DEPARTMENT OF FORESTRY AND FIRE PROTECTION
NORTHERN REGION HEADQUARTERS - SANTA ROSA
135 Ridgway Avenue
Santa Rosa, CA, 95401
(707) 576-2959
Website: www.fire.ca.gov

August 23, 2019

Hamey Woods
Nadia Hamey
267 Sunlet Lane
Santa Cruz, CA 95060

Nonindustrial Timber Management Plan
No: 1-07NTMP-020
Amd: 1-07NTMP-020-DEV6
SWANTON PACIFIC RANCH NTMP

Letter of Conformance

The Director of the Department of Forestry and Fire Protection (CAL FIRE) finds that the above referenced Nonindustrial Timber Management Plan (NTMP) Substantial Deviation (Major Amendment) conforms with the Rules and Regulations of the Board of Forestry and Fire Protection pursuant to the provisions of the Z'Berg-Nejedly Forest Practice Act of 1973. This Substantial Deviation is now considered part of the NTMP.

Final compliance with all provisions of the Forest Practice Act and Rules will be determined by future inspections.

Sincerely,

Dominik Schwab, RPF #2823
Resource Manager – Coast

cc: Unit, File, PS/TLO/TO, BOE
To view Harvesting Documents, please visit https://caltreesplans.resources.ca.gov/caltrees/

OFFICIAL NOTICE OF CONFORMANCE
For Timber Harvesting Plans (THPs), Non-Industrial Timber Management Plans (NTMPs), and Substantial Deviation to THPs and NTMPs
NORTHERN REGION HEADQUARTERS - SANTA ROSA
DATE: 8/23/2019

The harvesting plans listed below have been found by the Director of CAL FIRE to be in conformance with the Forest Practice Act and the regulations of the Board of Forestry

Plan number County Cost	Plan Type	Landowner and plan Submitter (SUB)	RPF	Acres	Legal Description/Watershed	Description
1-07NTMP-020-DEV6 SANTA CRUZ 37 cents/page	Substantial Deviation	STEVE SPAFFORD, STUART SPAFFORD, SUSAN SPAFFORD ENGLAND, CAL POLY CORPORATION SUB: STEVE SPAFFORD, STUART SPAFFORD, SUSAN SPAFFORD ENGLAND, CAL POLY CORPORATION	NADIA HAMEY, Hamey Woods	698	MDBM: T10S R03W S16 , MDBM: T10S R03W S17 , MDBM: T10S R03W S8 , MDBM: T10S R03W S9 Watershed: Big Creek, Little Creek	Add 900 feet of permanent road reconstruction. 1-07NTMP-020

The filed plan and associated review documents may be viewed at either the appropriate field office (see below), at the Review Team Office (see above) or through the internet at: https://caltreesplans.resources.ca.gov/CalTREES/. All documents on the site are in PDF format and are readable via the free reader from Adobe Acrobat: that can be downloaded from: http://www.adobe.com/. To purchase a photocopy by mail please contact the Review Team Office above for number of pages and pricing.

This notice is posted in compliance with Section 1037.1 of Title 14 of the California Code of Regulations.

TO POSTING AGENCY: Please post this Notice at the place where official notices concerning Environmental Quality Act compliance are usually posted. If there are questions, contact the Review Team Office listed above.

cc: CC: SAC; BOE, RPF, TO/TLO/PS(4), UNIT, CC, POST, FILE

Posting Period is 30 Days

DEPARTMENT OF FORESTRY AND FIRE PROTECTION
135 Ridgway Avenue
Santa Rosa, California 95401
(707) 576-2959
Website: www.fire.ca.gov

TIMBER OWNER/TIMBERLAND OWNER or PLAN SUBMITTER:

This report contains confidential cultural resources location information. Therefore, distribution of it should be restricted to those with a need to know. Archaeological and historical sites are types of cultural resources that are nonrenewable and their scientific, cultural and aesthetic values can be significantly impaired by disturbance. To deter vandalism, artifact hunting, and other activities that can damage cultural resources, the locations of such sites should be kept confidential. The legal authority to restrict cultural resources information is in California Government Code Section 6254.10 which exempts cultural resources site location information from the California Public Records Act and provides authority for widespread state policy (not just within the California Department of Forestry and Fire Protection) to keep archaeological site location information confidential. This exemption to the Public Records Act recognizes that providing site location information to the general public may put such sites at risk from artifact hunting, excavations and/or vandalism.

Cc: Unit
RPF

6-21-17 JB

NOTE

"Information concerning archaeological sites has been removed from **1-07NTMP-020 SCR Major Amendment #6** pursuant to California Government Code Section 6254.10 which exempts cultural resources site location information from the California Public Records Act and provides authority for widespread state policy (not just within the California Department of Forestry and Fire Protection) to keep archaeological site location information confidential. This exemption to the Public Records Act recognizes that providing site location information to the general public may put such sites at risk from artifact hunting, excavations and/or vandalism."

Copies of the information have been sent to the following locations to facilitate review of the project:

1. CAL FIRE field unit – Felton

2. Reviewing Archaeologist, Santa Rosa (Region Office)

The original copy of this material is maintained in a confidential file at CAL FIRE's Northern Region Headquarters, 135 Ridgway Avenue, Santa Rosa, CA 95401.

CONFIDENTIAL
FINAL VERSION
7/24/2017
NO SITES

1 Arch Page (06-21-2017)

Appendix C: Cultural Resources Documentation

RE: Supplemental Archaeological Survey for the Proposed Road Re-alignment for the Swanton NTMP

The Confidential Archaeological Addendum in the original NTMP, #1-07NTMP-020, included a complete records check for the property at the Northwest Information Center, Information Center File No. 05-THP-65. No archaeological sites were recorded in the vicinity of proposed road work. No cultural resources have subsequently been discovered or recorded in proximity to the proposed road work. Numerous site inspections have taken place. A focused archaeological survey of the area surrounding the proposed road reconstruction was conducted by RPFs, Nadia Hamey and Steve Auten on October 10, 2016. This was a complete survey of the project area, including transects approximately 1 meter apart, see the attached Survey Coverage Map. During the focused survey, approximately two hours were spent evaluating the 2.5 acre strip of land. No additional cultural resources were found.

In order to protect any undiscovered cultural resources that may be located within the project area, one of the RPFs or a designee with archaeological training will inspect the project area regularly during road reconstruction activities to determine if any artifacts are revealed. If a potentially significant archaeological site is discovered during project implementation, the following procedures apply:

1) The person who made the discovery shall immediately notify the Director, LTO, RPF, or timberland owner of record.
2) The person first notified in (a) shall immediately notify the remaining parties in (a).
3) No timber operations shall occur within 100 feet of the identified boundaries of the new site until the plan submitter proposes, and the Director agrees to, protection measures pursuant to 14 CCR 929.2.
4) A minor deviation shall be filed to the plan. The minimum information provided shall include:
    (a) A statement that the information is confidential.
    (b) The mapped location of the site.
    (c) A description of the site.
    (d) Protection measures, and
    (e) Site records, if site records are required pursuant to 14 CCR 929.1(g)(2)(b).

Swanton Pacific Ranch NTMP #1-07NTMP-020 SCR
Major Amendment: Reconstructed Road

Cal Poly's Swanton Pacific Ranch (SPR) is proposing a major amendment to reconstruct approximately 900 feet of haul road on the Swanton NTMP (See Road Reconstruction Map attached in Appendix A). The current permanent road for log trucks joining Swanton Road is a significant safety concern due to poor visibility from the north and the south. The proposed realignment of the permanent road would link existing roads from the 1950s harvest era to make one road with safe visibility in either direction on Swanton Road. The proposed reconstructed road strongly enhances the safety of future harvesting operations and access related to the educational mission of SPR.

<u>Road Reconstruction Highlights:</u>

- An estimated total of 900 feet of road reconstruction is proposed on predominantly existing infrastructure from the 1950s
  - Approximately 380 of the 900 feet is existing infrastructure that connects Landings L8 and L26 to an approved encroachment onto Swanton Road in the NTMP
- Road reconstruction is on slopes less than 50%
- Road grade will be less than 15%
- Road width will be approximately 20 feet
- Requires the removal of approximately 50 – 60 trees that will be available for review at the time of the Pre-Harvest Inspection (PHI)
- Over 800 feet away from any WLPZ or watercourse
- Proposed realignment does not require stream crossings
- Road will be paved to allow permanent access for management and education

Per 14 CCR 1090.14, (b)(4)(F) and (b)(5) of the California Forest Practice Rules pertaining to "NTMP Deviations" the above actions are considered a substantial deviation:

- (4)(F) Any road extension of more than 600 ft.
- (5) Any use of existing roads not shown in the original plan when reconstruction work to allow for vehicle travel will be substantial. This will require more than just minor repair and dressing on existing road surface, as well as removal of vegetation to allow for vehicle passage.

<u>Land and Road History</u>

This area of the Satellite Stands Unit was previously harvested in 2004 per Lower Little Creek THP, #1-04-053 SCR. Since then, NTMP #1-07NTMP-020 SCR was approved and the sustainability analysis was updated following the 2009 Lockheed Fire. The goal of this harvest is the same as the 2004 harvest; to rehabilitate portions of the stand in order to improve overall stand health and stocking levels. The Unit was heavily logged in the 1950s and 1960s to supply Douglas-fir to a local box factory. An aerial photo from 1953 shows both the current alignment of Old School House Gulch Road (OSHGR) and a large portion of the proposed re-alignment as existing in Appendix A. This major amendment proposes to connect the 1953 alignment from Swanton Road to the mid-portion of the existing Old School House Gulch Road, to improve visibility and safety.

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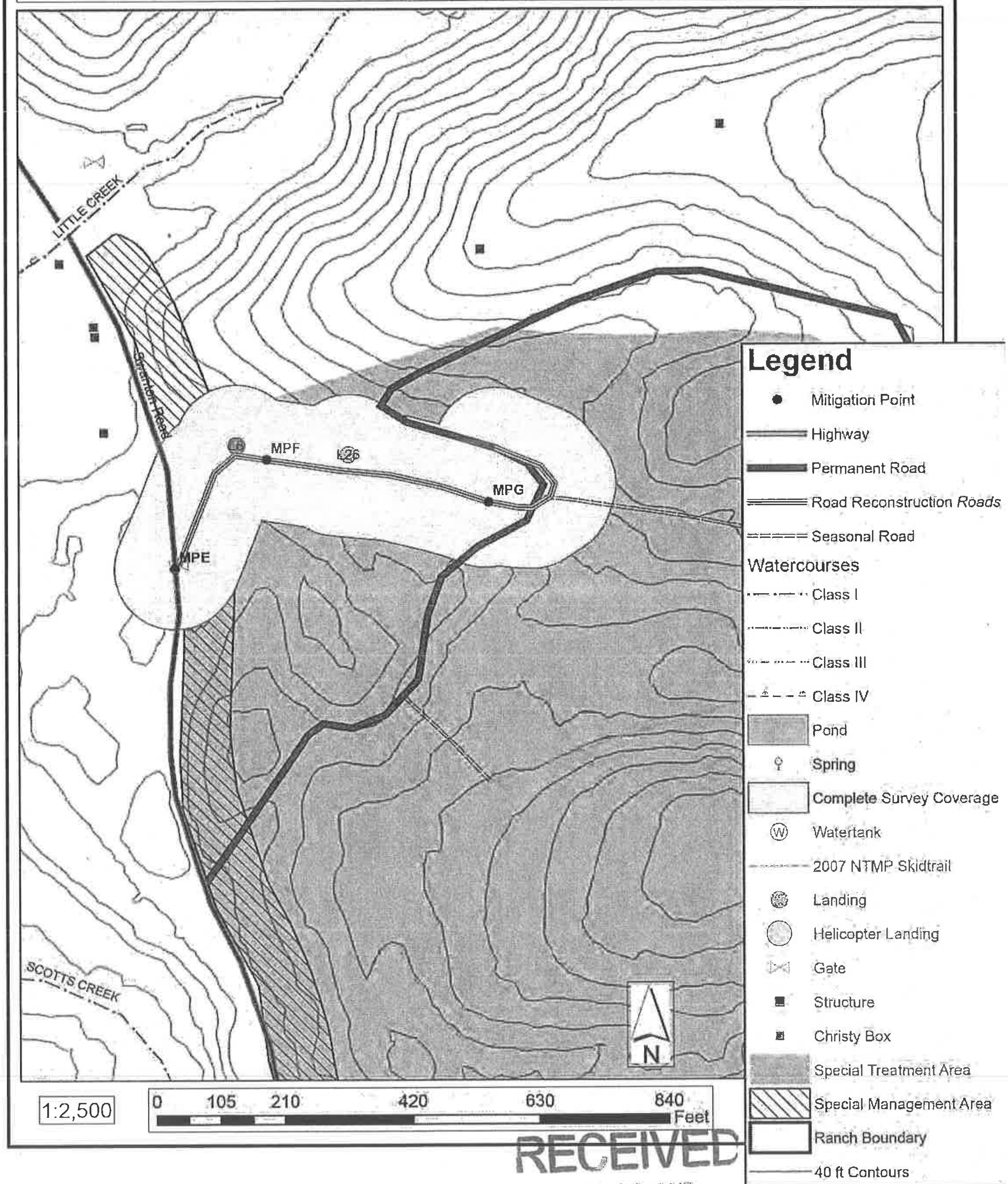
Archaeology Survey Coverage Map

T10S R3W, Portions of Sections 8,9,16,17 and Rancho Agua Puerca y Las Trancas, MDB&M Davenport USGS 7.5' Quadrangle



AMENDMENT NO 6 (Major)
To NTMP

From: Nadia Hamey <nadiahamey@gmail.com>
Sent: Tuesday, June 20, 2017 6:54 PM
To: Santa Rosa Review Team@CALFIRE
Cc: Steve Auten; Kristy C. Peterson; Sampson, Richard@CALFIRE
Subject: NTMP #1-07NTMP-020 SCR Major Amendment
Attachments: Swanton Pacific Ranch 1-07NTMP-020 SCR Major Amendment.pdf

Dear Santa Rosa Review Team,

A proposed major amendment to reconstruct approximately 900 feet of haul road on the Swanton Pacific Ranch NTMP, #1-07NTMP-020 SCR, is attached.
Please don't hesitate to contact me if you have any questions or concerns.

Thank you,
Nadia

--
Nadia Hamey, RPF #2788
267 Sunlit Lane
Santa Cruz, CA 95060
(831) 426-1658 office
(831) 431-0288 cell

PROFESSIONAL FORESTER
Dominik Schwab
No. 2823
STATE OF CALIFORNIA

Accepted for filing JUL 01 2017

This amendment conforms to the rules
And the regulations of the Board of
Forestry and the Forest practice Act

By [signature]

Title Forester III

Date 8/23/19

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SWANTON PACIFIC RANCH NTMP #1-07NTMP-020 SCR MAJOR AMENDMENT: RECONSTRUCTED ROAD

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Table of Contents

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RESOURCE MANAGEMENT

DS 8/23/19

Swanton Pacific Ranch NTMP #1-07NTMP-020 SCR
Major Amendment: Reconstructed Road

Cal Poly's Swanton Pacific Ranch (SPR) is proposing a major amendment to reconstruct approximately 900 feet of haul road on the Swanton NTMP (See Road Reconstruction Map attached in Appendix A). The current permanent road for log trucks joining Swanton Road is a significant safety concern due to poor visibility from the north and the south. The proposed realignment of the permanent road would link existing roads from the 1950s harvest era to make one road with safe visibility in either direction on Swanton Road. The proposed reconstructed road strongly enhances the safety of future harvesting operations and access related to the educational mission of SPR.

Road Reconstruction Highlights:

- An estimated total of 900 feet of road reconstruction is proposed on predominantly existing infrastructure from the 1950s
    - Approximately 380 of the 900 feet is existing infrastructure that connects Landings L8 and L26 to an approved encroachment onto Swanton Road in the NTMP
- Road reconstruction is on slopes less than 50%
- Road grade will be less than 15%
- Road width will be approximately 20 feet
- Requires the removal of approximately 50 – 60 trees that will be available for review at the time of the Pre-Harvest Inspection (PHI)
- Over 800 feet away from any WLPZ or watercourse
- Proposed realignment does not require stream crossings
- Road will be paved to allow permanent access for management and education

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- (5) Any use of existing roads not shown in the original plan when reconstruction work to allow for vehicle travel will be substantial. This will require more than just minor repair and dressing on existing road surface, as well as removal of vegetation to allow for vehicle passage.

Land and Road History

This area of the Satellite Stands Unit was previously harvested in 2004 per Lower Little Creek THP, #1-04-053 SCR. Since then, NTMP #1-07NTMP-020 SCR was approved and the sustainability analysis was updated following the 2009 Lockheed Fire. The goal of this harvest is the same as the 2004 harvest; to rehabilitate portions of the stand in order to improve overall stand health and stocking levels. The Unit was heavily logged in the 1950s and 1960s to supply Douglas-fir to a local box factory. An aerial photo from 1953 shows both the current alignment of Old School House Gulch Road (OSHGR) and a large portion of the proposed re-alignment as existing in Appendix A. This major amendment proposes to connect the 1953 alignment from Swanton Road to the mid-portion of the existing Old School House Gulch Road, to improve visibility and safety.

Road Reconstruction Mitigation Points

The following mitigation points are proposed as part of the road reconstruction. The location of each mitigation point can be found on the Road Reconstruction Map in Appendix A.

Mitigation Point E (MPE):

The location of this mitigation point is at the existing entrance on Swanton Road that accesses Landing L8. The mitigation addresses visibility onto Swanton Road. See Figures 1 and 2 for existing and desired future condition.

1. From the existing encroachment to the south, the LTO shall clear approximately 40 feet of brush to reasonably allow visibility for vehicles exiting onto Swanton Road.
2. From the existing encroachment to the north, the LTO shall remove vegetation, remove trees marked in blue (available for review at the PHI), and layback the slope at approximately 2:1 for 50 feet, to maximize visibility.
    a. Harvested trees shall be placed in proximity to Landing L8 to be used for firewood as feasible.
    b. Excess material from slope layback, not utilized in balanced cut and fill reconstruction of the entry way, shall be placed on or near Landing L8 on slopes less than approximately 5%.
3. A buried drivable Christy box containing private utilities owned by Swanton Pacific Ranch is located approximately 5 feet from the gate at Swanton Road. The lines from the Christy box are approximately 3 feet underground and run up the middle of the road for approximately 260 feet through Landing L8. The Christy box may be covered with material during operations as needed to build up the entrance to Swanton Road. Following operations, the lid of the Christy box will be excavated and an extension will be added to match road grade, if necessary.
4. Slash shall be treated in accordance with Item 30, Hazard Reduction, in Section II of the NTMP. Areas within 100 feet of the edge of Swanton Road are part of a Special Management Area and areas within 50 feet of the edge of Swanton Road shall be kept free of slash greater than 1 inch in diameter and less than 8 inches. Between 50 feet and 100 feet of the edge of Swanton Road, slash shall be treated by piling and burning, chipping, burying, removal, or lopping to within 12" of the ground, no later than April 1st of the year following its creation. Distances shall be measured along the surface of the ground.
5. This mitigation shall be closed-out prior to the winter period, or following operations, per the specifications in Item 18, Soil Stabilization, in Section II of the NTMP and as outlined below:
    a. From the encroachment to the north, the resulting slope lay back shall be seeded with barley at an application rate of 15 – 25 lbs/acre and straw mulched to a depth of approximately 3 inches. In addition, straw waddles shall be placed parallel every 3 feet on the excavated slope following seeding, but not before straw mulching.
    b. The road from Landing L8 shall not be drained over the newly excavated slope.
    c. The road from Landing L8 to Swanton Road shall be paved or rocked with ¾" drain rock to a depth of approximately 2 – 3 inches.

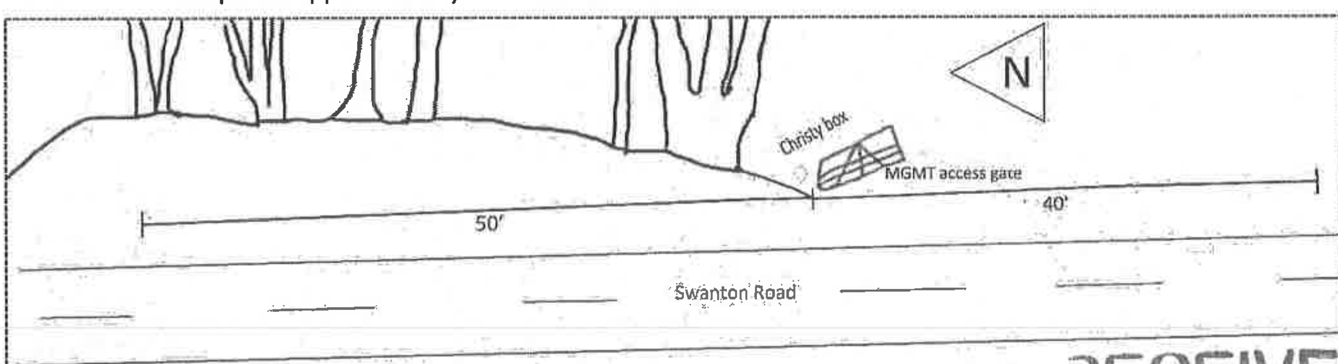

Figure 1. Mitigation Point E (MPE) Sketch of Existing Condition

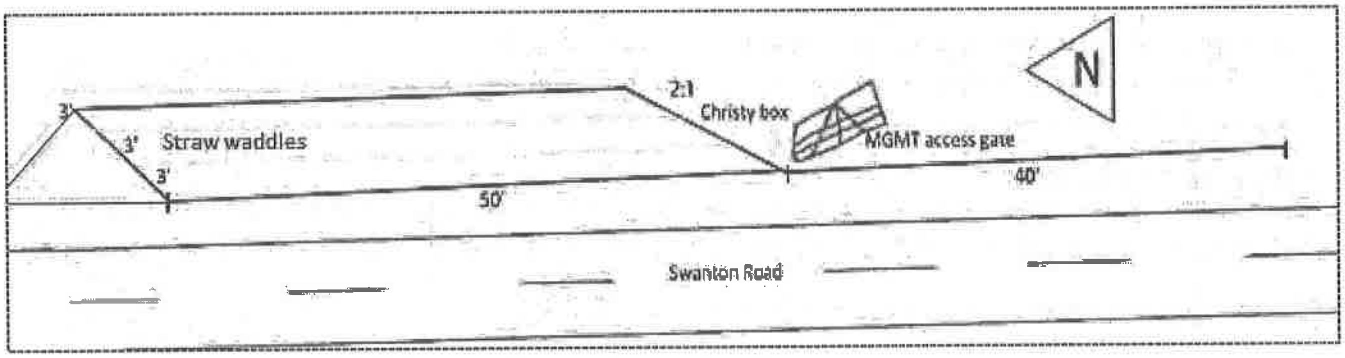

Figure 2. Mitigation Point E (MPE) Sketch of Desired Future Condition

<u>Special Treatment Area – Shreve Oak:</u>
It is necessary to remove some Shreve oaks and other tree species from areas adjacent to reconstruction activities in order to reconstruct the road. Therefore, mitigation actions per Item 32, Biological and Cultural Resources, in Section II of the NTMP shall be followed:

1. Trees to be removed shall be marked in blue and available for review during the PHI
2. Douglas-fir trees shall be removed to reduce Shreve oak competition
3. Taller-stature trees shall not be planted within the stand area
4. Shreve oaks shall be pointed out to the LTO and protected from damage during operations, to the extent feasible
5. Mitigations measures to inhibit the spread of sudden oak death, as described in Item 15, Pests, in Section II of the NTMP, shall be followed

These mitigations measures will facilitate Shreve oak regeneration by reducing Douglas-fir competition. The location of the Special Treatment Area regarding Shreve oaks is highlighted on the Road Reconstruction Map in Appendix A.

<u>Mitigation Point F (MPF):</u>
The location of this mitigation point begins just north of Landing L8 and extends southeast approximately 300 feet. Within this area, there is a 10-foot-wide section of existing road at a slope of approximately 15% for 120 feet. See Figures 3 and 4 for existing and desired future condition.

1. The eastern side of this existing road will be excavated to achieve a 20-foot-wide road. The remaining cutbank shall be laid back at approximately 2:1. The final reconstructed road grade will run at approximately 15% for 300 feet.
2. Harvested trees shall be placed in proximity to Landing L8, Landing L26, or in proximity to the reconstructed road, to be used for firewood if feasible.
3. Excess material from slope lay back, not utilized in balanced cut and fill construction shall be placed on or near Landing L8 or south of Landing L26 on slopes less than approximately 5%. Soil will be spread in uniform layers and compacted in 6 inch lifts, maintaining positive drainage away from the road.
4. Prior to the winter period or following operations Mitigation Point MPF shall be closed-out per the specifications in Soil Stabilization under Item 18, Section II of the NTMP.

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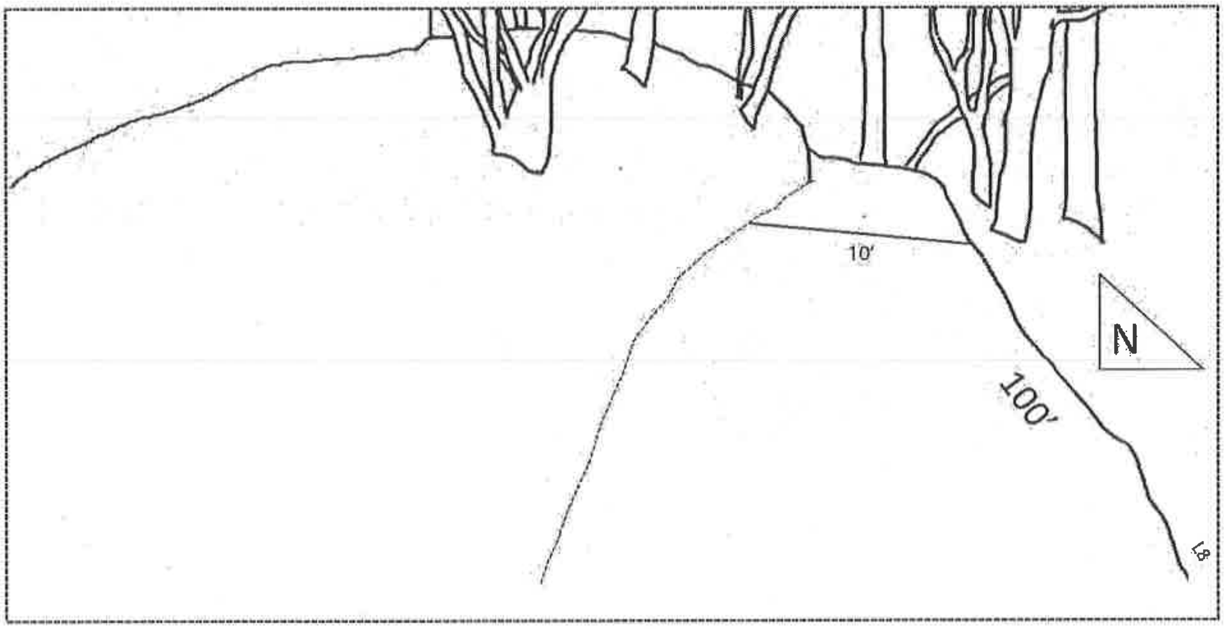


Figure 3. Mitigation Point F (MPF) Sketch of Existing Condition

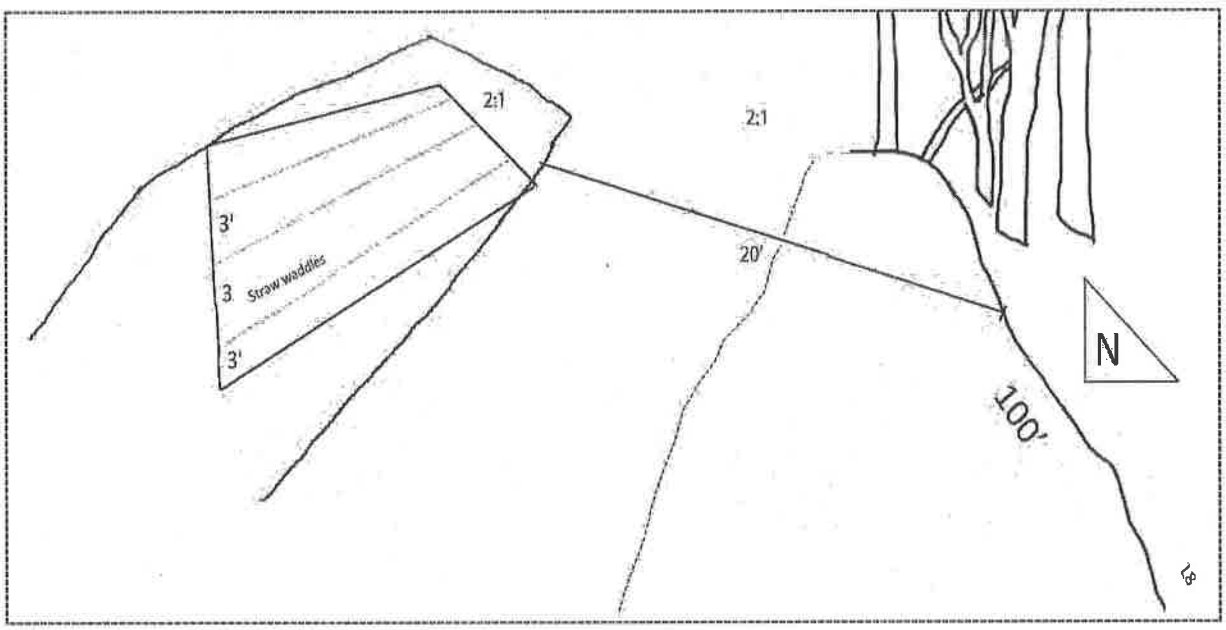


Figure 4. Mitigation Point F (MPF) Sketch of Desired Future Condition

Mitigation Point G (MPG):

The location of this mitigation is in proximity to the point where the proposed reconstructed road meets Old School House Gulch Road. To transition the reconstructed road to meet OSHGR, fill will be placed to match the existing grade. See Figures 5 and 6 for existing and desired future condition.

1. LTO shall remove trees marked in blue (available for review at the time of the PHI).
    a. Harvested trees shall be placed in proximity to Landing 8, Landing 26, or within proximity to the reconstructed road to be used for firewood as feasible.
    b. Excess material from slope layback, not utilized in balanced cut and fill construction of entry way, shall be placed on or near Landing 8 or Landing 26 on slopes less than approximately 5%.

2. The area adjacent the existing road will be sub-excavated approximately 2-3 feet to create a keyway for fill in order to transition the realignment onto OSHGR.
3. Soil will be compacted in approximately 6 inch lifts from the toe to the finished grade.
4. Prior to the winter period or following operations, the reconstructed road shall be closed-out per the specifications under Item 18, Soil Stabilization, in Section II of the NTMP.

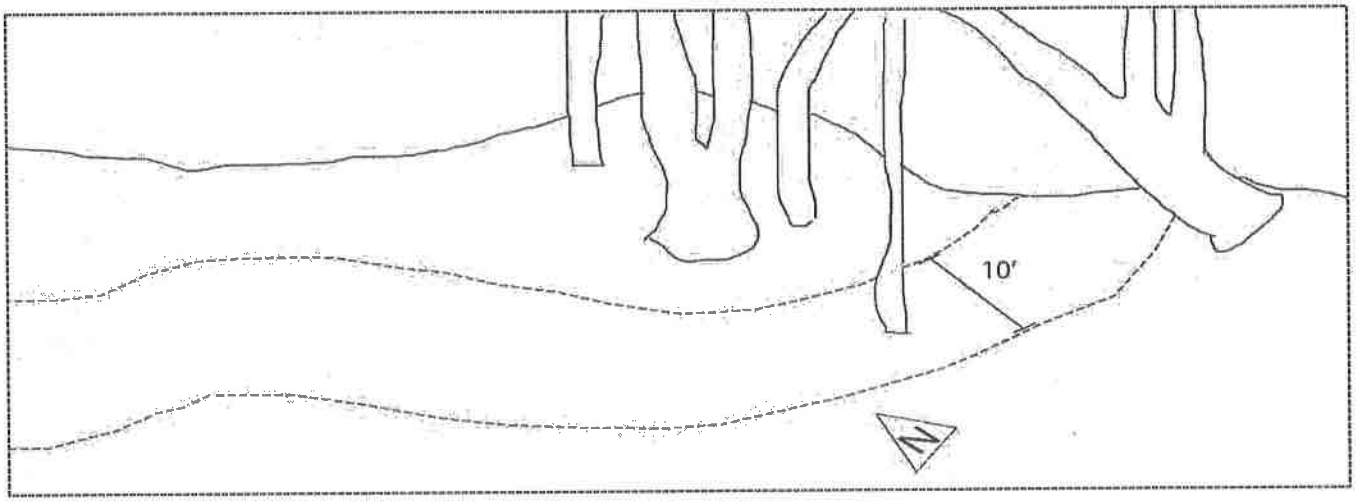


Figure 5. Mitigation Point G (MPG) Sketch of Existing Condition

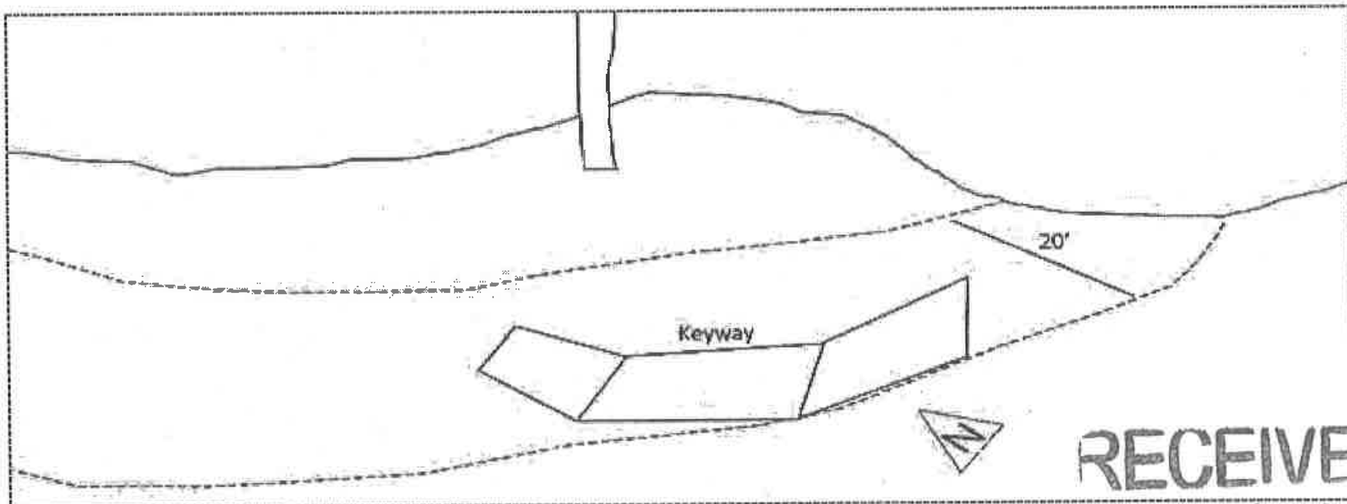


Figure 6. Mitigation Point G (MPG) Sketch of Desired Future Condition

Landing 26 (L26):

L26 is needed as an additional location for staging road reconstruction operations and is located on slopes less than 5%. The location of L26 can be found on the Reconstructed Road Map in Appendix A. L26 shall be closed-out prior to the winter period or following operations per the specifications under Item 18, Soil Stabilization, in Section II of the Swanton NTMP.

Geology

An on-site field review for portions of the proposed road reconstruction was conducted on October 1st, 2014 by Geo-Logic Associates. An engineering geologist reviewed the geologic suitability of the road reconstruction by performing a site geologic reconnaissance of the proposed road alignment. Following additional evaluation by contractors, RPFs, and LTO's the road alignment was changed slightly to lessen the slope of the road.

Five exploratory test pits were dug along the proposed road alignment with a backhoe. The result of this test indicated that the potential for significant relative movement between major landslide blocks were judged to be low. Overall, Geo-Logic Associates concluded, in general the proposed roadway realignment as shown on the referenced plans appears feasible from a geologic standpoint. We note that preserving the existing Old School House Gulch Road will provide alternate access.

Biological Resources

A full discussion of the presence or absence of species and habitats that could be affected by forest operations was completed and approved in the Swanton NTMP. Per the NTMP, updated botanical and murrelet surveys are provided:

1. A botanical survey was completed on September 11th, 2014 by Jim West, a recognized local botanical expert. West did not find any sensitive species in the area and concluded that there will be no significant impacts to botanical resources as a result of the proposed road reconstruction. Attached in Appendix B is the botanical report.
2. In 2014 and 2015, Marbled Murrelet surveys were conducted by Michael Duffy utilizing the Pacific Seabird Group protocols in the Lower Little Creek Habitat Unit. No murrelets were detected during surveys. Survey Reports are attached in Appendix B.

Signature Steve R. Auten (signed) Date 6/20/17

Steve Auten RPF# 2734

Signature (signed) Date 6/20/17

Nadia Hamey RPF# 2788

PROJECT DESCRIPTION

PROJECT DESCRIPTION

THE PURPOSE OF THESE IMPROVEMENT PLANS ARE TO PROVIDE GRADING AND SITE PLAN DESIGN FOR CONSTRUCTION LEVEL DOCUMENTS. THE PROPOSED IMPROVEMENTS ARE A NEW ACCESS ROAD THAT EXTENDS FROM SWANTON ROAD TO THE EXISTING DRIVEWAY (OLD SCHOOLHOUSE GULCH ROAD) THAT LEADS TO SWANTON RANCH FIELD CAMP AND EDUCATIONAL CENTER.

THE ACCESS ROAD ALIGNMENT FOLLOWS AN EXISTING LOGGING ROAD WITH DIRT SURFACING. IT IS HEAVILY COVERED IN BRUSH AND IS LOCATED IN A FORESTED AREA. THE ACCESS ROAD RUNS ABOUT 1,300 FEET LONG AND IS 22' WIDE IN MOST SEGMENTS TO ACCOMMODATE FOR TWO 10-FOOT TRAVEL LANES AND A 1-FOOT SHOULDER ON EITHER SIDE. THE PROPOSED ALIGNMENT VARIES FROM THE EXISTING LOGGING ROAD WHERE NECESSARY TO MEET CALFIRE STANDARDS FOR HORIZONTAL CURVES. A SANTA CRUZ COUNTY STANDARD DRIVEWAY CONNECTS THE ACCESS ROAD TO SWANTON ROAD, WHERE A MINIMUM OF 550' OF SIGHT DISTANCE IS ACHIEVED FROM BOTH DIRECTIONS ONTO SWANTON ROAD.

OTHER SITE FEATURES INCLUDE A GRAVEL TURNOUT AT THE ENTRANCE TO AID IN RIGHT TURNS FOR LARGER VEHICLES, SPEED TABLES TO REGULATE TRAFFIC CONTROL AND CONFORMS TO THE EXISTING OLD SCHOOLHOUSE GULCH ROAD TO SMOOTH THE TRANSITION AND MAINTAIN CIRCULATION FOR LOGGING TRUCKS.

CIVIL LINE TYPES

— — —	COUNTY RIGHT OF WAY
— — 160 — —	EXISTING CONTOURS
—— 160 ——	PROPOSED CONTOURS
————	LIMIT OF DISTURBANCE

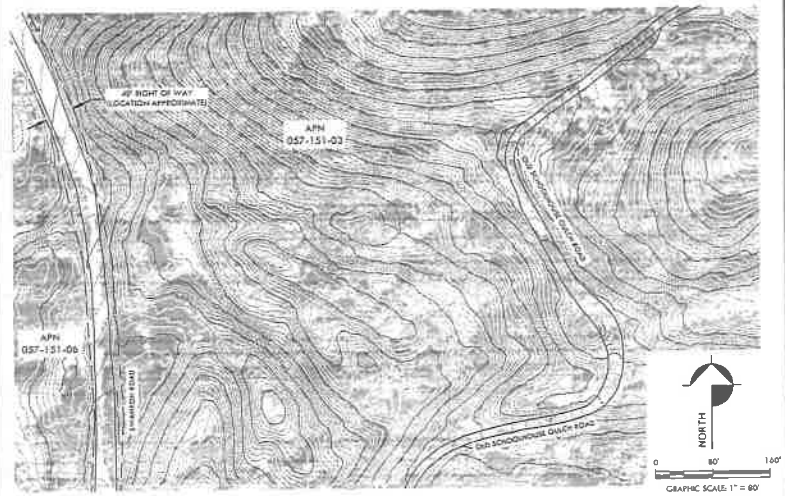
CIVIL SYMBOLS

- EROSION CONTROL BLANKET
- STRAW WATTLE
- EXISTING ASPHALT ROAD
- UNDISTURBED EARTH
- ASPHALT CONCRETE SURFACING
- GRAVEL
- CLEARING AND GRUBBING

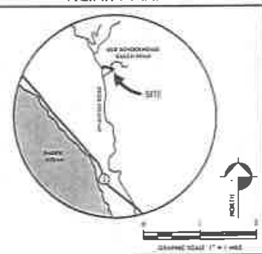
ABBREVIATIONS

ADA	AMERICAN DISABILITIES ACT	MAX	MAXIMUM
BOC	BOTTOM OF CURB	MIN	MINIMUM
DG	DECOMPOSED GRANITE	(N)	NEW
DIA	DIAMETER	NTS	NOT TO SCALE
EG	EXISTING GROUND ELEVATION	O.C.	ON CENTER
(E)	EXISTING	(P)	PROPOSED
FG	FINISHED GRADE	SCH	SCHEDULE
LEN	LENGTH	S.F.	SQUARE FEET
		STA	STATION
		TOC	TOP OF CURB
		VC	VERTICAL CURVE
		UG	UNDERGROUND

EXISTING SITE MAP



VICINITY MAP



DRAWING NOTATIONS

DETAIL NUMBER
SHEET WHERE DETAIL IS SHOWN

TECHNICAL REFERENCES

TECHNICAL REFERENCES

1. "GEOTECHNICAL INVESTIGATION REPORT - SWANTON PACIFIC RANCH ACCESS ROAD REALIGNMENT." GEO-LOGIC ASSOCIATES. JULY 6, 2018
2. "SWANTON ROAD - SIGHT DISTANCE ANALYSIS; SANTA CRUZ COUNTY, CALIFORNIA" HATCH MOTT MACDONALD. JUNE 27, 2012
3. "DRAINAGE ANALYSIS FOR PROPOSED ACCESS ROAD - SWANTON PACIFIC RANCH ACCESS ROAD REALIGNMENT." FALL CREEK ENGINEERING. SEPTEMBER 18, 2018
4. LIDAR DATA FROM NOAA, MARCH 2011.
5. AERIAL IMAGERY FROM ASSOCIATION OF MONTEREY BAY AREA GOVERNMENTS, 2010.
6. "ASSUMPTION OF ROLE OF GEOTECHNICAL CONSULTANT OF RECORD - SWANTON RANCH ACCESS ROAD REALIGNMENT" CAL ENGINEERING & GEOLOGY. MARCH 6, 2019

GRADING VOLUMES AND NOTES

GRADING VOLUMES	
CUT	3,233 CY
CUT (KEY & BENCH)	832 CY
FILL	1,402 CY
NET	2,613 CY CUT
LIMIT OF DISTURBANCE	1.14 ACRES

NOTES:

1. THE BALANCE OF CUT AND FILL ARE ESTIMATED QUANTITIES ONLY.
2. A COMPACTION FACTOR OF 90% HAS BEEN APPLIED TO THE GRADING FILL VOLUMES.
3. GRADING VOLUMES DO NOT ACCOUNT FOR PAVEMENT SECTIONS.
4. ADDITIONAL CUT CAN BE PLACED ON SITE WITH PROPER EROSION CONTROL MEASURES.
5. WITH ADDITIONAL CUT STORAGE ON SITE, THIS PROJECT PRODUCES A NET ZERO EARTHWORK BALANCE.
6. ADDITIONAL CUT FOR KEYING AND BENCHING IS ESTIMATED BASED ON CROSS SECTIONAL AREAS AND SEGMENTS OF THE ALIGNMENT UNDERGOING THIS EXCAVATION TREATMENT.

SHEET INDEX

IMPERVIOUS AREA ANALYSIS

EXISTING IMPERVIOUS AREA	AREA (SF)	AREA (SF)
SWANTON ROAD	11,442	
OLD SCHOOLHOUSE GULCH ROAD	27,091	
SUBTOTAL		38,533
NEW IMPERVIOUS AREA		
22' WIDE ROAD (ASPHALT CONCRETE)	24,757	
GRAVEL VEHICLE TURNOUT	880	
CONCRETE VALLEY GUTTER	316	
SUBTOTAL		25,953
TOTAL		64,486

GENERAL GRADING NOTES

GENERAL SITE GRADING NOTES

1. THE GEOTECHNICAL ENGINEER SHOULD BE NOTIFIED AT LEAST FOUR DAYS PRIOR TO ANY GRADING OR FOUNDATION EXCAVATING SO THE WORK IN THE FIELD CAN BE COORDINATED WITH THE GRADING CONTRACTOR AND ARRANGEMENTS FOR TESTING AND OBSERVATION CAN BE MADE. THE RECOMMENDATIONS OF THIS REPORT ARE BASED ON THE ASSUMPTION THAT THE GEOTECHNICAL ENGINEER WILL PERFORM THE REQUIRED TESTING AND OBSERVATION DURING GRADING AND CONSTRUCTION. IT IS THE OWNER'S RESPONSIBILITY TO MAKE THE NECESSARY ARRANGEMENTS FOR THESE REQUIRED SERVICES.

2. GRADING IS ANTICIPATED TO CONSIST OF SURFACE GRADING FOR DRAINAGE AND ROAD DESIGN. NO OTHER EARTHWORK SHOULD BE PERFORMED WITHOUT OUR REVIEW.

3. AREAS TO BE GRADED OR SHOULD BE CLEARED OF ALL OBSTRUCTIONS AND VEGETATION. EXISTING DEPRESSIONS OR VOIDS CREATED DURING SITE CLEARING SHOULD BE BACKFILLED WITH ENGINEERED FILL.

4. AREAS TO RECEIVE ENGINEERED FILL SHOULD BE SCARIFIED, MOISTURE CONDITIONED TO 2 TO 3 PERCENT OVER OPTIMUM MOISTURE CONTENT AND COMPACTED TO AT LEAST 95 PERCENT RELATIVE COMPACTION.

5. ENGINEERED FILL SHOULD BE MOISTURE CONDITIONED BETWEEN 2 TO 3 PERCENT OVER OPTIMUM MOISTURE CONTENT, PLACED IN THIN LIFTS LESS THAN 8-INCHES IN LOOSE THICKNESS AND COMPACTED TO AT LEAST 95 PERCENT RELATIVE COMPACTION. WHERE REFERENCED IN THIS REPORT, PERCENT RELATIVE COMPACTION AND OPTIMUM MOISTURE CONTENT SHALL BE BASED ON ASTM TEST DESIGNATION D1557-00.

6. THE ON-SITE SOILS ARE GENERALLY SUITABLE FOR USE AS ENGINEERED FILL. SOILS USED FOR ENGINEERED FILL BELOW IMPROVEMENTS SHOULD BE GRANULAR, HAVE A PLASTICITY INDEX LESS THAN 15, BE FREE OF ORGANIC MATERIAL, AND CONTAIN NO ROCKS OR CLODS GREATER THAN 6 INCHES IN DIAMETER, WITH NO MORE THAN 15 PERCENT LARGER THAN 4 INCHES. THERE ARE SOME CLAYEY SURFACE SOILS THAT HAVE A PLASTICITY INDEX GREATER THAN 15 AND ARE MODERATELY EXPANSIVE. EXPANSIVE CLAYS SHOULD NOT BE USED AS ENGINEERED FILL.

7. ENGINEERED FILL SHOULD BE OBSERVED AND TESTED BY CAL ENGINEERING & GEOLOGY. ONE IN-PLACE DENSITY TEST SHOULD BE PERFORMED FOR EVERY 12 VERTICAL INCHES OF SOIL PLACED FOR FILL SLOPES AND BELOW STRUCTURES, ONE TEST SHOULD BE PERFORMED FOR EVERY 500 SQUARE FEET OF AREA AND ONE TEST SHOULD BE PERFORMED WHENEVER THERE IS A DEFINITE SUSPICION OF A CHANGE IN THE QUALITY OF MOISTURE CONTROL OR EFFECTIVENESS IN COMPACTION.

8. AFTER THE EARTHWORK OPERATIONS HAVE BEEN COMPLETED AND THE GEOTECHNICAL ENGINEER HAS FINISHED THEIR OBSERVATION OF THE WORK, NO FURTHER EARTHWORK OPERATIONS SHALL BE PERFORMED EXCEPT WITH THE APPROVAL OF AND UNDER THE OBSERVATION OF THE GEOTECHNICAL ENGINEER.

AGENCY APPROVAL

DEPARTMENT OF PUBLIC WORKS
COUNTY OF SANTA CRUZ STATE OF CALIFORNIA
REVIEWED BY

SANITATION ENGINEERING
SURVEY DEVELOPMENT REVIEW
STORMWATER MANAGEMENT
TRAFFIC AND ROAD PLANNING
SANITATION OPERATIONS

APPROVAL RECOMMENDED: ASST. DIR., SPECIAL SERVICES DATE ASST. DIR., TRANSPORTATION DATE

APPROVED: DIRECTOR OF PUBLIC WORKS DATE

PLANNING DEPARTMENT
COUNTY OF SANTA CRUZ STATE OF CALIFORNIA
REVIEWED BY

ENVIRONMENTAL PLANNER
STAFF PLANNER

APPROVED: PLANNING DIRECTOR DATE

CALIFORNIA DEPARTMENT OF FORESTRY AND FIRE PROTECTION
COUNTY OF SANTA CRUZ STATE OF CALIFORNIA

REMARKS

APPROVED: FIRE MARSHALL DATE

REV.	DATE	BY
1	03/19	BJS

SHEET TITLE: COVER SHEET

CLIENT: SWANTON PACIFIC RANCH
ATTN: BRIAN DIETTERICK
125 SWANTON ROAD
DAVENPORT, CALIFORNIA 95017

PROJECT TITLE: SWANTON PACIFIC RANCH
UPDATED FIELD CAMP ENTRANCE AND EXIT ROAD ALIGNMENT
DAVENPORT, CALIFORNIA
APN: 057-121-22 AND 057-151-03

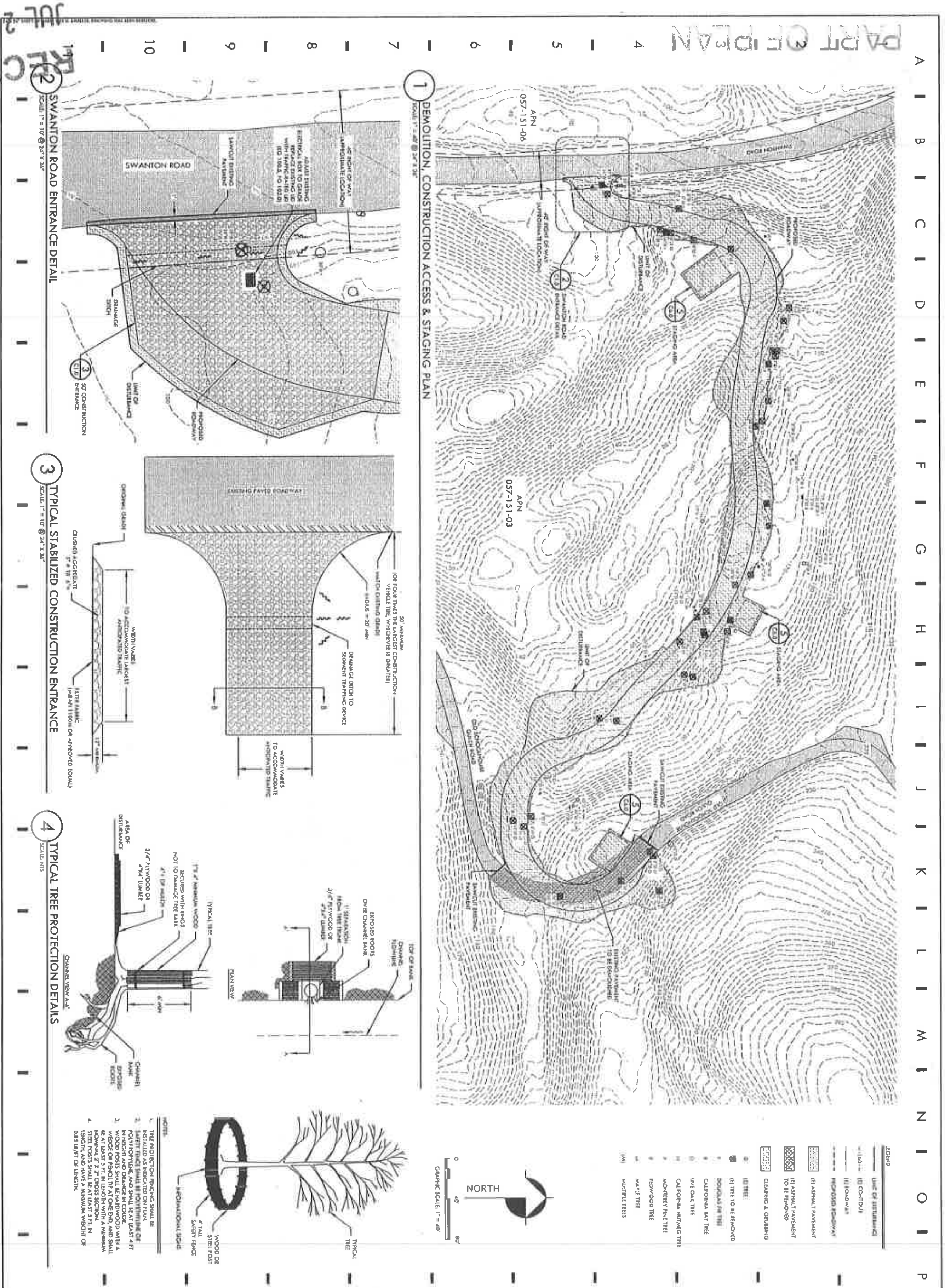
FALL CREEK ENGINEERING, INC.
Consulting Engineers
1525 SEABRIGHT AVE.
SANTA CRUZ, CA 95062
TEL (831) 426-9054

DRAWN BY:	BJS
CHECKED BY:	Prm
DATE:	OCTOBER 2018
JOB NO:	21706
SCALE:	AS SHOWN
SHEET:	C0.0

1 OF 9

9

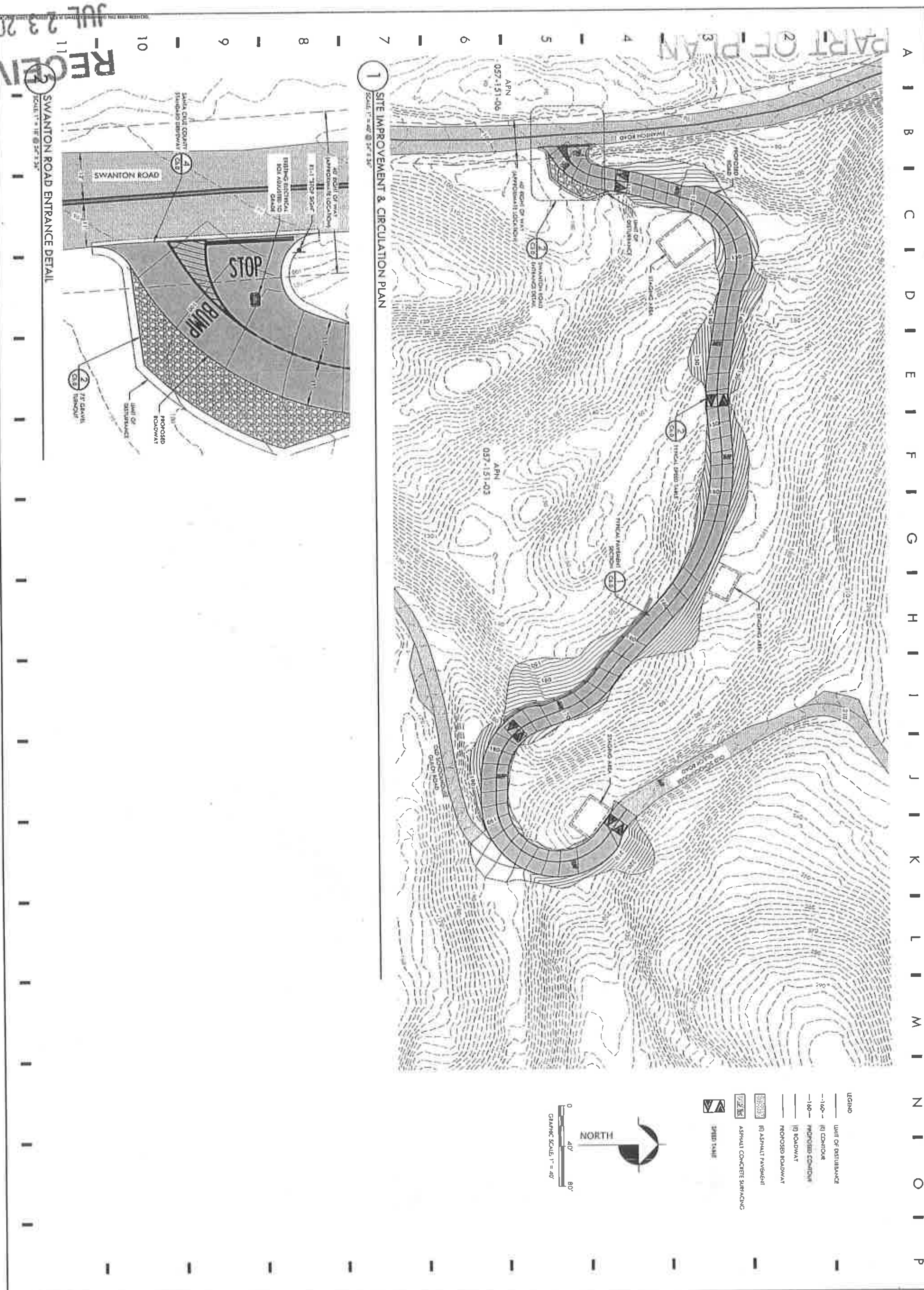
9



SHEET TITLE DEMOLITION, CONSTRUCTION ACCESS & STAGING PLAN	CLIENT SWANTON PACIFIC RANCH ATTN: BRIAN DIETTERICK 125 SWANTON ROAD DAVENPORT, CALIFORNIA 95017	PROJECT TITLE SWANTON PACIFIC RANCH UPDATED FIELD CAMP ENTRANCE AND EXIT ROAD ALIGNMENT DAVENPORT, CALIFORNIA APN: 057-121-22 AND 057-151-03

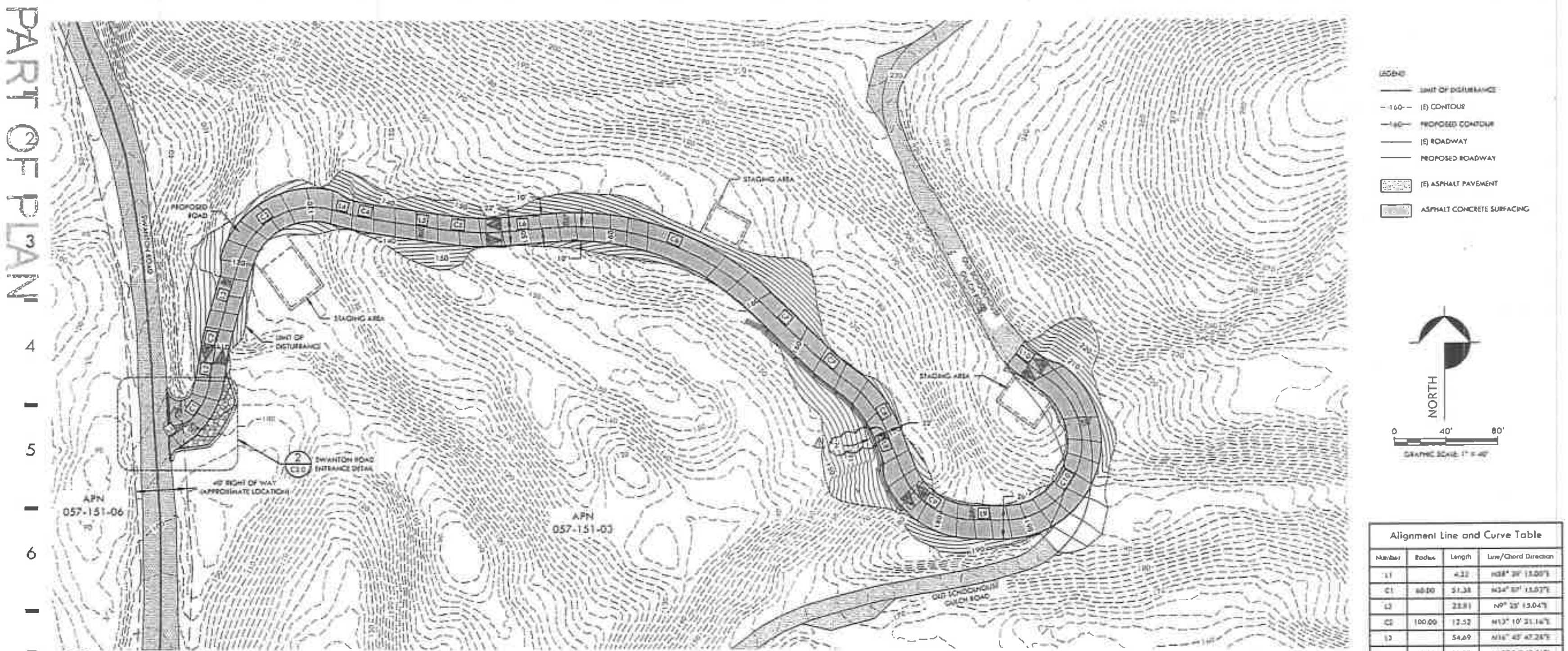
FALL CREEK ENGINEERING, INC.
Consulting Engineers
1525 SEABRIGHT AVE.
SANTA CRUZ, CA 95062

DRAWN BY: BJS
CHECKED BY: PHH
DATE: OCTOBER 2018
SCALE: AS SHOWN
SHEET: C1.0
2 OF 9



FALL CREEK ENGINEERING, INC Consulting Engineers 1125 ... AVE. SANTA CRUZ, CA 9506... TEL (831) 426-9054	PROJECT TITLE: SWANTON PACIFIC RANCH UPDATED FIELD CAMP ENTRANCE AND EXIT ROAD ALIGNMENT DAVENPORT, CALIFORNIA APN: 057-121-22 AND 057-151-03	CLIENT: SWANTON PACIFIC RANCH ATTN: BRIAN DIETTERICK 125 SWANTON ROAD DAVENPORT, CALIFORNIA 95017	SHEET TITLE: SITE IMPROVEMENT & CIRCULATION PLAN

DRAWN BY: ...
CHECKED BY: ...
DATE: OCTOBER 2018
JOB NO: 21706
SCALE: AS SHOWN
SHEET: C2.0 (2 OF 9)



1 HORIZONTAL CONTROL PLAN
SCALE: 1" = 40' @ 24" x 36"

2 SWANTON ROAD ENTRANCE DETAIL
SCALE: 1" = 10' @ 24" x 36"

Alignment Line and Curve Table

Number	Radius	Length	Line/Chord Direction
L1		4.32	N58° 39' 15.00"E
C1	60.00	51.38	N34° 57' 15.02"E
L2		23.81	N9° 25' 15.04"E
C2	100.00	12.52	N13° 10' 21.16"E
L3		54.69	N16° 45' 47.28"E
C3	60.00	91.77	N60° 34' 40.51"E
L4		14.90	S73° 36' 26.27"E
C4	200.00	20.88	S78° 25' 54.02"E
L5		53.94	S81° 32' 21.78"E
C5	211.00	48.48	S88° 10' 19.83"E
L6		33.00	N83° 14' 42.08"E
C6	211.00	178.42	S70° 31' 47.89"E
L7		56.89	S46° 18' 17.86"E
C7	211.00	31.22	S50° 32' 39.67"E
C8	90.00	53.81	S37° 41' 43.66"E
L8		26.92	S20° 34' 06.11"E
C9	60.00	71.84	S54° 52' 06.50"E
L9		24.34	S89° 10' 06.89"E
C10	60.00	121.49	N18° 30' 03.16"E
L10		33.24	N52° 49' 46.79"W

Line and Curve Table

Number	Radius	Length	Line/Chord Direction
C11	10.00	26.88	N79° 35' 13.75"W
C12	10.00	11.13	S26° 46' 44.45"W

REV.	DATE	BY
△	05/19	BJG

SHEET TITLE: HORIZONTAL CONTROL PLAN

CLIENT: SWANTON PACIFIC RANCH
ATTN: BRIAN DIETTERICK
125 SWANTON ROAD
DAVENPORT, CALIFORNIA 95017

PROJECT TITLE: SWANTON PACIFIC RANCH
UPDATED FIELD CAMP ENTRANCE AND EXIT ROAD ALIGNMENT
DAVENPORT, CALIFORNIA
APN: 057-121-22 AND 057-151-03

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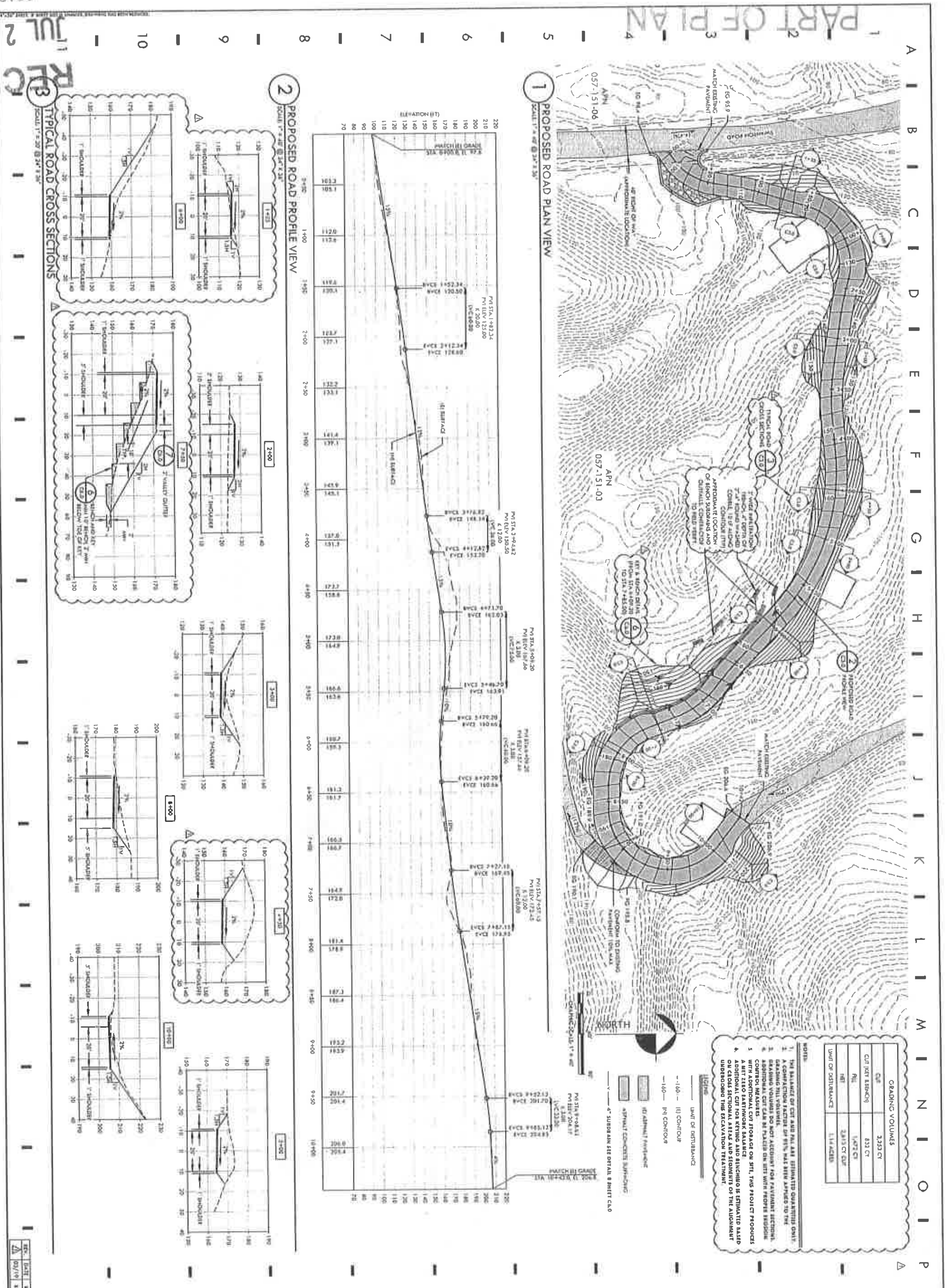
DRAWN BY:	BJG
CHECKED BY:	FHH
DATE:	OCTOBER 2018
JOB NO.:	21706
SCALE:	AS SHOWN
SHEET:	C2.1

4 OF 9



PROJECT TITLE
SWANTON PACIFIC RANCH
UPDATED FIELD CAMP ENTRANCE AND EXIT ROAD ALIGNMENT
DAVENPORT, CALIFORNIA
APN: 057-121-22 AND 057-151-03

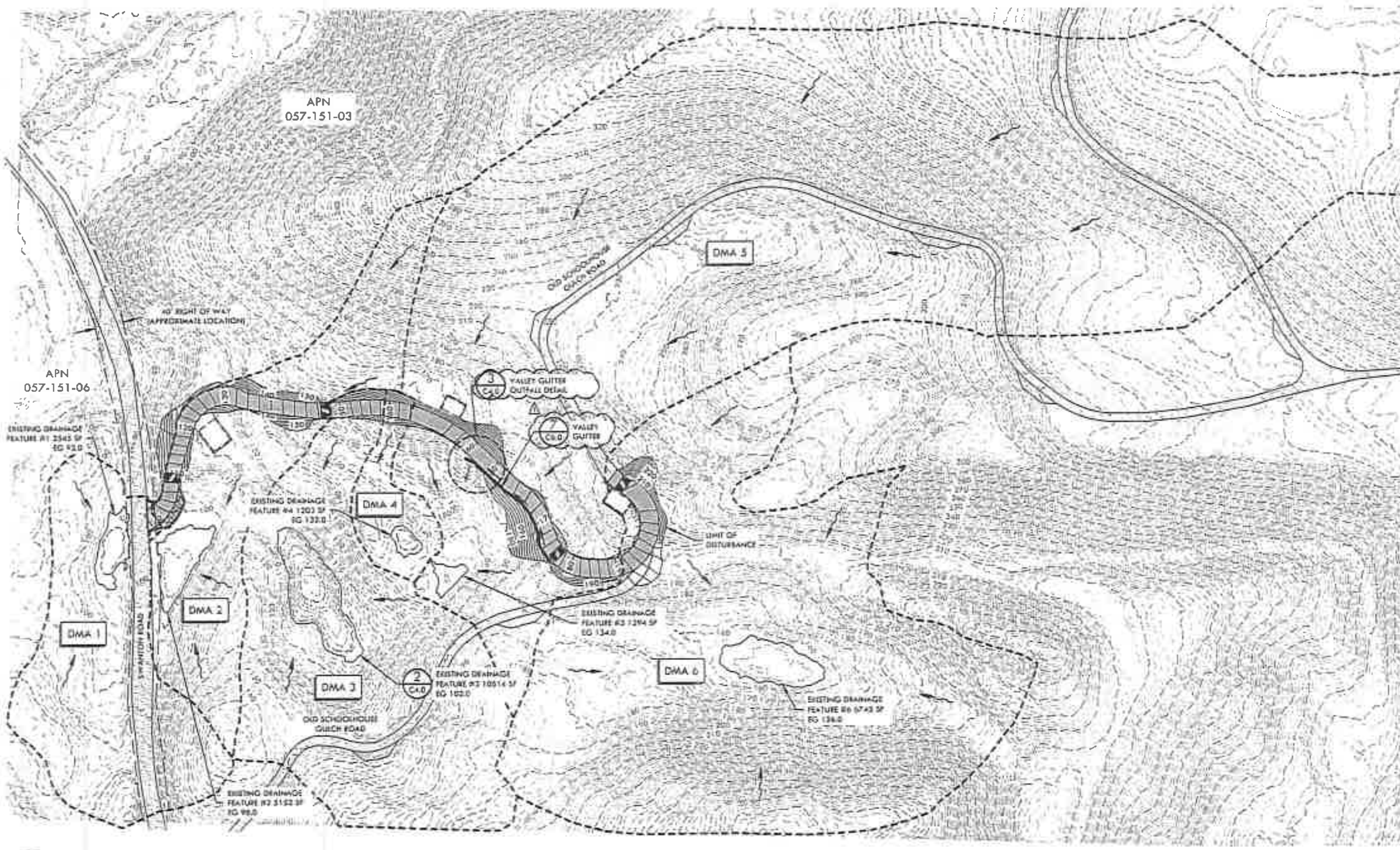
CLIENT:
SWANTON PACIFIC RANCH
ATTN: BRIAN DIETTERICK
125 SWANTON ROAD
DAVENPORT, CALIFORNIA 95017

SHEET TITLE
GRADING PLAN, PROFILE & CROSS SECTIONS

FALL CREEK ENGINEERING, INC.
Consulting Engineers

DRAWN BY: BJS
CHECKED BY: PHH
DATE: OCTOBER 2018
JOB NO.: 21706
SCALE: AS SHOWN
SHEET: C3.0

PART OF PLAN 4



LEGEND

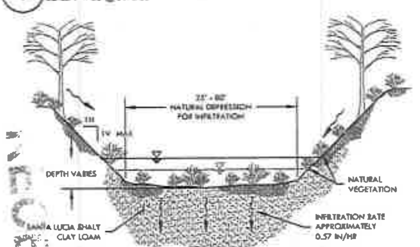
- LIMIT OF DISTURBANCE
- 160 (E) CONTOUR
- 160 (N) CONTOUR
- (E) ASPHALT PAVEMENT
- ASPHALT CONCRETE SURFACING
- DRAINAGE AREA BOUNDARY
- DRAINAGE FLOW PATTERN
- DMA 1 — DRAINAGE MANAGEMENT AREA NUMBER
- SPEED TABLE
- EXISTING DRAINAGE FEATURE

NORTH

GRAPHIC SCALE: 1" = 80'

1 DRAINAGE PLAN

SCALE: 1" = 80' @ 34" X 36"



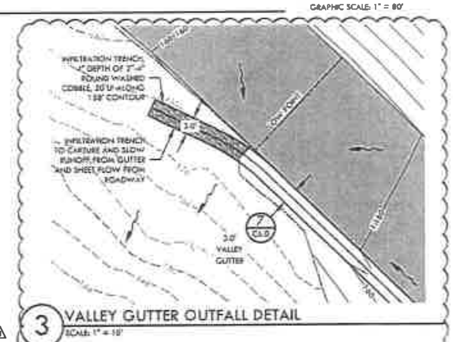
2 EXISTING DRAINAGE FEATURE DETAIL

SCALE: NTS

	DRAINAGE MANAGEMENT AREA (AC)	DRAINAGE FEATURE AREA (SF)	IMPERVIOUS AREA (SF)	C	25-YEAR RAINFALL INTENSITY (IN/HR)	RUNOFF (CFS)	VOLUME REQUIRED (CF)	EXISTING DEPRESSION VOLUME (CF)
1	2.09	3,545	11,955	0.60	2.33	2.95	412	4,752
2	2.26	5,152	8,456	0.58	2.33	3.06	291	6,017
3	3.31	10,514	6,204	0.56	2.33	4.35	214	61,036
4**	0.40	1,203	811	0.56	2.33	0.53	28	2,147
5**	14.95	1,294	29,288	0.56	2.33	19.62	1009	818
6	6.75	6,745	6,576	0.55	2.33	8.68	226	11,659

NOTES:

1. DRAINAGE CALCULATIONS ARE BASED ON THE DESIGN CRITERIA PROVIDED IN SECTION H "ON-SITE DETENTION OF STORMWATER RUNOFF" OF THE COUNTY OF SANTA CRUZ DESIGN CRITERIA PART 3, STORMWATER MANAGEMENT.
2. **FEATURES OVERFLOW TO DRAINAGE FEATURE 3.



3 VALLEY GUTTER OUTFALL DETAIL

SCALE: 1" = 10'

REV.	DATE	BY
1	03/19	BJS

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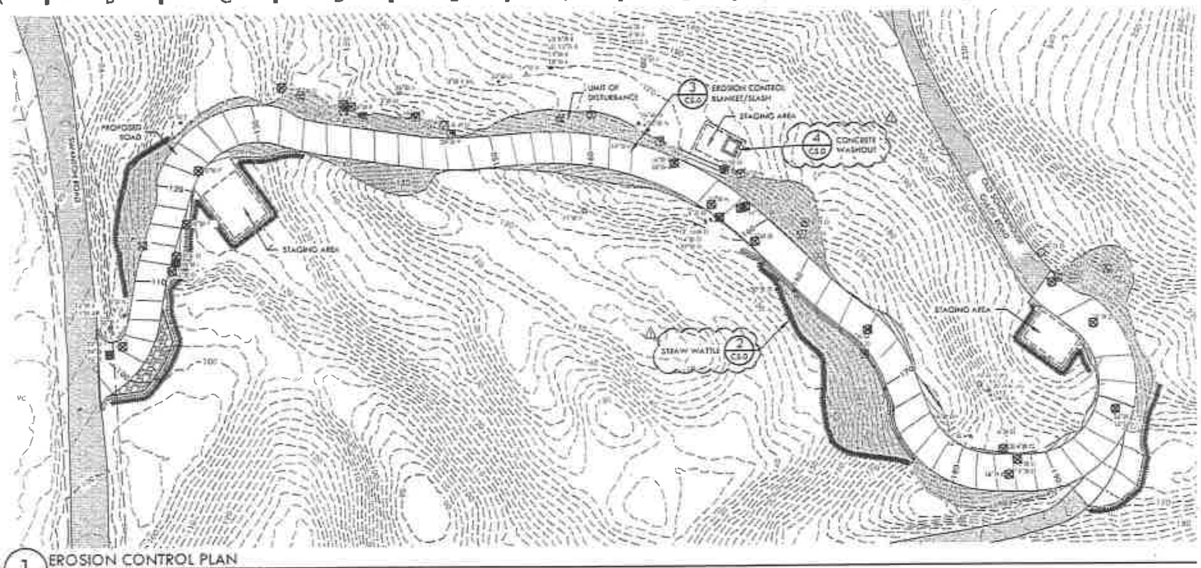
DRAWN BY:	BJS
CHECKED BY:	PHH
DATE:	OCTOBER 2018
JOB NO:	21706
SCALE:	AS SHOWN
SHEET:	C4.0

PROJECT TITLE
SWANTON PACIFIC RANCH
UPDATED FIELD CAMP ENTRANCE AND EXIT ROAD ALIGNMENT
DAVENPORT, CALIFORNIA
APN: 057-121-22 AND 057-151-03

CLIENT
SWANTON PACIFIC RANCH
ATTN: BRIAN DIETTERICK
125 SWANTON ROAD
DAVENPORT, CALIFORNIA 95017

SHEET TITLE
DRAINAGE PLAN



1 EROSION CONTROL PLAN

SCALE: 1" = 40' @ 24" X 36"

LEGEND			
	LIMIT OF DISTURBANCE		TREE
	(E) CONTOUR		TREE TO BE REMOVED
	(N) CONTOUR		DOUGLAS FIR TREE
	(E) ASPHALT PAVEMENT		CALIFORNIA BAY TREE
	ASPHALT CONCRETE SURFACING		LIVE OAK TREE
	EROSION CONTROL BLANKET		CALIFORNIA NUTMEG TREE
	SEED AND MULCH		MONTEREY PINE TREE
	STRAW WATTLE		REDWOOD TREE
			MAPLE TREE
		(M)	MULTIPLE TREES

GENERAL EROSION CONTROL MEASURES

THE CONTRACTOR SHALL INSTALL, MAINTAIN AND INSPECT EROSION CONTROL AND TEMPORARY STORMWATER CONTROL MEASURES TO CONTROL SEDIMENT AND RUNOFF IN ACCORDANCE WITH THESE PLANS

1.0 GENERAL REQUIREMENTS

1.1. ALL EROSION CONTROL AND SOIL CONSERVATION ACTIVITIES SHALL BE PERFORMED IN ACCORDANCE WITH THESE SPECIFICATIONS AND EROSION CONTROL REQUIREMENTS ESTABLISHED BY THE COUNTY OF SANTA CRUZ.

1.2. ALL GRADING ACTIVITIES ARE TO COMPLY WITH THE SANTA CRUZ COUNTY CODE CHAPTER 16 SECTION 22 AS IT PERTAINS TO EROSION CONTROL ON THE SITE

1.3. EROSION IS TO BE CONTROLLED AT ALL TIMES ALTHOUGH SPECIFIC MEASURES SHOWN ARE TO BE IMPLEMENTED AT A MINIMUM BETWEEN OCTOBER 15TH AND APRIL 15TH.

1.4. ACTUAL GRADING SHALL BEGIN WITHIN 30 DAYS OF VEGETATION REMOVAL OR THAT AREA SHALL BE PLANTED UNDER THE PROVISIONS OF SECTION

1.5. UNLESS SPECIFIC MEASURES ARE SHOWN OR NOTED ON THIS PLAN, ALL COLLECTED RUNOFF SHALL BE PERCOLATED INTO THE GROUND AND/OR CARRIED TO DRAINAGE COURSES IN A MANNER IN WHICH WILL NOT CAUSE EROSION.

1.6 THE DESIRED END RESULT OF THESE MEASURES IS TO CONTROL SITE EROSION AND PREVENT SEDIMENT TRANSPORT OFF THE SITE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO SEE THAT ANY ADDITIONAL MEASURES NECESSARY TO MEET THIS GOAL ARE IMPLEMENTED. IF FAILED INSPECTIONS BY PROJECT ENGINEER OR COUNTY STAFF SHOW THIS GOAL IS NOT BEING MET, ADDITIONAL MEASURES WILL BE REQUIRED.

1.7 RUNOFF FROM THE CONSTRUCTION SITE MUST NOT BE ALLOWED TO FLOW OVER ANY FILL SLOPES.

1.8. DURING CONSTRUCTION, NEVER STORE CUT AND FILL MATERIAL WHERE IT MAY WASH INTO DRAINAGE WAYS. KEEP ALL CULVERTS AND DRAINAGE FACILITIES FREE OF SILT AND DEBRIS KEEP EMERGENCY EROSION CONTROL MATERIALS SUCH AS STRAW MULCH, EROSION CONTROL BLANKETS, AND SANDBAGS ON-SITE AND INSTALL THESE AT THE END OF EACH DAY DURING THE WINTER RAINY SEASON AS NECESSARY

1.9. EROSION CONTROL MEASURES SHALL BE IN PLACE AT THE END OF EACH DAY'S WORK WHENEVER RAINFALL IS ANTICIPATED.

1.10. ANY DISTURBED AREA NOT COVERED BY THE ABOVE AND NOT PAVED, SODDED, OR BUILT UPON BY OCTOBER 15, OR DISTURBED AFTER THAT DATE, IS TO BE SEEDED AND MULCHED WITH WEED-FREE BARLEY STRAW MULCH. ALL SLOPES OVER 20% WILL BE HYDROSEEDED WITH CEREAL BARLEY AND COVERED BY AN EROSION CONTROL BLANKET

1.11. AT THE COMPLETION OF THE CONSTRUCTION PROJECT, AND AUTHORIZATION BY THE PROJECT MANAGER, ALL TEMPORARY EROSION CONTROLS SHALL BE REMOVED AND ALL DISTURBED AREAS SHALL BE STABILIZED WITH PERMANENT LANDSCAPING EROSION CONTROL MEASURES AS SPECIFIED BELOW.

1.12 BOTH LONG-TERM AND INTERIM MATERIAL STORAGE AND STAGING AREAS SHALL BE ESTABLISHED TO STORE CONSTRUCTION AND HAZARDOUS MATERIALS. THE STORAGE AREAS SHALL BE PLACED IN LOCATIONS REMOTE FROM DRAINAGE COURSES. THE STORAGE AREAS SHALL BE SETUP TO PROVIDE SECONDARY CONTAINMENT OF HAZARDOUS MATERIALS STORED ON THE PROPERTY AND CONTROL RUNOFF FROM THESE AREAS UTILIZING TEMPORARY BERMS AND/OR SILT CURTAINS. THE AREA(S) SHALL ALSO BE FENCED.

1.13. ALL ERODIBLE STOCKPILED MATERIALS SHALL BE COVERED WITH VISQUEEN SHEATHING DURING PERIODS OF RAIN.

1.14. TOP SOIL WITHIN THE GRADING PLAN SHALL BE STOCKPOLED FOR RE-APPLICATION WHERE SUITABLE.

1.15 MAINTAIN ADJACENT PUBLIC STREETS FREE AND CLEAR OF CONSTRUCTION DEBRIS, MATERIALS AND SOILS

2.0 EROSION CONTROL MEASURES

[illegible] TEMPORARY SEEDING

[illegible] AREAS SHALL BE HYDROSEEDED AND/OR BROADCAST WITH CEREAL BARLEY SEED AT [illegible]/ACRE. REFER TO REVEGETATION PLAN (IF APPLICABLE) FOR PERMANENT SEEDING.

[illegible] MULCHING

A. ALL SLOPES LESS THAN 20% SHALL BE COVERED WITH 4 TO 6 INCHES OF STRAW MULCH AFTER TEMPORARY EROSION CONTROL SEEDING.

B. OBTAIN STERILE, WEED-FREE BARLEY STRAW IN ORDER TO PREVENT THE SPREAD OF NOXIOUS WEEDS. AVOID MOLDY, COMPACTED STRAW BECAUSE IT TENDS TO CLUMP AND IS NOT EVENLY DISTRIBUTED.

C. STRAW SHALL BE SPREAD AND INCORPORATED INTO THE SOIL AT A RATE OF APPROXIMATELY 2.5 TONS PER ACRE

D. THE STRAW SHALL BE EVENLY DISTRIBUTED BY HAND OR MACHINE TO THE DESIRED DEPTH AND SHOULD COVER THE EXPOSED AREA TO A UNIFORM DEPTH.

E. APPROXIMATELY ONE BALE (80 LB (35 KG)) OF STRAW COVERS 1000 SF ADEQUATELY

F. THERE SHOULD BE A MINIMUM OF 3-4" OF STRAW OVER THE SOIL AND NO BARE SOIL SHOULD BE VISIBLE ONCE STRAW IS PLACED

G. ON STEEP OR HIGH WIND SITES, STRAW MUST BE ANCHORED TO KEEP IT FROM BLOWING AWAY.

H. "TRACKING" WITH MACHINERY ON SANDY SOIL PROVIDES ROUGHENING WITHOUT UNDUE COMPACTION.

2.1. OTHER PROVISIONS

A. CONTRACTOR, EROSION CONTROL SPECIALIST, AND/OR ENGINEER SHALL MONITOR ALL DISTURBED AREAS PRIOR TO AND IMMEDIATELY FOLLOWING ANY RAINS AND SHALL ADJUST BLANKETS, MULCH, STRAW ROLLS AND OTHER MEASURES TO INSURE NO SEDIMENT LEAVES SITE.

B. IF CONSTRUCTION OCCURS BETWEEN OCTOBER 15TH AND APRIL 15TH, EXPOSED SOIL NOT INVOLVED IN IMMEDIATE CONSTRUCTION ACTIVITY SHALL BE PROTECTED FROM EROSION AT ALL TIMES. IN ADDITION, TEMPORARY BERMS WILL BE INSTALLED AT THE EDGE OF THE CONSTRUCTION ZONE TO PREVENT SEDIMENT FROM ENTERING ADJACENT SLOPES. STRAW BALES SHALL BE STOCKPILED ON SITE TO ALLOW CONTRACTOR TO APPLY STRAW MULCH TO ALL EXPOSED SLOPES IF RAINFALL IS PREDICTED WITHIN 24 HOURS.

C. AFTER APRIL 15TH, EROSION CONTROL MEASURES SHALL BE IN PLACE DURING INCLEMENT WEATHER.

D. EROSION CONTROL MEASURES SHALL BE KEPT IN PLACE AND FUNCTIONAL FOR AT LEAST 3 YEARS UNTIL PERMANENT NATIVE/NON-NATIVE VEGETATION HAS BEEN ESTABLISHED AND PROVIDES NECESSARY SLOPE COVER.

E. UPON COMPLETION OF CONSTRUCTION, ALL TEMPORARY SEEDED SLOPES AND REMAINING EXPOSED SURFACES SHALL BE PERMANENTLY REVEGETATED PER THE LANDSCAPING PLAN (IF APPLICABLE)

F. THE CONTRACTOR OR CONTRACTOR'S REPRESENTATIVE SHALL MONITOR EROSION CONTROL ON DISTURBED AREAS FOR A PERIOD OF 3 YEARS TO INSURE MEASURES ARE SUCCESSFUL. MONITORING WILL TAKE PLACE DURING THE FALL DRY SEASON AND AFTER EACH SIGNIFICANT RAINFALL EVENT. CONTRACTOR WILL IMMEDIATELY NOTIFY EROSION CONTROL SPECIALIST OR PROJECT ENGINEER OF ANY PROBLEMS.

3.0 TREE PROTECTION MEASURES

A. THE CONTRACTOR SHALL CONTACT THE PROJECT BIOLOGIST IMMEDIATELY WITH ANY QUESTIONS REGARDING EXISTING TREES OR SITE CONDITIONS NEAR OR ADJACENT TO EXISTING TREES.

B. ESTABLISHMENT OF A TREE PRESERVATION ZONE (TPZ). ORANGE CONSTRUCTION FENCING, WITH STAKES IN THE GROUND, NO LESS THAN 48" INCHES IN HEIGHT, SHALL BE INSTALLED AS DIRECTED BY THE LANDSCAPE ARCHITECT OR ARBORIST. THE INSTALLATION WILL BE DONE PRIOR TO ANY CONSTRUCTION ACTIVITIES ON SITE. ONCE IN PLACE, FENCING WILL NOT BE REMOVED WITHOUT THE CONSENT OF THE PROJECT BIOLOGIST.

C. NO STORAGE OF CONSTRUCTION EQUIPMENT, MATERIALS, TOOLS, DEBRIS OR EXCESS SOIL WILL BE ALLOWED WITHIN THE TPZ. SOLVENTS OR LIQUIDS OF ANY TYPE SHOULD BE DISPOSED OF PROPERLY, NEVER WITHIN THIS PROTECTED AREA.

D. SOIL COMPACTION SHALL BE MINIMIZED WITHIN THE TPZ. SOIL SURFACE WITHIN THE TPZ SHALL BE MULCHED WITH A 6" LAYER OF MULCH.

E. UNAUTHORIZED PRUNING OF ANY TREE ON THIS SITE SHALL NOT BE ALLOWED. IF ANY TREE CANOPY ENCROACHES ON THE BUILDING SITE THE REQUIRED PRUNING WILL BE DONE ON THE AUTHORITY OF THE LANDSCAPE ARCHITECT/ARBORIST AND TO ISA GUIDELINES AND ANSI A-300 PRUNING STANDARDS.

4.0 SOIL RIPPING

IF SOIL RIPPING IS REQUIRED OF THE TOP 3" TO 6" OF GRADED SOIL IN THE BREEDING WETLAND AREAS, IT SHALL OCCUR IMMEDIATELY AFTER EXCAVATION TO AVOID DISTURBANCE OF PROTECTED WILDLIFE.

5.0 MATERIALS AND INSTALLATION

A. ALL MATERIALS SHALL BE INSTALLED PER MANUFACTURERS RECOMMENDATIONS

B. ALL MATERIAL SHOULD CONSIST OF NATURAL BIODEGRADABLE NETTING/WEBBING UNLESS OTHERWISE SPECIFIED.

5.1 EROSION CONTROL BLANKET:

A. FOR SLOPES OVER 20%, AN EROSION CONTROL BLANKET SHALL BE USED.

B. THE EROSION CONTROL BLANKET SHALL BE MADE OF ALL NATURAL FIBERS, SUCH AS NORTH AMERICAN GREEN SC 150 ON SLOPES, OR EQUIVALENT.

C. EROSION CONTROL BLANKETS SHALL BE INSTALLED PER MANUFACTURERS RECOMMENDATIONS AND IN CONFORMANCE WITH THE FOLLOWING SPECIFICATIONS

D. GRADE AND SHAPE AREA OF INSTALLATION

E. REMOVE ALL ROCK, CLODS, AND VEGETATIVE OR OTHER OBSTRUCTIONS SO THAT THE INSTALLED BLANKET WILL HAVE DIRECT CONTACT WITH THE SOIL.

F. U-SHAPED WIRE STAPLES, METAL GEOTEXTILE STAKE PINS OR TRIANGULAR WOODEN STAKES CAN BE USED TO ANCHOR MATS TO THE GROUND SURFACE. WIRE STAPLES SHOULD BE A MINIMUM OF 11 GAUGE. METAL STAKE PINS SHOULD BE 3/16 INCH DIAMETER STEEL WITH A 1 ½ INCH STEEL WASHER AT THE HEAD OF THE PIN. WIRE STAPLES AND METAL STAKES SHOULD BE DRIVEN FLUSH TO THE SOIL SURFACE. ALL ANCHORS SHOULD BE 6-8 INCHES LONG AND HAVE SUFFICIENT GROUND PENETRATION TO RESIST PULLOUT. LONGER ANCHORS MAY BE REQUIRED FOR LOOSE SOILS.

G. EROSION CONTROL BLANKET MAY BE COVERED WITH SLASH AFTER INSTALLATION IS PLACED. CARE SHOULD BE TAKEN TO NOT PUNCTURE, MOVE, OR OTHERWISE ALTER EROSION CONTROL BLANKET INSTALLATION.

5.1.1 INSTALLATION ON SLOPE:

A. BEGIN AT THE TOP OF THE SLOPE AND ANCHOR THE BLANKET IN A 6 INCH DEEP BY 6 INCH WIDE TRENCH. BACKFILL TRENCH AND TAMP EARTH FIRMLY.

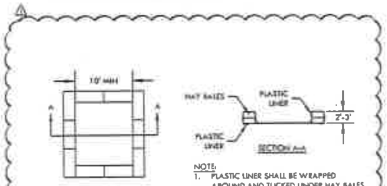
B. UNROLL BLANKET DOWNSLOPE IN THE DIRECTION OF WATER FLOW. BLANKET SHOULD BE UNROLLED SLOWLY IN A CONTROLLED MANNER TO ACHIEVE DIRECT CONTACT WITH THE SOIL.

C. THE EDGE OF ADJACENT PARALLEL ROLLS MUST BE OVERLAPPED 2-3 INCHES AND BE STAPLED EVERY 3 FEET

D. WHEN BLANKETS MUST BE SPLICED, PLACE BLANKET END OVER END (SHINGLE STYLE) WITH 6 INCH OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12 INCHES APART.

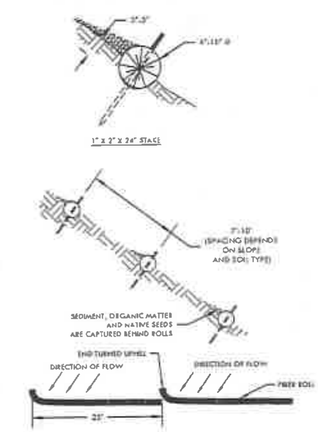
E. LAY BLANKET LOOSELY AND MAINTAIN DIRECT CONTACT WITH THE SOIL, DO NOT STRETCH.

F. BLANKETS SHALL BE STAPLED SUFFICIENTLY TO ANCHOR BLANKET AND MAINTAIN CONTACT WITH THE SOIL. STAPLES SHALL BE PLACED DOWN THE CENTER AND STAGGERED WITH THE STAPLES PLACES ALONG THE EDGES. STEEP SLOPES, 1:1 TO 2:1 REQUIRE 2 STAPLES PER SQUARE YEAR. MODERATE SLOPES, 2:1 TO 3:1, REQUIRE 1-2 STAPLES PER SQUARE YARD (1 STAPLE 3 O.C.). GENTLE SLOPES REQUIRE ONE STAPLE PER SQUARE YARD.



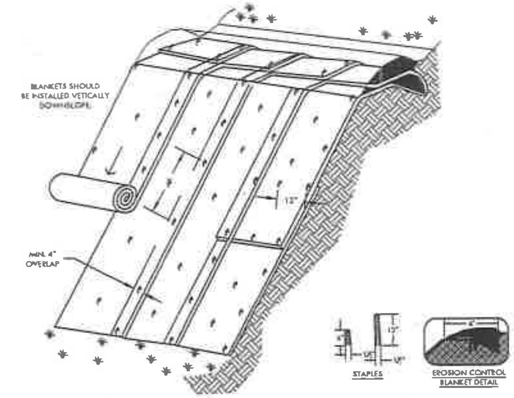
4 CONCRETE WASHOUT INSTALLATION

SCALE: 1" = 10'



2 TYPICAL STRAW WATTLE INSTALLATION

SCALE: NTS



3 TYPICAL EROSION CONTROL BLANKET INSTALLATION

SCALE: NTS

REV.	DATE	BY
1	03/19	BJS

SHEET TITLE: EROSION CONTROL PLAN

CLIENT: SWANTON PACIFIC RANCH
ATTN: BRIAN DIETTERICK
125 SWANTON ROAD
DAVENPORT, CALIFORNIA 95017

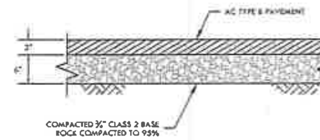
PROJECT TITLE: SWANTON PACIFIC RANCH
UPDATED FIELD CAMP ENTRANCE AND EXIT ROAD ALIGNMENT
DAVENPORT, CALIFORNIA
APN: 057-121-22 AND 057-151-03

PALI CREEK ENGINEERING, INC.
Consulting Engineers
1525 SEABRIGHT AVE.
SANTA CRUZ, CA 95062

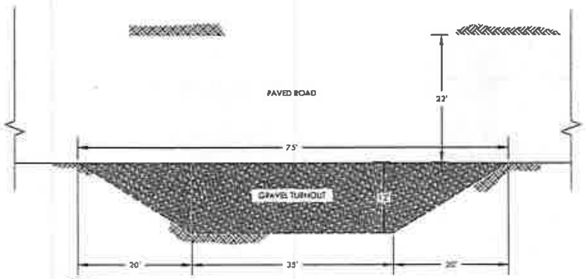
DRAWN BY:	BJS
CHECKED BY:	[illegible]
DATE:	OCTOBER 2018
JOB NO:	21706
SCALE:	AS SHOWN
SHEET:	C5.0

7 OF 9

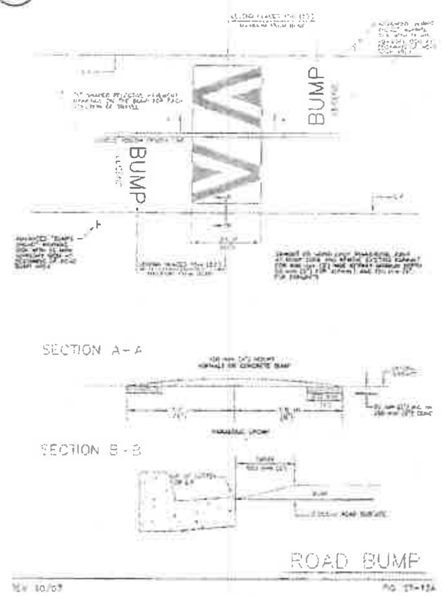
PART OF PLAN



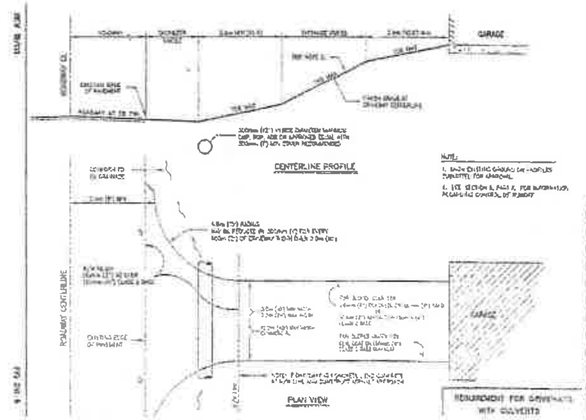
1 TYPICAL PAVEMENT SECTION
SCALE: AS DIMENSIONED



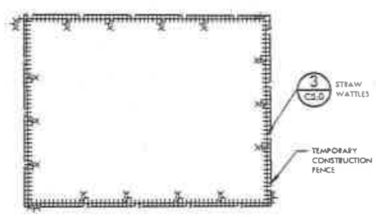
2 TYPICAL TURNOUT DETAIL
SCALE: 1" = 10'



3 TYPICAL SPEED TABLE DETAIL
SANTA CRUZ COUNTY DESIGN CRITERIA: FIG 27-13A



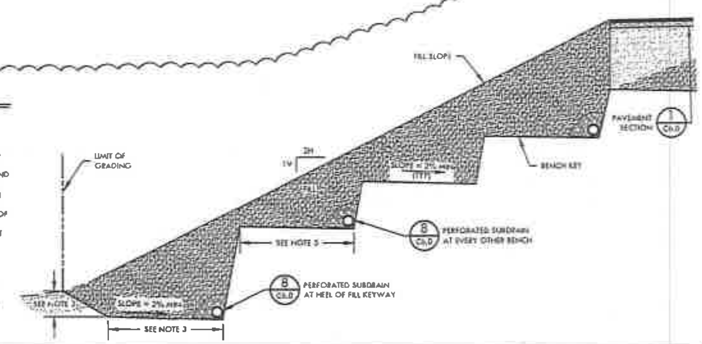
4 DRIVEWAY DETAIL
SANTA CRUZ COUNTY DESIGN CRITERIA: FIG DW-7



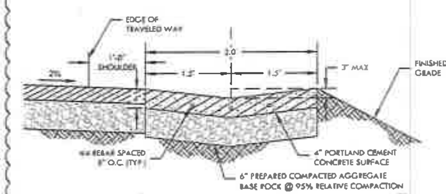
5 CONSTRUCTION STAGING AREA
SCALE: 1" = 10'

NOTES:

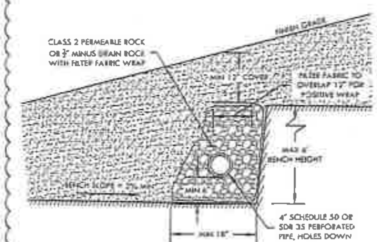
1. CONTRACTOR SHALL ATTEMPT TO MAINTAIN FILL SLOPES AT A MAXIMUM OF 2:1 (HORIZONTAL:VERTICAL); NO SLOPES SHALL EXCEED 2:1.
2. WHERE FILL IS TO BE PLACED ON EXISTING SLOPES WITH AN INCLINATION OF 5:1 OR STEEPER, THE FILL SHOULD BE KEYED AND BENCHED INTO THE EXISTING SLOPE.
3. TOE KEYS SHOULD EXTEND A MINIMUM OF 2 FEET BELOW GROUND SURFACE AND HAVE A MINIMUM WIDTH OF 10 FEET OR 1-1/2 TIMES THE WIDTH OF THE COMPACTION EQUIPMENT, WHICHEVER PROVIDES A WIDER EXCAVATION.
4. TOE KEYS SHOULD SLOPE TOWARD THEIR BACKS WITH A SLOPE OF AT LEAST 2 PERCENT.
5. BENCHES SHOULD BE CREATED BY CUTTING A MINIMUM OF 5 FEET INTO THE COMPETENT MATERIAL.
6. VERTICAL SPACING OF BENCHES SHOULD NOT BE MORE THAN ABOUT 6 FEET.
7. THE MATERIALS EXCAVATED FROM THE BENCHES CAN BE MIXED WITH THE SLOPE FILL AND THE FILL SHOULD BE COMPACTED TO A MINIMUM OF 95%.
8. THE SUBDRAIN DISCHARGE POINT IS AS SHOWN ON SHEET C3.0.



6 KEY AND BENCH DETAIL
SCALE: 1" = 5'



7 VALLEY GUTTER DETAIL
SCALE: AS DIMENSIONED



8 PERFORATED SUBDRAIN DETAIL
SCALE: AS DIMENSIONED

REV.	DATE	BY
△	03/19	BJS

SHEET TITLE: CIVIL DETAILS

CLIENT: SWANTON PACIFIC RANCH
ATTN: BRIAN DIETTERICK
125 SWANTON ROAD
DAVENPORT, CALIFORNIA 95017

PROJECT TITLE: SWANTON PACIFIC RANCH
UPDATED FIELD CAMP ENTRANCE AND EXIT ROAD ALIGNMENT
DAVENPORT, CALIFORNIA
APN: 057-121-22 AND 057-151-03

FALL CREEK ENGINEERING, INC.
Consulting Engineers
1525 SEABRIGHT AVE
SANTA CRUZ, CA 95062

DRAWN BY:	BJS
CHECKED BY:	PHH
DATE:	OCTOBER 2018
JOB NO:	21706
SCALE:	AS SHOWN
SHEET:	C6.0

GENERAL SPECIFICATIONS

THE CONTRACTOR SHALL CAREFULLY EXAMINE THE PROPOSED WORK, PLANS, AND SPECIFICATIONS. THE SUBMISSION OF A BID SHALL BE CONCLUSIVE EVIDENCE THAT THE CONTRACTOR HAS INVESTIGATED AND IS SATISFIED AS TO THE CONDITIONS TO BE ENCOUNTERED, THE CHARACTER, QUALITY, AND SCOPE OF WORK TO BE PERFORMED, THE QUANTITIES OF MATERIALS TO BE FURNISHED, AND TO THE REQUIREMENTS OF THE PLANS AND SPECIFICATIONS. ALL DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALE SHOWN ON THE PLANS.

1. LOCATION OF THE WORK AND ACCESS

PHYSICAL LOCATION OF THE WORK: STAUB AND SCHOOL HOUSE GULCH ROADS (OFF OF SWANTON ROAD) ON SWANONT-PACIFIC RANCH PROPERTY. RANCH OFFICE IS LOCATED AT 125 SWANTON ROAD, SANTA CRUZ, CALIFORNIA.

2. TIMING OF THE WORK

DAILY WORK HOURS FOR THE OPERATION OF HEAVY EQUIPMENT SHALL BE LIMITED TO HOURS WHICH ARE AGREED UPON WITH THE PROJECT OWNERS AND COMPLY WITH ALL LOCAL ORDINANCES AND REGULATIONS.

3. INQUIRIES

QUESTIONS SHOULD BE DIRECTED TO THE RESOURCE MANAGER

STEVE AUTEN SWANTON PACIFIC RANCH 125 SWANTON ROAD SANTA CRUZ, CA 95017 PHONE (831) 458-5413	OR THE PROJECT ENGINEER	PETER HAASE FALL CREEK ENGINEERING, INC PO BOX 7894 SANTA CRUZ, CA 95061 PHONE (831) 426-9054

4. SPECIAL NOTICES

4.1 THE PROJECT ENGINEER SHALL BE GIVEN SEVEN (7) BUSINESS DAYS NOTICE PRIOR TO START OF ON-SITE WORK.

4.2 CONSTRUCTION WORK SHALL BE ACCOMPLISHED IN STRICT ACCORDANCE WITH ENVIRONMENTAL PERMIT REQUIREMENTS, IF APPLICABLE. PERMITS SHALL BE ISSUED BY THE COUNTY OF SANTA CRUZ.

4.3 HAZARDOUS MATERIALS. NO HAZARDOUS OR CONTAMINATED SOILS SOILS HAVE BEEN OBSERVED ON SITE AND ARE NOT ANTICIPATED TO BE ENCOUNTERED. HOWEVER, IN THE EVENT THAT CONTAMINATED MATERIALS ARE ENCOUNTERED, ALL WORK SHALL CEASE AND THE PROJECT ENGINEER SHALL BE INFORMED.

5. GENERAL TECHNICAL REQUIREMENTS

5.1 IF THE CODE PROVISIONS CONFLICT, THE MORE STRINGENT CODE PROVISION SHALL GOVERN. IN ANY INSTANCES WHERE THE DRAWINGS AND SPECIFICATIONS DO NOT SPECIFY EXPLICIT MATERIALS OR METHODS, THEN PERFORM THE WORK IN ACCORDANCE WITH THE MINIMUM REQUIREMENTS OF THE CODE APPLICABLE TO THE WORK.

5.2 FIELD-VERIFY ALL DIMENSIONS AND CONDITIONS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO IMMEDIATELY NOTIFY THE PROJECT ENGINEER OF ANY CONFLICTS.

5.3 CLEARING LIMITS. MINIMIZE DISTURBANCE AND EXISTING CONDITIONS WITHIN THE PROJECT LIMITS.

6. CONSTRUCTION SUPPORT

6.1 THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE EQUIPMENT AND CONSTRUCTION METHODS NECESSARY TO EFFICIENTLY PERFORM THE WORK. EARTHWORK EQUIPMENT SHOULD BE CHOSEN TO MINIMIZE ENVIRONMENTAL IMPACTS TO THE PROJECT AND ADJACENT AREAS AS WELL AS THE ADJACENT ROADS.

6.2 THE CONTRACTOR SHALL PROVIDE FIELD SURVEYOR (HORIZONTAL LAYOUT AND GRADE CONTROL STAKING) TO ACCURATELY ESTABLISH THE HORIZONTAL AND VERTICAL LOCATIONS OF THE WORK. ADJUST THE LAYOUT OF THE WORK AS NECESSARY FOR SMOOTH HORIZONTAL AND VERTICAL TRANSITION TO EXISTING FEATURES.

7. PROTECTION

7.1 COMPLY WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL LAWS AND REGULATIONS. THIS CONDITION APPLIES TO, BUT IS NOT LIMITED TO, LAWS AND REGULATIONS GOVERNING NOISE LEVELS, AIR AND WATER QUALITY STANDARDS, AND CULTURAL RESOURCES.

7.2 PROTECT ADJACENT VEGETATION, PROPERTY, STRUCTURES, AND IMPROVEMENTS FROM DAMAGE. REPAIR OF DAMAGE INCURRED TO ADJACENT VEGETATION, PROPERTY, STRUCTURES, AND IMPROVEMENTS AS A RESULT OF CONSTRUCTION ARE THE RESPONSIBILITY OF THE CONTRACTOR.

7.3 RESTORE ANY DISTURBED AREAS TO THEIR PRE-CONSTRUCTION CONDITION. SLOPE ANY DISTURBED SOIL AREAS TO DRAIN. INSTALL EROSION CONTROL MEASURES IN ANY DISTURBED SOIL AREAS.

8. CLEAN UP

KEEP THE WORK SITE IN NEAT APPEARANCE TO THE EXTENT PRACTICAL. KEEP ROADWAYS, PARKING AREAS, AND WALKWAYS FREE OF MUD AND ROCKS. SWEEP DAILY AS NECESSARY. DISPOSE OF DEBRIS LEGALLY AT LICENSED DISPOSAL FACILITIES. UPON COMPLETION OF THE WORK AND IMMEDIATELY PRIOR TO THE FINAL INSPECTION, CLEAN THE IMPROVEMENTS AND REMOVE ANY TEMPORARY LABELS.

9. FINAL INSPECTION

9.1 NOTIFY THE PROJECT ENGINEER AT LEAST SEVEN (7) BUSINESS DAYS PRIOR TO THE ANTICIPATED DATE OF COMPLETION OF ALL WORK. THE PROJECT ENGINEER AND CONTRACTOR OR "DESIGNATED REPRESENTATIVE" (WHO WILL OVERSEE THE ACTUAL CONSTRUCTION WORK) WILL PROCEED WITH FINAL INSPECTION AS PROMPTLY AS PRACTICABLE.

9.2 THE TIME REQUIRED FOR SUCH REVIEW AND FOR MAKING ANY CORRECTIONS AS A RESULT THEREOF SHALL BE INCLUDED IN THE CONTRACT PERFORMANCE TIME.

9.3 THE CONTRACTOR REPRESENTATIVE RESPONSIBLE FOR THE WORK SHALL BE PRESENT AT THE FINAL INSPECTION AND SHALL SUBMIT A PRELIMINARY LIST OF UNFINISHED WORK.

10. CLOSE OUT DOCUMENTS

RECORD DOCUMENTS. MAINTAIN ON THE PROJECT SITE WHEN WORK IS IN PROGRESS, A CURRENT SET OF DRAWINGS CLEARLY AND ACCURATELY SHOWING THE AS-CONSTRUCTED WORK. PRIOR TO FINAL PAYMENT, SUBMIT ONE SET OF AS-BUILT DRAWINGS THAT CLEARLY INDICATE THE AS-CONSTRUCTED FEATURES SHOWN IN RED.

MATERIAL SPECIFICATIONS

THE ACCOMPANIED PLANS PRESENT THE GENERAL LAYOUT AND CONSTRUCTION DETAILS FOR THE SITE IMPROVEMENTS. THE FOLLOWING ARE MATERIAL SPECIFICATIONS FOR THE PROJECT COMPONENTS. ALL MATERIALS USED FOR THE CONSTRUCTION OF THIS PROJECT SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS AND AS DESCRIBED IN THE ACCOMPANIED PLANS.

1. EARTHWORK

1.1. FILL SOIL MATERIALS. USE OF FILL SOILS ONSITE SHALL BE APPROVED BY THE PROJECT ENGINEER.

1.2 FILL DEFINITION. SOIL EXCAVATED FROM THE PROJECT SITE AND IMPORTED MATERIALS WHICH MEET THE SATISFACTORY SOIL MATERIALS SPECIFICATIONS.

2. ASPHALT CONCRETE

THE ACCESS ROAD SHALL BE PAVED WITH 3" ASPHALT CONCRETE OVER 6" BASE ROCK.

2.1. ASPHALT CONCRETE. THE ASPHALT CONCRETE SHALL BE TYPE B, ½" MAXIMUM, MEDIUM AGGREGATE GRADATION. A PRIME COAT SHALL BE APPLIED BEFORE PAVING.

2.2 BASE ROCK. WHERE BASE ROCK IS SPECIFIED, THE BASE ROCK SHALL BE ¾" CLASS 2 BASE ROCK, COMPACTED TO 95% RELATIVE COMPACTION.

3. PORTLAND CEMENT CONCRETE

3.1. POURED IN PLACE CONCRETE WORK SHALL BE CONSTRUCTED OF NORMAL WEIGHT, PORTLAND CEMENT CONCRETE, HAVING A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 3000 PSI. ALL PORTLAND CEMENT CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF ACI 318, "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE", LATEST EDITION. MAXIMUM CONCRETE SLUMP SHALL BE 4 INCHES. THE USE OF ANY ADMIXTURE IN THE CONCRETE MUST BE APPROVED BY THE ENGINEER.

3.2. ALL NEWLY PLACED CONCRETE SHALL BE CURED IN ACCORDANCE WITH THE PROVISIONS IN ACI 308, "STANDARD PRACTICE FOR CURING CONCRETE," LATEST EDITION. METHOD OF CURING SHALL BE AT THE OPTION OF THE CONTRACTOR WITH APPROVAL OF THE COUNTY'S REPRESENTATIVE.

3.3 ALL METAL ANCHORAGE DEVICES, ANCHOR BOLTS, ETC. SHALL BE SECURED IN PLACE AND INSPECTED BY THE PROJECT ENGINEER PRIOR TO PLACING CONCRETE.

3.4 ALL WORK DONE UNDER THIS SECTION SHALL CONFORM WITH THE APPLICABLE PORTIONS OF ACI 318, LATEST EDITION.

3.5 CONCRETE COMPONENTS

3.5.1. CEMENT. PROVIDE A STANDARD BRAND OF PORTLAND CEMENT, ASTM C150, TYPE I OR II.

3.5.2. AGGREGATES. PROVIDE HARDROCK AGGREGATE, ASTM C33, WITH ADDITIONAL ATTRIBUTES AS SPECIFIED HEREIN.

3.5.3. FINE AGGREGATE. PROVIDE WASHED NATURAL SAND HAVING STRONG, HARD, DURABLE PARTICLES, AND CONTAINING NOT MORE THAN 2 PERCENT BY WEIGHT OF DELETERIOUS MATTER SUCH AS CLAY LUMPS, MICA, SHALE OR SCHIST. GRADE FROM COARSE TO FINE.

3.5.4. COARSE AGGREGATE. PROVIDE COARSE AGGREGATE CONSISTING OF CLEAN, HARD, FINE-GRAINED, SOUND CRUSHED ROCK OR WASHED GRAVEL, OR A COMBINATION OF BOTH, CONTAINING NOT MORE THAN 3 PERCENT BY WEIGHT OF FLAT, CHIP-LIKE, THIN, ELONGATED, FRIABLE OR LAMINATED PIECES, NOR MORE THAN 2 PERCENT BY WEIGHT OF SHALE OR CHERTY MATERIAL. USE COARSE AGGREGATE OF THE LARGEST PRACTICABLE SIZE FOR EACH CONDITION OF PLACEMENT.

3.5.5. WATER. USE ONLY CLEAN POTABLE WATER.

3.6. CONCRETE FORMS AND ACCESSORIES

3.7 THIS SECTION SPECIFIES CONSTRUCTION OF CONCRETE FORMS.

3.7.1. PLYWOOD B-B PLYFORM.

3.7.2 STEEL PREFABRICATED.

3.7.3 LUMBER. STANDARD GRADE, (CONCEALED SURFACES ONLY).

3.7.4. FORM TIES AND SPREADERS. SNAP-OFF TYPE, GALVANIZED METAL, FIXED LENGTH, CONE TYPE, WITH WATERPROOFING WASHER AND LEAVING NO METAL WITHIN 1 INCH OF THE CONCRETE FACE.

3.7.5. FORM RELEASE AGENT. COLORLESS MINERAL OIL WHICH WILL NOT STAIN CONCRETE, OR ABSORB MOISTURE, OR IMPAIR NATURAL BONDING OR COLOR CHARACTERISTICS OF COATING INTENDED FOR USE ON CONCRETE. DIESEL OR OIL BASED RELEASE AGENTS SHALL NOT BE USED.

3.8 REINFORCEMENT

3.8.1. USE GRADE 40 DEFORMED REINFORCING FOR #4 AND SMALLER BARS AND GRADE 60 FOR #5 AND LARGER BARS CONFORMING TO THE REQUIREMENTS OF ASTM A615. STAGGERED REINFORCING BAR CONTACT SPLICES SHALL LAP PER PLAN. SUPPORT HORIZONTAL STEEL AT BOTTOM ON MORTAR BLOCKS. MINIMUM CLEARANCE SHALL BE 3 INCHES FOR SURFACES POURED AGAINST EARTH AND 1.5 INCHES ELSEWHERE.

3.8.2 THIS SECTION SPECIFIES REINFORCING BARS AND WELDED WIRE FABRIC.

3.8.2.1. REINFORCEMENT STEEL: BAR REINFORCEMENT - ASTM A615 GRADE

3.8.2.2. REINFORCING FABRIC: WELDED WIRE FABRIC - ASTM A185.

3.8.3. ALL REINFORCING SHALL BE SECURED IN PLACE AND INSPECTED BY THE PROJECT ENGINEER PRIOR TO PLACING ANY CONCRETE OR GROUT.

3.8.4. ALL WORK DONE UNDER THIS SECTION SHALL CONFORM WITH THE APPLICABLE PORTIONS OF ACI 318, LATEST EDITION, PARTICULARLY CHAPTER 7, "DETAILS OF REINFORCEMENT".

4. ADDITIONAL COMPONENTS

4.1. SPEED TABLE. THE SPEED TABLE SHALL BE CONSTRUCTED OF ASPHALT TO THE DIMENSIONS SPECIFIED BY THE RESOURCE MANAGER.

4.2. TURNOUT. THE TURNOUT SHALL BE SURFACED WITH A MINIMUM OF 9" CLASS 2 AGGREGATE BASE COMPACTED TO 95% RELATIVE COMPACTION. THE CLIENT MAY CHOOSE TO PAVE TURNOUTS WITH AC PAVEMENT THAT SHALL MATCH THE TYPICAL PAVEMENT SECTION PRESENTED IN THESE PLANS.

CONSTRUCTION SPECIFICATIONS

THE CONSTRUCTION OF ALL FACILITIES SHALL CONFORM TO THE PLANS AND FOLLOWING SPECIFICATIONS. ALL NECESSARY CONSTRUCTION PERMITS SHALL BE OBTAINED PRIOR TO COMMENCEMENT OF ALL SITE WORK.

1. PRECONSTRUCTION CONFERENCE

THE CONTRACTOR SHALL HAVE A PRECONSTRUCTION MEETING WITH THE PROJECT MANAGER AND PROJECT ENGINEER AT LEAST ONE WEEK PRIOR TO COMMENCEMENT OF SITE WORK. THE PROJECT MANAGER AND PROJECT ENGINEER SHALL BE CONTACTED 48 HOURS PRIOR TO THE MEETING. THE MEETING SHOULD BE CONDUCTED TO REVIEW THE DESIGN, MATERIAL, AND CONSTRUCTION SPECIFICATIONS. ALL CONTRACTOR PROPOSED REVISIONS IN THE DESIGN SHALL BE APPROVED BY THE PROJECT ENGINEER.

2. FIELD ENGINEERING

2.1. STAGING AREAS. PRIOR TO THE START OF WORK THE CONTRACTOR SHALL PROPOSE A STAGING AREA TO BE APPROVED BY THE PROJECT MANAGER.

2.2. UTILITIES. PRIOR TO THE START OF CLEARING AND EXCAVATION WORK, LOCATE ANY EXISTING UTILITIES AND PROVIDE FIELD ENGINEERING TO ACCURATELY ESTABLISH THE HORIZONTAL LAYOUT AND VERTICAL ELEVATIONS OF THE WORK. MAINTAIN AND RENEW THE FIELD STAKING AS THE WORK PROGRESSES.

2.3. VERTICAL TOLERANCE. VERTICALLY LAYOUT AND FINISH-GRADE THE EARTHWORK AREA TO WITHIN 0.025 FEET OF THE ELEVATION(S) SHOWN ON THE DRAWINGS, AND TO SMOOTHLY TRANSITION VERTICALLY WITH THE EXISTING GROUND LINES.

2.4. HORIZONTAL TOLERANCE. HORIZONTALLY LAYOUT AND CONSTRUCT EARTHWORK WITHIN 0.5 FEET OF THE TRUE HORIZONTAL POSITION INDICATED ON THE DRAWINGS, AND SMOOTHLY TRANSITION HORIZONTALLY WITH THE EXISTING GROUND LINES. THE PRINCIPAL EDGES OF EARTHWORK SHALL BE CONSTRUCTED STRAIGHT OR SMOOTHLY CURVED AS INDICATED ON THE DRAWINGS WITHOUT READILY NOTICEABLE WAVINESS.

3. SITE WORK

MOBILIZATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PREPARATORY WORK AND PLACEMENT OF MATERIALS IN A STAGING AREA REQUIRED FOR CONSTRUCTION OPERATIONS INCLUDING, BUT NOT LIMITED TO, THOSE NECESSARY FOR THE MOVEMENT OF PERSONNEL, EQUIPMENT, SUPPLIES, AND INCIDENTALS TO THE PROJECT SITE; FOR THE ESTABLISHMENT OF FACILITIES NECESSARY FOR WORK ON THE PROJECT; PROVIDING POLLUTION CONTROL MEASURES; AND FOR ALL OTHER WORK AND OPERATIONS WHICH MUST BE PERFORMED. THE CONTRACTOR SHALL PROVIDE MATERIALS, NOT SPECIFICALLY DESCRIBED BUT REQUIRED FOR PROPER COMPLETION OF THE WORK OF THIS SECTION.

3.1. WET WEATHER CONSTRUCTION

IF SITE GRADING AND CONSTRUCTION IS TO BE PERFORMED DURING THE WINTER RAINY MONTHS, THE OWNER AND CONTRACTORS SHOULD BE FULLY AWARE OF THE POTENTIAL IMPACT OF WET WEATHER. RAINSTORMS CAN CAUSE DELAY TO CONSTRUCTION AND DAMAGE TO PREVIOUSLY COMPLETED WORK BY SATURATING COMPACTED PADS OR SUBGRADES, OR FLOODING EXCAVATIONS. EARTHWORK DURING RAINY MONTHS WILL REQUIRE EXTRA EFFORT AND CAUTION BY THE CONTRACTORS. THE GRADING CONTRACTOR SHOULD BE RESPONSIBLE TO PROTECT THEIR WORK TO AVOID DAMAGE BY RAINWATER. STANDING POOLS OF WATER SHOULD BE PUMPED OUT IMMEDIATELY. CONSTRUCTION DURING WET WEATHER CONDITIONS SHOULD BE ADDRESSED IN THE PROJECT CONSTRUCTION BID DOCUMENTS AND/OR SPECIFICATIONS. WE RECOMMEND THE GRADING CONTRACTOR SUBMIT A WET WEATHER CONSTRUCTION PLAN OUTLINING PROCEDURES THEY WILL EMPLOY TO PROTECT THEIR WORK AND TO MINIMIZE DAMAGE TO THEIR WORK BY RAINSTORMS.

3.2. CLEARING AND GRUBBING

CLEAR THE SITE AS SHOWN ON THE DRAWINGS AND AS SPECIFIED IN THIS SECTION. CLEARING AND GRUBBING SHALL CONSIST OF ALL WORK INCLUDING, BUT NOT LIMITED TO, PROVIDING AND INSTALLING TEMPORARY EROSION CONTROL, AND PLACEMENT OF TREES, TREE BRANCHES, TREE STUMPS, BRUSH, ROOTS, BOULDERS, SHRUBS, SEDIMENT, AND ALL OBJECTIONABLE MATERIALS IN AN AGREED UPON LOCATION ADJACENT TO THE WORK SITE. EXAMINE THE AREAS AND CONDITIONS UNDER WHICH THE WORK OF THIS SECTION WILL BE PERFORMED. CORRECT CONDITIONS DETRIMENTAL TO TIMELY AND PROPER COMPLETION OF THE WORK. DO NOT PROCEED UNTIL UNSATISFACTORY CONDITIONS ARE CORRECTED. CLEAR AND GRUB WITHIN THE CLEARING LIMITS. PROTECT TREES AND SHRUBS TO THE MAXIMUM EXTENT PRACTICAL. QUESTIONS ABOUT TREE REMOVAL SHOULD BE DIRECTED TO THE RESOURCE MANAGER OR THE PROJECT ENGINEER.

4. STAKING

THE CONTRACTOR SHALL PROVIDE SUFFICIENT HORIZONTAL AND VERTICAL CONTROL FOR INSTALLATION OF THE WORK AT DATUM POINTS NECESSARY TO ESTABLISH ALIGNMENT AND GRADE. THE PROTECTION AND CARE OF THE STAKES ONCE SET, SHALL ALSO BE THE RESPONSIBILITY OF THE CONTRACTOR.

5. STRIPPING

FOLLOWING THE DEMOLITION AND INITIAL SITE PREPARATION, SURFACE VEGETATION AND ORGANICALLY CONTAMINATED TOPSOIL SHOULD BE STRIPPED FROM THE AREA TO BE GRADED. THIS ORGANIC RICH SOIL MAY BE STOCKPILED FOR FUTURE LANDSCAPING. THE REQUIRED DEPTH OF STRIPPING WILL VARY WITH THE TIME OF YEAR AND MUST BE BASED UPON VISUAL OBSERVATIONS OF THE PROJECT MANAGER. IT IS ANTICIPATED THAT THE DEPTH OF STRIPPING MAY BE 2 TO 4 INCHES.

ALL WASTES DISPOSAL SHALL BE CONDUCTED AS FOLLOWS:
A. REMOVE WASTE FROM CLEARING OPERATIONS
B. DISPOSE OF AWAY FROM THE SITE IN A LEGAL MANNER.
C. DO NOT STORE OR PERMIT DEBRIS TO ACCUMULATE ON THE JOB SITE.
D. DO NOT BURN DEBRIS AT THE SITE.

6. EXCAVATION AND FILL

6.1. EXCAVATE AND FILL TO:
6.1.1. THE LINES AND GRADES SHOWN ON THE DRAWINGS;
6.1.2. PROVIDE A SMOOTH HORIZONTAL AND VERTICAL TRANSITION WITH EXISTING FEATURES AND;
6.1.3. PROVIDE EFFECTIVE DRAINAGE WITHOUT PONDING WATER.

6.2. FILL PLACEMENT METHODS. EXCAVATED SURFACES AND FILL AREAS SUPPORTING THE GEOTEXTILE SHALL BE LAYER-PLACED IN 8-INCH THICK (MAXIMUM LOOSE) LAYERS, WETTED TO AT-LEAST 2% OVER OPTIMUM MOISTURE CONTENT IN ACCORDANCE WITH ASTM D1557 METHOD A, AND MECHANICALLY COMPACTED TO ACHIEVE 90 PERCENT OF THE MAXIMUM DENSITY.
6.2.1. LAYERS SHALL BE HORIZONTAL.
6.2.2. WET OR DRY THE FILL MATERIAL AS NECESSARY TO ACHIEVE PROPER MOISTURE CONTENT AND COMPACTION.
6.2.3. THE CONTRACTOR IS RESPONSIBLE FOR ACHIEVEMENT OF PROPER COMPACTION, AS SPECIFIED HEREIN, DURING FILL PLACEMENT.

6.3. GENERAL COMPACTION REQUIREMENTS. COMPACTION TESTING IS REQUIRED. SOILS LOCATED IN ALL AGGREGATE BASE AND SUBBASE IN PAVEMENT AREAS, THE UPPER 8 INCHES OF SUBGRADE IN PAVEMENT AREAS, AND ALL UTILITY TRENCH BACKFILL IN PAVEMENT AREAS SHOULD HAVE A MAXIMUM DRY DENSITY OF 95%. SOILS LOCATED IN ALL REMAINING NATIVE SOIL AND FILL MATERIAL SHOULD HAVE MAXIMUM DRY DENSITY OF 90%. THE MAXIMUM DRY DENSITY WILL BE OBTAINED FROM A LABORATORY COMPACTION CURVE RUN IN ACCORDANCE WITH ASTM PROCEDURE (D1557). THIS TEST WILL ALSO ESTABLISH THE OPTIMUM MOISTURE CONTENT OF THE MATERIAL. FIELD DENSITY TESTING WILL BE IN ACCORDANCE WITH ASTM TEST #D2922.

6.4. MOISTURE CONDITIONING. THE MOISTURE CONDITIONING PROCEDURE SHOULD RESULT IN SOIL WITH A RELATIVELY UNIFORM MOISTURE CONTENT OF 1 TO 3 PERCENT OVER OPTIMUM AT THE TIME OF COMPACTION. IF THE SOIL IS DRY, WATER MAY NEED TO BE ADDED. IF THE SOIL IS WET, IT WILL NEED TO BE DRIED BACK. THE NATIVE SOIL MAY REQUIRE A DILIGENT AND ACTIVE DRYING AND/OR MIXING OPERATION TO REDUCE OR RAISE THE MOISTURE CONTENT TO THE LEVELS REQUIRED TO OBTAIN ADEQUATE COMPACTION.

6.5. ENGINEERED FILL MATERIAL. NATIVE SOIL AND/OR IMPORTED FILL SHALL BE APPROVED BY THE PROJECT ENGINEER. RE-USE OF APPROVED NATIVE SOIL WILL REQUIRE THE FOLLOWING:
A. SEGREGATION OF ALL EXPANSIVE SOIL ENCOUNTERED DURING THE EXCAVATION OPERATION. ALL EXCAVATED EXPANSIVE SOIL SHOULD BE REMOVED FROM THE CONSTRUCTION AREA;
B. REMOVAL OF ORGANICS, DELETERIOUS MATERIAL, AND COBBLES LARGER THAN 2 INCHES IN SIZE.
C. THOROUGH MIXING AND MOISTURE CONDITIONING OF APPROVED NATIVE SOIL.

7. POLLUTION CONTROL

7.1 WATER POLLUTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT ALL PERMITTING REQUIREMENTS RELEVANT TO THE CONSTRUCTION OF THE PROJECT ARE MET AT ALL TIMES. ACTIONS BY THE CONTRACTOR, THE SUBCONTRACTORS OR EMPLOYEES THEREOF RESULTING IN NONCOMPLIANCE OF PERMITTING REQUIREMENTS MAY BE GROUNDS FOR TERMINATION OF THIS CONTRACT.

7.2 NOISE POLLUTION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO KEEP NOISE POLLUTION, DUE TO THESE CONSTRUCTION ACTIVITIES, AS LOW AS POSSIBLE.

7.3 SOIL CONTAMINATION. THE CONTRACTOR SHALL NOT ALLOW REGULATED MATERIALS TO SPILL ON THE PROJECT SITE. ANY SPILLAGE OF REGULATED MATERIALS RELATING FROM THE CONTRACTOR'S OPERATION SHALL BE REMOVED IMMEDIATELY BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE.

8. FINISH GRADING AND CLEAN UP

SPREAD TOPSOIL AND FINISH GRADE ANY DISTURBED SOIL AREAS TO SMOOTHLY TRANSITION WITH THE SURROUNDING GROUND LINES AND STRUCTURES. ONCE THE EARTHWORK IS STABLE, PROMPTLY REMOVE ANY TEMPORARY EROSION CONTROL MATERIALS. POWER WASH ANY SOILED PAVED AREAS.

9. SPEED TABLE

THE DIMENSIONS OF THE SPEED TABLE SHALL BE SPECIFIED BY THE RESOURCE MANAGER. THE SPEED TABLE SHALL BE CONSTRUCTED SUCH THAT THE DEPRESSION IS OUTSLOPED AT 3:4H. THE ELEVATED SECTION OF THE SPEED TABLE SHALL BE TIED INTO EMBANKMENT.

10. EROSION CONTROL MEASURES

10.1 EROSION CONTROL PROVISIONS
A. CONTRACTOR AND/OR PROJECT ENGINEER SHALL MONITOR ALL DISTURBED AREAS PRIOR TO AND IMMEDIATELY FOLLOWING ANY RAINS, AND SHALL ADJUST BLANKETS, MULCH, STRAW ROLLS AND OTHER MEASURES TO INSURE NO SEDIMENT LEAVES SITE.
B. IF CONSTRUCTION OCCURS BETWEEN OCTOBER 15TH AND APRIL 15TH, EXPOSED SOIL NOT INVOLVED IN IMMEDIATE CONSTRUCTION ACTIVITY SHALL BE PROTECTED FROM EROSION AT ALL TIMES. STRAW BALES SHALL BE STOCKPILED ON SITE TO ALLOW CONTRACTOR TO APPLY STRAW MULCH TO ALL EXPOSED SLOPES IF RAINFALL IS PREDICTED WITHIN 24 HOURS.
C. AFTER APRIL 15TH, EROSION CONTROL MEASURES SHALL BE IN PLACE DURING INCLEMENT WEATHER.
D. EROSION CONTROL MEASURES (WITH THE EXCEPTION OF TEMPORARY EROSION CONTROL MEASURES SUCH AS TEMPORARY FIBER ROLL PLACEMENT AND STORMDRAIN INLET PROTECTION) SHALL BE KEPT IN PLACE AND FUNCTIONAL FOR AT LEAST 3 YEARS UNTIL NATIVE/NON-NATIVE VEGETATION HAS BEEN ESTABLISHED AND PROVIDES NECESSARY SLOPE COVER.

11. SUBBASE, BASE AND PAVING SPECIFICATIONS

A. REMOVAL OF BITUMINOUS SURFACES WHERE AN ABUTTING BITUMINOUS SURFACE IS TO REMAIN IN PLACE SHALL REQUIRE CUTTING A PRECISE EDGE.
B. THE SUBGRADE MUST BE PREPARED TO ACHIEVE A SMOOTH UNIFORM SURFACE AND SHALL BE GRADED TO A SLOPE PARALLEL TO THE FINISHED GRADE.
C. AGGREGATE BASE MATERIAL SHALL BE PLACED IN 4-6 INCH LIFTS FOR PEDESTRIAN PAVEMENTS AND 6-8 INCH LIFTS FOR VEHICULAR PAVEMENTS. PREPARATION SHALL INCLUDE SPREADING ROLLING AND VIBRATING TO CREATE A FIRM CONSISTENT BEARING DENSITY AND SHALL BE COMPACTED TO A RELATIVE COMPACTION AS SPECIFIED IN THE DESIGN PLANS.
D. ALL AGGREGATE AND SUBBASE AND PAVEMENT AREAS AND THE UPPER 8 INCHES OF SUBGRADE IN PAVEMENT AREAS SHALL BE COMPACTED TO A RELATIVE COMPACTION OF 95% OF MAXIMUM DRY DENSITY.
E. CONTRACTOR SHALL MAKE ARRANGEMENTS FOR THE GEOTECHNICAL ENGINEER TO PERFORM THE REQUIRED TESTING, RECORDING AND DISTRIBUTING OF THE RESULTS.
F. THE ROADBED SHALL BE SCARIFIED, BLADED, AND SHAPED TO REASONABLY CLOSE CONFORMITY WITH LINE, GRADE AND CROSS SECTIONS SHOWN ON THE PLANS.
G. SURFACE SHALL BE TESTED FOR ACCEPTANCE BY THE CONTRACTOR WITH A 10' STRAIGHT EDGE AFTER THE BASE HAS BEEN BLADED AND ROLLED INTO A SMOOTH SURFACE. AREAS WHERE THE SURFACE VARIATION EXCEEDS ¼ INCH IN 10 FEET SHALL BE REWORKED UNTIL THE VARIATION FALLS WITHIN THIS LIMIT.
H. PRIOR TO THE LAYING OF THE ASPHALT CONCRETE, CLEAN UNDERLYING COURSE OF ALL FOREIGN OR OBJECTIONABLE MATTER WITH POWER BLOWERS OR POWER BROOMS, SUPPLEMENTED BY HAND BROOMS AND OTHER CLEANING METHODS WHERE NECESSARY.
I. IMMEDIATELY BEFORE PRIMING AN AGGREGATE SURFACE WITH BITUMEN, THE CONTRACTING OFFICER MAY ORDER A LIGHT APPLICATION OF WATER TO LAY DUST AND IMPROVE THE ABSORBENCY OF THE SURFACE.
J. ALL HOLES IN EXISTING SURFACE SHALL BE PATCHED WITH APPROPRIATE MATERIAL. IF SO DIRECTED BY THE PROJECT MANAGER, THE SURFACE SHALL BE CLEANED WITH A POWER BROOM OR POWER BLOWER SUPPLEMENTED BY HAND SWEEPING AS REQUIRED TO REMOVE DELETERIOUS MATTER. THE EDGES OF EXISTING PAVEMENT, WHICH ARE TO BE ADJACENT TO NEW PAVEMENT, SHALL BE CLEANED OF LOOSE MATERIAL TO PERMIT ADHESION OF THE BITUMEN.
K. FURNISH AND APPLY A BITUMINOUS TACK/PRIME COAT OVER EXISTING ASPHALT SURFACE AND/OR BASE COURSE AT A COVERAGE OF 0.07 GALLONS PER SQUARE YARD AND 0.40 GALLONS PER SQUARE YARD, RESPECTIVELY.
L. THE PAVEMENT SHALL CONSIST OF HOT MINERAL AGGREGATE UNIFORMLY MIXED WITH HOT BITUMINOUS MATERIAL. PLACE THE PAVEMENT IN ONE OR MORE LAYERS, AS INDICATED. EXCEPT AS OTHERWISE PERMITTED BY THE CONSTRUCTION MANAGER, PROVIDE LINES AND GRADE STAKES AS NECESSARY FOR CONTROL. PLACE GRADE STAKES IN LANES PARALLEL TO THE CENTER LINE OF THE AREAS TO BE PAVED AND SUITABLY SPACED FOR STRING LINING.
M. AFFECT COMPACTION BY ROLLING. BEGIN ROLLING AS SOON AS PLACEMENT OF THE MIXTURE WILL BEAR THE ROLLERS WITHOUT UNDUE DISPLACEMENT. START ROLLING LONGITUDINALLY AT THE EXTREME SIDES OF THE LANES AND PROCEED TOWARD THE CENTER OF THE PAVEMENT, OR TOWARD THE HIGH SIDE OF THE PAVEMENT WITH A ONE-WAY SLOPE. OPERATE ROLLERS SO THAT EACH TRIP WILL OVERLAP THE PREVIOUS ADJACENT STRIP BY AT LEAST ONE FOOT.
N. CONTINUE ROLLING UNTIL ALL ROLLER MARKS ARE ELIMINATED AND THE COURSE HAS A DENSITY OF AT LEAST 93% BUT NOT MORE THAN 100% OF THAT ATTAINED IN A LABORATORY SPECIMEN OF THE SAME MIXTURE PREPARED IN ACCORDANCE WITH ASTM D 1559.
O. ALL JOINTS SHALL PRESENT THE SAME TEXTURE, DENSITY, AND SMOOTHNESS AS OTHER PORTIONS OF THE COURSE. CAREFULLY MAKE JOINTS BETWEEN OLD AND NEW PAVEMENT OR WITHIN NEW PAVEMENTS IN A MANNER AS TO ENSURE A THOROUGH AND CONTINUOUS BOND BETWEEN OLD AND NEW SECTIONS OF THE COURSE. PAINT ALL VERTICAL CONTACT SURFACES OF PREVIOUSLY CONSTRUCTED SECTIONS WITH A THIN UNIFORM COAT OF EMULSION OR OTHER APPROVED BITUMINOUS MATERIAL JUST BEFORE THE FRESH MIXTURE IS PLACED.
P. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANUP OF ALL WASTE, SPILLED, AND EXCESS MATERIAL AS A RESULT OF THEIR WORK.
Q. THE CONTRACTOR SHALL PROVIDE FOR CONTROLS TO PREVENT UNAUTHORIZED TRAFFIC IN OR ON WORK AREAS UNTIL THOSE AREAS ARE SUITABLY PREPARED FOR TRAFFIC.

12. CONCRETE

12.1 CONCRETE FORMS AND ACCESSORIES
12.1.1. CONSTRUCT FORMS TO PREVENT LEAKAGE OF MORTAR AND ANY SHIFTING OR DEFORMATION DURING THE PLACEMENT AND FINISHING OF CONCRETE.
12.1.2. WET FORMS TO ALLOW REMOVAL WITHOUT DAMAGING THE CONCRETE PER MANUFACTURER'S INSTRUCTIONS.
12.1.3. JOINTS. ARRANGE JOINTS VERTICALLY AND HORIZONTALLY.
12.1.4. INSPECTION. OBTAIN COUNTY'S REPRESENTATIVE INSPECTION AND APPROVAL OF FORMS AT LEAST 4 HOURS PRIOR TO PLACING CONCRETE. NOTIFY CONSTRUCTION MANAGER AT LEAST 24 HOURS IN ADVANCE OF CONCRETE POUR THAT FORMS WILL BE READY FOR INSPECTION.
12.1.5. CLEANING. REMOVE ALL SAWDUST, SHAVINGS, AND OTHER DEBRIS FROM WITHIN THE FORMS.
12.1.6. FORM REMOVAL. DO NOT DISTURB FORMS UNTIL CONCRETE HAS GAINED ENOUGH STRENGTH TO CARRY ITS OWN WEIGHT AND SUCH CONSTRUCTION LOADS AS MAY OCCUR. LOOSEN FORMS CAREFULLY. DO NOT WEDGE PRY BARS, HAMMERS, OR TOOLS AGAINST FINISH CONCRETE SURFACES SCHEDULED FOR EXPOSURE TO VIEW.

12.2 CONCRETE REINFORCEMENT
12.2.1. SECURE REINFORCEMENT AGAINST DISPLACEMENT CAUSED BY CONSTRUCTION LOADS OR PLACING OF CONCRETE. TIE ALL BAR INTERSECTIONS WITH ANNEALED IRON WIRE OF NOT LESS THAN 16 GAUGE. HOOK OR SUPPORT WIRE MESH DURING PLACING CONCRETE SLABS TO INSURE PLACEMENT AS DETAILED.
12.2.2. FIELD BENDING AND CUTTING WILL BE PERMITTED IF PERFORMED IN ACCORDANCE WITH THE ACI CODE.
12.2.3. KEEP REINFORCEMENT FREE OF DIRT, OIL, PAINT, GREASE, MILL SCALE, AND LOOSE OR THICK RUST.
12.2.4. PLACE, SUPPORT AND SECURE REINFORCEMENT AGAINST DISPLACEMENT. DO NOT DEVIATE FROM REQUIRED POSITION.
12.2.5. DO NOT DISPLACE OR DAMAGE VAPOR BARRIER.
12.2.6. ACCOMMODATE PLACEMENT OF FORMED OPENINGS.
12.2.7. CONFORM TO ACI 318 FOR CONCRETE COVER OVER REINFORCEMENT.
12.2.8. CLEANING
12.2.8.1. CLEAN-UP: CONCRETE SPILLED OR SPLASHED ON ADJACENT SURFACES SHALL BE THOROUGHLY REMOVED. AFTER FORM REMOVAL, BACKFILL AND LANDSCAPE TO MATCH SURROUNDING AREA.
12.2.8.2. EXCESS MATERIALS: EXCESS AND WASTE MATERIAL SHALL BE DISPOSED OF OFF THE SITE.

13. CONCRETE WASHOUT

13.1. TEMPORARY CONCRETE WASHOUT FACILITIES SHALL BE LOCATED A MINIMUM OF 50 FT AWAY FROM STORM DRAIN INLETS, OPEN DRAINAGE FACILITIES, AND WATERCOURSES.
13.2. A SIGN SHALL BE INSTALLED ADJACENT TO EACH WASHOUT FACILITY TO INFORM CONCRETE EQUIPMENT OPERATORS TO UTILIZE THE PROPER FACILITIES.
13.3. CONCRETE WASHOUT FACILITY SHALL BE CONSTRUCTED WITH A MINIMUM LENGTH AND MINIMUM WIDTH OF 10 FT. TEMPORARY CONCRETE WASHOUT FACILITIES SHALL BE CONSTRUCTED AND MAINTAINED IN SUFFICIENT QUANTITY AND SIZE TO CONTAIN ALL LIQUID AND CONCRETE WASTE GENERATED BY WASHOUT OPERATIONS.
13.4. LATH AND FLAGGING SHOULD BE COMMERCIAL TYPE.
13.5. PLASTIC LINING MATERIAL SHOULD BE A MINIMUM OF 10 MIL POLYETHYLENE SHEETING AND SHOULD BE FREE OF HOLES, TEARS OR OTHER DEFECTS THAT COMPROMISE THE IMPERMEABILITY OF THE MATERIAL.
13.6. TEMPORARY WASHOUT FACILITIES SHALL HAVE A TEMPORARY PIT OR BERMED AREAS OF SUFFICIENT VOLUME TO COMPLETELY CONTAIN ALL LIQUID AND WASTE CONCRETE MATERIALS GENERATED DURING WASHOUT PROCEDURES.
13.7. ONCE CONCRETE WASTES ARE WASHED INTO THE DESIGNATED AREA AND ALLOWED TO HARDEN, THE CONCRETE SHALL BE BROKEN UP, REMOVED, AND DISPOSED OF PER WM-5, SOLID WASTE MANAGEMENT. DISPOSE OF HARDENED CONCRETE ON A REGULAR BASIS.
13.8. WHEN TEMPORARY CONCRETE WASHOUT FACILITIES ARE NO LONGER REQUIRED FOR THE WORK, THE HARDENED CONCRETE SHALL BE REMOVED AND APPROPRIATELY DISPOSED. MATERIALS USED TO CONSTRUCT TEMPORARY CONCRETE WASHOUT FACILITIES SHALL BE REMOVED FROM THE SITE OF THE WORK AND APPROPRIATELY DISPOSED.
13.9. HOLES, DEPRESSIONS OR OTHER GROUND DISTURBANCES CAUSED BY THE REMOVAL OF THE TEMPORARY CONCRETE WASHOUT FACILITIES SHOULD BE BACKFILLED AND REPAIRED.

14. FINAL INSPECTION

THE CONTRACTOR SHALL PERFORM A FINAL INSPECTION WITH THE PROJECT ENGINEER OR OWNER TO VERIFY SYSTEMS ARE OPERATIONAL AND FUNCTIONING AS DESIGNED.

15. AS-BUILT DRAWINGS

THE CONTRACTOR SHALL PROVIDE THE OWNER WITH A SET OF AS-BUILT DRAWINGS OF THE LAYOUT AND CONSTRUCTION OF THE SYSTEM.

SHEET TITLE	GENERAL, MATERIAL & CONSTRUCTION SPECIFICATIONS
CLIENT	SWANTON PACIFIC RANCH ATTN: BRIAN DIETTERICK 125 SWANTON ROAD DAVENPORT, CALIFORNIA 95017
PROJECT TITLE	SWANTON PACIFIC RANCH UPDATED FIELD CAMP ENTRANCE AND EXIT ROAD ALIGNMENT DAVENPORT, CALIFORNIA APN: 057-121-22 AND 057-151-03

FALL CREEK ENGINEERING, INC.
Consulting Engineers
1525 SEABRIGHT AVE.
SANTA CRUZ, CA 95062
TEL (831) 426-9054

DRAWN BY:	BJS
CHECKED BY:	PHH
DATE:	OCTOBER 2018
JOB NO:	21706
SCALE:	AS SHOWN
SHEET:	C7.0 9 OF 9

17

County of Santa Cruz, PLANNING DEPARTMENT

Building Permit

701 Ocean Street, Santa Cruz, CA 95060 | TDD (831) 454-2260 1-4pm | Fax (831) 454-2131

B-192952

Application Date: 6/13/2019
Print Date: 6/13/2019
Permit Issue Date: 6/13/2019

Parcel No. **05715110**
Address **125 SWANTON RD, SANTA CRUZ, CA 95017**

Permit Type: GRD

Permit Description: Proposal to realign the driveway entry to include 1,957 cubic yards grading. Requires a Preliminary Grading Approval.

Property located at 900 School Gulch Road

Please contact Steve Auten at 831-247-6697 prior to site visit please

Owner
CALIFORNIA POLYTECHNIC STATE UNIV FOUNDATION
125 SWANTON RD., DAVENPORT, CA 95017
Telephone: (831)458-5410
Mobile: (831)247-6697
CALIFORNIA POLYTECHNIC STATE UNIV FOUNDATION
1 GRAND AVE 15, ATTN: EXECUTIVE DIRECTOR OR LEGAL, SAN LUIS C

Contractor

Comments

THIS PERMIT IS VOID IF FIELD INSPECTION REVEALS STRUCTURE OR USE TO BE ILLEGAL .
The issuance of this permit does not confer legal status on any structure or a portion of any structure , except those portions of the structure expressly covered by this permit.

HOLDS

APPLICATION FEES

Date Paid	Fee Description	Amount

TOTAL FEES

GRAND TOTAL

RECEIVED
JUN 19 2019
COAST AREA OFFICE
RESOURCE MANAGEMENT

PART OF PLAN

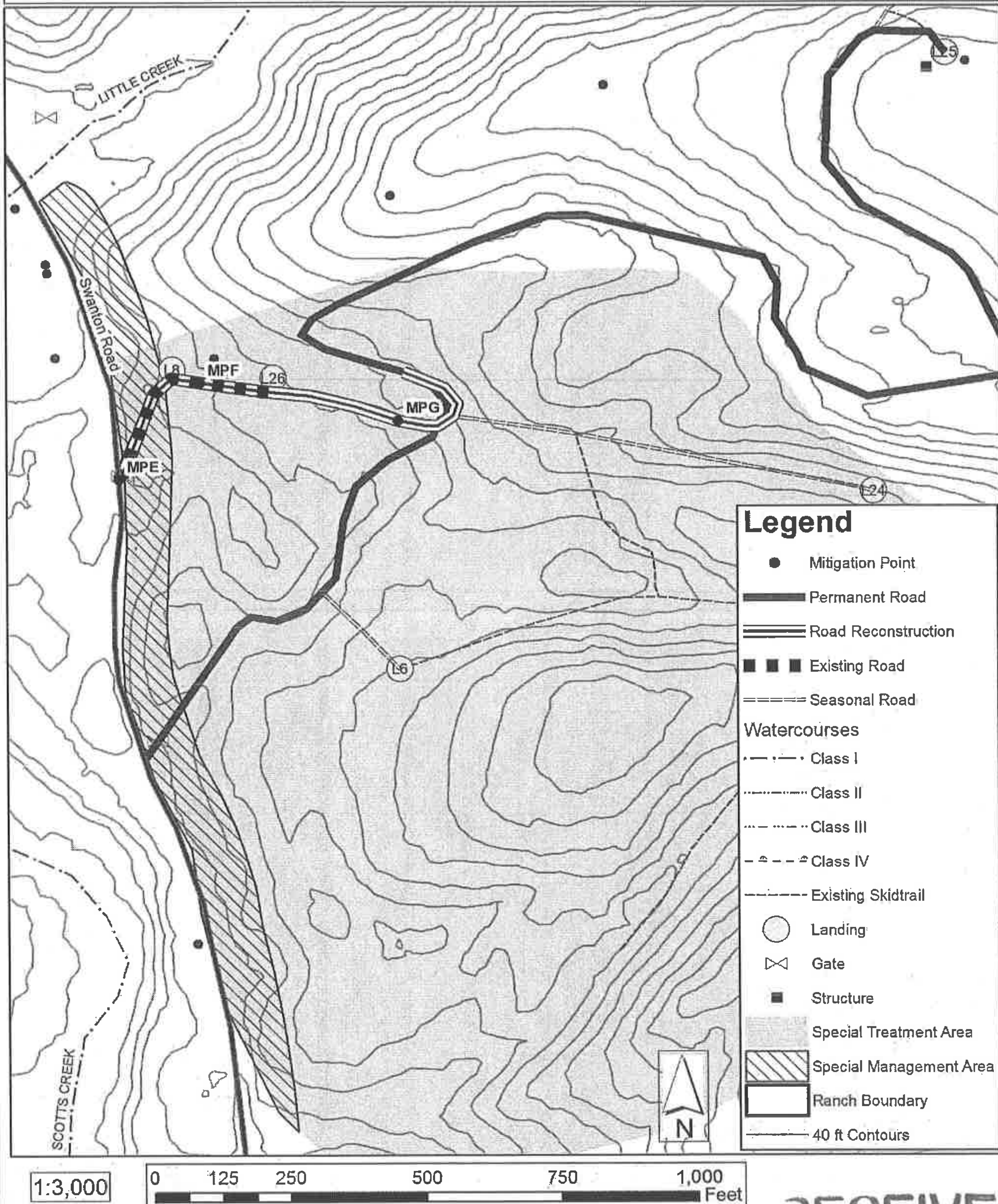
COPY – APPLICANT

Appendix A: Maps

RECEIVED
JUN 21 2017
COAST AREA
RESOURCE MANAGEMENT

Road Reconstruction Map

T10S R3W, Portions of Sections 8,9,16,17 and Rancho Agua Puerca y Las Trancas, MDB&M Davenport USGS 7.5' Quadrangle



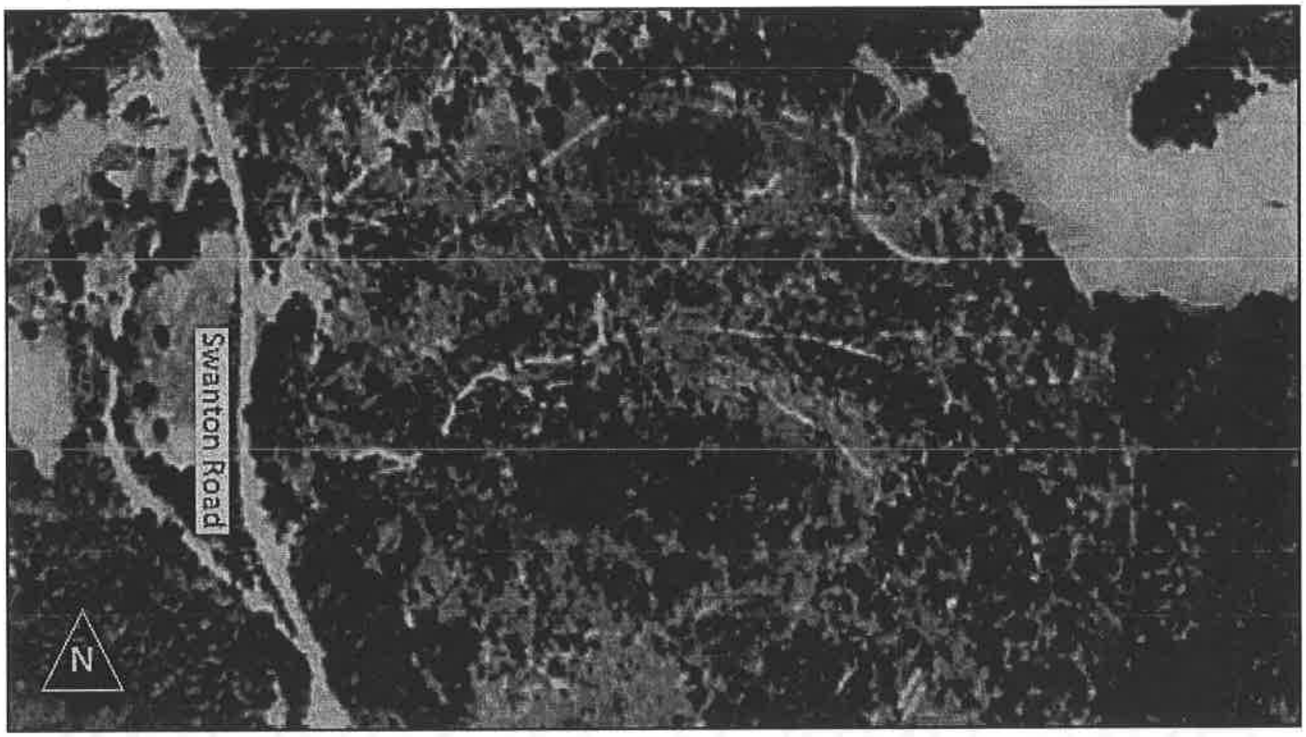


Figure 1. Aerial Photo from 1953

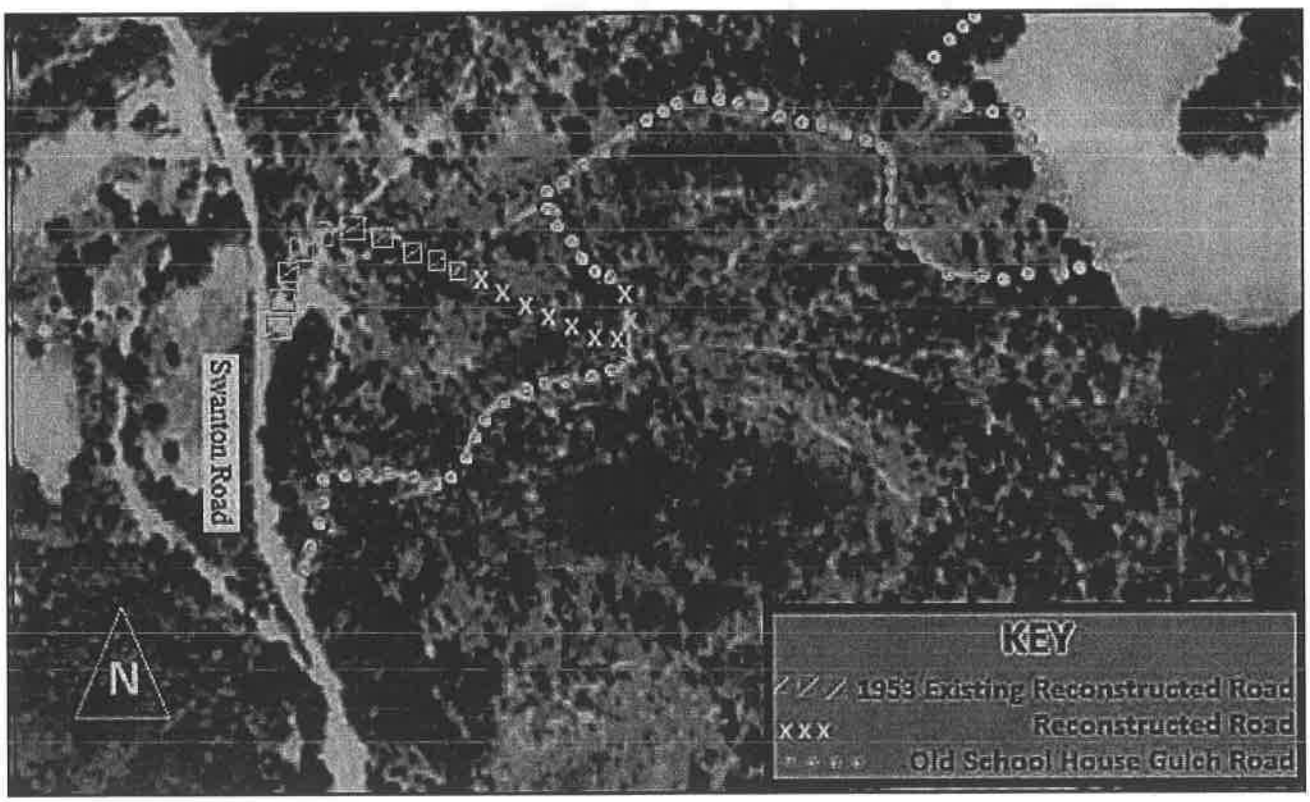


Figure 2. Aerial Photo from 1953 showing the current alignment of Old School House Gulch Road, as well as portion of the existing proposed alignment.

Appendix B: Geological & Biological Resources Documentation

Geo-Logic
ASSOCIATES

MEMORANDUM

Date: May 19, 2017
File: 2014.0143
Copies: Robyn Cooper, Fall Creek Engineering

To: Swanton Pacific Ranch
Attn: Brian Dietterick

Subject: **PROPOSED ACCESS ROAD ALIGNMENT GEOLOGIC FEASIBILITY**

General

As requested, this memorandum reviews our conclusions regarding geologic suitability of a proposed realignment of the access road to Swanton Pacific Ranch's proposed field camp. We understand the proposed alignment is intended to replace lower portions of Old School House Road as the primary access to the proposed field camp facilities. The original alignment of Old School House Road is to remain as secondary access. Attached is a composite figure overlaying the proposed road alignment with site landslide geology and LiDAR-derived topography (Figures 1). The figure incorporates a proposed road alignment, with associated cuts and fills, prepared by Fall Creek Engineering (dated March 2017). Overlaid onto the figure are landslide block boundaries from Figure 7 of our Preliminary Engineering Geologic Feasibility Investigation dated 11/12/10. As discussed in more detail in our 11/12/10 report, the landslide boundaries shown are the boundaries between major slide blocks, inferred on the basis of our LiDAR geomorphic analysis and field geologic mapping. The potential for significant relative movement between landslide blocks was judged to be low, as outlined in the aforementioned report.

On October 1, 2014, an engineering geologist from Geo-Logic Associates performed a site geologic reconnaissance of the proposed alignment, and logged subsurface conditions in five (5) exploratory test pits at locations shown on Figure 1 of this memorandum. An additional site geologic reconnaissance was performed on May 2, 2017 to review recent revisions to the proposed alignment in the context of our previous fieldwork and our geologic understanding of the site. The intent of the geologic reconnaissance and subsurface exploration was to assess geologic feasibility of the proposed alignment, and preliminarily characterize the types of geologic materials that can be anticipated where significant cuts and fills are planned. Test pit locations were selected to characterize soil/rock/landslide debris in topographic low areas that typically form the boundary between landslide blocks. Topographic high areas were anticipated to be underlain by relatively more competent and/or coherent blocks of Santa Cruz Mudstone (Tsc). Our field reconnaissance confirmed this, and we identified several areas along the proposed alignment where Tsc "subcrop" (used here to describe dislocated blocks of bedrock entrained in landslide masses, rather than in-

16055-D Caputo Drive, Morgan Hill, California 95037
Tel 408-778-2818 Fax 408-779-6879

place bedrock) was observed on several topographic highs along or adjacent to the proposed road alignment. Test pit logs are included on Figure 2.

Exploratory Test Pit Findings

Test pits TP-1 and TP-2 were excavated at approximately Sta. 2+10. We encountered refusal conditions on relatively competent hard blocks of Tsc at the ground surface in TP-1, located on the south side of the alignment. We photographed this shallow test pit (approximately 6" deep) but did not produce a drafted field log. Test pit TP-2, on the north side of the alignment at approximately the same station, encountered landslide debris consisting of soft to hard blocks of yellowish brown Santa Cruz Mudstone entrained in soft sandy clay matrix. Test pits TP-1 and TP-2 illustrate the wide range of subsurface conditions possible within a small area, as is typical of landslide terrain.

Test pit TP-3 was excavated in a topographic trough at approximately Sta 3+70 and encountered approximately 5 feet of colluvium (clay with sand) over landslide deposits (sandy clay). Landslide deposits were difficult to distinguish from colluvium. No blocks of Tsc were encountered. The geologic setting at this location is likely a backfilled graben between landslide blocks.

Test pit TP-4 was excavated at approximately Sta. 5+25 in the axis of a broad topographic swale and encountered colluvium (lean clay with sand) from the ground surface to the bottom of the test pit at 9 feet below the ground surface. Subcrop of Tsc is present on a knoll immediately to the southwest, suggesting that the swale setting is a backfilled graben between landslide blocks.

Test pit TP-5 was excavated at approximately Sta. 5+80 on sloping ground downslope of a subtle topographic bench. This excavation encountered approximately 1 to 2 feet of colluvium (clay with sand) over landslide debris composed of Tsc blocks in a clay matrix. We interpret the topographic bench to be a landslide block composed of dislocated and weathered masses of Tsc.

Additional Observations

Thick colluvium is anticipated in a pronounced topographic swale from approximately Sta. 7+50 to 8+00. This location was not accessible to the backhoe at the time of our reconnaissance/subsurface exploration. As relatively high fill slopes are planned to bridge this swale, we recommend that subsurface conditions be characterized at this location as part of a design-level geotechnical investigation for the proposed road alignment.

Conclusions

In general, the proposed roadway realignment as shown on the referenced plans appears feasible from a geologic standpoint. We note that preserving the existing Old School House Gulch Road would provide alternate access.

Please give us a call to discuss again once you've received this. Thank you.

16055-D Caputo Drive, Morgan Hill, California 95037
Tel 408-778-2818 Fax 408-779-6879

Geo-Logic
ASSOCIATES

MEMORANDUM

John A Feltman

PROFESSIONAL GEOLOGIST
JOHN A. FELTMAN
No. 2530
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

John Feltman CEG

Att: Figure 1 – Landslide Map
Figure 2 – Logs of Test Pits

16055-D Caputo Drive, Morgan Hill, California 95037
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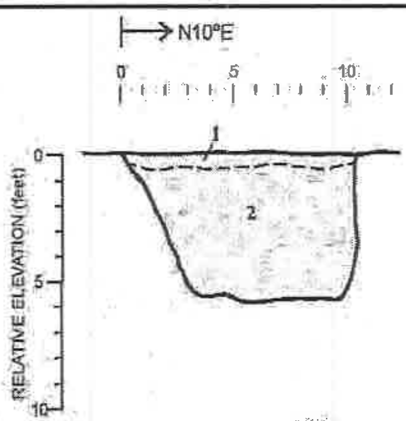
EXPLANATION

- Boundary between major older landslide blocks
- Outcrop or subcrop of Santa Cruz Mudstone
- TP-5 Exploratory test pit
- 39° Slope aspect and inclination

N

0 30 ft.

Geo-Logic ASSOCIATES	Drafted By: GDG	LANDSLIDE MAP	FIGURE 1
	Date: May 2017	PROPOSED ACCESS ROAD REALIGNMENT SWANTON PACIFIC RANCH DAVENPORT, CALIFORNIA	PROJECT 2014.0143
	Checked By: JF		
	Revision:		



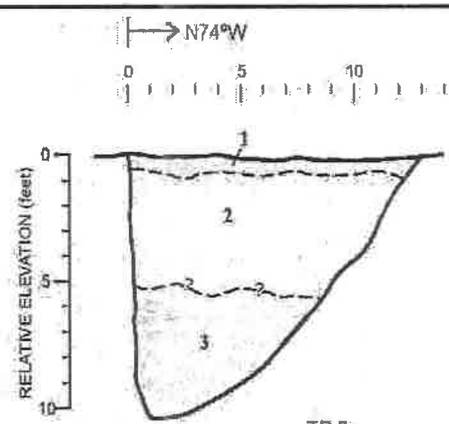
TP-2

TOPSOIL

1 TOPSOIL: Organic-rich with roots

LANDSLIDE DEBRIS

2 LANDSLIDE DEBRIS: Light yellowish brown; soft to hard blocks of Santa Cruz Mudstone in a stiff sandy clay matrix; mostly block supported



TP-3

TOPSOIL

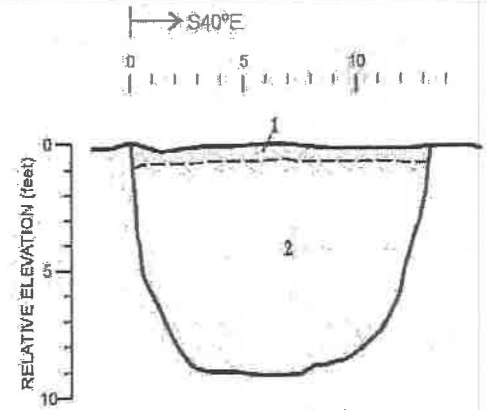
1 TOPSOIL: Organic-rich with duff and roots

COLLUVIUM

2 CLAY with SAND: Grayish brown; dry to moist; stiff; porous; a few blocks of Santa Cruz Mudstone below 5 feet

LANDSLIDE DEBRIS

3 SANDY CLAY: Light brown to light gray; moist; stiff; some blocks of Santa Cruz Mudstone; excavates to powdery fine sand with a few blocks of hard mudstone; difficult to distinguish from colluvium



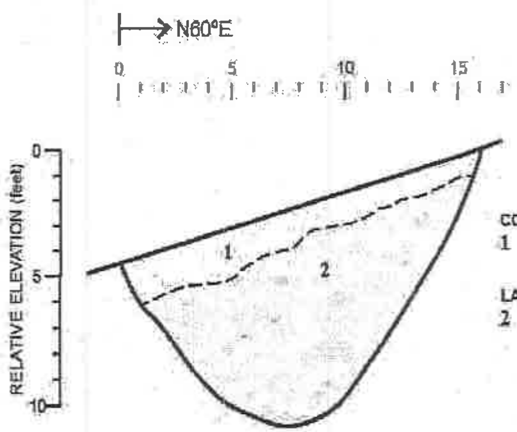
TP-4

TOPSOIL

1 TOPSOIL: Organic-rich; duff; abundant roots

COLLUVIUM

2 LEAN CLAY with SAND: Grayish brown; moist; stiff; porous; mostly fine sand, some cobble-sized angular fragments of hard Santa Cruz Mudstone in spoils



TP-5

COLLUVIUM

1 CLAY with SAND: Grayish brown; moist; stiff; porous; many roots; a few cobble-sized fragments of Santa Cruz Mudstone

LANDSLIDE DEBRIS

2 LANDSLIDE DEBRIS: Yellowish brown; dense; angular Santa Cruz Mudstone fragments and subrounded concretions in clay matrix

Geo-Logic ASSOCIATES	DATE MAY 2017	LOGS of TEST PITS TP-2, TP-3, TP-4, and TP-5 PROPOSED ACCESS ROAD REALIGNMENT SWANTON PACIFIC RANCH DAVENPORT, CALIFORNIA	FIGURE 2 PROJECT 2014.0143

PRELIMINARY ENGINEERING GEOLOGIC FEASIBILITY INVESTIGATION
PROPOSED STAUB FIELD CAMP
900 SCHOOL HOUSE GULCH ROAD
APN 057-121-022
SWANTON PACIFIC RANCH
DAVENPORT, CALIFORNIA

PROJECT 2341 G

For
Swanton Pacific Ranch
125 Swanton Road
Davenport, California 95017

By

PACIFIC GEOTECHNICAL ENGINEERING
16055 Caputo Drive, Suite D
Morgan Hill, California 95037
(408) 778-2818

November 12, 2010

TABLE OF CONTENTS

FIGURES

PART OF PLAN

PRELIMINARY ENGINEERING GEOLOGIC FEASIBILITY INVESTIGATION
PROPOSED STAUB FIELD CAMP
900 SCHOOL HOUSE GULCH ROAD
APN 057-121-022
SWANTON PACIFIC RANCH
DAVENPORT, CALIFORNIA

1. INTRODUCTION

1.1 GENERAL

This report presents the results of our preliminary engineering geologic feasibility investigation for a proposed field camp, at the Swanton Pacific Ranch, near Davenport, in Santa Cruz County California. The property and site location are depicted at a regional scale on the Regional Geologic Index Map (Figure 1) of this report. In this report, "site" is used to indicate the portions of the property currently proposed for field camp development. The proposed field camp facilities are split between two sites, referred to in this report as the "Al Smith House site" and the "Staub House site."

Based on the results of our investigation to date, we conclude that the conceptual development at the Al Smith House site, and access road improvements are geologically feasible to construct, provided appropriate additional investigation is undertaken to assess the integrity of the rock mass near side slopes of the ridge, and to formulate design recommendations. Subsurface investigation will be required to further assess the footprint of the conceptual development at the Staub House site.

This report outlines geologic considerations associated with the proposed development concept, and the nature of subsurface exploration and analysis that will be needed to refine and support the design of the project.

1.2 PROJECT DESCRIPTION

We understand that the proposed project consists of the construction of: student cabins (14, at the Staub House site); dining facility (at the Staub House site); comfort station; faculty cabins (2, on a ridge crest adjacent to the Al Smith House site); and possible expansions to an existing garage at the Al Smith House site (specific footprint not known yet). The details of these proposed facilities are in flux. We understand that the proposed projects will not be subject to OSHPD review. The conceptual locations of the project elements on the Ranch property is shown on Figures 3 and 4. We have based our investigation in part on the proposed project as shown on the following plan:

- *Staub Field Camp, A Learning Facility For Cal Poly, Swanton Pacific Ranch, 900 School House Gulch Road, Davenport, California* (Sheets T-1, C-1 through C-3, A-1 through A-4; dated May 19, 2009), prepared by TJ Weber Architect.

It is anticipated that some improvements will be needed for the prime access road, and possibly the alternate access road. The nature of improvements has not yet been established.

There are two access roads onto the site: an existing (northern) access road (known as School House Gulch Road) that stems off Swanton Road and climbs eastward onto the property; and a second (southern) alternate access road that stems off Swanton Road at Archibald Creek, and traverses/climbs onto the property from the south. These two access roads join just before a single spur extends on to the Staub House site. Another access spur from School House Gulch Road extends to the Al Smith House site. A separate proposed access spur would take off from near the junction of the two prime access roads, and leads along the ridge crest to the proposed faculty cabins east of the Al Smith House site.

Utilities would be routed below-ground, making use of existing utility corridors leading to the Al Smith House site and Staub House site. Water would be supplied by an existing supply well(s) on the property, with supplemental storage tanks (locations to be determined). Sewage disposal would be through on-site septic leach fields (locations and design to be determined by others).

At this time, no grading plan has been developed. The overall concept will be a low-impact project fitted as closely to site contours as practical, in order to hold down the volume of grading.

1.3 INFORMATION PROVIDED

For this investigation we were provided with the following information:

- *Staub Field Camp, A Learning Facility For Cal Poly, Swanton Pacific Ranch, 900 School House Gulch Road, Davenport, California* (Sheets T-1, C-1 through C-3, A-1 through A-4; dated May 19, 2009), prepared by TJ Weber Architect.
- *Preliminary Geologic Evaluation, Swanton Pacific Ranch Educational Center, School House Gulch Road, Davenport, California, Santa Cruz County APN 057-121-22*; prepared for Swanton Pacific Ranch by Rogers E. Johnson & Associates [REJA Job. No. G01047-14A], dated March 11, 2002.
- *Geotechnical Investigation for Swanton Pacific Ranch Educational Center, Davenport, California;* prepared for California Polytechnic State University Foundation by Pacific Crest Engineering Inc., dated July 23, 2002.
- Untitled LiDAR "bare earth" (filtered) DEM, obtained in late 2008 by Swanton Pacific Ranch.

1.4 PREVIOUS WORK

Rogers E. Johnson & Associates performed a preliminary geologic evaluation in 2002 for a previous project concept (layout unavailable). This evaluation focused on regional geology, and on indentifying which geologic hazards warranted detailed investigation. An excerpt of a 1"=2000' scale geologic map from a 1995 research report was presented. While the excerpted map was prepared for a San Gregorio fault zone research project, a fairly detailed landslide interpretation is shown that includes the project vicinity. The Rogers Johnson report identifies landslide potential as the primary geologic concern for development. The report recommends preparation of a detailed topographic base map; geologic (landslide) mapping using that base map; a subsurface program incorporating test pits and borings with oriented cores; and coordination with a geotechnical engineer during the course of geologic investigation.

Pacific Crest Engineering subsequently performed a geotechnical investigation in 2002 for a then-proposed project on the property that was focused near the Al Smith House site (listed above). A total of 15 exploratory borings were drilled, with some of those borings in the vicinity of the proposed staff cabins, and near the Al Smith House site.

Implicit in the findings of both these early investigations were the limitations placed on landslide geologic mapping, interpretation and conclusions by the lack of a detailed topographic base map.

1.5 PURPOSE AND SCOPE OF INVESTIGATION

The purpose of our services, through the milestone of this preliminary engineering geologic feasibility report, has been to identify the primary geologic considerations associated with the current proposed project; and to develop preliminary conclusions regarding feasibility of the project elements using surficial geologic information.

Early preliminary feedback from the County Geologist stressed the need to essentially create a landslide inventory, then develop follow-on, targeted investigation elements based on those findings. This report provides a landslide inventory and interpretation; discussion of implications for project feasibility; and recommendations regarding geologic components to a design-level geotechnical investigation.

For this study, we completed the following scope of work:

- Review of available published and unpublished geologic maps and literature regarding the site and its environs.
- Study of aerial imagery of the property and its environs, using aerial photographs from the UC Santa Cruz collection, and evaluation of GoogleEarth imagery for possible stereo acquisition and analysis.
- Manipulation of 2008 LiDAR "bare earth" DEM provided by Swanton Pacific Ranch; and coordination with Cal Poly GIS/LiDAR expert Russ White.
- Geologic reconnaissance and reconnaissance-level mapping of the property and immediate vicinity.
- Project meetings, including: initial meeting with Peter Haase (Fall Creek Engineering); field meeting with project team and County Planning staff; progress review meetings with project design team members; field meeting/reconnaissance with Brian Bauldry of Bauldry Engineering (project head for geotechnical engineering); meeting at County offices with Joe Hanna (County Geologist) Kent Edler (County Civil Engineer w/ Planning Dept.), and Brian Bauldry; and field meeting with Joe Hanna (County Geologist).
- Development of geologic model for landslide analysis of the site, and conclusions regarding the geologic suitability of the proposed development.
- Preparation of this report.

2. REGIONAL SETTING

2.1 PHYSICAL

The Swanton Pacific Ranch is located approximately 4 miles north of Davenport, and about 5 miles southeast of Point Ano Nuevo, on the northwestern slopes of Ben Lomond Mountain. The ranch and project sites are reached via Swanton Road, which follows Scott Creek upstream as it diverges northward from the coast and California Highway One.

The project sites are located in the hillslopes east of the Scott Creek drainage. These hillslopes are dissected by westward draining creeks with intervening upland areas. North of the project sites is Little Creek. South of the project sites are (in order) Winter Creek, Archibald Creek, and Molino Creek. The sites lie within the Davenport 7.5 minute topographic quadrangle.

The two access roads climb from the elevation of the Scott Creek valley floor at approximate elevation 100 or less feet above sea level, to the project vicinity near elevation 450 feet. The northern (primary) access road climbs from Swanton Road at a point just south of Little Creek. The southern (alternate) access road climbs from the floor of the Archibald Creek drainage where it meets Swanton Road.

The regional location of the site is shown on our Regional Geologic Index Map (Figure 1).

In general, ridge crests are moderately sloping (commonly on the order of 15 degrees), with steeper sideslopes commonly in the range of 30 to 40 degrees.

The ranch and vicinity support a generally dense forest cover, with local open grassy and brushy ground on hill crests and ridge crests.

Land use in the general area has historically been mainly dairying, and logging-related. The relatively gently sloping valley floor of Scott Creek and lowermost tributary creeks is currently farmed.

2.2 GEOLOGIC

The property lies on the northwestern flank of a tectonically rising block cored by metamorphic rocks that include schist, marble, and coarse-grained igneous rocks. Overlying these crystalline rocks are Tertiary age sedimentary rocks including the Santa Margarita Formation, and the overlying Santa Cruz Mudstone, which is mapped at the site.

Folding and tilting has affected the rocks in the property vicinity. A syncline (trough) axis is mapped as lying west of Scott Creek, between it and the coastline. Bedding in the project vicinity has regional westward dips of approximately 20 to 24 degrees, with dips shallowing to 4 degrees approaching the syncline.

Regional landslide maps (Cooper-Clark and Associates, 1975) show the project sites as lying within a queried large composite landslide mass with two different movement directions: westward toward Scott Creek and northward toward Little Creek. Discontinuous other queried landslide masses are mapped through the general property vicinity, some of them reflecting local topographic lows, some of them not.

Marine terraces are mapped semi-continuously along the western flank of Ben Lomond Mountain from near the San Lorenzo River northward to Point Ano Nuevo. The Quarry, Blackrock and Wilder marine terraces are shown by some workers as continuous across the lower reaches of the hillslopes encompassing the site, and by others as present north and south of the mouth of Scott Creek, but not extending significantly up into the drainage embayment itself (Weber and Allwardt, 2001).

The closest clearly marine terrace surfaces to the mouth of the modern Scott Creek are at roughly elevation 290 – 310 feet. The evolution of the interior of the Scott Creek drainage – timing of downcutting, backfilling, reincision etc. – is not clear. However, it is clear that for this terrace to form, the local base level for Scott Creek would have also been near that terrace elevation, thus likely affecting rocks in the lower portion of a landslide complex at the property.

2.2.1 Regional Faults and Seismic Setting

The San Gregorio fault zone is the closest mapped active fault to the sites. No active faults are mapped as passing through or in close proximity to the sites.

Potential sources of significant earthquake ground shaking at the site include several active and potentially active faults in the southern San Francisco Bay area. Of these, the San Gregorio and San Andreas faults (Peninsula and Santa Cruz Mountains segments) are the largest potential seismic sources. In a regional context, all of these faults are considered elements of the San Andreas fault system, which forms the tectonic boundary between the North American and Pacific Plates. Potentially significant seismic sources include the faults listed below; additional detail for selected faults is presented in the Appendix to this report. Distances were derived from the USGS Fault and Fold Database (at http://earthquake.usgs.gov/hazards/qfaults/).

- San Gregorio fault, located approximately 2.3 miles (3.7 km) southwest of the site.
- San Andreas fault, located approximately 14.1 miles (22.6 kilometers) northeast of the site.
- Monterey Bay/Tularcitos fault, located approximately 11.2 miles (18.0 km) to the southeast of the site.
- Monte Vista/Shannon fault, located approximately 19.1 miles (30.7 km) northeast of the site.
- The Hayward fault (southeast extension), located approximately 30.8 miles (49.6 km) northeast of the site.
- The Calaveras fault, located approximately 33.6 miles (54.1 kilometers) northeast of the site.

Ongoing research by the Working Group on California Earthquake Probabilities (WGCEP 1990, 1996, 2003, 2008) reaffirms that damaging earthquakes are a fact of life for the San Francisco/Monterey Bay area.

The WGCEP's estimates of the probabilities of major earthquakes are now in their fourth iteration, with the greatest changes in approach being the treatment of major faults as segmented, unsegmented or capable of different rupture scenarios; in the progressive consideration of more potential seismic sources, and in use of time-independent versus time-dependent models. Current estimates (WGCEP, 2003, 2008) are most detailed for the greater San Francisco Bay Area; WGCEP (2008) estimated a 63% probability of a large (magnitude 6.7 or greater) earthquake in the San Francisco Bay area as a whole over a 30-year period; this overall probability differed only slightly from the previous (WGCEP, 2003) probability of 62%. The estimate for the Calaveras fault alone is 7% (revised down from the 11% presented by WGCEP, 2003); for the (northern) San Andreas fault alone, 21%; and for the Hayward fault, 31% (revised upward from the WGCEP (2003) value of 27%).

Both the US Geological Survey and the California Geological Survey are pressing forward with probabilistic models of expected ground shaking at a given locality, in lieu of earlier approaches that used a "deterministic" approach based on the greatest possible ground acceleration, which did not consider how likely or unlikely a given seismic event might be. Attenuation curves continue to undergo refinement, and these refinements will affect the calculated/estimated ground motions for the project site.

The California Geological Survey's statewide probabilistic seismic hazard model (accessible at http://redirect.conservation.ca.gov/cgs/rghm/pshamap/pshamap.asp) provides one approach to assessing likely peak horizontal ground accelerations. Using the latitude/longitude coordinates of the Staub House site (lat 37.063801; lon -122.217882), this model predicts that the peak horizontal acceleration with a 10% chance of exceedance in the next 50 years, for a "firm rock" site, is 0.465g.

2.2.2 Regulatory Environment

The County of Santa Cruz sets development policy for the property, although regional hazard maps prepared by the State encompass the site. For sake of reference, these maps show the following:

Alquist-Priolo Earthquake Fault Zone Maps – The field camp sites are not located within an Alquist-Priolo Earthquake Fault Zone.

California Geological Survey Seismic Hazard Zone Maps – The California Geological Survey will be preparing a Seismic Hazard Map for the quadrangle encompassing the site, as mandated by the Seismic Hazard Mapping Act. As of this writing, no map has been issued that encompasses the site, and we are not aware of work significantly underway. This map series addresses the potential for earthquake induced landsliding, and liquefaction.

Seismic Design Maps - The site is shown on seismic hazard maps (CDMG, 1998) that are used in conjunction with the 1997 UBC as lying slightly less than 5km from the San Gregorio fault, which is considered an "A"- type fault. Seismic design criteria will need to be developed when a design-level geotechnical investigation is performed, as the applicable codes and the state of the practice are continually evolving.

3. SITE CONDITIONS

3.1 SITE TERRAIN

The Swanton Pacific Ranch is located on the northwestern slopes of Ben Lomond Mountain. This regional high is dissected by the westward-flowing creeks that drain into Scott Creek, and further modified by large-scale landsliding discussed below.

In general, ridge crests are moderately sloping, with steeper sideslopes commonly in the range of 30 to 40 degrees.

Drainage axes in the mountainous terrain generally are incised, typically with an inner gorge and only local alluvial terrace fragments.

3.1.1 Existing Improvements and Previous Grading

Existing improvements and previous grading are primarily associated with the primary historic ranch usages: dairying, logging, and farming. Features include:

A northern access road (School House Gulch Road and its eastern extension). This road is shown on Figures 3 and Figures 4 - 7. It is paved in its lower portion. There are culverts where this road crosses larger drainage axes.

A southern (alternate) access road (see Figures 3 and 8) that links up with the northern access road at its northern end, and with the Archibald Creek alluvial fan at its southern end. This road is entirely dirt, and has been improved since 2009 (after the Lockheed Fire) for salvage logging truck access. There are culverts where this road crosses larger drainage axes.

The "Al Smith House" itself and garage are located on a ridge crest, and reached via a short spur road stemming from the northern access road. There are associated unpaved parking and turnaround areas. The buildings and parking areas are built on a flat graded pad that appears to consist mainly of cut with a perimeter fill prism.

The "Staub House" and associated improvements (2 yurts, unpaved parking/turnaround areas). These buildings and parking areas are also likely built on a flat cut pad with a perimeter fill prism. The pad north of the Staub House has been extensively modified, probably in large part during past logging activities.

Numerous logging roads of varying age. All appear to have been constructed by cutting along the inboard edge, and sidecasting the fill onto the outboard hillslope. Locally there are graded landings and decks with more extensive fill.

Water tanks, including a cluster located on a knob crest east of the Al Smith House site. We are not aware of others.

Stock ponds, typically located in the narrow valleys separating major landslide blocks, not in drainages with large watersheds. We did not establish how these are supplied (i.e. extent of any piping, spring boxes, etc.).

The extent and location of underground utilities is not yet clear to us.

3.1.2 Drainage

Surface water currently flows by overland sheet flow generally toward swale axes that descend to the west, ultimately feeding into Scott Creek.

Despite relatively heavy rainfall experienced by coastal Santa Cruz County, we did not observe extensive gullying.

There are closed (undrained) depressions at various locations on the property. These depressions occur at boundaries between major landslide blocks, and typically are partially infilled with locally derived alluvium. Some of them contained water at the time of our field work.

At the time of our field work, Little Creek, Archibald Creek and Winter Creek all were flowing.

Culverts onsite are relatively few.

3.2 SITE GEOLOGY

We gathered data from our review of regional mapping and previous investigations, from manipulation and analysis of a LiDAR dataset, from aerial photographic analysis, and from geologic mapping. The findings from each of these are summarized below.

3.2.1 LiDAR and Aerial Photographic Analysis

This project provided an ideal opportunity to evaluate a detailed 2008 LiDAR (Light Detection and Ranging) dataset provided to us by Swanton Pacific Ranch (courtesy Brian Dietterick). This dataset was acquired in 2008, shortly following the Lockheed Fire, the western perimeter of which encroached into the general project area.

Our intent was to preliminarily evaluate the LiDAR dataset for its ability to reliably resolve the ground surface topography for landslide mapping purposes. Provided that surface appeared to be sufficiently well-resolved, we proposed to use that base map for our landslide mapping and interpretation. As a backup, we planned to use traditional stereo pairs of aerial photographs. The power of both of these approaches is the ability to consider the ground surface in three dimensions.

The quality of the LiDAR dataset far exceeded our expectations, and the information provided by it far outstripped that contained on aerial photographs. The ability of the LiDAR to "see through" the vegetative canopy revealed a wealth of topographic information simply not obtainable through aerial photographic analysis for a densely wooded site. Certain aspects of this same LiDAR dataset's accuracy have been examined quantitatively (White, 2010; Hilburn, 2010).

Briefly, the LiDAR is acquired from an aircraft equipped with a laser scanner that sends out precisely timed laser pulses as a beam is swept "lawnmower" fashion across the landscape being flown over. The position of the aircraft and certain ground points is established using GPS technology. Using computer processing, the x, y, and z coordinates of every point that returns or reflects a laser beam/pulse back to the aircraft is determined. For geologic applications, additional processing allows those returns that are due to vegetation to be filtered out, leaving only those returns associated with the ground surface. Those "bare earth" returns are then gridded to generate a DEM (digital elevation model). The LiDAR dataset can be processed differently for other purposes, such as to derive information about the forest canopy.

We examined the LiDAR imagery and aerial photographs focusing on two issues:

- Any evidence suggesting the possible presence of active fault trace(s). Among other features, we looked for features such as linear topographic elements, vegetation lineaments, aligned drainage deflections, planar truncations of landforms, and tonal lineaments.

- Any evidence suggesting past slope instability, and indications of potential future instability. Among other features, we looked for features such as topographic scarps, topographic bulges or convex lobes, arcuate topographic features, topographic reversals, disrupted drainages, and vegetative anomalies.

We manipulated the bare earth DEM to generate hillshade images to highlight subtle variations in local ground surface aspect, in particular subtle internal landslide scarps. We generated topographic profiles using the DEM to generate preliminary geologic cross-sections. We also made use of experimental hillshade images produced by Russ White of Cal Poly to help reduce bias introduced by a single artificial illumination azimuth.

Findings of our LiDAR analysis are integrated with field findings below.

3.2.2 Geologic Reconnaissance

After completing our desktop analysis of LiDAR imagery, we performed geologic reconnaissance mapping to field check, refine, and supplement our interpretation. For this project, geologic reconnaissance mapping takes the form of geomorphic mapping, as there are very few surface outcrops of the materials making up the main landslide blocks, let alone exposures of in-situ bedrock.

We were able to gather information regarding thickness of colluvium based on cut slope exposures, cut slope height, distribution of small irregular masses of existing fill, and of course the orientation of bedding within landslide masses where exposed.

3.2.3 Earth Materials

There are four primary earth materials underlying the property: earth fill, colluvium, landslide deposits, and Santa Cruz Mudstone bedrock. A brief description of the units is provided below, and our interpretation of their inter-relationships is shown on our Landslide Maps (Figures 4 – 8) and Geologic Cross Sections (Figures 9 and 10). Colluvium is not shown on our Site Geologic Map figures, as it mantles essentially all landslide blocks and the contacts between landslide blocks. At the scale of our geologic cross-sections, the thickness of colluvium cannot be portrayed.

We have used a modified version of the ASTM method of soil description and classification, and for descriptions of hardness and weathering properties of bedrock materials we have used the ASCE Manuals and Reports on Engineering Practice - No. 5.

Earth Fill (Ef) – Existing earth fill is present along the outboard edge of existing roadways located on sloping ground, and placed in greater quantity where the existing graded access road crosses swale axes. Based on its distribution, it is derived from onsite cuts, and is composed of a mixture of colluvium and weathered rock fragments.

Colluvium (Col) - Colluvial soil at the site mantles the rock that makes up the major landslide masses, and is exposed in cut slopes along roads. Colluvial soil thickness is highly variable across the property, with thickness typically in the 3 to 5 foot range on ridge crests, and commonly over 8 feet in swale areas. Thickness in swale areas is uncertain because cut slope heights are less than the total colluvium thickness. The texture of colluvium is variable. Where we observed it in road cuts, it typically is composed of gravelly clay and sandy clay.

Landslide Deposits (Qls) – Major landslide blocks on the property measure up to hundreds to thousands of feet in maximum dimension. Based on their form, we classify the large-scale mapped landslide blocks as translational rockslides, with thicknesses (greatly) exceeding 15 feet. These landslides involve large masses of Santa Cruz Mudstone rock that we infer has detached primarily along weak interbeds. Smaller-dimensioned landslides we mapped tend to involve mainly colluvium, and are classified as earthflows.

Santa Cruz Mudstone – We include this as a map unit even though we did not observe in-situ exposures of it. There are reasonably abundant exposures of rock in roadway cut slopes, and in many localities the rock fabric of in-situ rock is preserved, even though the locality lies within a large-scale landslide block. Regionally, the unit is typically a thin- to medium bedded siliceous mudstone with non siliceous mudstone and siltstone and minor sandstone.

Where we encountered the formation onsite, it consists of deeply weathered, interbedded mudstone and sandy mudstone. Bedding ranges from thin-bedded to thicker-bedded sandy mudstone (typically 3 – 8 inches, rarely 1.5 feet thick) with thinner-bedded mudstone intervals (individual beds ½ to 3 inches). Shearing locally has destroyed the original layering of the finer, softer, weaker intervals. Weathering appears to have preferentially attacked the fine-grained, mudstone intervals and sheared intervals.

4. CONCLUSIONS AND DISCUSSION

4.1 LANDSLIDE MODEL FOR SITE

Mapping/Analysis Approach

The detail of the LiDAR bare earth DEM resolved scarp and landslide mass details at a variety of scales not hitherto possible with aerial photographic analysis and field mapping. We were able to trace confidently subtle and discontinuous scarp elements that would not have been detected in the field, or could not have been traced or linked. The sharpness of topographic details provided clues to relative ages of landform features, as did cross-cutting relationships captured by the imagery. Our observations support more focused quantitative evaluations of the Swanton Ranch LiDAR dataset accuracy, such as White's (2010) and Hilburn's (2010) analyses of the accuracy of geomorphic features imaged by LiDAR.

Enough landslide details were apparent on the LiDAR hillshade and contoured topographic base that we had to modify our mapping approach to avoid generating too cluttered a geologic map. We constructed two landslide maps, one showing inferred landslide top-of-scarp, and one showing the boundaries of major landslide blocks. Landslide top-of-scarp maps were most useful in establishing cross-cutting relationships and relative ages of landslide masses. Since the boundaries of major landslide blocks are the key features of relevance to siting of field camp structures, that approach is used on Figures 3 and 4 - 8.

Key Landslide Complex Observations

The landslide complex is unusually concentric and symmetrical, suggesting that some set of controlling factors affected all landslides in the complex in the same general fashion (see Fig. 3).

The preserved parts of the landslide complex are almost entirely extensional in their geometry (see Fig. 3). None of the compressional portion – the toe – is preserved, having been removed by Scott Creek.

The general lack of landslide toes also indicates that slide planes for constituent landslides do not daylight within the complex, but instead likely toe out at depth at Scott Creek, buried beneath alluvium (Fig. 9).

The crests of the major landslide blocks and tops-of-scarps are greatly muted and smoothed, resulting in a large radius of curvature that indicates significant age or time of exposure (Figures 4 – 8). Even the youngest of the large landslide block boundaries has a radius of curvature on the order of several to many tens of feet. This is in great contrast with the scarp's radius of curvature for a fresh roadcut landslide: on the order of inches to a foot.

The course of Scott Creek swings eastward at the toe of the landslide complex, so the last significant movement of the landslide complex pre-dates this creek position, otherwise the creek axis would be deflected westward (Fig. 3).

The last westward deflection of Scott Creek must likewise predate the elevated terrace remnant west of Scott Creek, directly opposite the landslide complex toe (Fig. 3).

The alluvial floodplain of Scott Creek upstream and downstream of the landslide complex (Fig. 3) appear to be coplanar. If significant landslide complex movement had occurred, alluvium would have been impounded upstream of the landslide toe, resulting in floodplain terraces at different elevations.

The only sizeable landslide with an expressed toe within the overall landslide complex is a failure of an oversteepened pre-existing landslide scarp. This landslide is discussed further below, as it is relevant to the Staub House site access road spur.

Inferred Origin/History of Landslide Complex
The genesis of the landslide complex at the site appears to have been fostered by a regional syncline which creates an adverse bedding orientation over a large area (see Fig. 1). In a general sense, we infer bedding to dip gently to moderately westward approximately parallel to an envelope fitting the overall modern ground surface, with bedding curving upward near Scott Creek, which would facilitate daylighting of the landslide complex (see Cross-Section A-A', Figure 9).

Marine terrace studies trace the Wilder, Blackrock and Quarry marine terraces through the Swanton Pacific Ranch property (see Figure 1.7 of Weber and Allwardt, 2001). We have not reviewed the original research that may or may not support their presence on the Swanton Ranch property in the immediate project vicinity (we are skeptical of terrace remnants within the Scott Creek drainage as far north as the project vicinity). However, if preserved terrace remnants are present, it would provide evidence that there has not been significant landslide complex movement in a time span on the order of tens of thousands to hundreds of thousands of years. For terraces to be preserved, uplift must progress for a long enough time to permit terrace differentiation, with relative stillstands of sufficient duration again for terrace morphology to form. Uplift rates of Santa Cruz coastline have been estimated at 0.10 to 0.48 m per thousand years (Bradley and Griggs, 1976; and Weber and others, 1999; both cited in Munster and Harden [2002]). Ages of the five youngest terraces in the Santa Cruz area are estimated at 65 to 226 ka (thousand years) (Perg and others, 2001; cited in Harden [2002]), based on soil chronosequence data. Terraces in the Swanton area (mouth of Scott Creek) are estimated to range in age from 105 to 545 ka (research summary in Widrig and others, 2010). Regardless of the specifics of terrace correlation, these data speak to a landscape of significant age in the range of hundreds of thousands of years.

More likely, any remnant of terrace geomorphology within the limits of the landslide complex was erased by landsliding that accompanied those higher sealevel stands. The topographically lower rocks of the landslide complex likely were saturated when sealevel and the local base level for Scott Creek were higher (relative to today's position). As noted previously, several marine terraces are mapped south and north of the mouth of Scott Creek, with the uppermost clearly marine terrace surface at the mouth of Scott Creek at approximate elevation 290 - 310 feet above sea level – well above the modern landslide complex toe elevation of approximately 60 to 80 feet above sea level. As sea level dropped and Scott Creek incised, these rocks likely remained saturated until the shoreline finally retreated from most of today's Scott Creek valley floor. In our judgment, this history of saturation of the toe of the landslide complex is a prime factor in generating the landslide complex. Now that the toe of the landslide complex is no longer at sea level, a major destabilizing factor has been removed, and the complex has remained metastable for an extended time – thousands of years as evidenced by the greatly rounded tops-of-scarps of the landslide complex interior. Scott Creek has removed the toe portion of the landslide complex, leaving only the extensional upper portion.

It is likely that earthquake ground shaking was a contributing factor to increments of landslide complex movement, although we do not have direct evidence. Slope stability modeling of the complex to assess the sensitivity of it to internal water levels and to ground shaking would be possible. However, the complexity of the site would make it extremely hard, and likely impractical, to obtain enough information to construct an accurate, detailed slope stability model.

Smaller-scale landsliding has accompanied more recent development of the local landscape, as creeks downcut and oversteepened slopes adjust.

We examined roadcuts for exposures of basal landslide planes within the landslide complex, where our model predicted that more recent erosion and incision of drainages could have exposed them. One excellent example was found on a logging road north and upslope of the Staub House flat (see roadcut between Stations 1 and 3 shown on Figure 4). At this locality, one can observe beds of undeformed sandy mudstone juxtaposed against thick (up to 5 feet thick), bedding-parallel rubble zones. The rubble zones contain equant blocks on the order of ¾ to 3 inches of sandstone and mudstone, intermixed with sheared mudstone matrix. No organics are present, confirming that these zones cannot be buried landscape surfaces. We infer that bedding parallel shearing in the weaker intervals dismembered the relatively brittle sandstone and mudstone beds, with further rotation and breakage reducing them to equant blocks.

The overall geomorphology documents a large landslide complex that experienced extensive movement long in the past. The major landforms of this complex are now greatly rounded and subdued, and further document that the major landslide blocks have remained largely static for an extended period, with relatively minor adjustments and increments of additional movement.

4.1.1 Staub House Site Access Spur Landslide

Within the landslide complex as a whole, there is an anomalous landslide of potential concern to the access spur that reaches the Staub House site. While for the Al Smith House vicinity, there are two access routes off the property, for the Staub House vicinity, there is a sole access spur past the junction of the two primary access roads (see Fig. 3). This access spur traverses the toe of a landslide, raising the question of its potential to disrupt or cut access to the Staub House site.

This landslide (see Figures 3, 4, and 5) is unusual in that it is one of very few large landslides internal to the overall landslide complex that has an expressed landslide toe. We interpret this landslide to reflect a localized failure of an oversteepened ancient landslide headscarp. The source headscarp which failed is aged, as indicated by its smooth form, and large radius of curvature. The headscarp of the inset landslide is significantly sharper, indicating a somewhat younger feature. The landslide has come to rest at its current position as a result of transitioning from the steep headscarp source area onto more gently sloping ancient landslide deposits at its toe. The ancient landslide deposits overridden by the younger slide are visible to either side, and can be projected beneath it.

This transition is illustrated by geologic cross-section B-B' (see Figure 9). The basal plane of the inset slide must deflect upwards and daylight at this transition.

In map view, the slide's width narrows as the toe is approached. This is due to its position, wedged between two adjacent ancient landslide masses (see cross-section C-C'; Figure 10).

In summary, we judge that the inset landslide mass has a low potential to reactivate and disrupt the Staub House site access road.

4.2 LANDSLIDE STABILITY

In the following sections, we discuss our general assessment of slope stability with respect to the proposed project, both at the deep-seated scale and the shallow scale.

4.2.1 Qualitative Stability Assessment

Deep-Seated Landsliding - We preliminarily judge the potential for deep-seated landslide movement to adversely affect the site improvements to be acceptably low for improvements located away from boundaries between landslide blocks.

Shallow Landsliding – We judge the potential for shallow landsliding (involving colluvium and/or the uppermost 1 to 2 feet of deeply weathered bedrock) to be low on ridge crests, moderate on side slopes, and moderate to high for unsupported colluvial cut slopes. The potential for upslope shallow failures to affect road segments will need to be addressed at later stages of project design. Provided these are addressed, in our judgment the potential for shallow landsliding to adversely affect the proposed improvements can be reduced to an acceptably low level.

Significant soil creep occurs on many of the hillslopes on the property. Improvements proposed on slopes may need to take soil creep into design consideration; this should be addressed during design-level geotechnical investigation.

4.2.2 Seismically Induced Landsliding

As alluded to above, our qualitative judgment based on the available data is that ridge crest portions of the property are likely stable under seismic conditions, provided subsurface exploration indicates there is no evidence of rock mass dilation, or of throughgoing weak beds or fracture sets in an adverse orientation. Based on our mapping, future landsliding is most likely to involve colluvium and the uppermost interval of most-deeply-weathered rock (on the order of 1-2 feet where we have observed it) on slopes.

4.3 SEISMIC HAZARDS

Our judgment regarding various primary and secondary seismic hazards is summarized below. Specific seismic design criteria should be chosen at the time of design-level geotechnical investigation, based on codes and practice in effect at that time.

- In our judgment, the potential for fault ground rupture and for coseismic faulting to occur at the site is low, as evidenced by a lack of observed lineaments, and a lack of mapped active faulting in the site vicinity or projecting toward it.
- In our judgment, the potential for ridgetop fissuring/shattering is not yet known, pending subsurface information regarding presence or absence of fissuring and dilation in the rock masses underlying those areas. We are confident that test pit data can provide clear data on this, as the site has experienced many large earthquakes from a variety of sources, which would have provided multiple opportunities for this process to occur and progress.
- In our judgment the potential for liquefaction and associated lateral spreading of the hillside portions of the property is judged to be very low, based on texture of soils at the site, and the apparent lack of a shallow water table. We cannot comment on the the alluvial floors of Scott Creek and tributaries such as Alexander and Molino Creeks.

OTHER GEOLOGIC HAZARDS

For completeness' sake, we herein address other geologic hazards commonly included in engineering geologic reports, as referenced in CGS Note 48 (rev. 2007).

Our scope of work excludes a Phase I environmental site assessment of the site, and characterization of hazardous materials. Nevertheless, we are not aware of naturally occurring hazardous materials present at the site (e.g. serpentinite or tremolite with asbestiform mineral habit; methane, hydrogen sulfide; petroleum).

No new drinking water supply systems are proposed; hence ground-water quality concerns are not within our scope.

Feasibility of on-site septic systems or system improvements are not within our current scope.

Hydro-collapse of soils is a phenomenon that is typically associated with dry-climate settings, not the marine-influenced climate of the property. In our judgment, the potential for hydro-collapse of on-site soils is very low.

The site is not located in proximity to an active volcanic center (Jennings, 1977).

The proposed field camp sites are located some distance inland, and at an elevation hundreds of feet above sea level, and therefore are not subject to a tsunami hazard.

The site is not located within a flood zone, as mapped by FEMA..

The site is not underlain by earth materials known to emit significant quantities of radon gas. According to Environmental Protection Agency (EPA) regional maps (accessible at http://www.epa.gov/radon/states/california.html#zone%20map), the site lies within a region with a "moderate" potential for "average" indoor radon screening levels ranging from 2 to 4 pCi/L. Of

2 radon tests reported within the 95017 zip code, zero had reported levels above 4 pCi/L (tabulation of California Dept. of Health Services, accessible at http://www.cdph.ca.gov/healthinfo/environhealth/Documents/Radon/CaliforniaRadonDatabase.pdf)

4.4 GEOLOGIC CONSIDERATIONS FOR PROJECT CONCEPT

Based on our investigation to date, which is based on surface expression of geology and does not incorporate subsurface investigation, we have the following preliminary conclusions.

In general, sites centered on ridge crest areas, and not astride landslide block boundaries, have a relatively high likelihood of being geologically suitable. These are parts of the landscape which appear to have remained relatively stable, even if they do lie within landslide masses which have experience wholesale translation at times in their past.

In general, sites on topographic flats will require additional investigation to assess whether there has been internal deformation and offset.

Garage Expansion (at Al Smith House site) - We preliminarily conclude that the proposed expansions to the existing garage at the Al Smith House site (see Fig. 4) are geologically suitable, subject to confirmation with subsurface investigation. There are existing small-diameter borings (precise locations unknown) in the general vicinity. However, the geologic issues focus on disaggregation of the rock mass as a whole, which is extremely difficult (or impossible) to confidently assess in a small sample.

The issues to be addressed by subsurface investigation include:

- Thickness of colluvium
- Evidence of rock creep
- Evidence of ridgetop fracturing or fissuring
- Orientation of bedding with respect to nearby steep hillslopes

There is existing subsurface information from small-diameter borings (logs contained in Rogers Johnson, 2002) which will form an important starting point for the geotechnical design investigation.

Faculty (Staff) Housing (ridge crest east of Al Smith House site) – We preliminarily conclude that the staff housing site (see Fig. 5) is geologically suitable, subject to confirmation with subsurface investigation. There are existing small-diameter borings (precise locations unknown) in the vicinity. As with the improvements at the Al Smith House site, the geologic issues focus on disaggregation of the rock mass as a whole, which is extremely difficult (or impossible) to confidently assess in a small sample.

The issues to be addressed by subsurface investigation include:

- Thickness of colluvium
- Evidence of rock creep
- Evidence of ridgetop fracturing or fissuring
- Orientation of bedding with respect to nearby steep hillslopes

As with the Al Smith House vicinity, there is existing subsurface information from small-diameter borings (logs contained in Rogers Johnson, 2002) which will form an important starting point for the geotechnical design investigation.

Dining Facility, Comfort Station (Staub House site) – We preliminarily conclude that the access road (see Fig. 4) to the graded flat on which these two facilities are proposed is geologically suitable, based on the inferred metastable position of the landslide toe that reaches the access road.

The existing Staub House and yurts appear to be located on a ridge that constitutes a preserved landslide scarp which has not undergone internal offset (see Fig. 4, 5), and we preliminarily conclude that the approximate footprints of these existing structures are geologically suitable, should project needs dictate their redevelopment.

The proposed dining facility and comfort station would be located on the extensively modified flat area to the north, and in our judgment there is not yet sufficient information to assess whether there are offsets between landslide blocks that traverse parts of this pad.

The issues to be addressed by further investigation include:

- Presence/absence of landslide block boundaries, and their orientation(s)
- Evidence of rock creep (for areas near the outermost edge of the pad)
- Orientation of bedding with respect to nearby steep hillslopes (for areas near the outermost edge of the pad)

Northern Access Road – We preliminarily conclude that the northern access road (from Swanton Road to the junction with the alternate access) is geologically suitable, provided design-level geotechnical investigation is performed to design mitigation for shallow landsliding that affects a portion of the roadway next to the sawyering competition area.

Specific road-related improvements, if needed, have not yet been proposed. These could include road widening, fire turn-outs, and turn radius modifications. Depending on their nature, these may require geotechnical investigation for their design.

Alternate Access Road – We preliminarily conclude that the alternate access road (from the junction with the northern access road, southward to its lower terminus at Archibald Creek) is geologically suitable for use as a secondary/emergency access. Its current use as a logging haul road during dry months indicates that access can be maintained along this corridor. Performance issues will likely center on long-term stability of cut slopes, and stability of side-cast fill prisms.

5. RECOMMENDATIONS

In order to substantiate the preliminary conclusions presented here with respect to specific site suitability, we recommend that subsurface investigation be performed as outlined above. This investigation should be scoped and carried out in coordination with the project geotechnical engineer (Bauldry Engineering) in order to maximize the amount of useful information obtained.

6. SUBSEQUENT GEOTECHNICAL SERVICES

This preliminary engineering geologic feasibility report is an important milestone in successfully achieving your project goals. This report is intended to preliminarily address geologic feasibility of the proposed conceptual project using surficial information alone, and to facilitate planning discussions with the County of Santa Cruz. Our conclusions assume that some level of follow-on subsurface investigation will be undertaken, as discussed above. Once the conceptual geologic feasibility of the project is accepted by the County, design drawings can be begun in coordination with design-level geotechnical investigation (currently envisioned to be headed up by Bauldry Engineering, the project geotechnical engineer). Conclusions and recommendations outlined in this report may require modification and supplement based on field conditions revealed by later investigation, and during construction. For our findings and recommendations to remain valid, Pacific Geotechnical Engineering must be involved in pre-construction design consultations and reviews, and construction observation and testing. This (and future reports) are based on limited sampling and investigation, and by those constraints may not have discovered local anomalies or other varying conditions that may exist on the project site. Therefore, this report is preliminary until PGE can confirm that actual conditions in the ground conform to those anticipated in the report.

During design, PGE can provide consultation and supplemental recommendations to assist the project team in design and value engineering, especially if the project design has been modified after completion of our report. It is impossible to anticipate every design scenario and construction material during preparation of our report. Therefore, retaining PGE to provide post-report consultation will help address design changes, answer questions and evaluate alternatives proposed by the project designers and contractors.

Prior to issuing project plans and specifications for construction bidding purposes, PGE should review the grading, drainage and foundation plans and the project specifications to determine if the intent of our recommendations has been incorporated in these documents. We have found that such a review process can help reduce the likelihood of misinterpretation of our recommendations, possibly causing construction delay and additional cost.

7. LIMITATIONS

In preparing the findings and professional opinions presented in this report, we have endeavored to follow generally accepted principles and practices of the engineering geologic profession in the area and at the time our services were performed. No warranty, express or implied, is provided.

The conclusions and recommendations contained in this report are based, in part, on information that has been provided to us. In the event that the general development concept or general location and type of structures are modified, our conclusions and recommendations shall not be considered valid unless we are retained to review such changes and to make any necessary additions or changes to our recommendations. To remain as the project engineering geologic consultant-of-record, PGE must be retained to provide services as discussed above.

Subsurface exploration is necessarily confined to selected locations and conditions may, and often do, vary between these locations. Should conditions different from those described in this report be encountered during project development, PGE should be consulted to review the conditions and determine whether our recommendations are still valid. Exploration, testing, and analysis will be required for project design.

Should persons concerned with this project observe geologic/geotechnical features or conditions at the site or surrounding areas which are different from those described in this report, those observations should be reported immediately to Pacific Geotechnical Engineering for evaluation.

It is important that the information in this report be made known to the design professionals involved with the project, that our recommendations be incorporated into project drawings and documents, and that the recommendations be carried out during construction by the contractor and subcontractors. It is not the responsibility of Pacific Geotechnical Engineering to notify the design professionals and the project contractors and subcontractors.

The findings, conclusions and recommendations presented in this report are applicable only to the specific project development on this specific site. These data should not be used for other projects, sites or purposes unless they are reviewed by PGE or a qualified geotechnical professional.

Report prepared by,

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SELECTED REGIONAL FAULT DATA

Calaveras fault – The Calaveras fault passes through the lower foothills of the Diablo Range and roughly forms the eastern margin of the southern Santa Clara Valley. The creeping southern segment of this fault merges with the San Andreas fault near Hollister. The Calaveras fault has generated a number of moderate magnitude, damaging earthquakes during historic time: 1897, 1911, 1979, and 1984. The Richter magnitudes for all four of these earthquakes were nearly identical: 1897 – 6.2; 1911 – 6.1; 1979 – 5.9; and 1984 – 6.2. Current research (CGS, 1996, 2003) indicates that the maximum earthquake for the northern, central and southern segments of the Calaveras fault are moment magnitudes (Mw) 6.8, 6.2, and 5.8 respectively.

Hayward fault – The Hayward fault forms the eastern margin of the San Francisco Bay basin. The last major earthquake on the Hayward fault occurred in 1968 along a "southern segment" of the fault, and had an estimated Richter magnitude of 7.0. Until recently, it was thought that a similar-magnitude earthquake in 1836 occurred on a northern segment of the fault. However, as noted above, recent research suggests that the 1836 earthquake occurred on a different fault (Toppozada and Borchardt, 1998), and that the Hayward fault may be unsegmented. The CGS (1996) considers the maximum earthquake for the Hayward fault to be moment magnitude 6.9, with a return interval of 167 years.

Monte Vista/Shannon fault – This seismic source essentially composites several separately mapped frontal thrust faults along the northeastern margin of the Santa Cruz Mountain. While some of these west-dipping faults are not considered seismically capable, this seismic source is considered capable of a Mw 6.7 earthquake (CGS, 2003).

Monterey Bay/Tularcitos fault – This relatively short fault lies essentially within Monterey Bay, and accommodates some of the right-lateral slip carried solely by the San Gregorio-Hosgr fault in areas farther north, in additiont to reverse motion. This fault is considered capable of a Mw 7.3 earthquake (CGS, 1996, 2003), and is included in the CGS statewide probabilistic seismic hazards model (CGS, 2003).

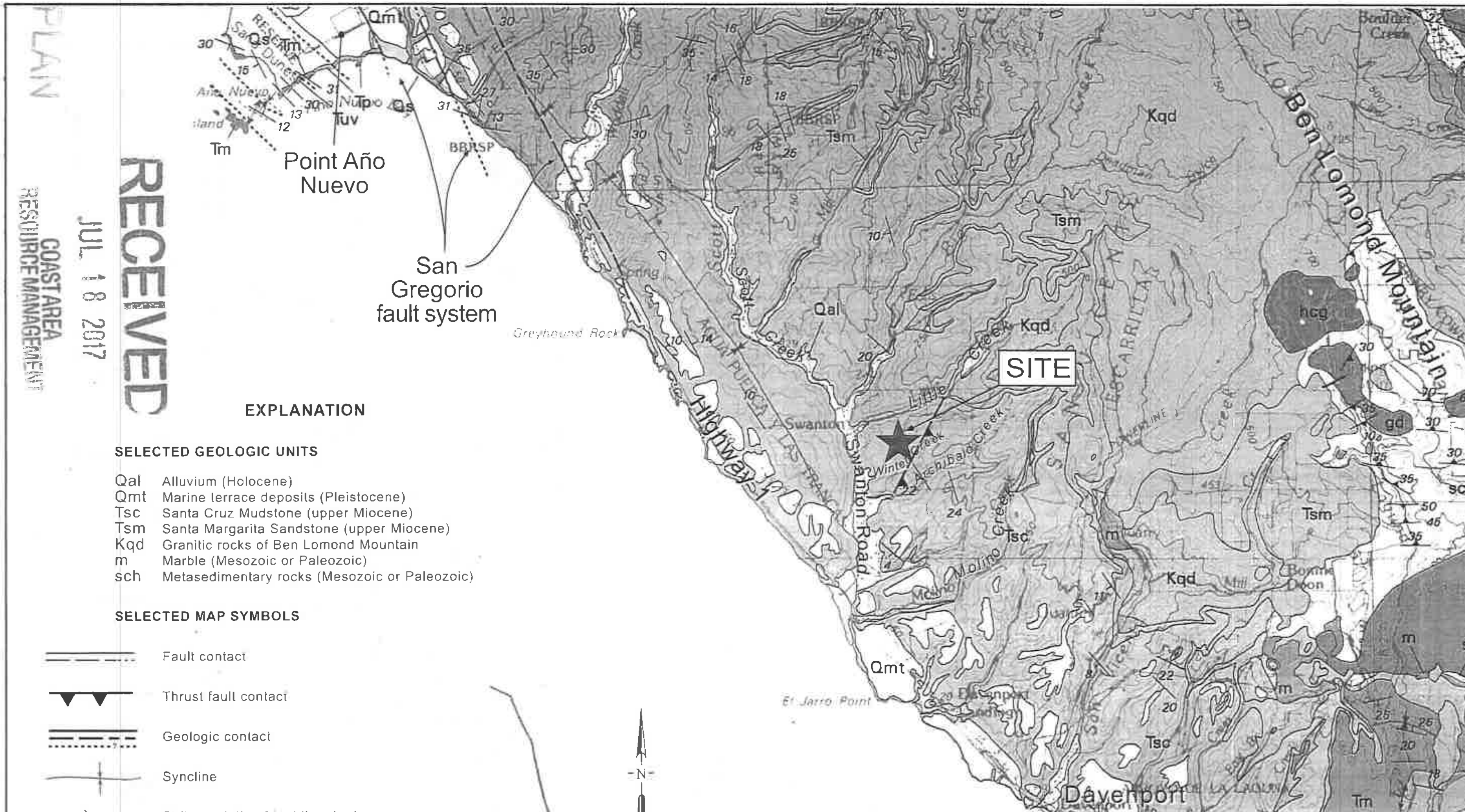
San Andreas fault – The San Andreas fault is hundreds of miles long, passing through the greater Bay Area from beyond Pt. Reyes to the north, down the San Francisco Peninsula, and extending on beyond Hollister to the south. This fault has generated at least four large, damaging earthquakes during historic time: 1838, 1857, 1906 and 1989. In addition, an 1836 earthquake once considered to have occurred on the Hayward fault is now thought to have occurred south of Loma Prieta in the Santa Cruz Mountains on an unknown fault (Toppozada and Borchardt, 1998). The earthquake of 1838 probably caused ground rupture from San Juan Bautista to San Francisco, and was centered somewhere in between; it had an estimated Richter magnitude of about 7.5. The earthquake of 1857 occurred in San Luis Obispo County; it had an estimated Richter magnitude of approximately 8.0. The 1906 earthquake was probably centered just offshore of the Golden Gate of San Francisco Bay, and had an estimated Richter magnitude of approximately 8.3. The 1989 Loma Prieta earthquake was epicentered in the Santa Cruz Mountains. This moment magnitude (Mw; a better measure of earthquake magnitude than Richter magnitude) 6.9 earthquake (Richter or surface wave magnitude 7.1) caused 64 deaths, about 4,000 injuries and about 6 billion dollars of damage in the Bay Area.

The California Geological Survey (CGS) currently considers the maximum earthquake for the Peninsula segment of the San Andreas fault to be moment magnitude 7.1 (CGS, 1996, 2003). The maximum earthquake for the Santa Cruz Mountains segment is considered to be moment magnitude 7.0. Both segments were considered by the CGS (1996) to have the same 400-year return intervals for the maximum earthquake, although more recent work suggests a shorter return interval (e.g. Hall and others, 1999).

San Gregorio-Hosgri fault – The San Gregorio-Hosgri fault is a part of the San Andreas fault system located offshore of Monterey Bay. The fault comes onshore near Ano Nuevo near the San Mateo/Santa Clara County line, and is transitional northward to the Seal Cove fault. The northern portion of the fault has a relatively high slip rate of 7mm/yr (+/- 3mm) and is considered to have a maximum earthquake of Mw 7.5, while the southern portion is capable of a Mw 7.0 (CGS, 1996, 2003). All faults in this system are considered seismically active.

Sargent fault - The Sargent fault is considered part of the San Andreas fault system and splays off of this fault north of the City of Santa Cruz. Like other thrust faults east of the San Andreas fault, the Sargent fault is thought to be tectonically coupled with the San Andreas fault at depth. However a recent study by Nolan and others suggests that the Sargent fault may not be tectonically coupled with the San Andreas, and that movement may be associated with distributed shear across the region.

Zayante-Vergeles fault – The Zayante-Vergeles fault accommodates strike-slip and reverse motion. It lies largely parallel to and west of the San Andreas fault in northern San Benito, Monterey, and southern Santa Cruz Counties. The CGS (2003) considers it to be capable of a Mw 7.0 earthquake.



EXPLANATION

SELECTED GEOLOGIC UNITS

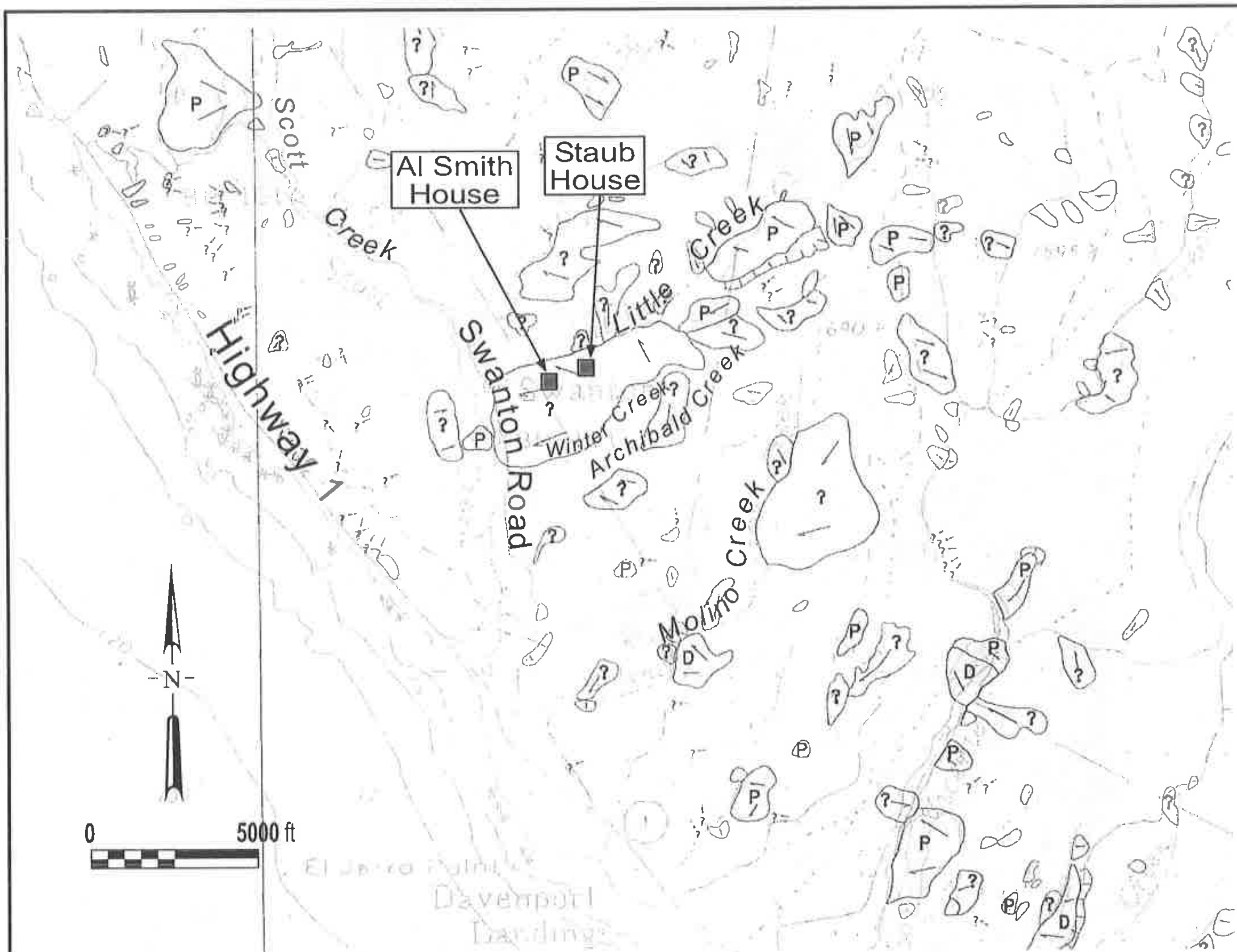
Qal Alluvium (Holocene)
Qmt Marine terrace deposits (Pleistocene)
Tsc Santa Cruz Mudstone (upper Miocene)
Tsm Santa Margarita Sandstone (upper Miocene)
Kqd Granitic rocks of Ben Lomond Mountain
m Marble (Mesozoic or Paleozoic)
sch Metasedimentary rocks (Mesozoic or Paleozoic)

SELECTED MAP SYMBOLS

Fault contact
Thrust fault contact
Geologic contact
Syncline
60 Strike and dip of bedding, in degrees

PACIFIC GEOTECHNICAL ENGINEERING	DATE NOVEMBER 2010	REGIONAL GEOLOGIC INDEX MAP SWANTON RANCH FIELD CAMP SWANTON PACIFIC RANCH DAVENPORT, CALIFORNIA	FIGURE 1 PROJECT 2341G

56



EXPLANATION

Large landslide deposit - More than 500 feet in maximum dimension. Arrows indicate general direction of downslope movement (omitted for lack of space on smaller landslides)

Small landslide deposit and gully - 50 to 500 feet in maximum dimension. Arrow indicates general direction of downslope movement and is centered over location of deposit. Included are gullies which exhibit observable side bank slumping.

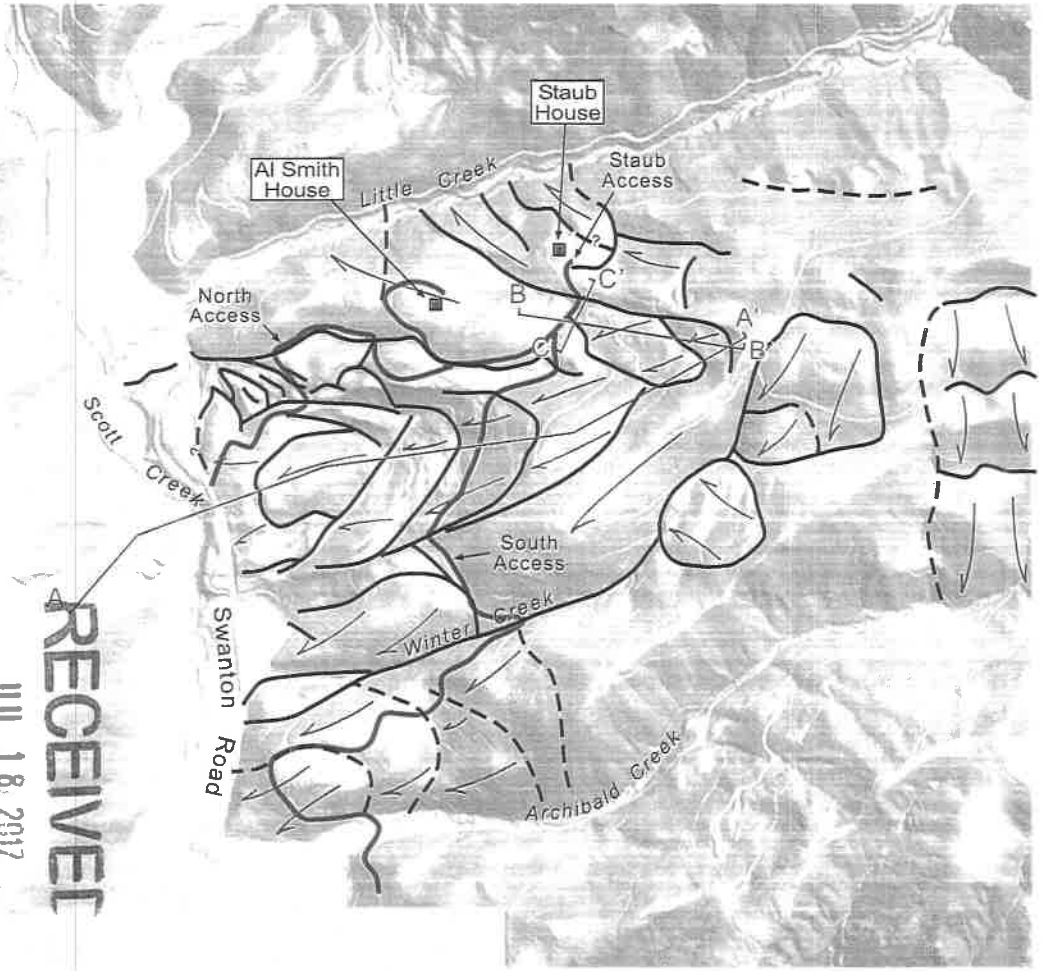
DR definite rapid landslide deposit

P probable landslide deposit

? questionable landslide deposit

BASE MAP: Modified from Cooper-Clark and Associates, digital compilation by Roberts and others (1998).

PACIFIC GEOTECHNICAL ENGINEERING	DATE NOVEMBER 2010	COOPER CLARK LANDSLIDE MAP SWANTON RANCH FIELD CAMP SWANTON PACIFIC RANCH DAVENPORT, CALIFORNIA	FIGURE 2 PROJECT 2341G



EXPLANATION

Boundary between major landslide blocks; dashed where approximate; queried where uncertain; scarps not mapped

Direction of landslide movement

Access road segments discussed in text

C — C' Line of geologic cross section

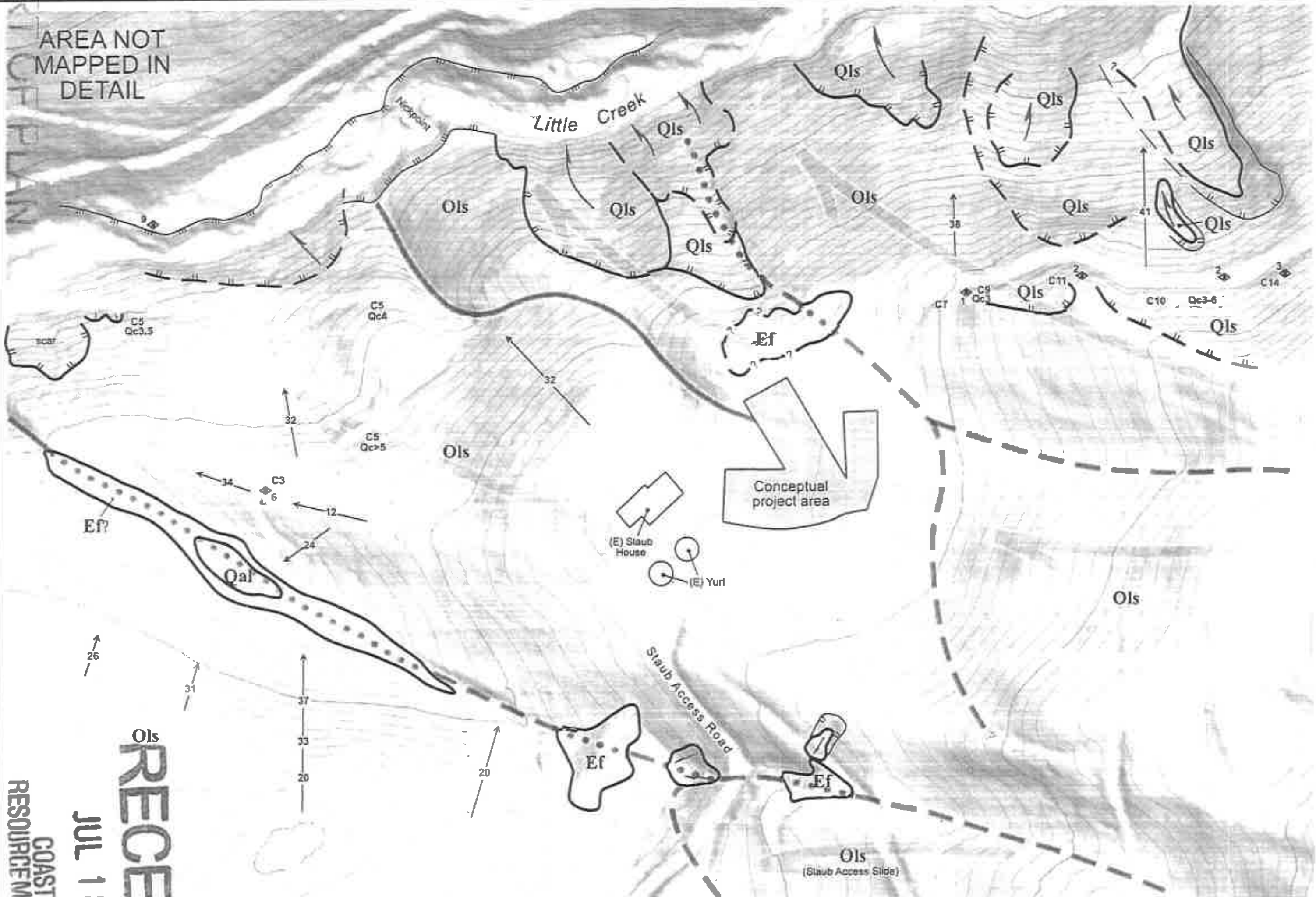
-N-

0 800 ft

NOTES:

1. The base maps for this and other hillshade figures were prepared from 2008 LiDAR DEM provided by Swanton Pacific Ranch. Hillshade is generated using Global Mapper software. On this figure hillshade is illuminated from azimuth 045 and exaggerated to accentuate differences in slope aspect.
2. For clarity, only boundaries between landslide blocks are shown. Landslide scarps are not identified on this figure.

PACIFIC GEOTECHNICAL ENGINEERING	DATE NOVEMBER 2010	SCHEMATIC LANDSLIDE MAP SWANTON RANCH FIELD CAMP SWANTON PACIFIC RANCH DAVENPORT, CALIFORNIA	FIGURE 3 PROJECT 2341G

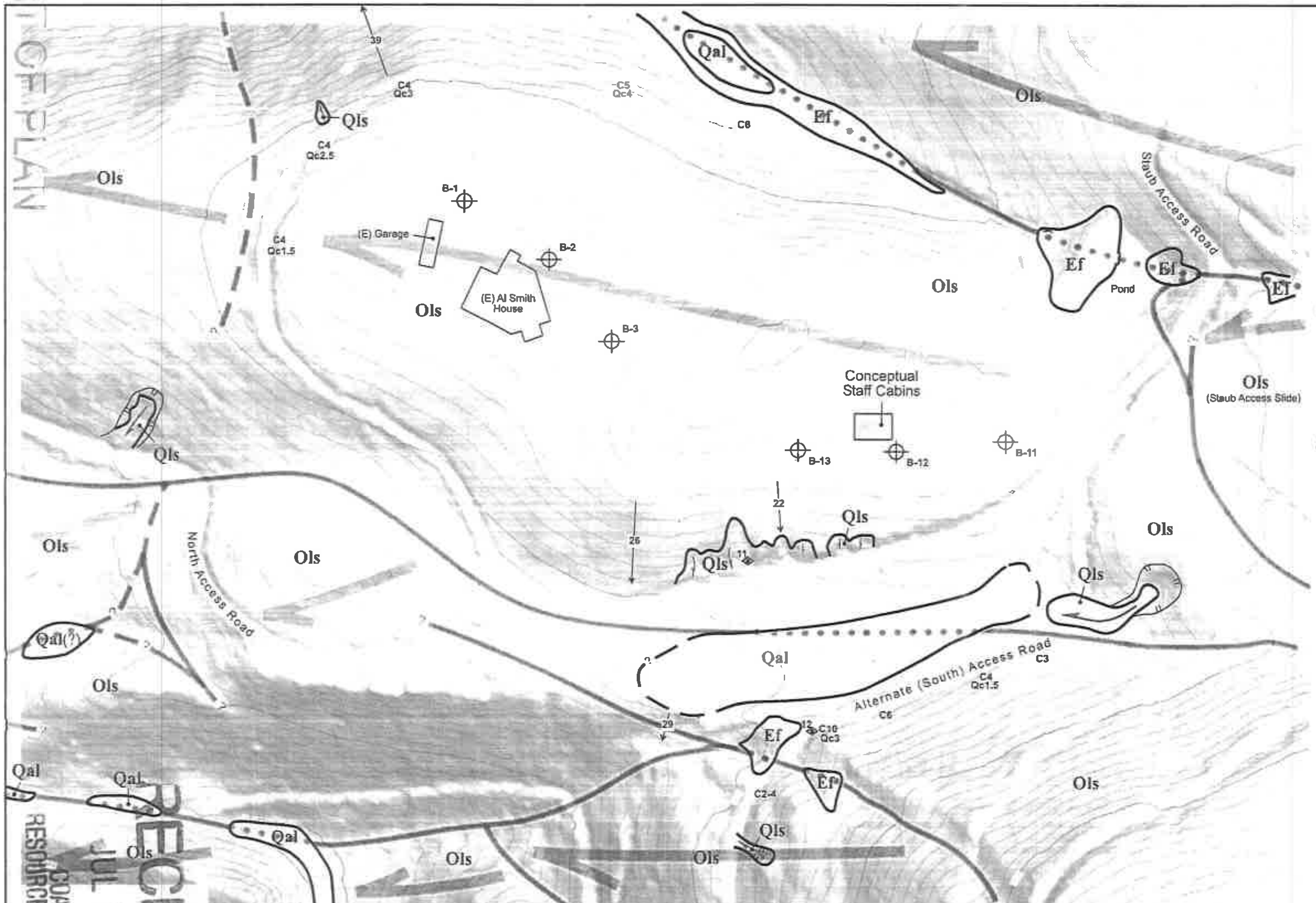


EXPLANATION

- **Ef** Fill
- **Qal** Alluvium
- **Qls** Landslide deposit
- **Ols** Older landslide block
- Boundary between major older landslide blocks
- Landslide - double hachure indicates top of scarp (landslide mass distinguished from scarp locally); arrow indicates direction of movement; downslope termination of scarp indicates scarp not expressed past this point
- Geologic contact - dashed where approximate, dotted where concealed, queried where uncertain
- Break in slope at outer edge of alluvial terrace
- Slope aspect and inclination (degrees)
- cd Closed depression
- Area of pronounced soil creep
- Gully
- C12 Cut slope height (feet)
- Qc2 Colluvium thickness (feet)
- 14 Station location discussed in text
- B-13 Exploratory boring by Pacific Crest Engineering (2000); location approximate

NOTE: Base map prepared from 2008 LIDAR DEM provided by Swanton Pacific Ranch. Source LiDAR was filtered and gridded to generate a "bare earth" DEM. Hillshade and contouring generated using Global Mapper software.

PACIFIC GEOTECHNICAL ENGINEERING	DATE	LANDSLIDE MAP 1 of 5	FIGURE 4
	NOVEMBER 2010	SWANTON RANCH FIELD CAMP SWANTON PACIFIC RANCH DAVENPORT, CALIFORNIA	PROJECT 2341G

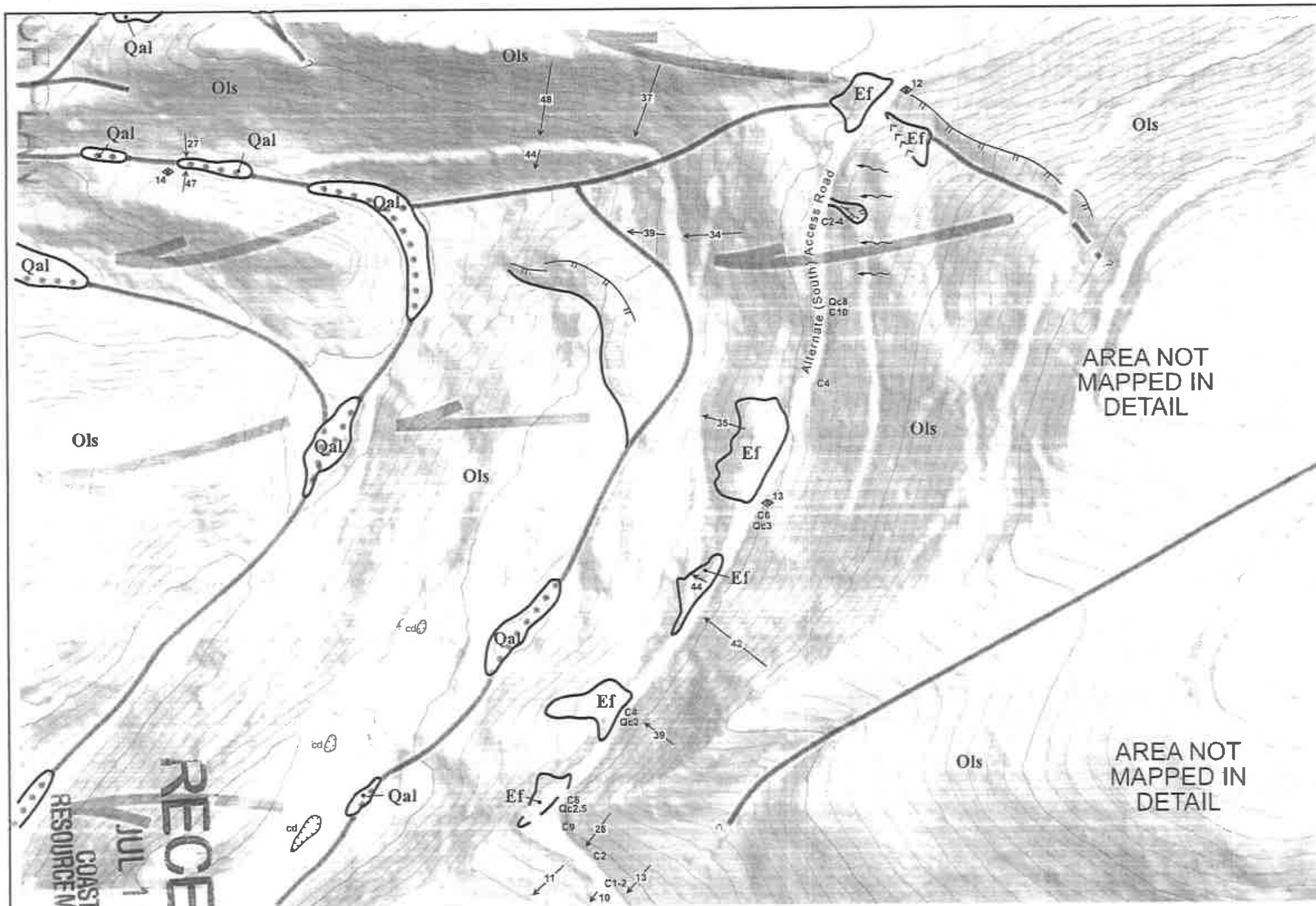


EXPLANATION

Ef	Fill
Qal	Alluvium
Qls	Landslide deposit
Ols	Older landslide block
	Boundary between major older landslide blocks
Qls (scarp, mass)	Landslide - double hachure indicates top of scarp (landslide mass distinguished from scarp locally); arrow indicates direction of movement; downslope termination of scarp indicates scarp not expressed past this point
	Geologic contact - dashed where approximate, dotted where concealed, queried where uncertain
	Break in slope at outer edge of alluvial terrace
32	Slope aspect and inclination (degrees)
cd	Closed depression
	Area of pronounced soil creep
	Gully
C12	Cut slope height (feet)
Qc2	Colluvium thickness (feet)
14	Station location discussed in text
B-13	Exploratory boring by Pacific Crest Engineering (2000); location approximate

NOTE: Base map prepared from 2005 LiDAR DEM provided by Swanton Pacific Ranch. Source LiDAR was filtered and gridded to generate a "bare earth" DEM. Hillshade and contouring generated using Global Mapper software.

PACIFIC GEOTECHNICAL ENGINEERING	DATE NOVEMBER 2010	LANDSLIDE MAP 2 of 5 SWANTON RANCH FIELD CAMP SWANTON PACIFIC RANCH DAVENPORT, CALIFORNIA	FIGURE 5 PROJECT 2341G

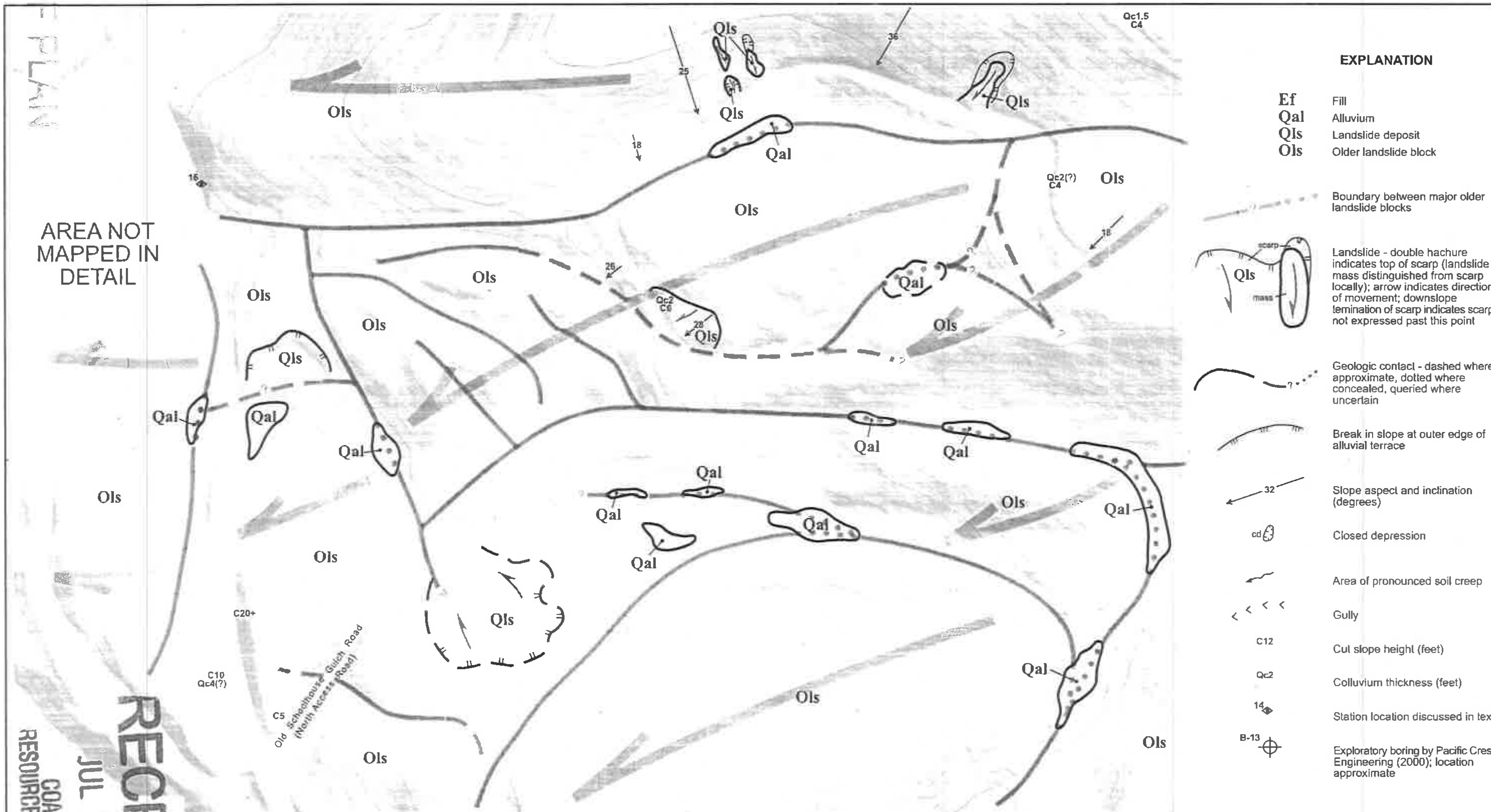


EXPLANATION

- **Ef** Fill
- **Qal** Alluvium
- **Qls** Landslide deposit
- **Ols** Older landslide block
- Boundary between major older landslide blocks
- Landslide - double hachure indicates top of scarp (landslide mass distinguished from scarp locally); arrow indicates direction of movement; downslope termination of scarp indicates scarp not expressed past this point
- Geologic contact - dashed where approximate, dotted where concealed, queried where uncertain
- Break in slope at outer edge of alluvial terrace
- Slope aspect and inclination (degrees)
- cd Closed depression
- Area of pronounced soil creep
- Gully
- C12 Cut slope height (feet)
- Qc2 Colluvium thickness (feet)
- 14 Station location discussed in text
- B-13 Exploratory boring by Pacific Crest Engineering (2000); location approximate

NOTE: Base map prepared from 2008 LiDAR DEM provided by Swanton Pacific Ranch. Source LiDAR was filtered and gridded to generate a "bare earth" DEM. Hillshade and contouring generated using Global Mapper software.

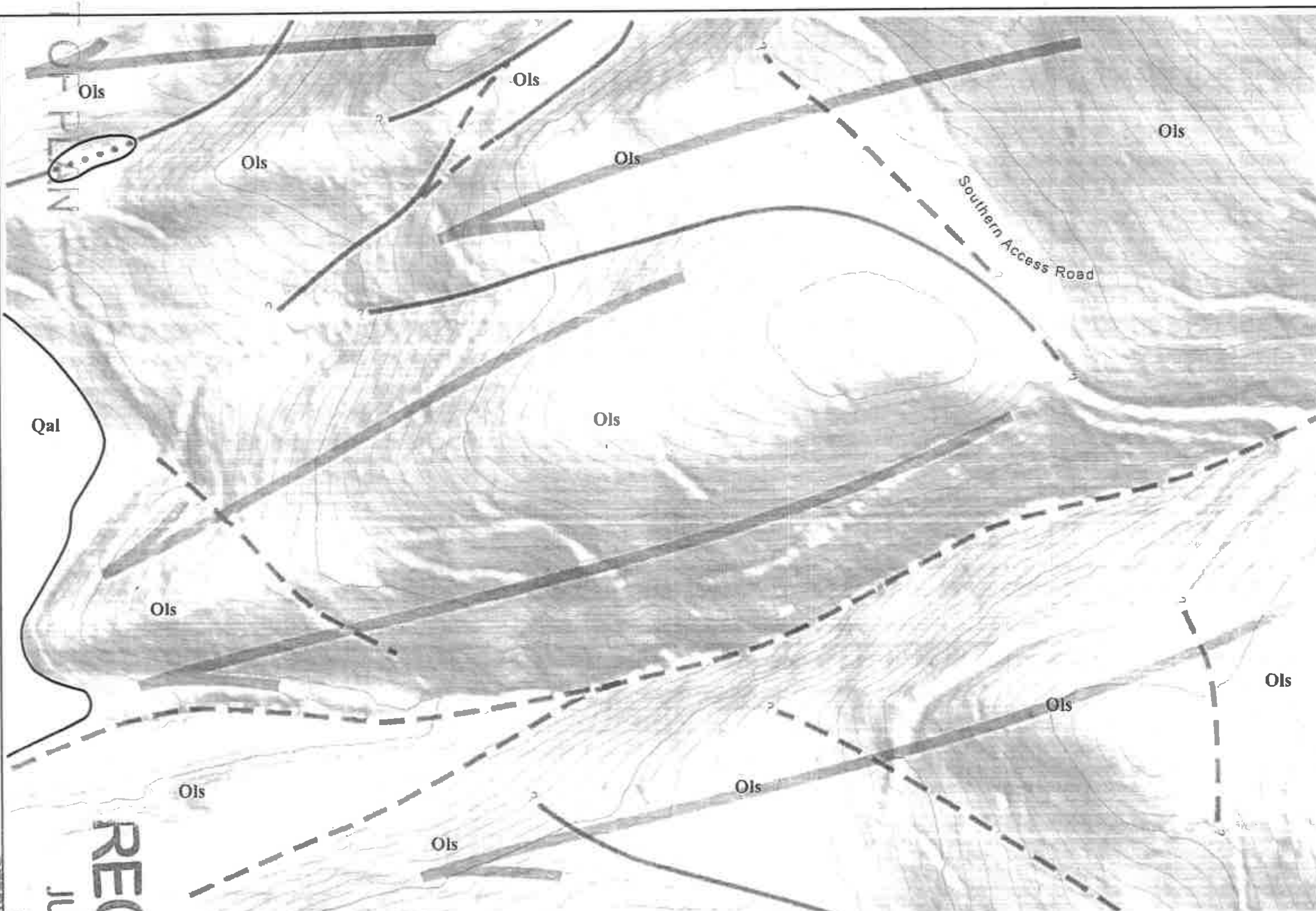
PACIFIC GEOTECHNICAL ENGINEERING	DATE NOVEMBER 2010	LANDSLIDE MAP 3 of 5 SWANTON RANCH FIELD CAMP SWANTON PACIFIC RANCH DAVENPORT, CALIFORNIA	FIGURE 6 PROJECT 2341G



PACIFIC GEOTECHNICAL ENGINEERING

DATE	LANDSLIDE MAP 4 of 5	FIGURE
NOVEMBER 2010	SWANTON RANCH FIELD CAMP SWANTON PACIFIC RANCH DAVENPORT, CALIFORNIA	7
		PROJECT 2341G

NOTE: Base map prepared from 2008 LiDAR DEM provided by Swanton Pacific Ranch. Source LiDAR was filtered and gridded to generate a "bare earth" DEM. Hillshade and contouring generated using Global Mapper software.

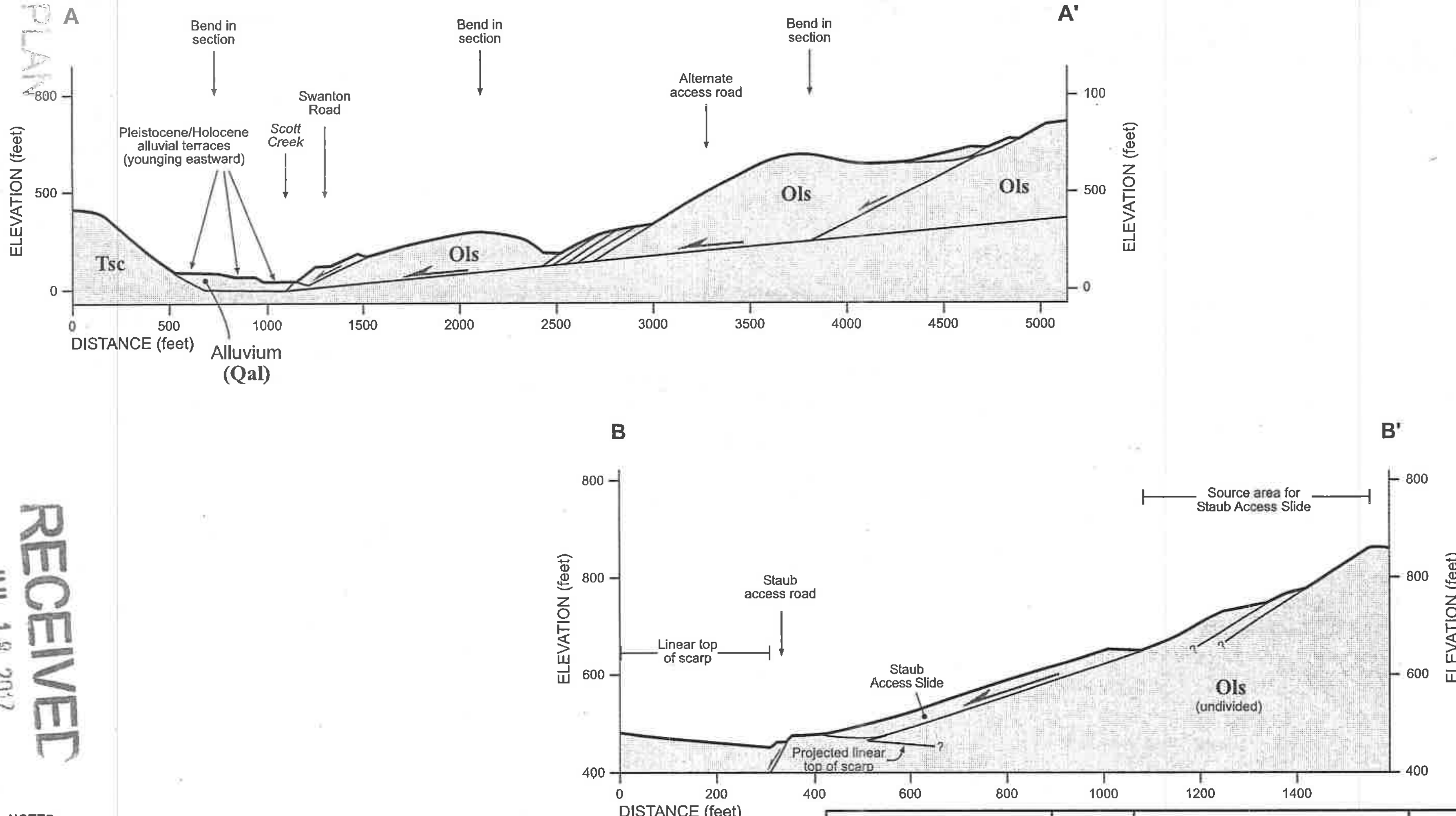


EXPLANATION

Ef	Fill
Qal	Alluvium
Qls	Landslide deposit
Ols	Older landslide block
	Boundary between major older landslide blocks
Qls, scarp, mass	Landslide - double hachure indicates top of scarp (landslide mass distinguished from scarp locally); arrow indicates direction of movement; downslope termination of scarp indicates scarp not expressed past this point
	Geologic contact - dashed where approximate, dotted where concealed, queried where uncertain
	Break in slope at outer edge of alluvial terrace
32	Slope aspect and inclination (degrees)
cd	Closed depression
	Area of pronounced soil creep
	Gully
C12	Cut slope height (feet)
Qc2	Colluvium thickness (feet)
14	Station location discussed in text
B-13	Exploratory boring by Pacific Crest Engineering (2000); location approximate

NOTE: Base map prepared from 2008 LiDAR DEM provided by Swanton Pacific Ranch. Source LiDAR was filtered and gridded to generate a "bare earth" DEM. Hillshade and contouring generated using Global Mapper software.

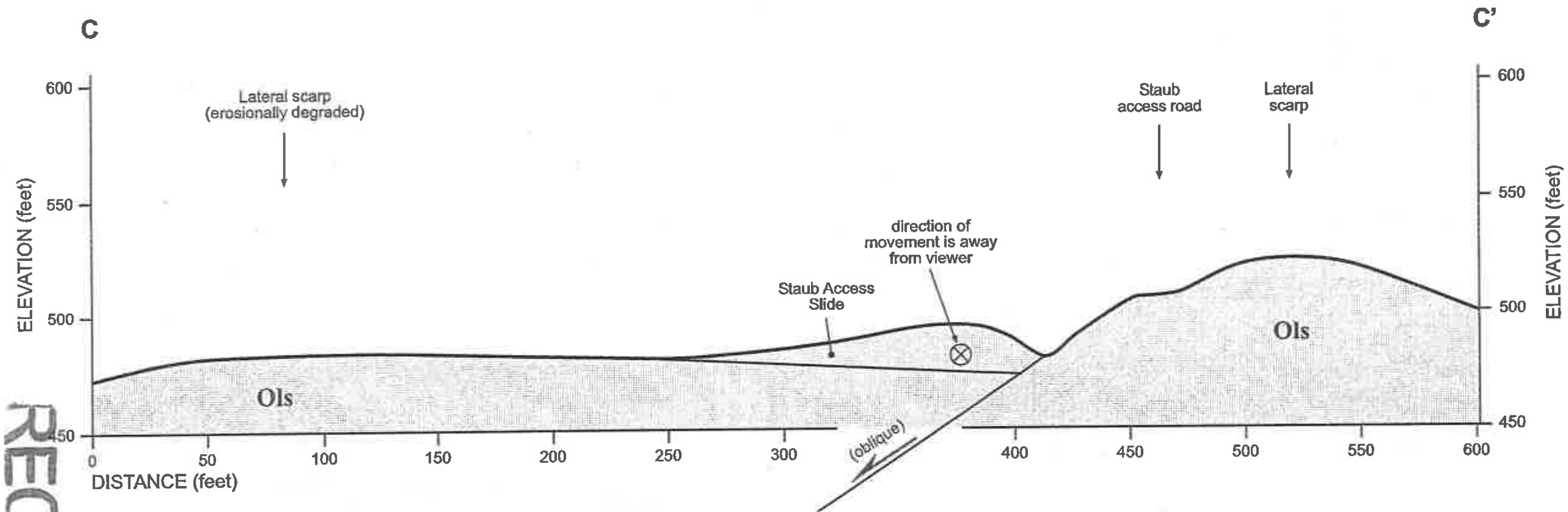
PACIFIC GEOTECHNICAL ENGINEERING	DATE NOVEMBER 2010	LANDSLIDE MAP 5 of 5 SWANTON RANCH FIELD CAMP SWANTON PACIFIC RANCH DAVENPORT, CALIFORNIA	FIGURE 8 PROJECT 2341G



NOTES:

1. Landslide geomety shown on cross sections is schematic and intended to portray inferred relationship of landslide complex to Scott Creek base level and to regional dip.
2. Topographic profile is unexaggerated and was developed from 2008 LiDAR "bare earth" DEM using Global Mapper software.

PACIFIC GEOTECHNICAL ENGINEERING	DATE NOVEMBER 2010	GEOLOGIC CROSS SECTIONS A-A' and B-B' SWANTON RANCH FIELD CAMP SWANTON PACIFIC RANCH DAVENPORT, CALIFORNIA	FIGURE 9 PROJECT 2341G



NOTES:

1. Landslide geometry shown on cross sections is schematic and intended to portray inferred relationship of landslide complex to Scott Creek base level and to regional dip.
2. Topographic profile is unexaggerated and was developed from 2008 LiDAR "bare earth" DEM using Global Mapper software.

PACIFIC GEOTECHNICAL ENGINEERING	DATE NOVEMBER 2010	GEOLOGIC CROSS SECTION C-C' SWANTON RANCH FIELD CAMP SWANTON PACIFIC RANCH DAVENPORT, CALIFORNIA	FIGURE 10 PROJECT 2341G

65

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October 21, 2014

Santa Cruz County Planning
Department 701 Ocean Street,
CA 95060

RE: Supplemental Botanical Survey for the Proposed Road Re-alignment for the Swanton NTMP.

The original botanical report submitted in the NTMP has been followed up with a supplemental botanical report for the Swanton Pacific Education Center and Field Camp (SPECFC) submitted to the Santa Cruz County Planning Department titled: "Smith Field Cabins", Botanical Report, Grey Hayes, PhD, 2/11/13. On September 11th, 2014, an additional botanical survey was conducted on the area proposed for road re-construction to re-align road access to Swanton Road from the SPECFC. The botanical survey was conducted by Jim West who is a recognized expert in the taxonomy and distribution of botanical resources within the Scotts Creek Watershed.

The approximate area of the botanical survey was 1100' x 100' and on the general site of an existing road that was utilized as infrastructure to clear-cut the surrounding area in 1955-1960. A location map for the botanical survey is represented by the road re- alignment designs completed by Fall Creek Engineering and submitted with this report. During this survey no sensitive species were found. Mr. West has also surveyed this site for many years and has never encountered sensitive species in this vicinity. It is expected that there will be no significant impacts to botanical resources as part of the proposed road re-alignment.

Approximately four hours were spent evaluating the 2.5 acre strip of land and 42 different plant species were found:

***Scientific name* (common name)**

Acer macrophyllum (big-leaf maple)
Aesculus californica (California buckeye)
Baccharis pilularis (coyote brush)
Briza maxima (rattlesnake grass)
Bromus carinatus (California brome)
Bromus vulgaris (nodding brome)
Calystegia purpurata (western morning glory)

Ceanothus thyrsiflorus var. t. (blue blossom)
Cirsium vulgare (bull thistle)
Clinopodium douglasii (yerba buena)
Corallorhiza maculata var. o. ((un)spotted coralroot)
Deinandra corymbosa (coastal tarplant)
Dryopteris arguta (coastal sword fern)
Elymus glaucus subsp. g. (blue wild rye)
Epilobium brachycarpum (Annual fireweed)
Epipactis helleborine (broad-leaved helleborine)
Galium triflorum (sweet-scented bedstraw)
Holcus lanatus (velvet grass)
Iris douglasiana (Douglas's iris)
Juncus patens (common rush)
Lathyrus odoratus (sweet pea)
Lonicera hispidula (hairy honeysuckle)
Melica torreyana (Torrey's melic grass)
Myosotis latifolia (forget-me-not)
Notholithocarpus densiflorus (tan oak)
Osmorhiza berteroi (mountain sweet-cicely)
Polystichum munitum (western sword fern)
Prosartes hookeri (Hooker's fairy bells)
Pseudotsuga menziesii (Douglas-fir)
Quercus agrifolia (coast live oak)
Quercus parvula var. shrevei (Shreve oak)
Ribes menziesii (canyon gooseberry)
Rubus ursinus (California blackberry)
Sanicula crassicaulis (gambleweed)
Scrophularia californica (California figwort)
Sequoia sempervirens (redwood)
Torreya californica (California nutmeg)
Toxicodendron diversilobum (poison oak)
Umbellularia californica (California bay)
Urtica dioica subsp. gracilis (American stinging nettle)
Vaccinium ovatum (California huckleberry)

Steve R. Auten

Steve R. Auten MS, RPF, LTO
Ranch Operations Manager
Cal Poly Swanton Pacific Ranch

MD

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2015- 2016 Survey for the Marbled Murrelet (*Brachyramphus marmoratus*)

Final Report

Swanton Pacific Ranch
Little Creek Stand
Santa Cruz County, California

Prepared by

Michael Duffy
3711 Moana Way
Santa Cruz, CA 95062
(408) 315-2135

August 25, 2016

Introduction:

In 2002, wildlife biologist John Bulger evaluated the Little Creek drainage of Cal Poly's Swanton Pacific Ranch for potential breeding habitat for the marbled murrelet (*Brachyramphus marmoratus*). CDFG Biologist Stacy Martinelli conducted a consultation for the Little Creek Habitat Unit on June 12, 2002. Potential habitat was identified and a survey was designed according to the Pacific Seabird Group protocols.[1] The survey's intention was to determine the presence or absence of marbled murrelets (MAMU), and assess the level and type of use if presence was determined. This habitat unit has been previously surveyed in 2002, 2003, 2009, and 2010. No detections have been recorded for this stand. Cal Poly decided to conduct another survey on this habitat unit. A survey was conducted in 2015 and 2016 for the habitat area. These evaluations and surveys may be submitted with a timber harvest plan or other project. These surveys are also fulfilling requirements associated with permits for developing a field camp.

The marbled murrelet is Federally listed as Threatened and listed as Endangered by the State of California. Breeding birds require mature, coastal coniferous forest for nesting and nearby coastal waters for feeding. The birds prefer to nest in large, tall trees, on large limb platforms covered with moss and lichen. Nests are typically located in the top third of the dominant tree canopy layer and usually with dense overhead protection.

Project Area Description:

Cal Poly's Swanton Pacific Ranch is located in Santa Cruz County, California. The project area is approximately 81 acres in the Agua Puerca Y Las Trancas Spanish Land Grant and in Section 17, Township 10 South, Range 3 West, MDB&M. The elevation ranges from 80 feet to 400 feet. The habitat unit lies within the Scott Creek watershed, with north facing slopes. The project area is approximately one air mile from the Pacific Ocean.

The vegetation in the project area is a mixture of second and third growth redwood and Douglas-fir. There are also patches of knobcone pine on some of the more exposed locations. There are a few residual conifers in the project area. There are some residual trees that provide the potential habitat that will be discussed in the Survey Method section of this report. The project area was originally harvested in between 1906 and the 1920s. A second growth harvest occurred on the early 1990s, as well as more recently in 2004.

The Lockheed Fire burned through the habitat unit in August of 2009. This fire significantly altered the stand, killing off many of the Douglas-fir and pine trees. The overstory and understory canopies were reduced. The forest is in the process of recovery, however the loss of habitat from Douglas-fir mortality has diminished the stand's potential for murrelet occupancy.

Survey Method:

The Little Creek Habitat Unit covers approximately 81 acres surrounding the lower slopes of Little Creek. This stand is on moderate slopes along the watercourse at an elevation of over 2200 feet. The trees located outside of the are exposed to wind. Five survey stations (1 - 5) are located in this Habitat Unit. Station #1 is located on a road prism near Swanton Road on the western edge of the habitat unit. Canopy cover is approximately 30%. Station #2 is located

[1] Methods For Surveying Marbled Murrelets in Forests: A Revised Protocol For Land Management and Research, Pacific Seabird Group, 2003.

along the Little Creek haul road approximately 200 feet above Little Creek. This station has a canopy cover of approximately 35% with an elevation of 250 feet. Station #3 is located along the Little Creek haul road and is approximately 200 feet above the watercourse. This station has a canopy cover of approximately 55% and an elevation of 250 feet. Station #4 is located along the Little Creek haul road and is approximately 200 feet above the watercourse in the eastern portion of the habitat unit. This station has a canopy cover of approximately 15% and an elevation of 250 feet. Station #5 is located along the near the "Staub House" approximately 600 feet above the watercourse, 30 meters outside of the southern edge of the habitat unit. This station has a canopy cover of approximately10%.

The 2015 - 2016 survey of the Little Creek Habitat Unit has been designed to repeat the survey conducted previously in 2002 - 2003 (Bulger) and 2009 - 2010 (Halbert). Stations #3 and #5 of the 2015 survey are reversed from their locations in the previous surveys. Station #2 of the 2015 survey is located at Station # 2b in the 2002-2003 survey and north of the Station #2 location in 2009 - 2010. All other survey stations are similar to those of the previous surveys.

Between May and July of 2015 and between April and July of 2016, Michael Duffy conducted surveys for the Little Creek Habitat Unit, to the specifications and guidelines of the Pacific Seabird Protocol. All surveys were conducted under suitable environmental conditions. Each survey began no later than 45 minutes before sunrise and continued until at least 75 minutes after sunrise. Protocol-level surveys provide a scientifically based method to record and interpret murrelet behavior and to classify areas of potential habitat on the basis of murrelet occurrence and behavior. Under the PSG protocol, murrelet observations are recorded as discrete "detections". This survey was designed with the expected requirement of five days, allowing for the possibility of nine required survey days. Due to the lack of detections, only five survey dates were required in both years.

Survey Results:

In 2015, surveys were conducted in the field over five days for the Little Creek Habitat Unit. The weather conditions ranged from clear skies to high clouds and light fog. Wind was minimally present. No murrelets were detected during surveys. The below table provides specific survey information.

2015 MAMU Survey Results									
Survey #	Station #	Date	Weather Conditions	Audio Detections	Visual Detections	Total Detections	Detections Within 100 Meters	Occupied Behavior
1	4	5/3/15	High Clouds	0	0	0	0	0
2	3	5/17/15	High Clouds	0	0	0	0	0
3	2	6/14/15	High Clouds	0	0	0	0	0
4	5	7/4/15	Scattered High Clouds	0	0	0	0	0
5	1	7/11/15	Clear Skies	0	0	0	0	0
Total				0	0	0	0	0

In 2016, surveys were conducted in the field over five days for the Little Creek Habitat Unit. The weather conditions ranged from clear skies to high clouds. Wind was minimally present. No murrelets were detected during surveys. The below table provides specific survey information.

2016 MAMU Survey Results								
Survey #	Station #	Date	Weather Conditions	Audio Detections	Visual Detections	Total Detections	Detections Within 100 Meters	Occupied Behavior
1	4	4/23/16	Clear Skies	0	0	0	0	0
2	3	5/21/16	High Clouds	0	0	0	0	0
3	2	6/12/16	Scattered Clouds	0	0	0	0	0
4	5	7/2/16	High Clouds	0	0	0	0	0
5	1	7/9/16	Clear Skies	0	0	0	0	0
Total				0	0	0	0	0

Ambient Noise:

Ambient noises were noted during surveys in the Little Creek Habitat Unit. Over the ten survey dates, an average of 3.1 airplanes flew overhead. A public two-lane road (Swanton Road) is located approximately 100 feet from survey station #1. An average of five vehicles were recorded on Swanton Road driving by during the surveys at Station #1 (eight in 2015 and two in 2016). The wind was not a significant disturbance during the survey seasons.

Predation:

Common ravens (*Corvus corax*) were each identified during two surveys in 2015 and one survey in 2016. Steller's Jays (*Cyanocitta stellen*) were detected on all surveys in 2015 and 2016. These birds are commonly found throughout the Santa Cruz Mountain Range.

Summary:

No detections indicating site presence or occupancy occurred in the Little Creek Habitat Unit during surveys in 2015 or 2016. After conducting a full two-year protocol level survey, probable site absence of marbled murrelets can be determined for the Little Creek Habitat Unit.

71

Definitions[2]:

Detection: The sighting or hearing of one or more birds acting in a similar manner and initially occurring at the same time. Sequential detections are distinguished by a lapse of five seconds or more from the previous detection.

Occupied Site: An occupied site is a site where at least one of the following subcanopy behaviors or conditions occurs:

- discovery of an active nest, a recent nest as evidenced by a fecal ring or eggshell fragments on structures in the forest canopy, or an old nest cup and landing pad;
- discovery of a downy chick, an egg, or eggshell fragments on the forest floor;
- birds flying below, through, into, or out of the forest canopy within or adjacent to a site of potential habitat. This includes birds flying over or along roads, young stands, or recently-harvested areas adjacent to potential habitat. However, only the adjacent site of potential habitat, not the non-habitat, should be classified as occupied. If birds are observed along a road where there is more than one site that the birds could be using, additional surveys may be required in some cases to determine which is occupied, if these sites are not part of the same survey area. Some subcanopy flights, such as low-flying birds observed in steep canyons or crossing ridge lines in non-habitat areas, are not associated with the site of interest and should not be considered occupied behaviors. Questions about flight behavior and occupancy should be directed to your regulatory agency for resolution.
- birds perching, landing, or attempting to land on branches;
- birds calling from a stationary location within the site. A detection should be considered 'stationary' when three or more calls are heard at less than 100 m (328 feet) from the observer, and the position of the bird does not appear to change. Detection of stationary calling is rare in most regions.

Platform: A relatively flat surface at least 10 cm (4 in.) in diameter and 10 m (33 ft.) high in the live crown of a coniferous tree.

Potential Habitat: Mature (with or without an old-growth component) and old-growth coniferous forests; and younger coniferous forests that have platforms.

Presence: A site of potential habitat where murrelets were detected, but subcanopy behaviors were not observed. Additional survey effort is required at areas with birds present to determine whether or not a site is occupied. Presence sites include those with:

- non-stationary audio detections;
- birds flying in small- or large-radius circles above the canopy;
- above-canopy dives (that do not end below the canopy) or other above-canopy flight

Probable Absence: A site of potential habitat where no murrelets were detected after the requisite number of surveys.

Subcanopy Detections: Behaviors that occur at or below the forest canopy and that strongly indicate that the site has some importance for breeding.

[2]Methods For Surveying Marbled Murrelets in Forests: A Revised Protocol For Land Management and Research, Pacific Seabird Group, 2003

Surrounding Marbled Murrelet Habitat:

There are several forest stands that possess habitat with potential for occupation by the marbled murrelet in near proximity to the survey area.

Big Creek Habitat: John Bulger reported detecting murrelet behavior in the Big Creek drainage[3]. Birds were seen accessing this stand from the northwest. This stand is located upstream of Big Creek falls, approximately one mile north of the Little Creek Habitat Area .

General Smith Stand: This stand was identified by John Bulger and survey in 2002 and 2003. There were two auditory detections during the survey in 2002. No detections were recorded in 2003[4]. This stand is located approximately 0.9 miles northeast of the Little Creek Habitat Area.

Lower Scott Creek: John Bulger surveyed this stand in 2001 and 2002. No murrelets were detected during those survey. This stand is approximately 500 feet west of the Little Creek Habitat Unit.

References:

Bulger, John, Results of Surveys for Marbled Murrelets during 2002 in the Lower Little Creek Drainage, Swanton Pacific Ranch, Santa Cruz County, California, Prepared for Swanton Pacific Ranch, Davenport, CA, August 2003.

California Department of Fish and Game, Marbled Murrelet Pre-Consultation for the Cal Poly Swanton Pacific Ranch Non-Industrial Timber Harvest Management Plan, Scott Creek and Little Creek Watersheds, Santa Cruz County, March 29, 2007.

Evans Mack, D., Richie, W. P., Nelson, S. K. , Kuo-Harrison, E., and Hamer, T. E., Methods For Surveying Marbled Murrelets in Forests: A Revised Protocol For Land Management and Research, Pacific Seabird Group, 2003.

Halbert, Portia, Results of Surveys for Marbled Murrelets during 2010 At the Lower Little Creek Stand, Swanton Pacific Ranch, Santa Cruz County, California, Prepared for Big Creek Lumber Company, Davenport, CA, February 2011.

Ralph, C.J., et.al. Technical Editors, Ecology and Conservation of the Marbled Murrelet, United States Forest Service General Technical Report, Pacific Southwest Research Station, Albany, CA, 1995.

United States Fish and Wildlife Service, Recovery Plan for the Marbled Murrelet (*Brachyramphus marmoratus*) in Washington, Oregon, and California, Portland Oregon, 1997.

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[3] Bulger, John, Results of MAMU Survey during 2002 in the Little Creek Drainage, August 2003.
[4] California Department of Fish and Game, Marbled Murrelet Pre-Consultation for the Cal Poly Swanton Pacific Ranch Non-Industrial Timber Harvest Management Plan, Scott Creek and Little Creek Watersheds, 2007.

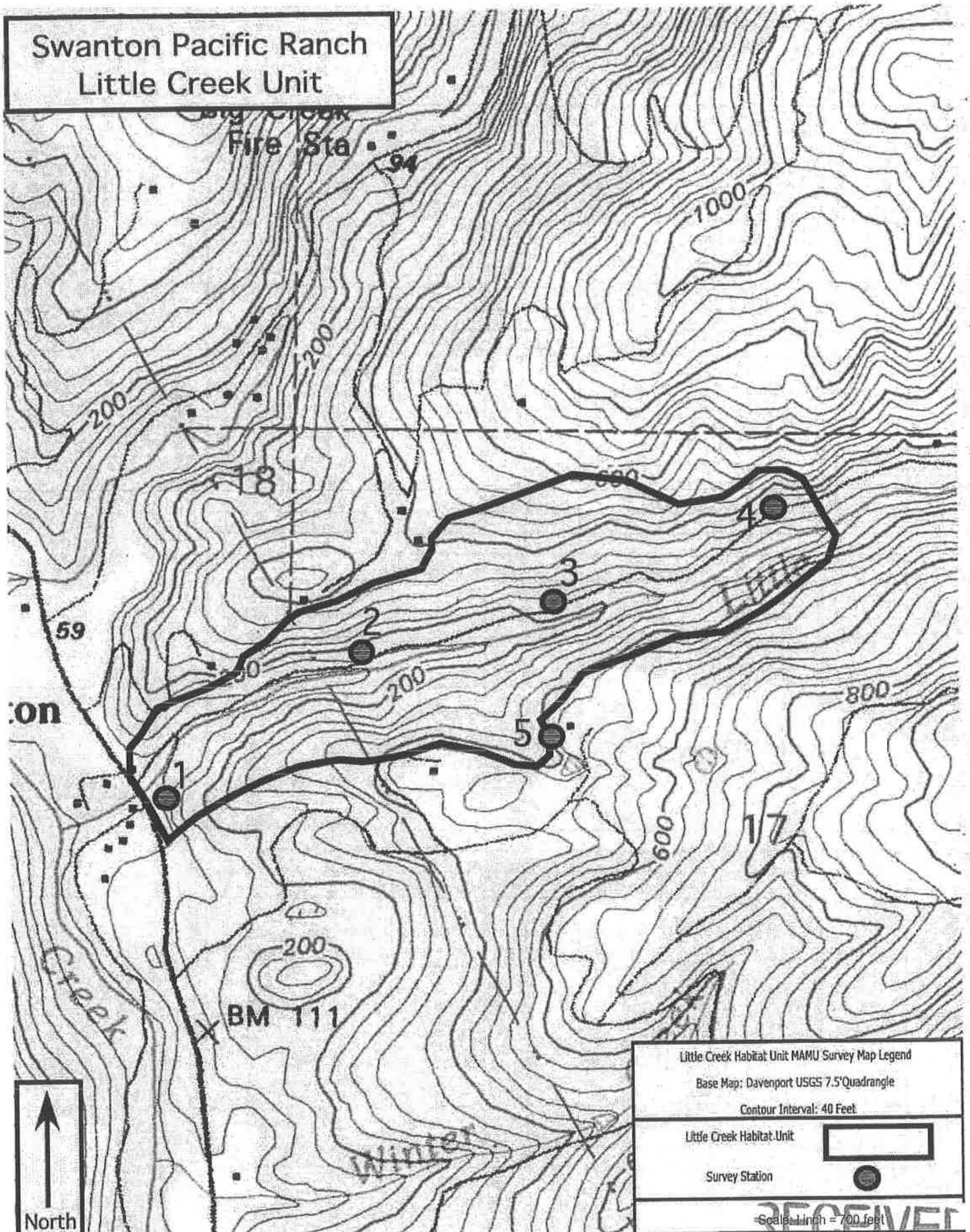
Previous Surveys:

2010 MAMU Little Creek Survey Results (Halbert)							
Survey #	Station #	Date	Audio Detections	Visual Detections	Total Detections	Detections Within 100 Meters	Occupied Behavior
1	4	5/10/10	0	0	0	0	0
2	1	7/11/10	0	0	0	0	0
3	5	7/12/10	0	0	0	0	0
4	3b	7/29/10	0	0	0	0	0
5	3a	7/30/10	0	0	0	0	0
Total			0	0	0	0	0

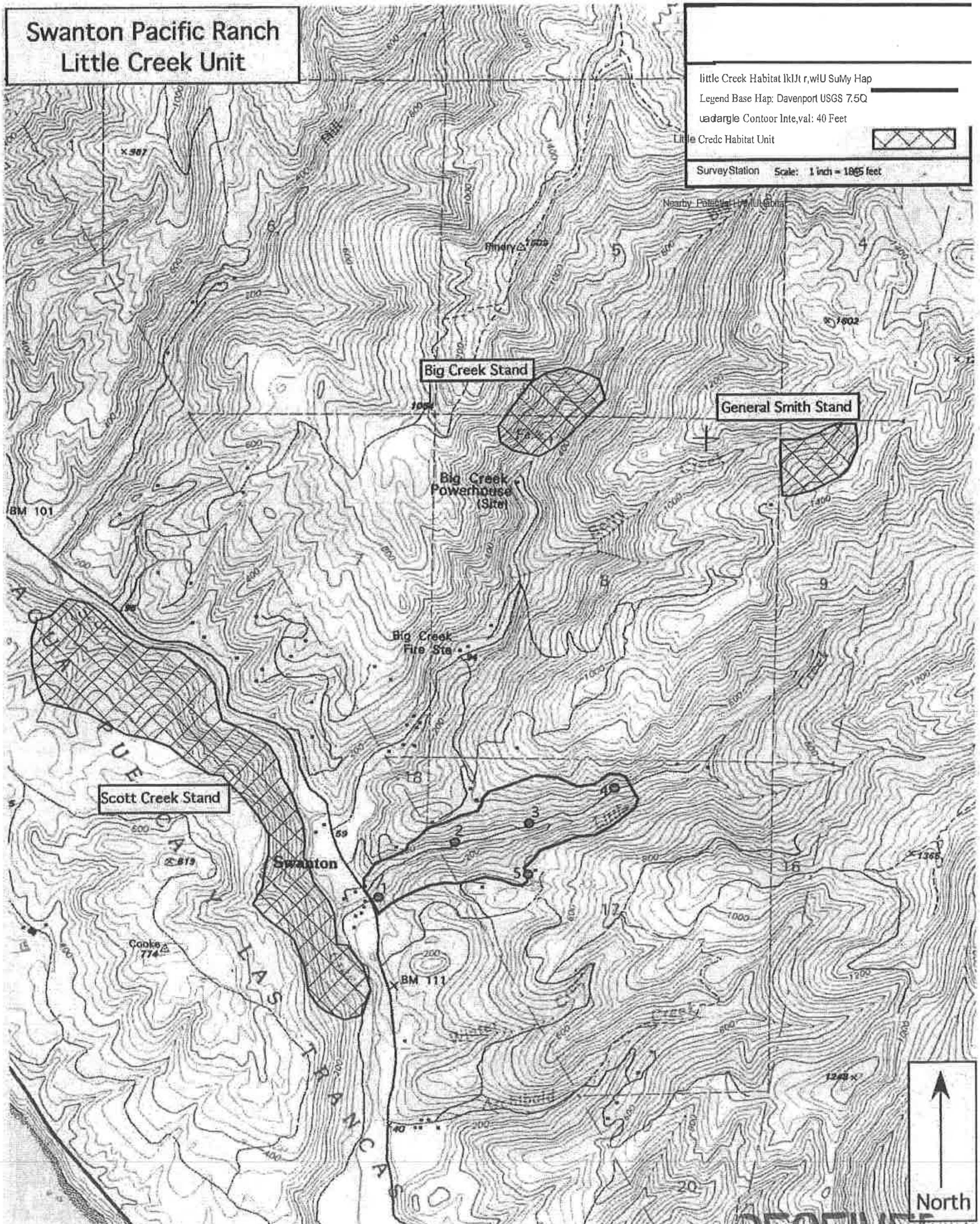
2009 MAMU Little Creek Survey Results (Halbert)							
Survey #	Station #	Date	Audio Detections	Visual Detections	Total Detections	Detections Within 100 Meters	Occupied Behavior
1	1	5/10/09	0	0	0	0	0
2	3	5/30/09	0	0	0	0	0
3	4	6/20/09	0	0	0	0	0
4	5	7/14/09	0	0	0	0	0
5	1	7/23/09	0	0	0	0	0
Total			0	0	0	0	0

2003 MAMU Little Creek Survey Results (Bulger)							
Survey #	Station #	Date	Audio Detections	Visual Detections	Total Detections	Detections Within 100 Meters	Occupied Behavior
1	2b	4/25/03	0	0	0	0	0
2	3a	5/12/03	0	0	0	0	0
3	5	5/21/03	0	0	0	0	0
4	4b	5/30/03	0	0	0	0	0
5	2a	6/09/03	0	0	0	0	0
6	1	6/23/03	0	0	0	0	0
7	3b	7/02/03	0	0	0	0	0
8	2b	7/08/03	0	0	0	0	0
9	5	7/17/03	0	0	0	0	0
10	4a	7/23/03	0	0	0	0	0
Total			0	0	0	0	0

2002 MAMU Little Creek Survey Results (Bulger)							
Survey #	Station #	Date	Audio Detections	Visual Detections	Total Detections	Detections Within 100 Meters	Occupied Behavior
1	2b	4/19/02	0	0	0	0	0
2	3b	5/06/02	0	0	0	0	0
3	5	5/21/02	0	0	0	0	0
4	4b	5/29/02	0	0	0	0	0
5	2b	6/05/02	0	0	0	0	0
6	1	6/12/02	0	0	0	0	0
7	3a	6/27/02	0	0	0	0	0
8	2a	7/03/02	0	0	0	0	0
9	5	7/17/02	0	0	0	0	0
10	4a	7/25/02	0	0	0	0	0
Total			0	0	0	0	0


Swanton Pacific Ranch
Little Creek Unit
Fire Sta
94
1000
200
200
18
59
600
3
4
2
1
5
200
800
600
17
Little
200
Creek
BM 111
Winter
North
Little Creek Habitat Unit MAMU Survey Map Legend
Base Map: Davenport USGS 7.5'Quadrangle
Contour Interval: 40 Feet
Little Creek Habitat Unit
Survey Station
Scale: 1 inch = 700 feet

75


Swanton Pacific Ranch
Little Creek Unit
Legend Base Hap: Davenport USGS 7.5Q
Little Creek Habitat Unit
Survey Station
Scale: 1 inch = 1865 feet
Big Creek Stand
General Smith Stand
Big Creek Powerhouse (Site)
Big Creek Fire Sta
Scott Creek Stand
Swanton
BM 101
BM 111
North

NOTE

"Information concerning archaeological sites has been removed from **1-07NTMP-020 SCR Major Amendment #6** pursuant to California Government Code Section 6254.10 which exempts cultural resources site location information from the California Public Records Act and provides authority for widespread state policy (not just within the California Department of Forestry and Fire Protection) to keep archaeological site location information confidential. This exemption to the Public Records Act recognizes that providing site location information to the general public may put such sites at risk from artifact hunting, excavations and/or vandalism."

Copies of the information have been sent to the following locations to facilitate review of the project:

1. CAL FIRE field unit – Felton

2. Reviewing Archaeologist, Santa Rosa (Region Office)

The original copy of this material is maintained in a confidential file at CAL FIRE's Northern Region Headquarters, 135 Ridgway Avenue, Santa Rosa, CA 95401.

1 Arch Page (06-21-2017)