

DESIGN MANUAL & Plan Preparation



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SECTION I GENERAL INFORMATION

Introduction

This Design Manual has been prepared to assist subdividers, developers, civil engineers, and land surveyors in the processing of maps and the design of improvement plans in the City of Lake Elsinore. This Manual is intended as a guide in providing important and necessary information for preparing and processing these documents.

It is not the intent of this manual to anticipate all possible situations that may arise during the development process. Therefore, the standards and criteria developed within this Manual will not address every situation, but it is anticipated that the standards and criteria put forth in this Manual will apply in the majority of cases.

This Manual is divided into six (6) major sections plus the Appendix. These sections are entitled General Information, Tract and Parcel Maps, Grading Plans, Improvement Plans, Traffic, and Miscellaneous Items. Each section outlines the basic requirements and information that should be included as part of the plan set prior to submittal for City review. Checklists are included within each section to aid the user in plan preparation.

All improvement projects, whether public or private, shall be designed in accordance with this Design Manual. This information has been compiled to assist users in processing all plan checks efficiently, quickly, and accurately through the City. Failure to submit the minimum requirements will result in delays in the plan checking process.

Controlling Documents

The following documents have been used as the basis of the information provided within this Manual. The user should reference these documents whenever additional information is needed in the preparation of plans or calculations.

1. Subdivision Map Act: The current Subdivision Map Act takes precedence over all other documents and ordinances relative to the subdivision of land.
2. Subdivision Ordinance: The City Code expands, delineates, and regulates those items that the Subdivision Map Act allows the local jurisdiction to regulate.
3. Grading Ordinance: City of Lake Elsinore Ordinances 801, 882, 1021, and this manual shall govern grading, erosion control, and plan preparation of grading plans.
4. City of Lake Elsinore Standard Plans, including latest revisions.
5. Riverside County Hydrology Manual: All hydrologic calculations done in the City of Lake Elsinore should be done using the methods outlined in this Hydrology Manual. Computer programs may be used to assist the user in preparation of calculation runoffs and hydraulic data for submittal.
6. Riverside County Flood Control and Water Conservation District Design Manual Standard Drawings: All flood control devices should be referenced to the standards and information within these drawings.
7. Other documents referred to within this Manual include the following:
 - Standard Specifications for Public Works Construction (Latest Edition)

- State of California, Department of Transportation, Standard Plans and Standard Specifications (Latest Edition)
- California Building Code (Latest Edition)
- International Building Code (Latest Edition)
- California Manual on Uniform Traffic Control Devices (CA MUTCD) (Latest Edition)
- Federal MUTCD (latest Edition)

Definitions

The definitions listed in this section are in addition to those listed in the Subdivision Map Act and the Subdivision Ordinance.

1. Legal Lot: Is a parcel established or set forth by one of the following means:
 - a. A deed describing the property recorded prior to March 4, 1972.
 - b. A recorded subdivision map or parcel map.
 - c. Either of the above combined with a City approved and recorded boundary adjustment plat.

NOTE: A parcel is not necessarily a legal parcel just because there is an Assessor's parcel number assigned to it.

2. Tentative Map: The tentative subdivision or parcel map is an official submittal depicting the overall development contemplated. Upon approval by the City, the tentative subdivision (parcel) map constitutes an agreement between the developer and the City.
3. Final Map: Is a map that delineates the boundary of the subdivision by bearings and distances, indicating the procedure of survey, and establishes the boundary of each lot within the subdivision.

Plan Submittal Check Lists

The following sections include check lists that should be used in verifying that the submittal is a complete package in order to avoid delays in the checking procedure.

Reminder: Failure to submit the minimum requirements will result in delays in the plan checking process.

SECTION II PARCEL AND SUBDIVISION MAPS

Parcel Maps

A parcel map procedure is used to create a division or consolidation of land under the provisions of the Subdivision Map Act and the Subdivision Ordinance. Both a tentative parcel map and a final parcel map are required. However, under some circumstances, the requirements for a tentative parcel map may be waived by the Planning Manager and the City Engineer, who have joint responsibility for the processing and approval of tentative parcel maps. A tentative map shows existing topography, boundaries, and improvements (100 ft. beyond the project boundary including driveways, etc., located across the street from the project) plus any proposed changes. An example of when the requirement to submit a tentative parcel map might be waived would be when all public improvements have already been installed, no grading is proposed, and the only changes proposed are changes to lot line or boundaries. The City Engineer shall determine if a tentative parcel map will be waived. If waived, a letter from the City Engineer placing conditions on the subdivision will be sent to the subdivider in the same manner as if conditionally approving a tentative parcel map.

The following shall apply to all Parcel Maps:

1. **Parcels.** All parcels created or divided by parcel maps shall conform to City standards and no existing building or structure shall be made non-conforming with respect to yard or other zoning requirements by the process.
2. **Easements.** No existing easement in favor of the public shall be rendered impractical by the creation of a parcel on any parcel map.
3. **Improvements.** The design and construction of required improvements shall conform to the criteria and standards contained in this Manual and dictated by local ordinance.
4. **Improvement Agreement/Security Instruments.** A parcel map improvement agreement similar to a subdivision improvement agreement may be required for improvements in conjunction with parcel maps. Said agreements, along with security instruments, shall be fully executed prior to recordation of parcel map.
5. **Final parcel maps** shall be prepared either by a registered Civil Engineer with a license number of 33965 or less or a licensed land surveyor.

Tentative Parcel Maps

The following checklist provides an outline of the information required on the tentative parcel map.

Checklist for Tentative Parcel Maps

A. GENERAL

1. Fees deposited
2. Reproducible and copies submitted per Submittal Sheet in Section I, along with copies of current Grand Deeds
3. Drawn on linen, polyester base film, or vellum with black waterproof drawing ink or pencil. Lettering or type to be a minimum of 1/8 inch in height

4. All sheets should be 18" x 26" (minimum) to 24" x 36" (maximum) with one-inch margins
5. Scale: 1" = 100' minimum (shown graphically) with North Arrow
6. Notification List and associated items

B. MARGINAL INFORMATION

1. Title: "Tentative Parcel Map"
2. Legal description sufficient to define boundaries – division of or consolidation of property
3. Tax Assessor's Parcel Number(s)
4. Owner's name, address, telephone number and signature
5. Applicant's name, address, telephone number (if other than owner)
6. Civil engineer's or land surveyor's name, address, telephone number and registration or license number
7. Source of water supply
8. Method of sewage disposal
9. Zoning – existing and proposed, including all adjacent parcels
10. Proposed usage of each parcel, including all adjacent parcels
11. Gross area (acres and square feet)
12. Reference to topographic source and date
13. Grading – statement if no grading proposed
14. Date of preparation and number, and dates of any revision
15. Vicinity map with north arrow and scale indicated

C. MAP INFORMATION

1. North arrow with graphic scale shown (1" = 100' minimum)
2. Boundaries
 - a. Fully dimensioned (approximations)
 - b. Proposed as solid line, existing as dashed lines
 - c. City – County boundaries identified
 - d. Curve information (approximate) including deltas, radii, and lengths
3. Inundation lines for design flood
4. The following "existing" information shall be shown within the parcel(s) boundaries and within at least 100 feet of the boundaries thereof:
 - a. Highways, streets, roads – names, grades, widths (all private roads shall be designated and labeled as such)
 - b. Sidewalks, pavement, curbs and gutters, street light, driveways

- c. Utilities:
 - 1) Sewer lines – location, size, type, depth, manholes
 - 2) Water lines – location, size, type
 - 3) Gas lines – location, size
 - 4) Electrical, telephone, and cable TV lines – location, size, type, poles, overhead or underground
 - d. Water Courses – widths, direction of flows
 - e. Buildings/structures – location with respect to lot lines
 - f. Trees – groves, orchards, and trees of trunk diameter 4” or more
 - g. Contours – maximum 5’ interval
 - h. Easements – location, purpose, size, public or private
5. The following “proposed” information shall be shown within the parcel(s) boundaries:
- a. Highways, streets, roads – names, grades widths (all private roads shall be designated and labeled as such)
 - b. Sidewalks, pavement, curbs and gutters, street lights, driveways.
 - c. Sewers – location, size, type, manhole locations
 - d. Drainage facilities
 - e. Removal or relocation of existing buildings and location of any proposed buildings
 - f. Removal of existing trees of trunk diameter 4” or more
 - g. Grading – degree of slope, benches, retaining walls, pad elevations
 - h. Easements – location, purpose, size, public or private
 - i. Parcel:
 - 1) Approximate dimensions
 - 2) Numbered in consecutive order
 - 3) Net area of each parcel (acres or square feet)
 - 4) Gross area of each parcel (acres or square feet)

Parcel Maps

The parcel map is the formalization of the approved tentative parcel map. Upon recordation, it officially and legally divides or consolidates parcels. The checklist provided below outlines the information required on the final parcel map.

Checklist for Parcel Maps

A. GENERAL

- 1. Fees deposited
- 2. Original and prints submitted per Submittal Sheet in Section I
- 3. Drawn on linen, polyester base film, or vellum with black, waterproof drawing ink or pencil. Lettering or typing to be a minimum of 1/8 inch in height.

4. All sheets shall be 18" x 26" with one-inch margins
5. Proof of Ownership – deed and title report submitted
6. Copies of easements submitted
7. Copies of traverses and closures submitted
8. Reference maps submitted
9. Marginal line – medium heavy, 1" inside trim line

B. MARGINAL INFORMATION/FORMAT

1. "Parcel Map No. ____" boldly shown at upper top of sheet
2. Scale: 1" = 100' minimum (shown graphically) with North arrow
3. Vicinity map with North arrow and scale indicated
4. "Sheet ____ of ____ sheet(s)" shown
5. Parcel map – division of consolidation of land, legal description and map referenced
6. Basis of bearings indicated
7. City Engineer's Certificate shown
8. City Surveyor's Certificate shown (as appropriate)
9. Surveyor's Certificate shown with appropriate signature and seal or Engineer's signature and seal shown
10. Recorder's Certificate

C. MAP DATA

1. Boundary around parcel(s) – heavy solid black line three (3) times thicker than interior parcel lines
2. Each parcel numbered
3. City and County boundary lines adjoining (or in vicinity) shown
4. Existing streets – names, widths, side lines shown as solid lines
5. Recorded maps identified by map name, number and with lots and blocks shown in "phantom letters"
6. Adjacent lot or block lines shown in dashed lines
7. Section, ¼ sections, or portions thereof identified in "phantom letters"
8. References in legal description fully identified on map
9. Mathematical data
 - a. Traverses include exterior boundaries, each parcel, streets and easements.
 - b. All bearings, distances, radii and deltas of traverses shown on map
 - c. Traverses close (1':10,000' if boundary)
 - d. Sum of parts of any line or curve must equal total length
 - e. Area calculations furnished where required

10. Record bearings, distances, and references in parentheses for:
 - a. Latest record map in disagreement with survey
 - b. Any deed data in disagreement with survey
11. Lines intersecting curves identified by bearing and whether (radial) or (not- radial)
12. Easements:
 - a. Identified as to private or proposed, width and purpose
 - b. Side lines shown as light dash lines
 - c. Recorded easements identified by document number and date of recordation
 - d. Fully dimensioned to include sufficient ties to locate
 - e. Drainage easements should include the note: "Drainage Easements will be kept clear of all obstructions. No buildings or walls should be placed within easement limits. Temporary improvements are subject to removal at the owner's expense."
13. Previously vacated streets or easements shown as light dash lines with recorded vacation data
14. Additional notes shown on map:
 - a. To clarify survey or explain discrepancies
 - b. To reference non-recorded information such as City ties, road surveys, State Highway maps, etc.
 - c. Improvement Certificate
15. Legend:
 - a. All abbreviations used on map defined
 - b. Monumentation symbols
16. Monumentation
 - a. Monuments per legend or fully described as to type, size, disc and engineer's or surveyor's registration number
 - b. Labeled as "No Record" or referenced to record map
 - c. If controlling location not of record: "No Record – Accepted Hereon As (describe callout location)"
 - d. Monuments tied into survey by bearing and distance, or "Used For Line Only". No floating monuments.
17. Inundation/seismic lines shown and identified
18. Ensure that Parcel map complies with:
 - a. General Plan
 - b. Zoning requirements
 - c. Tentative parcel map
 - d. All conditions imposed for parcel map approval

D. SEPARATE DEEDS, EASEMENTS:

1. Prepared, signed and submitted
2. Recording fees submitted
3. Approved by City Council
4. Recorded with County Recorder

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SUBDIVISION MAPS

Tentative Maps

The tentative subdivision map is made for the purpose of depicting the overall development contemplated. While not precise in detail, such as pavement structural section, it is specific in those items which can be predetermined such as street dimensions and right-of-way. Upon approval by the City, the tentative subdivision map constitutes an agreement between the developer and the City relative to approximate subdivision design to include its grading, zoning, and public improvements. All subsequent work by the developer and his engineer is based on the understanding reached at the tentative map stage. The tentative map should be as complete and specific as reasonably possible.

The tentative map is filed with the Planning Department and reviewed by both the Planning Commission and the City Council. The Commission acts in the capacity of an advisory body to the Council.

The following checklist provides an outline of the information required on the tentative map. All fees specified by the current fee schedule shall be paid at the time of filing a tentative map.

Checklist for Tentative Maps

A. GENERAL

1. Fees deposited
2. Reproducible and copies submitted per Submittal Sheet in Section I
3. Drawn on linen, polyester base film, or vellum with black waterproof drawing ink or pencil. Lettering or type to be a minimum of 1/8 inch in height
4. All sheets shall be 18" x 26" (minimum) to 36" x 60" (maximum) with one-inch margins
5. Associated maps, Reports, Statements and Exhibits
 - a. Preliminary Title Report (2 copies)
 - b. Preliminary Soils Report (2 copies)
 - c. Geological Report (1 copy), if required*
 - d. Scenic Highways Proposal (1 copy), if required*
 - e. Development Standards (1 copy), if required*
 - f. Affirmative Fair Marketing Plan (1 copy) for developments of 50 or more lots/units*
 - g. Preliminary hydrology study
 - h. Condominium conversions:
 - 1) Landscape concept plan (1 copy), also see (a) below

- 2) Building elevations (1 copy), also see (a) and (b) below
- 3) Site plan (1 copy), also see (a) and (b) below
- 4) Floor plans (1 copy), also see (b) below
- 5) Statement on utilities and meters (1 copy)
- 6) CC&Rs (1 copy)
- 7) Stamped self-addressed envelope of each tenant (3 sets)
- 8) Evidence of notification of intent to convert given to tenants 60 days prior to filing of tentative map

*Not required for condominium conversions
Plus one colored copy
Plus one copy reduced to 8-1/2" x 11" or other approved reduction

B. MARGINAL INFORMATION

1. Title: "Tentative Map for (subdivision name)" (Use Unit numbers when applicable)
2. Legal description sufficient to define boundaries – division of or consolidation of property
3. Tax Assessor's Parcel Number(s)
4. Owner's name, address, telephone number and signature
5. Subdivider's name, address, telephone number
6. Civil engineer's name, address, telephone number and registration or license number
7. Source of water supply
8. Method of sewage disposal
9. Gross area (acres or square feet)
10. Total number of lots
11. Total number of each type of lot (Residential, Open Space, etc.)
12. Area devoted to each proposed use
13. Minimum, Maximum and Average lot size
14. Present and Proposed Zoning
15. Present and Proposed Use(s)
16. Date of preparation and number and dates of any revision

17. Drainage and Flood Control Measures

18. Vicinity map with north arrow and scale indicated

C. MAP INFORMATION

1. North arrow with graphic scale shown (1" = 100' minimum)
2. Boundaries
 - a. Fully dimensioned (approximations)
 - b. Proposed as solid line, existing as dashed lines
 - c. City – County boundaries identified
 - d. Adjacent lands owned, leased, or under option by the subdivider shown
 - e. References to Adjacent Recorded maps by Name, Type and Number
3. The following "existing" information shall be shown within the parcel(s) boundaries and within at least 100 feet of the boundaries thereof:
 - a. Contours: Maximum Two (2) foot intervals to extend 100 feet beyond Subdivision boundaries and to include total ownership
 - b. Highways, streets, roads – names, grades, widths (all private roads shall be designated and labeled as such)
 - c. Sidewalks, pavement, curbs and gutters, street light, driveways
 - d. Utilities:
 - 1) Sewer lines – location, size, type, manholes with invert and rim elevations shown
 - 2) Water lines – location, size, type
 - 3) Gas lines – location, size
 - 4) Electrical, telephone, and cable TV lines – location, size, type, poles, overhead or underground
 - a. Water Courses – widths, direction of flows
 - b. Buildings/structures – location or relocation with respect to lot lines, size, and shape (to scale)
 - c. Trees – groves, orchards, and trees of trunk diameter 4" or more

- d. Easements – locations, purpose, size, public or private
 - e. Drainage Improvements – locations, size and type
 - f. Inundation line for the design storm
4. The following “proposed” information shall be shown within the tentative tract boundaries:
- a. Highways, streets, roads – names, grades, widths (all private roads shall be designated and labeled as such) along with typical cross section of each street. All curve data, cul-de-sac radii, and connections to existing streets shall be included
 - b. Sidewalks, pavement, curbs and gutters, street light, driveways, bicycle paths, riding and hiking trails, and pedestrian way (as applicable)
 - c. Sewers – location, size, type, manholes numbered, invert and rim elevations shown and access to all manholes
 - d. Drainage improvements – location, type and size
 - e. Removal or relocation of existing buildings and location of any proposed buildings
 - f. Removal of existing trees of trunk diameter 4” or larger
 - g. Grading – degree of slope, benches, retaining walls, brown ditches, pad elevations including Off-Site (slope rights must be obtained from the effected property owner)
 - h. Easements – locations, purpose, size, public or private

Final Subdivision Maps

Final subdivision maps are processed by the Engineering Department which is responsible for distribution to other departments. Final maps are not reviewed by the Planning Commission. Time limitations for submissions and processing are contained in the Subdivision Map Act.

- A. The items below shall be submitted along with the Final Map. The final subdivision map shall not be considered until all documents and plans supporting the subdivision have been submitted and the required fees have been paid. These documents include (but are not limited to) the following:
- 1. Proof of Ownership (Title Report, dated within 60 days of map approval)
 - 2. Copies of deeds, deed restrictions, and easements
 - 3. Traverse and closure sheets
 - 4. Hydraulic and hydrology computations
 - 5. Soils Report

6. Grading Plans (if required)
 7. Design data and/or calculations of special structures
 8. Engineer's Estimate based on City's cost rates
 9. Improvement Plans (if required)
 10. Other items as specified by City Council in approval of tentative map
 11. Reference Maps. Copy of Approved Tentative Map and Conditions of Approval.
- B. Additional submissions required prior to Council consideration. At least twenty-one (21) days in advance of the date scheduled for Council consideration of the final map, all required fees and assessments shall be paid and the following documents shall be filed by the subdivider with the City Engineer. All such documents shall be reviewed and approved by the City Engineer, fully executed and complete in all respects, at the time of filing.
1. Improvement Agreement(s), City signatures not required
 2. Bonds or request for delayed bonding procedure
 3. Easements for all off-site improvements
 4. Any other required deeds and/or easements
 5. Signatures required prior to Council consideration – Title Sheet. At least twenty-one (21) days in advance of the date scheduled for Council consideration, the title sheet shall be fully executed except for certificates by the City Clerk, City Engineer, and County Recorder.

The following checklist provides an outline of the information required on the subdivision map. All fees specified by the current fee schedule shall be paid at the time of filing a subdivision map.

Checklist for Final Subdivision Maps

A. GENERAL

1. Map Check deposited
2. Reproducible and copies submitted per Submittal Sheet in Section I
3. Supporting documents submitted:
 - a. Proof of Ownership
 - b. Traverse sheets
4. Improvement and grading plans submitted
5. Drafting requirements – all sheets

- a. Size: 18" x 26"
- b. Drawn with black waterproof drawing ink
- c. Drawn on polyester base film. All lettering or type to be a minimum of 1/8 inch in height
- d. 1" margin with medium-heavy marginal line
- e. "Tract (or Parcel as applicable) Map No. ____" at top of sheet
- f. "Sheet ____ of ____ sheets" inside upper right hand margin
- g. "Reversion to Acreage" or "Amended," if applicable
- h. Unit number, if applicable

B. TITLE SHEET – CERTIFICATES (SHEET 1)

1. Legal description
2. Number of lots. Each type and total
3. Gross acreage
4. Certificates, as appropriate
 - a. The certificate for those signers requiring embossing seals such as the City Clerk
 - b. The description of what is offered for dedication or as easements in the Owner's Certificate shall agree with what is accepted (or rejected) in the 'City Clerk's Certificate
 - c. All signatures must be signed in black waterproof ink and dated within authorized time periods

C. PROCEDURE OF SURVEY AND INDEX SHEET

1. Marginal information
 - a. Vicinity map with north arrow and scale indicated
 - b. Civil engineer or land surveyor's certificate with signature and seal
 - c. Other certificates which would not fit on Sheet 1
 - d. Legend with all symbols identified
 - e. Basis of Bearings
 - f. General Notes:

- 1) Total number of lots
- 2) Gross area in square feet or acres
2. Procedure of Survey
 - a. Scale: 1" = 200' or as required
 - b. North arrow shown
 - c. Legend:
 - 1) Sheet coverage/Index
 - 2) Identify sheet numbers
 - 3) Show subdivision, City-County boundaries, etc.
 - d. All monuments identified
 - e. All lots shown and numbered
 - f. All streets shown and identified
 - g. Record maps, section, $\frac{1}{4}$ sections identified
 - h. References to legal description fully identified
 - i. Bearings, distances, radii, and deltas shown for subdivision boundaries and ties
 - j. Record bearings, distances and references shown in parenthesis for:
 - 1) Latest record map in disagreement with survey, and
 - 2) Any deed data in disagreement with survey
 - k. Tied to California Coordinate System, Zone VI, if pertinent

D. MAP SHEETS

1. Scale: 1" = 100' (minimum) with graphical scale shown, or as required to show all details
2. North arrow
3. Subdivision boundary – heavy solid line approximately 1/16 inch wide with coincident blue boundary on reverse side
4. Each lot numbered
5. Each block numbered or lettered

6. City-County boundaries shown and identified
7. Adjacent lot or block lines shown in dashed lines
8. Existing streets – names, widths, side lines shown as solid lines
9. Recorded maps identified by map name, number and with lots and blocks shown in “phantom letters”
10. Adjacent lot or block lines shown in dashed lines
11. Sections, $\frac{1}{4}$ sections, or portions thereof identified in “phantom letters”
12. Record bearings, distances and reference in parenthesis for:
 - a. Latest record map in disagreement with survey
 - b. Any deed data in disagreement with survey
13. Lines intersecting curves identified by bearing and whether (radial) or (not- radial)
14. Easements:
 - a. Identified as to private or proposed, width and purpose
 - b. Side lines shown as light dashed lines
 - c. Recorded easements identified by document number and date of recordation
15. Previously vacated streets or easements shown as light dashed lines with recorded vacation data
16. Inundation/seismic lines shown and identified
17. Tree planting and maintenance easements shown on dedicated streets
18. Areas “Not A Part of Subdivision” clearly delineated
19. Lettered lots:
 - a. Lots reserved for parks and open space
 - b. Lots reserved for utility facilities
20. Abutter’s rights of access relinquished shown as required
21. Mathematical data:
 - a. Traverses include exterior boundaries, each parcel and streets and easements
 - b. All bearings, distances, radii, and deltas of traverses shown on map

- c. Traverses close (1' = 10,000 of perimeter)
- d. Sum of parts of any line or curve must equal total length
- e. Area calculations furnished, where required

22. All abbreviations used on map defined in Legend

23. Monumentation:

- a. Monuments per legend or fully described as to type, size, disc and engineer's or surveyor's number
- b. Labeled as "No Record" or referenced to record map
- c. If location not of record: "No Record – Accepted Hereon as (describe callout location)"
- d. Monuments tied into survey by bearing and distance, or "Used for Line Only." No floating monuments.

24. Additional notes shown on map

- a. To clarify survey or explain discrepancies
- b. To reference non-recorded information such as City ties, road surveys, state highway maps, etc.

25. Map complies with:

- a. General Plan
- b. Zoning requirements
- c. Tentative Map
- d. All conditions imposed for tentative map approval

26. Separate deeds, easements:

- a. Prepared, signed and submitted
- b. Recording fees submitted
- c. Approved by City Council
- d. Recorded with County Recorder

SECTION III GRADING PLANS

General

All grading improvements shall be done in accordance with the City of Lake Elsinore Grading Ordinance No. 636, Ordinance No. 801, Ordinance No. 882, Ordinance No. 1271, and the standards outlined within this section of the Design Manual.

Note: Grading Ordinances referenced Uniform Building Code (U.B.C.) which since have been replaced with the latest edition of the California Building Code (C.B.C.) and International Building Code (I.B.C.).

Plans submitted for checking shall be complete sets and include all supporting documentation and calculations to enable a thorough review to be done. All plans and calculations shall be stamped and signed by a registered engineer. Incomplete submittals will be returned to the engineer unchecked.

Documentation shall include all necessary easement documents; offsite letters of acceptance and copies of adjoining tract plans wherever necessary to ensure compatibility. Calculations shall include hydrology (existing and proposed) along with hydraulic calculation showing the adequacy of proposed drainage facilities to safely and effectively control runoff.

A complete set of erosion control plans shall be submitted showing all necessary devices needed to control erosion of the graded site during construction.

Plan Preparation

In order to obtain uniformity and allow easier review of the plan, the following criteria shall apply to all plans submitted:

1. The maximum plan size shall be 24" x 36", ink on mylar and minimum scale 1" = 40'. All lettering shall be 1/8" minimum.
2. Use County Benchmarks, give elevations, location, benchmark number and adjustment date.
3. Show property address.
4. Indicate the Tentative Tract or Parcel Map file numbers and Site Plan numbers. Indicate site address. Indicate purpose of grading in title block (e.g., rough, precise).
5. Show vicinity map or other data adequately indicating the site location.
6. Show name, address and telephone number of owner, design engineer (or architect), soils engineer and geologist.
7. Show key map indicating sheet coverage.
8. Show yardage of cut, fill, over excavation and backfill, export and import on plan.
9. Add "Engineer's Notice" to title sheet. (Refer to Appendix)

10. Show construction notes and quantities for on-site development.
11. Add "Soil Engineer's Certificate" to title sheet. (Refer to Appendix)
12. A Registered Civil Engineer must sign each sheet of plans and indicate a state license number, prior to submittal. Unsigned plans will not be accepted for plan checking.
13. Show and label property lines of the property on which the work is to be performed.
14. Show North arrow, scale, legend and symbols.
15. Show precise location of all existing buildings, structures, trees, cesspools, septic tank and wells on the property where the work is to be performed. Also show the location of any buildings or structures on the land of adjacent property owners that are within fifteen (15) feet.
16. Indicate all existing and proposed easements for drainage devices, roadways and utilities.
17. Show accurate contours (minimum 5' intervals) or spot elevations indicating the topography of the existing ground. Sufficient contours or spot elevations must be shown fifteen (15) feet minimum beyond the property line of the site being graded to indicate existing drainage patterns.
18. Show finish grades by contours and spot elevations indicating proposed drainage patterns and grading. Show finish grade elevations at corners of all structures, B.C., E.C., BVC, EVC and grade breaks. For precise grading plans, show pad and finished floor elevations.
19. Show daylight lines of all cuts and fills. Make them continuous and obvious.
20. Indicate where excess dirt (cut or import) is to be placed.
21. Provide berms at the tops of all slopes. Show detail (minimum 12 inches high and 4 feet wide). No sheet flow will be allowed over slopes greater than 5 to 1.
22. Show all applicable Standard Grading and Paving Notes on the plans.
23. Show building or structure setbacks as per approved site plan.
24. Provide complete hydrology and hydraulic report as required. Refer to Section IV for storm drainage requirements.
25. Show complete details of all drainage structures.
26. Show details of typical lot drainage.
27. Show location and complete details of de-silting basins.
28. Show top and toe of all cut and fill slopes.

29. Show details of typical slope.
30. Show details of typical slope benching for fill placement.
31. Show sub-drainage systems on plans.
32. Indicate City Grading Permit Number on first sheet of grading plans.
33. Provide right of entry for any grading on adjacent properties. Permission must be in letter form signed and notarized by adjacent property owner.
34. Show quantity estimate of all items to be constructed per the grading plan and requiring inspection, i.e., drainage devices, retaining walls, etc.
35. All existing drainage courses on the project site must continue to function, especially during storm conditions. Protective measures and temporary drainage provisions must be used to protect adjoining properties during grading operations.
36. The WDID number will be shown in the bottom right corner of the title sheet and a copy of the letter shall be provided.
37. If storm drain system is required, those plans will be referenced and if necessary, the following note shall be added to the title sheet:

“The storm drains shown hereon must be built concurrently with grading operations. The storm drain details are shown on the _____ plans. The storm drains shown thereon should be considered as part of these plans.”
38. Pay particular attention to setback requirements as outlined in the C.B.C., Section J108.
39. Certificate of approval of the City of Lake Elsinore Engineer shall appear on all sheets in the following form:

“These plans have been reviewed for compliance with the appropriate conditions of development and/or city and state laws, and a permit may be issued.”

City Engineer	RCE#	Expiration Date
---------------	------	-----------------

Soil Report

A soil engineering report shall be prepared for each grading project by a licensed soils engineer. The soil engineering report shall include data regarding the nature, distribution and strength of existing soils, conclusions and recommendations for grading procedures and design criteria for corrective measures when necessary, and opinions and recommendations covering adequacy of sites to be developed by the proposed grading.

The report should include compaction recommendations regarding fills, base materials beneath

pavements, sidewalks, and in trenches. The report should also provide a recommendation of all the required pavement sections.

Should the project require cast-in-place pipe, the report must address design issues associated with this type of pipe.

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Design Criteria

Drainage

1. Minimum gradients for residential sites:

Dirt, grass, etc.....	1.0%	
Fine graded residential lot – dirt.....	2.0%	sheet flow away from building pad for minimum of three (3) feet
Asphalt concrete	1.0%	
Concrete	0.5%	
Concrete gutter in paved area	1.0%	
Hillside single family residential subdivision rear yard.....	2.0%	
Rough graded hillside lots.....	2.0%	
Terrace drains.....	6.0%	
Interceptor drains.....	2.0%	

2. Minimum gradients for flat land industrial sites:

Earth at rough grade stage	0.5%	
Earth fine grade	1.0%	
Asphalt pavement (sheet flow)	1.0%	
Concrete drain in earth area	0.5%	
Concrete gutter in paved area	0.5%	
Maximum gradient for sheet flow.....	20.0%	
Maximum gradient for concentrated water on developed lots.....	4.0%	

3. Design to carry water to nearest practical street, storm drain or natural watercourse. Concentrated flows will not be allowed over curbs.
4. All concentrated flows shall be contained within a concrete drainage device.
5. Provide velocity reducers at storm drain outlets. (Refer to City Standard Plan No. 305 for Rip Rap Energy Dissipater.)
6. Provide cut-off walls at inlet end of paved drains.

7. Design and show locations of interceptor drains.
8. Drainage shall not flow over the top edge of any slope.
9. For residential lots, swales shall be three (3) feet minimum horizontal distance from pad.
10. Drainage of reciprocal side yard lots shall not cross over fence lines.

Slopes

Provide setbacks outlined in Grading Code and shown on approved site plan. Note permit area boundary and C.B.C. setbacks. Cut and fill slopes to be no greater than 2 horizontal and 1 vertical.

Drainage shall be directed away from the faces of cut and fill slopes or into approved drainage structures. The faces of cut and fill slopes shall also be manufactured to control against erosion. This control may consist of stepping or other surface protection, as approved by the City Engineer. The protection for the slopes shall be installed within fifteen (15) days after completion of the rough grading.

Provide terrace drains and down drains for cut and fill slopes as outlined in the Grading Code. Drains shall be constructed of three (3) inch minimum thickness concrete reinforced with 6" x 6" #10 welded wire mesh (W.W.M) or approved equal.

The surface of all cut slopes more than seven (7) feet in height, except those cut slopes adequately stabilized from erosion by stepping or other physical surface protection per item (2) above, and fill slopes more than three (3) feet in height shall be permanently protected against damage by erosion by planting with grass or ground-cover plants. It is required to install such vegetation upon completion of the rough grading in conjunction with the installation of temporary soil stabilization measures as specified above. Final approval of work shall be made after growth is established on the slopes. Slopes exceeding fifteen (15) feet in vertical height shall (as a minimum), also be planted with a seed and/or young plant mix containing grass, ground-cover plants, shrubs and/or trees that permanently protects the slope from erosion. Native and other plants selected, and planting methods used shall be suitable for the soil and climatic conditions of the site. Rationale for determination of seeding or planting rates and density and species selection shall be provided.

Slopes required to be planted shall be provided with an approved system of irrigation, designed to cover all portions of the slope, and plans therefore shall be submitted and approved prior to installation. A functional test of the system shall be required. All irrigation systems where required shall be designed on an individual lot basis unless commonly maintained in an approved manner.

Recommendations in the soils report and the City Grading Ordinance shall be incorporated into the design of any slope.

The following standard "Grading Notes" (as applicable) shall be placed on the plans:

GRADING NOTES

1. All work shall be done in accordance with the City of Lake Elsinore Municipal Code, Chapter 15.72 and applicable standards and specifications and the latest edition of the California Building Code (C.B.C.), Section J108.

2. A permit shall be obtained from the Engineering Department, City of Lake Elsinore, prior to any operations.
3. The developer and/or the contractor shall notify all utility companies and U.S.A. ALERT (1-800-422-4133) forty-eight (48) hours prior to grading.
4. The contractor shall notify the City Engineering Department at least twenty-four (24) hours in advance of beginning grading operations.
5. Dust shall be controlled by watering or other methods approved by the City Engineer.
6. Cut slopes shall be no steeper than 2 horizontal to 1 vertical, unless otherwise approved, and shall be shown on the plan.
7. Fill slopes shall be no steeper than 2 horizontal to 1 vertical, unless otherwise approved, shall be shown on plan, and shall not have less than 90% relative compaction out to the finished surface.
8. Fills shall be compacted throughout to 90% density as determined by the modified three (3) layer A.S.T.M. D-1557-70 test method.
9. Fill areas shall be cleaned of all vegetation and debris, scarified, and inspected by the grading inspector and approved soils testing agency prior to the placing of fill.
10. All fill material shall be clean earth. No fill shall be placed until preparation of ground is approved by the soils engineer.
11. Finish grade shall be sloped away from all exterior walls at not less than $\frac{1}{2}$ " per foot for a minimum of three (3) feet, then 1% (minimum) to flow line of earth swale.
12. Minimum building pad and drainage swale slope shall be 1% if cut or fill slope is less than ten feet (10'), and 2% if cut or fill is greater than ten feet (10'). Drainage swales shall be a minimum of 0.5' deep and constructed a minimum of two feet (2') from the top of cut or fill slopes.
13. Provide 4' wide by 1' high berm or equivalent along the top of all fill slopes over 5' high
14. Provide a brow ditch, designed to handle one hundred (100) year storm flows along the top of cut slopes.
15. No obstruction of flood plains or natural water courses shall be permitted.
16. A soils engineer shall be retained by the developer, to supervise grading and provide a final soils report which includes foundation requirements (subdivisions) and expansive characteristics of the soil.
17. Grading certification by the developer's civil engineer and a final

compaction report by a soils engineer shall be submitted to the building and engineering departments prior to issuance of building permits.

18. The soils engineering investigation dated _____ prepared by (engineer consultant) and the engineering geologic investigation dated _____ prepared by (geologic consultant), shall be considered a part of this grading plan and shall be complied with.
19. A registered civil engineer or licensed land surveyor shall submit certification of building pad elevation. Where specific elevations are required, the elevation (with respect to mean sea level) shall be given. If an elevation with respect to adjacent ground surface is required, the actual distance above the adjacent ground shall be given.
20. All property corners shall be clearly delineated in the field prior to commencement of any construction/grading.
21. Stability calculations with a safety factor of at least 1.5 shall be submitted by a soils engineer to the Building and Engineering Departments for cut and fill slopes over thirty feet (30') in vertical height.
22. A final compaction report will be required for all fills greater than one (1) foot.
23. If steep sloping terrain occurs upon which fill is to be placed, it must be cleared, keyed and benched into firm natural soil for full support. Preparation shall be approved by a registered soils engineer prior to placement of fill material. Slopes greater than 5:1 are required to be keyed and benched.
24. The soils engineer should inspect the construction in the following stages:
 - a. Upon completion of clearing and during excavation and before backfill of alluvial, colluvial and terraced areas and any substructures.
 - b. During all rough grading and operations including pre-compaction, benching and filling operations.
 - c. During installation of buttress and canyon sub-drains and filter material.
 - d. When any unusual grading conditions are encountered during construction.
25. Erosion Control: All graded slopes equal to or greater than 3 feet in vertical height shall be planted with rosea ice plant or another approved drought tolerant ground cover, at twelve inches (12") on center. Slopes over fifteen feet (15') in vertical height, in addition to ground cover, shall be planted with approved trees, shrubs or combination thereof. Shrubs shall be planted at ten feet (10') on center; trees at twenty feet (20') on center; combinations, fifteen feet (15') on center. Slopes over three feet (3') in vertical height shall have permanent irrigation systems with backflow prevention devices per C.B.C.

26. Approved protective measures and temporary drainage provisions must be used to protect adjoining properties during the grading project.
27. Approved erosion preventive devices shall be provided and maintained during the rainy season and shall be in place at the end of each day's work.
28. All work shall conform to the City and State construction safety orders.
29. The location and protection of all utilities is the responsibility of the permittee.
30. An approved set of grading plans shall be on the job site at all time.
31. Sanitary facilities shall be maintained on the site from beginning to completion of grading operation.
32. All slopes shall be planted, and irrigation facilities shall be provided for all slopes in excess of three (3) feet vertical height within ninety (90) days after completion of rough grading and shall be in accordance with City of Lake Elsinore Grading Ordinance No. 882 prior to the approval of final inspection.
33. Any contractor performing work on this project shall familiarize himself with the site and be solely responsible for any damage to existing facilities resulting directly or indirectly from his operations, whether or not such facilities are shown on these plans.
34. The design engineer shall provide a minimum of one (1) blue top per finished pad, prior to rough grade approval.
35. Approximate date of:
Beginning operation: _____
Completion: _____
36. No rock or other irreducible material with a maximum dimension greater than three inches (3") will be placed in fills within roadbed areas or three feet (3') of finish grades, unless the location, materials, and disposal methods are specifically approved by the soils engineer.
37. The engineer must set grade stakes for all drainage devices and obtain inspection before approval.
38. Grading plans will not be approved until all retaining walls are approved by the Building Department.
39. This site has obtained a National Pollution Prevention Elimination System (NPDES) permit to regulate municipal and industrial storm water discharges.

NPDES WDID # _____ DATE PERMIT ISSUED: _____

40. Drainage easements will be kept clear of all obstructions. No buildings or

walls shall be placed within easement limits. Temporary improvements are subject to removal at the owner's expense.

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Erosion Control Notes

All erosion control plans shall be in accordance with City of Lake Elsinore Ordinance Nos. 1237, 772, 529, 1004, construction site Best Management Practices (BMP's) and standards outlined within the Lake Elsinore Design Manual. No grading permit shall be issued without an erosion control plan approved by the City Engineer. The erosion control plan shall include details of protective measures, including desilting basins or other temporary drainage or control measures, or both, as may be necessary to protect the water quality of receiving water bodies or to protect adjoining public and private property from damage from erosion, flooding or the deposition of mud or debris which may originate from the site or result from such grading operations.

The following Erosion Control and NPDES notes as worded with blanks filled in, shall be placed on the plans:

1. All erosion control plans shall be in accordance with City of Lake Elsinore Ordinance Nos. 529, 772, 1237, 1004, construction site Best Management Practices (BMP's), and standards outlined within the Lake Elsinore Design Manual.
2. The developer/contractor is responsible for any discharges by subcontractors.
3. In case of emergency, call _____ (responsible person) at _____ (24-hour phone number).
4. Devices to reduce erosion damage shall not be placed, moved or modified without the approval of the Qualified SWPPP Developer, City Engineer, or in an emergency, by the person responsible for grading operations.
5. Areas that are cleared and graded shall be limited to only the portion of the site that is necessary for construction. The construction site shall be managed to minimize the exposure time of disturbed soil areas through phasing and scheduling of grading and the use of temporary and permanent soil stabilization.
6. Once disturbed, graded slopes exceeding a 3:1 ratio and/or ten (10) feet in height (temporary or permanent) shall be stabilized if they will not be worked within 7 days. During the storm season, all slopes shall be stabilized 24 hours prior to a predicted storm event. Construction sites shall be revegetated as early as feasible after soil disturbance and within 7-days of completion.
7. Fill slopes at the tract perimeter must drain away from the top of the slope at the conclusion of each working day.
8. The contractor shall be responsible and have signs posted on the site to warn against public trespassing into areas where water is impounded.
9. Dust shall be controlled by watering or other methods approved by the City Engineer.
10. Placement of devices to reduce erosion damage within the development shall be shown on the approved plan.

11. Desilting facilities at all drainage inlets for the graded site shall be designed for a twenty-five (25) year, six (6) hour storm intensity. They must be detailed on the plans. Design and specific recommendations shall be submitted for the following:
 - a. Desilting basin volume based on gradient and nature of soils.
 - b. The extent of all graded areas and identification of any temporary soil stabilization measures.
 - c. Size of desilting basin outlet pipe and overflow.
 - d. Dike requirements. Show minimum wall width, slope of walls, percent compaction, etc.
 - e. Outlet conditions from the desilting basin shall not exceed downstream limitations, with the exception of overflow, which is to be designed to provide capacity of 1.5 times the maximum design flow.
12. Necessary materials shall be available on-site and at convenient locations to facilitate rapid construction of temporary devices or to repair any damaged erosion control measures when a 50% chance or greater of rain within a 48-hour period is forecast for Lake Elsinore by the National Oceanic and Atmospheric Agency (NOAA).
13. BMPs shall be maintained and inspected daily to minimize and/or prevent the entrainment of soil in runoff from disturbed soil areas on Construction Sites. All removable protective erosion control devices shown shall be in place at the end of each working day when the four (4) day rain probability forecast exceeds forty percent (40%).
14. After a rainstorm, all project generated silt and debris shall be removed from check berms, onsite public drains and pipes, drains and pipes of adjacent properties and desilting basins and the basins pumped dry. Any graded slope BMP's damaged during a rainstorm shall also be immediately repaired. Failure to provide effective maintenance may result in penalties.
15. Discharging of contaminated soil via surface erosion is prohibited.
16. Construction access points shall be stabilized with a combination of rock and shaker plates year-round to prevent track-out. Routine street sweeping shall be performed on all paved streets where tracking is observed. Vacuum sweepers shall be used when street sweeping becomes ineffective.

NPDES / Storm Water Pollution Notes

1. For projects that require coverage under the General Construction Permit, the property owner is responsible for ensuring that a Qualified SWPPP Practitioner (QSP) and Qualified SWPPP Developer (QSD) implement and maintain the SWPPP-approved, pre-qualified BMP's from the California Storm water Quality Association (CASQA) handbook / website for construction to retain sediments and pollutants of concern from areas disturbed onsite to the maximum extent practicable during ANY phase of

construction operations. For all other projects, the property owner is responsible for ensuring that BMPs for construction are implemented to retain sediments and pollutants of concern from areas disturbed onsite to the maximum extent practicable. The erosion control measures include those shown on this plan as well as any additional erosion control measures dictated by field conditions to prevent erosion and/or the introduction of pollutants into existing public streets and/or onto adjacent properties during ANY phase of construction.

2. For projects that require coverage under the General Construction Permit, the Storm Water Pollution Prevention Plan (SWPPP) shall be kept on-site and made available upon request of a representative of the Regional Water Quality Control Board (RWQCB) - Santa Ana Region and/or the City of Lake Elsinore.
3. Construction sites shall be maintained in such a condition that an anticipated storm does not carry wastes or pollutants off the site. Discharges of material other than storm water (non-storm water) are prohibited except as authorized by an individual NPDES permit under the statewide General Permit – Construction Activity.
4. Potential pollutants include but are not limited to: solid or liquid chemical spills; wastes from paints, stains, sealants, solvents, detergents, glues, lime, pesticides, herbicides, fertilizers, wood preservatives, and asbestos fibers, paint flakes or stucco fragments; fuels, oils lubricants, and hydraulic, radiator or battery fluids; concrete and related cutting or curing residues; floatable wastes; wastes from engine/equipment steam cleaning or chemical degreasing; wastes from street cleaning; and super-chlorinated potable water from line flushing and testing. During construction, disposal of such materials should occur in a specified and controlled temporary area on-site physically separated from potential storm water runoff, with ultimate disposal in accordance with local, state and federal requirements.
5. Runoff from equipment and vehicle washing shall be contained at construction site and must not be discharged to receiving waters or the local storm drain system.
6. Appropriate BMPs for construction-related materials, wastes, spills or residues shall be implemented to eliminate or reduce transport from the site to streets, drainage facilities, or adjoining properties by wind or runoff.
7. Material storage and staging areas shall be established. Fuel tank, portable toilets, liquids, gels and powders shall have secondary containment and be stored away from all private / public storm water conveyance systems, sidewalks, rights-of-ways and flow lines.
8. All portable mixers shall have plastic liners underneath with gravel bags placed on the down-hill side of the liners to contain discharges.
9. Controlled street washing will only be allowed prior to the application of asphalt seal coats and only when all pertinent drainage inlets are protected.

10. All construction contractors and subcontractor personnel are to be made aware of the required BMPs and good housekeeping measures for the project site and any associated construction staging areas.
11. Discharging contaminated groundwater produced by dewatering groundwater that has infiltrated into the construction site is prohibited. Discharging non- contaminated groundwater produced by dewatering activities may require a National Pollutant Discharge Elimination System (NPDES) permit from the Regional Water Quality Control Board.
12. Storm water runoff shall not be directed over any slopes without permanent down drains installed. Erosion and sediment controls including maintenance are required on all exposed slopes until sufficient permanent landscaping has been established. 100% slope protection must be in place prior to the issuance of the final certificate of occupancy.
13. Vegetation clearing and brushing activities shall not be initiated during the wet season on any sites which are not adequately protected with desilting basins or other temporary drainage or control measures.
14. Stockpiles of soil shall be properly secured with BMPs to eliminate or reduce sediment transport from the site to streets, drainage facilities or adjacent properties.
15. Stockpiles of soil shall be properly contained to eliminate or reduce sediment transport from the site to streets, drainage facilities or adjacent properties via runoff, vehicle tracking or wind. Inactive for a period of 14 days or more shall be covered; active stockpiles shall be covered prior to a forecasted rain.
16. For project requiring coverage under the Construction General Permit, special attention shall be given to preparation and installation of the Rain Event Action Plan (REAP) as required based on site Risk Level or as mandated by the Santa Ana Regional Board NPDES Permit, General Permit – Construction Activities.
17. At the end of each day of construction activity, all construction debris and waste materials shall be collected and properly disposed of in covered trash or covered recycle bins.
18. This site has obtained a National Pollution Prevention Elimination System (NPDES) permit to regulate municipal and industrial storm water discharges.
NPDES WDID # _____ DATE WDID ISSUED: _____
19. The undersigned civil engineer, a qualified QSP and/or QSD will review placement of erosion control and insure that work is in accordance with the approved plans.

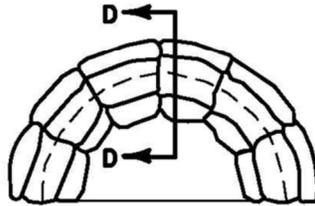
(Signature) (RCE No.) (Exp)

(Date)

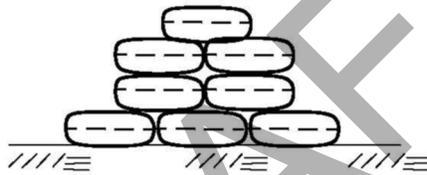
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TYPICAL SANDBAG DETAILS

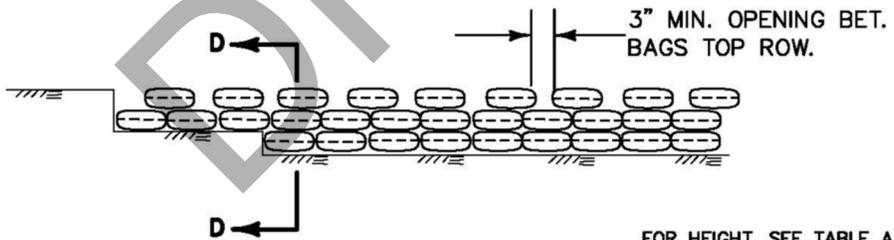
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SANDBAG CHECKDAM

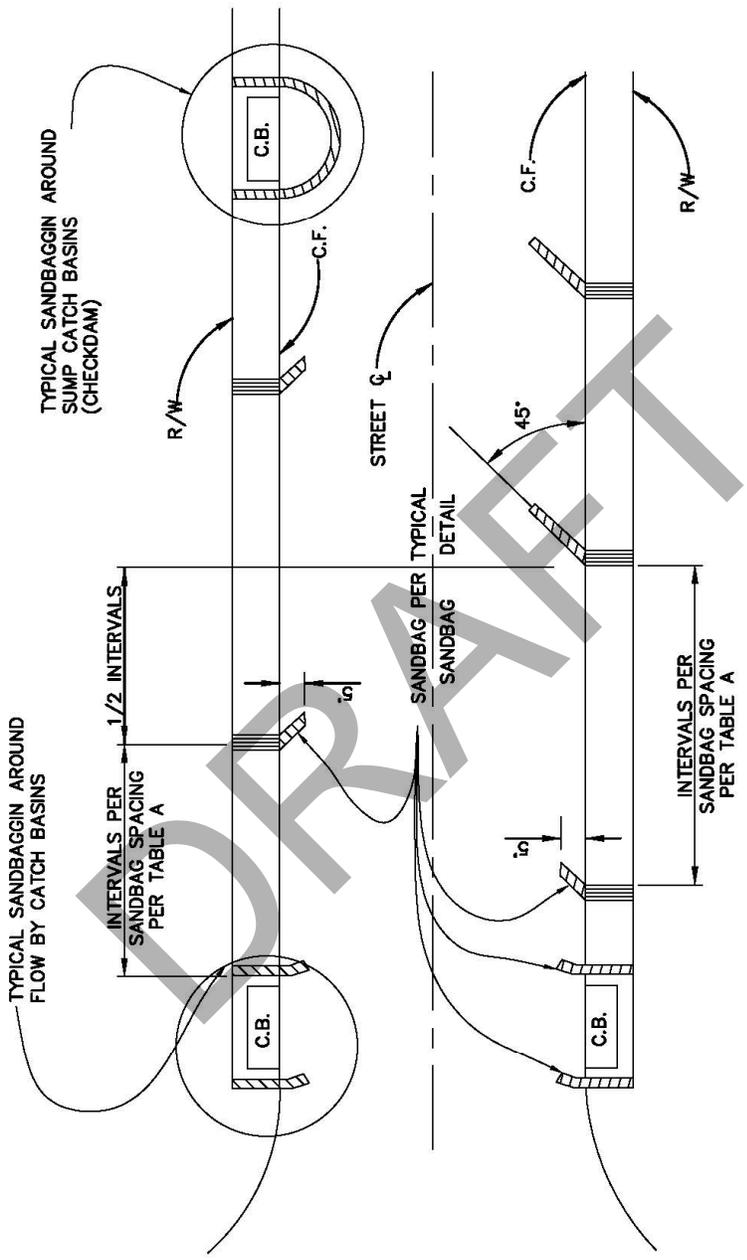


SECTION D-D



FOR HEIGHT, SEE TABLE A

TYPICAL SANDBAG DETAIL



TYPICAL PAVED STREET SANDBAGGING DETAIL

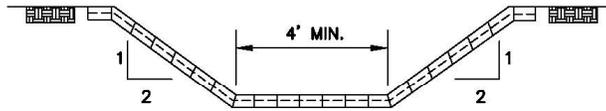
TABLE A
SPACING OF ROWS OF SANDBAGS

Slope of Street	Paved Street	Unpaved Street	
10% or more	25 ft	25 ft	3 courses 18 in. high min.
9.9% to 8%	50 ft	35 ft	3 courses 18 in. high min.
7.9% to 6%	75 ft	50 ft	1 ft high min.
5.9% to 4%	100 ft	74 ft	1 ft high min.
3.9% or less	100 ft	100 ft	1 ft high min.

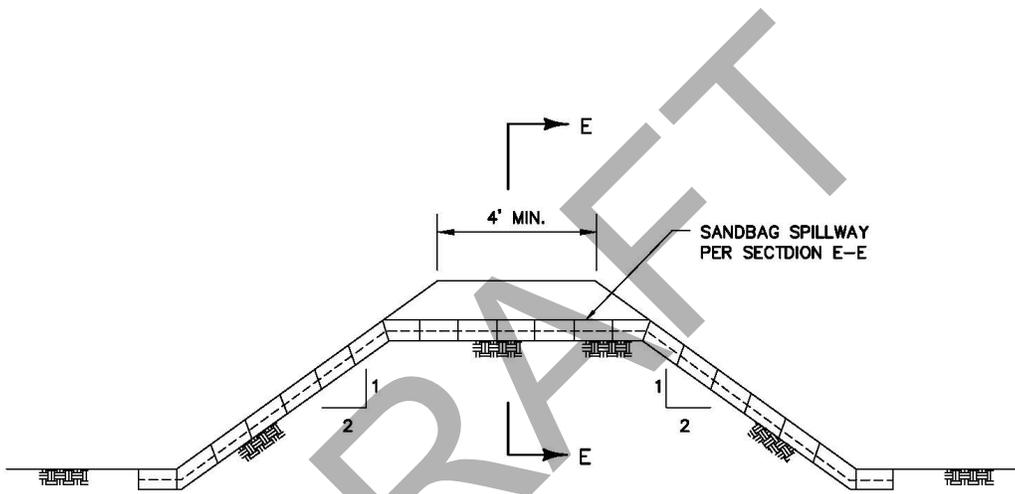
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DEBRIS BASIN DETAIL

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SECTION E-E

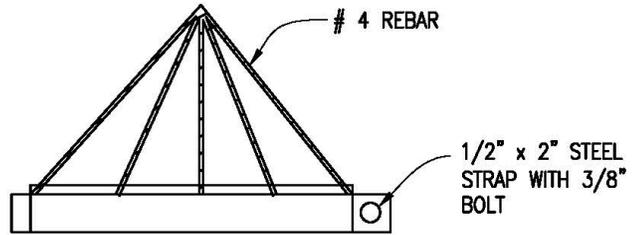


SPILLWAY SECTION

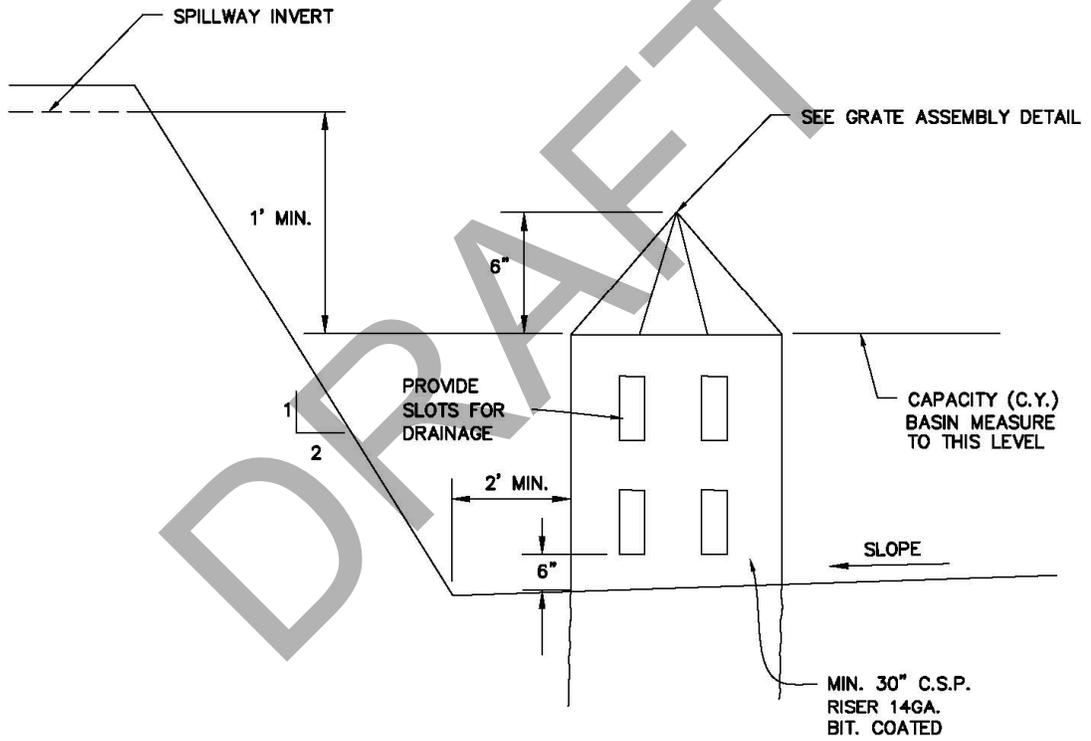
DEBRIS BASIN DETAIL

DEBRIS BASIN RISER DETAIL

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GRATE ASSEMBLY DETAIL



DEBRIS BASIN RISER DETAIL

Checklist for Grading Plans

A. GENERAL

1. Fees
2. Blue line prints submitted
3. Supporting data/calculations submitted
 - a. Soils report(s)
 - b. Drainage calculations
 - c. Structural calculations
 - d. Geology report(s), if applicable
 - e. Seismic report(s), if applicable
 - f. Landscape plan
 - g. Irrigation plan
 - h. Application for Land Development Permit
 - i. Letters of permission/easements
 - j. Engineer's estimate
4. Drafting requirements (each sheet):
 - a. Prepare on 24" x 36" mylar sheets
 - b. Sheet format – See Sheet A-1 of Appendix
 - c. Drawn with black waterproof drawing ink
 - d. All lettering to be a minimum of 1/8" in height
 - e. Sheets numbered consecutively with total number of sheets indicated
 - f. Civil engineer's signature and registration number on each sheet
 - g. Title block on each sheet to contain:
 - 1) Title: Grading Plan
 - 2) Designation of subdivision, if applicable
 - 3) Location or extent of grading
 - h. Benchmark description

B. COVER SHEET

1. Vicinity map with north arrow and scale indicated
2. Key map
 - a. North arrow
 - b. Scale: 1" = 200'
 - c. Shows general plan of subdivision with subdivision boundary, streets and lots identified
 - d. Show each adjacent subdivisions and connecting streets
 - e. Show each sheet coverage
 - f. Legend identifies all symbols used
 - g. Drainage facilities
 - h. Direction of drainage flow
3. Work to be done (general notes, notification notes, grading/landscaping notes) and Soils Engineer's Certificate
4. Street cross-sections:
 - a. Each street represented
 - b. Dimensions – right-of-way, sidewalks, medians, easements, etc.
 - c. Rough grade line shown with width and depth of grading
 - d. Side slopes (2:1 minimum cut, 2:1 minimum fill)
5. Legend identifies all symbols used
6. Details shown as necessary
7. Approvals by other agencies, as applicable
 - a. WDID number
 - b. SWPPP reference
8. Amounts of excavation, fill, cut, waste, import in cubic yards.
9. Show typical lot drainage. (Precise Grading Only.)
10. Certification of approval of the City of Lake Elsinore Engineer, shall appear on all sheets in the following form:

“These plans have been reviewed for compliance with the appropriate conditions of development and/or City and State laws, and a permit can be issued.”

City Engineer RCE # Expiration Date

C. GRADING SHEETS

1. Boundary lines shown:
 - a. City-County boundaries
 - b. Subdivision boundaries
 - c. Right-of-way lines
 - d. Lot lines dimensioned
 - e. Lot lines of adjacent properties
 - f. Utility easements
 - g. Tree planting and maintenance easements
2. Contours (extend at least fifty feet (50') beyond limits of grading)
 - a. Existing contours shown
 - b. Finish grade contours shown
3. Lots
 - a. Numbered
 - b. Building pads shown with pad elevations
 - c. Parking areas shown
 - d. Sufficient elevations flagged to show slope of lots and portions of lots
 - e. Driveway slopes (precise grade)
 - f. Centerline station and width of driveway
4. Grading
 - a. Slopes:
 - 1) Cut slopes – 2:1 maximum

- 2) Fill slopes – 2:1 maximum (shaded)
 - 3) Slope ratios shown
 - 4) Daylight line(s) shown
 - 5) Off-site grading shown with reference to authority (letters of permission, etc.)
- b. Setbacks (per C.B.C. requirements)
5. Drainage:
- a. Existing drainage facilities shown
 - b. Future drainage facilities (not a part of grading)
 - c. Drainage facilities to be built with grading plans, show:
 - 1) Location
 - 2) Type, size, gauge (strength)
 - 3) Details as necessary
 - 4) Elevations, grades, direction of flow
 - 5) Easements
 - 6) Streets, show:
 - A) Names and dimensions
 - B) Direction of street drainage
 - C) Percent of slope
 - D) Elevations at intersections
6. Typical Sections
- a. Brow ditches
 - b. Berms or swale at top of slopes
 - c. Terrace drains when $H > 30'$ should be 6' wide and 5% minimum slope
7. Storm Drains
- a. Show size and locations of all pipes and inlets.
 - b. Reference plan set (if not part of grading plans) where storm drain information can be found. Refer to Plan Preparation note 37 in this section.

D. LANDSCAPE/SLOPE PLANTING AND IRRIGATION PLANS

1. Landscaping plans

- a. Prepared by State licensed landscape architect or professional landscape designer
- b. Show location, size and quantities of all plantings
- c. Give botanical and common names
- d. Specific soil amendments and fertilizer requirements per 1,000 s.f.
- e. Type, amount and spacing of living ground cover
- f. Tree staking details:
 - 1) 2 redwood stakes (2" x 2" x 8') per tree
 - 2) 3 ties per tree
- g. Tree planting details:
 - 1) Tree hold to be two (2) times the diameter of container
 - 2) Backfill one (1) part soil amendment to two (2) parts existing soil
 - 3) Tree planted 1"-2" higher in ground than in container
 - 4) Bands around all trees and shrubs
 - 5) Fifteen (15) gallon (minimum) trees in parkways
 - 6) Five (5) gallon (minimum) shrubs adjacent to streets

2. Irrigation plans to include:

- a. Meter location
- b. Points of connection
- c. Size and type of atmospheric vacuum breaker (6" above highest irrigation line)
- d. Size and location of valves
- e. Location of automatic control station, if applicable
- f. Irrigation lines:
 - 1) Size, location, type of pipe
 - 2) Pressure line under AC pavement: PVC schedule: 40 or equal
 - 3) Minimum pressure line depth = 18"

- 4) Minimum irrigation line depth = 12"
- 5) Static water pressure indicated
- 6) Irrigation heads identified by type, manufacturer, model, psi, gpm

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SECTION IV IMPROVEMENT PLANS

General

All improvements are to be constructed in accordance with the Standard Specifications for Public Works Construction, special provisions and the appropriate standard plan or other approved agency standard drawings.

Each sheet of the improvement plans submitted for approval shall be signed and sealed by a Registered Civil Engineer. Plans submitted for checking shall be complete in all phases of design. Incomplete plans will not be accepted for checking purposes.

Any named travel way shall be a street. If developers desire a street to have a name, it must be constructed to City standards.

Private streets are discouraged and will only be allowed when approved in advance by the Planning Commission and the City Engineer. Private streets shall be constructed to City standards for private streets.

Sewer Improvements

All sewer lines within the City of Lake Elsinore are the responsibility of the Elsinore Valley Municipal Water District and all plans should be consistent with their standards and specifications. All sewer improvements shall be submitted through the Elsinore Valley Municipal Water District for plan check and approval. Plans should be approved by the City Engineer prior to issuance of encroachment permit.

Water Improvements

All water lines within the City of Lake Elsinore are the responsibility of either the Elsinore Valley Municipal Water District or the Elsinore Water District and all plans should be consistent with their standards and specifications. All water improvements shall be submitted through the District providing service to the proposed site for plan check and approval. Plans shall be approved by the City Engineer prior to issuance of encroachment permit.

Plan Preparation

In order to obtain uniformity and allow easier review of plans, the following criteria shall apply to all plans submitted.

- A. All sheets must be mylar, 24" x 36" overall size, with a 1/2" margin on all sides except that the left margin to be 1-1/2". Pre-printed sheets are available through local blueprint companies.
- B. All sheets must be numbered consecutively, "Sheet _____ of _____," in the lower right corner.
- C. All plans shall be drawn to a scale of 1" = 40' or 1" = 20'.
- D. All lettering shall be 1/8 inch minimum.
- E. North arrows shall point to the top or left of the sheet, if possible.
- F. All stationing shall refer to the centerline of the street unless otherwise indicated on the plan and shall read from left to right, and shall increase from south to north or west to east. No negative stationing will be allowed.
 1. Right end of one sheet joins the left end of the next.
 2. Stationing has preference over north arrow.
 3. All streets shall have continuous stationing.

Title Sheet – The first sheet shall be a Title Sheet and include:

- A. Location map showing the following:
 1. Project location
 2. Major cross streets
 3. City limit lines if contiguous to tract
 4. North arrow
 5. Scale
- B. Index map showing the following:
 1. Street configuration within tract
 2. Lot configurations
 3. Tract boundaries
 4. Street names
 5. Index of sheets

6. City limit lines, if contiguous to tract
 7. North arrow
 8. Scale
 9. Street lights
 10. Sewer, water and storm drain improvements (existing and proposed)
- C. Basis of bearings – shall be the same as the tract map.
- D. Benchmark – number description, date (year of adjustment), and elevation to three (3) decimal places.
- E. Engineering firm name, address, telephone number, date of plan preparation, signature and number of Registered Civil Engineer.
- F. Title block containing tract number and tentative tract number, if applicable; street name and limits of improvements.
- G. Certification of approval of the City of Lake Elsinore Engineer shall appear on all sheets in the following form:

“These plans have been reviewed for compliance with the appropriate conditions of development and/or City and State laws, and a permit can be issued.”

City Engineer	RCE #	Expiration Date
---------------	-------	-----------------

- H. Developer name, address and telephone number.
- I. Soils Engineer or Engineering Geologist name, address, telephone number, and date of report.
- J. Acceptance block for signature and date for all other agencies, as necessary.
- K. Revision block with revision number, date, initials of design engineer, description of plan change, and spaces for City approval and date.
- L. Plan legend and symbols.
- M. The following standard “General Notes” shall be placed on the plans:

GENERAL NOTES

1. Note to Contractors: The existence and location of any underground utility pipes or structures shown on these plans were obtained by a search of available records. Approval of these plans by the City of Lake Elsinore does not constitute a representation as to the accuracy

or completeness of the location, nor the existence or non-existence of any underground utility, pipe or structure within the limits of the project. The Contractor is required to take all due precautionary measures for the protection of all utilities, pipes or structures, whether shown on these plans or not. Any utility(ies) damaged during the performance of the work shall be repaired or replaced to the satisfaction of the governing agency by the Contractor, at his expense.

2. All work shall conform to City Codes, Standard Specifications for Public Works (Latest Edition), and Standard Drawing of the City of Lake Elsinore. It is the Contractor's responsibility to be familiar with these standards and codes at all times.
3. The Contractor shall notify the City Engineering Inspector, forty-eight (48) hours prior to beginning any work. Call for inspection at (951) 674-3124, between the hours of 9:00 am and 4:00 pm, Monday through Thursday.
4. Contractor shall maintain traffic control in accordance with Caltrans Traffic Manual and Watch Manual at all times during construction, as approved by the City Engineer or his representative. Failure to do so shall require immediate work stoppage.
5. It shall be the Contractor's responsibility to have a dependable representative at the job site, at all times during construction.
6. It shall be the responsibility of the Contractor to arrange for the necessary relocation of any utilities. The contractor shall notify all utility companies involved at least forty-eight (48) hours prior to beginning work. The Contractor shall also contact Underground Service Alert (U.S.A.) at 1-800- 422-4133, at least forty-eight (48) hours prior to beginning work.
7. The Contractor shall be responsible for the clearing of the proposed work area and relocation and cost of all existing utilities. Subdivider must inform the City of Lake Elsinore of construction schedule, prior to beginning construction.
8. All underground facilities and laterals including but not limited to sewer, water, telephone, electricity, gas and drainage facilities, shall be in place prior to paving the street section.
9. All street sections are tentative. Additional soil tests will be taken after rough grading, to determine the exact section required. Section thicknesses shown are for bonding purposes only.
10. All existing underground utilities and structures must be potholed, and elevations verified prior to construction. The engineer of record shall be notified of any necessary revisions to the approved plans. The revisions shall be in the form of "AS BUILT" plans submitted to the City Engineer for approval prior to the final acceptance of the project.
11. All existing monumentation disturbed or destroyed during construction

shall be replaced to City standards, as approved by the City Engineer. Centerline ties are to be furnished to the City Engineer upon completion of the project and before acceptance is granted.

12. An Encroachment Permit shall be required for all construction work done within Public Rights-of-way. Before issuance of said permit, the Contractor/Developer must provide the City Engineer with Certificate of Insurance and required bonding for public improvements. The encroachment permit must be present at the job site during the total time of the project construction along with an approved set of improvement plans.
13. If an Encroachment Permit is required through the District No. 8 office of Caltrans, please make reference to this fact in the "General Notes" section of the improvement plans.

Detail Sheet – The second sheet shall be the detail sheet and shall include:

A. Typical sections showing:

1. Each geometric street variation. A minimum street section is 4" AC over 6" AB.
2. Existing pavement to be joined or removed.
3. Paving, curb and gutter to be constructed, and details which join to existing pavement.
4. All necessary geometric dimensions including but not limited to:
 - a. Sidewalk width and location.
 - b. Centerline to curb face, including pavement crossfall.
 - c. Centerline to right-of-way.
 - d. Level line relationship between centerline (crown) and top of curb with vertical dimension

B. Interim conditions

1. Structural section: thickness dimensions should be omitted until recommendations of the soils report are approved.
2. References to appropriate agency standard drawings.

C. Overall construction notes.

D. Construction details not included in approved agency standard drawings.

E. Sheet title block including items (E), (F), and (G) as listed on page 60.

Plan and Profile Sheets

A. Profile shall be the top half of the sheet and include:

1. Centerline profile.
2. Existing ground profiles at centerline and right-of-way.
3. Top of curb profiles including elevations at $\frac{1}{4}$ deltas for curb return construction.
4. All rates of grade. Negative grades shall be indicated.
5. Elevation at grade breaks, at street intersections, and as necessary to provide vertical control.
6. Stationing, increasing from left to right.
7. Scale (horizontal and vertical).
8. Vertical curve data including tangent rates of grade, length of vertical curve, P.I.V.C. elevation, stations and elevations at maximum intervals of 25 feet and at points of control.
9. Identification of all storm drain lines.
10. Sewer profile.
11. All utility line crossings and sub-structures which could interfere with road or other underground construction.

B. Plan view shall include:

1. North arrow and scale.
2. Existing improvements shown dashed.
3. Improvements to be constructed, including all joins.
4. Street names.
5. Centerline stationing at all intersections.
6. Stationing shall match stationing established by earlier plans.
7. Stationing shall be marked on all construction centerlines and aligned with profile.
8. Centerline bearings and distances for all streets.
9. All proposed and existing utilities.
10. Tract number, boundary and lot lines for each adjacent parcel.
11. Applicable construction notes on each sheet.
12. Match lines clearly shown and referenced.

13. Curve data for all curves.

14. Identification of all storm drain lines.

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Street Design Criteria

1. General

The guidelines, criteria, and standards listed in Table B should be considered to be the minimum design standards for street improvements. Minimum horizontal curves are per Caltrans sight distance requirements.

a. Vertical curve design requirements are:

- 1) Wherever the grade break exceeds 0.5%
- 2) Vertical curves shall have the following minimum lengths
 - i. Local Street – 50 feet
 - ii. Collectors – 100 feet
 - iii. Major Arterials – 200 feet

Exceptions can be considered if dictated by adverse topographic or environmental conditions. Exceptions shall be approved by the City Engineer.

2. Miscellaneous Design Criteria

- a. When a raised median with landscaping is required, the design will indicate all proposed median openings and turning pockets and shall also be approved by the Traffic Engineer.
- b. General criteria for lengths of left turn pockets:
 - 1) Estimate the peak hour left turn movements.
 - 2) Design pockets shall provide for a minimum of twenty feet (20') length for each car desiring to turn left during peak hour or the minimum length shall be three hundred feet (300') for major or urban arterial roads, two hundred fifty feet (250') of secondary or collector streets, and one hundred fifty feet (150') for all local streets.
 - 3) If left turn movements are unknown or cannot be accurately predicted, the following guidelines may be used: (1) Pocket lengths should be increased if there is known to be greater than "average" truck traffic; (2) Turning volumes exceeding fifteen (15) cars per cycle should be accommodated by multiple left turn lanes; (3) Physical obstructions in the roadway should be designated with turning radius to accommodate larger vehicles.
 - 4) Pavement widening and tapers will be required as determined by the Traffic Engineer.

These may occur when the tract development does not require ultimate improvements to an adjacent arterial, but the traffic generated by the tract could cause significant congestion on the arterial. In these cases, pavement widening may be required for acceleration or deceleration or for left turn lanes.

For narrowing the travel lanes, the minimum transition rate should be 40 to 1. For widening the pavement, the transition should be approximately 10 to 1. Any proposed pavement widening and tapers should be reviewed by the Traffic Engineer.

- c. Permanent barricades will be used whenever a street dead ends without a cul-de-sac.
3. General criteria for the location of access points.
- a. Refer to Intersection Intervals of City Standard Plan No. 100A of Roadway Design Requirements.
 - b. The tentative map review should show all existing and proposed access within the tract limits and in some cases an area access plan may be required by the Traffic Engineer.
 - c. Access points should be selected at points with the best possible sight distance and all access points shall provide adequate sight distance.
 - d. If it is determined that a signal will be necessary to service the development, the location to be signalized shall be at least $\frac{1}{4}$ mile from adjacent signals. The Traffic Engineer should review and approve the signal location.
 - e. Adjacent intersections along the same arterial shall be spaced sufficiently apart to provide for left turn pockets for both streets. This usually requires a minimum of 660 feet.
 - f. Extreme care is needed in locating driveways to avoid possible left turn conflicts where no raised medians exist.
 - g. Adjacent intersections along the arterial, but on opposite sides and offset in a direction in which left turns will not be in conflict, should be avoided.
 - h. Standard cul-de-sacs are required for all permanent dead-end streets and may be required for temporary dead-end streets if future development seems remote. The maximum lengths of cul-de-sacs shall not exceed 660 feet.
 - i. Private Streets.
 - 1) Definition:
 - (a) Private streets are those streets which are privately owned and maintained and are not offered for dedication to the City. They are allowed only if adequate justification is provided.
 - (b) Design standards for private streets are considered to be the same as public streets regarding volume capacities and geometric design features and shall be designed to the same criteria. The absence of such standards will prohibit future dedication to the City for ownership or maintenance.
 - j. Driveways.
 - 1) Driveways which exceed centerline measurement of thirty feet (30') in length measured from the location of the face of curb, shall be provided ahead of each

garage, a parking space shall extend a minimum of twenty feet (20') out from the face of the garage and shall be at least the width for the garage opening with a minimum of ten feet (10'), shall have longitudinal and transverse slope gradients not exceeding plus or minus five percent (5% +/-) and shall be designed to prevent surface waters from draining into garage.

- 2) Driveways which do not exceed thirty feet (30') in length measured along the centerline shall have a maximum gradient of eight percent (8%) for the portion of the driveway located within twenty feet (20') of the garage entrance;
- 3) Maximum longitudinal driveway gradients shall be fifteen percent (15%); minimum crown or cross slope shall be one percent (1%); and maximum crown or cross slope shall be five percent (5%).
- 4) Vertical transitions shall prevent contact of any portion of the car with surface of driveway by use of the following criteria:
 - (a) Vertical transition shall be made with not less than four feet parabolic curve.
 - (b) When the driveway exceeds ten percent (10%), the vertical transition shall be an eight foot (8') parabolic curve.

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TABLE B
CITY OF LAKE
ELSINORE STREET
DESIGN CRITERIA

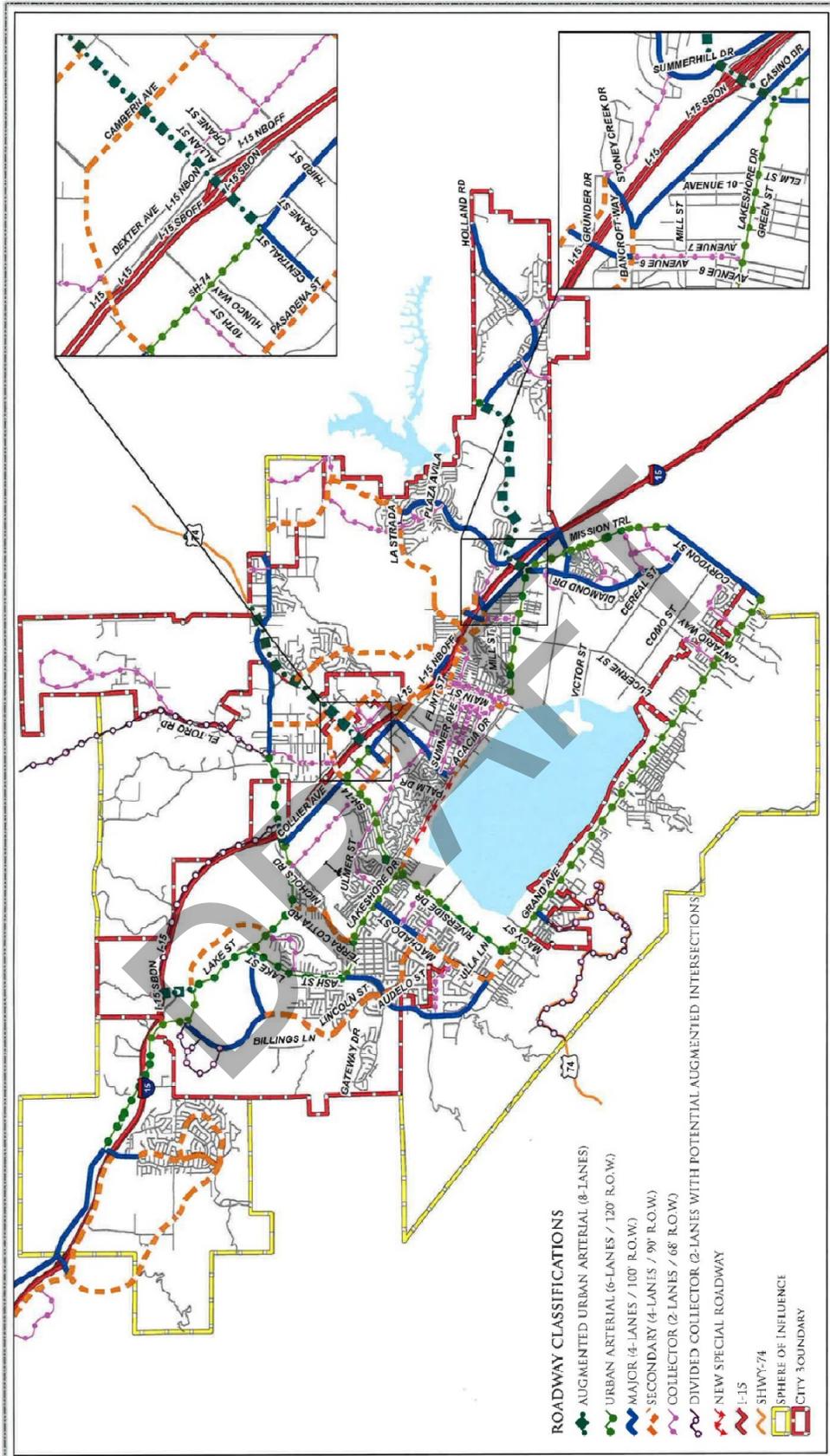
Design Criteria	Urban Arterial	Major Arterial	Secondary Arterial	Collector Streets
Estimated Ultimate ADT	50,000 – 60,000	32,000 – 42,000	20,000 – 32,000	10,000 – 15,000
Design Speed **	65 mph	60 mph	55 mph	45 mph
Right-of-Way	*120 ft	*100 ft	90 ft	68 ft
Curb-to-Curb Distance	* 96 ft 14 ft median (raised)	* 80 ft 14 ft median (raised)	70 ft 14 ft median	48 ft
Minimum Traffic Index	10	10	10	7-9
Minimum Structural Section (inches)	6 AC 12 AB	6 AC 12 AB	6 AC 12 AB	4 AC 6 AB
Stopping Sight Distance**	660 ft	580 ft	500 ft	360 ft
Corner Sight Distance**	715 ft	660 ft	605 ft	495 ft
Minimum Horizontal Radius**	2000 ft	2000 ft	1600 ft	850 ft
Maximum Grade	9%	9%	9%	12%
Minimum Grade	1.0%	1.0%	1.0%	1.0%
Minimum Tangent between reversing curves	300 ft	220 ft	200 ft	160 ft

* where double left turn lanes are required, an additional ten feet (10') of right-of-way and roadway width will be required.

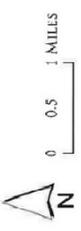
** flat terrain

FUNCTIONAL CLASSIFICATIONS AND STANDARDS

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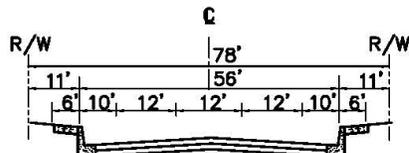
- ROADWAY CLASSIFICATIONS**
- AUGMENTED URBAN ARTERIAL (8-LANES)
 - URBAN ARTERIAL (6-LANES / 120' R.O.W.)
 - MAJOR (4-LANES / 100' R.O.W.)
 - SECONDARY (4-LANES / 90' R.O.W.)
 - COLLECTOR (2-LANES / 68' R.O.W.)
 - DIVIDED COLLECTOR (2-LANES WITH POTENTIAL AUGMENTED INTERSECTIONS)
 - NEW SPECIAL ROADWAY
 - I-15
 - SRWY-74
 - SPHERE OF INFLUENCE
 - CITY BOUNDARY



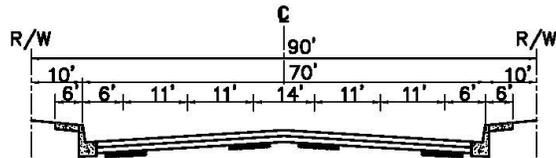
CITY OF LAKE ELSINORE
ROADWAY CLASSIFICATIONS
FIGURE 2.3

SOURCES: CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE

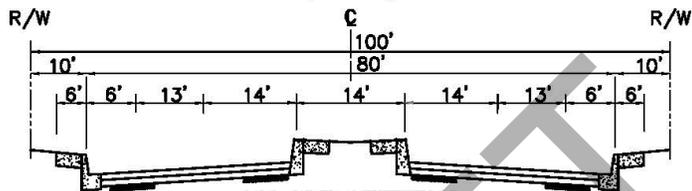




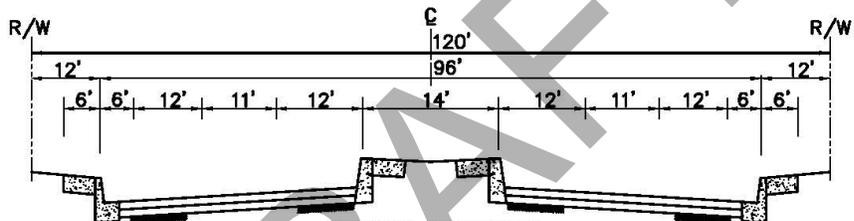
DIVIDED COLLECTOR



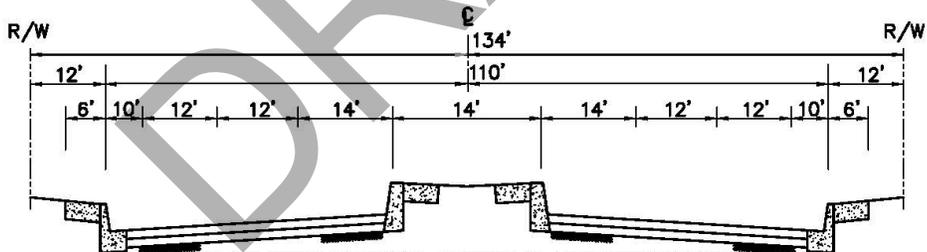
**SECONDARY ARTERIAL
(4-LANE)**



MAJOR ARTERIAL



**URBAN ARTERIAL
(6-LANE)**



**AUGMENTED URBAN ARTERIAL/STATE HIGHWAY
(6-LANE)**

**CITY OF LAKE ELSINORE
CIRCULATION ELEMENT ROADWAY CROSS-SECTIONS**

APPROVED BY:

CITY ENGINEER
REMON HABIB

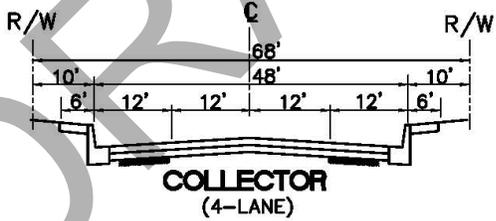
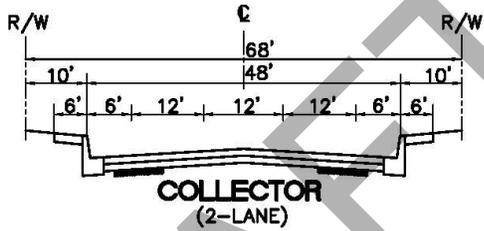
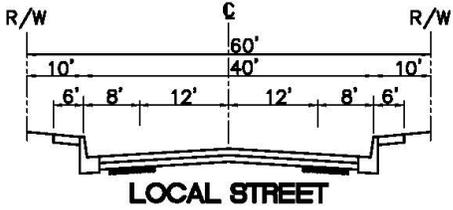
DATE

REVISION	BY:	APPROVED	DATE



CITY OF LAKE ELSINORE

**STREET CROSS
SECTIONS**



APPROVED BY: _____

CITY ENGINEER
REMON HABIB

DATE _____

REVISION	BY:	APPROVED	DATE



CITY OF LAKE ELSINORE

STREET CROSS SECTIONS

STANDARD PLAN NO. _____ SHEET 2 OF 2

Storm Drainage

Drainage design requirements shall be in accordance with the Riverside County Hydrology Manual, the Riverside County Flood Control and Water Conservation District Design Manual and Standard Drawings, and this Design Manual. All hydrologic and hydraulic calculations shall be submitted along with proper documentation as noted.

All storm drains greater than 36" shall be reviewed for acceptance and maintenance by Riverside County Flood Control and Water Conservation District. Contact them for more information on the process.

Although the storm drainage improvements are typically included with the street improvement plan submittal, it is often necessary to construct the drainage improvement plans concurrently with the grading. In such a case, hydrology, hydraulics and the storm drainage improvement plans will be submitted along with the grading plans for review.

Hydrology

Criteria utilized for the hydrology study shall be as stated in the Hydrology Manual published by the Riverside County Flood Control District, current edition. Frequency of design shall be as stated in the Hydrology Manual or as specified by the Engineering Department.

The hydrology map, grading improvement plans, and improvement plans shall agree as to the grades, drainage areas, and other information found on those plans.

1. Hydrology Map

- a. The hydrology map shall be on a topographic map of sufficient scale to show drainage patterns and quantities of runoff.
- b. The site must be shown on the hydrology map including on-site and off-site topography to the entire tributary drainage area.
- c. Show all Q's (with the time of concentration) flowing in the streets. Designate Q10 and Q25. If one side of a street carries more Q than the other side, show it.
- d. Show all cross-over Q's and flow splits where they occur.
- e. Show all street flow confluences and their calculations.
- f. Show all Q's approaching, entering and carried over from catch basins.
- g. Identify all catch basins by numbers or letter.
- h. Show lengths of all catch basins.
- i. Identify all critical street flow locations.
- j. Show the locations where street capacity and momentum calculations were made in Item "i" above.
- k. Show and verify with legible contours or other adequate means all Q's entering the

project. If previous studies were used, reference them and submit copies.

- l. Show all Q's leaving the project. Include their time of concentration.
 - m. Show north arrow and scale.
 - n. Show names or some other designation for all streets in the project vicinity.
 - o. Show tract numbers of all properties (as applicable).
 - p. Show name and telephone number of the Engineer who prepared and signed the hydrology study.
 - q. Show and identify all storm drains (use same designations as on improvement plans and show the Master Plan of Drainage facility number, if applicable), their sizes, line No.'s, line designation, Q's and times of concentration. Distinguish between Q10 and Q100.
 - r. If the project contains more than one soil group (A, B, C or D), delineate each group.
 - s. The drainage areas shall close and the acreage shall be shown. Areas should close at all points of confluence and at pickup points.
 - t. All off-site drainage areas must be shown with a reasonable analysis of the interim and ultimate Q's from those tributary areas. Include the necessary supporting calculations or reference previously accepted studies and submit copies.
 - u. Initial areas should be limited to 10 acres with a maximum flow path of 1,000 feet.
2. Hydrology calculations – General formula to be used is $Q=CIA$.
- a. Time of travel.
 - (1) Overland – use valley chart or representative sample section of natural channel.
 - (2) Streets – Refer to street capacity and inlet design aids manual. Use $Q \text{ est.}/S$ on chart to find A. Use A in $Q \text{ est.}/A$ to find V. Use V in $L (V \times 60)$ to find t. ($T=L/V \times 60$).
 - (3) Pipes – for pipes flowing full, use Q/A to find V. For pipes flowing open, calculate A and V. Use V in $L/(V \times 60)$ to find t.
 - (4) Travel times at points of confluence can be adjusted in accordance with the Riverside County Flood Control District Hydrology Manual.
 - (5) Street hydraulics shall be provided in the hydrology study.
 - b. Rainfall intensity – obtain from Riverside County Flood Control District Hydrology Manual.
 - c. Coefficient of runoff – obtain from Riverside County Flood Control District Manual, plate No. D-5.

- d. Check typical critical sections for flow splits, i.e., where flow exceeds crown. Use the street capacity charts per Drainage Design Criteria and Aides.
- e. Check “W” width of ponding on arterial for possible flooding of the required “dry lane.”
- f. Street sections should not transverse or be super elevated away from catch basins. Warping of street sections can either increase or reduce the capacity of the pickup and in some cases may create a ride-ability problem, particularly at “T” intersection.
- g. Check the Qs in pipes (option – t_c may be adjusted at points of confluence or pickup after entering basins).

NOTE: Q100 must be used until the sump condition is relieved by a downstream catch basin providing an alternate path for the water.

Hydraulics

Criteria utilized for the hydraulic study shall be as stated in this Manual.

1. The use of underground storm drain systems shall be required:
 - a. When flooding or street overflow will cause serious damage,
 - b. When future upstream development will cause drainage problems,
 - c. If less than one – twelve-foot (12') travel lane in each direction is dry on arterial highways.
 - d. To eliminate the need for cross gutters,
 - e. To eliminate nuisance water in residential areas (surface flow maximum – 1,000 linear feet),
 - f. When median drainage is required,
 - g. To insure building protection from 100-year frequency design flows. Finish floor to be one (1) foot above top of curb elevation.
2. The use of grate type catch basins is discouraged on public and private streets. They should only be considered on streets with slopes greater than 5%. To be used, they must receive prior approval.
3. The use of parkway culverts is discouraged. To be used, they must receive prior approval. The design shall incorporate adequate slope and maintenance access.

Hydraulic Calculations

1. Identify all calculations by referring to the storm drain line number and its location.
2. Begin all hydraulic grade line calculations at the downstream end of a system and proceed upstream to the catch basin or other inlet facility.

3. Calculations must proceed from point to point in a logical, easy to follow, analysis. Start with a controlling water surface which has been verified and add losses in a systematic manner as they accrue along the pipeline. Sum the losses and provide the hydraulic grade line and energy grade line elevations at all critical points.
4. The minimum free board in catch basins shall be 0.5 feet below the flowline at the catch basin opening.
5. When using Thompson's Y equation for junction losses, write your equation first and then insert the variables. Numbers alone will not suffice. The minimum loss in a basin is $1.2V^2/2g$. Check Thompson's Y for catch basins in a series.
6. At all junctions, show a detail including angles between the mainline storm drain and incoming laterals.
7. All trash racks or grate calculations must account for 50% debris clogging.
8. When required to bulk flows to account for burned areas, assume a 5-year growth.

Catch Basin Calculations

1. On calculation sheets, identify each catch basin by number or letter and give its location.
2. Show all required information including type of curb, the half width street section, crossfall, slope, etc. (The half width street location is the distance from crown line to front face of curb.)
3. Using Riverside County Design Charts, check for continuous grade catch basins and local sumps where secondary flow exists. Also, check for sump catch basins where true sump exists (no secondary outlet).
4. Continuous grade catch basins at intersections shall be designed to intercept a minimum of 85% of the flow.
5. Check for true maximum ponding elevation (not necessarily at the basin top of curb). Street grades may allow flow to escape at lower elevations.
6. Permanent debris basins should:
 - a. Have a 6' high chain link fence
 - b. Provide calculations showing how the basin empties within 24 hours
 - c. Provide an emergency route for overflows
 - d. Show volumes that include water and debris together

Plan Preparation

- A. Storm Drains

1. Show the hydraulic grade line plot on originals. Show all water surface elevations and the top of curb elevations at catch basins. Stationing shall be based on all storm drain centerlines.
2. Regarding "1" above, show all hydraulic elements, including Q's, Vn, slopes, pipe sizes, F.L. elevations and pertinent stationing. Show TC elevation at CB centerline.

B. Catch Basins

1. Show sizes including "L" and "V".
2. Show type.
3. Show centerline street stationing at catch basin centerline.
4. Provide details of any local depressions.

Design Criteria

A. Pipes

1. D-loads shall be in conformance with the Los Angeles County Flood Control Manual.
2. A bedding detail is required for all types of pipe.
3. A minimum pipe size of 18 inches shall be used for all public storm drains and private storm drains within streets.
4. Use a factor of $n=0.013$ for R.C.P. and 0.015 for cast-in-place pipe. Cast-in-place pipe is not permitted longitudinally in arterial highways.
5. Concrete collars shall be used as required per Riverside County Flood Control District Standard Drawing no. M803.
6. A minimum radius of 22-1/2 feet shall be used for any horizontal bend and the need for beveled end pipes should be called out.
7. Slope anchors shall be constructed at 7 feet vertical intervals on all slopes of 5 to 1 or steeper.
8. Thick wall R.C.P. with 1-1/2 inch minimum cover inside shall be used when the flow velocity exceeds 20 feet per second.

B. Cast-In-Place Pipe

1. Cast-In-Place concrete pipe (48" and larger) shall only be used where shown on the drawings and approved by the agency responsible for the maintenance of the project as an alternate construction.
2. A geotechnical investigation report shall be prepared and transmitted to the approving agency at the time the drawings are initially submitted for review. The report shall be

prepared by a licensed civil or geotechnical engineer registered in the State of California, and shall address, but not necessarily be limited to the following issues:

- a) Trench wall stability. A trench stability analysis shall be prepared. Sloughing and overall trench stability as it pertains to the construction of CIPP shall be addressed.
 - b) Existence of groundwater. If groundwater is present, the report shall specify appropriate mitigation measures.
 - c) Existence of expansive soils. CIPP shall not be used if expansive soils are present.
 - d) Corrosion potential. A chemical analysis of the soil samples shall be made to determine sulfate concentrations. A recommendation with respect to cement "Type" shall be made.
 - e) Overall feasibility of constructing CIPP
3. For structural design purposes, the pipe shall be designed to flow no more than just full unless structural calculations are submitted showing that the pipe can safely sustain the proposed hydrostatic head.
 4. Design flow velocities greater than 20 ft/sec. will not be allowed unless an exception is granted by the Engineer.
 5. A minimum 6 sack per cubic yard design mix shall be used and the compressive strength of the concrete (f_c) at 28 days shall be at least 4000 psi; the modulus of rupture shall be at least 550 psi. For velocities greater than 10 ft/sec. but not greater than 20 ft/sec. the compressive strength shall be 5000 psi. Compressive strengths shall be noted on the drawings.
 6. Pipe wall thickness for flows having velocities equal to or less than 10 ft/sec. shall comply with the requirements as set forth in the Standard Specifications. For velocities greater than 10 ft/sec. but not more than 20 ft/sec. a 140-degree segment of invert shall be thickened 2 inches in wall thickness as "sacrificial concrete". Increases in standard wall thickness shall be noted on the drawings.
 7. The minimum finished cover over the pipe shall be three (3) feet.
 8. The minimum pipe slope shall be 0.005.
 9. Cast-in-place concrete pipe, which is to be maintained by the County or District, shall not be placed except in the presence of the Engineer.
 10. When CIPP is specified as an alternative to RCP, a note shall be added to the construction drawings stating that Transition Structure No. 3 shall replace Junction Structure No. 2 when CIPP is used. No changes need be made for Junction Structures No. 4.
 11. Cast-in-Place pipe shall not have curve radii less than shown below:

PIPE SIZE

RADIUS

24 in	45 ft
36 in	45 ft
42 in	45 ft
48 in	60 ft
54 in	60 ft
60 in	60 ft
66 in	60 ft
72 in	60 ft
78 in	90 ft
84 in	120 ft
96 in	150 ft
120 in	160 ft

12. Construction of the C.I.P.P. shall conform to the provisions of ACI Standard 346-70 and Title No. 66-22. The trench to accept C.I.P.P. shall be dug in undisturbed soil and continuous inspection will be required. An in-place loading test may be required at the discretion of the City Engineer, prior to the acceptance of any C.I.P.P. storm drain. Such test shall be in conformance with Section 9.4 of the above referenced ACI Standard 346-70 and performed solely at the expense of the contractor.

13. The following Cast-In-Place notes shall be added to the titlesheet of the plans:

- a) Construction materials and method shall conform to the latest edition of the Standard Specification for Public Works Construction, the City's Special Provisions and these plans.
- b) Cast-in-Place concrete pipe shall not be used unless it is shown as an alternate on the drawings approved by the City Engineer.
- c) Concrete mix designs shall be submitted by the contractor for approval prior to start of construction.
- d) Trenching and backfilling shall be performed only in the presence of the soils engineer.
- e) The minimum cover over the pipe shall be three (3) feet, measured from the top of the pipe.
- f) Backfilling of the pipe shall not be done until the concrete has developed 80 percent of its design strength. No traffic shall be permitted on top of the pipe until the concrete has attained its design strength.
- g) Water densification methods for backfilling the pipe will not be permitted. Mechanical compaction will be required. An 8-inch lift of loose backfill "shading" over the pipe will be permitted 24 hours after initial placement, provided the forms are still in place at the time of shading.
- h) A minimum 6 sack per cubic yard design mix shall be used and the compressive strength of the concrete (f_c) at 28 days shall be at least 4000 psi; the modulus of rupture shall be at least 550 psi. For velocities greater than 10 ft/sec, but not greater than 20 ft/sec, the compressive strength shall be 5000 psi, and a 140-degree

segment of the invert shall be thickened by 2 additional inches; for velocities greater than 20 ft/sec, the 140 degree segment of the invert shall be thickened by an additional 4 inches. Compressive strengths shall be noted on the drawings.

- i) The consistency of the concrete shall be such as to allow it to be worked into place without segregation. The concrete for the cast-in-place concrete pipe shall have a slump of 2" plus or minus 1".
- j) Fly ash, meeting ASTM C 618, may be used to substitute for cement (up to 15 percent of cement by weight). When fly ash is used, water reducing agents meeting ASTM Designation C 494 will be permitted in amounts recommended by the supplier and approved by the City Engineer.
- k) At the end of all pours and the end of each working day, the Contractor shall install No. 4 dowels, 24 inches long, 12-inch centers around circumference of cast-in-place pipe.
- l) The maximum earth cover shall be 20 feet from the top of pipe.
- m) Cast-in-place concrete pipe, which is to be maintained by the County or City, shall not be placed except in the presence of the appropriate agency inspector. The inspection for the CIPP smaller than 39" in diameter shall be performed by video camera and core just prior to the final acceptance of the system.
- n) Type V cement shall be used if the sulfate content in the soil is greater than 2,000 ppm.
- o) Continuous inspection and testing if CIPP placement is required.
- p) Contractor shall allow inspector into pipe while under construction and rod for wall thickness at a minimum of 25 cubic yards of the pour.

C. Open P.C.C. Lined Channels

- 1. Require prior approval from City Engineer.
- 2. Structural calculations will be required.
- 3. Structural details shall be shown on the plans.
- 4. Are not allowed in the street right-of-way.

D. Manholes

- 1. Manholes are required at the following locations:
 - a) Beginning or ending of curves.
 - b) Pipe size changes.
 - c) Angle points and as required at junctions.
 - d) Maximum 500 feet intervals (300 feet maximum for pipe less than 24-inch

diameter).

e) As required for maintenance.

2. Manholes shall be restricted to, in order of preference:

a) Parking lane.

b) Parkway.

c) Center of travel lane nearest right curb.

d) Center of travel lane to the left of the travel lane nearest right curb.

E. Easements

1. Public drainage devices shall be centered within an easement.

2. Easements parallel to lot lines are preferred to be on one lot only.

3. Surface structures shall not surcharge storm drain facilities.

F. Abandonment of Underground Facilities

1. If existing culverts, pipes or other facilities are abandoned or removed, provisions must be made for drainage.

2. If facilities are abandoned, it will be necessary to either back fill with sand or cement slurry and seal the ends with brick and mortar or crush in place. These necessary requirements shall comply with state laws and municipal codes.

G. Surface Drainage Transitions

1. If it is necessary to grade to drain, the grade on the ditch shall be shown on the plan.

2. The length of ditch construction shall be shown on the plan.

3. A letter of consent will be required where grading or drainage involves adjacent private property.

4. Keep mud and debris out of drainage by grading around improvements.

5. Provide AC swales or aprons to protect improvements.

6. The need for grading 50 feet to 100 feet upstream from the proposed improvements must be checked.

7. Ensure ponding does not occur upstream.

8. Ensure water quality and erosion control.

Street Lighting

General

All street lights will be owned by the City of Lake Elsinore unless designated otherwise by separate agreement. Street light locations shall be submitted through the City for approval.

Street lighting design shall conform and follow City of Lake Elsinore Street Light Manual – Design Criteria and Standards, and City Standard Plan Numbers 501 to 509.

The following standard “General Notes” shall be placed on the plans:

GENERAL NOTES

1. Note to Contractors: The existence and location of any underground utility pipes or structures shown on these plans were obtained by a search of available records. Approval of these plans by the City of Lake Elsinore does not constitute a representation as to the accuracy or completeness of the location, nor the existence or non-existence of any underground utility, pipe or structure within the limits of the project. The Contractor is required to take all due precautionary measures for the protection of all utilities, pipes or structures, whether shown on these plans or not. Any utility(ies) damaged during the performance of the work shall be repaired or replaced to the satisfaction of the governing agency by the Contractor, at his expense.
2. All work shall conform to the most current requirement of City of Lake Elsinore’s current improvement standards and specification and as indicated in this manual. It is the Contractor’s responsibility to be familiar with these standards and codes at all times.
3. The Contractor shall notify the City Engineering Inspector, forty-eight (48) hours prior to beginning any work. Call for inspection at (951) 674-3124, between the hours of 9:00 am and 4:00 pm, Monday through Thursday.
4. Contractor shall maintain traffic control in accordance with Caltrans Traffic Manual and Watch Manual at all times during construction, as approved by the City Engineer or his representative. Failure to do so shall require immediate work stoppage.
5. It shall be the Contractor’s responsibility to have a dependable representative at the job site, at all times during construction.
6. It shall be the responsibility of the Contractor to arrange for the necessary relocation of any utilities. The contractor shall notify all utility companies involved, at least forty-eight (48) hours prior to beginning work. The Contractor shall also contact Underground Service Alert (U.S.A.) at 1-800-422-4133, at least forty-eight (48) hours prior to beginning work.
7. The Contractor shall be responsible for the clearing of the proposed work area and relocation and cost of all existing utilities.

8. An Encroachment Permit shall be required for all construction work done within Public Rights-of-way. Before issuance of said permit, the Contractor/Developer must provide the City Engineer with Certificate of Insurance and required bonding for public improvements. The encroachment permit must be present at the job site during the total time of the project construction along with an approved set of improvement plans.
9. If an Encroachment Permit is required through the District No. 8 office of Caltrans, please make reference to this fact in the "General Notes" section of the improvement plans.
10. The Service point is subject to revision by final SCE plans, it shall be the developer's responsibility to provide the proper service to the street lights shown on this plan.
11. The developer shall be responsible for providing conduit and conductors from the street lights to approved service point furnished by SCE.
12. It shall be the responsibility of the developer or contractor to apply for an encroachment permit for work performed within the City right-of-way.

SCE Service planner _____, Work order number _____
Energy charges paid by _____ (Developer, LMD, OTHER).

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SECTION V TRAFFIC PLANS

Signing and Striping

In order to obtain uniformity and allow easier review of plans, the following criteria shall apply to all plans submitted.

- A. All plans shall be prepared on 24"x36" mylars with a ½" margin on all sides except the left side which will be 1 ½".
- B. All plans shall be 1"=40' scale or 1"=20'.
- C. North arrows should point to the top or right of sheet if possible.
- D. All sheets shall be numbered consecutively, "Sheet ____ of ____," in the lower right of the plan.
- E. All lettering shall be 1/8" minimum height.
- F. Plan shall include engineering firm name, address, telephone number, date plans prepared, signature, number and expiration date of Registered Civil or Traffic Engineer.
- G. All stationing shall refer to the centerline of street unless otherwise noted and shall read from left to right.
- H. All plans shall include the City of Lake Elsinore signing and striping general notes. Construction notes and a legend shall also be included.
- I. All curbs, raised medians, edge of pavement, driveways, alleys, sidewalks, access ramps and right-of-way shall be shown and labeled.
- J. All existing regulatory, warning, guide and any special signs shall be shown. This includes parking prohibitions signs, advance street name signs, bus stop signs etc. All existing sign locations shall be field verified.
- K. All existing striping, pavement markings and curb markings shall be shown and labeled, including bike lanes, parking layouts, and crosswalks and limit lines. All existing striping shall be shown as a thin line and all proposed striping as a thick solid line. The locations and types of existing striping and pavement markings shall be field verified.
- L. Jurisdictional boundaries, street names, centerlines and stations shall be shown.
- M. Match lines shall be clearly shown and referenced on the plan.
- N. The following standard "General Notes" shall be placed on the plans:

GENERAL NOTES

1. All lines and markings shall conform to the California Manual on Traffic Control Devices (CA

- MUTCD) and Caltrans Standard Plans and Specifications (latest editions).
2. Lane widths shall be measured between center lines of each adjacent single or double stripe or top of curb, as appropriate.
 3. The Contractor shall notify underground service alert, (800) 422-4133, and all concerned utility companies at least two working days in advance of excavation.
 4. All traffic stripes, pavement markings, and signs shall be reflectorized and in standard sizes. All striping and marking details shall match Caltrans standard plans details. Stencils for pavement marking shall match Caltrans standard plans. All signs shall have prismatic reflective sheeting conforming to ASTM D4956 for Type IX and XI.
 5. The Contractor shall remove all conflicting stripes, pavement markings, and raised pavement markers in accordance with the plans and as directed by the engineer. Word or symbol pavement markings shall be removed by sandblasting a rectangular area covering the whole marking. Grinding shall only be done upon approval by the City Engineer.
 6. All crosswalks shall have 10 feet between the 12-inch white or yellow stripes.
 7. All double yellow stripes shall have 3-inch painted black line separating the yellow stripes.
 8. The Contractor shall apply traffic lines, and pavement markings including crosswalks, limit lines, stop bars, and detail 40 lines using thermoplastic material.
 9. The Contractor shall furnish and install raised pavement markers (RPMS) within seven working days of roadway striping. All existing RPMS within the project area shall be replaced in kind or removed in accordance with the plans, or as directed by the Engineer. Remnant adhesive material from removed RPMS shall be removed.
 10. The Contractor shall install standard size panel on 2" square perforated steel tube post with two-piece anchor and sleeve, fastened with 3/8" rivets with stainless steel washers, unless otherwise noted. The exact location of all signs shall be determined in the field by the Engineer.
 11. The Contractor shall remove signs in accordance with the plans and as directed by the Engineer. All removed signs shall be salvaged to the City Yard unless otherwise directed by the Engineer.
 12. The Contractor shall layout (cat-track) the proposed signing, striping, and markings in accordance with the plans within three days of final paving. Contact the City Engineering Inspector at (951) 674-3124 to obtain approval of layout prior to actual installation.
 13. The Contractor shall coordinate all signing and striping works through the Engineer prior to opening new roadways and/or existing roadways to new signing and striping in accordance with the plans.
 14. The Contractor shall install blue reflective pavement markers across from all fire hydrants per CA MUTCD.

Traffic Control

In order to obtain uniformity and allow easier review of plans, the following criteria shall apply to all plans submitted.

- A. All plans shall be prepared on 24"x36" overall size with a 1/2" margin on all sides except the left side which shall be 1 1/2".
- B. All plans shall be drawn to a scale of 1"=40' scale.
- C. North arrows should point to the top or left of the sheet.
- D. All sheets shall be numbered consecutively, "Sheet ___ of ___," in the lower right of the plan.
- E. All lettering shall be 1/8" minimum height.
- F. Plan shall include engineering firm name, address, telephone number, date plans prepared, signature, and number of Registered Civil or Traffic Engineer.
- G. All stationing shall be based upon record centerline information and refer to centerline of street unless otherwise noted and shall read from left to right.
- H. All plans shall include the City of Lake Elsinore traffic control general notes, Construction notes and a legend shall also be included.
- I. All existing regulatory, warning, guide and any special signs shall be shown. This includes parking prohibition signs, advance street name signs, bus stop signs etc. All existing sign locations shall be field verified. Signs to be temporarily covered (bagged) or removed and reinstalled shall be identified.
- J. All existing striping, pavement markings and curb markings shall be shown, including bike lanes, parking layouts, crosswalks and limit lines. The locations and types of existing striping and pavement markings shall be field verified.
- K. All streets within the project limits shall be identified with proper street names to ensure proper orientation. A vicinity map and location map shall be included on the title sheet.
- L. All traffic signals within the project area shall be identified on the plan. Construction related temporary traffic signal modifications shall be shown on a separate traffic signal plan, prepared according to the latest edition of the City of Lake Elsinore Traffic Signals design criteria located in City of Elsinore Plan Preparation and Design Manual.
- M. Posted speed shall be shown at all approaches to the work area.
- N. Road closures, trail closures, detours, bore and jack operations, weekend work and/or night work require prior written permission from the City. Lane dimensions shall be shown at 300-foot intervals and at each end of lane or pavement transitions, match lines and join locations. Also, show length of turn lanes, flares, reverse tapers.
- O. Jurisdictional boundaries, street names, curb, driveways, centerlines and stations, alleys, raised medians shall be shown.

- P. A minimum of 500 feet of roadway with striping details beyond project limits (showing join points) shall be shown.
- Q. All proposed sign locations shall be dimensioned.
- R. The following standard "General Notes" shall be placed on the plans:

GENERAL NOTES

1. All traffic control devices shall conform to the latest editions of the California manual of uniform traffic control devices (CA MUTCD), the Caltrans Specification and Standard Plans, and the Standard Specifications for Public Works Construction.
2. The City reserves the right to observe these traffic control plans in use and make the necessary changes as field conditions warrant. Any changes shall supersede these plans and shall be done solely at the Contractor's expense.
3. It is the responsibility of the Contractor performing work on a public street to install and maintain traffic control devices as shown hereon, as well as any such additional devices as may be required to ensure the safe movement of traffic and pedestrians through or around the work area. All traffic control devices shall be kept in their proper position at all times, and shall be repaired, replaced, or cleaned as necessary to preserve their appearance and continuity.
4. The Contractor shall maintain all traffic control devices 24 hours per day and 7 days per week.
5. All tubular delineators shall be removed from view when not in use.
6. All traffic control devices shall be removed from view when not in use.
7. Recessed steel plates shall be maintained for open excavations during non-working hours. "steel plates ahead" signs shall be provided at all times.
8. Work hours shall be restricted to between 8:30 a.m. to 3:30 p.m. unless approved otherwise.
9. Any pavement markings and striping damaged during construction shall be restored to the original condition and/or location at the end of each construction period for each stage.
10. Contractor shall remove or cover all conflicting signs including signs on the traffic signal mast arms.
11. The Contractor shall provide trained flaggers as deemed necessary by the Engineer.
12. All workers shall be equipped with an orange vest (or a reflective vest at night). All flaggers shall also be equipped with a hard hat.
13. Access to driveways will be maintained at all times unless other arrangements

are made.

14. A minimum of twelve (12) foot travel lanes must be maintained unless otherwise approved by the department of public works.
15. The Contractor shall notify nearby businesses and residences at least five working days in advance, in writing, regarding work to be done, hours of work, any closures, and any required detours.
16. The Contractor shall coordinate the relocation of the bus routes and bus stops with the riverside transit agency three weeks in advance of construction activity affecting bus stops.
17. Temporary "No Parking" signs are to be posted 24 hours prior to commencing work.
18. Any work that disturbs normal traffic signal operations shall be coordinated with the City Engineering Inspection, 48 hours prior to beginning construction.
19. Temporary video detection system shall be installed at the Contractor's expense if vehicle loop detectors are to be damaged during the course of construction, video detection systems shall be removed by the contractor only after new loops are installed and verified operational by the City.

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Traffic Signal

Traffic signal design shall conform and follow the City of Lake Elsinore Traffic Signal Specifications.

In order to obtain uniformity and allow easier review of plans, the following criteria shall apply to all plans submitted.

- A. All plans shall be prepared on 24"x36" overall size with a 1/2" margin on all sides except the left side which shall be 1 1/2".
- B. All signal plans shall be drawn to a scale of 1"=20'.
- C. North arrows should point to the top or left of the sheet.
- D. All sheets shall be numbered consecutively, "Sheet ____ of ____," in the lower right of the plan.
- E. All lettering shall be 1/8" minimum height.
- F. Plan shall include engineering firm name, address, telephone number, date plans prepared, signature, and number of Registered Civil or Traffic Engineer.
- G. All plans shall include the City of Lake Elsinore traffic signal general notes, Construction notes and a legend shall also be included.
- H. All existing striping, pavement markings and curb markings shall be shown, including bike lanes, parking layouts, crosswalks and limit lines. The locations and types of existing striping and pavement markings shall be field verified.
- I. All streets within the project limits shall be identified with proper street names to ensure proper orientation. A vicinity map and location map shall be included on the title sheet.
- J. Traffic signal plans shall include new and existing curb and gutter, access ramps, right of way, maintenance easements showing all existing utilities, all traffic signal interconnect cable, and City boundary lines. All widths shall be clearly labeled and dimensioned to the centerline.
- K. Squares shall be used to designate construction notes.
- L. Triangles and clouding shall be used to indicate plan revisions.
- M. All existing conditions shall be screened to appear lighter than the rest of the drawing.
- N. Include signal pole schedule.
- O. Include conductor schedule.
- P. Include controller cabinet – solid state traffic actuated controller units and cabinets shall conform to the provisions in Section 86-3, "Controller Assemblies" of the State Standard Specifications and this Manual.

- Q. The preferred location for cabinet placement shall be on the far-side corner of the main arterial, in the direction of the primary flow of traffic. A minimum of 48 inches of concrete pad shall be provided at the front and rear of the signal cabinet and electrical service/BBS. The police panel side of the signal cabinet may abut the ROW providing there are no physical barriers preventing access to the panel. Where sufficient ROW exists, up to 24 inches of clearance shall be provided on the police panel side of the signal cabinet. Clearances shall be unobstructed by any above ground facilities. A retaining wall shall be installed where required. The Engineer must approve any variance from the preferred location.
- R. Front side of traffic signal controller cabinet should open toward the intersection where possible. Electrical meter shall be facing the street.
- S. Nearest practical Southern California Edison service vault and service handhole shall be shown on plan.
- T. Utilize N.E.M.A. phasing conforming to the California MUTCD.
- U. Symbols shown shall conform to State of California Standard Plans ES-1A and ES-1B.
- V. Pole identification numbering shall increase clockwise around the intersection, with the No. 1 being the first pole away from the controller corner.
- W. All traffic signal plans shall indicate required traffic signal pole locations as referenced from BCR, ECR, and curb face.
- X. Conduit run identification numbering shall start at the conduit crossing farthest from the controller corner and increase sequentially toward the home run pull box on the controller corner. The final home run conduits shall have the highest identification numbers.
- Y. Unless otherwise physically required, an exclusive/split phase shall not be used in the phase sequence.
- Z. Traffic signal modifications requiring the installation of video detection cabling shall require all conductors to be removed from the conduit before pulling new cable. "Slipping" is not allowed.
- AA. Traffic signal modifications requiring the installation of ADA compliant Push Button Assembly cabling will require all conductors to be removed from the conduit before pulling new cable. "Slipping" is not allowed.
- BB. Traffic signal modifications shall match installed equipment by make and model. If the system cannot be matched, the entire system shall be replaced.
- CC. Maximum allowable conduit fill is 26% for new installation and 40% for existing/ modified installations.
- DD. Intersections approaches with a minimum of three through lanes or a distance greater than 36-feet from the lane line between the through and the left turn lanes to the far right most curb and gutter in the direction of travel will require two video detection cameras unless one camera is sufficient as determined by the Engineer.

EE. Advance detection shall be provided on streets where the approach speeds are 25 mph or greater. Separate loops shall be placed in each through lane. Advance loop setback requirements from intersections, based on approach speeds, are shown below. Radar detection zones may be used in place of advance loops.

**Advance Detector Loop Setback
MUTCD Table 4D-101**

Approach Speed (mph)	Setback (feet from limit line)
25	105'
30	140'
35	185'
40	230'
45	285'
50	345'
55	405'
60	475'

FF. Prepare equipment schedule. Refer to State Traffic Manual, Figure 9-23 for examples of these schedules and as directed by the City Traffic Engineer.

GG. Emergency Vehicle Preempt

A complete, functioning 3M Opticom™ IR and GPS emergency vehicle preemption system, or approved equal, shall be furnished and installed as directed by the City Traffic Engineer.

The system shall be designed to prevent simultaneous preemption by two or more emergency vehicles on separate approaches to the intersection.

The optical detector shall be mounted on the indicated signal mast by drilling and tapping and a detail of this shall be placed on the plan.

HH. Existing and Proposed Utilities

All existing and proposed overhead and underground utilities shall be shown on the plans. The design engineer shall be responsible for acquiring the necessary utility maps and plans to properly show the utilities on the plans.

II. The following standard "General Notes" shall be placed on the plans:

GENERAL NOTES

1. All work, material, and equipment shall conform to the requirements of the California Dept. of Transportation, Standard Plans and Standard Specifications

(latest edition), The Manual on Uniform Traffic Control Devices (CA MUTCD) (latest edition), County of Riverside Standards and Specifications, and the special provisions for this project.

2. Utilities shown on these plans are correct and accurate to the extent of available records and knowledge. The Contractor, however, is required to ascertain the exact location of underground facilities prior to doing work that may damage such facilities or interfere with their service. The Contractor shall bear the total expense of repair or replacement of any underground facilities damaged by his operation. Phone underground service alert (USA) a minimum 48 hours in advance.
3. The Contractor shall obtain all necessary permits and notify all utility companies and underground service alert a minimum of 48 hours prior to the start of construction. It shall be the responsibility of the Contractor to coordinate all phases of construction with the various utility companies involved.
4. All traffic signal equipment shall be furnished and installed by the Contractor unless otherwise specified.
5. All new red, yellow, and green signal indications, ped indications, and I.I.S.N.S. shall be a light emitting diode (LED). Signal lenses shall be 12" with metal housing, visors, and louvered backplates with 2" yellow retroreflective borders.
6. The location of signal poles shown on the plan is approximate. The exact location shall be determined in the field by the Engineer.
7. Street name signs shall be retroreflective, white letters on the blue background with City logo and "City of Lake Elsinore" below street name.
8. Pedestrian signal faces shall be type "A" pedestrian countdown head with LED uniform incandescent look countdown module.
9. Pedestrian push buttons shall be 2" dia. (min.) ADA compliant, vibratory/audible, APS buttons with international symbol sign plate per Caltrans sign specifications R62D. Accessible pedestrian signal (POLARA APS) system shall be installed per California MUTCD Sections 4E.09, 4E.10, 4E.11 and 4E.12.
10. All new conduit shall be 3" PVC unless otherwise shown.
11. Contractor shall place conduit by jacking or drilling unless otherwise approved by City engineer or his representative.
12. All traffic signal detection, signing, pavement markings, and striping shall be completed prior to traffic signal activation.
13. Conductor schedule is furnished as an installation guideline only. It shall be the Contractor's responsibility to provide the correct conductors required for the intended operation.
14. All wiring and equipment shall be marked (tagged) within the controller cabinet

for phase identification.

15. Underground signal light conductors shall not be spliced.
16. See Caltrans Std. Plan ES-1A and ES-1B for the symbol abbreviation legend.
17. All salvaged equipment not reused shall be delivered to the City of Lake Elsinore yard.
18. Video detection cameras shall be mounted on signal mast arms with six-foot extension poles with astro brackets. Final location shall be determined in the field by the Engineer. Units with radar capabilities shall be mounted on the mast arm per manufacturer specifications.
19. Signal interconnect pullbox spacing shall be 500' apart maximum.

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SECTION VI MISCELLANEOUS ITEMS

Revisions to Approved Plans

Revisions to approved improvement plans are subject to approval by the City Engineer and shall only be made by an engineer from the firm that prepared the original plan. When another engineering firm has a need to make revisions on the plan, permission must be obtained in writing from the original engineering firm.

The engineering firm needs to contact the City for bluelines of approved plans. Proposed revisions should be drawn by hand in red pencil on bluelines of the approved plan(s). Two sets of these bluelines are then to be submitted to the Engineering Department for review and approval. Once the blueline has been reviewed and approval is given, a copy of the original may be checked out of the Engineering Department and changed by the Engineer.

Revisions shall be called out with a delta number wherever they occur on the plan. The revision box on the title sheet **and** the revision box on the sheet where the revision appears should show the delta number and revision description. Upon approval, the City Engineer will sign and date in the revision box on the title sheet.

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Appendix

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SOILS ENGINEER'S CERTIFICATE:

THESE GRADING PLANS HVE BEEN REVIEWED BY THE UNDERSIGNED AND FOUND TO BE IN CONFORMANCE WITH THE RECOMMENDATIONS AND SPECIFICATIONS OUTLINED IN THE SOILS AND GEOLOGICAL RECONNAISSANCE REPORT PREPARED FOR THIS DEVELOPMENT.

(Signature) (RCE NO.) (Date)

(Signature) (RCE NO.) (Date)

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ENGINEER'S NOTICE

1. CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS. THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER AND ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR ENGINEER.
2. ALL UNDERGROUND UTILITIES OR STRUCTURES, REPORTED OR FOUND ON PUBLIC RECORDS, ARE INDICATED WITH THEIR APPROXIMATE LOCATION AND EXTENT. THE OWNER, BY ACCEPTING THESE PLANS OR PROCEEDING WITH THE IMPROVEMENTS HEREON, AGREES TO ASSUME LIABILITY AND HOLD THE ENGINEER HARMLESS FOR ANY DAMAGES RESULTING FROM THE EXISTENCE OF UNDERGROUND UTILITIES OR STRUCTURES NOT REPORTED OR INDICATED ON PUBLIC RECORDS, OR THOSE CONSTRUCTED AT VARIANCE WITH REPORTED OR RECORD LOCATIONS. THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITIES OR STRUCTURES SHOWN AND ANY OTHER FOUND AT THE SITE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE OWNERS OF ALL UTILITIES OR STRUCTURES CONCERNED BEFORE STARTING WORK.
3. THE ENGINEER PREPARING THESE PLANS WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ALL CHANGES TO THESE PLANS MUST BE IN WRITING AND MUST BE APPROVED BY THE PREPARER OF THESE PLANS.
4. QUANTITIES SHOWN HEREON ARE PROVIDED FOR BONDING PURPOSES ONLY. CONTRACTORS SHALL BE RESPONSIBLE FOR VERIFYING ALL THE QUANTITIES PRIOR TO BIDDING FOR CONSTRUCTION.