

Avila Valley Advisory Council

San Luis Obispo County, California

P.O. Box 65

Avila Beach, CA 93424 www.avac-avila.org

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Kirt Collins

Margaret Greenough

Open (alt)

August 14, 2018

Re: **DRC2018-00033 Somera Capital Management 50 Cottages Development Plan**

To: Schani Siong, Planner, SLO County Planning Department

Schani,

At the August 13th AVAC meeting the council approved the comments presented by the San Luis Bay Estates Committee in regards to the above referenced project. Comments are included below.

Sincerely,

Jim Hartig

Jim Hartig, AVAC Chairperson

CC: Adam Hill, 3rd District Supervisor, Nicole Nix, 3rd District Legislative Assistant, Trevor Keith, SLO County Planning Director, Matt Jansen, Planning, Sara Sanders, Planning, AVAC Members

GENERAL PLAN AMENDMENT

An application for a General Plan Amendment is needed due to the addition of the lodge, restaurant, hospitality center as well as the increase land use from 4 to 6 acres.

The project site is within the area encompassed by the 1981 San Luis Bay Estates Master Development Plan and subject to its regulations. Master Plan amendments are necessary for this project to be considered for approval. In accordance with the San Luis Bay Coastal Area Plan of the Land Use Element, amending the Master Plan involves a General Plan Amendment since the Area Plan's Planning Area Standards for San Luis Bay Estates require:

“Permit Requirement – Master Plan. An amendment to the approved Master Development Plan for the entire property is to be prepared for the portions of the site within the coastal zone, for county review and approval prior to further development within the coastal zone. The Master Development Plan is to include any regulations, conditions and programs needed to implement each element of the county general plan as applicable to the site, ...”

Of interest is that the above stipulation parallels the inland San Luis Bay Area Plan requirement for amending the Master Plan. It begins with "Master Development Plan included by reference."

The General Plan and Master Plan Amendment should occur concurrently.

DEDICATED OPEN SPACE

There currently is no mention by the applicant or staff of dedicated open space off-set development as required by the SLBE Master Plan.

The SLBE Master Plan states under III.J, Open Space and Conservation:

“Each phase of residential development will include the reservation of an area of open space to be reserved by perpetual easement. This reservation shall be adequate to maintain a ratio of one acre of open space for each existing and proposed residential living unit, including the 162 units in the Indian Hill Mobile Home Park and the 50 hotel cottage units.”

CHUMASH HERITAGE AND ARCHEOLOGICAL RESOURCES

AVAC has heard concerns from the Northern Chumash Tribal Council, May 14, 2018, regarding their concerns with disturbance of Chumash Heritage and Archeological Resources located on this site.

LIGHT INTRUSION

Comments were received from residents nearby the project regarding the concern of light intrusion from vehicles entering and leaving the project at nighttime.

TRAFFIC

It is a concern that employees, part time and full time, will have a more significant impact than the traffic study states. Alternative transportation options should be considered, ie., bussing, shuttles, etc. In addition the traffic study does not account accurately* for the approved Harbor Terrace project which will substantially increase counts prior to the completion of this proposed project.

*Traffic counts used are 2nd weekdays in May, which does not include Summer weekends when most resort traffic will occur.

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Denise Allen

Mike Casola

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Squire Canyon

Kirt Collins

Margaret Greenough

Open (alt)

December 11, 2018

Re: **DRC2018-00033 Somera Capital Management 50 Cottages Development Plan**

To: Schani Siong, Planner, SLO County Planning Department

Schani,

At the December 10th AVAC meeting the council approved the additional comments presented by the San Luis Bay Estates Committee in regards to the above referenced project and it's recent updates in regards to information hold responses. These comments are to accompany the original letter provided by AVAC for this project, August 14, 2018.

The comments are as follows:

PEDESTRIAN ACCESS

Safe pedestrian access to and from the project should be provided

SET BACKS

The original set back requirements should be upheld.

Sincerely,

Jim Hartig

Jim Hartig, AVAC Chairperson

CC: Adam Hill, 3rd District Supervisor, Nicole Nix, 3rd District Legislative Assistant, Trevor Keith, SLO County Planning Director, Matt Jansen, Planning, Sara Sanders, Planning, AVAC Members

Planning Dept Response for Somera Capital 50 Cottages Development Plan

Schani Siong

Wed 9/5/2018 10:48 AM

Sent Items

To: runhartig_gmail.com <runhartig@gmail.com>;

Cc: Trevor Keith <tkeith@co.slo.ca.us>; Robert Fitzroy <rfitzroy@co.slo.ca.us>; Ellen Carroll <elcarroll@co.slo.ca.us>; Sara Sanders <ssanders@co.slo.ca.us>;

Good morning Mr. Hartig,

Thank you for your letters dated July 10 and August 14, 2018 wherein your committee requested "...a written determination with the rationale for omitting the 50 acres of open space dedication and the requirement for a County General Plan amendment for this project."

County General Plan and Open Space Requirement

Regarding your request for a Director's Determination, the Department, in consultation with County Counsel, has concluded that the Director's Determination is not the appropriate process. Your comments regarding the GPA and Open Space requirements will be carefully reviewed by the Department and will be responded to in the staff report and considered by the Planning Commission during the public hearing on the project.

Sincerely,

Schani Siong
Senior Planner
(p) 805-781-4374
ssiong@co.slo.ca.us



COUNTY OF SAN LUIS OBISPO
DEPARTMENT OF PLANNING & BUILDING

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THIS IS A NEW PROJECT REFERRAL

DATE: 4/13/2018
TO: 3rd District Legislative Assistant, Agricultural Commissioner, Building Division, CAL FIRE / County Fire, Environmental Health, HEAL SLO, Public Works, Sheriff, PG&E, Avila CSD, San Miguelito Water Co., Bicycle Advisory Committee, CA Fish & Wildlife, Coastal Commission, Port San Luis Harbor District, RWQCB, Avila Valley Advisory Council, AB52 / Tribal Administrators
FROM: Schani Siong (805-781-4374 or ssiong@co.slo.ca.us)
PROJECT NUMBER & NAME: DRC2018-00033 SOMERA CAPITAL MGMT
PROJECT DESCRIPTION: Proposed Development Plan / Coastal Development Permit / San Luis Bay Estate Master Plan Amendment to develop a 50-room cottage style hotel in the Avila Beach Area.
APN(s): 076-174-009

Return this letter with your comments attached no later than 14 days from receipt of this referral. CACs please respond within 60 days. Thank you.

PART I: IS THE ATTACHED INFORMATION ADEQUATE TO COMPLETE YOUR REVIEW?

- YES (Please go on to PART II.)
NO (Call me ASAP to discuss what else you need. We have only 10 days in which we must obtain comments from outside agencies.)

PART II: ARE THERE SIGNIFICANT CONCERNS, PROBLEMS OR IMPACTS IN YOUR AREA OF REVIEW?

- YES (Please describe impacts, along with recommended mitigation measures to reduce the impacts to less-than-significant levels, and attach to this letter.)
NO (Please go on to PART III.)

PART III: INDICATE YOUR RECOMMENDATION FOR FINAL ACTION.

Please attach any conditions of approval you recommend to be incorporated into the project's approval, or state reasons for recommending denial.

IF YOU HAVE "NO COMMENT," PLEASE SO INDICATE, OR CALL.

See Comments.

8/7/2018
Date

Dennis Byrnes
Name

(805) 543-4244
Phone



CAL FIRE
San Luis Obispo
County Fire Department

635 N. Santa Rosa • San Luis Obispo, CA 93405
Phone: 805.543.4244 • Fax: 805.543.4248
www.calfireslo.org



Scott M. Jalbert, Unit Chief

August 7, 2018

County of San Luis Obispo
Department of Planning and Building
County Government Center
San Luis Obispo, CA. 93408

Subject: DRC2018-00033, Somera Capital MGMT./ The Cottages at Point San Luis
APN # 076-174-009

Schani Siong,

I have reviewed the referral for the project, hotel with 50 unit cottages in Avila Beach (22.25 acres). The project is located near Avila Beach Drive and Ana Bay Drive, Avila Beach California. This project is located approximately 8 minutes and 3 miles, from the closest CAL FIRE/ San Luis Obispo County Fire Station (Avila Valley Station 62) which is located 1551 Sparrow, San Luis Obispo. Also this project is located within State Responsibility Area (SRA) and in a High Fire Severity Zone and must conform to all fire safety rules and regulations of the California Fire Code and Public Resources Code.

Please see the Commercial Fire Safety Plan attached, however I have included this letter highlight comments and concerns with this project.

1. Provide a detailed plan for additional access and provide this prior to construction.
2. Provide a written Fire Protection Plan that included vegetation management component.
3. Provide a copy of the Water Company will serve letter.
4. Provide details on west parking structure/ underground structure.
5. Due to lack of Fire Apparatus access to remote cottage buildings a dry fire line maybe needed, depending on final placement of buildings.

Sincerely

Dennis Byrnes
Fire Captain



Scott M. Jalbert, Unit Chief

Commercial Fire Safety Plan

August 7, 2018

Project Summary

Name: Somera Capital MGMT/ The Cottages at Point San Luis Project Number: DRC 2018-00033

Street Name: Avila Beach Drive & Ana Bay City: Avila Beach State: CA Zip: 93424

Project Description: Hotel with 50 unit cottages in Avila Beach Phone #: (805)681-0144 Ext 234

This project is located approximately **10** minutes from the closest CAL FIRE/San Luis Obispo County Fire Station. The project **is** located in State Responsibility Area for wild land fires, and **is** designated as a **High** Fire Hazard Severity Zone. This project is required to comply with all fire safety rules and regulations including the California Fire Code, the Public Resources Code and any standards referenced therein.

OPERATIONAL REQUIREMENTS

Public Assemblage and Events

- Prior to Fire Department Review, proposed event area must first complete all requirements pursuant to Title 22, the San Luis Obispo County Land Use Ordinance. This includes receiving any necessary land use permit approval and issuance of construction and Conditional Use Permit requirements.
- A fire safety review is required to ensure public safety in a place of assembly, or any other place where people congregate, including but not limited to; amusement buildings, carnivals and fairs, exhibits and trade shows, open burning, flames and torches, candles, places of assembly, temporary membranes structures and tents, pyrotechnics and special effects, live audiences and any event with public attendance over 250. The fire code official shall have the authority to order the development of, or prescribe a plan for, the provision of an approved level of public safety.
- A written plan must be submitted to the fire code official 30 days prior to the event. Written submittal requirements will be in accordance with Section 404 Fire Safety and evacuation plans. **A field inspection verifying compliance of fire and life safety conditions must be conducted prior to public occupancy of the event.** If modifications or additions to the event areas are made, an updated permit & inspection must be completed. Local Ordinance and California Fire Code (CFC) section 105.
- Any time a tent, canopy or membrane structure in excess of 400 square feet is erected; it must be placed and utilized in accordance with California Fire Code – Chapter 31. The applicant shall be required to notify County Fire a minimum of 48-hours in advance of any tent or membrane structure being placed on site. Submittal requirements can be found on line at www.calfireslo.org

Additional/Special Conditions

Fire Safety and Evacuation Plans

- Applicant shall provide a written Fire Safety plan whose contents shall be in accordance with sections California Fire Code Chapter 4 Emergency Planning and Preparedness. Employee training, record keeping, hazard communication and drills will also comply with this chapter. The written plan will include at a minimum the detail outlined in sections 404.3.1 (Evacuations Plans) and 404.3.2 (Fire Safety Plans).

Fire Evacuation Plans

- Fire evacuation plans shall include the following:
 1. Emergency egress or escape routes and whether evacuation of the building is to be complete or, where *approved*, by selected floors or areas only.
 2. Procedures for employees who must remain to operate critical equipment before evacuating.
 3. Procedures for assisted rescue for *persons* unable to use the general *means of egress* unassisted.

4. Procedures for accounting for employees and occupants after evacuation have been completed.
5. Identification and assignment of personnel responsible for rescue or emergency medical aid.
6. The preferred and any alternative means of notifying occupants of a fire or emergency.
7. The preferred and any alternative means of reporting fires and other emergencies to the fire department or designated emergency response organization.
8. Identification and assignment of personnel who can be contacted for further information or explanation of duties under the plan.
9. A description of the emergency voice/alarm communication system alert tone and preprogrammed voice messages, where provided.

Fire Safety Plans

Fire safety plans shall include the following:

1. The procedure for reporting a fire or other emergency.
2. The life safety strategy and procedures for notifying, relocating or evacuating occupants/event attendees, including occupants who need assistance.
3. Site plans indicating the following:
 - 3.1. The occupancy assembly point.
 - 3.2. The locations of fire hydrants.
 - 3.3. The normal routes of fire department vehicle access.
4. Floor plans identifying the locations of the following:
 - 4.1. Exits.
 - 4.2. Primary evacuation routes.
 - 4.3. Secondary evacuation routes.
 - 4.4. Accessible egress routes.
 - 4.5. Areas of refuge.
 - 4.6. Exterior areas for assisted rescue.
 - 4.7. Manual fire alarm boxes.
 - 4.8. Portable fire extinguishers.
 - 4.9. Occupant-use hose stations.
 - 4.10. Fire alarm annunciators and controls.
5. A list of major fire hazards associated with the normal use and occupancy of the premises, including maintenance and housekeeping procedures.
6. Identification and assignment of personnel responsible for maintenance of systems and equipment installed to prevent or control fires.
7. Identification and assignment of personnel responsible for maintenance, housekeeping and controlling fuel hazard sources.

Additional/Special Conditions

Provide details on Secondary Evacuation Route, all aspects of route. Secondary access needs to be in place prior to construction.

Building Construction requirements and Vegetation Management

Vegetation Management

A written Wildland Fire/Vegetation Management Plan must be developed and approved by CAL FIRE.

Screening and Environmental Considerations

- Landscaping and vegetation shall be in accordance with San Luis Obispo County Planning and building "screening requirements". CAL FIRE requires that landscaping selections do not readily transmit fire.
- Fire resistant landscaping located within 100 feet of site improvements (structures or fire water tanks) shall be in accordance with CFC, Public resources code 4291 and Title 19 Division 1 described as "vegetation that are well-pruned and maintained so as to effectively manage fuels and not form a means of rapidly transmitting fire from other nearby vegetation to a structure or from a structure to other nearby vegetation. The intensity of fuels management may vary within the 100-foot perimeter of the structure, the most intense being within the first 30 feet around the structure. Consistent with fuels management objectives, steps should be taken to minimize erosion. For the purposes of this paragraph, "fuel" means any combustible material, including petroleum-based products and wildland fuels. www.calfireslo.org website has several links with recommended planning tools for landscape and fuels management plans.

Ignition Resistant Construction

- ☒ Your project is located within a wildland fire hazard severity zone and must comply with California Fire and Building Code Chapter 7A Ignition resistant Construction in Wildland Urban Interface areas. The construction type shall be designed to withstand a wildfire. The roof type will have to be consistent with the requirements of Chapter 15 - Section 1505.

Stairway Access to Roof

- ☒ New buildings two or more stories above grade plane, except those with a roof slope greater than four units vertical in 12 units horizontal (33.3-percent slope), shall be provided with a stairway to the roof or other access to the roof for emergency personnel approved by the fire code official. Stairway access to the roof shall be in accordance with Section 1009. Such stairway or other approved access shall be marked at street and floor levels with a sign indicating that the stairway or access continues to the roof. Where roofs are used for roof gardens or for other purposes, stairways shall be provided as required for such occupancy classification.

Building Height and Area

- ☒ Class III standpipe systems shall be installed throughout buildings where the floor level of the highest story is located more than 30 feet (9144 mm) above the lowest level of the fire department vehicle access, or where the floor level of the lowest story is located more than 30 feet (9144 mm) below the highest level of fire department vehicle access and in any parking structure.
- ☒ A building that is greater than 20,000 square feet (1.858 m²) of floor area and greater than 18 feet (5.49 m) in height shall have a dry or wet standpipe system with a 2 1/2 inch (64 mm) outlet at the roof near the roof access. Location of the outlet and the fire department connection to the standpipe shall be labeled and approved by the fire code official.

Address Requirements

- ☒ New and existing buildings shall have approved address numbers, building numbers or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property. These numbers shall contrast with their background. Where required by the fire code official, address numbers shall be approved in additional approved locations to facilitate emergency response. Address numbers shall be Arabic numerals or alphabet letters. Numbers shall be a minimum of **Commercial** 8 inches high with a minimum stroke width of 0.5 inch (12.7mm).

Address Directories

- ☒ When required by the fire code official, complexes with multiple buildings may be required to provide directories, premises maps and directional signs. The scale, design and location of directory signs shall be approved by the fire code official and may be required to be illuminated.

Additional/Special Conditions

Provide a monument sign and signage where needed. Cottage number are permitted 6 inch in size.
Provide a written Fire Protection Plan, which includes vegetation management section

Solar Photovoltaic systems

- ☒ Solar systems shall be installed in accordance with sections 605.11.1-605.11.4. Marking is required on interior and exterior Direct Current (DC) conduit, enclosures, raceways, cable assemblies, junction boxes, combiner boxes and disconnects.
- ☒ Solar components shall be located as close to the hip, ridge, or valley or directly possible to an outside wall to reduce trip hazards and maximize ventilation opportunities.
- ☒ Roof access points shall be located in areas that do not require the placement of ground ladders over openings such as windows, doors and must be located over strong points where access point does not conflict with overhead obstacles such as trees wires or signs.
- ☒ There shall be a six (6) foot wide clear perimeter around the edges of the roof unless either axis of the building is 250 feet then 4 (4) foot clear perimeter is permitted. Smoke ventilation operations requires distance between arrays shall be eight foot or greater in width OR a four foot or greater pathway and bordering roof skylights, or smoke and heat vents OR a four (4) foot or greater and a bordering four foot by eight (8) foot "venting cutouts" every 20 feet on alternating sides of the pathway.

Site Access /Roads/Knox/Exiting

Commercial and Residential Access Road Standards

- ☒ All road design criteria will meet the San Luis Obispo County Department of Public Works Public Improvement Standards. Standard construction drawing exhibits can be located on line at: <http://www.slocounty.ca.gov/Assets/PW/DevServ/general/2008+Standards.pdf>

Commercial and Residential Road Grades

- The grade for all roads, streets, private lands and driveways shall not exceed 16 percent. Design criteria shall be in accordance with San Luis Obispo County Public Works public improvement standards. Roads 12%-16% shall be a nonskid asphalt or concrete surface as specified in San Luis Obispo County public improvement Standards, specifications and drawings.
- All roads shall:
 - Be able to support Fire Apparatus.
 - Provide a vertical clearance of 13'6"
 - Provide a 10 foot fuel modification zone on both sides.

Commercial

- The access road must be a minimum of 24 feet in width for two way traffic and shall be constructed to SLO County Public Works Standards. Two (2) 10- foot driving lanes and Two (2) – Two (2) foot shoulders.
- Parking is only allowed where an additional 8 feet of width is added to each side of the road to accommodate parking. "No Parking - Fire Lane" signs may be required.
- Fire lanes shall be provided as set forth in Chapter 5 of the 2016 California Fire Code.
- Fire access shall be provided to within 150 feet of the outside building perimeter.

Secondary Access Road

- More than one Fire Apparatus access road shall be required when potential for the impairment of a single road by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access.

Additional/Special Conditions

CAL FIRE has permitted a section of the main access road to be 20 foot in width due to botanical and culture resource issues.

Driveway Standards

- Driveway specifications shall be provided and maintained when serving no more than one legal parcel or lot with no more than 3 dwelling units, and any number of accessory buildings.
- Driveway minimum width in Moderate Fire Hazard Severity zones 10 feet.
- Driveway minimum width in High and Very High fire Hazard Severity zones:
 - 0-49 feet, 10 feet is required.
 - 50-199 feet, 12 feet is required.
 - Greater than 200 feet, 16 feet is required.
- Turnarounds must be provided if driveway exceeds 300 feet, and shall be within 50 feet of the building. For driveways exceeding 300 feet, a turn-around shall be at the building site and must be within 50 feet of the dwelling.
- For driveways exceeding 800 feet, turnouts shall be provided no more than 400 feet apart. Driveways exceeding 150 feet in length, but less than 800 feet in length, shall provide a turnout near the midpoint of the driveway.
- A turnout shall be provided near the midpoint and shall be a minimum of 10 feet wide and 30 feet long with a minimum 25 foot taper on each end.

Dead-End Road

- A dead-end road has only one point of vehicular ingress/egress, including cul-de-sacs and looped roads.
- The maximum length of a dead end road, including all dead-end roads accessed from that dead-end road, shall not exceed the following cumulative lengths, regardless of the number of parcels served:

• Parcels less than 1 acre	800 feet
• Parcels 1 acre to 4.99 acres	1320 feet
• Parcels 5 acres to 19.99 acres	2640 feet
• Parcels 20 acres or larger	5280 feet
- A turnaround must be provided if the dead end road exceeds 150 feet.

Emergency Access Knox Keys and/or Gate Switches

Structural Access Requirements

- All commercial buildings shall install a Knox key box for fire department emergency access – CFC Section 506.1. The box shall be installed prior to final inspection of the building. An order form is available from the Prevention Bureau, call for more information at (805) 543-4244.

Gate Access Requirements

- Gate must be setback a minimum of 75 feet from the SLO County maintained road.
- Gate must automatically open with no special knowledge.
- Must have a KNOX key box or switch for fire department access. Call the Prevention Bureau for an order form at (805) 543-4244.
- Gate shall have an approved means of emergency operation at all times. CFC 503.6
- Gate must be 2 feet wider than the road on each side.
- Gates must have a turnaround located at each gate.

Exiting

- All egress and exiting components shall comply with Chapter 10 of the 2013 California Fire Code.

Setbacks

- A 30-foot building setback from property line required for parcels 1 acre in size or larger.

Fire Protection Systems Sprinklers Hydrants Alarms

Fire Sprinklers in Structures

- This project will require installing a commercial fire sprinkler system in all new buildings. The type of sprinklers required will depend upon the occupancy classification type of the structures and must comply with NFPA 13. The automatic fire extinguishing system shall comply with the National Fire Protection Association (NFPA) 13. The applicant will have to identify what Hazard Class the project is for review by the fire department (exp. Ordinary Hazard Class II), for each of the buildings in the project. Three sets of plans and calculations shall be submitted for functional review and approval to the County Fire Department. The contractor shall be licensed by the State of California, CFC. A licensed alarm company shall monitor the fire sprinkler and alarm system.
- Structure complies with the California Wildland Urban-Interface Ignition Resistant Construction Requirements
- Heat detectors installed in accordance with CBC linked to an audible bell mounted in the exterior of the structure.

Hydrants

- All fire hydrants and required access roads shall be installed PRIOR to structural construction.

Tenant Improvements

- Tenant Improvement requiring a Fire Safety Plan and alternations to an existing Sprinkler system must also provide a letter and/or a review from a Fire Protection Engineer verifying the fire and life safety function of the installed system. Examples of thresholds for alterations requiring FPE review include walls moved, removed or new walls installed. Occupancy change, hazard class change and or additional heads added to system.

Additional/Special Conditions

Cottage units can utilize a 13D NFPA Fire Sprinkler System

Sprinkler System Supervision and Alarms

- All valves controlling the water supply for automatic sprinkler systems, pumps, tanks, water levels, and temperatures, critical air pressures and water-flow switches on all sprinkler systems shall be electrically monitored for integrity and to ensure valves are locked in the open position, by a central station listed by Underwriters Laboratories for receiving fire alarms.

Fire Protection Engineer required

- A Fire Protection Engineer shall review the proposed Fire Protection Systems for this project. Multiple fire protection and hazardous conditions systems are required for this project. A list of Fire Protection Engineers is available on our website at <http://www.calfireslo.org>.

- Three sets of plans and calculations shall be submitted for functional review and approval to the County Fire Department. A licensed Fire Protection Engineer must design and submit all required drawings for CAL FIRE review. The contractor shall be licensed by the State of California, California Fire Code. A licensed alarm company shall monitor all fire protection and hazardous conditions systems.

PRESSURIZED System and Hydrant Specifications

- Plans shall be submitted to the County Fire Department for approval of the distribution system and hydrant locations. Fire hydrants shall have two, 2 1/2 inch outlets with National Standard Fire threads and one 4 inch suction outlet with National Standard Fire threads and comply with County Standard W-1. Each hydrant shall be identified by a blue reflective dot located on a non-skid surface located just off of center on the fire hydrant side. Hydrants must be protected from vehicle impact with the use of curbing or bollards.

FDC

- The fire department connections (FDC) supporting the required fire protection systems shall be located within 20 feet of a San Luis Obispo County Dept. of Public Works/County Fire standard fire hydrant and visible on fire engine approach to the building.

DRAFT System and Hydrant Specifications

- Hydrants for the currently proposed project may be draft; a pressurized hydrant system is not required. Future development of the facility may require a pressurized hydrant system. The draft hydrant system must meet County Fire commercial water supply standards as cited on the www.calfireslo.org website. Each hydrant shall be identified by a blue reflective dot located on a non-skid surface located just off of center on the fire hydrant side. Hydrants must be protected from vehicle impact with the use of curbing or bollards.

Additional/Special Conditions

Provide a copy of water company will serve letter.

ALARMS

NFPA 72 Alarm systems

- A centralized interlinked Fire Alarm System is required for this project. The alarm system shall terminate at a 24-hour monitoring point. Two sets of plans shall be submitted to CAL FIRE/San Luis Obispo County Fire for review and approval. California Fire Code Chapter 15 section 907. Fire alarm systems required by this chapter or by the California Building Code shall be monitored by an approved supervising station listed by Underwriters Laboratory for receiving fire alarms in accordance with NFPA 72. The supervising station shall contact and notify the Fire Chief or their call receiving location immediately on notification of an alarm and prior to making contact with the protected premises.
- Alarm system must be centralized and interlinked for the entire facility and include monitoring for all site alarm systems including; all on site Fire Protection Systems, and any and all hazardous materials, monitoring of hazardous materials, compressed gases, flammable and combustible liquids, liquefied petroleum gases, storage, delivery and processing areas.
- A Fire Alarm System is required throughout the site for the various fire suppression systems and required hazardous conditions monitoring. The alarm system shall terminate at a 24-hour monitoring point. Two sets of plans shall be submitted to the County Fire Department for review and approval. California Fire Code Chapter 15 section 907.

Proprietary Alarm systems (24 hour staffed Industrial Facilities)

- The existing and new alarm systems must be in compliance with NFPA 72 and monitoring must meet all requirements outlined in Chapter 26 section 26.4 Proprietary Supervising Station Systems.

Hazardous Materials Alarm(s)

- Approved monitoring method shall be provided to detect hazardous materials. An emergency alarm shall be provided if hazardous materials have a hazard ranking of 3 or 4 in accordance with NFPA 704 and exceed the maximum allowable quantity per control area. California Fire Code Chapter 50

Commercial Cooking Operations

- California Fire Code Section 904.11 states Commercial cooking equipment that produces grease laden vapors shall be provided with a Type I Hood, in accordance with the California Mechanical Code, and an automatic fire extinguishing system that is listed and labeled for its intended use as follows:
- 1) Wet chemical extinguishing system, complying with UL 300.
 - 2) Carbon Dioxide extinguishing systems

3) Automatic Fire Sprinkler Systems

Hazardous Materials

- Prior to final, a Hazardous Materials Management Plan (HMMP) must be provided. Chemical storage/treatment and hazardous gases will require a Hazardous Materials Management Plan HMMP in accordance with California Fire Code Chapter 50/Title 19 Division 2, Chapter 4/Health and Safety Code Chapter 6.95.
- CAL FIRE requires a written plan addressing safeguards to minimize the risk of unwanted releases, fires or explosions involving hazardous materials. Additionally, the written plan shall include safeguards to minimize the consequences of an unsafe condition involving hazardous materials during normal operations and in the event of an abnormal condition.
- Precautions for the safe storage, handling, or care of hazardous materials shall be in accordance with California Fire Code chapter 50 and shall include a Fire Department liaison to aid the Fire Department in pre-planning for all aspects of emergency responses.
- Rooms, buildings or areas used for the storage of liquid or solid hazardous materials shall be provided with spill control and secondary containment, California Fire Code Chapter 50.

Additional/Special Conditions

Provide air monitoring in underground parking area, and fire department controls for ventilation system.

California Fire Code Chapter 53 Compressed Gasses

Containers, cylinders and tanks shall be secured and separated from hazardous conditions. Monitoring and detection shall be in accordance with section 5303.16.10.

California Fire Code Chapter 57 Flammable and Combustible Liquids

- Signage for identification and warning inherent hazard of flammable or combustible liquid shall be provided. Signs will be of durable material white lettering on a red background. Letters shall not be less than 3 inches in height and 1/2 inch in stroke. Piping shall be identified in accordance with ASME A13.1. Permanently installed or mounted tanks more than 100 gallons in capacity storing class I, II or III liquids shall bear a label and placard identifying the materials. Placards shall be in accordance with NFPA 704.

California Fire Code Chapter 61 Liquefied Petroleum Gases

- Minimum separation between LP-containers and buildings and public ways must comply with CFC table 6104.3. No Smoking signs must be posted within 25 feet of containers or point of transfer. Weeds, grass and brush, trash and other combustible material shall be kept a minimum of 10 feet from containers. Protection from vehicular damage shall be provided in accordance with California Fire Code section 312.

General Fire Precautions and Signage

Portable Fire Extinguishers

- Portable fire extinguishers shall be installed in all the occupancies in compliance with the California Fire Code section 906 and Title 19. The contractor shall be licensed by the State Fire Marshal.

Combustible Waste Material

- Every building or portion of a building shall be maintained in a neat orderly manner, free from any condition that would create a fire or life hazard or a condition which would add to or contribute to the rapid spread of fire, CCR Title 19 Division 1.
- Refuse containers must not be stored within 5 feet of combustible walls, openings, or combustible roof eaves, unless the refuse container is protected by an automatic sprinkler system installed in accordance with California Fire Code section 903.

Storage, Stockpiles and Enclosures

- Areas must meet all applicable California Fire Code requirements and be labeled with NFPA 704 required placarding.

Electrical

- Electrical wiring and equipment shall be installed and maintained in accordance with California Fire Code section 605 and the California Electrical Code. Hazards and fire prevention concerns relational to Electrical equipment, wiring shall be abated as specified in the aforementioned Fire Code.

Fire Safety during Construction:

Prior to construction, an operational water supply system and established access roads must be installed in accordance with CFC Section 501.4. During construction all applicable Public Resources Codes must be complied with to prevent a wildfire. These will include the use of spark arresters, adequate clearance around welding operations, smoking restrictions and having extinguishers on site. The Industrial Operations Fire Prevention Field Guide will assist the applicant.

Additional/Special Conditions



Dennis Byrnes

Inspector

Fire Captain

FW: Avila Beach cottages - hotel

[Steve Welton <steve@sepps.com>](mailto:steve@sepps.com)

Tue 6/12/2018 3:11 PM

To: Schani Siong <ssiong@co.slo.ca.us>;

Cc: Terry Wahler <twahler@co.slo.ca.us>;

Hi Schani,

Please see below from Cal Fire regarding the narrowed driveway. We met with Captain Byrnes on site in May and reviewed the proposed driveway and other proposed site improvements.

Best Regards,

Steve

Steve Welton, AICP

Senior Planner

(805) 966-2758 x111

From: Byrnes, Dennis@CALFIRE <Dennis.Byrnes@fire.ca.gov>

Sent: Tuesday, June 12, 2018 2:37 PM

To: Steve Welton <steve@sepps.com>

Subject: Re: Avila Beach cottages - hotel

Steve,

CAL FIRE will accept the 20 foot road with a 2 foot shoulder on each side and yes got the full set of plans.

Thank You

Dennis Byrnes

Fire Captain / Fire Prevention

CAL FIRE San Luis Obispo

[635 N. Santa Rosa](#)

[San Luis Obispo, CA. 93405](#)

805-543-4244 Office

805-543-4248 Fax

From: Steve Welton <steve@sepps.com>

Sent: Tuesday, June 12, 2018 1:20:54 PM

To: Byrnes, Dennis@CALFIRE

Cc: Robert Schmidt; Paul Rubison (PRubison@appleton-architects.com)

Subject: RE: Avila Beach cottages - hotel

Hi Dennis,

I just wanted to follow up and make sure that you received the full sized plans that were sent your way about 2 weeks ago and to circle back on the comments below.

Thanks!

Steve

Steve Welton, AICP

Senior Planner

(805) 966-2758 x111

From: Steve Welton
Sent: Thursday, May 31, 2018 4:40 PM
To: 'Byrnes, Dennis@CALFIRE' <Dennis.Byrnes@fire.ca.gov>
Cc: 'Robert Schmidt' <raschmidt@flowersassoc.com>; 'Paul Rubison (PRubison@appleton-architects.com)' <PRubison@appleton-architects.com>
Subject: RE: Avila Beach cottages - hotel
Importance: High

Dennis,

Thanks again for meeting with us today - and for your comments and insights. We'll be sending you a full sized set of the civil and Master Fire Protection Plans to your address in Pismo.

Once you have had adequate time to review the drawings, SLO Planning is asking for a confirmation that Cal Fire will accept the narrower (in some locations) access road (24' down to 20') as shown on the civil plans. As shown in the section, there is also a 2' shoulder that will be provided.

We'll also look forward to your comments on interior circulation and access for medical emergencies and will engage with Collings as necessary to work things out to the satisfaction of Cal Fire.

Best Regards,

Steve

Steve Welton, AICP

Senior Planner

(805) 966-2758 x111

From: Steve Welton
Sent: Wednesday, May 30, 2018 4:33 PM
To: 'Byrnes, Dennis@CALFIRE' <Dennis.Byrnes@fire.ca.gov>
Cc: Robert Schmidt <raschmidt@flowersassoc.com>; Paul Rubison (PRubison@appleton-architects.com) <PRubison@appleton-architects.com>
Subject: RE: Avila Beach cottages - hotel

Hi Dennis,

Great - see you there at 10:30. There is a gate which we can open up and get access to the entire property. Meet you there.

Steve

Steve Welton, AICP

Senior Planner

(805) 966-2758 x111

From: Byrnes, Dennis@CALFIRE <Dennis.Byrnes@fire.ca.gov>
Sent: Wednesday, May 30, 2018 4:25 PM
To: Steve Welton <steve@sepps.com>
Cc: Robert Schmidt <raschmidt@flowersassoc.com>; Paul Rubison (PRubison@appleton-architects.com) <PRubison@appleton-architects.com>
Subject: Re: Avila Beach cottages - hotel

Steve,

Tomorrow morning at 10:30 work.

Let me know.

Thanks

Dennis Byrnes

Fire Captain / Fire Prevention
CAL FIRE San Luis Obispo
[635 N. Santa Rosa](#)
[San Luis Obispo, CA. 93405](#)
805-543-4244 Office
805-543-4248 Fax

From: Steve Welton <steve@sepps.com>
Sent: Wednesday, May 30, 2018 1:49:44 PM
To: Byrnes, Dennis@CALFIRE
Cc: Robert Schmidt; Paul Rubison (PRubison@appleton-architects.com)
Subject: RE: Avila Beach cottages - hotel

Hi Dennis,

Following up on this to see if we can confirm a time to meet tomorrow. I know operational things arise that may impact your schedule. If tomorrow doesn't work, I'll circle back with you on Monday to see about meeting with you next week.

Steve

Steve Welton, AICP

Senior Planner
(805) 966-2758 x111

From: Steve Welton
Sent: Wednesday, May 30, 2018 9:00 AM
To: 'dennis.byrnes@fire.ca.gov' <dennis.byrnes@fire.ca.gov>
Cc: Robert Schmidt <raschmidt@flowersassoc.com>; Paul Rubison (PRubison@appleton-architects.com) <PRubison@appleton-architects.com>; 'Schani Siong' <ssiiong@co.slo.ca.us>
Subject: Avila Beach cottages - hotel

Hi Dennis,

Thanks for taking my call yesterday. Here is a link to a folder with our plans:

https://www.dropbox.com/sh/n82lhvvjbsa94g9/AAA6c4hUgtaHsDGrgdSpu5H_a?dl=0

There are three files in there.

1. The entire set we submitted to SLO County planning, including civil and Master Fire Protection plans
2. Civil set standalone
3. Fire Protection standalone

The civil engineer (Robert Schmidt, copied here) and I can meet you on Thursday at the property, if you are available. We are both based out of Santa Barbara, so a meeting sometime after 10AM would be appreciated, if possible.

As we discussed, the civil plans show a 24' wide access road for some sections of the drive (most of it) and a 20' wide (with a 2' shoulder) road in other sections. Narrowing to 20' wide allows us to avoid cutting into the hillside which contain cultural resources.

If you have issues with Drop Box, please let me know and I can shoot over separate PDFs of the Fire and Civil plan sets.

Best Regards,

Steve

Steve Welton, AICP

Senior Planner



**1625 STATE STREET, SUITE 1
SANTA BARBARA, CA 93101**

PH: 805-966-2758 x 111

Please check out our new website www.sepps.com

Re: The Cottages @ Avila - DRC2018-000033 SOMERA

Lynda Auchinachie

Thu 4/26/2018 8:33 AM

To: Schani Siong <ssiونغ@co.slo.ca.us>;

The design does not need to be revised.

From: Schani Siong
Sent: Thursday, April 26, 2018 8:19 AM
To: Lynda Auchinachie
Subject: Re: The Cottages @ Avila - DRC2018-000033 SOMERA

Yes, typically EIR period includes more review/ comments. However, I like to get early feedback on things that will affect the overall development like incomplete project description, setback compliance etc. Their current setback is 10-15' as shown - Big impact to the development if there is a 50-100' setback required for ag buffer. Knowing this ahead of time will prioritize this on the EIR scope, which i'm starting to compile based on feedback.

Do you think a min. 50' ag buffer will be needed still?

Sincerely,

Schani Siong
Senior Planner
(p) 805-781-4374
ssiونغ@co.slo.ca.us



COUNTY OF SAN LUIS OBISPO
DEPARTMENT OF PLANNING & BUILDING

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From: Lynda Auchinachie
Sent: Thursday, April 26, 2018 8:12 AM
To: Schani Siong
Subject: Re: The Cottages @ Avila - DRC2018-000033 SOMERA

Hi Schani,

Pre app notes are not official comments. Since this project is going through the EIR process per applicant's request...I'm assuming comments should be during that time?

Thanks,

Lynda

From: Schani Siong
Sent: Wednesday, April 25, 2018 5:44 PM
To: Lynda Auchinachie
Subject: The Cottages @ Avila - DRC2018-000033 SOMERA

Hi Lynda

I checked the pre-app notes and Ag's office required a min. 50' setback from the grazing land. As designed, the project does not meet the 50' setback on the northern side. I presumed the west side is too steep for grazing and the 50' is not needed ? Like to get an indicative idea if an ag buffer will be needed for the northern side.

Sincerely,

Schani Siong
Senior Planner
(p) 805-781-4374
ssiong@co.slo.ca.us



COUNTY OF SAN LUIS OBISPO
DEPARTMENT OF PLANNING & BUILDING

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Air Pollution Control District
San Luis Obispo County

April 24, 2018

Schani Siong
SLO County Department of Planning & Building
County Government Center
San Luis Obispo, CA 93401

SUBJECT: Project DRC2018-00033 SOMERA

Dear Ms. Siong:

Thank you for including the San Luis Obispo County Air Pollution Control District (APCD) in the environmental review process. We have completed our review of a 50-unit cottage style hotel in Avila Beach. APN 076-174-009

The following are APCD comments that are pertinent to this project.

As a commenting agency in the California Environmental Quality Act (CEQA) review process for a project, the APCD assesses air pollution impacts from both the construction and operational phases of a project, with separate significant thresholds for each.

CONSTRUCTION PHASE IMPACTS

Hydrocarbon Contaminated Soil

Should hydrocarbon contaminated soil be encountered during construction activities, the APCD must be notified as soon as possible and no later than 48 hours after affected material is discovered to determine if an APCD Permit will be required. In addition, the following measures shall be implemented immediately after contaminated soil is discovered:

- Covers on storage piles shall be maintained in place at all times in areas not actively involved in soil addition or removal;
- Contaminated soil shall be covered with at least six inches of packed uncontaminated soil or other TPH –non-permeable barrier such as plastic tarp. No headspace shall be allowed where vapors could accumulate;
- Covered piles shall be designed in such a way to eliminate erosion due to wind or water. No openings in the covers are permitted;
- The air quality impacts from the excavation and haul trips associated with removing the contaminated soil must be evaluated and mitigated if total emissions exceed the APCD's construction phase thresholds;

- During soil excavation, odors shall not be evident to such a degree as to cause a public nuisance; and,
- Clean soil must be segregated from contaminated soil.

The notification and permitting determination requirements shall be directed to the APCD Engineering & Compliance Division at (805) 781-5912.

Construction Permit Requirements

Based on the information provided, we are unsure of the types of equipment that may be present during the project's construction phase. Portable equipment, 50 horsepower (hp) or greater, used during construction activities may require California statewide portable equipment registration (issued by the California Air Resources Board) or an APCD permit.

The following list is provided as a guide to equipment and operations that may have permitting requirements, but should not be viewed as exclusive. For a more detailed listing, refer to the Technical Appendices, page 4-4, in the APCD's 2012 CEQA Handbook.

- Power screens, conveyors, diesel engines, and/or crushers;
- Portable generators and equipment with engines that are 50 hp or greater;
- Electrical generation plants or the use of standby generator;
- Internal combustion engines;
- Rock and pavement crushing;
- Unconfined abrasive blasting operations;
- Tub grinders;
- Trommel screens; and,
- Portable plants (e.g. aggregate plant, asphalt batch plant, concrete batch plant, etc).

To minimize potential delays, prior to the start of the project, please contact the APCD Engineering Division at (805) 781-5912 for specific information regarding permitting requirements.

Truck Routing

Proposed truck routes should be evaluated and selected to ensure routing patterns have the least impact to residential dwellings and other sensitive receptors, such as schools, parks, day care centers, nursing homes, and hospitals. If the project has significant truck trips where hauling/truck trips are routine activity and operate in close proximity to sensitive receptors, toxic risk needs to be evaluated.

Developmental Burning

Effective February 25, 2000, **the APCD prohibited developmental burning of vegetative material within San Luis Obispo County.** If you have any questions regarding these requirements, contact the APCD Enforcement Division at (805) 781-5912.

Demolition/Asbestos

Demolition activities can have potential negative air quality impacts, including issues surrounding proper handling, abatement, and disposal of asbestos containing material (ACM). Asbestos containing materials could be encountered during the demolition or remodeling of existing structures or the disturbance, demolition, or relocation of above or below ground utility

pipes/pipelines (e.g., transite pipes or insulation on pipes). **If this project will include any of these activities, then it may be subject to various regulatory jurisdictions, including the requirements stipulated in the National Emission Standard for Hazardous Air Pollutants (40CFR61, Subpart M - asbestos NESHAP).** These requirements include, but are not limited to: 1) written notification, within at least 10 business days of activities commencing, to the APCD, 2) asbestos survey conducted by a Certified Asbestos Consultant, and, 3) applicable removal and disposal requirements of identified ACM. Please contact the APCD Enforcement Division at (805) 781-5912 and also go to slocleanair.org/business/asbestos.php for further information. To obtain a Notification of Demolition and Renovation form go to the "Other Forms" section of: slocleanair.org/business/onlineforms.php.

Dust Control Measures

Construction activities can generate fugitive dust, which could be a nuisance to nearby residents and businesses in close proximity to the proposed construction site. **Projects with grading areas that are within 1,000 feet of any sensitive receptor, or the graded area is greater than 4 acres, shall implement the following mitigation measures to manage fugitive dust emissions such that they do not exceed the APCD's 20% opacity limit (APCD Rule 401) or prompt nuisance violations (APCD Rule 402).**

- a. Reduce the amount of the disturbed area where possible;
- b. Use water trucks or sprinkler systems to prevent airborne dust from leaving the site and from exceeding the APCD's limit of 20% opacity for greater than 3 minutes in any 60-minute period. Increased watering frequency would be required whenever wind speeds exceed 15 mph. Reclaimed (non-potable) water should be used whenever possible. During drought conditions, the contractor or builder shall consider the use of an APCD-approved dust suppressant, where feasible, to reduce the amount of water used for dust control. For a list of suppressants, see Section 4.3 of the CEQA Air Quality Handbook;
- c. All dirt stock pile areas should be sprayed daily and covered with tarps or other dust barriers as needed;
- d. Permanent dust control measures identified in the approved project revegetation and landscape plans should be implemented as soon as possible, following completion of any soil disturbing activities;
- e. Exposed ground areas that are planned to be reworked at dates greater than one month after initial grading should be sown with a fast germinating, non-invasive grass seed and watered until vegetation is established;
- f. All disturbed soil areas not subject to revegetation should be stabilized using approved chemical soil binders, jute netting, or other methods approved in advance by the APCD;
- g. All roadways, driveways, sidewalks, etc. to be paved should be completed as soon as possible. In addition, building pads should be laid as soon as possible after grading unless seeding or soil binders are used;
- h. Vehicle speed for all construction vehicles shall not exceed 15 mph on any unpaved surface at the construction site;
- i. All trucks hauling dirt, sand, soil, or other loose materials are to be covered or should maintain at least two feet of freeboard (minimum vertical distance between top of load and top of trailer) in accordance with CVC Section 23114;
- j. "Track-Out" is defined as sand or soil that adheres to and/or agglomerates on the exterior surfaces of motor vehicles and/or equipment (including tires) that may then fall onto any highway or street as described in California Vehicle Code Section 23113 and California Water

Code 13304. To prevent 'Track Out', designate access points and require all employees, subcontractors, and others to use them. Install and operate a 'track-out prevention device' where vehicles enter and exit unpaved roads onto paved streets. The 'track-out prevention device' can be any device or combination of devices that are effective at preventing track out, located at the point of intersection of an unpaved area and a paved road. Rumble strips or steel plate devices need periodic cleaning to be effective. If paved roadways accumulate tracked out soils, the track-out prevention device may need to be modified.

- k. Sweep streets at the end of each day if visible soil material is carried onto adjacent paved roads. Water sweepers shall be used with reclaimed water where feasible. Roads shall be pre-wetted prior to sweeping when feasible; and,
- l. All mitigation measures should be shown on grading and building plans.

The contractor or builder shall designate a person or persons whose responsibility is to ensure any fugitive dust emissions do not result in a nuisance and to enhance the implementation of the mitigation measures as necessary to minimize dust complaints and reduce visible emissions below the APCD's limit of 20% opacity for greater than 3 minutes in any 60-minute period. Their duties shall include holidays and weekend periods when work may not be in progress (for example, wind-blown dust could be generated on an open dirt lot). The name and telephone number of such persons shall be provided to the APCD Compliance Division prior to the start of any grading, earthwork or demolition (Contact Tim Fuhs at (805) 781-5912).

Construction Phase Idling Limitations

Projects that will have diesel powered construction activity in close proximity to any sensitive receptor shall implement the following mitigation measures to ensure that public health benefits are realized by reducing toxic risk from diesel emissions:

To help reduce sensitive receptor emissions impact of diesel vehicles and equipment used to construct the project, the applicant shall implement the following idling control techniques:

1. California Diesel Idling Regulations
 - a. **On-road diesel vehicles** shall comply with Section 2485 of Title 13 of the California Code of Regulations. This regulation limits idling from diesel-fueled commercial motor vehicles with gross vehicular weight ratings of more than 10,000 pounds and licensed for operation on highways. It applies to California and non-California based vehicles. In general, the regulation specifies that drivers of said vehicles:
 1. Shall not idle the vehicle's primary diesel engine for greater than 5-minutes at any location, except as noted in Subsection (d) of the regulation; and,
 2. Shall not operate a diesel-fueled auxiliary power system (APS) to power a heater, air conditioner, or any ancillary equipment on that vehicle during sleeping or resting in a sleeper berth for greater than 5.0 minutes at any location when within 1,000 feet of a restricted area, except as noted in Subsection (d) of the regulation.
 - b. **Off-road diesel equipment** shall comply with the 5-minute idling restriction identified in Section 2449(d)(2) of the California Air Resources Board's In-Use Off-Road Diesel regulation.

- c. Signs must be posted in the designated queuing areas and job sites to remind drivers and operators of the state's 5-minute idling limit.
- d. The specific requirements and exceptions in the regulations can be reviewed at the following web sites: www.arb.ca.gov/msprog/truck-idling/factsheet.pdf and www.arb.ca.gov/regact/2007/ordiesl07/frooal.pdf.

2. Diesel Idling Restrictions Near Sensitive Receptors

In addition to the state required diesel idling requirements, the project applicant shall comply with these more restrictive requirements to minimize impacts to any sensitive receptors (residences, schools, parks, day care centers, nursing homes, hospitals, etc.):

- a. Staging and queuing areas shall not be located within 1,000 feet of sensitive receptors;
- b. Diesel idling within 1,000 feet of sensitive receptors shall not be permitted;
- c. Use of alternative fueled equipment is recommended; and
- d. Signs that specify the no idling areas must be posted and enforced at the site.

Naturally Occurring Asbestos

Naturally occurring asbestos (NOA) has been identified by the California Air Resources Board as a toxic air contaminant. Serpentine and ultramafic rocks are very common throughout California and may contain naturally occurring asbestos. The SLO County APCD has identified areas throughout the county where NOA may be present (see the APCD's website <http://www.slocleanair.org/rules-regulations/land-use-ceqa.php>). The project site is located in a candidate area for Naturally Occurring Asbestos (NOA), so the following requirements apply. Under the CARB Air Toxics Control Measure (ATCM) for Construction, Grading, Quarrying, and Surface Mining Operations (93105), **prior to any construction activities at the site, the project proponent shall ensure that a geologic evaluation is conducted to determine if the area disturbed is exempt from the regulation. An exemption request must be filed with the APCD.** If the site is not exempt from the requirements of the regulation, the applicant must comply with all requirements outlined in the Asbestos ATCM. This may include development of an Asbestos Dust Mitigation Plan and an Asbestos Health and Safety Program for approval by the APCD. More information on NOA can be found at slocleanair.org/business/asbestos.php.

OPERATIONAL PHASE IMPACTS

Residential Wood Combustion

Under APCD Rule 504, **only APCD approved wood burning devices can be installed in new dwelling units.** These devices include:

- All EPA-Certified Phase II wood burning devices;
- Catalytic wood burning devices which emit less than or equal to 4.1 grams per hour of particulate matter which are not EPA-Certified but have been verified by a nationally-recognized testing lab;
- Non-catalytic wood burning devices which emit less than or equal to 7.5 grams per hour of particulate matter which are not EPA-Certified but have been verified by a nationally-recognized testing lab;
- Pellet-fueled woodheaters; and dedicated gas-fired fireplaces.

If you have any questions about approved wood burning devices, please contact the APCD Enforcement Division at (805) 781-5912.

Again, thank you for the opportunity to comment on this proposal. If you have any questions or comments, feel free to contact me at (805) 781-5912.

Sincerely,



Gary Arcemont
Air Quality Specialist

GJA/agj

cc: Tim Fuhs, Enforcement Division, APCD
Agent - Steve Welton, Somera, steve@sepps.com



Date: April 24, 2018
To: Schani Siong, Project Planner
From: Glenn Marshall, Development Services
Subject: **Public Works Project Referral for DRC2018-00033, Somera Capital Mgmt CDP, Avila Beach Dr, Avila Beach, APN 076-174-009**

Thank you for the opportunity to provide information on the proposed subject project. It has been reviewed by several divisions of Public Works, and this represents our consolidated response.

PUBLIC WORKS REQUESTS THAT AN INFORMATION HOLD BE PLACED ON THIS PROJECT UNTIL THE APPLICANT PROVIDES THE FOLLOWING DOCUMENTS FOR PUBLIC WORKS REVIEW AND COMMENT:

1. Initial comments on the Draft Transportation Impact Study include:
 - a. Update the project trip generation rate to reflect 5,331sf restaurant (4,600sf evaluated) and add 1,679sf spa, 566sf fitness, 2,046sf conference & banquet space, 1,032sf lobby, 299sf gift shop, and the proposed events. Events with 200 visitors is discussed in project description but no information on how often and no discussion in traffic report.
 - b. Consider submitting a Traffic Management Plan as a project mitigation to limit vehicle trips for events, and to shuttle guests to and from town (as mentioned in project description).
 - c. Provide worse case design delivery truck or fire truck turning templates for Ana Bay Road and Marre Road showing sufficient access road widths are being provided.
 - d. The proposed Marre Road centerline curves and road sections A-A through D-D, Sheet C-3, do not conform to Cal Fire requirements. Show conformance or provide evidence that Cal Fire will support an adjustment to their standards.
 - e. Per Resolution 2008-152, submit a Roadway Safety Analysis for Avila Beach Drive between Ana Bay Road and San Luis Bay Drive.
 - f. Submit sight distance analysis with recommendations for the intersection Ana Bay Road at Avila Beach Drive.
 - g. Public Works requires additional time to circulate the Draft Transportation Impact Study through our Transportation Division. When completed will submit additional comments, if any, under separate cover.
2. Update the Marre Road preliminary improvement plans (C-series sheets) to show and label the existing offsite access road easements. Show the proposed Marre Road improvement remain within the existing easement or provide evidence additional easement width can be secured from the affected property owner/s.
3. Update the site plan to show a pedestrian path of travel between the project site and existing pedestrian improvements on Avila Beach Drive (recommendation from Traffic Report).
4. The proposed project is located off non-county maintained roads. In accordance with Resolution 2008-152 no proposed land development which attracts general public traffic shall be permitted on privately maintained roads without a submission of a road maintenance agreement. Provide evidence that a road maintenance agreement signed by ALL property owners having legal access to Ana Bay Road and Marre Road can be secured.
5. Provide a preliminary drainage plan and calculations showing how the project will comply with Section 5 of the Public Improvement Standards.

Public Works Comments:

- A. The proposed project triggers road improvements per Resolution 2008-152.
- B. The proposed project is located off non-county maintained roads. In accordance with Resolution 2008-152 no proposed land development which attracts general public traffic shall be permitted on privately maintained roads without a submission of a road maintenance agreement.
- C. The proposed project is within the Avila Valley Road Fee Area. Payment of Road Improvement Fees is required prior to building permit issuance.
- D. The proposed project is within a drainage review area. Drainage plan is required to be prepared by a registered civil engineer and it will be reviewed at the time of Building Permit submittal by Public Works. The applicant should review Chapter 22.52.110 or 23.05.040 of the Land Use Ordinance prior to future submittal of development permits.
- E. The applicable Post Construction Stormwater Performance Requirement(s) to fulfill shall be based on cumulative new or replaced impervious surface development on the entire project site including the public improvements as a plan of common development. From the information submitted it appears that all development associated with this project will be subject to Performance Requirements 1 & 2. . When Storm water management facilities are required:
 - i. Structural Control Measures (SCM) for public or common area improvements (including those for fronting and interior roadways) shall be constructed with those improvements and remain outside the County maintained road right-of-way. Private stormwater systems may use one of two mechanisms for recording an Operation and Maintenance Plan (i.e. Agreement, CCRs)
 - ii. Structural Control Measures (SCMs) and Flood Control Basins shall remain separate unless otherwise approved by the Public Works Department.
- F. If the project site disturbs 1.0 acre or more the applicant must enroll for coverage under California's Construction General Permit.

Recommended Project Conditions of Approval:

Access

- 1. **At the time of application for construction permits**, the applicant shall submit plans prepared by a Registered Civil Engineer to the Department of Public Works to secure an Encroachment Permit and post a cash damage bond to install improvements within the public right-of-way in accordance with County Public Improvement Standards. The plan is to include, as applicable:
 - a. Reconstruct, if necessary, all deteriorated or non-compliant Avila Beach Drive frontage improvements.
 - b. Pedestrian access improvements proposed within the Avila Beach Drive right-of-way.
 - c. Implement the recommendations of the project traffic report to ensure sight distance at the intersection of Avila Beach Drive at Ana Bay Road meets County standards. The encroachment permit will require the fronting property owner/s assume ongoing vegetation maintenance responsibility to ensure sight distance compliance.
- 2. **At the time of application for construction permits**, the applicant shall submit plans prepared by a Registered Civil Engineer to the Department of Planning and Building to improve all access roads to Cal Fire standards. The plan is to include, as applicable:
 - a. Implement the recommendations of the project traffic report to improve sight distance at the intersection of Ana Bay Road at Marre Road. The fronting property owner/s must assume ongoing vegetation maintenance responsibility to ensure sight distance compliance.
 - b. Improve Ana Bay Road to Cal Fire access road standards within the require access easements.
 - c. Improve Marre Road to Cal Fire access road standards within the require access easements.
 - d. Improve all onsite roads and parking facilities to Cal Fire requirements.

3. **At the time of application for construction permits**, the applicant shall enter into an agreement and post a deposit with Public Works for the cost of checking the improvement plans and the cost of inspection of any such improvements by the county or its designated representative. The applicant shall also provide the county with an Engineer of Work Agreement retaining a Registered Civil Engineer to furnish construction phase services, Record Drawings and to certify the final product to the Department of Public Works.
4. **Prior to commencing permitted activities**, all work in the public right-of-way must be constructed or reconstructed to the satisfaction of the Public Works Inspector and in accordance with the County's Public Improvement Standards; the project conditions of approval, including any related land use permit conditions; and the approved improvement plans.
5. **At the time of application for construction permits**, the applicant shall provide evidence to the Department of Planning and Building that onsite circulation and pavement structural sections have been designed and shall be constructed in conformance with Cal Fire standards and specifications back to the nearest public maintained roadway.
6. **At the time of application for construction permits**, the applicant shall submit evidence to the Department of Planning and Building of a road maintenance agreement. The agreement shall establish an organized and perpetual mechanism to ensure adequate maintenance of the shared access roads in a form acceptable to the County. The road maintenance agreement shall be signed by the owners of all properties which have shared access rights or be fully assumed by the applicant for the full width across their property frontage and back to the nearest county maintained road; be binding upon their heirs and assigns; and be recorded with the County Clerk on each of the effected properties.
7. **Prior to occupancy or final inspection**, all public improvements have been constructed or reconstructed in accordance with County Public Improvement Standards and to the satisfaction of the County Public Works Inspector.
8. **On-going condition of approval (valid for the life of the project)**, and in accordance with County Code Section 13.08, no activities associated with this permit shall be allowed to occur within the public right-of-way including, but not limited to, project signage; tree planting; fences; etc. without a valid Encroachment Permit issued by the Department of Public Works.
9. **On-going condition of approval (valid for the life of the project)**, the property owner shall be responsible for operation and maintenance of public road landscaping and maintaining County driveway sight distance standards, street lighting, and pedestrian amenities in a viable condition and on a continuing basis into perpetuity.

Fees

10. **On-going condition of approval (valid for the life of the project)**, and in accordance with Title 13.01 of the County Code, the applicant shall be responsible for paying to the Department of Public Works the Avila Valley Road Improvement Fee. The fee shall be imposed at the time of application for building permits and shall be assessed for each building permit to be issued. These fees are subject to change by resolution of the Board of Supervisors. The applicant shall be responsible for paying the fee in effect at the time of issuance of building permits.

Drainage

11. **At the time of application for construction permits**, the applicant shall submit complete drainage plans prepared by a licensed civil engineer for review and approval in accordance with Section 22.52.110 (Drainage) or 23.05.040 (Drainage) of the Land Use Ordinance.
12. **At the time of application for construction permits**, the applicant shall submit complete erosion and sedimentation control plan for review and approval in accordance with 22.52.120.
13. **Prior to issuance of construction permits**, the applicant shall provide evidence satisfactory to the Department of Planning and Building that the Army Corps of Engineers and the California Department of Fish and Game environmental permits have either been secured or that the regulatory agency has determined that their permit is not required.

14. **At the time of application for construction permits**, the applicant shall demonstrate that the project construction plans are in conformance with their Storm Water Control Plan.

Storm Water Pollution Prevention Plan (SWPPP)

15. **At the time of application for construction permits**, if the project disturbs more than 1.0 acre or is part of a common plan of development, the applicant must enroll for coverage under California's Construction General Permit. Sites that disturb less than 1.0 acre must implement all required elements within the site's erosion and sediment control plan as required by San Luis Obispo County Codes.

Stormwater Control Plan (SWCP):

16. **At the time of application for construction permits**, the applicant shall demonstrate whether the project is subject post-construction stormwater requirements by submitting a Stormwater Control Plan application.
- a. If required, the applicant must submit a Stormwater Control Plan (SWCP) prepared by an appropriately licensed professional to the County for review and approval. Applicants must utilize the County's latest SWCP template.
 - b. If applicable, the applicant shall submit a draft stormwater operations and maintenance plan for review by the County. The operations and maintenance plan may be incorporated into existing or proposed CC&Rs or drafted as an Agreement.
 - c. If applicable, following approval by the County, the applicant shall record with the County Clerk the stormwater operations and maintenance plan to document on-going and permanent storm drainage control, management, treatment, inspection and reporting.
 - d. If applicable, the applicant shall submit a draft General Notice to document the location and type of control measures that were installed to mitigate Performance Requirement #2. Following approval by the County, the applicant shall record the General Notice with the County Clerk. The recorded control measures shall remain in good working order in perpetuity.
17. **At the time of submittal of the improvement plans or construction permits**, if necessary, the applicant shall submit a draft Stormwater Operations and Maintenance Plan for all structural post-construction storm water treatment or retention facilities and it must be provided for review.
18. **Prior to approval of the improvement plans or construction permits if necessary**, the approved Operations and Maintenance Plan may be recorded as an element of the Codes, Covenants and Restrictions, or as an Agreement with the County.

Recycling

19. **On-going condition of approval (valid for the life of the project)**, the applicants shall provide recycling opportunities to all facility users at all events in accordance with Ordinance 2008-3 of the San Luis Obispo County Integrated Waste Management Authority (mandatory recycling for residential, commercial and special events).

G:\Development_DEVSERV Referrals\Land Use Permits\DP\DRC2018-00033 Cottages at Point San Luis\DRC2018-00033 Somera CDP Avila Beach.docx



Date: May 8, 2018
To: Schani Siong, Project Planner
From: Glenn Marshall, Development Services
Subject: **Amended Public Works Project Referral for DRC2018-00033, Somera Capital Mgmt CDP, Avila Beach Dr, Avila Beach, APN 076-174-009**

Thank you for the opportunity to provide information on the proposed subject project. It has been reviewed by several divisions of Public Works, and this represents our consolidated response.

PUBLIC WORKS REQUESTS THAT AN INFORMATION HOLD BE PLACED ON THIS PROJECT UNTIL THE APPLICANT PROVIDES THE FOLLOWING DOCUMENTS FOR PUBLIC WORKS REVIEW AND COMMENT:

1. Initial comments on the Draft Transportation Impact Study include:
 - a. Update the project trip generation rate to reflect 5,331sf restaurant (4,600sf evaluated) and add 1,679sf spa, 566sf fitness, 2,046sf conference & banquet space, 1,032sf lobby, 299sf gift shop, and the proposed events. Events with 200 visitors is discussed in project description but no information on how often and no discussion in traffic report.
 - b. Consider submitting a Traffic Management Plan as a project mitigation to limit vehicle trips for events, and to shuttle guests to and from town (as mentioned in project description).
 - c. Provide worse case design delivery truck or fire truck turning templates for Ana Bay Road and Marre Road showing sufficient access road widths are being provided.
 - d. The proposed Marre Road centerline curves and road sections A-A through D-D, Sheet C-3, do not conform to Cal Fire requirements. Show conformance or provide evidence that Cal Fire will support an adjustment to their standards.
 - e. Per Resolution 2008-152, submit a Roadway Safety Analysis for Avila Beach Drive between Ana Bay Road and San Luis Bay Drive.
 - f. Submit sight distance analysis with recommendations for the intersection Ana Bay Road at Avila Beach Drive.
 - g. Public Works requires additional time to circulate the Draft Transportation Impact Study through our Transportation Division. When completed will submit additional comments, if any, under separate cover.
 - h. Project specific impact at Avila Beach Drive and Ontario Road. Although covered in Avila Valley Circulation Study under cumulative conditions. Project must mitigate for project specific impacts by constructing signal or similar Public Works approved project. RIF fees may be applied together with a RIF reimbursement agreement. Contact Public Works for more information.
 - i. Project specific impact at Avila Beach Drive and Ana Bay Road. Project must propose mitigation if signal warrants not met, a southbound right turn lane should be considered/constructed.
2. See attached plan for recommended improvements for the Avila Beach Drive slope cut adjacent to the project site. The project must not create additional impervious area at top of road slope without construction concrete v-ditches or other slope drainage system protection system.
3. Update the Marre Road preliminary improvement plans (C-series sheets) to show and label the existing offsite access road easements. Show the proposed Marre Road improvement remain within the existing easement or provide evidence additional easement width can be secured from the affected property owner/s.

4. Update the site plan to show a pedestrian path of travel between the project site and existing pedestrian improvements on Avila Beach Drive (recommendation from Traffic Report).
5. The proposed project is located off non-county maintained roads. In accordance with Resolution 2008-152 no proposed land development which attracts general public traffic shall be permitted on privately maintained roads without a submission of a road maintenance agreement. Provide evidence that a road maintenance agreement signed by ALL property owners having legal access to Ana Bay Road and Marre Road can be secured.
6. Provide a preliminary drainage plan and calculations showing how the project will comply with Section 5 of the Public Improvement Standards.

Public Works Comments:

- A. The proposed project triggers road improvements per Resolution 2008-152.
- B. The proposed project is located off non-county maintained roads. In accordance with Resolution 2008-152 no proposed land development which attracts general public traffic shall be permitted on privately maintained roads without a submission of a road maintenance agreement.
- C. The proposed project is within the Avila Valley Road Fee Area. Payment of Road Improvement Fees is required prior to building permit issuance.
- D. The proposed project is within a drainage review area. Drainage plan is required to be prepared by a registered civil engineer and it will be reviewed at the time of Building Permit submittal by Public Works. The applicant should review Chapter 22.52.110 or 23.05.040 of the Land Use Ordinance prior to future submittal of development permits.
- E. The applicable Post Construction Stormwater Performance Requirement(s) to fulfill shall be based on cumulative new or replaced impervious surface development on the entire project site including the public improvements as a plan of common development. From the information submitted it appears that all development associated with this project will be subject to Performance Requirements 1 & 2. . When Storm water management facilities are required:
 - i. Structural Control Measures (SCM) for public or common area improvements (including those for fronting and interior roadways) shall be constructed with those improvements and remain outside the County maintained road right-of-way. Private stormwater systems may use one of two mechanisms for recording an Operation and Maintenance Plan (i.e. Agreement, CCRs)
 - ii. Structural Control Measures (SCMs) and Flood Control Basins shall remain separate unless otherwise approved by the Public Works Department.
- F. If the project site disturbs 1.0 acre or more the applicant must enroll for coverage under California's Construction General Permit.

Recommended Project Conditions of Approval:

Access

1. **At the time of application for construction permits**, the applicant shall submit plans prepared by a Registered Civil Engineer to the Department of Public Works to secure an Encroachment Permit and post a cash damage bond to install improvements within the public right-of-way in accordance with County Public Improvement Standards. The plan is to include, as applicable:
 - a. Reconstruct, if necessary, all deteriorated or non-compliant Avila Beach Drive frontage improvements.
 - b. Pedestrian access improvements proposed within the Avila Beach Drive right-of-way.
 - c. Implement the recommendations of the project traffic report to ensure sight distance at the intersection of Avila Beach Drive at Ana Bay Road meets County standards. The encroachment permit will require the fronting property owner/s assume ongoing vegetation maintenance responsibility to ensure sight distance compliance.

2. **At the time of application for construction permits**, the applicant shall submit plans prepared by a Registered Civil Engineer to the Department of Planning and Building to improve all access roads to Cal Fire standards. The plan is to include, as applicable:
 - a. Implement the recommendations of the project traffic report to improve sight distance at the intersection of Ana Bay Road at Marre Road. The fronting property owner/s must assume ongoing vegetation maintenance responsibility to ensure sight distance compliance.
 - b. Improve Ana Bay Road to Cal Fire access road standards within the require access easements.
 - c. Improve Marre Road to Cal Fire access road standards within the require access easements.
 - d. Improve all onsite roads and parking facilities to Cal Fire requirements.
3. **At the time of application for construction permits**, the applicant shall enter into an agreement and post a deposit with Public Works for the cost of checking the improvement plans and the cost of inspection of any such improvements by the county or its designated representative. The applicant shall also provide the county with an Engineer of Work Agreement retaining a Registered Civil Engineer to furnish construction phase services, Record Drawings and to certify the final product to the Department of Public Works.
4. **Prior to commencing permitted activities**, all work in the public right-of-way must be constructed or reconstructed to the satisfaction of the Public Works Inspector and in accordance with the County's Public Improvement Standards; the project conditions of approval, including any related land use permit conditions; and the approved improvement plans.
5. **At the time of application for construction permits**, the applicant shall provide evidence to the Department of Planning and Building that onsite circulation and pavement structural sections have been designed and shall be constructed in conformance with Cal Fire standards and specifications back to the nearest public maintained roadway.
6. **At the time of application for construction permits**, the applicant shall submit evidence to the Department of Planning and Building of a road maintenance agreement. The agreement shall establish an organized and perpetual mechanism to ensure adequate maintenance of the shared access roads in a form acceptable to the County. The road maintenance agreement shall be signed by the owners of all properties which have shared access rights or be fully assumed by the applicant for the full width across their property frontage and back to the nearest county maintained road; be binding upon their heirs and assigns; and be recorded with the County Clerk on each of the effected properties.
7. **Prior to occupancy or final inspection**, all public improvements have been constructed or reconstructed in accordance with County Public Improvement Standards and to the satisfaction of the County Public Works Inspector.
8. **On-going condition of approval (valid for the life of the project)**, and in accordance with County Code Section 13.08, no activities associated with this permit shall be allowed to occur within the public right-of-way including, but not limited to, project signage; tree planting; fences; etc. without a valid Encroachment Permit issued by the Department of Public Works.
9. **On-going condition of approval (valid for the life of the project)**, the property owner shall be responsible for operation and maintenance of public road landscaping and maintaining County driveway sight distance standards, street lighting, and pedestrian amenities in a viable condition and on a continuing basis into perpetuity.

Fees

10. **On-going condition of approval (valid for the life of the project)**, and in accordance with Title 13.01 of the County Code, the applicant shall be responsible for paying to the Department of Public Works the Avila Valley Road Improvement Fee. The fee shall be imposed at the time of application for building permits and shall be assessed for each building permit to be issued. These fees are subject to change by resolution of the Board of Supervisors. The applicant shall be responsible for paying the fee in effect at the time of issuance of building permits.

Drainage

11. **At the time of application for construction permits**, the applicant shall submit complete drainage plans prepared by a licensed civil engineer for review and approval in accordance with Section 22.52.110 (Drainage) or 23.05.040 (Drainage) of the Land Use Ordinance.
12. **At the time of application for construction permits**, the applicant shall submit complete erosion and sedimentation control plan for review and approval in accordance with 22.52.120.
13. **Prior to issuance of construction permits**, the applicant shall provide evidence satisfactory to the Department of Planning and Building that the Army Corps of Engineers and the California Department of Fish and Game environmental permits have either been secured or that the regulatory agency has determined that their permit is not required.
14. **At the time of application for construction permits**, the applicant shall demonstrate that the project construction plans are in conformance with their Storm Water Control Plan.

Storm Water Pollution Prevention Plan (SWPPP)

15. **At the time of application for construction permits**, if the project disturbs more than 1.0 acre or is part of a common plan of development, the applicant must enroll for coverage under California's Construction General Permit. Sites that disturb less than 1.0 acre must implement all required elements within the site's erosion and sediment control plan as required by San Luis Obispo County Codes.

Stormwater Control Plan (SWCP):

16. **At the time of application for construction permits**, the applicant shall demonstrate whether the project is subject post-construction stormwater requirements by submitting a Stormwater Control Plan application.
 - a. If required, the applicant must submit a Stormwater Control Plan (SWCP) prepared by an appropriately licensed professional to the County for review and approval. Applicants must utilize the County's latest SWCP template.
 - b. If applicable, the applicant shall submit a draft stormwater operations and maintenance plan for review by the County. The operations and maintenance plan may be incorporated into existing or proposed CC&Rs or drafted as an Agreement.
 - c. If applicable, following approval by the County, the applicant shall record with the County Clerk the stormwater operations and maintenance plan to document on-going and permanent storm drainage control, management, treatment, inspection and reporting.
 - d. If applicable, the applicant shall submit a draft General Notice to document the location and type of control measures that were installed to mitigate Performance Requirement #2. Following approval by the County, the applicant shall record the General Notice with the County Clerk. The recorded control measures shall remain in good working order in perpetuity.
17. **At the time of submittal of the improvement plans or construction permits**, if necessary, the applicant shall submit a draft Stormwater Operations and Maintenance Plan for all structural post-construction storm water treatment or retention facilities and it must be provided for review.
18. **Prior to approval of the improvement plans or construction permits if necessary**, the approved Operations and Maintenance Plan may be recorded as an element of the Codes, Covenants and Restrictions, or as an Agreement with the County.

Recycling

19. **On-going condition of approval (valid for the life of the project)**, the applicants shall provide recycling opportunities to all facility users at all events in accordance with Ordinance 2008-3 of the San Luis Obispo County Integrated Waste Management Authority (mandatory recycling for residential, commercial and special events).

Attachment: Avila Beach Site #1 Storm Damage Repairs, Drainage Memorandum, October 28, 2011



Date: November 2, 2018
To: Schani Siong, Project Planner
From: Glenn Marshall, Development Services
Subject: Amended Public Works Project Referral for DRC2018-00033, Somera Capital Mgmt CDP, Avila Beach Dr, Avila Beach, APN 076-174-009

Thank you for the opportunity to provide information on the proposed subject project. It has been reviewed by several divisions of Public Works, and this represents our consolidated response.

PUBLIC WORKS REQUESTS THAT AN INFORMATION HOLD BE PLACED ON THIS PROJECT UNTIL THE APPLICANT PROVIDES THE FOLLOWING DOCUMENTS FOR PUBLIC WORKS REVIEW AND COMMENT:

1. Initial comments on the Draft Transportation Impact Study include:
 - a. Submit a draft Traffic Management Plan as proposed in the project traffic report as a transportation mitigation to limit vehicle trips for events, and to shuttle guests to and from town.
2. Update the site plan to show a pedestrian path of travel between the project site and existing pedestrian improvements on Avila Beach Drive (recommendation from Traffic Report).

Public Works Comments:

- A. Amended to reflect 10/8/18 resubmittal package.
- B. The proposed project triggers road improvements per Resolution 2008-152.
- C. The proposed project is located off non-county maintained roads. In accordance with Resolution 2008-152 no proposed land development which attracts general public traffic shall be permitted on privately maintained roads without a submission of a road maintenance agreement.
- D. The proposed project is within the Avila Valley Road Improvement Fee Area. Payment is recommended in the traffic report for mitigating project impacts to the local intersections.
- E. The proposed project is within a drainage review area. Drainage plan is required to be prepared by a registered civil engineer and it will be reviewed at the time of Building Permit submittal by Public Works. The applicant should review Chapter 22.52.110 or 23.05.040 of the Land Use Ordinance prior to future submittal of development permits.

This project may be a regulated project as it is located in a Stormwater Management Area and is therefore required to submit a Stormwater Control Plan (SWCP) Application. The Stormwater Control Plan application, SWCP template, and LID Handbook guidance can be found at: <https://www.slocounty.ca.gov/Departments/Planning-Building/Stormwater/Services/Stormwater-Requirements-for-New-Construction.aspx>

The applicable Post Construction Stormwater Performance Requirement(s) to fulfill shall be based on cumulative new or replaced impervious surface development on the project site, including the required public improvements to the project frontage. The applicant must prepare a SWCP for all

improvements to encompass the entire project site and ensure a decentralized approach. When stormwater management facilities are required:

- i. Structural Control Measures (SCM) for public or common area improvements (including those for fronting and interior roadways) shall be constructed with those improvements and remain outside the County maintained road right-of-way. Private stormwater systems may use one of two mechanisms for recording an Operation and Maintenance Plan (i.e. Agreement, CCRs)
 - ii. Structural Control Measures (SCMs) and Flood Control Basins shall remain separate unless otherwise approved by the Public Works Department.
- F. If the project site disturbs 1.0 acre or more the applicant must enroll for coverage under California's Construction General Permit.

Recommended Project Conditions of Approval:

Access

1. **At the time of application for construction permits**, the applicant shall submit plans prepared by a Registered Civil Engineer to the Department of Public Works to secure an Encroachment Permit and post a cash damage bond to install improvements within the public right-of-way in accordance with County Public Improvement Standards. The plan is to include, as applicable:
 - a. Reconstruct, if necessary, all deteriorated or non-compliant Avila Beach Drive frontage improvements.
 - b. Implement the recommendations of the CCTC Sept 2018 traffic report to ensure sight distance at the intersection of Avila Beach Drive at Ana Bay Road meets County standards. The fronting property owner/s assume ongoing vegetation maintenance responsibility to ensure sight distance compliance.
2. **At the time of application for construction permits**, the applicant shall submit plans prepared by a Registered Civil Engineer to the Department of Planning and Building to improve all access roads to Cal Fire standards. The plan is to include, as applicable:
 - a. Improve Ana Bay Road to Cal Fire access road standards and County Public Improvement Standards within the require access easements.
 - b. Improve Marre Road to Cal Fire access road standards and County Public Improvement Standards within the require access easements.
 - c. Improve all onsite roads and parking facilities to Cal Fire standards.
 - d. Implement the recommendations of the CCTC Sept 2018 traffic report to ensure sight distance at the intersection of Ana Bay Road at Marre Road.
 - e. Implement the recommendations of the CCTC Sept 2018 traffic report to stripe the centerline of Ana Bay Road as no passing.
3. **At the time of application for construction permits**, the applicant shall enter into an agreement and post a deposit with Public Works for the cost of checking the improvement plans and the cost of inspection of any such improvements by the county or its designated representative. The applicant shall also provide the county with an Engineer of Work Agreement retaining a Registered Civil Engineer to furnish construction phase services, Record Drawings and to certify the final product to the Department of Public Works.
4. **Prior to commencing permitted activities**, all work in the public right-of-way must be constructed or reconstructed to the satisfaction of the Public Works Inspector and in accordance with the County's Public Improvement Standards; the project conditions of approval, including any related land use permit conditions; and the approved improvement plans.

5. **At the time of application for construction permits**, the applicant shall provide evidence to the Department of Planning and Building that onsite circulation and pavement structural sections have been designed and shall be constructed in conformance with Cal Fire standards and specifications back to the nearest public maintained roadway.
6. **At the time of application for construction permits**, the applicant shall submit evidence to the Department of Planning and Building of a road maintenance agreement. The agreement shall establish an organized and perpetual mechanism to ensure adequate maintenance of the shared access roads in a form acceptable to the County. The road maintenance agreement shall be signed by the owners of all properties which have shared access rights or be fully assumed by the applicant for the full width across their property frontage and back to the nearest county maintained road; be binding upon their heirs and assigns; and be recorded with the County Clerk on each of the effected properties.
7. **Prior to occupancy or final inspection**, all public improvements have been constructed or reconstructed in accordance with County Public Improvement Standards and to the satisfaction of the County Public Works Inspector.
8. **On-going condition of approval (valid for the life of the project)**, and in accordance with County Code Section 13.08, no activities associated with this permit shall be allowed to occur within the public right-of-way including, but not limited to, project signage; tree planting; fences; etc. without a valid Encroachment Permit issued by the Department of Public Works.
9. **On-going condition of approval (valid for the life of the project)**, the property owner shall be responsible for operation and maintenance of public road landscaping and maintaining County driveway sight distance standards, street lighting, and pedestrian amenities in a viable condition and on a continuing basis into perpetuity.

Transportation Management Plan

10. **At the time of application for construction permits**, the applicant shall submit a Transportation Management Plan (TMP) prepared by a licensed civil or traffic engineer for review and approval by the Planning and Building Department, in consultation with the Public Works Department. The intent of the TMP will be to minimize impacts to the surrounding road network for all approved permanent uses and temporary events of any size. The elements of the TMP must include:
 - a. Establish and implement a shuttle program for hotel guests and visitors.
 - b. Establish and implement a mandatory shuttle for special event guests and visitors, including identification of offsite park-and-ride facilities including encouraging alternative modes of transportation, high occupancy vehicle preferences, parking passes, free shuttle, etc.
 - c. Establish a monitoring and recording program to document TMP compliance that includes event day vehicle counts for morning and afternoon peak hour trips, and total daily trips
 - d. Event traffic control plan including signage and flag-persons. Note that an encroachment permit issued by Public Works will be required for any traffic control proposed within the right-of-way.
 - e. Limits events to not occur during annual community events, and limits event hours to not conflict with Diablo Canyon shift changes.
 - f. Limits event delivery services to off-peak event hours.
 - g. Designate a TMP coordinator and provide contact information. Together with implementing the TMP, the coordinator must also respond to all agency and public inquiries.
 - h. Establish and implement an enforcement program to ensure compliance with the approved TMP and a records keeping plan to substantiate compliance.
 - i. Establish and implement a procedure to request county approval for subsequent TMP amendments.
11. **Prior to occupancy, final inspection or commencing permitted activities**, the Transportation Management Plan must be approved by the County.

12. **On-going condition of approval (valid for the life of the project)**, the property owner(s) shall adhere to and enforce the Transportation Management Plan (TMP). Amendments to the TMP may be allowed but must be submitted by a registered civil or transportation engineer for prior approval by the County Planning and Building Department, in consultation with the Department of Public Works.

Fees

13. **On-going condition of approval (valid for the life of the project)**, and in accordance with Title 13.01 of the County Code, the applicant shall be responsible for paying to the Department of Public Works the Avila Valley Road Improvement Fee. The fee shall be imposed at the time of application for building permits and shall be assessed for each building permit to be issued. These fees are subject to change by resolution of the Board of Supervisors. The applicant shall be responsible for paying the fee in effect at the time of issuance of building permits.

Drainage

14. **At the time of application for construction permits**, the applicant shall submit complete drainage plans prepared by a licensed civil engineer for review and approval in accordance with Section 22.52.110 (Drainage) or 23.05.040 (Drainage) of the Land Use Ordinance.
15. **At the time of application for construction permits**, the applicant shall provide evidence to the satisfaction of Public Works that no new, increased, or point discharged project stormwater flows will reach the bluff top above Avila Beach Drive.
16. **At the time of application for construction permits**, the applicant shall submit complete erosion and sedimentation control plan for review and approval in accordance with 22.52.120.
17. **Prior to issuance of construction permits**, the applicant shall provide evidence satisfactory to the Department of Planning and Building that the Army Corps of Engineers and the California Department of Fish and Game environmental permits have either been secured or that the regulatory agency has determined that their permit is not required.
18. **At the time of application for construction permits**, the applicant shall demonstrate that the project construction plans are in conformance with their Storm Water Control Plan.

Storm Water Pollution Prevention Plan (SWPPP)

19. **At the time of application for construction permits**, if the project disturbs more than 1.0 acre or is part of a common plan of development, the applicant must enroll for coverage under California's Construction General Permit. Sites that disturb less than 1.0 acre must implement all required elements within the site's erosion and sediment control plan as required by San Luis Obispo County Codes.

Stormwater Control Plan (SWCP):

20. **At the time of application for construction permits**, the applicant shall demonstrate whether the project is subject post-construction stormwater requirements by submitting a Stormwater Control Plan application.
- a. If required, the applicant must submit a Stormwater Control Plan (SWCP) prepared by an appropriately licensed professional to the County for review and approval. Applicants must utilize the County's latest SWCP template.

- b. If applicable, the applicant shall submit a draft stormwater operations and maintenance plan for review by the County. The operations and maintenance plan may be incorporated into existing or proposed CC&Rs or drafted as an Agreement.
 - c. If applicable, following approval by the County, the applicant shall record with the County Clerk the stormwater operations and maintenance plan to document on-going and permanent storm drainage control, management, treatment, inspection and reporting.
 - d. If applicable, the applicant shall submit a draft General Notice to document the location and type of control measures that were installed to mitigate Performance Requirement #2. Following approval by the County, the applicant shall record the General Notice with the County Clerk. The recorded control measures shall remain in good working order in perpetuity.
21. **At the time of submittal of the improvement plans or construction permits**, if necessary, the applicant shall submit a draft Stormwater Operations and Maintenance Plan for all structural post-construction storm water treatment or retention facilities and it must be provided for review.
22. **Prior to approval of the improvement plans or construction permits if necessary**, the approved Operations and Maintenance Plan may be recorded as an element of the Codes, Covenants and Restrictions, or as an Agreement with the County.

Recycling

23. **On-going condition of approval (valid for the life of the project)**, the applicants shall provide recycling opportunities to all facility users at all events in accordance with Ordinance 2008-3 of the San Luis Obispo County Integrated Waste Management Authority (mandatory recycling for residential, commercial and special events).

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IN THE BOARD OF SUPERVISORS

County of San Luis Obispo, State of California

Tuesday May 6, 2008

PRESENT: Supervisors Harry L. Ovitt, Bruce S. Gibson, Jerry Lenthall,
K.H. 'Katcho' Achadjian, and Chairperson James R. Patterson

ABSENT: None

RESOLUTION NO. 2008-152

RESOLUTION REVISING POLICIES REGARDING LAND DEVELOPMENT IMPROVEMENTS ON COUNTY MAINTAINED STREETS AND ROADS

The following Resolution is now offered and read:

WHEREAS, on July 2, 1991, the Board of Supervisors adopted Resolution No. 91-367, establishing requirements for subdivision street and road improvements on County-Maintained Roads; and

WHEREAS, since that time there has been increased interest in a type of development known as Agricultural Cluster subdivisions; and

WHEREAS, there have been other types of intensification of land use in rural areas which need to have appropriate levels of road improvements required as conditions of approval in order to provide safe conditions for the public using the County-maintained road system; and

WHEREAS, the rate of vehicle collisions in the rural areas of San Luis Obispo County have had an increasing trend for several years, indicating a need to revise development policies.

NOW, THEREFORE, BE IT RESOLVED AND ORDERED by the Board of Supervisors of the County of San Luis Obispo, State of California, as follows:

A. Road Improvement Requirements

1. Improvements required with subdivisions. County-maintained streets or roads fronting subdivisions shall be improved to current County Public Improvement Standards, including bikeways where designated in the latest adopted edition of the County Bikeways Plan, when the subdivision is within:
 - a. Industrial, Commercial Retail, Commercial Service, Office/Professional, Residential Suburban, Residential Single Family or Residential Multi Family land use categories or,
 - b. Residential Rural land use category, where that roadway has a projected Average Daily Traffic (ADT) greater than 100.

In cases (a) and (b), the County-maintained street or road shall be improved fronting the property, and continuing to the nearest paved publicly-maintained road which meets or exceeds the standard improvements required. The level of improvement (e.g., A-1 rural, A-1j gravel, A-2 urban or A-3 commercial/industrial) shall be required as defined in the Public Improvement Standards and as further defined by this Resolution.

c. Agriculture or Rural Lands land use categories, where the subdivision is a cluster.

In case (c), the County-maintained road shall be improved to widen to complete the project side of an A-1 (rural) standard according to the criteria in Table 1:

Table 1. Criteria for road improvements for Ag/RL cluster subdivisions

Number of residential lots per entrance*	Improve this length of road**
1-7	300 feet each side of entrance
8-20	1/4 mile, centered on entrance
21-40	1/2 mile, centered on entrance
41+	1 mile, centered on entrance

* For projects which propose a "loop" configuration, half of the lots along the loop shall be assumed to be served by each entrance.

** Where the subdivision adjoins two or more County-maintained roads, the length shall be measured along the road with the highest traffic volume, measured from the intersection with the road with the second-highest traffic volume, as determined by the Department of Public Works.

2. **Improvements required for developments which attract public traffic.** Land development projects in rural areas which are not subdivisions, and which will attract general public traffic (e.g., wine tasting, ag tourism, events, etc.) on County-maintained roads, shall be approved with a condition to widen to complete the project side of an A-1 (rural) standard according to the criteria in Table 2 below, prior to occupancy of any new structure, or initiation of the use, if no structure is proposed. In addition, all land development projects shall be subject to the requirements of the County Public Improvement Standards for requirements of any driveway connections to the County-maintained road system. This may involve paving, grading or vegetation clearance as necessary to provide proper sight distance and handling of drainage.

Table 2. Criteria for road improvements for non-subdivision developments

Development regular ops. General public peak hour trips	Development event General public peak hour trips	Improve this length of road*
1-10	1-100	RSA** only
11-20	101-200	1/4 mile from entrance toward nearest intersection + RSA**
21-40	201-400	1/2 mile from entrance toward nearest intersection + RSA**
41+	400+	1 mile from entrance toward nearest intersection + RSA**

* Where the development adjoins two or more County-maintained roads, the length shall be measured along the road with the highest traffic volume, measured from the intersection with the road with the second-highest traffic volume, as determined by the Department of Public Works.

** RSA: Roadway Safety Analysis, defined in Section B (below).

3. **Public traffic on privately-maintained roads.** No proposed land development project in rural areas which will attract general public traffic (e.g., wine tasting, ag tourism, events, etc.), shall be permitted on roads which are privately maintained, without submission of a road maintenance agreement, signed by the owners of all property on which the access roads are located and binding upon their heirs and assigns. The agreement shall be required to establish an organized and perpetual mechanism to ensure adequate maintenance of the roads, acceptable to the Department of Public Works. Required improvements for the privately-maintained roads shall be based upon recommendations from the applicable fire protection agency.
4. **Cross-section required.** When subdivisions or other land development projects are required to construct improvements on streets or roads which are, or will become, County-maintained, they shall contain the following cross-sectional elements:
 - a. Streets or roads which are entirely within a subdivision or development shall be improved to the full width of the appropriate standard section.
 - b. When the subdivision or development fronts a part-width street or road previously constructed through the activities of others, whether publicly-maintained or private, the subdivision or development shall be required to widen to complete the project side of the appropriate standard section from the Public Improvement Standards, fronting the property or for length determined by Tables 1 and 2 above.
 - c. When the subdivision or development fronts a street or road which is to be newly constructed, the initial part-width improvement shall be to construct the full improvement on the project side plus a full travel lane on the opposite side, according to the appropriate standard section from the Public Improvement Standards, fronting the property or for length determined by Tables 1 and 2 above. Any offsite extension to connect with existing streets or roads shall be constructed to the same standards.
5. **Additional safety improvements.** When a development project is required to perform a Roadway Safety Analysis, as defined in Section B below, the analysis shall consider all the improvements required by Section A to be in place, and then shall determine whether additional improvements are warranted to mitigate potential safety impacts of the traffic generated by the proposed development.

B. Roadway Safety Analysis

1. **When required.** To limit the exposure of increasing the number of collisions on the road, all developments in rural areas which will attract general public traffic (e.g., wine, tasting, ag tourism, events, etc.) shall be required to perform a Roadway Safety Analysis (RSA).
2. **Improvements to reduce expected collision rate.** The Department of Public Works shall provide the existing collision rate for the road. In cases where the collision rate is greater than one standard deviation above the average collision rate for rural roads, the RSA shall proceed with an analysis of potential road improvements which would reduce the expected collision rate to acceptable limits. The improvements may include, but are not limited to, the following:
 - Superelevation revisions on existing curves
 - Widening of shoulders at curves to create a roadside recovery area
 - Removal of roadside obstacles
 - Improvement of shoulder width (minimum two feet) for recovery area
 - Reduction of vertical curves to improve sight distance
 - Enhance existing access points to improve safety
 - Turn movement channelization
3. **Limits of analysis.** The RSA shall evaluate the following length of road shown in Table 3:

Table 3. Roadway Safety Analysis requirements

Development regular ops. General public peak hour trips	Development event General public peak hour trips	Study/Improve this length of road
1-10	1-100	½ mile from entrance toward nearest intersection
11-20	101-200	1 mile from entrance toward nearest intersection
21-40	201-400	2 miles from entrance toward nearest intersection
41+	400+	3 miles from entrance toward nearest intersection

4. **Preparation requirements.** The analysis shall be performed by a Registered Civil Engineer or Registered Traffic Engineer, utilizing accident reduction factors as provided in Caltrans Local Programs Guidelines Manual, Chapter 9, "Hazard Elimination Systems," and models from Transportation Research Board Special Report 214 "Designing Safer Roads," which will quantify collision reduction based on curve and shoulder improvements.
5. **Coordination with project environmental determination.** The RSA shall be performed as part of the environmental determination for the proposed development project. Its recommendations shall then be incorporated into the Developer's Statement and conditions of approval for the project.

C. General Provisions

1. The determination of the necessary requirements to provide for the safety of the public using County roads will be based upon the maximum amount of general public traffic which will be generated by the proposed land use project. The Department of Public Works shall use the factors in Table 4 to estimate general public trip generation and determine what level of requirements in Tables 2 and 3 above shall apply.

For land development projects which include both regular operations and events, the amount of general public traffic generated by each shall be calculated by the Department of Public Works. The amount of traffic for regular operations and for events shall be considered separately. The amount of general public traffic (regular operations or events) which results in the greater improvement requirement in Tables 2 and 3 above shall determine the conditions for the project.

Table 4. General public trip generation factors

Type of land use	Trip generation factor
Single-family residential	Assume no <u>general public</u> trip generation
Farm support quarters	Assume no <u>general public</u> trip generation
Agricultural processing	Assume no <u>general public</u> trip generation
Retail, other visitor-serving areas	2.71 peak hour trips (pht) per 1,000 square feet
Events	0.4 pht per max. permitted attendance

Other land uses not shown in this table shall be estimated by Public Works staff based on information provided by the applicant and the Institute of Transportation Engineers Trip Generation Manual, most recent edition.

2. The requirements established by this Resolution shall apply to all street or road improvements constructed as a requirement of subdivision or land use permit applications which are deemed complete on or after the date of approval of this Resolution.
4. Nothing in this resolution shall be construed to preempt requirements of the California Environmental Quality Act or other applicable rules as adopted by appropriate authorities. Those other rules may require even greater mitigation measures which involve constructing greater levels of improvement.
3. This resolution supersedes and replaces Resolution 91-367.

Upon motion of Supervisor Achadjian, seconded by Supervisor Gibson, and on the following roll call vote, to wit:

AYES: Supervisors Achadjian, Gibson, Ovitt, Lenthall, and Chairperson Patterson

NOES: None

ABSENT: None

ABSTAINING: None

the foregoing Resolution is hereby adopted.

JAMES R. PATTERSON
Chairperson of the Board of Supervisors

ATTEST:

JULIE L. RODEWALD
Clerk of the Board of Supervisors

[SEAL] By: SANDY CURRENS
Deputy Clerk

APPROVED AS TO FORM AND LEGAL EFFECT:

R. WYATT CASH
County Counsel

By: 
Deputy County Counsel

Dated: April 18, 2008

L:\Trans\May08\BOS\Road Improvements rsl.doc.rem.law

STATE OF CALIFORNIA) COUNTY OF SAN LUIS OBISPO) SS
I, JULIE L. RODEWALD, County Clerk of the above established County, and Ex-Officio Clerk of the Board of Supervisors thereof, do hereby certify the foregoing to be a full, true and correct copy of an order entered in the minutes of said Board of Supervisors, and now remain- ing of record in my office.
Witness, my hand and seal of said Board of Super- visors this <u>may 15, 2008</u>
JULIE L. RODEWALD County Clerk and Ex-Officio Clerk of the Board of Supervisors
By <u>Sandy Currens</u> Deputy Clerk

AVILA BEACH SITE #1
STORM DAMAGE REPAIRS

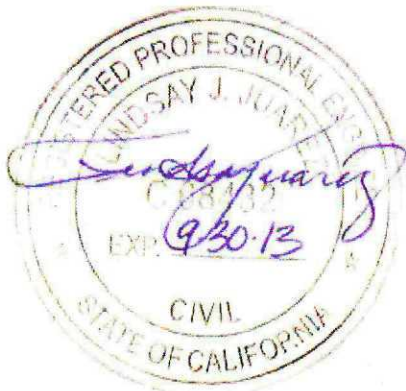
DRAINAGE MEMORANDUM

OCTOBER 28, 2011

Federal Project No. PR ER-18DO(011)
County I/O No. 245R12B416

Prepared for:
San Luis Obispo County, Department of Public Works

Prepared by:
Quincy Engineering, Inc



Approval Recommended by:

A handwritten signature in blue ink, likely belonging to Genaro Diaz, written over a horizontal line.

Genaro Diaz, P.E.
Dept. of Public Woks
San Luis Obispo County

Project: Avila Beach Site #1 on Avila Beach Drive

Prepared by: Quincy Engineering, Inc.

Prepared for: San Luis Obispo County

DRAINAGE MEMORANDUM

Purpose:

The purpose of this memorandum is to determine and support methodologies, assumptions, and calculations for the proposed improvements required to collect, convey, and dispose of rainfall runoff generated from the Avila Beach Site #1. In an effort to reduce the risk of future slope failures, the proposed drainage strategy is shown below.

Background Information:

Following a series of severe storm events during the winter of 2010, the project area experienced multiple slope failures. The area of interest is located on the northern side slope adjacent to Avila Beach Drive (a minor arterial that runs roughly east-west between Port San Luis and Avila Beach). The project site is located approximately 1,700' west of the San Luis Creek. Following the slope failure, traffic was shifted south towards San Luis Obispo Bay, resulting in two 12' lanes and minimal shoulders. With temporary traffic control devices in place, maintenance crews were able to clear the existing paved shoulders and reopen traffic to the existing 12' lanes and 10' shoulders.

As-Builts:

No As-Builts for Avila Beach Drive were available.

Existing Drainage Conditions:

Existing conditions were determined from aerial topography, field surveys, and field visits. The existing drainage facilities are minimal in regards to conveying and capturing water flow to existing drainage systems. The eastern portion of the slide area was reconstructed immediately following the slope failure. Fiber rolls are installed on the newly stabilized bench and stabilized side slopes. The western portion of the slide area has yet to be stabilized, but contains a bench created from the spoils of the slope failure. Between the newly built slope and the uncompacted slope, lies a temporary swale leading from the top of the bench down to an existing metal pipe drainage inlet.

Existing slopes of the hillside vary from 0.75:1 (H:V) to 1:1 (H:V) and vary from 150'-250' high. Existing rainfall sheet flows from the top to bottom of the slopes. Rill formations in the side slopes indicate significant erosion and insufficient drainage measures.

Existing Soil Conditions:

Kane Geotech, Inc. completed the *Avila Beach Slope Stabilization Progress Report*, dated January 15, 2011. The report summarizes the site conditions shortly after the slope failure had occurred. The findings of the report are as follows:

- Cut slope is comprised of Monterey Formation mudstones, siltstones, and sandstones.
- The average slope angle is 55°.
- The slope failure developed at the center of the cut, adjacent to a large slide that occurred in 1998.

Proposed Drainage Strategy:

The drainage design for the project is based on the procedures/equations presented in the San Luis Obispo County *Public Improvement Standards*, the sixth edition of the Caltrans *Highway Design Manual* (HDM), and the second edition of the Federal Highway Administration (FHWA) *Hydraulic Engineering Circular No. 22*. The Rational Method was used to determine flows for the 10-year, 25-year, and 50-year return periods.

Ditches: The San Luis Obispo *Public Improvement Standards* for channels and swales, along with Manning's Equation, were used to determine capacities of all proposed ditches.

Pipes: Manning's Equation was used to determine capacities of all proposed pipes.

Proposed drainage improvements were evaluated based on the following criteria:

- Hydraulic Design: Rational Method (due to small area of site; <200 Acres)
- Storm Events: 25-year and 50-year
- Storm Duration: 10 minutes
- Minimum/Maximum v-ditch velocities: 3 fps (min) and 10 fps (max)
- Minimum CSP diameter: 18 inches
- 4' wide concrete lined v-ditch w/ 1:1 side slopes (shotcrete or other finish to provide minimum Manning's "n" value of 0.020)

Proposed Drainage Improvements:

Below are the proposed drainage improvements for Avila Beach Site #1 (see Appendix C):

- Concrete lined (shotcrete or gunite finish) v-ditches and vegetated swale
- 18" CSP downdrains; cable anchored to slope (alternative pipes with minimum Manning's "n" value of 0.024 may be considered)
- Debris basin
- Energy Dissipater (Rock Slope Protection)
- Re-vegetation of side slopes (Hydroseed)
- Best Management Practices (BMPs) for erosion control

Conclusions:

Below is the total flow exiting the watershed through Pipe 2f (see Appendix B and C).

$Q_{total} = 6.06 \text{ cfs (25-year) and } 7.01 \text{ cfs (50-year)}$

Total watershed drainage volumes are existing and are not being increased as a result of proposed improvements.

Below is a summary of the drainage elements for the Avila Beach Site #1 watershed.

Ditches:

Drainage System No.	Drainage Unit	Design Velocity (fps) 25-Year Storm	Design Velocity (fps) 50-Year Storm	Meets SLO County Requirements (3 fps < V < 10 fps)	Q ₂₅ (cfs)	Q ₅₀ (cfs)	Q _{max} (capacity) (cfs)*
1	a	5.05	5.24	Yes	0.63	0.73	64.08
1	e	9.51	9.86	Yes	0.96	1.12	129.47
3	a	4.04	4.18	Yes	0.82	0.95	43.61
2	d	7.69	7.98	Yes	2.13	2.46	74.95
5	a	7.67	7.95	Yes	0.45	0.52	124.96
4	a	6.83	7.08	Yes	1.75	2.02	68.26
6	a	2.98	3.09	No (25 Yr.)/Yes (50 Yr.)	1.09	1.26	26.42

***Note: Ditch flowing full without freeboard.**

Pipes:

Drainage System No.	Drainage Unit	Q Entering Pipe (cfs) 25-Year Storm	Q Entering Pipe (cfs) 50-Year Storm	Required Pipe Size (in) 25-Year Storm	Required Pipe Size (in) 50-Year Storm	Proposed Pipe	Q _{max} (capacity) (cfs)*
1	c	0.63	0.73	4	4	18" CSP	71.25
1	g	0.96	1.12	5	5	18" CSP	66.29
2	b	0.82	0.95	4	4	18" CSP	94.12
2	f	4.97	5.75	9	10	18" CSP	54.61

***Note: Pipe flowing full without freeboard.**

See Appendix C for Drainage System information.

To address potential backwater issues at the junction boxes, we have calculated the energy (Total Head = Depth of Water + $V^2/2g$) in each of the ditches and pipes. Junction box 2c has the biggest energy differential (approximately 4.0 feet for the total of the pipes going in, 1.5 feet for the v-ditch going out). The proposed design solution is to make the junction boxes at least as deep as the larger head of the incoming or outgoing conduit (4.0 feet deep being the largest). Details that will gradually transition (slope to drain) the flow within the box to minimize energy loss will also be incorporated into the box design. Energy calculations are included in Appendix D.

Per the *San Luis Obispo County Public Improvement Plans*, a minimum pipe size of 18" is to be used on all downdrains.

This drainage memorandum documents and supports the data, procedures, and calculations applicable to the drainage design and analysis for the Avila Beach Site #1 project. Recommended improvements include the installation of several downdrains, concrete lined v-ditches, a debris basin, and re-vegetation of side slopes.

Equations:

- Rational Equation:

$$Q = CiA \text{ (FHWA Eqn. 3-1)}$$

Where:

Q : Design discharge in (cfs)

C : Coefficient of runoff (Per County Std. Dwg. H-3a)

i : Average rainfall intensity for the selected frequency and for a duration equal to the time of concentration (in/hr) (Per County Std. Dwg. H-1 and H-4)

A : Drainage Area in acres

- Manning's Equation (solving for velocity):

$$V = (K_U/n) \cdot R^{2/3} \cdot S^{1/2} \text{ (FHWA Eqn. 3-5)}$$

Where:

V : Velocity (fps)

K_U : Units conversion factor (1.49 in English units)

n : Manning's roughness coefficient

R : Hydraulic radius ($R=A/P$)

S : Slope (ft/ft)

- Manning's Equation (solving for hydraulic capacity):

$$Q = (K_Q/n) \cdot D^{2.67} \cdot S_o^{0.50} \text{ (FHWA Eqn. 7-1)}$$

Solving for diameter of pipe (D):

$$D = [(Q \cdot n)/(K_Q \cdot S_o^{0.50})]^{0.375}$$

Where:

D : Mean velocity (fps)

Q : Rate of flow (cfs)

n : Manning's roughness coefficient

K_Q : 0.46 in English units

S_o : Slope (ft/ft)

- Equation from King's Table 7-14

$$Q = (K'/n) \cdot d^{8/3} \cdot s^{1/2}$$

Solving for K':

$$K' = (Q \cdot n)/(d^{8/3} \cdot s^{1/2})$$

Where:

K' : constant

Q : Rate of flow (cfs)

n : Manning's roughness coefficient

d : diameter of channel

s : Slope (ft/ft)

See Appendix D for complete calculations.

References:

Kane Geotech, Inc. (January 2011). *Avila Beach Slope Stabilization Progress Report*.

California Department of Transportation. (2006). *Highway Design Manual, Sixth Edition*.

United States Federal Highway Administration (FHWA). (2008). *Urban Drainage Design Manual – Hydraulic Engineering Circular No. 22, Third Edition*.

San Luis Obispo County, Department of Public Works. (November 2008). *Public Improvement Standards*.

Appendices:

APPENDIX A: Location Map

APPENDIX B: Drainage Subareas Exhibit

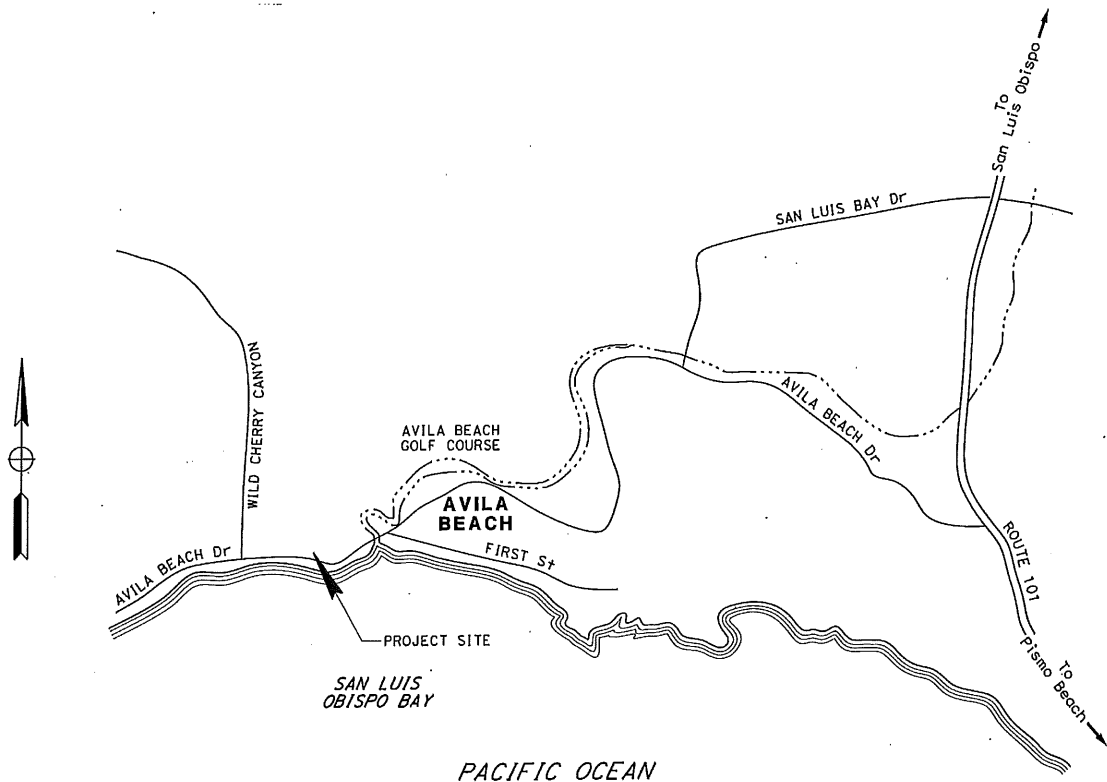
APPENDIX C: Proposed Improvements

APPENDIX D: Calculations

APPENDIX E: Other Assumptions/Resources

APPENDIX A
LOCATION MAP

LOCATION MAP:



PACIFIC OCEAN

NO SCALE

APPENDIX B
DRAINAGE SUBAREAS EXHIBIT

SAN LUIS OBISPO COUNTY DEPARTMENT OF PUBLIC WORKS AVILA BEACH SITE #1	PROJECT ENGINEER	CAROLYN DAVIS	CALCULATED-DESIGNED BY	XXXXXXXXXXXXXXXXXX	REVISOR	XXXXXXXXXX	DATE	XX/XX/XX	XX/XX/XX	XX/XX/XX
	CHECKED BY	XXXXXXXXXXXXXXXXXX	DATE	XX/XX/XX	XXXXXXXXXX	DATE	XX/XX/XX	XX/XX/XX	XX/XX/XX	XX/XX/XX

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
05	SLO	C.R.	XXXXXX	X	X

REGISTERED CIVIL ENGINEER
DATE XX/XX/XX

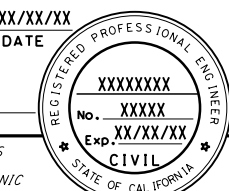
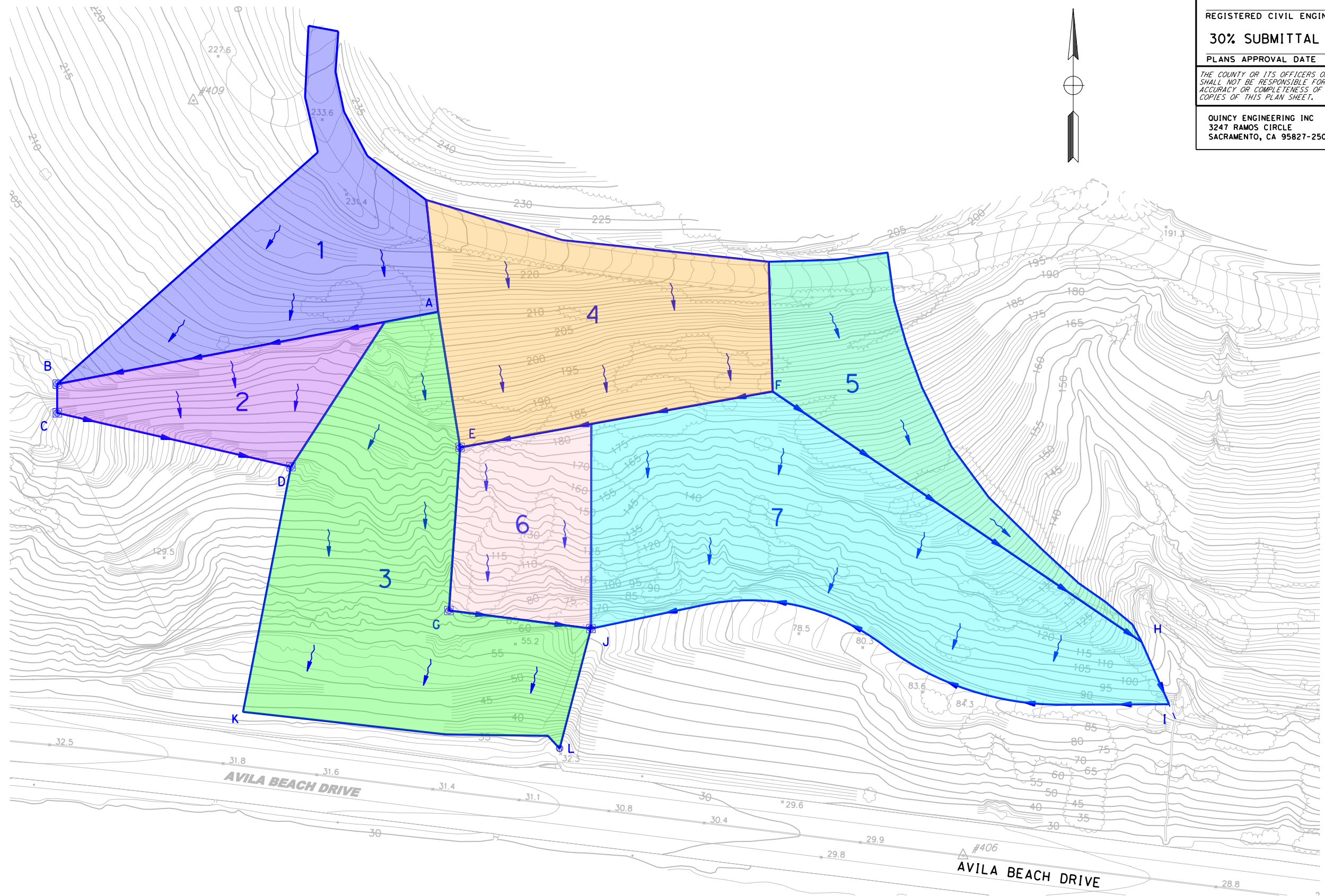
30% SUBMITTAL

PLANS APPROVAL DATE

THE COUNTY OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF ELECTRONIC COPIES OF THIS PLAN SHEET.

QUINCY ENGINEERING INC
3247 RAMOS CIRCLE
SACRAMENTO, CA 95827-2501

COUNTY OF SAN LUIS OBISPO
DEPARTMENT OF PUBLIC WORKS
County Government Center
San Luis Obispo, CA 93408

**AVILA BEACH SITE #1
DRAINAGE SUBAREAS**

NO SCALE

LAST REVISION DATE PLOTTED => 3/4/2011
 TIME PLOTTED => 3:17:13 PM

APPENDIX C
PROPOSED IMPROVEMENTS

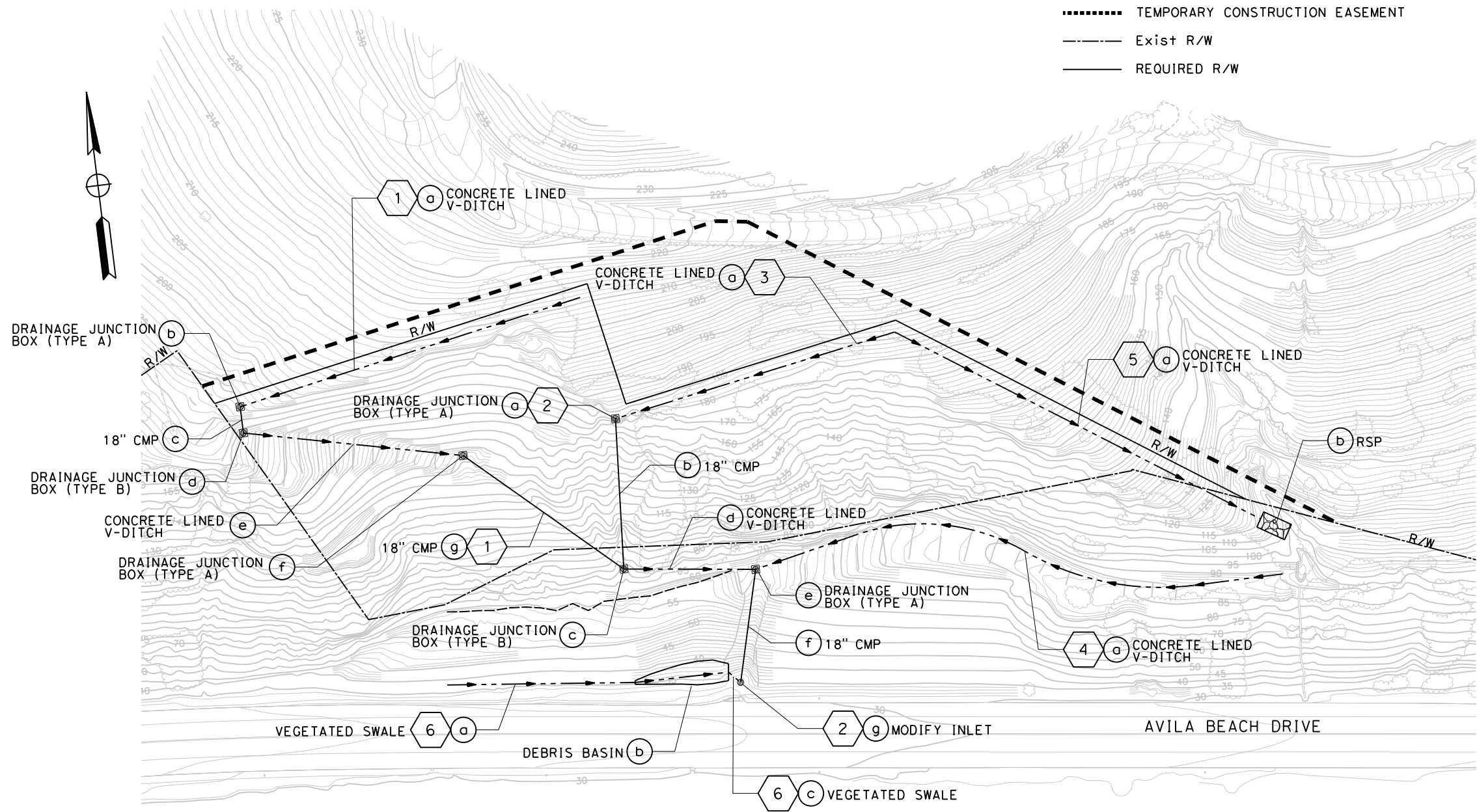
XX	XX	XX	XX	XX	XX
XXXXXXXXXXXXXX	XXXXXXXXXXXXXX	REVISOR	DATE	REVISOR	DATE
CALCULATED-DESIGNED BY	CHECKED BY				
PROJECT ENGINEER	CAROLYN DAVIS				
SAN LUIS OBISPO COUNTY DEPARTMENT OF PUBLIC WORKS					
AVILA BEACH SITE #1					

NOTE:
FOR COMPLETE RIGHT OF WAY AND ACCURATE ACCESS DATA,
SEE RIGHT OF WAY RECORD MAPS AT THE COUNTY OFFICE.

LEGEND:

- XXX DRAINAGE SYSTEM NUMBER
- XX DRAINAGE UNIT NUMBER
- - - - - DITCH/SWALE FL
- ROCK SLOPE PROTECTION
- TEMPORARY CONSTRUCTION EASEMENT
- - - - - Exist R/W
- REQUIRED R/W

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
05	SLO	C.R.	XXXXXX	X	X
			REGISTERED CIVIL ENGINEER	XX/XX/XX	DATE
			30% SUBMITTAL		
			PLANS APPROVAL DATE		
			THE COUNTY OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF ELECTRONIC COPIES OF THIS PLAN SHEET.		
			REGISTERED PROFESSIONAL ENGINEER No. XXXXXX Exp. XX/XX/XX CIVIL STATE OF CALIFORNIA		
			QUINCY ENGINEERING INC 3247 RAMOS CIRCLE SACRAMENTO, CA 95827-2501		
			COUNTY OF SAN LUIS OBISPO DEPARTMENT OF PUBLIC WORKS County Government Center San Luis Obispo, CA 93408		



THIS PLAN ACCURATE FOR DRAINAGE WORK ONLY.

LAYOUT
SCALE: 1"=40'

L-1

APPENDIX D

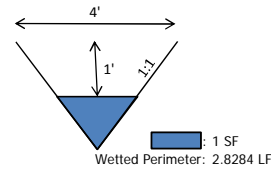
Calculations

Avila Site #1 Drainage Calculations:

Updated 9/13/2011
By: Reimond Garcia

Standards Used: 2008 Public Improvements Standards of San Luis Obispo County Department of Public Works
FHWA Urban Drainage Design Manual - Hydraulic Engineering Circular No. 22, Third Edition
2006 Caltrans Highway Design Manual (HDM), Sixth Edition

Proposed V-Ditch Dimensions:



Assumptions/Standards:

- Due to small area (< 200 Acres), the Rational Method is to be used for Hydraulic Design; County Std. 5.1.1 (B)
- Per County Std. Table 5-1, a 25 year storm should be used; a 10 year storm will also be calculated
- Assume storm duration of 10 min
- Proposed down drain material to be used is 18" CSP
- Use a minimum pipe diameter of 18"
- Mannings "n" value for CSP is 0.024 per FHWA Table 7-1
- K_0 constant is 0.46 for English Units
- Mannings "n" value for a shotcrete lined V-ditch is 0.020 per FHWA Table 3-4
- Assume a 4' wide shotcrete lined V-ditch with 1:1 side slopes
- Minimum/Maximum channel velocities are 3 ft/s and 10 ft/s w/ a freeboard of 1' per County
- K_u constant is 1.49 for English Units
- Use modified FHWA Eqn. 7-1 to solve for Diameter of pipe ($D = [(Qn)/K_0 S_0^{0.5}]^{0.375}$) <- See FHWA Example 7-1
- $R = D/4$ for full flowing pipe

Q/Q_{full}	V/V_{full}
0	0
0.02	0.31
0.07	0.48
0.14	0.61
0.26	0.71
0.41	0.8
0.56	0.88

Calculating Runoff Coefficient:

Per County Std. Dwg. H-3a

Relief:	0.28
Soil Infiltration:	0.04
Vegetal Cover:	0.12
Surface Storage:	0.10
C:	0.54

Intensity Value:

- Per County Std. Dwg. H-1, the average annual precipitation at Avila Beach is approximately 19"/year
- See County Std. Dwg. H-4; Use Table #3

i_{10} :	2.8
i_{25} :	3.2
i_{50} :	3.7

Flow Rates:

See Appendix B for Drainage Areas

Drainage Subarea No.	Area (Acres)	Q_{10} (cfs)	Q_{25} (cfs)	Q_{50} (cfs)
1	0.3662	0.55	0.63	0.73
2	0.1921	0.29	0.33	0.38
3	0.6317	0.96	1.09	1.26
4	0.4733	0.72	0.82	0.95
5	0.2623	0.40	0.45	0.52
6	0.1999	0.30	0.35	0.40
7	0.7501	1.13	1.30	1.50

V-Ditch AB:

Contributing Drainage Areas: 1

Item	10-year storm	25-year storm	50-year storm	
Ditch Width (ft)	4	4	4	
Wetted Perimeter (LF)	2.8284	2.8284	2.8284	<- With 1' freeboard
Wetted Perimeter (LF)	5.6569	5.6569	5.6569	<- At capacity
Wetted XS area of V-ditch (SF)	1	1	1	<- With 1' freeboard
Wetted XS area of V-ditch (SF)	4	4	4	<- At capacity
Design Flow Rate (from Drainage Area 1)	0.55	0.63	0.73	<- Q is from Drainage Area 1 only
Constant K_0	1.49	1.49	1.49	
Manning's "n" for Shotcrete Lined V-Ditch	0.020	0.020	0.020	
Hydraulic Radius <- $R=A/P$	0.35	0.35	0.35	<- With 1' freeboard
Hydraulic Radius <- $R=A/P$	0.71	0.71	0.71	<- At capacity
Slope	0.07	0.07	0.07	
Design V-ditch Depth	0.337	0.354	0.374	
Design V-ditch Wetted Area	0.1133	0.1253	0.1397	
Max Velocity in V-Ditch (ft/s) <- $V=(K_u/n)(R^{2/3})(S^{1/2})$	10.09	10.09	10.09	<- With 1' freeboard
Max Velocity in V-Ditch (ft/s) <- $V=(K_u/n)(R^{2/3})(S^{1/2})$	16.02	16.02	16.02	<- At capacity
Design Velocity of V-Ditch <- $V=Q/A$	4.89	5.05	5.24	
Max Flow Rate in V-Ditch (cfs)	64.08	64.08	64.08	
Design Flow Rate in V-Ditch (cfs)	0.55	0.63	0.73	
V-Ditch Full Area (SF)	4.00	4.00	4.00	
$Q_{max (capacity)} = V_{max} A$ (cfs)	64.08	64.08	64.08	
Minimum Design Velocity of 3 ft/s	Yes	Yes	Yes	
Maximum Design Velocity of 10 ft/s	Yes	Yes	Yes	

Resulting V-Ditch Width: **4' Wide V-Ditch**

Pipe BC:

Contributing Drainage Areas: 1

Item	10-year storm	25-year storm	50-year storm
Q entering Inlet B (cfs)	0.55	0.63	0.73
Manning's "n" for CMP	0.024	0.024	0.024
Constant K_0	0.46	0.46	0.46
Slope between Inlet B and Inlet C (S_0)	0.66	0.66	0.66
Hydraulic Radius <- $R=A/P$ (Assume 18" Pipe)	0.38	0.38	0.38
$V_{max} = (1.49/n)R^{2/3}S^{1/2}$ (ft/s)	26.19	26.19	26.19
Cross Sectional Area of Pipe (Assume 18" Pipe)	2.72	2.72	2.72
$Q_{max (capacity)} = V_{max} A$ (cfs)	71.25	71.25	71.25
$D = [(Qn)/K_0 S_0^{0.5}]^{0.375}$ (ft)	0.29	0.30	0.32

Resulting Pipe Size: **18" CMP** <- Use minimum 18" CMP

V-Ditch CD:

Contributing Drainage Areas: 1, 2

Item	10-year storm	25-year storm	50-year storm	
Ditch Width (ft)	4	4	4	
Wetted Perimeter (LF)	2.8284	2.8284	2.8284	<- With 1' freeboard
Wetted Perimeter (LF)	5.6569	5.6569	5.6569	<- At capacity
Wetted XS area of V-ditch (SF)	1	1	1	<- With 1' freeboard
Wetted XS area of V-ditch (SF)	4	4	4	<- At capacity
Design Flow Rate (from Drainage Areas 1&2)	0.84	0.96	1.12	<- Q is from Drainage Areas 1&2 only
Constant K_0	1.49	1.49	1.49	
Manning's "n" for Shotcrete Lined V-Ditch	0.020	0.020	0.020	
Hydraulic Radius <- $R=A/P$	0.35	0.35	0.35	<- With 1' freeboard
Hydraulic Radius <- $R=A/P$	0.71	0.71	0.71	<- At capacity
Slope	0.30	0.30	0.30	
Design V-ditch Depth	0.303	0.318	0.336	
Design V-ditch Wetted Area	0.0918	0.1014	0.1131	
Max Velocity in V-Ditch (ft/s) <- $V=(K_u/n)(R^{2/3})(S^{1/2})$	20.39	20.39	20.39	<- With 1' freeboard
Max Velocity in V-Ditch (ft/s) <- $V=(K_u/n)(R^{2/3})(S^{1/2})$	32.37	32.37	32.37	<- At capacity
Design Velocity of V-Ditch <- $V=Q/A$	9.20	9.51	9.86	
Max Flow Rate in V-Ditch (cfs)	20.39	20.39	20.39	
Design Flow Rate in V-Ditch (cfs)	0.84	0.96	1.12	
V-Ditch Full Area (SF)	4.00	4.00	4.00	
$Q_{max (capacity)} = V_{max} A$ (cfs)	129.47	129.47	129.47	
Minimum Design Velocity of 3 ft/s	Yes	Yes	Yes	
Maximum Design Velocity of 10 ft/s	Yes	Yes	Yes	

Resulting V-Ditch Width: **4' Wide V-Ditch**

Pipe DG:

Contributing Drainage Areas: 1,2

Item	10-year storm	25-year storm	50-year storm
Q entering Inlet D (cfs)	0.84	0.96	1.12
Manning's "n" for CMP	0.024	0.024	0.024
Constant K_0	0.46	0.46	0.46
Slope between Inlet D and Inlet G (S_0)	0.57	0.57	0.57
Hydraulic Radius <- $R=A/P$ (Assume 18" Pipe)	0.38	0.38	0.38
$V_{max} = (1.49/n)R^{2/3}S^{1/2}$ (ft/s)	24.37	24.37	24.37
Cross Sectional Area of Pipe (Assume 18" Pipe)	2.72	2.72	2.72
$Q_{max (capacity)} = V_{max} A$ (cfs)	66.29	66.29	66.29
$D = [(Qn)/K_0 S_0^{0.5}]^{0.375}$ (ft)	0.34	0.36	0.38

Resulting Pipe Size: **18" CMP** <- Use minimum 18" CMP

V-Ditch FE:

Contributing Drainage Areas: 4

Item	10-year storm	25-year storm	50-year storm	
Ditch Width (ft)	4	4	4	
Wetted Perimeter (LF)	2.8284	2.8284	2.8284	<- With 1' freeboard
Wetted Perimeter (LF)	5.6569	5.6569	5.6569	<- At capacity
Wetted XS area of V-ditch (SF)	1	1	1	<- With 1' freeboard
Wetted XS area of V-ditch (SF)	4	4	4	<- At capacity
Design Flow Rate (from Drainage Area 4)	0.72	0.82	0.95	<- Q is from Drainage Area 4 only
Constant K_0	1.49	1.49	1.49	
Manning's "n" for Shotcrete Lined V-Ditch	0.020	0.020	0.020	
Hydraulic Radius <- $R=A/P$	0.35	0.35	0.35	<- With 1' freeboard
Hydraulic Radius <- $R=A/P$	0.71	0.71	0.71	<- At capacity
Slope	0.03	0.03	0.03	
Design V-ditch Depth	0.428	0.450	0.475	
Design V-ditch Wetted Area	0.1834	0.2027	0.2260	
Max Velocity in V-Ditch (ft/s) <- $V=(K_u/n)(R^{2/3})(S^{1/2})$	6.87	6.87	6.87	<- With 1' freeboard
Max Velocity in V-Ditch (ft/s) <- $V=(K_u/n)(R^{2/3})(S^{1/2})$	10.90	10.90	10.90	<- At capacity
Design Velocity of V-Ditch <- $V=Q/A$	3.90	4.04	4.18	
Max Flow Rate in V-Ditch (cfs)	6.87	6.87	6.87	
Design Flow Rate in V-Ditch (cfs)	0.72	0.82	0.95	
V-Ditch Full Area (SF)	4.00	4.00	4.00	
$Q_{max (capacity)} = V_{max} A$ (cfs)	43.61	43.61	43.61	
Minimum Design Velocity of 3 ft/s	Yes	Yes	Yes	
Maximum Design Velocity of 10 ft/s	Yes	Yes	Yes	

Resulting V-Ditch Width: **4' Wide V-Ditch**

Pipe EG:

Contributing Drainage Areas: 4

Item	10-year storm	25-year storm	50-year storm
Q entering Inlet D (cfs)	0.72	0.82	0.95

Manning's "n" for CMP	0.024	0.024	0.024
Constant K_o	0.46	0.46	0.46
Slope between Inlet D and Inlet G (S_o)	1.15	1.15	1.15
Hydraulic Radius <- R=A/P (Assume 18" Pipe)	0.38	0.38	0.38
$V_{max}=(1.49/n)R^{2/3}S^{1/2}$ (ft/s)	34.59	34.59	34.59
Cross Sectional Area of Pipe (Assume 18" Pipe)	2.72	2.72	2.72
$Q_{max (capacity)}=V_{max}A$ (cfs)	94.12	94.12	94.12
$D=[(Qn)/K_o S_o^{0.5}]^{0.375}$ (ft)	0.28	0.30	0.32

Resulting Pipe Size: **18" CMP** <- Use minimum 18" CMP

V-Ditch GJ:

Contributing Drainage Areas: 1,2,4,6

Item	10-year storm	25-year storm	50-year storm	
Ditch Width (ft)	4	4	4	
Wetted Perimeter (LF)	2.8284	2.8284	2.8284	<- With 1' freeboard
Wetted Perimeter (LF)	5.6569	5.6569	5.6569	<- At capacity
Wetted XS area of V-ditch (SF)	1	1	1	<- With 1' freeboard
Wetted XS area of V-ditch (SF)	4	4	4	<- At capacity
Design Flow Rate (from Drainage Areas 1,2,4,6)	1.86	2.13	2.46	<- Q is from Drainage Areas 1,2,4,6
Constant K_u	1.49	1.49	1.49	
Manning's "n" for Shotcrete Lined V-Ditch	0.020	0.020	0.020	
Hydraulic Radius <- R=A/P	0.35	0.35	0.35	<- With 1' freeboard
Hydraulic Radius <- R=A/P	0.71	0.71	0.71	<- At capacity
Slope	0.10	0.10	0.10	
Design V-ditch Depth	0.500	0.526	0.555	
Design V-ditch Wetted Area	0.2503	0.2766	0.3084	
Max Velocity in V-Ditch (ft/s) <- $V=(K_u/n)(R^{2/3})(S^{1/2})$	11.80	11.80	11.80	<- With 1' freeboard
Max Velocity in V-Ditch (ft/s) <- $V=(K_u/n)(R^{2/3})(S^{1/2})$	18.74	18.74	18.74	<- At capacity
Design Velocity of V-Ditch <- $V=Q/A$	7.44	7.69	7.98	
Max Flow Rate in V-Ditch (cfs)	11.80	11.80	11.80	
Design Flow Rate in V-Ditch (cfs)	1.86	2.13	2.46	
V-Ditch Full Area (SF)	4.00	4.00	4.00	
$Q_{max (capacity)}=V_{max}A$ (cfs)	74.95	74.95	74.95	
Minimum Design Velocity of 3 ft/s	Yes	Yes	Yes	
Maximum Design Velocity of 10 ft/s	Yes	Yes	Yes	

Resulting V-Ditch Width: **4' Wide V-Ditch**

V-Ditch FH:

Contributing Drainage Areas: 5

Item	10-year storm	25-year storm	50-year storm	
Ditch Width (ft)	4	4	4	
Wetted Perimeter (LF)	2.8284	2.8284	2.8284	<- With 1' freeboard
Wetted Perimeter (LF)	5.6569	5.6569	5.6569	<- At capacity
Wetted XS area of V-ditch (SF)	1	1	1	<- With 1' freeboard
Wetted XS area of V-ditch (SF)	4	4	4	<- At capacity
Design Flow Rate (from Drainage Area 5)	0.40	0.45	0.52	<- Q is from Drainage Area 5 only
Constant K_u	1.49	1.49	1.49	
Manning's "n" for Shotcrete Lined V-Ditch	0.020	0.020	0.020	
Hydraulic Radius <- R=A/P	0.35	0.35	0.35	<- With 1' freeboard
Hydraulic Radius <- R=A/P	0.71	0.71	0.71	<- At capacity
Slope	0.28	0.28	0.28	
Design V-ditch Depth	0.231	0.243	0.257	
Design V-ditch Wetted Area	0.0535	0.0591	0.0659	
Max Velocity in V-Ditch (ft/s) <- $V=(K_u/n)(R^{2/3})(S^{1/2})$	19.68	19.68	19.68	<- With 1' freeboard
Max Velocity in V-Ditch (ft/s) <- $V=(K_u/n)(R^{2/3})(S^{1/2})$	31.24	31.24	31.24	<- At capacity
Design Velocity of V-Ditch <- $V=Q/A$	7.42	7.67	7.95	
Max Flow Rate in V-Ditch (cfs)	19.68	19.68	19.68	
Design Flow Rate in V-Ditch (cfs)	0.40	0.45	0.52	
V-Ditch Full Area (SF)	4.00	4.00	4.00	
$Q_{max (capacity)}=V_{max}A$ (cfs)	124.96	124.96	124.96	
Minimum Design Velocity of 3 ft/s	Yes	Yes	Yes	
Maximum Design Velocity of 10 ft/s	Yes	Yes	Yes	

Resulting V-Ditch Width: **4' Wide V-Ditch**

V-Ditch IJ:

Contributing Drainage Areas: 5,7

Item	10-year storm	25-year storm	50-year storm	
Ditch Width (ft)	4	4	4	
Wetted Perimeter (LF)	2.8284	2.8284	2.8284	<- With 1' freeboard
Wetted Perimeter (LF)	5.6569	5.6569	5.6569	<- At capacity
Wetted XS area of V-ditch (SF)	1	1	1	<- With 1' freeboard
Wetted XS area of V-ditch (SF)	4	4	4	<- At capacity
Design Flow Rate (from Drainage Areas 5&7)	1.53	1.75	2.02	<- Q is from Drainage Areas 5&7 only
Constant K_u	1.49	1.49	1.49	
Manning's "n" for Shotcrete Lined V-Ditch	0.020	0.020	0.020	
Hydraulic Radius <- R=A/P	0.35	0.35	0.35	<- With 1' freeboard
Hydraulic Radius <- R=A/P	0.71	0.71	0.71	<- At capacity
Slope	0.08	0.08	0.08	
Design V-ditch Depth	0.481	0.506	0.534	
Design V-ditch Wetted Area	0.2317	0.2562	0.2856	
Max Velocity in V-Ditch (ft/s) <- $V=(K_u/n)(R^{2/3})(S^{1/2})$	10.75	10.75	10.75	<- With 1' freeboard
Max Velocity in V-Ditch (ft/s) <- $V=(K_u/n)(R^{2/3})(S^{1/2})$	17.07	17.07	17.07	<- At capacity
Design Velocity of V-Ditch <- $V=Q/A$	6.61	6.83	7.08	
Max Flow Rate in V-Ditch (cfs)	10.75	10.75	10.75	
Design Flow Rate in V-Ditch (cfs)	1.53	1.75	2.02	
V-Ditch Full Area (SF)	4.00	4.00	4.00	
$Q_{max (capacity)}=V_{max}A$ (cfs)	68.26	68.26	68.26	
Minimum Design Velocity of 3 ft/s	Yes	Yes	Yes	
Maximum Design Velocity of 10 ft/s	Yes	Yes	Yes	

Resulting V-Ditch Width: **4' Wide V-Ditch**

V-Ditch KL:

Contributing Drainage Areas: 3

Item	10-year storm	25-year storm	50-year storm	
Ditch Width (ft)	4	4	4	
Wetted Perimeter (LF)	2.8284	2.8284	2.8284	<- With 1' freeboard
Wetted Perimeter (LF)	5.6569	5.6569	5.6569	<- At capacity
Wetted XS area of V-ditch (SF)	1	1	1	<- With 1' freeboard
Wetted XS area of V-ditch (SF)	4	4	4	<- At capacity
Design Flow Rate (from Drainage Area 3)	0.96	1.09	1.26	<- Q is from Drainage Area 3 only
Constant K_u	1.49	1.49	1.49	
Manning's "n" for Vegetated V-Ditch	0.030	0.030	0.030	Vegetal lining increased the "n" value to 0.03
Hydraulic Radius <- R=A/P	0.35	0.35	0.35	<- With 1' freeboard
Hydraulic Radius <- R=A/P	0.71	0.71	0.71	<- At capacity
Slope	0.03	0.03	0.03	
Design V-ditch Depth	0.576	0.605	0.639	
Design V-ditch Wetted Area	0.3315	0.3665	0.4086	
Max Velocity in V-Ditch (ft/s) <- $V=(K_u/n)(R^{2/3})(S^{1/2})$	4.16	4.16	4.16	<- With 1' freeboard
Max Velocity in V-Ditch (ft/s) <- $V=(K_u/n)(R^{2/3})(S^{1/2})$	6.61	6.61	6.61	<- At capacity
Design Velocity of V-Ditch <- $V=Q/A$	2.88	2.98	3.09	
Max Flow Rate in V-Ditch (cfs)	4.16	4.16	4.16	
Design Flow Rate in V-Ditch (cfs)	0.96	1.09	1.26	
V-Ditch Full Area (SF)	4.00	4.00	4.00	
$Q_{max (capacity)}=V_{max}A$ (cfs)	26.42	26.42	26.42	
Minimum Design Velocity of 3 ft/s	No	No	Yes	
Maximum Design Velocity of 10 ft/s	Yes	Yes	Yes	

Resulting V-Ditch Width: **4' Wide V-Ditch**

Pipe JL:

Contributing Drainage Areas: 1,2,3,4,5,6,7

Item	10-year storm	25-year storm	50-year storm	
Q entering Inlet J (cfs)	4.35	4.97	5.75	
Manning's "n" for CMP	0.024	0.024	0.024	
Constant K_o	0.46	0.46	0.46	
Slope between Inlet J and Outfall (S_o)	0.39	0.39	0.39	
Hydraulic Radius <- R=A/P (Assume 18" Pipe)	0.38	0.38	0.38	
$V_{max}=(1.49/n)R^{2/3}S^{1/2}$ (ft/s)	20.07	20.07	20.07	
Cross Sectional Area of Pipe (Assume 18" Pipe)	2.72	2.72	2.72	
$Q_{max (capacity)}=V_{max}A$ (cfs)	54.61	54.61	54.61	
$D=[(Qn)/K_o S_o^{0.5}]^{0.375}$ (ft)	0.69	0.72	0.76	

Resulting Pipe Size: **18" CMP** <- Use minimum 18" CMP

Avila Site #1 Energy Calculations at Junction Boxes:

Updated 9/14/2011 by C. Davis

Drainage Unit Description			Depth of Flow (d) - ft	Velocity (V) - ft/sec	Velocity Head ($V^2/2g$) - ft	Total Head ($H = (d + V^2/2g)$) ft	Head In - ft	Head Out - ft	Minimum Design Depth of Junction Box*
1	a	v-ditch	0.37	5.24	0.43	0.80			
1	b	box					0.80	1.54	1.54
1	c	18" pipe	0.14	9.50	1.40	1.54			
1	d	box					1.54	1.85	1.85
1	e	v-ditch	0.34	9.86	1.51	1.85			
1	f	box					1.85	1.46	1.85
1	g	18" pipe	0.18	9.07	1.28	1.46			
3	a	v-ditch	0.48	4.18	0.27	0.75			
2	a	box					0.75	2.52	2.52
2	b	18" pipe	0.14	12.39	2.38	2.52			
1	g	18" pipe	0.18	9.07	1.28	1.46			
2	b	18" pipe	0.14	12.39	2.38	2.52			
2	c	box					3.98	1.54	3.98
2	d	v-ditch	0.56	7.98	0.99	1.54			
2	d	v-ditch	0.56	7.98	0.99	1.54			
4	a	v-ditch	0.53	7.08	0.78	1.31			
2	e	box					2.86	3.30	3.30
2	f	18" pipe	0.42	13.61	2.88	3.30			

* Inside of Box will be a minimum depth of 4' unless design depth is greater
 Velocity and depth of flow for Pipes Hand calculated using King's Tables

QUINCY ENGINEERING, INC.

Project SLO STORM REPAIR

Description AVILA SITE #1 - PIPE VELOCITIES
(25-YEAR STORM)

Job No. _____

By RHG

Date 9/12/11

SHEET

4

PIPE FC (25-YEAR STORM):

$$k' = \frac{Qn}{d^{8/3} s^{1/2}} \quad \leftarrow \text{KINGS TABLE 7-14}$$

$$k' = \frac{(0.63 \text{ cfs})(0.024)}{(1.5 \text{ ft})^{8/3} (0.66)^{1/2}} =$$

$$k' = 0.00681$$

KINGS TABLE 7-14:

$$P/d = .08$$

D = DEPTH OF CHANNEL

d = DIAMETER OF PIPE

$$D = (0.08)(1.5) = 0.12' = 1.44''$$

W/ DEPTH OF 1.44", WETTED AREA = 0.0662 SF

$$v = Q/A = 0.63 / 0.0662 = 9.51 \text{ ft/s}$$

$$\underline{v_{FC} = 9.51 \text{ ft/s}}$$

QUINCY ENGINEERING, INC.

Project _____

Description _____

Job No. _____

By _____ Date _____

SHEET
2/4

PIPE DG (25-YEAR STORM):

$$k' = \frac{(0.96)(0.024)}{(1.5)^{2/3}(0.57)^{1/2}}$$

$$k' = 0.0104$$

KING'S TABLE 7-14:

$$D/d = 0.11$$

$$D = (0.11)(1.5) = 0.165' = 1.98''$$

W/ DEPTH OF 1.98", WETTED AREA = 0.1058 SF

$$V = Q/A = 0.96 / 0.1058 = 9.07 \text{ ft/c}$$

$$V_{DG} = 9.07 \text{ ft/s}$$

QUINCY ENGINEERING, INC.

Project _____

Description _____

Job No. _____

By _____ Date _____

SHEET
3/4

PIPE EG (25-YEAR STORM)

$$k' = \frac{(0.82)(0.024)}{(1.5)^{0.12}(1.15)^{0.12}}$$

$$k' = 0.006$$

KING'S TABLE 7-14:

$$D/d = 0.08$$

$$D = (0.08)(1.5) = 0.12' = 1.44''$$

w/ DEPTH OF 1.44", WETTED AREA = 0.0662 SF

$$v = Q/A = 0.82 / 0.0662 = 12.39 \text{ ft/s}$$

$$\underline{v_{EG} = 12.39 \text{ ft/s}}$$

QUINCY ENGINEERING, INC.

Project _____

Description _____

Job No. _____

By _____ Date _____

SHEET
4/4

PIPE JL (25-YEAR STORM)

$$K' = \frac{(4.97)(0.024)}{(1.5)^{8/3}(0.39)^{1/2}}$$

$$K' = 0.0648$$

KING'S TABLE 7-14:

$$P/d = 0.26$$

$$D = (0.26)(1.5) = 0.39 = 4.68''$$

W/DEPTH OF 4.68'', WETTED AREA = 0.2651 SF

$$V = Q/A = 4.97 / 0.2651 = 13.61 \text{ ft/s}$$

$$\underline{V_{JL} = 13.61 \text{ ft/s}}$$

QUINCY ENGINEERING, INC.

Project SLO STORM REPAIR

Description AVILA SITE #1 - PIPE VELOCITIES

Job No. _____

(50-YEAR STORM)

By RHG Date 9/14/11

SHEET

4

PIPE RC (50-YEAR STORM):

$$k' = \frac{Q_n}{d^{8/3} s^{1/2}} \quad \leftarrow \text{KING'S TABLE 7-14}$$

$$k' = \frac{(0.73)(0.024)}{(1.5)^{8/3} (0.66)^{1/2}}$$

$$k' = 0.00731$$

KING'S TABLE 7-14

$$D/d = 0.09$$

D = DEPTH OF CHANNEL

d = DIAMETER OF PIPE

$$D = (0.09)(1.5) = 0.135' = 1.62''$$

w/ DEPTH OF 1.62'', WETTED AREA = 0.0788 SF

$$V = Q/A = 0.73 / 0.0788 = 9.26 \text{ ft/s}$$

$$V_{RC} = 9.26 \text{ ft/s}$$

QUINCY ENGINEERING, INC.

Project _____

Description _____

Job No. _____

By _____ Date _____

SHEET
2/4

PIPE DG (50-YEAR STORM):

$$K' = \frac{(1.12)(0.024)}{(1.5)^{8/3}(0.57)^{1/2}}$$

$$K' = 0.0121$$

KING'S TABLE 7-14

$$D/d = 0.12$$

$$D = (0.12)(1.5) = 0.18' = 2.16''$$

W/ DEPTH OF 2.16", WETTED AREA = 0.1201 CF

$$V = Q/A = 1.12 / 0.1201 = 9.33 \text{ ft/s}$$

$$\underline{V_{PG} = 9.33 \text{ ft/s}}$$

QUINCY ENGINEERING, INC.

Project _____

Description _____

Job No. _____

By _____ Date _____

SHEET
3/4

PIPE EG (50-YEAR STORM):

$$K' = \frac{(0.95)(0.024)}{(1.5)^{8/3} (1.15)^{1/2}}$$

$$K' = 0.00721$$

KING'S TABLE 7-14:

$$D/d = 0.09$$

$$D = (0.09)(1.5) = 0.135' = 1.62''$$

w/ DEPTH OF 1.62", WETTED AREA = 0.0788 SF

$$V = Q/A = 0.95 / 0.0788 = 12.06 \text{ ft/s}$$

$$V_{EG} = 12.06 \text{ ft/s}$$

QUINCY ENGINEERING, INC.

Project _____

Description _____

Job No. _____

By _____ Date _____

SHEET
4/4

PIPE JL (50-YEAR STORM).

$$k' = \frac{(5.75)(0.024)}{(1.5)^{2/3}(0.39)^{1/2}}$$

$$k' = 0.0749$$

KINGS TABLE 7-14

$$D/d = 0.28$$

$$D = (0.28)(1.5) = 0.42' = 5.04''$$

w/ DEPTH OF 5.04'', WETTED AREA = 0.405 SF

$$V = Q/A = 575 / 0.405 = 14.20 \text{ ft/s}$$

$$\underline{V_{JL} = 14.20 \text{ ft/s}}$$

QUINCY ENGINEERING, INC.

Project CLO STORM DAMAGE

Description AVILA SITE #1 - RSP CALCULATIONS

Job No. _____

TOP DRAINAGE ELEMENT E6

By RHS Date 9/14/11

SHEET
3

DRAINAGE ELEMENT E6

50-YEAR OUTLET VELOCITY, $V_{50} = 7.95 \text{ ft/s}$

CULVERT SIZE = 1.5 ft

Rock Sizing:

N.K. DEPPY EQUATION:

$$d = 0.0126 V^2$$

$$= 0.0126 (7.95)^2$$

$$= 0.796' = 9.56''$$

PER USER EM-25; USE 40 lb STONES

40 lb Rock

CALTRANS BANK & SHOPE EQUATION:

$$\text{ROCK WEIGHT (W)} = 0.0000568 V^6$$

$$= 0.0000568 (7.95)^6$$

$$= 14.34 \text{ LBS}$$

15 lb Rock

QUINCY ENGINEERING, INC.

Project _____ Description _____
 Job No. _____
 By _____ Date _____

SHEET
2 / 3

EQUATION DERIVED FROM HEC 14 (1975):

$$D = 0.0066V^2 - 0.00001V - 0.0348$$

D = NOMINAL STONE DIAMETER (ft)

V = OUTLET VELOCITY (ft/s)

$$D = 0.0066(7.95)^2 - 0.00001(7.95) - 0.0348$$

$$= 0.344' = 4.13''$$

PER EM-25, USE 9lb STONES

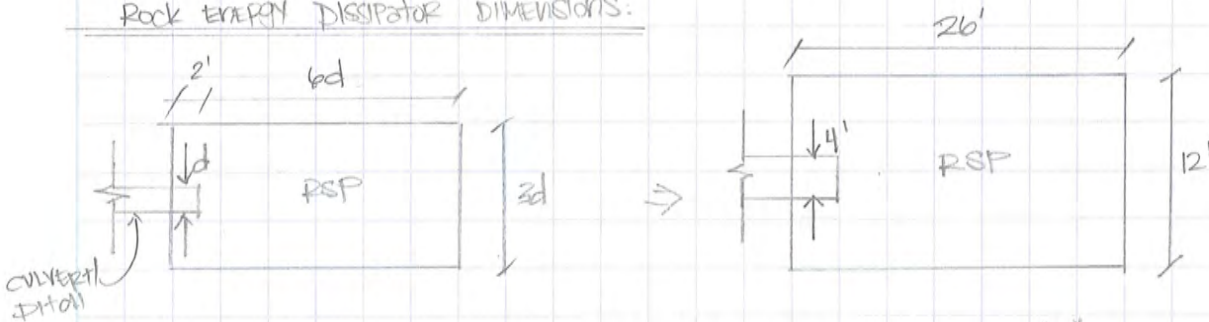
9 lb Rock

STABLE ROCK WEIGHT ⇒ ASSUME 40 lb

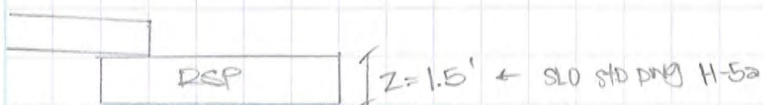
PER SLO COUNTY DWG. H-52, USE 75 lb ROCK

USE 75 lb ROCK

ROCK ENERGY DISSIPATOR DIMENSIONS:

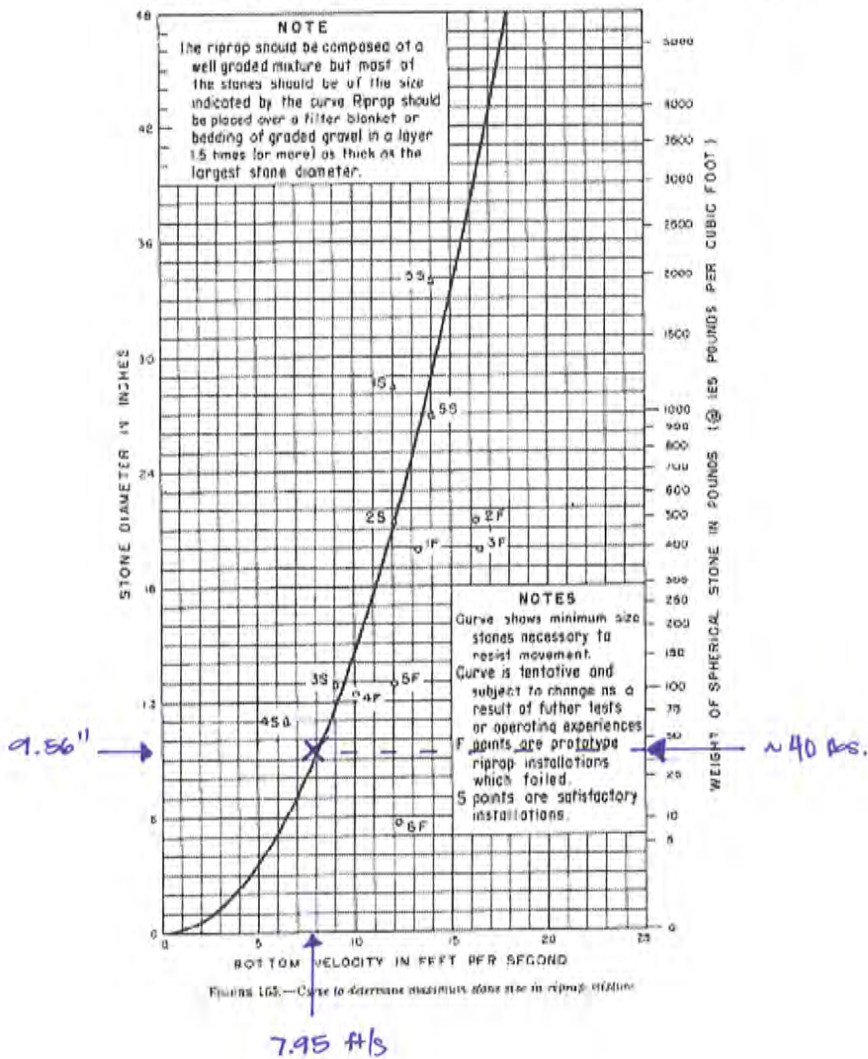


* NOTE = IT IS ASSUMED DITCH WIDTH IS EQUAL TO DIMENSION "d".



SIZE OF RIPRAP TO BE USED DOWNSTREAM FROM STILLING BASINS

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APPENDIX E

Other Assumptions

Table 3-4. Values of Manning's Coefficient (n) for Channels and Pipes⁽¹⁵⁾.

Conduit Material	Manning's n*
Closed Conduits	
Asbestos-cement pipe	0.011 - 0.015
Brick	0.013 - 0.017
Cast iron pipe	
Cement-lined and seal coated	0.011 - 0.015
Concrete (monolithic)	0.012 - 0.014
Concrete pipe	0.011 - 0.015
Corrugated-metal pipe - 13 mm by 64 mm (½ inch by 2 ½ inch) corrugations	
Plain	0.022 - 0.026
Paved invert	0.018 - 0.022
Spun asphalt lines	0.011 - 0.015
Plastic pipe (smooth)	0.011 - 0.015
Vitrified clay	
Pipes	0.011 - 0.015
Liner plates	0.013 - 0.017
Open Channels	
Lined channels	
Asphalt	0.013 - 0.017
Brick	0.012 - 0.018
Concrete	0.011 - 0.020
Rubble or riprap	0.020 - 0.035
Vegetal	0.030 - 0.400
Excavated or dredged	
Earth, straight and uniform	0.020 - 0.030
Earth, winding, fairly uniform	0.025 - 0.040
Rock	0.030 - 0.045
Unmaintained	0.050 - 0.140
Natural channels (minor streams, top width at flood stage <30 m (100 ft))	
Fairly regular section	0.030 - 0.070
Irregular section with pools	0.040 - 0.100
*Lower values are usually for well-constructed and maintained (smoother) pipes and channels.	

Table 7-1. Manning's Coefficients for Storm Drain Conduits^{*(2)}

Type of Culvert	Roughness or Corrugation	Manning's n
Concrete Pipe	Smooth	0.010-0.011
Concrete Boxes	Smooth	0.012-0.015
Spiral Rib Metal Pipe	Smooth	0.012-0.013
Corrugated Metal Pipe, Pipe-Arch and Box (Annular or Helical Corrugations -- see Figure B-3 in Reference 2, Manning's n varies with barrel size)	68 by 13 mm 2-2/3 by 1/2 in Annular	0.022-0.027
	68 by 13 mm 2-2/3 by 1/2 in Helical	0.011-0.023
	150 by 25 mm 6 by 1 in Helical	0.022-0.025
	125 by 25 mm 5 by 1 in	0.025-0.026
	75 by 25 mm 3 by 1 in	0.027-0.028
	150 by 50 mm 6 by 2 in Structural Plate	0.033-0.035
	230 by 64 mm 9 by 2-1/2 in Structural Plate	0.033-0.037
Corrugated Polyethylene	Smooth	0.009-0.015
Corrugated Polyethylene	Corrugated	0.018-0.025
Polyvinyl chloride (PVC)	Smooth	0.009-0.011

*NOTE: The Manning's n values indicated in this table were obtained in the laboratory and are supported by the provided reference. Actual field values for culverts may vary depending on the effect of abrasion, corrosion, deflection, and joint conditions.

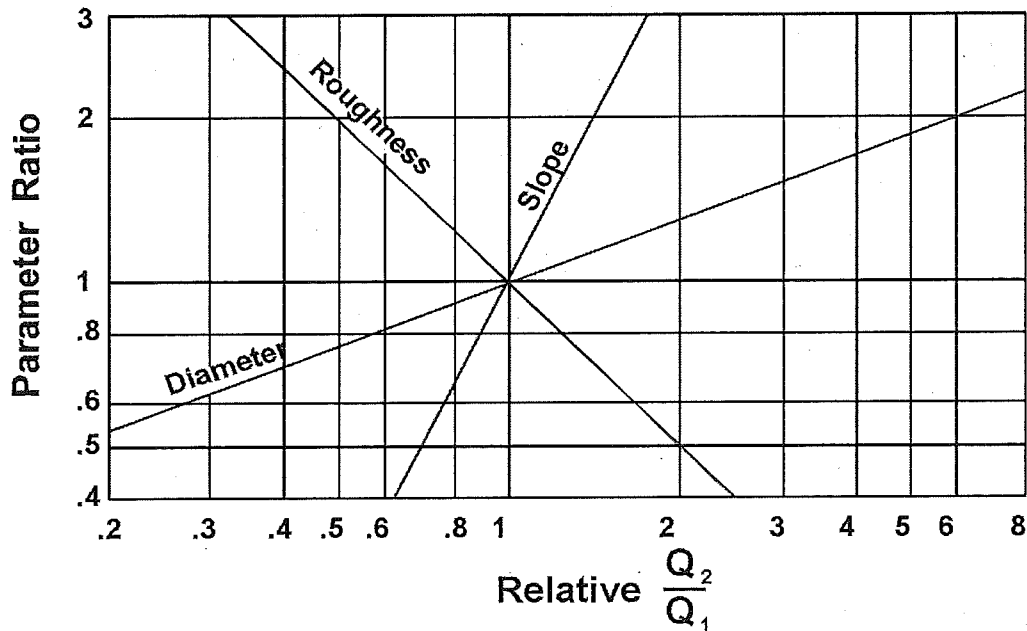


Figure 7-1. Storm drain capacity sensitivity.

Table 7-2. Increase in Capacity of Alternate Conduit Shapes Based on a Circular Pipe with the Same Height.

	Area (Percent Increase)	Conveyance (Percent Increase)
Circular	--	--
Oval	63	87
Arch	57	78
Box (B = D)	27	27

→ **Example 7-1**

Given: $Q = 0.50 \text{ m}^3/\text{s}$ (17.6 ft^3/s)
 $S_o = 0.015 \text{ m/m}$ (ft/ft)

Find: The pipe diameter needed to convey the indicated design flow. Consider use of both concrete and helical corrugated metal pipes.

Solution:

SI Units

(1) Concrete pipe

Using equation 7-1 or chart 25 with $n = 0.013$ for concrete

$$D = [(Q n)/(K_Q S_o^{0.5})]^{0.375}$$
$$D = [(0.50)(0.013)/\{(0.312)(0.015)^{0.5}\}]^{0.375}$$
$$D = 0.514 \text{ m} = 514 \text{ mm}$$

Use $D = 530 \text{ mm}$ diameter standard pipe size.

(2) Helical corrugated metal pipe.

Using equation 7-1 or chart 25
Assume $n = 0.017$

$$D = [(Q n)/(K_Q S_o^{0.5})]^{0.375}$$
$$D = [(0.50)(0.017)/\{(0.312)(0.015)^{0.5}\}]^{0.375}$$
$$D = 0.569 \text{ m} = 569 \text{ mm}$$

Use $D = 610 \text{ mm}$ diameter standard size.
(Note: The n value for 610 mm = 0.017. The pipe size and n value must coincide as shown in table 7-1.)

English Units

(1) Concrete pipe

Using equation 7-1 or chart 25 with $n = 0.013$ for concrete

$$D = [(Q n)/(K_Q S_o^{0.5})]^{0.375}$$
$$D = [(17.6)(0.013)/\{(0.46)(0.015)^{0.5}\}]^{0.375}$$
$$D = 1.69 \text{ ft.} = (20.3 \text{ in})$$

Use $D = 21 \text{ in}$ diameter standard pipe size.

(2) Helical corrugated metal pipe.

Using equation 7-1 or chart 25
Assume $n = 0.017$

$$D = [(Q n)/(K_Q S_o^{0.5})]^{0.375}$$
$$D = [(17.6)(0.017)/\{(0.46)(0.015)^{0.5}\}]^{0.375}$$
$$D = 1.87 \text{ ft} = 22.4 \text{ in}$$

Use $D = 24 \text{ in}$ diameter standard size. (Note: The n value for 24 in = 0.017. The pipe size and n value must coincide as shown in table 7-1.)

Example 7-2

Given: The concrete and helical corrugated metal pipes in example 7-1.

Find: The full flow pipe capacity and velocity.

Solution: Use equation 7-1 or chart 25.

SI Units

(1) Concrete pipe

$$Q = (K_Q/n) D^{2.67} S_o^{0.5}$$
$$Q = (0.312)/(0.013) (0.530)^{2.67} (0.015)^{0.5}$$
$$Q = 0.54 \text{ m}^3/\text{s}$$

$$V = (K_V/n) D^{0.67} S_o^{0.5}$$
$$V = (0.397)/(0.013) (0.530)^{0.67} (0.015)^{0.5}$$
$$V = 2.44 \text{ m/s}$$

English Units

(1) Concrete pipe

$$Q = (K_Q/n) D^{2.67} S_o^{0.5}$$
$$Q = (0.46)/(0.013) (1.75)^{2.67} (0.015)^{0.5}$$
$$Q = 19.3 \text{ ft}^3/\text{s}$$

$$V = (K_V/n) D^{0.67} S_o^{0.5}$$
$$V = (0.59)/(0.013) (1.75)^{0.67} (0.015)^{0.5}$$
$$V = 8.0 \text{ ft/s}$$

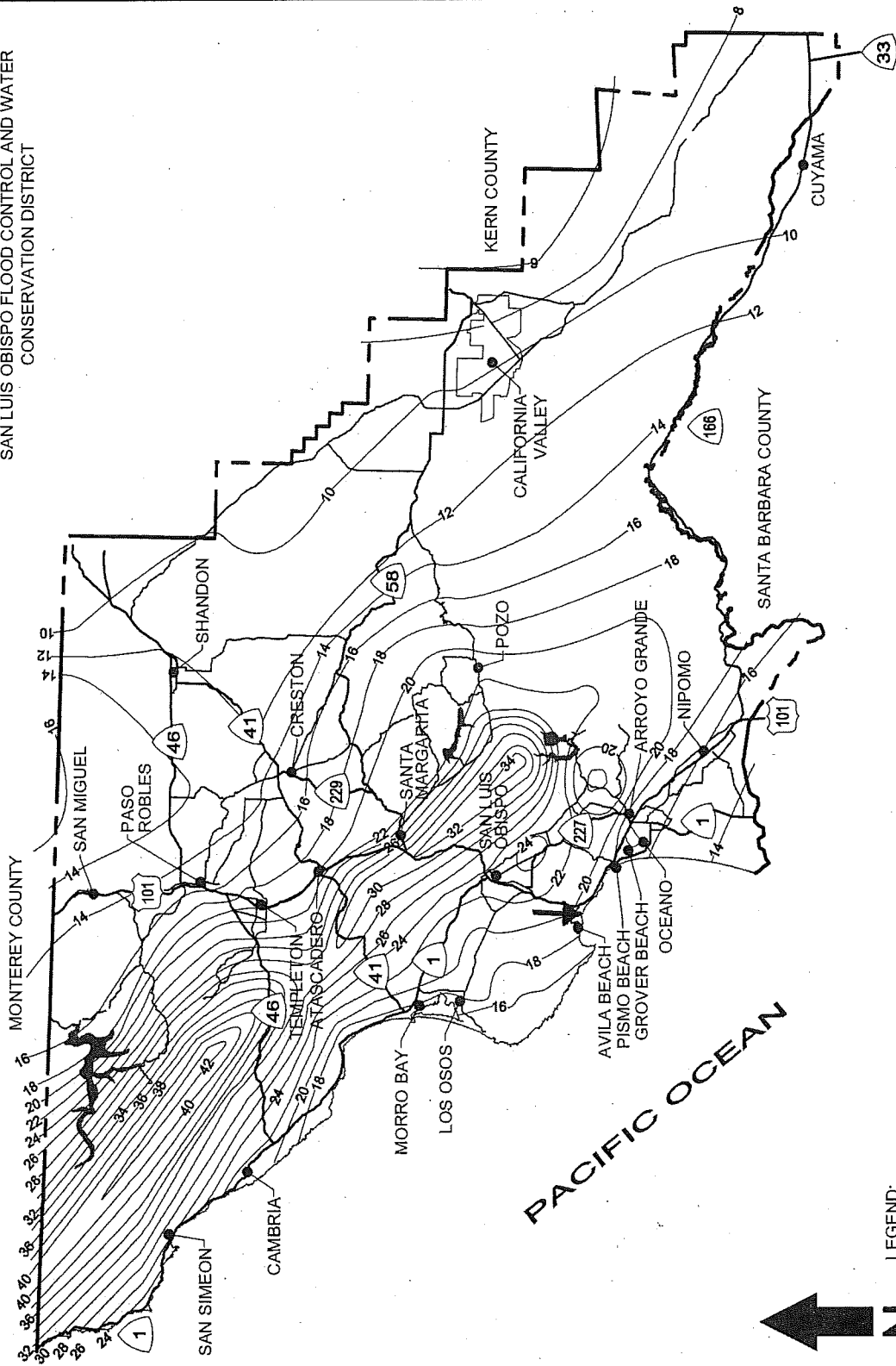
Revisions

Description	Approved	Date	Description	Approved	Date

**SAN LUIS OBISPO COUNTY
AVERAGE ANNUAL PRECIPITATION**

(JULY 1 THROUGH JUNE 30) FOR 42 YEAR PERIOD
FROM 1955-56 THROUGH 1997-98)

SAN LUIS OBISPO FLOOD CONTROL AND WATER
CONSERVATION DISTRICT



PACIFIC OCEAN

LEGEND:
22 - AVERAGE ANNUAL PRECIPITATION (INCHES)



SAN LUIS OBISPO COUNTY DEPARTMENT OF PUBLIC WORKS

AVERAGE ANNUAL RAINFALL

Scale:	Issued:
NTS	Aug. 2006
Drawing No:	H-1
Sheet No:	1 OF 1

Revisions

Description	Approved	Date	Description	Approved	Date
CORRECT TO MATCH HWY. DES. MAN.	REM	NOV 07			

TABLE 2: RATIONAL METHOD STANDARD RUNOFF COEFFICIENTS FOR UNDEVELOPED AREAS

	EXTREME	HIGH	NORMAL	LOW
RELIEF	→ 0.28 TO 0.35 STEEP, RUGGED TERRAIN WITH AVERAGE SLOPES ABOVE 30%	0.20 TO 0.28 HILLY, WITH AVERAGE SLOPES OF 10% TO 30%	0.14 TO 0.20 ROLLING, WITH AVERAGE SLOPE OF 5% TO 10%	0.08 TO 0.14 RELATIVELY FLAT LAND, WITH AVERAGE SLOPES OF 0% TO 5%
SOIL INFILTRATION	0.12 TO 0.16 NO EFFECTIVE SOIL COVER, EITHER ROCK OR THIN MANTLE OF NEGLECTIBLE INFILTRATION CAPACITY	0.08 TO 0.12 SLOW TO TAKE UP WATER, CLAY OR SHALLOW LOAM SOILS OF LOW INFILTRATION CAPACITY, IMPERFECTLY OR POORLY DRAINED	0.06 TO 0.08 NORMAL; WELL DRAINED LIGHT OR MEDIUM TEXTURED SOILS, SANDY LOAMS, SILT AND SILT LOAMS	→ 0.04 TO 0.06 HIGH; DEEP SAND OR OTHER SOILS THAT TAKES UP WATER READILY, VERY LIGHT WELL DRAINED SOILS
VEGETAL COVER	→ 0.12 TO 0.16 NO EFFECTIVE PLANT COVER, BARE OR VERY SPARSE COVER	0.08 TO 0.12 POOR TO FAIR; CULTIVATION CROPS, OR POOR NATURAL COVER, LESS THAN 20% OF DRAINAGE AREA OVER GOOD COVER	0.06 TO 0.08 FAIR TO GOOD; ABOUT 50% OF AREA IN GOOD GRASSLAND OR WOODLAND, NOT MORE THAN 50% OF AREA IN CULTIVATED CROPS	0.04 TO 0.06 GOOD TO EXCELLENT; ABOUT 90% OF DRAINAGE AREA IN GOOD GRASSLAND, WOODLAND, OR EQUIVALENT COVER
SURFACE STORAGE	→ 0.10 TO 0.12 NEGLECTIBLE SURFACE DEPRESSIONS FEW AND SHALLOW; DRAINAGE WAYS STEEP AND SMALL, NO MARSHES	0.08 TO 0.10 LOW; WELL DEFINED SYSTEM OF SMALL DRAINAGE WAYS, NO PONDS OR MARSHES	0.06 TO 0.08 NORMAL; CONSIDERABLE SURFACE STORAGE, LAKES AND POND MARSHES	0.04 TO 0.06 HIGH; SURFACE STORAGE, HIGH; DRAINAGE SYSTEM NOT SHARPLY DEFINED; LARGE FLOOD PLAIN STORAGE OR LARGE NUMBER OF PONDS OR MARSHES

(REFERENCES FIGURE 819.2A OF HIGHWAY DESIGN MANUAL)

EXAMPLE:

GIVEN: AN UNDEVELOPED WATERSHED CONSISTING OF:

1. ROLLING TERRAIN WITH AVERAGE SLOPES OF 5%
2. CLAY SOILS
3. GOOD GRASSLAND AREA
4. NORMAL SURFACE DEPRESSIONS

FIND: THE RUNOFF COEFFICIENT FOR THE ABOVE WATERSHED

SOLUTION:

1. RELIEF = 0.14
2. SOIL INFILTRATION = 0.08
3. VEGETAL COVER = 0.04
4. SURFACE STORAGE = 0.06

ANSWER: THE RUNOFF COEFFICIENT, C = 0.32



SAN LUIS OBISPO COUNTY DEPARTMENT OF PUBLIC WORKS
**RUNOFF COEFFICIENTS
 FOR UNDEVELOPED AREAS**

Scale:	Issued: Aug. 2006
Drawing No:	H-3a
Sheet No:	2 OF 2

Revisions

Description	Approved	Date	Description	Approved	Date

TABLE 1: ANNUAL RAINFALL < 14":

Recurrence Interval (Years)	Duration							
	10 Min	15 Min	30 Min	1 Hr	2 Hr	3 Hr	6 Hr	10 Hr
2	1.00	0.90	0.60	0.40	0.26	0.22	0.18	0.14
5	1.40	1.20	0.80	0.50	0.37	0.32	0.25	0.20
10	1.70	1.40	1.00	0.60	0.44	0.38	0.30	0.23
25	2.00	1.70	1.10	0.70	0.54	0.47	0.37	0.28
50	2.20	1.90	1.30	0.80	0.60	0.53	0.44	0.34
100	2.40	2.10	1.40	0.90	0.65	0.59	0.48	0.36

TABLE 2: ANNUAL RAINFALL 14" TO 17":

Recurrence Interval (Years)	Duration							
	10 Min	15 Min	30 Min	1 Hr	2 Hr	3 Hr	6 Hr	10 Hr
2	1.30	1.10	0.80	0.50	0.35	0.30	0.23	0.18
5	1.90	1.60	1.10	0.70	0.49	0.42	0.33	0.26
10	2.30	1.90	1.30	0.80	0.60	0.51	0.40	0.30
25	2.60	2.20	1.50	1.00	0.71	0.63	0.50	0.38
50	3.00	2.50	1.70	1.10	0.81	0.74	0.60	0.47
100	3.20	2.70	1.90	1.20	0.90	0.80	0.65	0.49

TABLE 3: ANNUAL RAINFALL 18" TO 21":

Recurrence Interval (Years)	Duration							
	10 Min	15 Min	30 Min	1 Hr	2 Hr	3 Hr	6 Hr	10 Hr
2	1.70	1.40	1.00	0.65	0.44	0.37	0.29	0.22
5	2.30	1.90	1.30	0.85	0.60	0.52	0.41	0.33
10	→ 2.80	2.40	1.60	1.03	0.74	0.64	0.50	0.38
25	→ 3.20	2.70	1.90	1.20	0.92	0.80	0.64	0.50
50	3.70	3.10	2.10	1.40	1.05	0.92	0.74	0.58
100	4.00	3.40	2.30	1.50	1.13	1.00	0.80	0.62

TABLE 4: ANNUAL RAINFALL 22" TO 28":

Recurrence Interval (Years)	Duration							
	10 Min	15 Min	30 Min	1 Hr	2 Hr	3 Hr	6 Hr	10 Hr
2	2.10	1.80	1.20	0.77	0.55	0.47	0.36	0.28
5	2.80	2.50	1.70	1.05	0.76	0.64	0.52	0.42
10	3.60	3.00	2.10	1.30	0.92	0.81	0.64	0.48
25	3.90	3.50	2.40	1.50	1.10	0.98	0.78	0.60
50	4.50	3.90	2.60	1.70	1.28	1.15	0.94	0.72
100	5.00	4.30	2.90	1.85	1.40	1.25	0.98	0.76



SAN LUIS OBISPO COUNTY DEPARTMENT OF PUBLIC WORKS

RAINFALL INTENSITY DATA

Scale:	Issued: Aug. 2006
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