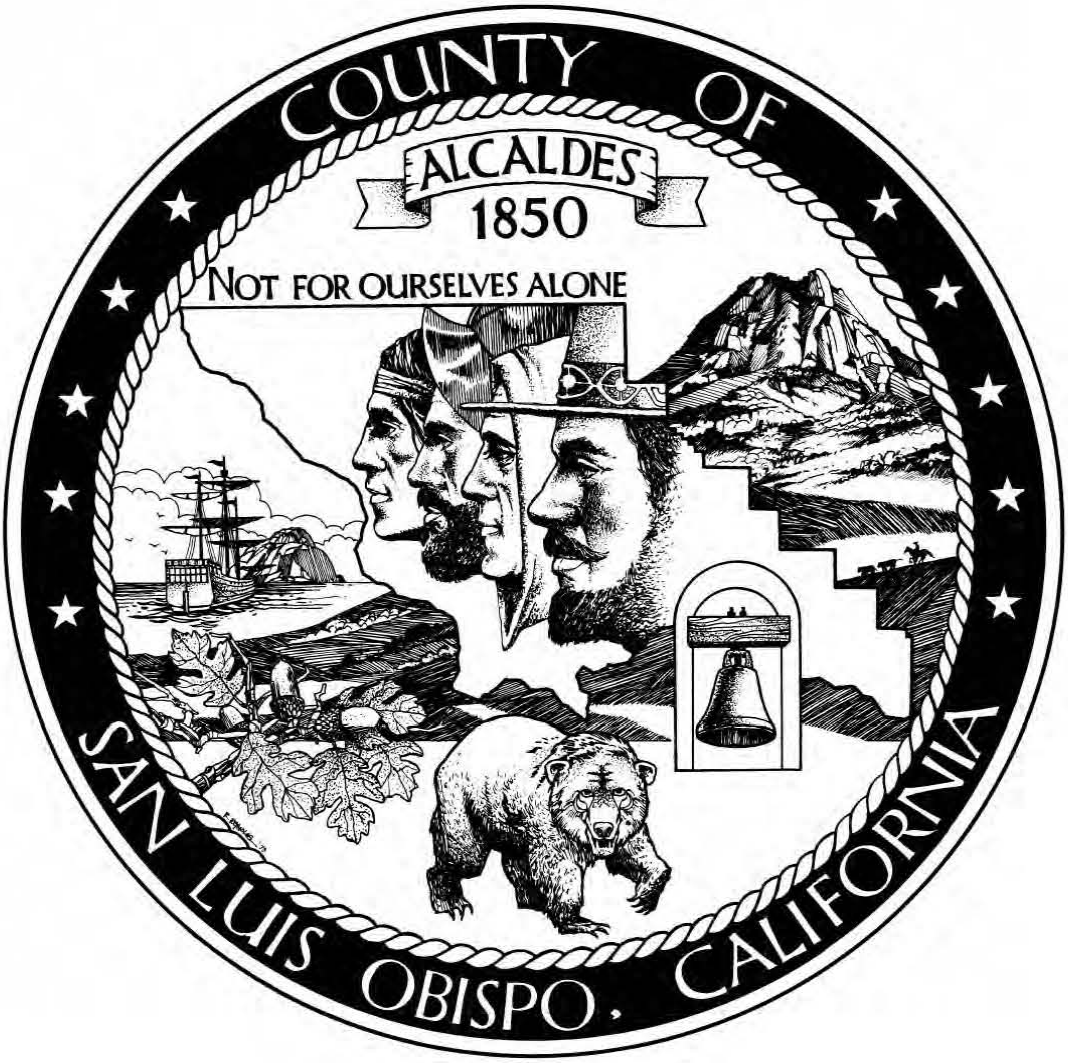
San Luis Obispo County

Department of Public Works & Transportation



APPENDIX

TO

2014 Public Improvement Standards

Available Online at:

http://www.slocounty.ca.gov/PW/DevServ/PublicImprovementStandards.htm

Appendix

Improvement Plans ..... **A**
- A1: General Notes
- A2: Erosion Control Notes
- A3: Traffic Control Notes
- A4: Traffic Signal Plan Notes
- A5: Public Improvements Acceptance for County Maintenance Inventory Data Requirements
- A6: Requirements for Subdivision Grading Permit Exceptions
- A7: Improvement Plan Checklist
- A8: Design Exception Request Application

Americans with Disabilities Act (ADA) Guidance
- B1: Reserved for ADA Grievance Form
- B2: ADA Design Exception Request Form
- B3: Caltrans DIB 82-05 – Pedestrian Accessibility Guidelines for Highway Projects
- B4: Caltrans Standard Plan – A88A – Curb Ramp Details
- B5: Caltrans Standard Plan – A88B – Curb Ramp Island Passageway Details
- B6: Caltrans Standard Plan – A90A –Accessible Parking Off-Street
- B7: Caltrans Standard Plan – A90B –Accessible Parking On-Street

Concrete **C**
- C1: Concrete Mix Designations
- C2: Compressive Strength Testing of Concrete
- C3: Concrete Mix by Type of Construction

Road Design **D**
- D1: Street Design Considerations
- D2: Recommendations for installing Marked Crosswalks
- D3: Left Turn Warrant Analysis Graphs (AASHTO)
- D4: Design Information Bulletin 79-03 – 3R and 2R Standards
- D5: Caltrans High Risk Utilities Policy

Encroachment **E**
- E1: Encroachment Permit Application and Procedures
- E2: Special Event Application and Procedures
- E3: County Lane Closure Restriction List
- E4: MUTCD – Typical Application 3 – Work on Shoulders (TA-3)
- E5: MUTCD – Typical Application 6 – Shoulder Work with Minor Encroachment (TA-6)
- E6: Reserved for future Public Work Approved Tree Planting List
- E7: Subdivision Project Security

Drainage **F**
- F1: Drainage Report Format
- F2: “n” Values for Manning’s Formula
- F3: Geotextile Selection
- F4: LID Specifications

Waterline **G**
- G1: Waterline Disinfection Procedures
- G2: Well Water Metering Standards and Installation Guidelines
- G3: CDPH Supplemental Separation Guidelines

Selected Board of Supervisor Policies **G**

H1: Resolution 2003-412: A Resolution Adopting a Policy Establishing Clearance Requirements for County Right-of-Way

H2: Resolution 2007-344: Establishing Requirements for Financing Maintenance of New Streets and Roads Constructed by Subdivisions

H3: Resolution 2008-152: Revising Policies Regarding Land Development Improvements on County Maintained Streets and Roads

Selected Calfire Standards on Developing Private Roads **I**

Standard 1 Water Supply
Standard 2 Addressing
Standard 3 Roof Access
Standard 4 Access Roads and Driveways
Standard 5 Tents Membranes and Canopies
Standard 5A Gate Requirements
FP-1: Residential Sample Site Plan for Fire Safety Application
FP-2: Residential Water Supply Tanks
FP-3: Residential Fire Connection
FP-4: Fire Hydrant Bollards
FP-5: Driveway and Access Road Gates
FP-6: Vegetation Clearance Requirements
FP-7: Private Driveway and Access Road – Paved Road Standard
FP-8: Private Driveway and Access Road – Gravel Road Standard
FP-9: Road Slope Standard
FP-10: Fire Truck Design Template
FP-11: Private Driveway and Access Road – Vertical Curve Standard
FP-12: Private Driveway and Access Road – Horizontal Curve Standard
FP-13: Private Driveway and Access Road – Turn Around and Bulbout
FP-14: Private Driveway and Access Road – Turn Around and Hammerhead
FP-15: Private Driveway and Access Road – Turn Around and Modified Hammerhead

APPENDIX A

Improvement Plans

These notes are subject to change. Please check the Department website to confirm you have the most-current version.

A1: General Notes

1. No construction shall be started without plans approved by the County Department of Public Works. The Department of Public Works shall be notified at least 24 hours prior to starting of construction and of the time location of the preconstruction conference. Any construction performed without approved plans or prior notification to the Department of Public Works will be rejected and will be at the contractor's and/or owner's risk.

2. For any construction performed that is not in compliance with plans or permits approved for the project the Public Works Department may revoke all active permits and recommend that County Code Enforcement provide a written notice or stop work order in accordance with Section 22.52.140 [23.10] of the Land Use Ordinance.

3. All construction work and installations shall conform to the most current County of San Luis Obispo Public Improvement Standards and all work shall be subject to the approval of the Department of Public Works.

4. The project owner and contractor shall be responsible for providing and/or maintaining all weather access at all times to existing properties located in the vicinity of work. Additionally, they shall be responsible for maintaining all existing services, including utility, garbage collection, mail distribution, etc., to all existing properties located in the vicinity of work.

5. On-site hazards to public safety shall be shielded by construction fencing. Fencing shall be maintained by the project owner and contractor until such time that the project is completed and occupied, potential hazards have been mitigated, or alternative protective measures have been installed.

6. Soils tests shall be done in accordance with the County Public Improvement Standards, Section 3.2.3. All tests must be made within 15 days prior to the placing material. The test results shall clearly indicate the location and source of the material.

7. Roadway compaction tests shall be made on subgrade material, aggregate base material, and material as specified by the Soils Engineer. Said tests shall be made prior to the placement of the next material lift.

8. Subgrade material shall be compacted to a relative compaction of 95% in the zone between finished subgrade elevation and a minimum of 1-foot below. All material in fill sections below the zone mentioned above shall be compacted to 90% relative compaction.

9. A registered civil engineer shall certify that the improvements when completed are in accordance with the plans prior to the request for a final inspection. Record Drawings shall be prepared after construction is completed. The civil engineer certifying the improvements and preparing as-built plans may be present when the final inspection is made by the County.

10. An Engineer of Work Agreement and an Engineer Checking and Inspection Agreement are required prior to the start of construction. The Public Works Department shall be notified in writing of any changes to the Engineer of Work Agreement. Construction shall not proceed without an Engineer or Work.
11. All utility companies shall be notified prior to the start of construction.

12. A County Encroachment Permit is required for all work done within the County right-of-way. The Encroachment Permit may establish additional construction, utility and traffic control requirements.

13. The County Inspector acting on behalf of the County Department of Public Works may require revisions in the plans to solve unforeseen problems that may arise in the field. All revisions shall be subject to the approval of the Developer's Engineer of Work.

14. The structural section shall be based on soils tests taken at the time of construction and using a Traffic Index of _____ for _____ (road name). The structural section shall be approved by the Public Works Department prior to road construction.

15. Hydro-seeding or other permanent erosion control shall be placed and established with 90% coverage on all disturbed surfaces (other than paved or gravel surfaces) prior to the final inspection.

16. For any public improvements to be maintained by the County, if environmental permits from the U.S. Army Corps of Engineers, the California Regional Water Quality Control Board/State Water Resources Control Board, or the California Department of Fish & Game are required, the Developer shall:
    a. submit a copy of all such completed permits to the County Department of Public Works OR,
    b. document that the regulatory agencies determined that said permit is not required; prior to acceptance of the completed improvements for County maintenance and release of improvement security. Any mitigation monitoring required by said permits will remain the responsibility of the Developer.

17. When the project site earthwork is not intended to balance then a separate grading permit for the sending or receiving property may be required. A copy of the permit/s or evidence that no permits are required shall be submitted to the Department prior to commencing project earthwork.

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A2: Erosion Control Notes

1. Erosion control measures for wind, water, material stockpiles, and tracking shall be implemented on all projects at all times and shall include source control, including protection of stockpiles, protection of slopes, protection of all disturbed areas, protection of accesses, and perimeter containment measures. Erosion control shall be placed prior to the commencement of grading and site disturbance activities unless the Public Works Department determines temporary measures to be unnecessary based upon location, site characteristics or time of year. The intent of erosion control measures shall be to keep all generated sediments from entering a swale, drainage way, watercourse, atmosphere, or migrate onto adjacent properties or onto the public right-of-way.

2. Site inspections and appropriate maintenance of all erosion control measures/devices shall be conducted and documented at all times during construction and especially prior to, during, and after rain events.

3. The Developer shall be responsible for the placement and maintenance of all erosion control measures/devices as specified by the approved plan until such time that the project is accepted as complete by the Public Works Department or until released from the Conditions of Approval of their General Permit. Erosion control measures/devices may be relocated, deleted or additional measures/devices may be required depending on the actual conditions encountered during construction. Additional erosion control measures/devices shall be placed at the discretion of the Engineer of Work, County Inspector, SWPPP Monitor, or RWQCB Inspector. Guidelines for determining appropriate erosion control devices shall be included in the plans with additional measures/devices noted from the appendix of the Public Improvement Standards.

4. Wet weather erosion control measures/devices shall be available, installed, and/or applied between October 15 and April 15 or anytime when the rain probability exceeds 30%.

5. The Contractor, Developer, and Engineer of Work shall be responsible to review the project site prior to October 15 (rainy season) and to coordinate an implementation plan for wet weather erosion control devices. A locally based standby crew for emergency work shall be available at all times during the rainy season (October 15 through April 15). Necessary materials shall be available and stock piled at convenient locations to facilitate rapid construction or maintenance of temporary devices when rain is imminent.

6. In the event of a failure, the Developer and/or his representative shall be responsible for cleanup and all associated costs or damage. In the event that damage occurs within the right-of-way and the County is required to perform cleanup, the owner shall be responsible for County reimbursement of all associated costs or damage.

7. In the event of failure and/or lack of performance by the owner and/or contractor to correct erosion control related problems the Public Works Department may revoke all active permits and recommend that County Code Enforcement provide a written notice or stop work order in accordance with Section 22.52.140 [23.10] of the Land Use Ordinance.

8. Permanent erosion control shall be placed and established with 90% coverage on all disturbed surfaces other than paved or gravel surfaces, prior to final inspection. Permanent erosion control shall be fully established prior to final acceptance. Temporary erosion control measures shall remain in place until permanent measures are established.

9. The County Air Pollution Control District (APCD) may have additional project specific erosion control requirements. The Contractor, Developer, and Engineer of Work shall be responsible for maintaining self-regulation of these requirements.

10. All projects involving site disturbance of one acre or greater shall comply with the requirements of the National Pollutant Discharge Elimination System (NPDES). The Developer shall submit a Notice of intent (NOI) to comply with the General Permit for Construction Activity with the Regional Water Quality Control Board (RWQCB). The Developer shall provide the County with the Waste Discharge Identification Number (WDID #) or with verification that an exemption has been granted by RWQCB. WDID No.: _____.

    Person to contact 24 hours a day in the event there is an erosion control/sedimentation problem (Storm Water Compliance Officer): Name _____ Local Phone No:_____

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A3: Traffic Control Notes

1. The Encroachment Permit applicant shall be responsible to assure that the appropriate existing traffic controls remain in place and functional during all construction phases. The Contractor shall cover any conflicting signs that exist along the roadway.

2. No work shall commence without the Construction Signs installed and other necessary traffic control devices on site. Stationary mounted construction area signs shall be fluorescent orange, using materials from the Caltrans "Prequalified Products List" for Signing and Delineation Materials. The list is available at the website of the Caltrans Office Engineer: www.dot.ca.gov/hq/esc/approved_products_list/

3. No lane closures are permitted on the roads and between the times listed in the Department's "Lane Closure Restriction List." No lane closure shall be permitted on Friday afternoon before weekends with Federal legal holidays, on the roads listed. Affected streets will be shown in the Encroachment Permit. [The "County Lane Closure Restriction List" is provided in Appendix E3.]

4. At the conclusion of each work day, all paved traveled-way surfaces shall be restored to an all-weather, traversable condition. There shall not be a drop-off along the edge of traveled way >0.15-feet. "Low Shoulder" signs shall be placed along the traveled way where there is any drop-off. Drop-offs >0.15-feet shall require either:
   a. Backfilling the drop-off to a minimum 4:1 slope;
   b. Providing appropriate steel plates over excavation;
   c. Providing temporary concrete railing along the work zone in conformance with the *State Standard Plans* and Specifications.

5. Excavations beyond eight (8) feet from the edge of traveled way may utilize portable delineators at appropriate spacing, along with "Open Trench" signs.

6. Where steel plates are used, they shall be pinned, and have a cold-mix slope of 12:1 placed on all sides. They shall be friction-coated for traction. Appropriate warning signs shall be placed.

7. Pedestrian access shall be afforded through the work area on County Roads in urban areas, either by providing necessary facilities for safe and viable access, or by providing appropriate advance warning to pedestrians to use alternate routes. Bicycle routes and lanes, when impacted by construction, shall be signed to afford safe passage through the work zone or to designate alternate routes. For both pedestrians and bicycles, surfaces shall be maintained free of loose debris and gravel.

8. No construction equipment or materials shall be parked or stored within six (6) feet of the edge of the traveled way. When construction equipment or materials are stored within the right-of-way, further than six (6) feet from the edge of the traveled way, the shoulder area shall be signed as closed, and portable delineators shall be used to mark a taper in advance of the material or equipment.

9. Removal of existing pavement striping or markings shall be by sandblasting or grinding. When the change of position will be greater than two (2) feet, the removed striping shall be further obscured by use of a Chip Seal, as required by Section 9.1.2 D. The Chip Seal shall extend the full width of the roadway.

10. Parking restrictions shall be posted 24 hours before any work starts. Posting shall be done by the Contractor.

11. All private driveways and side streets shall be kept open at all times, except when construction takes place immediately in front of the driveway or side street.

12. Any work that disturbs normal traffic signal operations shall be coordinated with the Public Works Transportation Division at least three (3) business days prior to beginning the work involving the signal. The Contractor shall replace all traffic signal loop detectors, damaged during construction, within five (5) days of the completion of construction involving the signal. Any damage to existing in-pavement loop detectors will require replacement within five days of the start of any trench cut work. Intersection detection shall be replaced with video detection system(s) acceptable to the Department. All components shall be available on the job site prior to commencing the trench work which will affect the loop(s). All costs, including Department operations time, shall be paid by the Developer.

13. All delineators shall be equipped with nighttime reflective bands, and spaced no greater than 50-foot intervals along tapers, lane control, and/or edge of work zone.

14. The operator of any transit operation affected by the work shall be notified two (2) working days prior to work commencing.

15. All flaggers shall hold current certifications. As defined under Cal OSHA Construction Safety Order Section 1599, all flaggers on the roadway shall be trained by qualified and experienced personnel to the aspects noted in Section 1599. The Developer or Project Engineer shall be responsible to ensure that the Contractor or other agents utilize trained personnel only. All workers within the roadway shall wear Type 2 CAL-OSHA high-visibility vests.

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A4: Traffic Signal Plan Notes

When the installation and modification of any signal for the County of San Luis Obispo is proposed the following notes must be included on the plans:

1. All work, material and equipment shall conform to the provisions of the Standard Plans and Specifications of the State of California, Department of Transportation (Caltrans) dated May 2006, and the Special Provisions.

2. A County Encroachment Permit shall be required to perform work within the County right-of-way. County approved plans do not relieve the contractor from the responsibility of obtaining an Encroachment Permit. A copy of the permit shall be kept on the construction site at all times.

3. The contractor shall be responsible for providing a detailed traffic control plan for any lane closures associated with the traffic signal construction.

4. The location of all existing underground utilities is approximate only. The contractor shall be responsible for verifying the exact location and depth of all utilities including those not shown on the plan prior to start of work. Contact Underground Service Alert at (800) 422-4133 at least 48 hours in advance.

5. The Developer shall be responsible for coordinating with Pacific Gas & Electric Company (PG&E) to have a power supply and meter installed.

6. The contractor shall be responsible for obtaining an Electrical Permit from the County's Planning Department for the service pedestal.

7. The contractor shall be responsible for obtaining all necessary permits and notifying affected agencies at least 72 hours prior to start of work.

8. Unless shown otherwise, inductive loop detectors shall be Type "C", loop detector wire shall be Type "1" and detector lead-in cable shall be Type "B". Prior to installation, the Department shall verify all loop detector locations in the field. Unless stated otherwise, all necessary striping shall be in place prior to positioning of detectors. Loop detectors shall be sealed with a "Hot Melt Sealant".

9. The Conductor Schedule is furnished as an installation guideline only. It shall be the Contractor's responsibility to provide the appropriate number of conductors required for the intended operation.

10. All vehicle signal indications shall be 12-inches. The signal housing, backplates and visors shall be metal. All signal indications shall be LED.

11. The Contractor shall provide the Department with a Certificate of Compliance from the manufacturer, in conformance with the provisions of Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. The certificate shall certify that the LED signal modules comply with the requirements of these specifications. The certificate shall also include a copy of all applicable test reports on the LED signal modules.

12. All pull boxes shall be No. 6, unless otherwise noted on the plans. Pull boxes shall not be located in or within 1-foot of any curb access ramp or driveway. All pull boxes and covers shall be concrete and shall be marked "Traffic Signal"

13. The contractor shall verify with the Department the exact location of all traffic signal equipment prior to installation.

14. The Contractor shall arrange to have a signal technician, qualified to work on the controller unit and employed by the controller unit manufacturer, or the manufacturer's representative, present at the time the equipment is turned on.

15. All conduits shall be 3-inch unless otherwise noted. All stub-outs shall be 3-inch conduit. All conduits under roadway section shall be installed without open cutting.

16. Each conductor shall be permanently identified. Identification shall be by direct labeling, tags or bands permanently fastened to the conductors. The identification shall be placed on each conductor or group of conductors in each pull box and near the end of each conductor where the conductors are terminated.

17. Luminaires shall be High Pressure Sodium with full cut-off lens, 200W integral ballast unless otherwise noted.

18. Internally Illuminated Street Name signs shall be Type “A”.

19. Underground traffic signal conductors shall not be spliced.

20. Any landscaping damaged by signal construction shall be repaired or replaced to the satisfaction of the Department and the property owner.

21. The contractor shall give the County Traffic Engineer 48 hour notice prior to signal turn-on.

22. The contractor shall be responsible for completing all “punch list” items prior to signal turn-on.

23. The controller cabinet schematic wiring diagram and intersection sketch shall be combined into one drawing, so that, when the cabinet door is fully open, the drawing is oriented with the intersection.

24. A maintenance manual shall be furnished for all controller units, auxiliary equipment, and vehicle detector sensor units, control units, and amplifiers. The maintenance manual and operation manual may be combined into one manual. The maintenance manual or combined maintenance and operation manual shall be submitted at the time the controllers are delivered for testing or, if ordered by the Department, prior to purchase. The maintenance manual shall include, but need not be limited to, the following items:
    a. Specifications
    b. Design characteristics
    c. General operation theory
    d. Function of all controls
    e. Trouble shooting procedure (diagnostic routine)
    f. Block circuit diagram
    g. Geographical layout of components
    h. Schematic diagrams
    i. List of replaceable component parts with stock numbers

Typical Traffic Signal Construction Notes

1. Construct Type 332 Cabinet foundation and furnish and install Type 170E controller assembly in a Type 332 Cabinet. The controller assembly shall be equipped with one (1) Model 412C System Memory Module, one (1) GDI Modem and BiTran Systems 233 Program. The controller assembly shall be housed in a Type 332 Cabinet wired for 8 phase operation, and include functions indicated on the plans. The cabinet shall include cabinet drawer assembly, and cabinet light assembly. The cabinet's Police panel shall be equipped with a connection for a traffic signal controller manual override switch. All equipment shall be on the current State of California "Qualified Products List". GDI load switches will not be accepted.

2. Furnish and install a dual-metered Type III-CF Service equipment EVPE enclosure with the following circuit breakers:
   a. 120/240V - 100A Main
   b. 120V – 50A Metered Signals
   c. 240V – 40A Metered Lighting
   d. 120V – 15A Metered IISNS
   e. Dual Type V – P.E.C.

3. Furnish and install emergency vehicle pre-emption equipment and 4-channel discrimination equipment required in the controller cabinet. EVPE optical detector shall be mounted on signal mast arm by clamping method. Exact location of detector shall be determined in the field by the Department. Mount on mast arm as shown on Detail "A".

4. Furnish and install Type "V" PEC unit in service cabinet.

5. Furnish and install mast arm mounted sign per Standard Plan ES-7N, Detail "U".

6. Furnish and install 3" conduit with pullrope.

7. Furnish and install #6 pull box as shown.

8. Furnish and install battery back-up system in controller cabinet. Furnish and install battery cabinet on rear of controller cabinet and wire per manufacturer's specifications. Battery back-up cabinet dimensions shall be 27"H x 24"W x 8"D.

A5: Public Improvements Acceptance for County Maintenance Inventory Data Requirements

For any public improvement which is to be accepted for County maintenance, the Project Engineer shall submit records of the improvements to be accepted, in the format listed below. Each new street shall have postmile control established, beginning at zero, based on increasing from west to east or from south to north. Existing streets shall be based on current postmile data provided by the Department. All intersections, culverts, bridges and drainage inlets shall be referenced to the postmiles.

A. Roads and Controls
   1. Street Name
   2. Postmile
   3. Street Width (feet)
   4. Curb Gutter & Sidewalk (yes/no)
   5. Intersection Features

B. Drainage Systems
   1. Storm Drain Diameter (inches)
   2. Storm Drain Material
   3. Storm Drain Inlet Postmile
   4. Storm Drain Outlet Postmile
   5. Catch Basin Type (D-2, etc.)
   6. Drainage Basin
      i. Type of Drainage Basin (Surface shallow or deep, subsurface, etc.)
      ii. Capacity of Drainage Basin (cubic feet)
      iii. Fence Material
      iv. Maintained by (HOA, County, Owner, etc.)

C. Signs/Markings
   1. Street Name
   2. Sign Type
   3. Road Markings
   4. Postmile
   5. Direction Facing (N, S, E, or W)

D. Map
   1. AutoCAD© file with street centerline layouts and drainage layouts.

E. Permits – Copies of Facility Permits from the following regulatory agencies:
   1. Corps of Engineers
   2. Department of Fish & Game
   3. Other regulatory agencies as determined necessary by project characteristics
   4. Regional Water Quality Control Board

A6: Requirements for Subdivision Grading Permit Exceptions

Applicable only to applications accepted for processing by the Planning and Building Department prior to May 13, 2010, subdivision projects which are permitted and inspected by the Public Works Department under the Subdivision Exemption (LUO Section 22.52.050 (B) (1) (a) (6) and CZLUO Section 23.05.026 (c)) shall be subject to the *California Building Code* (CBC) and County Buildings And Construction Ordinance, Title 19, requirements for on-site grading, outside of the (current or future) public right of way.

All references are to the 2007 CBC

A. Building Official. The Director of the Department of Public Works ("Director" as defined in these Public Improvement Standards) will act as a deputy to the Building Official for all Subdivision Grading Permit Exceptions.

B. Inspections. Inspections shall be performed as required by CBC Appendix Chapter 1, "Administration," Section 109 (as amended by Section 19.02.020 (h) of Title 19 of the County Code) and the specific chapters and sections covering the particular construction involved.

C. Special Inspections. The Registered Design Professional in responsible charge (Project Engineer) shall either: (1) document that no Special Inspections are required, or (2) prepare a Statement of Special Inspections and provide a Table on the plans including the following (an excerpt of the tables from the CBC are included at the end of Appendix A6):

1. List required inspection tasks,
2. Delineate continuous or periodic inspection for that task,
3. List who is the qualified Special Inspector to perform the inspections, and
4. Delineate when the report will be provided.
   (CBC Chapter 17, Sections 1702, 1704 and 1705)

D. Special Inspectors. Special inspectors shall be employed by the owner or Registered Design Professional in responsible charge (Project Engineer) acting as the owner's agent and not by the contractor. Special inspectors shall be a qualified person who shall demonstrate competence to the satisfaction of the Public Works Department. Names and qualifications of special inspector(s) shall be submitted to and approved by the Public Works Department prior to plan approval, unless otherwise requested of, and allowed by, the Department of Public Works. (CBC Chapter 17, Section 1704.1)

E. Reports. Interim and Final reports shall be submitted as follows:

1. Interim reports will be submitted to the Department of Public Works and the Registered Design Professional in Responsible Charge (Project Engineer). A schedule of interim reposts shall be submitted to and approved by the Public Works Department prior to plan approval, unless otherwise requested of, and allowed by, the Department of Public Works.

2. A Final Report of Special Inspections documenting required Special Inspections, testing and correction of any discrepancies noted in the inspections shall be submitted to the Department of Public Works prior to final.
   (CBC Chapter 17, Section 1704.1.2)

F. Soils. Special inspections are required for compaction and any other conditions identified by the preparer of the foundation and soils investigation and/or the engineering geologic report which require additional special inspections. The final report shall include pad elevation certification as needed.

G. Retaining Walls. The following is a non-exclusive list of possible required inspections. Excluded are retaining walls that are not over 4 feet in height measured from the bottom of the footing to the top of the wall, unless supporting a surcharge, impounding hazardous liquids, or located within 3 feet of a property line and retaining soil more than 2 feet in height per Title 19, Section 19.02.020 (c) (4). Wall shall be certified by the project engineer.

1. Reinforced Concrete Retaining Walls Special Inspections:
   a. Foundation
   b. Concrete with compressive strength > 2,500 psi
   c. Pours of greater than 50 cy
   d. Welded reinforcement

2. Reinforced Concrete Masonry Unit (CMU) Retaining Walls Inspections:
   a. Foundation
   b. Grout
   c. Reinforcement

Excerpt of Table from the CBC

Notation Used in Table:

Column headers:

C Indicates continuous inspection is required.

P Indicates periodic inspections are required. The table notes or other plan notes shall clearly describe the level or frequency of inspection.

Box entries:

X Is placed in the appropriate column to denote either “C” continuous or “P” periodic inspections.

--- Denotes an activity that is either a one-time activity or one whose frequency is defined in some other manner which shall be clearly delineated on the plans.

Additional tables are listed in CBC Chapter 17.

Edit table(s) for the specific project (eliminate unused portions, add notes, etc.) and include on the project plans.

Verification and Inspection	C	P	Notes
Table 1704.4 - Concrete			(add project specific notes as required)
1. Inspection of reinforcing steel, including prestressing tendons and placement.		X	
2. Inspection of reinforcing steel welding in accordance with Table 1704.3 Item 5b.	---	---	
3. Inspect bolts to be installed in concrete prior to and during placement of concrete where allowable loads have been increased.	X		
4. Verifying use of required design mix.		X	
5. At time fresh concrete is sampled to fabricate specimens for strength tests, perform slump and air content tests and determine the temperature of the concrete.	X		
6. Inspection of concrete and shotcrete placement for proper application techniques.	X		
7. Inspection for maintenance of specified curing temperature and techniques.		X	
8. Inspection of prestressed concrete.			
8a. Application of prestressing forces.	X		
8b. Grouting of bonded prestressing tendons in the seismic force-resisting system.	X		
9. Erection of precast concrete members.		X	
10. Verification of in-situ concrete strength, prior to stressing of tendons in postensioned concrete and prior to removal of shores and forms from beams and structural slabs.		X	
11. Inspect formwork for shape, location, and dimensions of the concrete member being formed.		X	

Verification and Inspection	C	P	Notes
Table 1704.5.1 - Level 1 Masonry Inspections.			(add project specific notes as required)
1. At the start of masonry construction verify the following to ensure compliance:			
1a. Proportions of site-prepared mortar.		X	
1b. Construction of mortar joints.		X	
1c. Location of reinforcement, connectors, prestressing tendons, and anchorages.		X	
1d. Prestressing technique.		X	
1e. Grade and size of prestressing tendons and anchorages.		X	
2. Verify:			
2a. Size and location of structural elements.		X	
2b. Type, size, and location of anchors, including other details of anchorage of masonry to structural members, frames or other construction.		X	
2c. Specified size, grade, and type of reinforcement.		X	
2d. Welding of reinforcing bars.	X		
2e. Protection of masonry during cold weather (temperature below 40 degrees F) or hot weather (temperature above 90 degrees F)		X	
2f. Application and measurement of prestressing force.		X	
3. Prior to grouting verify the following to verify compliance.			
3a. Grout space is clean.		X	
3b. Placement of reinforcement and connectors and prestressing tendons and anchorages.		X	
3c. Proportions of site-prepared grout and prestressing grout for bonded tendons.		X	
3d. Construction of mortar joints.		X	
4. Verify grout placement to ensure compliance with code and construction document provisions.	X		
4a. Observe grouting of prestressing bonded tendons.	X		
5. Observe preparation of required grout specimens, mortar specimens, and/or prisms.	X		
6. Verify compliance with required inspection provisions of the construction documents and the approved submittals.		X	

Verification and Inspection	C	P	Notes
Table 1704.7 - Inspection of Soils			(add project specific notes as required)
1. Verify materials below footings are adequate to achieve the desired bearing capacity.		X	
2. Verify excavations are extended to proper depth and have reached proper material.		X	
3. Perform classification and testing of controlled fill materials.		X	
4. Verify use of proper materials, densities and lift thicknesses during placement and compaction of controlled fill.	X		
5. Prior to placement of controlled fill, observe subgrade and verify that site has been prepared properly.		X	

This checklist is subject to change. Please check the Department website to confirm you have the most-current version.

A7: Improvement Plan Checklist

San Luis Obispo County Public Works Department: Improvement Plan Checklist

Engineer of Work: _____	File: _____
Developer: _____	W.O: _____
Tentative Approval Date: _____	Plan Checker: _____
Main File Review Date: _____	Field Review Date: _____

	Date Received	Date Checked	Date Returned
1st Submittal			
2nd Submittal			
3rd Submittal			
4th Submittal			

Item	1st	2nd	3rd	4th
Checking & Inspection Agreement received				
Checklist and check prints returned with resubmittal				
Conditions of Approval attached to plan check, all construction COA addressed				
Engineer of Work Agreement received				
Soils report received (Tract Map SMA §66490 & Co. Code §21.02.048(a)(7)(i)				
Transmittal letter received with submittal				
Two good blueline drawing sets received				

Approved Design Exception [Section 1.2]:

Description of Exception	Approval Date

Project Conditions of Approval:

_____

Revised May 2012
V:_DEVSERV Forms\Plan Check Unit\Form-Plan Checklist.doc

X = *Not Applicable* **O** = *Requires Compliance* ✓ = *Complied* Page 1 of 7

San Luis Obispo County Public Works Department: Improvement Plan Checklist

Approvals Required Prior to Permit Issuance:	1st	2nd	3rd	4th
►All plan check comments sufficiently addressed by design engineer				
All construction related project Conditions of Approval have been satisfied				
Conforms to County Drainage Ordinance and Policies				
Conforms to County Stormwater Pollution Prevention Discharge Ordinance				
Copies of all recorded easements (if not done with map recordation)				
Copies of all Right-of-Entries provided (when working outside permitted site)				
Copies of all State and Federal Environmental Permits (ACOE, F&G, SWRCB, etc)				
Engineers seal, signature, date, and expiration date on each sheet of plan set				
WDID Number shown on plans (No:)				
Outside Agencies (signatures on Title Sheet)				
• Cal Fire (or local fire agency)				
• Electric purveyor				
• Gas purveyor				
• Telephone purveyor				
• Cable Television purveyor				
County Agencies (verification collected by County plan checker)				
• Parks Department Review				
• Planning Department Review				
• PW Design Division Review				
• PW Roads Division Review				
• PW Transportation Division Review				
• PW Utilities Division Review				
►Other plan check comments:				

Roadway Design Parameters:

Road	T.I.	ADT	Terrain	Design Speed	Min Radius	Max Grade %

X = *Not Applicable* **O** = *Requires Compliance* ✓ = *Complied* Page 2 of 7

San Luis Obispo County Public Works Department: Improvement Plan Checklist

Improvement Plans [Section 1.1]:	1st	2nd	3rd	4th
►Conforms with Public Improvement Standards, Section 1				
All existing and proposed physical features clearly differentiated				
All existing physical features clearly shown and labeled to retain or remove				
All proposed physical features clearly shown and labeled for construction				
All tangent and vertical curve information labeled on profiles				
Basis of Bearing provided				
Benchmark provided and ties into County approved datum				
Centerline data shown (curve data & tangent bearing and distance)				
Conforms clearly shown and detailed as necessary				
County Title Block on each sheet and accurately completed [L-1]				
Drafting media and sheet size conforms to County Standards				
Earthwork quantities shown				
Erosion control plan and standard notes provided [Appendixes A & B]				
Existing centerline profile shown				
General notes provided [Appendix A]				
No recent or proposed improvements conflict with this project				
North arrow, scale and graphic scale shown accurately on each sheet				
Official Road Names shown (includes Planning Dept approval of road names)				
Plan and Profile sheets match grading plan sheets				
Plan scale 1:20 (1:30 max), Profile scale 1:2 or 1:4 (1:6 max) [1.1.2]				
Plan Sheets				
• Title Sheet				
• Grading & Drainage Plan				
• Erosion Control Plan (construction phase & post construction permanent)				
• Road Plan and Profile				
• Traffic Control Plan				
• Composite Utility Plan (shows all required utility installation)				
• Striping, Signage and Signalization Plan				
• Wall Plan, Profile, Notes, Sections and Details				
• Details (all County and other agency standard details referenced in plans)				
Plan sheets are legible and able to microfilm				
Plans conform to County Specifications [1.1.3]				
Plans conform with project conditions of approval				
Plans conform with subdivision map act (easement, etc)				
Plans conform with tentative map				
Profile Plans show existing centerline				
Proposed improvements conform to existing improvements				
Sheets numbered and appropriately indexed				
Standard Abbreviations conform to County Standards [L-2]				
Stationing accurately shown in both plan and profile				
Stationing conforms to approved County stationing (provided by County)				
U.S.A. Note and Phone number shown on Title Sheet [8.1.1 C]				
Vicinity map adequate to identify project location with north arrow and scale				
►Other plan check comments:				

X = Not Applicable O = Requires Compliance ✓ = Complied Page 3 of 7

San Luis Obispo County Public Works Department: Improvement Plan Checklist

Site Preparation and Grading [Section 2.1]:	1st	2nd	3rd	4th
►Conforms with Public Improvement Standards, Section 2				
Conforms to recommendations of the project Soils Report				
Cut and fills conform to CBC requirements (height, benches, setbacks, drains, etc)				
Demolition shown clearly states separate permit required (Planning Dept)				
Existing and proposed contours clearly shown				
Grading conforms with County Specifications [Section 2, Appendix O]				
Limits of disturbance accurately shown and identified				
Parking lots shall conform to LUO 22/23 standards				
Plans clearly address abandonment of wells, septic systems, etc				
Retaining wall details shown (typical sections, drainage, etc)				
Retaining wall plan and profile provided				
Retaining wall structural calculations provided (sign, seal, date)				
Slope easements shown on map (or recorded prior to plan approval)				
Tree removal clearly shown and identified on plans [Appendix G]				
Tree removal conforms to project environmental determination				
Tree trimming conforms to project COA and County Standards [M-5 series]				
►Other plan check comments:				

Roadways [Section 3.1]:	1st	2nd	3rd	4th
►Conforms with Public Improvement Standards, Section 3				
Barricades conform to County Standards [M-2 series]				
Bike lanes (Class II) shall be identified (5' w/ curb, 4' w/ EP) [Co Bikeways Plan]				
Bike ways (Class III) shall be identified (12' min pave lane) [Co Bikeways Plan]				
Bus Turnout conforms to County Standards [A-6c]				
Cul-de-Sac conforms to County Standards [A-6 & A-6a]				
Curve radii conforms to County Standards [A-1, A-2 & A-3]				
Disjointed effect meets AASHTO minimum guidelines				
Horizontal curves meet County Standards [A-5]				
Intersection grades meet County Standards [3.1.2 D]				
Intersections meet at near 90 degrees				
Knuckle conforms to County Standards, allowed in urban areas only [A-6b]				
Longitudinal grades conform to County Standards [3.1.2 A]				
Road widths and transitions clearly shown (or detailed)				
Road section conforms to County Public Improvement Standards [A-1 to A-3 series]				
Road section conforms to project Conditions of Approval				
Road Section shows required structural section calculation note and T.I. *"The structural section shall be determined at the time of construction and based on the subgrade R-Value and a Traffic Index of = ____. Prior to construction the structural section calculations shall be submitted to the Department for review and approval. In no case shall the zone of compaction be less than 24-inches."*				
Road widening conform to County Standards [R-series]				
Road widening cross sections provided (spacing: 50' min/25' min for long ≤0.5%)				
Road widening cross slopes between 1% min to 5% max				
Roadway prism cut/fill limits shown				
Right-of-Way contains all elements of the roadway prism				
Sawcut limits shown on plans				
Street monuments (existing) tie out or replaced				
Street monuments wells shown and conform to County Standards [M-1 series]				
Super-elevation diagram shown [A-4b & HDM 202.5]				

X = *Not Applicable* O = *Requires Compliance* ✓ = *Complied* Page 4 of 7

San Luis Obispo County Public Works Department: Improvement Plan Checklist

Roadways [Section 3.1]:	1st	2nd	3rd	4th
Tangent lengths conform to County Standards (50' min betw vertical curves [A-4b]				
Tapers- Intersection tapers conform to 3.1.2 L				
Tapers- Mid block road tapers conform to 3.1.2 K				
Trench repair conforms to County Standards [R series]				
Trenching conforms to County Standards [U-4 series]				
Typical Road Section shown on each sheet				
Vertical curves meet County Standards [A-4 & A-4a]				
Vertical curves used at grade breaks >1%				
►Other plan check comments:				

Road Edges [Section 4.1]:	1st	2nd	3rd	4th
►Conforms with Public Improvement Standards, Section 4				
Angled parking conforms to County Standards [4.1.6]				
Asphalt dikes conform to County Standards [C-3 & 4.1.7 G]				
Bulb-Out conforms to County Standards [A-6d & A-6e]				
Curb Gutter and Sidewalk repair conform to County Standards [R-3 & 4.1.2 D]				
Curb Ramps accurately drawn and detailed [spot elevations, slopes, etc] (A detailed design for each ramp is required when adjacent street longitudinal slope is >5%)				
Curb Ramps conform to County Standards [C-1, C-2, C-6 and RSP A88A]				
Curb return radii conform to County Standards [3.1.2 G]				
Curbs conform to County Standards [C-1, C-2 & C-2a]				
Cut and fill catch inside right-of-way				
Driveway profiles detailed (if required by plan checker)				
Driveway sight distance conforms to County Standards [A-5a]				
Driveways conform to County Standards [B-1 to B-3 series & 4.1.5]				
Driveways conform to multiple parking space requirements [B-1, B-2 & B-3]				
Fixed objects outside "clear zone" [4.1.7 A]				
Guardrail requirement worksheet provided				
Guardrails shown on plan and all relevant construction details provided				
Intersection (rural) sight distance meets County Standards [HDM 201.1]				
Intersection (urban) sight distance meets County Standards [A-5b]				
Mailboxes conform to County Standards [4.1.7 F]				
Multi use trails conform to County Standards [A-1a, A-2a & 4.1.3]				
Pedestrian barricades conform to County Standards [M-3 & 4.1.7 C]				
Pedestrian crossings conform to County Standards [4.1.4]				
Pedestrian easements shown on map [or recorded prior to plan approval]				
Ramps and trails cross only at intersections [4.1.3 C]				
Sidewalks conform to County Standards [C-1 & C-4]				
Sidewalks meet ADA accessibility requirements [4.1.2 A]				
Signs shown and conform to County Standards [M-4]				
►Other plan check comments:				

X = Not Applicable O = Requires Compliance ✓ = Complied Page 5 of 7

San Luis Obispo County Public Works Department: Improvement Plan Checklist

Storm Drainage [Section 5.1]:	1st	2nd	3rd	4th
►Conforms with Public Improvement Standards, Section 5				
Adequate topography shown for drainage design				
Catch Basins conform to County Standards [D-2 series & 5.2.1 B]				
Cross Gutters & Spandrels conform to County Standards [D-5]				
Cross gutters shall not cross roadways with future ADT>3,000 ADT				
Downstream evaluation conforms with County Standards [5.1.2 C]				
Drainage conforms with adopted Area Drainage Studies				
Drainage easements shown on map (or recorded prior to plan approval)				
Drainage Report accurately reflect plans				
Drainage Report conforms to County Standards [Appendix H & H-series drawings]				
Drainage Report provided and adequate design approach (sign, seal, date)				
Headwall conform to County Standards [5.2.1 D]				
Hydraulic calculations acceptable				
Hydrology calculations acceptable				
Manholes conform to County Standards [D-3 series & 5.2.1 A]				
Plans identify "Point of Discharge" per CBC 1805.3.4 (2001 CBC 1806.5.5)				
Primary & secondary design storm evaluated [5.1.1 E]				
Primary design storm HGL 0.5' below inlet grate and manhole covers [5.1.2 B]				
Provision for overland escape [5.1.2 D]				
Retaining walls in basins "suitable for intended use" letter (sign, seal, date)				
Retention & Detention Basins conform to County Standards [D-1 series & 5.2.2]				
Sidewalk underdrains conform to County Standards [D-4 series]				
Storm drainage system conforms to County Standards [5.1.4]				
Storm drains conform to County Standards [5.2.4 & 5.2.5]				
►Other plan check comments:				

Water Supply [Section 6.1]:	1st	2nd	3rd	4th
►Conforms with Public Improvement Standards, Section 6				
Project connects to existing community water system				
• Water purveyor's standard details provided in plan set				
• Construction callouts for valves, blowoffs, airvacs, meters, thrust blocks, etc				
• Water purveyor's signature block on title sheet				
<*or*> Project utilizes individual wells				
<*or*> Project utilizes private water system				
• Airvacs shown as required				
• Blowoffs shown as required [or fire hydrants]				
• Cross connections				
• Distribution lines				
• Flow requirements met				
• Hydrant location and spacing				
• Services provided to each lot				
• Standard details provided in plan set				
• Storage requirements met				
• Valves and thrust blocks at line intersections and bends				
►Other plan check comments:				

X = *Not Applicable* O = *Requires Compliance* ✓ = *Complied* Page 6 of 7

San Luis Obispo County Public Works Department: Improvement Plan Checklist

Wastewater Disposal [Section 7.1]:	1st	2nd	3rd	4th
►Conforms with Public Improvement Standards, Section 7				
Project connects to existing community sewer system				
• Sewer purveyor's standard details provided in plan set				
• Construction callouts for all manholes, cleanouts, backflow devices, etc				
• Sewer purveyor's signature block on title sheet				
<or> Project utilizes individual septic disposal system				
<or> Project utilizes private sewer collection and treatment system				
• Collection lines				
• Cross connections				
• Flow requirements met				
• Lift stations				
• Manholes, cleanouts				
• Services provided to each lot				
• Standard details provided in plan set				
• Storage requirements met				
• Treatment requirements met				
►Other plan check comments:				

Utilities [Section 8.1]:	1st	2nd	3rd	4th
►Conforms with Public Improvement Standards, Section 8				
All above ground utilities are located outside "clear zone" [4.1.7 A]				
All utilities are stubbed to serve each new or existing lot [8.1.1 E]				
Any offsite utility tie-in shown and labeled on plans				
Fire hydrant location and spacing conforms to Fire Agency standards [W-2]				
Plans show and label all utility easements & P.U.E.				
Plans show County Standard Utility Notes [8.1.1 B4]				
Trenching conforms to County Standards [U-4 series]				
Undergrounding of frontage utilities in urban areas [Title 21]				
Utility appurtenances located out of sidewalk [C-4 note 10]				
Utility company signature block on title sheet (Electric, Gas, Telephone, CATV)				
Utility location conforms to County Standards [U-1 & U-2]				
Water-Sewer separation conforms to Public Health Standards [U-3 series]				
►Other plan check comments:				

Traffic Control [Section 9.1]:	1st	2nd	3rd	4th
►Conforms with Public Improvement Standards, Section 9				
All plan sheets reviewed and approved by PW Transportation				
Permanent traffic controls conform to County Standards [9.1.2]				
Standard signal and lighting plan notes provided [9.1.2 B8]				
Standard traffic control notes provided [Appendixes A, K & L]				
Traffic Control Plan conforms to County Standards [9.1.1]				
►Other plan check comments:				

X = Not Applicable O = Requires Compliance ✓ = Complied Page 7 of 7

San Luis Obispo County Public Works Department

DESIGN EXCEPTION REQUEST FORM

(Section 1.2 of the Public Improvement Standards)

Date:

Project Name:
APN:
Community:
Engineer:

Road Information: (*completed by Public Works*)

Road Name	Road No.	Forecast ADT	Req. Road Std.	Collision/mm	RSA

Design Engineer Required Submittal: (*completed by the Engineer of Record. Use as much space as necessary*)

1. Proposed Project and Existing Site Conditions.

2. Project Conditioned or Required Design Standards.

3. Proposed Alternative Design Standards.

4. Reasons for Requesting Design Exception.

5. Determination that the proposed alternative provides the same level of service, approximately the same estimated maintenance costs, and is not adverse to public health, safety and welfare.

6. For the reasoning and professional judgment indicated above, I recommend this design exception be approved by the Public Works Department.

_____ _____

Name Date

Seal

_____ _____

Development Services Engineer Concurrence Date

_____ _____

Transportation Engineer Concurrence Date

_____ _____

Utility Division Manager Concurrence Date

Design Exception Approved

_____ _____

Deputy Director of Public Works Date

Road File:
V:_DEVSERV Forms\Plan Check Unit\Form-Design Exception Request Form.doc

APPENDIX B

Americans with Disabilities Act (ADA) Guidance

B1: Reserved for future ADA Grievance Form

San Luis Obispo County Public Works Department

ADA DESIGN EXCEPTION REQUEST FORM

(Section 1.3 of the Public Improvement Standards)

Date:

Project Name:
APN:
Community:
Engineer:

Road Information: (*completed by Public Works*)

Road Name	Road No.	Forecast ADT	Req. Road Std.	Collision/mm	RSA

Design Engineer Required Submittal: (*completed by the Engineer of Work. Use as much space as necessary*)

1. Proposed Project and Existing Site Conditions.

2. Project Conditioned or Required Design Standards.

3. Proposed Alternative Design Standards.

4. Reasons for Requesting Design Exception.

5. Determination that the proposed alternative provides substantially equivalent or greater access as the minimum Federal and State accessibility standards.

6. For the reasoning and professional judgment indicated above, I recommend this design exception be approved by the Public Works Department.

_____ _____

Name Date

Seal

_____ _____

Development Services Engineer Concurrence Date

_____ _____

Transportation Engineer Concurrence Date

ADA Design Exception Approved

_____ _____

Public Works ADA Design Coordinator Date

Road File:
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State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: DISTRICT DIRECTORS
DEPUTY DIRECTORS
DIVISION CHIEFS

Date: October 1, 2013

File: 608

From: TIMOTHY CRAGGS
Chief
Division of Design

Subject: **DESIGN INFORMATION BULLETIN (DIB) 82-05**

DIB 82, "Pedestrian Accessibility Guidelines for Highway Projects", has been updated. Version 82-05 is now available on the Division of Design website: www.dot.ca.gov/hq/oppd/dib/dib82-05.pdf and is effective as of the date of this memorandum. Projects, where project development efforts have started, shall comply with Highway Design Manual (HDM) Index 82.5 "Effective Date for Implementing Design Revisions to Design Standards."

SUMMARY OF SIGNIFICANT CHANGES IN DIB 82-05

This revision reflects recent changes in Federal and State guidance. The following is a summary of the key changes:

- The 1991 Americans with Disabilities Act Accessibility Guidelines (ADAAG) has been replaced by the 2010 ADA (Americans with Disabilities Act) Standards.
- The Federal Highway Administration (FHWA) has issued revised guidance for when curb ramps are required on resurfacing projects.
- The FHWA has allowed more use of the draft Public Rights of Way Accessibility Guidelines (PROWAG) as design standards.
- The California Building Code 2013 (Title 24) has been updated and was published in July 2013.
- Incorporation of the previously distributed "Curb Ramp Scoping and Design Memo" as an appendix to the DIB.
- In addition, minor changes were also made to update terminology, provide clarifications, etc.

Training on pedestrian accessibility design for highway projects and this DIB is available from the Office of Geometric Design Standards on an as needed basis. If training is desired in the Region or District, please inform the Division of Design Coordinator to arrange for its delivery.

If you have any questions on this DIB, please contact Kevin Herritt, Chief, Office of Geometric Design Standards, at (916) 653-0253, or David Cordova, Office of Geometric Design Standards, at (916) 653-0485. Project specific applicability and questions should be referred to the Division of Design District Coordinators.

c: DCordova
KMHerritt
JBenton
Design Coordinators and Design Reviewers
Design Files

DESIGN INFORMATION BULLETIN NUMBER 82-05

Department of Transportation
Division of Design
Office of Geometric Design Standards

PEDESTRIAN ACCESSIBILITY GUIDELINES FOR HIGHWAY PROJECTS

APPROVED BY:

TIMOTHY CRAGGS
DIVISION CHIEF
DIVISION OF DESIGN

October 1, 2013

Table of Contents

		Page Number
1.0	Background	1
2.0	Definitions	1
3.0	Procedures	2
3.1	Applicability and Review Process	2
3.2	Rail and Transit Stations	3
3.2.1	Filing Fees for Rail and Transit Station Projects	3
4.0	Design Guidance and Best Practices for Pedestrian Facilities	4
4.1	Pedestrian Accessibility	4
4.1.1	New Construction	4
4.1.2	Alterations	4
4.1.3	Accessibility Requirements on 2R, 3R and CAPM Projects	5
4.1.4	Minimum Accessibility	5
4.1.5	Historic Preservation	5
4.1.6	Program Accessibility	6
4.2	Placement of Pedestrian Facilities	6
4.3	Accessibility Design Standards	6
4.3.1	Surface	7
4.3.2	Vertical Clearance	7
4.3.3	Clear Width	8
4.3.4	Grade	8
4.3.5	Cross Slope	9
4.3.6	Grates and Railroad Tracks	9
4.3.7	Ramps	9
4.3.8	Curb Ramps	10
4.3.9	Medians and Islands	11
4.3.10	Handrails	11
4.3.11	Warning Curb and Guard	12
4.3.12	Curb or Barrier	13
4.3.13	Landings	13
4.3.14	Detectable Warning Surface	13

Table of Contents (Continued)

		Page Number
4.3.15	Grooves	14
4.3.16	Bus Stops	15
4.3.17	Parking	15
4.3.18	Trails	16
4.3.19	Protruding Objects	17
4.4	Shared Facilities	17
4.5	Alternate Standards	17
4.6	Temporary Traffic Control	18
4.7	Exhibits	18

Attachment

Exception to Accessibility Design Standards	A-1

Appendix

Curb Ramp Scoping and Design	Appendix-1

Tables

TABLE 4.3.7	Helical Radius Requirements	10
TABLE 4.3.8	Curb Ramp Runs for Sidewalks with 2.0% Cross Slopes	11
TABLE 4.3.17	Off Street Accessible Parking Space Requirements	16

1.0 BACKGROUND

The Americans with Disabilities Act (ADA) of 1990, along with its implementing regulations, and the California Government Code Sections 4450 et seq. prescribe that facilities shall be made accessible to persons with disabilities. To comply with the ADA, the 2010 ADA Standards, as adopted by the United States Department of Justice (DOJ), shall apply to the design of the California Department of Transportation (Caltrans) facilities. Although the 2010 ADA Standards are not specifically written for public rights-of-way projects, some of the provisions can apply to the highway environment and are included in this Design Information Bulletin (DIB). Until the draft Public Rights-of-Way Accessibility Guidelines (PROWAG) are adopted and binding, the 2010 ADA Standards are to be used as the primary basis of accessibility standards for public rights-of-way.

In addition to the 2010 ADA Standards, other Federal documents on designing accessible pedestrian facilities in public rights-of-way were used to develop this DIB. For example, the publication Designing Sidewalks and Trails for Access is referred to several times and is available on the Internet at:

www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/sidewalk2/tranmemo.cfm

Also, certain portions of the PROWAG, as agreed to by the Federal Highway Administration (FHWA), are used in this DIB.

Title 24 of the California Code of Regulations (Title 24) is similar to the 2010 ADA Standards in that it prescribes accessibility design standards for the State of California; in Part 2, the California Building Code. The Department of General Services - Division of the State Architect (DSA) oversees California Building Code compliance. However, for transportation facilities on the State highway system, Caltrans (in addition to DSA) is authorized to certify, on a project-by-project basis, that a project complies with State pedestrian accessibility design standards. Rail and transit stations are the exception. Rail and transit stations are to be reviewed and require an approval from DSA to certify accessibility compliance.

This DIB has been written to provide general design guidance on how to comply with the various Federal laws and State codes on pedestrian accessibility for public use. The accessibility requirements typically associated with projects constructed in public rights-of-way have been presented in this DIB as "accessibility design standards" only to facilitate Caltrans processes and procedures. It is not the intent of this DIB to discuss all of the various Federal laws and State codes that apply to making buildings and public facilities accessible; nor is it the intent of this DIB to diminish the importance of and the requirement to comply with those accessibility standards not specifically mentioned in this DIB and as may be required on a project-by-project basis. See Section 3.1 of this DIB for further guidance on the review process for projects.

2.0 DEFINITIONS

The following words and phrases that are shown in bold text are used in this DIB and are defined as follows. As appropriate, referenced documents are noted within the brackets to indicate the source of the definition.

Accessible: A site, building, facility, or portion thereof that complies with this part (of the 2010 ADA Standards) [2010 ADA Standards].

Element: An architectural or mechanical component of a building, facility, space, site, or public right-of-way [PROWAG].

Facility: All or any portion of buildings, structures, improvements, elements, and pedestrian or vehicular routes located in a public right-of-way [PROWAG].

Historic Property/Historical Resources: Under Federal law [36 CFR 800.16(l)] the term used is "Historic Property" and includes any building, structure, site, object or district that is listed in or eligible for listing in the National Register of Historic Places.

Under State law [CEQA Guidelines 15064.5 and California Public Resources Code 5020] the term used is "Historical Resources" and includes any building, structure, site, object or district that meets one of the following:

- Listed in or eligible for listing in the National Register of Historic Places,
- Listed in or eligible for listing in the California Register of Historical Resources,
- Has been identified as significant for purposes of the California Environmental Quality Act (CEQA) by the lead agency because it meets the eligibility criteria of the California Register,
- Is listed in a local register of historical resources or has been identified as significant in an historical resource survey meeting the California Office of Historic Preservation's standards.

Path or Pathway: A track or route along which people are intended to travel [*Designing Sidewalks and Trails for Access*].

Pedestrian: A person who travels on foot or who uses assistive devices, such as a wheelchair, for mobility [*Designing Sidewalks and Trails for Access*].

Public Right-of-Way: Public land or property, usually in interconnected corridors, that is acquired for or devoted to transportation purposes [PROWAG].

Sidewalk: A surfaced pedestrian way contiguous to a street used by the public [Title 24 11B-106.5]. Also, see the discussion in Section 4.3.1, "Surface" of this DIB.

State Highway: A traversable highway adopted as or designated in the Streets and Highways Code as a state highway.

Structurally Impracticable: Rare circumstances when the unique characteristics of terrain prevent the incorporation of accessibility features. [28 CFR 35.151(a)(2)(i)].

Technically Infeasible: With respect to an alteration of a building or a facility, something that has little likelihood of being accomplished because existing structural conditions would require removing or altering a load-bearing member that is an essential part of the structural frame; or because other existing physical or site constraints prohibit modification or addition of elements, spaces, or features that are in full and strict compliance with the minimum requirements. [2010 ADA Standards].

Transition Plan: Caltrans' written commitment to accomplish ADA compliance in its services, programs, and activities.

Walk or Walkway: An exterior prepared surface for pedestrian use, including pedestrian areas such as plazas and courts. [2010 ADA Standards].

3.0 PROCEDURES

3.1 Applicability and Review Process

Every highway project (Capital and Maintenance; including <u>all</u> Encroachment Permit projects) within the State highway right-of-way, regardless of the project sponsor, that proposes to construct pedestrian facilities [See Section 4.1], must be designed in accordance with the policies and standards of this DIB. Accessibility design standards are listed in Section 4.3. Documentation of project compliance with this DIB will be at Ready-to-List (RTL) Certification (by checking the appropriate box on Section 4c of the RTL Certification Form), or at encroachment permit issuance, whichever is applicable.

If an accessibility design standard cannot be fully incorporated in a design, an accessibility design exception will be required. For an accessibility design exception to be approved, it will be necessary to document that, in the case of alterations to existing facilities, it is technically infeasible to do so. For new construction, the accessibility design standard must be structurally impracticable. Approval of accessibility design exceptions shall occur prior to project approval or as soon as the recommended alternative is identified. Accessibility design exceptions shall be documented, using the Exception to Accessibility Design Standards document format [See Attachment], and approved by the Design Coordinator. The Division of Engineering Services (DES) – Office of Transportation Architecture (OTA) will determine the compliance with accessibility design standards that pertain to building projects. Please note, the external site work not part of the building PS&E will be subject to the procedures in this DIB. OTA will provide ADA site design assistance for the Districts on building projects that they are responsible for designing.

3.2 Rail and Transit Stations

Approval authority for accessibility design of rail and transit stations rests with DSA and must occur by RTL or encroachment permit issuance. The appropriate filing fees [See Section 3.2.1] and a completed application form [See www.documents.dgs.ca.gov/dsa/forms/DSA-1.pdf] need to be transmitted to DSA along with the title sheet and pertinent project plans that show the details of the rail or transit station facilities being altered or newly constructed. DSA's office locations are listed on their website at:

www.dgs.ca.gov/dsa/AboutUs/contact.aspx

An Exception to Accessibility Design Standards document [See Attachment] must also be submitted as supplemental information when an exception is being requested to the accessibility design standards listed in Section 4.3 of this DIB. The DSA Regional Office will need to be contacted to discuss these details and confirm their specific requirements. Early submittal to DSA is recommended once enough design information, such as layouts, cross sections, profiles, construction details, etc. are developed and it is certain that the pedestrian facility design will not change. In the event of disagreement with the DSA Regional Office, DSA has an appeal process, which may invoke the involvement with their Headquarters DSA Office. The Headquarters Division of Design ADA Technical Specialist should be contacted immediately to assist with the negotiations and to contact the FHWA California Division Office for their assistance in resolving the issue(s). The DSA Regional Office normal review process is expected to take between 30 and 60 days from application submittal until receipt of their approval letter. Approval letters will be sent by DSA to the Project Engineer for incorporation into the project history files. DSA will stamp copies of the plan sheets that have been sent to them for their use during the project review and will retain them for their records.

3.2.1 Filing Fees for Rail and Transit Station Projects

Filing fees are to be calculated according to the fee schedule as prescribed in the *California Building Code* and as administered by DSA. The DSA website provides a fee calculator to determine the filing fee [See www.apps.dgs.ca.gov/tracker/FeeCalculator.aspx]. The fees to be paid by Caltrans can be authorized by completing the "Request for Revolving Fund Check" form (FA-0017). This form should indicate that the "Vendor" is DSA and that the expenditure is to be charged against the Project ID and the appropriate Object Code. The check can be mailed directly to the DSA Regional Office, if requested on the form. On the form, under "Purpose," indicate that this payment is for the DSA filing fee and reference the District and Project ID. The District and Project ID will then be referenced on the check for identification purposes. The completed form FA-0017 should then be mailed to Mail Station 25 (MS 25) or faxed (916-227-8766) to the Division of Accounting, Service Payables Branch, Alpha G. The completed DSA

application form for the project must be sent with this form to substantiate payment. It is anticipated that it should not take more than 5 working days to obtain this check.

4.0 DESIGN GUIDANCE AND BEST PRACTICES FOR PEDESTRIAN FACILITIES

4.1 Pedestrian Accessibility

All pedestrian facilities on all projects are to be accessible in accordance with State and Federal laws. The following guidance and best practices capture the lessons learned through the years since the passage of the ADA and to document the Federal and State regulatory standards that apply. Early consultation with the Design Coordinator is recommended to discuss pedestrian accessibility issues and their resolution. In addition, for safety roadside rest facilities, vista points, and park and ride facilities, early consultation is recommended with the Landscape Architecture Program District Coordinator.

4.1.1 New Construction

Federal regulations require that each facility or part of a facility constructed on State right-of-way shall be designed and constructed in such a manner that the facility or part of the facility is readily accessible to and usable by individuals with disabilities.

4.1.2 Alterations

Federal regulations require that each facility or part of a facility altered in the State right-of-way in a manner that affects or could affect the usability of the facility or part of the facility shall, to the maximum extent feasible, be altered in such manner that the altered portion of the facility is readily accessible to and usable by individuals with disabilities.

Where existing elements, spaces, or facilities are altered, each altered element, space or facility within the scope of the project shall comply with the applicable requirements for new construction. The work that will physically impact a pedestrian feature is due to the scope of the project identified in the project initiation document or the project report.

More specifically, the following types of highway work are considered to be alterations of existing facilities:

1. Pavement Reconstruction. For more information, see Chapter 600 of the *Highway Design Manual*.
2. Pavement focused (2R) and resurfacing, restoration, and rehabilitation (3R) work. For additional guidance see DIB 79 – "Design Guidance and Standards for Roadway Rehabilitation Projects [Pavement Focused (2R) and Resurfacing, Restoration, and Rehabilitation (3R) Projects] . . ."
3. Capital Preventive Maintenance (CAPM) projects. For additional guidance see DIB 81 – "Capital Preventive Maintenance (CAPM) Guidelines."
4. Major Maintenance, HM-1 Program (Pavement), thin overlay projects or projects to place open-graded surface course, microsurfacing, cape seals, and in-place asphalt recycling. For additional guidance see Highway Maintenance Guidelines (Maintenance Policy Directives).
5. Any work that physically impacts existing curb ramps.

Regarding items 1 through 5, for the intersections that are altered, existing nonstandard curb ramps will be required to be reconstructed to current standards; and where missing, curb ramps are to be constructed where there are sidewalks or other pedestrian facilities. Additionally, item 1 will require the marked crosswalk (or unmarked crosswalk to pedestrian facilities) cross slope and grade to be reconstructed to current standards. Item 2 will require the marked crosswalk (or unmarked crosswalk to pedestrian facilities) grade to be reconstructed to current standards. Routine maintenance work is not considered to be

an alteration and may be designed following the guidance in this DIB, but they are not required to unless the work significantly affects a pedestrian facility.

4.1.3 Accessibility Requirements on 2R, 3R, and CAPM Projects

2R, 3R, and CAPM projects are SHOPP funded pavement projects that have specific program requirements for the inclusion of safety and operational improvements. Other improvements may supplement the minimum accessibility requirements in Section 4.1.2, such as, including sidewalk and driveway corrections. The accessibility needs of the communities and highway users, in particular the needs of users with disabilities, need to be considered on each 2R, 3R, and CAPM project. Early stakeholder participation, as appropriate, to identify accessibility deficiencies is recommended.

Any pedestrian facility work that needs to be completed outside of the scope of a 2R, 3R, or CAPM project should be added to the Transition Plan through the following process. The pedestrian facility needing accessibility improvements must be specifically identified and documented by memorandum to the project history file. The District ADA Engineer needs to be contacted and involved in submitting this information. Externally sponsored work that is not being designed by Caltrans is not exempt from this requirement. The Caltrans representative that is working with the external sponsor for the work is required to contact the District ADA Engineer and assist the external partner in submitting any work for inclusion in the Caltrans Transition Plan.

4.1.4 Minimum Accessibility

Newly constructed or altered (see Section 4.1.2) streets, roads, and highways must contain curb ramps or other sloped areas at any intersection having curbs or other barriers to entry from a street level pedestrian walkway. This context refers to entry to a sidewalk or pedestrian path from a street level pedestrian walkway.

To the maximum extent feasible, at least one accessible route must be provided from one facility to another. If a more direct route exists that is not an accessible route, the accessible route must be in the same vicinity as the other route.

Whether the project is for new construction or for an alteration of an existing facility, full compliance with the design standards contained herein are not required where it can be demonstrated that it is structurally impracticable (for new construction) or technically infeasible (for alterations projects) to meet the requirements. An exception would be required as explained in Section 3.1. Any portion of the new facility that can be made accessible to persons with disabilities shall comply to the extent that it is not structurally impracticable. Also, any elements or features of the facility that are being altered and can be made accessible shall be made accessible within the scope of the alteration. Regarding scope, a more extensive discussion is provided in the Appendix of this DIB.

4.1.5 Historic Preservation

In meeting the aforementioned requirements of “Minimum Accessibility,” a design that would alter or destroy the historic significance of a historic property/historical resource should not be constructed. Historic property/historical resource is any property listed or eligible for listing in the National Register of Historic Places, or properties designated as historic under State or local law. In order to comply with Public Resources Code 5024 and CEQA, the District Heritage Resources Coordinator should be contacted as early as possible in the planning process in order to initiate the required consultation. Non-construction strategies may be an option. See Section 4.1.6, “Program Accessibility” of this DIB.

The fourth item under Section 4.3.7 in this DIB may be used to maintain historic preservation of a historic property/historical resource based on the California State Historic Building Code, which is the mandatory

code for State-owned historical resources. An approved accessibility design exception must be obtained to use this standard. Additionally, consultation with the State Historical Building Safety Board is required

4.1.6 Program Accessibility

In some situations, an operational solution may achieve accessibility without the need for construction. Alterations to existing facilities do not have to be made accessible if other methods of providing access are effective. Non-construction approaches may include alternate accessible routings, relocating services or activities to accessible locations, or taking the service or benefit directly to the individual. Coordination with local agencies, transit agencies, or other affected entities may be required to achieve these strategies.

4.2 Placement of Pedestrian Facilities

Vehicular lanes and shoulders are not required to be designed as accessible pedestrian routes. Where vehicular lanes and shoulders are intended by Caltrans for pedestrian use, thus rendering them walkways, they shall be made accessible.

Deciding to construct pedestrian facilities and elements where none exist is an important consideration. In built-up urban areas with pedestrians present, pedestrian facilities should be constructed. In rural areas where few or no pedestrians exist, it may not be reasonable or cost effective to construct pedestrian facilities. For situations between these two extremes the designer should consult with the affected local agency, and special interest groups. Any decision made should be clearly documented in the Project History Files.

All pedestrian facilities proposed within the State highway right-of-way shall follow the guidance in Chapter 31 "Non-motorized Transportation Facilities" in the *Project Development Procedures Manual*. Pedestrian facilities proposed by non-Departmental entities within State highway access controlled right-of-way shall also comply with Chapter 17 "Encroachments in Caltrans' Right of Way," in the *Project Development Procedures Manual*.

4.3 Accessibility Design Standards

The most current version of the *Standard Plans* (this includes Revised Standard Plans) for Curbs and Driveways A87A, Curb Ramp Details A88A, Curb Ramp and Island Passageway Details A88B, Accessible Parking Off-Street A90A, and Accessible Parking On-Street A90B should be used for designing accessible facilities. The *Standard Plans* are used for commonly designed accessible features and are consistent with this DIB. Curb ramps or pedestrian paths in the *Standard Plans* contain conservative slopes and widths (not the same slopes and widths as in this DIB) and may be used where the designer has determined that due to relatively flat terrain and ample space these conservative designs are realistically attainable. However, where the designer has determined that due to existing grades and space constraints the *Standard Plans* may not achieve accessibility, a Construction Detail according to the standards and best practices of this section should be developed. Construction Details for curb ramps and driveway crossings designed as part of the pedestrian route should specify the slopes and dimensional widths that require contractor surveys (see the PS&E section of the Appendix and the *Plans Preparation Manual* for further guidance). In many cases, designing to the maximum slope or minimum width is unnecessary. The concept of designing using conservative slopes and widths is recommended. Modifying the features shown on the *Standard Plans* or designing pedestrian facilities not covered by the *Standard Plans*, such as in a Construction Detail, shall be in accordance with the following standards and best practices. Following each accessibility design standard is a reference to the applicable Federal and/or State regulation.

4.3.1 Surface

(1) All surfaces on an accessible route shall be stable, firm, and slip resistant.
[2010 ADA Standards 302.1 and Title 24 11B-302.1]

(2) Changes in level up to ¼ inch may be vertical and without edge treatment.
[2010 ADA Standards 303.2 and Title 24 11B-303.2]

(3) Changes in level between ¼ inch and ½ inch shall be beveled with a slope no greater than 1V:2H.
[2010 ADA Standards 303.3 and Title 24 11B-303.3]

(4) Changes in level greater than ½ inch shall be accomplished by means of a ramp.
[2010 ADA Standards 303.4 and Title 24 11B-303.4]

Surface types on State right of way can vary due to the type of facility served. Normally, sidewalks are made of Portland cement concrete, or in some situations asphalt concrete. Surface type selection is a decision made by the designer. Design factors to consider for surface materials are discussed in *Designing Sidewalks and Trails for Access*.

The use of paving units, stamped concrete, or stamped asphalt concrete, although within the surface uniformity requirements of an accessible route, could lead to a vibration effect causing repeated jarring to a wheelchair user. No roughness index exists for walkways, as it does for roadway surfaces. Until such guidance becomes available, engineering judgment must be used; the Design Reviewer or Traffic Operations Liaison can be consulted for further assistance. As a general rule, cobblestone or similar treatments should not be used. It should be noted that the change in level standards in (2) and (3) does not apply to the curb ramp – gutter transition; it should be flush (no lip).

If paving units are used, they must meet the specification requirements of the American Society for Testing and Materials (ASTM) C936.

All walkway surfaces shall have a broom finish texture or an equivalent. A broom finish surface is described in Section 73 of the current *Standard Specifications*. Regardless of surface type, if the walkway encroaches onto a roadway, as in the case of a crosswalk, the surface must have a coefficient of friction not less than 0.35 as determined by using California Test Method 342.

At present, no particular color requirement is prescribed in Federal guidelines for an accessible route; see the Detectable Warning Surface section of this DIB regarding the color specification. However, material used to provide contrast of detectable warnings on walkway surfaces should have a contrast of at least 70%. This contrast is intended to assist the visually impaired pedestrian. This contrast is calculated by [(B1-B2)/B1] x 100, where B1=light reflectance value (LRV) of the lighter area, and B2=light reflectance value (LRV) of the darker area. Visual contrast can be quantified with a luminance meter that measures the amount of light reflected by each subject (where zero is total darkness and 100 is theoretical complete light reflection). This contrast may be used to distinguish elements of a walkway, such as to differentiate a curb ramp from the sidewalk, or the crosswalk from the rest of the pavement. Also, crosswalk or sidewalk surfacing shall not cause glare to the user. Colored pavement or paving units are not to be used in lieu of striping for marked crosswalks.

4.3.2 Vertical Clearance

(1) Vertical clearance shall be 80 inches high minimum.
[2010 ADA Standards 307.4 and Title 24 11B-307.4]

It should be noted that the Federal and California State version of the *Manual on Uniform Traffic Control Devices (MUTCD)* requires a vertical clearance at pedestrian pathways to the bottom of signs to be at least

7 feet. This will meet most pedestrian vertical clearance needs. Pedestrian pathways that are part of a shared facility, i.e., bicyclists and equestrians, shall follow the appropriate guidance in the *Highway Design Manual*. See Section 4.4, "Shared Facilities" of this DIB for further information.

4.3.3 Clear Width

See the *Highway Design Manual (HDM)* Index 105.2 for the discussion and Advisory Design Standard, of sidewalk width. In many locations, local agency sidewalk standards will require greater widths; which can provide even greater accessibility than the minimum standard stated in the *HDM*. If for a specific project this is the case, the local agency standard should be used. Street furniture, signs, above ground utilities and poles, business frontage needs, street landscaping, etc. should all be placed outside of the clear width of a sidewalk.

In addition to the standards referenced above, the following Accessibility Design Standards are to be followed:

(1) If an accessible route has less than 60 inches clear width, then passing spaces at least 60 inches by 60 inches shall be located at intervals not to exceed 200 feet.
[2010 ADA Standards 403.5.3 and Title 24 11B-403.5.3]

(2) The clear width for sidewalks and walks shall be 48 inches minimum, exclusive of the width of the curb.
[Title 24 11B-403.5.1.3 and PROWAG R302.3]

(3) When, because of right-of-way restrictions, natural barriers or other existing conditions, the enforcing agency determines that compliance with the 48-inch clear sidewalk width would create an unreasonable hardship, the clear width may be reduced to 36 inches.
[Title 2411B-403.5.1.3]

Regarding (3) above, an unreasonable hardship must be concurred with by the Design Coordinator and documented using the Exception to Accessibility Design Standards format (see attached). In the exception document under Reason for Exception, the following factors for an unreasonable hardship are to be discussed for each location: 1) the cost of providing access, 2) the impact of proposed improvements on financial feasibility of the project, 3) the nature of the accessibility which will be gained or lost, and 4) the nature of the use of the facility under construction and its availability to persons with disabilities.

4.3.4 Grade

(1) All walks with continuous gradients shall have resting areas, 5 feet in length, at intervals of 400 feet maximum.
[Title 24 11B-403.7]

(2) Where pedestrian access routes are contained within a street or highway right-of-way, the grade of pedestrian access routes shall not exceed the general grade established for the adjacent street or highway. Where pedestrian access routes are not contained within a street or highway right-of-way, the grade of pedestrian access routes shall be 5.0% maximum.
[PROWAG R302.5]

(3) When pedestrian access routes are contained within pedestrian street crossings, the grade of the pedestrian route shall be 5.0% maximum.
[PROWAG R302.5.1]

The accessibility standard in (1) above does not apply to sidewalks, but (2) does. The grade or slope of an accessible route should be as flat as possible. Since exterior facilities must drain, a walkway can be at 2.0% and still be considered level. The practical use of the accessibility standard in (1) above is thus applied for grades exceeding 2.0%; the "resting areas" are considered level, not exceeding 2.0%. Any part

of an accessible route with a slope greater than 1V:20H (5.0%) shall be considered a ramp, and must comply with the standards of a ramp. See Section 4.3.7 of this DIB, "Ramps," for further information.

A profile of the pedestrian pathway should be developed to ensure compliance with grade and other design parameters.

4.3.5 Cross Slope

(1) Except as provided in Section 4.3.5(2) and (3), the cross slope of pedestrian access shall be 2.0% maximum.
[PROWAG R302.6]

(2) Where pedestrian access routes are contained within pedestrian street crossings without yield or stop control, the cross slope of the pedestrian access route shall be 5.0% maximum.
[PROWAG R302.6.1]

(3) Where pedestrian access routes are contained within midblock pedestrian street crossings, the cross slope of the pedestrian access route shall be permitted to equal the street or highway grade.
[PROWAG R302.6.2]

Drainage is always a design consideration for exterior facilities. Walkways shall be designed so that water will not accumulate on the surface. "Yield or stop control" refers to yield or stop signs for the State highway traffic movement.

4.3.6 Grates and Railroad Tracks

(1) If gratings are located in walks, then they shall have spaces no greater than ½ inch in one direction. If gratings have elongated openings, then they shall be placed so that the long dimension is perpendicular to the dominant direction of travel.
[2010 ADA Standards 302.3 and Title 24 11B-302.3]

(2) Where a path crosses tracks, the opening for wheel flanges shall be permitted to be 2-½ inches maximum.
[2010 ADA Standards 810.10 and Title 24 11B-810.10 Exception]

Walks shall be free of grating whenever possible.

4.3.7 Ramps

(1) Slopes that are greater than 1V:20H (5.0%) will be considered ramps and must not exceed a 30-inch rise without landings.
[2010 ADA Standards 106.5, 405.6 and Title 24 11B-403.3, 11B-405.6]

(2) The maximum slope of a ramp shall not exceed 1V:12H (8.3%).
[2010 ADA Standards 405.2 and Title 24 11B-405.2]

(3) The cross slope of ramp surfaces shall be no greater than 2.0%.
[2010 ADA Standards 405.3 and Title 24 11B-405.3]

(4) In the case of a historic property/historical resource, ramps no greater than 1V:10H, cannot exceed a horizontal distance of 5 feet. Or, ramps of 1V:6H slope cannot exceed a horizontal distance of 13 inches. Signs shall be posted at upper and lower levels to indicate steepness of the slope.
[Title 24 8-603.6]

This standard should only be used with an approved exception.

It should be noted that a sidewalk is not bound by the requirements of a ramp. Curved (or helical) ramps shall be subject to the same design standards as straight ramps. However, because of the complexity,

curved ramps should not be constructed if a straight ramp can accomplish the same accessibility. If a curved ramp is sloped at the maximum 1V:12H (8.3%), then the minimum radius needed is 50 feet; otherwise, a smaller radius will provide a path that exceeds the maximum 2.0% cross slope. Table 4.3.7 shows the minimum radius required for a given ramp slope:

TABLE 4.3.7 – HELICAL RADIUS REQUIREMENTS

Slope	Minimum Radius Required to Inner Side of Ramp
5.0%	30 feet
8.3%	50 feet

4.3.8 Curb Ramps

The most common curb ramps are the perpendicular (Case A) and the parallel (Case C); these standards and their variations are contained in the *Standard Plans*. The blended transition is also acceptable, although not shown in the *Standard Plans*; it would require a Construction Detail. See the Appendix for a graphical representation of these curb ramps.

(1) Perpendicular and parallel curb ramps shall have a running slope not steeper than 1V:12H (8.3%) maximum but shall not require the ramp length to exceed 15 feet. Blended transitions shall have a running slope not steeper than 1V:20H (5.0%).
[2010 ADA Standards 406.1, 405.2 and Title 24 11B-406.2.1, 406.3.1, 406.4.1, PROWAG R304.2.2, R304.3.2 and R304.4.1]

(2) The clear width of curb ramp runs (excluding any flared sides), blended transitions, and turning spaces shall be 48 inches minimum.
[Title 24 11B-406.5.2]

(3) Landings shall be provided at the tops of curb ramps and blended transitions. The landing clear length shall be 48 inches minimum. Exception: parallel curb ramps shall not be required to comply with the top landing requirement.
[2010 ADA Standards 406.4 and Title 24 11B-406.5.3 including Exception]

(4) Counter slopes of adjoining gutters and road surfaces immediately adjacent to and within 24 inches of the curb ramp shall not be steeper than 1V:20H (5.0%). The adjacent surfaces at transitions at curb ramps to walks, gutters, and streets shall be at the same level.
[2010 ADA Standards 406.2 and Title 24 11B-406.5.8]

(5) Where provided, curb ramp flares shall not be steeper than 1V:10H (10.0%).
[2010 ADA Standards 406.3 and Title 24 11B-406.2.2]

(6) Diagonal curb ramps with flared sides shall have a segment of curb 24 inches long minimum located on each side of the curb ramp and within the marked crossing.
[2010 ADA Standards 406.6 and Title 24 11B-406.5.10]

(7) Diagonal curb ramps provided at marked crossings shall provide the 48 inches minimum clear space within the markings.
[2010 ADA Standards 406.6 and Title 24 11B-406.5.9]

(8) The cross slope of curb ramps, blended transitions, and turning spaces (landings) shall be 2.0% maximum. At pedestrian street crossings without yield or stop control and at midblock pedestrian street crossings, the cross slope shall be permitted to equal the street or highway grade.
[PROWAG R304.5.3]

Regarding (6) above, this standard applies only on flared sides, such as the Case A curb ramp (see Detail B of Standard Plan A88A); the Case C curb ramp and others without flares are not subject to this standard.

Regarding (8) above, the designer should strive to hold a 2.0% cross slope before deciding to match the street or highway grade. In most cases, the 2.0% can be held and a detail would be needed to show the transition and pavement/sidewalk conformance. To accomplish this, the gutter pan must be warped before additional slope, beyond the 2%, is introduced outside of the curb ramp itself (on the pavement and sidewalk). The crosswalk must comply with Section 4.3.5 (also see Section 4.1.2); therefore, cross slope of curb ramps should not exceed that of the crosswalk regardless of roadway profile grade.

Standard Plan A88A shows the illustration of curb ramps that may apply to curved alignments on a corner or on a tangent. The ramp width shall be consistent with the width of an accessible route. Flares are needed if the curb ramp is located where pedestrians may traverse across the ramp.

The Federal recommendation found in Part II of *Designing Sidewalks and Trails for Access* is for curb ramps to be aligned perpendicular to curb face. However, directional curb ramps may be designed by the use of a construction detail that shows a bottom grade break perpendicular to crosswalk travel.

In addition to the curb ramp slope, the cross slope of a sidewalk will determine the horizontal length of the curb ramp run, since anything more than a flat surface (no slope) will require more length to intercept the sidewalk surface. Table 4.3.8 can be used as a design aide when the sidewalk has a 2.0% cross slope.

TABLE 4.3.8 – Curb Ramp Runs for Sidewalks with 2.0% Cross Slopes

Height of Curb Face	**Curb Ramp Run** (Horizontal Length)
4 inches	63 inches
5 inches	78 inches
6 inches	95 inches
7 inches	111 inches
7-½ inches	118-½ inches
8 inches	126 inches

4.3.9 Medians and Islands

(1) Raised islands in crossings shall be cut through level with the street or have curb ramps at both sides.
[2010 ADA Standards 406.7]

The width of the cut through raised medians or islands should be consistent with the widths required in Section 4.3.3 in this DIB. Since the cut for the path through the raised median or island is adjacent to traffic and without a “barrier,” it must have a detectable warning surface as described in Section 4.3.14 in this DIB. The detectable warning surface width and placement shall follow the details in Standard Plan A88B.

4.3.10 Handrails

Handrails are not required on curb ramps or along sidewalks. In all other situations, the following applies:

(1) Ramp runs with a rise greater than 6 inches shall have handrails. Handrails shall be provided on both sides of stairs and ramps.
[2010 ADA Standards 405.8, 505.2 and Title 24 11B-505.2]

(2) Handrails shall be continuous within the full length of each stair flight or ramp run. Inside handrails on switchback or dogleg stairs and ramps shall be continuous between flights and runs.
[2010 ADA Standards 505.3 and Title 24 11B-505.3]

(3) Clearance between handrail gripping surfaces and adjacent surfaces shall be 1-½ inches minimum.
[2010 ADA Standards 505.5 and Title 24 11B-505.5]

(4) Gripping surfaces shall be continuous.
[2010 ADA Standards 505.6 and Title 24 11B-505.6]

(5) Top of handrail gripping surfaces shall be mounted between 34 inches and 38 inches above ramp surface.
[2010 ADA Standards 505.4 and Title 24 11B-505.4]

(6) Handrails shall not rotate within their fittings.
[2010 ADA Standards 505.9 and Title 24 11B-505.9]

(7) Handrail gripping surfaces with a circular cross section shall have an outside diameter of 1¼ inches minimum and 2 inches maximum. Handrail gripping surfaces with a non-circular cross section shall have a perimeter dimension of 4 inches minimum and 6¼ inches maximum, and a cross-section dimension of 2¼ inches maximum.
[2010 ADA Standards 505.7.1, 505.7.2 and Title 24 11B-505.7.1, 505.7.2]

(8) Ramp handrails shall extend horizontally above the landing for 12 inches minimum beyond the top and bottom of ramp runs. Extensions shall return to a wall, guard, or the landing surface, or shall be continuous to the handrail of an adjacent ramp run.
[Title 24 11B-505.10.1]

4.3.11 Warning Curb and Guard

Guard as used in this section is defined in the *California Building Code* [Title 24 202] as a building component or a system of building components located at or near the open sides of elevated walking surfaces that minimizes the possibility of a fall from the walking surface to the lower level. It should be noted that a guard is not an accessibility design feature and not subject to the ADA. A guard is a fire and life safety design feature for elevated pedestrian paths. The guard standards in this DIB do not apply to bridge structures and railings. The Division of Engineering Services guidance on bridge structures applies.

(1) Abrupt changes in level exceeding 4 inches in a vertical dimension between walks, sidewalks or other pedestrian ways and adjacent surfaces or features shall be identified by warning curbs at least 6 inches in height above the walk or sidewalk surface. Exception: a warning curb is not required between a walk or sidewalk and an adjacent street or driveway.
[Title 24 11B-303.5 including Exception #1]

(2) A warning curb is not required when a guard or handrail is provided with a guide rail centered 2 inches minimum and 4 inches maximum above the surface of the walk or sidewalk.
[Title 24 11B-303.5 Exception #2]

(3) Guards shall be located along open-sided walking surfaces, including mezzanines, equipment platforms, stairs, ramps and landings that are located more than 30 inches measured vertically to the floor or grade below at any point within 36 inches horizontally to the edge of the open side.
[Title 24 1013.2]

(4) Required guards shall not be less than 42 inches high, measured vertically as follows: 1) From the adjacent walking surfaces; 2) On stairs, from the line connecting the leading edges of the tread nosings; and 3) On ramps, from the ramp surface at the guard.
[Title 24 1013.3]

(5) Required guards shall not have openings which allow passage of a sphere 4 inches in diameter from the walking surface to the required guard height.
[Title 24 1013.4]

Chain link fence Type CL-4 satisfies the requirements of a guard, see the *Standard Plans* for details.

4.3.12 Curb or Barrier

Where the ramp surface is not bounded by a wall, the ramp shall comply with the following requirements:

(1) A curb, 2 inches high minimum, or barrier shall be provided that prevents the passage of a 4 inch diameter sphere, where any portion of the sphere is within 4 inches of the finish floor or ground surface. To prevent wheel entrapment, the curb or barrier shall provide a continuous and uninterrupted barrier along the length of the ramp.
[2010 ADA Standards 405.9.2 and Title 24 11B-405.9.2]

This requirement is not applicable to sidewalks or curb ramps.

4.3.13 Landings

A level landing is allowed to be sloped up to 2.0% to accommodate drainage. For curb ramp landing guidance, see Section 4.3.8 of this DIB. This DIB does not discuss the situation where a door opens onto a landing at a building entrance. For this situation, as well as with any building egress design, refer to the Office of Transportation Architecture in the Division of Engineering Services. DSA may review and approve building entrance design in combination with the State highway rights-of-way. Processing plans through DSA would be similar to the process described in Sections 3.2 and 3.2.1 of this DIB.

Landings shall be designed as following:

(1) Ramps shall have landings at the top and the bottom of each ramp run.
[2010 ADA Standards 405.7 and Title 24 11B-405.7]

(2) The landing clear width shall be at least as wide as the widest ramp run leading to the landing.
[2010 ADA Standards 405.7.2 and Title 24 11B-405.7.2]

(3) The landing clear length shall be at least 60 inches long minimum. However, the bottom landing length shall be not less than 72 inches.
[2010 ADA Standards 405.7.3 and Title 24 11B-405.7.3, 11B-405.7.3.1]

(4) Top landings shall be not less than 60 inches wide.
[Title 24 11B-405.7.2.1]

(5) Ramps that change direction between runs at landings shall have a clear landing 60 inches minimum by 72 inches minimum in the direction of downward travel from the upper ramp run.
[2010 ADA Standards 405.7.4 and Title 24 11B-405.7.4]

4.3.14 Detectable Warning Surface

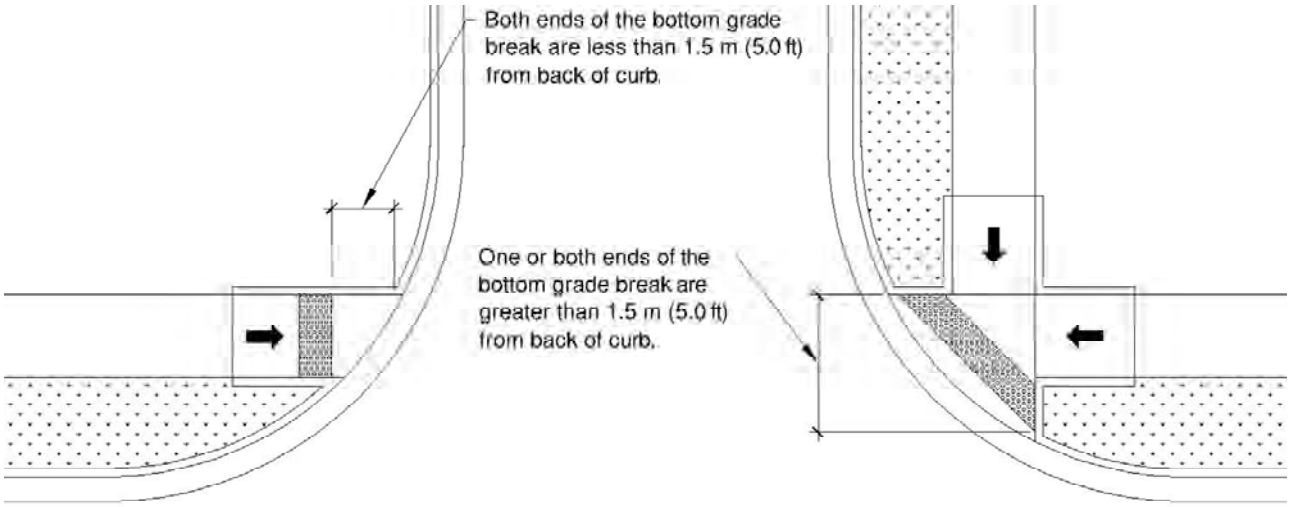
(1) Detectable warnings at hazardous vehicular areas shall be 36 inches in width.
[Title 24 11B-705.1.2.5]

(2) On perpendicular curb ramps, detectable warning surfaces shall be placed as follows (also see figure below):
(a) Where the ends of the bottom grade break are in front of the back of curb, detectable warning surfaces shall be placed at the back of curb.

(b) Where the ends of the bottom grade break are behind the back of curb and the distance from either end of the bottom grade break to back of curb is 5.0 ft or less, detectable warning surfaces shall be placed on the ramp run within one dome spacing of the bottom grade break.

(c) Where the ends of the bottom grade break are behind the back of curb and the distance from either end of the bottom grade break to the back of curb is more than 5.0 ft, detectable warning surfaces shall be placed on the lower landing at the back of curb.

[PROWAG R305.2.1]



Detectable warnings on curb ramps shall consist of raised truncated domes with the 3 foot depth and full width standard shown on Standard Plans A88A, A88B, A90A, and A90B. Detectable warning products generally come in a 4 foot width; this width meets the full width intent when placed on the 4 foot 2 inch curb ramp width shown on the Standard Plans. Additionally, Section 73 of the *Standard Specifications* contains the color, warranty, and Authorized Material List specifications for detectable warning surfaces. Detectable warning surfaces are not normally placed at driveways. However, in some cases driveways at high traffic generators are designed similarly to street intersections; including curb returns and curb ramps. Detectable warning surfaces may be necessary in these instances.

4.3.15 Grooves

(1) Curb ramps shall have a grooved border 12 inches wide along the top of the curb ramp at the level surface of the top landing and at the outside edges of the flared sides. The grooved border shall consist of a series of grooves ¼ inch wide by ¼ inch deep, at ¾ inch on center. Exceptions: 1) At parallel curb ramps, the grooved border shall be on the upper approach immediately adjacent to the curb ramp across the full width of the curb ramp. 2) A grooved border shall not be required at blended transitions.

[Title 24 11B-406.5.11 including Exceptions]

See Standard Plan A88A for grooving detail.

4.3.16 Bus Stops

(1) Bus Stop boarding and alighting areas shall provide a clear length of 96 inches minimum, measured perpendicular to the curb or vehicle roadway edge, and a clear width of 60 inches minimum, measured parallel to the vehicle roadway.
[2010 ADA Standards 810.2.2 and Title 24 11B-810.2.2]

(2) Where provided, new or replaced bus shelters shall be installed or positioned so as to permit a wheelchair or mobility aid user to enter from the public way and to reach a location, having a minimum clear floor area of 30 inches by 48 inches, entirely within the perimeter of the shelter.
[2010 ADA Standards 305.3 and Title 24 11B-810.3]

(3) Bus stop boarding and alighting areas shall be connected to streets, sidewalks, or pedestrian paths by an accessible route. Newly constructed bus stop pads shall provide a square curb transition between the pad and roadway elevations or detectable warnings.
[Title 24 11B-810.2.3]

Caltrans Type A or B curb, will satisfy the square curb requirement. See *Standard Plans.*

(4) Parallel to the roadway, the slope of the bus stop boarding and alighting area shall be the same as the roadway, to the maximum extent practicable. Perpendicular to the roadway, the slope of the bus stop boarding and alighting area shall not be steeper than 2.0%.
[2010 ADA Standards 810.2.4 and Title 24 11B-810.2.4]

4.3.17 Parking

The following applies to off street accessible parking.

(1) For off street parking, Table 4.3.17 establishes the number of accessible parking spaces required.
[2010 ADA Standards 208.2 and Title 24 11B-208.2]

(2) For every six or fraction of six accessible parking spaces, at least one shall be a van parking space.
[2010 ADA Standards 208.2.4]

(3) Car and van parking spaces shall be 216 inches (18 ft) long minimum. Car parking spaces shall be 108 inches (9 ft) wide minimum and van parking spaces shall be 144 inches (12 ft) wide minimum, shall be marked to define the width, and shall have an adjacent access aisle. Exception: Van parking spaces shall be permitted to be 108 inches (9 ft) wide minimum where the access aisle is 96 inches (8 ft) wide minimum.
[Title 24 11B-502.2 including Exception]

(4) Access aisles serving car and van parking spaces shall be 60 inches wide minimum.
[2010 ADA Standards 502.3.1 and Title 24 11B-502.3.1]

(5) Access aisles shall be at the same level as the parking spaces they serve. Changes in level are not permitted. Exception: Slopes not steeper than 2.0% shall be permitted.
[2010 ADA Standards 502.4 including Exception and Title 24 11B-502.4 including Exception]

Parking spaces that serve a particular building or facility shall be located on the shortest accessible route from the parking to an entrance. Where parking serves more than one accessible entrance, parking spaces shall be dispersed and located on the shortest accessible route to the accessible entrances. In parking

facilities that do not serve a particular building or facility, parking spaces shall be located on the shortest accessible route to an accessible pedestrian entrance of the parking facility.

In each parking area, a bumper or curb shall be provided and located to prevent encroachment of cars over the required width of walkways. Also, the space shall be so located that persons with disabilities are not compelled to wheel or walk behind parked cars other than their own. Pedestrian ways which are accessible to persons with disabilities shall be provided from each such parking space to related facilities, including curb cuts or ramps as needed. Ramps shall not encroach into any accessible parking space or the adjacent access aisle.

TABLE 4.3.17 – OFF STREET ACCESSIBLE PARKING SPACE REQUIREMENTS

Total Number of Parking Spaces Provided in Parking Facility	Minimum Number of Required Accessible Parking Spaces
1-25	1
26-50	2
51-75	3
76-100	4
101-150	5
151-200	6
201-300	7
301-400	8
401-500	9
501-1,000	See Note 1
1,001 and over	See Note 2

Notes:
1. Two percent of total.
2. Twenty plus one for each 100, or fraction thereof, over 1,000.

Signing and striping for on and off street parking shall conform to the design details shown on Standard Plans A90A and A90B. Consult with the Division of Traffic Operations Liaison regarding proposed signing and striping changes.

4.3.18 Trails

Trails within the State highway right of way are considered to be pedestrian facilities if pedestrians may traverse the path, either for their exclusive use or shared with other users. Trails that are intended for nonpedestrian use only, e.g., equestrian or for mountain bikes, are not subject to the guidance in this section.

(1) This DIB adopts the trail guidance provided within Sections 1016 through 1018 of the Federal Guide on "Outdoor Developed Areas" as found on the US Access Board website:
www.access-board.gov/guidelines-and-standards/recreation-facilities/outdoor-developed-areas

The provisions found on this website shall be regarded as design standards.
[Final Guidelines for Outdoor Developed Areas]

Any proposed exception to the design standards in the "Outdoor Developed Areas Guide" must make reference to those applicable sections in the exception request. The conditions described in Section 1019 Conditions for Exceptions may be used, as specified in the provisions, to support an exception.

4.3.19 Protruding Objects

(1) Objects with leading edges more than 27 inches and not more than 80 inches above the finish floor or ground shall protrude 4 inches maximum horizontally into the circulation path. Exception: Handrails shall be permitted to protrude 4½ inches maximum.
[2010 ADA Standards 307.2 and Title 24 11B-307.2 including Exception]

(2) Guardrails or other barriers shall be provided where the vertical clearance is less than 80 inches high. The leading edge of such guardrail or barrier shall be located 27 inches maximum above the finish floor or ground. Where a guy support is used parallel to a circulation path, including but not limited to sidewalks, a guy brace, sidewalk guy or similar device shall be used to prevent an overhanging obstruction.
[2010 ADA Standards 307.4 and Title 24 11B-307.4]

(3) Free-standing objects mounted on posts or pylons shall overhang circulation paths 12 inches maximum when located 27 inches minimum and 80 inches maximum above the finish floor or ground. Where a sign or other obstruction is mounted between posts or pylons and the clear distance between the posts or pylons is greater than 12 inches, the lowest edge of such sign or obstruction shall be 27 inches maximum or 80 inches minimum above the finish floor or ground.
[2010 ADA Standards 307.3 and Title 24 11B-307.3]

(4) Protruding objects shall not reduce the clear width required for accessible routes.
[2010 ADA Standards 307.5 and Title 24 11B-307.5]

In general, street furniture or any item placed within the pedestrian environment must be cane detectable. Objects that protrude over a pedestrian pathway above a height of 27 inches are not considered detectable by cane. A critical zone, which is not considered detectable, is between 27 inches and 80 inches above the pedestrian pathway surface. Many transportation elements within the pedestrian pathway are cane detectable, such as electrical systems hardware, as specified in the Caltrans *Standard Plans*.

Where it is decided to prohibit pedestrian crossings at an intersection or ramp crossing, a pedestrian barricade per Standard Plan ES-7Q should be used. Consult with your Division of Traffic Operations Liaison for further guidance.

4.4 Shared Facilities

Pedestrian facilities that are part of nonmotorized transportation facilities must be designed in accordance with the *Highway Design Manual* for the appropriate bikeway classification, and the *Designing Sidewalks and Trails for Access* for best practice equestrian design.

Designers of pedestrian-shared facilities must consider the geometric requirements that are most critical for the intended users. In some cases designing for pedestrians may govern the geometric features. For example, a designated Class 1 bikeway may legally be used by pedestrians and bicycles. But, it may not be practical to design for both users at certain segments of the path. In such cases, appropriate documentation of the deviation from standard will either be required for a bicycle standard in Chapter 1000 of the *Highway Design Manual* or for a pedestrian accessibility standard in this DIB; consult with your Design Coordinator.

4.5 Alternate Standards

Federal regulations allow the use of other accessibility standards, if they provide substantially equivalent or greater access to the facility system, as the minimum Federal accessibility standards. Similarly, the *California Building Code* allows the enforcing agency to make design judgments as to equivalent designs.

Local Agency standards that provide equivalent or greater accessibility than the Federal 2010 ADA Standards and the *California Building Code* may be used in lieu of the minimum standards in this DIB. Those standards not in this DIB should be discussed with the Design Coordinator and the decision documented in the project files. In the case of a historic property/historical resource, use of the California State Historical Building Code is mandatory for State-owned facilities as well as consultation with the State Historical Building Safety Board.

4.6 Temporary Traffic Control

Temporary traffic control zones can impact a wide range of State highway users, including persons with disabilities. During the design phase, a decision must be made whether or not to include plans to accommodate pedestrians and/or special provisions consistent with the *California Manual on Uniform Traffic Control Devices* (*CA MUTCD*). If plans and/or special provisions are provided for this purpose, the Transportation Management Plan Guidelines must be followed. If it is elected to close any sidewalk(s) due to construction and if it is elected to provide a temporary route for use by the public, the various provisions for pedestrian accommodation as set forth in the *CA MUTCD* Part 6 must be followed. For projects under construction, the Resident Engineer must discuss the provisions of the *CA MUTCD* with the contractor prior to the beginning of work during the preconstruction meeting, as required in the *Construction Manual*.

4.7 Exhibits

Pedestrian facilities that are part of nonmotorized transportation facilities may include vertical exhibit panels, wayside exhibits panels, and touchable exhibits. The following information is taken from the Programmatic Accessibility Guidelines for National Park Service Interpretive Media. This publication is available at www.nps.gov/hfc/accessibility/accessibilityGuideVersion2.1.pdf.

The smallest type in a vertical exhibit panel should be placed within a zone containing the range of eye level for a person in a wheelchair to a standing adult for a panel that must be approachable, with no physical barriers. This eye-level zone is approximately 40 inches to 60 inches from the finished grade. Adjustments would have to be made based on lighting conditions, colors, contrasts, layouts, and other design considerations. This typically applies to the body copy and photo caption type. If type cannot be placed at the appropriate eye level, increase readability with a larger type size, more leading, smaller line length, and/or more contrasting color and background.

Wayside exhibit panels shall be installed at heights and angles favorable for viewing by all visitors, including wheelchair users. For low-profile exhibits (angled at 30 or 45 degrees) the recommended height is 28 to 34 inches from the bottom of the exhibit frame to finished grade (based on the California State Parks Accessibility Guidelines); for upright exhibits and bulletin boards the height is 24 to 36 inches from the bottom of the exhibit frame to the finished grade, depending on the panel.

The following reach ranges refer to items briefly touched with one hand, such as a push button or small tactile exhibit or display:

- Reach Ranges: See Architectural Barriers Act Accessibility Standards 308 for more information, including children's reach ranges, obstructed/unobstructed reaches, and exceptions.
- Forward Reach (unobstructed): For touchable exhibits positioned unobstructed on a vertical surface, the high forward reach will be 44 inches maximum, and the low forward reach will be 16 inches minimum above the finished grade. These are common measurements for adults and children ages 9 and above.
- Side Reach (unobstructed): Where a clear floor space allows a parallel approach to a touchable exhibit and the side reach is unobstructed, the high side reach will be 44 inches maximum, and the low side reach shall be 16 inches minimum above the finished grade. These are common measurements for adults and children ages 9 and above.

Dist – Co – Rte
PM
Project ID or Encroachment Permit Number

EXCEPTION TO ACCESSIBILITY DESIGN STANDARDS

Prepared by:

_____
(Name), Registered Civil Engineer [3]

Submitted by: _____ Date: _____
(Name), Design Engineer

Recommended by: _____ Date: _____
(Name), Project Manager

Concurrence [1] by: _____ Date: _____
(Name), Office Chief
Or District/Region Division Chief of Design

Approved [2] by: _____ Date: _____
(Name), Design Coordinator

Notes:

1. Must be a Supervising Transportation Engineer or higher Civil Service Engineering Classification.
2. Delete this signature line for Rail or Transit Station projects (DSA is the approving entity).
3. A Licensed Architect or Licensed Landscape Architect may prepare this document and sign and seal it in lieu of a Registered Civil Engineer, provided the same Licensed Architect or Licensed Landscape Architect designed the on-site improvements. Use the seal of the appropriate licensed person in responsible charge.

Dist – Co – Rte
PM
Project ID or Encroachment Permit Number

This documentation shall be filed in the district Project History Files. A copy shall be sent to Division of Design, Division Chief, attention Design Exception. Attach, as necessary, the information discussed in Item Number 3. At a minimum, the Exception to Accessibility Design Standards should contain the following sections:

1. Project Description

Describe the overall project scope and the proposed pedestrian facility design portion. Provide geographic project limits and lengths. Also, describe the existing highway facility as well as the existing pedestrian facilities.

If using an accessibility standard not listed in DIB 82-05, describe the accessibility standard and its reference of origin.

2. Project Costs

Provide the total capital cost estimate of the project. Also, provide an estimate of the capital cost of the proposed pedestrian features.

3. Nonstandard Feature(s)

Describe the nonstandard accessibility feature(s) to be constructed or to be maintained in an alteration. Provide sufficient information in written and graphic (layouts, cross sections, profiles, details, etc.) format to convey the extent of noncompliance with accessibility standards.

4. Standard(s) for Which Exception is Requested

State the accessibility standard from DIB 82-05.

5. Reason for Exception

The request for exception to accessibility design standards must state the reason why the facility or element is in whole or in part structurally impracticable (for new construction) or technically infeasible (for alterations) to comply with DIB 82-05 standards. Exceptions must be based on factors which may include historical significance, existing terrain, environmental issues, right of way constraints, conflicts with other design standards, and/or other significant considerations. Excessive cost may be supplemental information but cannot be used to support an exception related to a structural impracticability or technical infeasibility.

The four (4) factors for unreasonable hardships related to Clear Width, discussed in Section 4.3.3 of DIB 82-05, are to be documented in this section.

6. Work Required to Make Standard

Provide a description of the additional work in excess of the proposed project work required to meet the subject accessibility standard.

7. Reviews and Concurrence

As appropriate, provide the names of the Headquarters Design and District personnel who have discussed and concurred with this document; and include date of their concurrence.

Curb Ramp Scoping and Design Guide

A. Introduction

This guidance has been developed to assist designers of curb ramps to be familiar with design requirements and construction considerations for these facilities. Section 4.3 of this DIB contains the accessibility standards in accordance with the 2010 ADA Standards, which replaced the Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG). The goal is to design fully accessible facilities. However, in certain circumstances where physical or project scope constraints prevent meeting strict compliance with the accessibility standards, the facilities may be designed to be compliant to the extent practicable as explained in this guide.

The *Highway Design Manual* (HDM), Index 105.5 provides a discussion on pedestrian movement, location of curb ramp placement, and the number of curb ramps at each corner. Also discussed in HDM Topic 401 is the pedestrian as a factor in design of intersections.

B. Project Scoping

Curb ramps may be included as part of the project scope and funded from many different sources. Generally, projects with curb ramp work are considered roadway alterations (see Section 4.1.2). The Clarification of FHWA's Oversight Role Memorandum, Questions and Answers Attachment at http://www.fhwa.dot.gov/civilrights/programs/ada_sect504qa.cfm#q1, dated September 12, 2006, states the following regarding project scope and alterations:

> *17. What projects constitute an alteration to the public right-of-way?*
>
> *An alteration is a change to a facility in the public right-of-way that affects or could affect access, circulation, or use. Projects altering the use of the public right-of-way must incorporate pedestrian access improvements within the scope of the project to meet the requirements of the ADA and Section 504. These projects have the potential to affect the structure, grade, or use of the roadway. Alterations include items such as reconstruction, rehabilitation, widening, resurfacing (see USDOJ-FHWA technical assistance dated 6-28-13 for additional clarification), signal installation and upgrades, and projects of similar scale and effect (6-28-2013).*

The draft implementing ADA regulations, Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG), recognizes that existing highway grades built to the surrounding terrain are appropriate reasons for not building to full standard. Although this is currently a draft document, the FHWA has recommended this document as best practice guidance. The draft PROWAG says:

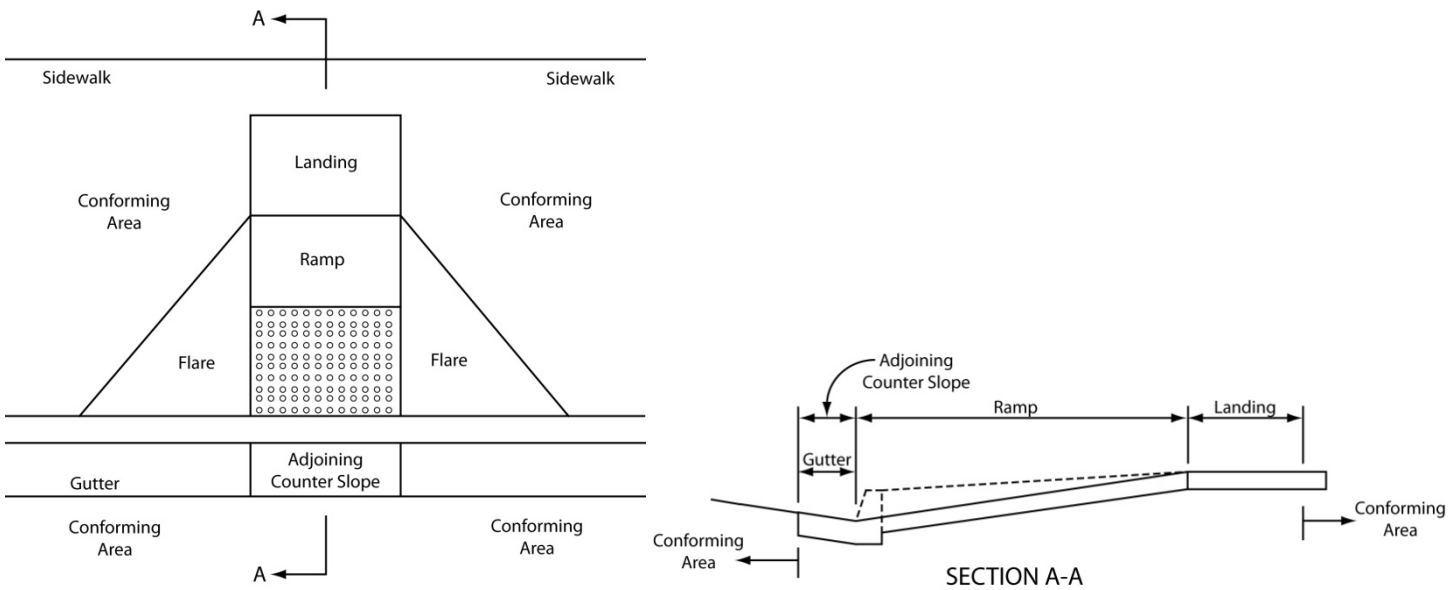
> *R202.3.1 Existing Physical Constraints. Where existing physical constraints make it impracticable for altered elements, spaces, or facilities to fully comply with the requirements for new construction, compliance is required to the extent practicable within the scope of the project. Existing physical constraints include, but are not limited to, underlying terrain, right-of-way availability, underground structures, adjacent developed facilities, drainage, or the presence of a notable natural or historic feature.*

The ADAAG and its replacement, the 2010 ADA Standards, discusses how both physical constraints and limits of the project's scope may determine when ADA facilities may be considered "technically infeasible". Therefore, both the 2010 ADA Standards and the draft PROWAG allows for ADA improvements to be constructed to the extent technically feasible or practicable. The clear primary goal of each document is to construct accessible facilities in compliance with their standards.

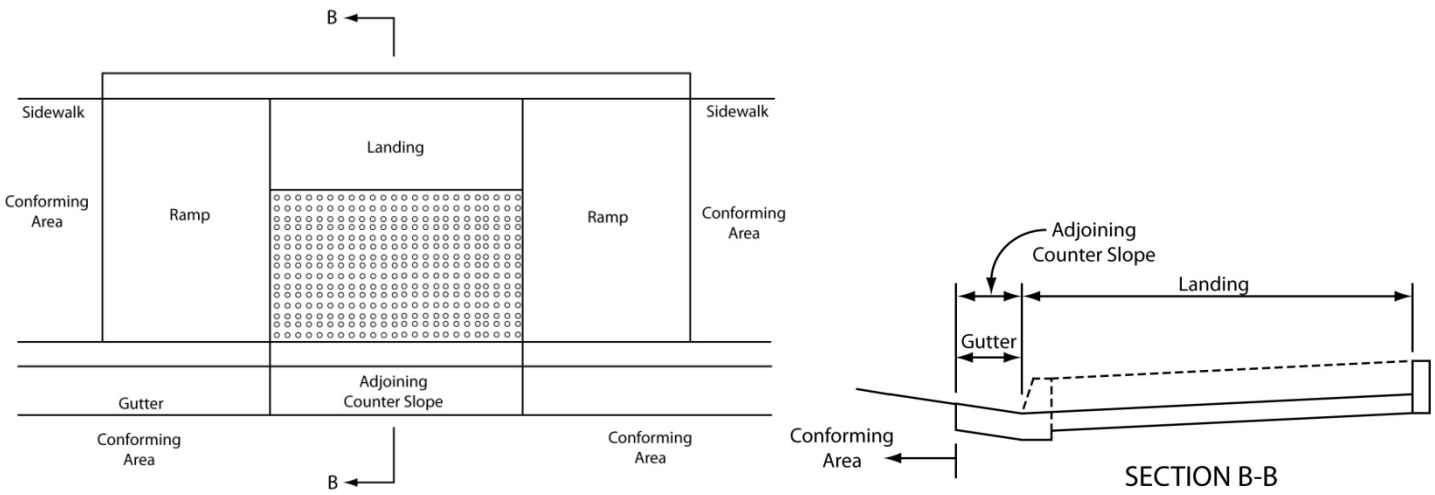
Curb ramps are a key accessibility feature in the public right of way since they will act as a refuge associated with a pedestrian crossing. It may be a challenge to design curb ramps into an existing network of pedestrian sidewalks and crossings because sidewalks and crossings are subject to the existing roadway features, which are designed according to geometric highway standards approved by the Federal Highway Administration in the HDM. In spite of this potential dichotomy, curb ramps are to be given the priority of meeting the full accessibility standards and then conforming to the surrounding area as necessary. Conforming to the surrounding area should also be designed to fully meet accessibility standards. In some limited instances constraints may prevent strict compliance of the conforming area. In these instances the conforming area shall comply with the ADA to the "extent practicable within the scope of the project."

For the purpose of this guide, a typical curb ramp (Case A and Case C) will consist of basic features shown below. A Blended Transition is also shown, which would require a Construction Detail. These features are to be designed to meet full accessibility standards. See Section 4.3 and Standard Plan A88A for more details and the applicable standards.

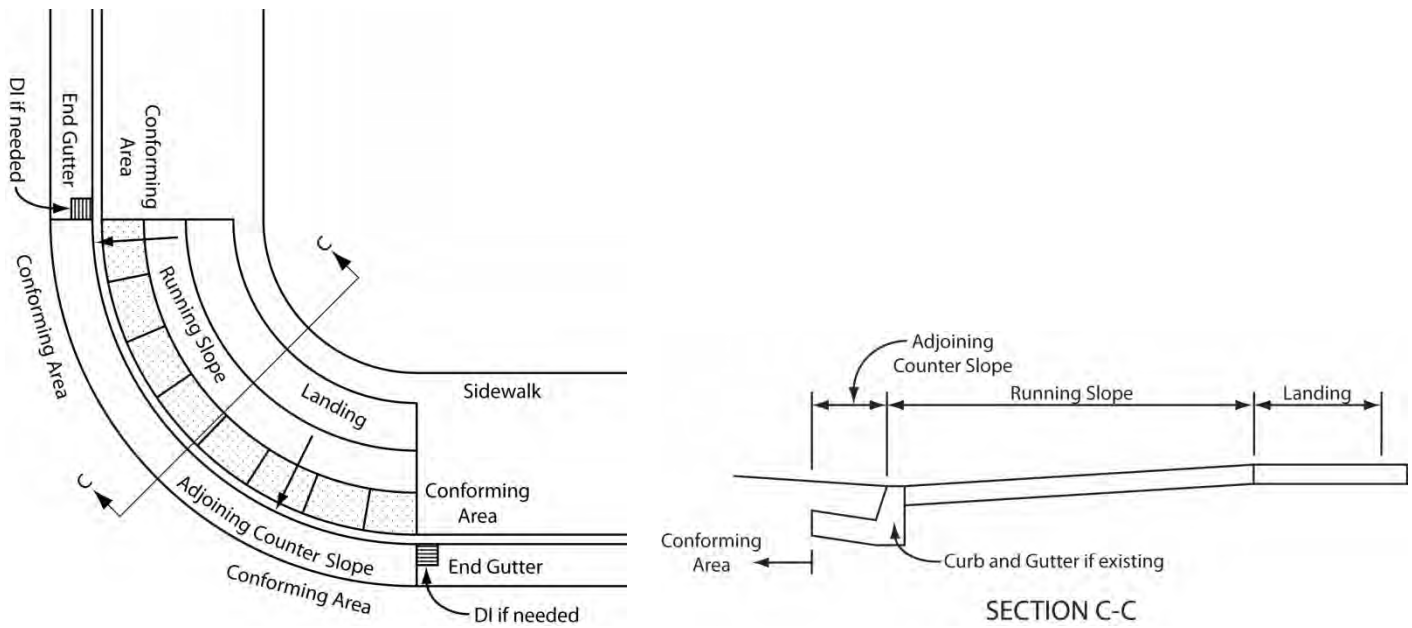
Perpendicular Curb Ramp (Case A):



Parallel Curb Ramp (Case C):



Blended Transition:



It is expected that scoping decisions will lead to designing the curb ramp features to full accessibility standards. Consultation with the Design Coordinator or the Design Reviewer will help ensure these expectations are met.

C. <u>Project Development</u>

The level of design detail will depend on the phase of the project in the project development process. The following should be considered for each phase.

Project Initiation Document (PID)

1. Seek sufficient funds to allow ADA facilities to be adequately scoped into the project. This should be a project development team decision.
2. Identify where curb ramps are missing or if they exist, but do not meet the accessibility standards and best practices (see Section 4.0). Usually, a recommendation from the District Traffic Operations unit will be the basis of this early scope. An access request or grievance filed by the public or the need identified in the ADA Transition Plan could also be the basis of the project.
3. Identify potential constraints, e.g., utilities, signal hardware, electrical, drainage, structures, R/W, etc. using as-built plans, mapping and photos.
4. Perform a site visit with staff from District/Region Design, Traffic, District ADA Engineer and other functional units as needed, e.g., Structures, Surveys, Hydraulics, R/W, etc.
    a. Measure the existing curb ramps or other pedestrian facilities to determine if they meet the standards in Section 4.3. Measurements of curb heights, sidewalk width, sidewalk running/cross slope, flow line slope, pavement cross slope, etc., will help to ascertain what will be required in order for a curb ramp to be designed to meet full standards.
    b. Determine the appropriate type of curb ramp for each location.
    c. Determine approximate dimensions of each proposed curb ramp, considering existing curb height, existing slopes of roadbed gutter, roadbed pavement, and sidewalks.
    d. Identify all existing features within limits of each proposed curb ramp, e.g., signal poles, drainage inlets, utilities, R/W fence, bridge, buildings, evidence of truck offtracking, pavement markings, etc.
    e. Consider capturing stormwater runoff prior to each curb ramp.
    f. Include other features (see Section 4.0) that improve accessibility within the project.
5. Determine what portion of the adjacent sidewalk will need to be reconstructed to provide a standard top landing (e.g., Case A Curb Ramp) as well as a transition section to conform back to the existing sidewalk. Transition sections should be outside the boundary of the top landing to a reasonable distance, e.g., a sidewalk contraction joint or to a structure. Consult with the Design Reviewer or Design Coordinator regarding the reasonable conforming distance.
6. Work with the District Traffic Operations unit to determine the proper scope and cost of traffic related items such as striping and signal activation details.
7. Avoid designing to maximum slopes and minimum dimensions of the accessibility standards. See the conservative slopes and widths in the curb ramp standard plans.
8. Identify right of way, utility relocation, and drainage needs at each location.
9. Include the necessary funds and time for resolving conflicts as noted above in the schedule and estimate.
10. Evaluate reconstructing the roadbed pavement if necessary. Readily achievable roadbed work is considered practicable.
11. Curb ramps are the most common solution when a curb obstructs the pedestrian accessible route. Occasionally, solutions such as raising roadbed pavement to the top of curb, thereby creating a blended curb ramp or transition, is a valid alternate design.
12. Consider scoping stand alone ADA curb ramp projects to combine curb ramps with similar work involved, such as those on existing structures requiring special construction materials and techniques, those with significant relocations, and the less complex locations. This may lead to the decision to break up the curb ramps identified in the PID process for multiple highway projects.
13. Estimate contract item quantities to provide sufficient funding to meet the ADA standards at each location.

Project Approval and Environmental Document (PA&ED)

1. Perform a site visit with staff from District/Region Design, Traffic, District ADA Engineer and other functional units as needed, e.g., Structures, Surveys, Hydraulics, R/W, etc. to:
   a. Verify type of curb ramp or pedestrian facility for each location.
   b. Verify dimensions of each proposed curb ramp, considering existing curb height, existing slopes of gutter, pavement, and sidewalks.
   c. Verify all existing features within limits of each proposed curb ramp, e.g., signal poles, drainage inlets, utilities, R/W fence, bridge, buildings, evidence of truck offtracking, pavement markings, etc.
   d. Consider capturing stormwater runoff prior to each curb ramp.
   e. Consider other features that should be included in the project to enhance accessibility (see Section 4.0).
2. Prepare survey request for locations with many constraints, e.g., R/W, significant utilities, street grades, and elevation changes.
3. Meet with functional units to determine feasibility of relocating existing features in conflict with each proposed curb ramp, e.g., Hydraulics, Electrical Design, Utilities, R/W (easements), Structures, etc.
4. Meet with functional units to identify additional features to be added to the project to improve pedestrian access, e.g., additional drainage, signs, profile adjustments, pavement markings, etc.
5. Prepare curb ramp designs that are fully compliant with the accessibility standards and best practices in Section 4.0. Once standard curb ramps and landings are designed, the transition to the existing sidewalk also should strictly meet the accessibility standards. When it is not feasible to design the transition to the accessibility standards, the transition shall be designed to comply with the accessibility standards to the "extent practicable within the scope of the project." Documentation of the nonstandard conforming area is to be included in the Transition Plan and coordinated by the District ADA Engineer once a request is initiated by the designer. Documentation of the request (memo, e-mail, etc) is to be included in the Project History File. Documentation of an Exception to Accessibility Design Standards is not required.
6. If the curb ramps themselves cannot be designed to full accessibility standards, an approved Exception to Accessibility Design Standards, see Section 3.1, will be required. This will also document compliance with the ADA to the "extent practicable within the scope of the project."

Plans, Specifications, and Estimates (PS&E)

1. Use the survey data and field notes provided during the Project Report (PA&ED) phase to design the curb ramps.
2. The current curb ramp standard plans contain conservative slopes and widths in order to account for errors in design and construction; these show a 1.5% instead of 2.0%, 7.5% instead of 8.3%, 9% instead of 10%, and 50 inches instead of 4 ft. However, a Construction Detail should be developed for situations where the adjacent roadway is on a grade or there are space constraints. These Construction Details are to indicate the slopes and widths, and will require contractor surveys. Utilize SSP 73-3 (using minor concrete) for all sidewalks, curb ramps, or driveway crossings designed as part of the pedestrian route. For the contractor surveys, use the Bid Item for Pre/Post Construction Surveys. Follow the DES – Office Engineers guidance on how to use the specification and estimate the cost for the contractor surveys.
3. Follow the guidance in the *Plans Preparation Manual* regarding the placement, off-sets, call-outs, and features to be surveyed by the contractor.
4. Discuss with District Construction the need to provide cross sections.
5. Update the nonstandard accessibility documentation in the Transition Plan and/or the Exception to Accessibility Design Standards, per the discussion in Numbers 5 and 6 under PA&ED above, if necessary.

6. Asphalt concrete pavement conforming areas and Blended Transitions should use ½" Type B HMA for better workability.

D. Compliance

Curb ramps that are designed and constructed in accordance with DIB 82, standard plans and specifications will achieve compliance with the ADA. Design compliance is documented at Ready-to-List or at encroachment permit issuance per Section 3.1 of this DIB. Regions/Districts also document compliance at the conclusion of construction per the October 5, 2012 ADA Compliance Memo signed by Robert Pieplow.

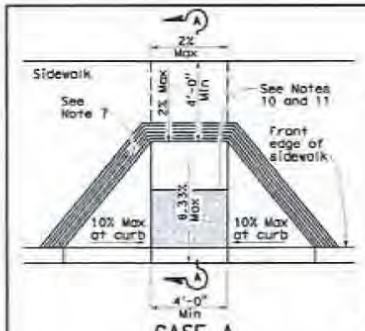
If the Design Coordinator has approved an Exception to Accessibility Design Standards, this documentation will be referenced in the Project Report and will be made part of the Project History File. Also, if a request from the designer to the District ADA Engineer is made to include nonstandard conforming area designs to the existing facility in the Transition Plan, this request is to be included in the Project History File.

For existing pedestrian facilities, the documentation of not designing to full accessibility standards contained in a previously Project History File may be useful when deciding to scope a project in the beginning.

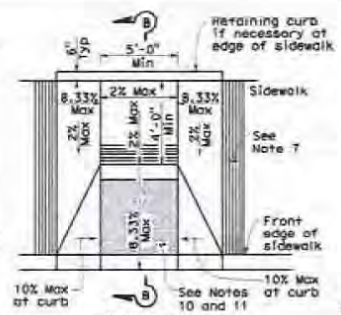
E. Other Considerations

The following are recommendations and reminders when designing curb ramps:

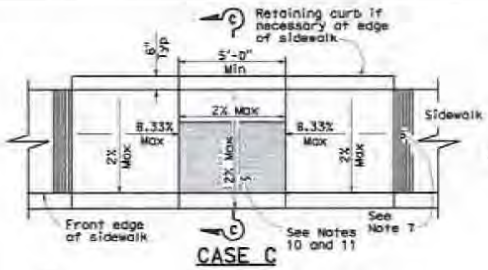
- Whether projects are stand alone curb ramp projects or other alterations of roadways, DIB 82 standards apply to all pedestrian facilities.
- When using the curb ramp standard plans, make sure to verify that a standard curb ramp can meet the accessibility standards in construction. Check to see if ample space is available and that there are no obstructions, e.g., utilities, drainage inlets, etc. If that is not the case, construction details will be required.
- Provide an adequate estimate and schedule at the PID phase to provide full standard curb ramp design.
- Do not design to the maximum slopes or the minimum widths if feasible.
- Consider relocating/redesigning the drainage system of an intersection in order to intercept flow before the curb ramp location.
- If pavement reconstruction is not part of the project scope, consider minor pavement work as needed to achieve standards.
- Consider modifying the alignment of the sidewalk transition segment to achieve standard slopes.
- Make sure the marked crossings are well placed. Involve the District Traffic Operations unit to help decide the need and/or placement of marked crosswalks in accordance with accessibility standards and the *CA MUTCD*.
- Right of way acquisition (fee, easements, etc.) or utility relocation may be necessary to solve an accessibility issue. This should be identified early in the process.
- Consider designing a curb extension (bulbout), see HDM Index 303.4, where right-of-way is limited to accommodate a standard curb ramp.
- Consider directional curb ramps (curb ramps aligned in the direction of pedestrian crossing) if an engineered design can show that no instability will occur.
- Curb ramps are normal solutions when a curb obstructs the pedestrian accessible route. However, there may be other solutions, e.g., a blended curb ramp. Consult with your Design Coordinator or Design Reviewer.



CASE A

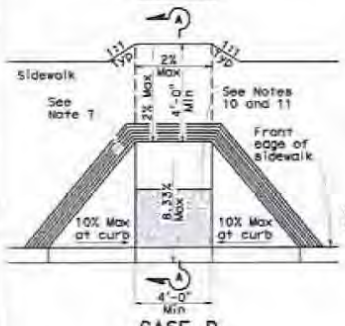


CASE B



CASE C

RAISED TRUNCATED DOME



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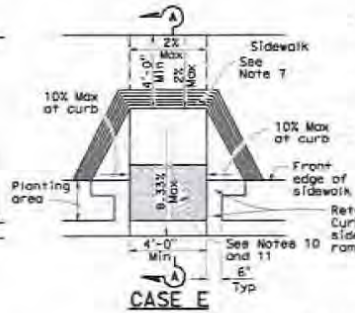

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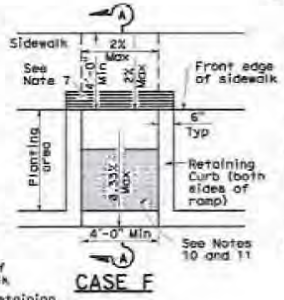

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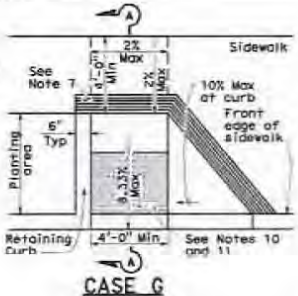
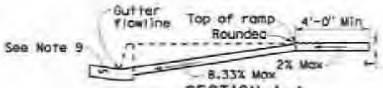
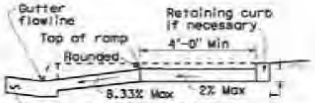


CASE G
See Note 4



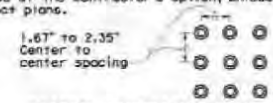
SECTION A-A



SECTION B-B

Depress entire sidewalk as required

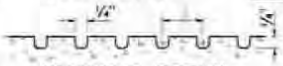
SECTION C-C



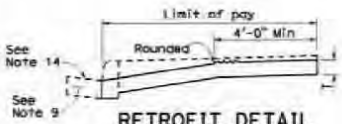
RAISED TRUNCATED DOME PATTERN (IN-LINE)

DETECTABLE WARNING SURFACE

See Note 10

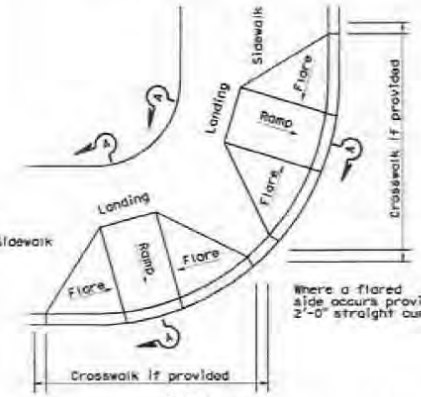


GROOVING DETAIL



RETROFIT DETAIL

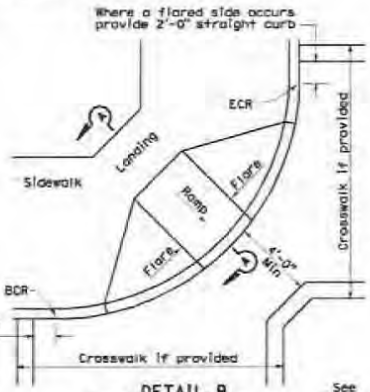
Existing curb and sidewalk



DETAIL A

TYPICAL TWO-RAMP CORNER INSTALLATION

See Note 1



DETAIL B

TYPICAL ONE-RAMP CORNER INSTALLATION

See Notes 1 and 3

NOTES:

1. As site conditions dictate, Case A through Case G curb ramps may be used for corner installations similar to those shown in Detail A and Detail B. The case of curb ramps used in Detail A do not have to be the same. Case A through Case G curb ramps also may be used at mid block locations, as site conditions dictate.
2. If distance from curb to back of sidewalk is too short to accommodate ramp and 4'-0" platform (landing) as shown in Case A, the sidewalk may be depressed longitudinally as in Case B, or C or may be widened as in Case D.
3. When ramp is located in center of curb return, crosswalk configuration must be similar to that shown for Detail B.
4. As site conditions dictate, the retaining curb side and the flared side of the Case G ramp shall be constructed in reversed position.
5. If located on a curve, the sides of the ramp need not be parallel, but the minimum width of the ramp shall be 4'-0".
6. Side slope of ramp flares vary uniformly from a maximum of 10% at curb to conform with longitudinal sidewalk slope adjacent to top of the ramp, except in Case C and Case F.
7. The curb ramp shall be outlined, as shown, with a 1'-0" wide border with ¼" grooves approximately ¾" on center. See grooving detail.
8. Transitions from ramps and landing to walks, gutters or streets shall be flush and free of abrupt changes.
9. Maximum slopes of adjoining gutters, the road surface immediately adjacent to the curb ramp or accessible route shall not exceed 5 percent within 4'-0" of the top and bottom of the curb ramp.
10. Curb ramps shall have a detectable warning surface that extends the full width and 3'-0" depth of the ramp. Detectable Warning Surfaces shall conform to the details on this plan and the requirements in the Special Provisions.
11. The edge of the detectable warning surface nearest the street shall be between 6" and 8" from the gutter flowline.
12. Sidewalk and ramp thickness, "T", shall be 3½" minimum.
13. Utility pull boxes, manholes, vaults and all other utility facilities within the boundaries of the curb ramp will be relocated or adjusted to grade by the owner prior to, or in conjunction with, curb ramp construction.
14. For retrofit conditions, removal and replacement of curb apron will be at the Contractor's option, unless otherwise shown on project plans.

September 1, 2006

To accompany plans dated _____

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

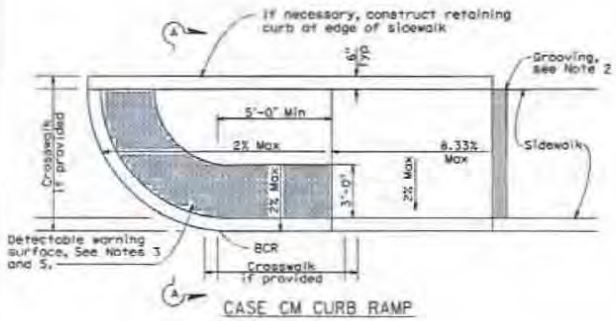
CURB RAMP DETAILS

NO SCALE

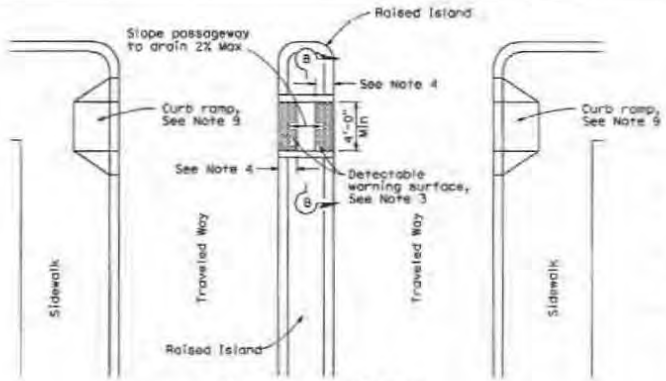
RSP A88A DATED SEPTEMBER 1, 2006 SUPERSEDES STANDARD PLAN A88A DATED MAY 1, 2006 - PAGE 115 OF THE STANDARD PLANS BOOK DATED MAY 2006.

REVISED STANDARD PLAN RSP A88A

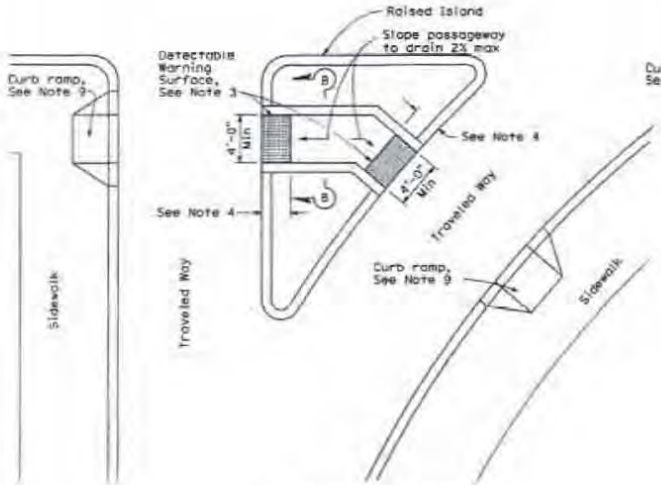
2006 REVISED STANDARD PLAN RSP A88A



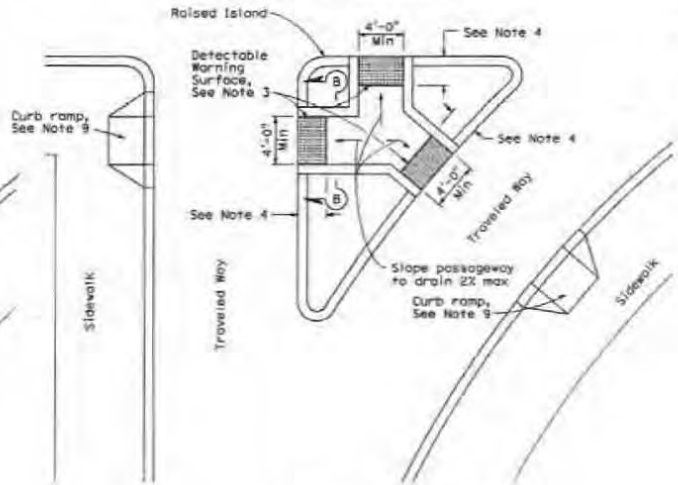
CASE CM CURB RAMP



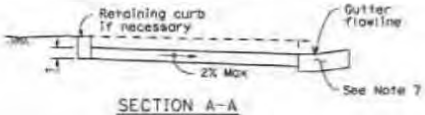
TYPE A PASSAGEWAY



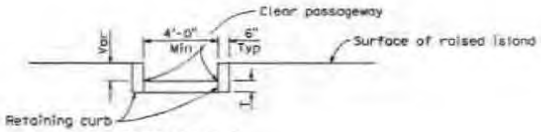
TYPE B PASSAGEWAY



TYPE C PASSAGEWAY



SECTION A-A



SECTION B-B

DIST.	COUNTY	ROUTE	POST MILES TOTAL	POST MILES PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

May 1, 2006

PLANS APPROVAL DATE

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To get to the California web site, go to http://www.dot.ca.gov

NOTES:

1. Sidewalk, ramp and passageway thickness, "T", shall be 3½" minimum.
2. For details of grooving used with Case CM curb ramp, see Standard Plan A88A.
3. For details of detectable warning surfaces, see Standard Plan A88A.
4. Where an island passage way length is less than 6'-0", the detectable warning surface shall extend the full width and full depth of the passage way length. Where an island passage way length is greater than or equal to 6'-0", but less than 8'-0", each detectable warning surface shall extend the full width and 2'-0" depth of the passage way length. Where an island passage way length is greater than or equal to 8'-0", each detectable warning surface shall extend the full width and 3'-0" depth of the passage way length.
5. For Case CM curb ramp, the edge of the detectable warning surface nearest the street shall be between 6" and 8" from the gutter flowline.
6. Transitions from ramps to walks, gutters or streets shall be flush and free of abrupt changes.
7. Maximum slopes of adjoining gutters, the road surface immediately adjacent to the curb ramp or accessible route shall not exceed 5 percent within 4'-0" of the top and bottom of the curb ramp.
8. Utility pull boxes, manholes, vaults and all other utility facilities within the boundaries of the curb ramp will be relocated or adjusted to grade by the owner prior to, or in conjunction with, curb ramp construction.
9. For additional curb ramp details, see Standard Plan A88A.

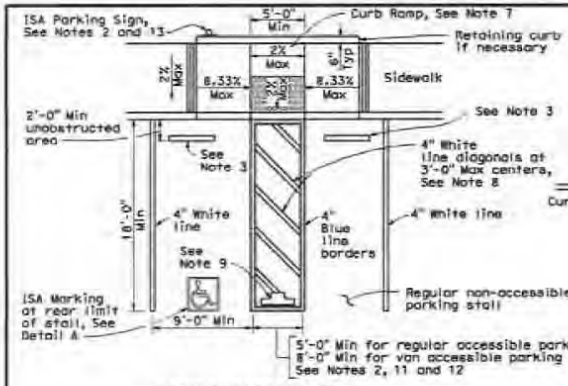
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

CURB RAMP AND ISLAND PASSAGEWAY DETAILS

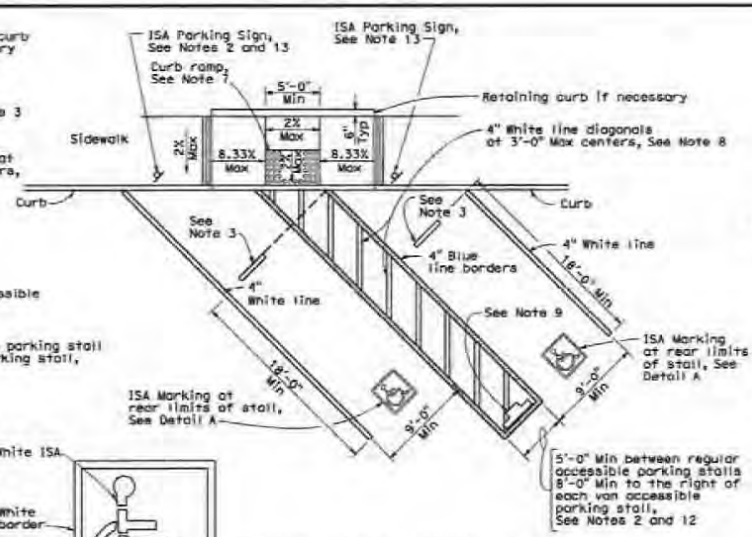
NO SCALE

A88B

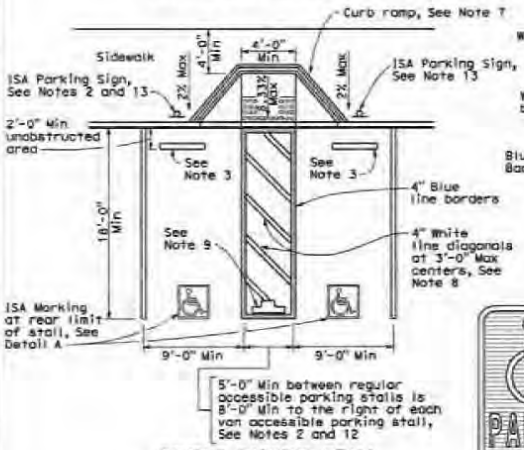
2006 STANDARD PLAN A88B



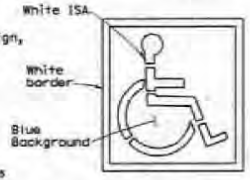
SINGLE PARKING STALL



DIAGONAL DOUBLE PARKING STALLS



DOUBLE PARKING STALL



ISA MARKING
See Revised Std Plan RSP A24C

DETAIL A

TABLE A

Total Number of Parking Spaces or Stalls	Minimum Number of Disabled Accessible Parking Spaces or Stalls
1-25	1
26-50	2
51-75	3
76-100	4
101-150	5
151-200	6
201-300	7
301-400	8
401-500	9
501-1000	2 percent of total
Greater than 1001	20 plus 1 for each 100 or fraction thereof over 1001

SIGN R99 (CA)

PLAQUE R99B (CA)

SIGN R99 (CA) with PLAQUE R99B (CA)
See Note 6

SIGN R99C (CA)
See Note 6

SIGN R100B (CA)
See Note 10

SIGN R7-8b
See Notes 2 and 6

ISA = International Symbol of Accessibility

OFF-STREET PARKING SIGNS
(Parking lot or garage)
See Note 6

DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

June 6, 2008
PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER — Rector Davis Carlson — C41957 — Exp. 3-31-10 — CIVIL — STATE OF CALIFORNIA

To accompany plans dated _____

NOTES:

1. Accessible parking spaces serving a particular building shall be located on the shortest accessible route of travel from adjacent parking to an accessible entrance. In parking facilities that do not serve a particular building, accessible parking shall be located on the shortest accessible route of travel to an accessible pedestrian entrance of the parking facility.
2. One in every eight accessible off-street parking stalls, but not less than one, shall be served by an accessible aisle of 8'-0" minimum width and shall be signed van accessible. The R7-8b sign shall be mounted below the R99B (CA) plaque or the R99C (CA) sign.
3. In each parking stall, a curb or bumper shall be provided and located to prevent encroachment of vehicles over the required width of walkways. Parking stalls shall be so located that persons with disabilities are not compelled to wheel or walk behind parked cars other than their own.
4. Surface slopes of accessible off-street parking stalls shall be the minimum possible and shall not exceed 2 percent in any direction.
5. Table A shall be used to determine the required number of accessible parking stalls in each parking lot or garage.
6. Where Plaque R99B (CA), Sign R99C (CA) or Sign R7-8b are installed, the bottom of the sign or plaque panel shall be a minimum of 7'-0" above the surrounding surface.
7. Curb ramps shall conform to the details shown on Revised Standard Plan RSP A88A.
8. Blue paint, instead of white may be used for marking accessibility aisles in areas where snow may cause white markings to not be visible.
9. The words "NO PARKING", shall be painted in white letters no less than 1'-0" high and located so that it is visible to traffic enforcement officials. See Revised Standard Plan RSP A90B for details of the "NO PARKING" pavement marking.
10. A R100B (CA) sign shall be posted in a conspicuous place at each entrance to off-street parking facilities or immediately adjacent to and visible from each stall. The sign shall include the address where the towed vehicle may be reclaimed and the telephone number of the local traffic law enforcement agency.
11. Where a single (non-van) accessible parking space is provided, the loading and unloading access aisle shall be on the passenger side of the vehicle as the vehicle is going forward into the parking space.
12. Where a van accessible parking space is provided, the loading and unloading access aisle shall be 8'-0" wide minimum, and shall be on the passenger side of the vehicle as the vehicle is going forward into the parking space.
13. Accessible Parking Only Sign shall be Sign R99C (CA) or Sign R99 (CA) with Plaque R99B (CA).

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

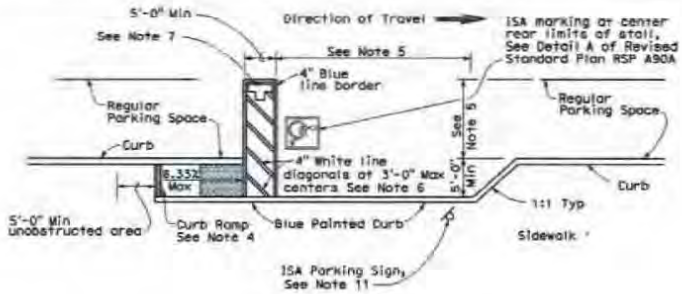
ACCESSIBLE PARKING OFF-STREET

NO SCALE

RSP A90A DATED JUNE 6, 2008 SUPERSEDES STANDARD PLAN A90A
DATED MAY 1, 2006 - PAGE 117 OF THE STANDARD PLANS BOOK DATED MAY 2006.

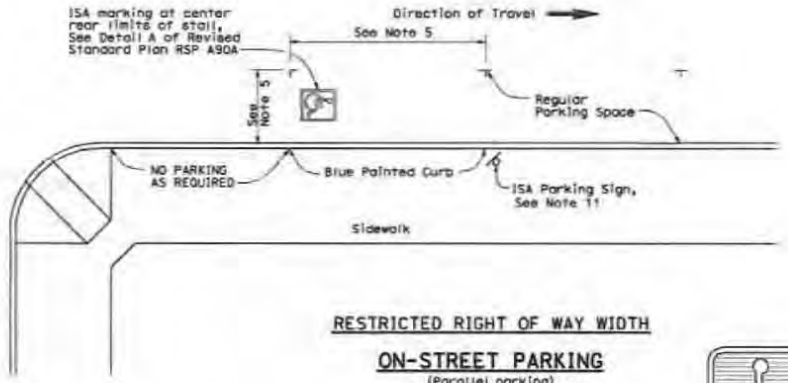
REVISED STANDARD PLAN RSP A90A

2006 REVISED STANDARD PLAN RSP A90A



CONVENTIONAL

(See Note 9)



RESTRICTED RIGHT OF WAY WIDTH

ON-STREET PARKING

(Parallel parking)

(See Note 10)

PAVEMENT MARKING

See Note 7

SIGN R99 (CA)

PLAQUE R99B (CA)

SIGN R99 (CA) with PLAQUE R99B (CA)

See Note 3

SIGN R99C (CA)

See Note 3

ISA = International Symbol of Accessibility

DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

June 6, 2008

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — HECTOR David Cardenas — C61857 — Exp. 3-31-10 — CIVIL — STATE OF CALIFORNIA

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To accompany plans dated _____

NOTES:

1. Parking spaces shall be so located that persons with disabilities are not compelled to wheel or walk behind parked cars other than their own.
2. Surface slopes of accessible on-street parking spaces shall be the minimum feasible.
3. Where Plaque R99B (CA) or Sign R99C (CA) are installed, the bottom of the sign or plaque panel shall be a minimum of 7'-0" above the surrounding surface.
4. Curb ramps shall conform to the details shown on Revised Standard Plan RSP A88A.
5. Accessible on-street parking spaces shall not be smaller in length or width than that specified by the local jurisdiction for other parking spaces, but not less than 20'-0" in length and not less than 8'-0" in width.
6. Blue paint, instead of white may be used for marking accessibility aisles in areas where snow may cause white markings to not be visible.
7. The words "NO PARKING", shall be painted in white letters no less than 1'-0" high on a contrasting background and located so that it is visible to traffic enforcement officials. See Standard Plan A24E for square foot area for painting the words "NO PARKING".
8. There shall be no obstructions on the sidewalk adjacent to and for the full length of the parking space, except for the ISA parking sign shown.
9. The Conventional detail should be the primary choice of accessible on-street parking. However, if the sidewalk lacks adequate space to construct a standard curb ramp, the Restricted Right of Way detail should be used.
10. If the Restricted Right of Way width detail is selected and it conflicts with a bus stop or other uses, this detail may apply to the other end of the block.
11. Accessible Parking Only Sign shall be Sign R99C (CA) or Sign R99 (CA) with Plaque R99B (CA).

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

ACCESSIBLE PARKING ON-STREET

NO SCALE

RSP A90B DATED JUNE 6, 2008 SUPERSEDES STANDARD PLAN A90B DATED MAY 1, 2006 - PAGE 118 OF THE STANDARD PLANS BOOK DATED MAY 2006.

REVISED STANDARD PLAN RSP A90B

2006 REVISED STANDARD PLAN RSP A90B

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APPENDIX C

Concrete

C1: Concrete Mix Designations

All Portland Cement Concrete shall conform to Section 90 of the *State Standards*.

- Whenever the 28-day compressive strength specified is greater than 3,600 psi, the concrete shall be designated by compressive strength. If the specified 28-day compressive strength is 4,000 psi or greater, an additional 14 days will be allowed to obtain the specified strength. If the 28-day compressive strength is 3,600 psi or less it is given for design information only and is not a requirement for acceptance of the concrete.

- Concrete with a 28-day compressive strength of 3,600 psi or less shall contain the minimum amount of cementitious material listed in Table D-1.

- Concrete with a 28-day compressive strength greater than 3,600 psi shall be proportioned such that the concrete will attain the strength required by the project plans and specifications.

- Concrete for County Public Works contracts shall be specified on the project plans and in the project special provisions.

Materials. All portland cement concrete materials shall comply with the provisions of Section 90-2 of the *State Standards*, except that prequalification tests in conformance with California Test 549 will not be required for the construction types listed in Table D-1.

C2: Compressive Strength Testing of Concrete

Public Works Contracts. For County Public Works contracts, compressive strengths and production methods shall be required in accordance with the State Construction Manual, the project Special Conditions and the provisions of Section 90-9 of the *State Standards*.

Public Improvements Constructed by Development Projects. For public improvements constructed by development projects, when the compressive strength of the specified portland cement concrete is greater than 3,600 psi, the prescribed compressive strengths shall be tested in accordance with the provisions of Section 90-9 of the *State Standards*. The Contractor shall maintain copies of test reports at the job site, which shall be available for review and inspection.

- Projects of 50 CY or More. One set of standard cylinders shall be collected from each day's run volume, for every lot and class of concrete. Additional cylinder sets shall be collected not less than once for every 150 CY of each concrete class.

- Projects Less than 50 CY. When the daily lot or class of concrete is less than 50 CY, a Certificate of Compliance, signed by the manufacturer, may be submitted in-lieu of standard cylinder tests. The Certificate of Compliance shall state the average compressive strength of each lot, and that it complies in all respects with the requirements of the specifications. As is required in section 6.1 of the *State Standards*, Certificates of Compliance for Portland cement concrete shall be furnished prior to use or placement of the material.

Curing Concrete. Curing concrete shall comply with the requirements of Section 90-7 of the *State Standards*.

C3: Concrete Mix by Type of Construction

Type of Construction	Minimum Cementitious Material Content		Minimum Compressive Strength at 28 days (PSI)
	lbs./CY	Sacks/CY	
Street Surface Improvements			
Curb, Gutter, Sidewalk, Concrete Pavement, Alleys, Driveways, Curb Ramps, Cross Gutters and Spandrels	520	5-1/2	2,500
Extruded Curb, Curb and Gutter when using 3/8" aggregate	548	6	2,500
Water, Sewer & Storm Drainage Facilities			
Pipe Collars, Pre-Cast Manhole Components, Catch Basins, Sidewalk Culverts, Utility Lid Collars	565	6	3,250
Side hill Surface Drainage Facilities	520	5-1/2	2,500
Pipe Bedding and Encasement Anchors, Thrust Blocks, Wall Support for Pipe	470	5	2,500
2 Sack Trench Backfill Slurry	188	2	
Manhole Ring Support – Hydraulic cement grout, non-shrink, packaged dry (ASTM C1107)			7,000
Reinforced Structures			
Section 2.1.2 H. Retaining Walls and footings not requiring a construction permit by Title 19 of the County Code	590	6-1/4	3,250
Channels and Boxes	590	6-1/4	3,250
Miscellaneous			
Street Light and Traffic Signal Foundations, Survey Monuments	565	6	3,250
Fence and Guardrail Post Foundations	520	5-1/2	2,500
Concrete Not Otherwise Specified	565	6	3,250
Shotcrete (Wet Mix)	632	6-3/4	3,250
Coarse Masonry Grout	610	6-1/2	2,000

APPENDIX D

Road Design

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D1: Street Design Considerations

Street Design Considerations, from the Circulation Element chapter of Framework for Planning, are as follows.

F. STREET DESIGN CONSIDERATIONS

The location and design of streets can have a major effect on adjacent land uses. The design of residential streets is particularly important since improper design of such routes can have a long-term adverse effect on residents using them. The following guidelines offer general design parameters for providing safe, convenient routes for movement of automobiles, bicycles and pedestrians within residential neighborhoods and local commercial areas.

General Design Guidelines

a. Street and pedestrian circulation patterns in newly developed areas should be compatible with the land use recommendations of the community plans for the planning areas.

b. Arterial roads and streets should be developed to provide appropriate service for local trips, to minimize traffic on principal arterials.

c. Pedestrian circulation should be expressly addressed in street designs so that walking is accommodated by various methods of implementation.

d. New street network designs should minimize the overall length of streets.

e. Driveway entrances should be avoided on arterials.

f. Local residential streets should generally be designed to serve limited, localized access needs, rather than through traffic.

g. All dwellings and structures should be readily accessible to emergency and service vehicles.

h. Street standards should be developed using the guidelines of the "Guide to Urban and Rural Street Design" published by the association of State and Highway Transportation Officials.

i. Horizontal and vertical street alignments should be located to minimize grading and to incorporate natural ground contours as much as possible without creating hazards to traffic, and should be consistent with other design objectives.

j. Street layouts should be planned to avoid adverse concentration of storm water runoff.

k. Street design should promote safe bicycling by considering the placement of bike lanes that wil provide for the safety of the cyclist as well as the automobile driver with whom they share the streets.

Local Street Intersections

Residential street layouts should generally be designed to minimize the use of four-way local street intersections by avoiding conventional gridiron street layout patterns.

Parking

Adequate off-street parking for residents and guests, including spaces for recreational vehicles, should be provided in both urban and rural areas.

Street Landscaping

a. Street landscaping should be included in planned street designs to improve the appearance and aesthetic value of urban and village areas.

b. Landscaping should be planned for safety and beauty, to provide buffering to minimize conflicts between streets, parking, structures, and pedestrian paths.

c. New street development projects should include landscaping along with funding for its installation and maintenance, either through the county or other agencies such as community service districts.

d. The design and construction of new roads or the expansion of existing roads, to the degree that right-of-way and traffic safety allow, should incorporate and preserve natural features, such as native woodlands or significant mature trees, rock outcrops and other landmarks.

e. Implementation of street landscaping projects should occur after the assignment of departmental responsibilities for installation and maintenance and discussion of funding sources and methods by the Board of Supervisors. For example, the Public Works and General Services Departments may develop a coordinated program for design and a funding mechanism through the Public Works Department, and installation and maintenance by the General Services Department. These decisions should be made to avoid problems with inadequate staffing or financial capability to develop and maintain projects.

Alternative Street Design

Due to the considerations listed above, special street designs may be necessary in unique local situations, such as in developments where public roads are not a consideration. In such cases, special design standards or criteria may be utilized that do not conform to the County Standard Improvement Specifications and Drawings.

Some special design needs are noted in the Land Use Element area plans as guidelines in the Circulation chapter programs or as requirements in Article 9 of the Land Use Ordinance (Community Planning Standards). Special designs that are available in the "Guide to Urban and Rural Street Design," or other design guidebooks will be necessary to implement them. Other special design needs may come to light during review of applications for land use permits and subdivisions or capital improvement projects, for example to preserve a woodland or to create a paved pathway separate from a street. In such cases, streets should be designed to accommodate those needs if traffic safety can be assured.

Street Construction

Before the construction of new or expanded streets and roads, detailed plans must be developed. At that stage, engineering feasibility studies and geometric designs should carry out the guidelines listed in the previous sections with the coordination of Planning and Public Works Department staff as a general plan conformity report is prepared.

An environmental determination is then made for the preliminary design of each project. The Public Works Department prepares construction drawings based on the process of plan development and the environmental determination.

D2: Recommendations for installing Marked Crosswalks

Use the following table for determining appropriate locations for marking crosswalks:

Table 1. Recommendations for installing marked crosswalks and other needed pedestrian improvements at uncontrolled locations.*

Roadway Type (Number of Travel Lanes and Median Type)	Vehicle ADT ≤ 9,000			Vehicle ADT > 9000 to 12,000			Vehicle ADT < 12,000 - 15,000			Vehicle ADT > 15,000		
	Speed Limit**											
	≤ 30 mph	35 mph	40 mph	≤ 30 mph	35 mph	40 mph	≤ 30 mph	35 mph	40 mph	≤ 30 mph	35 mph	40 mph
2-Lanes	C	C	P	C	C	P	C	C	N	C	P	N
3-Lanes	C	C	P	C	P	P	P	P	N	P	N	N
Multi-Lane (4 or More Lanes) With Raised Median†	C	C	P	C	P	N	P	P	N	N	N	N
Multi-Lane (4 or More Lanes) Without Raised Median	C	P	N	P	P	N	N	N	N	N	N	N

* These guidelines include intersection and midblock locations with no traffic signals or stop sign on the approach to the crossing. They do not apply to school crossings. A two-way center turn lane is not considered a median. Crosswalks should not be installed at locations which could present an increased safety risk to pedestrians, such as where there is poor sight distance, complex or confusing designs, substantial volumes of heavy trucks, or other dangers, without first providing adequate design features and/or traffic control devices. Adding crosswalks alone will not make crossings safer, nor necessarily result in more vehicles stopping for pedestrians. Whether marked crosswalks are installed, it is important to consider other pedestrian facility enhancements, as needed, to improve the safety of the crossing (e.g., raised median, traffic signal, roadway narrowing, enhanced overhead lighting, traffic calming measures, curb extensions). **These are general recommendations; good engineering judgment should be used in individual cases for deciding where to install crosswalks.**

** Where speed limit exceeds 40 mph, marked crosswalks alone should not be used at unsignalized locations.

C = Candidate sites for marked crosswalks. Marked crosswalks must be installed carefully and selectively. Before installing new marked crosswalks, an engineering study is needed to show whether the location is suitable for a marked crosswalk. For an engineering study, a site review may be sufficient at some locations, while a more in-depth study of pedestrian volumes, vehicle speeds, sight distance, vehicle mix, etc. may be needed at other sites. It is recommended that a minimum of 20 pedestrian crossings per peak hour (or 15 or more elderly and/or child pedestrians) exist at a location before placing a high priority on the installation of a marked crosswalk alone.

P = Possible increase in pedestrian crash risk may occur if crosswalks are added without other pedestrian facility enhancements. These locations should be closely monitored and enhanced with other pedestrian crossing improvements, if necessary, before adding a marked crosswalk.

N = Marked crosswalks alone are not recommended, since pedestrian crash risk may be increased with marked crosswalks. Consider using other treatments, such as traffic signals with pedestrian signals to improve crossing safety for pedestrians.

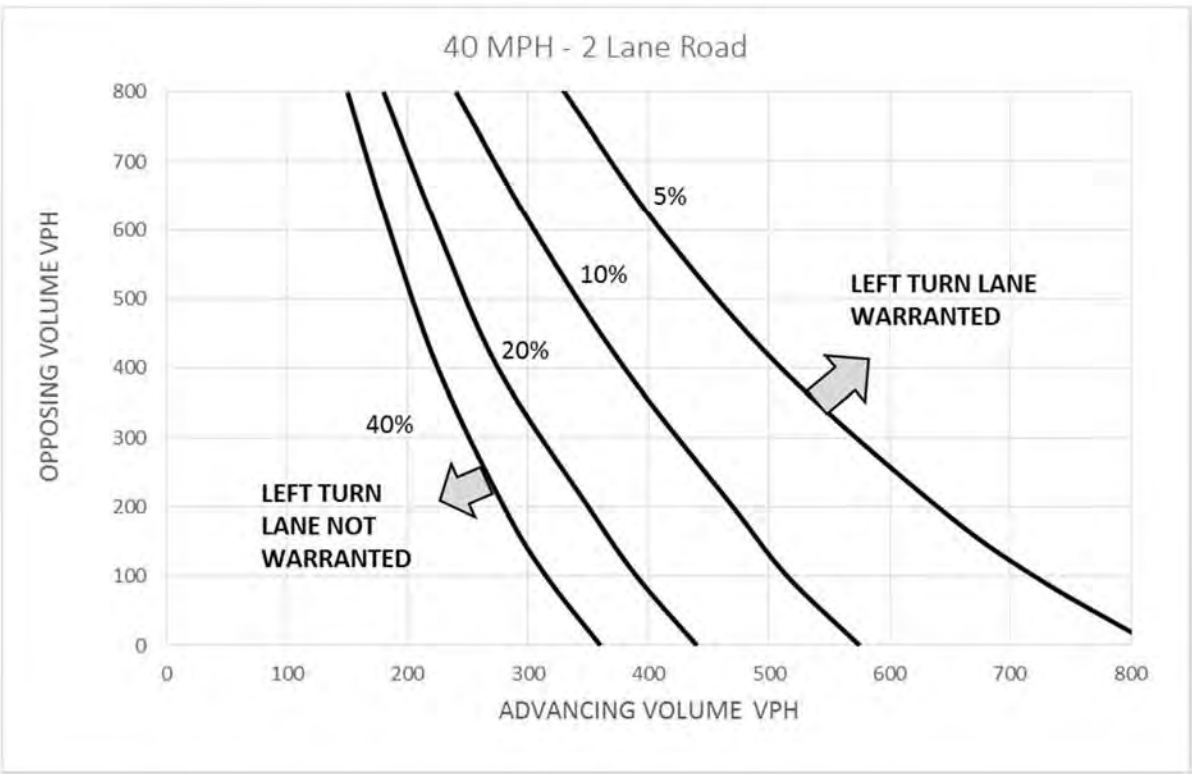
† The raised median or crossing island must be at least 4 ft wide and 6 ft long to adequately serve as a refuge area for pedestrians in accordance with MUTCD and AASHTO guidelines.

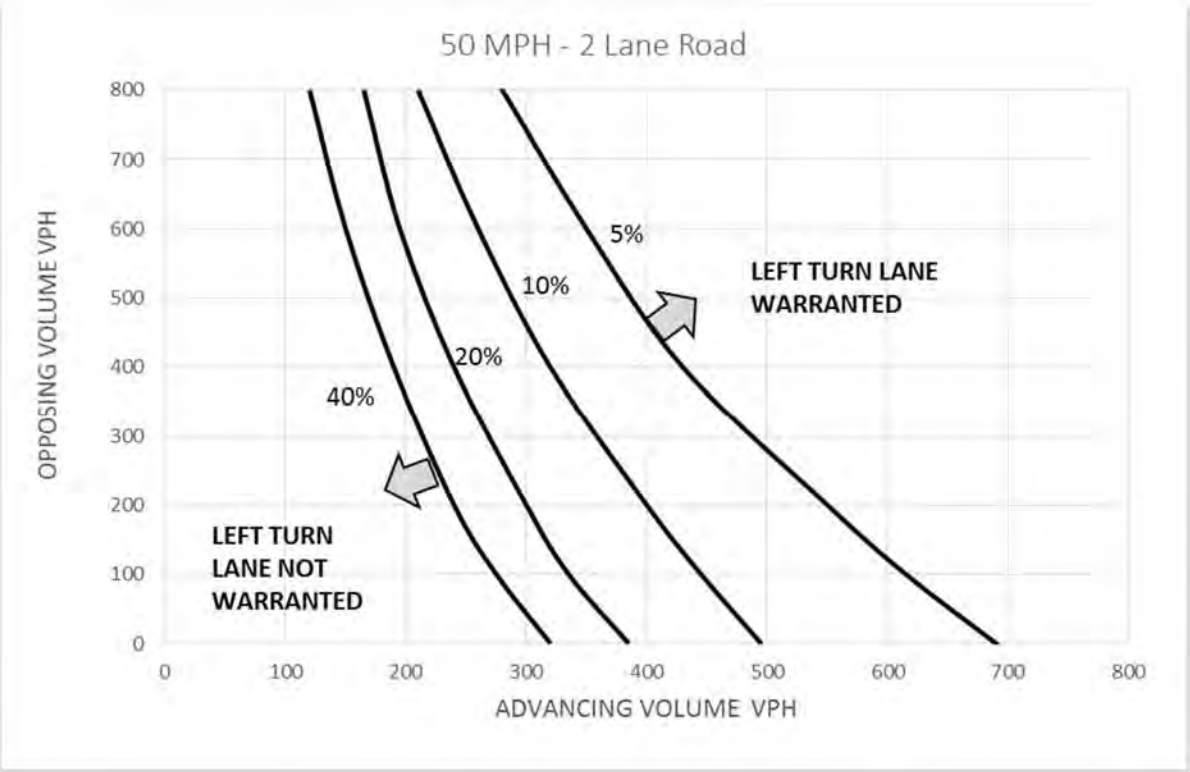
D3: Left Turn Warrant Analysis Graphs (AASHTO)

The table and graphs for left turn warrant analysis on the next two pages were taken from the AASHTO manual.

Table 2. AASHTO (5) guide for left-turn lanes on two-lane highways, 2004.

Operating Speed (mph)	Opposing Volume (veh/hr)	Advancing Volume (veh/hr)			
		5% Left Turns	10% Left Turns	20% Left Turns	30% Left Turns
40	800	330	240	180	160
	600	410	305	225	200
	400	510	380	275	245
	200	640	470	350	305
	100	720	515	390	340
50	800	280	210	165	135
	600	350	260	195	170
	400	430	320	240	210
	200	550	400	300	270
	100	615	445	335	295
60	800	230	170	125	115
	600	290	210	160	140
	400	365	270	200	175
	200	450	330	250	215
	100	505	370	275	240




50 MPH - 2 Lane Road
OPPOSING VOLUME VPH
ADVANCING VOLUME VPH
0
100
200
300
400
500
600
700
800
5%
10%
20%
40%
LEFT TURN LANE WARRANTED
LEFT TURN LANE NOT WARRANTED

60 MPH - 2 Lane Road
OPPOSING VOLUME VPH
ADVANCING VOLUME VPH
0
100
200
300
400
500
600
700
800
5%
10%
20%
40%
LEFT TURN LANE WARRANTED
LEFT TURN LANE NOT WARRANTED

DESIGN INFORMATION BULLETIN NUMBER 79-03

Department of Transportation
Division of Design
Office of Geometric Design Standards

Design Guidance and Standards
For
Roadway Rehabilitation Projects

[Pavement Focused (2R) and Resurfacing, Restoration, and Rehabilitation (3R) Projects]

And

Certain Other Projects

[Storm Damage, Protective Betterment, Operational Improvement and Safety-funded Projects]

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ACTING DIVISION CHIEF
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November 19, 2007

Table of Contents

		Page Number
1.0	Capital Pavement Improvements to the State Highway System	1
1.1	Pavement Repair Program Elements in the State Highway and Protection Program (SHOPP)	1
1.2	Capital Preventive Maintenance (CAPM) Projects	2
1.3	Project Development Guidance for 2R and 3R Projects	2
1.3.1	Purpose and Need	2
1.3.2	Existing Pavement Condition	2
1.3.3	Safety Screening to Identify 2R Projects	2
1.3.4	Alternative Countermeasures to Reconstruction for Safety Improvement	3
1.4	Applicability to Certain Other Types of Projects	3
2.0	2R Projects	5
2.1	Pavement Rehabilitation Strategies	5
2.2	Project Scoping Guidance	5
2.2.1	General Guidance	5
2.2.2	Pedestrian Accessibility and the Americans with Disabilities Act (ADA)	5
2.2.3	Bicyclist Accommodation	6
2.2.4	Storm Water Management	6
2.2.5	Pavement Edges and Tapers	6
2.2.5.1	Edge Drop-offs	6
2.2.5.2	Shoulder Backing	6
2.2.5.3	Pavement Tapers	7
2.2.6	Curbs and Dike	7
2.2.7	Drainage Facilities	7
2.2.8	Vertical Clearance at Structures	7
2.2.9	Shoulders on and Connections to Conventional Highways	7
2.2.10	Traffic Operations Strategies	8
2.2.10.1	Roadway Safety (Protection) Devices	8
2.2.10.2	Signs and Delineation	8
2.2.10.3	Shoulder and Centerline Rumble Strips	8
2.2.11	All Other Highway Appurtenances and Design Features	8
2.3	Documentation of Design Exceptions	8

3.0 3R Projects 9

3.1 Pavement Rehabilitation Strategies 9

3.2 Project Scoping Guidance 9

3.2.1 General Guidance 9

3.2.2 Pedestrian Accessibility and the Americans with Disabilities Act (ADA) 9

3.2.3 Bicyclist Accommodation 10

3.2.4 Storm Water Management 10

3.2.5 Pavement Edges and Tapers 10

3.2.6 Curbs and Dike 10

3.2.7 Drainage Facilities 10

3.2.8 Structures 10

3.2.8.1 Vertical Clearance 10

3.2.8.2 Structural Bridge Capacity 11

3.2.8.3 Bridge Rail and Other Structure Improvements 11

3.2.9 Maintenance 11

3.2.10 Traffic Operations Strategies 11

3.2.10.1 Roadway Safety (Protection) Devices 11

3.2.10.2 Signs and Delineation 11

3.2.10.3 Shoulder and Centerline Rumble Strips 12

3.2.11 Highways Appurtenances 12

3.2.12 Landscaping 12

3.3 Geometric Design Guidance
12

3.3.1 Projects on Freeways, Expressways, and Multilane Conventional Highways 12

3.3.2 Additional Geometric Design Guidance for Projects on Freeways and Expressways 12

3.3.2.1 Cross Slope (Traveled Way) 12

3.3.2.2 Ramps and Gore Areas 13

3.3.2.3 Interchange Spacing 13

3.3.3 Geometric Design Guidance for Two- and Three-Lane Conventional Highways 13

3.3.3.1 Selection of Design Speed 13

3.3.3.2 Stopping Sight Distance at Grade Crests and Sags 13

3.3.3.3 Superelevation 14
3.3.3.4 Horizontal Alignment 14
3.3.3.5 Intersections (Public and Private Connections) and Driveways 15
3.3.3.5.1 General 15
3.3.3.5.2 Corner Sight Distance 16
3.3.3.5.3 Left- and Right-Turn Channelization 16
3.3.3.5.4 Skew Angle 16
3.3.3.5.5 Truck Turning 16
3.3.3.6 Cross Section Design Elements 17
3.3.3.6.1 Widths 17
3.3.3.6.1.1 Traveled Way 17
3.3.3.6.1.2 Shoulders 17
3.3.3.6.1.2.1 Roadbed 17
3.3.3.6.1.2.2 Bridges 18
3.3.3.6.2 Cross Slopes 19
3.3.3.6.2.1 Traveled Way 19
3.3.3.6.2.2 Shoulders 19
3.3.3.6.3 Clear Recovery Zone (CRZ) 19
3.3.3.6.4 Side Slopes 20

Tables

		Page Number
Table 1	Alternative Countermeasures to Reconstruction	4
Table 2	Two-Lane Conventional Highway 3R Standards for Shoulder Widths	18

Attachments

Attachment 1 Pavement Repair on the State Highway System
Attachment 2 2R Project Certification Form

1.0 Capital Pavement Improvements to the State Highway System

The focus of this Design Information Bulletin (DIB) is to provide guidance on design procedures and standards for roadway rehabilitation projects, both 2R and 3R, and to provide guidance on how to identify safety enhancements and other upgrades to include in these projects. This DIB supplements the highway design guidance and standards provided in the California Department of Transportation *Highway Design Manual (HDM)*. The standards established herein are communicated in the same manner as defined in Chapter 80 of the *HDM*. When this DIB is silent on a subject covered in the *HDM*, the new construction design guidance in the *HDM* applies.

This DIB is not a textbook or a substitute for engineering knowledge, experience or judgment. Many of the instructions given herein are subject to amendment as conditions and experience may warrant. Special situations may call for variation from the polices and procedures described in this document, subject to Division of Design approval, or such other approval as may be specifically provided for in the text.

More information regarding highway design for roadway rehabilitation projects can be found in the *American Association of State Highway and Transportation Officials (AASHTO) Roadside Design Guide* and *AASHTO "Highway Safety Design and Operations Guide - Chapter 4: "Rural Highways."* Copies of these publications can be ordered through the AASHTO website. Other resources that are available and should be reviewed include:

- *DIB 82: "Pedestrian Accessibility Guidelines for Highway Projects;"*
- *Storm Water Quality Handbook "Project Planning and Design Guide;"*
- Chapter 7 of the *Traffic Manual*;
- *California MUTCD;*
- *"Guidelines for Reconstruction of Intersections,"* dated August 1985, which is available through the Headquarters Division of Traffic Operations;
- *HDM Pavement Engineering Chapters 600* through *670*; and the,
- *Life-Cycle Cost Analysis (LCCA) Procedures Manual*.

1.1 Pavement Repair Program Elements in the State Highway and Protection Program (SHOPP)

The SHOPP has various funding programs that the Department uses to repair the pavements on the State Highway System. Specifically:

- 3R Projects are programmed in and funded out of the SHOPP 201.120 Program;
- Capital Preventive Maintenance (CAPM) Projects are programmed in and funded out of the SHOPP 201.121 Program;
- 2R Projects are programmed in and funded out of the SHOPP 201.122 Program; and,
- Long-life Pavement Rehabilitation projects are programmed in and funded out of the SHOPP 201.125 Program.

This DIB provides guidance for projects in the SHOPP 201.120 and 201.122 Programs. For further information about these SHOPP program elements, see Chapter 7 in the *Coding Manual* on the Headquarters Division of Accounting website.

1.2 Capital Preventive Maintenance (CAPM) Projects

CAPM Projects are not covered by this document. See the *Project Development Procedures Manual (PDPM)*, *HDM Topic 603*, and *DIB 81: Capital Preventative Maintenance (CAPM) Guidelines* on the Departmental website for more guidance on CAPM Projects.

1.3 Project Development Guidance for 2R and 3R Projects

Chapter 9 of the *PDPM* describes the project development process for roadway rehabilitation projects. The Project Initiation Document (PID) typically used for roadway rehabilitation projects is the *"Project Scope Summary Report (PSSR) for 3R Projects."* This document should be used for both pavement resurfacing, restoration, and rehabilitation (3R) and pavement resurfacing and restoration (2R) projects. In addition, the *"Main Streets: Flexibility in Design and Operations"* publication located on the Department Division of Design "Context Sensitive Solutions" website should be consulted for guidance during the scoping process.

1.3.1 Purpose and Need

Generally speaking, the purpose and need for 2R and 3R Projects is to restore the facility to a state of good repair so that the roadway will be in a condition that only requires minimal maintenance expenditures by the Department; see *HDM Topic 612* for further guidance on Department standards related to pavement design life. 2R Projects are to be programmed as "pavement-focused" projects, with their primary goal being to extend the service life of the identified pavement structure; while 3R Projects, in addition to extending the service life of the pavement structure, also replace and upgrade other highway appurtenances and facilities within the project limits that are failing, worn out or functionally obsolete. The determination of whether a segment of highway is to proceed as either a 2R or 3R Project is to be made after Safety Screening has occurred and during the pre-PID phase; see Section 1.3.3 for further guidance.

1.3.2 Existing Pavement Condition

The scope of a roadway rehabilitation project is driven by the purpose and need for the project. Roadway rehabilitation projects will vary in scope depending on pavement condition needs and the identified safety enhancements, and other facility upgrades, needed within the project limits. Analysis of the pavement condition data reported in the Pavement Management System will identify the structural deficiencies of the pavement structure that needs to be repaired and trigger the need for a project. Additional data including testing data and materials analysis such as deflection test results for flexible pavements; and notes from field reviews of the project site may also dictate the viable pavement repair strategies for the project. The *PDPM* should be consulted for further guidance on scoping roadway rehabilitation projects, the Scoping Team Review process, and additional guidance on deflection studies and field reviews. The *HDM*, particularly Topics 625, 635, and 645, should be consulted for further guidance on rehabilitation designs and requirements for pavements.

1.3.3 Safety Screening to Identify 2R Projects

Safety Screening to identify and analyze the collisions within the limits of all proposed roadway rehabilitation projects is required, regardless of highway type; see *HDM Index 62.3*. A review of collision data and other relevant information is required to determine if the highway segment in need of pavement repairs qualifies as a 2R Project, or if it should be repaired and upgraded as a 3R Project. The District Traffic Safety unit will perform the Safety Screening prior to the initiation of the PID phase. The results of the Safety Screening, in addition to the results of the pavement condition analysis, will be used to determine and adequately define the scope of the project. Integrating targeted (e.g., addition of protection devices,

such as Metal Beam Guard Rail) and cost-effective safety improvements (e.g., signing, striping) into 2R Projects is an effective way for the Department to preserve both mobility and safety. District Traffic Safety can be contacted to obtain more details on the Safety Screening process and procedures.

If the Safety Screening determines that targeted and cost-effective traffic operation strategies are the only needed safety enhancements within the project limits, the project can be identified as a "pavement-focused" 2R Project. If the Safety Screening results in the determination that more extensive safety work is required, which is beyond the targeted and cost-effective traffic operation strategies mentioned above, then the project will be identified as a 3R Project. In either case, the scope of the project should incorporate the recommendations of the Safety Screening.

If during the Safety Screening, a safety issue is identified and recommended for corrective action, District Traffic Safety will consider initiating a separate safety improvement project. In most cases, safety enhancements incorporated into 2R and 3R Projects are considered proactive safety measures.

1.3.4 Alternative Countermeasures to Reconstruction for Safety Improvement

In some cases, reconstruction measures to enhance safety in a corridor are impractical. When that is the case for a given location or segment of highway, it is important to remember that there exists a broad range of alternative measures that can be used alone or in combination with others to improve the safety along an existing highway. The Headquarters Division of Traffic Operations Office of Traffic Safety Program website has additional guidance on countermeasures to reconstruction which provides a list of *"General Countermeasures for Accident Patterns and Their Probable Cause"* that may aid designers. See *Highway Safety Improvement Program (HSIP) Guidelines*, Chapter 3.0, pages 3-15 through 3-21 for further information. Table 1 in this DIB serves as a supplement to the *HSIP* guidance and provides a partial list of alternative countermeasures to reconstruction for various existing geometric conditions.

1.4 Applicability to Certain Other Types of Projects

Certain storm damage repair, protective betterment, operational improvement and safety-funded non-freeway projects, as defined below, are to be designed using the geometric design guidance provided in Section 3.3 of this DIB:

- All projects costing less than the Minor A limit (excluding the cost of Right of Way and Environmental Mitigation);
- Projects costing more than the Minor A dollar limit and do not involve extensive grading, paving, or retaining structures that are not spot locations.
- Projects that are considered "spot" improvements; typically, these projects can be up to approximately one-half mile in length. Examples of this type of work include storm damage repairs, curve improvements, adding turn pockets, miscellaneous pavement widening, culvert replacement, and rock slope protection.
- Permanent Restoration projects, triggered due to fire, earthquake, slides or storm damage, that do not include structures such as walls or bridges, may be restored to the "condition" that existed prior to the damage.
- The 2R and 3R guidance in this DIB also applies to bridge deck rehabilitation projects funded from the Bridge Rehabilitation (20.xx.210.110) Program that necessitate the inclusion of improvements to the geometric features, and other improvements, in addition to the work being performed to restore the bridge deck.

TABLE 1
ALTERNATIVE COUNTERMEASURES TO RECONSTRUCTION

Existing Geometric Condition:	Alternate Countermeasure:
Narrow lanes and shoulders	♦ Pavement edge lines ♦ Raised pavement markers ♦ Recessed pavement markers in snow areas ♦ Post (roadside) delineators ♦ Rumble strips
Steep side slopes	♦ Shield with guardrail ♦ Roadside delineators
Roadside obstacles	♦ Remove or relocate obstacle ♦ Slope flattening (including ditches) ♦ Add breakaway hardware to obstacle ♦ Shield with guardrail ♦ Delineate
Narrow bridge	♦ Traffic control devices ♦ Approach guardrail ♦ Object markers ♦ Rumble strips placed on approaches
Poor sight distance at vertical crest	♦ Traffic control devices ♦ Fixed-object removal ♦ Shoulder widening ♦ Relocate driveway or local road to a location with better sight distance ♦ Lighting
Sharp horizontal curve	♦ Traffic control & warning devices ♦ Add lighting ♦ Shoulder widening ♦ Appropriate superelevation ♦ Slope flattening ♦ Pavement antiskid treatment ♦ Obstacle removal ♦ Obstacle shielding
Various Intersections Issues	♦ Traffic control devices ♦ Traffic signalization (warrants must be met) ♦ Fixed lighting ♦ Speed controls ♦ Add turn lanes ♦ Increase sight distance

2.0 2R Projects

2.1 Pavement Rehabilitation Strategies

2R pavement rehabilitation strategies do not differ from those used on 3R Projects; see Section 3.1 of this DIB for further guidance.

2.2 Project Scoping Guidance

2.2.1 General Guidance

All roadway rehabilitation projects are to be scoped taking into consideration all modes of travel and the context of the facility being rehabilitated. A life cycle cost analysis shall be performed to assist the decision-making process being used to select the pavement rehabilitation strategy or strategies used within the project limits; see *HDM Topic 619* and the *LCCA Procedures Manual* for further guidance. The Maintenance Supervisor in the area of the project should also be contacted for input on highway deficiencies and needed safety upgrades. Maintenance personnel are typically very familiar with their segments of highway system and can often identify upgrades or deficiencies that might otherwise be overlooked such as drainage issues, pavement failures, collision locations, deficiencies related to bicycle and pedestrian usage, slope stability problems, the need for maintenance pullouts, safety concerns, and any other problematic issues. If the identified upgrades or deficiencies are significant (e.g., most highway appurtenances are failing, worn out or functionally obsolete, work necessary to upgrade the geometric design features requires additional right of way, environmental impacts are encountered that require additional study), the project may no longer qualify as a 2R Project and the Design Coordinator should be contacted as soon as possible for further project specific guidance.

In addition, the *PDPM* should also be consulted to review the current Departmental requirements, practices, and procedures related to project scoping and project delivery documentation.

2.2.2 Pedestrian Accessibility and the Americans with Disability Act (ADA)

Pedestrian accessibility and compliance with the ADA is to be decided on a project-by-project basis in accordance with *DIB 82* and *HDM Topic 105*. Upgrades and additions to pedestrian facilities must be considered on projects covered by this DIB. Federal and State law require the installation of curb ramps at intersections with curbs where they are absent. Pedestrian facilities that are altered must be upgraded to current ADA accessibility standards. If the project does not alter pedestrian facilities, consideration should still be given to upgrading the facilities, especially if pedestrian safety can be enhanced. Although new sidewalks should be considered, projects covered by this DIB are not required to add new pedestrian facilities throughout the limits of every project. Upgrades such as walkway (sidewalk) gap closures, widening sidewalks to current standards, upgrading curb ramps to current standards, relocating path width obstructions, sidewalk cross slope, and accessible driveways are to be evaluated and considered. Where pedestrians will use the shoulder in locations where sidewalks are not justified, see Section 2.2.9 of this DIB for further guidance. Facilities near school zones, rail grade crossings, parks, playgrounds, and other uses that have the potential to generate pedestrian activity are to be evaluated per the guidance in *DIB 82*. The Departmental website, under Traffic Operations, should also be visited to obtain guidance in the *California Manual of Uniform Traffic Control Devices (California MUTCD)* and additional Departmental guidance on work zone requirements during construction related to pedestrians.

2.2.3 Bicyclist Accommodation

Bicyclist safety must be taken into consideration on all 2R Projects. On 2R Projects it may be appropriate to widen shoulders; see Section 2.2.9 of this DIB for further guidance. *HDM Index 1003.2* should also be reviewed for guidance on bicycle lane widths when bicycle lanes are adjacent to on-street parallel vehicle parking to avoid conflicts between the parked vehicle doors, the bicyclists and the vehicles in the traveled way.

Also, see *HDM Chapter 1000* for further bicycle design criteria noting *HDM Index 1003.6(2)* regarding surface quality and the use of rumble strips, and *HDM Index 1003.6(3)* for requirements pertaining to drainage inlet grates. The Traffic Operations and the Office Engineers websites should be visited to obtain further guidance in Part 3 of the *California MUTCD* and the appropriate *Standard Plans* on rumble strips and their placement related to the needs of bicyclists. The Traffic Operations website should also be visited to obtain guidance in the *California MUTCD* and Departmental guidance on work zone requirements during construction related to the needs of bicyclists.

2.2.4 Storm Water Management

Features required for compliance with the Caltrans National Pollutant Discharge Elimination System (NPDES) Permit / Storm Water Management Plan (SWMP) must be included in the scope of work for 2R Projects. This not only involves the Best Management Practices (BMPs) required based on the work performed as part of the pavement repair strategies, plus any appurtenance and facility upgrades, but may also include BMPs for NPDES Permit compliance.

Contact the District Storm Water Coordinator for guidance on the current Caltrans NPDES Permit requirements and BMPs to include in the project. After consulting the District Storm Water Coordinator, consult with the District Maintenance Supervisor for the area to discuss the proposed BMPs and issues related to their maintenance.

2.2.5 Pavement Edges and Tapers

2.2.5.1 Edge Drop-offs

Pavement edge drop (e.g., vertical drops or ruts) can develop at the edge of paved surfaces and must be investigated for safety concerns. Consideration should be given to adding shoulder backing, see Section 2.2.5.2, or reconstructing the embankment on overlay projects because edge drops often develop over time. Visit the Department's Pavement website to review Pavement Tech Notes on *"Pavement Tapers"* for further guidance.

In addition, longitudinal edge differences are problematic for bicycles and motorcycles and are to be avoided. On the outside of superelevated curves, overlays and surface treatments (including Open Graded Friction Courses, OGFC) must extend to the edge of shoulder; see *HDM Index 645.1*.

Unpaved driveways, public road intersections and private road intersections should be paved to prevent pavement edge drops from developing. Such facilities are to be evaluated location-by-location and selectively paved on an as needed basis.

2.2.5.2 Shoulder Backing

Shoulder backing is a common design element for paving projects. Shoulder backing is a granular material that is used to protect the outside edge of pavement from edge cracking, avoid pavement edge loss, provide

edge support and minimize edge drop-offs. Guidance has been prepared to assist designers with shoulder backing. Visit the Department's Pavement website to review Pavement Tech Notes on *"Shoulder Backing"* for further guidance.

2.2.5.3 Pavement Tapers

Pavement tapers are a common design detail for 2R Projects. The goal of these tapers is to provide a smooth, ideally unnoticeable transition from one pavement type, overlay, or surface to another. Guidance has been prepared to assist designers with pavement tapers. Visit the Department's Pavement website to review Pavement Tech Notes on *"Guidance for Pavement Tapers"* for further information.

2.2.6 Curbs and Dike

Curb and dike placement, removal, and replacement may be done on 2R Projects as needed. Curbs and dikes have safety implications and must be evaluated based upon *HDM Topic 303*. Current practice involves placing or replacing curb and dike only when necessary and after all safety aspects have been considered. Curb and dike that is currently nonstandard should be removed or replaced based on the guidance in *HDM Topic 303*, unless specific circumstances dictate otherwise. The District Hydraulics unit, District Landscape, and Maintenance Supervisor in the area of the project should review any design proposals that involve dike removal or placement to ensure that it's removal does not impact an erodible slope.

2.2.7 Drainage Facilities

Only drainage repairs for structural deficiencies and the restoration of function and capacities are to be included in 2R Projects. The Maintenance Supervisor in the area of the project should be contacted to assist in identifying such drainage facility needs. District Maintenance should be contacted to have their culvert inspection crew(s) check all of the culverts to identify any structural deficiencies and possible need for replacement. If extensive modifications are needed to address or mitigate fish passage (e.g., grade control structures, step pools), then the project will be identified as a 3R Project.

2.2.8 Vertical Clearance at Structures

On 2R Projects, improving nonstandard vertical clearance should be based on the Safety Screening. However, where existing vertical clearance does not meet the requirements stated in *HDM Index 309.2* and cannot be achieved by milling prior to overlaying the pavement, the removal and replacement of the existing pavement may be necessary.

2.2.9 Shoulders on and Connections to Conventional Highways

2R Projects on conventional highways should be brought to the attention of the Design Coordinator as early as possible in the project development process to obtain their concurrence on the appropriate shoulder width(s) for project. Shoulders on conventional highways may need to be widened in urbanized areas, suburban areas with commercial and residential development adjacent to central business districts, and other locations where it is known or anticipated that shoulder usage by pedestrians and bicyclists is common. The need to widen the shoulder to accommodate pedestrians and bicyclists should be discussed with the Design Coordinator as early as possible in the project development process, if it has not already been discussed during the pre-PID phase. The Design Coordinator should also be made aware of the number and frequency of residential road and commercial connections to the conventional highway to determine if widening the existing shoulder is desirable.

2.2.10 Traffic Operation Strategies

Targeted and cost-effective traffic operation strategies such as roadway safety (protection) devices, signing, and striping to address identified accident patterns should be included in 2R Projects as needed. The Safety Screening completed by District Traffic Operations should be used to identify and determine what features are to be added to each pavement focused 2R Project.

2.2.10.1 Roadway Safety (Protection) Devices

The District Traffic Safety Systems Coordinator must be consulted regarding the application of and appropriate use of all roadway safety devices. Roadway safety devices typically include Metal Beam Guard Rail (MBGR), guardrail end treatments, crash cushions, median barrier, bridge rail, and bridge approach transition railing. Roadway safety devices that do not meet *NCHRP Report 350* criteria (or the latest crashworthiness criteria adopted by FHWA) are to be identified during the project's Safety Screening and upgraded or replaced. Roadway safety devices such as MBGR, bridge rails, and barriers may also require reconstruction when pavement overlays, shoulder backing, or slope changes necessitate adjusting their heights to meet the allowable limits. Consult with the District Traffic Safety Systems Coordinator to identify and discuss all of the roadway safety devices that may require an adjustment in height.

2.2.10.2 Signs and Delineation

Signs and pavement markings within the project limits should be evaluated for replacement and/or upgrading on an as needed basis. This evaluation should consider visibility performance, conformance with existing policies, appearance, and legibility for both day and night conditions.

2.2.10.3 Shoulder and Centerline Rumble Strips

Shoulder and Centerline Rumble strips are an effective proactive safety measure in reducing run-off-road or cross centerline collisions. Rumble strips can be used adjacent to the outside lane and along the centerline of undivided highways, or adjacent to both inside and outside lanes of divided highways. Consideration should also be given to adding a centerline buffer zone with rumble strips on highway segments where collision data exhibits a high number of cross centerline collisions. Consult with District Traffic regarding potential locations for installation of shoulder and centerline rumble strips. The Traffic Operations and the Office Engineers websites should be visited on the Department website to obtain further guidance in Part 3 of the *California MUTCD* and the appropriate *Standard Plans* on rumble strips.

2.2.11 All Other Highway Appurtenances and Design Features

The purpose of a 2R Project is to focus on repairing the pavement to extend the service life of the facility. If the Safety Screening for the segment of highway under consideration as a 2R Project indicates that the highway segment needs repairs and upgrading of its appurtenant facilities, the highway must be scoped as a 3R Project. If this is the case for a proposed project, a decision will need to be made to either rescope or modify the project in some manner to conform to the 2R guidance in this DIB.

2.3 Documentation of Design Exceptions

The philosophy of the 2R Program and its projects is that the geometric features and the safety of the facility will not be degraded. If the Safety Screening concludes that a 2R Project is appropriate for the proposed project, both Mandatory and Advisory Design Exception fact sheets will not be required for geometric design features, but a statement to document that conclusion should be included in both the Project History File and the PID for the project. All newly proposed nonstandard features must be

documented in a Mandatory or Advisory Design Exception Fact Sheet, as appropriate. Newly proposed nonstandard geometric design features are to be documented using the procedures in Chapter 21 of the *PDPM*.

Pavement designs for 2R Projects must meet the requirements found in *HDM Chapters 600* through *670*.

Exceptions to Accessibility Design Standards on 2R Projects are to be documented following the guidance provided in *DIB 82*.

3.0 3R Projects

3.1 Pavement Rehabilitation Strategies

Pavement rehabilitation strategies are constantly evolving with new technologies and materials. The following needs to be taken into account when selecting the 3R pavement strategy:

- Pavement design life (see *HDM Topic 612*);
- Minimizing maintenance worker exposure;
- Minimizing maintenance effort;
- Consistency with adjacent corridor pavement;
- Long term corridor plan;
- Constructability;
- Traffic handling during construction; and,
- Cost-effectiveness (both initial and life cycle – see *LCCA Procedures Manual* and *HDM Topic 619*).

Pavement repair techniques and rehabilitation strategies are to be developed in coordination with District Materials, District Maintenance, and the Office of Pavement Design. Refer to the *HDM Pavement Engineering Chapters 600* through *670* and the Departmental Pavement website for additional pavement guidance and information. Exceptions to the pavement design standards and guidance in the *HDM* are to be documented appropriately.

3.2 Project Scoping Guidance

3.2.1 General Guidance

3R Projects differ from New Construction and Reconstruction projects in that they do not include capacity improvements, major highway realignments, or major upgrades to geometric features to meet current standards. The guidance provided for 2R Projects in Section 2.2.1 of this DIB also applies to 3R Projects except that instead of a project "no longer qualifying as a 2R Project" because the upgrades needed to eliminate the identified deficiencies are significant (e.g., most highway appurtenances are failing, worn out or functionally obsolete, work necessary to upgrade the geometric design features requires additional right of way, environmental impacts are encountered that require additional study), upgrades that are not appropriate for 3R Projects may warrant the initiation and programming of a New Construction or Reconstruction project.

3.2.2 Pedestrian Accessibility and the Americans with Disability Act (ADA)

The guidance provided for 2R Projects in Section 2.2.2 of this DIB also applies to 3R Projects.

3.2.3 Bicyclist Accommodation

The guidance provided for 2R Projects in Section 2.2.3 of this DIB also applies to 3R Projects.

3.2.4 Storm Water Management

The guidance provided for 2R Projects in Section 2.2.4 of this DIB also applies to 3R Projects.

3.2.5 Pavement Edges and Tapers

The guidance provided for 2R Projects in Sections 2.2.5.1, 2.2.5.2, and 2.2.5.3 of this DIB also applies to 3R Projects.

3.2.6 Curbs and Dike

The guidance provided for 2R Projects in Section 2.2.6 of this DIB also applies to 3R Projects.

3.2.7 Drainage Facilities

On 3R Projects, the guidance in *HDM Indexes 803.3* and *804.3* regarding the need for repair, replacement, and upgrading of existing drainage facilities applies. In addition, the Maintenance Supervisor in the area of the project should be contacted to assist in identifying the drainage facility needs. District Maintenance should be contacted to have their culvert inspection crew(s) check all of the culverts to identify any structural deficiencies and possible need for replacement.

Where shoulders carry roadway drainage, the hydraulic capacity should be verified. If the cross slope is modified, the designer should be aware that additional pavement thickness or cross slope modifications may require modifying drainage facilities such as dikes, inlets, and slotted pipe.

Drainage features can present clear recovery zone issues and should be evaluated for modification. Refer to the AASHTO *Roadside Design Guide* for further information on traversable drainage features. However, if traversable drainage features in the *Roadside Design Guide* are being considered for use, the District Hydraulics unit needs to be contacted to discuss their utilization.

3.2.8 Structures

3.2.8.1 Vertical Clearance

In addition to the guidance provided for 2R Projects in Section 2.2.8 of this DIB and *HDM Index 309.2*, the following guidance also applies to 3R Projects:

- Structures Maintenance must be contacted to determine the past history of structure “hits” to existing structures within the project limits. When it is proposed to reduce the existing vertical clearance of a structure, either temporarily or permanently, the Transportation Permits Region Manager must be contacted to determine the potential use of the roadway at the structure location by over-height and over-width permit loads.
- Milling, grinding, or replacing the existing pavement should always be considered to avoid reducing the vertical clearance. Raising the structure is another option that may be considered.

- The final decision should include consideration of adjacent structure clearances and the likelihood of over-height loads passing beneath the structure in question. Vertical clearance signs should be modified, as necessary.

3.2.8.2 Structural (Bridge) Capacity

Existing structures within the project limits may have inadequate load capacity to meet the Transportation Permits Program needs. Consequently, the Transportation Permits Region Manager should be contacted to determine the potential use of the facility by overweight vehicles and the impacts of any load-restricted bridges within the project limits. If a bridge is determined to require strengthening for loads, the bridge reconstruction work should normally be considered as a part of the project. Although strongly discouraged, under certain circumstances, structure reconstruction can be deferred to avoid delaying the overall project due to environmental and/or right of way clearance problems, structure design time constraints, etc. The guidance regarding the deferral of a structure widening provided in the *PDPM* may also be applied to the deferral of a structure replacement.

3.2.8.3 Bridge Rail and Other Structure Improvements

Departmental Policy (Structures Maintenance and Investigations Policy and Procedures Memo Number 2003.1) states that the upgrade of bridge rail classified as not meeting currently acceptable standards will be made on a Department-wide programmatic basis for all bridges on the State highway system. On 3R Projects, bridge rail within the project limits that does not meet *NCHRP Report 350* criteria (or the latest crashworthiness criteria adopted by FHWA) are to be identified during the project's Safety Screening and upgraded or replaced by the project. This need should be identified early on during the project development process when scoping the 3R Project. The Office of Structure Design Technical Liaison Engineer should be contacted to discuss the need, if any, to upgrade the bridge rails within the project limits and any other structure improvements identified in the *Structures Replacement And Improvement Needs (STRAIN) Report*.

3.2.9 Maintenance

Maintenance vehicle pullouts should be placed upstream of recurrent work areas so the maintenance vehicles can shield the workers from errant vehicles. Similarly, it is appropriate to locate work areas downstream of large “fixed shields” such as structures, while keeping in mind sight distance for ingress/egress. The designer should look for opportunities to provide vehicle parking and access from adjacent parallel facilities (local roads) through use of gates and pathways. See *HDM Index 107.2* for further guidance on providing features that can enhance the personal safety of maintenance workers and law enforcement officers that work on the State Highway system.

3.2.10 Traffic Operation Strategies

3.2.10.1 Roadway Safety (Protection) Devices

The guidance provided for 2R Projects in Section 2.2.10.1 of this DIB also applies to 3R Projects.

3.2.10.2 Signs and Delineation

All signs and pavement markings within the project limits should be evaluated for replacement and/or upgrading. This evaluation should consider visibility performance, conformance with existing policies, appearance, and legibility for both day and night conditions.

While traffic control devices may not fully mitigate all problems associated with nonstandard geometric features, they can compensate for certain operational deficiencies. In addition, minimizing or eliminating possible adverse safety and operational features by judicious use of special traffic regulations, positive

guidance techniques and traffic operational improvements can often reduce extensive reconstruction of existing highways. District Traffic should be contacted for guidance when additional signs, markings, or other traffic control devices are being considered as a possible mitigation for a nonstandard geometric feature or to address a safety issue.

Signs with information regarding vertical clearance shall be updated or installed per Division of Traffic Operations Policy Directive #00-03, effective September 1, 2000. Interchange exit numbers shall be added per Division of Traffic Operations Policy Directive #02-04, effective February 1, 2002.

3.2.10.3 Shoulder and Centerline Rumble Strips

The guidance provided for 2R Projects in Section 2.2.10.3 of this DIB also applies to 3R Projects.

3.2.11 Highway Appurtenances

The effects on accessibility, relating to both existing and proposed highway appurtenances, on all roadway users must be carefully reviewed and appropriately addressed.

Also, the need to adjust highway appurtenances such as object markers, sign supports, luminaries, irrigation systems, etc., should be reviewed for potential or known maintenance worker safety issues. Although the highway appurtenances will be analyzed during the Safety Screening for the project, every functional unit, particularly Maintenance, should also evaluate them. See *HDM Index 210.6* for guidance regarding safety railing, fences, and concrete barriers that may be appropriate to include in the project. For additional guidance, see Section 3.3.3.6.3, "Clear Recovery Zone," in this DIB.

3.2.12 Landscaping

Typically, projects covered under this DIB do not involve landscape work. However, there may be a need to replace existing landscaping due to construction activities. Consult with the District Landscape Architecture unit regarding the Roadside Program and the need for replacement planting and/or other roadside features.

3.3 Geometric Design Guidance

3.3.1 Projects on Freeways, Expressways, and Multilane Conventional Highways

3R Projects on Freeways, Expressways, and Multilane Conventional Highways shall not degrade the safety or the geometric features of the facility. 3R Projects on these facilities are required to meet the current geometric standards for new construction as stated in the *HDM* and the additional guidance that is provided in Section 3.3.2 of this DIB. Any exceptions to Mandatory and Advisory design standards are to be documented appropriately; see the *PDPM* for further guidance.

3.3.2 Additional Geometric Design Guidance for Projects on Freeways and Expressways

3.3.2.1 Cross Slope (Traveled Way)

To achieve an economy in materials and to minimize the impact on median facilities such as slotted drains, drainage inlets, and median barriers, it may be acceptable to reduce the thickness of the overlay on the inner lanes of the traveled way to the minimum thickness and cross-slope tolerances. Breaks, or crowns, in the resurfacing should occur at the lane lines, not in the wheel paths. However, before it is decided to reduce the thickness of the overlay and adjust the various cross slopes, the District Materials and Hydraulics units need to be consulted with to concur with these decisions.

In addition, on expressways and multilane conventional highways, where the existing traveled way cross slope exceeds the standard and it is not reasonable to adjust the existing curb, gutter, and sidewalk, milling or removal and replacement of the existing pavement may be necessary.

3.3.2.2 Ramps and Gore Areas

Removing or relocating fixed objects such as overhead signs, lighting, curbs, and existing crash cushions in the vicinity of on-ramp and off-ramp gores should be considered. A review should be made of the collision and maintenance history of "hits" into existing signs and crash cushions to determine the advisability of removing or relocating the signs and crash cushions. District Traffic and Maintenance should assist when performing this evaluation.

Gore curbs that are not in accordance with the guidance in *HDM Indexes 504.3(11)* and *504.2(5)*, and *Topic 303* should be removed. When the overlay thickness matches or exceeds the height of curb, it may be unnecessary to remove the curb pending an investigation for the need to convey runoff.

When rehabilitating ramps on the National Network or on Service Terminal Access routes, consideration should be given to modifying the ramps to accommodate Surface Transportation Assistance Act (STAA) of 1982 design vehicles. Consult with the District Truck Service Manager for routes on and connecting to National Network and Terminal Access routes. See *HDM Indexes 404.3(2)* and *404.3(3)* for further guidance on the use of truck turn templates.

Consideration should be given to paving areas that will reduce the maintenance worker's exposure to traffic and removing, or relocating, maintainable features such as: inlets, controller cabinets, ITS equipment, etc. See *HDM Chapter 500* for guidance related to gore paving. Contact the local area Maintenance Supervisor for assistance in determining these locations. Also see Design Memo dated September 30, 1998 and entitled: "*New Design for Safety Practice: Roadside Paving*" located on the Department website, under Project Delivery Memos.

3.3.2.3 Interchange Spacing

A design exception for interchange spacing as stated in *HDM Index 501.3* and *DIB 77* is not required unless the project involves a new interchange or an interchange is being relocated. If the project involves a new or relocated interchange, *HDM Index 501.3* and *DIB 77* must be consulted.

3.3.3 Geometric Design Guidance for Two- and Three-Lane Conventional Highways

Federal Code, Title 23 CFR Section 625.2(b), states: "Resurfacing, restoration and rehabilitation (RRR) projects, other than those on the Interstate system and other freeways, shall be constructed in accordance with standards which preserve and extend the service life of highways and enhance highway safety." The following additional guidance applies to projects on two- and three-lane conventional highways.

3.3.3.1 Selection of Design Speed

The criteria for design speed as discussed in *HDM Index 101.1* applies to projects on two- and three-lane conventional highways covered by this DIB. The Design Coordinator and/or Design Reviewer should be consulted regarding the design speed, and the design speed should be documented in the PID or PR.

3.3.3.2 Stopping Sight Distance at Grade Crests and Sags

The criteria for stopping sight distance at vertical curves in *HDM Indexes 201.1*, *201.4*, and *201.5* apply to projects covered by this DIB. The Safety Screening should also be used to identify and determine which, if any, grade crests or sags may warrant improvement. The vertical alignment within the limits of the project

shall be evaluated for possible improvements at "spot" locations taking into consideration the collision data at the location. Performing this evaluation at all "spot" locations is not meant to imply that all of the vertical curves should be upgraded. District Traffic Operations should be consulted to assist with determining which vertical curves should be upgraded.

Special attention should be given to crest vertical curves where the available sight distance corresponding to the design speed of the crest vertical curve is 20 mph or more below the 85th percentile speed of the section of highway preceding the curve; District Traffic Operations can assist in estimating the 85th percentile. Where this condition exists and the crest vertical curve conceals highway features such as intersections, driveways, horizontal curves, narrow bridges, at-grade railroad crossings, etc., consideration must be given to reconstructing these vertical curves or removing these features. If a crest vertical curve is not upgraded following the evaluation because reconstruction is not feasible, consider installing warning signs or using other mitigation strategies.

Sag vertical curves are rarely related to collisions because drivers have adequate sight distance during daylight hours, and at night the driver's range of sight is restricted to the vehicle's headlight limitations. If necessary, street lighting can be added to mitigate reduced stopping sight distance on sag vertical curves. Discussions should be held with District Electrical regarding the feasibility of lighting. Sag vertical curves can be slightly improved during overlays with little extra cost or impacts.

3.3.3.3 Superelevation

The criteria for superelevation contained in *HDM Index 202.2* apply to projects covered by this DIB. If nonstandard superelevation rates exist, they must be evaluated for possible improvement.

Superelevation improvements can often be attained inexpensively and with minimal impact on overlay projects, and should therefore be incorporated. Where as-built plans do not exist or no longer reflect the current conditions, a Digital Inclinometer (Smart Level) may be used to estimate the superelevation rate.

3.3.3.4 Horizontal Alignment

The criteria for horizontal alignment contained in *HDM Index 201.6* and *Topic 203* apply to projects covered by this DIB. Horizontal alignments shall be evaluated for possible improvements at "spot" locations. The evaluation of horizontal curves must consider collision data. District Traffic Operations should assist when performing this evaluation. Typically, nonstandard horizontal curves requiring additional right of way and/or that result in significant environmental impacts are not upgraded without supporting collision data that justifies the additional costs or impacts. Where the radius of a curve is less than 300 feet, with an interior angle greater than 60 degrees, consideration must be given to providing additional lane width to accommodate vehicle offtracking. See *HDM Topic 404* and *Index 504.3(b)* for more information and widening criteria.

Although individual horizontal and vertical curves may meet design criteria, their use in combination must be considered to avoid undesirable alignments. For example, the alignment of a segment of highway may consist of a series of curves. The first curve in this series, particularly if it follows a long tangent, must receive special attention because, once a driver safely passes through it, the driver should be prepared for the subsequent curves in the series. <u>To prepare a driver for a series of curves, the design speed of this first curve, especially if it follows a long tangent, should be at least equal to the design speed of the tangent section of highway leading into it; which is important because drivers tend to travel at higher speeds on tangent segments of highway. The other curves in the series should only differ from the design speed of the curve that follows or precedes it by 10 mph; which is the desired maximum reduction or increase in speed</u>

between curves in a series. Special attention should also be given to any curve within a series of curves that has a significantly smaller radius than the other curves. If improvements are being considered at any of the curves in a series of curves, the effects of the proposed change(s) to an individual curve will need to also be evaluated on the entire series of curves; this particularly needs to be done to curves adjacent to the one being improved. The intended outcome from of all of this analysis is to avoid "moving" a collision concentration from one curve in the series to another. See *HDM Index 203.3* for additional information regarding alignment consistency.

Also see *HDM Index 204.6* and the AASHTO document *"A Policy on Geometric Design of Highways and Streets"* for guidance of desirable and undesirable alignment combinations.

The following should be considered when evaluating horizontal curves for improvements:

- Reconstruction with a larger horizontal radius.
- Correction or improvement of superelevation.
- Widening the shoulders.
- Installing rumble strips.
- Widening lanes or providing a buffer for truck offtracking.
- Flattening fill slopes that are 4:1 or steeper on the inside and outside of the curve. For slopes between 3:1 and 4:1, check for adequate run out distance. See the AASHTO *"Roadside Design Guide"* for methods of determining the run out distance.
- Installation of roadside barrier. See the *Traffic Manual* on the Department website, under Division of Traffic Operations, and discuss with the District Traffic Operations personnel for guidance.
- Permanently removing vegetation or cutting back slopes to provide a "sight bench" at locations where the stopping sight distance is reduced by vegetation growth or cut sections.
- Consult with District Traffic Operations or the Headquarters Division of Traffic Operations Liaison about adding signs, delineation, and/or markers to mitigate operational deficiencies.
- Add lighting.
- Move intersections outside of curves.

3.3.3.5 Intersections (Public and Private Connections) and Driveways

3.3.3.5.1 General

Road connections (both public and private) and driveways must be evaluated for possible improvements. The decision to improve intersections can often be made by observing vehicle, bicycle, and pedestrian movements during field visits. *DIB 82* and *HDM Topic 105* should be reviewed for pedestrian accessibility and compliance with the ADA; which is decided on a project-by-project basis.

3R Projects also present an opportunity for driveway upgrades. Contact the District Encroachment Permits office to see if there are issues with any existing driveways that may need to be addressed.

To facilitate movements in and out of driveways and local streets, connections should be paved to the edge of the right of way or far enough beyond the right of way line so that the rear drive wheels of longer vehicles can accelerate on a paved surface. This is to prevent vehicles wheels from spinning while attempting to enter the highway. It also serves to prevent rock and debris from collecting on the mainline shoulder, which can be a problem for both bicycles and pedestrians.

HDM Topic 205, *HDM Indexes 405.7*, *405.8*, and *405.9* provide further guidance on the design of public road intersections and driveways.

3.3.3.5.2 Corner Sight Distance

The Corner Sight Distance criteria in *HDM Topic 405* apply to these projects. All intersections shall be evaluated for possible improvements. The evaluation of corner sight distance must consider collision data. District Traffic should assist when performing this evaluation. It is often difficult to obtain corner sight distance per *HDM Topic 405* at all intersections, but that does not preclude the need to evaluate cost-effective solutions (e.g., those that do not physically impact homes, businesses, historic buildings, large natural land features) at each location.

3.3.3.5.3 Left- and Right-Turn Channelization

Left and/or right turn channelization should be considered at intersections to public roads and other potential higher volume intersections.

Consult with both District Traffic Operations and Traffic Safety when establishing the need for turn channelization. See *HDM Indexes 405.2* and *405.3* for further geometric guidance on right- and left-turn channelization. Also see *"Guidelines for Reconstruction of Intersections,"* dated August 1985, which is available through Headquarters Division of Traffic Operations.

3.3.3.5.4 Skew Angle

The criteria pertaining to intersection skew in *HDM Index 403.3* applies and should be reviewed. The Safety Screening should also be used to identify and determine which, if any, skewed intersections may warrant realignment. Skew angles less than 75 degrees must be investigated for potential upgrades. If realigning the local street will require a large expense of funds and right of way impacts are significant, an intersection is typically not modified.

Skewed "T" intersections are typically easier to upgrade than through streets because they impact only one side of the highway. Small radius curves can be added on the cross street because speeds on the cross street are typically low due to the stopped condition. When "T" intersections cannot be upgraded without extensive realignments, improvements may be accomplished by minor widening at the curb returns and the striping realigned to an angle closer to perpendicular; see Section 3.3.3.5.5, "Truck Turning," in this DIB for issues related to pedestrian movements when increasing the curb return radii. Also see *HDM Index 403.3* for additional discussion on the angle of intersections.

3.3.3.5.5 Truck Turning

The criteria for truck turning in *HDM Index 404.3 (2)* and *(3)* apply to these projects. Intersections experiencing frequent truck use should be evaluated to accommodate truck offtracking. See *HDM Topic 404* and *HDM Index 405.8* for further information on designing for offtracking. Designers should inspect the ground adjacent to intersection curb returns for physical evidence of vehicle offtracking, which can identify those locations most in need of upgrades.

It is often impractical to provide for truck turning on most local streets due to the infrequency of truck use at these locations. Where truck volumes are very low, bus turning may be a more appropriate application, especially if it is a school bus or transit route. There are several factors affecting the decision to increase the curb return radii at these locations:

- Large curb return radii could promote higher than desirable speeds for motor vehicles making right turn moves.

- Assure trucks and buses will off-track into same direction lanes and shoulders of the receiving roadway and not intrude upon the lanes in the opposite direction of travel.
- Pedestrian crossings will become longer; therefore, the additional length of the pedestrian crossings and its impacts to wheelchair ramp placement (see *DIB 82* for additional guidance on ADA design issues) will need to be evaluated.
- Pedestrians waiting to cross are set further from turning vehicles, which might place pedestrians out of the field of vision of the Driver.
- Impacts to adjacent property and right of way cost.

3.3.3.6 Cross Section Design Elements

3.3.3.6.1 Widths

3.3.3.6.1.1 Traveled Way

All lane widths for projects covered by this DIB shall be 12 feet except as follows:
In urbanized areas with restricted right of way and operating speeds 35 mph or less, it may be appropriate to reduce right- and left-turn pocket lane widths to 11 feet when supported by an approved design exception. The lower speeds in the left- and right-turn lanes make it reasonable to use narrower widths in urban areas. As an order of importance, the right-turn lane is typically reduced first because the left-turn lane is adjacent to oncoming traffic. Truck turning can be an important factor when reducing lane widths under these conditions. A truck usage study and turning analysis must be applied to each location where turning lane widths are reduced.

Further reductions in right-turn lane width, to 10 feet, are sometimes warranted in severely constrained situations.

See Section 3.3.3.4 of this DIB for guidance on lane widening to accommodate truck offtracking on radii less than 300 feet.

3.3.3.6.1.2 Shoulders

3.3.3.6.1.2.1 Roadbed

The shoulder widths given in Table 2 shall be the minimum paved shoulder width for two-lane conventional highway projects covered by this DIB. Shoulders less than the "Minimum Existing In-Place Shoulder Width" shall be widened to the "3R Shoulder Width." Shoulders at or above the "Minimum Existing In-Place Shoulder Width" may be rehabilitated at their existing widths, including minor widening for lateral support or uniformity of pavement width, **unless pavement widening or realignment is performed, then the 3R shoulder width criteria applies. If the Safety Screening recommends widening beyond the "Minimum Existing In-Place Shoulder Width," the roadbed shall be widened to the "3R Shoulder Width" or the "3R Bridge Shoulder Width,"** as appropriate.

Shoulders are important to accommodate bicycle traffic, and pedestrian traffic where sidewalks are not present. The minimum usable shoulder for bicycles and pedestrians is 4 feet, but wider shoulders are more appropriate. Wider shoulders should be considered on highways with higher vehicular volumes and speeds.

The truck, bus and recreational vehicle usage on the highway should be taken into account when determining shoulder widths. When truck, bus and/or recreational vehicle volumes are generally higher than

10%, particularly on curvilinear highways, shoulder widths greater than those in Table 2 should be considered.

When adding passing or climbing lanes or right turn lanes, the minimum width of the adjacent shoulder shall be 4 feet.

Where a left turn lane is provided and a right turn lane is not, the right shoulder width shall be the "3R shoulder width" as provided in Table 2, but not less than 4 feet (5 feet where a gutter is present). The minimum right shoulder width adjacent to right turn pockets shall be 4 feet (5 feet where a gutter is present).

TABLE 2

Two-Lane Conventional Highway 3R Standards for Shoulder Widths

Existing ADT (vehicles)	3R Bridge Shoulder Width (ft)	3R Shoulder Width (ft)	Minimum Existing In-Place Bridge Shoulder Width (ft)	Minimum Existing In-Place Shoulder Width (ft)
0-250	4	0 *	0	0
251-1000	4	2 *	2	0
1001-3000	8	4 *	4	2
3001-6000	8	8	6	4
6001-18,000	8	8	8	4
Over 18,000	8	8	8	8

*** See discussion in Section 3.3.3.6.1.2.1, "Roadbed." Under certain conditions, the minimum width of the adjacent right shoulder shall be 4 feet, or 5 feet where a gutter is present.**

3.3.3.6.1.2.2 Bridges

The bridge shoulder widths given in Table 2 shall be the minimum paved bridge shoulder for two-lane conventional highway projects covered by this DIB. The structure clear width (width between curbs or rails, whichever is less) shall equal or exceed the approach roadbed width. Shoulders less than the "Minimum Existing In-Place Bridge Shoulder Width" shall be widened to the "3R Bridge Shoulder Width." Bridge shoulders at or above the "Minimum Existing In-Place Bridge Shoulder Width" may be rehabilitated at their existing widths.

Upgrading existing bridge rail, approach guardrail, and guardrail transition railing connections is to be included in the project regardless of the bridge shoulder width requirements discussed above. **If bridge rail is being replaced, the shoulders shall be widened to the bridge 3R shoulder width.** The Headquarters

Bridge Preservation Program Manager must be consulted in determining if a bridge rail type requires upgrading.

Bridge replacement strategies shall meet new construction standards.

3.3.3.6.2 Cross Slopes

3.3.3.6.2.1 Traveled Way

The criteria in *HDM Index 301.2* apply.

3.3.3.6.2.2 Shoulders

The shoulder cross-slope criteria contained in *HDM Indexes 302.2* and *307.2* also apply, except as follows: **On tangent sections of conventional urban highways with operating speeds of less than or equal to 45 mph and where it is necessary to match existing curb and gutter, the maximum shoulder cross slope shall be 8% except when snow and ice conditions prevail.** Locations with snow and ice removal operations are to follow the guidance in *HDM Index 302.2 (3).*

When shoulder widths are 2 feet or less, shoulder cross slopes shall match the traveled way cross slope, but may be increased to 9% if necessary for drainage.

When curb ramps are present, shoulder cross slopes greater than 5% may exceed ADA standards where the maximum grade break at the base of the curb ramp is 13.3%. See *DIB 82* for further guidance regarding compliance with the ADA.

Where shoulder cross slopes do not meet the above criteria and it is not reasonable to adjust existing curb, gutter and sidewalk, grinding or removal and replacement of the pavement may be necessary. Each project must be evaluated on an individual basis. Where shoulders carry roadway drainage, the hydraulic capacity of the shoulder should be verified.

See *HDM Indexes 301.2* and *302.2* for the maximum grade break between edge of traveled way and shoulder cross slopes.

3.3.3.6.3 Clear Recovery Zone (CRZ)

The horizontal clearance criteria in *HDM Index 309.1* apply to these projects with the exception of the following: It is not the intent to flatten all of the side slopes within the project limits. Typically, existing side slopes are not flattened unless the project incorporates grading on a slope, or there are CRZ concerns identified in the Safety Screening. <u>When widening or modifying existing embankment slopes, 4:1 or flatter side slopes should be used</u>. Although cut slopes represent a form of fixed object and should also be 4:1 or flatter, less emphasis is placed on them. In any case, slopes should be designed as flat as is reasonable. Slopes steeper than 4:1 may require special erosion control features as described in the *Storm Water Quality Handbook, "Project Planning and Design Guide" (PPDG).* See *HDM Topic 304* and Chapter 7 in the *Traffic Manual,* on the Headquarters Division of Traffic Operations website, for further guidance on side slopes and their relation to the CRZ and placement of roadside safety devices at the top of embankment slopes.

The Safety Screening process will look at the CRZ associated with the segment of highway being evaluated. The absence of collisions should not be used as a reason to not include CRZ strategies in the scope of a project. Improving the CRZ is an effective proactive measure in reducing the occurrence or severity of run-

off-road collisions along corridors. Refer to Table 1 for alternative countermeasures regarding roadside obstacles.

The AASHTO publication *"Roadside Design Guide"* provides detailed design guidance for creating a forgiving roadside environment. Also, see Chapter 7 in the *Traffic Manual,* on the Headquarters Division of Traffic Operations website.

3.3.3.6.4 Side Slopes

The following geometric design standard from *HDM Topic 304* is permissive for two- and three-lane conventional highway projects:

> In projects involving grading where slopes catch in a distance less than 18 feet from the edge of the shoulder, a uniform catch point, at least 18 feet from the edge of the shoulder, should be used.

This should be done not only to improve errant vehicle recovery and aesthetics, but also to promote the use of large production grading equipment, which can reduce the construction costs associated with grading on the project.

Policy on High and Low Risk Underground Facilities Within Highway Rights of Way

– January 1997 –

Excerpted from Appendix LL from the Caltrans Project Development Procedures Manual
http://www.dot.ca.gov/hq/oppd/pdpm/apdx_pdf/apdx_ll.pdf

STATE OF CALIFORNIA
Department of Transportation
Division of Design

APPENDIX LL - Utilities

Table of Contents

APPENDIX LL - Utilities ..... LL-i
Policy on High and Low Risk Underground Facilities Within Highway Rights of Way LL-3
SECTION 1 - General Policy LL-7
1-1 Policy Statement LL-7
1-2 Effective Date LL-7
1-3 General Responsibility LL-7
1-4 Deviation from Policy LL-8
1-5 Change in Policy LL-8
SECTION 2 - Definitions LL-8
2-1 High Risk Facilities LL-8
2-2 Low Risk Facilities LL-8
2-3 Exempt Facilities LL-9
2-4 Other Definitions LL-9
SECTION 3 - Clearance Requirements for Construction Projects LL-12
3-1 Existing Facilities On New Projects LL-12
3-2 New and Relocated Facilities LL-13
3-3 Existing Facilities Not in Conflict With New Projects LL-13
SECTION 4 - Locating High and Low Risk Facilities LL-14
4-1 Positive Location Requirements LL-14
4-2 Methods of Positive Location LL-14
4-3 Exceptions to Positive Location LL-15
4-4 Exempt Projects LL-17
4-5 Allowable Omissions LL-17
4-6 Authority To Approve Exceptions LL-17
SECTION 5 - Alternatives to Relocation LL-18
5-1 Exposing During Construction LL-18
5-2 Protection During Construction LL-18
5-3 Special Contract Provisions LL-18
SECTION 6 - Responsibilities LL-18
6-1 Preparation of Plans LL-18
6-2 Surveying LL-19
6-3 Decisions to Relocate, Adjust, or Protect LL-19
6-4 Contractor Notification Requirement LL-19
6-5 Certifying Policy Compliance LL-19
6-6 Retention of Records LL-19
SECTION 7 - Right of Way Procedures LL-20
7-1 Identification LL-20
7-2 Notices LL-20
7-3 Financial Liability LL-20
7-4 Expenditure Authorizations LL-20
SECTION 8 - New Installations Under Encroachment Permit LL-20
8-1 Installation Standards LL-20
8-2 Permit Application LL-21
8-3 Location Data LL-21
8-4 Financial Liability LL-21
8-5 Retention of Records LL-21
SECTION 9 - Local Agency Projects LL-22

9-1 General LL-22
9-2 Certifying Policy Compliance LL-22
9-3 Financial Liability LL-22
SECTION 10 - Project Engineer's Certification LL-22
10-1 Guidelines LL-22
10-2 Certification & Sample Form LL-23

TABLE OF CONTENTS

SECTION 1 - GENERAL POLICY

1-1 Policy Statement
1-2 Effective Date
1-3 General Responsibility
1-4 Deviation from Policy
1-5 Change in Policy

SECTION 2 - DEFINITIONS

2-1 High Risk Facilities
2-2 Low Risk Facilities
2-3 Exempt Facilities
2-4 Other Definitions

SECTION 3 - CLEARANCE REQUIREMENTS FOR CONSTRUCTION PROJECTS

3-1 Existing Facilities on New Projects
3-2 New and Relocated Facilities
3-3 Existing Facilities Not in Conflict with New Projects

SECTION 4 - LOCATING HIGH AND LOW RISK FACILITIES

4-1 Positive Location Requirements
4-2 Methods of Positive Location
4-3 Exceptions to Positive Location
4-4 Exempt Projects
4-5 Allowable Omissions
4-6 Authority to Approve Exceptions

SECTION 5 - ALTERNATIVES TO RELOCATION

5-1 Exposing During Construction
5-2 Protection During Construction
5-3 Special Contract Provisions

SECTION 6 - RESPONSIBILITIES

6-1 Preparation of Plans
6-2 Surveying
6-3 Decisions to Relocate, Adjust, or Protect
6-4 Contractor Notification Requirement
6-5 Certifying Policy Compliance
6-6 Retention of Records

TABLE OF CONTENTS

SECTION 7 - RIGHT OF WAY PROCEDURES

7-1 Identification
7-2 Notices
7-3 Financial Liability
7-4 Expenditure Authorizations

SECTION 8 - NEW INSTALLATIONS UNDER ENCROACHMENT PERMIT

8-1 Installation Standards
8-2 Permit Application
8-3 Location Data
8-4 Financial Liability
8-5 Retention of Records

SECTION 9 - LOCAL AGENCY PROJECTS

9-1 General
9-2 Certifying Policy Compliance
9-3 Financial Liability

SECTION 10 - PROJECT ENGINEER'S CERTIFICATION

10-1 Guidelines
10-2 Certification & Sample Form

SECTION 1 - General Policy

1-1 Policy Statement

The Department is responsible to provide a safe environment for the employees of both Caltrans and its contractors, as well as the traveling public. An important element of the safe environment is to provide a clear and safe right of way through the proper placement, protection, relocation, abandonment or removal of utility facilities that may pose a safety risk to the highway worker or user when the utility is excavated, cut or penetrated. Toward this end, Caltrans must establish and enforce mandatory standards and procedures for the placement and protection of underground utility facilities within highway rights of way and for the safe conduct of highway workers involved in maintenance or construction operations carried out in proximity to underground utility facilities.

This policy is applicable to the design phase of a project. For the construction phase, the contractor must follow applicable statutes, which require that all utilities be located and marked out on the ground by a regional notification center prior to any excavation. (Chapter 3.5 of Division 5 of the Government Code.)

1-2 Effective Date

This policy supersedes all previous instructions and policies concerning High and Low Risk underground facilities and is effective upon issuance.

1-3 General Responsibility

The District **Utility Coordinator** is responsible to coordinate the requirements of this policy with all underground facility owners, and must work with the Project Engineer in accomplishing the coordination.

The District **Permit Engineer** is responsible for enforcing the terms and conditions set forth in Section 8 of this policy.

The **Project Engineer** is responsible for the administration of the policy requirements specified herein, and must certify to the Office Engineer that the High and Low Risk policy has been met whenever submitting Plans, Specifications and Estimate for project advertisement. The Office Engineer will not list a project for advertisement until the project has been certified as meeting the High and Low Risk policy.

The District must work closely with any affected utility owners. A pre-design meeting must be held with the affected utility owners to discuss available alternatives to resolving any conflicts. It is important that the utility owners be consulted during project design and concerning any alternative selection that involves their utilities. Also, final design plans must be made available to the appropriate utility owners prior to advertisement of the project, and a pre-construction meeting should be held with the affected utility owners.

1-4 Deviation from Policy

Any deviation from the requirements contained in this policy must be submitted by the Project Engineer to the Division Chief, Division of Design (DOD), for approval.

1-5 Change in Policy

All requests for change to requirements contained in this policy must be submitted to the DOD, Attention: High/Low Risk Exception.

SECTION 2 - Definitions

2-1 High Risk Facilities

Facilities conducting the following materials, whether encased or not, are considered to be High Risk facilities:

1. Petroleum products,
2. Oxygen,
3. Chlorine,
4. Toxic or flammable gases,
5. Natural gas in pipelines greater than 150 mm (6 inches) nominal pipe diameter, or pipelines with normal operating pressures greater than 415 kPa gauge (60 p.s.i.g.)
6. Underground electric supply lines, conductors or cables that have a potential to ground of more than 300 volts, either directly buried or in duct or conduit, which do not have concentric grounded or other effectively grounded metal shields or sheaths.

2-2 Low Risk Facilities

Facilities conducting the following materials are considered to be Low Risk facilities:

1. Natural gas in pipelines 150 mm (6 inches) or smaller (nominal pipe diameter) with normal operating pressures of 415 kPa gauge (60 p.s.i.g.) or less.
2. Underground electric supply lines, conductors or cables with a potential to ground of more than 300 volts, either directly buried or in duct or conduit, which do have concentric grounded or other effectively grounded metal

shields or sheaths, and for which the utility owner furnished location information in conformance with the requirements of Article 17.7, "Location Information" of General Order No. 128 of the California Public Utility Commission, or electrical underground conductors with a potential to ground of 300 volts or less.

2-3 Exempt Facilities

The following facilities are exempt from the requirements of this policy:

1. Natural gas service lines of 50 mm (2 inches) or less nominal pipe diameter and with normal operating pressures of 415 kPa gauge (60 p.s.i.g.) or less.

2. Underground electrical service conductors with a potential to ground of 300 volts or less.

3. Any electrical facility with a potential to ground of 50 volts or less.

4. State-owned electrical facilities operating at 300 volts or less potential to ground.

2-4 Other Definitions

Access Control Full or partial restriction of the access of owners or occupants of abutting land to or from a highway.

Approximate Location The "approximate location of subsurface installations" is defined in Section 4216 of the Government Code as a strip of land not more than 600 mm (24 inches) on either side of the exterior surface of the subsurface installation.

Cable An insulated conductor, or combination of insulated conductors, enclosed in a sheath.

Conductor A wire, or combination of wires not insulated from one another, suitable for carrying electric current.

Conduit A pipe or tube in which smaller pipes, tubes, or electrical conductors are inserted.

Construction Area Specifically identified work areas within a construction project in which all construction activities will take place. It is normally coincident with the overall project limits except where specifically set forth in the Project Plans.

Department The Department of Transportation of the State of California, as created by law.

District One of the twelve California Department of Transportation Districts, or in the case of a district that is tailored under a regional district for capital outlay support, the district having the delegated authority for performing the subject function.

Duct A fabricated tube for receiving and containing conductors and cables.

Electric Lines Underground conductors or cables with the conduit in which they are contained.

Electronic Detector A device designed to detect underground utility facilities via electronic signals with sufficient accuracy to determine horizontal and vertical location.

Encasement A sleeve or jacket.

Encroachment A non-highway structure or object of any kind or character that is placed in, under, or over any portion of a highway.

Excavation Any operation in which earth, rock, or other material in the ground is moved, removed, or otherwise displaced by means of tools, equipment, or explosives in any of the following ways: grading, trenching, digging, ditching, drilling, auguring, tunneling, scraping, cable or pipe plowing and driving, or any other way.

Finished Grade Finished grade is the finished surface of the completed highway.

Grading Plane The basement material surface upon which the lowest layer of sub-base, base, pavement, surfacing, or other specified layer, is placed, or the upper surface of the ground or earthwork in the absence of base, pavement, surfacing or other specified layer.

Highway The entire width of the right of way of a highway, whether or not such entire area is used for highway purposes.

Jacket An encasement of reinforced concrete poured around a pipeline or

conduit.

kPa KiloPascals gauge pressure. (Metric version of Pounds per Square Inch)

Local Agency A city, county or other local public agency.

Local Assistance Projects Local agency projects on local streets and roads involving either Federal-aid or State highway funds.

Longitudinal A facility located parallel to and within highway right of way.

Median That portion of a divided highway separating the traveled ways for traffic in opposite directions including inside shoulders.

Owner The owner of the underground facility or its authorized agent.

Pipeline A pipe used to transport liquids or gases.

Positive Location Determination Determining the existence and location of a utility to within 150mm (0.5 foot) using any of the means listed in Section 4, or any combination of those means.

Pothole An excavation to expose an underground facility.

Probes Rods physically inserted in the ground to mechanically or electronically locate an underground facility without exposing the facility.

Project Limits The entire right of way width lying within the project termini.

P.S.I.G. Pounds per square inch gauge pressure. (Now to be stated in terms of kiloPascals.)

Relocations The removal, rearrangement, reinstallation, or adjustment of a utility facility required by a transportation improvement project.

Right of Way A general term for a strip of land, or rights in a strip of land, used for highway, public utility services, or other purposes. The right of way of a freeway includes any adjacent frontage road until such time as the frontage road is relinquished. Thereafter, the right of way line of the freeway is usually the access control line between the freeway and the frontage road.

Roadbed That portion of the roadway extending from curb line to curb line or shoulder line to shoulder line. A divided highway is considered

as including two separate roadbeds.

Roadway That portion of the highway included between the outside lines of the sidewalks, or curbs, slopes, ditches, channels, waterways, and including all the appertaining structures, and other features necessary for proper drainage and protection.

Service The portion of the electrical or gas system that connects a customer, usually at the meter location, to the utility distribution or supply system.

Shoulders The portion of the roadway contiguous with the traveled way for accommodation of stopped vehicles, for emergency use, and for lateral support of base and surface courses.

Sleeve A pipe in which a pipeline or conduit is inserted.

Special Funded Projects Those projects on the State Highway System that are locally sponsored through the use of local and/or private funds.

Special Provisions The special provisions are specific clauses setting forth conditions or requirements peculiar to the work and supplementary to the Department's Standard Specifications.

Transverse A facility passing from one side of the highway right of way to the other side of the highway right of way.

SECTION 3 - Clearance Requirements for Construction Projects

3-1 Existing Facilities On New Projects

Existing underground High and Low Risk facilities within the planned construction area must meet the following minimum clearances, or they must be protected in place or relocated in accordance with this policy:

High Risk Facilities

1. 450 mm (18 inches) below the grading plane.

2. 300 mm (12 inches) below disturbed ground, and in areas of unsuitable material.

3. 300 mm (12 inches) below the grading plane of drainage structures.

4. 450 mm (18 inches) below flow line of unlined ditches.

5. 600 mm (24 inches) horizontally from face of pile or from side of excavation.

The above clearances are minimum safety margins for safe operation of equipment in proximity to High Risk facilities. The Project Engineer should verify their adequacy with the utility owners whenever heavy traffic loading is anticipated. When planned clearances are less than the above, the Project Engineer and district Utility Coordinator should work with the utility to determine methods to protect the facility or to have it relocated.

Low Risk Facilities

Existing Low Risk facilities must clear proposed construction as determined by the Project Engineer, including determination of loading factors.

3-2 New and Relocated Facilities

New or relocated High or Low Risk facilities within proposed new projects must meet the standards of Section 8.

3-3 Existing Facilities Not in Conflict With New Projects

High and Low Risk facilities installed within conventional highway rights of way and facilities transversely installed in freeway rights of way prior to this policy and not in conflict with proposed construction may remain in place during their useful life.

High and Low Risk facilities longitudinally installed within freeway or expressway rights of way prior to this policy and not in conflict with proposed construction should be reviewed in context with current encroachment policy to determine if they should be relocated outside the controlled access right of way. If this review determines that the utilities can remain inside the rights of way, and is concurred in by the Division of Design Division Chief, then they may remain in place during their useful life.

SECTION 4 - Locating High and Low Risk Facilities

4-1 Positive Location Requirements

Except as noted in Section 4-3, all High Risk facilities within the construction area must be positively located to within 150 mm (0.5 foot) for both horizontal and vertical location. The requirements shown below are minimums and additional determinations should be made if there is any question or doubt as to location.

Transverse Facilities

Location determinations for transverse facilities must be done:

1. On each side of an undivided highway

2. On each side and in the median of a divided highway. In the event that the utility or casing was originally placed by boring or jacking and is considered sufficiently rigid to have maintained direction throughout the installation, the location need not be determined in the median. For median determinations, Caltrans maintenance should be requested to furnish appropriate traffic control.

In no event should there be spacing greater than 30 m (100 feet) between location determinations.

Longitudinal Facilities

Location determinations for longitudinal facilities must be done at intervals sufficient to establish the location of the line, but in no event greater than 30 m (100-foot) intervals as, defined in Section 4-2 below.

4-2 Methods of Positive Location

Positive location of all High or Low Risk facilities must be accomplished by potholing or other acceptable methods. Combinations of methods may be more effective than a single method. The **Project Engineer** is responsible for determining the methods of specifically identifying the facility and of locating the horizontal and vertical position. These determinations should be made after obtaining input from the utility owners and the District Utility Coordinator.

Pothole

Location by digging, or "potholing," to expose the facility is the preferred method to specifically identify the facility and to determine the precise horizontal and vertical position.

NOTE: Machine excavation to expose the high-risk facility in order to physically locate it must be done by, or at the authorization of, the owner. Due to the potential State liability resulting from machine excavation around a High Risk facility, Caltrans employees should neither pothole the facility nor authorize others to pothole it, except by hand excavation and after obtaining written authorization of the owner.

Probe

Locating facilities by probing is an acceptable method of determining the horizontal and vertical position of a facility. The owner may probe the facility at the required intervals with the addition of one or more potholes to ensure positive identification of the facility. The **Project Engineer** must determine the number and location of potholes and probes, after obtaining input from the utility owners and the District Utility Coordinator.

Electronic Detection

Electronic detection for determining the horizontal and vertical location is acceptable when used in conjunction with potholing to ensure proper facility identification and to verify accuracy of electronic readings. Electronic detection is particularly effective for determining that the utility is outside the construction area or well below a prescribed depth. The **Project Engineer** is responsible for determining the number and frequency of the supplemental potholing and/or probing requirements, after obtaining input from the utility owners and the District Utility Coordinator.

As-Builts

Utility facility "As-Builts" may be accepted only when signed by a responsible utility owner representative certifying as to the acceptable location accuracy of the installed facility, and verified by potholing or other positive locating methods at critical locations determined by the Project Engineer.

Other Acceptable Methods

Other methods that will provide positive location of facilities may be used by the owner upon verification of the accuracy of the proposed method and approval of the **Project Engineer**. Such other methods should stand the tests of common sense, field measurements and good judgment.

4-3 Exceptions to Positive Location

Facilities Outside Planned Excavation

For High Risk facilities lying outside the identified construction area but within the project limits, and for all Low Risk facilities within the project limits, the approximate horizontal location must be determined within 600 mm (2 feet) of either side of the outside dimensions of the facility (required by Section 4216 of the Government Code).

High Risk facilities that have been determined by the owner to be more than 1.1 m (42 inches) below the lowest planned work, or more than 1.2 m (4 feet) horizontally from

the side of the planned excavation, are considered to be outside of the construction area and do not require plotting of the facility elevation on the plans. The method and required accuracy to be used in locating the facility will depend on its proximity to the construction area.

Facilities that are at depths greater than 1.1 m (42 inches) below planned work must be horizontally plotted with a notation that "DEPTH EXCEEDS 1.1 m (42 INCHES) BELOW PLANNED WORK." The horizontal location of all High Risk and Low Risk facilities within the project limits must be plotted on the plans.

Where High and Low Risk utilities exist within the project limits but outside areas of planned excavation, the Obstructions Section of the project Special Provisions must call out such utilities by type, owner and location, and must caution the contractor that "no excavation may be made within 1.2m (4 feet) of these utilities unless and until such utilities have been positively located as to horizontal and vertical position".

Special Projects

For the following types of projects, the vertical location of the facilities need not be included in the contract plans. Positive location will be performed during construction via the utility owner markout as required by Government Code Section 4215 et seq., and not prior to the PS&E. The basis for this exception is that any conflicts identified during the positive location activity may be resolved by adjusting the location of the proposed highway facility to miss the identified High Risk facility. The District **Utility Coordinator** must make the necessary arrangements to have the owner locate the facilities in conjunction with the contractor's operation and in accordance with the aforementioned Sections of the Government Code. The coordination for this work must be covered by special clauses in the Special Provisions for the contract. The special projects are:

1. Street lighting, traffic signal and ramp metering installations and similar projects where the boring, trenching or jacking operations are being made for electrical conduit runs only.

Note: If the project includes foundations for street lights, traffic signals or ramp meters, then it is not considered a special project -- it only qualifies as a special project if the only excavation is for the conduit runs.

2. Highway planting projects where the excavations are being made for plants and/or irrigation lines and appurtenances only.

3. Type 1 edge drain as shown on RSP-D981D1 when the maximum depth does not exceed 375 mm (15 inches).

Temporary Construction Signs

Construction signs, when shown on the plans, will be cleared in the same manner as for any other construction feature requiring excavation. (Typical post hole depth is 1.7 m (5 1/2 feet).)

If the exact sign locations are not shown on the plans, post holes must be dug by hand except where potential conflicts can be eliminated by:

1. An appropriate Regional Notification Center has been contacted and they indicate there are no utility facilities in the area of the proposed post hole.

2. The Regional Notification Center has identified underground facilities but post holes can be dug in another acceptable location that has also been cleared; and it is mutually agreeable with the operator and the excavator.

NOTE: Standard Special Provision No. 12.00 must be included in all projects that include temporary construction signs.

4-4 Exempt Projects

This policy does not apply to those projects where planned excavation is pavement removal only, is 150 mm (six inches) or less below existing ground level, or 300 mm (one foot) or less below existing road surface when trenching beneath existing pavement. Plans for such exempt projects must include a note on all plan sheets that states that "EXISTING UTILITY FACILITIES HAVE NOT BEEN PLOTTED ON THESE PLANS".

4-5 Allowable Omissions

If the Project Engineer wishes to omit utility facility plotting on plans, for portions of a project where planned excavation does not exceed 150 mm (0.5 foot), the following are required:

1. A note must be included on the plan sheets stating that "EXISTING UTILITY FACILITIES HAVE NOT BEEN PLOTTED ON PORTIONS OF THESE PLANS".

2. The plans must clearly show with bold labels those parts of the plans on which utility facilities have been omitted.

4-6 Authority To Approve Exceptions

The **Project Engineer** is responsible for determining that the positive location requirements have been met, or that exception requirements for positive location, exempt projects, and allowable omissions have been complied with, and that the appropriate special provisions are used on a project. Approval must be obtained from the Division of Design Division Chief for any deviation not meeting these exception requirements.

SECTION 5 - Alternatives to Relocation

5-1 Exposing During Construction

When approved by the Division of Design (DOD) Division Chief, High Risk facilities may be permitted to remain in limited critical areas, provided the owner agrees to fully expose the facility prior to work being done in close proximity. This determination must be made by the **Project Engineer** after consultation with the owner, but the determination must be made by the Project Engineer and not by the owner. These conditions must be fully explained in the contract Special Provisions.

5-2 Protection During Construction

When approved by the DOD Division Chief, the **Project Engineer** has the option of protecting rather than relocating high risk facilities. The Project Engineer should discuss this option with the utility owner and the District Utility Coordinator prior to making the decision.

5-3 Special Contract Provisions

Facilities that can be adjusted during construction must be covered by special clauses in the Special Provisions that provide for the necessary coordination between the owner and the highway contractor. Approval by the DOD Division Chief must be obtained whenever the clearance requirements of Section 3-1 or the exceptions of Section 4-3 are not met.

SECTION 6 - Responsibilities

6-1 Preparation of Plans

The preparation of contract plans and the delineation of underground facility information thereon will be the responsibility of the Unit (Design, Traffic, etc.) preparing the plans, specifications and estimates. See Chapter 4 of the *Drafting and Plans Manual* for preparation of the Utility Plan.

High Risk Facilities

Horizontal and vertical positions as required by Section 4 must be shown on or included in the contract plans.

Low Risk Facilities

Horizontal alignment must be shown on or included in the contract plans. Elevations may be included, but are not required.

6-2 Surveying

It is Caltrans' responsibility to tie utilities to the State's datum. The district's Survey Branch should establish the alignment and elevation of High Risk facilities that are within the construction area, on the State's datum. This information is to be furnished for inclusion on the contract plans.

6-3 Decisions to Relocate, Adjust, or Protect

The decision to relocate, adjust or protect High Risk facilities must be made by the **Project Engineer** after consultation with the owner and the District Utility Coordinator. The method of protection is subject to approval as a deviation by the Division of Design Division Chief.

6-4 Contractor Notification Requirement

Whenever underground facilities (including High and Low Risk facilities) are located within the limits of a project, Standard Special Provision No. 8.02 must be inserted in the Special Provisions (without deletion modifications) to require the contractor to notify the Resident Engineer and the Regional Notification Center when any excavation is to be performed.

The **Project Engineer** has the responsibility for including this requirement in the Special Provisions.

6-5 Certifying Policy Compliance

The **Project Engineer** must certify that the facilities conform to the requirements of this policy, prior to listing of the project for advertisement. See Section 10 for guidelines and a sample format for the "Project Engineer's Certification of Utility Facilities".

6-6 Retention of Records

The records of locations of existing, relocated or new installations under permits must be retained so the information may be recalled. The type of records maintained will be at the discretion of the district. Maintenance of records must be determined by the district, providing that any procedure adopted will allow for ready retrieval and permanent retention.

SECTION 7 - Right of Way Procedures

7-1 Identification

Facility identification, including categorization as High or Low Risk facilities, is a part of the preliminary phase of project development.

7-2 Notices

Owners of High Risk utility facilities are issued a "Notice To Owner" to positively locate their facilities by potholing, probing, or other acceptable method.

7-3 Financial Liability

Determination of the State's financial liability for work performed by an owner to comply with this policy will be made by Right of Way in accordance with applicable statutes and policies.

7-4 Expenditure Authorizations

The State's cost of work resulting from potholing and/or locating facilities as determined by Right of Way should be charged to a Phase 1 Expenditure Authorization (may be charged to Phase 0 on an exception basis with prior approval of the Division of Right of Way).

Any required adjustment of facilities ordered by the State at State's liability should be charged to a Phase 9 or Phase 4 Expenditure Authorization, as appropriate.

SECTION 8 - New Installations Under Encroachment Permit

8-1 Installation Standards

The new installation of High and Low Risk facilities within existing or ultimate State Highway rights of way must be not less than 1.1 m (42 inches) below existing ground level. New installations in proposed projects must meet the following minimum clearances along the location of the utility facility:

1. 1.1 m (42 inches) below finished grade or 450 mm (18 inches) below grading plane of a currently planned project, whichever is greater.

2. 300 mm (12 inches) below existing or future drainage structures, but not less than in "1" above.

3. 750 mm (30 inches) below flow line of unlined ditches.

4. 600 mm (24 inches) horizontally from face of pile or side of excavation for a currently planned project.

5. 900mm (36 inches) below concrete sidewalks, where future street widening in the sidewalk area is not contemplated. This minimum may be reduced at the discretion of the utility owner, with the permission of the Permit or Project Engineer.

NOTE: All highway related facilities, such as signal and lighting conduits, that meet the definition of High and Low Risk facilities must meet these standards.

New installations within streets or frontage roads to be turned over to a local agency may be installed at lesser depths, as allowed by Public Utility Commission General Orders or normal procedures.

8-2 Permit Application

For installation of High and Low Risk facilities, the owner must furnish a plan showing location and construction details with their application. Such plans are normally delivered to the Permit Engineer, then reviewed by the District Utility Coordinator, Design and other district functions.

8-3 Location Data

Locations must be tied to points that are compatible with the State's datum for the area. If no datum exists, permanent reference points must be set so that the High and Low Risk facilities can be accurately located. This should be worked out with the utility owner, and if necessary may be performed by the District's Survey Unit.

8-4 Financial Liability

The costs of conforming to the requirements of Section 8-1 through 8-4 should be borne by the facility owner.

8-5 Retention of Records

Records of High and Low Risk facilities installed under permit must be retained so the information may be recalled. The type of records maintained will be at the discretion of the district. Maintenance of records must be determined by the district, providing that any procedure adopted will allow for ready retrieval and permanent retention.

SECTION 9 - Local Agency Projects

9-1 General

All Local Agency projects designed or administered by the State and all Special Funded State Highway projects must conform to the requirements of Section 1 through 6, inclusive.

For the purposes of this section, the term "**Project Engineer**" as used in this policy is the responsible engineer of the local agency.

A State administered project is any project that is advertised by the State, where the State opens bids and awards the contract and where the State pays the contractor directly.

9-2 Certifying Policy Compliance

On State administered local projects, or any Local Agency prepared project on the State Highway System (Special Funded), the local agency must certify to the State that the High Risk facilities conform to the requirements of this policy.

On Federally aided Local Streets and Roads projects, the State, as a part of its certification, must certify that the agency has been made aware of this policy.

9-3 Financial Liability

Reimbursement of utility owners for work associated with positively locating and/or relocating facilities for local street and road projects should be in accordance with local agency's normal procedures. Reimbursement for these costs on State projects must follow Caltrans procedures.

The cost of surveying and mapping of high risk facilities should be borne by the local agency in the same manner as its other plan preparation costs.

SECTION 10 - Project Engineer’s Certification

10-1 Guidelines

Any project that involves High or Low Risk utilities will not be advertised by the Office Engineer until there is a "Project Engineer's Certification of Utility Facilities" in the PS&E file. On the Certification, each High and Low Risk utility is to be listed, and its description and disposition must include:

1. Horizontal and vertical location in relation to the work area (accuracy, as appropriate)

2. Size and type of material transmitted

3. Pressure or voltage of High and Low Risk facilities

4. Disposition of facility:

   - Remain in place
   - Relocated
   - Expose prior to construction
   - Expose during construction
   - Protect during construction
   - Etc.

10-2 Certification & Sample Form

The "Project Engineer's Certification of Utility Facilities" is a mandatory attachment to the PS&E submittal. A sample form is provided on the following page.

Project Engineer's Certification

Of Utility Facilities
on

_____ _____
[Dist-Co-Rte-PM] (EA)

_____
_____
_____
(description)

	Within Construction Area?	
	yes*	no
- - - - - - - - - - - - REQUIRED INFORMATION - - - - - - - - - - - -		
High Risk Facilities (list, describe with location, and disposition):		
Low Risk Facilities (list, describe with location, and disposition):		

* (All High and Low Risk Utilities within the construction area must be positively identified.)

- - - - - - - - - - - - OPTIONAL INFORMATION - - - - - - - - - - - -		
Other Utility Facilities (list, describe w/location, and disposition):		

I hereby certify that the above listed facilities are located within the project limits and that this project conforms to the Policy on High and Low Risk Underground Facilities:

_____ _____
(PROJECT ENGINEER) *(DATE)* *(ENGINEER'S SEAL)*

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APPENDIX E

Encroachment

E1: Encroachment Permit Application and Procedures

Case Number: PMT _____-_____
Permit Number: ENC _____-_____

SAN LUIS OBISPO COUNTY DEPARTMENT OF PUBLIC WORKS

ENCROACHMENT PERMIT APPLICATION

Paavo Ogren, Director

County Government Center, Room 207 • San Luis Obispo CA 93408 • (805) 781-5252
Fax (805) 781-1229 email address: pwd@co.slo.ca.us

LAND OWNER INFORMATION

Name: _____ Email: _____

Mailing Address: _____ City, Zip: _____

Telephone (24-hr): _____ Fax: _____

Signature of Land Owner: _____ *(Date)* _____

I, the above signed applicant, do hereby certify that the information provided on the Encroachment Permit Application is true, accurate, and to the best of my knowledge. I also, by signing this Application do hereby agree to abide with the Agreement Clause stated below.

CONTRACTOR / UTILITY FRANCHISE INFORMATION

Name: _____ License No: _____

Mailing Address: _____ City, Zip: _____

Contact Name: _____ Email: _____

Telephone (24-hr): _____ Fax: _____

Signature: _____ *(Date)* _____

I, the above signed applicant, do hereby certify that the information provided on the Encroachment Permit Application is true, accurate, and to the best of my knowledge. I also, by signing this Application do hereby agree to abide with the Agreement Clause stated below.

PROJECT SITE INFORMATION

Project Address: _____ City, Zip: _____

Est. Start Date: _____ Est. Completion Date: _____

Project Description (check all that apply):

☐ Curb, Gutter, Sidewalk** ☐ Driveway ☐ Public Improvement ☒ Special Event
☒ Transportation ☐ Utility ☐ Utility Blanket ☐ Other

**For Transportation Permits (one trip and annual) and Special Event Permits (with or without road closures) refer to separate application(s) found at http://www.slocounty.ca.gov/PW/DevServ/Encroachment__Special_Event__and_Transportation_Permits.htm*

***For Curb, Gutter, and Sidewalk installation with a building permit see http://www.slocounty.ca.gov/PW/DevServ/permitInfo/CGSInfo.htm for additional information.*

Description of Work: _____

_____

_____

Agreement Clause:

- The applicant agrees and accepts that the work will be conducted in accordance with the County Standards and Specifications, Encroachment Permit Conditions, California Manual of Uniform Traffic Control Devices, State Standards and Specifications, State Streets and Highways Code, State Vehicle Code, and the attached Provisions.
- The applicant agrees and accepts that any work within the right of way of a county maintained road shall be performed by an appropriately licensed and bonded contractor, and shall provide traffic control per the latest California Manual of Uniform Traffic Control Devices.
- The permittee shall defend, indemnify and save harmless the County of San Luis Obispo, its officers, agents and employees from any and all claims, demands, damages, costs, expenses, or liability that relate in any way to this permit, including, but not limited to, any act or omission on the part of the permittee, or of agents, employees, or independent contractors directly responsible to the permittee; including, but not limited to, any defects, flaws or errors in the design or performance of any work under this permit, providing further that the foregoing shall apply to any acts, or omissions to act, committed jointly or concurrently by the permittee, the permittee's agents, employees or independent contractors, and the County, its agents, employees or independent contractors. Nothing contained in the foregoing indemnity provisions shall be construed to require the permittee to indemnify the County against any responsibility or liability in contravention of Section 2782 of the Civil Code.

DRAW AND LABEL ALL EXISTING IMPROVEMENTS (STRUCTURES, HARDSCAPE, LANDSCAPE, ETC.) AND THE PROPOSED NEW IMPROVEMENTS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING (CLEARLY DIFFERENTIATE BETWEEN EXISTING AND PROPOSED):

1. Hardscape (asphalt and/or concrete) to include driveway approaches, parking areas, paving, curbing and/or berms, sidewalks, curb and gutters, etc. Label type and dimensions.

2. Drainage facilities, both major and minor.

3. Trenching and/or the placement of utilities to include utility boxes, pedestals, pads, vaults and poles, etc. shall be delineated in a typical trench detail outlining the size, type, length, location, etc.

4. Landscaping to include trees, shrubs, groundcover, irrigation facilities, walls, pillars, fences, gates, and a planting schedule/legend.

5. All other miscellaneous construction and improvements (mailboxes, etc).

IF APPLYING FOR A UTILITY ENCROACHMENT:

IF THE PROPOSED UTILITY INSTALLATION / WORK INVOLVES LESS THAN 100 LINEAR FEET, USE THE ATTACHED GRAPH SHEET TO PROVIDE A DETAILED DRAWING OF UTILITY INSTALLATION / WORK PLANS FOR YOUR PROJECT. MAKE SURE TO INCLUDE ACCURATE DIMENSIONS OF ANY UTILITY LINES IN ORDER TO PROCESS YOUR PERMIT APPLICATION. BE PREPARED ALSO TO PREPARE ANY APPROVED PROJECT PLANS THAT ARE AVAILABLE TO THE PERMIT ENGINEER AS REQUESTED.

IF THE PROPOSED UTILITY INSTALLATION / WORK PROJECT INVOLVES 100 LINEAR FEET OR MORE IN LENGTH, SUBMIT THE FOLLOWING TO THE PERMIT ENGINEER ALONG WITH YOUR APPLICATION.

Three (3) sets of plans (No larger than 24” x 36”) to include the following information:

1. Site Plan (Vicinity Map) showing the private property line and County Road Right of Way in relationship to the edge of street pavement.

2. The edge of the pavement and gutter lip.

3. North Arrow and Scale. Scale must not be smaller than 1”=20’.

4. Addresses and Assessor’s Parcel Numbers.

5. Trenching and/or the placement of utilities to include utility boxes, pedestals, pads, vaults and poles, etc. shall be delineated in a typical trench detail outlining the size, type, length, location, etc.

6. Trench Detail (Depth, Width, etc.)

IF APPLYING FOR A DRIVEWAY ENCROACHMENT:

USE THE ATTACHED GRAPH SHEET TO PROVIDE A DETAILED DRAWING OF THE PROPERTY ADJACENT TO THE COUNTY MAINTAINED ROAD AND THE LOCATION OF THE PROPOSED DRIVEWAY. SHOW PROPERTY LINES AND BUILDINGS IN RELATION TO THE COUNTY ROADWAY.

(ENCROACHMENTS REQUIRED BY BUILDING PERMITS ARE EXEMPT FROM COMPLETING THE APPLICATION. ENCROACHMENT PERMIT WILL BE ISSUED THROUGH THE BUILDING PERMIT PROCESS.)

IF APPLYING FOR A MISCELLANEOUS ENCROACHMENT:

PLEASE PROVIDE A DETAILED DRAWING OF YOUR PROPOSED MISCELLANEOUS PROJECT ON THE GRAPH SHEET ATTACHED. MORE COMPLEX PROJECTS MAY REQUIRE ENGINEERED PLANS, AND WILL BE DETERMINED BY THE PERMIT ENGINEER AT THE TIME OF APPLICATION.

SAN LUIS OBISPO COUNTY DEPARTMENT OF PUBLIC WORKS
STANDARD ENCROACHMENT PERMIT PROVISIONS

GENERAL

1. Authority. This permit is issued pursuant to Chapter 13.08 of the San Luis Obispo County Code and Chapter 5.5 (commencing with Section 1450) of the Division 2 of the California Streets and Highways Code, the provisions of which are incorporated herein by reference as though fully set forth herein. Special event permits with are issued pursuant to Chapter 15.610 of the San Luis Obispo County Code and Chapter 2 (commencing with Section 942) of the Division 2 of the California Streets and Highways Code, the provisions of which are incorporated herein by reference as though fully set forth herein. Issuance or denial of permit may be appealed to the Board of Supervisors. All board decisions are final and conclusive.

2. Definitions. The word "County" as used herein means the County of San Luis Obispo acting by and through its director of Public Works or his duly authorized representative. For special event permits, the word "work" as used herein refers to all activities related to the special event.

3. No Precedent Established. This permit is granted with the understanding that this action is not to be considered to establish a precedent concerning any kind of encroachment within the county right-of-way.

4. Permits from Others. When the law requires the consent to any work hereunder from any other public board or person having jurisdiction, this permit shall be suspended unless and until such consent is obtained.

5. Permission from Property Owners. Whenever it is necessary to secure permission from abutting property owners, such authority must be secured by the permittee prior to the starting of work.

6. Responsible Party. No party other than the named permittee or their agent is authorized to work under any permit.

7. Notice Prior to Starting Work. Before starting work under the Encroachment Permit, the permittee shall notify the county inspector 24 hours prior to initial start of work.

8. Indemnity. The permittee shall defend, indemnify and save harmless the County of San Luis Obispo, its officers, agents and employees from any and all claims, demands, damages, costs, expenses, or liability that relate in any way to this permit, including, but not limited to, any act or omission on the part of the permittee, or of agents, employees, or independent contractors directly responsible to the permittee; including, but not limited to, any defects, flaws or errors in the design or performance of any work under this permit, providing further that the foregoing shall apply to any acts, or omissions to act, committed jointly or concurrently by the permittee, the permittee's agents, employees or independent contractors, and the County, its agents, employees or independent contractors. Nothing contained in the foregoing indemnity provisions shall be construed to require the permittee to indemnify the County against any responsibility or liability in contravention of Section 2782 of the Civil Code.

9. Other Work. This permit is to be strictly construed, and no work other than that specifically mentioned is authorized hereby.

10. Safety. All work shall be performed in a safe and workmanlike manner in accordance with all applicable laws and regulations.

11. Keep Permit on the Job. This permit shall be kept at the site of the work and shall be shown to any representative of the County Department of Public Works, or any law enforcement officer on request.

12. Protection of the Public. The work shall cause the least possible inconvenience to the traveling public. At least one-way traffic shall be maintained at all times during the working day (7 a.m. through 5 p.m.). Two-way traffic shall be maintained from the close of the working day to the start of the next working day. Department approval required for full width road closures. All warning signs, lights, devices, and procedures shall conform to the latest California Manual of Uniform Traffic Control Devices (CAMUTCD). All traffic associated with the work shall follow the provisions of the California Vehicle Code.

13. Standards of Construction. Any matter not specifically mentioned herein, or covered by direct reference, shall conform to the County Standard Improvement Specifications and drawings, and, if not covered therein, to Caltrans Standard Specifications and Plans.

14. County Inspection. All work shall be subject to County inspection, and shall be performed in accordance with County Standards to the satisfaction of the County.

15. Expense of Inspection. On work which in the judgment of the County requires the presence of an employee of the Department of Public Works as inspector, the actual cost (including salary, traveling expense, and overhead) of such inspection shall be paid by the permittee upon presentation of a statement therefore. The cost of any tests required by the County shall be borne by the permittee.

16. Bonds. The applicant shall provide a cash bond (with assignment to the County) in the amount specified on the Encroachment Permit which sum is deemed sufficient by the Department of Public Works and which bond or deposit aforesaid shall guarantee payment to the County for all costs of work of improvement, engineering, inspection, and related incidental expenses done or incurred by the County as is provided for herein. Expense of Inspections shall be paid current and/or the finalization of Encroachment Permit is required prior to release of Bonds.

17. Restoration of Right-of-Way. All portions of the right-of-way, and all adjacent areas directly affecting such, if disturbed by work pursuant to this permit, shall be promptly restored to prior condition (including the replacement of suitable material and/or the planting of vegetation) and shall be left in a presentable condition.

18. Existing Utilities. The permittee shall contact all utilities to determine the location of any existing facilities prior to any excavation. The underground Service Alert ticket number and name shall be kept on the job site and be available to any representative of the County Department of Public Works or any law enforcement officer on request. The permittee shall also contact the local water purveyor, sanitation district or other utility not affiliated with Underground Service Alert to advise them of the proposed project. The date and name

of this contact must also be kept on the job site. The permittee shall immediately notify the owning utility of any damage to the existing facility.

19. Future Moving of Installation. In the event it becomes necessary, in the opinion of the County, to remove or relocate the encroachment permitted hereunder, such shall be accomplished by, and at the sole expense of, the permittee, and within such time and manner as may be required by the County. (Curb and gutter improvements constructed in accordance with approved County plans are exempted from this provision).

20. Taxation of Possessory Interests. Permittee recognizes and understands that this permit may create a possessory interest subject to property taxation, and that permittee may be subject to payment of taxes levied on such interest.

21. Joint and Several Obligation. If there is more than one permittee subject to the terms of this permit, then all of the terms of this permit shall bind the permittees individually and collectively, and said permitees shall be individually and collectively liable therefore.

22. Maintenance. The permittee agrees by the acceptance of this permit to exercise reasonable care to maintain properly any encroachment placed by it in the highway and to exercise reasonable care in inspecting for and immediately repairing and making good any injury to any portion of the highway which occurs as a result of the maintenance of the encroachment in the highway or as a result of the work done under this permit, including any and all injury to the highway which would not have occurred had such work not been done or such encroachment not placed therein.

23. Clear Zone. Any work performed in the right-of-way shall be designed and constructed so that a 10-feet wide area beside the edge of traveled way is clear of any obstructions (Section 14.1.7A). No above grade unyielding fixed objects shall be constructed within this clear zone unless specifically permitted by the County Director of Public Works. The director of Public Works may consider construction within the clear zone when it is designed in a manner to break away easily if hit by a moving vehicle.

USA MEMBERSHIP REQUIREMENTS

24. California Law. Every operator of a subsurface installation, except the Department of Transportation, shall become a member of, participate in, and share in the costs of, a regional notification center, (USA). Cal. Govt. Code Sections 4216-4216.9. “Operator” means any person, corporation, partnership, business trust, public agency, or other entity which owns, operates, or maintains a subsurface installation. For purposes of Section 4216.1 an “operator” does not include any owner of real property where subsurface facilities are exclusively located if they are used exclusively to furnish services on that property and the subsurface facilities are under the operation and control of that owner. “Subsurface installation” means any underground pipeline, conduit, duct, wire, or other structure, except non-pressurized sewer lines, non-pressurized storm drains, or other non-pressurized drain lines.

UTILITY AND UNDERGROUND

25. Cutting Pavement. All construction in asphalt shall be bored wherever possible. Open cut construction must be specifically permitted or may be authorized by the County inspector to accommodate unexpected field conditions. When pavement is cut it shall be done in a manner which causes the least possible damage to the adjacent pavement. After the utility is placed and the trench backfilled and based, the pavement shall be trimmed by sawing or other approved means to a sufficient width to removal displaced or damaged pavement. If the trench edge is within 2-feet of the edge of the roadway pavement, the entire 2-feet shall be removed and replaced.

26. Backfill. Bedding and shading material shall be consolidated and compacted by a field approved method. Backfill material shall be consolidated and compacted to the following standards: (Std. Dwg. U-4, U-4a, U-4b). Compaction tests shall be taken in locations as determined by the County Inspector. If approved by the County Inspector, excavations may be backfilled with vibrated sand slurry, or two sack cement slurry. All tests shall be conducted using Caltrans test methods.

27. Replacement of Pavement. The surface of all trenches in the traveled way shall be temporarily patched or otherwise surfaced at the end of each working day. Such temporary patching or other field approved surfacing shall be kept in a smooth, firm, dust-free condition for the safe use of the public for no more than 30 days or the final surface patch is required. Cold mix asphalt may be used as a temporary patch material; however, recessed metal plates are required on all arterial and major collector streets. Steel plate bridging shall conform to State Standards TR-0157. After the ditch edges have been trimmed, the base and pavement shall be replaced. The thickness of the base and paving to be replaced shall be determined in the field and shall be at least equal in section to that adjacent to the trench area; however, no pavement shall be less than 3” inches thick. Pavement shall be replaced with Type A hot mix asphalt which shall conform to State requirements for 1/2” maximum medium grading. Base material shall conform to State requirements for Class 2 Base.

28. Plowing. The use of a static plow within 5-feet of the edge of the pavement is prohibited. A vibrating plow may be used to within 1-foot off the edge of the pavement. Any pavement that is broken or otherwise disturbed by the plowing operations shall be removed and replaced. After plowing and prior to any compactive effort, the plow trench shall be flooded to attain a plastic condition. The trench shall then be compacted by wheel rolling or other suitable means.

29. General. Minimum cover over utilities shall conform to the County Standard U-1 drawing for installation. Maximum length of work under construction at any time shall not exceed 1,000 feet. Disposal of spoil material shall be outside the road right-of-way unless otherwise specifically approved by the County. Reasonable care shall be taken to avoid damage to major roots of trees. If an independent contractor installs a utility, the operator of the utility must accept the work before final approval of the work by the County.

30. Responsibility for Failures. The utility/service company that required the installation of facilities within the limits of the County right-of-way shall assume maintenance responsibility, in perpetuity, for any damage/failure to County maintained facilities as a result of such installation.

Revised: May 28, 2013
V:_DEVSERV Encroachment\ENC PERMITS - Permit Application-Provisions & Info\EP Application and Provisions.doc

E2: Special Event Application and Provisions

Permit Number: ENC _____-_____

SAN LUIS OBISPO COUNTY DEPARTMENT OF PUBLIC WORKS

SPECIAL EVENT PERMIT APPLICATION

Paavo Ogren, Director

County Government Center, Room 207 • San Luis Obispo CA 93408 • (805) 781-5252

Fax (805) 781-1229 email address: pwd@co.slo.ca.us

APPLICANT INFORMATION

TAX ID #:_____

Organization: _____ Non Profit: Yes ☐ No ☐

Mailing Address: _____ City, Zip: _____

Contact Name: _____ Email: _____

Telephone (24-hr): _____ Fax: _____

Signature of Authorized Individual: _____ *(Date)* _____

*Printed Name (if different from contact)***:** _____ *Email:* _____

I, the above signed applicant, do hereby certify that the information provided on the Encroachment (Special Event) Permit Application is true, accurate, and to the best of my knowledge. I also, by signing this Application do hereby agree to abide with the Agreement Clause stated below.

EVENT INFORMATION (attach additional sheets if needed)

Annual Event: Yes ☐ No ☐

Event Name: _____

Event Description: _____

Event Date: _____ Event Time (in Right-of-Way): _____

Event Location/Route: _____

_____

_____

Road Closure: ☐ Yes ☐ No If Yes, where: _____

# of Participants: _____ # of Spectators: _____ # of Volunteers: _____

Event **Activities in County Right-of-Way** (check all that apply) *Do not check if located on Private Property*:

Traffic Control:	☐ Cones/Barricades	☐ Flaggers	☐ Pavement Markings	☐ Signs
Encroachments:	☐ Aid Stations	☐ Alcohol Sales	☐ Restrooms	☐ Vendors
Other:	☐ Ambulance	☐ Cal Fire	☐ CHP	☐ Sheriff
	☐ Parking	☐ Spectators	☐ Volunteers	☐ _____

Rules of the Road Event: ☐ Yes ☐ No Participant Fees: ☐ Yes ☐ No Participant Waiver: ☐ Yes ☐ No

Pre-Event Advertizing: ☐ Yes ☐ No If Yes, type/where/when: _____

_____

Has CHP been contacted? ☐ Yes ☐ No Is CHP traffic control required? ☐ Yes ☐ No

If CHP has not been contacted, the County will initiate any required correspondence.

Agreement Clause:

- The applicant agrees and accepts that the work will be conducted in accordance with the County Standards and Specifications, Encroachment Permit Conditions, California Manual of Uniform Traffic Control Devices, State Standards and Specifications, State Streets and Highways Code, State Vehicle Code, and the attached Provisions.
- The permittee shall defend, indemnify and save harmless the County of San Luis Obispo, its officers, agents and employees from any and all claims, demands, damages, costs, expenses, or liability that relate in any way to this permit, including, but not limited to, any act or omission on the part of the permittee, or of agents, employees, or independent contractors directly responsible to the permittee; including, but not limited to, any defects, flaws or errors in the design or performance of any work under this permit, providing further that the foregoing shall apply to any acts, or omissions to act, committed jointly or concurrently by the permittee, the permittee's agents, employees or independent contractors, and the County, its agents, employees or independent contractors. Nothing contained in the foregoing indemnity provisions shall be construed to require the permittee to indemnify the County against any responsibility or liability in contravention of Section 2782 of the Civil Code.

REQUIRED SUBMITTALS/ATTACHMENTS

☐ Completed and signed SPECIAL EVENT PERMIT APPLICATION (page 1)

☐ Event Location/Route Map (use space provided below or attach separate sheets)

☐ Traffic Control Plan (see *Traffic Control Plan Guidelines & Examples.pdf* available on the website)

NOTE: **Applications are due at least 3 months prior to the event (6 months for multiple road closures**). During review of the completed application, the County will determine the permit conditions and submittals and will typically **respond to the applicant within 2 weeks**. (See Page 3 for Guidelines for Special Event Permit Conditions and Submittals). All completed submittals must then be submitted (in single package) at least **6 weeks prior to the event.** INCOMPLETE SUBMITTALS NOT ACCEPTED.

DRAW AND LABEL THE FOLLOWING:

☐ Event Location/Route

☐ Detour Routes (if applicable)

☐ Event Activities in ROW (see page 1)

☐ Proposed Traffic Control Plan (attach additional sheets as needed)

GUIDELINES FOR SPECIAL EVENT PERMIT CONDITIONS AND SUBMITTALS (due prior to issuance of permits)			
CONDITION/SUBMITTAL	**REQUIRED?**		**NOTES**
	YES	**NO**	
A. **Permit Required**	If any traffic control, route markings, road/lane closures, pre-event advertizing, participant fee, or event activities in ROW.	No impacts to free flow traffic and no encroachments in the County ROW.	
B. **Application Fee**	If participant fee, vendors or not exempt per Title 13.08.055. General Encroachment Permit fee. (See Fee List on website)	Title 13.08.055 (i.e non-profits)	If required, fee is required prior to permit issuance. Fee is payable at PW counter or via USPS.
C. **Checking and Inspection Agreement**	Events with multiple road closures where staff review is expected to exceed fees. Agreement allows applicant to be billed at time and materials.	Most events	If required, must be executed at least 60 days prior to event. Standard agreement can be found online at http://www.slocounty.ca.gov/PW/Dev Serv/OnlineForms.htm
D. **Traffic Control Plan**	Required for all special events (See Traffic Control Plan Guidelines & Examples.pdf on website)	N/A	Draft Traffic Control Plan must be submitted with application. Traffic Control Plan must approved by the County prior to issuance of permit.
E. **CHP Review and Agreement for Services**	CHP must be notified of all special events. Each CHP office has different requirements. If CHP will be providing traffic control, applicant must enter into an agreement w/CHP.	N/A	If CHP will be providing traffic control, the fully executed agreement (or confirmation from CHP) must be on file prior to issuance of permit.
F. **Insurance Policy**	**Required for all special events. $1M-$2M per occurrence general liability for most events**; **up to $5M per occurrence for large events.** Check with the Department for requirements (based on duration, # of participants/spectators, alcohol sales, etc.)	N/A	Applicant must name County of San Luis Obispo and CHP as additional insured. A copy of the **certificate and endorsement (one for each entity)** must be on file prior to issuance of permit. Umbrella policies are not accepted in lieu of general liability requirements.
G. **Participant Waiver/ Release and Hold Harmless Agreement**	Most events. At a minimum, waivers must "indemnify the County of San Luis Obispo from any and all liability for any and all loss(es), damage(s), and any and all claims…in connection with participation in the event" Additional language is required when participants are adjacent to traffic.	N/A	Waivers must be reviewed and approved by County Counsel prior issuance of permit. County may request originals. Contact the Department for waiver boilerplates.
H. **Damage Bond**	If ancillary facilities (Restrooms, Staging, Stations, Vendors) in the ROW. $500 most events; $1000 large events.	If no ancillary facilities in ROW.	If required, bond is payable at PW counter upon issuance of permit. In permit conditions are met, bond will be returned two (2) weeks after event.
I. **Caltrans/City Permits**	If required by jurisdiction(s), based on event location.	If event is only on SLO County maintained roads.	The permittee is responsible for obtaining any other permits or approvals that may be required.
J. **Public Outreach**	Based on event size, location and traffic control (i.e. road closures), County may require the following: • Letter to residents/businesses • Pre-event signage • Press release	N/A	At a minimum, applicant must notify emergency services and community organizations 14-30 days prior to event. County may require review of press release and/or letters prior to issuance of permit. Changeable message signs or other pre-notification signs may be required.

SAN LUIS OBISPO COUNTY DEPARTMENT OF PUBLIC WORKS
STANDARD ENCROACHMENT PERMIT PROVISIONS

GENERAL

1. Authority. This permit is issued pursuant to Chapter 13.08 of the San Luis Obispo County Code and Chapter 5.5 (commencing with Section 1450) of the Division 2 of the California Streets and Highways Code, the provisions of which are incorporated herein by reference as though fully set forth herein. Special event permits with are issued pursuant to Chapter 15.610 of the San Luis Obispo County Code and Chapter 2 (commencing with Section 942) of the Division 2 of the California Streets and Highways Code, the provisions of which are incorporated herein by reference as though fully set forth herein. Issuance or denial of permit may be appealed to the Board of Supervisors. All board decisions are final and conclusive.

2. Definitions. The word "County" as used herein means the County of San Luis Obispo acting by and through its director of Public Works or his duly authorized representative. For special event permits, the word "work" as used herein refers to all activities related to the special event.

3. No Precedent Established. This permit is granted with the understanding that this action is not to be considered to establish a precedent concerning any kind of encroachment within the county right-of-way.

4. Permits from Others. When the law requires the consent to any work hereunder from any other public board or person having jurisdiction, this permit shall be suspended in operation unless and until such consent is obtained.

5. Permission from Property Owners. Whenever it is necessary to secure permission from abutting property owners, such authority must be secured by the permittee prior to the starting of work.

6. Responsible Party. No party other than the named permittee or their agent is authorized to work under any permit.

7. Notice Prior to Starting Work. Before starting work under the Encroachment Permit, the permittee shall notify the county inspector 24 hours prior to initial start of work.

8. Indemnity. The permittee shall defend, indemnify and save harmless the County of San Luis Obispo, its officers, agents and employees from any and all claims, demands, damages, costs, expenses, or liability that relate in any way to this permit, including, but not limited to, any act or omission on the part of the permittee, or of agents, employees, or independent contractors directly responsible to the permittee; including, but not limited to, any defects, flaws or errors in the design or performance of any work under this permit, providing further that the foregoing shall apply to any acts, or omissions to act, committed jointly or concurrently by the permittee, the permittee's agents, employees or independent contractors, and the County, its agents, employees or independent contractors. Nothing contained in the foregoing indemnity provisions shall be construed to require the permittee to indemnify the County against any responsibility or liability in contravention of Section 2782 of the Civil Code.

9. Other Work. This permit is to be strictly construed, and no work other than that specifically mentioned is authorized hereby.

10. Safety. All work shall be performed in a safe and workmanlike manner in accordance with all applicable laws and regulations.

11. Keep Permit on the Job. This permit shall be kept at the site of the work and shall be shown to any representative of the County Department of Public Works, or any law enforcement officer on request.

12. Protection of the Public. The work shall cause the least possible inconvenience to the traveling public. At least one-way traffic shall be maintained at all times during the working day (7 a.m. through 5 p.m.). Two-way traffic shall be maintained from the close of the working day to the start of the next working day. Department approval required for full width road closures. All warning signs, lights, devices, and procedures shall conform to the latest California Manual of Uniform Traffic Control Devices (CMUTCD). All traffic associated with the work shall follow the provisions of the California Vehicle Code.

13. Standards of Construction. Any matter not specifically mentioned herein, or covered by direct reference, shall conform to the County Standard Improvement Specifications and drawings, and, if not covered therein, to Caltrans Standard Specifications and Plans.

14. County Inspection. All work shall be subject to County inspection, and shall be performed in accordance with County Standards to the satisfaction of the County.

15. Expense of Inspection. On work which in the judgment of the County requires the presence of an employee of the Department of Public Works as inspector, the actual cost (including salary, traveling expense, and overhead) of such inspection shall be paid by the permittee upon presentation of a statement therefore. The cost of any tests required by the County shall be borne by the permittee.

16. Bonds. The applicant shall provide a cash bond (with assignment to the County) in the amount specified on the Encroachment Permit which sum is deemed sufficient by the Department of Public Works and which bond or deposit aforesaid shall guarantee payment to the County for all costs of work of improvement, engineering, inspection, and related incidental expenses done or incurred by the County as is provided for herein. Expense of Inspections shall be paid current and/or the finalization of Encroachment Permit is required prior to release of Bonds.

17. Restoration of Right-of-Way. All portions of the right-of-way, and all adjacent areas directly affecting such, if disturbed by work pursuant to this permit, shall be promptly restored to prior condition (including the replacement of suitable material and/or the planting of vegetation) and shall be left in a presentable condition.

18. Existing Utilities. The permittee shall contact all utilities to determine the location of any existing facilities prior to any excavation. The underground Service Alert ticket number and name shall be kept on the job site and be available to any representative of the County Department of Public Works or any law enforcement officer on request. The permittee shall also contact the local water purveyor, sanitation district or other utility not affiliated with Underground Service Alert to advise them of the proposed project. The date and name

of this contact must also be kept on the job site. The permittee shall immediately notify the owning utility of any damage to the existing facility.

19. Future Moving of Installation. In the event it becomes necessary, in the opinion of the County, to remove or relocate the encroachment permitted hereunder, such shall be accomplished by, and at the sole expense of, the permittee, and within such time and manner as may be required by the County. (Curb and gutter improvements constructed in accordance with approved County plans are exempted from this provision).

20. Taxation of Possessory Interests. Permittee recognizes and understands that this permit may create a possessory interest subject to property taxation, and that permittee may be subject to payment of taxes levied on such interest.

21. Joint and Several Obligation. If there is more than one permittee subject to the terms of this permit, then all of the terms of this permit shall bind the permittees individually and collectively, and said permitees shall be individually and collectively liable therefore.

22. Maintenance. The permittee agrees by the acceptance of this permit to exercise reasonable care to maintain properly any encroachment placed by it in the highway and to exercise reasonable care in inspecting for and immediately repairing and making good any injury to any portion of the highway which occurs as a result of the maintenance of the encroachment in the highway or as a result of the work done under this permit, including any and all injury to the highway which would not have occurred had such work not been done or such encroachment not placed therein.

23. Clear Zone. Any work performed in the right-of-way shall be designed and constructed so that a 10-feet wide area beside the edge of traveled way is clear of any obstructions (Section 14.1.7A). No above grade unyielding fixed objects shall be constructed within this clear zone unless specifically permitted by the County Director of Public Works. The director of Public Works may consider construction within the clear zone when it is designed in a manner to break away easily if hit by a moving vehicle.

USA MEMBERSHIP REQUIREMENTS

24. California Law. Every operator of a subsurface installation, except the Department of Transportation, shall become a member of, participate in, and share in the costs of, a regional notification center, (USA). Cal. Govt. Code Sections 4216-4216.9. “Operator” means any person, corporation, partnership, business trust, public agency, or other entity which owns, operates, or maintains a subsurface installation. For purposes of Section 4216.1 an “operator” does not include any owner of real property where subsurface facilities are exclusively located if they are used exclusively to furnish services on that property and the subsurface facilities are under the operation and control of that owner. “Subsurface installation” means any underground pipeline, conduit, duct, wire, or other structure, except non-pressurized sewer lines, non-pressurized storm drains, or other non-pressurized drain lines.

UTILITY AND UNDERGROUND

25. Cutting Pavement. All construction in asphalt shall be bored wherever possible. Open cut construction must be specifically permitted or may be authorized by the County inspector to accommodate unexpected field conditions. When pavement is cut it shall be done in a manner which causes the least possible damage to the adjacent pavement. After the utility is placed and the trench backfilled and based, the pavement shall be trimmed by sawing or other approved means to a sufficient width to removal displaced or damaged pavement. If the trench edge is within 2-feet of the edge of the roadway pavement, the entire 2-feet shall be removed and replaced.

26. Backfill. Bedding and shading material shall be consolidated and compacted by a field approved method. Backfill material shall be consolidated and compacted to the following standards: (Std. Dwg. U-4, U-4a, U-4b). Compaction tests shall be taken in locations as determined by the County Inspector. If approved by the County Inspector, excavations may be backfilled with vibrated sand slurry, or two sack cement slurry. All tests shall be conducted using Caltrans test methods.

27. Replacement of Pavement. The surface of all trenches in the traveled way shall be temporarily patched or otherwise surfaced at the end of each working day. Such temporary patching or other field approved surfacing shall be kept in a smooth, firm, dust-free condition for the safe use of the public for no more than 30 days or the final surface patch is required. Cold mix asphalt may be used as a temporary patch material; however, recessed metal plates are required on all arterial and major collector streets. Steel plate bridging shall conform to State Standards TR-0157. After the ditch edges have been trimmed, the base and pavement shall be replaced. The thickness of the base and paving to be replaced shall be determined in the field and shall be at least equal in section to that adjacent to the trench area; however, no pavement shall be less than 3” inches thick. Pavement shall be replaced with Type A hot mix asphalt which shall conform to State requirements for 1/2” maximum medium grading. Base material shall conform to State requirements for Class 2 Base.

28. Plowing. The use of a static plow within 5-feet of the edge of the pavement is prohibited. A vibrating plow may be used to within 1-foot off the edge of the pavement. Any pavement that is broken or otherwise disturbed by the plowing operations shall be removed and replaced. After plowing and prior to any compactive effort, the plow trench shall be flooded to attain a plastic condition. The trench shall then be compacted by wheel rolling or other suitable means.

29. General. Minimum cover over utilities shall conform to the County Standard U-1 drawing for installation. Maximum length of work under construction at any time shall not exceed 1,000 feet. Disposal of spoil material shall be outside the road right-of-way unless otherwise specifically approved by the County. Reasonable care shall be taken to avoid damage to major roots of trees. If an independent contractor installs a utility, the operator of the utility must accept the work before final approval of the work by the County.

30. Responsibility for Failures. The utility/service company that required the installation of facilities within the limits of the County right-of-way shall assume maintenance responsibility, in perpetuity, for any damage/failure to County maintained facilities as a result of such installation.

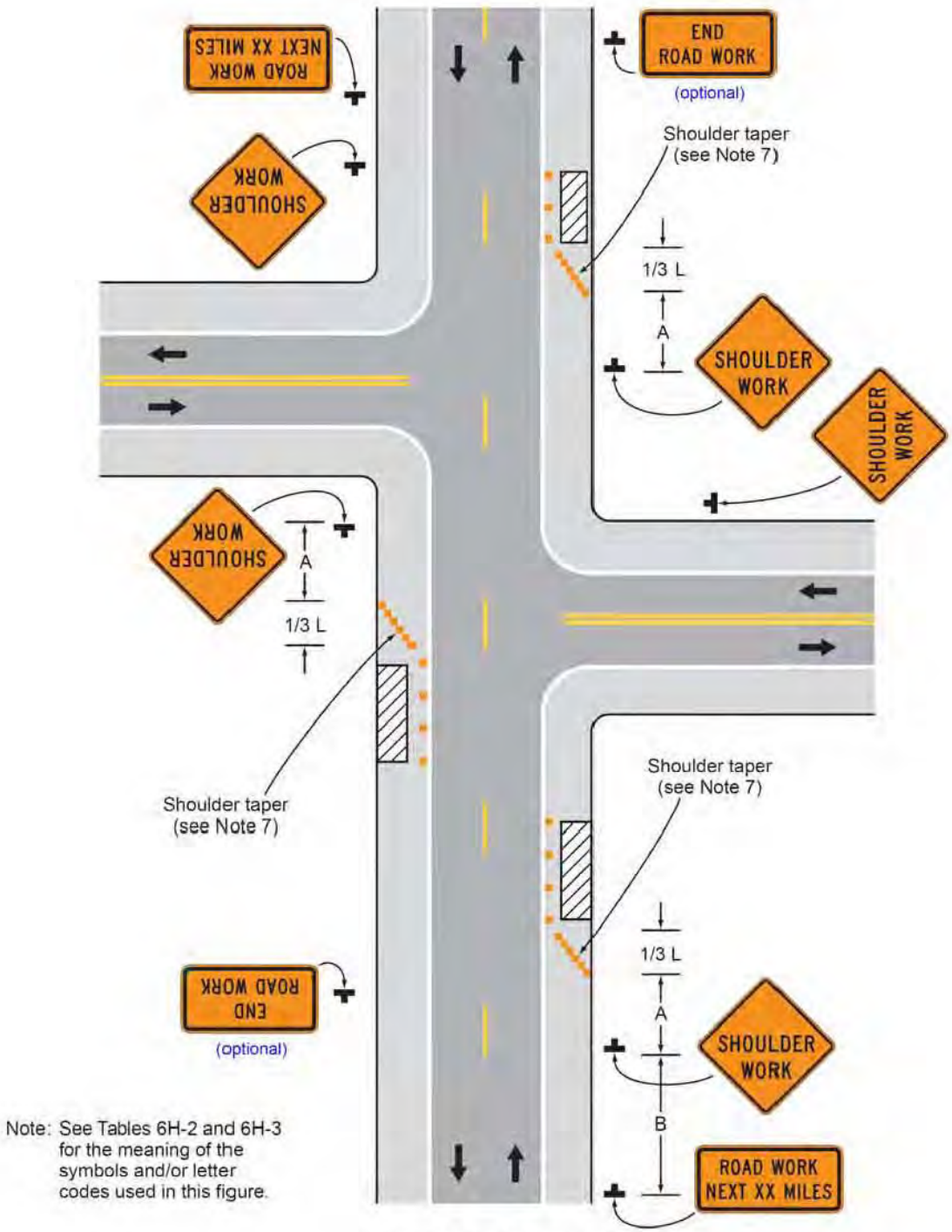
Revised: May 28, 2013
V:_DEVSERV Encroachment\ENC PERMITS - Permit Application-Provisions & Info\Special Event EP Application and Provisions.doc

E3: County Lane Closure Restriction List

County Road	No Closures Permitted Between	
Avila Beach Drive*	0700-0830	1500-1800
Burton Drive (SR 1 to Main St)	0700-0830	1500-1800
El Camino Real	0700-0830	1500-1800
Foothill Road*	0700-0830	1500-1800
Halcyon Road* (A.G. to El Campo Rd	0700-0830	1430-1800
Hutton and Joshua Roads*	0700-0800	1600-1800
Las Tablas Road	0700-0830	1600-1800
Lopez Drive*	0700-0830	1600-1800
Los Berros Road	0700-0830	1500-1800
Los Osos Valley Road*	0700-0830	1500-1800
Los Ranchos Road	0700-0830	1430-1800
Main Street, Cambria	0730-0830	1430-1730
Main Street, Templeton	0700-0830	1600-1800
Nacimiento Lake Drive*	0700-0830	1600-1800
O'Connor Way	0700-0830 (unless off school schedule)	
Orchard Avenue*	0700-0830	1600-1800
Pomeroy Road Willow Rd to Tefft St	0700-0830	1600-1800
Price Canyon Road*	0700-0830	1600-1800
San Luis Bay Drive*	0700-0830	1430-1800
Santa Ysabel Avenue	0700-0830	1700-1800
South Bay Boulevard*	0700-0830	1500-1800
South Frontage Road	0700-0800	1600-1800
Tank Farm Road	0700-0830	1600-1800
Tefft Street*	0700-0830	1430-1800
Thompson Avenue Tefft St to US 101	0700-0830	1430-1800
Valley Road	0700-0830	1500-1800
Vineyard Drive* SR 46 to Main St	0700-0830	1430-1800
Willow Road*	0700-0830	1600-1800

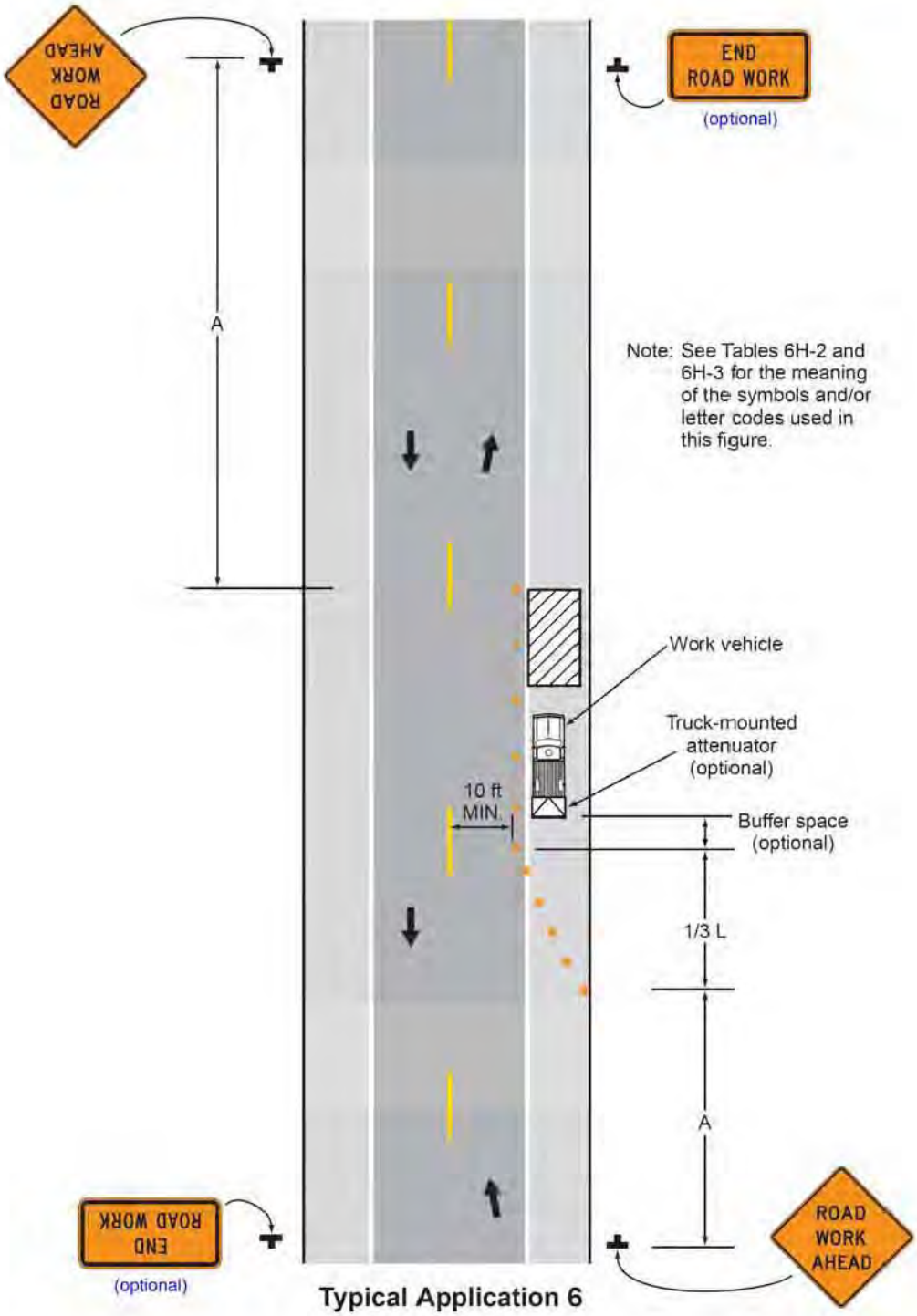
* Lane closures not permitted on Friday afternoons preceding three-day weekend of a Federal holiday.

Figure 6H-3. Work on the Shoulders (TA-3)



Typical Application 3

Figure 6H-6. Shoulder Work with Minor Encroachment (TA-6)



Typical Application 6

E6: Reserved for future Public Works Approved Tree Planting List

San Luis Obispo County
Department of Public Works

Subdivision Project Security

Security required. Security (also referred to as "bonding") must be posted with most subdivision projects, to ensure completion of the public improvements that are required as conditions of approval. Following approval of the improvement plans, we will review an Engineer's Estimate of the cost of construction that is to be secured. Please note that the cost estimate must be based on unit costs that would be experienced if the County were to claim the bonds and construct the improvements under public agency contracting rules.

Once we have approved the estimate of construction cost, the following factors must be added:

Construction cost	Contingency	Inflation	Administrative costs
<$75,000	10%	10%	40%
$75,000 - $200,000	10%	10%	30%
>$200,000	10%	10%	20%

(Construction cost) + (Contingency) + (Inflation) + (Administrative costs) = **Bonding Amount**

Items to be secured. There are three different items to be secured during the bonding period:

Performance = 100% of the bonding amount. Once all the required public improvements have been accepted and a Guarantee Bond posted, the Performance Bond will be exonerated. Note that acceptance includes the completion of the improvements **and** the preparation of "as-built" plans, submittal of required reports, and the engineer's certification.

Payment and Materials = 50% of the bonding amount. The Payment and Materials Bond will be held for 90 days after acceptance of the improvements.

Guarantee = 10% of the bonding amount. The Guarantee Bond will be held for one year from date of completion and acceptance of improvements.

Types of security. The types of security accepted by San Luis Obispo County are listed below. Note that all forms of security must be made payable to the County of San Luis Obispo.

Cash. Submit 100% of the bonding amount. A certified check may also be submitted in this amount. Because we pay you interest, a Taxpayer Identification Number is required with cash bonds. You will need to fill out an IRS form W-9 and return it to Public Works with your check. The form may be obtained from us or at: http://www.irs.gov/pub/irs-pdf/fw9.pdf

Certificate of Deposit. Submit three separate certificates – 1 @ 50%, 1 @ 40%, 1 @ 10% of the bonding amount.

Letters of Credit. Submit three separate letters of credit – 1@ 100%, 1@ 50%, 1 @ 10% of the bonding amount. The Guarantee letter of credit (10%) may be submitted at the time of acceptance of improvements. Important - any Letters of Credit with expiration dates need to include an automatic extension and notice provision.

Surety Bonds. Submit two separate bonds – 1 @ 100%, 1 @ 50% of the bonding amount. The Performance bond (100%) will be reduced to 10%, to become the Guarantee bond, at the time of acceptance of improvements.

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APPENDIX F

Drainage

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F1: Drainage Report Format

All Drainage Reports submitted to the Department shall be prepared in the following format:

A. Cover Sheet
- Title of Report (Ex: Hydrologic and Hydraulic Drainage Report for Tract ##)
- Approximate Location (Street, Town)
- Seal and Signature of the Project Engineer
- Name & Address of Client
- Report Date

B. Table of Contents
- List All Headings & Page Numbers
- Number All Pages

C. Introduction
- Description of Site Size, Location and surroundings
- Description of Pre/Post-Development Drainage Conditions
- Description of Historic Hydrologic/Hydraulic Information

D. Procedure
- Description of Methodology & Assumptions
- Description of Special Requirements (i.e. retention, detention, etc.)

E. Hydrology
- Description of Historic Flows vs. Post-Development Flows
- Pre-Development Drainage Map (May be included in Appendix)
    - Property lines
    - Existing Contours (Beyond project limits if necessary)
    - Existing Improvements/Structures/Drainage Facilities/ Waterways
    - Arrows Denoting Historic Drainage Path
    - Watershed Boundaries (Beyond project limits if necessary)
        - Label ID #
        - Label Area

Table of Flow Calculations for each Watershed Area

	C Value	Area (ac)	Tc (min)	I2 (in/hr)	I25 (in/hr)	I50 (in/hr)	I100 (in/hr)	Q2 (cfs)	Q25 (cfs)	Q50 (cfs)	Q100 (cfs)
Area 1											
Area 2											

- Post-Development Drainage Map (May be included in Appendix)
  - Property lines
  - Existing Contours
  - Existing Improvements/Structures/Drainage Facilities/ Waterways
  - Proposed Improvements/Structures/Drainage Facilities
  - Arrows Denoting Proposed Drainage Path
  - Labeled Overland Escape Route
  - Watershed Boundaries (Both on and Off-Site)
    - Label ID #
    - Label Area

Table of Flow Calculations for each Watershed Area

	C Value	Area (ac)	Tc (min)	I2 (in/hr)	I25 (in/hr)	I50 (in/hr)	I100 (in/hr)	Q2 (cfs)	Q25 (cfs)	Q50 (cfs)	Q100 (cfs)
Area 1											
Area 2											

F. <u>Hydraulics</u>

- Drainage System Schematic Map (May be included in Appendix)
  - Gray-Scaled Proposed/Existing Improvements
  - Darkened Proposed & Existing Drainage Facilities
  - Label all Drainage Facilities with ID#
    - Pipes
    - Inlets
    - Outlets
    - Channels
    - Basins
  - Arrows Denoting Drainage Flow
- Storm Drainage (if applicable)
  - Description of System Design
  - Discuss Overland Escape Route
  - Discuss Ability to Meet County Requirements
  - Culvert – 2 ft/s > Primary Design Storm Velocity < 15 ft/s
  - Inlets – Enough Capacity for Primary Design Storm
  - Inlets/Junctions – HGL (Primary Design Storm) > 0.5’ Below Top of Grates, Bottom of Curb Openings, & Manhole Covers

Table of Pipe Segment Analysis (Example Below)

	Size (in)	Length (ft)	Slope (%)	Invert IN (ft)	Invert OUT (ft)	Q25* (cfs)	HGL25* IN (ft)	HGL25* OUT (ft)	V25* AVG (ft/s)	Pipe Capacity (cfs)
Pipe 1										
Pipe 2										

* Primary Design Storm

Table of Inlet Analysis (Example Below)

	Q25* (cfs)	Invert (ft)	Top of Structure (ft)	HGL25* (ft)	HGL100 (ft)	Freeboard** (ft)	Inlet*** Capacity (cfs)
Inlet 1							
Manhole 1							
Outlet 1							

* Primary Design Storm
** Freeboard = Top of Structure – HGL25*
*** Inlet capacity shall account for 50% clogging in a sump condition

- Channels & Swales (if applicable)
  - Description of Channels (Shape, Location, Watershed Area, Lining, etc.)
  - Discuss Ability to Meet County Requirements
    - Channel – 2 ft/s > Primary Design Storm Velocity < 4 ft/s or 10 ft/s for Concrete-lined
    - Channel – Freeboard = 0.2 x Specific Energy or 1'

Table of Channel Analysis (Example Below)

	Q25* (cfs)	Slope (%)	V25* AVG (ft/s)	Specific Energy (ft)	Surface Elevation (ft)	Top of Channel (ft)	Freeboard (ft)
Channel 1							
Channel 2							

* Primary Design Storm

- Retention Basins (if applicable)
  - Description of Project Retention Requirements
  - Discuss Locations/Types of Basins
  - Discuss Water Quality Measures & Maintenance Plan
  - Discuss Non-Erosive Overland Escape Route/Spillway Design for 100-yr Storm
  - Discuss Ability to Meet County Retention Requirements
    - Volume Designed for 50-yr Storm, 10-hr Intensity, 10-hr Duration
    - Antecedent Moisture Factor = 1.3 in Areas of Natural Sump
    - Basin Shall Percolate Within 7 Days (Provide Percolation Tests)
    - Freeboard – Deep Basin = 1 Ft, Shallow Basin = 15%, Subsurface Basin = 20%

Retention Basin Volume Table (Example Below)

	Type (Subsurface, Deep, Shallow)	Q50 (cfs)	I50 (in/hr)	Duration (hr)	VOL Required (cf)	Freeboard (cf)	VOL Total (cf)
Basin 1							
Basin 2							

- Detention Basins (if applicable)
  - Description of Project Detention Requirements
  - Discuss Locations/Types of Basins
  - Discuss Access & Maintenance Plan
  - Discuss Non-Erosive Overland Escape Route/Spillway Design for 100-yr Storm
  - Discuss Ability to Meet County Retention Requirements
    - Volume to Detain Developed 50-yr Flows and Release Pre-Developed 2-yr Flows
    - Freeboard – Deep Basin = 1 Ft, Shallow Basin = 15%, Subsurface Basin = 20%

Detention Basin Volume Table (Example Below)

	Type (Subsurface, Deep, Shallow)	VOL IN* (cf)	VOL OUT** (cf)	VOL*** Maximum (cf)	Freeboard (cf)	VOL Total (cf)
Basin 1						
Basin 2						

* Based on flows from fully-developed 50-yr storm
** Based on flows from pre-developed 2-yr storm
*** The maximum result of VOLin – VOLout at a specific time within a 10-hour duration

- Rock Slope Protection (if applicable)
  - Description of Location
  - Discuss Sizing Based on County Standard Drawings H-5

- Spreadwidth
  - Description of Street Sections
  - Discuss Ability to Meet County Requirements
    - Design Speed < 45 mph – Spread Shall be Less Than ½ Outside Lane Width
    - Design Speed > 45 mph – Spread shall not encroach traveled way
    - Street Section Shall be Sufficient to Convey 100-yr Flows within the right-of-way

Table of Q25* Spreadwidth Analysis (Example Below)

	Design Speed (mph)	Station (ft)	Side of Street (Lt/Rt)	Q25* (cfs)	Street Half-Width (ft)	Bikelane (Yes/No)	Spreadwidth (ft)
Street A							
Street B							

* Primary Design Storm

Table of Q100 Spreadwidth Analysis (Example Below)

	Station (ft)	Q100 (cfs)	Street Width (ft)	R/W Width (ft)	Spreadwidth (ft)
Street A					
Street B					

G. <u>Conclusion & Recommendations</u>

- Summary of Proposed Drainage Design
- Statement/Description of Design's Ability to Meet Drainage Requirements

H. <u>Drainage Report Appendix</u>

- Calculations
- Additional Maps/Exhibits
- References (Standards, Specifications, Letters, etc.)

F2: "n" values for Manning's Formula

[Source: Urban Drainage Design Manual, FHWA-NHI-01-021]

The Project Engineer shall provide the source(s) for other "n" values used in situations not listed below.

Table 1: Street and Pavement Gutters

Type of Gutter or Pavement	Manning's "n"
Concrete gutter, troweled finish – greater than 0.5% slope	0.012
Concrete gutter, troweled finish – 0.5% or flatter	0.032
Hot Mix Asphalt pavement – greater than 0.5% slope	0.016
Hot Mix Asphalt pavement – 0.5% or flatter	0.036
Concrete gutter and Hot Mix Asphalt pavement combination – greater than 0.5% slope	0.015
Concrete gutter and Hot Mix Asphalt pavement combination – 0.5% or flatter	0.035

Table 2: Storm Drain Culverts

Type of Culvert	Roughness or Corrugation	Manning's "n"
Concrete pipe	smooth	0.012
Concrete boxes	smooth	0.013
Spiral rib metal pipe	smooth	0.013
Corrugated metal pipe, pipe-arch	2-2/3 by ½ in annular	0.025
	2-2/3 by ½ in helical	0.023
	6 by 1 in helical	0.024
	5 by 1 in	0.026
	3 by 1 in	0.028
	6 by 2 in structural plate	0.035
	9 by 2-1/2 in structural plate	0.035
Corrugated polyethylene	smooth	0.015
Corrugated polyethylene	corrugated	0.025
Polyvinyl chloride (PVC)	smooth	0.012

Table 3: Open Channels

Lining Category	Lining Type	"n" for given depth ranges		
		0-0.5 ft	0.5-2 ft	>2 ft
Rigid	Concrete	0.015	0.013	0.013
	Grouted riprap	0.040	0.030	0.028
	Stone masonry	0.042	0.032	0.030
	Soil element	0.025	0.022	0.020
	Hot Mix Asphalt	0.018	0.016	0.016
Unlined	Bare soil	0.023	0.020	0.020
	Rock cut	0.045	0.035	0.025
Temporary*	Woven paper net	0.016	0.015	0.015
	Jute net	0.028	0.022	0.019
	Fiberglass roving	0.028	0.021	0.019
	Straw with net	0.065	0.033	0.025
	Curled wood mat	0.066	0.035	0.028
	Synthetic mat	0.036	0.025	0.021
Gravel riprap	1 inch D_{50}**	0.044	0.033	0.030
	2 inch D_{50}**	0.066	0.041	0.034
Rock riprap	6 inch D_{50}**	0.104	0.069	0.035
	12 inch D_{50}**	–	0.078	0.040

* Some "temporary" linings become permanent when buried.
** D_{50} = median aggregate diameter

F3: Geotextile Selection

Topsoil with soil amendments, fertilizer and seed is required beneath all blanket liners. Seed shall be watered regularly until there is 80% successful coverage over the area planted. Additional seeding, watering and amending, as needed, shall be completed immediately if, at any point during the rainy season, the initial planting fails, or is removed or disturbed.

Geotextile blanket installation shall conform to the following requirements:

1. Temporary blankets shall be used only on mild to moderate slopes (less than 5%) and where Primary Design Storm flow velocities (intermittent) are less than 2.5 feet per second (fps).

2. Extended-term blankets shall be used on steep slopes (5 to 10%), where intermittent flow velocities exceed 2.5 fps in sand, or 4.0 fps in gravel, and where the establishment of adequate vegetation is delayed.

3. Permanent blankets shall be used on steep to severe slopes (greater than 10%), where intermittent flow velocities exceed 2.5 fps in sand, or 4.0 fps in gravel.

4. Trapezoidal or parabolic channel cross-sections are preferred over V-sections. V-sections shall not be used where intermittent flow velocities exceed 2.5 fps in sand, or 4.0 fps in gravel.

5. Geotextile blankets shall be installed in firm and continuous contact with the soil.

6. Blankets shall be longitudinally lapped or anchor trenched, and installed according to the manufacturer's detailed installation requirements.

7. Blankets shall be inspected, maintained and repaired until they have become vegetated and stable.

F4: LID Specifications

Appendix E -

Low Impact Development (LIDI) Specifications

Appendix E – Low Impact Development Institute (LIDI) Specifications

BIORETENTION SOIL MEDIA (BSM)

BSM shall by comprise of:

INGREDIENT	PERCENT BY VOLUME
Mature Compost	30-40
Sand	60-70

BSM shall not be mixed on site.

Mature Compost

Unless otherwise approved by the Low Impact Development Initiative staff, compost must be derived from one or a combination of the following types of materials:

1. Green material consisting of chipped, shredded or ground vegetation or clean, processed recycled wood products
2. Biosolids*
3. Mixed food waste

*Compost must not be derived from mixed, municipal solid waste and must not contain paint, petroleum products, pesticides or other chemical residues harmful to plant or animal life. Compost shall be relatively free of inert ingredients, including glass, plastic and paper,

Mature compost must arrive on site at a temperature < 120° F and meet at least one of the following stability methods:

METHOD	UNITS	REQUIREMENT
NH_4- : NO_3-N Ratio	None	< 3
Total NH3-N	ppm, dry basis	< 500
Seed Germination	Percent	> 80 of control
Plant Trials®	Percent	> 80 of control
Solvita®	Index value	> 5

AND at least one of the following maturity indices in the following table:

METHOD	UNITS	REQUIREMENT
OUR Test	O2 / unit TS / hr	< 1.3
SOUR Test	O2 / unit BVS / hr	< 1.5
CO2 Test	C / unit VS / day	< 8
Dewar	Temp. rise (oC)	< 20
Solvita®	Index value	> 5

Compost must comply with the following gradation requirements below

SIEVE SIZE	PERCENT PASSING (BY WEIGHT)	
	MIN	*MAX*
1 inch	99	100
½-inch	90	100
¼-inch	40	90
No. 200	2	10

Compost shall comply with the requirements shown in the following table:

PROPERTY	REQUIREMENT
Bulk Density	500 and 1100 dry lbs/cubic yard
Moisture Content	30% - 55% of dry solids
Inert Materials	< 1 % by weight or volume combined total
Carbon : Nitrogen Ratio	15:1 < C:N < 25:1
Salinity	< 6.0 mmhos/cm
pH	6.5 < pH < 8.0
Total Nitrogen content	> 0.9%
Boron	< 8- ppm dry < 2.5 ppm soluable

Where TMECC= Test Methods for the Examination of Composting and Compost

Sand

ASTM C33 for fine aggregate, or…the following gradation requirements:

SIEVE SIZE	PERCENT PASSING (BY WEIGHT)	
	Min	***Max***
3/8 inch	100	100
No. 4	90	100
No. 8	70	100
No. 16	40	95
No. 30	15	70
No. 40	5	55
No. 100	0	15
No. 200	0	5

COMPOST MULCH

Compost mulch shall consist of 100% of mature compost. See BSM for aged compost specifications.

GRAVEL FILTER

Gravel filter shall consist of 3” deep layer of ¾” (no. 4) open-graded aggregate.

OR

Gravel filter shall conform to Caltrans Class 2 Permeable Material (Section 68-2.02F(3)) gradation requirements:

SIEVE SIZE	PERCENT PASSING
1 inch	100
3/4 inch	90 -100
3/8 inch	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

Class 2 permeable material must have a sand equivalent value of not less than 75.

PLANT PALETTE The plant palette shall be according the Plant List found in **Appendix F**.

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APPENDIX G

Waterline

G1: Waterline Disinfection Procedure

Based on July 15, 2002 Procedural Memorandum O-3 (Revised)

The following memorandum outlines the revised procedures to be followed by laboratory personnel, water operators, inspectors and contractors for the disinfection and testing of new waterline extensions and/or water mains. This procedure is an extraction from the American Waterworks Association (AWWA) *Standards for Disinfecting Water Mains* (C651-99) and the new drinking water requirements from the California Department of Health Services. **Note: This Memorandum should be included in specifications for all waterline projects.**

This standard presents essential procedures for disinfecting new and repaired water mains, including installation of fire hydrants. All new water mains shall be disinfected before they are placed in service. All water mains taken out of service for inspection, repair, or other activities that might lead to contamination of water shall be disinfected before they are returned to service. Additionally, steps shall be taken to prevent contaminated materials from entering the water main during storage, construction, or repair.

Any activity associated with this procedure that may disrupt or affect the overall water system in regard to: system pressure, water supplied to customers, contamination of existing lines, or other major events must be cleared through the Water Quality Manager prior to commencing that activity.

BASIC DISINFECTION PROCEDURE

The basic disinfection procedure shall be:

1. Inspect all materials to be used to insure the integrity of the materials.

2. Prevent contaminating materials from entering the water main during storage, construction, or repair and noting potential contamination at the construction site.

3. Remove, by flushing, those materials that may have entered the water main.

4. Chlorinate any residual contamination that remains in the new water main using the “continuous feed” method as described below. Note that “tablet/granule” and “slug” methods are no longer acceptable.

Before the main is chlorinated, it shall be filled to remove air pockets and flushed to remove particles. The flushing velocity in the main shall not be less than 2.5 ft/s.

Water supplied from a temporary backflow-protected connection to the existing distribution system or other approved supply source shall flow at a constant metered rate into the newly installed water main. The point of entry shall not be more than 5 feet from the beginning of the new line.

Liquid Sodium hypochlorite solution conforming to ANSI/AWWA B300 standards shall be fed at or before the entry point in an amount sufficient to produce not less than 25 mg/L of free chlorine residual throughout the new main and its appurtenances. Chlorine application shall not cease until the entire main is filled within the heavily chlorinated water.

The chlorinated water shall be retained in the main for a minimum of 24 hours, during which time all valves and hydrants in the treated section shall be operated to ensure disinfection of the appurtenances. At the end of the 24 hour period, the treated water in all portions of the main shall have a free chlorine residual of not less than 10 mg/L.

FINAL FLUSHING

1. Clear the main of heavily chlorinated water. After a 24-hour retention period, heavily chlorinated water should not remain in prolonged contact with pipe. In order to prevent damage to the pipe lining or to prevent corrosion damage to the pipe itself, the heavily chlorinated water shall be flushed from the main fittings, valves, and branches until chlorine measurements show that the concentration in the water leaving the main is not higher than that generally prevailing in the distribution system or acceptable for domestic use (typically 2 ppm).

2. Dispose of heavily chlorinated water. The environment to which the chlorinated water is to be discharged shall be inspected. If there is any question that the chlorinated discharge will cause damage to the environment, then a neutralizing chemical shall be applied to the water to be wasted to neutralize thoroughly the chlorine residual remaining in the water. Where necessary, Federal, State and local regulatory agencies should be contacted to determine special provisions for the disposal of heavily chlorinated water.

BACTERIOLOGICAL TESTS

1. **Standard conditions.** After final flushing and before the new water main is connected to the distribution system, two consecutive tests of acceptable samples, taken at least 24 hours apart, shall be collected from the new main. At least one set of samples shall be collected from every 1,200 ft of the new water main, plus one set from the end of the line and at least one set from each branch. All samples shall be tested for bacteriological (chemical and physical) quality in accordance with Standard Methods for the Examination of Water and Wastewater; and shall show the absence of coliform organisms. A standard plate count and general physical analysis (odor, turbidity, color) are also required.

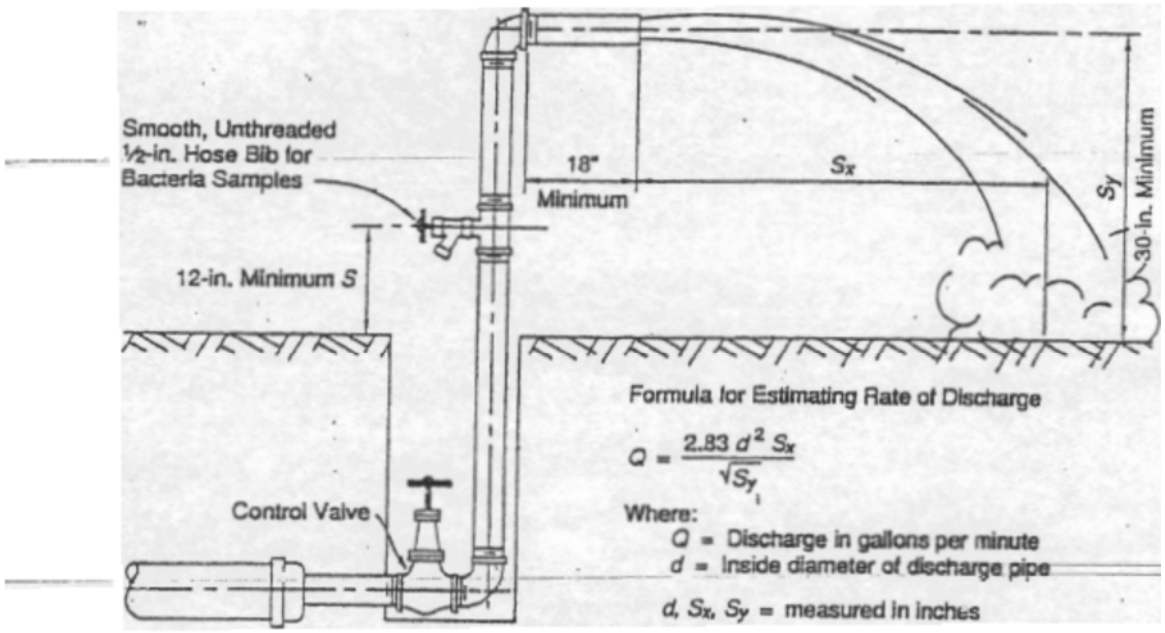
2. **Sampling procedure.** Samples for bacteriological analysis shall be collected by Water Treatment Operators or laboratory personnel in sterile bottles with sodium thiosulfate as required by Standard Methods for the Examination of Water and Wastewater. No hose or fire hydrant shall be used in collection of samples. A combination blow off and sampling tap for mains up to including 8-inch diameter may be used as corporation stop that is installed in the main with a copper-tube gooseneck assembly. After samples have been collected, the gooseneck assembly may be removed and retained for future use. Each sample site must be positioned so that it may be flushed for several minutes (during sampling) without contamination of the hose bib, sample bottles, etc. when samples are being taken.

3. **Notification procedure.** Initial arrangement for scheduling sampling of new/repaired main shall be made with the Water Quality Manager. The Water Quality Manager will arrange sampling dates and time with the Water System Operator in charge of the effected system. The Water System Operator shall notify the Engineering Inspector of the time and particular location that samples are to be taken. The Inspector shall insure that the Contractor in charge of the line has installed adequate sampling stations (see attached drawing) on the days that samples are to be taken.

Once it has been determined that all bacteriological and general physical analysis meet current requirements, the Water Quality Manager shall notify the in-charge Water System Operator of the same. The Operator shall in turn notify the Engineering Inspector in charge of the job. It shall be the Inspector's responsibility to notify the contractor/property owner of the test results.

If the test results do not meet current requirements, the same notification procedure as outlined above shall be followed. Once the contractor/property owner has been notified it shall be his responsibility to perform the following (as determined by the Water Quality Manager): flush the line, re-chlorinate the lines (for a period of 24 hours), flush to an acceptable chlorine residual level, have the line re-sampled.

4. **Analysis Charges.** Unless otherwise stated in the construction contract, the cost of the initial sampling and analysis shall be paid by the contractor/property owner. In the event that follow-up analyses are required due to failed tests, the contractor/property owner will be liable for all costs associated with the follow-up sampling and analysis.



NOTE: This figure applies to pipes up to and including 8-in. (200 mm) diameter.

G2: Well Water Metering Standards and Installation Guidelines

SAN LUIS OBISPO COUNTY
DEPARTMENT OF PUBLIC WORKS
Paavo Ogren, Director

County Government Center, Room 206 • San Luis Obispo, CA 93408 • (805) 781-5252
Fax (805) 781-1229 email address: pwd@co.slo.ca.us

June 17, 2014

PROCEDURAL MEMORANDUM O-10

TO: All Division Heads
All Utilities Division Personnel

FROM: Dean Benedix, Utilities Division Manager

SUBJECT: Well Water Metering Standards and Installation Guidelines

PURPOSE

Provided below are the water meter technical standards and installation guidelines that shall be followed whenever metering of a water well is required by San Luis Obispo County or San Luis Obispo County Flood Control and Water Conservation District. This includes but is not limited to the requirements associated with the following: 1) County of San Luis Obispo Ordinance No. 3246, 2) Nacimiento lakeside water users, 3) County of San Luis Obispo Ordinance No. 2343, 4) all others.

BACKGROUND

County of San Luis Obispo Ordinance No. 3246

Under Ordinance No. 3246, water meters must be installed on all wells on properties with issued Offset Clearances. Ordinance 3246, Section 7.A.2.b states:

> "Within 30 days of installation of a well for which a permit has been issued pursuant to Chapter 8.40 of the County Code, or prior to final building inspection, whichever is applicable, evidence shall be submitted to the Public Works Director that the property owner has installed a meter on the well serving the use to measure all groundwater used from that well. The configuration of the installation shall conform to a drawing prepared by the property owner and shall conform to the technical standards set forth by the Public Works Director."

Nacimiento lakeside water users

Under the current San Luis Obispo County Flood Control and Water Conservation District policy for Nacimiento lakeside users, property owners submitting well permit applications shall enter into an Agreement for the Sale of Nacimiento Water (Agreement). The Agreement states:

> "Water furnished by the facilities provided by BUYER shall be metered in a manner approved by the Director of Public Works at locations mutually agreeable to the two parties. The metering equipment shall be maintained by the BUYER in good working order at all times; and all costs of said equipment, including the installation, operation, maintenance, repair, and replacement thereof, shall be borne by the BUYER."

County of San Luis Obispo Ordinance No. 2343

Under Ordinance No. 2343, the county engineer may require that a well permit applicant participate in a water monitoring program and install a water meter on the well associated with the subject well permit. Ordinance No. 2343 § 3 states:

> "In certain areas of the coastal zone established by the California Coastal Act of 1976, groundwater is limited and extraction must be monitored to satisfy the requirements of the Coastal Act. All water well permit applications within the coastal zone shall be reviewed by the county engineer to determine if participation in a water monitoring program is necessary to assure records are available for use in the resource management system. The manner in which a permit applicant shall participate in the monitoring program, including the frequency and type of reporting shall be determined by the county engineer."

All others

Under any other situations where metering of a private water well is required by San Luis Obispo County or San Luis Obispo County Flood Control and Water Conservation District, these water meter technical standards and installation guidelines shall be followed.

WELL WATER METERING TECHNICAL STANDARDS

The basic standards shall be:

1. The type of metering device shall be in accordance with standards established by the American Water Works Association (AWWA) and approved by the Utilities Division Manager or designee in advance of installation. In addition, "wet dial face" meters are not permitted.

2. The property owner where any well requiring a metering device is located shall be responsible for operation and maintenance of said device, including accuracy of the meter in accordance with AWWA Standards. The County shall not be responsible for operation and maintenance of these devices.

3. Metering devices shall be constructed in accordance with AWWA Standards. The County of San Luis Obispo Public Works Department Utilities Division maintains a list of water meter manufacturers that are satisfactory to the County (Attachment A).

4. Metering device calibration shall be performed in accordance with AWWA Standards and/or manufacturer recommendations and at the request of the Utilities Division Manager or designee.

5. Metering devices shall be installed in accordance with AWWA Standards and/or manufacturer recommendations. The following standards and guidelines are provided to assist with installation:
    a. The metering device shall be situated such that all water produced from the well is measured.
    b. The metering device shall be configured to provide a full flow of water in the pipe at the metering device under all flow conditions.
    c. A minimum of eight diameters of straight pipe upstream and downstream of the centerline of the metering device (i.e. no bends or valves) shall be provided to limit turbulence at the metering device. Exceptions can be made if it can be demonstrated that the metering device is installed according to the manufacturer's recommendations.
    d. The specified flow range of the metering device shall be consistent with the range of flows from the well.
    e. The metering device should be installed in accordance with good practices with sufficient space provided to allow access for inspection and testing as may be deemed necessary.
    f. If solid material (e.g. silt, sand, rust particles, etc.) is present in the discharge from the well, a strainer or filter should be installed in the pipe upstream of the meter to avoid fouling of the metering device.
    g. The metering device and discharge line shall be protected from freezing.
    h. Appropriate fittings should be used to allow easy installation and maintenance of the metering device.
    i. The metering device should be installed by a qualified, experienced professional.
    j. Upon completion of installation, each metering device shall be inspected by County staff.

G3: CDPH Supplemental Separation Guidelines

Memorandum

Date: April 14, 2003 **(Revised Date: October 16, 2003)**

To: Regional and District Engineers

From: David P. Spath, Ph.D., Chief *(Original signed by Dave)*
Drinking Water and Environmental Management
601 North 7th Street, MS 216
Sacramento, CA 95814
(916) 322-2308

Subject: **GUIDANCE MEMO NO. 2003-02: GUIDANCE CRITERIA FOR THE SEPARATION OF WATER MAINS AND NON-POTABLE PIPELINES**

The purpose of this memo is to update guidance dated April 5, 1983 for consistency with proposed 2003 regulations. Should there be any modification to the proposed Water Works Standards that may impact the content of this guidance, the guidance will be amended accordingly.

GUIDANCE: CRITERIA FOR THE SEPARATION OF WATER MAINS AND NON-POTABLE PIPELINES

BACKGROUND

When buried water mains are in close proximity to non-potable pipelines, the water mains are vulnerable to contamination that can pose a risk of waterborne disease outbreaks. For example, sewers (sanitary sewer mains and sewage force mains) frequently leak and saturate the surrounding soil with sewage due to structural failure, improperly constructed joints, and/or subsidence or upheaval of the soil encasing the sewer. If a nearby water main is depressurized and no pressure or negative pressure occurs, that situation is a public health hazard that is compounded if an existing sewer is broken during the installation or repair of the water main. Further, failure of a water main in close proximity to other pipelines may disturb their bedding and cause them to fail. In the event of an earthquake or other disaster, simultaneous failure of all pipelines could occur.

The most effective protection against this type of drinking water contamination is adequate construction and separation of non-potable pipelines and water mains. The Waterworks Standards (Title 22, Chapter 16, Section 64572) provide separation criteria for new construction. However, when these criteria cannot be met, the risk of contamination can be reduced by increasing the structural integrity of pipe materials and joints, and ensuring minimum separation requirements are met. Therefore, the following guidance details construction criteria for the installation of water mains and non-potable pipelines to minimize the risk of contamination of drinking water.

Flex your POWER Do your part to help California save energy. To learn more about saving energy, visit the following web site: www.consumerenergycenter.org/flex/index.html

DEFINITIONS

- COMPRESSION JOINT - A push-on joint that seals by means of the compression of a rubber ring or gasket between the pipe and a bell or coupling.
- CONTINUOUS SLEEVE - A protective tube of high-density-polyethylene (HDPE) pipe with heat fusion joints or other non-potable metallic casing without joints into which a pipe is inserted.
- DISINFECTED TERTIARY RECYCLED WATER - Wastewater that has been filtered and subsequently disinfected in accordance with Section 60301.230, Chapter 3 (Water Recycling Criteria), Title 22, California Code of Regulations.
- HOUSE LATERAL - A sewer line connecting the building drain and the sanitary sewer main serving the street.
- SUPPLY LINE - Pipelines conveying raw water to be treated for drinking purposes in accordance with Section 64572 ©, **proposed** Water Works Standards.
- WATER MAIN – Means any pipeline, except for user service lines, within the distribution system in accordance with Section 64551.70, **proposed** Water Works Standards.
- RATED WORKING WATER PRESSURE - A pipe classification system based on internal working pressure of the fluid in the pipe, type of pipe material, and the thickness of the pipe wall.
- SANITARY SEWER MAIN - A gravity sewer conveying untreated municipal wastewater.
- SEWAGE FORCE MAIN - A pressurized sewer conveying untreated municipal wastewater.

APPLICABILITY

Note that the construction criteria presented in this document apply to house laterals that cross above a water main, but not to those house laterals that cross below a water main.

Water mains or non-potable pipelines that are 24-inches in diameter or larger may pose a higher degree of public health concern because of the large volumes of flow involved. Therefore, installation of water mains or non-potable pipelines 24-inches in diameter or larger should be reviewed and approved in writing by the Department on a case-by-case basis prior to construction.

In no case, should water mains and non-potable pipelines conveying sewage or other liquids be installed in the same trench.

REGULATORY REQUIREMENTS

Any new development project in which all the underground facilities are being constructed for the first time must comply with the following regulatory requirements:

Existing requirements:

Section 64630.(Title 22 CA Code of Regulations) Water Main Installation"

(c) Water mains shall be installed at least:

(1) Ten feet (3 meters) horizontally from and 1 foot (0.3 meters) higher than sanitary sewer mains located parallel to the main.

(2) One foot (0.3 meters) higher than sanitary sewer mains crossing the main.

(3) Ten feet (3 meters), and preferably 25 feet (7.5 meters), horizontally from sewage leach fields, cesspools, seepage pits and septic tanks.

(d) Separation distances specified in (c) shall be measured from the nearest outside edges of the facilities.

(e) Where the requirements of (c) and (d) cannot be met due to topography, inadequate right-of-way easements, or conflicts with other provisions of these regulations, lesser separation is permissible if:

(1) The water main and the sewer are located as far apart as feasible within the conditions listed above.

(2) The water main and the sewer are not installed within the same trench.

(3) The water main is appropriately constructed to prevent contamination of the water in the main by sewer leakage.

(f) Water mains shall be disinfected according to AWWA Standard C601-81 before being placed in service.

(g) Installation of water mains near the following sources of potential contamination shall be subject to written approval by the Department on a case-by-case basis:

(1) Storage ponds or land disposal sites for wastewater or industrial process water containing toxic materials or pathogenic organisms.

(2) Solid waste disposal sites.

(3) Facilities such as storage tanks and pipe mains where malfunction of the facility would subject the water in the main to toxic or pathogenic contamination.

Although the following requirements have not yet been adopted, they should be within the next two years and should be used as guidance for future construction.

Proposed requirements as of the date of this document:

Section 64572. Water Main Separation

(a) New water mains and new supply lines shall not be installed in the same trench as, and shall be at least 10 feet horizontally from, and one foot vertically above, any parallel pipeline conveying:

(1) Untreated sewage,
(2) Primary or secondary treated sewage,
(3) Disinfected secondary-2.2 recycled water (defined in section 60301.220),
(4) Disinfected secondary-23 recycled water (defined in section 60301.225), and
(5) Hazardous fluids such as fuels, industrial wastes, and wastewater sludge.

(b) New water mains and new supply lines shall be installed at least 4 feet horizontally from, and one foot vertically above, any parallel pipeline conveying:

(1) Disinfected tertiary recycled water (defined in section 60301.230), and
(2) Storm drainage.

(c) New supply lines conveying raw water to be treated for drinking purposes shall be installed at least 4 feet horizontally from, and one foot vertically below, any water main.

(d) If crossing a pipeline conveying a fluid listed in subsection (a) or (b), a new water main shall be constructed perpendicular to and at least one foot above that pipeline. No connection joints shall be made in the water main within eight horizontal feet of fluid pipeline.

(e) The vertical separation specified in subsections (a), (b), and (c) is required only when the horizontal distance between a water main and pipeline is ten feet or less.

(f) New water mains shall not be installed within 100 horizontal feet of any sanitary landfill, wastewater disposal pond, or hazardous waste disposal site, or within 25 feet of any cesspool, septic tank, sewage leach field, seepage pit, or groundwater recharge project site.

(g) The minimum separation distances set forth in this section shall be measured from the nearest outside edge of each pipe barrel.

ALTERNATIVE CRITERIA FOR CONSTRUCTION

Water Mains, and Sewers and Other Non-potable Fluid-carrying Pipelines

When new water mains, new sanitary sewer mains, or other non-potable fluid-carrying pipelines are being installed in existing developed areas, local conditions (e.g., available space, limited slope, existing structures) may create a situation in which there is no alternative but to install water mains, sanitary sewer mains, or other non-potable pipelines at a distance less than that required by the regulations [existing Section 64630 (proposed Section 64572)]. In such cases, through permit action, the Department may approve

alternative construction criteria. The alternative approach is allowed under the proposed regulation Section 64551(c):

> "A water system that proposes to use an alternative to the requirements in this chapter shall demonstrate to the Department how it will institute additional mitigation measures to ensure that the proposed alternative would not result in an increased risk to public health."

Appropriate alternative construction criteria for two different cases in which the regulatory criteria for sanitary sewer main and water main separation cannot be met are shown in **Figures 1 and 2**.

- **Case 1** - New sanitary sewer main and a new or existing water main; alternative construction criteria apply to the sanitary sewer main.
- **Case 2** - New water main and an existing sanitary sewer main; alternative construction criteria may apply to either or both the water main and sanitary sewer main.

Case 1: New Sanitary Sewer Main Installation (Figures 1 and 2)

Zone	***Special Construction Required for Sanitary Sewer Main***
A	Sanitary sewer mains parallel to water mains shall not be permitted in this zone without prior written approval from the Department and public water system.
B	If the water main paralleling the sanitary sewer main does not meet the Case 2 Zone B requirements, the sanitary sewer main should be constructed of one of the following:

1. High-density-polyethylene (HDPE) pipe with fusion welded joints (per AWWA C906-99);
2. Spirally-reinforced HDPE pipe with gasketed joints (per ASTM F-894);
3. Extra strength vitrified clay pipe with compression joints;
4. Class 4000, Type II, asbestos-cement pipe with rubber gasket joints;
5. PVC sewer pipe with rubber ring joints (per ASTM D3034) or equivalent;
6. Cast or ductile iron pipe with compression joints; or
7. Reinforced concrete pressure pipe with compression joints (per AWWA C302-95).

C If the water main crossing below the sanitary sewer main does not meet the requirements for Case 2 Zone C, the sanitary sewer main should have no joints within ten feet from either side of the water main (in Zone C) and should be constructed of one of the following:

1. A continuous section of ductile iron pipe with hot dip bituminous coating; or
2. One of the Zone D options 1, 3, 4, or 5 below.

D If the water main crossing above the sanitary sewer main does not meet the Case 2 Zone D requirements, the sanitary sewer main should have no joints within four feet from either side of the water main (in Zone D) and be constructed of one of the following:

1. HDPE pipe with fusion-welded joints (per AWWA C906-99);
2. Ductile iron pipe with hot dip bituminous coating and mechanical joints (gasketed, bolted joints);
3. A continuous section of Class 200 (DR 14 per AWWA C900-97) PVC pipe or equivalent, centered over the pipe being crossed;
4. A continuous section of reinforced concrete pressure pipe (per AWWA C302-95) centered over the pipe being crossed; or
5. Any sanitary sewer main within a continuous sleeve.

Case 2: New water mains Installation (Figures 1 and 2)

Zone Special Construction Required for Water Main

A No water mains parallel to sanitary sewer mains shall be constructed without prior written approval from the Department.

B If the sanitary sewer main paralleling the water main does not meet the Case 1 Zone B requirements, the water main should be constructed of one of the following:

1. HDPE pipe with fusion welded joints (per AWWA C906-99);
2. Ductile iron pipe with hot dip bituminous coating;
3. Dipped and wrapped one-fourth-inch-thick welded steel pipe;
4. Class 200, Type II, asbestos-cement pressure pipe;

5. Class 200 pressure rated PVC water pipe (DR 14 per AWWA C900-97 & C905-97) or equivalent; or

6. Reinforced concrete pressure pipe, steel cylinder type, per AWWA (C300-97 or C302-99 or C303-95).

C If the sanitary sewer main crossing above the water main does not meet the Case 1 Zone C requirements, the water main should have no joints within ten feet from either side of the sanitary sewer main (in Zone C) and be constructed of one of the following:

1. HDPE pipe with fusion-welded joints (per AWWA C906-99);

2. Ductile iron pipe with hot dip bituminous coating;

3. Dipped and wrapped one-fourth-inch-thick welded steel pipe;

4. Class 200 pressure rated PVC water pipe (DR 14 per AWWA C900-97 & C905-97); or

5. Reinforced concrete pressure pipe, steel cylinder type, per AWWA (C300-97 or C301-99 or C303-95).

D If the sanitary sewer main crossing below the water main does not meet the requirements for Case 1 Zone D, the water main should have no joints within eight feet from either side of the sanitary sewer main (in Zone D) and should be constructed as for Zone C.

Water Mains and Pipelines Conveying Non-potable Fluids

When the basic separation criteria cannot be met between water mains and pipelines conveying non-potable fluids, the requirements described above for sanitary sewer mains should apply. This includes the requirements for selecting special construction materials and the separation requirements shown in Figures 1 and 2. Note that not all construction materials allowed for sanitary sewer mains will be appropriate for other non-potable fluid lines. For example, certain plastic lines may not be appropriate for the transport of some fuel products. The selection of compatible materials of construction for non-potable fluids is a decision to be made by the project engineer.

Water Mains and Sewage Force Mains

- Sewage force mains shall not be installed within ten feet (horizontally) of a water main.

- When a sewage force main must cross a water main, the crossing should be as close as practical to the perpendicular. The sewage force main should be at least one foot below the water main.

- When a new sewage force main crosses under an existing water main, and a one-foot vertical separation cannot be provided, all portions of the sewage force main within eight feet (horizontally) of the outside walls of the water main should be enclosed in a continuous sleeve. In these cases, a minimum vertical separation distance of 4 inches should be maintained between the outside edge of the bottom of the water main and the top of the continuous sleeve.

- When a new water main crosses over an existing sewage force main, the water main should be constructed of pipe materials with a minimum rated working pressure of 200 psig or the equivalent.

Water Mains and Tertiary Treated Recycled Water or Storm Drainage

The basic separation criteria for water mains and pipelines conveying tertiary treated recycled water or storm drainage lines are a 4-foot horizontal separation where lines are running parallel and a 1-foot vertical separation (water line above recycled or storm drainage) where the lines cross each other.

When these criteria cannot be met, the Zone A criteria apply where lines are running parallel, and the Zone C and Zone D criteria apply where the lines cross each other as shown on Figures 1 and 2. For these situations, the Zone "P" criteria are in effect and prohibit construction less than 1 foot in parallel installations and less than 4 inches in vertical (crossing) situations.

For tertiary treated recycled water and storm drainage lines, the Zone B criteria (requirements for special pipe) do not apply as the basic separation criteria is a four-foot horizontal separation criteria for parallel lines. The tertiary treated recycled water lines should be constructed in accordance with the color-coding, and labeling requirements per Section 116815, California Health and Safety Code of Regulations.

MISCELLANEOUS GUIDANCE

- More stringent requirements may be necessary if conditions such as high groundwater exist. HDPE or similar pipe may be required to provide flexibility to move without potential joint leaks.

- Sanitary sewer mains should not be installed within 25 feet horizontally of a low head (5 psig or less pressure) water main.

- New water mains and sanitary sewer mains should be pressure tested in accordance with manufacturer's specifications.

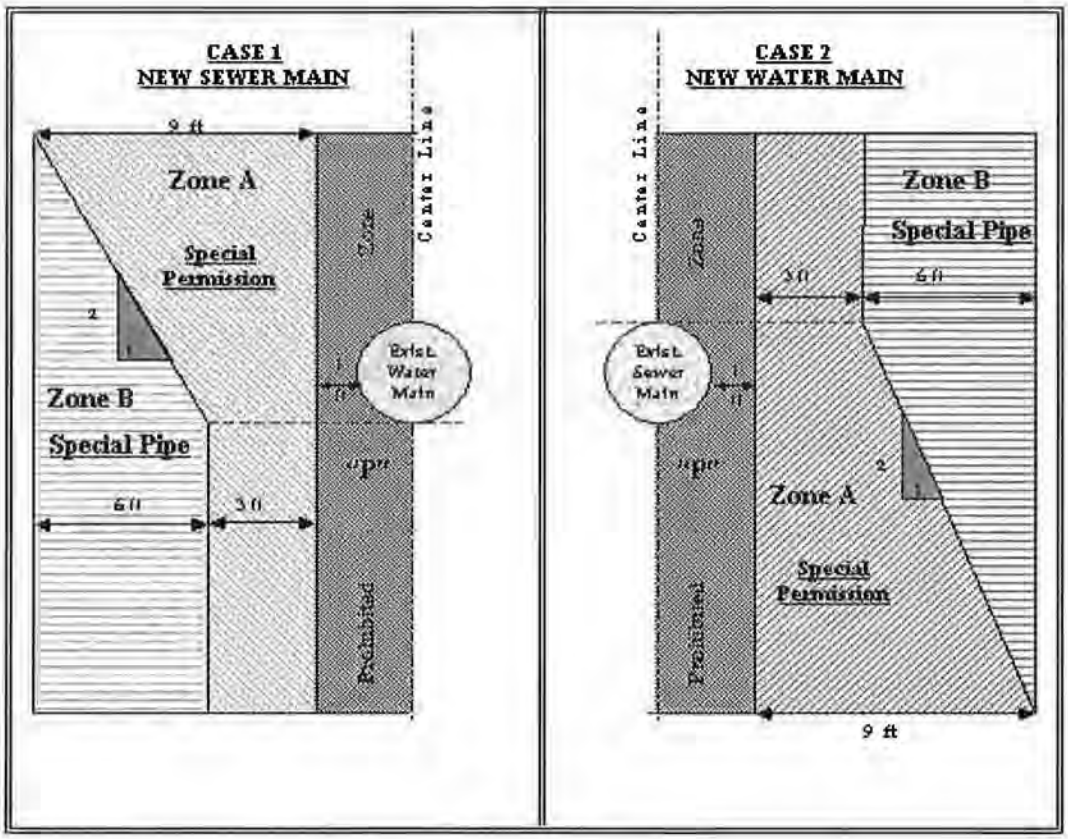
- When installing water mains, sewers, or other pipelines, measures should be taken to prevent or minimize disturbances of existing pipelines. Disturbance of the conduit's supporting base could eventually result in pipeline failure.

- Special consideration should be given to the selection of pipe materials if corrosive conditions are likely to exist. These conditions may be due to soil type and/or the nature of the fluid conveyed in the conduit, such as a septic sewage producing corrosive hydrogen sulfide.

NOTE: Dimensions are from the outside of the water main to the outside of the other pipeline, manhole, or sleeve.

FIGURE 1 PARALLEL CONSTRUCTION

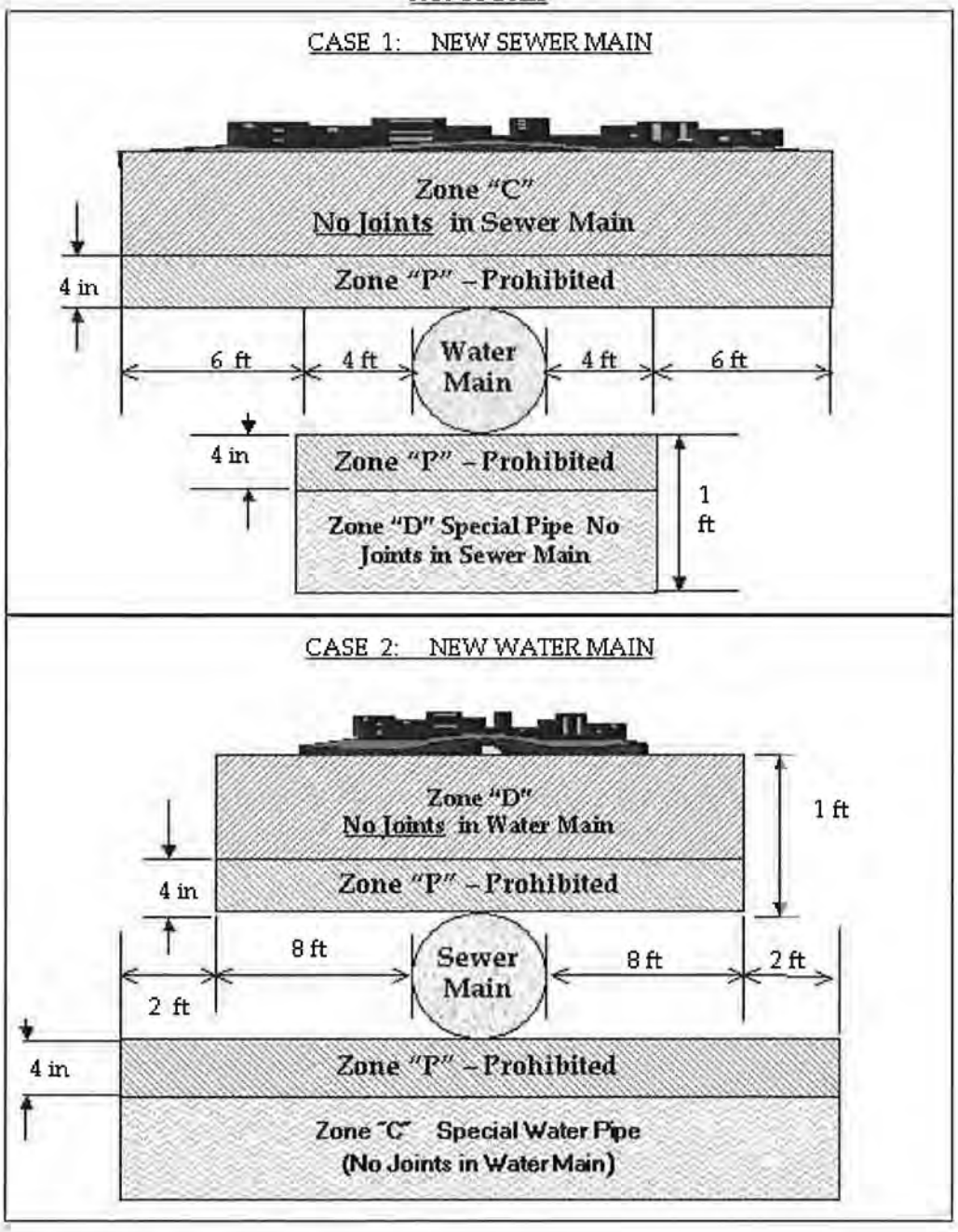
Not To Scale



Note: Zones identical on either side of center lines

Zones "P" is a prohibited zone. Section 64630 (e) (2) California Code of Regulations, Title 22 (Current); or Section 64572 (a) California Code of Regulations, Title 22 (Proposed).

FIGURE 2 CROSSINGS
Not To Scale



APPENDIX H

Selected Board of Supervisor Policies

H1: Resolution 2003-412: A Resolution Adopting a Policy Establishing Clearance Requirements for County Right-of-Way

Note: The following is a non-conforming copy of the resolution but is easier to reproduce and read within this document.

RESOLUTION NO. *{2003-412}*

A RESOLUTION ADOPTING A POLICY ESTABLISHING CLEARANCE REQUIREMENTS FOR COUNTY RIGHT-OF-WAY

The following resolution is now offered and read:

WHEREAS, the County adopted a Trails Plan in 1991, which designates pedestrian and equestrian trail corridors within the County, including some trails which run along the untraveled shoulder of County Road right-of-way; and

WHEREAS, the Trails Plan is the policy document which guides the construction and/or implementation of new trail corridors within the County; and

WHEREAS, although a trails corridor may not be open to public use as a County-maintained trail until all segments of that corridor have been properly improved and specifically accepted by the County as a "trail" under the provisions of the Trails Plan, the County desires to establish a policy prohibiting placement of obstructions along the shoulder of the traveled way of County Roads.

NOW, THEREFORE, BE IT RESOLVED AND ORDERED by the board of supervisors of the County of San Luis Obispo, State of California:

1. The recitals set forth herein above are true and correct.

2. The "Policy Establishing Clearance Requirements for County Right-of-way," as set forth in attached Exhibit A hereto, is hereby approved.

3. The Director of Public Works and Transportation is hereby authorized to implement said policy.

4. Once all segments of a trail corridor have been accepted by the County as a "trail," the Parks Division of the Department of General Services shall be responsible for signifying such acceptance by the posting of the appropriate signs which will mark the location of the trail, subject to the approval of the Director of Public Works and Transportation.

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

AYES:

NOES:

ABSENT:

ABSTAINING:

the foregoing Resolution is hereby adopted.

Chairperson of the Board of Supervisors

ATTEST:

_____
Clerk of the Board of Supervisors

[SEAL]

APPROVED AS TO FORM AND LEGAL EFFECT:

JAMES B. LINDHOLM, JR.
County Counsel

By: _____
Deputy County Counsel

Dated: _____

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Exhibit A

POLICY

A POLICY ESTABLISHING CLEARANCE REQUIREMENTS FOR COUNTY RIGHTS-OF-WAY

Policy. It is the policy of the Board of Supervisors of the County of San Luis Obispo, State of California, as follows:

I. Definitions.

a. County Trails Plan defined. The most recent update of the County Trails Plan, originally adopted by the Board of Supervisors November 26, 1991.

b. Lateral Clearance Area defined. On a paved County Road with concrete sidewalks, a horizontal dimension measured from edge to edge of a concrete sidewalk. On a paved County Road without concrete sidewalks, a horizontal dimension measured outward from the edge of pavement. On an unpaved County Road, a horizontal dimension measured outward from the edge of the traveled way. It is not the intent of this policy to address naturally occurring obstacles found within the right-fo-way.

c. Vertical Clearance Area defined. A vertical dimension measured from the ground surface at any point within the width of the Lateral Clearance.

d. Right-of-Way defined. Property which the County has the right to use for street, road or related purposes pursuant to a dedication, deed, easement, resolution, deed or other legal means, and includes both the traveled and untraveled portions of said property. It is not the intent of this policy to expand any existing rights-of-way or to create any new rights-of-way.

e. Roadway defined. The traveled portion of the right-of-way.

II. Maintenance of Clearance Areas. The clearance areas, as defined in this Policy, shall be maintained free of all encroachments, including but not limited to landscaping or other vegetation, or fences or other obstructions which would restrict the passage of pedestrians and equestrians along the County right-of-way, unless an encroachment permit is issued under the provisions of Chapter 13.08 of the San Luis Obispo County Code. Property owners are allowed to plant ground cover, or cover the area with mulch or other material which will retard soil erosion, provided that said ground cover, mulch or other material can be walked or ridden upon.

III. Clearance Requirements established. Clearance requirements shall be established on all County rights-of-way as follows:

a. Minimum clearance requirements for all rights-of-way. There shall be a lateral clearance a minimum of four (4) feet in width, except where a greater width is required for concrete sidewalks in the Standard Improvement Specifications and Drawings. There shall also be a vertical clearance eight (8) feet in height. These clearance requirements shall apply to both sides of all County roadways. Under this policy, property owners may not place or maintain any obstructions within the clearance areas.

b. Minimum clearance requirements for rights-of-way within the County Trails Plan. There shall be a lateral clearance a minimum of eight (8) feet, and a vertical clearance twelve (12) feet in height. These clearance requirements shall apply to both sides of all such County roadways which are designated trail routes in the County Trails Plan. Under this policy, property owners may not place or maintain any obstructions within the clearance areas.

c. Applicability. In no case shall the requirement for lateral clearance, as defined in subsections (a) and (b) above, extend beyond the limits of the right-of-way of the County Road that has been accepted by the Board of Supervisors on behalf of the public.

d. Feasibility. The Director of Public Works and Transportation shall have the authority to determine whether it is feasible to apply the clearance requirements as defined in this Policy, in cases of severe terrain or other natural obstructions.

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Exhibit B
PROCEDURE

Procedure. Following is the adopted procedure for implementing the Policy Establishing Clearance Requirements for County Rights-of-Way (hereafter, "Clearance Requirements Policy"):

1. Neighbors/community members experiencing obstructions which are in violation of the Clearance Requirements Policy may contact the property owner (where the obstruction is occurring) and request that the owner move or remove the obstruction. The neighbors/community members may offer their assistance.

2. If the property owner is agreeable, no correspondence with the County is necessary. If the owner refuses to move or remove the obstruction, the neighbors/community members contact the Public Works Department – Road Operations Division. A brief letter indicating the nature and location of the problem should be provided by the neighbors/community members.

3. The Public Works Department will review the situation (perform a site visit and determine the right-of-way width in this area). A letter is written to the property owner from the County Public Works Department (citing the safety issue and the Clearance Requirements policy) with a request that the property owner move or remove the obstruction by a certain date. The assistance of the neighbors/ community members may be offered.

4. If the Public Works Department determines there is no concern, a letter is sent to the neighbors/community members indicating the property in question has been reviewed and found not to be in violation of the Clearance Requirements Policy.

5. If the property owner does not remove the obstruction by the date requested, a second letter is sent to the property owner (from the Public Works Department), indicating the obstruction will be removed at the applicant's cost. The date this will occur is specified in the letter. The obstructions are then removed by County staff as designated in the County letter and the property owner is billed for this action. Prior to any obstructions being removed or the applicant billed, the applicant will have the ability to appeal Public Works' decision to the Board of Supervisors. (Reference: Sections 1480 *et seq.* Streets & Highways Code)

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H2: Resolution 2007-344: Establishing Requirements for Financing Maintenance of New Streets and Roads Constructed by Subdivisions

IN THE BOARD OF SUPERVISORS

County of San Luis Obispo, State of California

Tues day September 11, 2007

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

ABSENT: None

RESOLUTION NO. 2007-344 (SUPERSEDES 2007-316)

RESOLUTION ESTABLISHING REQUIREMENTS FOR FINANCING MAINTENANCE OF NEW STREETS AND ROADS CONSTRUCTED BY SUBDIVISIONS

The following Resolution is now offered and read:

WHEREAS, on May 15, 2007, the Board of Supervisors considered a report by the Department of Public Works on existing and proposed policies regarding the County-maintained road system; and

WHEREAS, the County receives a portion of the taxes levied on the sale of gasoline, which is apportioned mainly on the basis of the number of registered vehicles; and

WHEREAS, there is not sufficient funding from gasoline taxes to maintain the road system properly; and

WHEREAS, on June 7, 2005, the Board of Supervisors endorsed the "Guiding Principles of Smart Growth," which are attached hereto and incorporated by reference herein; and

WHEREAS, the application of Smart Growth Principles can be one tool to address the growing concerns about financing the ongoing maintenance of new streets and roads, since by creating subdivisions with higher density, a smaller length of new streets or roads is constructed which will need to be maintained; and

WHEREAS, even with the implementation of Smart Growth Principles, the County will need to secure additional sources of revenue to finance maintenance of streets and roads which are in the County-maintained system; and

WHEREAS, the Board of Supervisors finds that it is in the interest of the County to limit the length of new streets and roads which are accepted into the County-maintained Road System, and to establish new sources of revenue for financing the maintenance of those new streets and roads which are accepted.

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

Acceptance of Streets and Roads

1. The County will accept into the County-maintained Road System, any widening extension or other improvement of existing County-maintained streets or roads.

2. The County will accept into the County-maintained Road System, any new street or road which is depicted as a "Proposed" Principal Arterial, Arterial, or Collector in the Circulation Element of the General Plan.

3. The County will accept into the County-maintained Road System, any new streets or roads in a new subdivision, which satisfy both of the following criteria:

   a. The length of new streets or roads is below the maximum "Road/Lot Ratio." The "Road/Lot Ratio" is defined as the total centerline-feet of new streets or roads constructed by a subdivision, divided by the total number of new lots created by that subdivision. The maximum "Road/Lot Ratio" is established as 100.

   b. The new street or road shall serve at least six (6) residences, or non-residential equivalent as determined by the Department of Public Works based on traffic-generating characteristics.

4. All streets and roads to be accepted into the County-maintained Road System shall be constructed to County Public Improvement Standards, within valid Offers of Dedication to the Public. Acceptance shall be recommended to the Board of Supervisors upon completion of construction and approval of the Department of Public Works.

5. New streets or roads which do not satisfy the criteria in #1, 2 or 3 above shall not be accepted into the County-maintained Road System. Persons constructing such streets or roads shall have the option of forming a Property Owners' Association or other acceptable organized and perpetual mechanism to ensure adequate private maintenance of these new streets or roads. Offers of Dedication, or access easements, shall be recorded which satisfy the requirements of Title 21 of the San Luis Obispo County Code, and which ensure that all parcels relying on the new street or road have necessary access rights. All non-County-maintained streets or roads shall be constructed to County Public Improvement Standards as required by Title 21, recognizing that the adjustment procedure is available for unusual circumstances.

THAT PORTION WHICH WILL BE CONVEYED TO PUBLIC INCLUDE

Establishment of Financing Mechanism

1. The developer of any new public street or road which is to be accepted into the County-maintained Road System shall be required to establish a service charge for road maintenance. Procedures for service charge establishment shall be developed by the Department of Public Works according to the requirements of Article XIII of the California Constitution, which were adopted by State voters in 1996 as "Proposition 218."

2. A land development project may be exempt from establishment of service charges, as follows:

   a. Attached to this Resolution are lists of screening criteria for each of several land use categories. Satisfaction of each of the listed criteria earns the indicated number of points. The total number of points available in each land use category is indicated in Column B of Table 1, below. Projects receiving at least the number of points indicated in Column C are eligible for priority processing.

   b. Those criteria which have the potential to reduce the need for street maintenance, by making it possible for residents of these new developments to meet more of their daily needs by walking or bicycling, rather than by automobile, are indicated by * on the lists. The total number of * points available in each land use category is indicated in Column D of Table 1, below. Projects receiving at least the number of points indicated in Column E shall be exempt from the establishment of service charges described above.

Table 1. Qualifications for Smart Growth Exemption From Maintenance Fee

(A) Land Use Category	(B) Total Points Available	(C) # Points to Qualify for Priority Processing	(D) Total * Points Available	(E) # * Points to Qualify for Maintenance Finance Exemption
Residential Single Family	28	12	14	9
Residential Multi Family	29	15	13	8
Commercial Retail or Office Professional	34	15	19	12

General Provisions

1. The requirements established by this Resolution shall apply to all streets or roads 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.

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

AYES: Supervisors Achadjian, Gibson, Patterson, Chairperson Lenthall

NOES: Supervisor Ovitt

ABSENT: None

ABSTAINING: None

the foregoing Resolution is hereby adopted.

JERRY LENTHALL
Chairperson of the Board of Supervisors

ATTEST:

JULIE L. RODEWALD
Clerk of the Board of Supervisors
By: C.M. CHRISTENSEN Deputy Clerk
[SEAL]

APPROVED AS TO FORM AND LEGAL EFFECT:

JAMES B. LINDHOLM, JR.
County Counsel

By: [signature]
Deputy County Counsel

Dated: August 21, 2007

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STATE OF CALIFORNIA,
County of San Luis Obispo, } ss.

I, JULIE L. RODEWALD, County Clerk and ex-officio Clerk of the Board of Supervisors, in and for the County of San Luis Obispo, State of California, do hereby certify the foregoing to be a full, true and correct copy of an order made by the Board of Supervisors, as the same appears spread upon their minute book.

WITNESS my hand and the seal of said Board of Supervisors, affixed this 18th day of September, 20 07.

F-1

JULIE L. RODEWALD
County Clerk and Ex-Officio Clerk of the Board of Supervisors

(SEAL)

By CMChristensen
Deputy Clerk

CD-325

Exhibit A

SMART GROWTH CRITERIA FOR DEVELOPMENT PROJECTS

SAN LUIS OBISPO COUNTY DEPARTMENT OF PLANNING AND BUILDING
976 OSOS STREET • ROOM 300 • SAN LUIS OBISPO • CALIFORNIA 93408 • (805) 781-5600

Promoting the Wise Use of Land • Helping to Build Great Communities

"Smart growth is the way to grow the economy, preserve the environment and have healthy communities without sacrificing the quality of life for future generations. Smart growth is the planning side of sustainable development." Christine Todd Whitman, Chief Administrator, Environmental Protection Agency, former Governor of New Jersey.

There is a growing call for new tools to help deal with the challenges will be confronting us as a region over the next several decades. We face a serious shortage of affordable workforce housing, our economic strength is threatened, our major roadways are becoming more congested, and our open space and natural resources are threatened by continued sprawl into rural areas. On June 7, 2005 the Board of Supervisors endorsed the "Guiding Principles of Smart Growth". The Board endorsed these principles "with the intent of engaging in implementing actions, programs and projects to succeed in achieving the principles." Since that time, widespread acceptance and implementation of these principles is occurring and the term "Smart Growth" is becoming accepted vernacular for decision-makers as they review projects.

The term "Smart Growth" was coined by the State of Maryland in 1990 to guide governance that respects and coordinates economics, the environment and social equity (the three "E's"), to create sustainable growth. The concept of sustainability has risen from Native American cultures as an important governing principle itself, which is to aim to meet the needs of current generations without compromising future generations' ability to meet their own needs, that is to think long term in decision-making. The United States Environmental Protection Agency endorses and promotes Smart Growth as a way of bringing together traditionally opposing interests to improve community quality of life while at the same time improving the environment and the economy.

Smart Growth principles address current development patterns that are often dominated by what many call "sprawl," or low density, automobile-oriented development. Typical land development policies and ordinances are often at odds with Smart Growth. It is becoming clear that these patterns are no longer in the long-term interest of our communities, cities, suburbs, and agricultural areas. In response, Smart Growth policies draw upon the successful models of the past and present, and plan for growth that will more successfully serve the present and future population.

One action that implements the concept of Smart Growth is a priority processing system for Smart Growth-rated projects. This system is being prepared as a pilot program by county Planning staff. It allows expedited processing of land use, land division and building permits for projects that include features attributed to Smart Growth principles. Attached are draft criteria that projects would be evaluated against to determine if projects possess Smart Growth principles and therefore qualify for priority processing. Projects that qualify for expedited processing will not receive any less scrutiny for compliance with land use or environmental regulations. Examples of Smart Growth principles include developments that contain a variety of smaller and standard lot sizes with large common open areas, internal connectivity, densities that achieve intended zoning standards, smaller home sizes and close proximity to transit routes, shopping and other services.

The projects that qualify for expedited processing are those that give priority for resources and services to compact, life-enriching, healthy neighborhoods and commercial development, compared to low-density development that sprawls all over the rural areas of our county.

Smart Growth Criteria for Priority Processing

In addition to acquiring the required number of points detailed on the following pages, each development must have the following characteristics in order to qualify for priority processing:

- ☐ Within a Urban Reserve Line or Village Reserve Line served by community water and sewer
- ☐ Provides for logical, attractive and safe pedestrian circulation within the site - At minimum, all units have direct access to common open area (where applicable) and commercial areas (where applicable) via pedestrian route where automobile access has minimum impact on the pedestrian experience (ie, not via a driveway)
- ☐ Provides for logical, attractive and safe pedestrian and bicycle connections from the site to adjacent facilities - At minimum, all units connect to nearby parks, open space, public streets, transit stop, and/or commercial area (where applicable) via pedestrian route, automobile access has minimum impact on the pedestrian experience (ie, not via a driveway), and there are pedestrian links between the end of cul-de-sacs and an adjacent cul-de-sac or between a cul-de-sac and larger pathway system.
- ☐ Development protects, preserves, and/or restores important on-site natural features where applicable (i.e. wetlands, riparian corridors, watersheds, steep slopes, oak trees). Development buffers on and off-site natural features. * Must be shown on plans

In order to qualify for priority processing, all projects within the Residential Single Family, Residential Multi-Family, Commercial Retail, or Office/Professional land use categories must incorporate the following essential components of Smart Growth development. Please explain how your project meets each of the following:

- ☐ Buildings are arranged to provide usable and easily accessible private outdoor living spaces. Please explain:
- ☐ Buildings are arranged to provide usable and centrally located common areas. Please explain:
- ☐ Building arrangement also maximizes the use of natural lighting, solar access and to the extent feasible implements sustainable site drainage concepts. Please explain:
- ☐ Buildings exhibit high quality architectural design consistent with local community design plans if applicable and take into account the neighborhood context in terms of building scale, style and site planning. Please explain:
- ☐ Building design reflects local historic building type in the community. Please explain:
- ☐ Treatment of façade breaks down massing, articulates depth, and defines the street edge for pedestrians. Please explain:

Scale and mass of buildings relate to neighborhood. Please explain:

RSF

All projects within the Residential Single Family land use category must incorporate project characteristics in order to achieve at least 12 points.			
Possible Points	*Criteria*	*Points Earned*	
2	Project is within ¼ mile walking distance of any of the following: food/convenience store, retail/services, schools, daycare, recreation centers		*
1	Project is located within ¼ mile walking distance of an existing transit stop or proposes a transit stop		*
3	All lots of 6,000 square feet or larger provide for secondary dwellings		
3	Average lot size is 4,000 square feet or less		*
3	Common area is provided at a minimum of 200 square feet per unit consisting of tables, benches, and shade provided by structures or landscaping		*
2	At least 75% of garages are located at least five feet behind the front of the house		
3	15% of units are very low or low income affordable; or 20% of units are moderate income affordable; or 30% of units are middle income affordable		
1	Setbacks are varied on the street. Each group of three adjacent houses contain at least one house whose front yard setback differs from those of its neighbors by a minimum of 5 feet.		
1	All buildings with street frontage shall face the street with visible entrances.		
1	Creates a continuation of the existing neighborhood. Development provides a series of through street connections within the site that connect to other through streets in the surrounding area.		*
2	Streets continue the existing grid pattern of the neighborhood.		*
1	All new streets are the minimum allowable width		*
1	Solar access considered in the site design (quantify – Templeton, countywide design)		
1	Site design maximizes solar access to all buildings.		
1	Exceeds California Energy Code by at least 20%		
1	All landscaping is irrigated through drip irrigation (except turf).		
1	All pedestrian walkways are landscaped and illuminated with pedestrian scaled elements.		*
TOTAL			

RMF

All projects within the Residential Multi-Family land use category must incorporate project characteristics in order to achieve at least 15 points.			
Possible Points	*Criteria*	*Points Earned*	
	Must provide one of the following:		
3	Density greater than or equal to 20 units/useable acre; or		
3	Density greater than or equal to 90 percent of the maximum density allowed by ordinance; or		*
2	Density greater than or equal to 15 units/ gross acre		
2	Project is within ¼ mile walking distance of any of the following: food/convenience store, retail/services, schools, daycare, recreation centers		*
1	Project is located within ¼ mile walking distance of an existing transit stop or proposes a transit stop		*
2	Provides common facilities such as day care facilities, senior or teen centers, cultural facilities		*
2	Common area is provided at a minimum of 200 square feet per unit consisting of tables, benches, and shade provided by structures or landscaping		*
2	Private open space is provided for each unit at a minimum of 6 feet by 8 feet in size		
3	15 percent of the units are no larger than 900 square feet		
2	10 percent of the units are one bedroom or studio units		
3	15% of units are very low or low income affordable; or 20% of units are moderate income affordable; or 30% of units are middle income affordable		
1	Parking is placed in below grade structures, individual garage structures, or behind buildings.		
1	All buildings with street frontage shall face the street with visible entrances.		
1	Creates a continuation of the existing neighborhood. Development provides a series of through street connections within the site that connect to other through streets in the surrounding area.		*
1	All new streets are the minimum allowable width		*
1	Solar access considered in the site design (quantify – Templeton, countywide design)		
1	Site design maximizes solar access to all buildings.		
1	Exceeds California Energy Code by at least 20%		
1	All landscaping is irrigated through drip irrigation (except turf).		
1	All pedestrian walkways are landscaped and illuminated with pedestrian scaled elements.		*
TOTAL			

CR / OP

All projects within the Commercial Retail or Office/Professional land use categories must incorporate project characteristics in order to achieve at least 15 points.			
Possible Points	*Criteria*	*Points Earned*	
2	Located within a CBD		*
1	Located within 1,000 feet of a CBD		*
2	Project is within ¼ mile walking distance of any of the following: food/convenience store, retail/services, schools, daycare, recreation centers		*
1	Project is located within ¼ mile walking distance of an existing transit stop or proposes a transit stop		*
3	Density is greater than or equal to 10 units per acre		*
1	Density is greater than or equal to 7 units per acre		*
3	15 percent of the units are no larger than 900 square feet		
2	10 percent of the units are one bedroom or studio units		
2	Provides common facilities such as day care facilities, senior or teen centers, cultural facilities		*
2	Common area is provided at a minimum of 200 square feet per unit consisting of tables, benches, and shade provided by structures or landscaping		*
2	Private open space is provided for each unit at a minimum of 6 feet by 8 feet in size		
2	10% are live / work units		*
3	15% of units are very low or low income affordable; or 20% of units are moderate income affordable; or 30% of units are middle income affordable		
1	Parking is placed in below grade structures, individual garage structures, or behind buildings.		
1	All buildings with street frontage shall face the street with visible entrances.		
1	Creates a continuation of the existing neighborhood. Development provides a series of through street connections within the site that connect to other through streets in the surrounding area.		*
1	All new streets are the minimum allowable width		*
1	Site design maximizes solar access to all buildings.		
1	Exceeds California Energy Code by at least 20%		
1	All landscaping is irrigated through drip irrigation (except turf).		
1	All pedestrian walkways are landscaped and illuminated with pedestrian scaled elements.		*
TOTAL			

H3: Resolution 2008-152: Revising Policies Regarding Land Development Improvements on County Maintained Streets and Roads

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	½ 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 general public trip generation
Farm support quarters	Assume no general public trip generation
Agricultural processing	Assume no general public 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 entitled 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 remaining of record in my office.

Witness, my hand and seal of said Board of Supervisors this May 15, 2008

JULIE L. RODEWALD
County Clerk and Ex-Officio Clerk of the Board of Supervisors

By Sandy Currens Deputy Clerk

APPENDIX I

Selected CalFire Standard on Developing Private Roads

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CAL FIRE
San Luis Obispo
County Fire Department

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Phone: 805-543-4244 • Fax: 805-543-4248
www.calfireslo.org

Robert Lewin, Fire Chief

• STANDARD 1 •
WATER SUPPLY

SCOPE:

To identify minimum water supply requirements for fire fighting purposes relative to commercial, industrial or residential development. This Standard provides requirements for water from fire hydrants for the purpose of fire suppression activities.

GENERAL REQUIREMENTS:

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

AMOUNT OF WATER STORAGE REQUIRED:

This information is derived from the current adopted California Fire Code, Local Ordinances and NFPA.
If your project requires Fire Sprinklers please contact a Fire Protection Engineer (FPE) or C-16 contractor.

Flammable vegetation Defensible Space requirements

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, Pubic resources code 4291 and Title 19 Div 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.

RESIDENTIAL

- One- and Two-Family Dwellings:

Private Water System

- ✓ A C-16 contractor will design sprinkler system, and determine required dedicated fire water storage amount for structure of design.
- ✓ CAL FIRE will determine minimum dedicated fire water storage amount for structure(s) and site (Minimum 2500 gallons per NFPA 1142). See CAL FIRE Exhibit 2 & 3 for schematics
- ✓ Most projects will require a minimum 5,000 water storage tank. The 2500 gallon minimum dedicated fire water reserve combined with average domestic water usage dictates a standard tank size of 5,000 gallons.

- ✓ CAL FIRE does not require the installation of a dedicated fire water tank, only the required dedicated water storage amount.

Exception(s):

- ✓ *Large shops, multi-level residential and/or large atrium or vaulted ceiling designs may require the review of a fire protection engineer.*
- ✓ *Large and/or multiple structures with less than 50 feet separation may require additional dedicated fire water storage.*

Community Water System

- ✓ One and two family dwellings on a community water system shall meet the California Fire Code Appendix B fire-flow requirements, and Appendix C hydrant locations and distribution. A signed will serve letter from the water purveyor must be submitted with your fire safety plan, and received prior to final of the project.

1. Building construction type and square footage will determine fire flow requirements. The minimum allowable fire flow will be 1000 GPM for 2 hours if structure is less than 3600 square feet. For determining fire flow requirements on any structure over 3600 square feet refer to Appendix B table B105.1

Exceptions:

2. *Los Osos CSD: a reduction to 750 gpm is permitted in areas served by the water purveyors.*

Remodel/Alterations:

For the purpose of calculating square footage for the application of fire sprinkler requirements and fire flow requirements, the floor area shall include all combustible areas attached to the structure, including garages, patio covers, overhangs, covered walkways and alterations, additions and remodel square footage will be considered a combined and cumulative sum of floor area.

COMMERCIAL

A Fire Protection Engineer is required to design and review fire protection systems in new commercial development. For complex facilities a master fire protection plans is also required. The FPE will determine water storage capacity.

- ✓ The minimum fire-flow and flow duration for buildings other than one- and two-family dwellings shall be as specified in CFC Appendix B Table BB105.1. Buildings over 100,000 square feet will require secondary power supply for the fire protection system pumps.

Exceptions:

1. *A reduction in fire-flow of up to 75 percent, as approved by the chief, is allowed when the building is provided with an approved automatic sprinkler system. The resulting fire-flow shall not be less than 1500 gallons per minute.*
2. *In rural areas where there are no water purveyors and the building is protected by an approved automatic sprinkler system, the provisions in NFPA 13 for combined inside and outside hose lines may be utilized to determine fire-flow and duration. The water storage total quantity will be a combination of the sprinkler demand and the fire flow requirements. The location, connections and other appurtenances of tanks shall be approved by the fire department.*

Please note:

- When using this option, the resulting fire flow (hose demand) shall double for every 10,000 square feet of building area or portion thereof. The fire sprinkler demand only needs to be provided once per building. Use of this option is limited

to up to 2 buildings on the same property and ownership.

- Buildings classified as Group U, agricultural buildings used as barns, storage structures, stables, poultry buildings and other similar uses with a total fire area of 3,000 square feet or less are not required to provide fire-flow.
- Buildings classified as Group U, agricultural buildings used as greenhouses, horticultural structures, nurseries and similar uses may use NFPA 1142 provisions for water storage regardless of number of buildings of this type.
- Buildings with a total floor area of 500 square feet or less are not required to provide fire-flow.
- Domestic water demands shall be in addition to required fire water storage.

SUBDIVISIONS

✓ Subdivisions will require community water systems that comply with Appendix C of the California Fire Code. For additional information relative to this requirement contact the San Luis Obispo County Planning and Building Department.

SCHOOLS

- Public Schools:

  ✓ The State Fire Marshal (SFM) requires the Division of State Architect (DSA) to request water and access requirements and approval from the local jurisdiction. The minimum fire-flow and duration for public school buildings shall be as specified in Table BB105.1 of the CFC.

  Note: A reduction in fire-flow of up to 75 percent, as approved by the chief, is allowed when the building is provided with an approved automatic sprinkler system. CAL FIRE will consult with the approving Fire Protection Engineer prior to permitting reduced fire-flow.

- Private Schools:

  ✓ Private schools shall comply with all the requirements for an educational building. Local requirements are applicable to private schools.

MULTIPLE TANKS

Daisy chaining of tanks is prohibited.

Exception: When topographical or soil conditions prohibit large tanks (technical report required) and/or Planning and Building Department land use conditions require reduced visual impact reduction (Coastal Zone screening) and where approved by the fire chief multiple tanks may be installed. Multiple tanks systems must: all valves must be chained and locked open, each tank must be installed with monitored tamper resistance, all tanks must feed into one common manifold serving the fire protection systems and on site hydrants or other appurtenances.

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.

DEFINITIONS:

CBC: California Building Code 2010, California Code of Regulations Title 24, Part 2

FLOOR AREA, GROSS: For the purpose of calculating square footage for the application of fire sprinkler requirements and for fire flow requirements, the floor area shall include all combustible areas attached to the structure, including garages, patio covers, overhangs, covered walkways, etc.

FIRE FLOW: The flow rate of a water supply, measured at 20 pounds per square inch (PSI) (137.9kPa) residual pressure that is available for firefighting. When water supply tanks are approved for use, the flow rate of a water supply may be at draft.

LOCAL ORDINANCE: Amendments to the CFC adopted by the County of San Luis Obispo, Avila Beach CSD, City of Pismo Beach and Los Osos CSD.

NFPA 13: National Fire Protection Association 2011, Standard for the Installation of Sprinkler Systems.

OCCUPANCY TYPE: The purpose for which a building or part thereof is used or intended to be used, as determined by Chapter 3, CBC.

SINGLE FAMILY DWELLING (SFD): One and two family dwellings, including attached or detached private garages.

TYPE OF CONSTRUCTION: Determined from Chapter 6 of the CBC.

CFC: California Fire Code 2013, California Code of Regulations, Title 24, Part 2

CRC: California Residential Code 2013, California Code of Regulations, Title 24, Part 2.5

WATER PURVEYOR: A public utility, a mutual water company, a governmental body, or other entity, owning and operating a water system and holding a valid permit from the State or County Health Department to purvey water.

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Robert Lewin, Fire Chief

• STANDARD 2 •
ADDRESSING

SCOPE:
To provide consistent identification of all buildings throughout the County so they can be located during an emergency. Reference: 2013 California Fire Code, Section 505 & SLO County Title 20.

General:
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 and may be required in additional locations to facilitate emergency response.

Address numbers shall be Arabic numerals or alphabet letters, contrast with their background, and be a minimum width of 0.5 inch and (12.7mm) and Height per occupancy type as follows:

- Residential 6 inches,
- Commercial 8 inches
- Industrial 10 inches high with a minimum stroke

- Address numbers & street names are assigned by the County of San Luis Obispo Planning Department. You may contact them at (805) 781-5157 for an application for new address or more information.
- Addresses shall be assigned to the road from which the primary driveway originates.
- Address numbers at the driveway entrance shall be clearly visible from both directions, preferably using reflectorized numbers.
- Where multiple addresses are required at a single driveway, such addresses shall be mounted on a single approved post.
- When a building is not visible from the roadway or when required by the fire chief, additional numbers or addresses shall be provided on an elevated post or monument adjacent to roads or driveway leading to buildings.
- Approved street or road signs and address numbers shall be installed prior to occupancy of any new building, and prior to construction when required by the fire chief.
- For complexes with multiple buildings, the fire chief may require directories, premises maps and directional signs at approved locations. The site plan submitted to the fire department for approval shall also include the location and details of directories, maps, signs, building and unit numbers and any other information deemed necessary by the Fire Department. (See Directory Requirements on page 2 for more information).

Requirements:

- One and Two Family Dwellings and Mobile Homes: Address numbers shall be a minimum of six (6) inches in height, one-half inch (1/2") stroke. Where buildings are set back from the street, larger numbers shall be required. Each dwelling unit requires a separate address that is assigned by the SLO County Planning Department. Identifying units with A, B, C, 1, 2, 3, etc… is not allowed. Please contact the Planning Department at (805) 781-5157 to obtain the correct address numbers for your home.
- Commercial Buildings: Address numbers shall be a minimum of eight (8) inches in height, and on-half inch (1/2") stroke. Where buildings are set back from the street, larger numbers shall be required.
- Industrial Buildings: Address numbers shall be a minimum of ten (10) inches in height, and on-half inch (1/2") stroke. Where buildings are set back from the street, larger numbers shall be required.
- All numbers shall be of a contrasting color to the background. Reflectorized or lighted numbers are highly recommended, especially at the driveway entrance.
- Address numbers shall be of a contrasting color to the background. Reflectorized or lighted numbers are highly recommended.
- Address numbers shall be visible at all times. Trim tress, bushes and shrubs if foliage obstructs visibility.
- Suite numbers shall be located above or adjacent to the entrance door. Multi-unit buildings with rear doors shall also provide suite numbers above or adjacent to each rear door. Numbers shall be a minimum of six (6) inches in height, of contrasting color to the background, and readily visible.
- Apartments, Towns Houses and Condominiums: Building address numbers shall be a minimum of eight (8) inches in height, of contrasting color to the background, and readily visible. Each individual unit number shall be above or adjacent to the entrance door. Numbers shall be a minimum of six (6) inches in height, of contrasting color to the background and readily visible.

Directory Requirements:

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.

- Must be provided at every entrance into the complex.
- Must be set back two (2) feet from the curb, facing the driveway.
- A directory shall be a minimum of 3 feet X 2 feet.
- Individual unit numbers shall be a minimum of ½" in height.
- Building numbers shall be a minimum of ½ inch in height.
- Lettering shall be a minimum of ½" in height.
- Must be illuminated, either internally or externally.
- Subject to Fire Department approval prior to directory printing and installation.

Street Signs:

- Street signs shall meet the SLO County Public Improvement standards road sign specification M-4, available from the County Engineering Department at (805) 781-5252 or online: http://www.slocounty.ca.gov/Assets/PW/DevServ/general/2008+Standards.pdf
- I f the road is maintained by the County, the sign will also be maintained by the County.
- If the road is maintained by another agency (road maintenance agreement, Homeowner' Association, district, etc), the signs shall be maintained by that entity.
- If the road is not maintained by either the County or another agency, the road signs shall be maintained by the party or parties who requested the road name or the construction permit.
- All signs <u>not</u> maintained by the County shall have reflective green lettering on a reflective white background and can be purchased from any sign vendor.

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• STANDARD 3 •
ROOF ACCESS

DEFINITIONS:

- **High-Piled Combustible Storage:** is storage of combustible materials in closely packed piles or combustible material on pallets, in racks or on shelves where the top storage is greater than 12 feet in height.

- **Standpipe System:** is a wet or dry system of piping, valves, outlets and related equipment designed to provide water at specified pressures and installed exclusively for the fighting of fires. They are classified into three classes.

REQUIREMENTS:

- **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) 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) or floor area and greater than 18 feet (5.49 m) in height shall have a dry or wet standpipe system with a 2 ½ inch (64 mm) outlet at the roof near the roof access. Location of the outlet and the fire department connectin to the standpipe shall be labeled and approved by the fire code official.

March 2014

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• STANDARD 4 •
ACCESS ROADS AND DRIVEWAYS

SCOPE:

Fire Apparatus Access Roads shall be provided and maintained according to California Fire Code section 503. Access to residential and commercial parcels shall provide for safe access for emergency equipment and civilian evacuation concurrently during fire and rescue operations. Additionally, roads shall provide occupants and emergency vehicles unobstructed traffic circulation. (CFC 503, LUO, PRC 4290/4291)

DEFINITIONS:

- **PRIVATE ACCESS ROAD(S):** Must be constructed to CAL FIRE/San Luis Obispo County Fire and San Luis Obispo County Department of Public Works Standards when serving more than one parcel; when providing access to any industrial or commercial occupancy, or vehicular access to a single parcel with more than two buildings or four or more dwelling units. (PRC 4290/4291)

- **CFC:** California Fire Code current edition

- **PRC:** Public Resources Code

- **LUO**: Land Use Ordinance of San Luis Obispo County

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/ImprovmentPlans/2011+SLOCo+PW+Stds+Final.pdf

COMMERCIAL AND RESIDENTIAL ROAD GRADES
The grade for all roads, streets, private lands and driveways shall not exceed 16 percent unless approved by fire code official. 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 2013 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.

RESIDENTIAL ACCESS ROADS – (serving more than one legal parcel)

- The road must be named and properly signed according to San Luis Obispo County Planning and Building.
- 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. (2) 10- foot driving lanes and (2) - 2 foot shoulders.
- Parking is only allowed where an additional 8 feet of width is added to each side of the road that will require parking.
- "No Parking - Fire Lane" signs may be required.

SECONDARY DWELLING:

Access road and driveway requirements for an additional dwelling allowed by section 22.10.130 of the LUO must be reviewed by the San Luis Obispo County Planning and Building Department.

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.

ONE-WAY ROADS:

- When allowed, one-way roads serving residential use only shall be constructed to provide a minimum of one 10-foot traffic lane.
- All one-way roads shall connect to a two-lane roadway at both ends, and shall provide access to an area currently zoned for no more than 10 dwelling units. In no case shall it exceed 2,640 feet in length.
- A turnout shall be placed and constructed at approximately the midpoint of each one-way road.

BRIDGES:

Commercial, subdivision and bridges on access roads must meet the standards outlined by Caltrans for bridge designs on public roads. Additional design criteria and information may be obtained from San Luis Obispo County Public Works. San Luis Obispo County Public Works defers to Cal Trans standards.

Caltrans link is:

http://www.dot.ca.gov/hq/esc/techpubs/manual/bridgemanuals/bridge-design-specifications/bds.html

Private bridges must meet the following requirements:

Be designed by a Registered Civil Engineer.
Engineer must provide written design load and specifications to CAL FIRE/County Fire.
Bridge weight limit and vertical clearance signs posted at each entrance.
Provide a minimum of 20 ton capacity.
Provide vehicle & pedestrian guard rails on each side.
Provide turnouts on either side of bridge entry.
One lane bridges must be approved by the fire department.

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Robert Lewin, Fire Chief

• STANDARD 5 •
TENTS MEMBRANES AND CANOPIES

SCOPE:

This standard shall apply to individual tents, temporary structures or membrane structures exceeding 200 square feet and/or canopies exceeding 400 square feet in size used as booths for carnivals, street fairs and flea markets.

Permits, approvals and inspections shall be in accordance with the California Code of Regulations-Title 19 (Chapter 2), 2013 California Fire Code (Section 906 & Chapter 31), 2013 California Building Code (Chapter 31), California Health & Safety Code (Division 104, Part 7, and Chapter 4), CAL FIRE/San Luis Obispo County Fire Department, and the San Luis Obispo County Health Department.

BOOTHS:

- Sidewalls, drops, and tops of all such structures shall be made of a flame-resistant material or treated with a flame retardant approved by the California State Fire Marshal.
- The California State Fire Marshal's seal shall be permanently affixed to the structure or a label showing the name, type and applicant of flame retardant materials.
- A 10-foot wide separation shall be provided for every 200 lineal feet of vendor booths.
- A fire access of 20 feet between rows of booths shall be maintained at all times.
- Sale or display items shall not be allowed within the fire access.
- Booths shall be used for not more than 180 days in a 12 month period.
- Booths or rows of booths shall be located more than 20 feet from property lines, buildings, parking areas or internal combustible engines.
- Booths shall have at least one exit.
- All structures shall be adequately braced and anchored to prevent collapse.

PORTABLE FIRE EXTINGUISHERS:

- Portable fire extinguishers shall be installed throughout the premises, (display areas), so as to not exceed 75 feet of travel.
- Portable fire extinguishers shall be a minimum rating of 2A:10B:C.
- Booths with cooking facilities inside or adjacent to them shall have a fire extinguisher rating of a minimum 3A:40B:C.
- Permanent businesses shall have a portable fire extinguisher with a minimum rating of 2A: 10B:C.

IGNITION SOURCES:

- Smoking, fireworks, open flame or hot objects capable of ignited combustible materials shall not be allowed inside the booths.
- 'No Smoking' signs shall be posted.
- Cooking and BBQs shall be a minimum of 10 feet from any booth and shall be protected from access by the public.

ELECTRICAL & GENERATORS:

- Extension cords shall be of a grounded type and listed for exterior use.
- Extension cords shall be unplugged after each daily use.
- Extension cords shall not be used in lieu of hardwiring.
- Generators shall be a minimum of 20 feet from all structures and protected from public access.

COMPRESSED GAS TANKS:

- LPG and other compressed gas tanks shall be secured in an upright position.
- All tanks shall be protected from public access.
- Empty tanks shall be removed on a daily basis.

COOKING AREA LAYOUT:

- A minimum of 2-foot side clear space shall be provided between the cooking space area and the back of the tent.
- A minimum of 18-inch wide clear space shall be provided between the cooking space and the side and rear of the cooking area.
- Cooking & barbecues shall be a minimum of 10 feet from any booth and shall be protected from access by the public.

USE OF LIQUID PETROLEUM GAS:

- Vendors may use Liquefied Petroleum Gas (LPG) in booths as defined above, when the booth is separated from other booths, tents & canopies by at least twenty feet and approved by the SLO County Health Department.
- LPG cylinders shall be located outside tents and canopies.
- Vendors using LPG or liquid fueled appliances in a tent or canopy will not be allowed to participate in the event. Wood booths would be required.

BARBECUES:

- Trailer barbecues shall not be located within 10 feet of combustible walls, roofs, or other combustible material.
- Charcoal and LPG gas barbecues may be located in the cooking space, but in other use locations shall not be located within 10 feet of combustible walls, roofs or other combustible material.
- Small barbecues and hibachis may be placed on tables in the cooking space if a thermal barrier is provided between the barbecue and table. This may be a concrete block underneath the barbecue, as long as the entire area of the barbecue is provided with protection underneath.

SPECIAL APPLIANCES:

- Warming appliances/steaming trays, both electric and solid fuel types, shall be located inside tents. They will be monitored by the event organizers, the County Health Department and the Cal Fire/SLO County Fire Department. The intent is that food preparation will occur within the tent.
- Deep-fat fryers and other unique appliances for the cooking and holding of food until served will be reviewed by Cal Fire/SLO County Fire Department and are only approved on a case-by-case basis. If approved, a Class K portable fire extinguisher shall be located within 30 feet of the fryer.
- If the appliances used would require food preparation to occur outside, the Fire Marshal may evaluate the heat potential of the appliance and approve its' use within the tent.

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County Fire Department

635 N. Santa Rosa • San Luis Obispo, CA 93405
Phone: 805-543-4244 • Fax: 805-543-4248
www.calfireslo.org

Robert Lewin, Fire Chief

EXHIBIT 5A
GATE REQUIREMENTS

Effective January 1, 2014 all gates for residential and commercial use shall meet Section 503.6 of the 2013 California Fire Code requirements for access:

- All gates shall be set back from the road a minimum of 30 feet from the edge of roadway, and shall open to allow a vehicle to stop without obstructing traffic on the public road. Local ordinance, certain conditions or County Public Works may require a greater setback.
- All gates shall be 2 feet wider on each side of the road/driveway.
- All electric gates shall automatically open with no special knowledge upon exiting.
- All electric gates shall have a KNOX switch for emergency fire department access.
- All electric gates shall have an approved means of emergency operation at all times, either through the use of solar power, battery back-up or fail to the open position upon a power outage.
- Security gates and their emergency operation shall be maintained operational at all times.
- Gates designed for automatic operation shall be designed, constructed and installed to comply with the requirements of ASTM F 2200.
- Residential non-electric gates may be secured by a padlock.
- Commercial non-electric gates shall be secured by a KNOX padlock.

The use of a red "Fire Dept Access" box is no longer allowed for either residential or commercial use. CAL FIRE no longer maintains a list of gate codes due to security concerns and the extreme difficulty in maintaining current data. Your request for a Knox switch or padlock must include the address of the location where the product(s) will be installed. Once the order form has been completed, please send it, along with payment directly to the Knox Company.

The KNOX Company will not process CAL FIRE orders without an official KNOX Corporation order form, including an authorized original signature from approved CAL FIRE staff. A signed KNOX form will be sent to you via the U.S. Postal Service and will not be faxed due to security requirements. CAL FIRE orders placed on-line through the Knox website will not be processed.

Once you have received your KNOX gate switch/padlock and it has been installed, please contact the Fire Prevention Office at (805) 543-4244 extension #3490 to schedule an appointment for CAL FIRE staff to test the switch/padlock and ensure that it has been installed correctly.

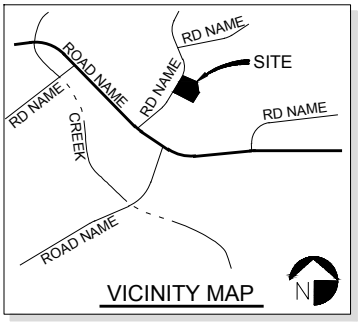
APPROVED KNOX SWITCH

NEVER APPROVED

NO LONGER APPROVED

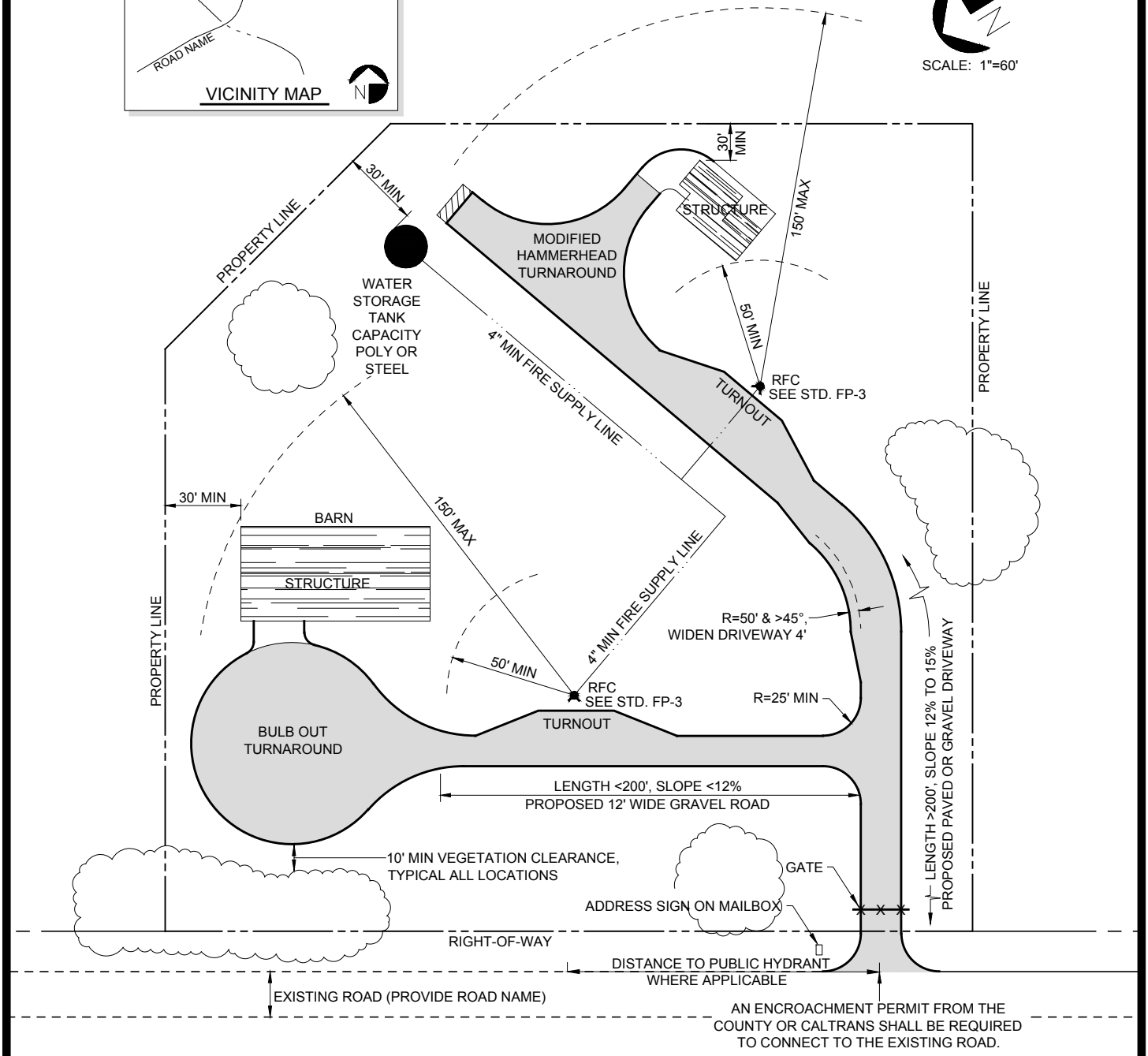
Revisions

Description	Approved	Date	Description	Approved	Date



PROJECT INFORMATION REQUIRED ON SITE PLAN:
PROJECT NAME: _____
PROJECT ADDRESS/CITY: _____
APPLICANT'S NAME: _____
APPLICANT'S PHONE: (___) _____
PERMIT No: _____

SCALE: 1"=60'



SAN LUIS OBISPO COUNTY FIRE DEPARTMENT

RESIDENTIAL

SAMPLE SITE PLAN FOR FIRE SAFETY APPLICATION

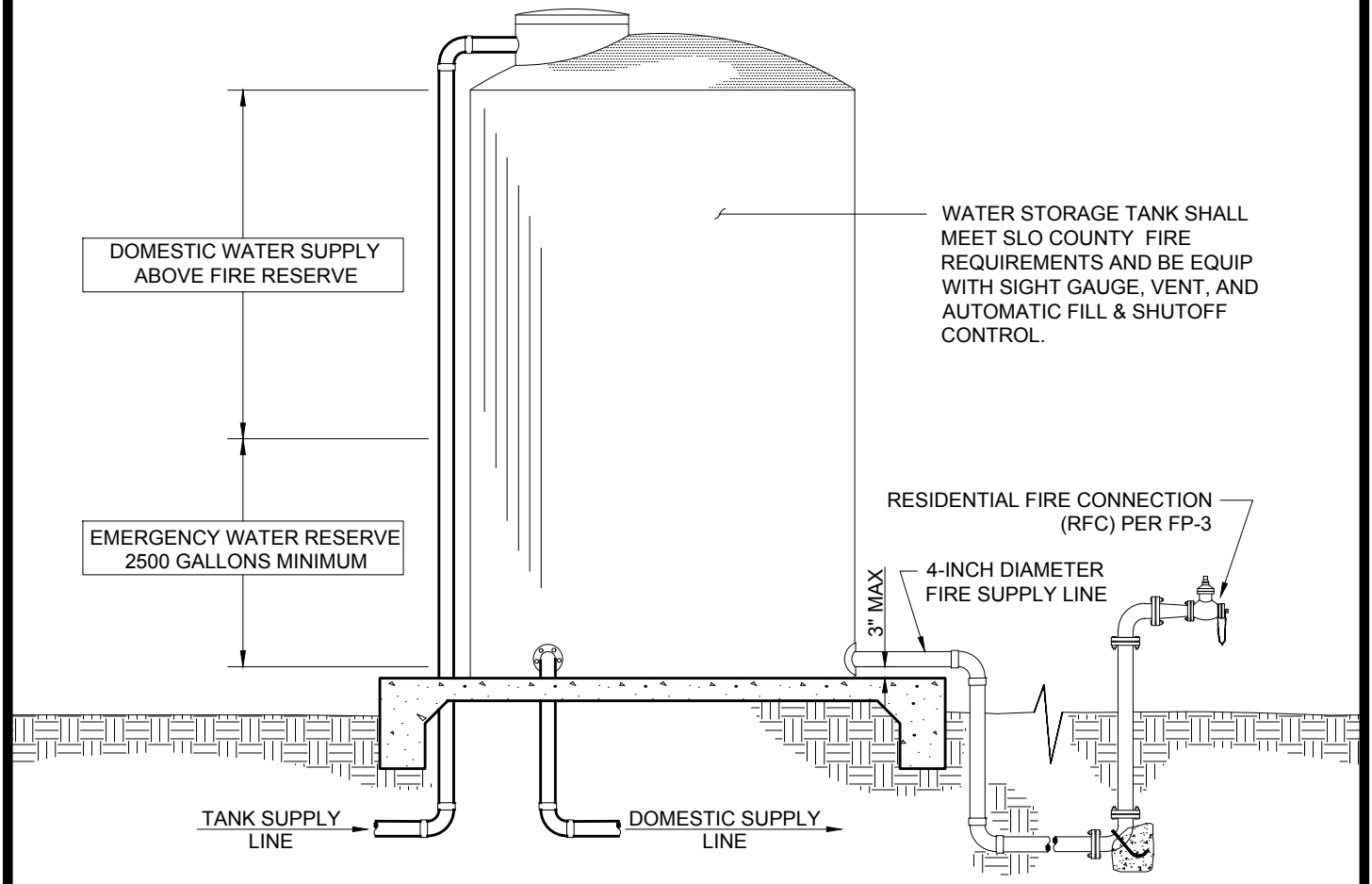
Scale:	Adopted:
NTS	AUG 2014

Fire Safe Drawing No: **FP-1**

Sheet No: OF

Revisions					
Description	Approved	Date	Description	Approved	Date

NOTES:
1. REFER TO WATER STORAGE REQUIREMENTS FOR TOTAL REQUIRED TANK CAPACITY.
2. WHEN MULTIPLE WATER STORAGE TANKS ARE USED THE CONNECTION BETWEEN THE TANKS SHALL BE BY AN APPROVED 4-INCH MINIMUM DIAMETER WATER LINE.
3. POLY TANKS ALLOWABLE IN MODERATE FIRE HAZARD SEVERITY ZONES ONLY. STEEL TANKS REQUIRED IN HIGH AND VERY HIGH FIRE HAZARD SEVERITY ZONES.
4. MOST SINGLE FAMILY HOMES REQUIRE 5,000 GAL TANK MINIMUM SHARED FIRE AND DOMESTIC STORAGE.
5. TANKS OVER 5,000 GAL AND ALL COMMERCIAL WATER STORAGE TANKS SHALL REQUIRE ADDITIONAL DESIGN.



SAN LUIS OBISPO COUNTY FIRE DEPARTMENT

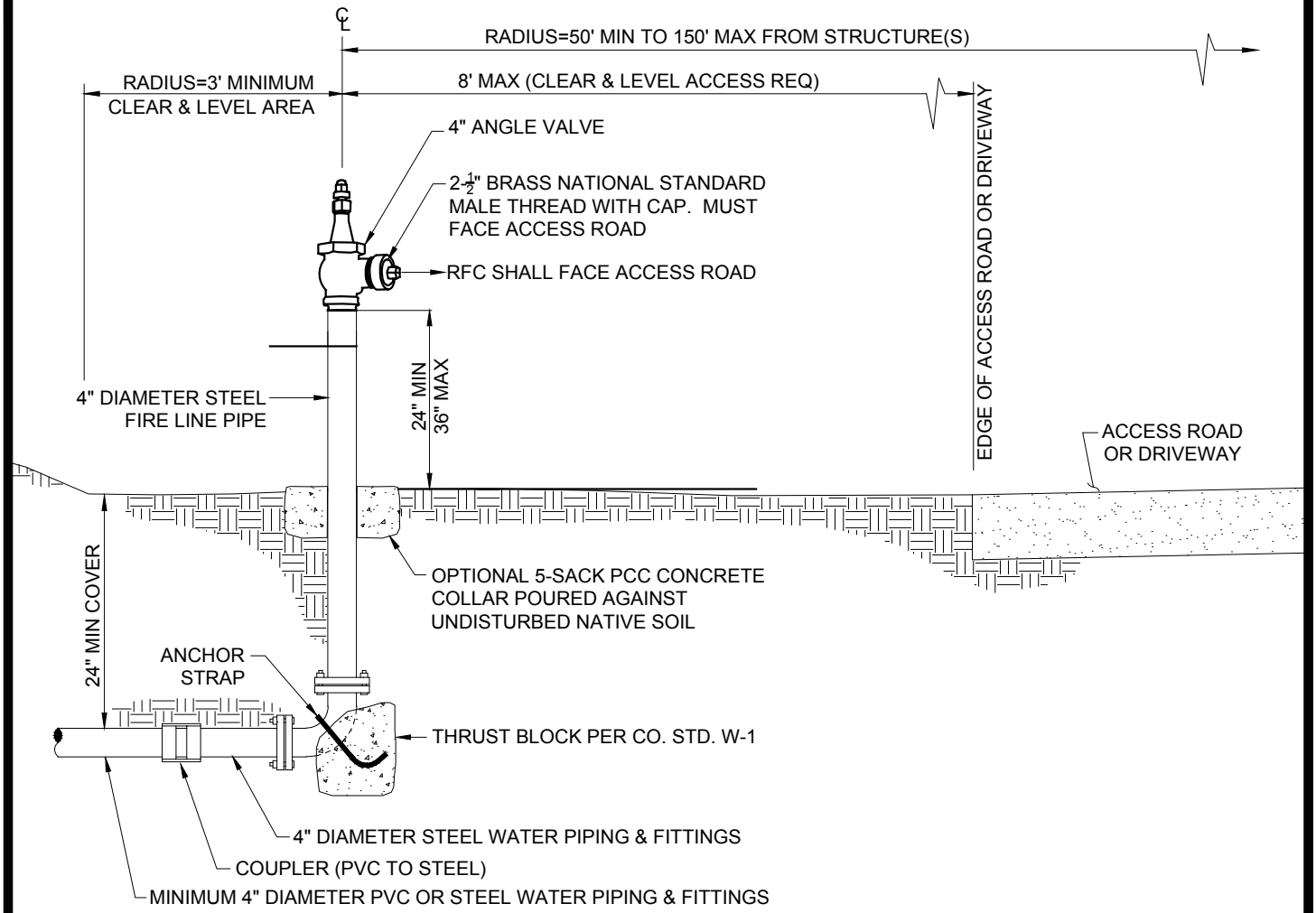
RESIDENTIAL WATER SUPPLY TANKS

Scale:	Adopted:
NTS	AUG 2014

Fire Safe Drawing No: FP-2

Sheet No: OF

Revisions					
Description	Approved	Date	Description	Approved	Date



NOTES:

1. RESIDENTIAL FIRE CONNECTION (RFC) SHALL BE INSTALLED AND FULLY FUNCTIONAL PRIOR TO AND DURING CONSTRUCTION.
2. RFC SHALL BE INSTALLED WITHIN 8-FEET OF THE EDGE OF ACCESS ROAD OR DRIVEWAY AND THE AREA BETWEEN SHALL BE LEVEL AND CLEAR OF ALL OBSTACLES.
3. THE RFC OUTLET SHALL BE 24-INCHES ABOVE FINISHED GRADE.
4. THE RFC SHALL BE EQUIPPED WITH EITHER A BRASS OR PLASTIC RED CAP.
5. THE RFC SHALL BE LOCATED BETWEEN 50-FEET AND 150-FEET FROM THE STRUCTURE(S).
6. A 3-FOOT MINIMUM CLEAR AND LEVEL ZONE SHALL BE PROVIDED ALL AROUND THE CENTER OF THE RFC.
7. A 3-INCH BLUE REFLECTOR MEETING CAL FIRE REQUIREMENTS SHALL BE PROVIDED.
8. A 10' CLEAR ZONE PER FSS No 5 SHALL BE PROVIDED AROUND RFC.
9. COMMERCIAL HYDRANTS AND BOLLARDS SHALL COMPLY WITH CO. STD. W-2.

SAN LUIS OBISPO COUNTY FIRE DEPARTMENT

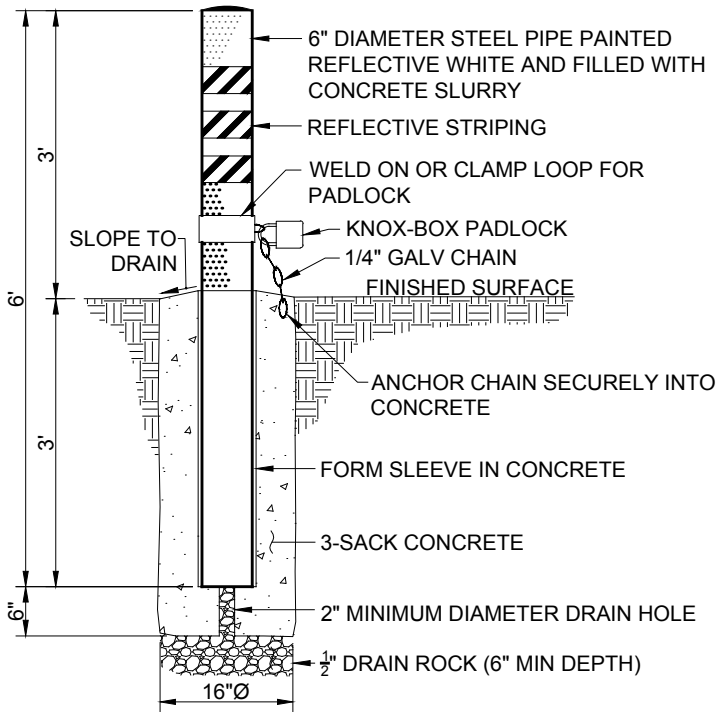
RESIDENTIAL FIRE CONNECTION (RFC)

Scale:	Adopted:
NTS	AUG 2014

Fire Safe Drawing No: FP-3

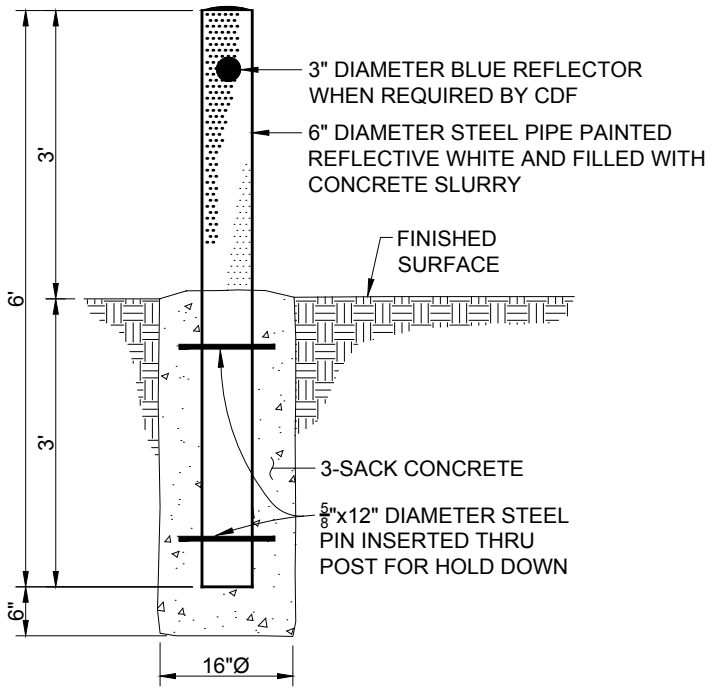
Sheet No: OF

Revisions					
Description	Approved	Date	Description	Approved	Date



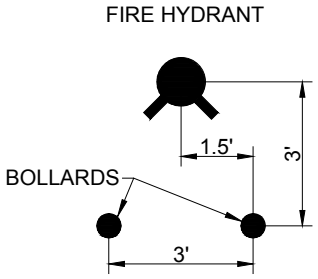
REMOVABLE BOLLARD

NOTES:
1. REMOVABLE BOLLARDS SHALL BE INSTALLED WHEN REQUIRED BY CDF TO PROVIDE ACCESS TO ROUTES NORMALLY CLOSED TO VEHICLES.
2. PROVIDE KNOX-BOX PADLOCKS PER CDF.
3. PROVIDE 48" CLEAR SPACING BETWEEN BOLLARDS (53" ON CENTER).
4. YELLOW REFLECTIVE TAPE SHALL BE PLACED ON EACH FACE OF BOLLARD.



PERMANENT BOLLARD

NOTES:
1. BOLLARDS SHALL BE INSTALLED ONLY WHEN REQUIRED BY CDF TO PROTECT FIRE HYDRANTS AND OTHER FIRE APPURTENANCES.
2. WHEN REQUIRED, BOLLARDS SHALL BE INSTALLED PER "TYPICAL BOLLARD LOCATION" DETAIL, THIS SHEET.
3. BOLLARDS SHALL NOT BE LOCATED WITHIN THE PUBLIC RIGHT-OF-WAY WITHOUT FIRST OBTAINING AN ENCROACHMENT PERMIT FROM COUNTY PUBLIC WORKS DEPARTMENT OR CALTRANS.



TYPICAL BOLLARD LOCATION

SCALE: 1"=4'

SAN LUIS OBISPO COUNTY FIRE DEPARTMENT

FIRE HYDRANT BOLLARDS

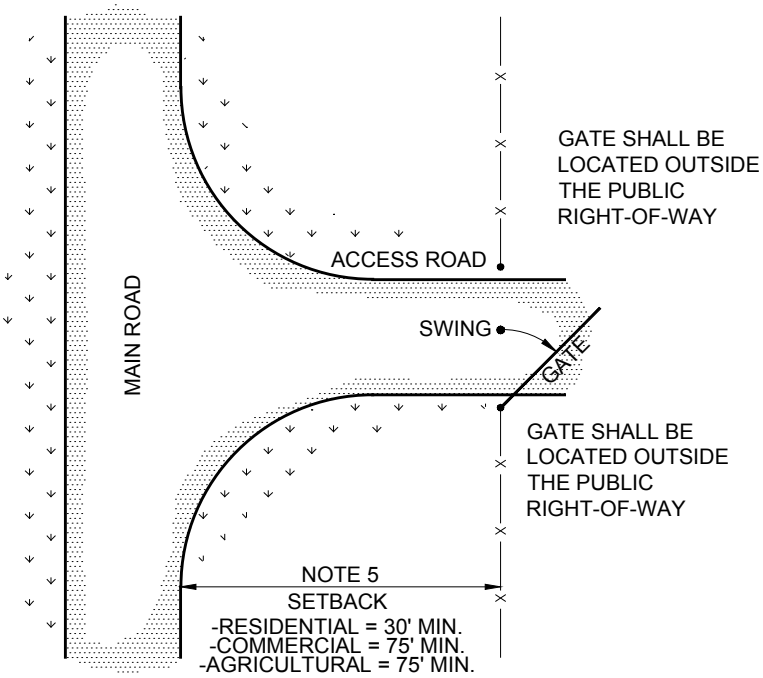
Scale:	Adopted:
NTS	AUG 2014

Fire Safe Drawing No: FP-4

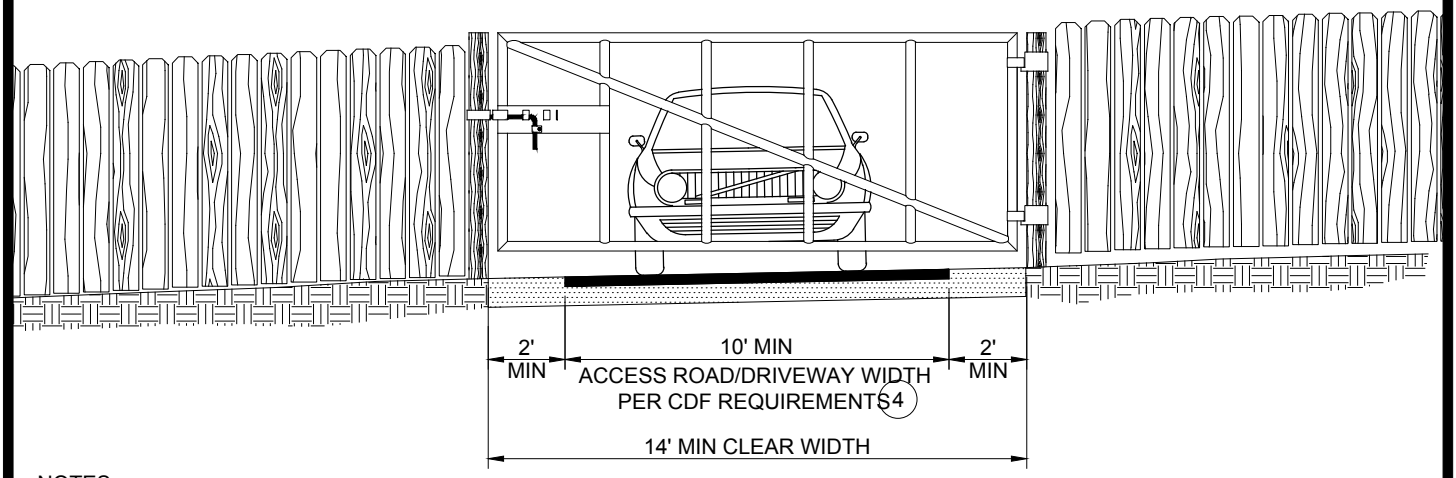
Sheet No: OF

Revisions

Description	Approved	Date	Description	Approved	Date



GATE LOCATION



NOTES:

1. INSTALLATION OF GATES SHALL REQUIRE PRIOR DEPARTMENT APPROVAL.
2. INSTALLATION OF GATES MAY REQUIRE A BUILDING PERMIT FROM COUNTY PLANNING AND BUILDING DEPARTMENT. CONTACT 805/781-5200 FOR ADDITIONAL INFORMATION.
3. ALL LOCKED GATES SHALL BE EQUIP WITH A DEPARTMENT APPROVED EMERGENCY ACCESS LOCK. CONTACT CDF A 805/543-4244 FOR ADDITIONAL INFORMATION.
4. CLEAR WIDTH SHALL BE NO LESS THAN THE WIDTH OF THE ACCESS ROAD OR DRIVEWAY PLUS A TWO FOOT SHOULDER ON EACH SIDE, AND IN NO CASE BE LESS THAT 14-FEET WIDE.
5. THE APPLICANT SHALL OBTAIN PRIOR APPROVAL FROM CALTRANS OR SAN LUIS OBISPO COUNTY PUBLIC WORKS FOR ACTUAL GATE SETBACK REQUIREMENTS. MINIMUM SETBACK GUIDELINES ARE PROVIDED AS FOLLOWS:
   A. FOR RESIDENTIAL DRIVEWAYS, GATES SHALL BE SET BACK A MINIMUM OF 30-FEET FROM THE NEAREST INTERSECTING ROAD PER CALIFORNIA FIRE CODE.
   B. FOR COMMERCIAL AND AGRICULTURAL ACCESS ROADS, GATES SHALL BE SETBACK A MINIMUM OF 75-FEET FROM THE NEAREST INTERSECTING ROAD.

SAN LUIS OBISPO COUNTY FIRE DEPARTMENT

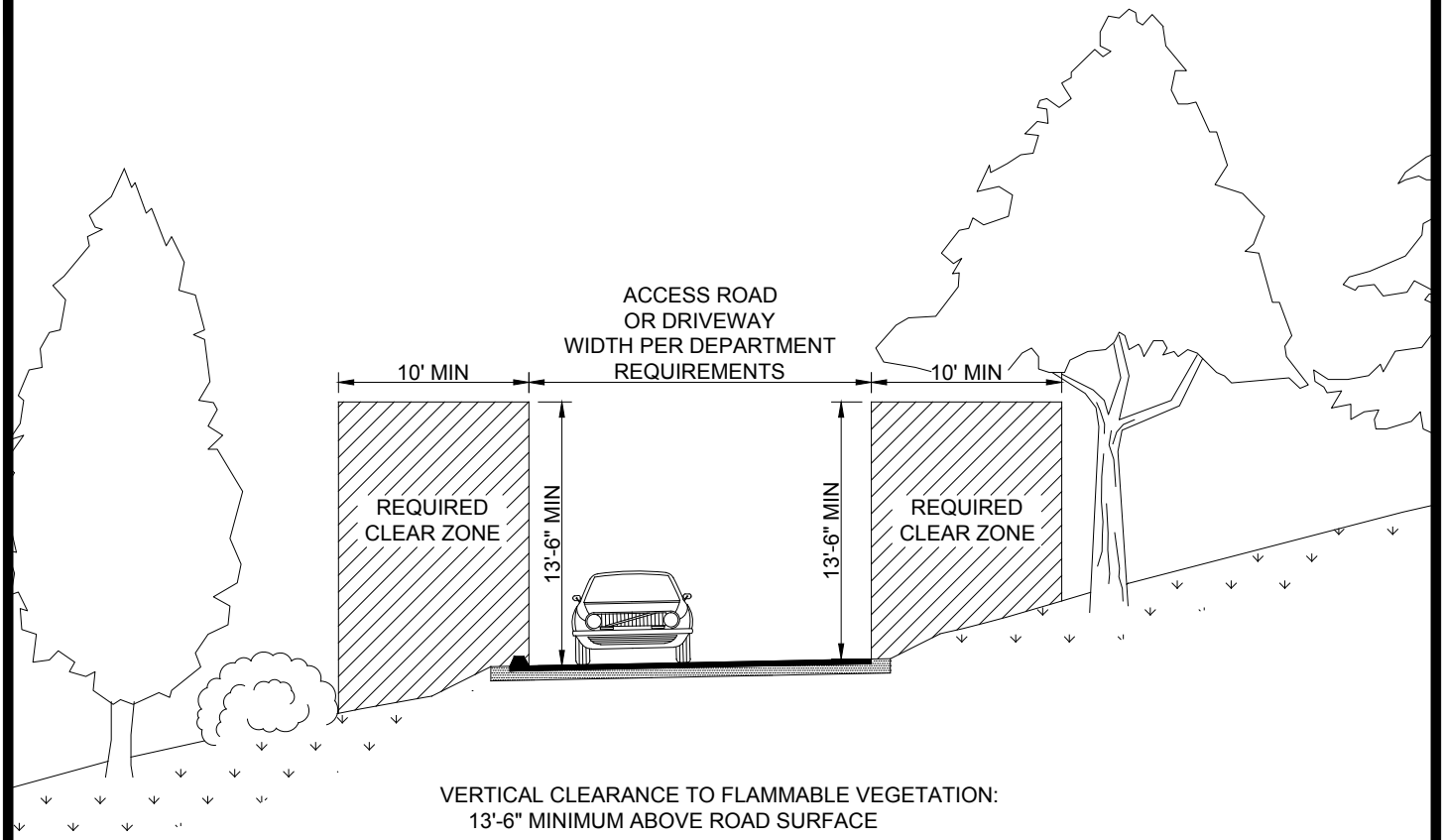
DRIVEWAY & ACCESS ROAD GATES

Scale:	Adopted:
NTS	AUG 2014

Fire Safe Drawing No: FP-5

Sheet No: OF

Revisions					
Description	Approved	Date	Description	Approved	Date



VERTICAL CLEARANCE TO FLAMMABLE VEGETATION:
13'-6" MINIMUM ABOVE ROAD SURFACE

HORIZONTAL CLEARANCE TO FLAMMABLE VEGETATION:
10' MINIMUM FROM EDGE OF ROADWAY

NOTES:
1. VEGETATION CLEARANCE REQUIREMENTS PER CALIFORNIA FIRE CODE, SECTION 304.1.2
2. VEGETATION CLEARANCE ZONE APPLIES TO DRIVEWAYS, ACCESS ROADS, TURNOUTS, CUL-DE-SACS, HAMMERHEADS, AND ALL OTHER SITE ACCESS IMPROVEMENTS.
3. DRIVEWAY AND ACCESS ROAD WIDTHS SHALL BE PER DEPARTMENT REQUIREMENTS.

SAN LUIS OBISPO COUNTY FIRE DEPARTMENT

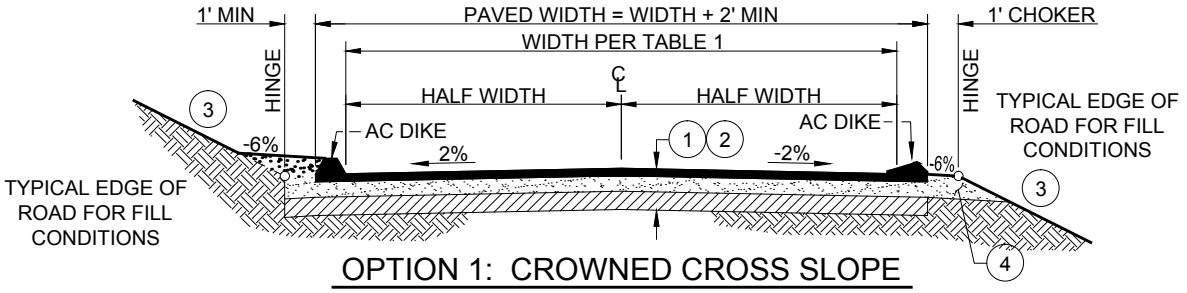
VEGETATION CLEARANCE REQUIREMENTS

Scale:	Adopted:
NTS	AUG 2014

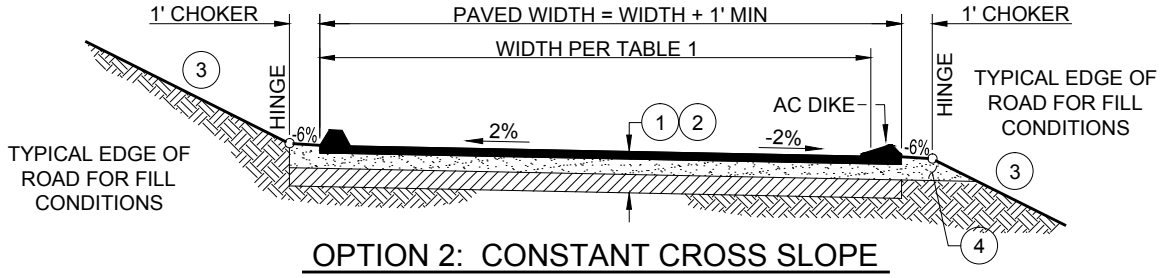
Fire Safe Drawing No: FP-6

Sheet No: OF

Revisions					
Description	Approved	Date	Description	Approved	Date



OPTION 1: CROWNED CROSS SLOPE



OPTION 2: CONSTANT CROSS SLOPE

NOTES:

1. THE STRUCTURAL SECTION SHALL BE DETERMINED BY THE DESIGNER AT THE TIME OF CONSTRUCTION BASED ON THE SUBGRADE R-VALUE AND A MINIMUM TRAFFIC INDEX (TI) OF 4.5.
2. TYPICAL SECTION SHALL BE:
   - TYPE B ASPHALT CONCRETE TO 95% RELATIVE COMPACTION, OVER
   - CLASS II AGGREGATE BASE TO 95% RELATIVE COMPACTION, OVER
   - 12" MINIMUM SUBGRADE TO 95% RELATIVE COMPACTION
3. CUT AND FILL SLOPES SHALL NOT EXCEED 2 HORIZONTAL:1 VERTICAL (OR 3h:1v IN NATIVE SAND) WITHOUT PRIOR APPROVAL BY THE DEPARTMENT.
4. THE AGGREGATE BASE MATERIAL SHALL EXTEND TO THE EDGE OF THE FILL SLOPE (CHOKER) TO ALLOW FOR STRUCTURAL ROAD SECTION DRAINAGE.
5. ADDITIONAL WIDTH SHALL BE PROVIDED AS NECESSARY TO ACCOMMODATE FOR ROADSIDE DRAINAGE. DRAINAGE SHALL NOT BE ALLOWED TO ENCROACH WITHIN THE TRAVEL LANE.
6. ASPHALT DIKE SHALL BE REQUIRED WHERE NEEDED TO CONTROL DRAINAGE OR EROSION AND ON LONGITUDINAL GRADES OF 5% OR GREATER. DIKE SHALL CONFORM TO SAN LUIS OBISPO COUNTY STANDARD DRAWING C-3.

TABLE 1: DRIVEWAY/ACCESS ROAD WIDTH REQUIREMENTS

DRIVEWAY WIDTH REQUIREMENTS (RESIDENTIAL): 10-FEET MINIMUM WIDTH FOR LENGTHS TO 49-FEET 12-FEET MINIMUM WIDTH FOR LENGTHS 50 TO 199-FEET 16-FEET MINIMUM WIDTH FOR LENGTHS GREATER THAN 200-FEET
DRIVEWAY WIDTH REQUIREMENTS (COMMERCIAL): 24-FEET MINIMUM WIDTH - INCLUDES SECONDARY EGRESS 18-FEET MINIMUM WIDTH FOR EMERGENCY EGRESS FIRE LANES PER CFC SECTION 503 MUST BE PAVED
ACCESS ROAD WIDTH REQUIREMENTS (RESIDENTIAL): 18-FEET MINIMUM WIDTH WITH NO-PARKING 8-FEET ADDITIONAL WIDTH PER SIDE WITH PARKING 10-FEET MINIMUM WIDTH FOR ONE-WAY (REQUIRES PRIOR DEPARTMENT APPROVAL)
ACCESS ROAD WIDTH REQUIREMENTS (COMMERCIAL): 24-FEET MINIMUM WIDTH WITH NO-PARKING (INCLUDES SECONDARY EGRESS) 8-FEET ADDITIONAL WIDTH PER SIDE WITH PARKING 18-FEET MINIMUM WIDTH FOR EMERGENCY EGRESS FIRE LANES PER CFC SECTION 503 MUST BE PAVED

SAN LUIS OBISPO COUNTY FIRE DEPARTMENT

PRIVATE DRIVEWAY & ACCESS ROAD

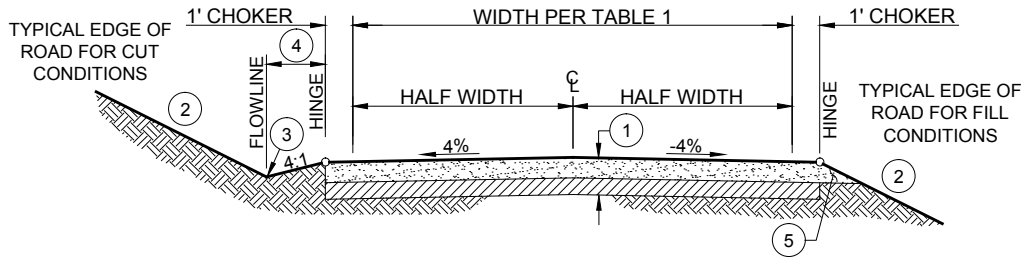
PAVED ROAD STANDARD

Scale:	Adopted:
NTS	AUG 2014

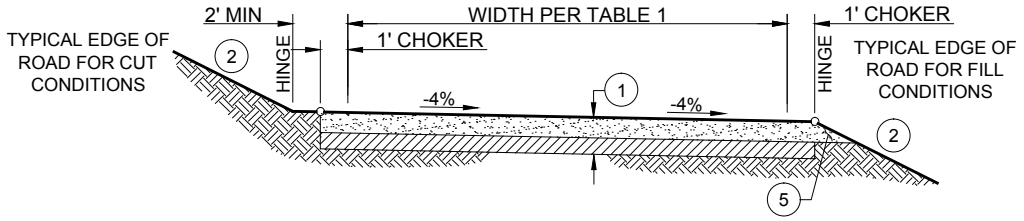
Fire Safe Drawing No: FP-7

Sheet No: OF

Revisions					
Description	Approved	Date	Description	Approved	Date



OPTION 1: GRAVEL ROAD SECTION WITH CROWNED CROSS SLOPE



OPTION 2: GRAVEL ROAD SECTION WITH CONSTANT CROSS SLOPE

NOTES:

1. TYPICAL SECTION SHALL BE:
   - 10" MINIMUM CLASS II AGGREGATE BASE TO 95% RELATIVE COMPACTION FOR R ≥40 & SE=50, OR
   - 6" MINIMUM CLASS II AGGREGATE BASE TO 95% RELATIVE COMPACTION FOR R <40, OVER
   - 12" MINIMUM SUBGRADE COMPACTED TO 95% RELATIVE COMPACTION
2. CUT AND FILL SLOPES SHALL NOT EXCEED 2 HORIZONTAL:1 VERTICAL (OR 3h:1v IN NATIVE SAND).
3. ROADSIDE DRAINAGE SHALL BE ACCOMMODATED FOR SUCH THAT IT DOES NOT ERODE THE AGGREGATE SHOULDER. THE SIDE SLOPE OF ANY DRAINAGE SWALE DIRECTLY ADJACENT TO THE EDGE OF ROADWAY SHALL NOT EXCEED 4h:1v. DESIGN AND CONSTRUCTION SHALL BE TO THE SATISFACTION OF THE DEPARTMENT.
4. ADDITIONAL WIDTH SHALL BE PROVIDED AS NECESSARY TO ACCOMMODATE FOR ROADSIDE DRAINAGE. DRAINAGE SHALL NOT BE ALLOWED TO ENCROACH WITHIN THE TRAVEL LANE.
5. THE AGGREGATE BASE MATERIAL SHALL EXTEND TO THE EDGE OF THE FILL SLOPE (CHOKER) TO ALLOW FOR STRUCTURAL ROAD SECTION DRAINAGE.

TABLE 1: DRIVEWAY/ACCESS ROAD WIDTH REQUIREMENTS

DRIVEWAY WIDTH REQUIREMENTS (RESIDENTIAL): 10-FEET MINIMUM WIDTH FOR LENGTHS TO 49-FEET 12-FEET MINIMUM WIDTH FOR LENGTHS 50 TO 199-FEET 16-FEET MINIMUM WIDTH FOR LENGTHS GREATER THAN 200-FEET
DRIVEWAY WIDTH REQUIREMENTS (COMMERCIAL): 24-FEET MINIMUM WIDTH - INCLUDES SECONDARY EGRESS 18-FEET MINIMUM WIDTH FOR EMERGENCY EGRESS FIRE LANES PER CFC SECTION 503
ACCESS ROAD WIDTH REQUIREMENTS (RESIDENTIAL): 18-FEET MINIMUM WIDTH WITH NO-PARKING 8-FEET ADDITIONAL WIDTH PER SIDE WITH PARKING 10-FEET MINIMUM WIDTH FOR ONE-WAY (REQUIRES PRIOR DEPARTMENT APPROVAL)
ACCESS ROAD WIDTH REQUIREMENTS (COMMERCIAL): 24-FEET MINIMUM WIDTH WITH NO-PARKING (INCLUDES SECONDARY EGRESS) 8-FEET ADDITIONAL WIDTH PER SIDE WITH PARKING 18-FEET MINIMUM WIDTH FOR EMERGENCY EGRESS FIRE LANES PER CFC SECTION 503

ADDITIONAL DESIGN CRITERIA:

1. ALL WEATHER ROAD STANDARD IS FOR RESIDENTIAL USE ONLY AND NOT ALLOWED IN COMMERCIAL PROJECTS.
2. FOR ROAD LONGITUDINAL SLOPE STANDARDS REFER TO FP-9
3. FOR ROAD HORIZONTAL AND VERTICAL STANDARDS REFER TO FP DRAWING SERIES.

SAN LUIS OBISPO COUNTY FIRE DEPARTMENT

PRIVATE DRIVEWAY & ACCESS ROAD

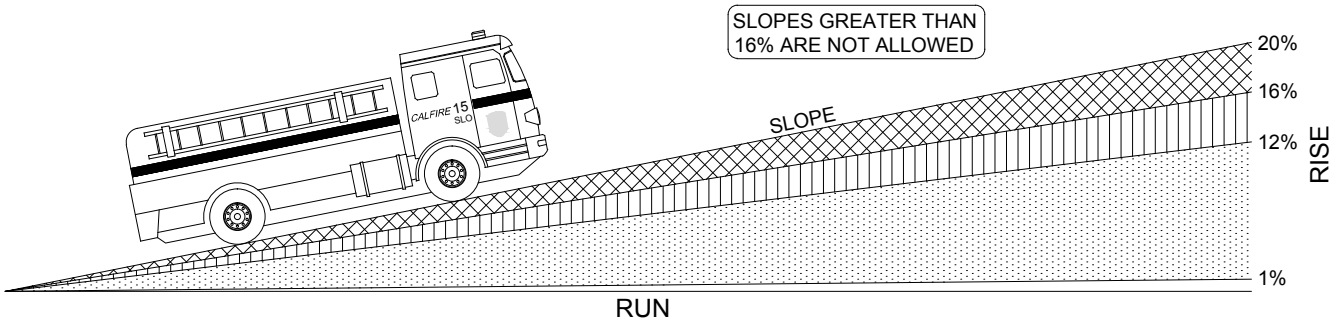
GRAVEL ROAD STANDARD

Scale:	Adopted:
NTS	AUG 2014

Fire Safe Drawing No: FP-8

Sheet No: OF

Revisions					
Description	Approved	Date	Description	Approved	Date



1% TO 11.9%: ALL WEATHER AGGREGATE BASE SURFACE (MINIMUM).

12% TO 15.9%: NON-SKID ASPHALT OR CONCRETE SURFACE (MINIMUM).

16% THE GRADE FOR ALL STREETS ROADS, PRIVATE LANDS AND DRIVEWAYS SHALL NOT EXCEED 16% UNLESS APPROVED BY FIRE CODE OFFICIAL.

FIGURE 1: SURFACE REQUIREMENTS FOR DRIVEWAYS & ACCESS ROADS BASED ON SLOPE

EXAMPLES:

EXAMPLE 1:
GIVEN: THE PROPOSED DRIVEWAY OR ACCESS ROAD GRADES RANGE FROM 2% TO 11%

REQUIREMENT: BASED ON FIGURE 1, AN ALL-WEATHER (GRAVEL) ROAD SURFACE IS THE MINIMUM REQUIRED ROAD SURFACE.

EXAMPLE 2:
GIVEN: THE PROPOSED DRIVEWAY OR ACCESS ROAD GRADES RANGE FROM 12% TO 16%

REQUIREMENT: BASED ON FIGURE 1, PORTIONS OF THE DRIVEWAY OR ACCESS ROAD WITH SLOPES LESS THAN 12% MAY BE CONSTRUCTED WITH AN ALL-WEATHER (GRAVEL ROAD) SURFACE, HOWEVER THE REMAINING PORTIONS HAVING SLOPES BETWEEN 12% AND 16% SHALL BE CONSTRUCTED WITH A NON-SKID PAVED SURFACE. THE APPLICANT HAS THE OPTION TO CONSTRUCT THE ENTIRE LENGTH WITH A NON-SKID PAVED SURFACE.

EXAMPLE 3:
GIVEN: THE PROPOSED DRIVEWAY OR ACCESS ROAD GRADES RANGE FROM 4.5% TO 16%

REQUIREMENT: SIMILAR TO EXAMPLE 2 BUT WITH THE ADDED REQUIREMENT THAT ALL PORTIONS OF THE DRIVEWAY OR ACCESS ROAD SHALL NOT EXCEED 16% UNLESS APPROVED BY THE FIRE CODE OFFICIAL.

SAN LUIS OBISPO COUNTY FIRE DEPARTMENT

PRIVATE DRIVEWAY & ACCESS ROAD

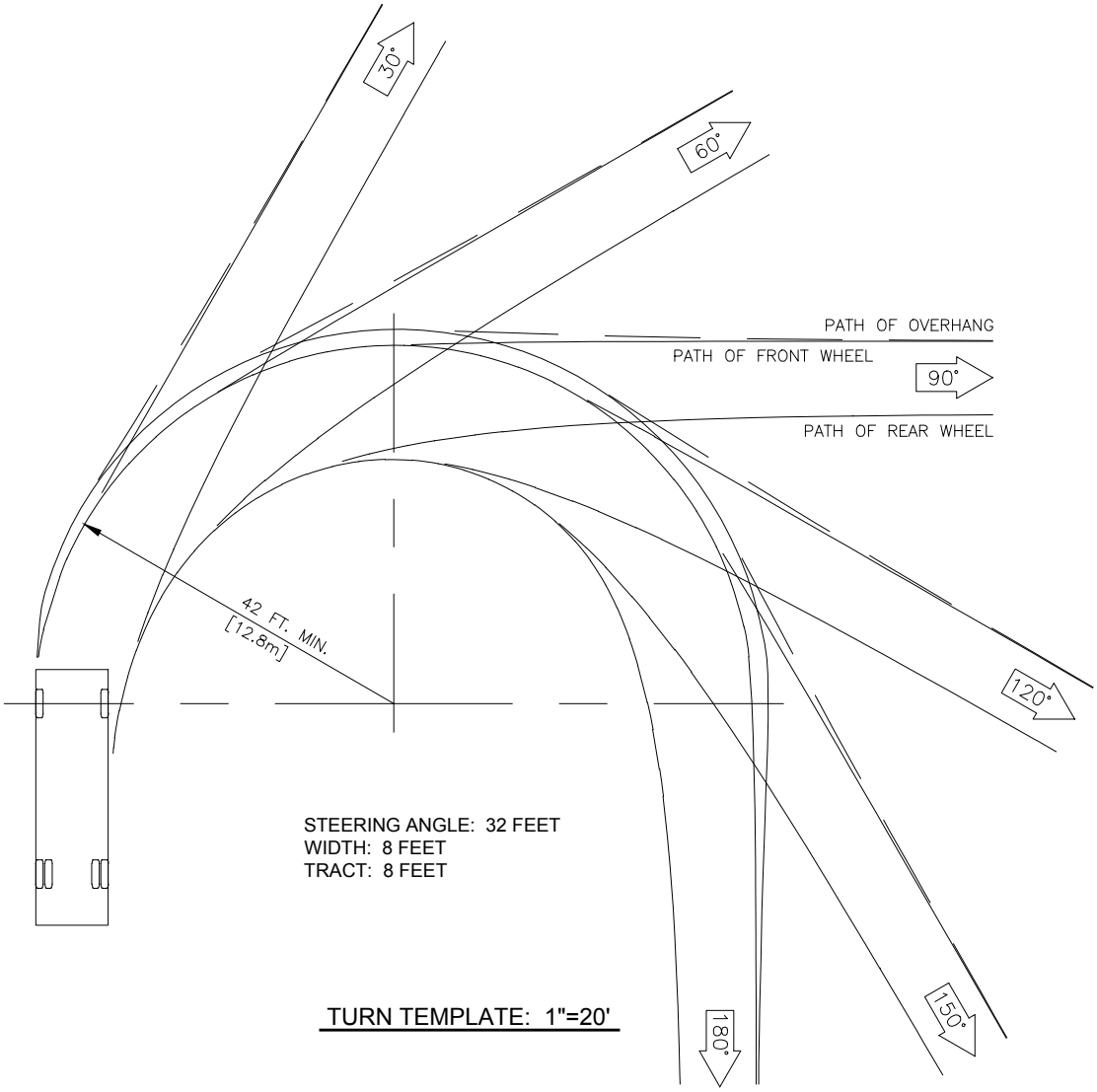
ROAD SLOPE STANDARDS

Scale:	Adopted:
NTS	AUG 2014

Fire Safe Drawing No: FP-9

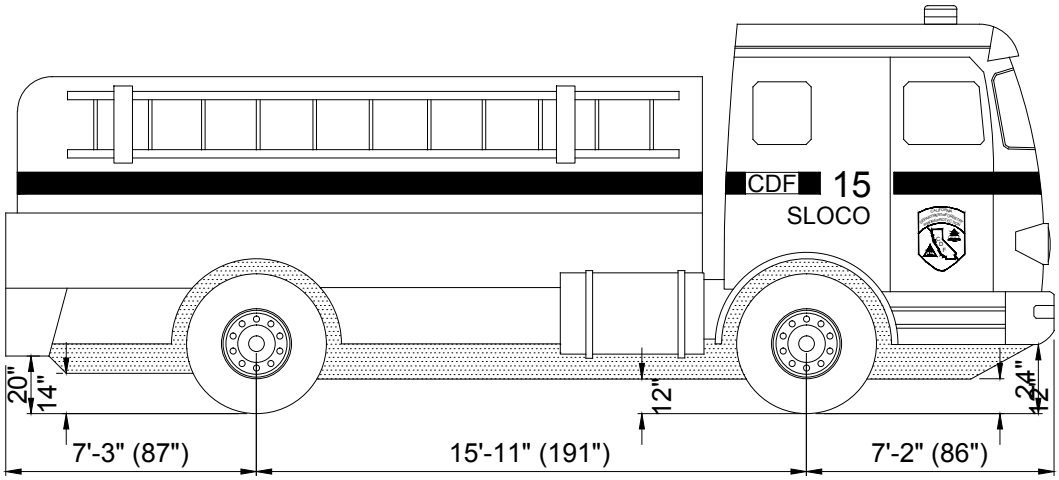
Sheet No: OF

Revisions					
Description	Approved	Date	Description	Approved	Date



STEERING ANGLE: 32 FEET
WIDTH: 8 FEET
TRACT: 8 FEET

TURN TEMPLATE: 1"=20'



DESIGN TRUCK: 1"=5'

SAN LUIS OBISPO COUNTY FIRE DEPARTMENT

FIRE TRUCK DESIGN TEMPLATE

Scale:	Adopted:
AS SHOWN	AUG 2014

Fire Safe Drawing No: FP-10

Sheet No: OF

Revisions					
Description	Approved	Date	Description	Approved	Date

DESIGN CRITERIA:
1. VERTICAL CURVES ARE REQUIRED FOR ALL GRADE BREAKS GREATER THAN 1%
2. MINIMUM VERTICAL CURVE LENGTH (L) SHALL BE 10-FEET
3. LENGTH OF VERTICAL CURVE (L) = KA
4. GRADE BREAK (A)=S2-S1
5. K DETERMINE FROM TABLE 2

TABLE 1: MINIMUM DESIGN SPEED

	MIN DESIGN SPEED
DRIVEWAYS	15 mph
ACCESS ROADS	25 mph

TABLE 2: MINIMUM DESIGN K-VALUE

DESIGN SPEED (mph)	SAG VERTICAL CURVE (minimum K-value, ft/%)	CREST VERTICAL CURVE (minimum K-value, ft/%)
15	3	10
20	7	17
25	12	26
30	19	37
35	29	49

FOR DESIGN SPEEDS GREATER THAN 35 mph REFER TO SAN LUIS OBISPO COUNTY PUBLIC WORKS STANDARD DRAWINGS FOR DESIGN REQUIREMENTS

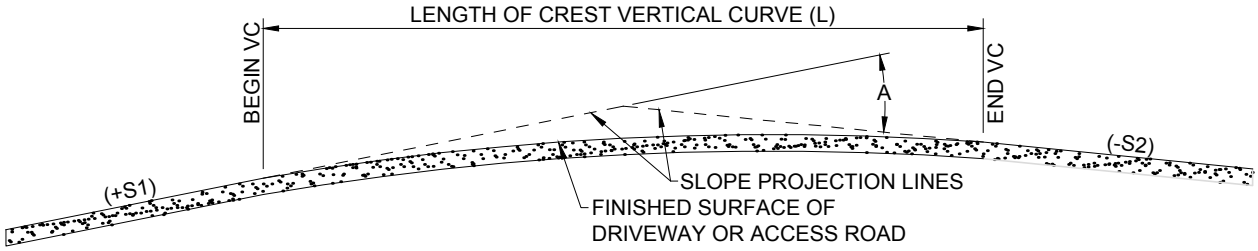


FIG 1: CREST VERTICAL CURVE

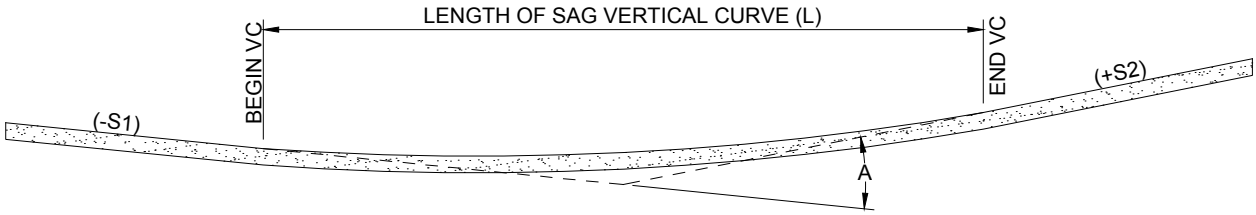


FIG 2: SAG VERTICAL CURVE

EXAMPLE 1:

GIVEN:
DRIVEWAY WITH A DESIGN SPEED OF 20 mph, SAG CONDITION, A DOWNHILL SLOPE IN (S1) OF -5% AND A UPHILL SLOPE OUT (S2) OF +3%, DETERMINE THE MINIMUM VERTICAL CURVE LENGTH.

SOLUTION:
FROM TABLE 2 & FIG 2, SAG CONDITION, 20mph DESIGN SPEED, THEN K=7
GIVEN THAT S1=-5 & S2=+3, THEN A=S2-S1=(+3)-(-5)=8
REQUIRED MINIMUM LENGTH OF VERTICAL CURVE (L)=KA=7x8=56 ft

EXAMPLE 2:

GIVEN:
ACCESS ROAD WITH A DESIGN SPEED OF 20 mph, CREST CONDITION, A UPHILL SLOPE IN (+S1) OF +3% AND A DOWNHILL SLOPE OUT (S2) OF -10%, DETERMINE THE MINIMUM VERTICAL CURVE LENGTH.

SOLUTION:
FROM TABLE 2 & FIG 1, CREST CONDITION, 20mph DESIGN SPEED, THEN K=17
GIVEN THAT S1=+3 & S2=-10, THEN A=S2-S1=(-10)-(+3)=-7, OR 7
REQUIRED MINIMUM LENGTH OF VERTICAL CURVE (L)=KA=17x7=119 ft

SAN LUIS OBISPO COUNTY FIRE DEPARTMENT

PRIVATE DRIVEWAY & ACCESS ROAD

VERTICAL CURVE STANDARD

Scale:	Adopted:
NTS	AUG 2014

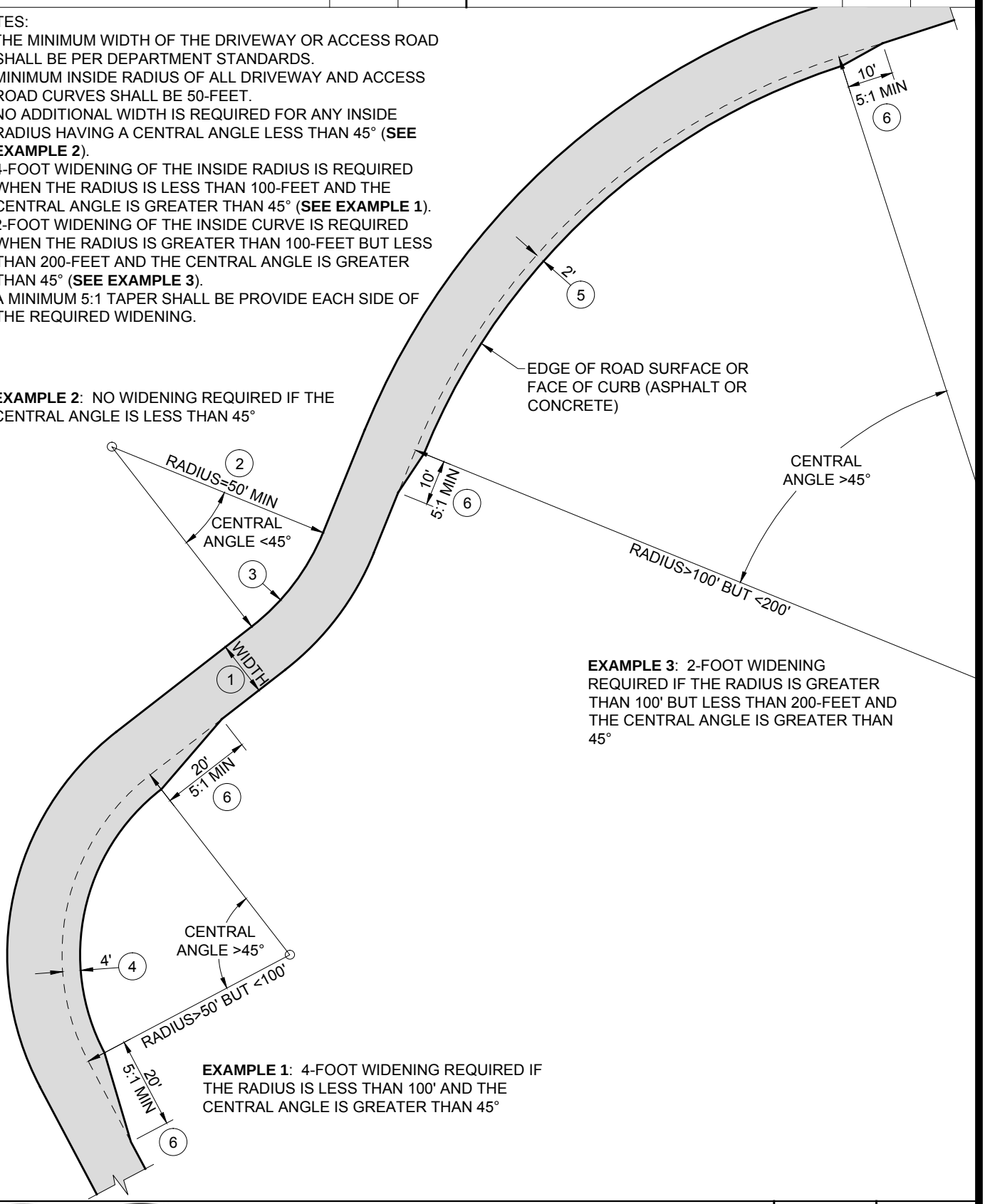
Fire Safe Drawing No: FP-11

Sheet No: OF

Revisions					
Description	Approved	Date	Description	Approved	Date

NOTES:

1. THE MINIMUM WIDTH OF THE DRIVEWAY OR ACCESS ROAD SHALL BE PER DEPARTMENT STANDARDS.
2. MINIMUM INSIDE RADIUS OF ALL DRIVEWAY AND ACCESS ROAD CURVES SHALL BE 50-FEET.
3. NO ADDITIONAL WIDTH IS REQUIRED FOR ANY INSIDE RADIUS HAVING A CENTRAL ANGLE LESS THAN 45° (**SEE EXAMPLE 2**).
4. 4-FOOT WIDENING OF THE INSIDE RADIUS IS REQUIRED WHEN THE RADIUS IS LESS THAN 100-FEET AND THE CENTRAL ANGLE IS GREATER THAN 45° (**SEE EXAMPLE 1**).
5. 2-FOOT WIDENING OF THE INSIDE CURVE IS REQUIRED WHEN THE RADIUS IS GREATER THAN 100-FEET BUT LESS THAN 200-FEET AND THE CENTRAL ANGLE IS GREATER THAN 45° (**SEE EXAMPLE 3**).
6. A MINIMUM 5:1 TAPER SHALL BE PROVIDE EACH SIDE OF THE REQUIRED WIDENING.



EXAMPLE 2: NO WIDENING REQUIRED IF THE CENTRAL ANGLE IS LESS THAN 45°

EXAMPLE 3: 2-FOOT WIDENING REQUIRED IF THE RADIUS IS GREATER THAN 100' BUT LESS THAN 200-FEET AND THE CENTRAL ANGLE IS GREATER THAN 45°

EXAMPLE 1: 4-FOOT WIDENING REQUIRED IF THE RADIUS IS LESS THAN 100' AND THE CENTRAL ANGLE IS GREATER THAN 45°

SAN LUIS OBISPO COUNTY FIRE DEPARTMENT

PRIVATE DRIVEWAY & ACCESS ROAD

HORIZONTAL CURVE STANDARD

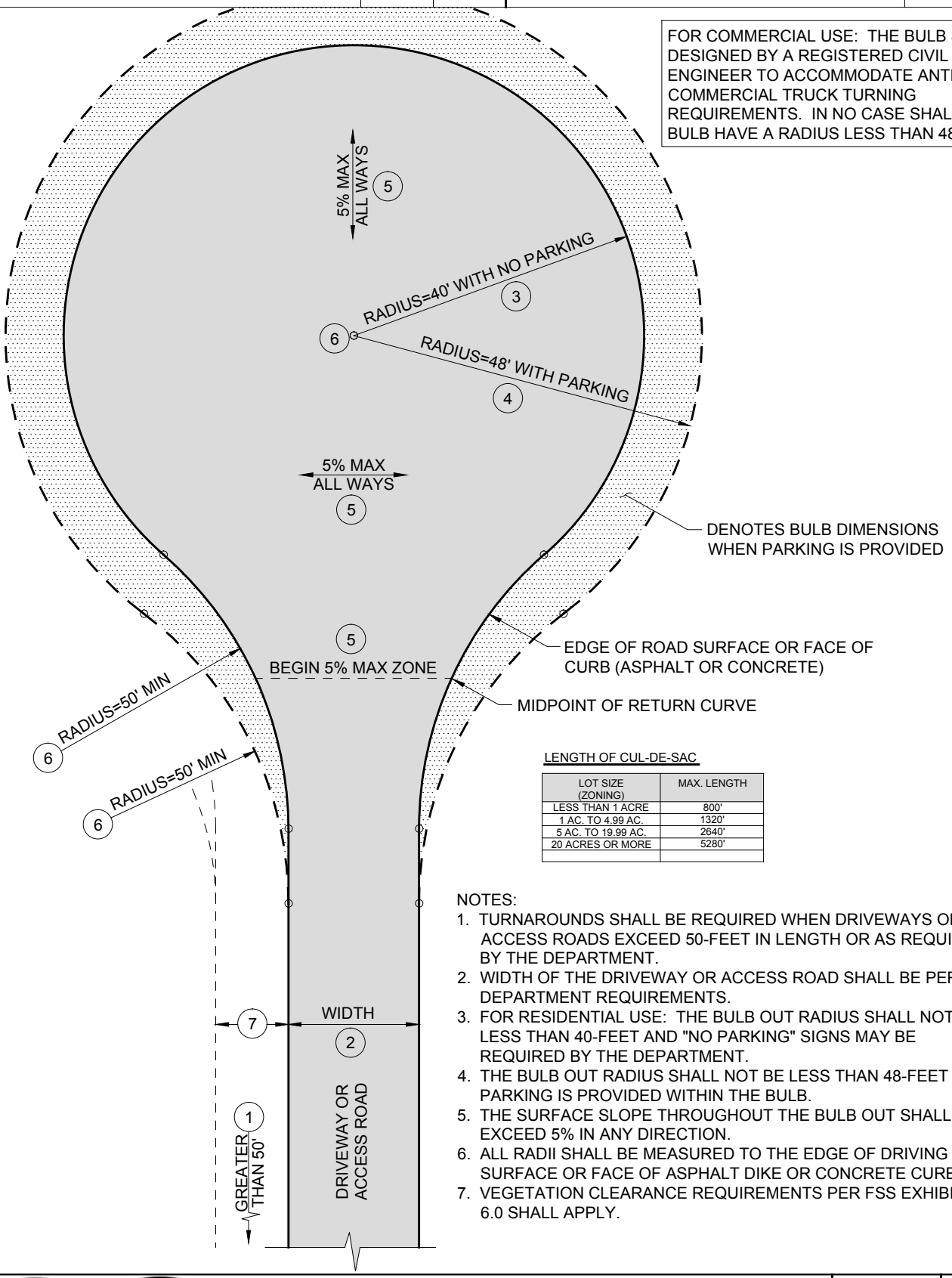
Scale:	Adopted:
NTS	AUG 2014

Fire Safe Drawing No: FP-12

Sheet No: OF

Revisions					
Description	Approved	Date	Description	Approved	Date

FOR COMMERCIAL USE: THE BULB SHALL BE DESIGNED BY A REGISTERED CIVIL ENGINEER TO ACCOMMODATE ANTICIPATED COMMERCIAL TRUCK TURNING REQUIREMENTS. IN NO CASE SHALL THE BULB HAVE A RADIUS LESS THAN 48-FEET.



LENGTH OF CUL-DE-SAC

LOT SIZE (ZONING)	MAX. LENGTH
LESS THAN 1 ACRE	800'
1 AC. TO 4.99 AC.	1320'
5 AC. TO 19.99 AC.	2640'
20 ACRES OR MORE	5280'

NOTES:

1. TURNAROUNDS SHALL BE REQUIRED WHEN DRIVEWAYS OR ACCESS ROADS EXCEED 50-FEET IN LENGTH OR AS REQUIRED BY THE DEPARTMENT.
2. WIDTH OF THE DRIVEWAY OR ACCESS ROAD SHALL BE PER DEPARTMENT REQUIREMENTS.
3. FOR RESIDENTIAL USE: THE BULB OUT RADIUS SHALL NOT BE LESS THAN 40-FEET AND "NO PARKING" SIGNS MAY BE REQUIRED BY THE DEPARTMENT.
4. THE BULB OUT RADIUS SHALL NOT BE LESS THAN 48-FEET WHEN PARKING IS PROVIDED WITHIN THE BULB.
5. THE SURFACE SLOPE THROUGHOUT THE BULB OUT SHALL NOT EXCEED 5% IN ANY DIRECTION.
6. ALL RADII SHALL BE MEASURED TO THE EDGE OF DRIVING SURFACE OR FACE OF ASPHALT DIKE OR CONCRETE CURB.
7. VEGETATION CLEARANCE REQUIREMENTS PER FSS EXHIBIT No. 6.0 SHALL APPLY.

SAN LUIS OBISPO COUNTY FIRE DEPARTMENT

PRIVATE DRIVEWAY & ACCESS ROAD

TURNAROUND-BULBOUT

Scale:	Adopted:
NTS	AUG 2014

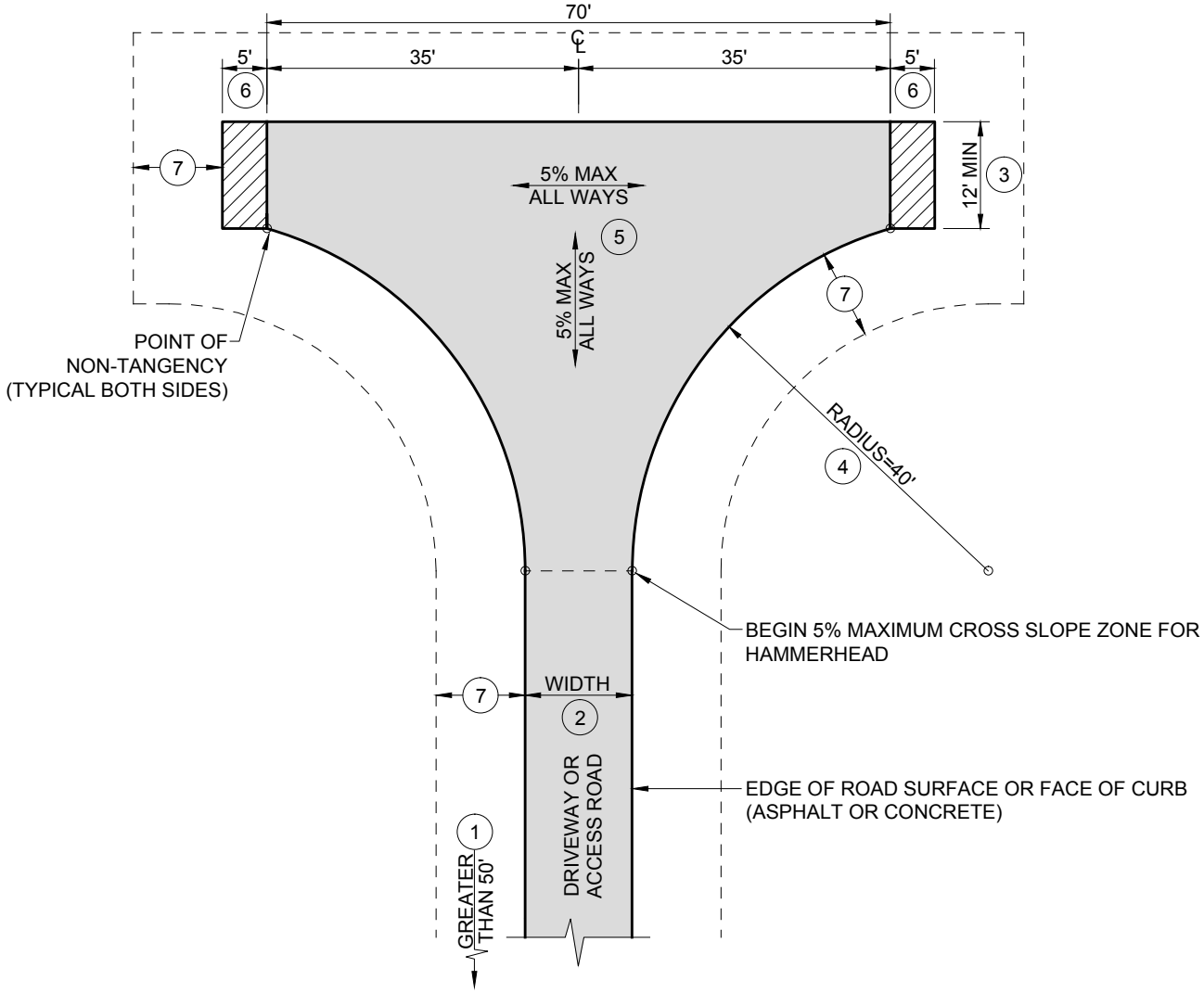
Fire Safe Drawing No: FP-13

Sheet No: OF

Revisions

Description	Approved	Date	Description	Approved	Date

COMMERCIAL USE: HAMMERHEADS SHALL NOT BE USED FOR COMMERCIAL PROJECTS



NOTES:

1. TURNAROUNDS SHALL BE REQUIRED WHEN DRIVEWAYS OR ACCESS ROADS EXCEED 50-FEET IN LENGTH OR AS REQUIRED BY THE DEPARTMENT.
2. WIDTH OF THE DRIVEWAY OR ACCESS ROAD SHALL BE PER DEPARTMENT REQUIREMENTS.
3. WIDTH SHALL BE WIDTH OF DRIVEWAY OR ACCESS ROAD BUT 12-FEET MINIMUM IS REQUIRED.
4. ALL RADII SHALL BE MEASURED TO THE EDGE OF DRIVING SURFACE OR FACE OF ASPHALT DIKE OR CONCRETE CURB.
5. MAXIMUM CROSS SLOPE THROUGHOUT THE TURNOUT SHALL NOT EXCEED 5% IN ANY DIRECTION.
6. OPTIONAL: VEHICLE OVERHANG LIMITS, DRIVING SURFACE IN THIS AREA IS NOT REQUIRED HOWEVER SURFACE SHALL BE CLEAR OF OBSTRUCTIONS AND HAVE A LEVEL SURFACE.
7. VEGETATION CLEARANCE REQUIREMENTS PER FP-6 SHALL APPLY.

SAN LUIS OBISPO COUNTY FIRE DEPARTMENT

PRIVATE DRIVEWAY & ACCESS ROAD

TURNAROUND-HAMMERHEAD

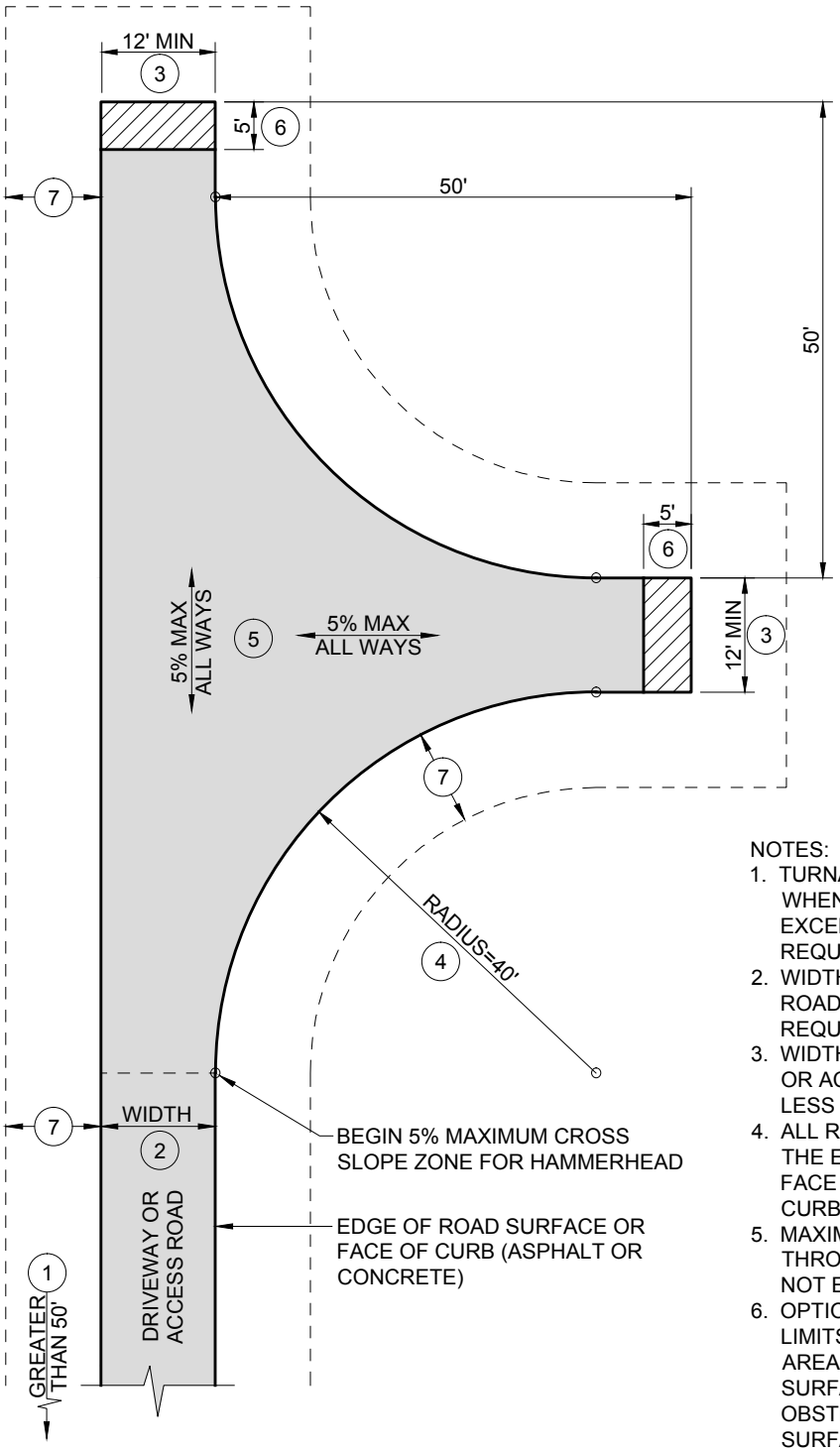
Scale:	Adopted:
NTS	AUG 2014

Fire Safe Drawing No: FP-14

Sheet No: OF

Revisions					
Description	Approved	Date	Description	Approved	Date

COMMERCIAL USE: HAMMERHEADS SHALL NOT BE USED FOR COMMERCIAL PROJECTS



NOTES:

1. TURNAROUNDS SHALL BE REQUIRED WHEN DRIVEWAYS OR ACCESS ROADS EXCEED 50-FEET IN LENGTH OR AS REQUIRED BY THE DEPARTMENT.
2. WIDTH OF THE DRIVEWAY OR ACCESS ROAD SHALL BE PER DEPARTMENT REQUIREMENTS.
3. WIDTH SHALL BE WIDTH OF DRIVEWAY OR ACCESS ROAD BUT SHALL NOT BE LESS THAN 12-FEET.
4. ALL RADII SHALL BE MEASURED TO THE EDGE OF DRIVING SURFACE OR FACE OF ASPHALT DIKE OR CONCRETE CURB.
5. MAXIMUM CROSS SLOPE THROUGHOUT THE TURNOUT SHALL NOT EXCEED 5% IN ANY DIRECTION.
6. OPTIONAL: VEHICLE OVERHANG LIMITS, DRIVING SURFACE IN THIS AREA IS NOT REQUIRED HOWEVER SURFACE SHALL BE CLEAR OF OBSTRUCTIONS AND HAVE A LEVEL SURFACE.
7. VEGETATION CLEARANCE REQUIREMENTS PER FSS EXHIBIT No. 4.0 SHALL APPLY.

SAN LUIS OBISPO COUNTY FIRE DEPARTMENT

PRIVATE DRIVEWAY & ACCESS ROAD

TURNAROUND-MODIFIED HAMMERHEAD

Scale:	Adopted:
NTS	AUG 2014

Fire Safe Drawing No: FP-15

Sheet No: OF