



Whitlock & Weinberger
Transportation, Inc.

490 Mendocino Avenue
Suite 201
Santa Rosa, CA 95401

voice 707.542.9500
fax 707.542.9590
web www.w-trans.com

November 29, 2011

Mr. Dan Takasugi, PE
City of Calistoga
1232 Washington Street
Calistoga, CA 94515

Focused Traffic Impact Analysis for the Brian Arden Winery

Dear Mr. Takasugi;

Whitlock & Weinberger Transportation, Inc. (W-Trans) has completed a focused traffic analysis for the proposed Brian Arden Winery to be located at 331 Silverado Trail in the City of Calistoga. Based on the information provided, including at our meeting on September 29, 2011, the issues we addressed include the project's trip generation, site access and circulation (including for large trucks and alternative modes), sight distance, and the need for turn lanes.

Project Description

The proposed project would allow for development of a 10,000 case winery in two buildings separated by a skylight-covered crush pad. One building would house the production facilities, including the barrels and fermentation tanks, while the administrative offices and tasting room would be in the other building. Participation in wine related events is also proposed. The tasting room is proposed to operate daily between 10:00 a.m. and 5:00 p.m., while winery operations would typically occur between 8:00 a.m. and 6:00 p.m. The project site would have 12 parking spaces for employees and visitors. Access to the project will be provided via an existing driveway on Silverado Trail, which currently provides access to Aubert Winery previously known as August Briggs Winery.

Existing Conditions

The project site is located along the southerly side of Silverado Trail within the City of Calistoga limits. Silverado Trail is a two-lane east-west rural arterial with no curb, gutter, or sidewalk on either side of the street; however, Class II bike lanes are provided on both sides. The posted speed limit is posted at 45 miles per hour (mph) along the project frontage and changes to 55 mph about 750 feet east of the project site's driveway at the city limits.

Trip Generation

For purposes of estimating the number of trips that a proposed use is expected to generate, *Trip Generation* by the Institute of Transportation Engineers is typically used. However, since *Trip Generation* does not contain information for wineries, W-Trans has developed a spreadsheet that covers all aspects of operation and determines trips associated with activities such as arrival of materials (fruit, barrels, etc.), shipping of products, and disposal of pomace, as well as trips made by employees, visitors and special event guests. This spreadsheet was used to determine the potential trip generation of the proposed project.

The proposed Brian Arden Winery will produce 10,000 cases of wine annually on-site. Wine production activities will include the processing, crushing and fermenting of wine as well as tasting and special events. At buildout, the winery is expected to have a total of four full-time employees for daily operations, including the tasting room. Other traffic associated with the proposed project was assumed to include an average of 42 visitors per day (a maximum of 60 daily) and approximately one truck trip per weekday (including production-related traffic, the mobile bottling line, pomace removal and deliveries). During harvest season, four additional employees would be expected to generate 12 more daily trips.

It was assumed that 75 percent of employees would generate one inbound trip during the a.m. peak hour and one outbound trip during the p.m. peak hour. Data collected by W-Trans at Sonoma County wineries was used to develop factors for winery tasting room trips made during the p.m. peak hour. Counts were collected on a driveway serving a large tasting room for one week every month for a year and indicate that 10 percent of the daily visitor trips occur during the p.m. peak hour. No factors were established for the a.m. peak hour as tasting rooms are not open and only employee trips typically occur during the a.m. peak hour.

The likely trip generation of the proposed project is shown in Table I, and includes an average of 46 daily trips, including three trips during the a.m. peak hour and seven during the p.m. peak hour.

Table I
Trip Generation Summary

Land Use	Units	Daily		AM Peak Hour				PM Peak Hour			
		Rate	Trips	Rate	Trips	In	Out	Rate	Trips	In	Out
Employees	4	3	12	0.75	3	3	0	0.75	3	0	3
Truck Traffic	n/a	n/a	1	0	0	0	0	0	0	0	0
Tasting Room Visitors	42	0.80	33	0	0	0	0	0.10	4	2	2
Total Project Trips			46		3	3	0		7	2	5

Note that while agricultural trips and event traffic are not shown in Table I, they are included in the Winery Trip Generation Form, as is harvest period information and an indication of daily trips for each month of the year. A copy of the Winery Trip Generation form is enclosed.

Special Events

Special events proposed at Brian Arden Winery include wine release and club member appreciation events. Six special events per year currently are proposed with a maximum of 50 guests per event. Using an average occupancy of 2.5 persons per vehicle, a 50-person special event would be expected to generate 40 trip ends, including 20 inbound trips at the start of the event and 20 outbound trips upon its conclusion. Additionally it is expected that there would be 10 trips associated with a staff of up five employees, though these trips would mostly occur more than an hour before and after the event. These events are infrequent and generate a fairly low volume of trips during the peak periods for traffic.

Access and Circulation

Access to the project will be provided via a new driveway connecting to an existing driveway on Silverado Trail which provides access to Aubert Winery via an existing easement. The new driveway is proposed to be 25 feet wide, which is adequate to accommodate two-way traffic.

It is understood that a new driveway for the Silver Rose Winery and Resort project is proposed on the north side of Silverado Trail approximately 200 feet west of the existing driveway that will provide access to the Brian Arden Winery. This proposed new driveway would be a secondary access as the existing main access driveway is located approximately 500 feet further west. Given that the closest driveway on Silverado Trail, either existing or proposed, will be at least 200 feet away, conflicts with the existing project driveway are expected to be minimal.

Sight Distance

Sight distance from the existing driveway on Silverado Trail was evaluated based on criterion contained in the *Highway Design Manual* published by the California Department of Transportation (Caltrans). The recommended sight distance for minor street approaches that are either a private road or a driveway is based on stopping sight distance and the approach travel speeds on the major street.

For a 45-mph design speed, stopping sight distance of at least 360 feet is needed from the existing driveway. Sight distance to the east, or right, exceeds 700 feet, which is adequate for speeds of more than 65 mph and therefore adequate for the higher approach speeds as drivers transition from the 55-mph speed zone. To the west, or left, vehicles were visible from more than 600 feet away, which is adequate for speeds of up to 60 mph. The sight distance available is adequate for speeds in excess of the posted speed limit.

Any vegetation or frontage improvements that may be installed as a component of the project should be low-lying or located back from the roadway to avoid any reduction of sight lines.

Left-Turn Lane Warrants

The need for a left-turn lane, right-turn lane or right-turn taper on Silverado Trail at the project driveway was evaluated based on criteria contained in the *Intersection Channelization Design Guide*, National Cooperative Highway Research Program (NCHRP) Report No. 279, Transportation Research Board, 1985, as well as a more recent update of the methodology developed by the Washington State Department of Transportation. The NCHRP report references a methodology developed by M. D. Harmelink that includes equations that can be applied to expected or actual traffic volumes in order to determine the need for a turn pocket based on safety issues. Based on our research and discussions with Caltrans staff, this methodology is consistent with the "Guidelines for Reconstruction of Intersections," August 1985, which is referenced in Section 405.2, Left-turn Channelization, of Caltrans' *Highway Design Manual*.

Machine count data collected for the *Terrano Napa Valley Traffic Impact Study* (W-Trans, 2007) as well as safety criteria were evaluated. Note that traffic volume comparisons have consistently indicated that 2011 volumes are either equal to or less than volumes taken prior to 2008, so it is anticipated that these 2007 volumes represent a conservative analysis. Based on machine counts taken between Thursday and Monday, March 1-5, 2007, Silverado Trail east of Brannan Street had an average weekday volume of approximately 5,070 vehicles, including 319 vehicles during the a.m. peak hour and 476 vehicles during the p.m. peak hour. Based on information previously provided by City staff, population in this area has

grown by an average of 1.35 percent per year. Using this average level, a growth factor was developed to determine future (2031) traffic volumes for a 20-year horizon from existing (2011) conditions. A growth factor of 1.38 was applied to 2007 through volumes on Silverado Trail to project 2031 conditions.

Existing peak hour trips accessing Aubert Winery, as referenced in the *Focused Traffic Analysis for the August Briggs Winery* (W-Trans, 2002), as well as the proposed trips that are expected to access Brian Arden Winery were added to future volumes as this represents a worst-case scenario. It was conservatively assumed that 75 percent of inbound peak hour traffic accessing either winery site would do so via a westbound left turn movement from Silverado Trail. Even with these conservative assumptions, neither a left-turn, right-turn or right-turn taper lane is warranted on Silverado Trail at the existing driveway.

Internal Circulation

The ability for drivers of large vehicles to maneuver through the site was examined using the AutoTURN analysis software to simulate vehicle turning movements. Through discussions with the applicant, it is understood that the largest truck expected to access the site would be a bottling line truck. A heavy-duty 10-wheel truck was used to simulate the bottling line truck expected to be used. Additionally, maneuverability was examined for the City of Calistoga Fire Department's largest fire apparatus.

Based on the AutoTURN analysis it was determined that both fire trucks and bottling line trucks would be able to enter and exit the site without the need for widening at the existing or proposed driveway locations. On-site roadways are also expected to be sufficient to accommodate the circulation of the evaluated trucks. Drivers of these larger trucks will need to utilize the courtyard for backing up to perform a three-point turn to complete the full circuit. Figures of the site plan showing maneuvering of the evaluated trucks are enclosed.

Although a right-turn taper lane is not warranted on Silverado Trail, the trucks that are proposed to access the site will need at least a 20-foot radius to adequately perform right-turn movements in and out of the site. The paved areas located on both sides of the existing driveway currently provide adequate space for the expected trucks to access the site. Therefore, turns can be made without impacting the existing power pole and sign located on the east side of the driveway, as well as the utility pedestal located to the west.

It is important to note that the maneuverability of a larger bottling line truck (CA Legal-50) was also evaluated, and it was determined that significant modifications to the existing access driveway as well as throughout the proposed project site would be needed to adequately accommodate these larger trucks, so use of smaller trucks such as the one evaluated is recommended.

Parking

Daily Operations

Assuming that each employee drives to work in their own vehicle, a total of four spaces would be needed to accommodate the proposed employees associated with daily winery and tasting room operations. Data collected by W-Trans to develop winery tasting room rates was also used to develop the parking demand for the project. Based on this information, it was assumed that an average of 25 percent of the 17 daily vehicles associated with the tasting room visitors, or five vehicles, would be

parked on-site during any single hour; therefore, a maximum of nine spaces might be needed to accommodate the typical daily parking demand.

The project as proposed provides a total of 12 parking spaces, which would accommodate the typical guest and employee parking demand with a surplus of three spaces.

Special Events

A maximum-sized special event with 50 guests would be expected to generate need for 20 parking spaces, plus an additional five spaces for employees for a combined total of 25 parking spaces. The 12 permanent on-site parking spaces would not be able to accommodate the demand for event parking. It is our understanding that the unpaved area between the proposed vineyard and north of the proposed driveway will be available for valet parking during a special event. It is anticipated that the expected deficiency in the on-site parking supply for a maximum-sized event could be accommodated within this overflow parking area.

Alternative Modes of Transportation

There are no sidewalks in the immediate vicinity of the project, and installation of sidewalks along the project frontage is not proposed. Given the presence of a wide paved shoulder as well as a paved shoulder on the site's frontage, there is adequate clear space for pedestrian access.

Class II bicycle lanes are provided along Silverado Trail in the vicinity of the project. Bicycle racks should be provided near the tasting room to accommodate bicyclists.

Conclusions and Recommendations

- The proposed project is expected to generate an average of 46 new daily vehicle trips, including three trips during the a.m. peak hour and seven trips during the p.m. peak hour.
- Six special events are proposed annually, but since the events are infrequent and fairly small in size, they are expected to result in minimal traffic impact.
- Sight distance along Silverado Trail is adequate for speeds in excess of the posted speed limit. To prevent possible obstruction of clear sight lines, it is recommended that any vegetation or frontage improvements that may be installed as a component of the project should be low-lying or located back from the roadway.
- It is expected that the proposed site configuration will accommodate the City's largest fire truck as well as the expected heavy-duty 10-wheel bottling line truck. Larger trucks will not be able to make the turns into and out of the site, so their use is not recommended.
- Installation of a left-turn lane on Silverado Trail at the existing driveway is not warranted and is therefore not recommended.
- The proposed parking supply of 12 spaces will accommodate the anticipated nine space peak demand for employees and daily visitors.

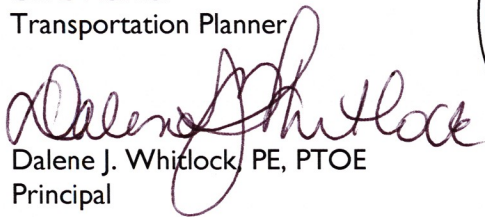
- During maximum sized special events, the proposed parking supply would be inadequate. During these maximum sized special events, valet parking should be provided using the unpaved area between the proposed vineyard and the driveway.
- There are no sidewalks on Silverado Trail along the project frontage; however, this is consistent with the rural nature of the area.
- Silverado Trail has bicycle lanes in both directions which will provide bicycle access to the proposed project.
- It is recommended that racks be provided near the proposed winery tasting room to accommodate bicycle parking.

Thank you for allowing W-Trans to provide these services. Please feel free to call if you have any questions.

Sincerely,



Chris Helmer
Transportation Planner



Dalene J. Whitlock, PE, PTOE
Principal



DJW/ch/CAL033.L2

Enclosure: Winery Trip Generation Form
Left Turn Lane Warrants
Vehicle Maneuvering Drawings

Winery Trip Generation

Winery: Brian Arden Winery
 Location: 331 Silverado Trail, Calistoga
 Annual Full Production: 10000 cases

WINERY OPERATIONS

Employee traffic using passenger vehicles, in average ADT

Item Description	Employees				Trips			
	Existing	Proposed (year round)	Proposed (harvest period)	Proposed (bottling period)	Existing	Proposed (year round)	Proposed (harvest period)	Proposed (bottling period)
Winery Production	0	0	4	--	0	0	12	--
Cellar / Storage	0	1	1	--	0	3	3	--
Administrative	0	1	1	--	0	3	3	--
Sales	0	0	0	--	0	0	0	--
Bottling	0	0	--	4	0	0	--	12
Other staff (describe):					0	0	0	0
Totals	0	2	6	4	0	6	18	12

Truck traffic associated with winery operations (average ADT)

Item Description	Existing	Proposed
Grape Importation Truck loads per year: 19; 12 truck(s) at 10 tons/truck; and 7 truck(s) at 4 tons/truck Dates of Activity: September through October	0.00	0.14
Juice Importation Truck loads per year: None Dates of Activity:	0.00	0.00
Juice/Fruit Exportation Truck loads per year: None Dates of Activity:	0.00	0.00
Pomace Disposal Truck loads per year: 0; and 0 truck(s) at 3 tons/truck Dates of Activity: October through November Disposed:	0.00	0.00
Bottle Delivery Truck loads per year: 0 Dates of Activity: February through March	0.00	0.00
Barrel Delivery Truck loads per year: 3 truck(s) at 50 barrels/truck Dates of Activity: September through October	0.00	0.02
Finished Wine Transportation to storage/sales Truck loads per year: 0 Dates of Activity: February through March	0.00	0.00
Less Backhauls Truck loads per year: 0 Dates of Activity:	0.00	0.00
Miscellaneous trips Truck loads per year: 142 trucks Dates of Activity: January through December	0.00	1.08
Totals	0.00	1.24

VINEYARD OPERATIONS

Employee trips associated with vineyard operations (in average ADT)

Item Description	Employees		Trips	
	Existing	Proposed	Existing	Proposed
Vineyard Maintenance: Year Round	0	0	0	0
Vineyard Maintenance: Peak Season	0	2	0	1
Totals	0	2	0	1

Winery Trip Generation

TASTING ROOM OPERATIONS

Item Description	Persons		Trips	
	Existing	Proposed	Existing	Proposed
Average Tasting Room Visitors	0	42	0	33
Tasting Room Employees	0	2	0	6
Totals	0	44	0	39

	Tasting Room		Production	
	Existing	Proposed	Existing	Proposed
Months of Operation	N/A	Year Round	N/A	Sep - Oct
Days of Operation - Non-Harvest Season	N/A	Daily	N/A	Mon - Fri
Days of Operation - Harvest Season	N/A	Daily	N/A	Mon - Fri
Hours of Operation - Non-Harvest Season	N/A	10am - 5pm	N/A	8am - 6pm
Hours of Operation - Harvest Season	N/A	10am - 5pm	N/A	7am - 6pm

MISCELLANEOUS OTHER TRAFFIC GENERATORS

Item Description	Existing	Proposed
Event Traffic		
Wine Release Events & Club Member Appreciation Events	0	0
Other Trips (If Applicable)		
None		
Totals	0	0

SUMMARY (During Non-Harvest Period)

Item Description	Existing	Proposed
Winery Operations (employees)	0	6
Winery Operations (truck traffic)	0	1
Vineyard Operations (employees)	0	1
Tasting Room Traffic (employees and visitors)	0	39
Event Traffic (employee and visitors)	0	0
Miscellaneous other traffic generators	0	0
Totals	0	47

Variation in ADT during the course of a typical full production year (Proposed Trips)

Month	January	February	March	April	May	June
Total Trips	37	39	43	46	49	51

Month	July	August	September	October	November	December
Total Trips	61	87	79	80	44	38

Notes:

Employees - Assume 3 ADT per employee

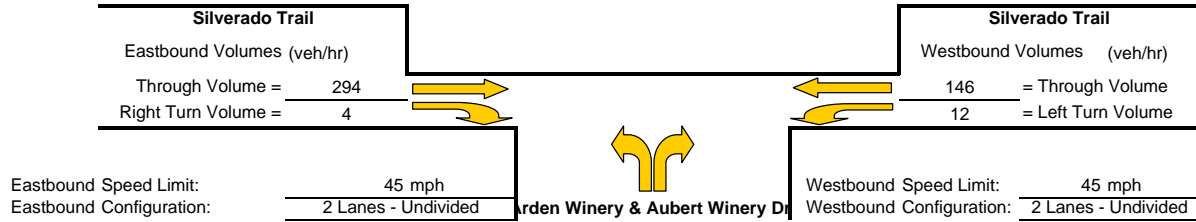
Visitors - Assume 2.5 person per vehicle occupancy

Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: Silverado Trail at Brian Arden Winery & Aubert Winery Driveway
 Study Scenario: Future AM Peak Hour plus Project

Direction of Analysis Street: East/West

Cross Street Intersects: From the South



Eastbound Right Turn Lane Warrants

1. Check for right turn volume criteria

NOT WARRANTED Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	298

If $AV < Va$ then warrant is met -

Right Turn Lane Warranted: NO

Eastbound Right Turn Taper Warrants (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

NOT WARRANTED - Less than 20 vehicles

2. Check advance volume threshold criteria for taper

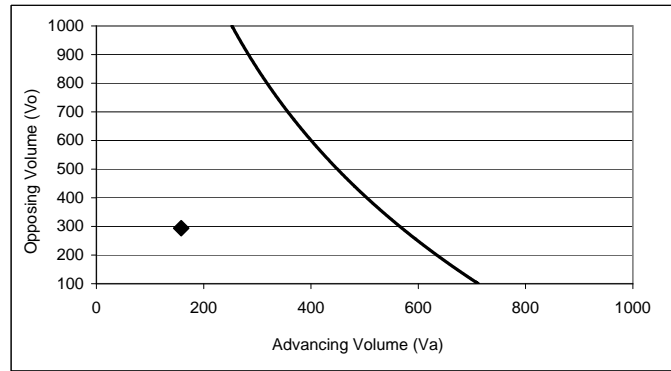
Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	298

If $AV < Va$ then warrant is met -

Right Turn Taper Warranted: NO

Westbound Left Turn Lane Warrants

Percentage Left Turns %lt 7.6 %
 Advancing Volume Threshold AV 570 veh/hr
 If $AV < Va$ then warrant is met



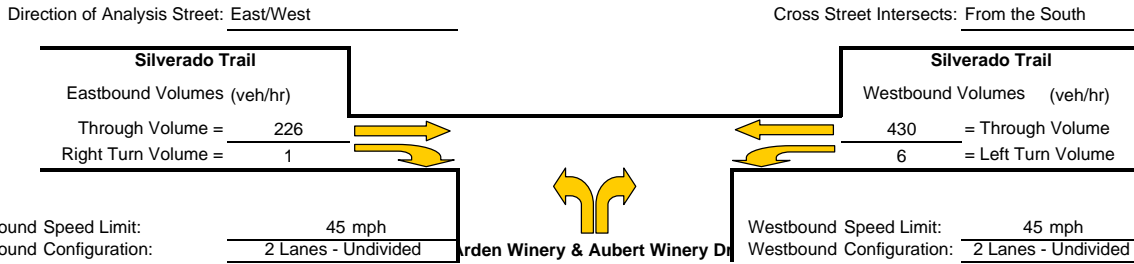
◆ Study Intersection
 — Two lane roadway warrant threshold for: 45 mph
 Turn lane warranted if point falls to right of warrant threshold line

Left Turn Lane Warranted: NO

Methodology based on Washington State Transportation Center Research Report *Method For Prioritizing Intersection Improvements*, January 1997.
 The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.
 The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, and modified by Kikuchi and Chakroorty in 1991.

Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: Silverado Trail at Brian Arden Winery & Aubert Winery Driveway
 Study Scenario: Future PM Peak Hour plus Project



Eastbound Right Turn Lane Warrants

1. Check for right turn volume criteria

NOT WARRANTED Less than 40 vehicles

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold AV = -
 Advancing Volume Va = 227
 If $AV < Va$ then warrant is met -

Right Turn Lane Warranted: NO

Eastbound Right Turn Taper Warrants

(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

NOT WARRANTED - Less than 20 vehicles

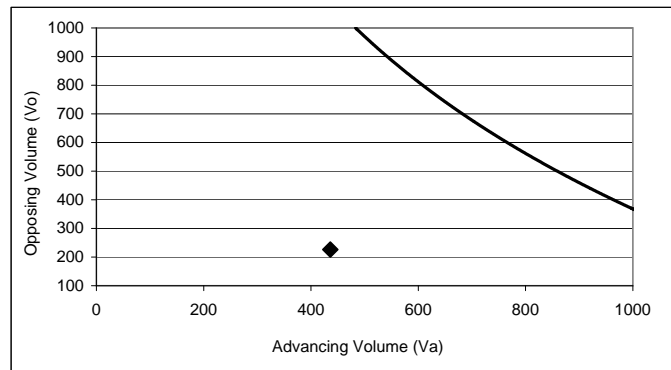
2. Check advance volume threshold criteria for taper

Advancing Volume Threshold AV = -
 Advancing Volume Va = 227
 If $AV < Va$ then warrant is met -

Right Turn Taper Warranted: NO

Westbound Left Turn Lane Warrants

Percentage Left Turns %lt 1.4 %
 Advancing Volume Threshold AV 1178 veh/hr
 If $AV < Va$ then warrant is met



◆ Study Intersection

Two lane roadway warrant threshold for: 45 mph

Turn lane warranted if point falls to right of warrant threshold line

Left Turn Lane Warranted: NO

Methodology based on Washington State Transportation Center Research Report *Method For Prioritizing Intersection Improvements*, January 1997.

The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.

The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, and modified by Kikuchi and Chakroorty in 1991.

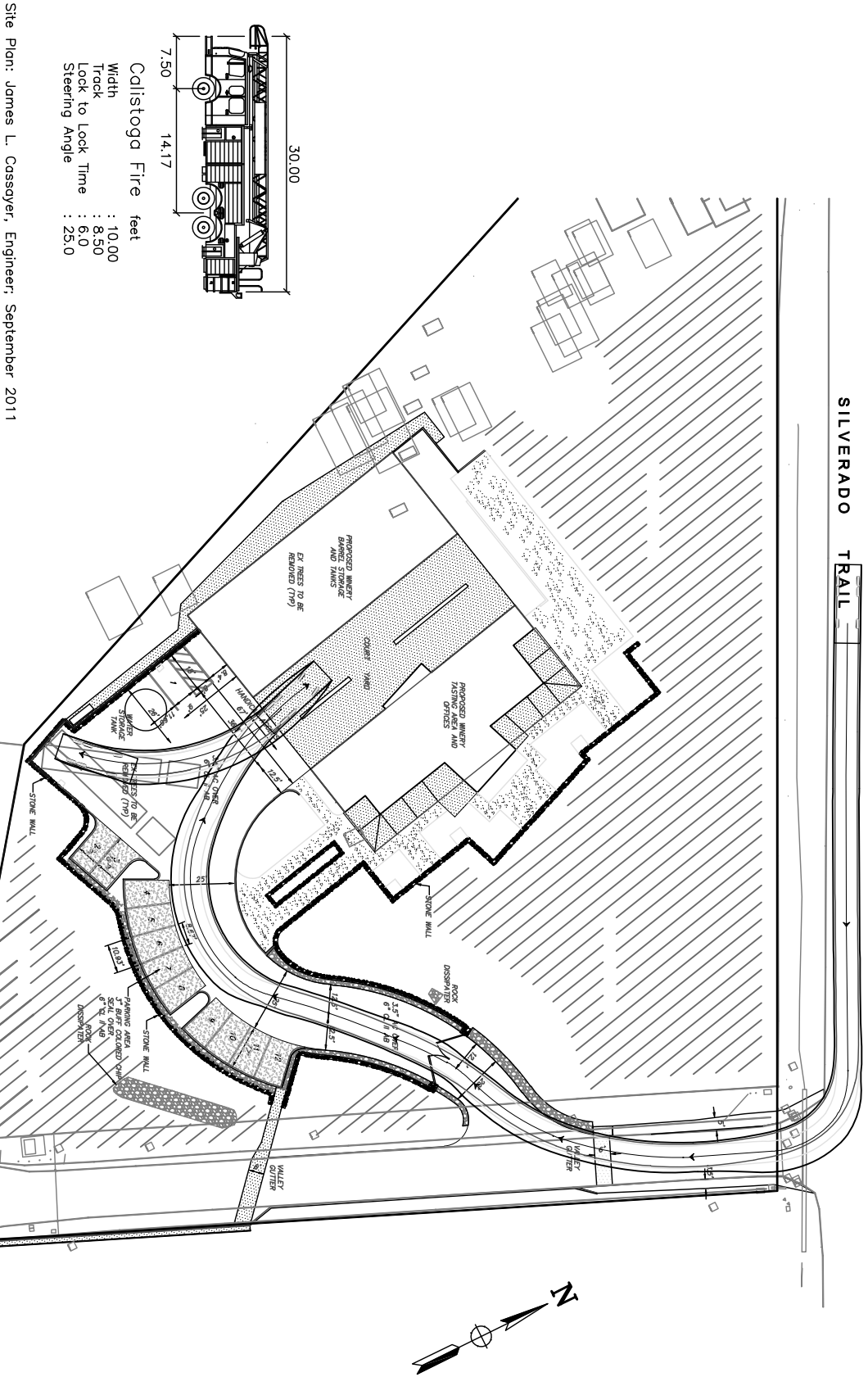


**Whitlock & Weinberger
Transportation, Inc**

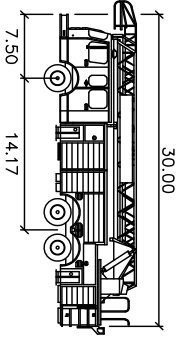
490 Mendocino Ave, Suite 201
Santa Rosa, CA
(707)542-9500 Fax: (707)542-9590

Brian Arden Winery

Truck Turning Exhibit
Entering Fire Truck



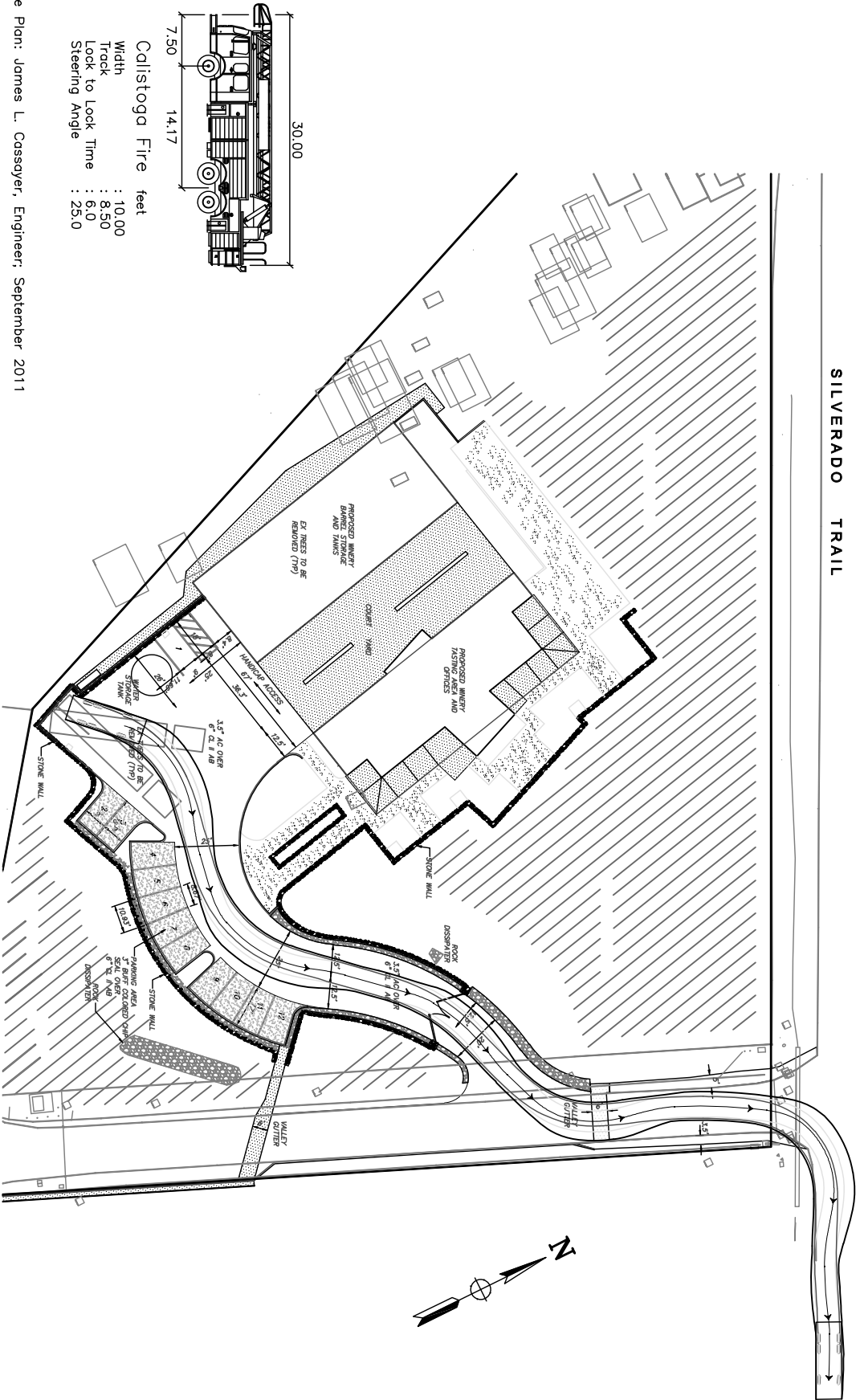
Calistoga Fire feet
Width : 10.00
Track : 8.50
Lock to Lock Time : 6.0
Steering Angle : 25.0



Site Plan: James L. Cassoyer, Engineer; September 2011

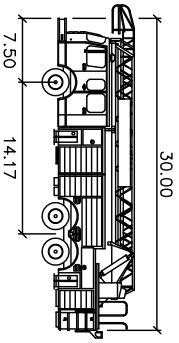
DRAWN:	TDH	SCALE:	None
DESIGN:	TDH	DATE:	Nov 2011
SHEET:	1 of 2	JOB NO.:	CAL033
SHEETS			

SILVERADO TRAIL



Site Plan: James L. Cassoyer, Engineer; September 2011

Calistoga Fire feet
 Width : 10.00
 Track : 8.50
 Lock to Lock Time : 6.0
 Steering Angle : 25.0



Whitlock & Weinberger
 Transportation, Inc

490 Mendocino Ave, Suite 201
 Santa Rosa, CA
 (707)542-9500 Fax: (707)542-9590

Brian Arden Winery

Truck Turning Exhibit
 Exiting Fire Truck

DRAWN:	TDH	SCALE:	None
DESIGN:	TDH	DATE:	Nov 2011
SHEET:	1 of 2	JOB NO.:	CAL033
SHEETS			

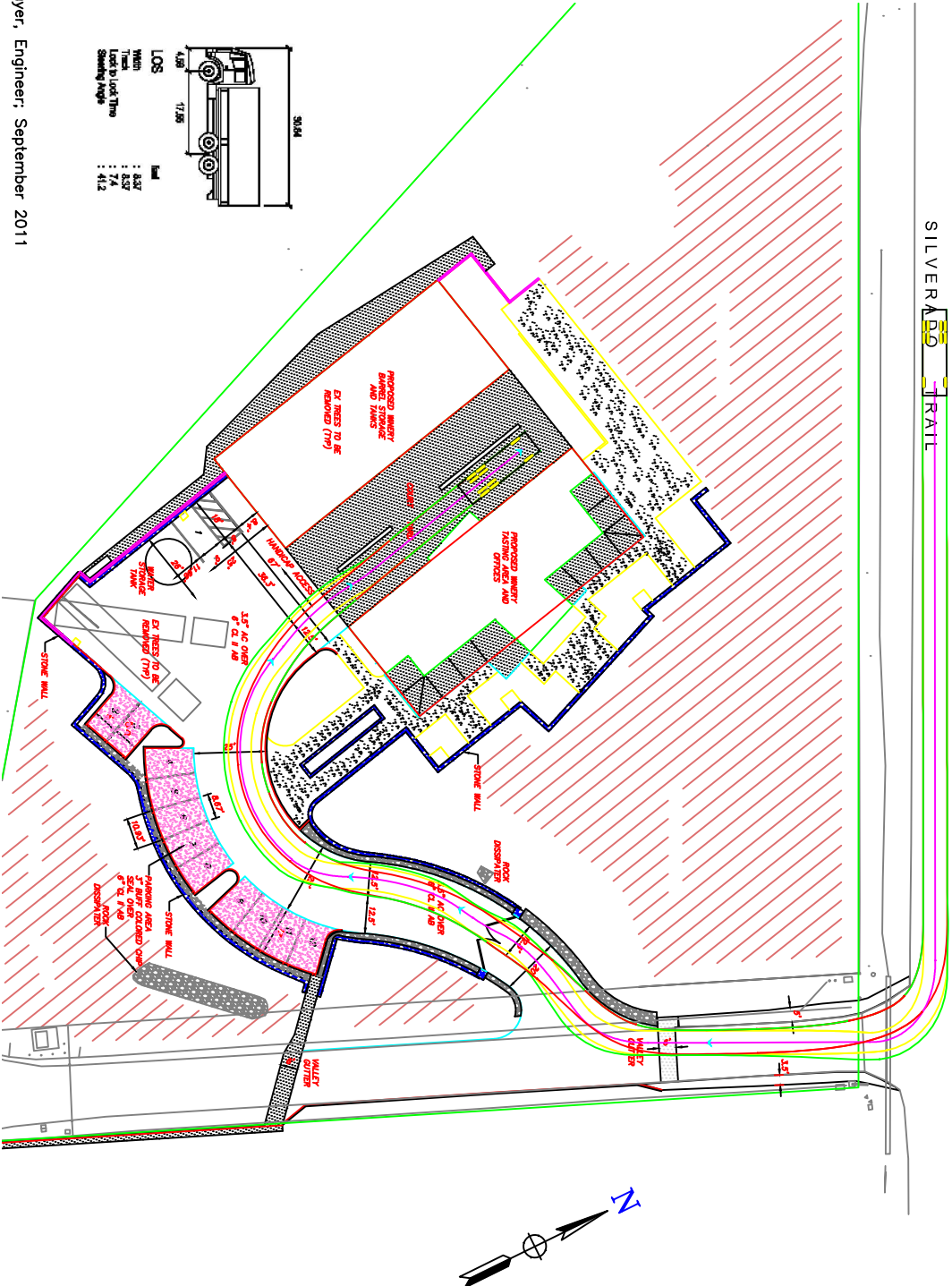
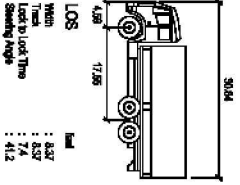
Site Plan: James L. Cassoyer, Engineer; September 2011



**Whitlock & Weinberger
Transportation, Inc**
490 Mendocino Ave, Suite 201
Santa Rosa, CA
(707)542-9500 Fax: (707)542-9590

Brian Arden Winery

Truck Turning Exhibit
Entering Bottling Truck (HD 30)



SILVERADO TRAIL

DRAWN:	TDH	SCALE:	None
DESIGN:	TDH	DATE:	NOV 2011
SHEET:	3 of 4	JOB NO.:	CA1033
SHEETS			

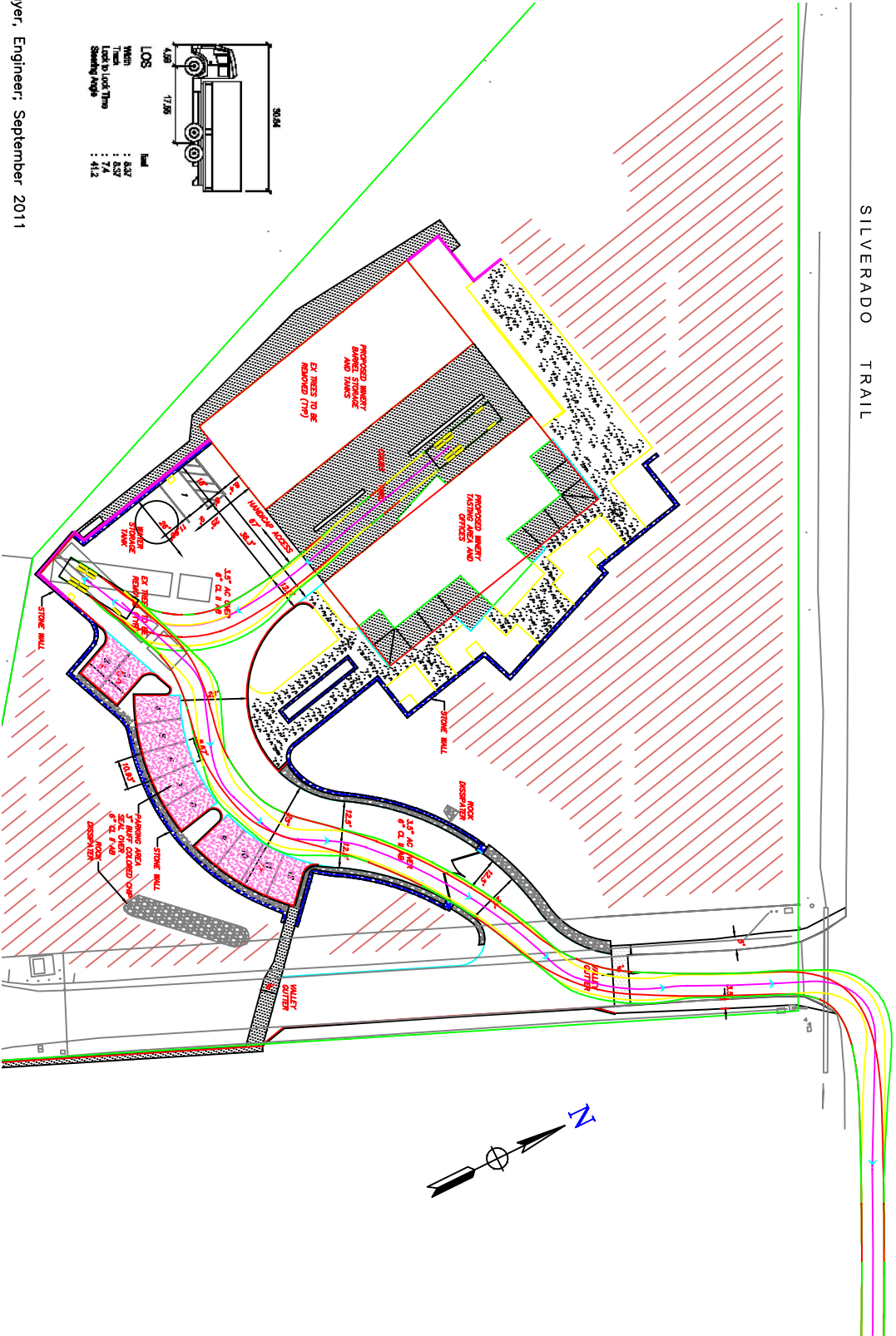
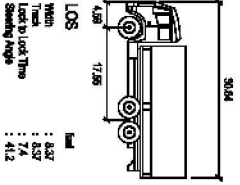
Site Plan: James L. Cassoyer, Engineer; September 2011



**Whitlock & Weinberger
Transportation, Inc**
490 Mendocino Ave, Suite 201
Santa Rosa, CA
(707)542-9500 Fax: (707)542-9590

Brian Arden Winery

Truck Turning Exhibit
Exiting Bottling Truck (HD 30)



SILVERADO TRAIL

DRAWN:	TDH	SCALE:	None
DESIGN:	TDH	DATE:	NOV 2011
SHEET	4 of 4	JOB NO.	CA1033
SHEETS			