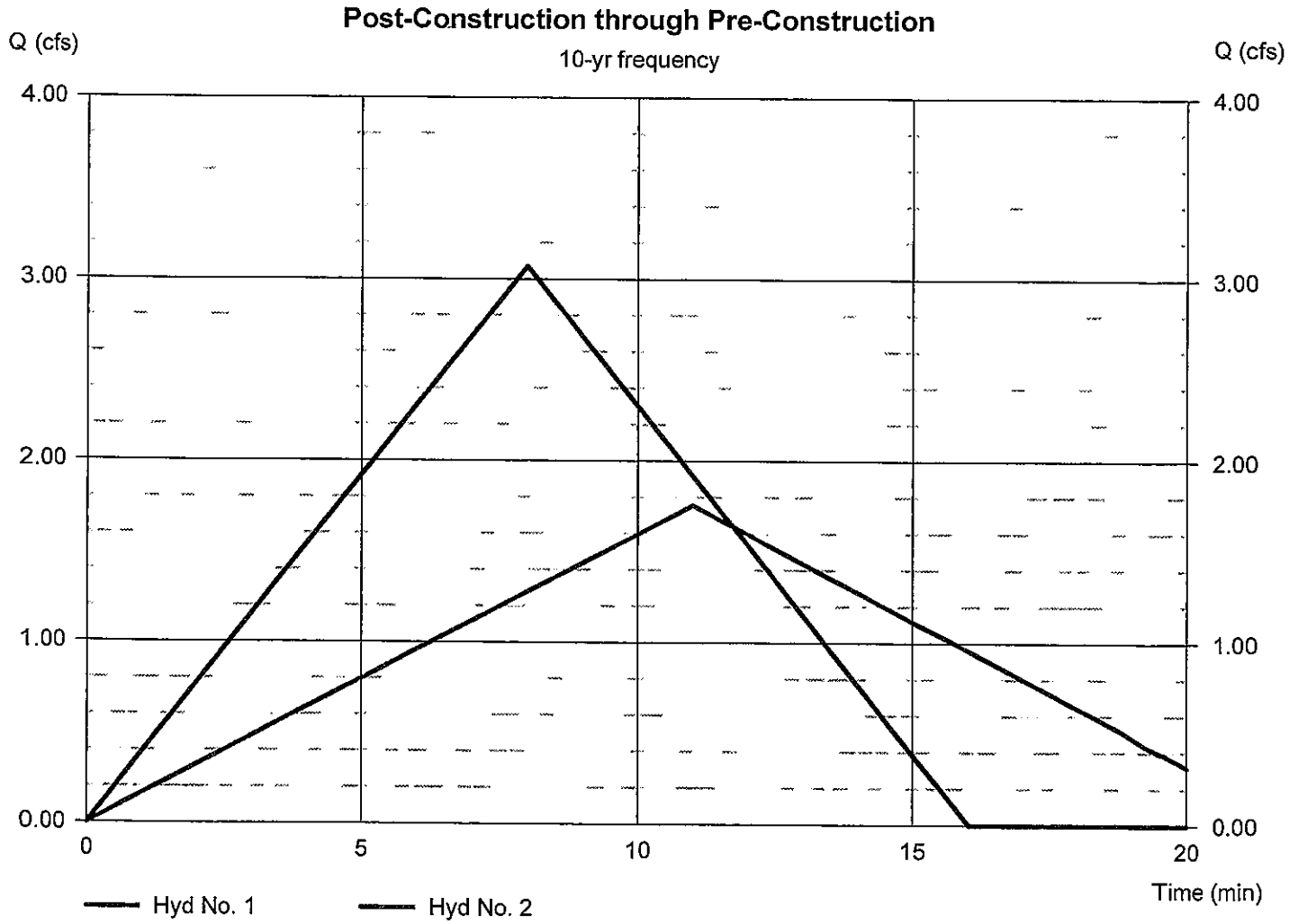
Post-Construction

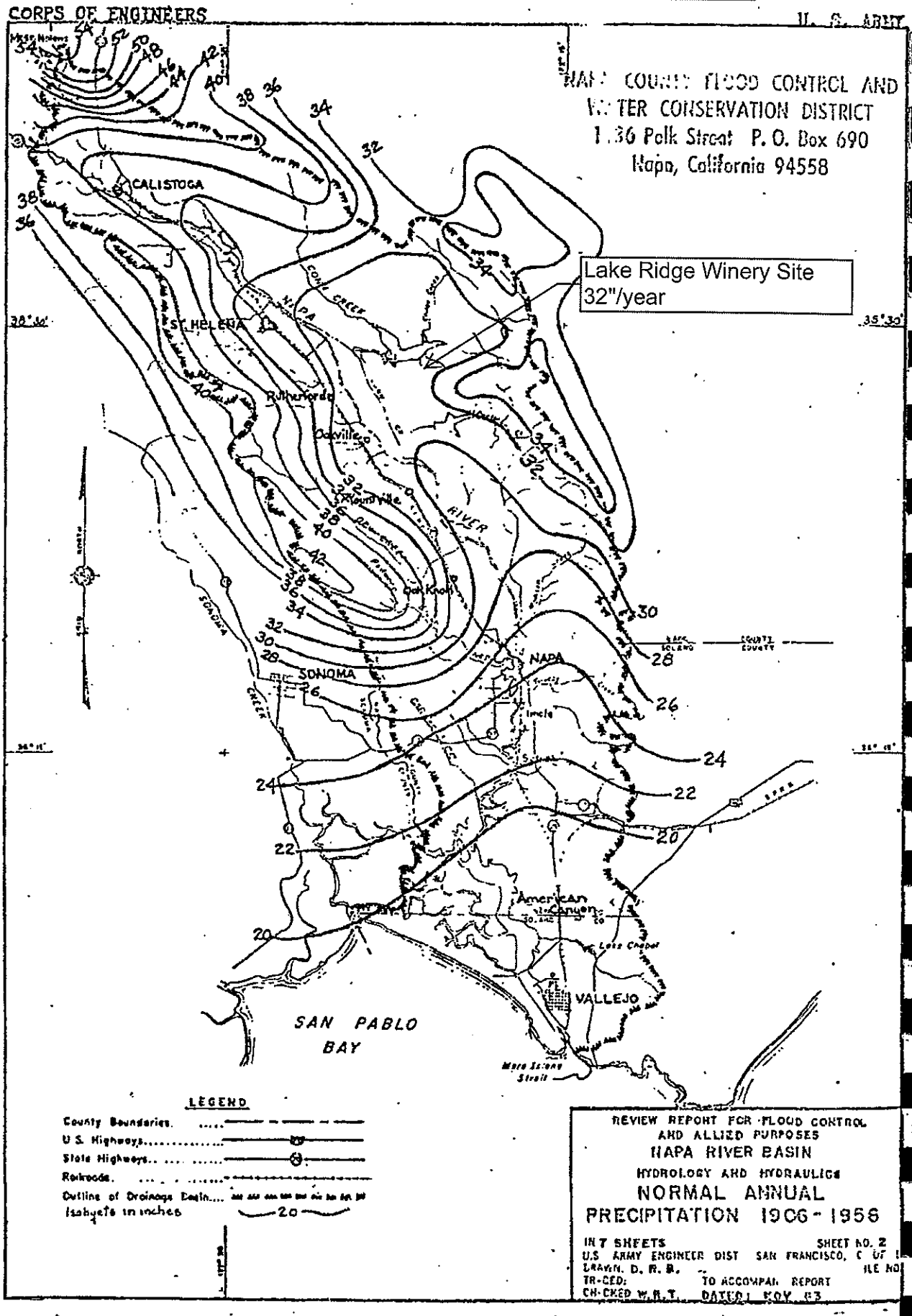
Hydrograph type	=	Rational
Peak discharge	=	3.071 cfs
Time to peak	=	8 min
Hyd. Volume	=	1,474 cuft

Hyd. No. 2

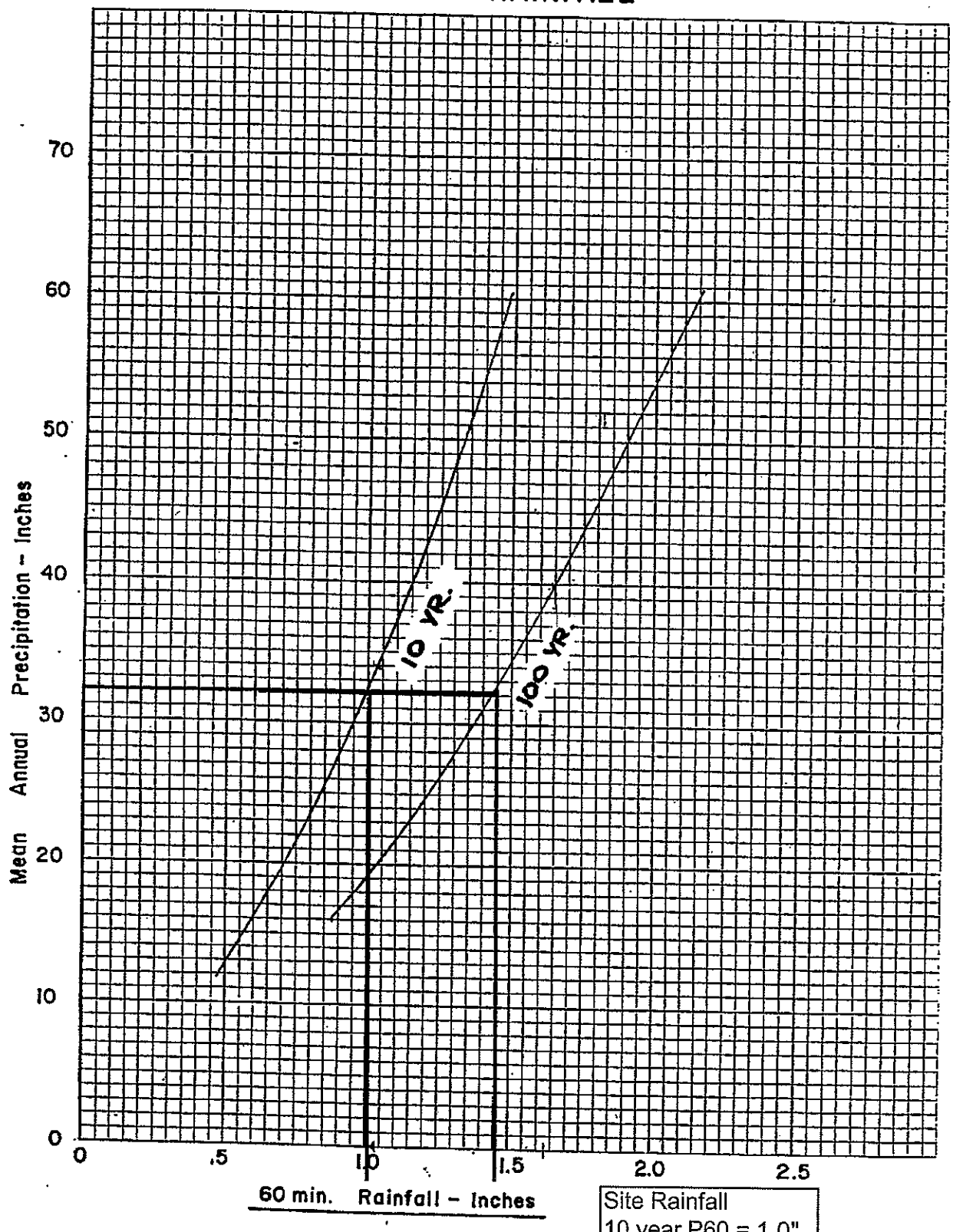
Pre-Construction

Hydrograph type	=	Rational
Peak discharge	=	1.76 cfs
Time to peak	=	11 min
Hyd. Volume	=	1,159 cuft




CORPS OF ENGINEERS
U. S. ARMY
NAPA COUNTY FLOOD CONTROL AND
WATER CONSERVATION DISTRICT
1136 Polk Street P. O. Box 690
Napa, California 94558
Lake Ridge Winery Site
32"/year
CALISTOGA
ST. HELENA
Rutherford
Oakville
Yountville
NAPA
SONOMA
Oak Knoll
Imola
American Canyon
VALLEJO
SAN PABLO BAY
Mare Island Strait
NAPA RIVER
SONOMA CREEK
LEGEND
County Boundaries
U.S. Highways
State Highways
Railroads
Outline of Drainage Basin
Isohyets in inches
REVIEW REPORT FOR FLOOD CONTROL AND ALLIED PURPOSES
NAPA RIVER BASIN
HYDROLOGY AND HYDRAULICS
NORMAL ANNUAL PRECIPITATION 1906-1956
IN 7 SHEETS
SHEET NO. 2
U.S. ARMY ENGINEER DIST SAN FRANCISCO, C OF E
DRAWN D. R. B.
FILE NO.
TRACED: TO ACCOMPAN REPORT
CHECKED W.R.T. DATED NOV. 63

MEAN ANNUAL PRECIPITATION vs 60 MINUTE RAINFALL

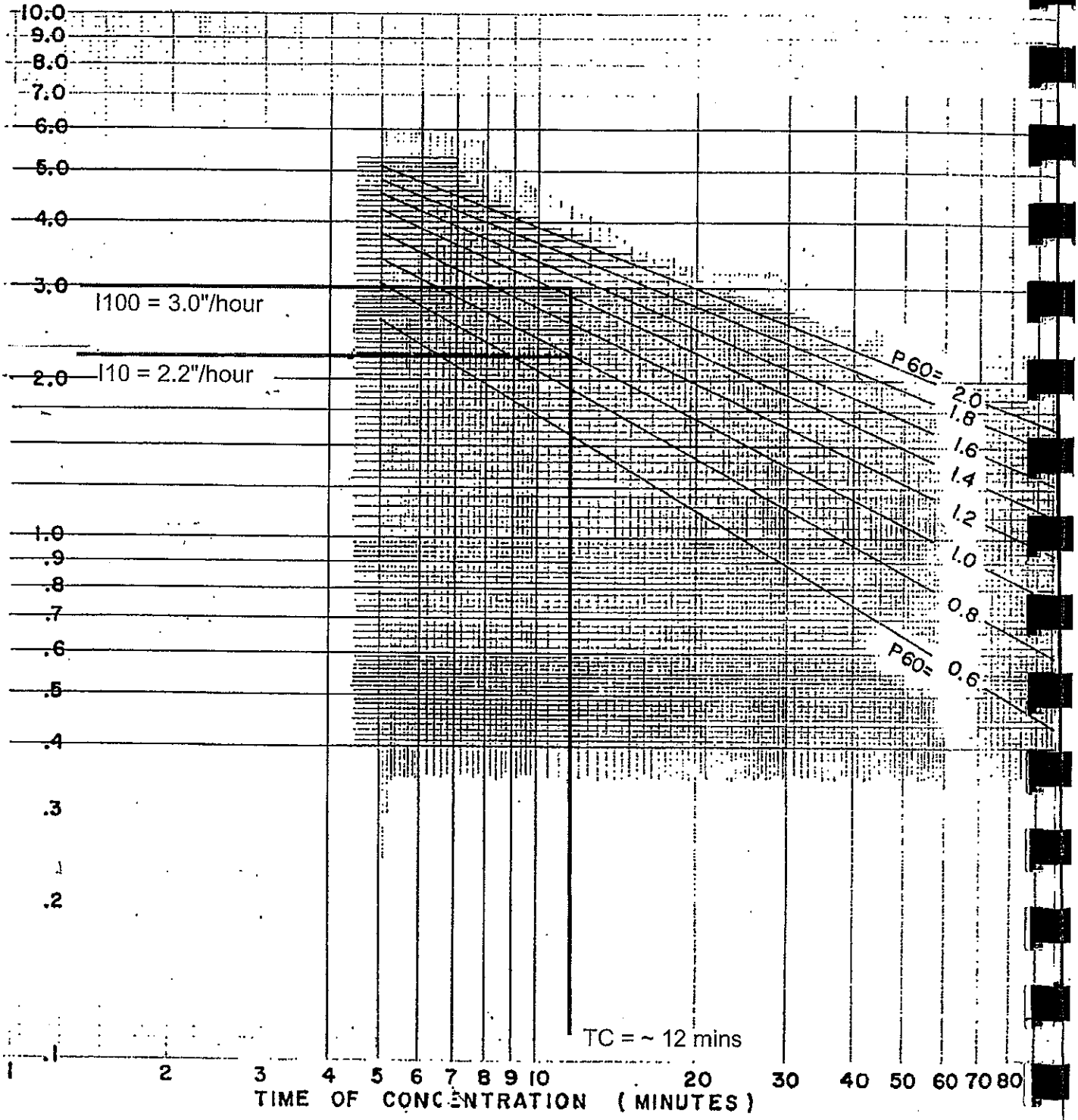


Site Rainfall
10 year P60 = 1.0"
100 year P60=1.5"

1.75

12-185

INTENSITY – DURATION CHART



Based on figure 7-8II.6 (-8-64)
State of California
Division of Highways
Planning Manual

Logarithmic, 2 x 2 Cycles

RUN-OFF PRODUCING CHARCTERISTICS OF WATERSHEDS SHOWING FACTORS FOR EACH CHARACTERISTIC FOR VARIOUS WATERSHED TYPES

	WATERSHED TYPES AND FACTORS			
Run-off Producing Features	Extreme	High	Normal	Low
Relief	0.28-0.36 Steep, rugged terain, with average slopes above 30%.	0.20 - 0.28 Rolling, with average slopes of 10 to 30%.	0.14 - 0.20 Rolling, with average slopes of 5 to 10%.	0.08 - 0.14 Relatively flat land, with average slopes of 0 to 5%.
Soil Infiltration	0.12 - 0.16 No effective soil cover either rock or thin soil mantle of negligible infiltration capacity.	0.08 - 0.12 Slow to take up water; clay or shallow loam soils of low infiltration capacity imperfectly or poorly drained.	0.06 - 0.08 Normal; well drained light and medium textured soils sandy loams, silt, and silt loams.	0.04 - 0.06 High; deep sand or other soil that takes up water readily; very light, well drained soils.
Vegtal Cover	0.12-0.16 No effective plant cover; bare or very sparse cover.	0.08-0.12 Poor to fair; clean cultivation crops or poor natural cover; less than 20% of drainage area under good cover.	0.06-0.08 Fair to good; about 50% of area in good grassland or woodland; not more than 50% of area in cultivated crops.	0.04-0.06 Good to excellent; about 90% of drainage area in good grassland, woodland, or equivalent crop.
Surface	0.10-0.12 Negligible; surface depressions, few and shallow; drainageways steep and small; no marshes.	0.08 - 0.10 Low; well-defined system of small drainageways; no ponds or marsh.	0.06 - 0.08 Normal; considerable surface depression storage; lakes, ponds, and marshes	0.04 - 0.06 High; surface storage high; drainage system not sharply defined; large floodplain storage or large number of ponds or marshes.

THE RUNOFF FACTOR IS DETERMINED BY THE SUM OF THE FACTORS FOR RELIEF INFILTRATION, COVER, AND SURFACE. NOT APPLICABLE TO BUILT UP AREAS.

FIGURE 3

Averaging each category & summing:
C = 0.32 + 0.10 + 0.07 + 0.11
C = 0.60

APPENDIX 5
REFERENCE FROM LAND DEVELOPMENT HANDBOOK

TABLE 14.10 Summary of Time of Concentration Formulas

METHOD AND DATE	FORMULA FOR t_c (MIN)	REMARKS
Kirpich (1940)	$t_c = 0.0078\, L^{0.77} S^{-0.385}$ L = length of channel/ditch from headwater to outlet (feet) S = average watershed slope (ft/ft)	Developed from SCS data for seven rural basins in Tennessee with well-defined channel and steep slopes (3–10%); for overland flow on concrete or asphalt surfaces multiply t_c by 0.4; for concrete channels multiply by 0.2; no adjustments for overland flow on bare soil or flow in roadside ditches.
California Culverts Practice (1942)	$t_c = 60\left(11.9\frac{L^3}{H}\right)^{0.385}$ L = length of longest watercourse (miles) H = elevation difference between divide and outlet (feet)	Essentially the Kirpich formula; developed from small mountainous basins in California (U.S. Bureau of Reclamation 1973)
Izzard (1946)	$t_c = \frac{41.025(0.0007\, i + c)L^{0.33}}{S^{0.33} i^{0.67}}$ i = rainfall intensity (in/hr) c = retardance coefficient L = length of flow path (feet) S = slope of flow path (ft/ft)	Developed in laboratory experiments by Bureau of Public Roads for overland flow on roadway and turf surfaces; values of the retardance coefficient range from 0.0070 for very smooth pavement to 0.012 for concrete pavement to 0.06 for dense turf; solution requires iteration; product i times L should be ≤ 500.
Federal Aviation Administration (1970)	$t_c = 1.8\,(1.1 - C)\frac{L^{0.5}}{S^{0.33}}$ C = rational method runoff coefficient L = length of overland flow (feet) S = surface slope %	Developed from airfield drainage data assembled by the Corps of Engineers; method is intended for use on airfield drainage problems, but has been used frequently for overland flow in urban basins.
Kinematic wave formulas Morgali and Linsley (1965) Aron and Erborge (1973)	$t_c = \frac{0.94\, L^{0.6} n^{0.6}}{i^{0.4} S^{0.3}}$ L = length of overland flow (feet) n = Manning roughness coefficient i = rainfall intensity (in/hr) S = average overland slope (ft/ft)	Overland flow equation developed from kinematic wave analysis surface runoff from developed surfaces; method requires iteration since both i (rainfall intensity) and t_c are unknown; superposition of intensity-duration-frequency curve gives direct graphical solution to t_c.
SCS average velocity charts (1975, 1986)	$t_c = \frac{1}{60} \leq \frac{L}{V}$ L = length of flow path (feet) V = average velocity in feet per second from fig. 3-1 of TR 55 for various surfaces	Overland flow charts in fig. 3-1 of TR 55 show average velocity as function of watercourse slope and surface cover (see also Table 5.7.1)

Kibler, David F., ed. 1982. *Urban Stormwater Hydrology Monograph 7.* Washington, D.C.: Copyright by the American Geophysical Union.

form of

$$T_t = \frac{(0.94)(NL)^{1/m}}{(i)^{(m-1/m)} S^{1/2m}} \qquad (14.15)$$

where T_t is the travel time in minutes, N is Manning's roughness coefficient adjusted for overland flow conditions due to an increase in friction for very shallow flows (see table 14.11), L is the flow length in feet, i is rainfall intensity (in/hr), and S is the average land slope (ft/ft) of the overland flow path. The exponent m varies from 1.67 to 3.0 depending on whether the overland flow regime is laminar or turbulent. For fully turbulent flow m is taken as 1.67. Use of this equation is limited to very shallow depths (< 0.1 feet) and for $L < 300$ feet. The solution to this equation is a trial and error procedure performed as follows:

1. Assume a value of i.
2. Use equation (14.15) to find T_t.
3. Find the actual rainfall storm duration of compute
4. Compare the assumed from the IDF curve. If they through 4.

Large catchments may req flow paths in determining tim path with the longest time of lected for design. However, the ket statement. Since the ratio homogeneous drainage areas · topography) which increase li and homogeneity of the drain charge at various points with situations where catchment ar related or when the catchmen selecting the flow path with t

DELTA CONSULTING & ENGINEERING
OF ST. HELENA

May 15, 2009

Erich Kroll, P.E.
Supervising Engineer
County of Napa, Department of Public Works
1195 Third Street, Suite 201
Napa, California 94559

Re: Public Works – Request for Supporting Documentation
Lake Ridge Winery
90 Long Ranch Road, St. Helena, APN 032-010-068

Dear Mr. Kroll:

The following is my response to your letter requesting supporting documentation dated April 2, 2009 and email dated April 30, 2009 as an adjustment to said letter. Please find the supporting documents included, as noted below.

Use Permit – P09-00039

1. Please find included the completed County of Napa "Applicability Checklist" (Appendix A) signed by the Applicant's representative.
2. The project is a Standard, Medium Priority Project. The footprint of the proposed winery and terraces is approximately 9,000 square feet. The inclusion of the parking lot and work pad (excluding the driveway and service road) increases the disturbed soil to approximately 17,500 square feet.
    a. Since this is a Standard Project, detention is required for the run-off difference between pre- and post-construction. Please see the Hydrology Report, dated May 14, 2009 for details relating to the detention. Please also see sheet UP3.0 for the location of the detention basin.
    b. In addition, best management practices will be a part of this project. They include, but are not limited to: any disturbed areas on the hillsides surrounding the project shall be re-seeded to encourage new vegetation growth to reduce erosion, enhance infiltration and trap sediment.
3. Please find included a site hydrology map and preliminary drainage study, dated May 14, 2009 which includes a brief discussion of the historic drainage patterns of the site.

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707-963-8456 TELE + 707-963-8528 FAX

4. Please see revised Use Permit Plans, dated May 5, 2009 for grading and drainage plans for both the proposed winery site and proposed widening of the existing driveway.
    a. Please see UP2.3 and UP2.4 for preliminary grading and drainage of the widening of the existing driveway to 20.' The earthwork calculations on sheet UP1.0 have been updated to include any cut or fill required to widen the driveway. In addition, typical cross-sections have been provided.
    b. Excess spoils will be stockpiled on site and used in the vineyards and along vineyard roads. Excess spoils from the work performed pursuant to the ECP issued last fall are being depleted this spring. Spoils that are deemed appropriate by the vineyard manager will be used in the vineyard areas to be planted over with new vines. The vineyard road levels will be increase by approximately 2-3 inches by the use of the spoils.
    c. The proposed water tank is not a part of this project and shall not be used for winery use, therefore grading and earthwork calculations are not included. The water tank exclusively serves a neighboring parcel pursuant to existing recorded rights and therefore is shown on the site plan. On the previously submitted plans the water tank was mislabeled as to be used for the proposed winery. We do not know when construction of the new tank will commence.
5. Please see sheet UP3.1 for an overall site utility plan showing existing and proposed wet and dry utilities throughout the project.
6. The neighboring parcel labeled as APN 032-220-002 was mislabeled on the previously submitted plans. The correct APN is 030-220-022 and the easements for this parcel are resubmitted herewith.
7. Please see sheet UP4.0 for a circulation plan. This plan shows how a delivery truck shall use the service road to perform a 3-point turn to enter/exit the parking lot for deliveries. It also shows a hammerhead in the parking area for fire truck access.
8. Please see UP3.0 and UP3.1 for the piping layout of the water systems. The existing 110,000 gallon water tank is more than sufficient for domestic and fire requirements. If a fire pump or water treatment are required for this project, they shall be located as shown on UP3.1. Construction documents for this project will confirm whether these items are needed for the project.
9. Please see sheet UP3.1 for the location of an existing dirt road that shall provide access to the disposal field.

Road Modification – W09-00138

Per an email from Kelly Berryman to Mary Doyle and yourself, dated April 28, 2009, the applicant withdrew their request for an exception to the Napa County Road Standards with respect

to the Use Permit submitted. The requested grading and drainage plans have been incorporated into the Use Permit Plans for the proposed winery.

If you have any questions or comments on these items, or if you require anything more, please feel free to contact our office.

Sincerely,

Kristi Wagner
Project Engineer

Enclosures:
Use Permit Plans, Delta 1, dated 05/05/09
Hydrology Report, dated 05/05/09
Applicability Checklist (Appendix A)

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NAPA COUNTY CONSTRUCTION SITE RUNOFF CONTROL REQUIREMENTS
APPENDIX A – PROJECT APPLICABILITY CHECKLIST

Construction Site Runoff Control Applicability Checklist	County of Napa Department of Public Works 1195 Third Street, Suite 201 Napa, CA 94559 (707) 253-4351 www.co.napa.ca.us/publicworks

Project Address:	Assessor Parcel Number(s):	Project Number: *(for County use Only)*
90 Long Ranch Road St. Helena	032-010-068	

INSTRUCTIONS

Structural projects that require a building and/or grading permit must complete the following checklist to determine if the project is subject to Napa County's Construction Site Runoff Control Requirements. This form must be completed and submitted with your permit application(s). Definitions are provided in the Napa County Construction Site Runoff Control Requirements policy. **Note:** If multiple building or grading permits are required for a common plan of development, the total project shall be considered for the purpose of filling out this checklist.

DETERMINING PROJECT APPLICABILITY TO THE CONSTRUCTION SITE RUNOFF CONTROL REQUIREMENTS

- ✓ If the answer to question 1 of Part A is "Yes" your project is subject to Napa County's Construction Site Runoff Control requirements and must prepare a Stormwater Pollution Prevention Plan (SWPPP). The applicant must also comply with the SWRCB's NPDES General Permit for Stormwater Associated with Construction Activity and must provide a copy of the Notice of Intent (NOI) and Waste Discharge Identification (WDID).
- ✓ If the answer to question 1 of Part A is "No", but the answer to any of the remaining questions is "Yes" your project is subject to Napa County's Construction Site Runoff Control requirements and must prepare a Stormwater Quality Management Plan (SQMP).
- ✓ If every question to Part A is answered "No" your project is exempt from Napa County's Construction Site Runoff Control Requirements, but must comply will all construction site runoff control standard conditions attached to any building or grading permit (see Appendix D of the Napa County Construction Site Runoff Control Requirements).
- ✓ If any of the answers to the questions in Part A is "Yes", complete the construction site prioritization in Part B below.

OVER

NAPA COUNTY CONSTRUCTION SITE RUNOFF CONTROL REQUIREMENTS
APPENDIX A – PROJECT APPLICABILITY CHECKLIST

Part A: Determine Construction Phase Stormwater Requirements

Would the project meet any of these criteria during construction?

1. Propose any soil disturbance of one acre or more? ..... Yes (No)
2. Does the project propose any soil disturbance greater than 10,000 square feet?..... (Yes) No
3. Does the project propose grading, earth moving, or soil disturbance on slopes 15% or greater?..... (Yes) No
4. Does the project propose earthmoving of 50 cubic yards or more?..... (Yes) No
5. Does the project propose soil disturbance within 50 feet of a stream, ditch, swale, curb and gutter, catch basin or storm drain that concentrates and transports stormwater runoff to a "receiving water" (i.e., Waters of the State defined as all waters, including but not limited to, natural streams, creeks, rivers, reservoirs, lakes, ponds, water in vernal pools, lagoons, estuaries, bays, the Pacific Ocean, and ground water)? Yes (No)

Part B: Determine Construction Site Priority

Projects that are subject to the Construction Site Runoff Control Requirements must be designated with a priority of high, medium, or low. This prioritization must be completed with this form, noted on the plans, and included in the SWPPP or SQMP. Indicate the project's priority in one of the checked boxes using the criteria below. The County reserves the right to adjust the priority of projects both before and during construction.

Note: The construction priority does NOT change construction Best Management Practice (BMP) requirements that apply to projects. The construction priority does affect the frequency of inspections that will be conducted by County staff and associated fees.

Select the highest priority category applicable to the project.

☐ High Priority
- a) Projects with soil disturbance of one acre or greater.
- b) Projects on slopes of 30% or greater.
- c) Projects proposing new storm drains.

☑ Medium Priority
- a) Projects on slopes from 5% to 29%.
- b) Projects with soil disturbance between 10,000 sq. ft and one acre.
- c) Projects with earthmoving of 50 cubic yards or more.

☐ Low Priority
- a) Projects with soil disturbance within 50 feet stream, ditch, swale, curb and gutter, catch basin or storm drain that concentrates and transports stormwater runoff to a "receiving water".

Name of Owner or Agent (Please Print):	Title:
Kelly Berryman	
Signature of Owner or Agent:	Date: