B

Type

✓

Plans

GRD09-0049

Permit Number

27801

Street Number

River Rd

Street Name

CLO

Community Code

117-000-059

APN

PRMD County of Sonoma

S.C. Repro 3/10

COUNTY OF SONOMA - PERMIT AND RESOURCE MANAGEMENT DEPARTMENT

2550 Ventura Avenue, Santa Rosa, CA 95403 (707) 565-1900 FAX (707) 565-1103

Please Print Your Name: KURT KELDER **Date Applied:** 4/9/09

INFORMATION WITHIN HEAVY LINE TO BE COMPLETED BY APPLICANT

SITE LOCATION INFORMATION - PRINT CLEARLY

Site Address: 27801 RIVER ROAD | City: CLOVERDALE | ZIP 95425

Cross-Street: GIBSON LANE | APN: 117-060-059 | Project Phone #: 707 894-0862 | Project Fax #: 707 894-0863

Directions: 101 N TO CITRUS FAIR TO RIVER ROAD | Email address: KELDERCE@SONIC.NET | Unit # N/A | Lot # N/A

Describe Project: GRADING FOR NEW WINERY & DRIVEWAY 520' out - 5300cy Fill = 5300cy total = 10,600 | Living Area N/A | Garage | Decks 1 | Contract Price: $100,000.00

OWNER NAME AND ADDRESS	APPLICANT NAME AND ADDRESS
Name: NINA FIELD	Name: KURT KELDER
Mailing Address: 2535 MARICOPA ST	Mailing Address: 132 S. CLOVERDALE BLVD
City: TORRANCE State: CA ZIP: 90503	City: CLOVERDALE State: CA ZIP: 95425
Day Ph: 310 699-1278 Fax: ( )	Day Ph: 707 894-0862 Fax: 707 894-0862
CONTRACTOR INFORMATION	**OTHER PERSONS (ARCHITECT, ENGINEER, ETC)**
Company Name:	Name: KURT KELDER
Address:	Address: SAME
City: State: ZIP:	City: State: ZIP:
Day Ph: ( ) Fax: ( )	Day Ph: ( ) Fax: ( )
	License No: C58353 Exp. Date: 9/30/10

WORKER'S COMPENSATION DECLARATION

I hereby affirm under penalty of perjury one of the following declarations:

☐ I have and will maintain a certificate of consent to self-insure for worker's compensation, as provided for by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued.

☐ I have and will maintain worker's compensation insurance, as required by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued. My worker's compensation insurance carrier and policy number are:

Carrier _____ Policy No. _____

(This section need not be completed if the permit is for one hundred dollars ($100) or less).

☐ I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any manner so as to become subject to the worker's compensation laws of California, and agree that if I should become subject to the worker's compensation provisions of Section 3700 of the Labor Code, I shall forthwith comply with those provisions.

Exp. Date: _____ Applicant: _____

WARNING: FAILURE TO SECURE WORKER'S COMPENSATION COVERAGE IS UNLAWFUL, AND SHALL SUBJECT AN EMPLOYER TO CRIMINAL PENALTIES AND CIVIL FINES UP TO ONE HUNDRED THOUSAND DOLLARS ($100,000), IN ADDITION TO THE COST OF COMPENSATION, DAMAGES AS PROVIDED FOR IN SECTION 3706 OF THE LABOR CODE, INTEREST, AND ATTORNEY'S FEES.

OWNER-BUILDER DECLARATION

I hereby affirm under penalty of perjury that I am exempt from the Contractor's License Law for the following reason (Sec. 7031.5, Business and Professions Code: Any city or county which requires a permit to construct, alter, improve, demolish, or repair any structure, prior to its issuance, also requires the applicant for such permit to file a signed statement that he or she is licensed pursuant to the provisions of the Contractor's License Law (Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code) or that he or she is exempt therefrom and the basis for the alleged exemption. Any violation of Section 7031.5 by any applicant for a permit subjects the applicant to a civil penalty of not more than five hundred dollars ($500).):

☐ I, as owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale (Sec. 7044 Business and Professions Code: The Contractors License Law does not apply to an owner of property who builds or improves thereon, and who does such work himself or herself or through his or her own employees, provided that such improvements are not intended or offered for sale. If, however, the building or improvement is sold within one year of completion, the owner-builder will have the burden of proving that he or she did not build or improve for the purpose of sale.).

☐ I, as owner of the property, am exclusively contracting with licensed contractors to construct the project (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner of property who builds or improves thereon, and who contracts for such projects with a contractor(s) licensed pursuant to the Contractors License Law.).

☐ I am exempt under Sec. _____, B & P.C. for this reason C58353

By my signature below I acknowledge that, except for my personal residence in which I must have resided for at least one year prior to completion of the improvements covered by this permit, I cannot legally sell a structure that I have built as an owner-builder if it has not been constructed in its entirety by licensed contractors. I understand that a copy of the applicable law, Section 7044 of the Business and Professions Code, is available upon request when this application is submitted or at the following website: http://www.leginfo.ca.gov/calaw.html.

4/9/09 Date — Signature of Property Owner or Authorized Agent: AGENT

LICENSED CONTRACTOR'S DECLARATION

I hereby affirm under penalty of perjury that I am licensed under provisions of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code, and my license is in full force and effect.

Lic. Class _____ Lic. No. _____

Exp. Date _____ Contractor _____

ASBESTOS DECLARATION

Written asbestos notification pursuant to Part 61 of Title 40 of the Code of Federal Regulations is required when asbestos exists in buildings, or portions thereof, undergoing demolition. I hereby declare that demolition authorized by this permit is from construction that (☐ does) (☐ does not) contain asbestos, or that ☒ no demolition is authorized by this permit.

I certify that I have read this application and affirm under penalty of perjury that the above information is correct. I agree to comply with all local Ordinances and State laws relating to building construction. I hereby authorize representatives of the County of Sonoma to enter upon the above-mentioned property for inspection purposes. If, after making the Certificate of Exemption for the Worker's Compensation provision of the Labor Code, I should become subject to such provisions, I will forthwith comply. In the event I do not comply with the Workman's Compensation law, this permit shall be deemed revoked.

PERMITTEE SIGNATURE _____

132 S. CLOVERDALE BLVD ADDRESS — CLO CITY — 95425 ZIP

☐ Contractor ☐ Owner ☑ Other Licensed Professional

THIS PERMIT SHALL EXPIRE IN THREE(3) YEARS FROM DATE FEES ARE PAID UNLESS OTHERWISE NOTED BY CODE ENFORCEMENT

DPANGBORN 12/29/12

FOR DEPARTMENT USE

Zoning: LIA 20Z, BR, IT Fire: 2, MR, V61 Acres: 38

Existing Use/Structures: SFD, AG EMPLOYEE UNIT

Proposed Use/Structures: GRADING FOR WINERY & DRIVEWAY

Zoning Min. Yard Requirements: Front N/A Left Right Bmk

NOTE: Fire Safe Standards require all parcels greater than 1 Acre to have a min. 30' setback unless mitigated. ☐ Mitigation Required ☐ Address subject to change

Approval for Permit Issuance: By: _____ Date: _____

Approved for Occupancy: By: [signature] Date: 4/9/09 FINAL

Conditions: _____

Sewer Connection: ☐ Available ☐ Fees Paid

Approved by: _____ Date: _____

Road Encroachment: ☐ Fees Paid SEE EMC 10-0279

Approved by: [signature] Date: 5/4/10

Septic System Permit/Clearance #

Approved by: [signature] Date: 4-9-09

Flood Zone: ☒ Yes ☐ No 100 Year Flood Elevation: _____

Site Review

Drainage Review:

Approved by: [signature] Date: 4/15/10

Fire:

Approved by: [signature] Date: 5/5/09

Code Enforcement Violation ☒ Yes ☐ No V84108-0300

This permit is limited to _____ days.

OK TO ISSUE PERMIT DOES NOT LEGALIZE VIOLATION. NOT RELATED TO LANDSLIDE.

Work Authorized: GRADING FOR WINERY & DRIVEWAY ZERO-NET FILL IN SFHA.

☑ Plans Approved ☐ No Plans Subject to Field Inspection

☐ Post FIRM ☐ Alquist Priolo Report Available ☐ Pre FIRM ☐ Geotechnical report Available

Plancheck Cleared By	Date:	Type of Construction	Occupancy	No. of Stories	No. of Bedrooms
[signature]	4/15/10				

Permit Cleared for Issuance By	Date:	Auto. Fire Sprinklers Req'd	No of Units	Certificate of Occupancy
Regina	5/4/10			

Machine Space for Permit Fee

cmiller s:\handouts\css\CIS-007.cdr Revised: 01/29/2009

JOB ADDRESS: 27801 River Rd Clo

PERMIT NUMBER: GRD09-0049

INSPECTION AREA: 30

Distribution: White - File Canary - Applicant Blue - Assessor Cardstock - Inspector

ENGINEERING DIVISION - PERMIT INSPECTION RECORD

Sonoma County Permit And Resource Management Department
2550 Ventura Avenue ❖ Santa Rosa, CA 95403 ❖ Telephone (707) 565-1900

OWNER: FIELD KATARINA

PERMITS: GRD09-0049 AREA: 30
ADDRESS: 27801 RIVER RD CLO
ISSUED DATE: 05/04/2010
APPLICANT: KELDER KURT THOMAS

CONTACT: EDOBLE
DESC: GRADING FOR NEW WINERY & DRIVEV

AUTOMATED INSPECTION REQUEST SYSTEM
❖ 565-3551 ❖

Our automated inspection request system (for use with a touch tone phone) allows you to schedule next day inspections by calling between the hours of 6:00 a.m. to midnight. You must have your permit number, job address number and the inspection code listed below.

THIS JOB CARD MUST BE AVAILABLE AT TIME OF INSPECTION

The current status of this permit is available on our website:
http://www.SonomaCountyPermits.org

RB 1 X RB 2 _____ NPDES _____

Scantron CODE	INSPECTION TYPE	Scantron CODE	INSPECTION TYPE
	SITE GRADING & SITE IMPROVEMENTS GRD		**STORM WATER**
200	SITE GRADING, PRE-CONSTRUCTION *(5 DAY NOTICE)*	650	SUSMP INSPECTION
201	START WORK *(5 DAY NOTICE)*	651	S/W PRE-CONSTRUCTION
202	RESUME GRADING ACTIVITY *(2 DAY NOTICE)*	652	S/W BMPS VERIFICATION
203	SITE GRADING, ROUGH		
204	SUB DRAIN	654	S/W SITE INVESTIGATION
205	SUB GRADE *(2 DAY NOTICE)*	655	S/W PRE-RAIN SEASON INSPECTION
206	SITE IMPROVEMENTS, PRE-PAVING	656	S/W ENFORCEMENT ACTION COMPLIANCE
207	CONCRETE FLATWORK	657	S/W POST-RAIN SEASON INSPECTION
208	PAD CERTIFICATION		
209	PRE-PAVING *(2 DAY NOTICE)*	659	STORM WATER FINAL *(2 DAY NOTICE)* 12/24/12
210	PAVING *(2 DAY NOTICE)*		
211	STRIPING & SIGNAGE *(5 DAY NOTICE)*		
212	LIGHTING & SIGNALS *(5 DAY NOTICE)*		
213	KEYING & BENCHING		
214	SLOPE STABILITY / RETAINING WALL		
215	SOIL REPORT CERTIFICATION		
216	SPECIAL INSPECTION		**SEWER SYSTEMS SEW**
		430	START WORK *(5 DAY NOTICE)*
218	PRE-FINAL *(5 DAY NOTICE)*	431	RESUME SEWER SYSTEM ACTIVITY
219	SITE GRADING, FINAL *(2 DAY NOTICE)* 12/19/12	432	SEWER TRENCH
220	SUBDIVISION WARRANTY	433	SEWER PIPE / BEDDING
		434	SEWER BACKFILL / COMPACTION
		435	SEWER TESTING
	WATER SYSTEMS WAT		
450	WATER FIELD WORK COMPLIANCE		
451	WATER PIPE INSTALLATION	438	SEWER MANHOLE
452	WATER ENCROACHMENT REQUIREMENTS	439	SEPTIC TANK DESTRUCT W/SEWER CONNECTION
453	WATER WELL DRAWDOWN & YIELD	440	GREASE INTERCEPTOR
454	WATER SYSTEM HYDROSTATIC TEST	441	PUMP SYSTEM
		442	SEWER PRE-PAVING
		443	SEWER PAVING
459	WATER SYSTEM FINAL		
	ENCROACHMENT ENC		
240	START WORK *(5 DAY NOTICE)*	449	SEWER FINAL *(2 DAY NOTICE)*
241	ENCROACHMENT TRENCHING		
242	ENCROACHMENT PIPE / BEDDING		
243	ENCROACHMENT BACKFILL / COMPACTION		
244	ENCROACHMENT PRE-PAVING		
245	ENCROACHMENT PAVING		
249	ENCROACHMENT FINAL		
250	PUBLIC IMPROVEMENTS WARRANTY		
	DRAINAGE DRN		
640	TRENCH (DRAINAGE PIPE)		
641	DRAINAGE PIPE		
642	PIPE BACKFILL / COMPACTION		
643	PIPE STRUCTURES		
644	INLET / OUTLET EROSION PROTECTION		
645	SWALE(S)		
			12/24/12
649	DRAINAGE FINAL *(2 DAY NOTICE)*	699	PERMIT FINAL *(5 DAY NOTICE)*

GRD09-0049

27801 River Rd

ENGINEERING DIVISION - PERMIT INSPECTION RECORD

Sonoma County Permit And Resource Management Department
2550 Ventura Avenue ❖ Santa Rosa, CA 95403 ❖ Telephone (707) 565-1900

INSPECTION NOTES for PERMIT # ____________________

INSP #	DATE	INITIALS	REMARKS

Required Cut/Fill Table For Grading Permits

BPC-008

☐ Applicant ☐ Owner ☑ Architect \ Engineer

KURT KELDER
Name

132 S. CLOVERDALE BLVD
Mailing Address

CLOVERDALE CA 95425
City/Town State/Zip

707-894-0862 707-894-0863
Phone Fax

Kurt Kelder 4/5/09
Signature Date

Project Site Information

27801 RIVER ROAD
Address(es)

CLOVERDALE
City/Town

117-060-059
Assessor's Parcel Number(s)

FIELD WINERY
Project Name (If applicable)

1.6 ac.
Disturbed Area:

Please do not write in the shaded areas.

Cut	-		5300	Cu. Yds.
Fill	+	5300	Cu. Yds.	
Export	-			Cu. Yds.
Import	+		Cu. Yds.	
Shrinkage	-			Cu. Yds.
Totals		5300	Cu. Yds.	5300 Cu. Yds.

Purpose or use of grading:

NEW WINERY & DRIVEWAY

Geotechnical report available? Yes ☑ No ☐

Geotechnical report included with application? Yes ☑ No ☐

Will more than 1 acre be denuded? Yes ☑ No ☐

---------- ◊ DO NOT WRITE BELOW THIS LINE - To Be Completed by PRMD Staff ◊ ----------

Total volume used for fee calculations Cu. Yds.

For excavation and fill on the same site, the fee shall be based on the volume of excavation or fill, whichever is greater. (Reference is 1998 California Building Code Section 3310.2)

Activity No GRD09-0049

BOARD FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS

Licensee Name: KELDER KURT THOMAS
License Type: CIVIL ENGINEER
License Number: 58353
License Status: **CLEAR Definition**
Expiration Date: September 30, 2010
Address: 410 JOSEPHINE DR
City: CLOVERDALE
State: CA
Zip: 95425
County: SONOMA
Actions: No

Disciplinary Actions

No records returned

This information is updated Monday through Friday - Last updated: APR-08-2009

Back

GRD09 - 0049

RETAIN

REESE CONSULTING GEOTECHNICAL
& ASSOCIATES ENGINEERS

134 LYSTRA COURT SANTA ROSA, CA 95403
TELEPHONE (707) 528-3078 FACSIMILE (707) 528-2837

January 25, 2010

Job No. 209.1.13

Katarina Field
2535 Maricopa Street
Torrance, CA 90503

Report
Soil Engineering Consultation
and Review of Grading Plans
Field Winery
Cloverdale, California

This report presents the results of our soil engineering consultation and review of grading plans for the planned Field Winery to be constructed at 27801 River Road in Cloverdale, California. Giblin Associates performed a soil investigation for the project and the results were presented in their report dated May 19, 2009. Our principal engineer served as project manager during the investigation and co-authored that report. In general, their recommendations for site preparation and grading within the building areas included criteria for overexcavation of existing weak upper soils, moisture conditioning and placement of compacted fill to accommodate spread footing foundations and conventional slab-on-grade floors.

Grading plans reviewed were prepared by Kelder Engineering, Civil Engineers, and are dated January 11, 2010. Plans indicate that the development will consist of the construction of a new winery building and tasting room served by asphalt- and concrete-paved driveway and parking areas and underground utilities. Adjacent concrete walkway areas are also shown surrounding the north portion of the buildings with an exterior concrete slab-on-grade crush pad located adjacent to the west side of winery barrel and fermentation rooms. A water tank pad and pump house are also planned in the west central portion of the site just beyond the driveway and crush pad area. Planned fills varying up to about 3 to 4 feet and minor cuts (on the order of about 1 foot or less) are indicated to create level building areas, develop the planned driveway and parking areas and provide drainage.

Based on our knowledge of the subsurface conditions, we believe that the materials and methods indicated on the plans are in general conformance with the recommendations outlined in the soil investigation report.

Our review of the plans and soil investigation report indicates that the depth of overexcavation to remove existing weak porous and compressible upper soils within the building envelope(s) (as defined in the soil investigation report) will likely vary up to about 6 feet below the existing ground surface. However, deeper overexcavation could be needed to remove deeper zones of weak porous or compressible upper soils, if encountered. To help reduce the risk of differential settlements caused by liquefaction and/or densification during seismic shaking, an impervious lining and protective woven geotextile fabric is recommended in the bottom of the overexcavation prior to replacing the materials as properly compacted fill as noted on the plans. Site preparation, grading, fill placement and compaction should be performed as outlined in the soil investigation report. Because the actual depth of excavation to remove weak porous and compressible upper soils could vary, we suggest contract documents contain provisions to account for such variations.

Weak, porous and compressible soils, such as those encountered at the site, can tend to trap considerable amounts of water into the late spring or early summer. For grading performed in winter and early spring, there is a risk that the site can become too wet and soft to support construction equipment. Therefore, we believe that site grading early in the construction season could require more than normal effort to satisfactorily excavate and/or compact the materials.

Ponding water will soften site soils and could be detrimental to foundations. It is important that the building pad areas be sloped to drain away from foundations. We recommend that good positive surface drainage away from the buildings consisting of at least ¼-inch per foot extend at least 4 feet out be provided. The roofs should be provided with gutters and/or roof drain inlets with downspouts, and the downspouts should discharge onto paved areas or splash blocks draining at least 30 inches away from foundations or be connected to rigid plastic nonperforated pipelines that discharge by gravity into planned or existing storm drainage facilities.

Based on our plan review and previous work at the site, we believe that, provided the site is graded in conformance with the criteria outlined in the soil investigation report, the materials and methods indicated on the plans are in general conformance with our recommendations. We recommend that site grading work and footing excavations be observed and tested by the soil engineer to verify that the actual conditions encountered are as anticipated and to modify our recommendations, if warranted. Field and laboratory tests should be performed to ascertain that the specified moisture content and degree of compaction of the planned fills and asphalt- and concrete-paved area subgrade and aggregate base materials are being attained.

We trust this provides the information needed at this time. If you have questions or wish to discuss this in more detail, please do not hesitate to contact us.

Yours very truly,

REESE & ASSOCIATES

Dan J. Figoni
Project Manager

Jeffrey K. Reese
Civil Engineer No. 47753

DF/JKR:nay/ra/df/Job No. 209.1.13
Copies submitted: 2

cc: 3 Kelder Engineering
132 South Cloverdale Boulevard
Cloverdale, CA 95425
Attention: Kurt Kelder

KELDER ENGINEERING
CONSULTING CIVIL ENGINEERS

December 21, 2012
08-41

Mr. John Rainwater, P.E.
Sonoma County PRMD
2550 Ventura Avenue
Santa Rosa, CA 95403

Re: GRD 09-0049, Final Inspection
27801 River Road, Cloverdale

Dear Mr. Rainwater:

I recently inspected the work at 27801 River Road, Cloverdale for conformance with the approved grading plans, GRD 09-0049.

Based on my inspection, I find that the work has been performed within substantial conformance of the approved plans and the current Sonoma County Codes, Regulations, and Ordinances.

Enclosed, please find a final report from Reese Associates, geotechnical engineer, regarding the geotechnical aspects of the work.

Please call me at (707) 894-0862 if you have any questions or comments.

Thank you.

Sincerely,

Kurt T. Kelder, P.E.

Enclosures

Cc: File

132 S. CLOVERDALE BLVD., CLOVERDALE, CA 95425
PHONE: (707) 894-0862, FAX: (707) 894-0863, E-MAIL: KELDERCE@SONIC.NET

Linda S. Adams
Secretary for Environmental Protection

State Water Resources Control Board

Division of Water Quality
1001 I Street Sacramento, California 95814 (866) 563 3107
Mailing Address: P.O. Box 1977 Sacramento, California 95812-1977
FAX (916) 341-5543 Internet Address: http://www.waterboards.ca.gov
Email Address: stormwater@waterboards.ca.gov

Arnold Schwarzenegger
Governor

Approved Date: 05/13/2009
Nina Field
Nina Field
27801 River Rd
Cloverdale CA 95425

RECEIPT OF YOUR NOTICE OF INTENT (NOI)

The State Water Resources Control Board (State Water Board) has received and processed your NOI to comply with the terms of the General Permit to Discharger Storm Water Associated with Construction Activity. Accordingly, you are required to comply with the permit requirements.

The Waste Discharger Identification (WDID) number is: **1 49C355317**. Please use this number in any future communication regarding this permit.

	SITE DESCRIPTION
OWNER:	Nina Field
DEVELOPER:	Field Winery
SITE INFORMATION:	Field Winery 27801 River Rd Cloverdale
TOTAL DISTURBED ACRES:	1.6
START DATE:	06/15/2009
COMPLETION DATE:	07/31/2009
COUNTY:	Sonoma

When the Owner changes , a new NOI, site map, and fee must be submitted by the new Owner. As the previous owner, you are required to submit a Notice of Termination (NOT) to the local Regional Water Board stating you no longer own or operate the Site and coverage under the General Permit is not required. Unless notified, you will continue and are responsible to pay the annual fee invoiced each April.

If you have any questions regarding permit requirements, please contact your Regional Water Board at 707-576-2220 . Please visit the storm water web site at http://www.waterboards.ca.gov/water_issues/programs/stormwater/ to obtain an NOT and other storm water related information and forms.

Sincerely,

Storm Water Section
Division of Water Quality

Required Grading Inspections

ENG-001

This is a list of required inspections to be performed by the grading inspector and, if engineered grading, by the engineer providing grading controls. If work requiring inspection is covered or concealed without first having been inspected, the grading inspector may require, by written notice, that such work be exposed for examination.

Project Address: 27801 RIVER RD City: CLOVERDALE

Grading Plan Check or Permit # GP09-0049 APN: 107-060-059

☒ The project plans have been checked and classified as **engineered grading.** (Chapter 11 Sonoma County Code)
☐ The project plans have been checked and classified as **non-engineered** grading. (Chapter 11 Sonoma County Code)

Note: Inspections, tests and reports are required when the corresponding box is checked.

Grading Inspector	Engineer
☒ Pre-construction meeting with contractor, grading inspector and/or others.	☒ Pre-construction meeting with contractor, geotechnical engineer, grading inspector and others, as applicable.
☒ Other inspections, as agreed at pre-construction meeting.	☒ Other inspections, as agreed at pre-construction meeting.
☒ Preparation of ground for fill placement, organic layer removed, competent material exposed, surface scarified, etc.	☒ Preparation of ground for fill placement, organic layer removed, competent material exposed, surface scarified, etc.
☐ Surface benched where surface receiving fill is steeper than 5h:1v.	☐ Surface benched where surface receiving fill is steeper than 5h:1v. (The geotechnical engineer may require benching at flatter than 5h:1v.)
☐ Key or core.	☐ Key or core.
☐ Terraces, as required.	☐ Subsurface drainage facilities.
☒ Surface drainage facilities including interceptor drains, swales, ditches on terraces, concrete or shotcrete ditch lining, etc.	☒ Fill placement method, suitability of materials, lift thickness, moisture content and density monitored and reported to contractor, etc. (Design specifications).
☒ Final rough grading of both cut and fill slopes, including terracing, rounding of top soil layer, setbacks from permit area boundaries, etc.	☐ Terraces, as required.
☒ Erosion control measures, either temporary or permanent, including sediment fences, installation of fabrics, seeding slopes, etc.	☒ Surface drainage facilities including interceptor drains, swales, ditches on terraces, concrete or shotcrete ditch lining, etc.
☒ Final inspection for code compliance. If engineered grading, the final report is also reviewed by grading inspector before the grading permit is finaled.	☒ Final rough grading of both cut and fill slopes, including terracing, rounding of top soil layer, setbacks from permit area boundaries, etc.
PRIOR TO START OF WORK, PLEASE CONTACT ALEX ROSAS AT (707)565-3746 TO SCHEDULE A MANDATORY PRE-CONSTRUCTION CONSULTATION	☒ Density tests and moisture content with moisture/density curve at locations chosen by engineer providing grading controls, not by contractor.
	☒ Erosion control measures, either temporary or permanent, including sediment fences, installation of fabrics, seeding slopes, etc.
	☒ "As Built" plans by civil engineer, if changes have been made during construction. Verification on line & grade by civil engineer may be requested by soils engineer or this department.
	☒ Final report by the soils engineer providing grading controls meeting the requirements.

Plan Checker: [signature] Date: 4/13/10

*Engineer: [signature] Date: 4/12/10

*Engineer's signature is required for **"engineered"** grading.

134 LYSTRA COURT
TELEPHONE (707) 528-3078

REESE CONSULTING GEOTECHNICAL & ASSOCIATES ENGINEERS

SANTA ROSA, CA 95403
FACSIMILE (707) 528-2837

December 21, 2012

Job No. 209.1.13

Katarina Field
2535 Maricopa Street
Torrance, CA 90503

Final Report
Soil Engineering Services
Field Winery
Cloverdale, California

At your request, this final report presents the results of our soil engineering observation and testing during site preparation and grading for Field Winery in Cloverdale, California. A soil investigation was performed for the project by Giblin Associates and the results are presented in their report dated May 19, 2009. We provided soil engineering consultation and reviewed the grading plans for the project and summarized the results in our report dated January 25, 2010. Our recommendations, the recommendations in the Giblin Associates report, and the plans prepared by Kelder Engineering were the guidelines for the work.

Site Grading

Site grading of the building pad was performed in July 2011. Initially, areas to be graded were cleared of surface obstructions and stripped of the upper few inches of soil containing root growth and organic matter. The strippings and cleared materials were removed from the site. Weak porous and compressible soils were excavated within the building envelope to depths that varied from about 9 to 12 feet below planned pad grade elevation. The exposed grade then was scarified, moisture conditioned and compacted with a segmented, self-propelled, sheepsfoot-wheel roller. An impervious lining consisting of two layers of 20-mil polyethylene was installed at the bottom of the overexcavation and covered by a woven geotextile fabric. Approved materials from an on-site borrow site then were placed in layers, moisture conditioned and similarly compacted. Excessive deflection and pumping of saturated unstable soils was observed in the southwest portion of the building pad during backfilling operations. A Tencate Basxgrid geogrid was installed at approximately 5 feet below planned pad grade elevation to help stabilize the area. Following installation of the geogrid, subsequent backfill placement was completed without excessive deflection or pumping.

Construction of asphalt-paved areas was performed during July and early August 2011. During development of asphalt-paved areas, we were on-site to observe and test the subgrade soils. Saturated, unstable soils were encountered in the entrance roadway subgrade approximately from Station 0+40 to 1+50. To reduce the risks of future pavement distress, subgrade soils were removed in this area to depths that varied from about 1 to 2½ feet below planned subgrade level and replaced with materials from the borrow site. The materials were placed in layers and thoroughly compacted using segmented, self-propelled, sheepsfoot-wheel compaction equipment up to planned subgrade level. Prior to placement of the borrow site materials, the exposed grade was covered with a woven geotextile fabric.

Soil Engineering Services

Representative samples of the materials used for fill were compacted in our laboratory in general accordance with the ASTM D 1557 compaction test procedure to determine the optimum moisture contents and maximum dry densities. Our representative was at the site on an intermittent basis to observe the work in progress, obtain samples for laboratory testing, and perform field density tests at representative locations in the building pad fills and roadway subgrade. The field densities were compared to the corresponding maximum densities to determine the relative compaction attained. Summaries of the compaction and field density test data are shown on Plates 1 through 4.

Summary

Based on our observations and the results of our field and laboratory tests, we believe that the site preparation and grading work accomplished under our soil engineering observation has been completed satisfactorily in accordance with our recommendations, and the intent of the recommendations contained in the original soil investigation report. Our tests indicate that the building pad fills and the upper 6 inches of the subgrade materials were compacted to at least 90 and 95 percent relative compaction, respectively.

We trust this provides the information needed at this time. If you have questions or wish to discuss this in more detail, please do not hesitate to contact us. The following plates are attached and complete this report.

Plate 1	Compaction Test Data
Plates 2 through 4	Summary of Field Density Test Data

Yours very truly,

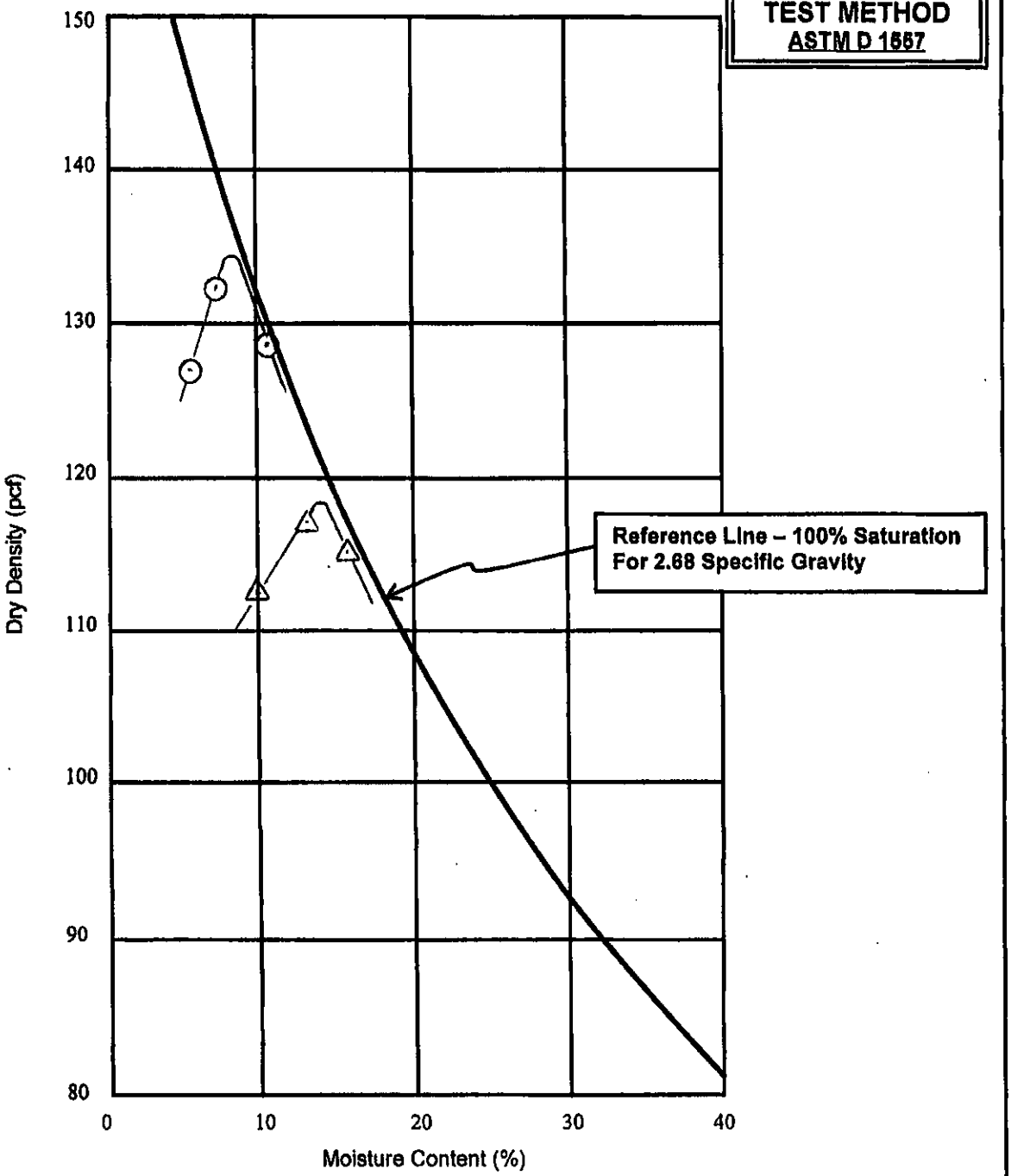
REESE & ASSOCIATES

Joseph Mauney, EIT
Field Engineer

Jeffrey K. Reese
Civil Engineer No. 47753

JM/JKR:nay/rn/Job No. 209.1.13
Copies Submitted: 2

cc: 3 Kelder Engineering
132 South Cloverdale Boulevard
Cloverdale, CA 95425
Attention: Kurt Kelder



Symbol	Sample Source	Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)
⊙	On-site excavations	DARK BROWN SILTY SAND (SM) with gravel	8½	134
△	On-site excavations	DARK BROWN SILTY SAND (SM)	14	119

REESE & ASSOCIATES CONSULTING GEOTECHNICAL ENGINEERS	Job No: 209.1.13 Date: 12-07-12 Appr:	COMPACTION TEST DATA FIELD WINERY 27801 RIVER ROAD CLOVERDALE, CALIFORNIA	PLATE 1

Test No.	Location (by coordinates) North	East	Elevation (feet) ‡	Moisture Content (Percent)	Dry Density (pcf)	Maximum Dry Density (pcf)	Degree of Compaction (Percent)	Remarks
1	116'	117'	273.3	16.3	113	119	95	
2	99'	153'	273.3	16.2	113	119	95	
3	52'	176'	273.3	15.3	111	119	93	
4	55'	183'	273.3	15.0	114	119	96	
5	33'	135'	273.3	17.0	114	119	96	
6	134'	97'	274.3	16.2	110	119	92	
7	150'	130'	274.3	16.7	111	119	93	
8	72'	179'	274.3	16.8	109	119	92	
9	55'	125'	274.3	14.6	107	119	90	
10	77'	141'	274.3	14.9	109	119	92	
11	155'	95'	275.3	17.6	107	119	90	
12	169'	143'	275.3	15.7	113	119	95	
13	35'	196'	275.3	18.2	110	119	92	
14	57'	107'	275.3	16.2	113	119	95	
15	139'	154'	276.3	15.7	114	119	96	
16	22'	185'	276.3	16.5	112	119	94	
17	61'	72'	270.0	15.6	112	119	94	
18	154'	72'	273.5	19.8	104	119	87	† See retest #23
19	149'	187'	272.2	15.5	109	119	92	
20	69'	222'	273.1	13.0	112	119	94	
21	10'	236'	275.0	12.9	110	119	92	
22	20'	121'	274.8	12.9	116	119	97	
23	117'	84'	273.5	13.7	110	119	92	
24	South 16'	145'	273.5	14.0	109	119	92	

Origin of Coordinates: Southeast corner of existing residence west of winery

‡ Elevation of tests were determined in the field using a hand level and folding rule and a staked elevation provided by the project surveyor.

† denotes Recompacted

REESE & ASSOCIATES
CONSULTING GEOTECHNICAL ENGINEERS

Job No: 209.1.13

Date: 12-17-12

Appr: JKR

SUMMARY OF FIELD DENSITY TEST DATA

FIELD WINERY
27801 RIVER ROAD
CLOVERDALE, CALIFORNIA

PLATE 2

Test No.	Location (by coordinates) North	East	Elevation (feet) ‡	Moisture Content (Percent)	Dry Density (pcf)	Maximum Dry Density (pcf)	Degree of Compaction (Percent)	Remarks
25	215'	176'	273.0	14.7	109	119	92	
26	164'	110'	273.0	15.5	111	119	93	
27	155'	148'	273.0	15.4	115	119	97	
28	25'	199'	273.0	12.8	117	119	98	
29	31'	207'	273.0	13.4	111	119	93	
30	30'	176'	273.0	12.0	112	119	94	
31-S	South 38'	160'	s	14.1	107	119	90	† See retest #35
32-S	South 38'	188'	s	15.5	107	119	90	† See retest #35
33	63'	159'	274.5	12.3	118	119	99	
34	34'	94'	274.5	13.7	112	119	94	
35-S	37'	115'	s	11.8	117	119	98	
36	52'	77'	274.0	14.1	116	119	97	
37	122'	89'	275.0	11.9	121	134	90	
38	76'	105'	275.0	11.2	121	134	90	
39	24'	126'	275.5	10.1	118	134	89	†
40	55'	164'	276.1	9.0	121	134	90	
41	16'	161'	276.0	10.9	123	134	92	
42	255'	179'	276.0	13.6	116	119	97	
43	169'	69'	276.3	12.3	116	119	97	
44	182'	139'	276.3	12.2	124	134	93	
45	101'	172'	277.5	12.0	122	134	91	
46	57'	192'	277.5	11.2	120	134	90	
47	31'	147'	277.0	11.4	123	134	92	
48	75'	154'	277.0	10.8	123	134	92	

Origin of Coordinates: Southeast corner of existing residence west of winery

‡ Elevation of tests were determined in the field using a hand level and folding rule and a staked elevation provided by the project surveyor.

S denotes Subgrade s denotes top of subgrade † denotes Recompacted

REESE & ASSOCIATES
CONSULTING GEOTECHNICAL ENGINEERS

Job No: 209.1.13

Date: 12-17-12

Appr: JRR

SUMMARY OF FIELD DENSITY TEST DATA

FIELD WINERY
27801 RIVER ROAD
CLOVERDALE, CALIFORNIA

PLATE 3

Test No.	Location (by coordinates) North	East	Elevation (feet) ‡	Moisture Content (Percent)	Dry Density (pcf)	Maximum Dry Density (pcf)	Degree of Compaction (Percent)	Remarks
49	132'	91'	277.8	9.4	121	134	90	
50	171'	129'	277.8	11.5	125	134	93	
51	40'	211'	277.8	12.2	120	134	90	
52	South 2'	151'	277.8	10.9	122	134	91	
53	72'	14'	277.8	10.2	123	134	92	
54	77'	164'	277.8	9.8	120	134	90	
55	179'	102'	277.8	10.8	120	134	90	
56	161'	79'	277.8	10.2	122	134	91	
57	202'	139'	277.8	10.7	120	134	90	
58-S	200'	85'	s	12.0	128	134	96	
59-S	240'	160'	s	9.7	126	134	94	†
60	279'	234'	273.8	8.0	123	134	92	
61-S	186'	43'	s	9.9	128	134	96	
62	29'	264'	274.9	6.5	133	134	99	
63-S	277'	219'	s	10.3	130	134	97	
64-S	304'	284'	s	10.2	129	134	96	
65-S	288'	239'	s	9.8	130	134	97	
66-S	267'	213'	s	9.2	132	134	99	

Origin of Coordinates: Southeast corner of existing residence west of winery

‡ Elevation of tests were determined in the field using a hand level and folding rule and a staked elevation provided by the project surveyor.

S denotes Subgrade s denotes top of subgrade † denotes Recompacted

REESE & ASSOCIATES
CONSULTING GEOTECHNICAL ENGINEERS

Job No: 209.1.13

Date: 12-17-12

Appr: JWR

SUMMARY OF FIELD DENSITY TEST DATA

FIELD WINERY
27801 RIVER ROAD
CLOVERDALE, CALIFORNIA

PLATE 4

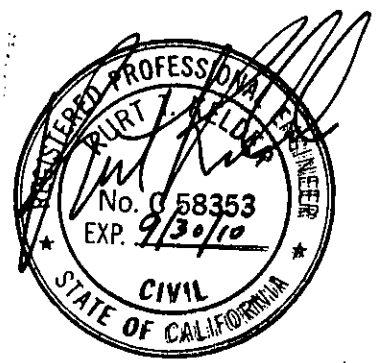
KELDER ENGINEERING
LAND PLANNING – CIVIL ENGINEERING

FLOOD STUDY

For

Field Winery
27801 River Road
Cloverdale, CA 95425
APN. 117-060-059

Prepared by,



Kurt Kelder, P.E.
March 17, 2010 **Job No. 08-41**

Project Description:

The owner wishes to develop her 38-acre parcel by constructing a new winery/tasting room and improving the driveway entrance at River Road. Currently the parcel is developed with a single family dwelling and an out-building. The rest of the parcel consists of vineyard and native grasses.

Flood Analysis:

Per the topographic survey of the property, the 100-year, base flood elevation was determined to be at elevation 277.0 (NGVD '29). This elevation was used for planning purposes for the use permit and septic system investigations.

The winery building, tasting room, crush slab, and parking areas will be constructed within the 100-year flood plain. Sonoma County PRMD requires a no-net fill within the 100-year flood plain. Therefore, it is proposed that any fill within the flood plain will be obtained from a borrow area within the flood plain at the closest practical proximity to the fill. The result is a no-net fill within the flood plain.

Calculations:
The earthwork volumes are determined using two methods:

1. Composite Volume Calculations using AutoCAD R2009 Civil 3D software.
2. Grid Volume Calculations.

Composite Volume Calculation Method:

A surface of the existing ground, labeled EG, was created in AutoCAD. A surface was created of the proposed finish grade within the flood limits. This surface was labeled FG LIMIT. A third surface representing the base flood elevation was created and called FLOOD SURF.

The total amount of cut and fill was determined by subtracting the finish grade surface from the existing ground surface, EG - FG LIMIT. The amount of fill for the finished ground above the flood plain was then determined by subtracting the base flood surface from the finished grade surface, FG LIMIT – FLOOD SURF (BFE). This resulting volume (FG LIMIT - BFE) was then subtracted from the first volume (EG – FG LIMIT).

A graphical representation is presented on the next page. The corresponding cuts and fills within the flood plain are shown on this graphical representation.

Output – the output of the Composite Volume Calculation shows that the cuts and fills within the flood plain limits are balanced as shown on the improvement plans dated 03/17/10.

FIELD WINERY
COMPOSITE VOLUME CALCULATION FROM AUTO CAD


```
- <LandXML xmlns="http://www.landxml.org/schema/landxml-1.0"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://www.landxml.org/schema/LandXML-1.0
    http://www.landxml.org/schema/LandXML-1.0/LandXML-1.0.xsd" version="1.0"
    date="2010-03-19" time="23-52-08" readOnly="false" language="English">
  - <SurfVolumes>
      <SurfVolume surfBase="EG" surfCompare="FG LIMIT"
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        volNet="20263.3407280283" />
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        volNet="759517.229746566" />
    </SurfVolumes>
  </LandXML>
```


THESE VALUES ARE IN CUBIC FEET. CONVERT TO CUBIC YARD BY DIVIDING BY 27

INPUT DATA:

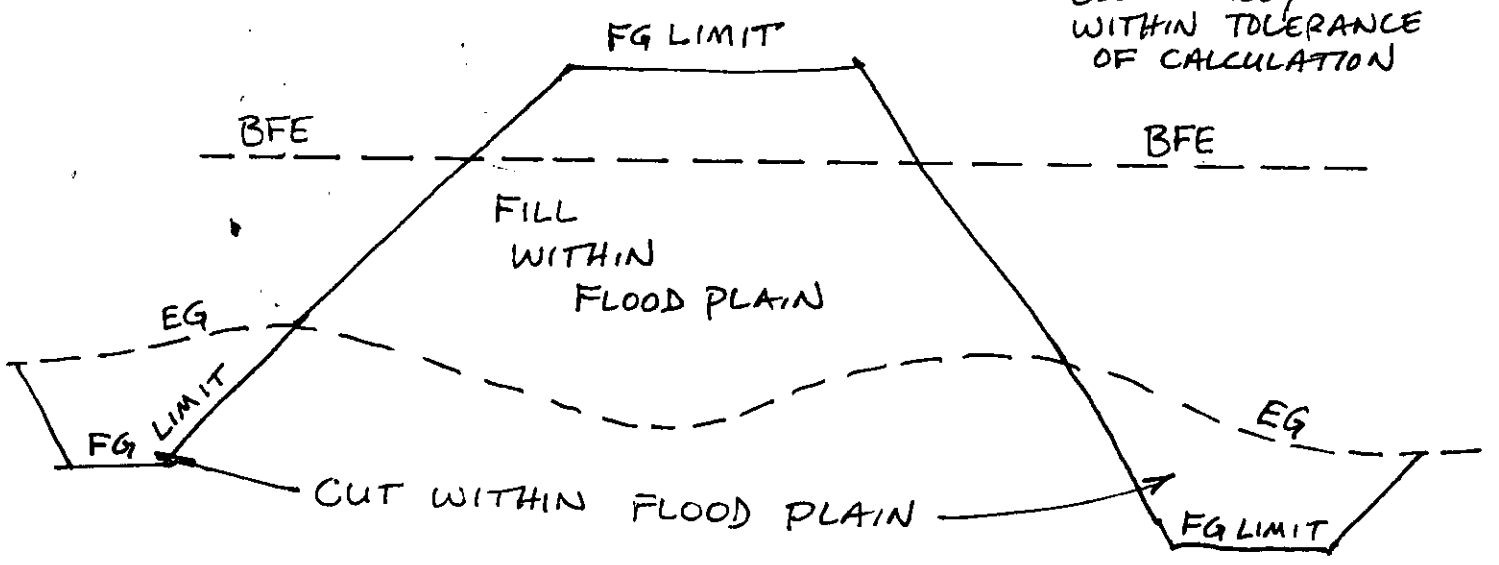
EG-FG LIMIT : CUT = 112359/27 = 4,161 cy
FILL = 132622/27 = 4,912 cy

FGLIMIT - FLOOD:
CUT = 20162/27 = 747 cy
FILL = 779679/27 = 28,877 cy

OUTPUT DATA:

CUT WITHIN FLOOD PLAIN = 4,161 cy
FILL WITHIN FLOOD PLAIN = 4912-747 = 4,165 cy
NET = 4 cy OK

ESSENTIALLY ZERO WITHIN TOLERANCE OF CALCULATION



Grid Volume Calculation Method:

The second method of calculating earthwork and corresponding flood volume capacity was the Grid Volume Calculation Method. This method estimates earthwork by analyzing a series of sections through the site. The sections are 400' long and are typically spaced at 150' intervals. The proposed improvement areas within the flood limit are calculated and the existing (pre-construction) flood storage areas are calculated.

The corresponding volumes are interpolated by multiplying the areas by the section width.

The results of the Grid Volume Calculations are presented in tabular format on Sheets FL2 and FL3.

The tabulated results indicate that the post-construction flood storage capacity within the flood zone will be slightly greater than the pre-construction flood storage capacity. The difference between the calculated pre-construction volume and post-construction volume is less than 1%.

Results:

Both calculation methods show that there will be a resulting zero net fill within the flood plain. The Composite Volume Calculation Method provides a more accurate calculation than the Grid Volume Calculation Method.

The Grid Volume Calculation Method involves interpolation between sections, and is therefore subject to more variations. However, the Grid Volume Calculation provides a good check of the results obtained using the Composite Volume Method.

According to the Composite Volume Calculation Method, the proposed development results in a fill within the flood plain of 4,165 cy. The area immediately to the south of the winery will be used for the borrow area. It is proposed that at least 4,165 cy of soil will be excavated from the borrow area and placed in the area of the winery development. The final result is a no-net fill within the flood plain.

GIBLIN ASSOCIATES
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Report
Soil Investigation
Field Winery
27801 River Road
Cloverdale, California

Prepared for
Katarina Field
2535 Maricopa Street
Torrance, CA 90503

By

GIBLIN ASSOCIATES
Consulting Geotechnical Engineers

Robert B. Di Jorio
Staff Engineer

Jeffrey K. Reese
Civil Engineer No. 47753

Job No. 4095.1.1
May 19, 2009

INTRODUCTION

This report presents the results of our soil investigation for a proposed winery in Cloverdale, California. The site is located at 27801 River Road, and is further identified as Assessor's Parcel Nos. 117-060-059 and -060.

We understand that the proposed winery will be a one- or two-story, metal-frame structure with a concrete slab-on-grade floor. Foundation loads are not known at this time, but are expected to be normal for the type of construction proposed. Access to the facility will be provided by asphalt-paved driveway and parking areas. Preliminary plans indicate 4 to 6 feet of fill will be placed to bring existing grade to planned building pad elevation.

The object of our investigation, as outlined in our proposal dated February 20, 2009, was to review selected, geotechnical information in our files, explore subsurface conditions, measure depth to groundwater, if encountered, and determine physical properties of the soils encountered. We then performed engineering analyses to develop conclusions and recommendations concerning:

1. Seismic design parameters and proximity of the site to active faults, including the potential for liquefaction and mitigation measures to reduce the risk of distress, if appropriate.
2. Site preparation and grading.
3. Foundation support and design criteria.
4. Support of concrete slab-on-grade floors.

5. Soil engineering drainage.

6. Supplemental soil engineering services.

WORK PERFORMED

We reviewed pertinent, published, geologic information and maps in our files to determine if the site is impacted by mapped active faults or liquefaction hazards. Those sources include:

1. The "Geologic Map of the Santa Rosa Quadrangle, California," by D. L. Wagner and E. J. Bortugno, California Division of Mines and Geology, 1982.

2. The "Geology for Planning in Sonoma County" maps, Special Report 120, California Division of Mines and Geology, 1980.

3. The "Maps of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada," Uniform Building Code (UBC), 1997.

4. The "Association of Bay Area Governments Liquefaction Hazard Map," Association of Bay Area Governments (ABAG), 2001.

5. Lawson, Andrew, *The California Earthquake of April 18, 1906,* report of the State Earthquake Investigation Commission, 1908.

On April 6, 2009, our engineer was at the site to observe conditions exposed and explore subsurface conditions to the extent of three test borings at the approximate locations indicated on Plate 1. The borings were drilled to depths of about 13½ to 29½ feet with truck-mounted, hollow-stem auger equipment. Our engineer located the borings, observed the drilling, logged the conditions encountered and obtained samples for visual classification and

laboratory testing. At the completion of the drilling, the borings were backfilled with the auger cuttings.

Relatively undisturbed samples were obtained with a 2.5-inch (inside-diameter) split-spoon sampler and a 2.0-inch (outside diameter) standard penetration sampler driven with a 140-pound drop hammer. The length of the stroke of the drop hammer during driving was about 30 inches. The blows required to drive the sampler were recorded and converted to equivalent Standard Penetration blow counts for correlation with empirical data. Logs of the borings showing soil classifications, sample depths and converted blow counts are presented on Plates 2 through 4. The soils are classified in accordance with the Unified Soil Classification System explained on Plate 5.

Selected samples from the borings were tested in our laboratory to determine moisture content, dry density and classification (Atterberg Limits, sieve analysis, and percent free swell) and strength characteristics. The test results are shown on the logs with the strength data shown in the manner described by the Key to Test Data, Plate 5. Detailed results of the Atterberg Limits tests are summarized on Plate 6.

The boring locations shown on Plate 1 were determined by visually estimating from existing surface features. The locations should be considered no more accurate than implied by the methods used to establish the data.

SURFACE AND SUBSURFACE CONDITIONS

The site is located in an area of gently rolling hills and is bordered on the north by a gravel driveway and an existing vineyard beyond that, on the west by an existing residence, on the east by River Road and on the south by an open field and more vineyards beyond that. The footprint of the proposed building location sits atop a small knoll adjoined by two shallow drainage swales to the east and west that appear to converge at the south end of the planned building area.

The borings and laboratory tests indicate that the site is underlain by discontinuous layers of alluvial sands, gravels, silty sands and sandy silts to the maximum depth explored. In general the upper soils consist of loose silty sand. The upper soils were observed to be porous from prior cultivation and organic decomposition to a depth of about 3 feet below existing grade. The upper soils exhibit a low expansion potential. Such soils would tend to undergo small strength and volume changes with seasonal variation in moisture content. Below the upper natural soils, and to the bottom of the test borings, stiff, sandy silts, and loose to medium dense silty and clayey sands and gravels were observed. The sands and gravels appeared to become denser with depth.

Groundwater was initially observed in Borings 1 and 2 at depths of about 17 and 14 feet, respectively. The groundwater depth was recorded prior to backfilling of Boring 1 at 15½ feet below the ground surface. Our experience indicates that groundwater levels can vary

seasonally and can rise and fall several feet annually. Precise groundwater location, or that of a perched water condition, is beyond the scope of this investigation.

CONCLUSIONS

Based on the results of our field exploration and laboratory tests, we conclude that, from a soil engineering standpoint, the site can be used for the proposed construction. The most significant soil engineering factors that must be considered in design and construction are:

1. The presence of weak, porous natural soils;
2. Loose, cohesionless soils that, when saturated, could be subject to liquefaction during seismic activity.

Our experience indicates that weak, porous and/or compressible soils can undergo considerable strength loss and settlement when loaded in a saturated condition. Where evaporation is inhibited by foundations, slabs, or fill, eventual saturation of the underlying soils can occur. Therefore, we conclude that the weak, upper soils in the building area are not suitable for foundation, slab, or fill support in their present condition.

Liquefaction, a loss in shear strength, and densification, a reduction in void ratio, are phenomena associated with loose, cohesionless, sands and gravels subjected to ground shaking during earthquakes. Liquefaction and/or densification can result in unacceptable total and/or differential settlements. Whether such phenomena will actually occur depends on complicated

factors, such as duration and intensity of ground shaking at the site, and the response characteristics of the materials and groundwater conditions underlying the site. The ABAG liquefaction susceptibility map indicates that liquefaction susceptibility at the site is considered moderate.

We have analyzed the soil data from the borings at the site in accordance with the "*Simplified Procedure for Evaluating Soil Liquefaction Potential*" by H. B. Seed and I. M. Idriss, published in the Journal of the Soil Mechanics and Foundation Division of the American Society of Civil Engineers, dated September 1971, and "*Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils,*" by Youd, et al dated April 2001. Based on our analyses, we conclude that the sandy soils encountered in Test Borings 2 and 3 in the upper 15 feet could be subject to liquefaction.

Surface cracking, subsidence and resultant distress to overlying improvements can result from soil liquefaction during strong earthquake shaking. However, such displacements at the ground surface would be expected to occur where the buildup of excess pore water pressures can be relieved by vertical (upward) movement of the groundwater through cracks, fissures, or permeable lenses. Our subsequent recommendations for site grading and design of foundations are intended to reduce to risk of future distress to a low level.

Satisfactory foundation support for the structure can be obtained from spread footings bottomed at relatively shallow depths on a pad of properly compacted fill. Mat-slab or post-

tensioned foundation systems could also be utilized. Recommendations for a foundation system or ground improvement technique that could better withstand erratic total and/or differential settlements, including driven piles, ground modification, grouting, and others, could also be developed, if desired. We could provide specific recommendations for these alternatives, if requested.

For foundations designed and installed in accordance with our subsequent recommendations, we judge that total settlements would be about 1-inch or less. We believe that post-construction settlements should be about one-half this amount.

SEISMIC DESIGN PARAMETERS

The geologic maps reviewed did not indicate the presence of active faults at the site and, therefore, we judge that there is little risk of fault-related ground rupture during earthquakes. In a seismically active region such as Northern California, there is always some possibility for future faulting at a site. However, historical occurrences of surface faulting have generally closely followed the trace of more recently active faults. The closest significant active faults to the site are summarized below.

Fault	Approximate Distance To Site	General Direction (Site to Source)
Maacama (south)	2.2 miles	East
Collayomi	13.3 miles	East
Rodgers Creek	21.8 miles	South
San Andreas	21.9 miles	Southwest

Strong ground shaking will occur during earthquakes. The intensity at the site will depend on the distance to the earthquake epicenter, depth and magnitude of the tremor, and the response characteristics of the materials beneath the site. Because of the proximity to active fault zones in the region and the potential for strong ground shaking, it will be necessary to design and construct the project in strict accordance with current standards for earthquake-resistant construction.

We have determined the seismic ground motion values in accordance with procedures outlined in Section 1613 of the 2007 California Building Code (CBC). Mapped acceleration parameters (S_S and S_1) were obtained by inputting approximate site coordinates (latitude and longitude) into an earthquake ground motion program made available for use by the USGS for the determination of CBC ground motion values. Based on our review of available geologic maps and our knowledge of the subsurface conditions, we judge that the site can be classified as Site Class D, as described in Table 1613.5.2 of the 2007 CBC. Using corresponding values of site coefficients for Site Class D and procedures outlined in the CBC, the mapped acceleration parameters were adjusted to yield design spectral response acceleration parameters S_{DS} and S_{D1} and are summarized in the following table.

2007 California Building Code Ground Motion Parameters

Site Class	D
Mapped Spectral Response Accelerations:	
S_S	1.8g
S_1	0.8g
Design Spectral Response Accelerations:	
S_{DS}	1.2g
S_{D1}	0.8g

RECOMMENDATIONS

Site Preparation and Grading

The site should be cleared of debris and brush, where encountered. Designated trees, if any, should be removed and the root systems excavated. Resultant voids should be backfilled with compacted soil as subsequently described. Dense growths of grass and vegetation should be removed. The area to be graded then should be stripped of the upper soils containing root growth and organic matter. We anticipate that the depth of stripping needed will average about 3 inches. The strippings should be removed from the site, stockpiled for reuse as topsoil or mixed with at least five parts of soil and used as fill at least 10 feet away from structure, walkway and paved areas.

Wells, septic tanks or other voids encountered or created should be removed, filled with compacted soil or compacted granular material or capped with concrete as determined by the soil engineer.

After stripping, excavation should be performed as necessary. We anticipate that, with the exception of organic matter and rocks or hard fragments larger than 4 inches in diameter, the excavated materials will be suitable for reuse as compacted fill. However, expansive clayey soils, if encountered, should not be used as fill in the upper 24 inches of the building pad, as discussed below.

Within the planned building, crush pad and any exterior tank pad foundation/floor slabs and adjacent concrete walkway areas and extending to at least 10 feet beyond the perimeter (building envelope), existing fills and weak, porous upper soils should be excavated for their full depth. The depth of the excavation in the building envelope to remove weak, porous soils and/or existing fills will likely vary up to about 6 feet. Deeper overexcavation will be necessary where deeper weak, porous soils are encountered. Also, the depth of excavation should be adjusted, as needed, so as to provide space for at least 24 inches of approved on-site or imported nonexpansive fill over any expansive clayey soils that may be encountered, as well as providing space for at least 30 inches of similarly compacted fill beneath footings and slabs. Because the actual depth of excavations to remove existing fills and weak, upper soils and/or expansive materials will vary, we recommend that the contract documents contain provisions to account for such variations.

The surface exposed by stripping or overexcavation should be scarified at least 6 inches deep, moisture conditioned to at least 2 percentage points above optimum (at least 4 percentage

points for expansive clayey soils) and compacted to at least 90 percent relative compaction[1]. The moisture conditioning should be sufficient to close any shrinkage cracks for their full depth. Approved, excavated and/or imported fill then should be placed in layers; similarly moisture conditioned and compacted to at least 90 percent. Only approved on-site or imported soils of low expansion potential should be used within the upper 24 inches of the building pad.

To help reduce the risk of differential settlements caused by liquefaction and/or densification during seismic shaking, we recommend an impervious lining be installed at the bottom of the overexcavation prior to replacing the materials as fill. The lining is intended to inhibit movement of water up into the compacted fill pad and to reduce the risk of structural distress should the underlying soils liquefy during seismic shaking. The lining could consist of "Hypalon H-45" or 40-mil polyethylene, or two layers of 20-mil polyethylene or equivalent. To improve stability of the compacted fill pad and to help protect the impervious lining, we recommend that a woven geotextile fabric (such as Mirafi 500X or equivalent) be placed over the impervious lining. The lining material and geotextile fabric should extend across the entire bottom of the excavation. The initial fill layer should be sufficient to protect the lining and geotextile fabric and yet be able to be properly compacted in accordance with the recommendations presented below. A detail of the recommended compacted fill pad and accompanying linings is indicated on Plate 7.

---

1 Relative compaction refers to the in-place dry density of fill expressed as a percentage of maximum dry density of the same material determined in accordance with the ASTM D 1557-00 laboratory compaction test procedure. Optimum moisture content refers to the moisture content at maximum dry density.

After compaction of the exposed materials in the excavation bottom and placement of the geotextile fabric and impervious lining as discussed above, approved on-site or imported fill materials then should be spread in 8-inch-thick, or less, loose lifts, moisture conditioned to near optimum, and compacted to at least 90 percent relative compaction.

It is our experience that existing fill and weak, porous soils, such as those encountered at the site, can tend to trap considerable amounts of water into the late spring or early summer. For grading performed in winter and early spring, there is a risk that the site can become too wet and soft to support construction equipment. Therefore, we believe that site grading early in the construction season could require more than normal effort to satisfactorily excavate and/or compact the materials.

Imported fill material should be nonexpansive and have a Plasticity Index of 15 or less. Imported material should be free of organic matter and rocks or hard fragments larger than 4 inches in diameter. The material proposed for use as nonexpansive fill should be tested and approved by the soil engineer prior to importation to the site.

Where on-site soils are used in building floor slab areas, the pad surface should be periodically watered so as to be maintained in a moist condition from the completion of the rough grading until concrete slabs are placed. As an alternative to regular moisture conditioning, the upper 12 inches of the building pad could consist of approved imported nonexpansive fill.

Finished cut and fill slopes should be trimmed to expose dense material and should be no steeper than two horizontal to one vertical (2:1). Slopes over 3 feet high should be planted with deep rooted, fast growing ground cover to help reduce erosion.

Foundations

Spread Footings - Spread footings should be at least 12 inches wide, at least 18 inches deep, and be bottomed on at least 24 inches of properly compacted fill, as discussed above. Such footings can be designed to impose dead plus code live load and total design load (including wind or seismic forces) bearing pressures of 2,000 and 3,000 pounds per square foot (psf), respectively.

To help reduce possible foundation distress should liquefaction and/or densification occur, footings should be well-reinforced and well-tied-together in a grid-type system. Grid spacing should be no more than about 20 feet, each way. No isolated pad footings should be used, and continuous footings should be designed to span at least 6 feet of nonsupport.

Resistance to lateral loads can be obtained from passive earth pressures and soil friction. We recommend the following criteria for design:

Passive Earth Pressure	=	300 pounds per cubic foot (pcf) equivalent fluid, neglect the upper one foot unless confined by pavements or slabs
Soil Friction Factor	=	0.30

Slab-On-Grade

Provided the site is prepared as recommended above, slab-on-grade floor areas should be underlain by a minimum of 30 inches of properly compacted approved fill materials of low expansion potential. In addition, floor slabs should be underlain with a capillary moisture break and cushion layer consisting of at least 4 inches of free-draining crushed rock or gravel (slab rock). Crushed rock should be used where the slabs would be subjected to wheel loads such as forklifts. Moisture vapor will condense on the underside of slabs. Where moisture migration through slabs is detrimental, an impermeable membrane moisture barrier should be provided over the slab-rock. Two inches of clean moist sand should be placed on top of a plastic membrane, if used, to aid in curing and help provide puncture protection.

In general, floor slabs could be tied to the foundation. Frequent joints should be provided in the slabs to permit movements to occur without distressing the slabs.

Floor slabs should be at least 5 inches thick and be reinforced to reduce cracking. Prior to placing the reinforcing or slab rock, the subgrade soils should be thoroughly moisture conditioned and be smooth, firm and uniform. Where subjected to heavy wheel or storage loads, the slabs should be thickened and reinforced to accommodate the increased loading. Actual slab thickness and reinforcing should be determined by the design engineer based on anticipated use and performance.

Pavement Thicknesses

For planning purposes, based on our experience with similar projects and soils, we recommend the following minimum pavement sections for driveways and parking areas:

Material	Parking Areas	Driveway Areas
Class II Aggregate Base	6"	8"
Asphalt Concrete	2½"	2½"

Such pavements should be suitable for auto and light pickup truck traffic. Where heavier delivery truck and/or grape gondola loadings are anticipated, the pavement thickness should be increased to at least 3 inches of asphalt and about 12 to 16 inches of aggregate base, depending on anticipated loading. We can provide specific recommendations, if desired. Because of concentrated heavy wheel loads at dumpster lift points, reinforced concrete slabs should be used at those locations.

Pavement subgrades should be prepared by scarifying to a depth of at least 6 inches, moisture conditioning to slightly above optimum (at least 2 percentage points above optimum for on-site clayey soils, if encountered) and compacting to at least 95 percent relative compaction. Finished subgrade should be smooth, firm, uniform and nonyielding. Aggregate base materials should be spread in layers, moisture conditioned and compacted to at least 95 percent relative compaction. The aggregate base should also be firm and nonyielding.

The materials and methods used should conform to the requirements of the current edition of the State of California Caltrans Standard Specifications and the requirements of the County of Sonoma.

Geotechnical Drainage

Ponding water will soften site soils and would be detrimental to foundations. It is important that the area adjacent to the building be sloped to drain away from foundations. The roofs should be provided with gutters, and the downspouts should discharge onto paved areas or splash blocks draining at least 30 inches away from foundations.

Where irrigated landscape areas abut the building, excess water can be introduced into soil layers along the edge of the building, tending to soften soils around the footings and increase the risk of potential heave of the floor slab in expansive soils areas and/or migration of moisture beneath floor slabs. We believe that the installation of the recommended compacted fill pad that extends to at least 10 feet beyond the building perimeter should provide an effective barrier to the infiltration of excess water from landscape areas. Any cold joints in the perimeter foundation below grade should be hot-mopped or waterproofed on the exterior side in some manner. We recommend that positive surface drainage away from the building consisting of gradient of at least 1/4-inch per foot extending at least 4 feet from the foundation should be maintained. To further reduce the potential for moisture migration through the floor

slab, underslab subdrains could be installed. We can provide specific recommendations, if desired.

It should be recognized that concrete curbs and sidewalks, mowing strips and header boards, and raised berms can impede the flow of the surface water away from the building, promote soil saturation and contribute to seepage of water into underfloor areas. Where such landscaping elements are planned, surface and subsurface drainage features may need to be incorporated into the plans. We can provide specific recommendations, if desired.

Supplemental Services

We should review grading and foundation plans for conformance with the intent of our recommendations. During site grading and foundation excavation operations, the soil engineer should be notified to provide intermittent observation and testing. We should observe the conditions encountered, confirm needed overexcavation depths and modify our recommendations, if warranted. Field and laboratory tests should be performed to ascertain that the specified moisture content and degree of compaction are being attained. Foundation location, forms, and set-up should be checked by the Building Department. Concrete and reinforcing should be checked as stipulated on the project plans or as required by the Building Department.

LIMITATIONS

We have performed the investigation and prepared this report in accordance with generally accepted standards of the soil engineering profession. No warranty, either express or implied, is given. This scope of work is limited to evaluating the physical properties of earth materials considered typical of geotechnical engineering practice and does not include other concerns such as soil chemistry, corrosion potential, mold, and soil and/or groundwater contamination.

Subsurface conditions are complex and may differ from those indicated by surface features or encountered at test boring locations. Therefore, variations in subsurface conditions not indicated on the logs could be encountered. If the project is revised, or if conditions different from those described in this report are encountered during construction, we should be notified immediately so that we can take timely action to modify our recommendations, if warranted.

Supplemental services as recommended herein are in addition to this investigation and are charged for on an hourly basis in accordance with our Standard Schedule of Charges. Such supplemental services are performed on an as-requested basis, and we can accept no responsibility for items we are not notified to check, or for use or interpretation by others of the information contained herein.

Site conditions and standards of practice change. Therefore, we should be notified to update this report if construction is not performed within 24 months.

LIST OF PLATES

Plate 1	Test Boring Location Plan and Site Vicinity Map
Plates 2 through 4	Logs of Test Borings 1 through 3
Plate 5	Soil Classification Chart and Key to Test Data
Plate 6	Atterberg Limits Test Results
Plate 7	Recommended Grading Detail

DISTRIBUTION

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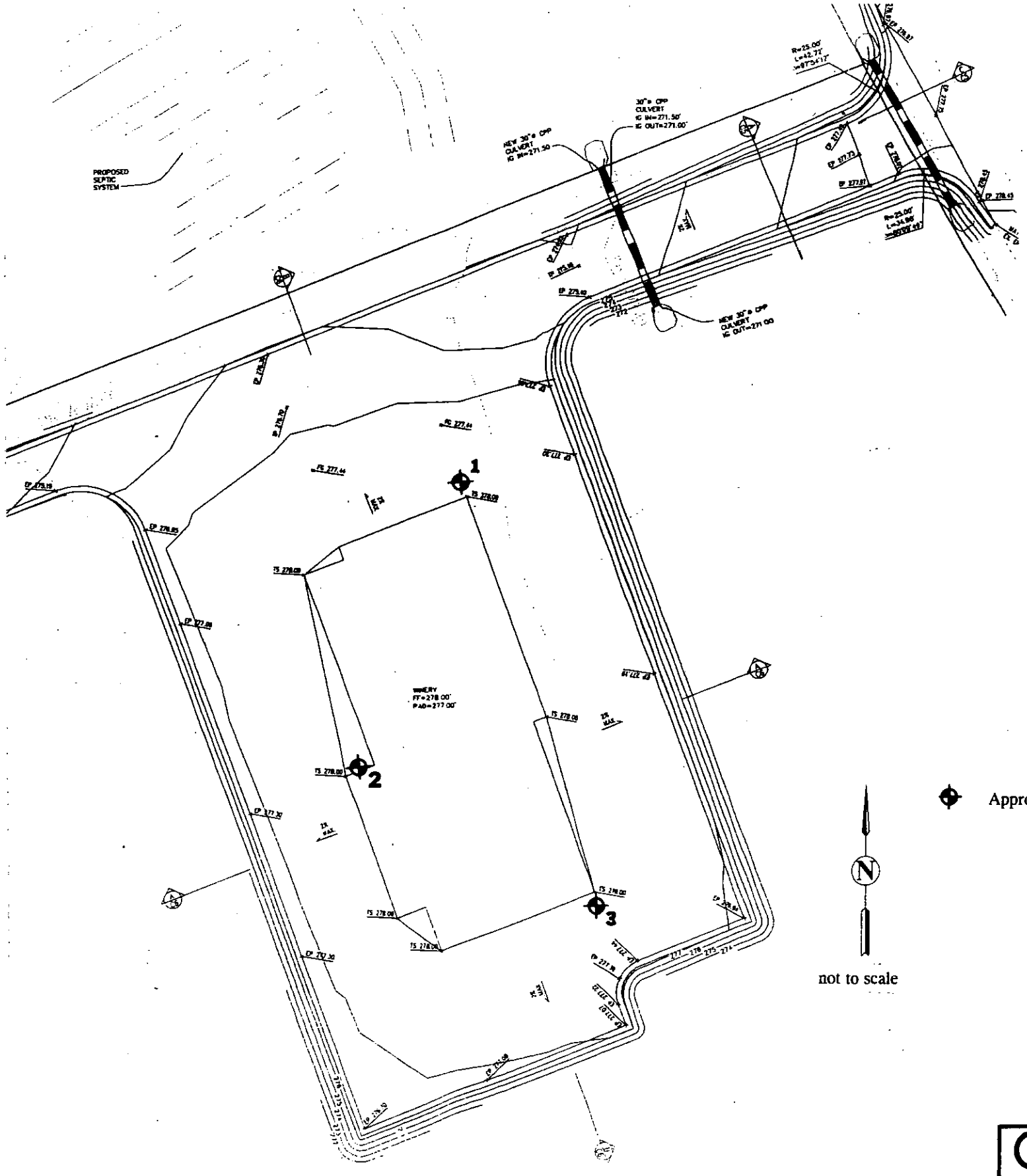
Katarina Field
2535 Maricopa Street
Torrance, CA 90503

3

Kelder Engineering
132 S. Cloverdale Boulevard
Cloverdale, CA 95425
Attention: Kurt Kelder

RD/JKR:nay/NN/HD/bound/rd/Job No. 4095.1.1



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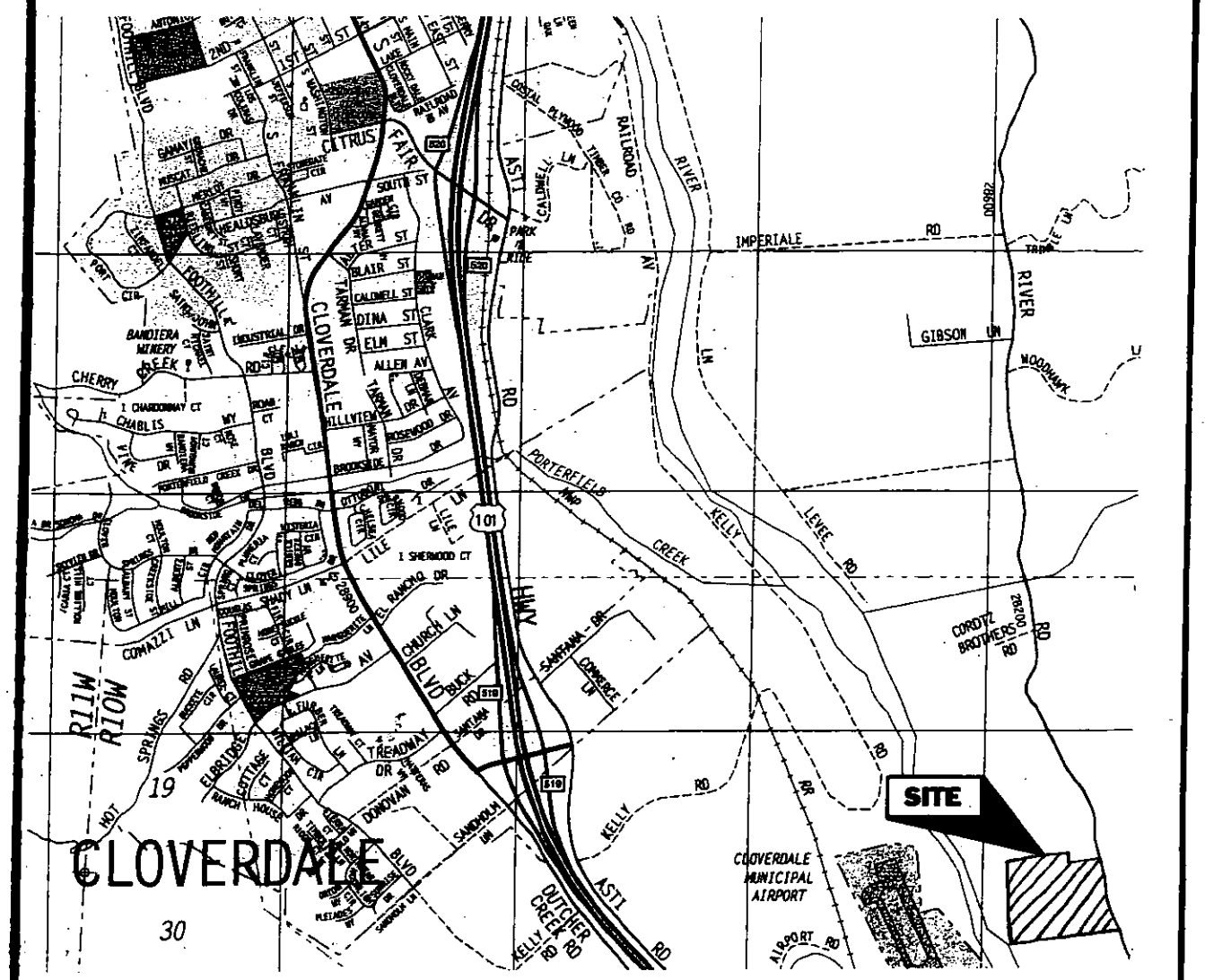

SITE VICINITY MAP

Approximate Test Boring Location

SITE VICINITY MAP

GIBLIN ASSOCIATES CONSULTING GEOTECHNICAL ENGINEERS	Job No: 4095.1.1 Date: 04-29-09 Appr:	TEST BORING LOCATION PLANS AND SITE VICINITY MAP FIELD WINERY 27801 RIVER ROAD CLOVERDALE, CALIFORNIA	PLATE 1

▽ groundwater first encountered at time of drilling

▼ groundwater at time of backfilling

LOG OF BORING 1

Equipment 6" FLIGHT AUGER

Elevation _____ Date 4-6-09

Laboratory Test Results or Remarks	Blows/foot *	Moisture Content (%)	Dry Density(pcf)	Depth (ft)	Sample	
				0		BROWN SANDY SILT (ML), soft, wet, fine roots, porous, fine sands
	4	14.6	98	2		
TxUU = 1120 (500)	4	18.2	96	4		BROWN SILTY SAND (SM), loose, wet, fine sand
	3	10.5	95	6		
Percent Passing No. 200 Sieve = 33.6	4					
Percent Passing No. 200 Sieve = 63.6	11			8		BROWN SANDY SILT (ML), stiff, saturated, fine sands, becomes stiff, with occasional gravel
				10		
				12		GRAY-BROWN POORLY GRADED GRAVEL WITH SAND (GP), medium dense, moist
Percent Passing No. 200 Sieve = 3.8 Percent Passing No. 4 Sieve = 31.9	18			14		
				16		

*Converted to Standard Penetration Blow Counts

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Job No: 4095.1.1

Date: 4-28-09

Appr: RD

LOG OF BORING 1

FIELD WINERY
CLOVERDALE, CALIFORNIA

PLATE **2a**

▽ groundwater first encountered at time of drilling

▼ groundwater at time of backfilling

Laboratory Test Results or Remarks

Blows/foot *	Moisture Content (%)	Dry Density(pcf)	Depth (ft)	Sample

LOG OF BORING 1

Equipment 6" FLIGHT AUGER

Elevation _____ Date 4-6-09

GRAY-BROWN POORLY GRADED SAND WITH CLAY (SP-SC), dense, saturated, with gravel

Percent Passing No. 200 Sieve = 5.8
Percent Passing No. 4 Sieve 64.4

31

32 8.6 132

DARK BROWN POOLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC), dense, saturated

32

*Converted to Standard Penetration Blow Counts

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Date: 4-28-09

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LOG OF BORING 1

FIELD WINERY
CLOVERDALE, CALIFORNIA

PLATE 2b

▽ groundwater first encountered at time of drilling

▼ groundwater at time of backfilling

LOG OF BORING 2

Equipment 6" FLIGHT AUGER

Elevation _____ Date 4-6-09

Laboratory Test Results or Remarks	Blows/foot *	Moisture Content (%)	Dry Density(pcf)	Depth (ft)	Sample	
				0		BROWN SILTY SAND (SM), loose, wet, with fine roots and pores, fine sands
Percent Passing No. 200 Sieve = 39.5 Percent Free Swell = 30	4	13.6	104	2		
UC(P) = 1500	4	21.5	99	4		BROWN SANDY SILT (ML), soft, wet, lensed with (SM)
Percent Passing No. 200 Sieve = 18.2	5			6		BROWN SILTY SAND (SM), loose, wet, fine sands
				8		
				10		
				12		
	12			14	▽	becomes medium dense and saturated

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Date: 4-28-09

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LOG OF BORING 2

FIELD WINERY
CLOVERDALE, CALIFORNIA

PLATE 3

*Converted to Standard Penetration Blow Counts

▽ groundwater first encountered at time of drilling

▼ groundwater at time of backfilling

LOG OF BORING 3

Equipment 6" FLIGHT AUGER

Elevation _____ Date 4-6-09

Laboratory Test Results or Remarks	Blows/foot *	Moisture Content (%)	Dry Density(pcf)	Depth (ft)	Sample	
				0		BROWN SANDY SILT (ML), soft, wet, with fine roots, and fine sands, porous
PI = 4.6 Percent Free Swell = 30	3			2		
TxUU = 1040 (1000)	3	20.1	99	4		
						BROWN SILTY SAND (SM), loose, wet
	8			6		
Percent Passing No. 200 Sieve = 4.7	9					GRAY-BROWN SAND (SP), loose, wet, uniformly graded fine sands
				8		
				10		
				12		
	22					becomes medium dense with increasing gravel content
						(No free water encountered)

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Date: 4-28-09

Appr: RD

LOG OF BORING 3

FIELD WINERY
CLOVERDALE, CALIFORNIA

PLATE 4

*Converted to Standard Penetration Blow Counts

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS				TYPICAL NAMES
COARSE GRAINED SOILS (MORE THAN HALF IS LARGER THAN No. 200 SIEVE)	GRAVEL (MORE THAN HALF OF COARSE FRACTION IS LARGER THAN No. 4 SIEVE SIZE)	CLEAN GRAVEL WITH LESS THAN 5% FINES	GW	WELL GRADED GRAVEL, GRAVEL-SAND MIXTURE
			GP	POORLY GRADED GRAVEL, GRAVEL-SAND MIXTURE
		GRAVEL WITH OVER 12% FINES	GM	SILTY GRAVEL, GRAVEL-SAND-SILT MIXTURE
			GC	CLAYEY GRAVEL, GRAVEL-SAND-CLAY MIXTURE
	SAND (MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN No. 4 SIEVE SIZE)	CLEAN SAND WITH LESS THAN 5% FINES	SW	WELL GRADED SAND, GRAVELLY SAND
			SP	POORLY GRADED SAND, GRAVELLY SAND
		SAND WITH OVER 12% FINES	SM	SILTY SAND, GRAVEL-SAND-SILT MIXTURE
			SC	CLAYEY SAND, GRAVEL-SAND-CLAY MIXTURE
FINE GRAINED SOILS (MORE THAN HALF IS SMALLER THAN No. 200 SIEVE)	SILT AND CLAY (LIQUID LIMIT LESS THAN 50)		ML	INORGANIC SILT, ROCK FLOUR, SANDY OR CLAYEY SILT WITH LOW PLASTICITY
			CL	INORGANIC CLAY OF LOW TO MEDIUM PLASTICITY, GRAVELLY, SANDY, OR SILTY CLAY (LEAN)
			OL	ORGANIC CLAY AND ORGANIC SILTY CLAY OF LOW PLASTICITY
	SILT AND CLAY (LIQUID LIMIT GREATER THAN 50)		MH	INORGANIC SILT, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOIL, ELASTIC SILT
			CH	INORGANIC CLAY OF HIGH PLASTICITY, GRAVELLY, SANDY OR SILTY CLAY (FAT)
			OH	ORGANIC CLAY OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILT
HIGHLY ORGANIC SOILS			PT	PEAT AND OTHER HIGHLY ORGANIC SOILS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

KEY TO TEST DATA

						Shear Strength, psf	Confining Pressure, psf
EI	–	Expansion Index	TxUU	–	Unconsolidated Undrained Triaxial	320	(2600)
Consol	–	Consolidation	TxCU	–	Consolidated Undrained Triaxial	320	(2600)
LL	–	Liquid Limit (in %)	DSCD	–	Consolidated Drained Direct Shear	2750	(2000)
PL	–	Plastic Limit (in %)	FVS	–	Field Vane Shear	470	
PI	–	Plasticity Index	LVS	–	Laboratory Vane Shear	700	
SA	–	Sieve Analysis	UC	–	Unconfined Compression	2000	*
G_s	–	Specific Gravity	UC(P)	–	Laboratory Penetrometer	700	*
■		"Undisturbed" Sample					
□		Bulk Sample					

Notes: (1) All strength tests on 2.8" or 2.4" diameter samples unless otherwise indicated. * Compressive Strength

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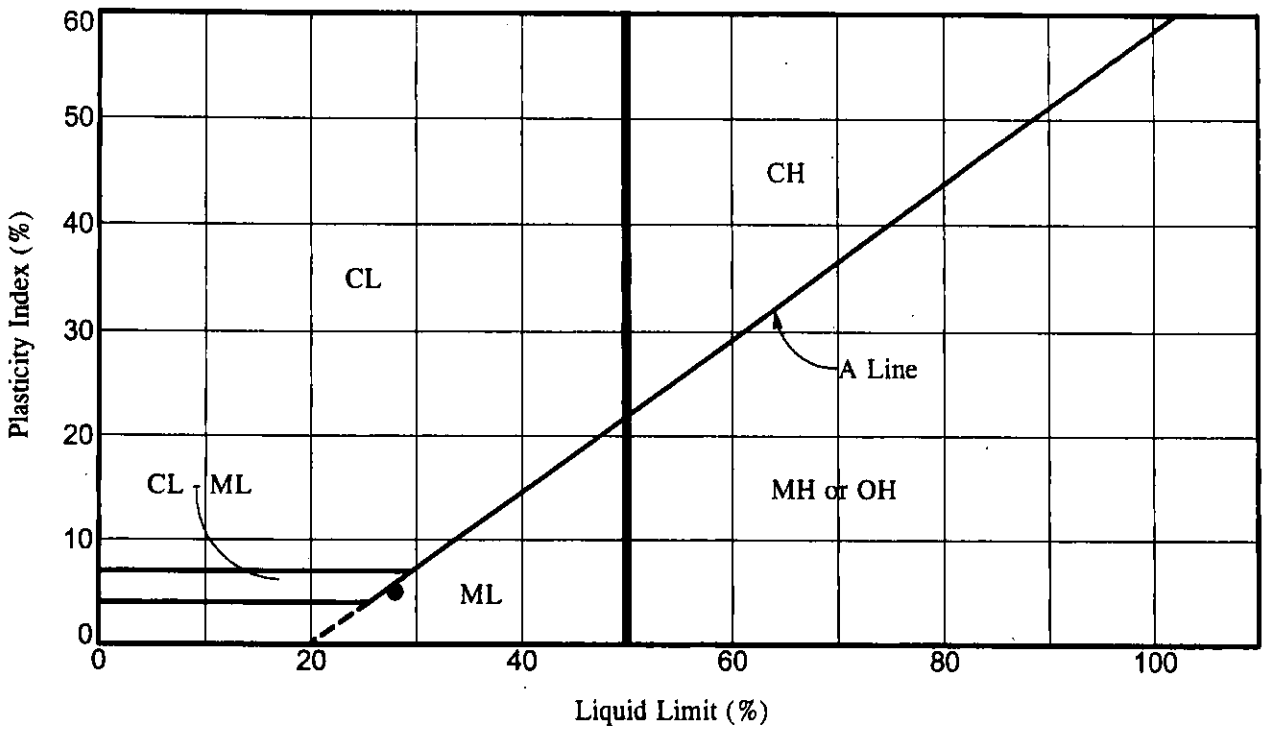
SOIL CLASSIFICATION CHART AND KEY TO TEST DATA
FIELD WINERY
CLOVERDALE, CALIFORNIA

PLATE 5



ASTM D 4318-98

Symbol	Classification and Source	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Free Swell (%)
●	**DARK BROWN SANDY SILT (ML)** **Test Boring 3 at 1.5 feet**	**28**	**23**	**5**	**30**

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Date: 4-28-09
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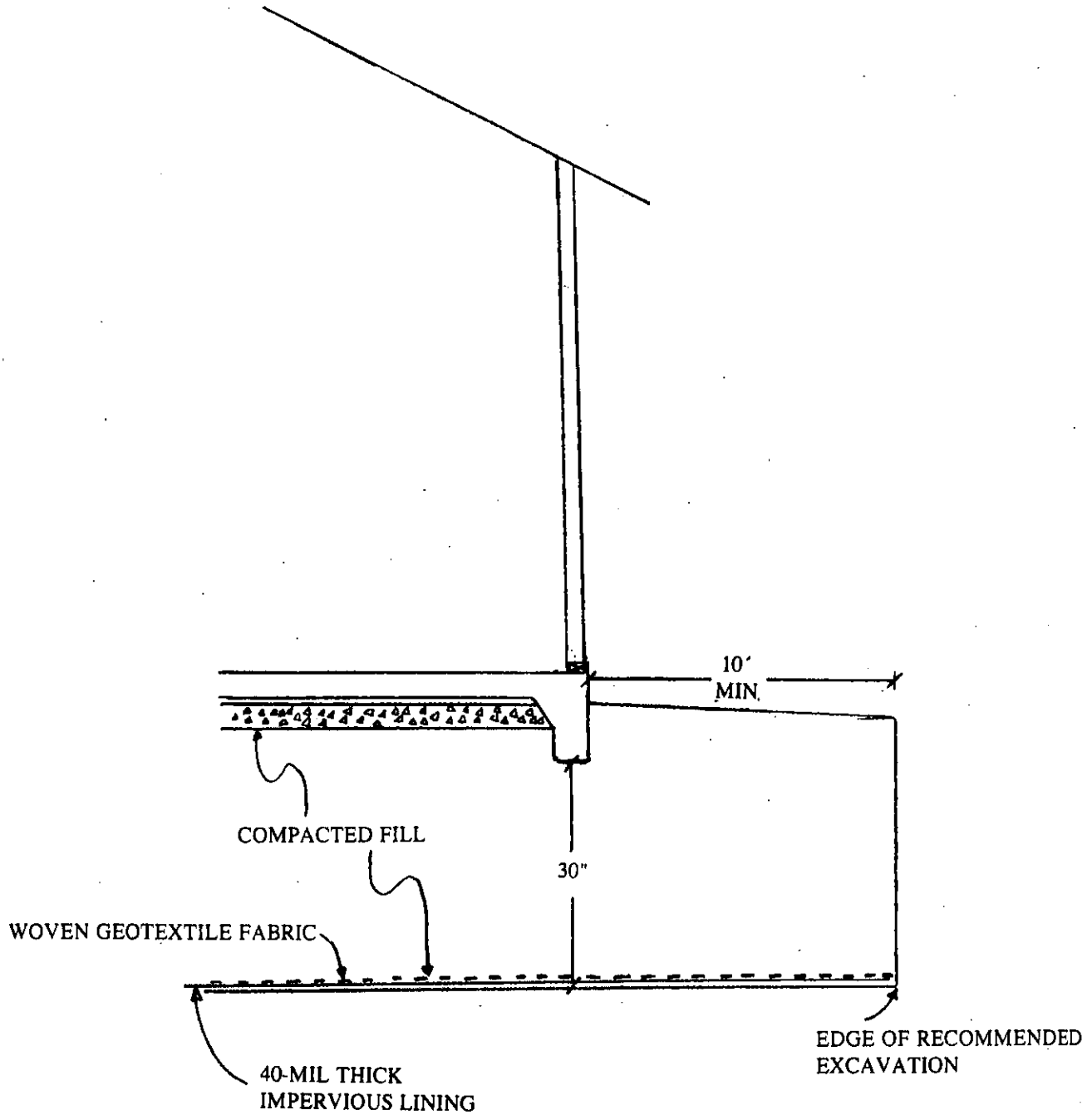
ATTERBERG LIMITS TEST RESULTS

FIELD WINERY
CLOVERDALE, CALIFORNIA

PLATE
6



GIBLIN ASSOCIATES CONSULTING GEOTECHNICAL ENGINEERS	Job No: 4095.1.1 Date: 04-29-09 Appr: RD	RECOMMENDED GRADING DETAIL FIELD WINERY 27801 RIVER ROAD CLOVERDALE, CALIFORNIA	PLATE 7

KELDER ENGINEERING
LAND PLANNING – CIVIL ENGINEERING

HYDROLOGY CALCULATIONS

For

Field Winery
27801 River Road
Cloverdale, CA 95425
APN. 117-060-059

Prepared by,

Kurt Kelder, P.E.
March 17, 2009 **Job No. 08-41**

Project Description:

The owner wishes to develop her 38-acre parcel by constructing a new winery/tasting room and improving the driveway entrance at River Road.

Currently the parcel is developed with a single family dwelling and an out-building. The rest of the parcel consists of vineyard and native grasses.

Surrounding Areas:

The surrounding areas consist of the Russian River to the west, River Road to the east and rural residential parcels to the north and south. The parcel is relatively flat. The rurual residential parcels to the north and south are also relatively flat. The area east of River Road is hilly and steep and consists of rural residential parcels covered by native vegetation and vineyards.

Basis for design: Sonoma County Water Agency, "Flood Control Design Criteria".

$Q = C\ I\ A\ K$

$C_P = 0.90$ for hardscape
$C_V = 0.45$ for vegetative areas

I_{10} = 1.70 inches/hour (15 minutes)
I_{100} = 2.42 inches/hour (15 minutes)

Factor K is based on an average rainfall of 40" per year, K = 1.35

Drainage improvements will consist of installing two (2) culverts along the driveway, one (1) culvert beyond the parking areas, and a series of storm drains at the winery . The first culvert will be at the new entrance at River Road. The second culvert will be further down the driveway to replace the existing culvert. The third culvert will be beyond the parking area.

The majority of the watersheds that contribute to the culverts are east of River Road. These areas are steep on average but consist mostly of native vegetation and vineyards.

As a conservative estimate of the run-off, a C value of 0.45 will be used for both watersheds.

Although the Water Agency requires an initial drainage area of less than 2 acres, the following hydrology analysis uses the entire watershed into each culvert. Since the time of travel is neglected, this method of using the whole watershed will produce conservative results.

A hydrology map of the winery site is shown on Sheet HD1. The hydrology of the area east of River Road is shown on HD2.

CULVERT #1

Check Flow into Culvert #1 (see attached hydrology maps):

Zone #1:
Area = 16.5 ac
Q_{10} = 0.45 x 1.70 x 16.5 x 1.35 = 17.0 cfs
Q_{100} = 0.45 x 2.42 x 16.5 x 1.35 = 24.3 cfs

The attached culvert report shows that a 30" diameter pipe is sufficient. **OK**

CULVERT #2

Check Flow into Culvert #2 (see attached hydrology maps):

Zone #2:
Area = 18.5 ac
Q_{10} = 0.45 x 1.70 x 18.5 x 1.35 = 19.1 cfs
Q_{100} = 0.45 x 2.42 x 18.5 x 1.35 = 27.2 cfs

The attached culvert report shows that a 30" diameter pipe is sufficient. **OK**

CULVERT #3

Check Flow into Culvert #3 (see attached hydrology maps):

Zone #3:
Area = 0.27 ac
Q_{10} = 0.45 x 1.70 x 0.27 x 1.35 = 0.42 cfs
Q_{100} = 0.45 x 2.42 x 0.27 x 1.35 = 0.60 cfs

The attached culvert report shows that a 8" diameter pipe is sufficient.
A 12" diameter pipe is used for the plans, but the option of using 8" is acceptable. **OK**

Winery Storm Drains:

The storm drain system at the winery is very straight-forward. The roof areas will be collected in roof gutters and downspouts. The downspouts will be connected to 4" roof leaders that will discharge to DI's near the northerly half of the building, or will discharge directly to riprap outfall away from the planned improvements.

Tributary #1:

Tributary #1 consists of the northerly half of the improvements and includes the landscape areas at the front of the tasting room. As a conservative measure, a run-off coefficient of 0.90 is used. Stormwater from Zone #4 enters D.I. #1 where it is conveyed via an 8" pipe to D.I. #2 at Zone #5. D.I. #2 collects surface stormwater and roof leaders. The combined stormwater from Zones #4 and #5 is conveyed via an 8" pipe to an outfall at the easterly side of the improvements.

Areas and flow calculations are shown on Sheet HD1

The 100-year storm event is used in AutoCAD Civil 3D's Hydraflow Storm Sewer software to design and analyze Tributary #1's pipe system. A starting HGL = 277.00 is used to model the flood condition of a 100-year storm.

The results are attached. The results show that the storm drain system contains the flow from a 100-year event.

Tributary #2:

Tributary #2 consists of a portion of the easterly side of the winery building and a small landscape area on the easterly side of the tasting room. As a conservative measure, a run-off coefficient of 0.90 is used. Stormwater from Zone #6 enters D.I. #3, where it is conveyed via an 8" pipe to an outfall on the easterly side of the planned improvements.

Zone #6:

Area = 0.08 ac

Q_{10} = 0.90 x 1.70 x 0.08 x 1.35 = 0.17 cfs

Q_{100} = 0.90 x 2.42 x 0.08 x 1.35 = 0.24 cfs

The storm drain pipe is calculated using AutoCAD Civil 3D's Hydraflow Express. The results are attached. The attached results show that an 8" storm drain pipe is acceptable.

Culvert Report

Field Winery - Culvert #1

Invert Elev Dn (ft)	= 272.50
Pipe Length (ft)	= 67.00
Slope (%)	= 0.75
Invert Elev Up (ft)	= 273.00
Rise (in)	= 30.0
Shape	= Cir
Span (in)	= 30.0
No. Barrels	= 1
n-Value	= 0.012
Inlet Edge	= Mitered
Coeff. K,M,c,Y,k	= 0.021, 1.33, 0.0463, 0.75, 0.7

Embankment

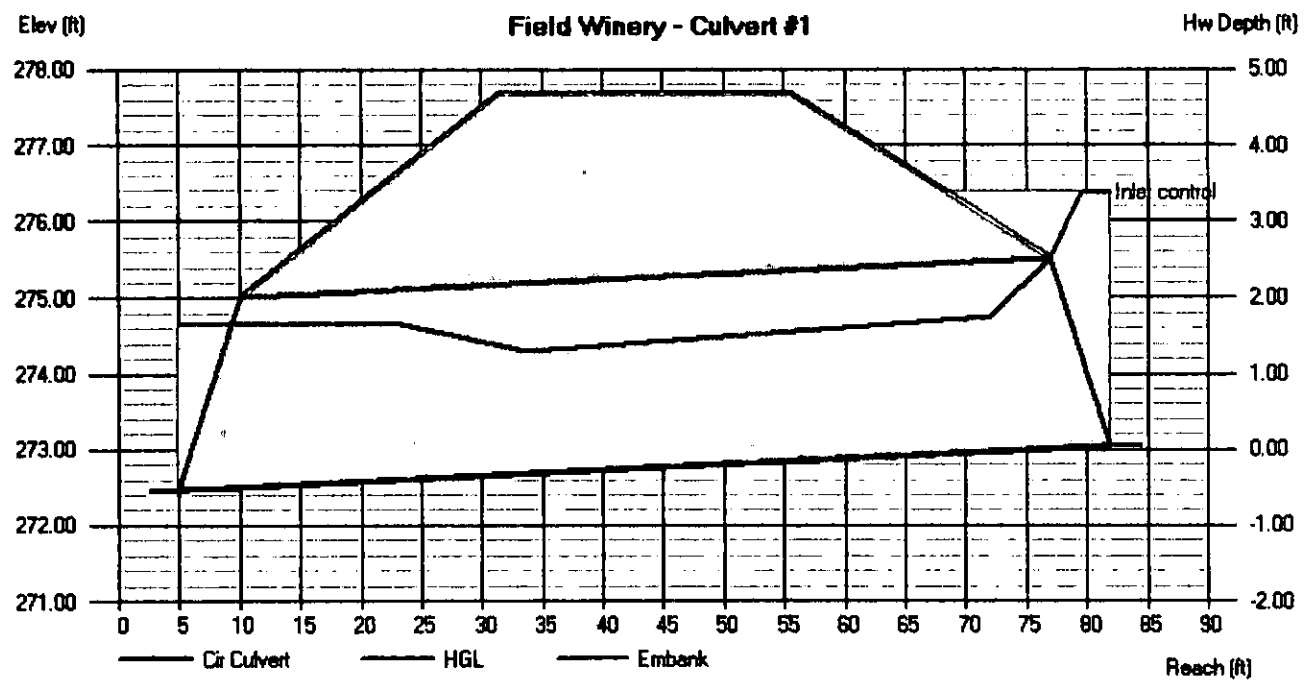
Top Elevation (ft)	= 277.70
Top Width (ft)	= 24.00
Crest Width (ft)	= 24.00

Calculations

Qmin (cfs)	= 16.00
Qmax (cfs)	= 28.00
Tailwater Elev (ft)	= (dc+D)/2

Highlighted

Qtotal (cfs)	= 28.00
Qpipe (cfs)	= 28.00
Qovertop (cfs)	= 0.00
Veloc Dn (ft/s)	= 6.22
Veloc Up (ft/s)	= 7.36
HGL Dn (ft)	= 274.65
HGL Up (ft)	= 274.81
Hw Elev (ft)	= 276.37
Hw/D (ft)	= 1.35
Flow Regime	= Inlet Control



Q			Veloc		Depth		HGL	
Total	Pipe	Over	Dn	Up	Dn	Up	Dn	Up
(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(in)	(in)	(ft)	(ft)
16.00	16.00	0.00	3.94	5.86	23.13	16.34	274.43	274.36
18.00	18.00	0.00	4.34	6.14	23.65	17.30	274.47	274.44
20.00	20.00	0.00	4.73	6.39	24.13	18.26	274.51	274.52
22.00	22.00	0.00	5.11	6.63	24.60	19.21	274.55	274.60
24.00	24.00	0.00	5.48	6.88	25.03	20.06	274.59	274.67
26.00	26.00	0.00	5.86	7.12	25.45	20.90	274.62	274.74
28.00	28.00	0.00	6.22	7.36	25.86	21.72	274.65	274.81

Culvert Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. Monday, Mar 22 2010

Field Winery - Culvert #2

Invert Elev Dn (ft)	= 271.00
Pipe Length (ft)	= 60.00
Slope (%)	= 0.50
Invert Elev Up (ft)	= 271.30
Rise (in)	= 30.0
Shape	= Cir
Span (in)	= 30.0
No. Barrels	= 1
n-Value	= 0.012
Inlet Edge	= Projecting
Coeff. K,M,c,Y,k	= 0.0045, 2, 0.0317, 0.69, 0.5

Embankment

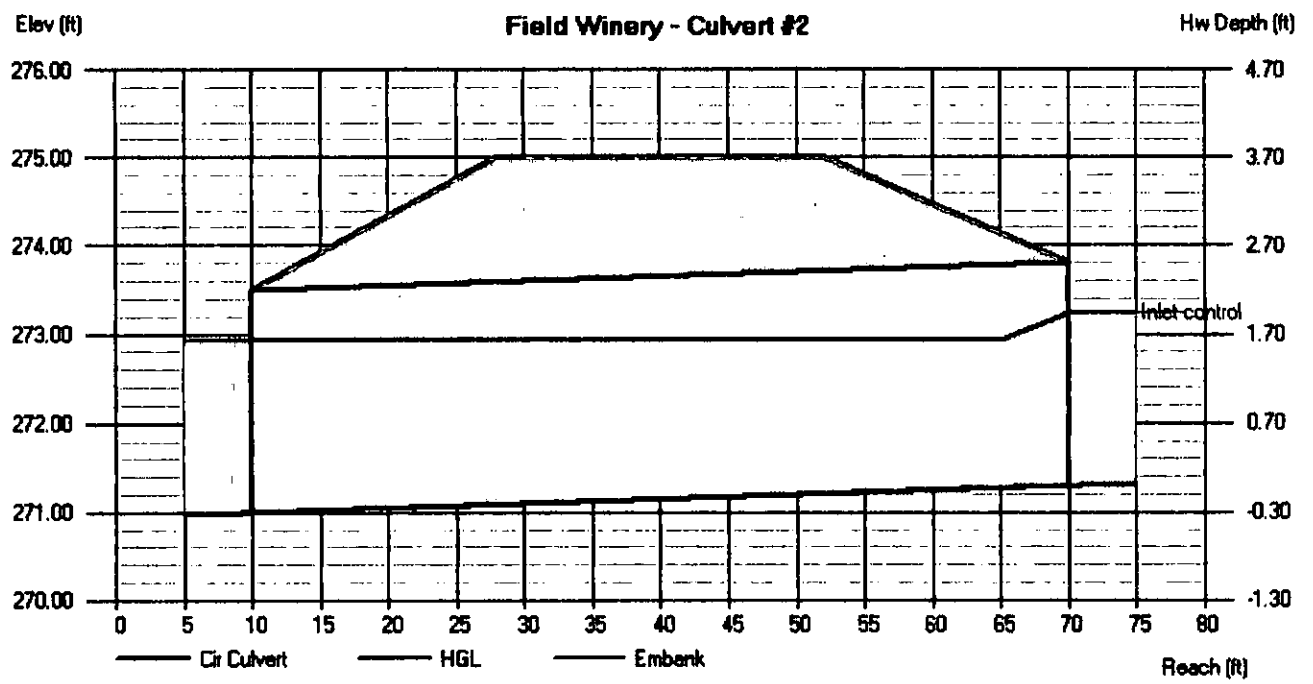
Top Elevation (ft)	= 275.00
Top Width (ft)	= 24.00
Crest Width (ft)	= 24.00

Calculations

Qmin (cfs)	= 16.00
Qmax (cfs)	= 28.00
Tailwater Elev (ft)	= (dc+D)/2

Highlighted

Qtotal (cfs)	= 16.00
Qpipe (cfs)	= 16.00
Qovertop (cfs)	= 0.00
Veloc Dn (ft/s)	= 3.94
Veloc Up (ft/s)	= 4.70
HGL Dn (ft)	= 272.93
HGL Up (ft)	= 272.94
Hw Elev (ft)	= 273.24
Hw/D (ft)	= 0.78
Flow Regime	= Inlet Control



Q			Veloc		Depth		HGL	
Total	Pipe	Over	Dn	Up	Dn	Up	Dn	Up
(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(in)	(in)	(ft)	(ft)
16.00	16.00	0.00	3.94	4.70	23.13	19.64	272.93	272.94
18.00	18.00	0.00	4.34	5.10	23.65	20.27	272.97	272.99
20.00	20.00	0.00	4.73	5.48	24.13	20.90	273.01	273.04
22.00	22.00	0.00	5.11	5.80	24.60	21.65	273.05	273.10
24.00	24.00	0.00	5.48	6.11	25.03	22.38	273.09	273.16
26.00	26.00	0.00	5.86	6.38	25.45	23.21	273.12	273.23
28.00	28.00	0.00	6.22	6.63	25.86	24.07	273.15	273.31

Culvert Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. Monday, Mar 22 2010

Field Winery - Culvert #3

Invert Elev Dn (ft)	=	273.75
Pipe Length (ft)	=	50.00
Slope (%)	=	0.50
Invert Elev Up (ft)	=	274.00
Rise (in)	=	8.0
Shape	=	Cir
Span (in)	=	8.0
No. Barrels	=	1
n-Value	=	0.012
Inlet Edge	=	Mitered
Coeff. K,M,c,Y,k	=	0.021, 1.33, 0.0463, 0.75, 0.7

Embankment

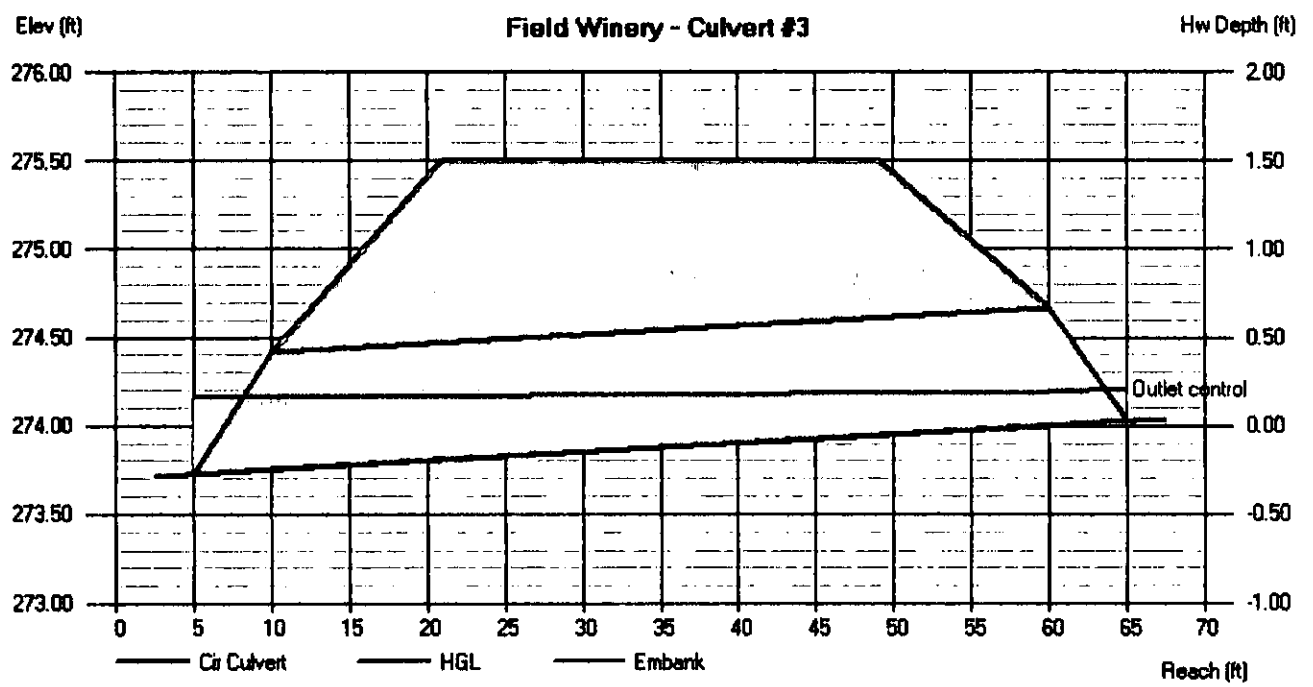
Top Elevation (ft)	=	275.50
Top Width (ft)	=	28.00
Crest Width (ft)	=	28.00

Calculations

Qmin (cfs)	=	0.10
Qmax (cfs)	=	0.71
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	0.10
Qpipe (cfs)	=	0.10
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	0.45
Veloc Up (ft/s)	=	1.25
HGL Dn (ft)	=	274.16
HGL Up (ft)	=	274.19
Hw Elev (ft)	=	274.20
Hw/D (ft)	=	0.31
Flow Regime	=	Outlet Control



Q			Veloc		Depth		HGL	
Total	Pipe	Over	Dn	Up	Dn	Up	Dn	Up
(cfs)	(cfs)	(cfs)	(ft/s)	(ft/s)	(in)	(in)	(ft)	(ft)
0.10	0.10	0.00	0.45	1.25	4.87	2.24	274.16	274.19
0.20	0.20	0.00	0.83	1.81	5.24	2.83	274.19	274.24
0.30	0.30	0.00	1.16	2.17	5.53	3.34	274.21	274.28
0.40	0.40	0.00	1.48	2.47	5.78	3.78	274.23	274.31
0.50	0.50	0.00	1.78	2.66	6.00	4.24	274.25	274.35
0.60	0.60	0.00	2.07	2.80	6.20	4.71	274.27	274.39
0.70	0.70	0.00	2.35	2.90	6.38	5.22	274.28	274.43

Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. Tuesday, Mar 23 2010

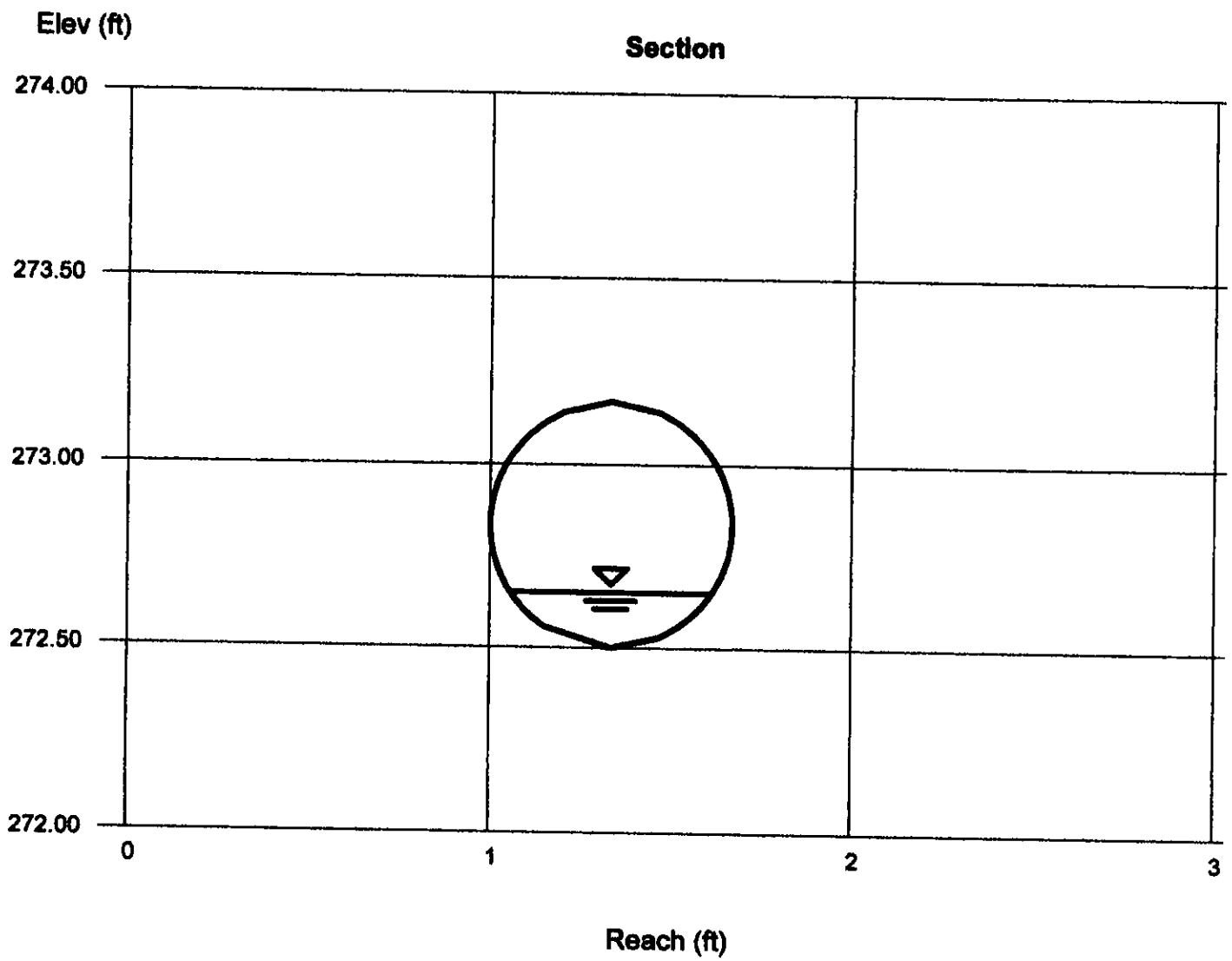
Field Winery - Storm Drain #3

Circular
Diameter (ft) = 0.67

Invert Elev (ft) = 272.50
Slope (%) = 2.70
N-Value = 0.012

Calculations
Compute by: Known Q
Known Q (cfs) = 0.24

Highlighted
Depth (ft) = 0.15
Q (cfs) = 0.240
Area (sqft) = 0.06
Velocity (ft/s) = 4.03
Wetted Perim (ft) = 0.66
Crit Depth, Yc (ft) = 0.23
Top Width (ft) = 0.56
EGL (ft) = 0.40

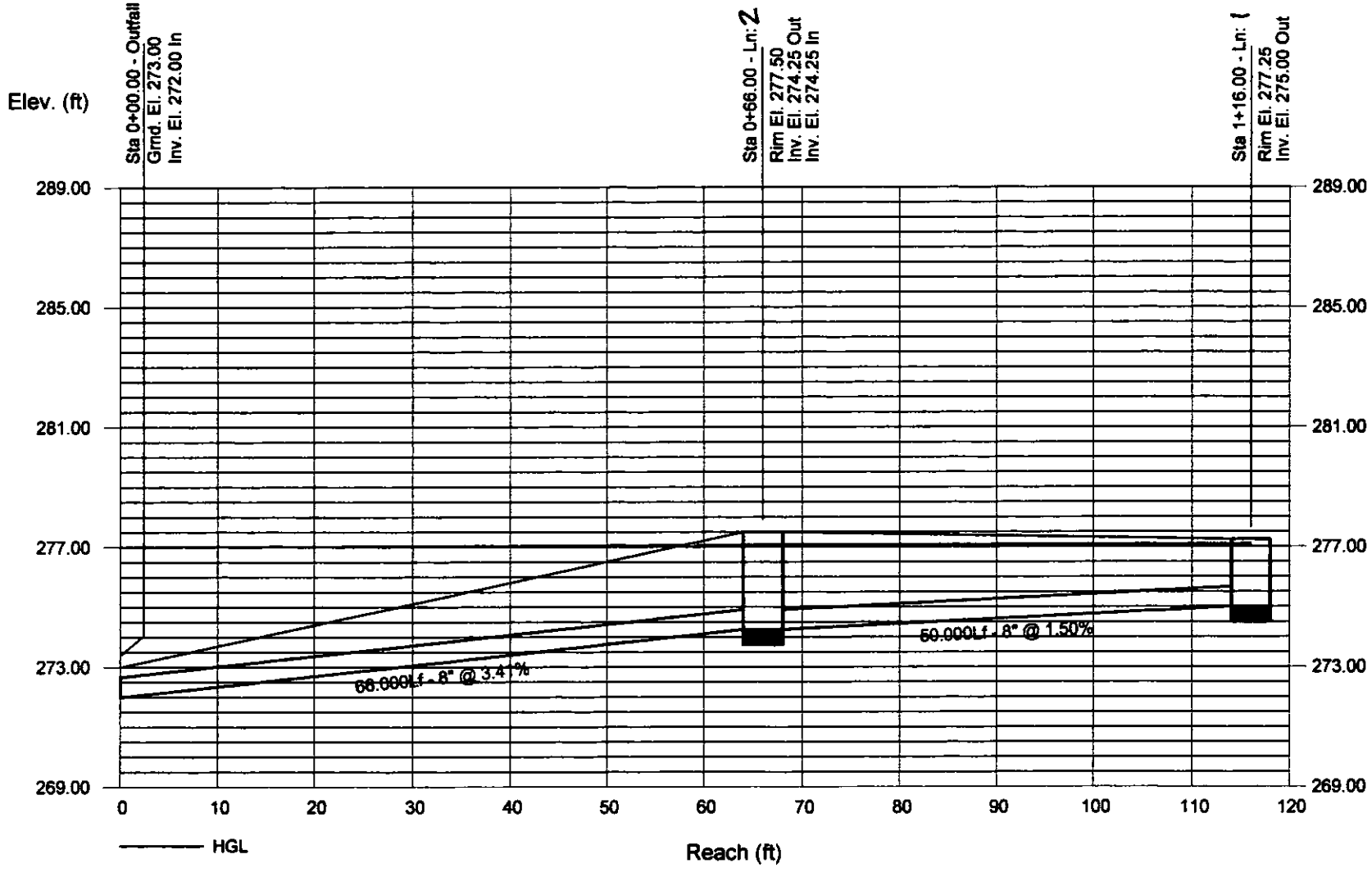


Depth	Q	Area	Veloc	Wp	Yc	TopWidth
(ft)	(cfs)	(sqft)	(ft/s)	(ft)	(ft)	(ft)
0.07	0.046	0.018	2.48	0.43	0.01	0.40
0.13	0.193	0.051	3.81	0.62	0.10	0.54
0.20	0.427	0.089	4.80	0.78	0.21	0.61
0.27	0.735	0.132	5.58	0.92	0.31	0.66
0.34	1.097	0.177	6.19	1.06	0.41	0.67
0.40	1.469	0.221	6.63	1.19	0.50	0.66
0.47	1.828	0.264	6.92	1.33	0.57	0.61
0.54	2.130	0.302	7.04	1.48	0.62	0.54
0.60	2.323	0.334	6.95	1.68	0.64	0.40
0.67	2.179	0.353	6.18	2.10	0.65	0.00

Storm Sewer Profile

TRIBUTARY #1

Proj. file: Tributary #1 - 100Year.stm



Kelder01

TRIBUTARY #1

Line No.	Capac Full (cfs)	Crit Depth (ft)	Depth Dn (ft)	Depth Up (ft)	Drng Area (ac)	Flow Rate (cfs)	Grate Area (sqft)	Gnd/Rim El Dn (ft)	Gnd/Rim El Up (ft)	HGL Dn (ft)	HGL Up (ft)	Incr CxA	Inlet ID	Invert Dn (ft)	Invert Up (ft)	Known Q (cfs)	Line ID
2	2.42	0.30	0.67	0.67	0.04	0.42	2.00	273.00	277.50	277.00	277.07	0.05		272.00	274.25	0.09	Line #2
1	1.60	0.22	0.67	0.67	0.03	0.21	2.00	277.50	277.25	277.08	277.09	0.04		274.25	275.00	0.12	Line #1

Project File: Tributary #1 - 100Year.stm | Number of lines: 2 | Date: 03-23-2010

NOTES: ** Critical depth

Kelder01

CxK K=1.35

TRIBUTARY #1

Line #	Line Length (ft)	Line Size (in)	Line Slope (%)	Line Type	n-val Pipe	Q Capt (cfs)	Runoff Coeff (C)	Tc (min)	Total Area (ac)	Total CxA	Total Runoff (cfs)	Vel Dn (ft/s)	Vel Hd Up (ft)	Vel Up (ft/s)
2	66.000	8	3.41	Cir	0.012	0.21	1.22	15.3	0.07	0.09	0.21	1.19	0.02	1.19
1	50.000	8	1.50	Cir	0.012	0.21	1.22	15.0	0.03	0.04	0.09	0.60	0.01	0.60

Project File: Tributary #1 - 100Year.stm | Number of lines: 2 | Date: 03-23-2010

NOTES: ** Critical depth