

Standard Specifications - 2014

City of Modesto

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2014



Adopted by the Modesto City Council September 9, 2014 by Resolution 2014-345

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STANDARD SPECIFICATIONS - 2014

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CHAPTER 1

GENERAL

1.01 PURPOSE AND INTENT

The purpose and intent of these Standard Specifications is to provide certain minimum standards for the design, construction, repair and alterations for streets, roadways, alleys, drainage, sewerage, water supply facilities, utility location, landscaping & irrigation, lighting, stormwater quality controls and all appurtenances thereunto, within the City of Modesto.

1.02 SCOPE

The primary scope of these Standard Specifications is intended to be those improvements to be later accepted by the City of Modesto for operations and/or maintenance and City of Modesto Capital Improvement Projects. The City recognizes, however, that it has a responsibility to assure that certain other owned improvements (private streets, public and private utilities, etc.) meet a minimum standard as well. City Standard Specifications may be applied to privately owned and maintained improvements and Capital Improvement Projects which affect public health and safety.

1.03 DESIGN

The design of each development is in itself a special case and these Standard Specifications shall not be construed to be a maximum required design on all or any separate phase of the construction. Under certain conditions, any or all phases of the development may be required to exceed these Standards as directed by the City Engineer. It is also recognized that there may be developments where it is impossible to meet these Standard Specifications. It is suggested that these cases be reviewed with the City Engineer early in the design process to minimize re-designs where deviation is not permitted.

1.04 FINAL AUTHORITY

The City Engineer shall be the final authority on all questions which may arise as to the interpretation of these Standards. The City Engineer's decision shall be final and he/she shall have authority to enforce and make effective such decisions. Appeals of the City Engineer's decisions may be made to the City Council.

1.05 DEFINITIONS

In these Standards, the intent and meaning of the terms that are used shall be as defined in Section 1 of the City General Provisions except as herein below specifically noted, revised, or added.

- A. CALTRANS - Shall mean California Department of Transportation.
- B. CBC - Shall mean the edition, as approved by City Council, of the California Building Code of the International Conference of Building Code of the International Conference of Building Officials.
- C. CPC - Shall mean the edition, as approved by City Council, of the California Plumbing Code.
- D. CITY - Shall mean the City of Modesto, a municipal corporation.
- E. CITY ENGINEER - Shall mean the City Engineer of the, City of Modesto, or his designated representative.
- F. CONSULTING ENGINEER - Any person or persons, firm, partnership or corporation legally authorized to practice Civil Engineering in the State of California who prepares or submits Improvement Plans and specifications to the Department of Community Development for the City of Modesto for approval.
- G. COUNTY - Stanislaus County.
- H. DESIGN - Shall mean, including but not limited to, street alignment, grade, geometric section, structural section; sanitary sewer alignment, grade, size; water system alignment, size, valving, fire hydrant location; storm drain alignment, grade, size and miscellaneous improvements as required by the City Engineer.
- I. DEVELOPER - Shall mean any person, firm, corporation, partnership or association engaged in the development of property in part or in whole by the placing of any improvements thereon, whether the property was previously developed in whole, in part, or at all.
- J. EASEMENT - Shall mean an easement dedicated to the City or Public Utility which shall be continuing and irrevocable unless formally abandoned.
- K. IMPROVEMENTS - Refers to street work, sidewalk, curb, gutter, driveways, water mains, sanitary sewer, storm drainage, stormwater quality controls, public utilities, landscaping, and fences to be installed by the developer on land to be used for public right-of-way.
- L. MANUAL OF WARNING SIGNS - Shall mean the "California Manual on Uniform Control Devices " of the State of California, Department of Transportation - Current Edition.
- M. NPDES - Shall mean the National Pollutant Discharge Elimination System.

- N. SOILS REPORT - Shall mean a report as prepared by any person or persons, firm, partnership, or corporation legally licensed to prepare "Soils Reports" in the State of California.
- O. STANDARD DETAILS - Shall mean the Standard Details found within the City of Modesto, Standard Specifications 2014.
- P. STATE HIGHWAY DESIGN MANUAL - Shall mean the State of California Department of Transportation Highway Design Manual, latest edition, unless otherwise stated.
- Q. STATE MATERIAL MANUAL - Shall mean the Materials Manual of Testing and Control Procedures of the State of California, Public Transportation Laboratory Manual of Tests, Department of Transportation, latest edition, unless otherwise stated.
- R. STATE PLANNING MANUAL - Shall mean the Planning Manual of Instructions of the State of California, Department of Public Works, Department of Transportation, latest edition, unless otherwise stated.
- S. STATE STANDARDS - Shall mean the Standard Specifications of the State of California Department of Transportation, latest English unit edition, unless otherwise stated.
- T. STANDARD PLANS - Shall mean the Standard Plans of the State of California Department of Transportation, latest edition, unless otherwise stated.
- U. SUBDIVISION ORDINANCE - Shall mean the Subdivision Ordinance of the City of Modesto.
- V. SWPPP - Shall mean Storm Water Pollution Prevention Plan.
- W. ZONING ORDINANCE - Shall mean the zoning ordinance of the City of Modesto.

CHAPTER 2

SUBMITTAL, PERMITTING & SURVEYING REQUIREMENTS

2.01 GENERAL

Complete plans for all proposed improvements including any necessary dedications and easements shall be submitted to the Land Development Engineering Division for approval and must receive the required approval prior to the commencement of construction of any such improvements. This shall apply where it is the intent that any portion of such improvements is being dedicated to the City of Modesto. Such plans shall be prepared and signed by a Registered Civil Engineer in accordance with the provisions of "Professional Engineer's Act" Chapter 7 - Article 3 of the Business and Professional Code, relating to the practice of Civil Engineering.

Subdivision plans will not be approved without executed reimbursement agreements and Landscape Plans, if applicable.

2.02 IMPROVEMENT PLAN SUBMITTAL

Submit a minimum of three (3) initial sets for review and subsequent submittals until signed for construction. All plans submitted for review shall be final and complete. Incomplete plans or partial submittals will not be reviewed. Delays may be incurred when incomplete plans or partial packages are submitted for review. Commercial Development and Private Gated Communities are not exempt from providing Improvement Plans to the Land Development Engineering Division for review of improvements within the public right-of-way. Improvement plans shall be prepared in accordance with the following requirements:

A. Minimum Requirements

The improvement plan sheet(s) for a commercial or gated community development shall, at a minimum, detail the following information:

1. Curb Ramps (type, elevation, and any obstructions).
2. Curb & Sidewalk (width, top of curb, and existing obstructions).
3. Driveways (type, elevations to demonstrate control of on- & off-site drainage, handicap ramp for drop approaches, and slopes & radii on drop approaches).
4. Street Signage (locations).
5. Sewer connection w/ cleanout at property line (invert & rim connections at manhole or sewer lateral).
6. Water connection with meter and backflow prevention device locations.

7. Permit Construction Notes (Section 2.16) notes with type of construction materials for utilities placed in the right-of-way.

B. Dimensions

Improvement Plans shall be clearly and legibly drawn in ink on engineering vellum paper 24" by 36" with a 1½" minimum clear margin on the left edge and ½" minimum margins on all other edges.

C. Drafting Specifications

Standard drafting symbols are shown in Standard Details Nos. 200-205. Deviations must be approved prior to submittal of any plans to the City.

D. Title Sheet (Cover Sheet) (additional sheets may be used)

1. Name of Subdivision or Project.
2. Vicinity Map with North Arrow.
3. Index of Sheets.
4. City Engineer's Signature Block (attached).
5. CFD/CFF signature block (if applicable)
6. Dry utility agency signature block (if applicable)
7. Consulting Engineer's Signature Block.
8. General and special notes relating to construction methods. Standard notes for plans prepared in the City of Modesto are shown in Section 2.16 of these Standard Specifications and may be placed on Sheet 2 instead of cover sheet.
9. List of applicable City Standard Detail No.'s.
10. Temporary and permanent benchmarks and horizontal control points including their description (NAV88 Datum).
11. Planning Commission, City Council or Board of Zoning Adjustment Resolution No. approving the project.
12. Plan view showing the limits of each sheet and sheet number within the plan set.
13. Typical street sections. Show storm drain open channels where applicable in these sections.
14. Pavement Design Chart showing street name (and station if section changes), TI, R-value, HMA, AB and ASB thickness.

E. Composite Utility Plan

1. Plan view showing the entire street right-of-way layout, proposed and existing water and sewer mains, storm drainage system, fire hydrant, street light locations, lot numbers and other miscellaneous improvements to be installed.
2. Show all existing power poles to be relocated and, if possible, the ultimate location. The Developer is responsible to relocate all lines within the subdivision and areas dedicated to the public.
3. Where street improvements adjacent to a development project are deferred, such as CFF and CFD street or landscaping improvements, the Engineer shall consider installing storm drain conduit, an electrical pull box for street lights, an irrigation controller, and a water service for irrigation. The Consulting Engineer may determine some or all of the improvements are not needed. If any of these facilities are not provided, a short note shall be placed on the plans stating how these facilities are ultimately provided. City utilities shall be constructed in dedicated public right-of-way and not easements between individual lots.

F. Topography, Demolition and Abandonment Plan

1. Plan view showing existing topography at a scale large enough to clearly show existing improvements.
2. Show all existing surface and subsurface improvements, including buildings, wells, septic tanks and leach fields.
3. The location of on-site and surrounding watercourses and wetlands, existing and proposed drainage systems, and drainage area boundaries and acreages. Additional hydrologic analysis shall be provided as required by the City Engineer.
4. Accurate contours at 2' intervals for slopes up to 10%, and 5' intervals for slopes over 10% showing topography of existing ground and location of existing vegetation, including all oak trees, all other trees over 6" in diameter measured at 4.5' above the ground, groves of trees, and natural features such as rock outcroppings. Spot elevations will be required where relatively flat conditions exist. The spot elevations or contour lines shall be extended off-site for a minimum distance of 50' or 100' in flat terrain.

G. Grading Plan

1. Plan view at a scale of 1" = 10', 20', 30', 40' or 50' showing existing significant geographic features and proposed topography on site and a minimum 50' of the immediately adjacent areas.
2. Top of curb elevations at all property line extensions and grade breaks.
3. Street slopes at centerline.
4. Lot elevations.

5. Lot numbers.
6. Locations of proposed and existing storm drain structures to include adjacent developments which have an effect on the proposed drainage system.
7. Retaining walls and sound walls.
8. Typical lot grading details showing plans and section. Location of any disposal areas, fills or other special features to be included in the work.
9. A statement of the quantity of material to be excavated, the quantity of material to be filled, whether excavation or fill is permanent or temporary, and the amount of such material to be imported to or exported from site.
10. A delineation of area to be cleared and grubbed.
11. Elevations at rear of all lots.
12. Elevations of all adjacent property to include the existing streets top of curb elevations.
13. See Chapter 11 of these standards for additional requirements.

H Street Plan & Profile Sheets

1. Plan views at a scale of 1" = 40' for all new streets, widening of existing streets, etc. including existing improvements, proposed improvements, landscaped parkways, and future improvements if known.
2. Proposed improvements shall include sidewalk, parkway strip, curb, gutter, driveways, sewer mains and laterals, water mains and services, storm drains, manholes, drainage inlets, valves, fire hydrants, barricades, street lights, pavement removal and replace survey monuments and other data required by the City Engineer.
3. Centerline stationing shall be shown with grades indicated in plain view for street intersections, drainage structures (include dimensions or station offsets from centerline), beginning and endings of curb returns and vertical and horizontal curve information (as required).
4. Street plan views shall include right-of-way lines (including widths), street widths (curb to curb) street names and easement widths.
5. Profile view of each street shall be shown on the same sheet as plan view and at a vertical scale of 1" = 2' or 4' or approved alternate.
6. Profiles shall show existing grade at centerline of street, existing proposed top of curb, sanitary sewer mains, water mains, storm drains, utility crossings, dry utilities and any other features of interest.

7. Elevations shall be shown in profile of top of curb at grade breakpoints, manhole and drainage inlet inverts, high points and low points of water mains. Vertical curves shall show station and elevation of beginning points, points of intersections, low points and ending points.
 8. Street cross slopes, curb slopes, storm drain and sewer main slopes shall be shown.
 9. Centerline curve data shall be shown in plain view or by tabulation for street centerline; curb data for curb returns shall also be shown. If a utility is non-concentric with the street centerline, utility curb data shall be annotated on the pipe in plain view.
- I. Signing & Striping Plan (may be combined with the electrical Street lighting Plan)
1. Plans shall be at a scale of 1" = 40', 50' or 100'.
 2. Plan view at a scale sufficient to clearly indicate all street striping and signing.
 - a. Plan shall include all existing and proposed striping and markings for the full width of the roadway including any intersecting streets. Any tapering needs to match existing striping to the new striping and striping plan shall extend at least 300' past the end of tapering.
 3. Striping plan shall conform to Caltrans Standards.
- J. Street Lighting Plan (incl. signing and striping information)
1. Plans shall be at a scale of 1" = 40', 50' or 100'.
 2. The Consulting Engineer shall show the street light locations and wattage the initial submittal of Improvement Plans. The final As-built set of Improvement Plans shall show the service points, conduit runs, pull box locations and wire size. As-builts shall be provided before final acceptance of the subdivision.
 3. Street light locations and wattage shall be shown on plans and approved by the City of Modesto. Any street lights attaching to existing or new MID poles shall be approved by the Modesto Irrigation District with a signature block for MID provided on the base sheet.
 4. Service Pedestal shall be located out of sight distance triangle area, 25' or more from corner property line.
- K. Traffic Signal Plan (when required by City)
1. Plans shall be at a scale of 1" = 20'.
 2. Plans shall have a cover sheet showing project location, map, Caltrans Standards used, general notes, project name, index of sheets, City and Consulting Engineer signing blocks.

3. Plans shall have equipment and wiring schedules.
4. Plans shall have detector loop layout, service and phasing diagrams.
5. Detector loop assignments shall be called out.
6. Type A detector loop hand holes are required.
7. Plans shall show existing or proposed lane widths. A signing and striping plan will be required for any new or modified street widths.
8. Plans shall show all existing utilities and accommodate for them. Overhead line heights at pole locations shall be noted on plans.
9. Conductors shall be THW.
10. Emergency Vehicle pre-emption shall be installed.
11. Phases 2 and 5 shall be for eastbound traffic.
12. Plans shall have overhead street name signs with block numbers using diamond grade sheathing.
13. Service locations shall be shown on plans and approved by Modesto Irrigation District.
14. Controller Cabinet and Service Pedestal shall be located out of Sight Distance Triangle area, 25' or more from corner property line.

L. Detail Sheet

Additional drawings may be required to show special project improvements or structures that are deviation from any adopted City Standard.

M. Reimbursement Plan (if required or in lieu of clouding individual items on the various sheets)

1. May be used in lieu of clouding individual items on the various sheets.
2. Note the type of reimbursement and quantities (i.e. CFF, CFD, Sewer, Water, Storm, Traffic Signal, etc.).
3. If two (2) or more types of reimbursement are on the plan sheets, provide some type of delineation between the types.

N. Landscape & Irrigation Plan

1. Shall be submitted prior to approval of Improvement Plans.
2. Scale shall be 1" - 20'.

3. Irrigation schematic to be shown separate from planting details.
 4. Shall be signed by a Landscape Professional.
 5. Shall incorporate all requirements of Modesto Municipal Code Title 12 into the design.
- O. Storm Drain Package – See Chapter 4, Section 4.03 for submittal requirements
- P. Local Stormwater Pollution Prevention Plan (SWPPP)
1. Detail erosion control measures.
 2. Detail sediment control measures.
 3. Detail drain inlet protection in the public right-of-way.
 4. Detail stabilized entrance and egress from construction site.
 5. Detail on-site concrete wash out area.
 6. Detail stockpile management, material storage & delivery areas
 7. Detail solid waste management practices
 8. Detail location of temporary sanitary waste facilities
 9. List name and contact number of person responsible for implementation of and adherence to Local SWPPP.
 10. State size of project in square feet or acres.

See Chapter 15, Erosion and Sediment Control Standards for Construction activities for details and references.

2.03 FINAL MAP SUBMITTALS

A. Minimum Requirements

1. All maps shall be prepared in conformance to the current version of the State of California Subdivision Map Act.
2. The generic term PUE (Public Utility Easement) may be used as a label on the map only when the City is accepting the PUE for its utilities or other public utility companies. If sewer, water, or storms are to be private utilities, the PUE label may not be used. The private utilities to be shared between parcels will be labeled by the type of dedication and a separate instrument number shall be used. For example, "Private Sewer Easement, Instrument No. 3452233". If one of the systems in an

easement is public and the remainder private, the label might be "Public Sewer Easement, Private Water Easement, Instrument No.34593".

3. Non-buildable remnants of parcels may not be dedicated on a Final Map or Parcel Map. The non-buildable remnant must be combined with public right-of-way or another parcel. Non-buildable remnants are parcels not conforming to the zoning code.

2.04 COMMUNITY FACILITIES FEES (CFF), COMMUNITY FACILITIES DISTRICT (CFD), & AND OTHER DEVELOPER INSTALLED AND CITY OR DISTRICT REIMBURSED FACILITIES

At a minimum, all Improvement Plan sets shall place four (4) separate signature blocks for City staff to sign-off on. These signatures are verifying compliance standards and execution of any and all reimbursement agreements. Possible reimbursement agreements include CFF, CFD, and utility work. All plan sheets having CFF, CFD, utility and/or other city or CFD reimbursable facilities shall have additional signature blocks placed on the specific plan sheet(s) for the CFD, CFF, and/or Utility Planning Engineer. Also, those items being reimbursed shall be "clouded" on the plan sheet(s). In lieu of "clouded" plan sheets, the Engineer may create another plan sheet for reimbursable work. Staff will indicate not applicable ("N/A") before their signature if they are not reimbursing the Developer. Below is an example of the required signatures on the cover sheet for reimbursement:

REIMBURSEMENT AGREEMENTS:

BY: _____ DATE: _____
CFD COORDINATOR

CFD REIMBURSEMENT, IF ANY, IS CONTINGENT UPON EXECUTION OF AN ACQUISITION & SHORTFALL AGREEMENT PRIOR TO COMMENCING ANY SUCH REIMBURSABLE WORK.

BY: _____ DATE: _____
CFF COORDINATOR

BY: _____ DATE: _____
UTILITY PLANNING COORDINATOR

Only the plan sheets with reimbursable CFF/CFD work and the title sheet must have these signature blocks placed on the sheets. The fourth required signature block is the City Engineer's signature block.

2.05 CITY ENGINEER'S SIGNATURE BLOCK

The following signature is required for Improvement Plan sets to include small commercial sites making public improvements:

APPROVED BY CITY ENGINEER: CITY OF MODESTO,
CALIFORNIA FOR PUBLIC IMPROVEMENTS ONLY (SHEETS____)

BY: _____ DATE: _____
CITY ENGINEER

After the signature block for the City Engineer, the following statement shall be added:
APPROVAL OF THESE PLANS DOES NOT RELEASE THE DEVELOPER FROM RESPONSIBILITY FOR CORRECTION OF MISTAKES, ERRORS OR OMISSIONS CONTAINED THEREIN. IF DURING THE COURSE OF CONSTRUCTION THE PUBLIC INTEREST REQUIRES A MODIFICATION OR A DEPARTURE FROM THE CITY SPECIFICATIONS, OR THE APPROVED PLANS, THE CITY SHALL HAVE THE AUTHORITY TO REQUIRE SUCH MODIFICATION OR A DEPARTURE, AND TO SPECIFY THE MANNER WHICH THE SAME IS MADE.

2.06 SIGNED AND APPROVED CONSTRUCTION DRAWINGS

After final approval and signatures on the vellums/mylars/bonds by the City Engineer and all agencies, the Consulting Engineer shall submit ten (10) sets of bond prints of the Improvement Plans to the Land Development Engineering Division.

2.07 RECORD DRAWINGS (Required for final acceptance of improvements)

The Consulting Engineer and the Contractor are responsible for completing the As-built plans. The Consulting Engineer shall submit the following prior to final acceptance of improvements by the City:

- A. One (1) set of bond of the Improvement Plans with "Record Drawings" stamped or printed on each sheet of the plans and a compact disk.
- B. One (1) compact disk with a scan of the prints (PDF), a CAD drawing of the entire improvement area, and surveyor maps. Scans shall be 400 DPI and saved into a single Adobe PDF file. CAD shall be AutoCAD DWG version 2006 format or newer.
- C. Traffic plans shall include all of the above plus a vellum or mylar.
- D. Any maintenance and/or operational manuals for such things as pumps, traffic signals, lift station packages, and other dedicated improvements requiring daily to yearly service.

Record drawings will not require a re-survey of the improvements. Record drawings shall indicate horizontal movement and additions of any appurtenances such as catch basins, manholes, cleanouts, street lights, pull boxes and monuments. Only horizontal movements exceeding 5" for surface improvements and 1' for underground improvements must be shown. Other data required in the record drawings are schematics of the street light conduit and additions of elbows in the water line to cross specific unknown obstructions and other unknown obstructions discovered in the course of construction.

2.08 GENERAL PERMITTING

Permits for work in the public right-of-way are the responsibility of the Land Development Engineering Division. The time required to process a permit will vary by the complexity of the issues presented. In general, permits for a single residential driveway, sidewalk, or sewer repair or sewer tie-in can be obtained immediately if insurance is on file and the fees are paid.

2.09 INSURANCE REQUIREMENTS

To obtain a permit, the applicant's company must have workers' compensation and general liability insurance on file with the City of Modesto City Clerk's Office. Homeowners working on their own concrete work may have the insurance requirement waived. No homeowner may work in the public right-of-way without the proper state contractor's license. (Except minimal sidewalk repairs)

2.10 PLAN REQUIREMENTS

In general, unless the permit is a repair to an existing facility or adding a single residential driveway, plans are required. A commercial project may use the architectural drawings in lieu of creating civil engineering drawings to obtain a permit for minor concrete related work. A civil engineer stamp will be required when constructing underground utilities beyond a simple sewer and water tie-in or when sidewalk grade design is required.

Traffic control plans will be required prior to closing a single lane. If the entire road is being closed for the project, an application for a permit must be approved at least two (2) weeks prior to the road closure dates. The Contractor will also be required to post notification signs at least 10 days prior and distribute leaflets to property tenants or owners within 300' of the closure. The Contractor shall follow requirements as set forth in the most current California Manual on Uniform Traffic Control Devices.

For projects one (1) acre or greater, the Developer shall obtain coverage under the CGP; General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (General Construction Permit) issued by the State Water Resources Control Board (SWRCB). To obtain coverage under the General Construction Permit, a Notice of Intent (NOI) shall be electronically filed with the SWRCB. The General Construction Permit requires the applicant to prepare permit

registration documents, including a Notice of Intent and a Stormwater Pollution Prevention Plan (SWPPP) for the project. Developer shall provide one copy of the SWPPP to the City of Modesto Land Development Engineering Division for review prior to obtaining a Grading or Encroachment permit for project. A copy of the SWPPP shall be kept on the construction site at all times, until completion of the project.

2.11 SIGNS

Signs posted for a road closure must meet Caltrans specifications. The advanced closure signage will have the dates on the sign and must be re-adjusted two (2) days prior to any extension granted.

2.12 PRE-CONSTRUCTION REQUIREMENTS

Residential Subdivisions and large commercial projects will require a Pre-Construction meeting with City permits and inspection staff. This meeting is to help communicate the areas of responsibility. Please make a copy of the form found in Figure 2.2 and fill-in as much as possible prior to the meeting. Staff will review the submittal requirements found in figure 2.1 and give the Contractor a list of required submittals.

All projects greater than one (1) acre shall obtain coverage under the CGP; General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (General Construction Permit) issued by the State Water Resources Control Board (SWRCB). The General Construction Permit requires the applicant to prepare and carry out a Storm Water Pollution Prevention Plan or SWPPP for the project. Developer shall provide one copy of the NOI and SWPPP to the City of Modesto Development Services Division for review prior to obtaining a Grading or Encroachment Permit for project.

All projects less than one (1) acre shall develop a Local Storm Water Pollution Prevention Plan (Local SWPPP) or Erosion Control Plan and implement stormwater Best Management Practices (BMPs) during construction. The Local SWPPP typically consists of one to two pages, included in the civil drawings. The Local SWPPP shall be submitted to the City of Modesto Land Development Engineering Division for review prior to obtaining a Grading or Encroachment permit for project.

2.13 ENCROACHMENT PERMIT STANDARDS

The following conditions are from the City standard encroachment permit:

- A. Call the Inspector 48 hours before starting work and for final inspection @ 577-5452.
- B. Perform work according to City of Modesto Standard Specifications and MMC Sec.7-2.01 et seq and Sec 7-1.105 et seq.

- C. Call USA at 800-642-2444 and 800-227-2600 and the Modesto Irrigation District (MID) at 209-526-7373 for utility locations at least 48 hours before digging. Other companies include: PG&E, AT&T and Comcast.
- D. Provide a copy of these permit conditions to all Contractors doing work covered under this permit.
- E. Construct subdivision improvements in accordance with approved plan set. Inspection fees to be reimbursed in accordance with Subdivision Agreement and/or Modesto Municipal Code (MMC).
- F. Prior to receiving any water taps, the Developer shall pay the water service connection charges.
- G. If project is greater than one (1) acre, provide one copy of Notice of Intent (NOI) and Stormwater Pollution Prevention Plan (SWPPP).
- H. Projects shall comply with Stormwater Erosion and Sediment Control provisions listed in Chapter 16 of these Standards.
- I. All CFD, CFF and reimbursable utility line construction work shall be permitted by a separate agreement. No work shall be done on these items until the reimbursement agreement is executed and a permit is issued specifically for the items.
- J. No landscaping work is permitted unless plans are approved by the Parks, Recreation and Neighborhoods Department.
- K. Street and Alley Closures/ Traffic Control: Call Fire and Police at 572-9679 **BEFORE** closing any part of the street or alley.
- L. Open all traffic lanes during peak hours: Mon-Fri: 7:30 – 8:30 AM; 4:30 – 5:30 PM.
- M. Full street closures will require a separate permit. Street closure permits will be conditioned to post all streets covering to this location with public warning signs of the pending closure. The traffic plan shall be approved a minimum of two (2) weeks prior to pending closure. The traffic plan will address the detour of traffic. The permit will minimize the amount of time the closure is in effect.
- N. Partial street closures may be coordinated with the inspector. Partial street closures may be limited in time to 8:30 am to 4:30 pm. All construction traffic control shall follow the Caltrans manual.

2.14 GRADING PERMIT

A Grading permit is required prior to grading, filling, storing or disposing of three hundred fifty (350) cubic yards or more of soil, or the clearing and grubbing of more than one half (0.5) acre of land within the City of Modesto. See Chapter 11 for more detailed requirements on Grading Permits.

A Developer may seek a Grading permit prior to the approval of the Improvement Plans. The Land Development Engineering Division must approve the grading plans for a project prior to issuance of a Grading permit.

2.15 CLOSING A PERMIT (ACCEPTANCE OF IMPROVEMENTS)

- A. GENERAL: No permit will be closed by the Inspector without a final inspection. Contractors must call for final inspection after all work is completed and the site is cleaned up. On final inspection, the Inspector will either sign-off on the permit and forward the signed copy to permits or develop a punch list of corrections required prior to acceptance.
- B. SUBDIVISION IMPROVEMENTS: By ordinance, permitted subdivision improvements must be formally accepted by City Council. To be accepted by City Council the following must be completed:
 - 1. Developer's Contractor must complete the punch list to the satisfaction of the Inspector.
 - 2. Developer must submit and have approved warranty bonds.
 - 3. Developer must pay all outstanding invoices to include inspection and water service fees.
 - 4. Developer must have complied with all conditions placed on the Subdivision Map.
 - 5. Developer's Engineer must submit a set of "Record Drawings" and a compact disk with the scans and CAD file.
 - 6. Developer's Engineer must submit a letter signed and stamped by a registered Civil Engineer or Land Surveyor verifying the site was graded to within 0.10 feet of the grades shown on the Record Drawings.
- C. COMMERCIAL IMPROVEMENTS: Most commercial improvements do not have to be formally accepted by City Council. To have improvements accepted the following must be completed:
 - 1. Developer's Contractor must complete the punch list to satisfaction of the Inspector
 - 2. Developer must pay all outstanding invoices.
 - 3. Developer must have complied with all conditions placed on the development.

2.16 PERMIT CONSTRUCTION NOTES

- A. General

1. All material and work shall conform to City of Modesto Standards Specifications and Details. The improvements are subject to the inspection and approval of the Public Works Department. Contact the Construction Administration Office at 577-5452 two (2) working days (48 hours) prior to the start of any work to arrange for inspection.
2. The Contractor or Developer shall obtain an encroachment permit prior to the start of any work. No work can begin without an approved and signed set of Improvement Plans.
3. Prior to excavating near any underground utilities, call U.S.A. at least 48 hours in advance at phone (800) 642-2444 or (800) 227-2600.
4. These plans have been checked by the City of Modesto and/or its authorized representative, but such checking and/or approval does not relieve the Developer and Contractor from his/her responsibility to correct errors, omissions or make changes required by conditions discovered in the field during the course of construction.
5. Contractor shall control dust at all times during construction as required by the City of Modesto and the Regional Air Quality Control Board.
6. Relocation of designed utility systems more than 10' must be reviewed by the Land Development Engineering Division prior to construction and shall be accurately shown on revised stamped plans and shall be approved by City staff and the Design Engineer prior to the installation of the improvements.
7. All construction staking for curb, gutter, and sidewalk, sanitary sewers, storm drains, water lines, fire hydrants, and electroliers, etc. shall be done under the direction of a civil engineer or an individual licensed to perform land surveying under the California Business & Professions Code.
8. All existing underground utilities may **not** be shown. The Contractor shall take precautionary measures to protect these utilities. The Contractor shall not begin excavation until all utility companies and the City of Modesto have been notified and have been given the opportunity to mark their facilities in the field.
9. House services, fire hydrant laterals, gas and telephone lines, and all other underground utilities shall be installed prior to curb, gutter, and sidewalk construction and street paving.
10. All lines abandoned during construction shall be removed.
11. For all projects, regardless of size, the Contractor shall implement Best Management Practices to eliminate or minimize pollution discharge caused by construction (see Chapter 15).
12. Material Testing:

- i. All independent material testing and inspection called for by the City Engineer shall be furnished and paid for by the Developer or Contractor.
 - ii. Subgrade testing for R-values is required prior to the installation of base rock.
 - iii. Contractor shall furnish material certifications of pre-manufactured material when called for by the City Engineer.
13. Street striping shall include stop bars, centerline striping or markers, crosswalks and all other markings required by the City Engineer. Striping shall be done with thermoplastic and reflective markers.
14. All trenches shall be backfilled in accordance with City of Modesto Standard Specifications.
15. When widening the pavement on an existing road, the existing pavement shall be cut to a neat line and removed back to an existing adequate structural section, or to the original road section. An exploratory trench, or pot-holing, may be required to determine the limits of pavement removal.
16. Existing curb and sidewalk within the project limits that are damaged or displaced, even though they were not to be removed, shall be repaired or replaced per City of Modesto Standard Details even if damage or displacement occurred prior to any work performed by the Contractor.
17. Asbestos Cement Pipe (ACP) or fittings shall not be used within the City of Modesto.
18. Prior to trenching for any sewer, water, or storm drain pipe, the Contractor shall verify, in the field, the size and location of the existing pipe at the point of connection. Any deviation from the plans shall be resolved by the Design Engineer prior to trenching.
19. Manholes, valves, cleanouts, etc. shall be brought to finish grade by the underground contractor after the final paving course is placed.
20. For pipes greater than 30" on sewer and 36" on storm drain, 60" inside diameter, manholes shall be used.
21. Street closure or lane closure will require a traffic control plan and the designation of a qualified individual for its implementation and safe maintenance.

B. Water

1. All water lines shall be pressure-tested, disinfected, flushed, and tested for bacteria in conformance with the City of Modesto specifications prior to final acceptance by the City.
2. All water services shall be 1" minimum. Water service shall be connected to

water mains with two-strap bronze saddles. Only City of Modesto crews will perform any construction activity on existing water mains, including water taps or main extensions.

3. All valves, tees and crosses to be flanged to their respective fittings. Water valves to be resilient seat only.
4. Water mains at the end of future streets shall have two (2) half-lengths of pipe between gate valve and blow-off. Deflection of water lines shall not exceed 80% of manufacturer's specifications.
5. Water mains shall be as per City Standard Details and fire hydrants shall be Jones J- 4040, Long Beach 425, Clow 850, AVK 2470 or approved equal and shall conform to the latest AWWA Specifications, C-503, for wet-barrel fire hydrants. All hydrants shall be painted with Caterpillar Yellow Polyurethane high duty industrial enamel. No lead based paints may be used.
6. All valve stems must be brought to a minimum of 4' below finish grade with stem extension units.
7. Thrust blocks shall be provided at all required locations on water line in accordance with the City of Modesto Standard Specifications and Details.

C. Storm Drain

1. Storm drain pipe sizes shall not be changed without the approval of the City Engineer and the Design Engineer.
2. Storm drain pipe alternatives:
 - a) Reinforced concrete pipe class III (unless otherwise noted).
 - b) Cast-in-place concrete pipe, City of Modesto Standard (36" or larger).
3. Catch basins to be constructed per City Standard Details.
4. Contractor shall be in compliance with Chapter 10 of Title V of the Modesto Municipal Code.
5. All construction site activities, regardless of project size, shall conform to Chapter 15 of these Standards. Projects greater than one (1) acre shall also conform to the State Water Resources Control Board (SWRCB) General Construction Activity Storm Water Permit.

D. Sanitary Sewer

1. All sanitary sewer mains shall be television inspected, flushed with an approved sewer ball or using a hydro-flushing jetter with an appropriately sized cleaning nozzle and pass a leakage test in conformance with City of Modesto Standard Specifications prior to acceptance by the City. All testing shall be performed after the compaction for street base rock and prior to paving.
2. One 4" sanitary sewer lateral shall be installed to each lot at location shown on the plan. A cleanout shall be placed at right-of-way line per standard plan #508.

Cover on lateral at property line to be 3' minimum to 5' maximum except as noted on plans.

3. All manholes constructed on a trunk main shall be PVC lined per industry standard/manufacture's specifications and tested in conformance with City of Modesto Standard Specifications.
4. PVC welding may be required on any work done to existing lined manholes.

E. Street Lights

1. When pole location conflicts with an existing or proposed facility, the pole shall be placed as directed by the City Engineer. In no circumstances shall a pole be moved more than 20' without an approved revision of the plan sheets.
2. Developer shall supply all materials when served from an underground source. MID shall supply and install conduit on overhead connections.
3. Contractor shall provide a pull box at the service point, each side of the street crossing, and at 200' maximum spacing. Pull box may be set adjacent or behind pole in right-of-way. Any conduit run over 100' will require a pull box at the pole.
4. Conduit shall be a minimum depth of 18" below sidewalk grade in park strips and 30" below top of curb grade in streets, alleys and easements not adjacent to curb or sidewalk. Depth shall not exceed 48".
5. Where sidewalk is against property line, the conduit shall be placed 6" behind curb.
6. Where walk is separated from curb and gutter, or a 10' sidewalk is installed in back of curb and gutter, place pole 18" from back of curb. All other zones shall be 18" from back of sidewalk.
7. Pole foundations shall be 72" deep by 30" diameter or 60" deep by 36" square and placed against undisturbed earth.
8. When spotting the distance for placement of pull boxes, a pull box shall be placed at the light pole and then space from there.

FIGURE 2.1 STANDARD INSURANCE REQUIREMENTS

The permittee/licensee shall provide, at its own expense, and maintain at all times the specified insurance policies with insurance companies licensed in the State of California and with an acceptable Best's rating of A:VII or with approval of the City's Risk Manager. The policies or certificates thereof shall provide that thirty (30) days prior to cancellation or material change in the policy notices of same shall be given to the Public Works of the City by registered mail, return receipt requested.

1. **Workers' Compensation** – in compliance with the statutes of the State of California, plus employer's liability with a minimum limit of liability of \$1,000,000.
2. **General Liability** insurance with a minimum limit of liability per occurrence of \$1,000,000 for bodily injury and \$1,000,000 for property damage or \$1,000,000 combined single limit.* This insurance shall indicate on the certificate of insurance the following coverage's and indicate the policy aggregate limit applying to: premises and operation; broad form contractual; and products and completed operations.

The Certificate of Insurance:

The Certificate shall indicate the City of Modesto to be a Certificate holder and additional insured.

A separate endorsement changing the policy to indicate the City of Modesto as "additional insured" must accompany the Certificate of Liability Insurance.

The Certificate shall contain the provision that the issuing company shall mail a 30-day written notice to the City of Modesto - Public Works Department, prior to any intent to cancel, non-renew, or reduce coverage. Statements such as "Will endeavor to notify" or "Failure to mail such notice shall impose no obligation..." cannot be accepted. Please have your insurance agent cross out those phrases if they are printed on the certificate form.

The Certificate of Insurance must include the policy's expiration date or an indication that it is continuous. The Certificate must also include a policy number. "Binders" are unacceptable.

- The limits of liability required may vary, depending on the type of permit or contract. If there are any questions pertaining to the above, please contact Risk Management at (209) 577-5411.

**CITY OF MODESTO
Risk Management Department
(209) 577-5411
FAX (209) 576-7069**

Figure 2.2 PRE-CONSTRUCTION MEETING FOR ENCROACHMENT PERMIT APPLICANTS

Encroachment Permit Number: N_____

Improvement Plan Number: _____

Subcontractor/Developer Information Sheet Submitted? Y N

Copy of Notice of Intent (NOI) provided, Waste Discharge Identification (WDID) number provided and copy of Storm Water Pollution Prevention Plan (SWPPP) filed with State Water Resources Control Board (SWRCB) provided? Y N

Insurance on File: Workers' Compensation? Y N Liability? Y N

Construction Inspector: _____ Ph. 577-5452 Fax 577-4302

Stormwater Quality: ph. 577-5264

Water Connection: Permits ph. 571-5569

Encroachment Permits: ph. 571-5569

Building Permits: ph. 577-5232

Inspections Required (48 hour notice required) for Grading, Subgrade, Utilities, Concrete, Rocking, Paving, Traffic control: lane & road closures, and all other work required by the inspector to be inspected.

Additional Permits Required for Road Closures, major CFD financed items, & Landscaping.

Changes to approved plans may require City Engineer and Design Engineer's approval.

Submittals required for:

Pipe & Fittings (mfg literature)	Y	N
City Utility Appurtenances (CB, MH, etc.)	Y	N
AB & HMA & Concrete	Y	N
Street Lights, Pull Boxes, & Conduit	Y	N
Traffic Signals (if required)	Y	N
Pump Stations (if required)	Y	N

ATTENDEES:

Name	Job	Company	Phone
	Encroachment Permits	Permits, City	577-5264
	Construction Inspector	City	577-5452

Figure 2.3 DEVELOPER/CONTRACTOR INFORMATION

Subdivision Name: _____ Plan No. _____

Encroachment Permit No. _____ Date Issued: _____

Developer Co. Name: _____

Individuals Name: _____

Billing Address: _____

Phone: _____ Fax: _____

Email: _____

Civil Engineer Design Firm: _____

Address: _____

Phone: _____ Fax: _____

Email: _____

Contractors Work Items: Grading, Paving, Concrete, Water, Sewer, Storm, Landscaping, Street lights, Traffic Signal, Lift Station, etc.

Primary Contractor : _____ Work Items: _____

Address: _____

Phone: _____ Fax: _____

Email: _____

Subcontractor 1: _____ Work Items: _____

Address: _____

Phone: _____ Fax: _____

Email: _____

Subcontractor 2: _____ Work Items: _____

Address: _____

Phone: _____ Fax: _____

Email: _____

Subcontractor 3: _____ Work Items: _____

Address: _____

Phone: _____ Fax: _____

Email: _____

Subcontractor 4: _____ Work Items: _____

Address: _____

Phone: _____ Fax: _____

Email: _____

2.17 SUBDIVISION MAP AND PARCEL MAP

- A. The City Surveyor has established coordinated positions in the City of Modesto based on the California Coordinate System of 1983, Zone 3. The epoch date of the coordinate is 1991.35, CCS83 (1991.35).
- B. All data pertaining to these control monuments has been or will be filed in accordance with the requirements of the Land Surveyor's Act.
- C. The City shall require the Surveyor or Engineer preparing the Subdivision Map or the Parcel Map to tie the boundary of said map to the CCS83 (1991.35) or current adjustment in at least two (2) locations, on opposite sides of the boundary or as mutually agreed to by the Surveyor or Engineer and the City Surveyor.
- D. The Basis of Bearings of the Subdivision Map or the Parcel Map shall be the CCS83 (1991.35) or current adjustment as established by the use of existing monuments, Global Positioning System surveys (GPS), or by astronomic observation.
- E. If the boundary of the Subdivision Map or Parcel Map being submitted is a parcel or lot of a map already tied to the or current adjustment as directed by the City Surveyor, the requirements in Paragraph C (above) shall be waived, except that the record ties to the CCS83 (1991.35) or current adjustment shall be shown on the Subdivision Map or Parcel Map.

2.18 SPECIFICATIONS FOR SURVEYS ON THE CALIFORNIA COORDINATE SYSTEM 1983 BASED ON THE NAD 83 DATUM

The following specifications apply to surveys based on the CCS83 (1991.35) or current adjustment.

- A. All points coincident with City Geodetic Control Points will have the exact published coordinate values in U.S. Survey feet. If a survey is initiated prior to publication of a readjustment, the previously adjusted values will be accepted for a period of up to ninety (90) days from the date of current publication.
- B. The whole number for the coordinate will be shown, i.e. no constants will be applied.
- C. One (1) point on the external boundary will have a grid coordinate value. The boundary point assigned grid coordinate values should be on the major control line where applicable. The boundary point assigned a grid value will be annotated with the grid coordinates.
- D. A tie to the geodetic control network will be made to the boundary point showing the California Coordinate System Values. Additional ties as previously required will also be provided.

- E. A combination factor and coordinate system information, including the date of adjustment, will appear on the recorded map.
- F. The difference between computed tie distances and annotated tie distance multiplied by the combination factor will not exceed 0.02'.

2.19 VERTICAL DATUM

The official vertical datum for the City of Modesto is the North American Vertical Datum of 1988 (NAVD 88). All elevations shown on plans shall be based on the NAVD 88.

2.20 STREET MONUMENTS

- A. Street monuments and boxes shall be installed as follows:
 - 1. Section corners and $\frac{1}{4}$ section corners.
 - 2. Changes in direction on streets that have a designation greater than a collector.
 - 3. Locations as required by the City Engineer/City Surveyor.
 - 4. A minimum of two (2) monuments tied to the California Coordinate System (NAD83) 1992 Adjustment or current Adjustment or as directed by the City Surveyor shall be referenced to the subdivision. This monument shall be constructed per Standard Detail 212. All other monuments shall consist of durable new material. They shall be 1" O.D. x 24" minimum long galvanized iron pipe or approved equal. The center of the punch or cross (X) shall be the exact point monumented. The monument shall be tagged as required by the State of California Land Surveyor's Act.
- B. Monument boxes shall be as shown on the Standard Detail 212 and all monuments show the registration number of the licensed Civil Engineer or Land Surveyor who prepared the Final Map or Parcel Map.
- C. The location and detail of monuments and boxes in the right-of-way shall be shown on the Improvement Plans, and on the Final Map or the Parcel Map.

2.21 BOUNDARY MONUMENTS

Boundary monuments shall be placed on the exterior boundary of the subdivision at the following locations:

- A. Changes in direction.
- B. Beginning and end of curves.
- C. Other points deemed necessary by the City Engineer/City Surveyor.

Boundary monuments shall be placed in the same manner and of the same material as street monuments except in unpaved areas a monument box shall not be required and the top shall be at least 1' below finished grade.

2.22 BLOCK CORNER MONUMENTS

Corner monuments shall be placed at all block corners and alley corners.

Block corner monuments shall be placed in the same manner and of the same material as street monuments except a monument box shall not be required and the top shall be at least 1' below the surface.

2.23 LOT CORNER MONUMENTS

Lot corner monuments shall be placed in the same manner and of the same material as street monuments except they may be $\frac{3}{4}$ " O.D. and, in unpaved areas a monument box shall not be required and, the top shall be at least 1' below the finished grade.

Lot corner monuments shall be located where required by the City Engineer. The basic criteria for the locations shall be as follows:

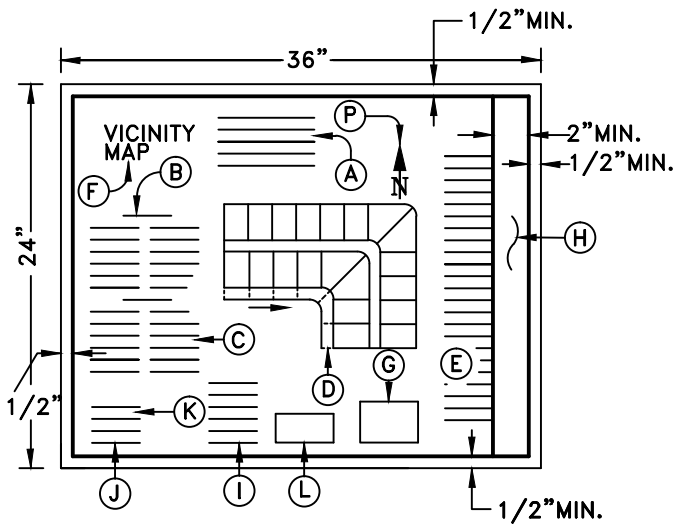
- A. Lots shall have a monument at each corner except as otherwise provided by this section.
- B. Lots that are created with zero (0) back or side yards may have lot corners under building foundations deleted except those corners that are block or alley corners.
- C. Lots that are created as part of a townhouse condominium development where realty is to be owned in fee by the individual lot owner shall be monumented using a minimum of four (4) monuments for each contiguous group of lots. Contiguous groups of lots containing more than ten (10) lots shall have additional monuments as required by the City Engineer. Monuments shall not be located under footing or structure.
- D. Condominium airspace developments where realty is not to be owned in fee by the individual lot owner shall have the exterior boundary monumented as required by these Standards.

2.24 SECTION CORNER AND $\frac{1}{4}$ SECTION CORNER

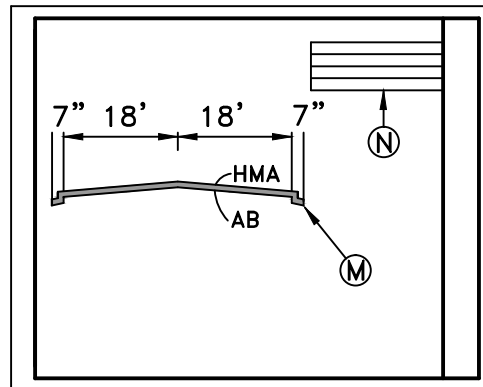
California Codes Government Code Section 27580: If in the performance of his official duties any Surveyor finds a government corner which has been marked by a government Surveyor by placing charcoal in the ground or a wooden stake, earth mound, or other perishable monument, he shall remark the corner by placing therein a monument of heavily galvanized iron pipe or galvanized iron stake not less than 2" in diameter and not less than 2' long, or other monument not less in size and equally imperishable.

2.25 PRESERVATION OF MONUMENTS

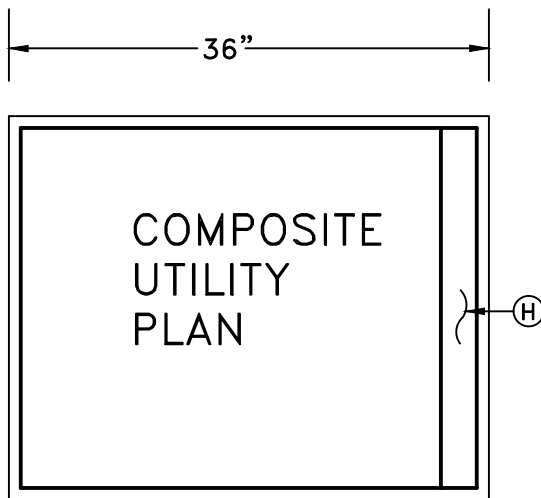
- A. Monuments set shall be sufficient in number and durability and efficiently placed so as not to be readily disturbed, to assure, together with monuments already existing, the perpetuation or facile reestablishment of any point or line of the survey.
- B. When monuments exist that control the location of subdivisions, tracts, boundaries, roads, streets, or highways, or provide survey control, the monuments shall be located and referenced by or under the direction of a licensed land surveyor or registered civil engineer prior to the time when any streets, highways, other rights-of-way, or easements are improved, constructed, reconstructed, maintained, resurfaced, or relocated, and a corner record or record of survey of the references shall be filed with the County Surveyor:
 - 1. They shall be reset in the surface of the new construction, a suitable monument box placed thereon, or permanent witness monuments set to perpetuate their location if any monument could be destroyed, damaged, covered, or otherwise obliterated, and a corner record or record of survey filed with the County Surveyor prior to the recording of a certificate of completion for the project.
 - 2. Sufficient controlling monuments shall be retained or replaced in their original positions to enable property, right-of-way and easement lines, property corners, and subdivision and tract boundaries to be reestablished without devious surveys necessarily originating on monuments differing from those that currently control the area.
 - 3. It shall be the responsibility of the governmental agency or others performing construction work to provide for the monumentation required by this section. It shall be the duty of every land surveyor or civil engineer to cooperate with the governmental agency in matters of maps, field notes, and other pertinent records.
 - 4. Monuments set to mark the limiting lines of highways, roads, streets or right-of-way or easement lines shall not be deemed adequate for this purpose unless specifically noted on the corner record or record of survey of the improvement works with direct ties in bearing or azimuth and distance between these and other monuments of record.
- C. The decision to file either the required corner record or a record of survey pursuant to subdivision shall be at the election of the licensed land surveyor or registered civil engineer submitting the document.



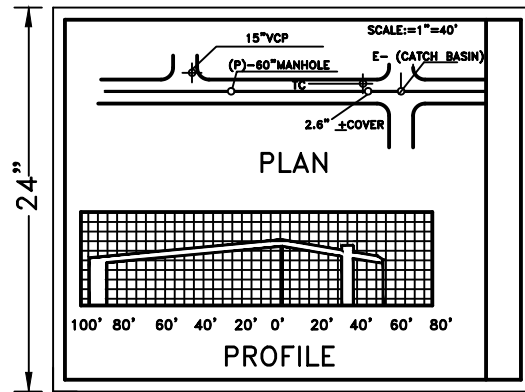
SHEET NO. 1



SHEET NO. 2



SHEET NO. 3



SHEET NO. 4

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

ENGINEERING

**TYPICAL LAYOUT FOR
 IMPROVEMENT PLANS**

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345



DETAIL NO.
200

COMPOSITE UTILITY PLAN SHALL INCLUDE SEWER, WATER AND STORM DRAIN PIPE LENGTH AND SIZE. MAINTENANCE HOLES SHALL BE NUMBERED TO CORRESPOND WITH MAINTENANCE HOLE NUMBERS ON MASTER PLANS AND PLAN AND PROFILE.

SHEETS 1 THROUGH 3 MAY BE COMBINED ON 1 OR 2 SHEETS DEPENDING ON THE SIZE OF THE PROJECT. THE COMPOSITE UTILITY PLAN MUST BE AT 1"=100' SCALE. SUBSEQUENT SHEETS SHALL BE AT: HORIZONTAL 1"=40' OR 1"=20' AND VERTICAL 1"=4' OR 1"=2'.

LEGEND

- A PROJECT TITLE
- B SYMBOLS LEGEND
- C ABBREVIATIONS
- D ENTIRE PROJECT INCLUDING OFFSITE
- E STD. CONSTRUCTION NOTES
- F VICINITY MAP
- G CONCURRENCE BY OTHER DEPARTMENTS
- H TITLE STRIP
- I INDEX OF SHEETS
- J RESOLUTION NO. / APPROVING CONDITIONS REFERENCE
- K BENCH MARK
- L SOILS ENGINEER
- M TYPICAL CROSS SECTIONS
- N PAVEMENT THICKNESS TABLE FOR ALL STREETS WITHIN PROJECT
- P NORTH ARROW AND SCALE

NOTES:

1. DETAILS MAY BE PLACED ON ANY SHEET AND REFERENCED IN THE PLAN AND PROFILE SHEET.
2. SUBDIVISIONS SHALL INCLUDE A GRADING PLAN. HORIZONTAL SCALE MAY BE 1"=10' TO 1"=50'.
3. TRAFFIC DRAWINGS, IF REQUIRED, SHALL BE LOCATED AT THE END OF THE IMPROVEMENT PLANS.
4. ALL PLANS FOR WORK IN THE PUBLIC RIGHT OF WAY SHALL INCLUDE THE CITY'S STANDARD NOTES AS FOUND IN THE DESIGN SECTION, APPENDIX B OF THE MODESTO CITY STANDARD SPECIFICATIONS.
5. ALL PLAN SHEETS SHALL HAVE A TITLE STRIP AS DEFINED IN THE CITY STANDARD SPECIFICATIONS.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

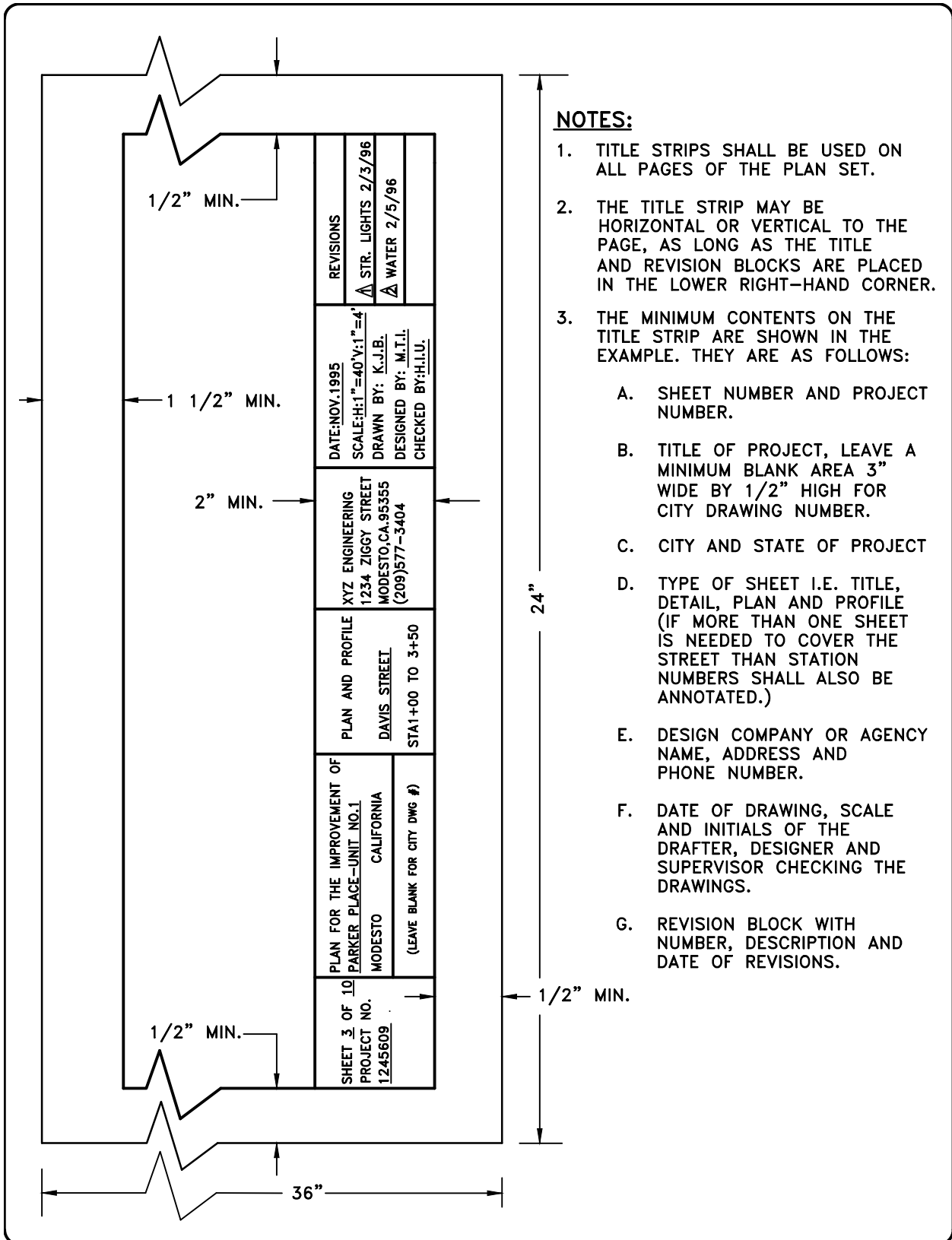
ENGINEERING

**TYPICAL LAYOUT FOR
 IMPROVEMENT PLANS**



ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
201



NOTES:

1. TITLE STRIPS SHALL BE USED ON ALL PAGES OF THE PLAN SET.
2. THE TITLE STRIP MAY BE HORIZONTAL OR VERTICAL TO THE PAGE, AS LONG AS THE TITLE AND REVISION BLOCKS ARE PLACED IN THE LOWER RIGHT-HAND CORNER.
3. THE MINIMUM CONTENTS ON THE TITLE STRIP ARE SHOWN IN THE EXAMPLE. THEY ARE AS FOLLOWS:
 - A. SHEET NUMBER AND PROJECT NUMBER.
 - B. TITLE OF PROJECT, LEAVE A MINIMUM BLANK AREA 3" WIDE BY 1/2" HIGH FOR CITY DRAWING NUMBER.
 - C. CITY AND STATE OF PROJECT
 - D. TYPE OF SHEET I.E. TITLE, DETAIL, PLAN AND PROFILE (IF MORE THAN ONE SHEET IS NEEDED TO COVER THE STREET THAN STATION NUMBERS SHALL ALSO BE ANNOTATED.)
 - E. DESIGN COMPANY OR AGENCY NAME, ADDRESS AND PHONE NUMBER.
 - F. DATE OF DRAWING, SCALE AND INITIALS OF THE DRAFTER, DESIGNER AND SUPERVISOR CHECKING THE DRAWINGS.
 - G. REVISION BLOCK WITH NUMBER, DESCRIPTION AND DATE OF REVISIONS.

APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
REVISED:	DATE:
REVISED:	DATE:
REVISED:	DATE:

ENGINEERING

**TYPICAL TITLE STRIP FOR
CITY PROJECTS**

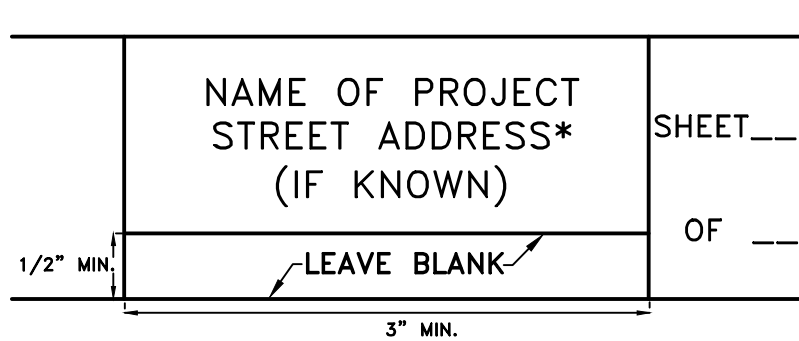
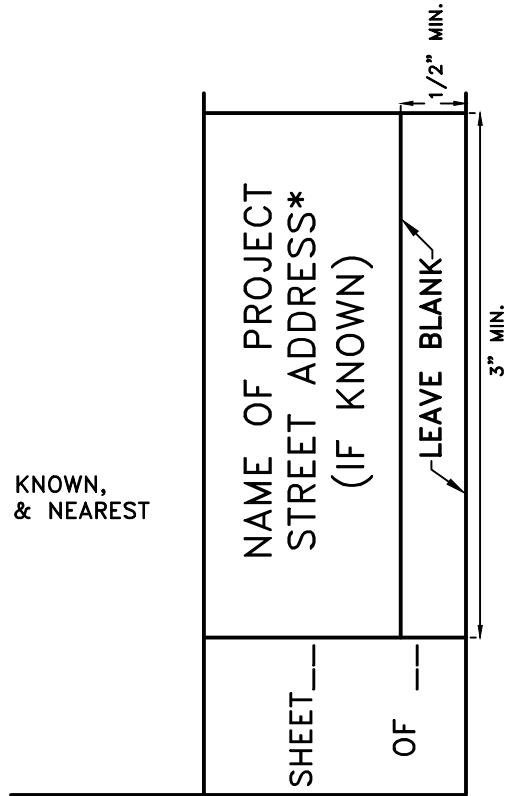
ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



**MODESTO
CALIFORNIA**

DETAIL NO.
202

* IF STREET NO. IS NOT KNOWN,
USE FRONTING STREET & NEAREST
CROSS-STREET



APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

ENGINEERING

TYPICAL TITLE BLOCK
FOR IMPROVEMENT PLANS

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



DETAIL NO.
202B

**CITY ENGINEER APPROVAL BLOCK
FOR PUBLIC IMPROVEMENTS**

APPROVED BY THE CITY ENGINEER
CITY OF MODESTO, CALIFORNIA
FOR PUBLIC IMPROVEMENTS ONLY
(SHEETS 1 THRU _____)

BY _____ DATE: _____

**CITY ENGINEER APPROVAL BLOCK FOR
WATER LINES OUTSIDE OF CITY LIMITS**

APPROVED BY THE CITY ENGINEER
CITY OF MODESTO, CALIFORNIA
FOR CITY OF MODESTO WATER LINES ONLY
(SHEETS _____ THRU _____)

BY _____ DATE: _____

NOTE. CITY ENGINEER SIGNATURE BLOCK MUST CONTAIN THE VERBAGE FOUND IN ASSIGN SECT. 2.05.

MODESTO IRRIGATION DISTRICT APPROVAL BLOCKS

APPROVED BY THE MODESTO IRRIGATION DISTRICT, IRRIGATION DEPARTMENT
(FOR IRRIGATION FACILITIES ONLY)

BY _____ DATE: _____

APPROVED BY THE MODESTO IRRIGATION DISTRICT, ELECTRICAL DEPARTMENT
(FOR STREET LIGHTING SERVICE LOCATION ONLY)

BY _____ DATE: _____

FIRE PREVENTION BUREAU APPROVAL BLOCK

APPROVED BY THE CITY OF MODESTO
FIRE PREVENTION BUREAU

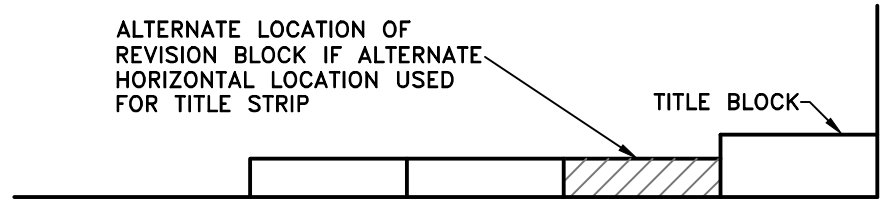
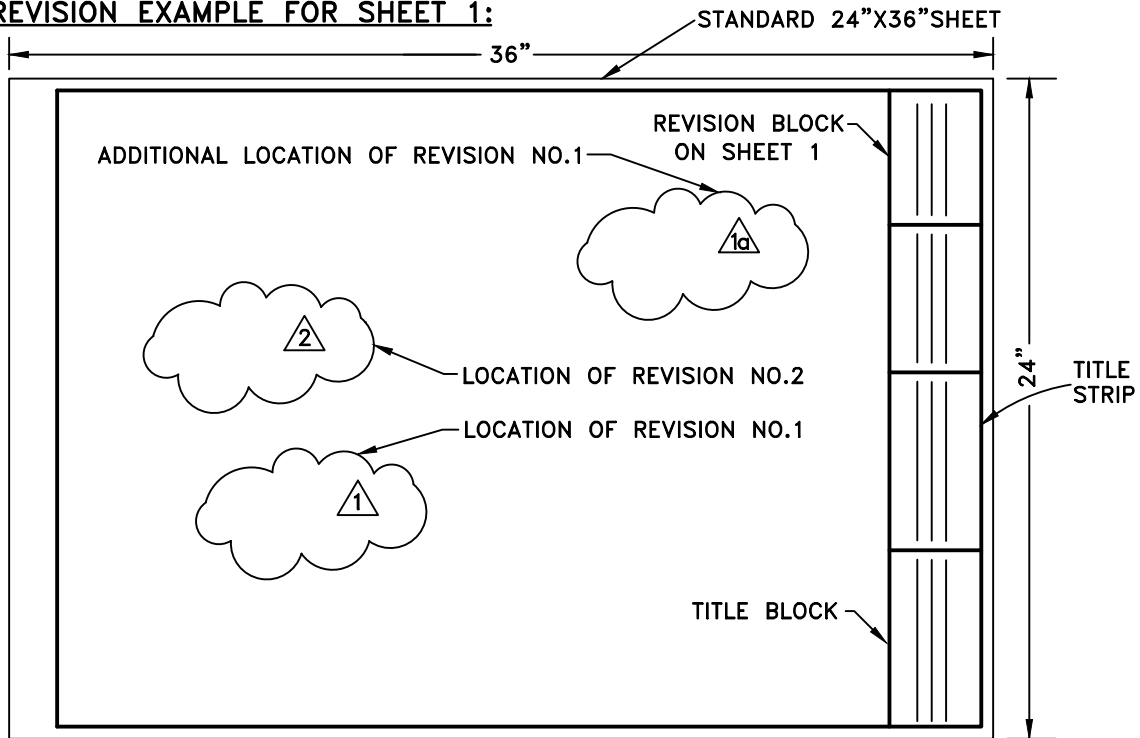
BY _____ DATE: _____

APPROVED BY: <i>BILL SANDHU, CITY ENGINEER</i> C59650	
REVISED:	DATE:
REVISED:	DATE:
REVISED:	DATE:




ENGINEERING
TYPICAL APPROVAL BLOCKS FOR IMPROVEMENT PLANS
ADOPTED BY CITY COUNCIL RESOLUTION NO. 2014-345

 MODESTO CALIFORNIA
DETAIL NO. 202C

REVISION EXAMPLE FOR SHEET 1:



NOTES:

1. SHEET 1 SHALL CONTAIN A REVISION BLOCK AS SHOWN ON DETAIL #203A. THE REMAINING SHEETS AFFECTED BY THE REVISION SHALL BE NOTED AS IN THE EXAMPLE ON DETAIL #203A.
2. EACH DESIGN SHALL BE NUMBERED CONSECUTIVELY WITH THE NUMBER PLACED IN A TRIANGLE THUS:  AND DESCRIBED IN THE REVISION BLOCK.
3. FOR LOCATION OF THE RELATED REVISION", I.E.  .SHALL BE PLACED AROUND THE ITEMS) TO BE REVISED. A REVISION TRIANGLE (NOTE 1). SHALL BE PLACED WITHIN THE CLOUD TO IDENTIFY THE REVISION NUMBER. I.E.  (SEE SAMPLES ABOVE).
4. WHEN A REVISION APPEARS AT MORE THAN ONE PLACE ON A SHEET, LETTERS SHALL BE USED IN ADDITION TO THE NUMBERS IN ORDER TO ACCURATELY DETERMINE THE SPECIFIC LOCATION OF EACH IDENTICAL CHANGE. (SEE EXAMPLE ABOVE).
5. IF MASSIVE REVISIONS OCCUR THAT COULD RENDER THE DRAWING UNREADABLE, AN ADDITIONAL SHEET MAY BE USED AS APPROVED BY THE CITY ENGINEER.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

ENGINEERING
DESIGN REVISIONS
FORMAT



ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
203

REVISION BLOCK FOR TITLE SHEET (SHEET #1)

REVISION NO.	DESCRIPTION	SHEETS AFFECTED	DATE	BY	APPROVED BY C.E.	DATE
①	BRIEF DESCRIPTION OF CHANGE #1 TO PLANS.					
②	BRIEF DESCRIPTION OF CHANGE #1 TO PLANS.					

CITY ENGINEER APPROVAL

REVISION NOTES FOR ALL OTHER AFFECTED SHEETS AFTER THE TITLE SHEET

NOTES:

- ① INCLUDE A BRIEF DESCRIPTION AND REASON FOR CHANGE #1 ON THE APPROVED PLANS.
- ② INCLUDE A BRIEF DESCRIPTION AND REASON FOR CHANGE #2 ON THE APPROVED PLANS.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

ENGINEERING

REVISION BLOCK



ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345




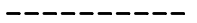
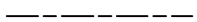

DETAIL NO.
203B





DRAFTING STANDARDS

ALL SUBDIVISION PLANS. CONSTRUCTION DRAWINGS.+PROPERTY PLATS SUBMITTED TO THE CITY ENGINEER FOR CONSIDERATION SHALL CONFORM TO AND BE PREPARED IN ACCORDANCE WITH THE FOLLOWING STANDARDS:

1.- ALL LETTERING, OTHER THAN THAT HEREIN SPECIFIED OR SHOWN BELOW. SHALL BE A MINIMUM OF 0.100 INCH IN HEIGHT USING A NO.0 RAPIDOGRAPH PEN, OR EQUAL. VERTICAL OR SLANTED LETTERING MAY BE USED.

2.- SUBDIVISION PLANS

SUBDIVISION OUTLINE		NO. 3 RAPIDOGRAPH
BLOCK OUTLINE		NO. 2 RAPIDOGRAPH
LOT LINES		NO. 1 RAPIDOGRAPH
EASEMENT LINES		NO. 0 RAPIDOGRAPH
STREET CENTER LINES		NO. 0 RAPIDOGRAPH
RADIAL BEARING LINES		NO. 00 RAPIDOGRAPH

MONUMENTS SET	
MONUMENTS SET IN MONUMENT BOX.....	
MONUMENTS FOUND	
MONUMENTS FOUND IN MONUMENT BOX..	

STREET NAMES..... **NAME**LETTERS 0.175" HIGH
NO. 2 RAPIDOGRAPH

LOT NUMBERS **36**LETTERS 0.175"
NO. 2 RAPIDOGRAPH



BEARING, DISTANCES, CURVE DATALETTERS 0.175" HIGH
COORDINATES,ECT. NO. 1 RAPIDOGRAPH

ADJACENT SUBDIVISIONSLETTERS 0.100"HIGH
NO. 0 RAPIDOGRAPH
SHADOW LETTERING

ADJACENT LOT NUMBERSLETTERS 0.175" HIGH
NO. 0 RAPIDOGRAPH
DOTTED LETTERING


TITLE BLOCK AND OTHER RELATED LETTERING SHALL BE IN ACCORDANCE WITH STANDARD ACCEPTED ENGINEERING PRACTICE. BUT IN NO CASE SHALL THE LETTERING BE LESS THAN 0.100" IN HEIGHT AND USING A NO. 0 RAPIDOGRAPH PEN.

3.- IMPROVEMENT PLANS

<u>DESCRIPTION</u>	<u>PROPOSED</u>	<u>EXISTING</u>
SANITARY SEWER	— 6"S —	--6"S--
STORM SEWER	— 8"D —	--8"D--
GAS LINE	— 4"G —	--4"G--
WATER LINE	— 8"W —	--8"W--
TELEPHONE.....	— T —	--T --
CABLE TELEVISION.....	— TV —	--TV --
GAS VALVE	— G — 	--G --
WATER VALVE	— W — 	--W --
ELECTRICAL CONDUIT.....	— E —	--E --
MATCH LINE	STA. 5+00	

APPROVED BY: <i>BILL SANDHU, CITY ENGINEER</i> C59650	
REVISED:	DATE:
REVISED:	DATE:
REVISED:	DATE:

ENGINEERING
DRAFTING STANDARDS
ADOPTED BY CITY COUNCIL RESOLUTION NO. 2014-345

 MODESTO CALIFORNIA
DETAIL NO. 204

IMPROVEMENT PLANS (CONTINUED)

<u>DESCRIPTION</u>	<u>TO BE CONSTRUCTED</u>	<u>EXISTING</u>
MAINTENANCE HOLE		
CATCH BASIN		
GAS METER		
WATER METER		
CURB AND GUTTER		
SIDEWALK		
DRIVEWAY		
PAVEMENT BUTT JOINT OR REMOVAL		
FIRE HYDRANT		
SIGN		
SANITARY SEWER CLEAN OUT		
UTILITY POLE		
GUARD RAIL		
BARRICADE		
FENCE		
RAILROAD		
CURB RAMP		
SANITARY SEWER SERVICE		
LAMP POLE		
TRAFFIC SIGNAL		

THE FOREGOING SYMBOLS SHALL BE USED IN CONNECTION WITH ALL IMPROVEMENTS AND CONTRACT PLANS.

ANY ABBREVIATIONS USED SHALL CONFORM TO THE STANDARD ABBREVIATIONS AS SET FORTH IN THE CURRENT EDITION OF THE CALTRANS STANDARD SPECIFICATIONS.

ALL LETTERING SHALL CONFORM TO ACCEPTED ENGINEERING PRACTICE. BUT IN NO CASE SHALL THE LETTERING BE LESS THAN 0.100" IN HEIGHT AND USING A NO. 0 RAPIDOGRAPH PEN.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

**ENGINEERING
 DRAFTING
 STANDARDS**

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345



DETAIL NO.
205

TEXT	AaBbCcDdEeFfGgHhIiJjKkLlMmNnOoPpQqRrSsTtUuVvWwXxYyZz 1234567890
MONDTEXT	AaBbCcDdEeFfGgHhIiJjKkLlMmNnOoPpQqRrSsTtUuVvWwXxYyZz 1234567890
ROMANS	AaBbCcDdEeFfGgHhIiJjKkLlMmNnOoPpQqRrSsTtUuVvWwXxYyZz 1234567890
ROMAND	AaBbCcDdEeFfGgHhIiJjKkLlMmNnOoPpQqRrSsTtUuVvWwXxYyZz 1234567890
ROMANC	AaBbCcDdEeFfGgHhIiJjKkLlMmNnOoPpQqRrSsTtUuVvWwXxYyZz 1234567890
ROMANT	AaBbCcDdEeFfGgHhIiJjKkLlMmNnOoPpQqRrSsTtUuVvWwXxYyZz 1234567890
ITALICC	<i>AaBbCcDdEeFfGgHhIiJjKkLlMmNnOoPpQqRrSsTtUuVvWwXxYyZz 1234567890</i>
ITALICT	<i>AaBbCcDdEeFfGgHhIiJjKkLlMmNnOoPpQqRrSsTtUuVvWwXxYyZz 1234567890</i>

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

ENGINEERING
AUTOCAD STANDARDS
(TEXT TYPES)

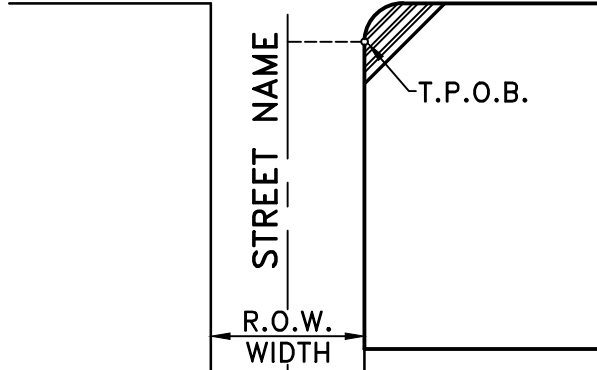
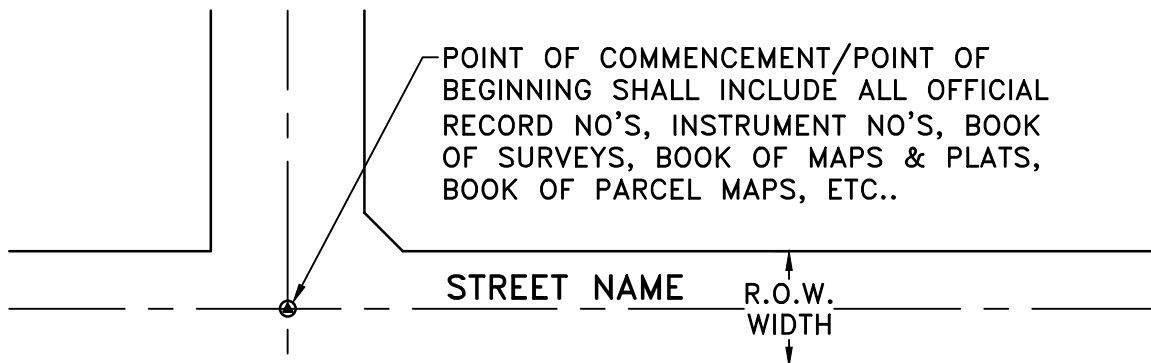
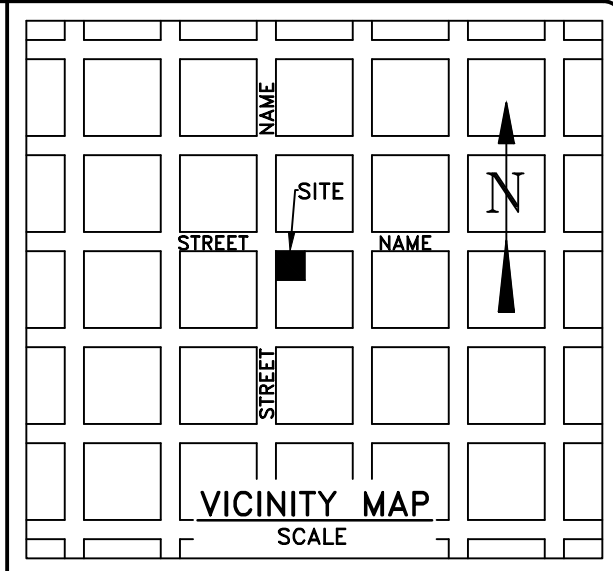
ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



DETAIL NO.
206

MAP SHALL INCLUDE:

1. STREET NAMES
2. RIGHT-OF-WAY AND EASEMENT WIDTHS DIMENSIONED
3. PROJECT LIMITS CLEARLY SHOWN
4. CITY-COUNTY BOUNDARIES AND SECTION LINES SHOWN WHERE APPLICABLE
5. NORTH ARROW AND SCALE



SHALL INCLUDE:

1. LOT/PARCEL NO.
2. AREA
3. BEARINGS & DISTANCES
4. CURVE DATA- RADIUS, CENTRAL ANGLE, ARC LENGTH, CHORD BEARING & CHORD LENGTH
5. EXISTING EASEMENTS SHOWN AND DIMENSIONED
6. CITY OF MODESTO MONUMENTS

NOTES:

1. DRAFTING STANDARDS AND SYMBOLS SHALL CONFORM TO CITY OF MODESTO STANDARDS.
2. CLOSURE CALCULATIONS, INCLUDING AREA AND PRECISION, SHALL BE SUBMITTED SEPARATELY.
3. LEGAL DESCRIPTIONS SUBMITTED WITH THE MAP SHALL BE STAMPED & SIGNED BY A QUALIFIED REGISTERED PROFESSIONAL ENGINEER OR LICENSED SURVEYOR.

PREPARED BY:

(ENGINEERING FIRM)

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

ENGINEERING

STANDARD MAP ASSOCIATED
WITH LEGAL DESCRIPTION FOR
8½" x 11" SHEET

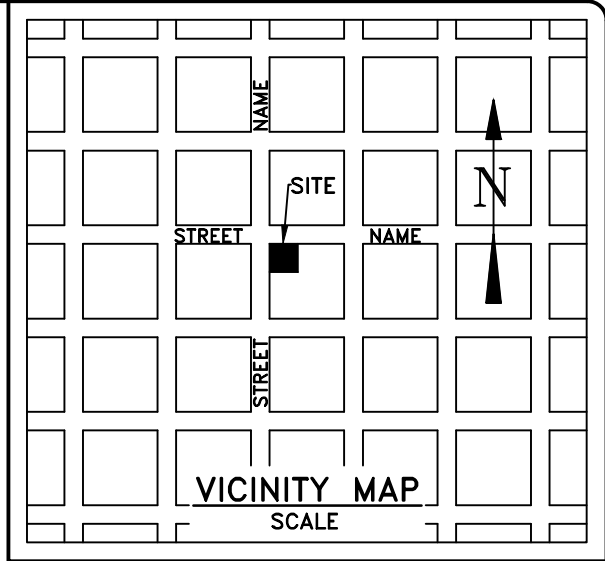


ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

DETAIL NO.
207

MAP SHALL INCLUDE:

1. STREET NAMES
2. RIGHT-OF-WAY AND EASEMENT WIDTHS DIMENSIONED
3. PROJECT LIMITS CLEARLY SHOWN
4. CITY-COUNTY BOUNDARIES AND SECTION LINES SHOWN WHERE APPLICABLE
5. NORTH ARROW AND SCALE
6. VICINITY MAP (SHEET 2)
7. BASIS OF BEARINGS SHALL BE TWO CITY GPS MONUMENTS, TIED TO THE PERIMETER OF BLUE BORDER AT TWO POINTS.
8. BLOCK AND LOT NUMBERS AS APPROVED BY THE PLANNING COMMISSION.
9. AREA OF EACH LOT, ACRES (ROUNDED TO HUNDREDTHS) UNLESS SMALLER THAN 1 ACRE, THEN IN SQUARE FEET.
10. BEARINGS & DISTANCES
11. CURVE DATA- RADIUS AND EITHER CENTRAL ANGLE AND ARC LENGTH OR CORD BEARING AND CORD LENGTH.
12. EXISTING EASEMENTS SHOWN AND DIMENSIONED
13. CITY OF MODESTO MONUMENTS, EXISTING AND PROPOSED SURVEY MARKERS.
14. PROPOSED PUBLIC DEDICATIONS MUST BE CLEARLY DELINEATED WITHIN THE SUBDIVISION BOUNDARIES.
15. DRAFTING STANDARDS AND SYMBOLS SHALL CONFORM TO CITY STANDARDS.
16. CLOSURE CALCULATIONS, INCLUDING AREA AND PRECISION, SHALL BE SUBMITTED SEPARATELY, ROUNDED TO THE NEAREST HUNDREDTH OF A FOOT FOR DISTANCES AND SECONDS FOR BEARINGS.



APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
REVISED:	DATE:
REVISED:	DATE:
REVISED:	DATE:

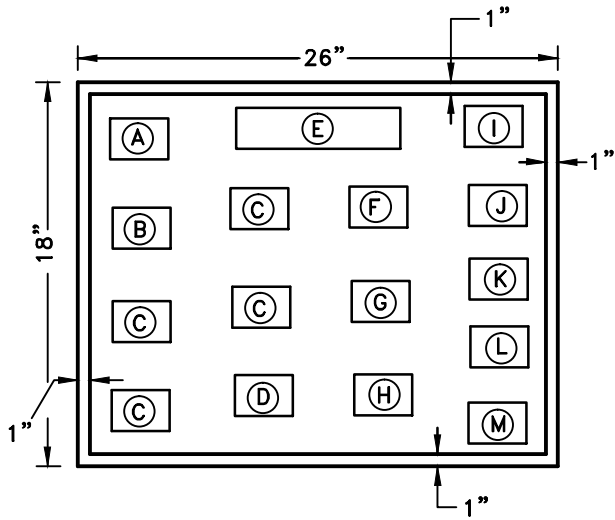
ENGINEERING

**DRAFTING STANDARDS FOR
SUBDIVISION MAPS AND
PARCEL MAPS**

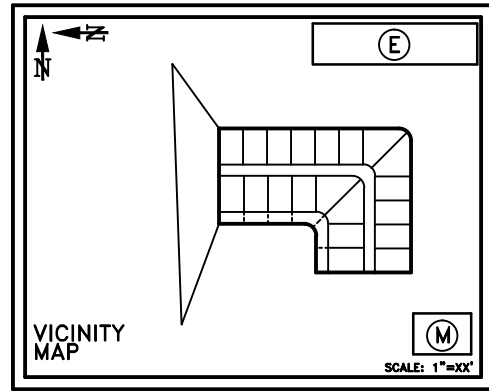
ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

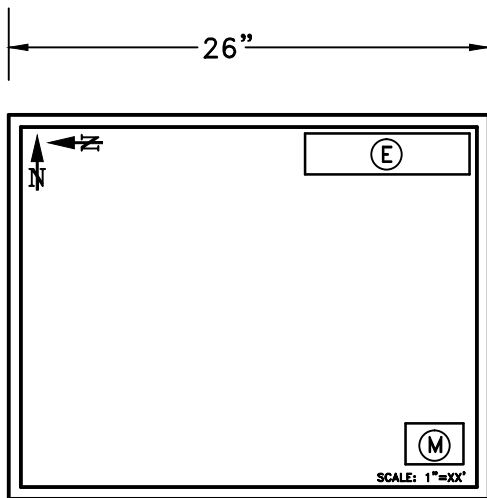
DETAIL NO.
209



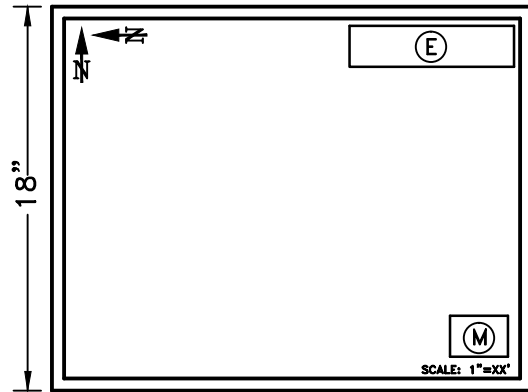
SHEET NO. 1
AFFIDAVIT SHEET



SHEET NO. 2
BLUE BORDER



SHEET NO. 3
LOT LAYOUT



SHEET NO. 4
LOT LAYOUT (CONT. IF NEEDED)

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

ENGINEERING

TYPICAL LAYOUT FOR
SUBDIVISION MAPS

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



MODESTO
CALIFORNIA

DETAIL NO.
210

THESE ARE GENERAL GUIDELINES FOR LAYOUT OF SUBDIVISION AND PARCEL MAPS WITHIN THE CITY OF MODESTO IN ACCORDANCE WITH THE SUBDIVISION MAP ACT, ENGINEER'S AND LAND SURVEYORS CODES AS APPLICABLE. THE CITY ENGINEER MAY REQUIRE ADDITIONAL INFORMATION ON A CASE BY CASE BASIS IN ORDER TO COMPLY WITH THE TENTATIVE MAP CONDITIONS AND CHANGES TO STATE CODES.

THE MAP SHALL BE LEGIBLY DRAWN, PRINTED, OR REPRODUCED BY A PROCESS GUARANTEEING A PERMANENT RECORD IN BLACK ON TRACING CLOTH OR POLYESTER BASE FILM. CERTIFICATES, AFFIDAVITS, AND ACKNOWLEDGEMENTS MAY BE LEGIBLY STAMPED OR PRINTED UPON THE MAP WITH OPAQUE INK. IF INK IS USED ON POLYESTER BASE FILM, THE INK SURFACE SHALL BE COATED WITH A SUITABLE SUBSTANCE TO ASSURE PERMANENT LEGIBILITY.

LEGEND

- A OWNER'S STATEMENT
- B TRUSTEES SIGNATURE(S)
- C NOTARY STATEMENT(S)
(USE ENOUGH STATEMENTS TO WITNESS ALL OWNER/TRUSTEE SIGNATURES)
- D EASEMENT HOLDER'S STATEMENT
- E ENGINEER'S TITLE BLOCK
- F CLERK OF THE BOARD OF SUPERVISOR'S STATEMENT
- G TAX COLLECTOR'S STATEMENT
- H PLANNING COMMISSION STATEMENT
- I SURVEYOR'S STATEMENT
- J CITY ENGINEER'S STATEMENT
- K CITY CLERK'S STATEMENT
- L COUNTY RECORDER'S STATEMENT
- M MAP TITLE BLOCK

NOTES:

1. THE FINAL MAP MUST BE ACCEPTABLE TO THE STANISLAUS COUNTY RECORDER.
2. STANDARD TEXT REQUIRED FOR STATEMENT AND NOTES IS AVAILABLE UPON REQUEST FROM THE CITY ENGINEER.
3. CORPORATIONS REQUIRE SIGNATURE OF TWO OFFICERS, INCLUDING THEIR CORPORATE TITLE (PRESIDENT, VICE PRESIDENT, SECRETARY, TREASURER, ETC).
4. DEEDS OF TRUST REQUIRE SIGNATURE(S) OF EITHER THE TRUSTEE OR BENEFICIARY.
5. EXISTING PUBLIC EASEMENTS REQUIRE SIGNATURE ON MAP.
6. EXISTING PUBLIC EASEMENTS WHICH ARE NO LONGER USED MUST BE NOTED ON THE MAP INCLUDING THE NATURE OF THE EASEMENT, RECORD INFORMATION, AND A STATEMENT OF THE CIRCUMSTANCES PREVENTING PROCUREMENT OF SIGNATURES.
7. EXISTING PRIVATE EASEMENTS MUST BE NOTED ON THE MAP, INCLUDING THE NATURE OF THE EASEMENT AND RECORD INFORMATION.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

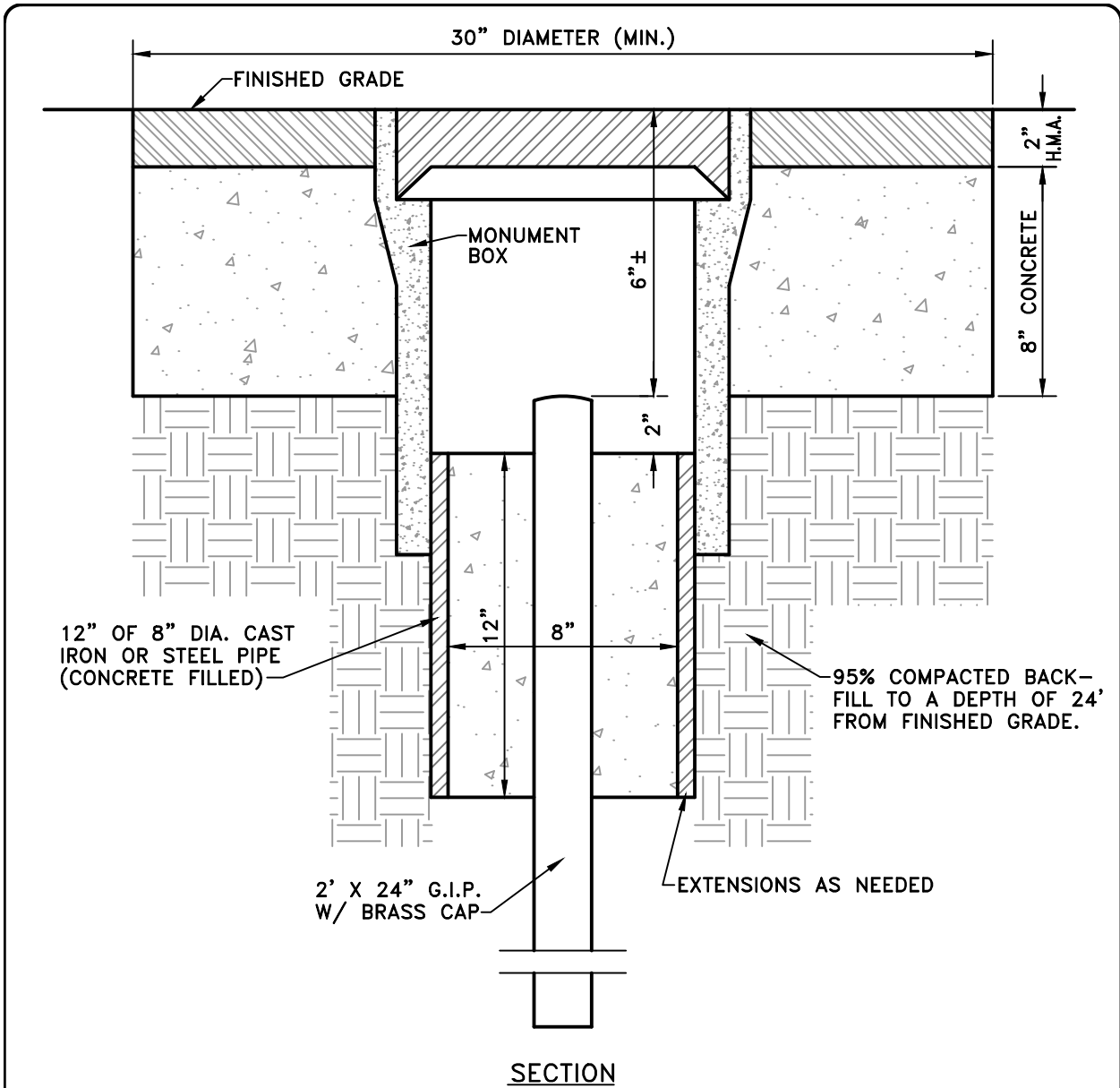
ENGINEERING

**TYPICAL LAYOUT FOR
SUBDIVISION MAPS AND
PARCEL MAPS**




ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

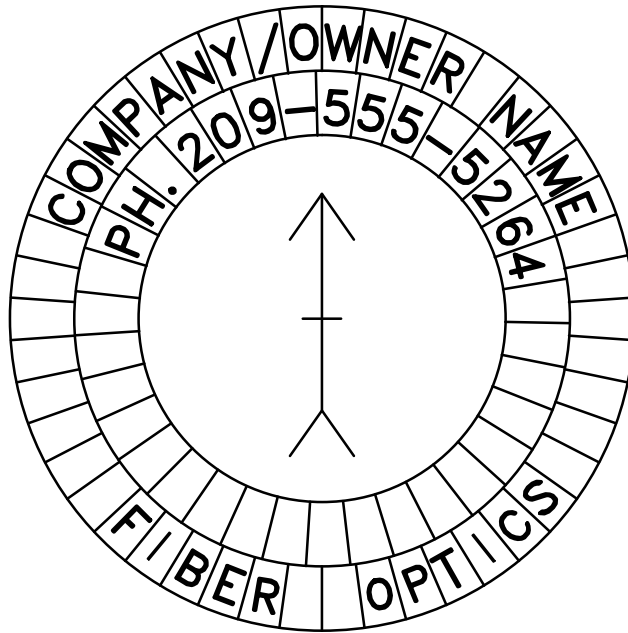
DETAIL NO.
211



NOTES:

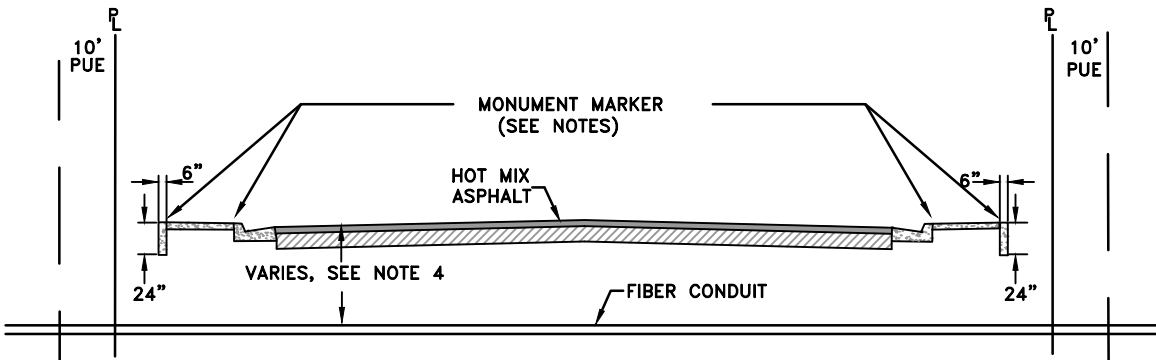
1. MONUMENT BOXES SHALL BE CHRISTY G5 WITH CHRISTY IRON COVER OR APPROVED EQUAL.
2. SET MONUMENT BOX TO FINISH GRADE.
3. COMPACT EARTH AROUND BASE WITH MECHANICAL TAMPER TO 95% RELATIVE COMPACTION AND ENCASE IN 8" OF CONCRETE.
4. AFTER CONCRETE SETS, PATCH WITH 2" H.M.A.
5. IN TRAFFIC AREAS, CONCRETE SHALL BE MADE WITH TYPE III HIGH EARLY STRENGTH CEMENT. BARRICADES SHALL BE REMOVED IN 24 HOURS.

APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	SURVEY	 MODESTO CALIFORNIA
REVISIONS:	SURVEY MONUMENT	
REVISIONS:	DATE:	ADOPTED BY CITY COUNCIL RESOLUTION NO. 2014-345
REVISIONS:	DATE:	
REVISIONS:	DATE:	
REVISIONS:		DETAIL NO. 212



NOTES:

1. LOCATION OF CONDUIT SHALL BE MONUMENTED BY PLACING 2 MONUMENT CAPS WITH DIRECTIONAL ARROWS POINTING OUT THE CONDUIT ALIGNMENT AS WELL AS THE OWNER'S NAME AND PHONE NUMBER.
2. THE MONUMENT CAPS SHALL BE A MINIMUM OF 3" IN DIAMETER.
3. MONUMENT ANCHOR SHALL BE A MINIMUM OF 2 1/2" INTO THE CONCRETE. PLACEMENT MAY BE ON THE CURB OR IN A SEPARATE 6"x6"x24" DEEP MONUMENT CONCRETE POUR BEHIND THE SIDEWALK. NO MONUMENTATION SHALL BE PLACED WITHIN THE SIDEWALK.
4. A MINIMUM OF 42" OF COVER REQUIRED OVER CONDUIT.
5. CONDUIT SHALL CROSS STREET AS CLOSE TO PERPENDICULAR ANGLE AS POSSIBLE.
6. MONUMENT CAPS CAN BE MADE ANY MANUFACTURER. SAMPLE ORDER FORM SHOWN ON DETAILS 214 & 215.



APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

SURVEY

**MONUMENT FOR
 PRIVATE UTILITY LINE
 CROSSING ROW**



**ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345**

**DETAIL NO.
 213**

Standard Layout For Personalized Survey Monuments


Enclose This Handy Drawing With Your Order For Berntsen Survey Caps or Survey Monuments, or PERMAMARK® caps
It's easy to design your own survey cap!

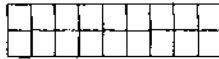
1. Select a center design (if any is desired) for your personalized Berntsen Survey Cap or Survey Monument. Draw that design on the layout for the size cap you are ordering.
2. Fill in blank spaces with the lettering you want on your cap. All letters, numbers, and characters, including periods ("."), take up one full space. Lettering may face "in" or "out" but is usually placed so that one may read the cap from one position.
3. Use the drawing at the right for PERMAMARK plastic caps. Standard center designs are not available for PERMAMARK caps. Lettering on PERMAMARK caps is "straight across" only.


Note: We want to give you the fastest service, so be sure to use the correct standard layout for the type of customized product you are ordering. If you have any questions, please call.

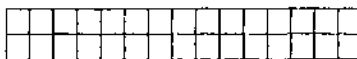
Standard Layout for PERMAMARK®

PERMAMARK lettering is straight across only. All come with center "hole".

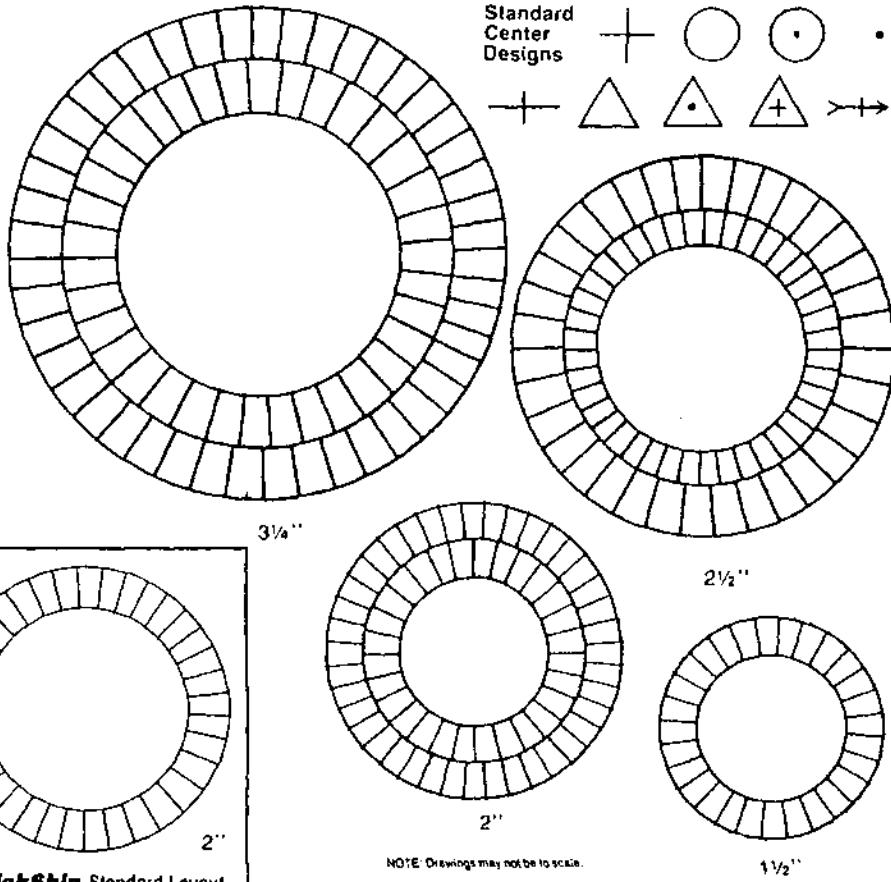
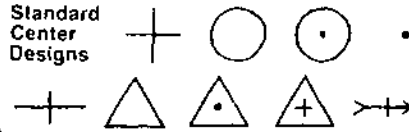
PERMAMARK® 1/2" Pipe or 3/8" Rebar Caps 

PERMAMARK® 3/4" Pipe or 1/2" Rebar Caps 

PERMAMARK® 1" Pipe or 5/8" Rebar Caps 

PERMAMARK® for 3/4" Rebar 

If you have any questions, or comments on how we can make the design part of ordering caps easier, please call us TOLL FREE at 1-800-356-7388



QuickShip Standard Layout

NOTE: Drawings may not be to scale.

APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
REVISED:	DATE:
REVISED:	DATE:
REVISED:	DATE:

SURVEY

**MONUMENT FOR
PRIVATE UTILITY LINE
CROSSING ROW**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



MODESTO
CALIFORNIA

DETAIL NO.
214

Berntsen

P.O. Box 8670
Madison, WI 53708-8670
PHONE TOLL FREE 1-800-356-7388

Fax or Mail Order Form

TOLL FREE FAX 1-800-249-9794

Sales Tax Exemption

The undersigned is exempt from tax

Name _____

State Exempt Tax No. _____

is certificate on file? Yes No

If not, please send with order

Method of Payment

VISA® MasterCard American Express®

Payment Enclosed C.O.D.

(Make your check payable to Berntsen International, Inc.)

Sorry, no C.O.D. on PERMAMARK products.

Name on Card _____

My Credit Card Account No. is _____

Expiration Date _____

is this your first order from us?

Signature _____ Date _____ Yes No

CHARGE TO

Type or Print

SHIP TO

(Shipments must have street or highway address)

Type or Print

Institution, Company or Individual (please print)	Name as Charged
Address	Street Address
City, State, Zip (Zip Code must be furnished)	City, State, Zip (Zip Code must be furnished)
Telephone	Telephone
FAX Number	Attention
(Signature of Duty Authorized Official)	(Title)

1. DELIVERY - We ship by UPS or truck freight depending on the total weight of your order. While an average order is shipped within 2 weeks, please allow additional time for personalized items, and 5 to 7 working days for transportation.

2. PAYMENT - For your convenience, we accept MasterCard, VISA and The American Express Card. You may, of course, enclose your check or money order or have most items shipped C.O.D. Sorry, no C.O.D. on PERMAMARK products.

3. SHIPPING AND HANDLING* Prices in this brochure do not include shipping charges. Please call or write for shipping information on your order, or add 10% for shipping and handling on BERNTSEN and PERMAMARK products. On all other items, such as CARSONITE, call for additional information on shipping charges.

4. SALES TAX - Wisconsin and Arkansas residents add State, City, and County tax as may be applicable.

- Prices DO NOT include freight charges.
- Price List is based on stamped lettering only. Please call for quotation on custom cast lettering and designs.
- NO stamping charges on 11+ caps (\$30.00 stamping set up charge for 1-10 caps).
- Prices are in U.S. Dollars.

Office hours are 8am to 4:30pm Central Time (M-F). Answering machine operates at all other times. 24 hour FAX line: 1-800-249-9794.

CUSTOM CAST MONUMENTS: Call for quotations on all custom cast monuments and markers. Camera ready art may be required.

CUSTOM MONUMENTS: Berntsen welcomes the opportunity to offer a quotation on custom survey monuments to meet your specifications.

TERMS: Terms and prices subject to change without notice. Because product innovation is a continuing endeavor at Berntsen, specifications and prices are subject to change without notice.

Price list P-43 supersedes all previous price lists

The unique design and layout of this brochure and the products depicted herein, and the arbitrary, distinctive numbering system for Berntsen products all originated with Berntsen International, Inc. and are the result of years of research by Berntsen to determine not only exactly what our customers wanted, but to best present our customers with the wide range of products available from Berntsen. No copying or reproduction of the format of this brochure or any of the designs, layouts, drawings, or combinations of designs or parts manufactured by Berntsen is permissible without the express written consent of Berntsen. Many Berntsen products are protected by U.S. Patents including 243,159; 243,319; 4,087,945; 4,502,258; 3,748,795; 4,625,473. Other patents pending.

Quantity	Item Number	Item Description	Unit Price	Total Price

Use standard layouts on reverse side for personalized markers.

Price list P-43 contains most of the more popular items offered by Berntsen International, Inc. All items are priced F.O.B. SHIPPING POINT (Madison, WI for Berntsen items or Carson City, NV for most Carsonite items).

January 1996 *Add 10% for shipping and handling on Berntsen & Permarmark products for delivery in the 48 states (not including Alaska and Hawaii) or call for shipping charges to your destination anywhere in the world

Sub Total
10% Shipping & Handling
Sub Total
Tax (WI, AR)
Total US\$

Check here and we'll send our FREE catalog.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

SURVEY

MONUMENT FOR PRIVATE UTILITY LINE CROSSING ROW

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



DETAIL NO.
215

CHAPTER 3

STREET DESIGN

3.01 GENERAL

A. Description:

This work shall include furnishing of all the labor, materials, tools, and equipment to construct and complete the installation of streets, curbs, gutters and sidewalks in accordance with the approved plans, Standard Details and these Specifications.

The safety and convenience of all users of the transportation system including pedestrians, bicyclists, transit users, freight and motor vehicle drivers shall be accommodated in all types of transportation and development projects and through all phases of a project so that even the most vulnerable – children, elderly and persons with disabilities – can travel safely within the public right-of-way. All transportation projects, programs and issues from scoping to maintenance, will favor pedestrians first, and then transit rider's second, bicyclists third, and automobiles last.

B. Definitions of Street Improvements (MMC 7-1.102):

1. Curbline - The line established by the curb face of a curb and gutter section. In those areas where curb and gutter do not exist, the Public Works Director shall determine the location of the curb and gutter from which the curblin will be established.
2. Driveway - The area required for vehicular access to a property across the sidewalk-planting strip.
3. Encroachment - Any permanent or temporary structure or appurtenance thereto, fence, hedge, planter, shrub, sprinkler system or any other thing which intrudes into, upon, over or under, or invades the sidewalk-planting strip.
4. Planting Easement - That portion of land made available as a public easement for the purpose of planting and maintaining City street trees.
5. Planting Strip - That portion of the sidewalk-planting strip not required for sidewalk, driveway or curb use.
6. Sidewalk - That portion of the sidewalk-planting strip established for pedestrian use. The sidewalk area shall be defined as the entire area required to have sidewalk including tree and tree blockout areas, but not including curb ramps or drive approaches.

7. Sidewalk-Planting Strip - That portion of the street between the property line and the curblineline.
8. Street - A thoroughfare which has been dedicated to or acquired by the public and which affords the principal means of access to abutting property; provided that utility and planting easements, walkways and alleys shall not be considered as streets for the purpose of this chapter.

C. Submittal Requirements:

All new street improvements will require that underground utilities extend to the limit of the improvements plus 5' beyond the edge of new pavement (when right-of-way is available) and services extend to the property line. If half-street construction is approved, utility services must extend a minimum of 5' from beyond the edge of new pavement.

All new street and infrastructure improvements will require a cost-benefit analysis by the developer or the developer's engineer. This analysis will show the value captured from the land use due to the infrastructure improvements and show that the value captured will pay for the cost of the second life cycle of that proposed street and infrastructure. To accomplish this street widths for automobiles and Right-of-Way maybe adjusted (made smaller than City Standard).

D. Right-of-way:

The right-of-way widths and typical sections for the various class streets shall conform to the City of Modesto Standard Detail #300 and the established Specific Plans on file in the Public Works Department.

E. Easements:

Public service, drainage, tree planting, and fence easements shall be located as required by the Utility companies and the City.

Public Utility Easements (PUE's) on private property shall be a minimum of 10' in width and provide for the express purposes of placement of underground utilities. Where the City Engineer finds that sufficient public right-of-way exists, underground utilities shall be placed within said public right-of-way in the location deemed appropriate by the City Engineer. PUE's through cul-de-sac bulbs are discouraged. If a utility is cross connected through a cul-de-sac to an adjacent street, the City Engineer will require dedication of the property and line of sight vision where possible (See Standard Detail #313).

F. Exactions Policy (MMC 99-32)(CC Reso 2008-070):

DEVELOPMENT DEDICATIONS

1. Residential Streets

The collector and local streets required by new development shall be dedicated and improved by the abutting developer in accordance with City Standard Specifications.

2. Expressways

Expressway improvements shall be constructed as required by the conditions of approval.

- a. The developer shall be reimbursed the cost of said improvements and right of way dedication pending the availability of CFF funds and provided funding for said improvements are included in the CFF Program.
- b. All reimbursements shall be detailed in a CFF Reimbursement Agreement in advance of construction or dedication in accordance with the municipal code.
- c. When **interim improvements** are required to facilitate current development prior to future expressway improvements, the interim improvements shall be funded and provided by the abutting developer.
- d. When **extra facilities** are required specifically for a particular development at hand (i.e.: deceleration/acceleration lanes, slip ramps, etc.), the extra facilities shall be funded and provided by the abutting developer.

3. Arterial & Major Collector Streets

Arterial and major collector streets shall be constructed per City Standard Specifications. A standard width of 40 feet shall be dedicated and improved to City Standard Specifications. ***In all cases described in this section, the 40 foot width shall be measured from the new property line on each side of the street towards the street centerline.*** This dedication is a requirement of development and not subject to reimbursement.

- a. When a developer is required to dedicate and improve more than required 40 feet, the cost of right of way and improvements in excess of 40 feet shall be reimbursed to the developer pending the availability of CFF funds and provided funding for said improvements are included in the CFF Program.
- b. All reimbursements shall be detailed in an Agreement in advance of construction or dedication in accordance with the municipal code.
- c. When there is an **existing street**, where the 40 feet dedication and improvements have been previously made, any additional dedication and improvements shall be subject to appropriate reimbursement to the developer.
- d. When there is an **existing street**, if the streets have not been previously improved to City Standard Specifications, only the dedication or improvements in excess of 40 feet will be subject to the appropriate reimbursement.
- e. When **extra facilities** are required specifically for a particular development at hand (i.e.: deceleration/acceleration lanes, slip ramps, etc.), the extra facilities shall be funded and provided by the abutting developer.

For Priority Policies and Reimbursements of the Capital Facilities Fees Policies and Procedures refer to City Council Resolution No. 2008-070.

G. Undergrounding of Utilities:

All subdivisions and major developments, in accordance with City policy, shall underground all new services and existing fronting overhead utilities in accordance with respective utility company policies in either public utility easements or within the

public right-of-way. Any installation of utilities outside a Public Utility Easement and in a public right-of-way shall be specifically approved by the City Engineer for location. Installation of said underground utilities shall be in accordance with the specifications of the respective utilities. Where corner properties are undergrounding existing fronting overhead facilities and those facilities continue across the fronting streets, the Developer shall be responsible for undergrounding to the street right-of-way line opposite the development.

Undergrounding of electrical utilities shall include lines up to 12KVA. Utilities 12 KVA and greater may remain pole mounted. A 12 KVA line may remain on poles when installed on a 69 KVA line.

Chapter 8, Utility, Excavation and Trench Section, gives some additional guidance to undergrounding utilities.

H. Fire Department Standards for Private Streets and Developments:

Section 16.02 of these Standard Specifications provides design requirements in use by the Modesto Fire Code and Modesto Municipal Code.

The City Engineer will be the final authority for Public Works Department on allowing gated communities with public sewer, water, and storm drain facilities. Policy decisions to accept the utilities as public facilities are based on the size of the development and conformance to the minimum Modesto Standards. These Design Standards include meeting the requirements for street width and structural section, installation of Curb, Gutter & Sidewalk and installation of sewer, water and storm drain.

I. Tree Evaluation Report:

When an existing City street tree(s) is within 15' of a proposed improvement project, a Tree Evaluation Report must be obtained from the Public Works Department and submitted to the City Engineer prior to commencement of work.

J. Replacement and Repair:

Where existing curb, gutter and sidewalk do not meet the current City Standards or are in need of repairs, it shall be the Developer's responsibility to remove and replace necessary curb, gutter and sidewalk. Removal shall be to the nearest expansion, weakened plane or construction joint or sawed at the nearest score line, whenever sidewalk is removed and replaced regardless of reasons for removal.

3.02 DESIGN

A. Horizontal Alignment:

Subdivision boundary lines should follow lot lines where possible and should cross streets perpendicular to street centerline. Streets shall be fully improved within tract boundaries. Corner lot frontages shall have each street considered separately.

1. Intersections - Streets shall intersect at or as near right angles as practical. In no case shall the angle of intersection be less than 70°.
2. Opposing Streets - All streets entering upon opposite sides of any given street shall either have their centerline directly opposite each other or have their streets separated by 100' on residential streets, 200' on collector streets and 300' on arterial streets.
3. Curb Return Radii - Curb return radii shall be shown on the Improvement Plans.
4. Street Curvature - Curve design shall be based on Table 3.1 and the American Association of State Highway and Transportation Officials (AASHTO), a Policy on Geometric Design of Highways and Streets.
5. Cul-de-sac - The maximum length of a cul-de-sac street, from center of intersecting street to center of turn-around, shall be 750'.
6. Curb Return Radii -
 - a. Downtown District (See Standard Detail #321) - the minimum radius shall be 15'.
 - b. Local - Minimum radius shall be as shown in the traffic details (300's).
 - c. Commercial and Industrial - Minimum radius for new construction shall be as shown in the traffic details (300's).
 - d. Design of bulbouts shall be approved by the City Engineer on case-by-case basis. (See Detail 317 for a sketch of a bulbout)
7. Minor Streets - Minor streets shall be laid out so that their use by through traffic will be discouraged.
8. Block Lengths - Block lengths shall not exceed 1,100'.
9. Stopping Sight Distance - The minimum stopping sight distance over any segment of the roadway shall conform to the State Highway Design Manual.
10. Bicycle Facilities – Bicycle facilities shall be based on National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide Second Edition.
11. Pedestrian Facilities – Pedestrian facilities shall be based on Institute of Transportation Engineers (ITE) *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach and Walkable and Livable Communities Institute April 2012 Walkability 101: The Walkability Workbook*.

B. Vertical Alignment:

1. Top of Curb Grades - Grades shall not be less than 0.20% and not greater than 6%. With the approval of the City Engineer, in problem areas, the gutter slope may be 0.15% for residential and 0.10% for commercial.
2. Grades - Grades on opposite sides of the street shall be the same wherever practical.

3. Curb Returns - The minimum fall around returns shall be as follows:
 - 0.20' for 15' to 20' radius.
 - 0.30' for 25' radius
 - 0.35' for 30' to 40' radius.
 - 0.40' for a radius greater than 40'.
4. Cross Slope - The standard cross slope of the street shall be 2%. Where necessary when matching existing facilities, the cross slope may vary between 1.5% and 4%.
5. Vertical Curves - Where the algebraic difference in slope exceeds 1%, a vertical curve shall be used. The minimum length of vertical curve shall be 50' minimum or as required by the Highway Design Manual, whichever is larger.
6. Low Points - Whenever possible, streets shall be designed to collect storm water at intersections (3' past the end of curb return) and property lines. Low points shall not be designed in driveways or curb returns.
7. High Points - High points shall be successively lower than the last high point for at least 2 (two) high points. The purpose for this is to allow plugged up drains to overflow within the street right-of-way and overland release to the next inlet before flooding private property. Successive high points with a relative flat grade shall not differ more than 0.3' (ponding at inlet limited to 0.8').
8. Bicycle Facilities – Bicycle facilities shall be based on National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide Second Edition.
9. Pedestrian Facilities – Pedestrian facilities shall be based on Institute of Transportation Engineers (ITE) Designing Walkable Urban Thoroughfares: A Context Sensitive Approach and Walkable and Livable Communities Institute April 2012 Walkability 101: The Walkability Workbook.

C. Pavement Design:

1. For purposes of geometric and structural design, streets shall be classified according to the classes shown on Table 3.1 Street Design Standards. Any deviation from the standard will require the approval of the City Engineer.

In the project limits, if subgrade soils R-values are not known, the structural section of the street shall be designed assuming an R-value of 5. Standard Detail 301A (Structural Section Requirements) shows the required aggregate base and Hot Mix Asphalt thickness based on a given traffic index and R-value.

TABLE 3.1 STREET DESIGN STANDARDS

Class	Right-of-Way (Feet)	Mid-Block Width Between Curbs (Feet)	Design Speeds	*Traffic Index	Minimum Centerline Radius for Horizontal Curve (ft.)
Expressway 4 lane	110	90	55	11	1300**
Expressway 6 lane	135	115	55	11	1300**
Principal Arterial	114	94	45	11	1000
Minor Arterial	100	80	40	10	750
Major Collector	84 96 w/bike lanes	64 76	35	10	525
Minor Collector	60 72 w/bike lanes	40 52	25	8	250
Local	50	36	25	6	250**
Cul-de-sac	50	34	25	4.5	250**
Major Industrial	110	94	45	10	1200**
Industrial	60	40	40	9	600**
Residential Alleys	20	N/A	15	5	200**
Commercial Alleys	20	N/A	15	5	200**

*May be raised at the discretion of the City Engineer if traffic warrants a higher value.

**Smaller radii may be approved by the City Engineer.

The minimum street section shall be determined from R-values obtained from material gathered from the level of the proposed subgrade using the design method described in the Highway Design Manual. In no case shall the minimum street section be less than 0.20' of Hot Mix Asphalt (HMA) and 0.35' of aggregate base (AB). Aggregate base section may be comprised of an equivalent section of aggregate base and aggregate sub base, but in no case shall aggregate base be less than 0.35'.

The Developer's Engineer shall indicate on the plans a 0.1' overlay on any section of street where five (5) or more multiple street tie-ins for sewer and/or water in 500' are placed in an existing city street. The overlay shall be proceeded by grinding at the lip of curbs and conforms, and removal of any temporary HMA. Feathering the edges will not be allowed. City water tie-ins in the area of multiple taps shall be backfilled with a minimum of 24" aggregate base and 0.17' of temporary HMA. The Developer shall remove the temporary HMA and pave to the depth required. The City will not charge the patching fee and will offer discounts on multiple water taps.

In designing a half street, the design shall be per Standard Detail 324.

The plans shall show the reconstruction of the street section to centerline on any street bounded by the subdivision where the street section has a pavement condition index less than 80.

2. Intersections shall use a Traffic Index (TI) for design as shown in the following table:

TABLE 3.2 TRAFFIC INDEX STANDARDS

Street Class Intersections	Intersection Condition (Traffic Index x Traffic Index)	Intersection Traffic Index
Expressway x Principal Arterial	11 x 11	12
Principal Arterial x Principal Arterial	11 x 11	12
Principal Arterial x Minor Arterial	11 x 10	12
Minor Arterial x Minor Arterial	10 x 10	11
Major Industrial x Major Industrial	10 x 10	11
Minor Arterial x Major Collector	10 x 9	11
Major Collector x Major Collector	9 x 9	10
Major Collector x Minor Collector	9 x 8	9.5
Minor Collector x Minor Collector	8 x 8	9
Minor Collector x Local	8 x 6	8
Industrial x Industrial	9 x 9	10

D. R-Value Testing

The Developer shall be responsible for obtaining soil R-value tests, specifically supervised by a licensed registered civil engineer, in sufficient quantity to establish the quality of the soil and to provide a basis for the design of the structural section.

The following R-value tests will be required at the street subgrade elevation:

A minimum of one (1) R-value test shall be taken for all developments with additional R-value tests specified by the City Engineer. The City Engineer may require as many as one (1) test per ten (10) lots along a residential street.

On arterial and collector streets where the frontage is less than 500', one (1) R-value test shall be made. On major or collector streets, where the frontage exceeds 500', a minimum of one (1) R-value test shall be taken at each 500' interval.

Exact locations of the R-value tests shall be as approved by the City Engineer. The Developer shall stake the field test locations and shall provide an existing ground and finish subgrade elevation for each test location. The top of the R-value sample shall be taken at the estimated finished subgrade elevation.

The Developer shall provide results of the R-value tests to the City Engineer. The results provided to the City shall include the following:

1. Locations and a summary table shown in the soils report or the supplement.
2. Self-certification that the stabilimeter is properly calibrated per California Test 102.

3. Completed California Test 301 Forms T.C. - 361.

E. Curbs and Gutters

1. Vertical curb and gutter (6") and 5' wide sidewalk shall be installed in P-O Zones and on collector streets. Sidewalk in C-1, C-2, C-M and C-3 Zones shall be extended to within 1" of property line (width may be determined by use or by existing conditions, if specifically approved in writing by the City Engineer - See Details 306 - 310).
2. Drive-over curb (4 1/2") and 4' sidewalk shall be installed on local streets in newly developed R-1, R-2, and R-3 zones, except where alternative street sections have been approved by the Specific Plan, Precise Plan, or other approved document.
3. Vertical curb (6") and 4' sidewalk shall be installed in existing in-fill R-1, R-2, and R-3 zones where previous work is a vertical curb.

F. Sidewalks, Curb Ramps and Drive Approaches

1. Sidewalk in C-1, C-2, C-M and C-3 Zones may substitute landscape for sidewalk under the following conditions:
 - a. The finished width of sidewalk is at least 8' wide. (7.5' if it constructed immediately in back of curb).
 - b. If there is parking on the street, a minimum of 24" of sidewalk landing (curb + 18") must be constructed behind the curb before the landscaping may begin.
 - c. The landscaping maintenance shall be performed by the property owner at his own expense including the irrigation water.
 - d. The landscaping design must be approved by the Director of the Parks, Recreation and Neighborhoods Department or designee.
2. Downtown Exposed Aggregate Sidewalk & Streetscape - These Standards, as shown in Standard Details #317-319, 321, shall be mandatory within the area as shown in Standard Detail #321, except that exposed aggregate sidewalks shall not be required on the streets bordering the area. Exposed Aggregate is prohibited at ADA curb ramps.

Any proposed changes to this pattern or substitution of materials shall be considered on a case-by-case basis. The Citizens Redevelopment Advisory Commission (CRAC) shall provide the initial review and recommendations to the City council. The City Engineer will also make recommendations for CRAC and City council consideration. The City Council will then approve or deny the proposed change with appropriate modifications.

3. New, full-width, exposed aggregate sidewalk shall be constructed and shall replace existing sidewalk when the existing sidewalk is less than 50% of the total sidewalk area.

4. For existing developments in areas requiring full-width sidewalk, fill-in sidewalk, added to provide the full-width, shall be exposed aggregate when the existing sidewalk is less than 50% of the total sidewalk area.
5. See Modesto Municipal Code, Section 7-1.502, for required locations of full-width sidewalk. Where existing sidewalk is more than 50%, exposed aggregate finish is optional.
6. New and existing curb returns.

G. Open Ended Cul-De-Sacs: (Standard Details #313-315, & 907-908)

1. Open ended cul-de-sacs must be dedicated easements to the City, Community Facilities District, or Homeowners Association for Private Gated Communities.
2. If City water, storm or sewer utilities are installed through the un-landscaped cul-de-sac, a minimum width of 10' of concrete pavement is required, see Standard Detail #313. Otherwise, see Standard Detail #315.
3. Cul-de-sacs concrete shall be a minimum 6" thick when proposed as a secondary access point for fire. Otherwise, concrete may be a minimum of 4" thick.
4. Cul-de-sacs shall be protected from vehicular traffic. A combination of bollards, elevated landscaping, and fencing may be used. A detailed layout shall be provided on the civil drawings. See Standard Details #313-315 for conceptual examples.
5. Wrought iron fence may be used in closing off the cul-de-sac. Wrought iron fence must be between 42" and 72" in height. The fence can start at the building setback line and shall be set back a minimum of 25' from the centerline extension of cul-de-sac.

H. Alleys:

1. Commercial Alleys shall be 20' wide with 5' wide valley gutter. Sectional thickness design of the aggregate base shall be based on a minimum traffic index (TI) of 6 and a minimum of 0.3' Hot Mix Asphalt. A commercial alley approach shall be constructed as detailed in the Standard Details.
2. New residential alleys shall be designed with a TI of 6 and a minimum of 0.20' HMA. Drainage shall also be provided with new alleys.
3. Existing residential alleys may be surfaced with a 0.20' HMA over existing base.
4. Existing alleys contiguous to new development shall be improved to a minimum width of 20'.

I. Intersections:

1. Street intersections shall be designed so that the larger street or through street maintains its cross-slope through the intersection. The plans shall clearly indicate which street cross-slope is to be maintained.
2. Sufficient elevations shall be shown on the plan or profile to clearly indicate how it is to be constructed. As a minimum, see section 2.02H of these Standards.

Intersections shall be designed to drain all water to drainage inlets without ponding or draining water across intersections. Valley gutters are not to be utilized in positive storm drain areas to obtain drainage across intersections except in cul-de-sacs and unusual circumstances approved by the City Engineer. Valley gutters are discouraged from use in in-fill projects. The City Engineer may require detailed design submittals for problem intersections.

The Developer shall dedicate the appropriate taper area for intersections and transitions per the Standard Details.

J. Curbed Medians:

On existing major streets of 70' or wider (excluding expressways), from curb flowline to curb, flowline, an 8" high curbed median shall be installed at the intersection of a major street as shown in Standard Details #328, 329, 353-387 or as directed by the City Engineer. The median shall extend a minimum of 350' from the intersection centerline. Medians shall be installed per City of Modesto Standard Details.

On new major streets or where part of a street is widened from two (2) lanes to four (4) or more lanes, a curbed median shall be installed for the full length of the new street or street widening and shall conform to the following:

1. A curbed median with a minimum width of 4' and a maximum width of 16' shall be installed as indicated in the Standard Details. The specific design of medians and traffic lanes shall be as directed by the City Engineer. Breaks in curbed medians shall be at all arterial and collector streets with a minimum of 660' between breaks. Additional or fewer breaks are at the discretion of the City Engineer and shall be approved by the City Engineer. Traffic lanes adjacent to the medians shall be 12'-6" in width.
2. All areas of the median that are 8' in width or greater shall be landscaped. In landscaped areas the curb shall extend to the bottom of the aggregate base layer of pavement section or a maximum of 24". Landscape and Irrigation Plans shall be submitted for approval as part of any Improvement Plans for work within the public right-of-way.
3. All areas of the median that are less than 8' in width shall be paved with exposed aggregate concrete as shown on Standard Detail #328 except that on principle arterial and larger streets the median paving shall be colored stamped concrete. The stamp pattern shall be Bomanite "Hex Tile" and the color shall be Bomanite "Brick Red" or approved equal.

K. Bus Turnouts:

Prior to filing of a tentative parcel or subdivision map or prior to property development, the location of bus turnouts shall be approved by the City Engineer. Bus turnouts may be required on expressway, major and collector streets where there is a curbside travel or bike lane or the probability of replacing curbside parking with travel or bike lanes. Bus turnouts may be placed approximately 1,000' apart, or as directed by the City Engineer. Turnouts may be required at all four (4) corners at expressway/arterial and collector, arterial/arterial, arterial/collector, and collector/collector street intersections where there is no parking lane or where the parking lane will be eliminated, as directed by the City Engineer.

Bus turnouts may be placed on the far side of the intersection in the travel direction. Other locations shall be as determined by the City Engineer. Location of mid-block turnouts shall be as approved by the City Engineer and shall only be approved if there is no intersection available to accommodate a turnout within 1,000'.

L. Design Speed:

Street speeds shall be designed as listed in Table 3-1 or as approved by the City Engineer.

3.03 MATERIALS

A. Description

This work shall include furnishing all the labor, materials, tools and equipment necessary to place the engineering fabrics in accordance with Caltrans Standard Specifications, Section 88 "Geosynthetics", the approved plans and these Standard Specifications.

Engineering fabrics shall include pavement reinforcing fabric and light-duty road stabilization fabrics. A Certificate of Compliance from the product manufacturer for each type of engineering fabric used shall be furnished to the Engineer. Engineering fabrics shall be furnished in protective covers to shield against ultraviolet rays, abrasion, and water.

B. Pavement Reinforcing Fabric:

Pavement reinforcing fabric shall be manufactured from polyester, polypropylene, or polypropylene-nylon material. The fabric shall be non-woven heat bonded on the top side, and shall conform to the following:

TABLE 3.3 PAVEMENT REINFORCING FABRIC

Property	Minimum Requirements	Test Method
Grab Strength (lbs.)	102	ASTM D4632
Elongation at Break (%)	50	ASTM D4632
Asphalt retention (gal/sy)	0.2	TF25 #8
Thickness (mils.)	30 to 100	ASTM D461
Melting Point (F)	325	ASTM D276

C. Road Stabilization Fabric:

Road stabilization fabric shall be for light duty applications and shall be manufactured from polyester, nylon, or polypropylene material, or any combination thereof.

The fabric shall be woven or non-woven, permeable, and shall conform to the equivalent of Mirafi HP370 or equal.

D. Aggregate Base:

Aggregate base shall conform to Section 26 of the Caltrans Specifications and shall be Class 2, $\frac{3}{4}$ " maximum AB. Thickness shown on the plans shall be the minimum section allowed.

E. Hot Mix Asphalt:

Hot Mix Asphalt shall conform to Section 39 of the Caltrans Standards and shall be HMA Type A, Hot Mix Asphalt using PG 64-10 asphalt binder. Aggregate used in all but the final course shall be $\frac{3}{4}$ " maximum, medium grading.

Aggregate used in the final course shall be as follows:

- Expressway, Arterial, Collector and Industrial Streets – Type A, $\frac{1}{2}$ " maximum, medium grading.
- Residential Streets – Type B, $\frac{1}{2}$ " maximum, medium grading

Asphalt for 0.1' overlays shall be PG 64-10 binder, Type B, $\frac{1}{2}$ " maximum, medium grading for each project.

F. Header Board:

Header Boards shall be constructed to protect the edges of the hot mix asphalt where streets are partially completed.

All header boards shall be either redwood or Douglas Fir with an American Wood Preservers Bureau stamp indicating its use for ground contact and application of LP22 waterborne preservative or approved equal.

The header board size shall meet or exceed the depth of the hot mix asphalt section (i.e. 2" x 4", 2" x 6", 2" x 8", etc.)

G. Shoulder Backing:

Shoulder backing shall be required on all roadways, parking lots, and header board applications where no curb or barrier is installed to prevent vehicles from straying onto a shoulder.

Unless specified in the plans and specifications as an aggregate base rock, the materials shall be compacted native material.

H. Sidewalks, Curbs, Gutters, Curb Ramps, and Driveways:

Sidewalks, curbs, gutters, curb ramps, and driveways shall be constructed of 5 sack (2500 psi) Concrete. Materials - Type II cement, 4" maximum slump, 1" maximum size aggregate.

I. Truncated Domes:

The Contractor shall furnish and install cast iron truncated dome tiles as detectable warnings on the curb ramps, as shown on the details. The tiles shall be manufactured by East Jordan Iron Works or Neehah Foundry or approved equal. The tiles used must be uniform for all of the new curb ramps.

The truncated dome tiles shall comply with the following specifications:

Dome Alignment - Square grid pattern in the predominant direction of travel.

Dome Size - Base diameter of 0.9" (22.9 mm) minimum to 0.92" (23.4 mm) maximum, a top diameter of 0.45" (11.4 mm) minimum and 0.47" (11.9 mm) maximum and a height of 0.18" (4.6mm) minimum and 0.22" (5.6mm) maximum.

Dome Spacing - Center-to-center spacing of 2.3" (58 mm) minimum and 2.4" (61 mm) maximum, and a base-to-base spacing of 0.65" (16.5 mm) minimum, measured between the most adjacent domes on square grid. Dome Spacing Exception: Where installed in a radial pattern, truncated domes shall have a center-to-center spacing of 1.6" (41 mm) minimum to 2.4" (61 mm) maximum.

- a. Natural Finish (no painting required). Tile Size and Location - The truncated dome tiles shall extend 36" in the direction of travel and the full width of the curb ramp as shown on the plans. The edge of the detectable warning surface nearest the back of curb line shall be 6" (150 mm) minimum and 8" (205 mm) maximum from the back of curb line.
- b. In existing areas where domes need to be added, a glue down and anchored option may be used if the existing ramp meets all current ADA ramp guidelines with the approval of the City Engineer.

J. Bus Turnouts:

Bus turnouts shall be constructed as shown in Standard Details #325-327B. The minimum concrete mix design standards shall be 4,000 psi with a maximum water/cement ratio of 0.42 with flexural design strength of 600 psi as measured by ASTM C 78-02 and a maximum slump of 3". A midrange water reducer/superplasticizer may be used to increase the slump to a maximum of 6". The slope of the bus turnout parallel to the roadway shall match the slope of the roadway. A maximum cross slope of 2% is allowed perpendicular to the roadway in the passenger loading area.

1. Concrete Mix Design

Minimum cement content: 6 sack

Maximum fly ash: 15%

Maximum aggregate: ¾"

Minimum polypropylene fibers content: 0.1% by volume (1.5 pounds per cubic yard)

2. Polypropylene Fiber

The Concrete shall be reinforced with polypropylene fibrillated fibers. The fibers shall be 100% virgin polypropylene fibrillated fibers. Fiber shall be Fibermesh InForce e3 as manufactured by SI Concrete Systems, or approved equal.

3.04 INSTALLATION

A. Pavement Reinforcing Fabric:

Pavement reinforcing fabric shall be installed in accordance with Section 39-1.09D "Geosynthetic Pavement Interlayer" of the Caltrans Specifications.

B. Road Stabilization Fabric:

1. The subgrade to receive the geotextile fabric, immediately prior to placing, shall conform to the compaction and grade requirements as specified in Chapter 11 "Grading Design Standards" of these Standards and as shown on the plans.
2. Geotextile fabric shall be handled and placed in accordance with manufacturer's recommendations.
3. The fabric shall be aligned and placed in a wrinkle-free manner.
4. Adjacent borders of the fabric shall be overlapped a minimum of 12" or stitched. The preceding roll shall overlap the following roll in the direction the material is being spread or shall be stitched. When the fabric is joined by stitching, it shall be stitched with yarn of a contrasting color. The size and composition of the yarn shall be as recommended by the fabric manufacturer. The stitches shall number 5 to 7 per inch of the seam.
5. Within 24 hours after the fabric has been placed, it shall be covered with aggregate base material as shown on the plans.
6. During spreading and compaction of the aggregate base material a minimum of 6" of such material shall be maintained between the fabric and the Contractor's equipment. Equipment or vehicles shall not be operated or driven directly on the fabric.

C. Subgrade Preparation:

1. All clods shall be broken and all rocks, hard ribs, and earth lumps over 2½" in greatest dimension and other unsuitable material such as roots shall be removed from the jobsite.
2. On industrial streets or where the TI is ten (10) or above, relative compaction of not less than 95% shall be obtained for a minimum depth of 2.5' below the finished grade.

3. For all other streets, the subgrade material shall be compacted to a firm stable condition with approved equipment until a relative compaction of not less than 95% has been obtained to a minimum depth of 6" below the grading plane for the full width between the face of the gutters. Locations or depth of existing utilities may require alternate construction methods as approved by the Engineer.
4. The finished grade shall not vary more than 0.05' above or below the planned grade at any point. Care shall be taken to obtain compaction around existing manholes and water valves.
5. Relative compaction shall be tested by the Developer, at Developer's expense, as directed by the Engineer, in accordance with Test Methods No. California 216 or 231 and test results shall be provided to the Engineer.

D. Aggregate Base:

Where not controlled by existing conditions, the grade of aggregate base shall not exceed 0.1 feet above or below the planned finished grade, provided it is uniform and free from sharp breaks. The cross-section of the base shall be free from ridges or valleys and be within 0.1 feet above or below the theoretical section shown on the plans at any point on the cross-section. Surfaces will be tested with a 16-foot straight edge applied parallel with and at right angles to the roadway centerline. The contractor shall furnish the straight edge for the City Engineer's use, and it shall be of a type and in a condition approved by the City Engineer.

Relative compaction shall be determined in accordance with California Tests 216 and 231. Upon the recommendation of the contractor, alternative test methods may be recommended for use, as approved by the City Engineer.

E. Hot Mix Asphalt:

Hot Mix Asphalt shall be spread per Section 39-1.11 "Transporting, Spreading and Compacting" of the Caltrans Standards.

1. Paving Spread

The following rules shall apply to all paving in public streets:

- a. The final course shall be paved starting from the curb and paving toward the centerline of the street.
- b. When paving the final surfacing course, there shall be a minimum of two (2) rakers and one (1) screed person per paving machine.
- c. Vibratory rollers may be used as approved by the City Engineer.
- d. All paving courses shall be laid with a paving machine except.
- e. Paving machines shall have automatic joint control.
- f. Extensions or wings shall not be permitted except as approved by the City Engineer.

2. Penetration Treatment, Prime and Tack Coats: (when required by conditions or specifications)

TABLE 3.4 PRIME AND TACK COAT SPECIFICATIONS

TYPE	ASPHALTGRADE	RATE gallons/yard
Prime	SC-250	0.25
Tack	CSS-1 (slow setting)	0.02 - 0.05

Tack coat must comply with the specifications of asphaltic emulsion in Section 94, "Asphaltic Emulsion," or asphalt binder in Section 92, "Asphalts" and Section 39-1.09C, "Tack Coat."

Tack Coat is required between hot mix asphalts lifts when traffic has utilized the paving surface.

3. Adjustment of Utility Covers:

All utility covers structures including manholes, cleanouts, blow-offs and water valve boxes shall be lowered prior to any pavement planning and shall be brought to finish grade after the final pavement lift has been installed.

4. Mix Design:

Contractor shall insure the hot mix asphalt suppliers have an approved current (calendar year) mix design on file with the City of Modesto prior to any paving.

5. Spreading and Compacting Equipment:

Spreading and compacting equipment shall be as specified in Section 39-1.10 "Spreading and Compacting Equipment" of the Caltrans Standards. Caltrans Standards are amended to allow use of a motorized latent box for projects involving less than 50 tons of hot mix asphalt.

F. Header Board:

Backfill shall be native material, mechanically compacted.

When a header board is being installed as part of a half-street construction, the Contractor shall have the option to extend the full pavement section an extra 2' from the specified dimension. This assumes there is sufficient right-of-way to extend the pavement section an additional 2'.

G. Shoulder Backing:

The top 12" of shoulder for a minimum distance of 4' from edge of pavement shall be scarified and re-compacted to 95% at 3% over optimum moisture content.

H. Sidewalks, Curbs, Gutters, Curb Ramps, and Driveways:

1. General - Curb ramps shall be installed at all street crossings and curb returns. Ramps shall conform to Standard Details #345-349) according to type of street.

All cuts to existing concrete shall be made and replaced from a score line or expansion joint. Any cuts to existing driveways will result in the removal and replacement of the full drive approach (or from existing score line to score line.)

Work shall conform to Section 73 "Concrete Curbs and Sidewalks" and Section 90 "Concrete" of the State Specifications with the following additions.

Traffic, parking and street name signs on City streets which require relocation because of the work will be relocated by the City but two (2) working days advance notice is required. Contact Development Services Division to coordinate relocation. Traffic signs on state highways and stop signs on streets entering state highways must be relocated by Caltrans. Utility poles that require relocation because of the work shall be relocated by the utility company owning the poles.

2. Subgrade Preparation - The finished subgrade immediately prior to placement of aggregate base or concrete shall be compacted to 90% relative compaction at 3% over optimum moisture content for a depth of 0.5'.
3. Cushion (if specified) - Shall be mechanically compacted Class 2 Aggregate Base.
4. Forms - Lumber used for forms must be smooth on the side placed next to the concrete and shall not be less than 1½" thick. Warped forms and forms not having a smooth, straight upper edge shall not be used. Benders or thin planks, rigidly placed, may be used on curves, grade changes, or the curb returns.

All forms shall be clean and coated with a light oil to prevent the concrete from adhering to them. All forms must be carefully set to proper alignment and grade and shall be rigidly held in place by the use of steel or wooden stakes. Clamps, spreaders and braces shall be used where required to insure rigidity in the forms.

Forms shall not vary from vertical grade by more than 0.02' and from horizontal alignment by more than 0.05' within the distance not to exceed 25'. All forms shall have smooth even lines in both the horizontal and vertical plane. A windrow of earth placed against the forms prior to placing concrete may be required to prevent them from bulging.

Except for vertical curb forms, all forms shall remain in place for at least 12 hours after the concrete is placed.

5. Extruded Sidewalk, Curb and Gutter - Use of an extrusion machine is allowed. A test pour may be required by the City Engineer prior to approval.
6. Placing and Finishing - No concrete shall be placed or finished in the rain. It shall be the Contractor's responsibility to schedule his operations such that concrete will not be placed or finished in the rain.

At the end of each day's pour, when work is terminated, or when a delay of more than 30 minutes occurs, the joint shall be made vertical and square ended. In no case shall the end of a day's pour terminate in a driveway.

7. Expansion joints, weakened plane joints, score lines - Expansion joints shall be constructed in conformance with Section 303.5.4.2 "Expansion Joints" of the Standard Specifications for Public Works Construction (SSPWC); at the end of each curb return and at intervals not to exceed 200'. Where the existing sidewalk is cut to install new driveways and approaches, expansion joints shall be constructed on each side of the driveway or approach.

Weakened plane joints shall be constructed in conformance with Section 303-5.4.3 "Weakened Plane Joints" of SSPWC at 8' intervals and at each end of the driveway approaches.

When curb, gutter and sidewalk are poured monolithically, scoring lines in conformance with Section 303-5.5.3 "Walk" of the SSPWC shall be placed along the back of the curb.

When making new curb cuts, replacing existing curb, or placing new concrete curb in existing asphalt, the asphalt shall be cut a minimum of 6" from the lip of the curb.

Sidewalk - Expansion joints for new construction shall be located opposite the expansion joints as placed for curbs and gutters.

Expansion joints placed in sidewalks where curbs and gutters exist shall be placed to match the expansion joints in existing curbs and gutters.

Sidewalk score lines shall conform to score lines of existing sidewalks when new construction is placed contiguous and in line with existing sidewalk or as indicated on the contract plans or standard plans for sidewalk.

Weakened plane joints shall be constructed at a maximum interval of 8' for 4' sidewalk, 10' for other widths. Depth of weakened plane joint shall be a minimum of 25% of the thickness of the concrete.

Concrete shall be scored at equal intervals between weakened plane joints to approximate squares. Concrete surface shall be finished with a medium broom finish.

Driveways & Approaches - When back of approach is poured against existing concrete, a ¼" pre-molded expansion joint filler shall be placed against the existing concrete.

Score lines shall correspond with the score lines of adjacent sidewalk.

8. Exposed Aggregate Sidewalk - Exposed aggregate sidewalk shall conform to sidewalks of these Standards for concrete sidewalk except for surface finish.

Exposed aggregate sidewalk may be seeded with 3/8" maximum aggregate embedded in the surface of the concrete by tapping or rolling. A standard mix with 60% Minimum – 70% Maximum aggregate content and 3/8" Minimum – ½"

Maximum aggregate screening may be used. The aggregate shall be exposed by washing away the surface mortar with water.

The finished surface shall contain 40-60% exposed, crushed aggregate. The same source rock shall be utilized for the entire project frontage.

If a concrete retarder is desired, the contractor shall obtain approval from the City's Construction inspector.

9. Service and Lot Lines - Contractor shall clearly mark a "W" for water services, and an "S" for sewer services on the curb in the wet concrete at the location of perpendicular crossings.
10. Testing - The finished concrete shall be in conformance with the tolerances as stated in Section 40-1.01D(13)(e) "Concrete Pavement Thickness" of the State Standard Specifications and attain a minimum 28-day compressive strength of 3000 psi. Core testing of substandard concrete will not be permitted.

After construction, gutters shall be checked by flowing water. The Engineer or his/her representative must be present during the flow test. Any high spots or depressions revealed by the flow test (which exceed 0.02') shall be repaired by removing that section of concrete and replacing it to the correct grade.

Finished face of curb shall not vary by more than an aggregate total of 0.05' from the design alignment within a distance not to exceed 25'.

I. Truncated Domes:

Prior to actual construction, the Contractor shall construct on the project site, a test detectable warning surface using the selected truncated dome tile for the project and shall be of a size not less than 36" x full width of ramp. The test surface shall be constructed to the satisfaction of the Engineer, before the selected tile and installation procedure will be accepted for the project.

The truncated dome tiles shall be installed per the manufacturer's written recommendations. The tiles shall be flush with the surrounding surface of the curb ramp. The tiles shall be installed with precision, such that along with maintaining the slope of the curb ramp, the concrete surface surrounding the detectable warning area shall have the exact surface finish as if the truncated dome tiles were not installed. The ramp surface shall not have any concrete bulges or deposits associated with the installation of the tiles.

The Contractor shall submit a certificate of compliance for the truncated dome tiles, conforming to ADA requirements, strength requirements and warranty. The Contractor shall submit a certification from the tile manufacturer, certifying that the Contractor or the Contractor's subcontractor that will install the tile is qualified for installation, and who has successfully completed tile installations similar in material, design, and extent to that indicated for the project.

J. Bus Turnout:

1. Placing and Finishing Concrete in Hot Weather - Hot weather is defined as any combination of high air temperature, low relative humidity, and wind velocity tending to impair the quality of fresh or hardened concrete or otherwise resulting in abnormal properties. The Contractor shall take all measures to minimize the effects of relative humidity, ambient air temperature, wind speed and concrete temperature on the finishing and curing of concrete. The Contractor shall take all precautions to minimize the rate of surface evaporation when any combination of air temperature, relative humidity, concrete temperature, and wind velocity results in an evaporation rate exceeding 0.10 lbs./sq. ft./hour. These measures include, but are not limited by, the following:
 - a. Fog or sprinkle cool water on forms, reinforcing steel and subgrade prior to concrete placement.
 - b. The subgrade should be moist but free of standing water and soft spots at the time of placement of concrete.
 - c. Whenever possible, erect temporary windbreaks to reduce wind velocity over the concrete surface.
 - d. Place concrete early morning or evening.
 - e. Supply sufficient workers to eliminate delays during construction.
 - f. Apply final curing immediately after final finishing.
 - g. Schedule transit-mix trucks for minimum wait time.
 - h. Minimize total mixing.
 - i. Use ice to replace some of the mix water.
2. Concrete Curing - The method(s) of curing shall comply with Section 90-7, "Curing Concrete", of these Standards. Curing compound shall be pigmented and comply with Section 90-7.01B "Curing Compound Method", of the State Standards. Curing of the concrete bus turnout shall begin immediately following the concrete finishing operations.
3. Concrete Finish - The concrete bus turnout shall receive a medium to heavy broom finish. The texturing equipment shall provide corrugations that are 1/16" – 1/8" in depth, uniform in appearance, and are parallel to the slope of the concrete slab. (The design intent is to have water flow easily off the concrete bus turnout.)
4. Control Joints - Joint lines for the concrete bus turnout and curb and gutter shall be laid out and marked before concrete pavement and curb and gutter is poured and placed. The Engineer shall inspect and approve the joint layout before the concrete is placed. Joint lines shall run continuously across the length and width of the concrete bus turnout and extend through the curb and gutter. Joint spacing in the 50' straight portion of the bus turnout shall not exceed 10'. For rectangular concrete, the long dimension shall not exceed 1.5 times the short dimension. (Example: the short dimension equals 10' in length; the long dimension shall not exceed 15'.) The control joint spacing shall be as shown or noted on the Standard Details. The depth of saw-cut or formed groove for transverse and longitudinal joints shall be one-fourth the thickness of the concrete slab. Transverse and longitudinal control joints shall be made by the sawing method.

5. Sawing Control Joints - The Contractor shall saw cut the concrete bus turnout as early as possible to prevent premature cracking. The Contractor may use either conventional wet cut (water injection) saws, conventional dry cut saws or early entry dry cut saws. If the former method is used, joints shall be cut within 4 hours after the concrete slab has been finished. If the later method is used, joints shall be cut within 1 to 2 hours after the concrete slab has been finished. (The intent is to create a weakened plane joint as soon as the joint can be cut, preferably without creating spalling of material at the joint.)

After sawing the control joints, the Contractor shall immediately flush the control joints with water to remove the majority of the concrete slurry. After the control joint has dried sufficiently, the Contractor shall sandblast the control joints to remove any remaining dirt, dust, laitance, residue and any other foreign material. Following the sandblasting, the Contractor shall thoroughly clean the joints using clean, oil-free compressed air. The control joints shall be free from all dust and contaminants and be dry prior to the installation of the back-up material, the non-extruding pre-molded compressible material and the joint sealant.

6. Backer Rod - A backer rod shall be installed in the control joint sealant reservoir of specific concrete panels whose control joints are to be sealed. The minimum diameter and material composition of the backer rod shall be as recommended by the silicone sealant manufacturer. The backer rod shall be compatible with the silicone sealant and have a diameter about 25% greater than the width of the joint sealant reservoir.
7. Control Joint Sealant - The Contractor shall not install the control joint sealant until the Engineer has inspected and approved the control joints for cleanliness. The Contractor shall apply a cold-pour single-component self-leveling silicone sealant in the control joints shown, detailed or noted on the plans. The joint sealant material shall be Crafcro Roadsaver Silicone Sealant part number 34903, as manufactured by Crafcro Inc., or approved equal. The Contractor shall install the joint sealant material according to the manufacturer's recommendations. The control joint sealant shall be installed one quarter inch below the finished surface of the concrete pavement.
8. Concrete testing - Testing shall be performed per Chapter 90 of the State Standard Specifications.

3.05 MEASUREMENT AND PAYMENT

A. Engineering Fabric

Engineering fabric will be measured by the square yard of area covered, excluding additional fabric required for overlap.

Payment for engineering fabric shall be based on the contract unit price and quantity installed as described above. The contract unit price shall include furnishing all labor, materials, tools, equipment, and incidentals and for performing all the work involved in installing the engineering fabric, as specified in these specifications and as directed by the City Engineer.

B. Subgrade Preparation

Quantities of subgrade preparation to be paid for by square footage and will be calculated on the basis of the dimensions shown on the plans adjusted by the amount of any change ordered by the City Engineer. No allowance will be made for subgrade preparation outside said dimensions unless otherwise ordered by the City Engineer. The payment shall include full compensation for furnishing all labor, materials, tools, water, equipment and incidentals, and for completing all work involved in subgrade preparation.

C. Aggregate Base

Quantities of aggregate base to be paid for by the cubic yard will be calculated on the basis of the dimensions shown on the plans adjusted by the amount of any change ordered by the City Engineer. No allowance will be made for aggregate base placed outside said dimensions unless otherwise ordered by the City Engineer.

Quantities of aggregate base will be paid for at the contract unit price per cubic yard for the class or classes involved. The above prices and payments shall include full compensation for furnishing all labor, materials (including water in the material at the time of weighting as provided in Section 26-1.06 of the Caltrans Standards, "Measurement"), tools, equipment, and incidentals and for doing all the work involved in hauling and constructing aggregate base, complete in place as shown on the plans, and as specified in these specifications and the special provisions, and as directed by the City Engineer.

D. Hot Mix Asphalt

Hot Mix Asphalt shall be measured by the ton as placed on the street, driveways, and other areas designated by the City Engineer.

Payment shall be made as per Section 39-6 "Payment" of the Caltrans Standard Specifications.

E. Header Board

Measurement will be per the plans at a linear foot.

F. Shoulder Backing

No measurement is necessary.

Full compensation for conforming to the requirements of this section shall be considered as included in the unit price bid for the roadway or parking lot.

G. Curbs, Gutters, Sidewalks, Curb Ramps, and Driveways

Quantities of concrete in curbs, gutters, sidewalks, curb ramps, and driveways shall be measured and payment made at the bid price per unit as shown on the bid sheet. Curbs and gutters shall be measured continuous through driveways (approaches)

and through curb ramps. Approaches shall be measured to the "back of curb line" when payment is made by the square foot. Payment shall include full compensation for the furnishing, placing, and curing of the concrete together with the excavation, cushion material and all incidentals.

H. Truncated Domes

The cost of truncated dome tiles, the full compensation for furnishing all labor, materials, tools, equipment, and for doing all the work involved in installing truncated domes tiles complete in place as shown on the plans, as specified in these specifications and as recommended by the manufacturer shall be included in the unit price of each curb ramp and no additional compensation shall be allowed.

I. Bus Turnout

Measurement for bus turnouts shall be by the cubic yard. Payment shall include full compensation for all labor and materials for completing the work.

J. Curbed Medians

Measurements for curbed medians shall be by the linear foot. Payment shall include full compensation for all labor and materials for completing the work.

3.06 STANDARD LOCATIONS OF UTILITIES

Utilities in a common trench shall be located as shown in the Standard Details #804, 805, and 806. Revisions to these locations or separate utilities in an existing right-of-way should be noted on the plan submitted with the encroachment permit request.

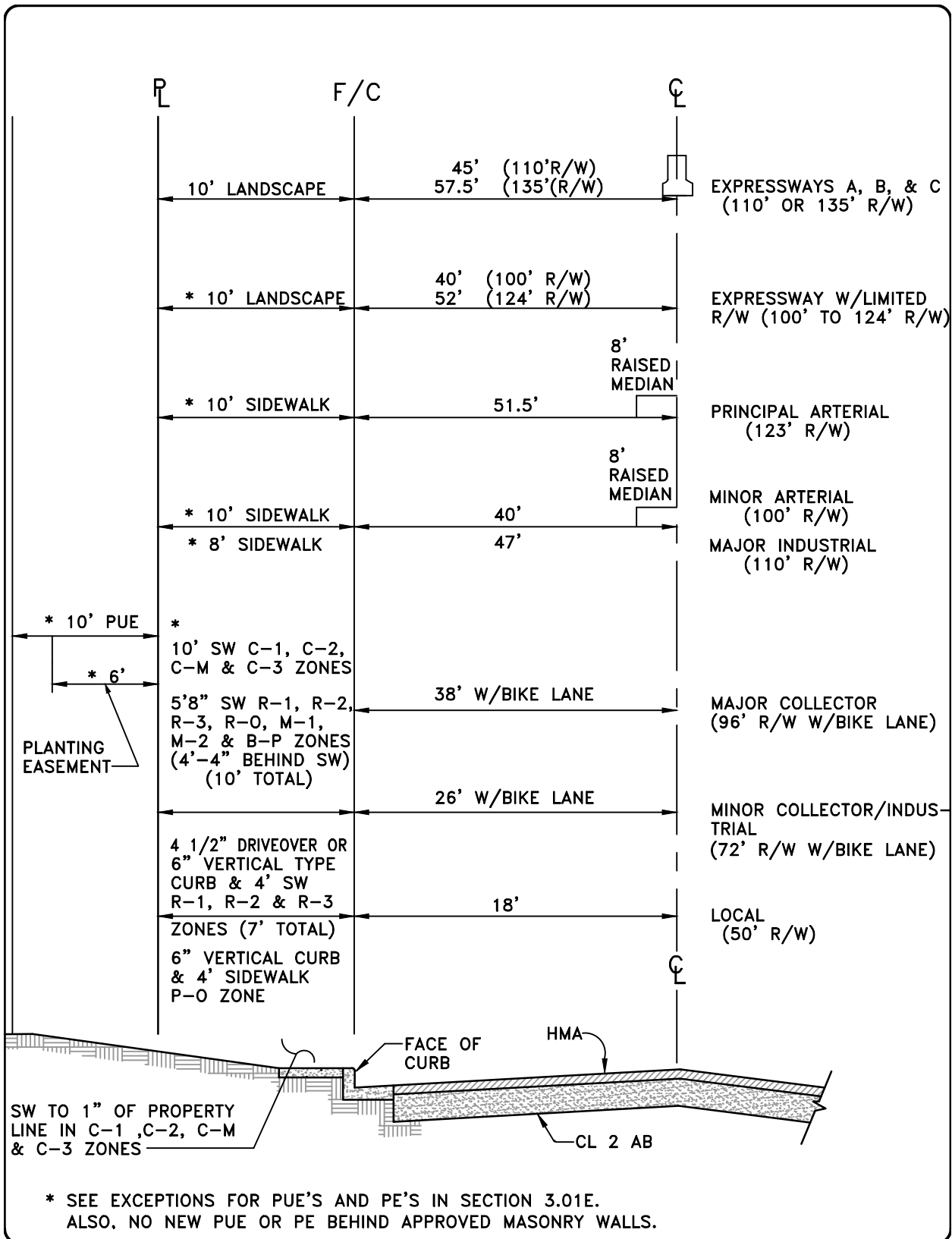
3.07 RELOCATING EXISTING IRRIGATION LINES

Existing cast-in-place irrigation lines in street right-of-way shall be replaced with rubber-gasketed, reinforced concrete pipe (RCP) conforming to Sections 65-2.02B "Circular Reinforced Concrete Pipe" and 65-2.02E "Joints" of the State Standards.

The pipe shall be Class III RCP except where the cover to finish grade is less than 3', the pipe shall be Class IV. Special bedding and type of pipe shall be required where cover depth is less than 3'.

Irrigation lines to be abandoned shall be removed, and not crushed and left in place.

Irrigation lines within a development shall be removed, protected or relocated as required by the Irrigation District and the City Engineer. Appropriate easements for irrigation lines to remain shall be dedicated as necessary. If required, the Property Owner shall execute a release of irrigation rights.



APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
REVISED:	DATE:
REVISED:	DATE:
REVISED:	DATE:

STREETS

STREET SECTIONS

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

DETAIL NO.
300

STRUCTURAL SECTION REQUIREMENTS

T.I.	WITHOUT SAFETY FACTOR (5.0-8.0)		WITH SAFETY FACTOR (8.0-12.0)		REQUIRED AB THICKNESS (FEET)													
	4.00	5.00	6.00	7.00	8.00	9.00	10.00	11.00	12.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	11.00	12.00
R-VALUE	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
5	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
10	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
15	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
20	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
25	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
30	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
35	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
40	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
45	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
50	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
55	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
60	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60

NOTE 1:

THE MINIMUM T.I. USED TO DETERMINE THE STRUCTURAL SECTION FOR A MAJOR - MAJOR INTERSECTION SHALL BE T.I. 11 AND AN INDUSTRIAL - INDUSTRIAL INTERSECTION SHALL BE T.I. 10.

NOTE 2:

THE FOLLOWING CONDITIONS APPLIED TO FORMULATING THE ABOVE STRUCTURAL DESIGNS:

- A) THE CHART UTILIZED THE R-VALUE DESIGN METHOD USED BY THE CALIFORNIA DEPARTMENT OF TRANSPORTATION AS DETAILED IN THE "HIGHWAY DESIGN MANUAL" AND THE "FLEXIBLE PAVEMENT STRUCTURAL SECTION DESIGN GUIDE FOR CALIFORNIA CITIES AND COUNTIES", THIRD EDITION (JANUARY 1979)
- B) THE FOLLOWING CONDITIONS APPLIED TO THE DESIGN GUIDELINES:
 - 1) USED A SAFETY FACTOR FOR A TRAFFIC INDEX (T.I.) OF 8.0 OR GREATER.
 - 2) ADJUSTED RESULTING AB THICKNESSES TO CONFORM TO THE CITY'S ACCEPTABLE MINIMUM AB THICKNESS OF .35'.
 - 3) MAXIMUM ACCEPTABLE R-VALUE USED IN CALCULATING STREET PAVEMENT WAS R-VALUE 60.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

STREETS

STRUCTURAL SECTION REQUIREMENTS

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



DETAIL NO.
301A

**FULL DEPTH HOT MIX ASPHALT (HMA) CONCRETE
STRUCTURAL SECTION REQUIREMENTS**

TI 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0 9.5 10.0 10.5 11.0 11.5 12.0

R-VALUE	<u>REQUIRED HOT MIX ASPHALT (HMA) CONCRETE THICKNESS (FEET)</u>														
5	0.60	0.70	0.75	0.85	0.90	0.95	1.00	1.10	1.15	1.25	1.30	1.40	1.45	1.55	1.60
10	0.60	0.65	0.70	0.80	0.80	0.95	1.00	1.05	1.10	1.20	1.25	1.35	1.40	1.50	1.55
15	0.55	0.65	0.70	0.75	0.80	0.90	0.95	1.05	1.05	1.15	1.20	1.30	1.35	1.40	1.45
20	0.55	0.60	0.65	0.75	0.80	0.85	0.90	1.00	1.00	1.10	1.15	1.25	1.30	1.35	1.40
25	0.50	0.60	0.65	0.70	0.75	0.80	0.85	0.95	1.00	1.05	1.10	1.20	1.20	1.30	1.35
30	0.45	0.55	0.60	0.65	0.70	0.80	0.80	0.90	0.95	1.00	1.05	1.10	1.15	1.25	1.25
35	0.40	0.55	0.55	0.65	0.65	0.75	0.75	0.85	0.90	0.95	1.00	1.05	1.10	1.15	1.20
40	0.40	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.10	1.15
45	0.35	0.40	0.50	0.55	0.60	0.65	0.60	0.75	0.80	0.85	0.90	0.95	1.00	1.05	1.05
50	0.30	0.40	0.45	0.55	0.55	0.60	0.60	0.70	0.75	0.80	0.80	0.90	0.90	0.95	1.00
55	0.30	0.40	0.40	0.50	0.50	0.55	0.60	0.65	0.70	0.75	0.75	0.80	0.85	0.90	0.95
60	0.25	0.35	0.40	0.45	0.45	0.50	0.55	0.60	0.65	0.70	0.70	0.75	0.80	0.85	0.85
65	0.25	0.30	0.35	0.40	0.40	0.45	0.45	0.55	0.55	0.60	0.65	0.70	0.70	0.75	0.80
70	0.20	0.25	0.30	0.35	0.35	0.40	0.40	0.50	0.50	0.55	0.60	0.60	0.65	0.70	0.70
75	0.20	0.25	0.25	0.30	0.30	0.30	0.35	0.40	0.45	0.50	0.50	0.55	0.55	0.60	0.60
80	0.20	0.20	0.20	0.25	0.25	0.30	0.30	0.35	0.35	0.40	0.40	0.45	0.45	0.50	0.55

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

STREETS

**STRUCTURAL SECTION
REQUIREMENTS**



ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

DETAIL NO.
301B

	Local Street	Minor Collector (60' and 72')	Major Collector (84' and 96')	Minor Arterial	Principal Arterial	Class B 4-Lane Expressway	Class B 4-Lane Landscaped Expressway	Class B 6-Lane Expressway	Class B 6-Lane Landscaped Expressway	Class C 4-Lane Expressway	Class C 4-Lane Landscaped Expressway	Class C 6-Lane Expressway	Class C 6-Lane Landscaped Expressway
Local Street		377	378										
Minor Collector (60' and 72')	377	376	365/6	379	382	367	368	369	371	353	356	359	362
Major Collector (84' and 96')	378	365/6	381	380	383	354	358	360	364	354	358	360	364
Minor Arterial		379	380	384	384	355	357	361	363	355	357	361	363
Principal Arterial		382	383	384	385	355	357	361	363	355	357	361	363
Class B 4-Lane Expressway		367	354	355	355	374	374	370	370	374	374	373	370
Class B 4-Lane Landscaped Expressway		368	358	357	357	374	374	387	384	374	374	387	387
Class B 6-Lane Expressway		369	360	361	361	370	387	375	375	373	387	375	375
Class B 6-Lane Landscaped Expressway		371	364	363	363	370	384	375	374	374	370	375	375
Class C 4-Lane Expressway		353	354	355	355	374	374	373	370	374	374	370	370
Class C 4-Lane Landscaped Expressway		356	358	357	357	374	374	387	387	374	374	387	387
Class C 6-Lane Expressway		359	360	361	361	370	387	375	375	370	387	375	375
Class C 6-Lane Landscaped Expressway		362	364	363	363	370	387	375	375	370	387	375	375

NOTE: IN THE EVENT THE TITLE ON THE DETAIL DOES NOT REFLECT A SPECIFIC APPLICATION, THE ABOVE CHART WILL SUPERCEDE.

NOTE: FOR DETAILS ON THE PELANDALE-CLARATINA CLASS C EXPRESSWAY, SEE DETAILS NO. 355, 359, 360, 361, 373 AND 375.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

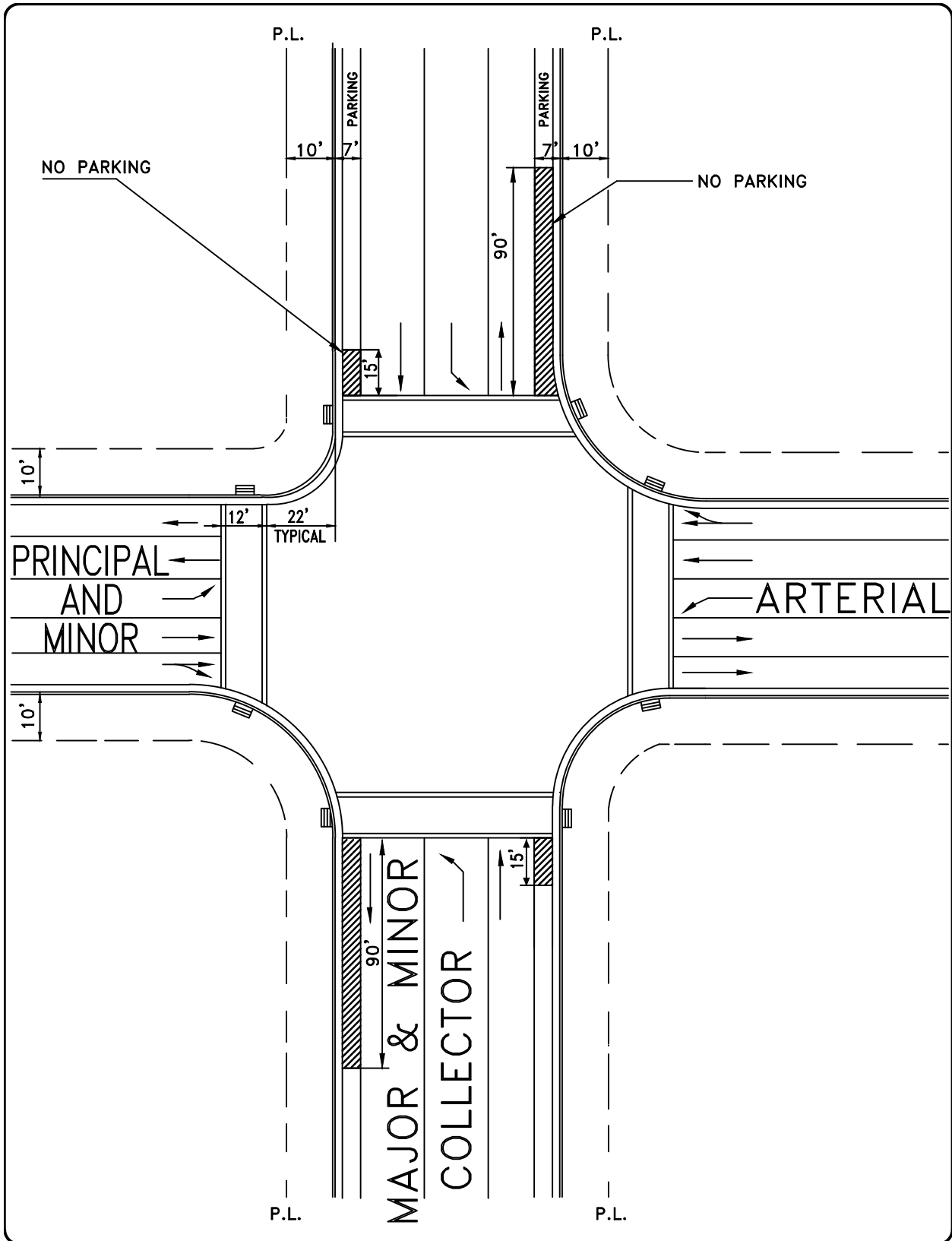
STREETS

**INTERSECTION
 DETAILS**



**ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345**

**DETAIL NO.
 302**



APPROVED BY:
 BILL SANDHU, CITY ENGINEER
 C59650

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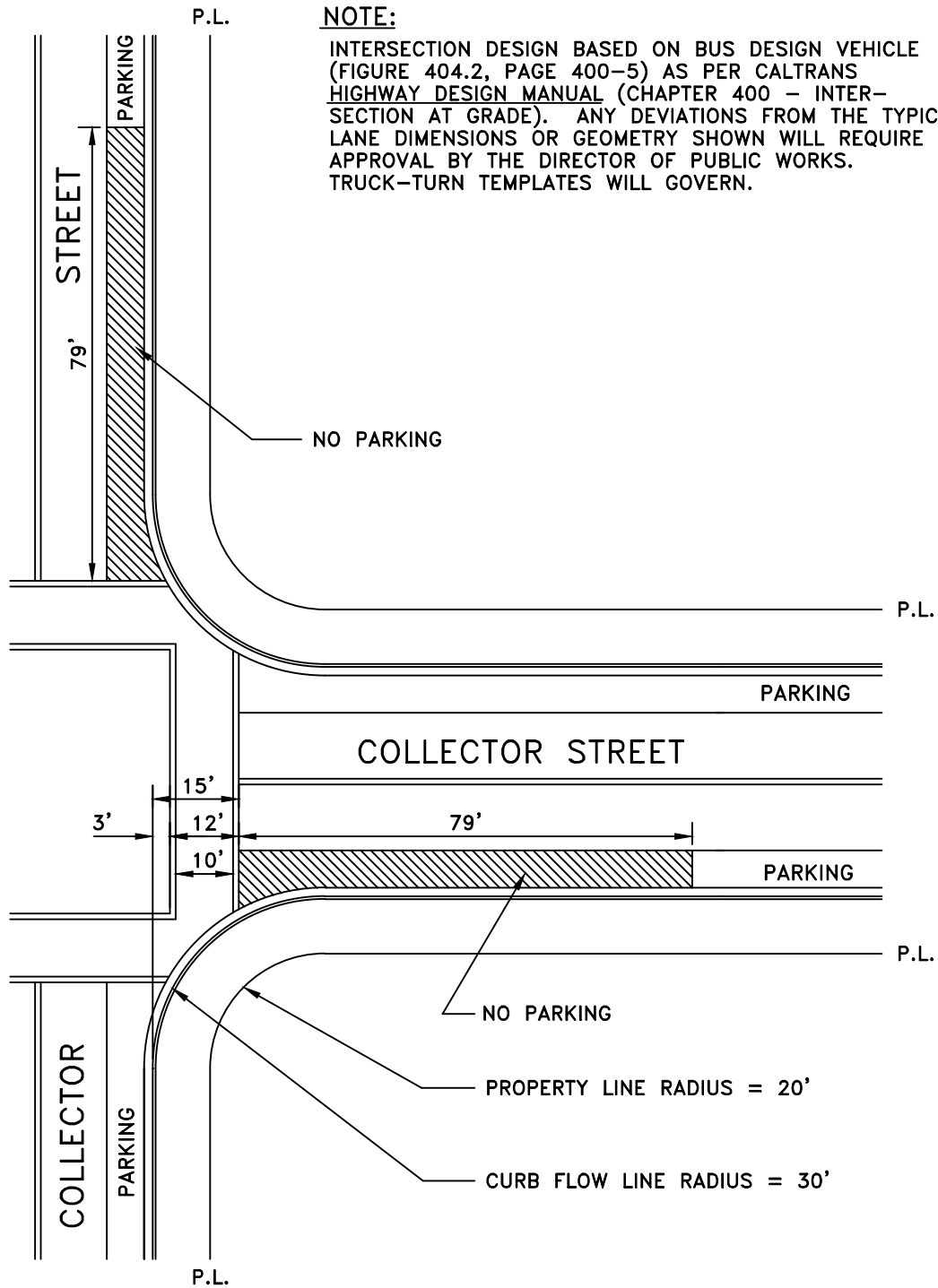
REVISED: DATE:

STREETS
NO-PARKING AREA
COLLECTOR/ARTERIAL
INTERSECTION



ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
303



NOTE:

INTERSECTION DESIGN BASED ON BUS DESIGN VEHICLE (FIGURE 404.2, PAGE 400-5) AS PER CALTRANS HIGHWAY DESIGN MANUAL (CHAPTER 400 - INTERSECTION AT GRADE). ANY DEVIATIONS FROM THE TYPICAL LANE DIMENSIONS OR GEOMETRY SHOWN WILL REQUIRE APPROVAL BY THE DIRECTOR OF PUBLIC WORKS. TRUCK-TURN TEMPLATES WILL GOVERN.

APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
REVISED:	DATE:
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REVISED:	DATE:

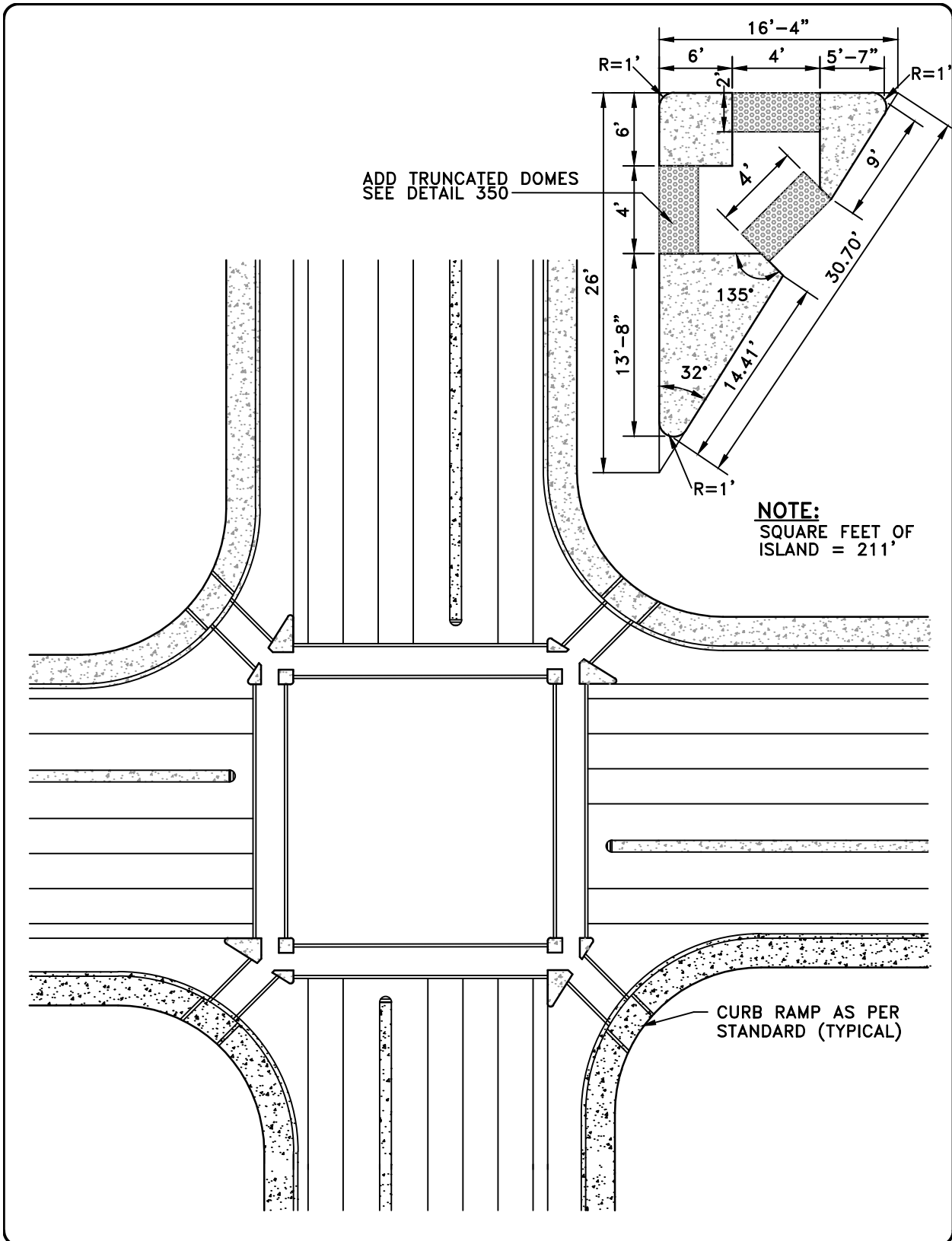
STREETS

**NO PARKING AREA
COLLECTOR/COLLECTOR
STREET INTERSECTION**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

DETAIL NO.
304



ADD TRUNCATED DOMES
SEE DETAIL 350

NOTE:
SQUARE FEET OF
ISLAND = 211'

CURB RAMP AS PER
STANDARD (TYPICAL)

APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
REVISED:	DATE:
REVISED:	DATE:
REVISED:	DATE:

STREETS

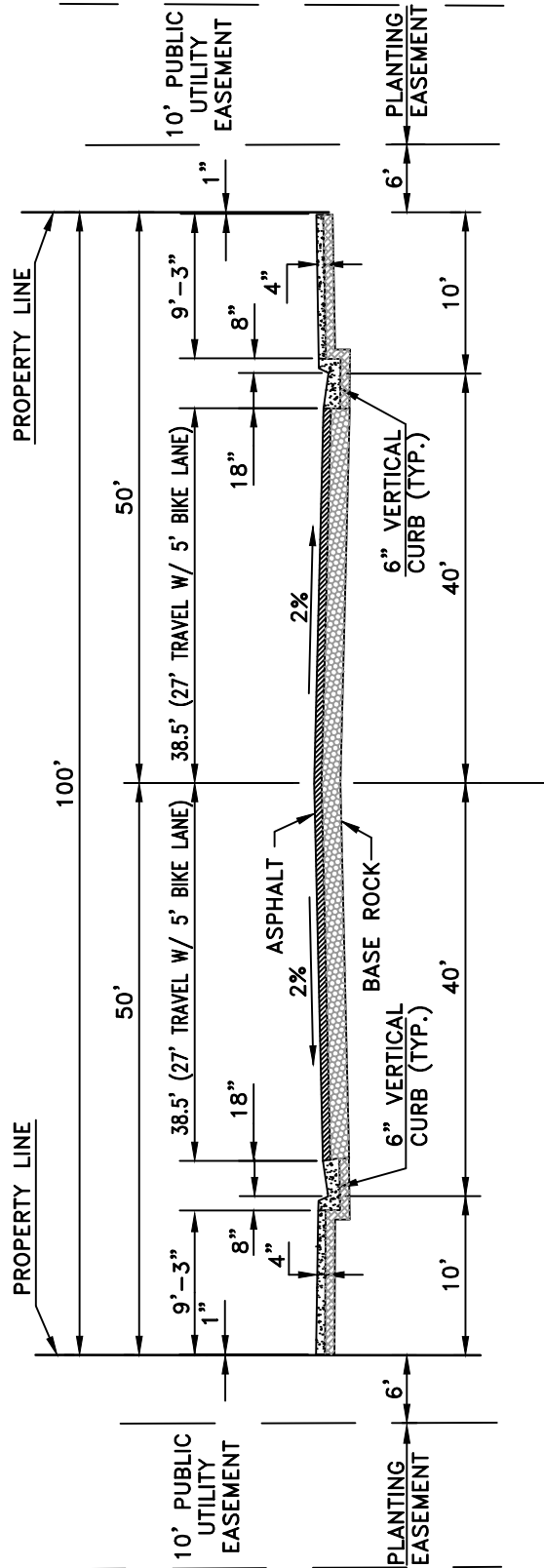
**INTERSECTION PEDESTRIAN
ISLAND DETAIL AT STREET
INTERSECTION**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



MODESTO
CALIFORNIA

DETAIL NO.
305



NOTE:

6" VERTICAL CURB AND SIDEWALK INSTALLED IN C-1, C-2, C-M AND C-3 ZONES TO BE EXTENDED TO WITHIN 1" OF THE PROPERTY LINE. (WIDTH MAY BE DETERMINED BY USE OR BY EXISTING CONDITIONS. IF SPECIFICALLY APPROVED IN WRITING BY THE CITY ENGINEER.) SEE STANDARD DETAIL #337 FOR STREET TREE BLOCK OUT ON FULL WIDTH SIDEWALK.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

STREETS

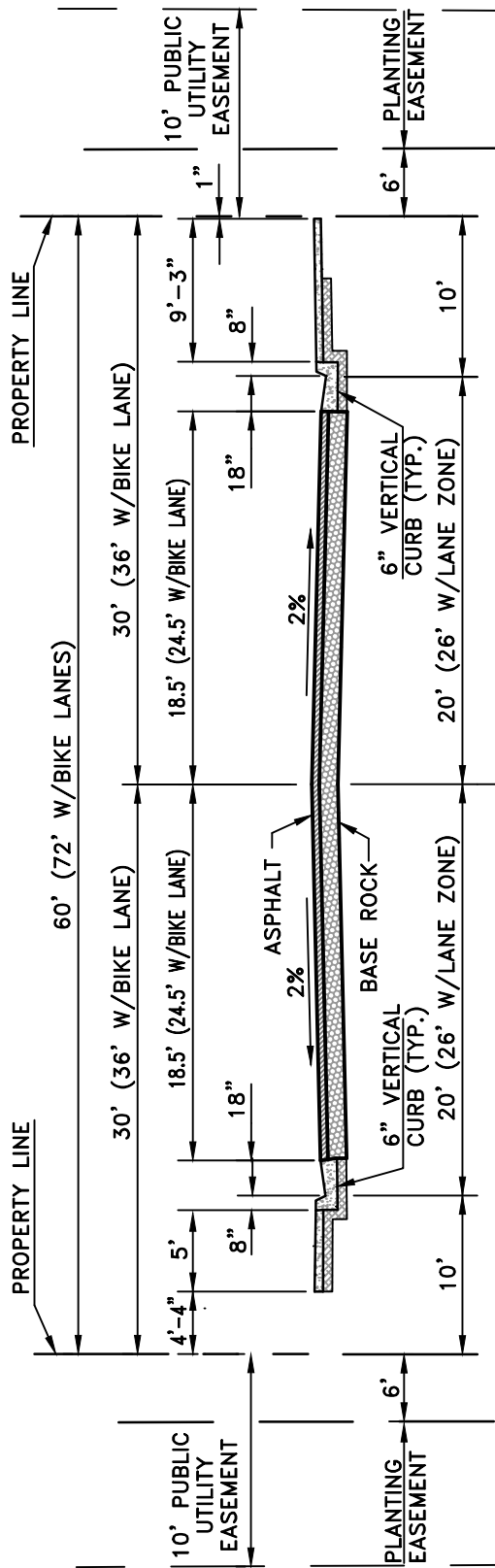
**MINOR ARTERIAL
 STREET SECTION**

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345



MODESTO
 CALIFORNIA

DETAIL NO.
306



SEE NOTE 1
 R-1, R-2, R-3, P-O, M-1,
 M-2, M-3 & B-P ZONES

SEE NOTE 2
 C-1, C-2, C-M & C-3 ZONES

NOTE 1:

6" VERTICAL CURB AND 5' WIDE SIDE- TO BE INSTALLED IN R-1, R-2, R-3 P-O, M-1, M-2, M-3 AND B-P ZONES.

NOTE 2:

6" VERTICAL CURB AND SIDEWALK INSTALLED IN C-1, C-2, C-M AND C-3 ZONES TO BE EXTENDED TO WITHIN 1" OF THE PROPERTY LINE. (WIDTH MAY BE DETERMINED BY USE OR BY EXISTING CONDITIONS. IF SPECIFICALLY APPROVED IN WRITING BY THE CITY ENGINEER.) SEE STANDARD DETAIL #337 FOR STREET TREE BLOCK OUT ON FULL WIDTH SIDEWALK.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

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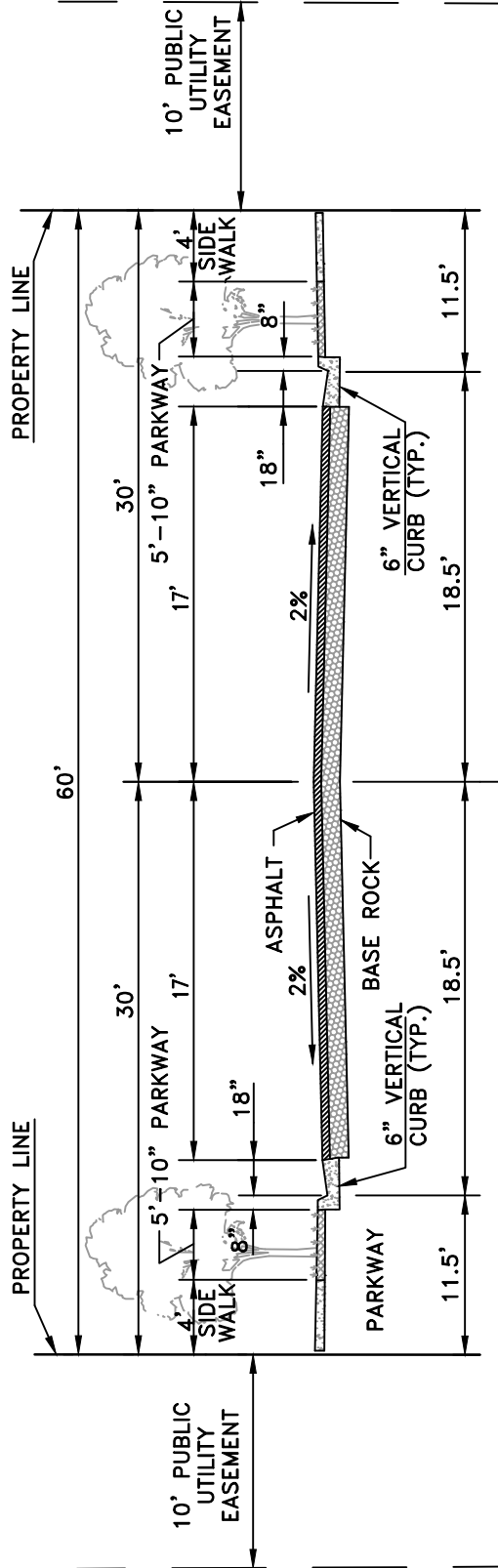
STREETS

**MINOR COLLECTOR/
 INDUSTRIAL STREET SECTION**



ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
307



SEE NOTE 1
 R-1, R-2, R-3, P-O, M-1,
 M-2, M-3 & B-P ZONES

SEE NOTE 2
 C-1, C-2, C-M & C-3 ZONES

NOTE 1:

6" VERTICAL CURB AND 4' WIDE SIDE- TO BE INSTALLED IN R-1, R-2, R-3 P-O, M-1, M-2, M-3 AND B-P ZONES.

NOTE 2:

6" VERTICAL CURB AND SIDEWALK INSTALLED IN C-1, C-2, C-M AND C-3 ZONES TO BE EXTENDED TO WITHIN 1" OF THE PROPERTY LINE. (WIDTH MAY BE DETERMINED BY USE OR BY EXISTING CONDITIONS. IF SPECIFICALLY APPROVED IN WRITING BY THE CITY ENGINEER.) SEE STANDARD DETAIL #337 FOR STREET TREE BLOCK OUT ON FULL WIDTH SIDEWALK.

APPROVED BY:
 BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

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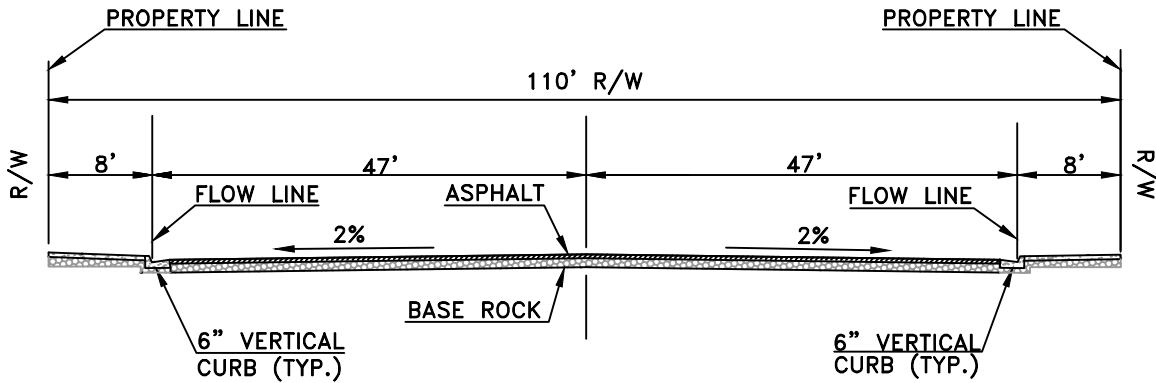
STREETS

**ALTERNATE MINOR COLLECTOR
 STREET SECTION**

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345



DETAIL NO.
307A



MAJOR INDUSTRIAL STREET

NOTE 1:

6" VERTICAL CURB AND 8' WIDE SIDEWALK TO BE INSTALLED IN M-1, M-2, & M-3 ZONES

APPROVED BY:
 BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

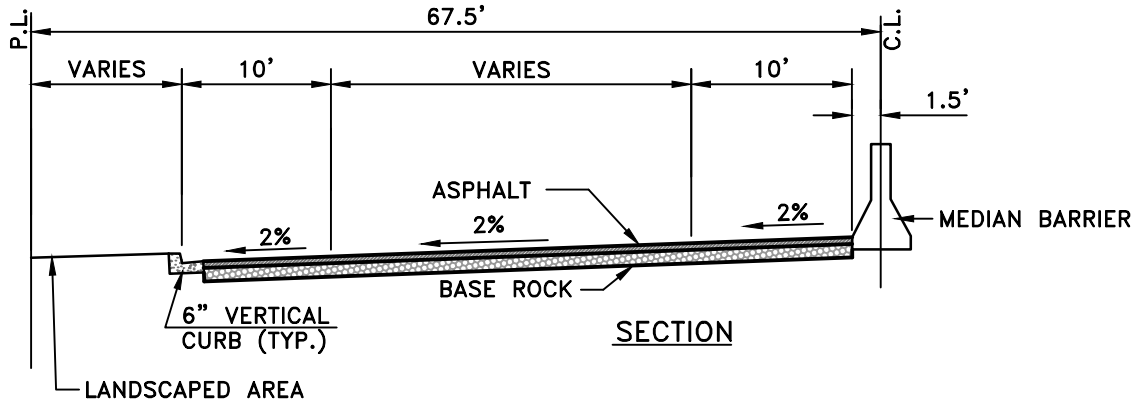
STREETS

MAJOR INDUSTRIAL STREET SECTION



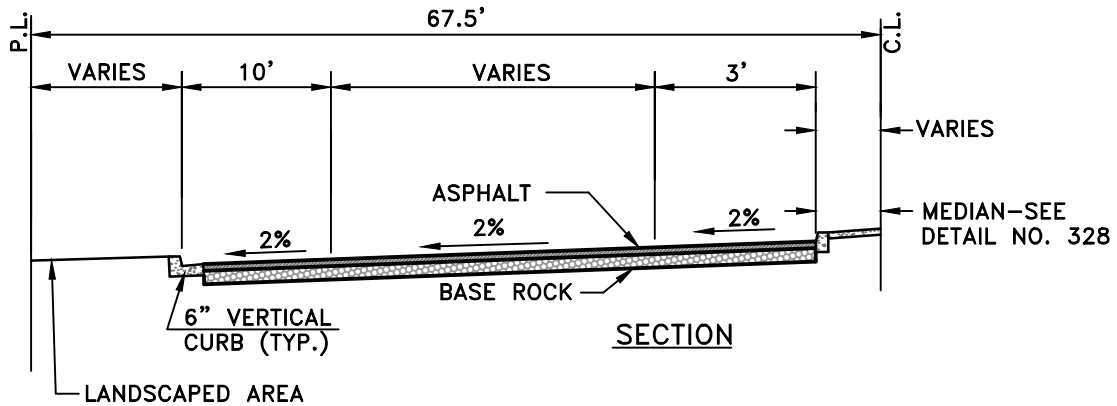
ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
307B



NOTE:
 LANDSCAPING AND IRRIGATION SHALL BE APPROVED BY THE DIRECTOR, PARKS, RECREATION AND NEIGHBORHOODS DEPT. OR DESIGNEE.

135' RIGHT OF WAY
 (WITH MEDIAN BARRIER)



NOTE:
 LANDSCAPING AND IRRIGATION SHALL BE APPROVED BY THE DIRECTOR, PARKS, RECREATION AND NEIGHBORHOODS DEPT. OR DESIGNEE.

135' RIGHT OF WAY
 (WITH MEDIAN)

APPROVED BY:
 BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

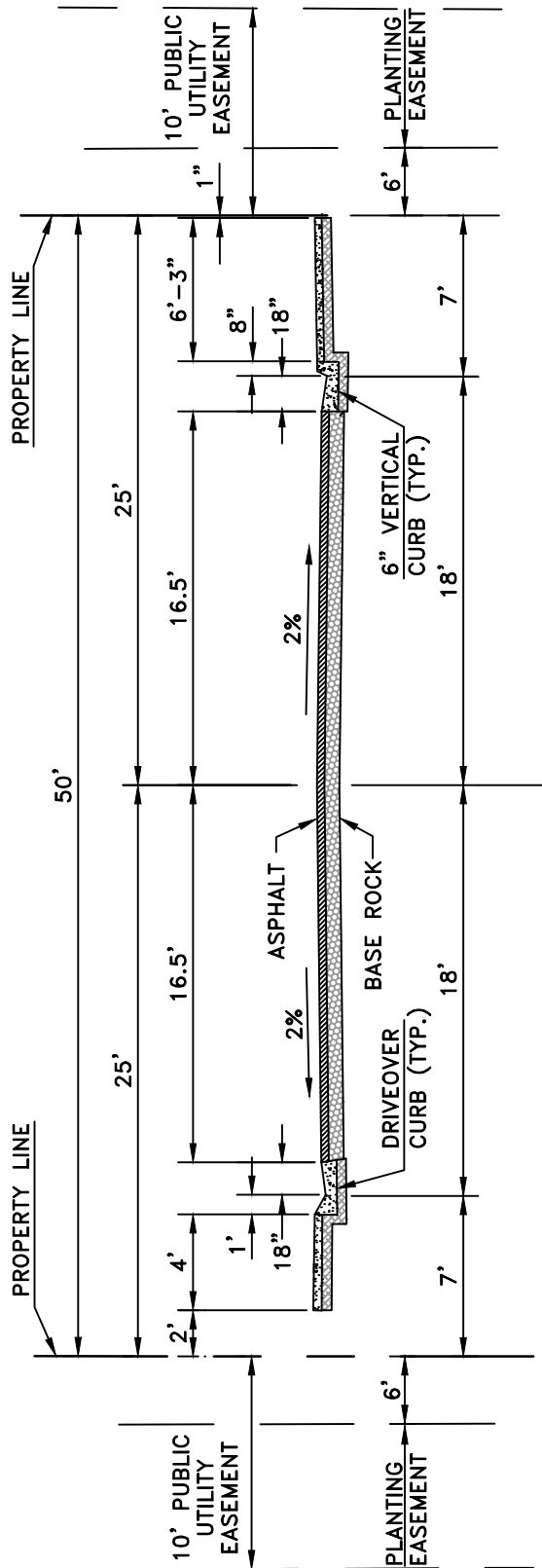
STREETS

EXPRESSWAY
 STREET SECTION



ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
 308



NOTE:
 4-1/2" DRIVEOVER OR 6" VERTICAL CURB AND 4' WIDE SIDEWALK TO BE INSTALLED IN R-1, R-2, AND R-3 ZONES.

APPROVED BY:
 BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

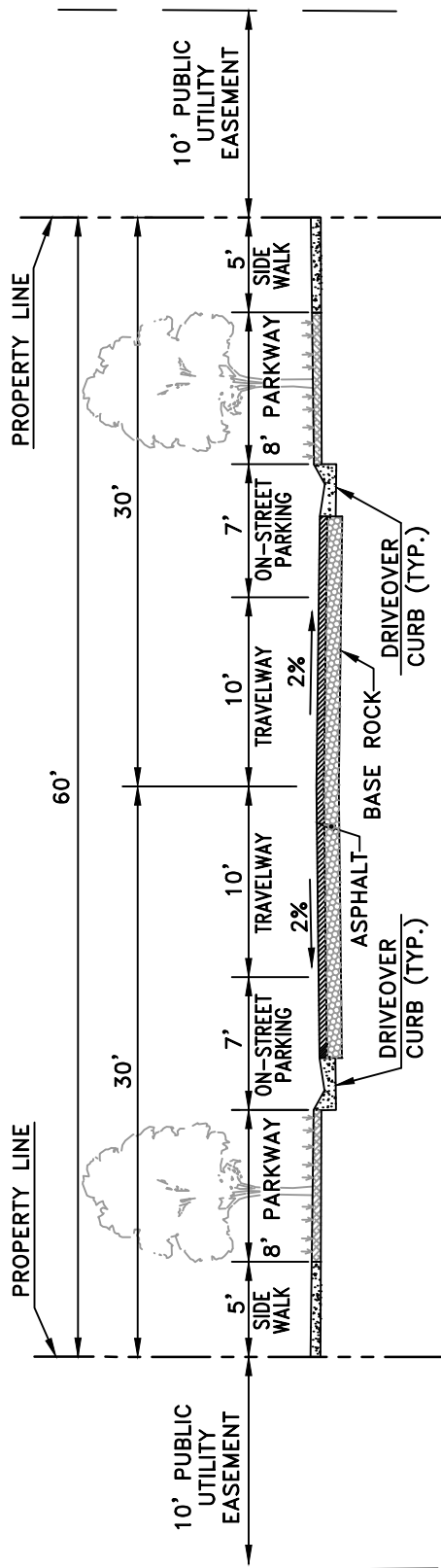
STREETS

LOCAL STREET SECTION

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345



DETAIL NO.
309



NOTE:

4-1/2" DRIVEOVER CURB AND 4' WIDE SIDEWALK TO BE INSTALLED IN R-1, R-2, AND R-3 ZONES.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

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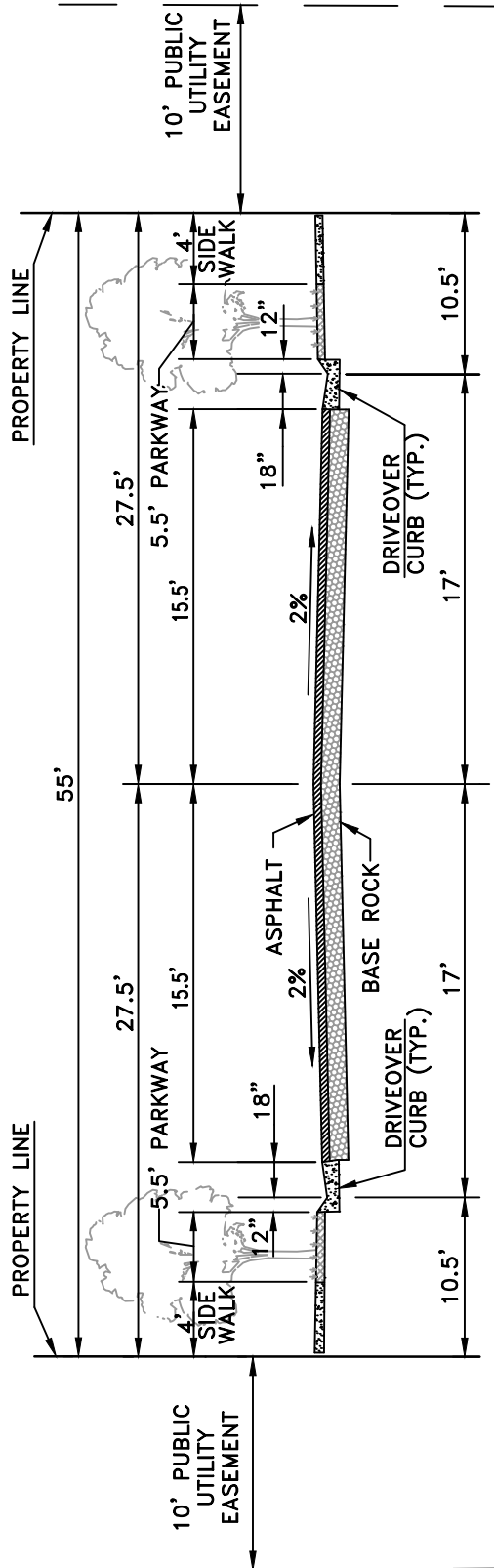
STREETS

ALTERNATE LOCAL STREET SECTION

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345



DETAIL NO.
309A



NOTE 1:


4-1/2" DRIVEOVER CURB AND 4' WIDE SIDEWALK TO BE INSTALLED IN R-1, R-2, AND R-3 ZONES.

APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
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STREETS

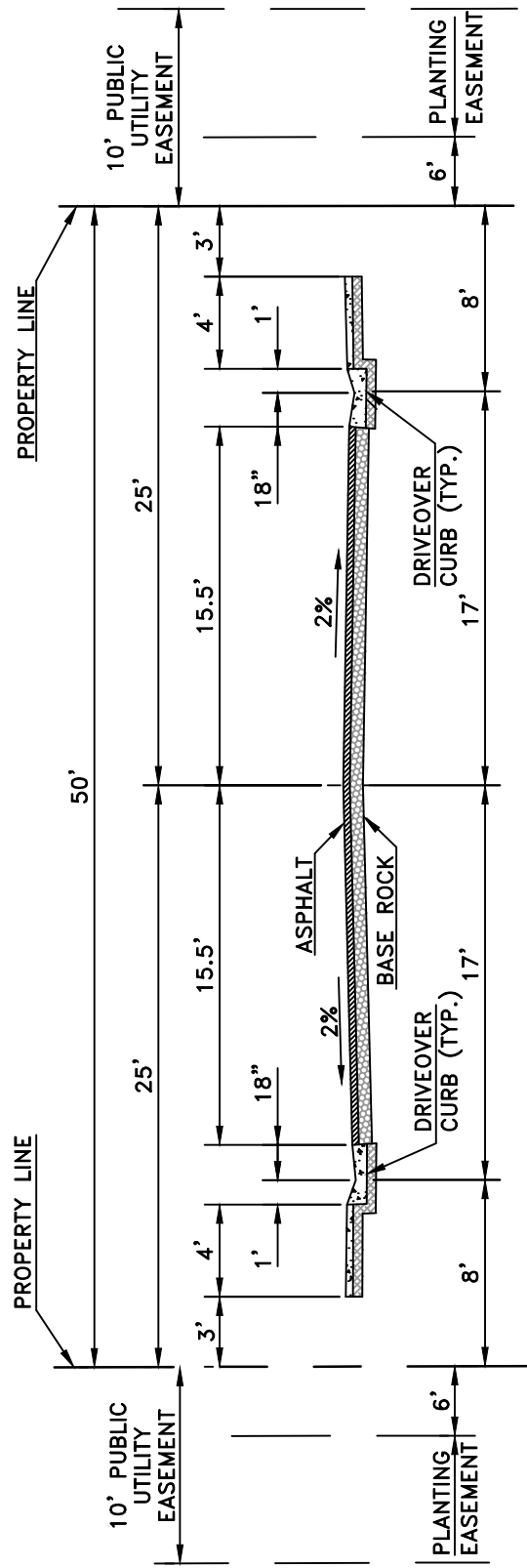
ALTERNATE LOCAL STREET SECTION

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MODESTO
CALIFORNIA

DETAIL NO.
309B



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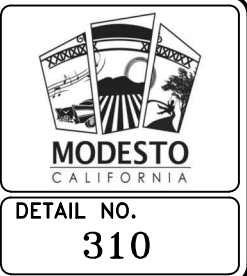
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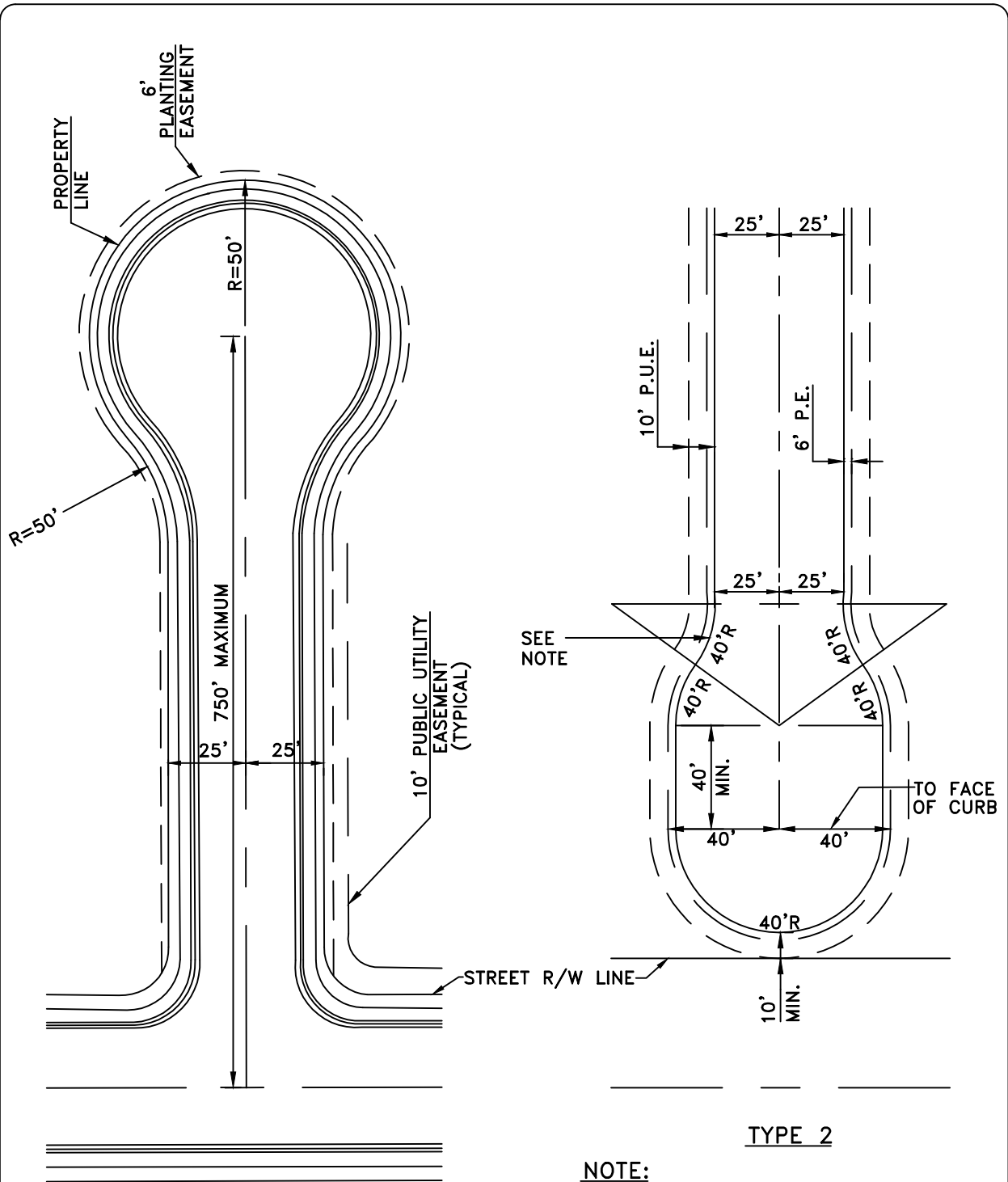
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STREETS

**CUL-DE-SAC
 STREET SECTION**

ADOPTED BY CITY COUNCIL
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NOTE:
 RADII OTHER THAN 40 FEET
 SHALL BE AS APPROVED BY
 THE CITY ENGINEER.

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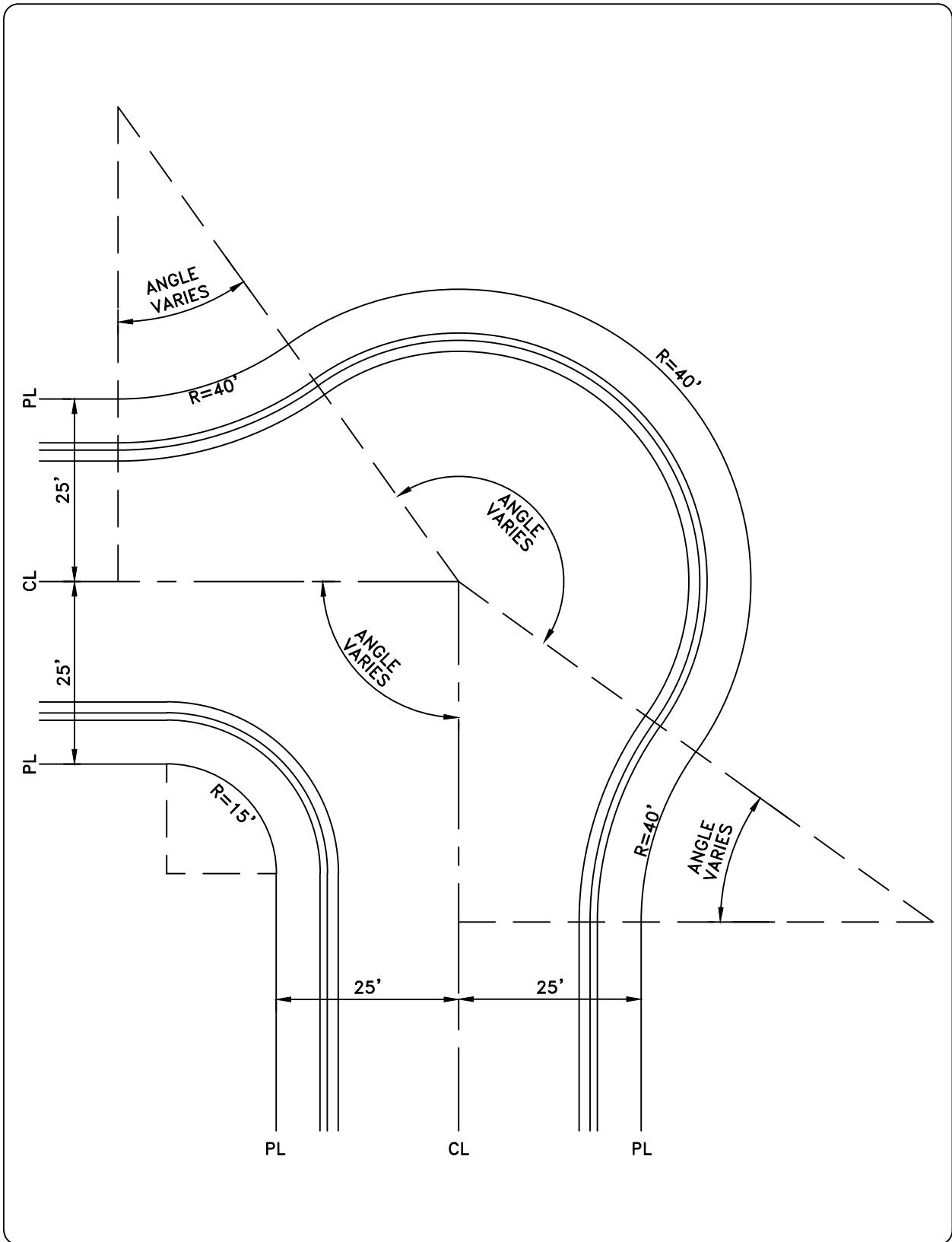
STREETS

**CUL-DE-SAC
STREET SECTION**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

DETAIL NO.
311



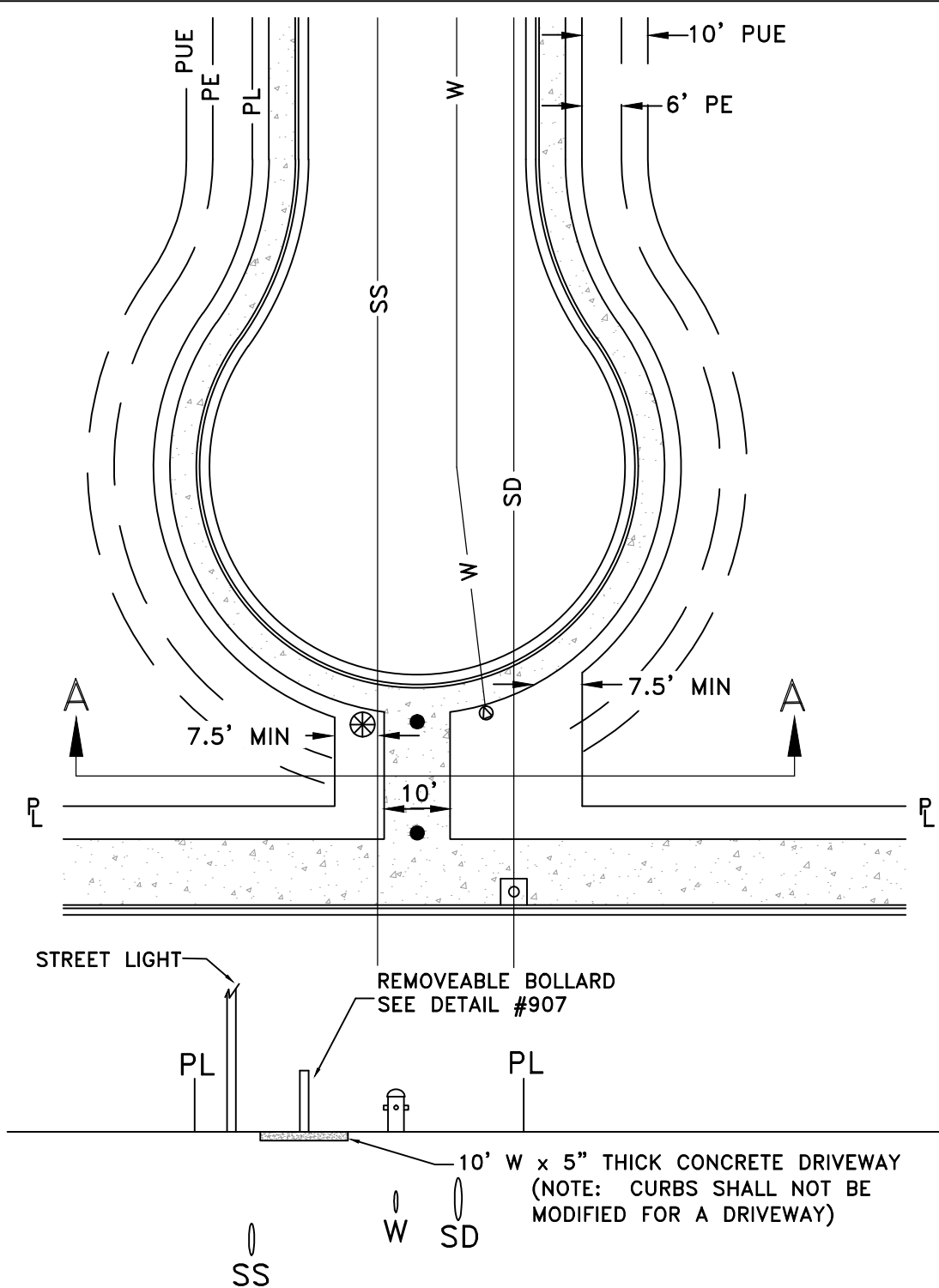
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STREETS
STREET INTERSECTION KNUCKLE
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MODESTO
CALIFORNIA


DETAIL NO. 312



SECTION A-A
TYPICAL UTILITY SECTION

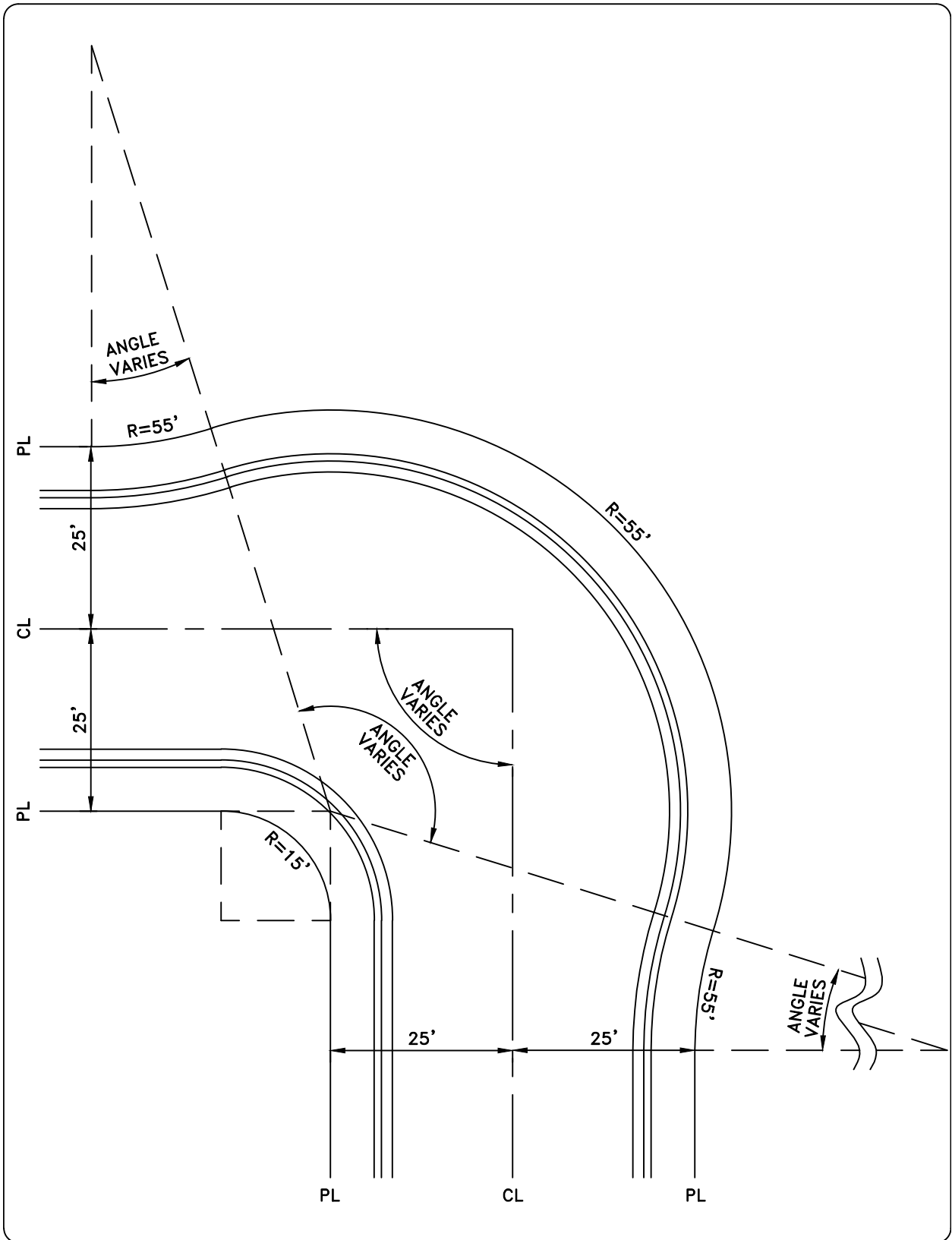
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STREETS
WALK-THRU CUL-DE-SAC SECTION
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MODESTO
CALIFORNIA

DETAIL NO.
313



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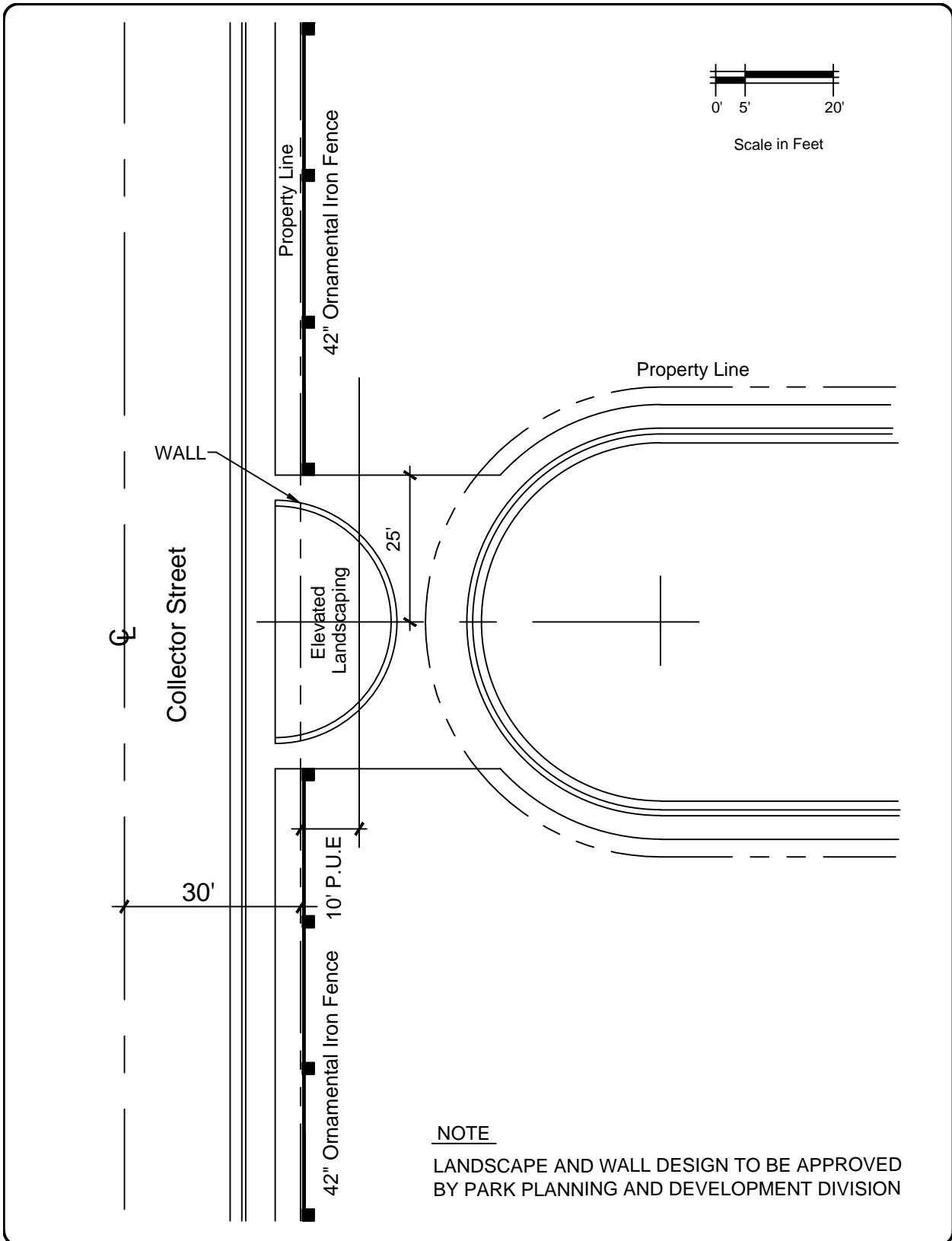
STREETS
ALTERNATE STREET
INTERSECTION
KNUCKLE

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



MODESTO
CALIFORNIA

DETAIL NO.
314



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STREETS

**OPEN-ENDED
CUL-DE-SAC**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

DETAIL NO.
315

LEFT BLANK
INTENTIONALLY

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STREETS



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RESOLUTION NO. 2014-345

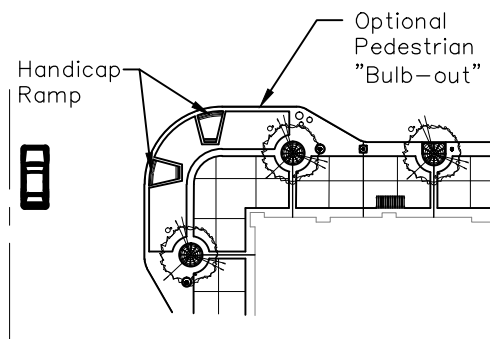
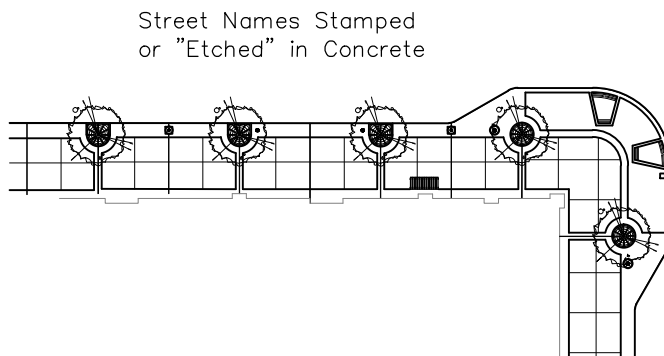
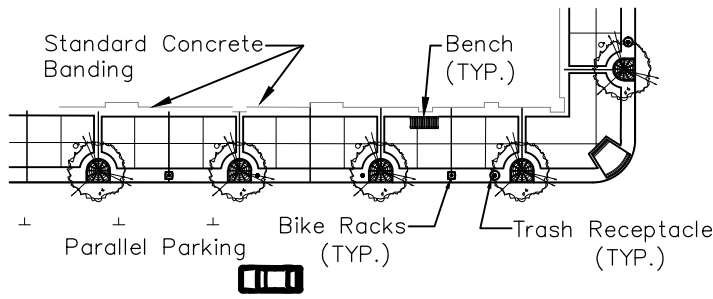
DETAIL NO.
316

Streetscape Amenities:

1. Pedestrian "bulb-outs" on sidewalks should be used at key intersections and at mid-block crosswalks when appropriate to encourage pedestrian connections.
2. Discourage the use of bollards. Round landscaped planters may be used in lieu of bollards especially at "bulb-outs" or other special use areas for pedestrian safety.
3. Shop owners/merchants should be allowed and encouraged to place additional site furnishings (including benches, tables, and planters) in front of their storefronts. Maintenance of the same will be the responsibility of individual property owners/merchants.
4. With any new streetscape construction, provisions should be made for installation of automatic irrigation systems for the street trees and other landscape features. In addition, electrical outlets/junction boxes should be placed at regular intervals in tree wells to help facilitate any street fairs or other public activities and accent lighting of the streetscape.
5. Curb radii for Downtown shall be 15-foot minimum radius. Bulb-outs shall be designed on a case-by-case basis as approved by the City Engineer, including minimum curb return radii.

Signage:

1. Guidelines should be created and implemented for storefront awnings and signage. Awnings should be encouraged if kept consistent with the streetscape character. Storefront signage should be provided at the pedestrian level (i.e. signs hanging perpendicular to sidewalks). Allow for variety, but unsightly colors and fonts should be strongly discouraged.
2. Storefront signage should be limited to a maximum of two identification signs per business – one to be located horizontally on the building face, the other to be located perpendicular to the building face, projecting from the building. Horizontal signage may occur directly above or below the awning or on the outer awning edge. Perpendicular signage should not exceed six square feet and should be located below the awning, with a minimum clearance from sidewalk of 8 feet.
3. Public domain signage (i.e., "parking", directional, kiosks, etc.) should remain consistent in color and style to the chosen streetscape furniture and the streetscape character as a whole. The city should develop a detailed Public Domain Signage Program addressing specific size, color and style. Signs should identify key project features with names and arrows including but not limited to: parks, public features, Civic Center, neighborhoods, shopping areas, etc.



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STREETS

**DOWNTOWN
 STREETSCAPE**

**ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345**



**DETAIL NO.
 317**

Trash Receptacles:

Trash cans (DuMor, Inc. Model 86) shall be placed toward each intersection, with a maximum of one per street frontage at corners. They should be placed within the three foot band that runs next to the street opposite the locations of benches. The style matches that of the specified bench. They should also be painted black to match all other site furniture.

Bike Racks:

Bike racks (TimberForm CycLoops 2172) should be placed maximum four per block side, within the three foot band running parallel with the street. They should be painted black to match all other site furniture.

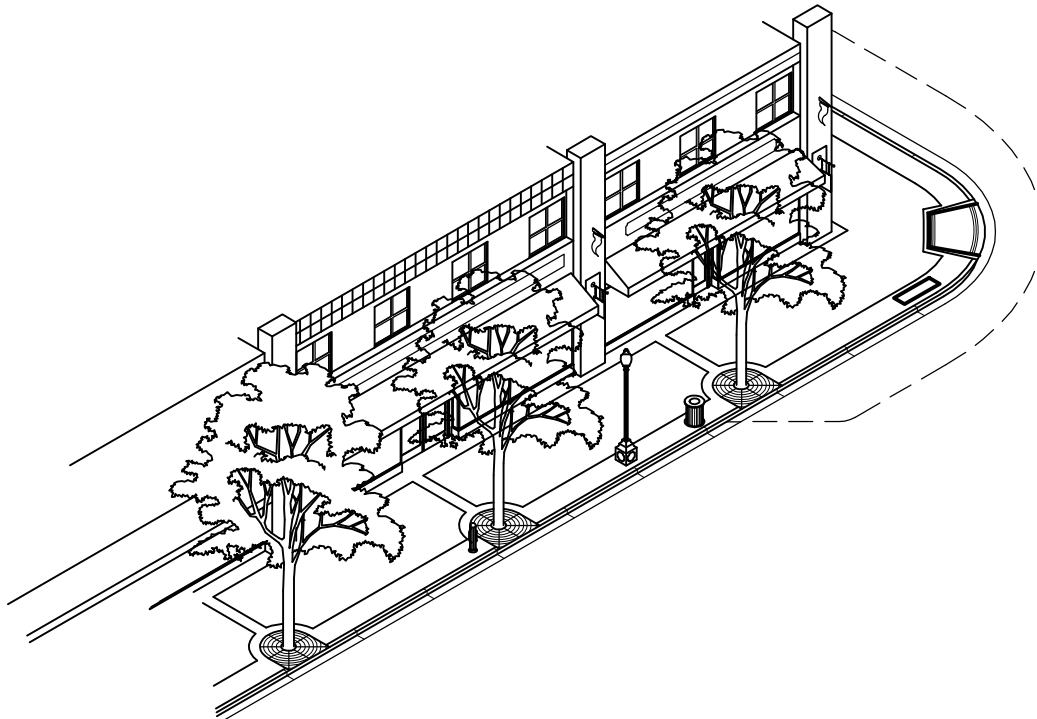
Benches:

Sidewalk benches should be placed two per block side, located toward each corner. The exact location will be determined by the configuration of the adjacent building façade. The specific bench type to be used is Model 93 by DuMor, Inc. and shall be painted black to match other site furnishings.

Streetlights:

Streetlights (Visco VI-X-1-OF or comparable) will be placed 60' O.C., beginning 25' from the corner property line of each block. Existing lighting should be retrofitted with matching luminaries to minimize amount of new lighting being installed. All lighting, including existing and future lights and poles, shall be painted black to match other site furnishings.

I Street: Twin luminaries shall be utilized along I Street and other selected prominent circulation routes. Light standards shall match the style throughout downtown and be placed as noted above.



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STREETS

**DOWNTOWN
STREETSCAPE**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

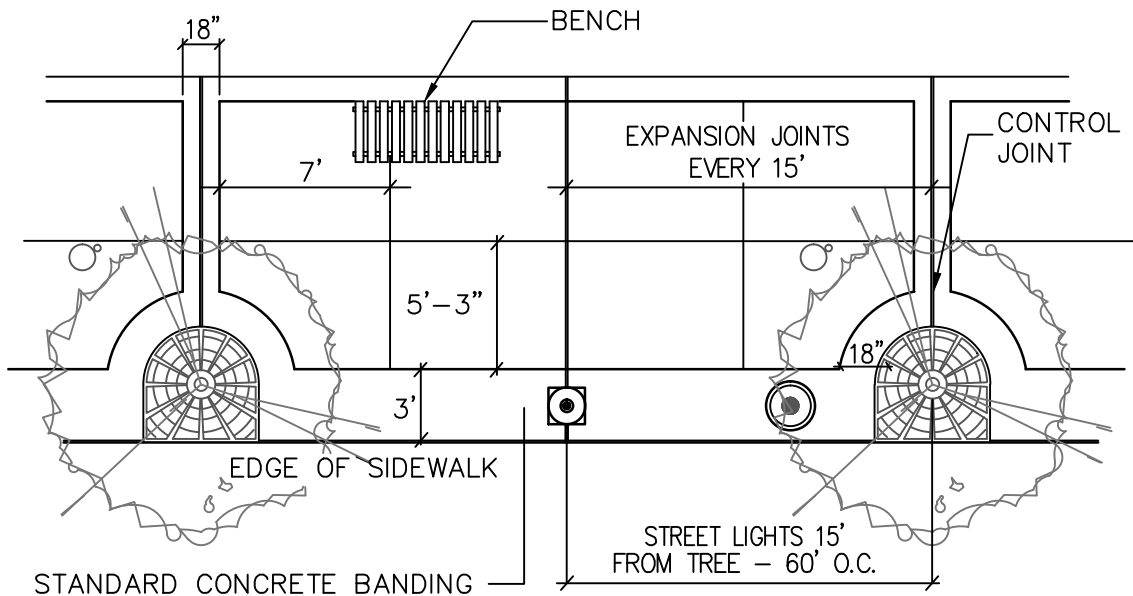


DETAIL NO.
318

STREET TREES:

1. STREET TREES SHOULD BE PLACED AT 30' ON CENTER, BEGINNING 10' IN FROM THE CORNER OF THE PROPERTY LINES. SPECIMEN TREES SHOULD BE PLACED AT THE CORNERS TO HIGHLIGHT KEY INTERSECTIONS. A HORSESHOE TREE GRATE (COMBINATION ROUND/SQUARE TREE GRATE – NEENAH R-8713-A AND R-8838 OR APPROVED EQUAL) SHALL BE USED AGAINST THE CURB AND A FULL CIRCLE TREE GRATE (NEENAH R-8838 OR APPROVED EQUAL) WILL BE USED IN OPEN PAVED AREAS. FOR STREET TREE SELECTION CONTACT URBAN FORESTRY AT 209-342-2249.

2. STREET TREE SELECTION (SPECIES, TYPE, SIZE, ECT.) SHALL BE APPROVED BY THE CITY OF MODESTO WITH THE GOAL TO MINIMIZE OBSTRUCTION OF VISIBILITY FROM THE STREET.



3. SEE DETAIL 708 IN CHAPTER 7 STREET LIGHTING.

4. TREE GRATES TO BE BOLTED TOGETHER TO PREVENT THEFT.

5. APPLY LOCTITE THREAD LOCKER RED 271 TO THREADED BOLT WHEN INSTALLING TREE GRATE NUT AND BOLT.

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BILL SANDHU, CITY ENGINEER
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STREETS

**DOWNTOWN
 STREETSCAPE**

**ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345**



**DETAIL NO.
 319**

LEFT BLANK
INTENTIONALLY

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STREETS



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RESOLUTION NO. 2014-345

DETAIL NO.
320

THESE STANDARDS SHALL BE MANDATORY WITHIN THE AREA AS SHOWN IN FIGURE 1, EXCEPT THAT EXPOSED AGGREGATE SIDEWALKS SHALL NOT BE REQUIRED ON THE STREETS BORDERING THE AREA.

EXPOSED AGGREGATE SIDEWALK AREA BOUNDARY




FIGURE 1

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STREETS

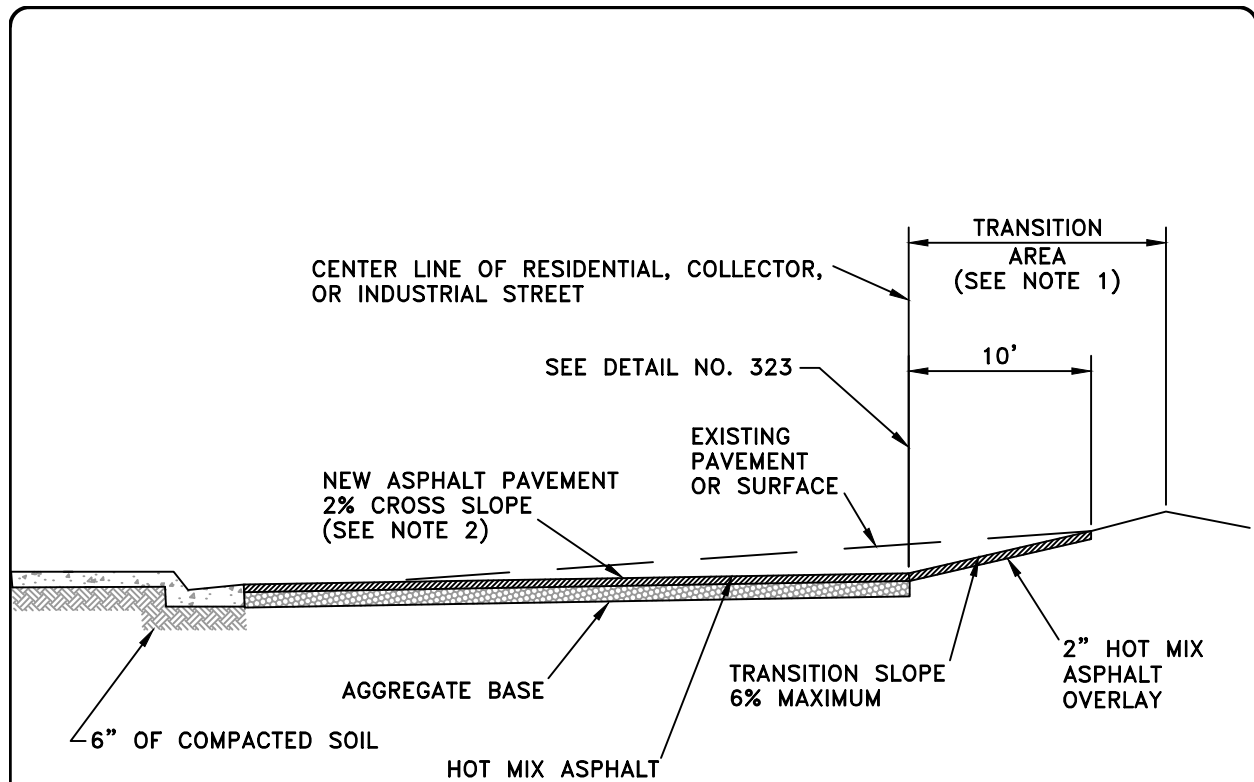
**DOWNTOWN EXPOSED
AGGREGATE SIDEWALK**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



MODESTO
CALIFORNIA

DETAIL NO.
321



NOTES:

1. TRANSITIONS REQUIRING WORK BEYOND THE CENTER LINE SHALL BE DONE BY THE DEVELOPER.
2. WITH WRITTEN PERMISSION FROM THE CITY ENGINEER, A MAXIMUM CROSS SLOPE OF 4% MAY BE PERMITTED.
3. WHERE EXISTING GRADES CANNOT BE MET, THE CITY ENGINEER MAY APPROVE ALTERNATE PROPOSALS SUCH AS DEVELOPER POSTING A CASH BOND FOR THAT PORTION OF THE STREET ADJACENT TO PROJECT.
4. THE MAXIMUM WIDTH OF STANDARD IMPROVEMENTS REQUIRED SHALL BE 40 FEET. THE MAXIMUM WIDTH OF TRANSITION PAVEMENT SHALL BE 10' (FEET) FOR SLOPES BETWEEN 4% & 6%.
5. NOT APPLICABLE TO SINGLE FAMILY, DUPLEX, TRIPLEX, AND FOURPLEX LOTS CREATED BY PARCEL MAPS IN EXISTING DEVELOPED AREAS.

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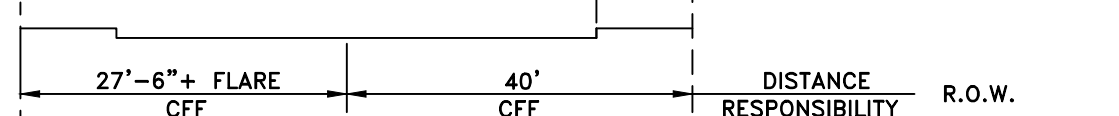
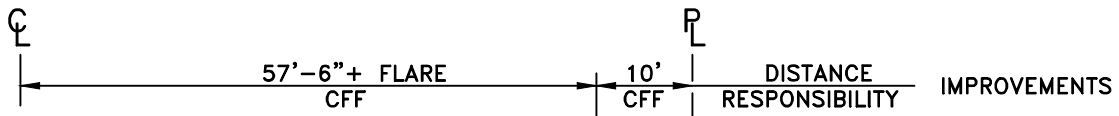
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STREETS
STANDARD PAVEMENT ON
EXISTING STREET
SECTION

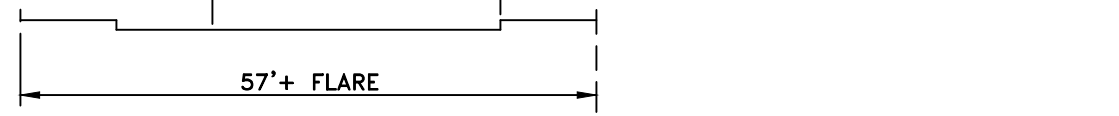
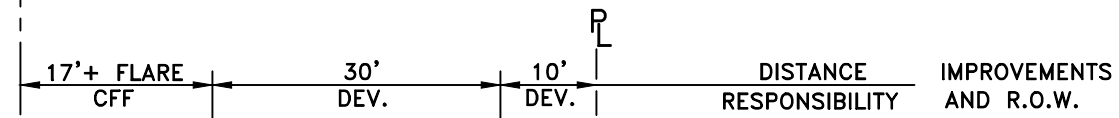
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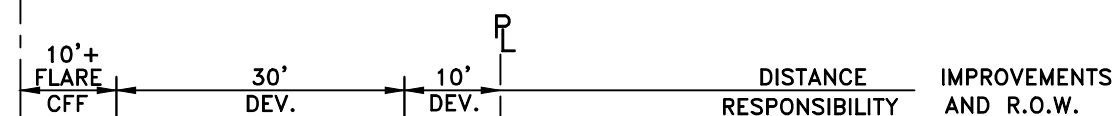
DETAIL NO.
322



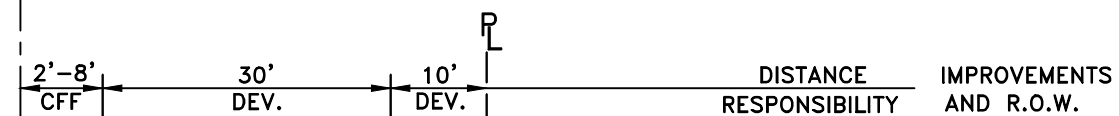
EXPRESSWAYS



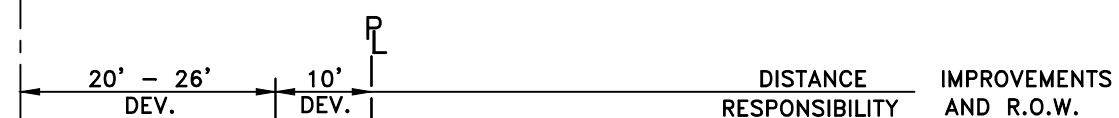
PRINCIPAL ARTERIAL



MINOR ARTERIAL



MAJOR COLLECTOR



MINOR COLLECTOR/INDUSTRIAL

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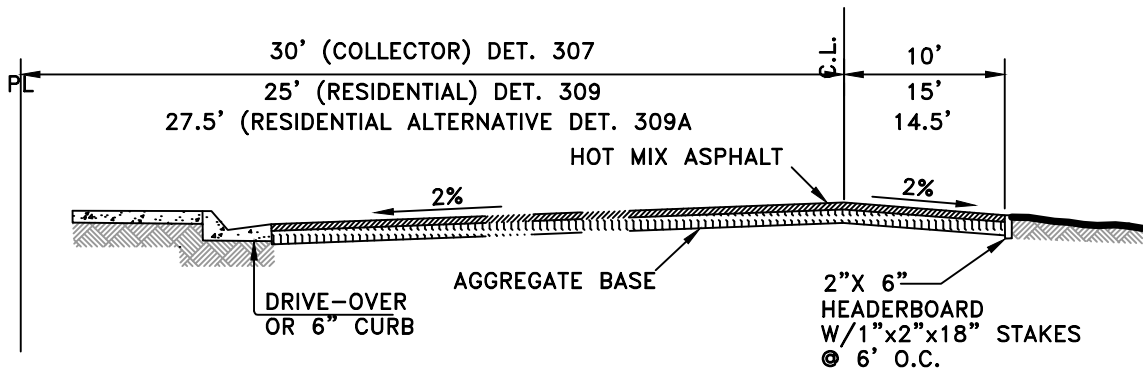
STREETS

**STREET EXACTIONS
POLICY**

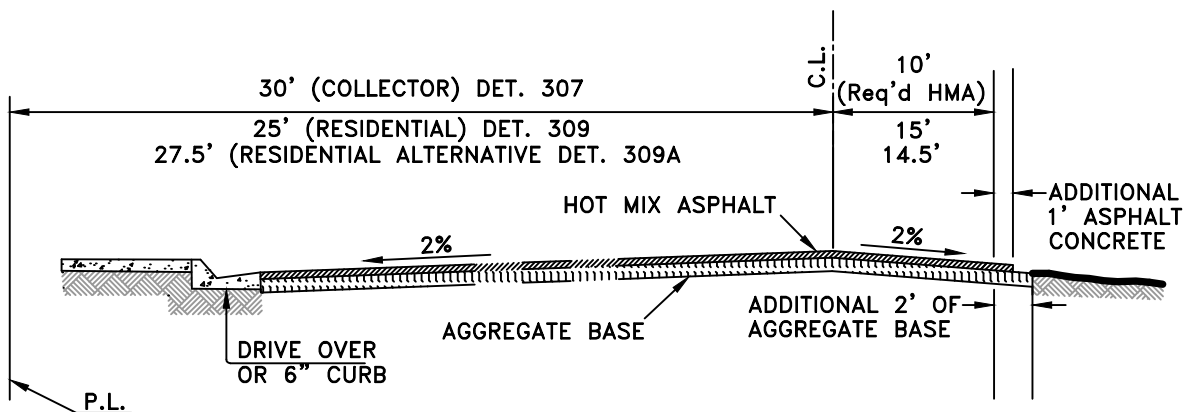


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DETAIL NO.
323



SECTION



ALTERNATIVE SECTION

NOTE:

1. THE PART-WIDTH STREET IS ONLY PERMITTED ON A FRONTAGE WHERE THE DEVELOPER DOES NOT HAVE OWNERSHIP OR CONTROL OF THE RIGHT OF WAY FOR A FULL WIDTH STREET IMPROVEMENT.
2. THE ALTERNATIVE SECTION CONSISTS OF AN ADDITIONAL WIDTH OF 1' OF ASPHALT CONCRETE AND 2' OF AGGREGATE BASE AT THE SAME DEPTH AND COMPACTION AS THE REST OF THE STREET.
3. WHEN THE REMAINING STREET SECTION IS CONSTRUCTED, THE AC MUST BE SAW-CUT IN A STRAIGHT LINE, BACK TO A POINT SUCH THAT THE STREET SECTION IS STABLE, AS REQUIRED BY THE CITY ENGINEER.

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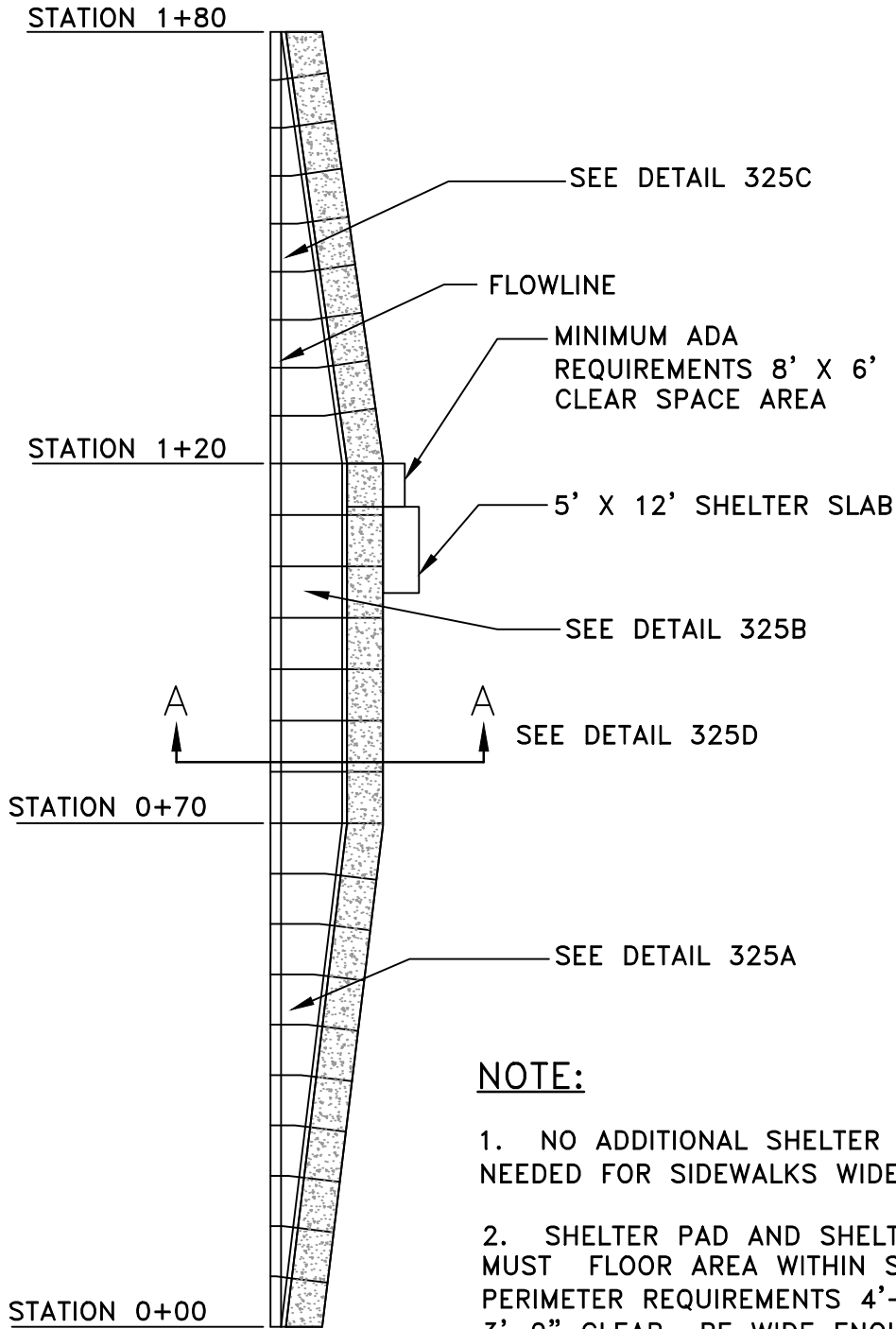
STREETS

**PART-WIDTH
 STREET SECTION**



ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
324



NOTE:

1. NO ADDITIONAL SHELTER PAD NEEDED FOR SIDEWALKS WIDER THAN 10'
2. SHELTER PAD AND SHELTERS MUST FLOOR AREA WITHIN SHELTER PERIMETER REQUIREMENTS 4'-0" X 3'-0" CLEAR BE WIDE ENOUGH TO MEET ADA

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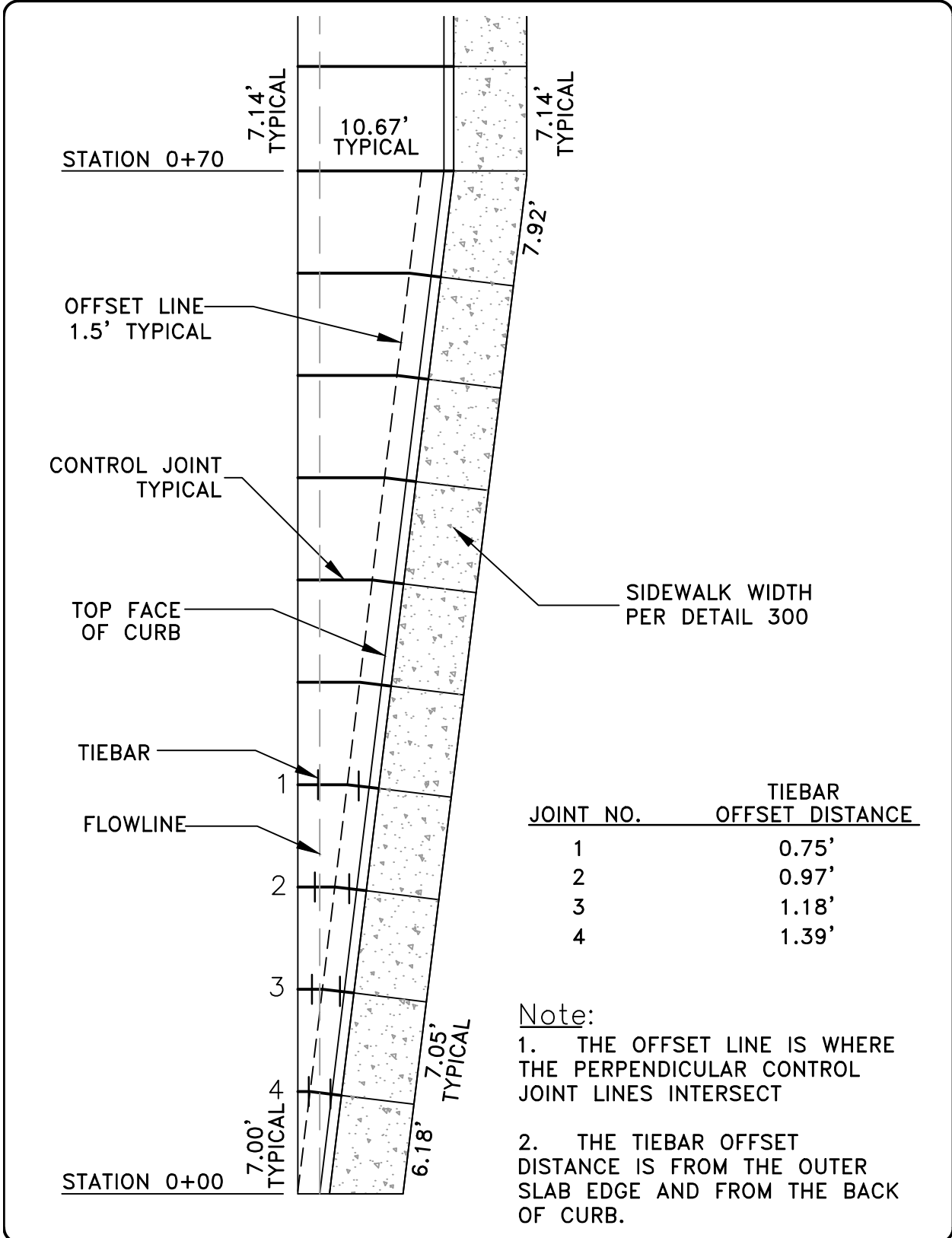
STREETS

BUS TURNOUT

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345



DETAIL NO.
325



JOINT NO.	TIEBAR OFFSET DISTANCE
1	0.75'
2	0.97'
3	1.18'
4	1.39'

Note:
 1. THE OFFSET LINE IS WHERE THE PERPENDICULAR CONTROL JOINT LINES INTERSECT
 2. THE TIEBAR OFFSET DISTANCE IS FROM THE OUTER SLAB EDGE AND FROM THE BACK OF CURB.

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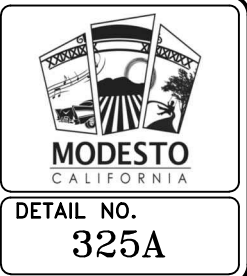
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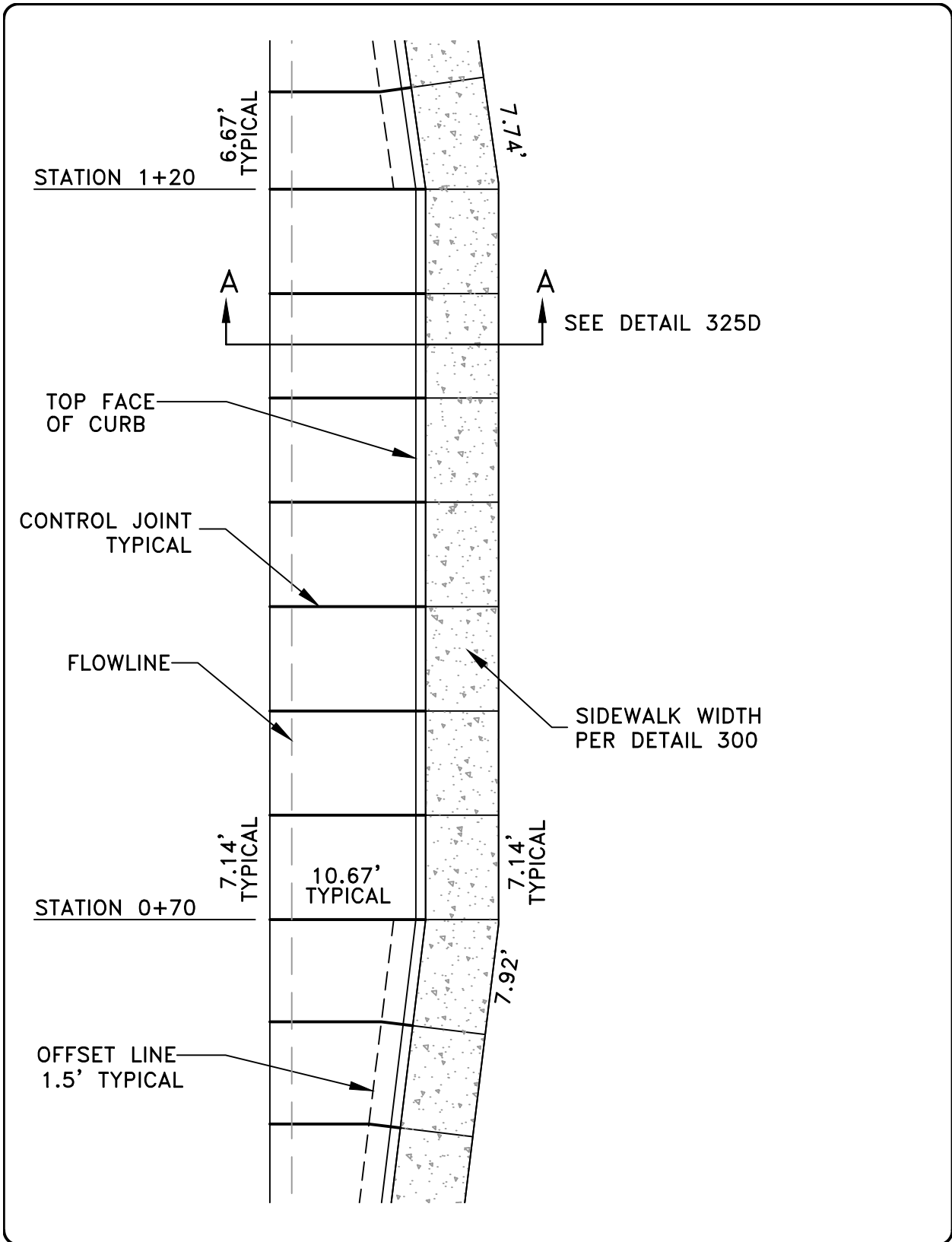
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STREETS

BUS TURNOUT

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345





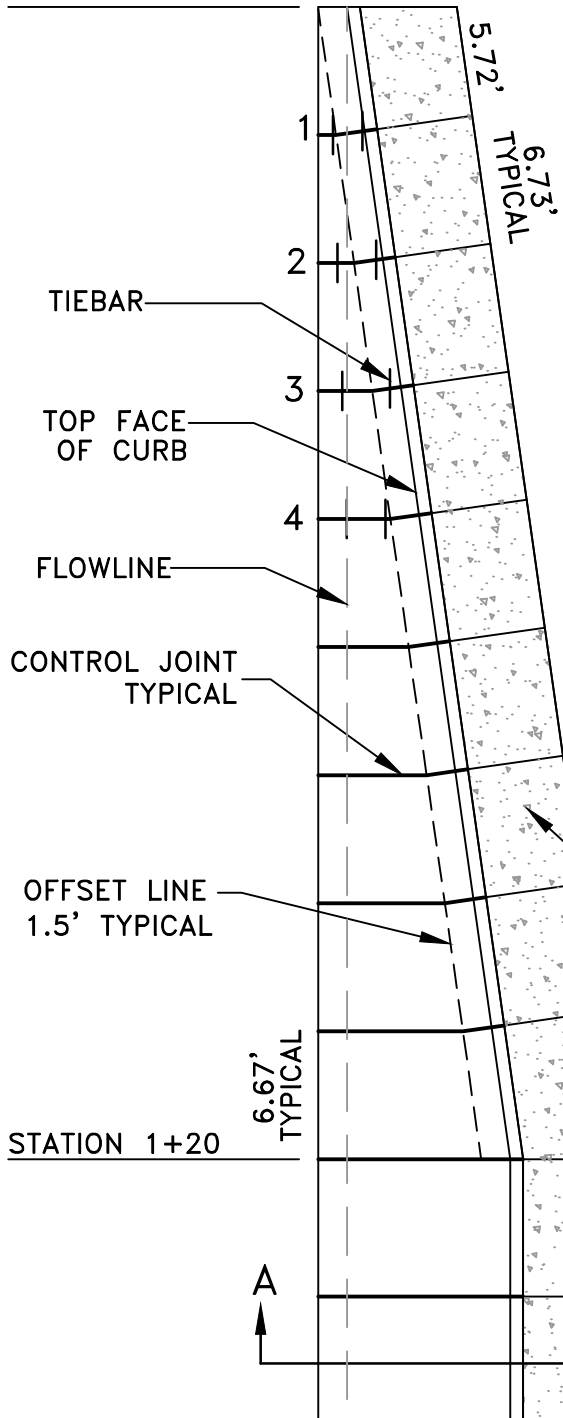
APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
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STREETS
BUS TURNOUT
ADOPTED BY CITY COUNCIL RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

DETAIL NO.
325B

STATION 1+80



JOINT NO.	TIEBAR OFFSET DISTANCE
1	0.78'
2	1.01'
3	1.25'
4	1.48'

NOTE:

1. THE OFFSET LINE IS WHERE THE PERPENDICULAR CONTROL JOINT LINES INTERSECT
2. THE TIEBAR OFFSET DISTANCE IS FROM THE OUTER SLAB EDGE AND FROM THE BACK OF CURB.

SIDEWALK WIDTH PER DETAIL 300

SEE DETAIL 325D

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BILL SANDHU, CITY ENGINEER
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STREETS

BUS TURNOUT

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MODESTO
 CALIFORNIA

DETAIL NO.
325C

SIDEWALK WIDTH
PER DETAIL 300

8" CONCRETE (4000 PSI
COMPRESSIVE STRENGTH
OR 600 PSI FLEXURAL
STRENGTH)

10'
SLOPE = 1% MIN.

6" SUBGRADE
COMPACTED AT 95%
RELATIVE COMPACTION

FLOWLINE

THICKENED EDGE
TAPERS FROM
8"-10" IN 3'

HOT MIX
ASPHALT

AGGREGATE
BASE

SECTION A-A

TYPICAL BUS TURNOUT

NOT TO SCALE

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STREETS

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BUS TURNOUT

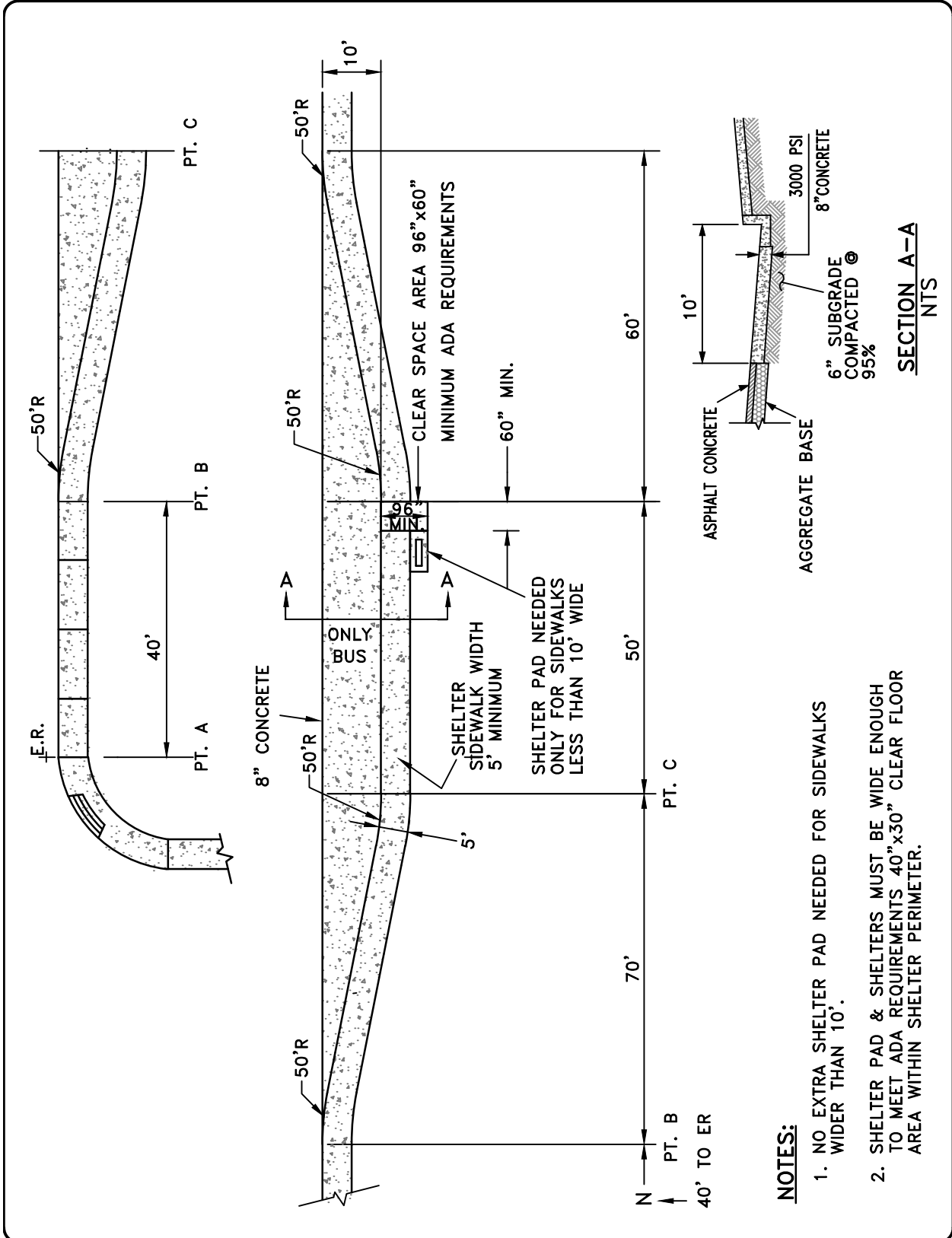
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RESOLUTION NO. 2014-345

DETAIL NO.
325D



- NOTES:**
1. NO EXTRA SHELTER PAD NEEDED FOR SIDEWALKS WIDER THAN 10'.
 2. SHELTER PAD & SHELTERS MUST BE WIDE ENOUGH TO MEET ADA REQUIREMENTS 40" x 30" CLEAR FLOOR AREA WITHIN SHELTER PERIMETER.

SECTION A-A
NTS

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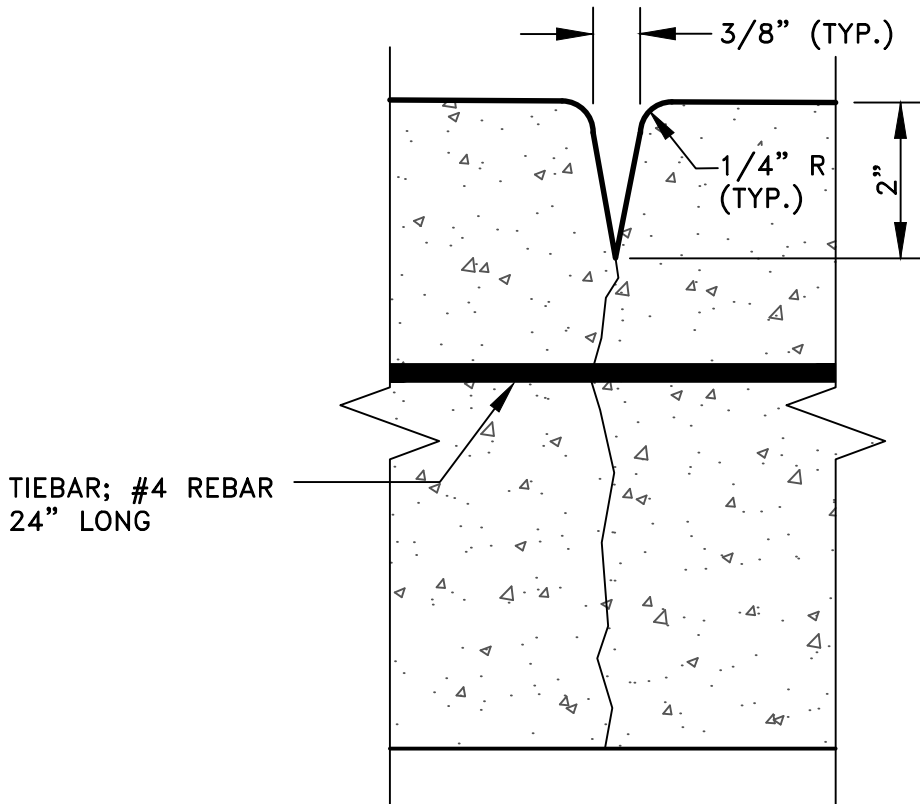
STREETS

**FAR SIDE BUS
TURNOUT**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

DETAIL NO.
326



DETAIL A
TYPICAL TIED CONTROL JOINT

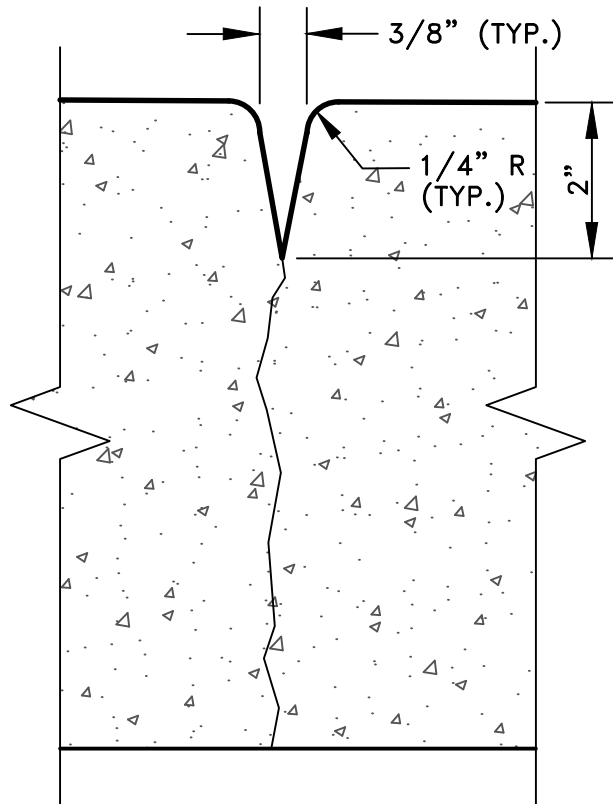
APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
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STREETS
JOINT DETAIL
ADOPTED BY CITY COUNCIL RESOLUTION NO. 2014-345



MODESTO
CALIFORNIA

DETAIL NO.
327



DETAIL B
TYPICAL CONTROL JOINT

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

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REVISED: DATE:

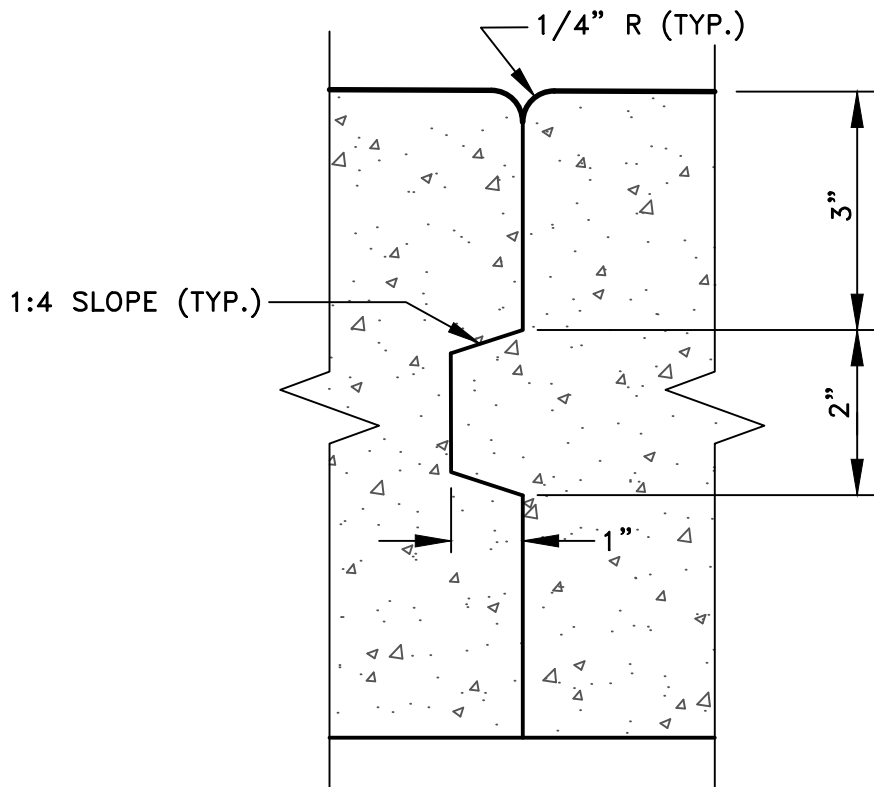
STREETS

JOINT DETAIL

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



DETAIL NO.
327A



DETAIL C

FOR USE AT ALL COLD JOINTS (NON CONTINUOUS POURS)

APPROVED BY:
BILL SANDHU, CITY ENGINEER
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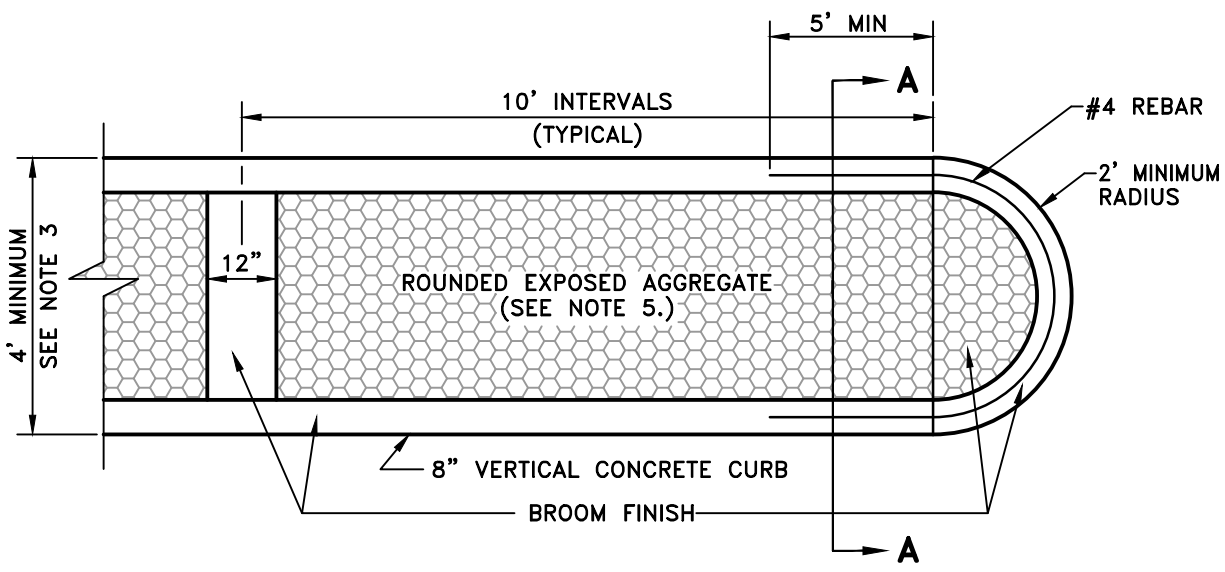
STREETS

JOINT DETAIL

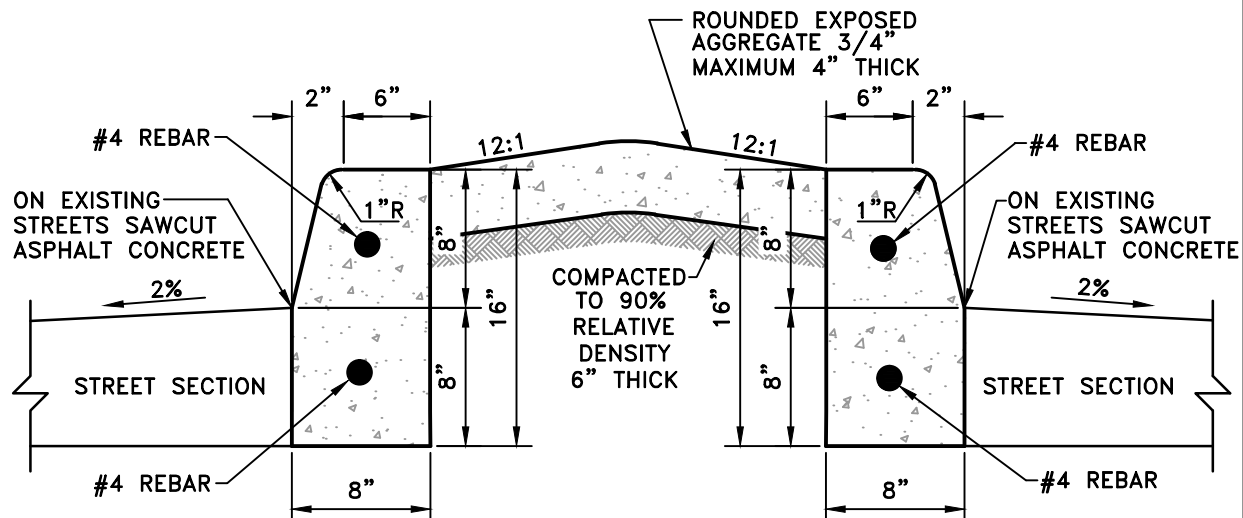


ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
327B



PLAN



SECTION A-A

NOTES:

1. ON LANDSCAPED MEDIANS, CURB SHALL EXTEND 6" BELOW BOTTOM OF AGGREGATE BASE.
2. PROVIDE WEAKENED PLANE JOINTS IN ACCORDANCE WITH STANDARDS SECTION 3.04H(7) AND AT END OF RETURNS.
3. MEDIANS GREATER THAN 6 -FEET SHALL BE LANDSCAPED.
4. MEDIANS SHALL BE CONTINUOUS FROM START AT AN INTERSECTION FOR A MINIMUM DISTANCE OF 300 FEET. ALL DRIVEWAYS WITHIN THIS DISTANCE SHALL BE RIGHT-IN AND RIGHT-OUT ONLY. MEDIANS SHALL EXTEND A MINIMUM OF 100 FEET FROM THE FURTHEST EDGE OF ANY DRIVEWAY LOCATED WITHIN THE FIRST 300 FEET OF A STREET MEASURED FROM THE START POINT OF THE MEDIAN AT AN INTERSECTION.
5. MEDIANS ON PRINCIPAL ARTERIALS AND ABOVE AND LESS THAN 6-FEET IN WIDTH SHALL BE PAVED WITH COLORED STAMPED CONCRETE WITHOUT 12-INCH BROOM FINISH AREAS.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

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REVISED: DATE:

STREETS

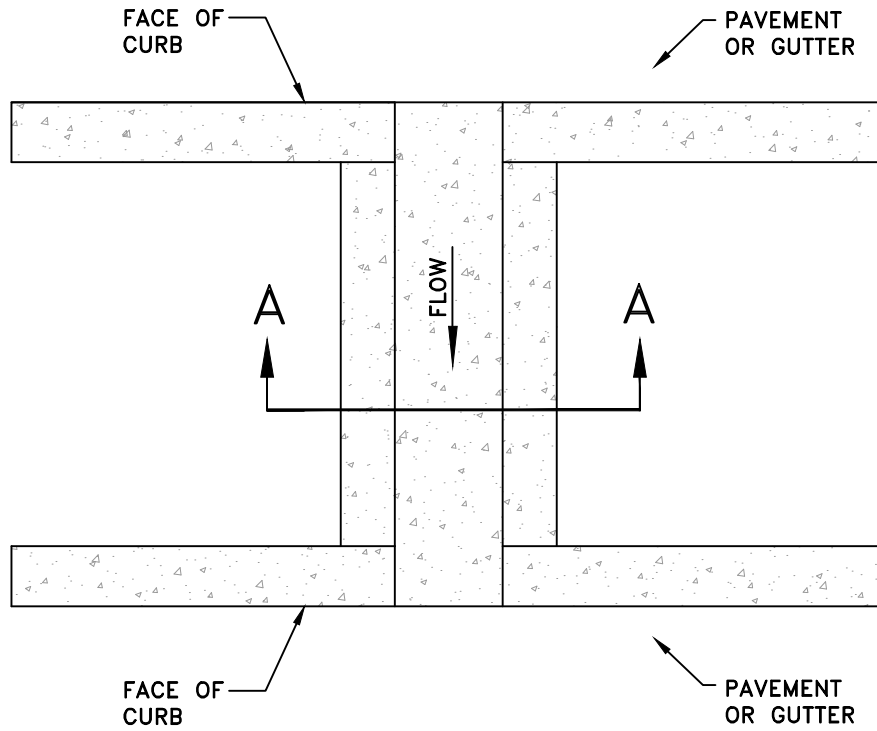
MEDIAN

DETAIL

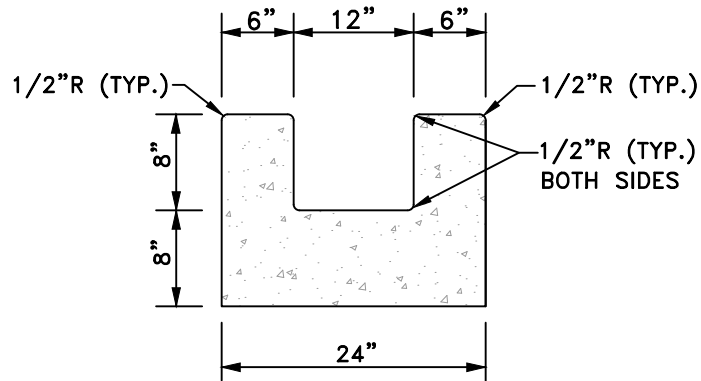


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RESOLUTION NO. 2014-345

DETAIL NO.
328



PLAN
NTS



SECTION A-A
NTS

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C59650

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STREETS

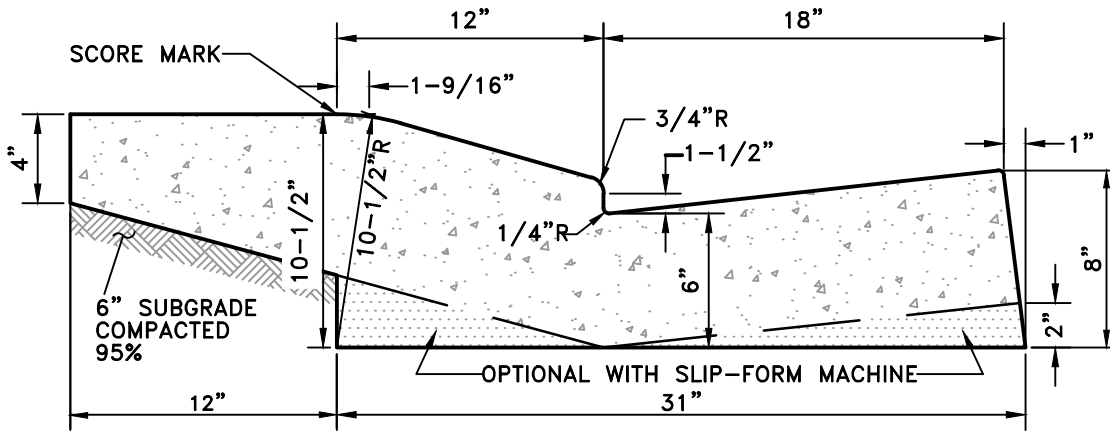
**THRU DRAIN
DETAIL FOR MEDIANS**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

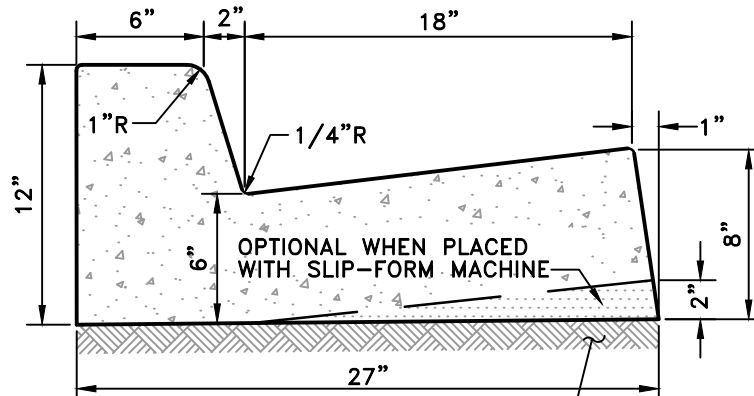


MODESTO
CALIFORNIA

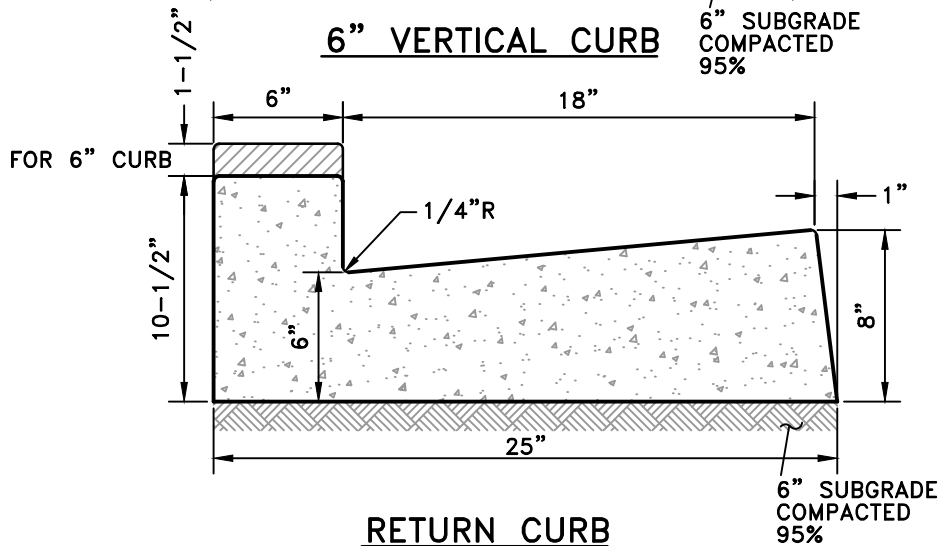
DETAIL NO.
329



4-1/2" DRIVE OVER CURB



6" VERTICAL CURB



RETURN CURB

(OPTIONAL WITH 6" VERTICAL CURB)

NOTE:

6" OF SUBGRADE SHALL BE COMPACTED TO 95% AT 3% ABOVE OPTIMUM MOISTURE CONTENT PRIOR TO PLACEMENT OF CONCRETE.

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C59650

REVISED: DATE:

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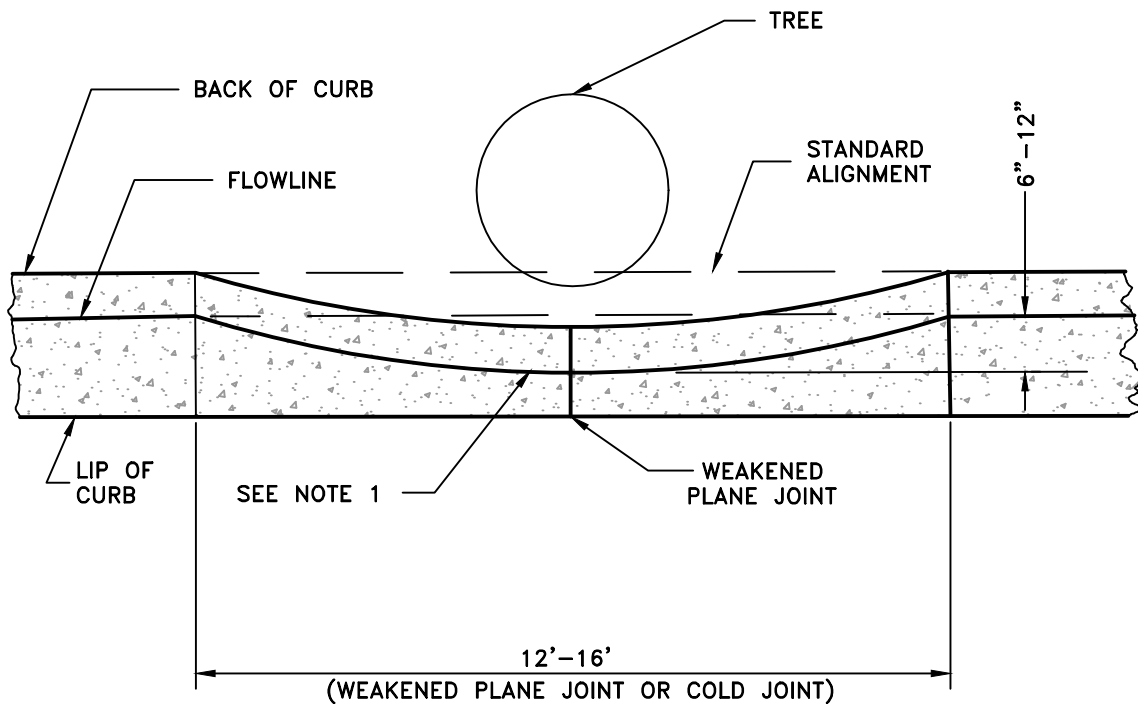
STREETS

**CURB
SECTIONS**



ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

DETAIL NO.
330



NOTES:

1. CURB ALIGNMENT SHALL BE MODIFIED WITH FLOWLINE GRADE MAINTAINED.
2. TREE ROOTS ARE TO BE CUT AT EDGE OF WALK TO 10" BELOW FINISH GRADE, AS DETERMINED BY THE CITY ENGINEER.

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 C59650

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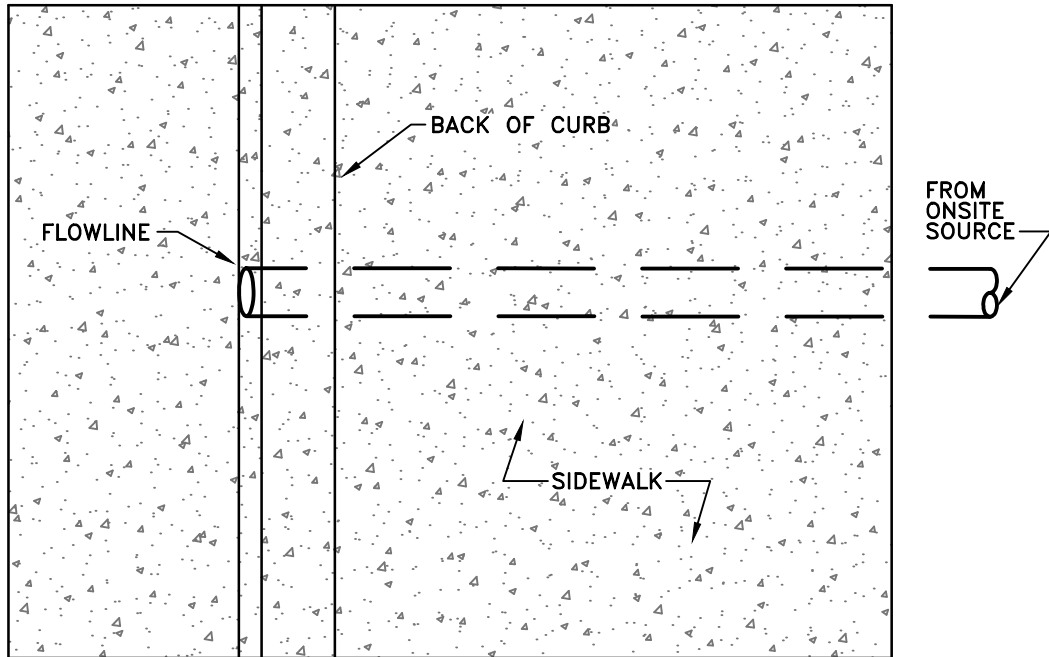
STREETS

**CURB MODIFICATION
 FOR EXISTING TREE**



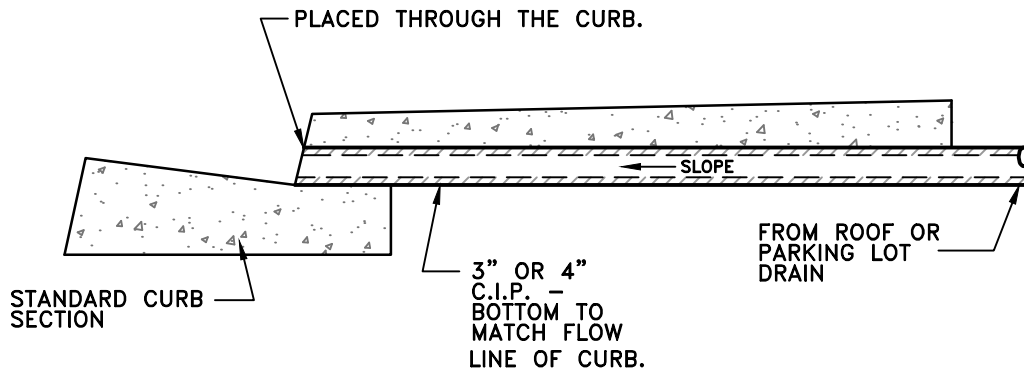
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 RESOLUTION NO. 2014-345

DETAIL NO.
331



FIBERMESH OR WIRE MESH
TO BE ADDED TO THE CONCRETE

PLAN



SECTION

APPROVED BY:
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C59650

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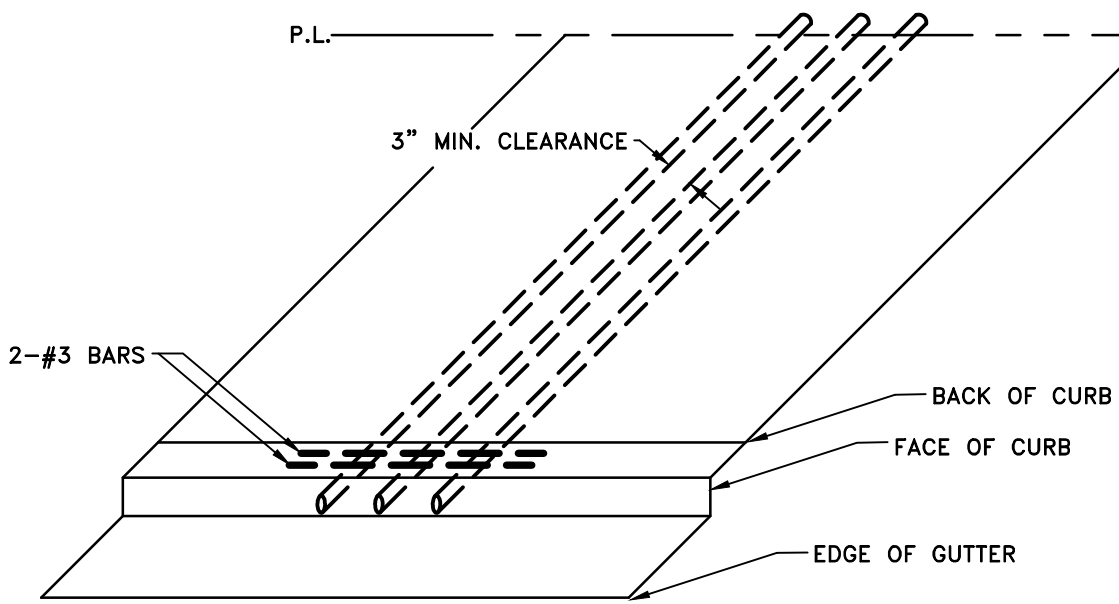
STREETS

**CURB DRAIN
UNDER SIDEWALK**

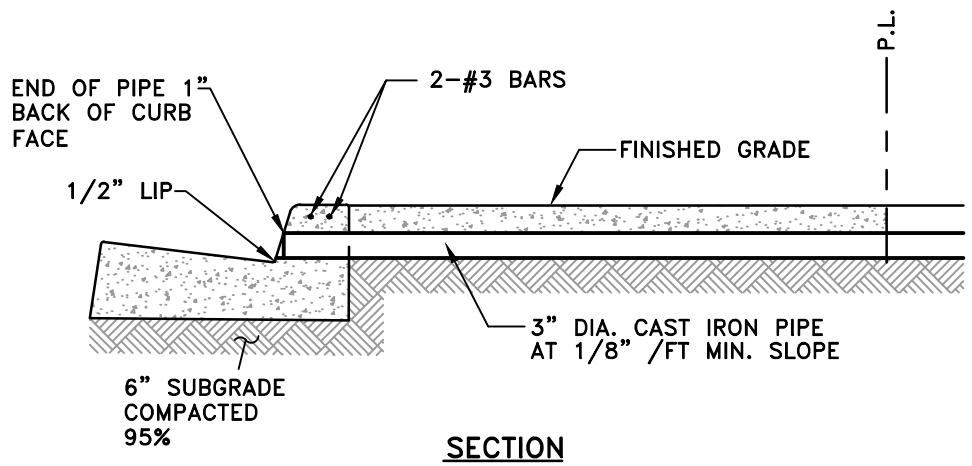
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RESOLUTION NO. 2014-345



DETAIL NO.
332



PLAN



SECTION

NOTES:

1. PIPES WILL NOT BE MAINTAINED BY THE CITY.
2. ANGLE AT 90° TO CURB UNLESS APPROVED BY CITY ENGINEER.
3. THE NUMBER OF PIPES AT ANY LOCATION SHALL NOT EXCEED 4.
4. LAY FIBER MESH OR WIRE MESH REINFORCEMENT OVER DRAIN PIPES PRIOR TO CONCRETE POUR FOR SIDEWALK.

APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
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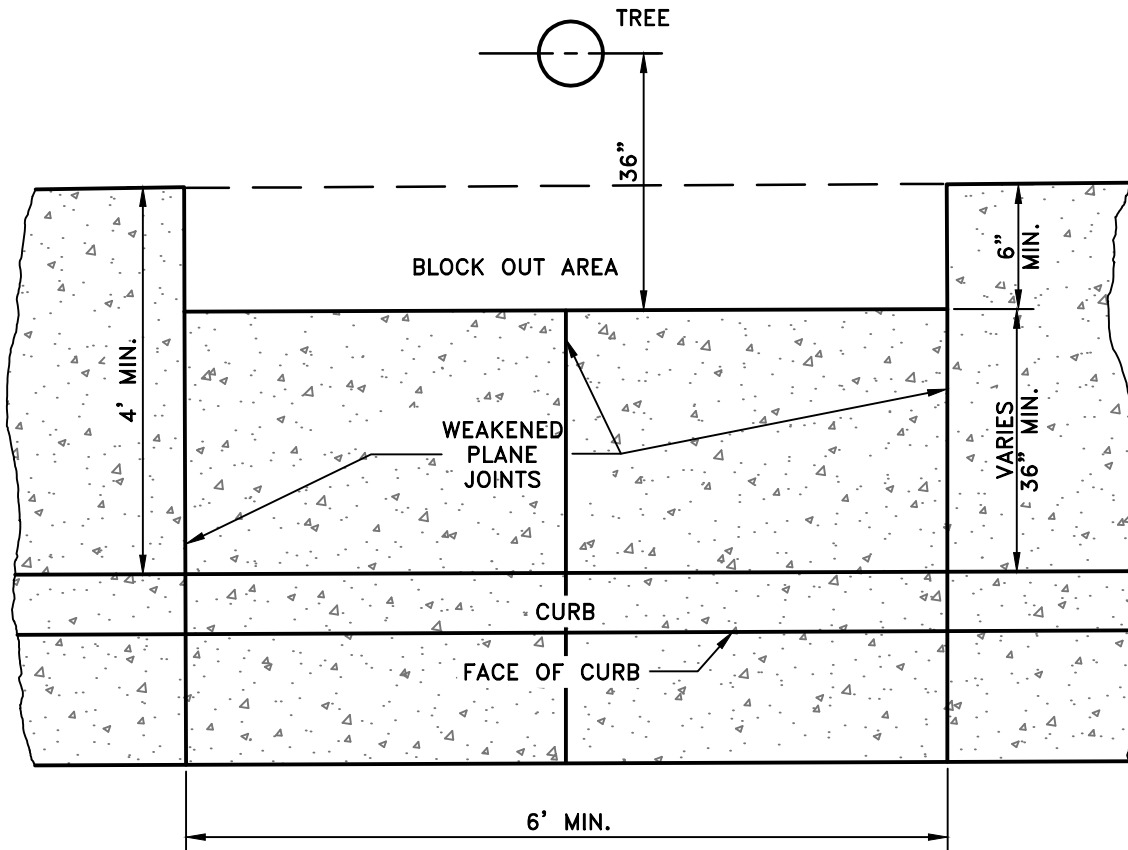
STREETS

**CURB DRAIN UNDER
SIDEWALK (MULTIPLE)**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

DETAIL NO.
333



NOTES:

1. TREE ROOTS ARE TO BE CUT AT EDGE OF WALK TO 10" BELOW FINISH GRADE, AS DETERMINED BY THE CITY ENGINEER.
2. IF TREE IS 6" OR LESS IN DIAMETER (20" GIRTH) AND IT'S CENTER IS 12" - 36" FROM BACK EDGE OF FULL WALK, PLACE CONCRETE IN BLOCK-OUT AREA, WITH COLD JOINTS OR REDWOOD STRIPS AT THE EDGES (SEE DETAIL #337).

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BILL SANDHU, CITY ENGINEER
 C59650

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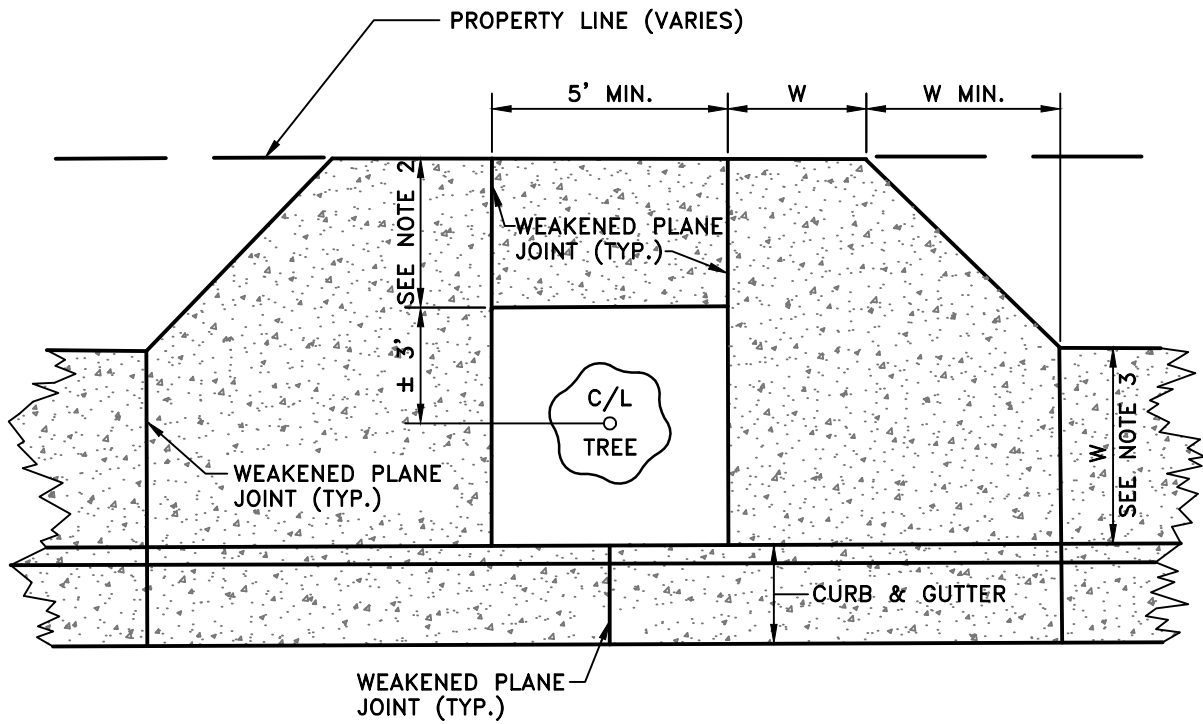
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STREETS
SIDEWALK MODIFICATION
FOR TREE AT
PROPERTY LINE



ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
334



NOTES:

1. TREE ROOTS ARE TO BE CUT AT EDGE OF WALK TO 10" BELOW FINISH GRADE, AS DETERMINED BY THE CITY ENGINEER.
2. THE DISTANCE BETWEEN THE BACK OF THE TREE BLOCK-OUT AND THE BACK OF THE SIDEWALK SHALL BE A MINIMUM OF 36" IN R-1 AND R-2 ZONES AND A MINIMUM OF 60" IN ALL OTHER ZONES, UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.
3. W = PROPOSED OR EXISTING SIDEWALK WIDTH.

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 C59650

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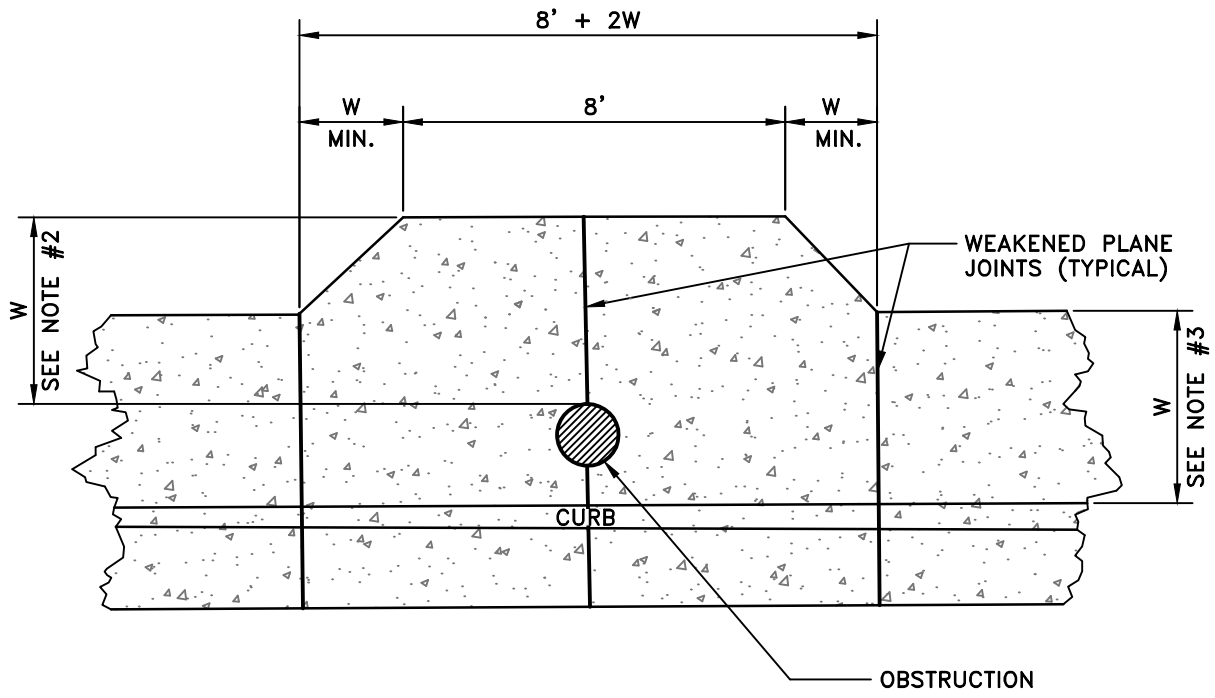
STREETS

**SIDEWALK MODIFICATION
 FOR TREE AT CURB**



ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
335



NOTES:

1. NO WIDENING IS NEEDED WHEN SPACE BETWEEN BACK OF CURB AND FACE OF OBSTRUCTION IS 36" OR MORE.
2. BACK OF WIDENED SIDEWALK SHALL REMAIN WITHIN THE STREET RIGHT OF WAY.
3. W = PROPOSED OR EXISTING SIDEWALK WIDTH.

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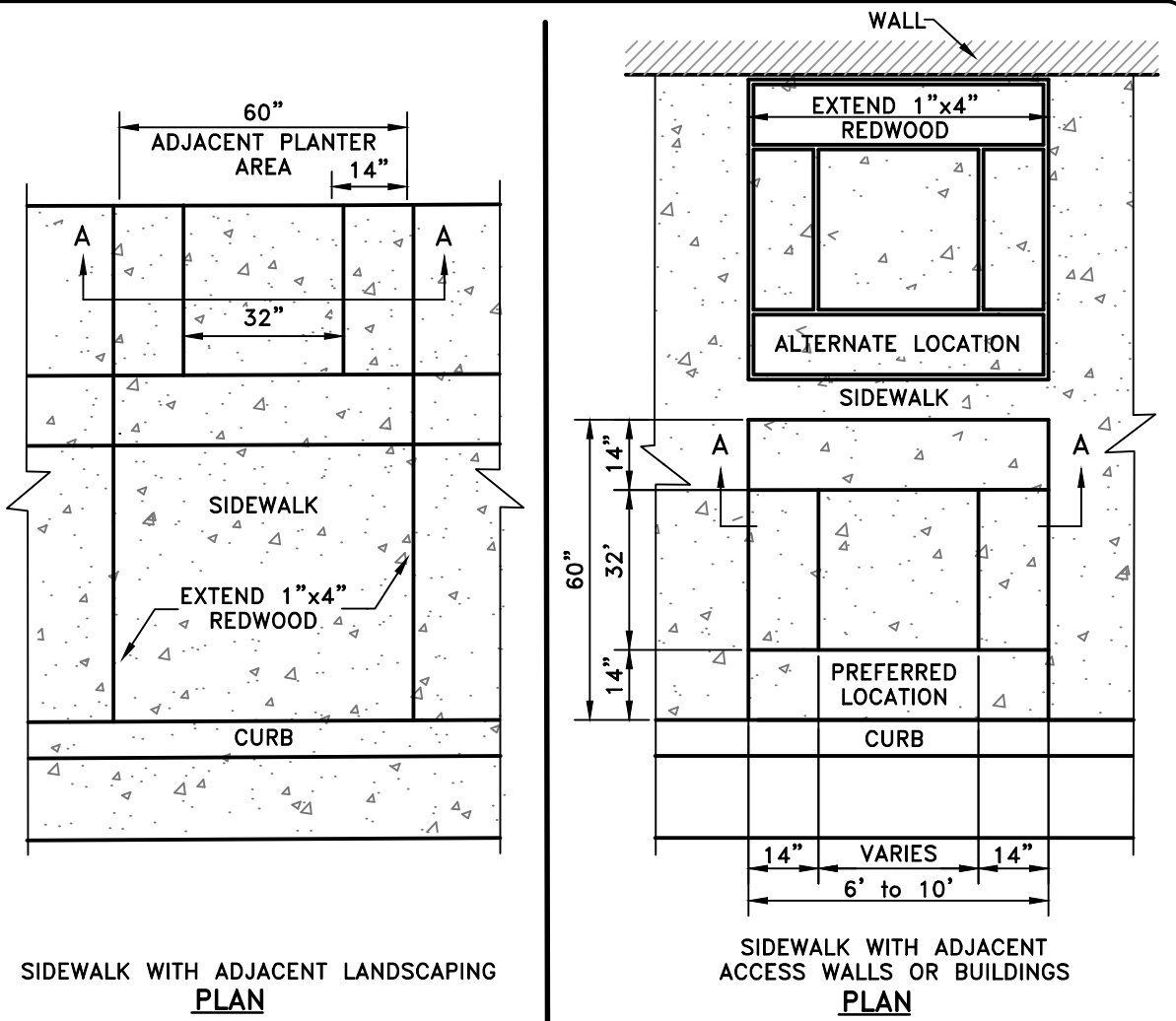
STREETS

**SIDEWALK WIDENING
 FOR OBSTRUCTIONS**



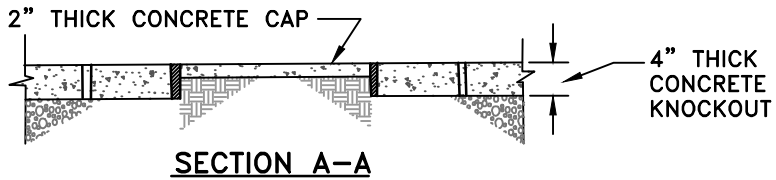
ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
336



SIDEWALK WITH ADJACENT LANDSCAPING PLAN

SIDEWALK WITH ADJACENT ACCESS WALLS OR BUILDINGS PLAN



SECTION A-A

NOTES:

1. BLOCK-OUTS SHALL BE SPACED AT 40' INTERVALS (APPROXIMATELY).
2. THE URBAN FORESTRY SUPERINTENDENT SHALL DETERMINE THE FINAL PLACEMENT OF STREET TREE BLOCK-OUTS AND MUST BE CONTACTED AT 342-2249 AT LEAST 24 HOURS PRIOR TO PLACEMENT OF CONCRETE WALKWAYS OR DRIVEWAYS.
3. USE 1" X 4" REDWOOD OR CEDAR FORMS.
4. THOSE AREAS THAT HAVE EXISTING STREET IMPROVEMENTS AND EXISTING STREET TREES ON ADJACENT PARCELS SHALL BE EVALUATED ON AN INDIVIDUAL BASIS BY THE URBAN FORESTRY SUPERINTENDENT PRIOR TO INSTALLATION OF THE TREE BLOCK-OUT.
5. IN COMMERCIAL AREAS, TREES MAY BE REQUIRED TO BE LOCATED AT THE BACK OF SIDEWALK AS DIRECTED BY THE ENGINEER, ON A CASE BY CASE BASIS. IN SUCH CASES, A PLANTING EASEMENT CAN BE REQUIRED AT THE BACK OF SIDEWALK.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

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STREETS
TREE BLOCK OUTS
FOR FULL WIDTH
SIDEWALK



ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
337

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INTENTIONALLY

APPROVED BY:
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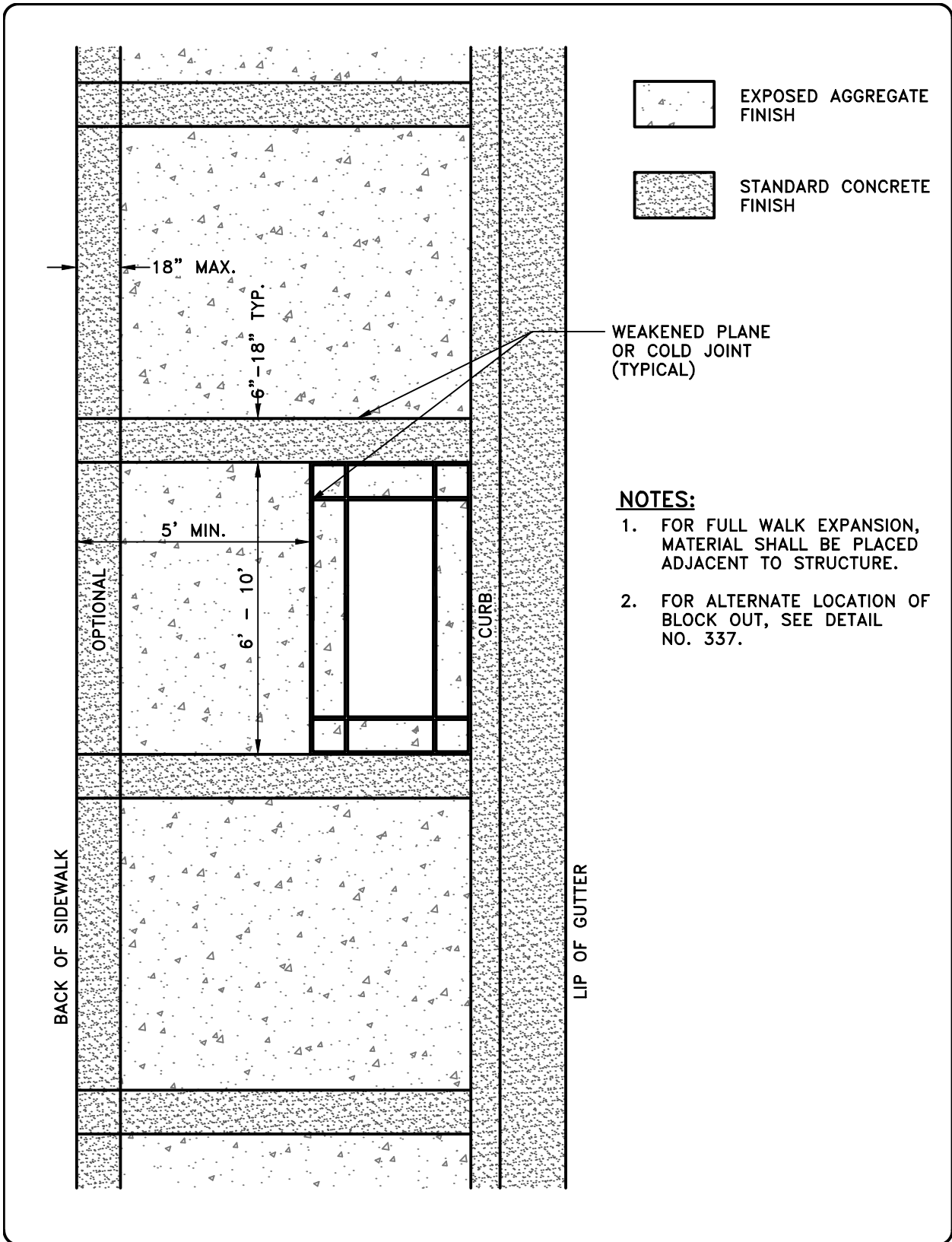
STREETS



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ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

DETAIL NO.
338-341



APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
REVISED:	DATE:
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STREETS

**TREE BLOCK OUTS
FOR INFILL ONLY**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



MODESTO
CALIFORNIA

DETAIL NO.
342

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INTENTIONALLY

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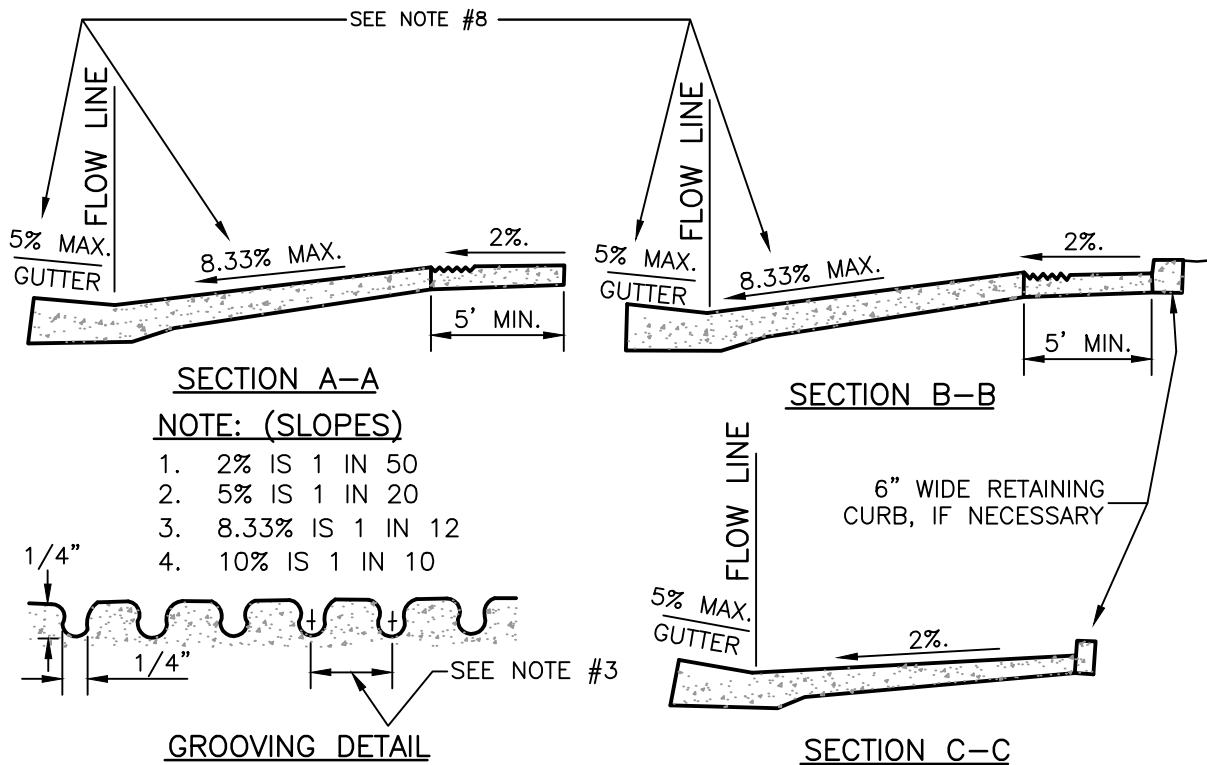
STREETS



MODESTO
CALIFORNIA

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

DETAIL NO.
343-344



NOTE: (SLOPES)

1. 2% IS 1 IN 50
2. 5% IS 1 IN 20
3. 8.33% IS 1 IN 12
4. 10% IS 1 IN 10

NOTES:

1. THE LOWER END OF EACH RAMP SHALL BE FLUSH WITH GUTTER.
2. WHEN THE RAMP IS LOCATED IN THE CENTER OF THE CURB RETURN, CROSS WALK CONFIGURATION MUST BE SIMILAR TO THAT SHOWN ON THE PLAN TO ACCOMMODATE WHEELCHAIRS.
3. THE RAMP SHALL HAVE A 12" WIDE BORDER WITH 1/4" GROOVES APPROXIMATELY 3/4" O.C. (SEE GROOVING DETAIL) AT LOCATIONS INDICATED ON THE PLANS. THE SURFACE OF THE RAMP SHALL HAVE A TRANSVERSE BROOMED SURFACE TEXTURE ROUGHER THAN THE SURROUNDING SIDEWALK EXCEPT WHEN LOCATED IN THE CENTER OF CURB RETURN.
4. THE RAMPS SHALL HAVE TRUNCATED DOME TILES AS DETECTABLE WARNINGS AT THE END OF THE RUNNING SLOPE OF THE RAMP, AS INDICATED IN THE PLANS AND SPECIFICATIONS.
5. ALL CURB RAMPS SHALL BE 4" THICK CONCRETE.
6. 5% MAX. GUTTER PAN SLOPE, 2% MIN.
7. CONTRACTOR TO PROVIDE A LEVEL LANDING (4' LONG BY WIDTH OF SIDEWALK AT THE TOP OF THE RAMP WHICH SHALL BE AS WIDE AS THE RAMP WITH SLOPES AT 2% MAXIMUM, BOTH DIRECTIONS IF SIDEWALK CROSS SLOPE IS MORE THAN 2%
8. THE GRADE BREAK BETWEEN THE COUNTER SLOPES OF GUTTER AND/OR ROAD SURFACES WITHIN 24 INCHES OF THE CURB RAMP AND THE RUNNING GRADE OF THE CURB RAMP SHALL NOT EXCEED THE ALGEBRAIC DIFFERENCE OF 11 PERCENT. IF TWO OR MORE PLANE CHANGES ARE PRESENT, THEY SHALL BE SEPARATED BY 24 INCHES (2% MAX.)
9. 4' LONG TRANSITION BY WIDTH OF SIDEWALK IS REQUIRED IF EXISTING SIDEWALK CROSS SLOPE IS MORE THAN 2%.
10. TRAFFIC SIGNAL PEDESTRIAN PUSH BUTTONS SHALL BE 40" MAX. VERTICAL FROM CLEAR 2% MAX. LANDING AREA, 6" MAX. HORIZONTAL FROM FRONT OF CURB ADJACENT TO LANDING AND 32" MIN. AWAY FROM EDGE OF CURB RETURN.

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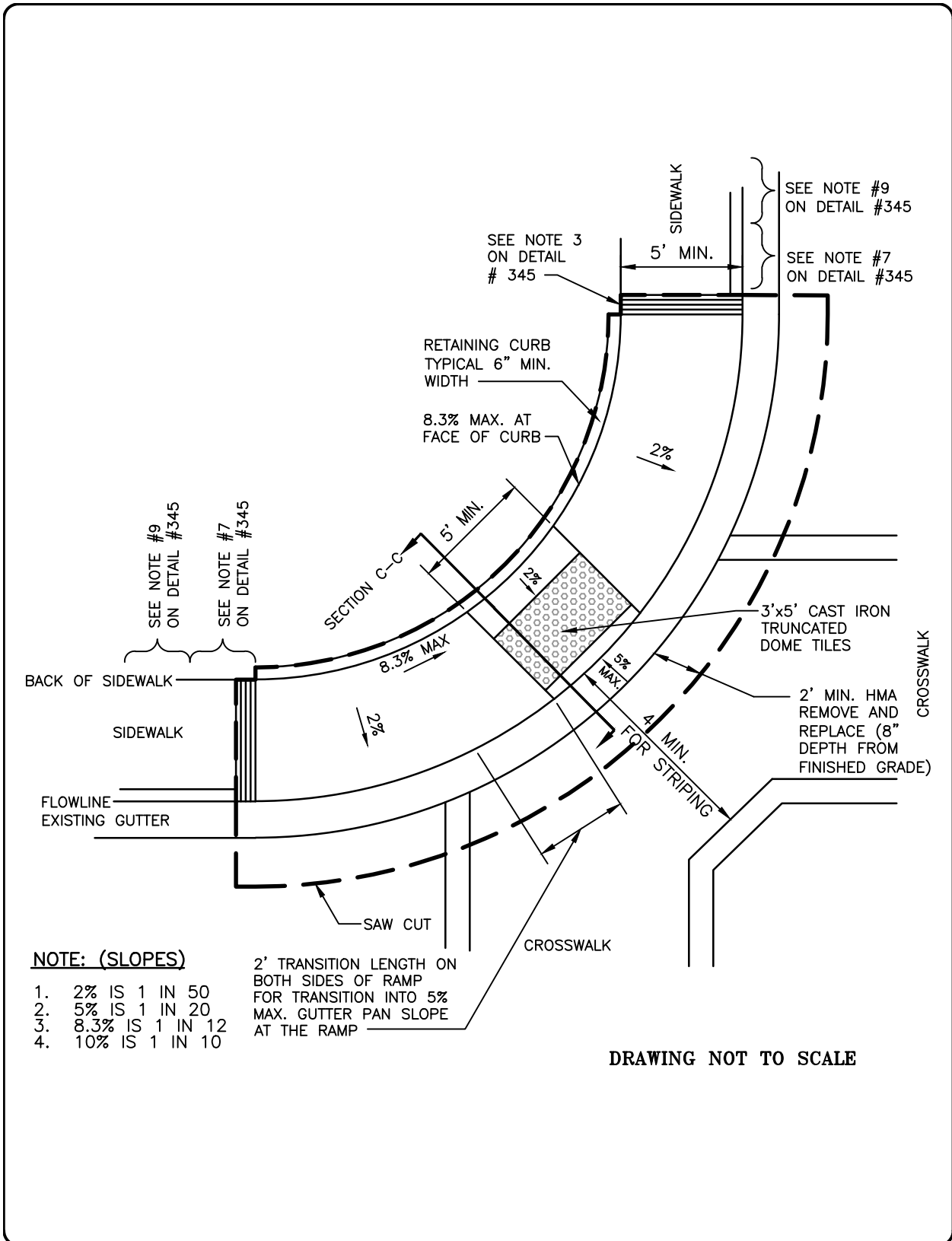
STREETS

**CURB RAMP
 NOTES AND DETAILS**



ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
345




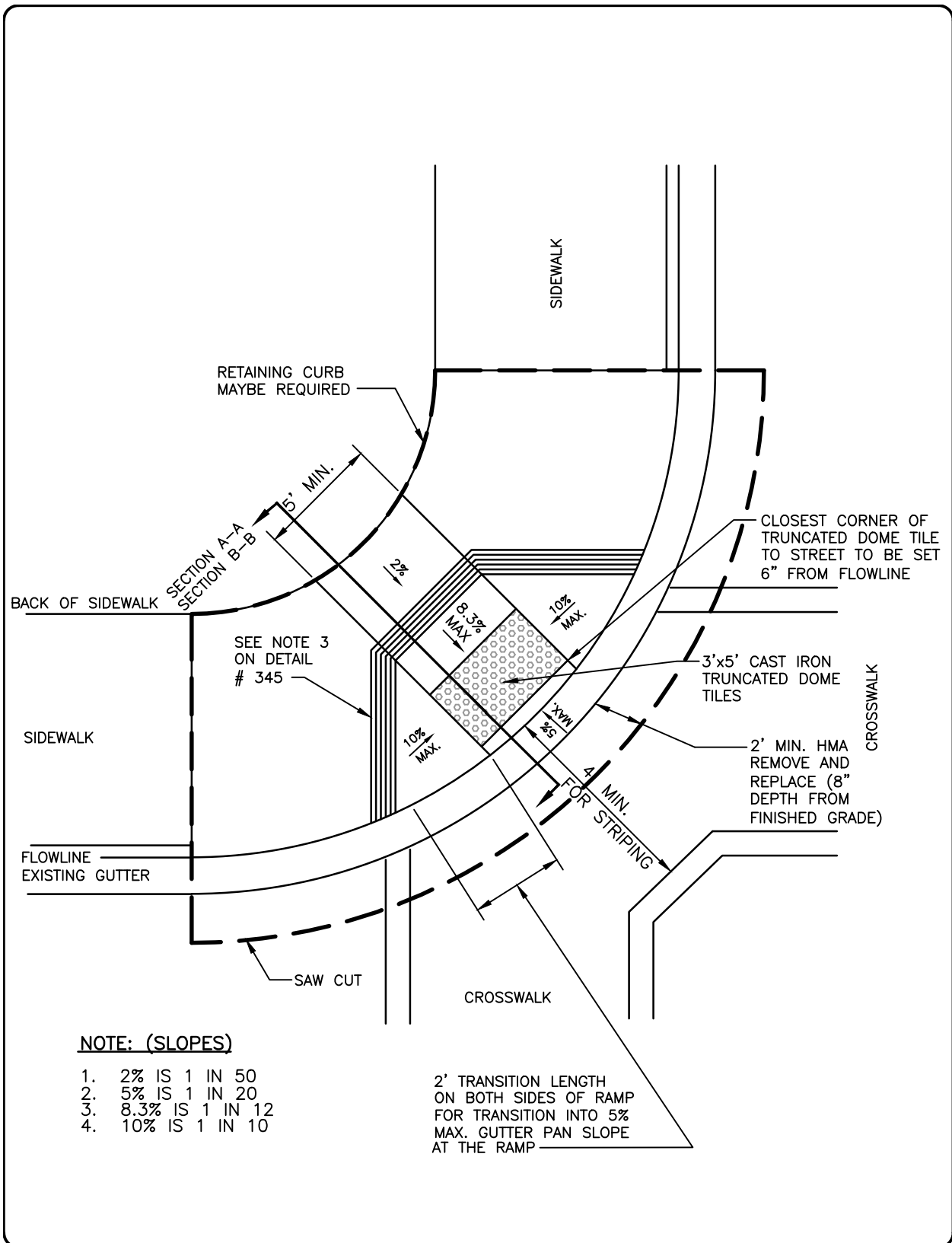
NOTE: (SLOPES)

1. 2% IS 1 IN 50
2. 5% IS 1 IN 20
3. 8.3% IS 1 IN 12
4. 10% IS 1 IN 10

2' TRANSITION LENGTH ON BOTH SIDES OF RAMP FOR TRANSITION INTO 5% MAX. GUTTER PAN SLOPE AT THE RAMP

DRAWING NOT TO SCALE

APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	STREETS		 MODESTO CALIFORNIA
REVISED: DATE:	CURB RAMP CASE A		
REVISED: DATE:	ADOPTED BY CITY COUNCIL RESOLUTION NO. 2014-345		DETAIL NO. 345A
REVISED: DATE:			




NOTE: (SLOPES)

- 1. 2% IS 1 IN 50
- 2. 5% IS 1 IN 20
- 3. 8.3% IS 1 IN 12
- 4. 10% IS 1 IN 10

2' TRANSITION LENGTH ON BOTH SIDES OF RAMP FOR TRANSITION INTO 5% MAX. GUTTER PAN SLOPE AT THE RAMP

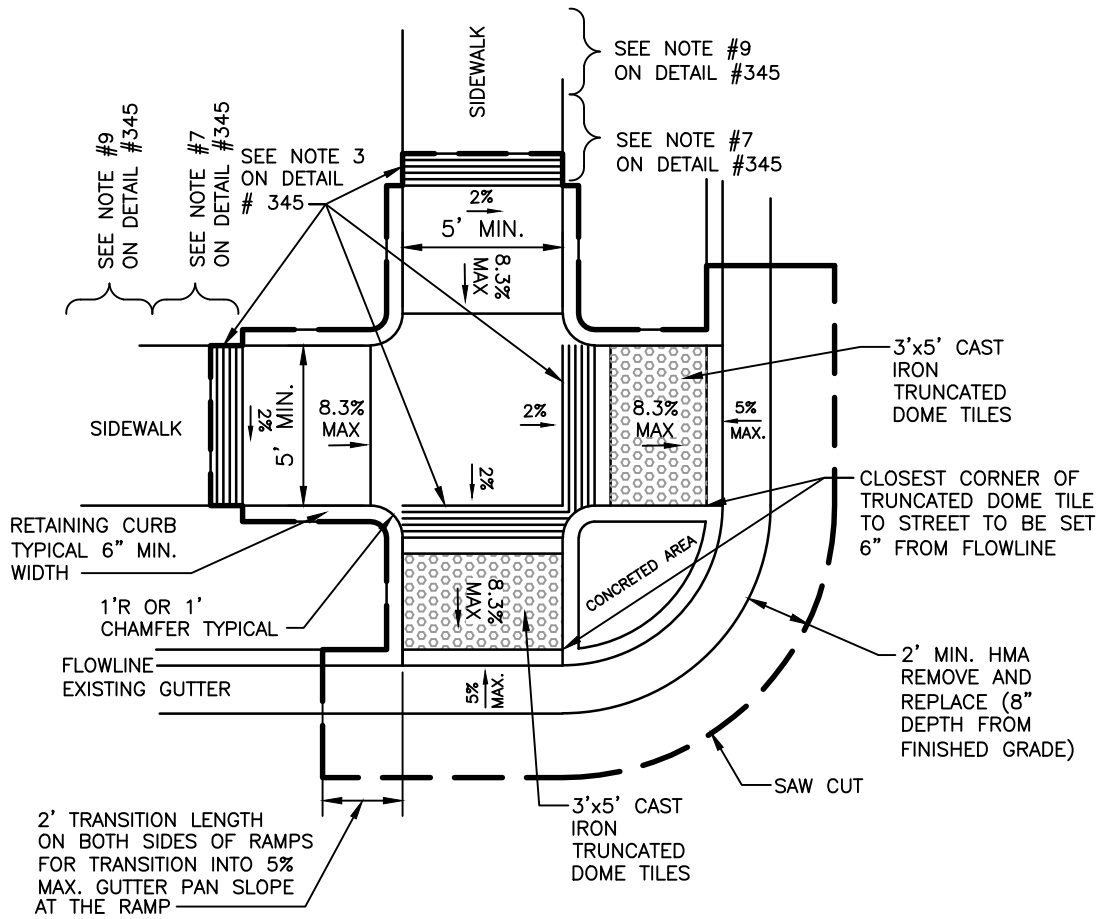
APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
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STREETS
CURB RAMP CASE B
ADOPTED BY CITY COUNCIL RESOLUTION NO. 2014-345



MODESTO
CALIFORNIA

DETAIL NO.
345B



NOTE: (SLOPES)

1. 2% IS 1 IN 50
2. 5% IS 1 IN 20
3. 8.3% IS 1 IN 12
4. 10% IS 1 IN 10

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 C59650

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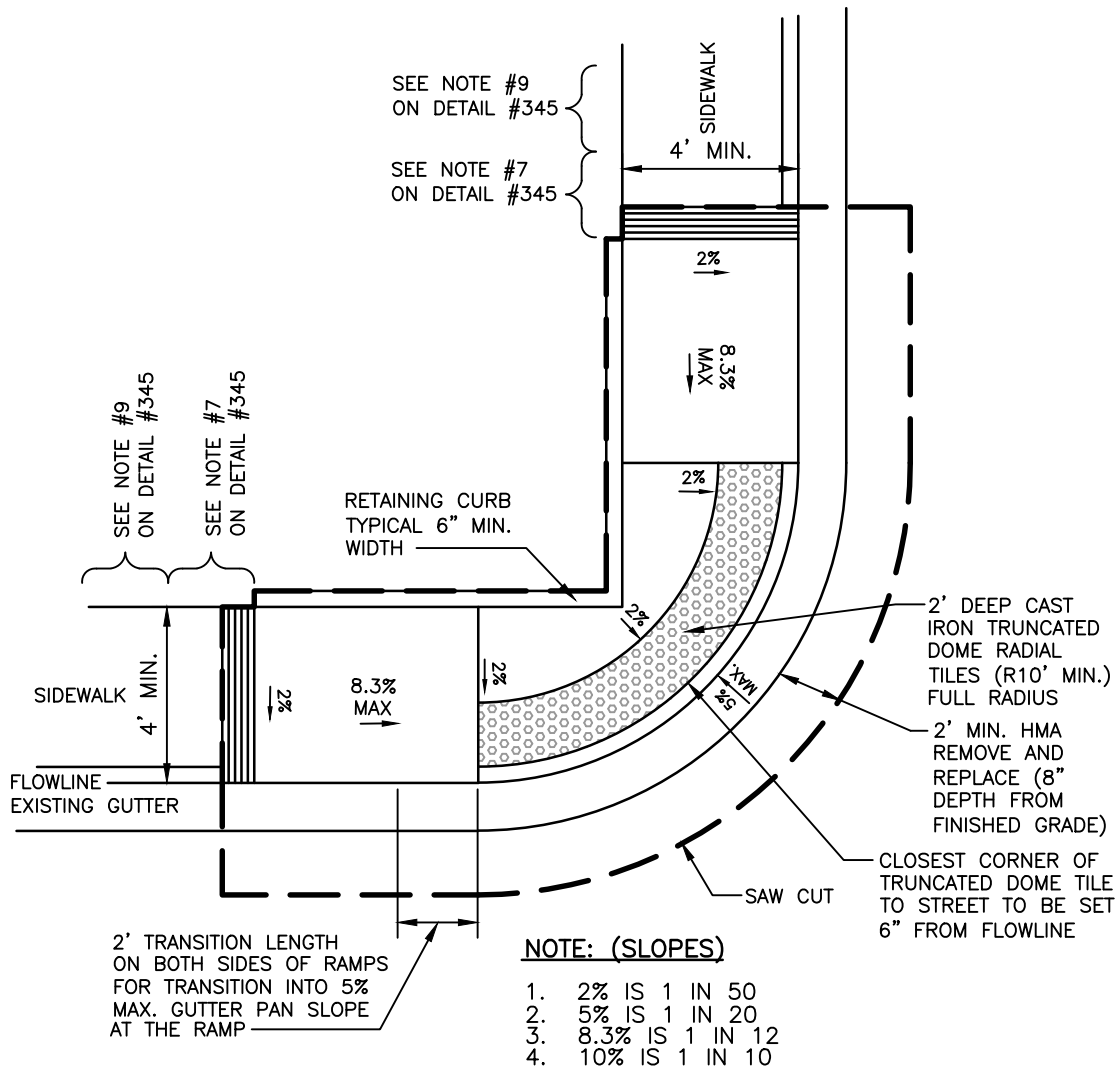
STREETS

**CURB RAMP
 CASE C**



ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
345C




NOTE:
THIS RAMP IS FOR LOCATIONS WITH RIGHT-OF-WAY ISSUES AND RADIUS LARGER THAN 10'.

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STREETS

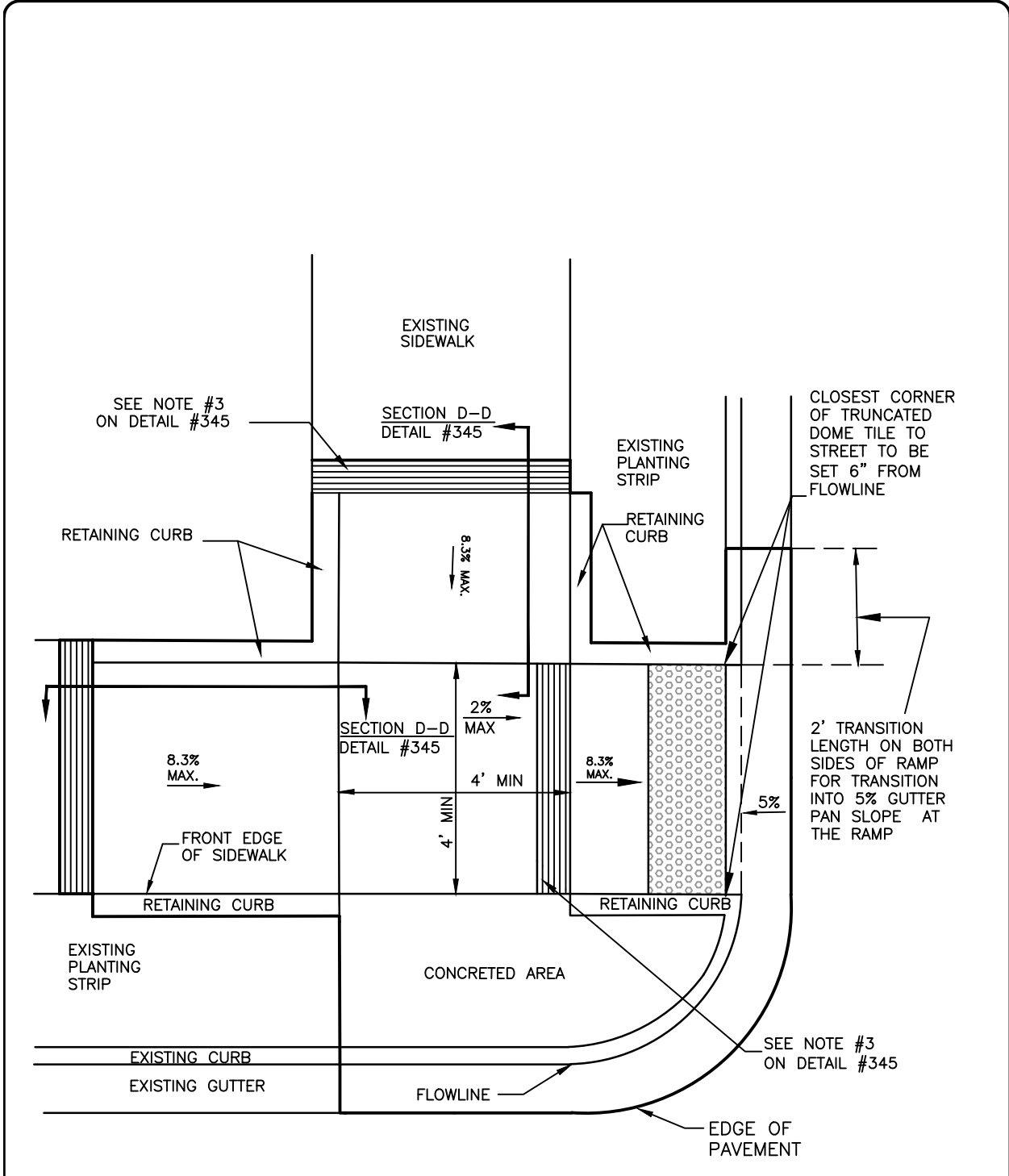
CURB RAMP
CASE D

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



MODESTO
CALIFORNIA

DETAIL NO.
345D



- NOTE: (SLOPES)**
1. 2% IS 1 IN 50
 2. 5% IS 1 IN 20
 3. 8.3% IS 1 IN 12
 4. 10% IS 1 IN 10

DRAWING NOT TO SCALE

APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
REVISED:	DATE:
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STREETS

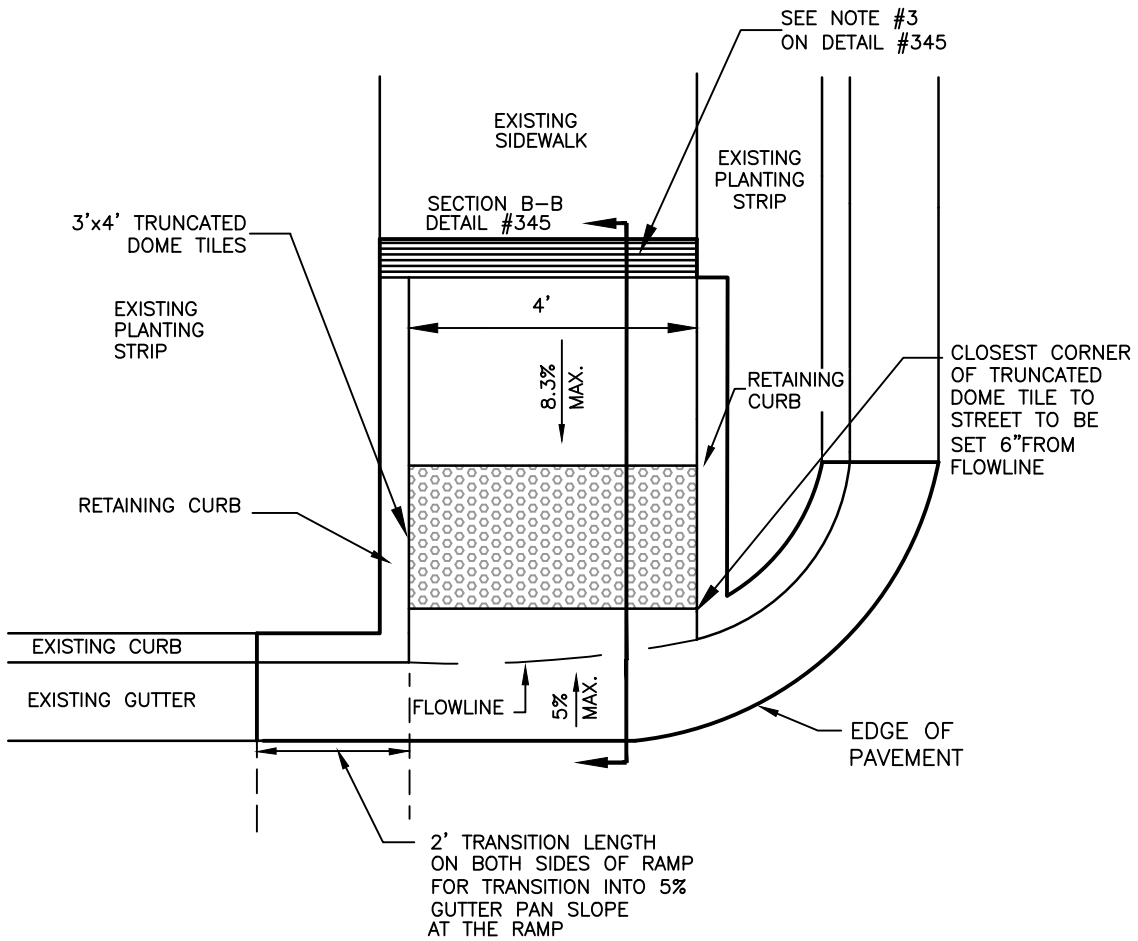
CURB RAMP
CASE E

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



MODESTO
CALIFORNIA

DETAIL NO.
345E



NOTE: (SLOPES)

1. 2% IS 1 IN 50
2. 5% IS 1 IN 20
3. 8.3% IS 1 IN 12
4. 10% IS 1 IN 10

DRAWING NOT TO SCALE

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

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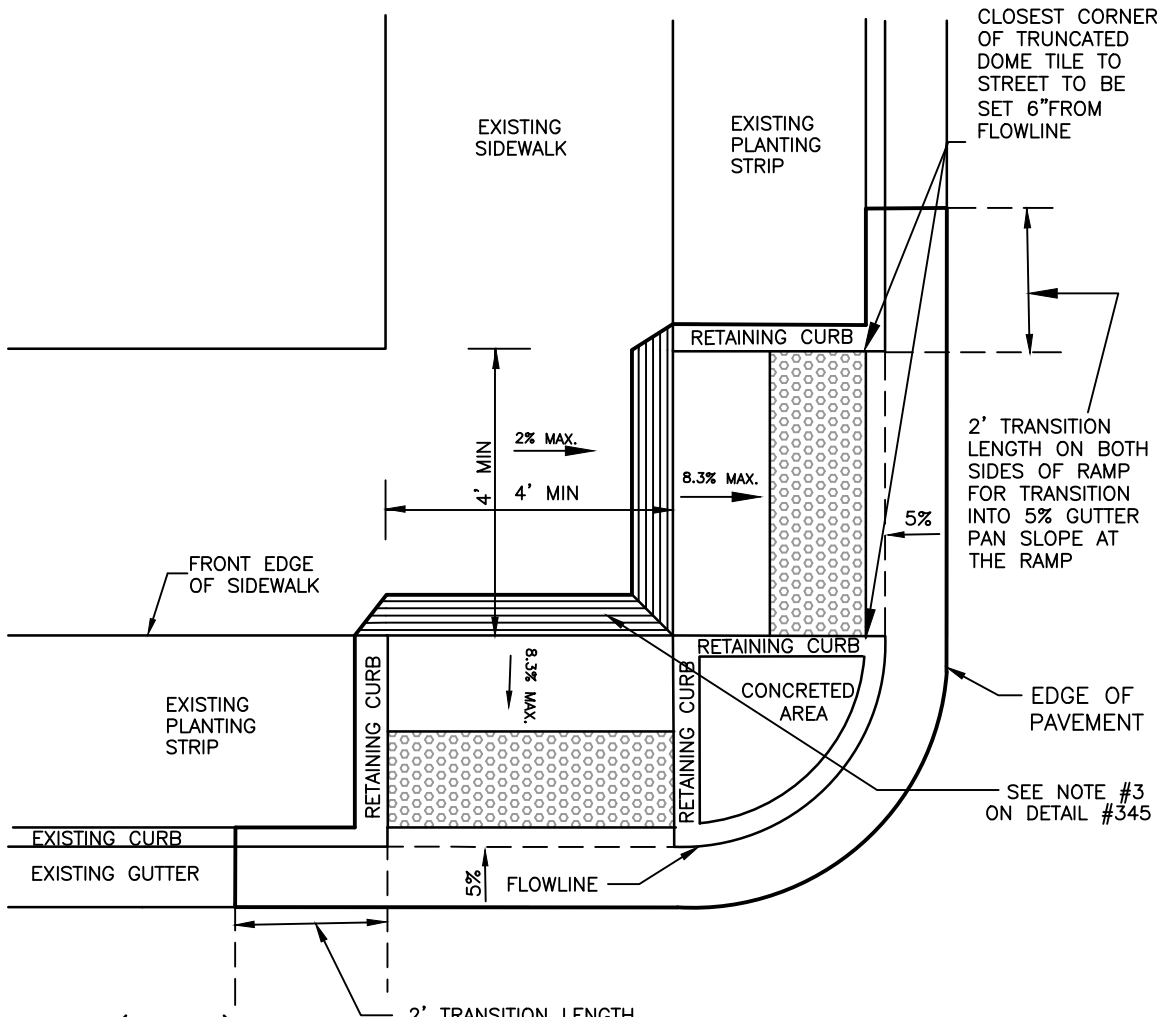
STREETS

**CURB RAMP
CASE F**

**ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345**



**DETAIL NO.
345F**



NOTE: (SLOPES)

1. 2% IS 1 IN 50
2. 5% IS 1 IN 20
3. 8.3% IS 1 IN 12
4. 10% IS 1 IN 10

2' TRANSITION LENGTH ON BOTH SIDES OF RAMP FOR TRANSITION INTO 5% GUTTER PAN SLOPE AT THE RAMP

DRAWING NOT TO SCALE

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BILL SANDHU, CITY ENGINEER
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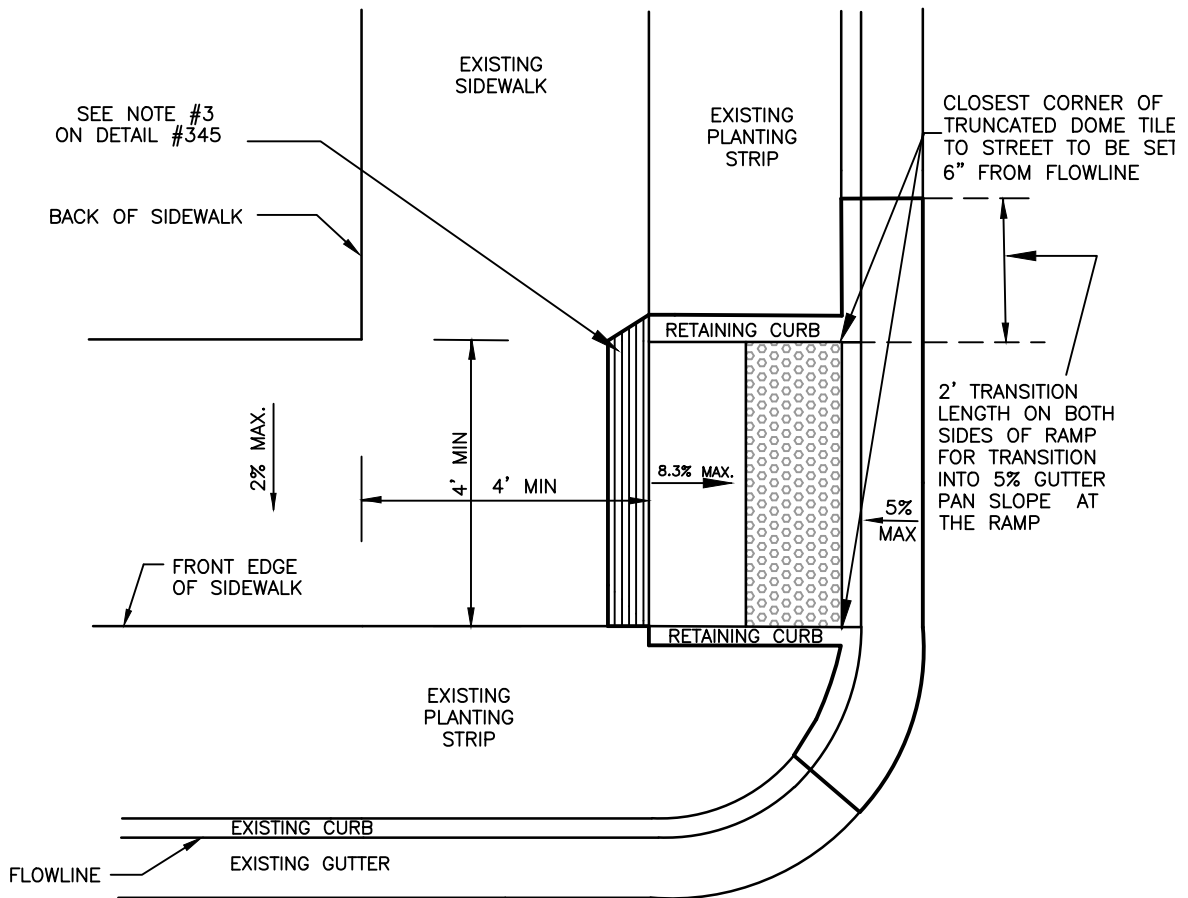
STREETS

**CURB RAMP
 CASE G**



**ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345**

**DETAIL NO.
 345G**



NOTE: (SLOPES)

1. 2% IS 1 IN 50
2. 5% IS 1 IN 20
3. 8.3% IS 1 IN 12
4. 10% IS 1 IN 10

DRAWING NOT TO SCALE

APPROVED BY:
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 C59650

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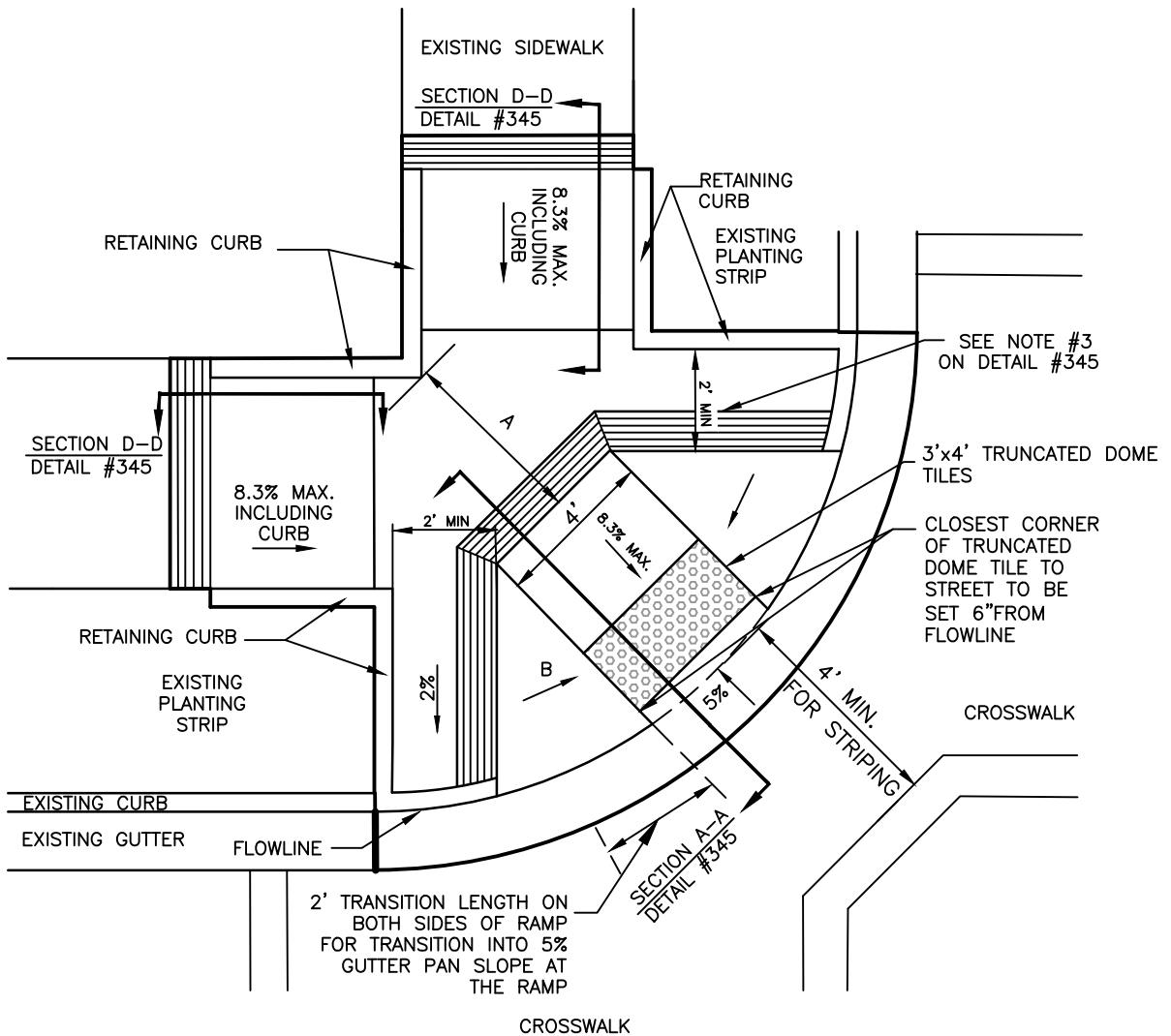
STREETS

**CURB RAMP
 CASE H**



**ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345**

**DETAIL NO.
 345H**



FLARED SIDE SHALL BE TRANSVERSE BROOMED TEXTURE ROUGHER THAN SURROUNDING SIDEWALK

NOTE: (SLOPES)

1. 2% IS 1 IN 50
2. 5% IS 1 IN 20
3. 8.3% IS 1 IN 12
4. 10% IS 1 IN 10

DRAWING NOT TO SCALE

IF "A" IS:	THEN "B" FOR THE FLARED SIDE SHALL BE:
4' OR GREATER	10% MAX
3' TO LESS THAN 4'	8.33% MAX

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BILL SANDHU, CITY ENGINEER
C59650

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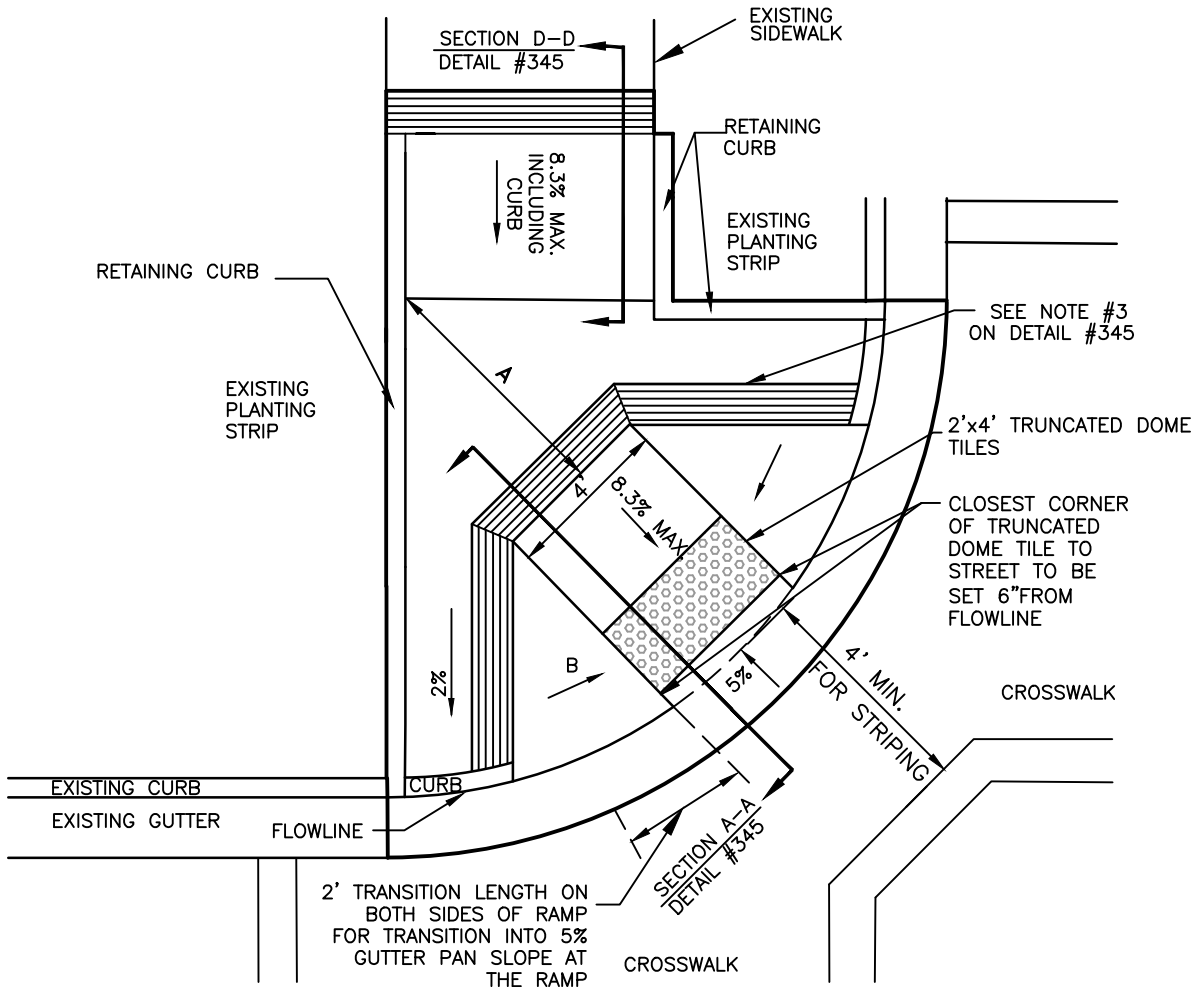
STREETS

**CURB RAMP
CASE I**



ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

DETAIL NO.
345I



FLARED SIDE SHALL BE TRANSVERSE BROOMED TEXTURE ROUGHER THAN SURROUNDING SIDEWALK

NOTE: (SLOPES)

1. 2% IS 1 IN 50
2. 5% IS 1 IN 20
3. 8.3% IS 1 IN 12
4. 10% IS 1 IN 10

DRAWING NOT TO SCALE

IF "A" IS:	THEN "B" FOR THE FLARED SIDE SHALL BE:
4' OR GREATER	10% MAX
3' TO LESS THAN 4'	8.33% MAX

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STREETS

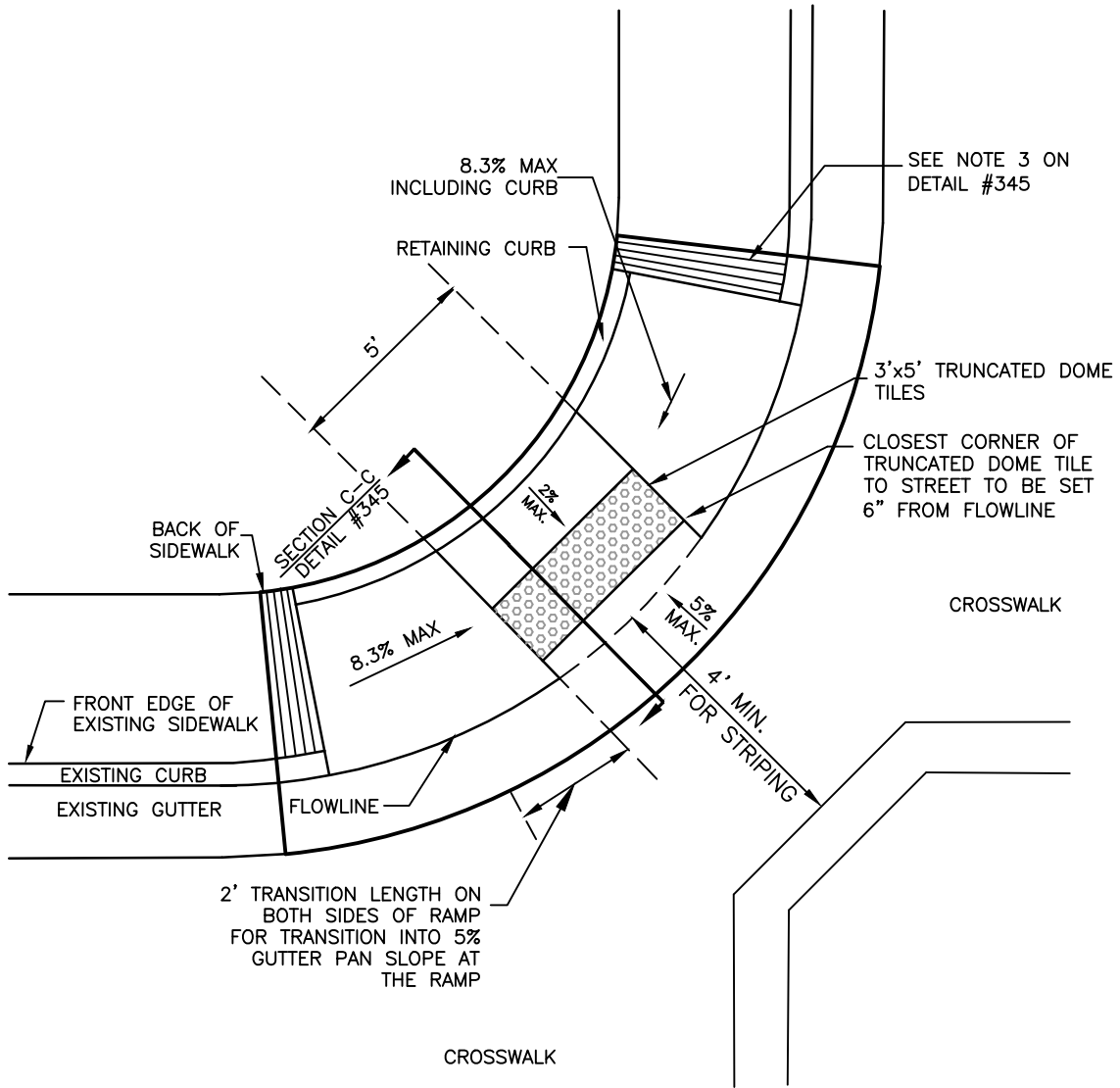
CURB RAMP

CASE J



ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

DETAIL NO.
345J



NOTE: (SLOPES)

1. 2% IS 1 IN 50
2. 5% IS 1 IN 20
3. 8.3% IS 1 IN 12
4. 10% IS 1 IN 10

DRAWING NOT TO SCALE

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

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REVISED: DATE:

STREETS

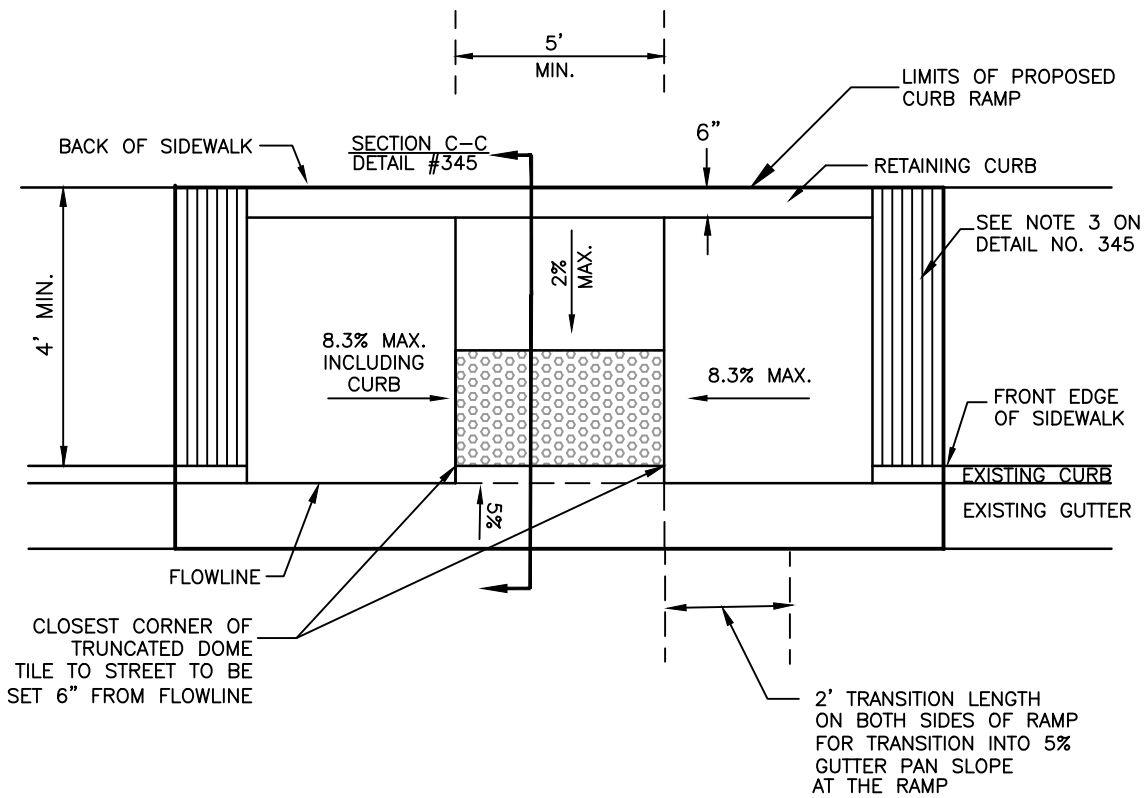
**CURB RAMP
 CASE K**

**ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345**



MODESTO
 CALIFORNIA

**DETAIL NO.
 345K**



NOTE: (SLOPES)

1. 2% IS 1 IN 50
2. 5% IS 1 IN 20
3. 8.3% IS 1 IN 12
4. 10% IS 1 IN 10

DRAWING NOT TO SCALE

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 C59650

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STREETS

**CURB RAMP
 CASE L**

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345



DETAIL NO.
345L

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INTENTIONALLY

APPROVED BY:
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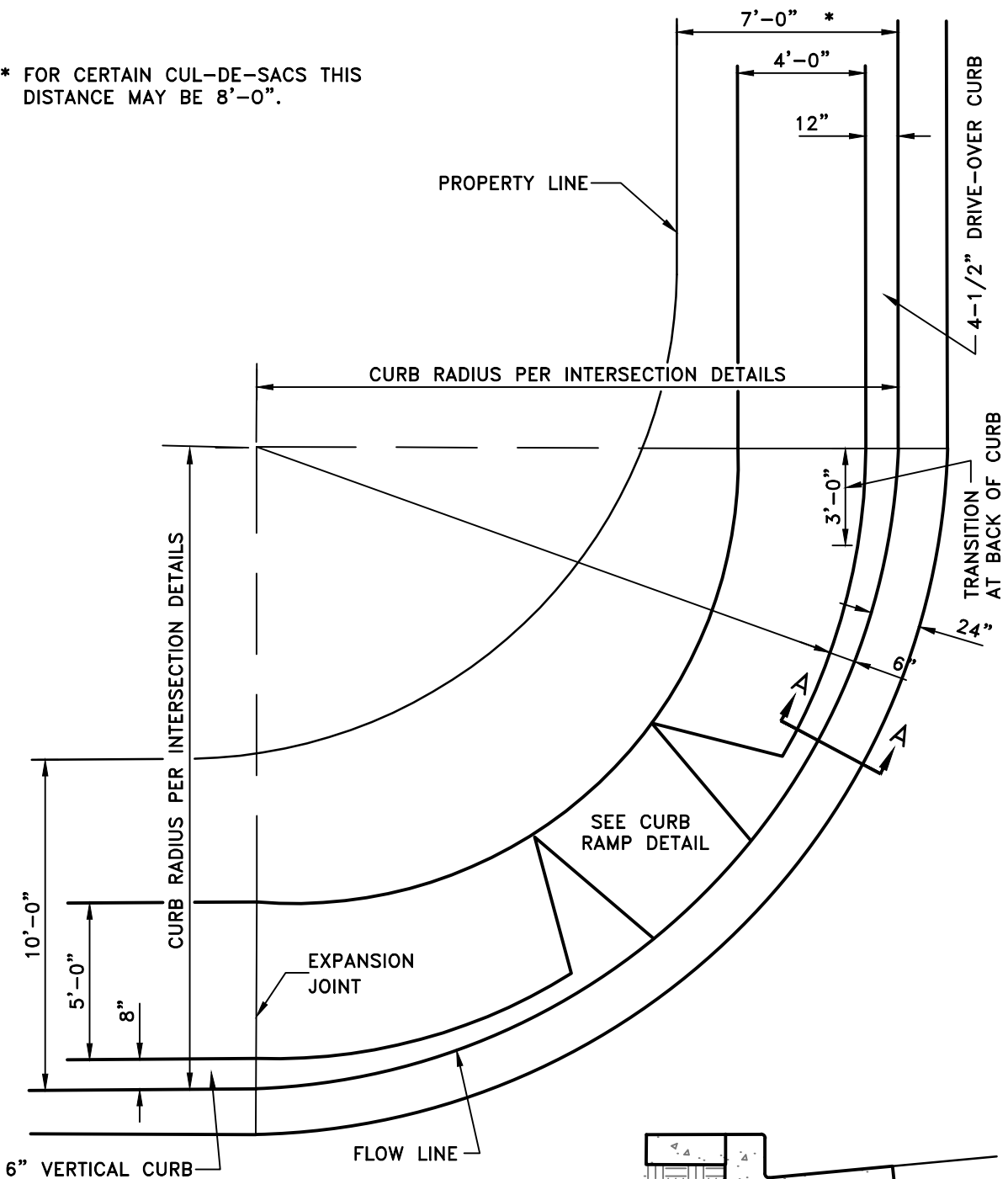
STREETS



ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

DETAIL NO.
346-348


* FOR CERTAIN CUL-DE-SACS THIS DISTANCE MAY BE 8'-0".

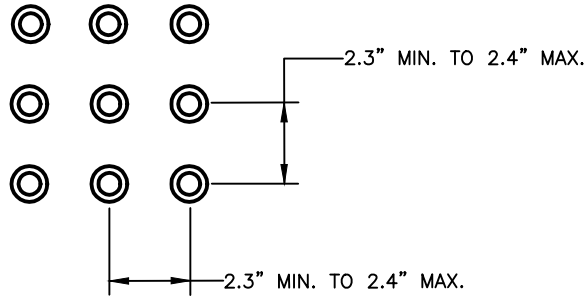


NOTE:
DRIVE APPROACHES SHALL NOT ENCROACH IN RETURNS.



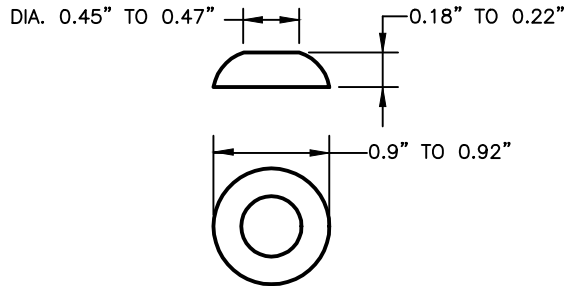
4-1/2" OR 6" RETURN CURB
SECTION A-A

APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	STREETS		 MODESTO CALIFORNIA
REVISED: DATE:	CURB & SIDEWALK RETURNS WITH TRANSITIONS		
REVISED: DATE:	ADOPTED BY CITY COUNCIL RESOLUTION NO. 2014-345		
REVISED: DATE:	DETAIL NO. 349		




EXCEPTION:
 WHERE INSTALLED IN A RADIAL PATTERN, TRUNCATED DOMES SHALL HAVE A CENTER-TO-CENTER SPACING OF 1.6 INCHES (41MM) MINIMUM TO 2.4 INCHES (61MM) MAXIMUM.

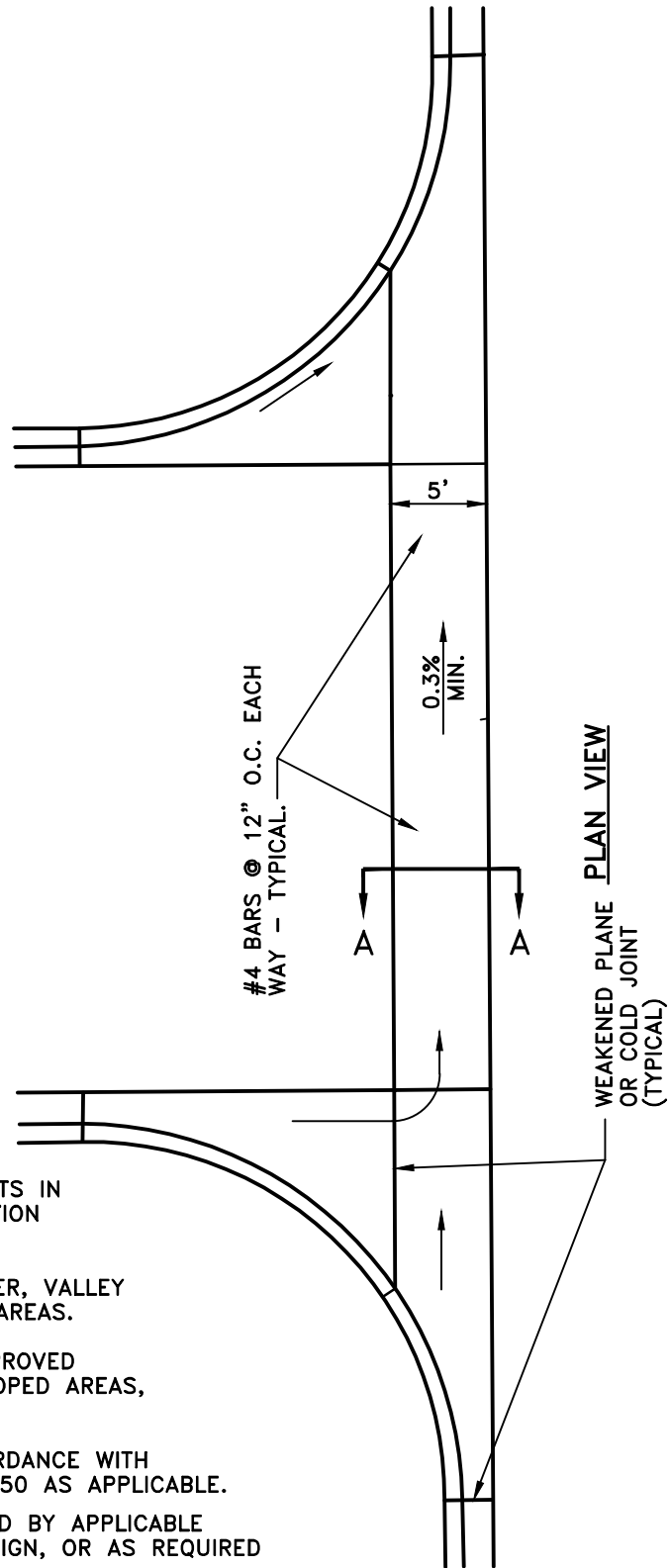
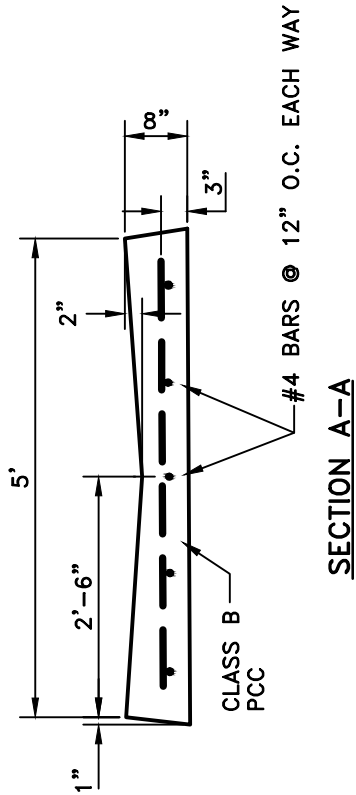
RAISED TRUNCATED DOME PATTERN



RAISED TRUNCATED DOME
FOR NON RADIUS PLATE APPLICATIONS
DRAWING NOT TO SCALE

APPROVED COLORS:
 CAST IRON PLATES – NATURAL FINISH (NO PAINTING REQUIRED)

APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	STREETS	 MODESTO CALIFORNIA
REVISED: DATE:	TRUNCATED DOME DETAIL	
REVISED: DATE:	ADOPTED BY CITY COUNCIL RESOLUTION NO. 2014-345	DETAIL NO. 350
REVISED: DATE:		



NOTES:

1. ADDITIONAL WEAKENED PLANE JOINTS IN ACCORDANCE WITH THE CONSTRUCTION STANDARDS (SECTION 3.05 B).
2. IF APPROVED BY THE CITY ENGINEER, VALLEY GUTTER MAY BE USED IN IN-FILL AREAS.
3. VALLEY GUTTERS WILL NOT BE APPROVED ACROSS STREETS IN NEWLY DEVELOPED AREAS, EXCEPT CUL-DE-SACS.
4. CONSTRUCT CURB RAMPS IN ACCORDANCE WITH CURB RAMP DETAILS #345 THRU 350 AS APPLICABLE.
5. SPECIFY CURB RADIUS AS REQUIRED BY APPLICABLE STANDARD DETAIL FOR STREET DESIGN, OR AS REQUIRED BY CITY ENGINEER.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

STREETS

VALLEY GUTTER



ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
351

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INTENTIONALLY

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

REVISED: DATE:

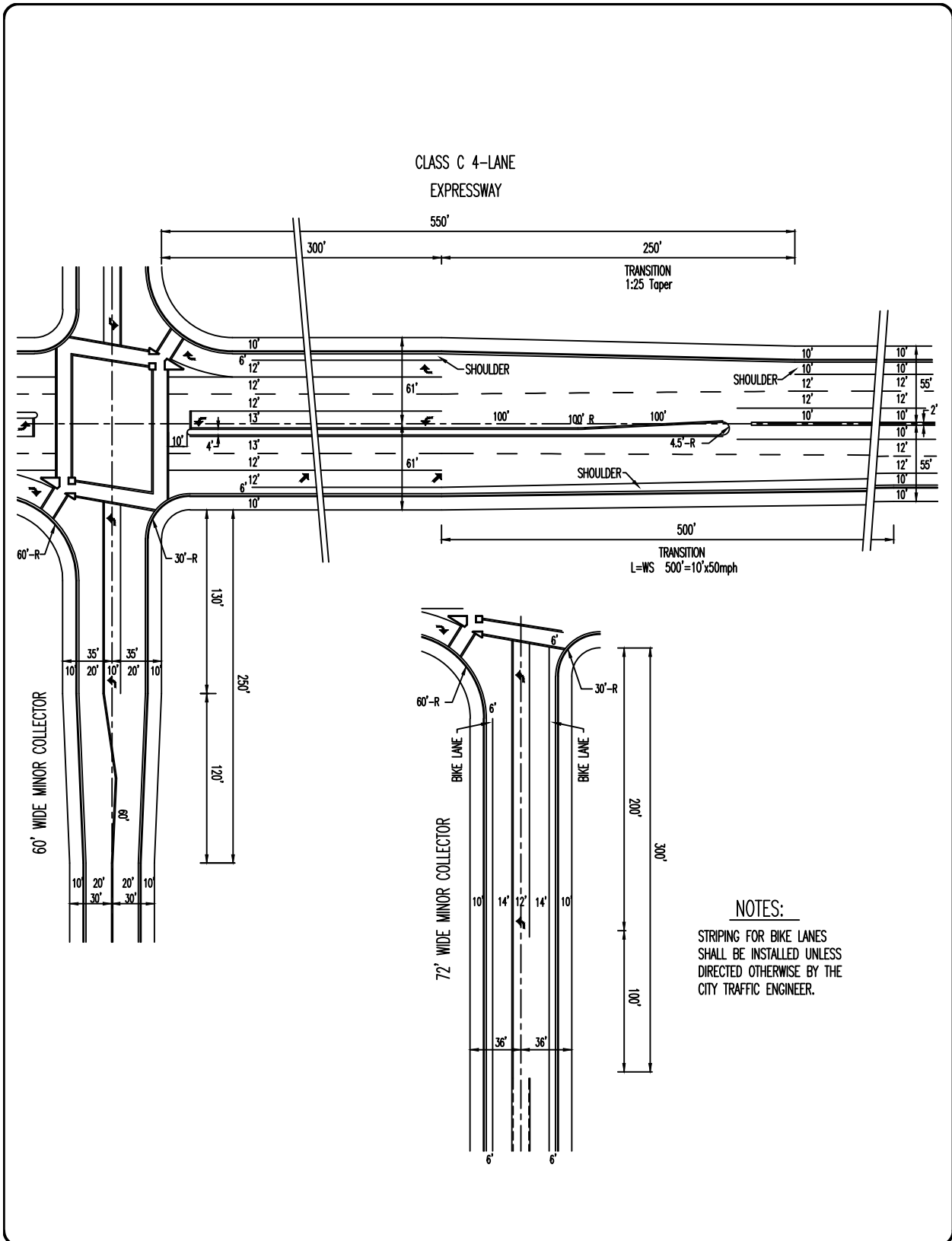
REVISED: DATE:

STREETS



ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

DETAIL NO.
352



NOTES:
 STRIPING FOR BIKE LANES SHALL BE INSTALLED UNLESS DIRECTED OTHERWISE BY THE CITY TRAFFIC ENGINEER.

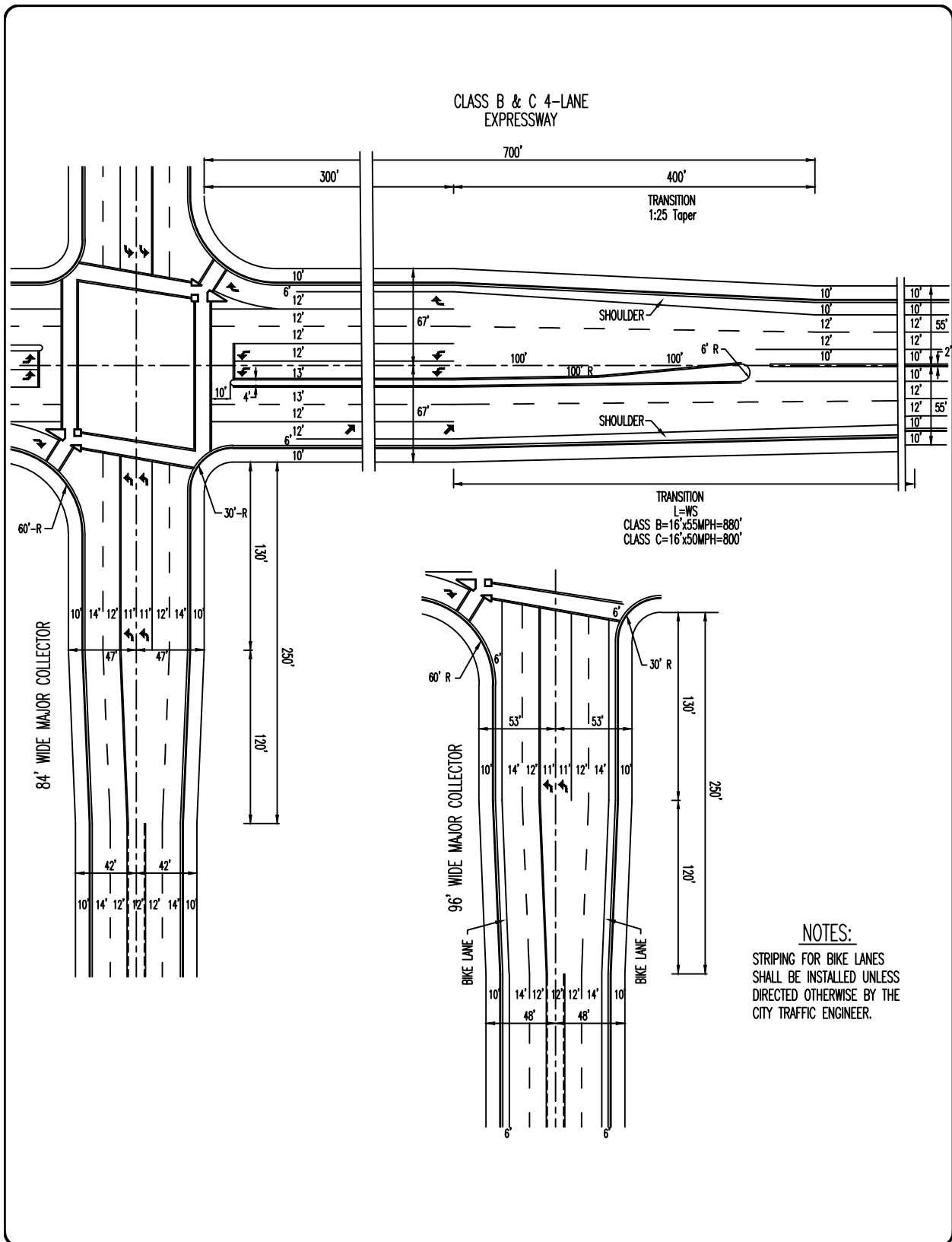
APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
REVISED:	DATE:
REVISED:	DATE:
REVISED:	DATE:

STREETS
CLASS C 4-LANE EXPRESSWAY AT A MINOR COLLECTOR

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

DETAIL NO.
353



APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
REVISED:	DATE:
REVISED:	DATE:
REVISED:	DATE:

STREETS

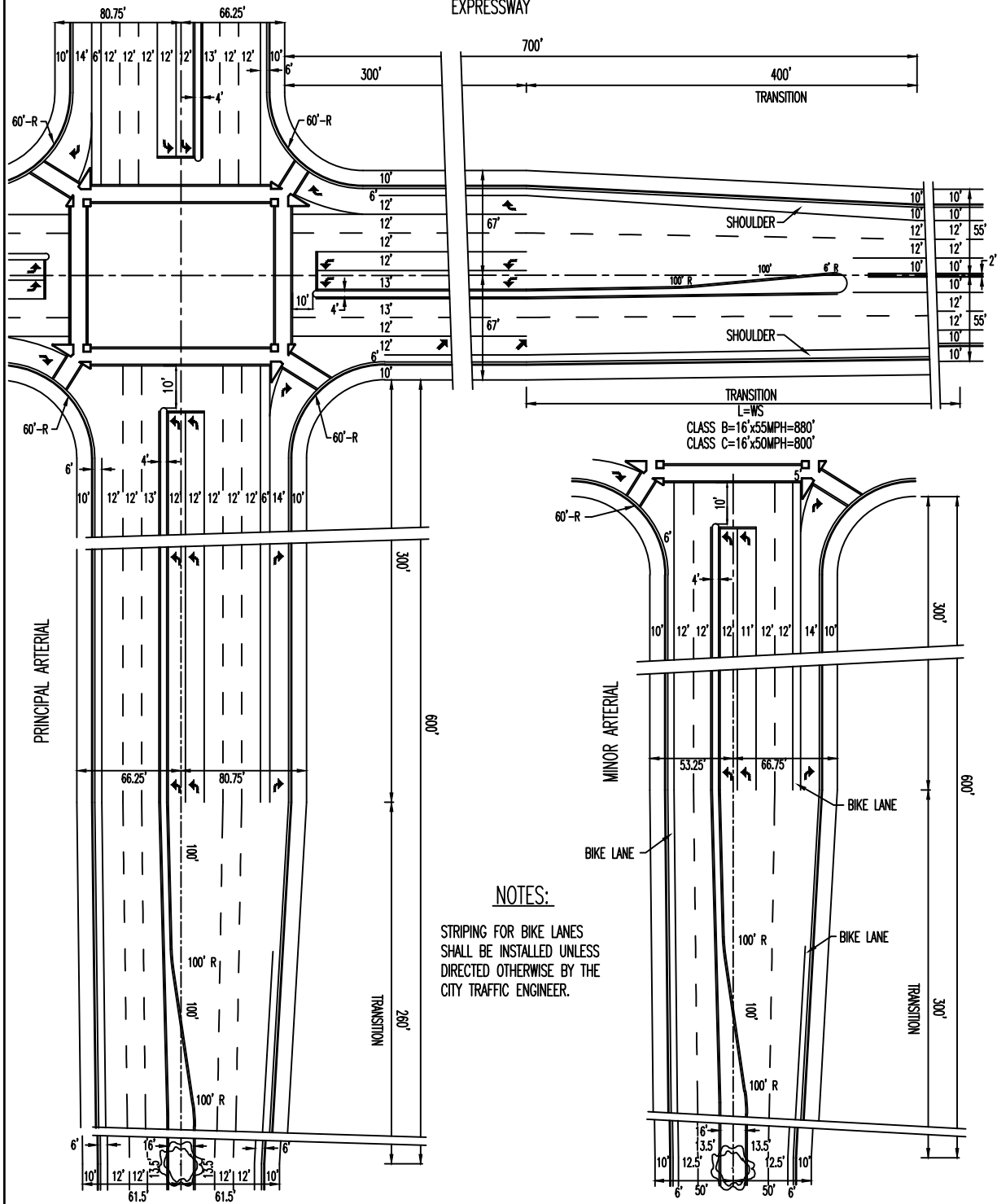
CLASS B & C 4-LANE EXPRESSWAY AT A MAJOR COLLECTOR

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

DETAIL NO.
354

CLASS B & C 4-LANE EXPRESSWAY



APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

REVISED: DATE:

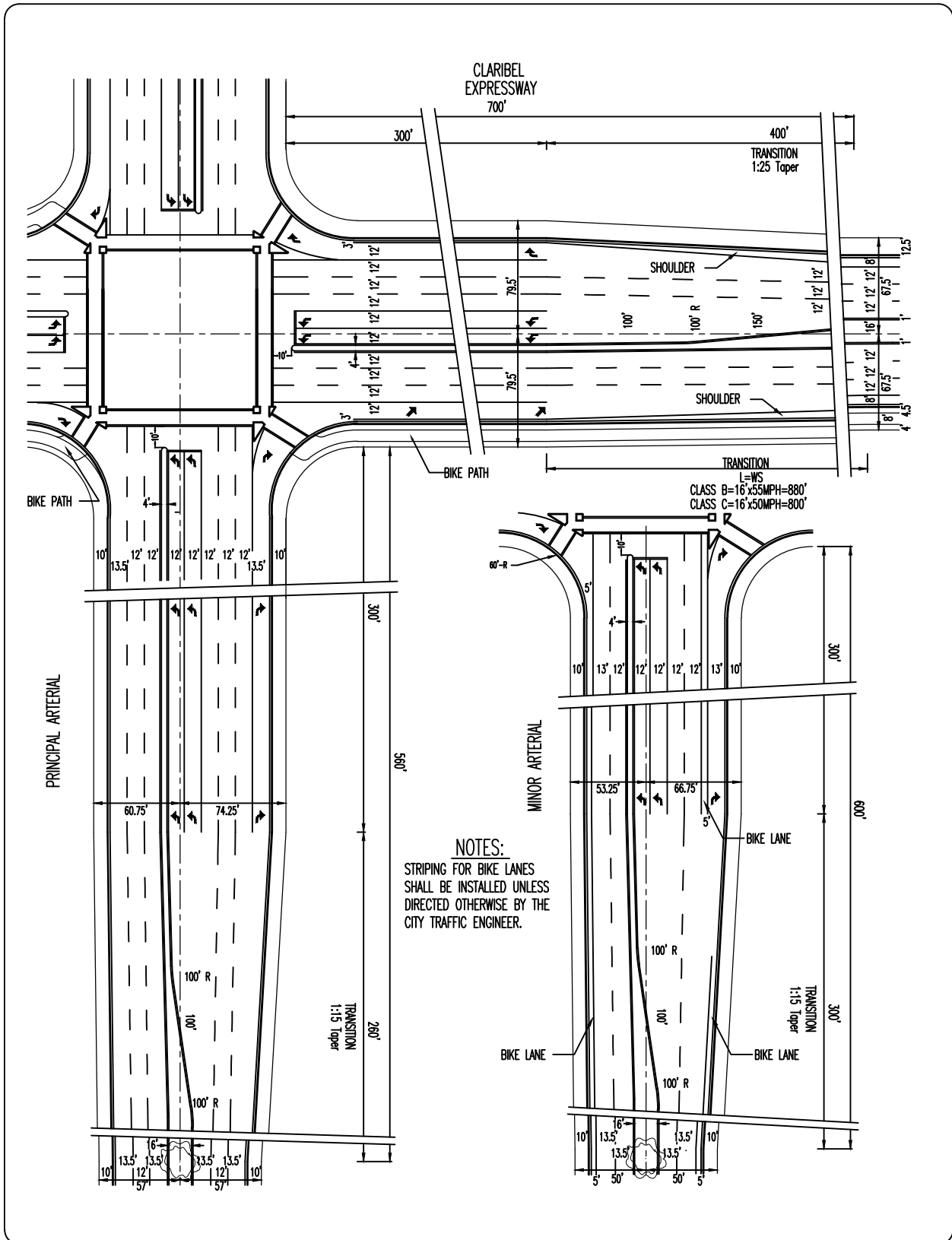
REVISED: DATE:

STREETS
CLASS B & C 4-LANE EXPRESSWAY AT A PRINCIPAL ARTERIAL

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345



DETAIL NO.
355




APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
REVISED:	DATE:
REVISED:	DATE:
REVISED:	DATE:

STREETS

CLARIBEL EXPRESSWAY

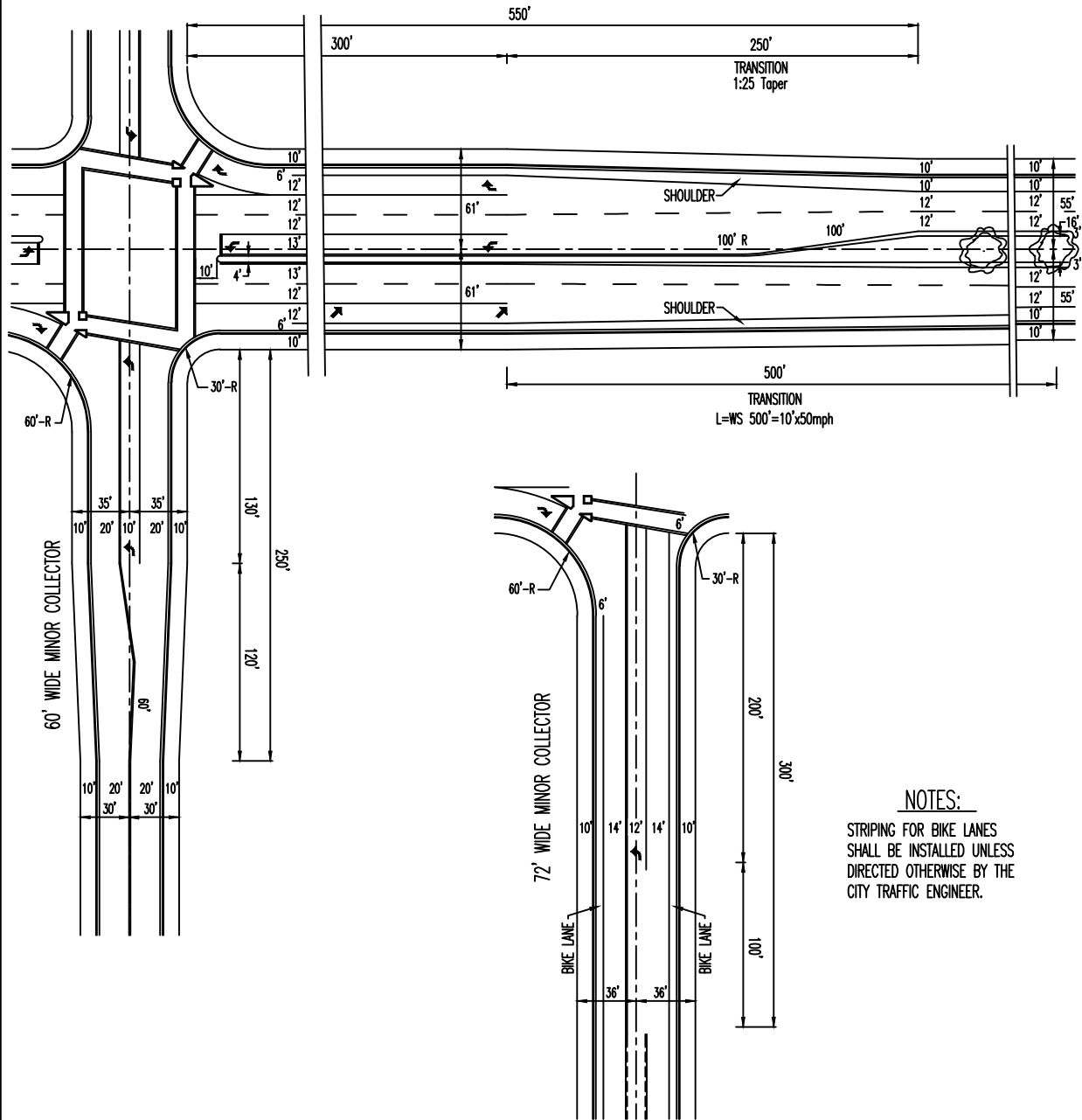
ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



MODESTO
CALIFORNIA

DETAIL NO.
355A

CLASS C 4-LANE
LANDSCAPED EXPRESSWAY



NOTES:

STRIPING FOR BIKE LANES
SHALL BE INSTALLED UNLESS
DIRECTED OTHERWISE BY THE
CITY TRAFFIC ENGINEER.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

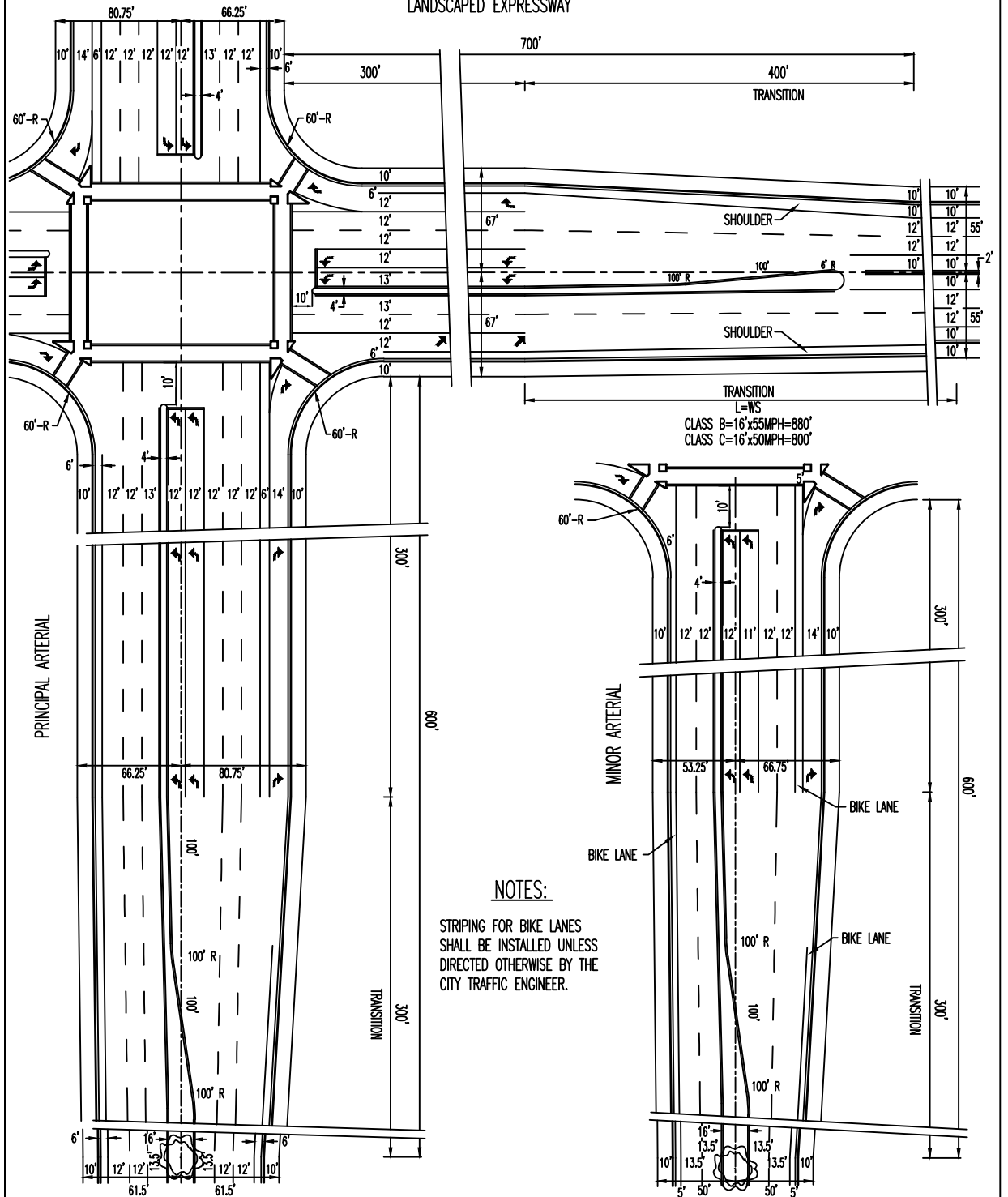
STREETS
CLASS C 4-LANE
LANDSCAPED EXPRESSWAY
AT A MINOR COLLECTOR

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



DETAIL NO.
356

CLASS B & C 4-LANE
LANDSCAPED EXPRESSWAY



APPROVED BY:
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C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

STREETS

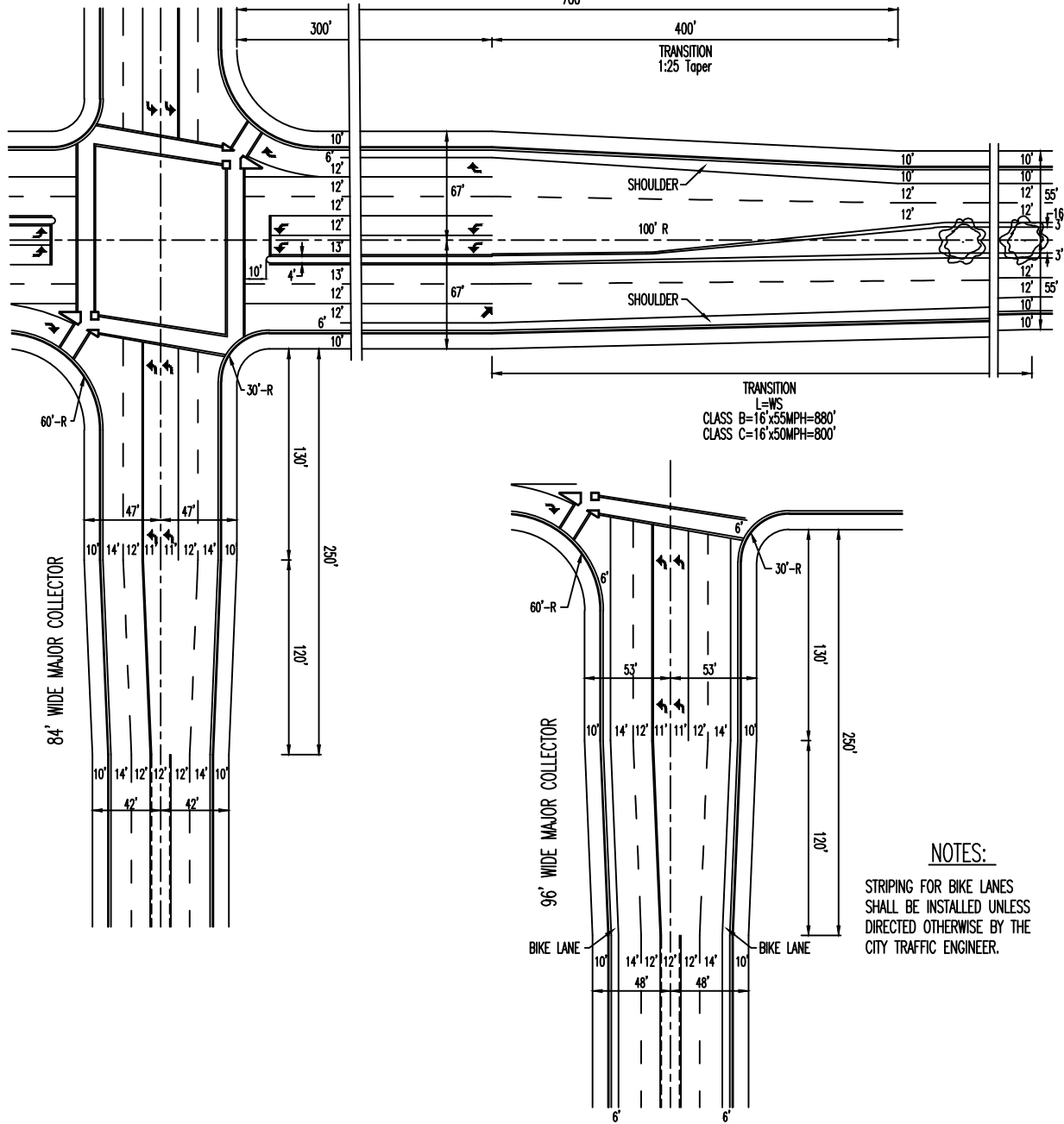
**CLASS B & C 4-LANE
LANDSCAPED EXPRESSWAY
AT A PRINCIPAL ARTERIAL**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

MODесто CALIFORNIA

DETAIL NO.
357

CLASS B & C 4-LANE
LANDSCAPED EXPRESSWAY
700'



NOTES:

STRIPING FOR BIKE LANES SHALL BE INSTALLED UNLESS DIRECTED OTHERWISE BY THE CITY TRAFFIC ENGINEER.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

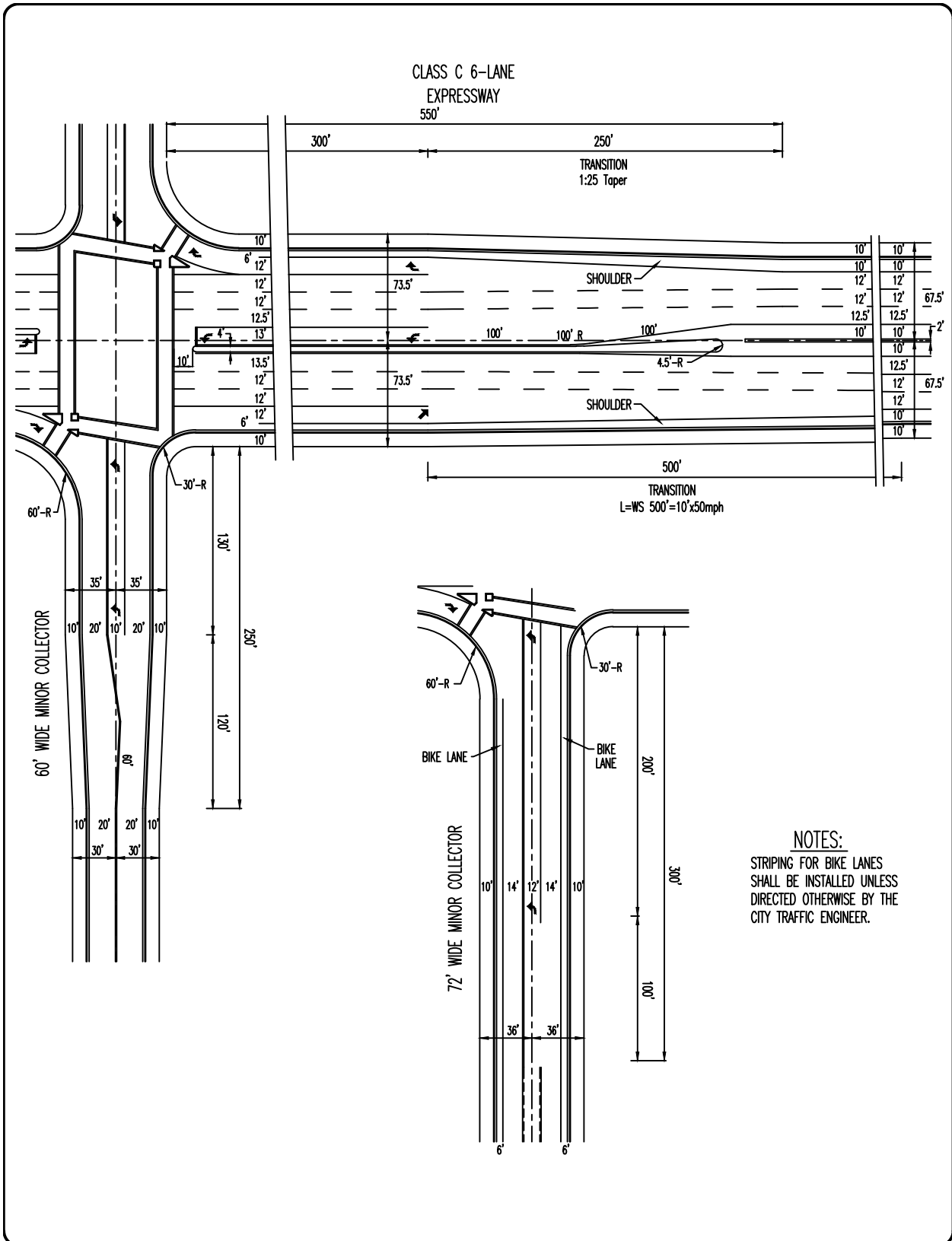
STREETS

**CLASS B & C 4-LANE
LANDSCAPED EXPRESSWAY
AT A MAJOR COLLECTOR**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



DETAIL NO.
358



APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
REVISED:	DATE:
REVISED:	DATE:
REVISED:	DATE:

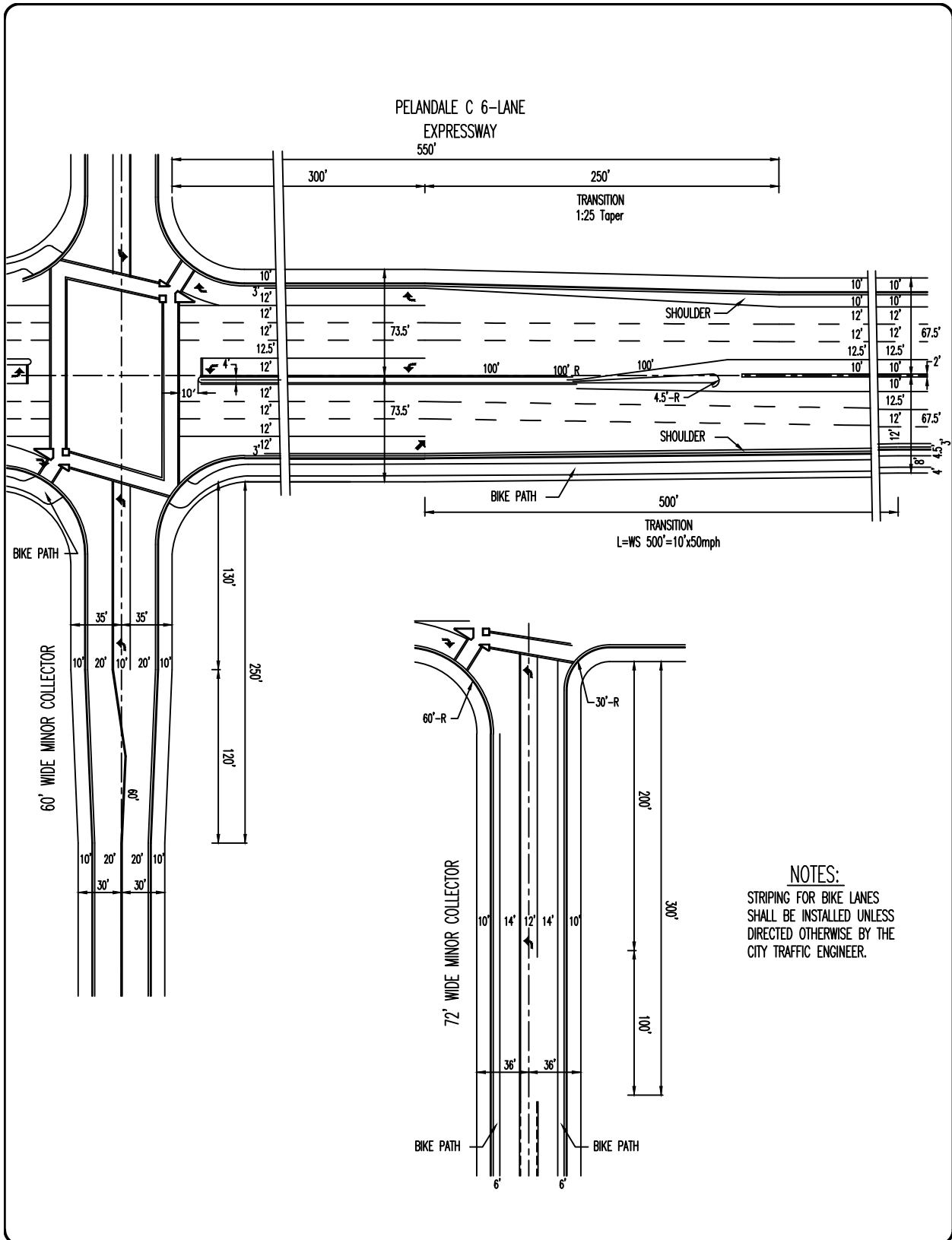
STREETS

**CLASS C 6-LANE
EXPRESSWAY AT A
MINOR COLLECTOR**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

DETAIL NO.
359



APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

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REVISED: DATE:

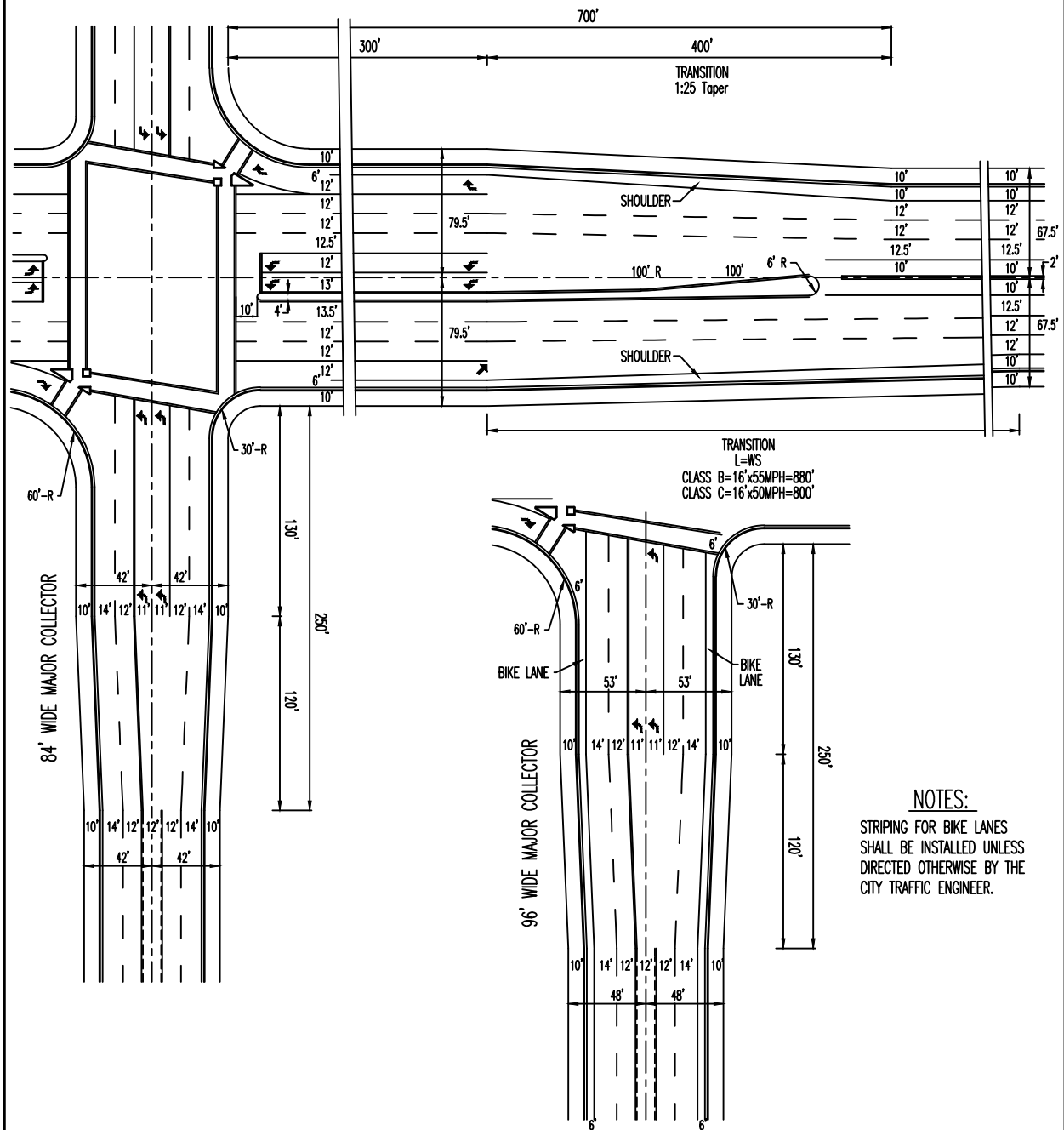
STREETS
PELANDALE AVENUE
CLASS C 6-LANE
EXPRESSWAY

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

DETAIL NO.
359A

CLASS B & C 6-LANE EXPRESSWAY



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C59650

REVISED: DATE:

REVISED: DATE:

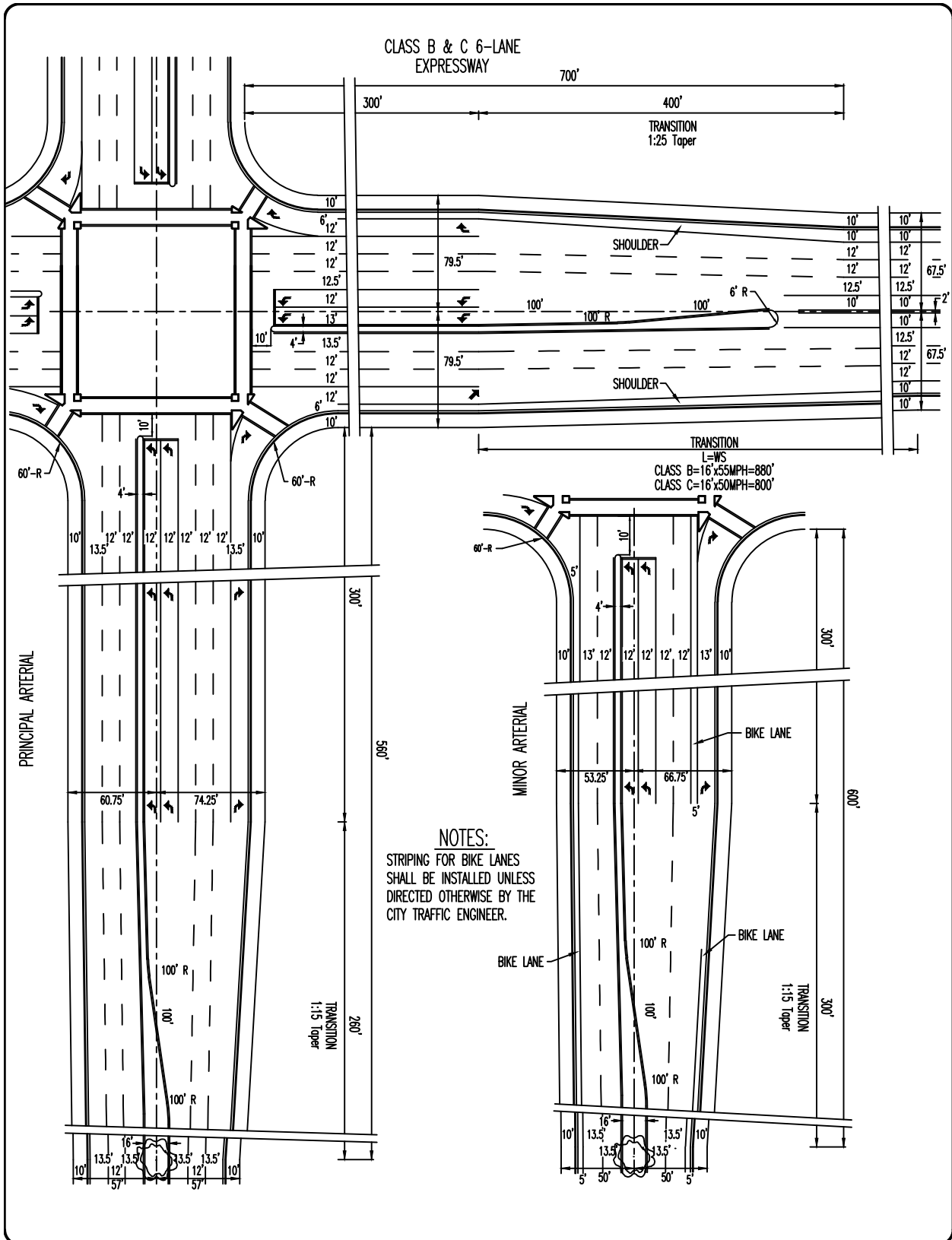
REVISED: DATE:

STREETS
CLASS B & C 6-LANE EXPRESSWAY AT A MAJOR COLLECTOR

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



DETAIL NO.
360



APPROVED BY:
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C59650

REVISED: DATE:

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REVISED: DATE:

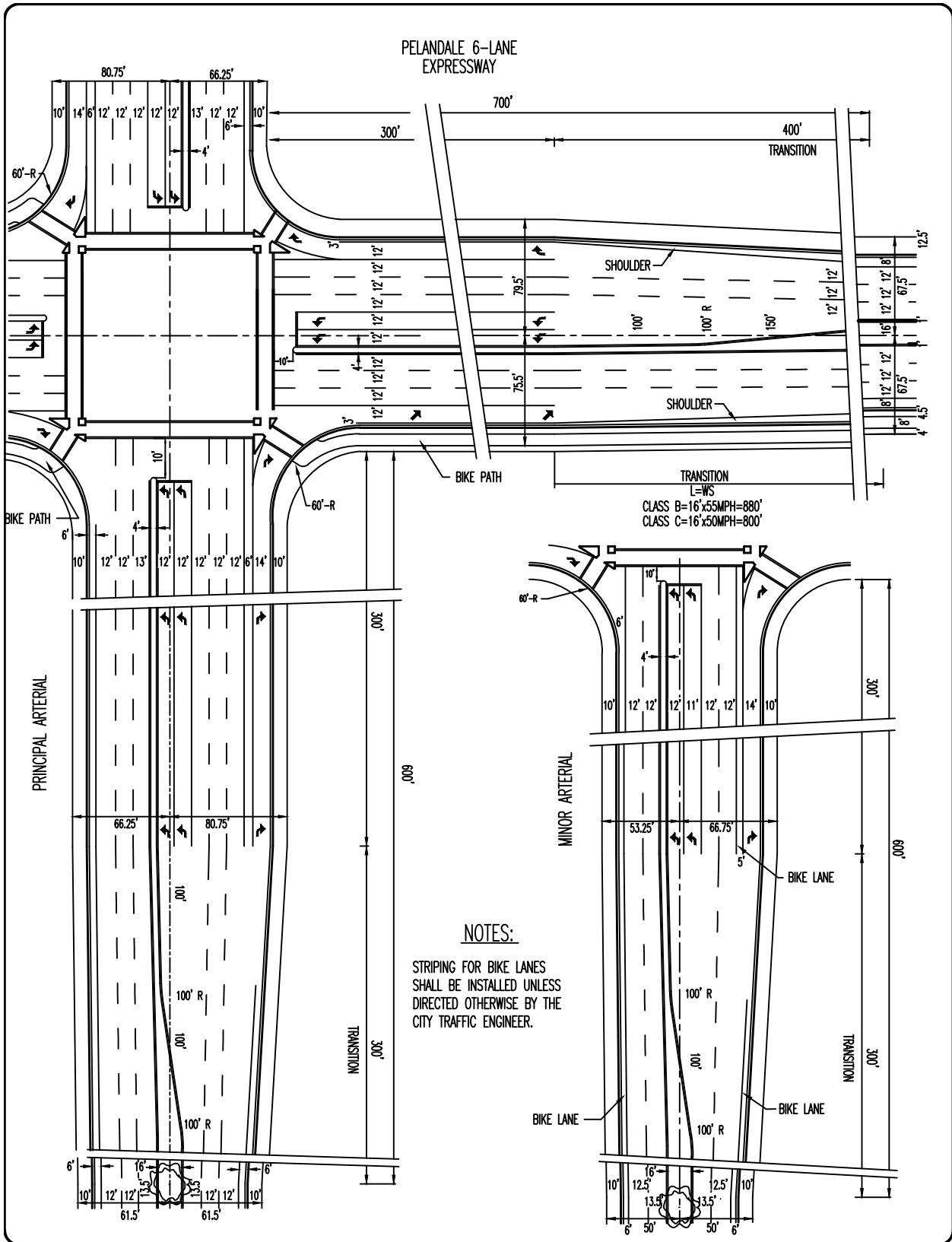
STREETS

CLASS B & C 6-LANE EXPRESSWAY AT A PRINCIPAL AND MINOR ARTERIAL

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

DETAIL NO.
361



APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
REVISED:	DATE:
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REVISED:	DATE:

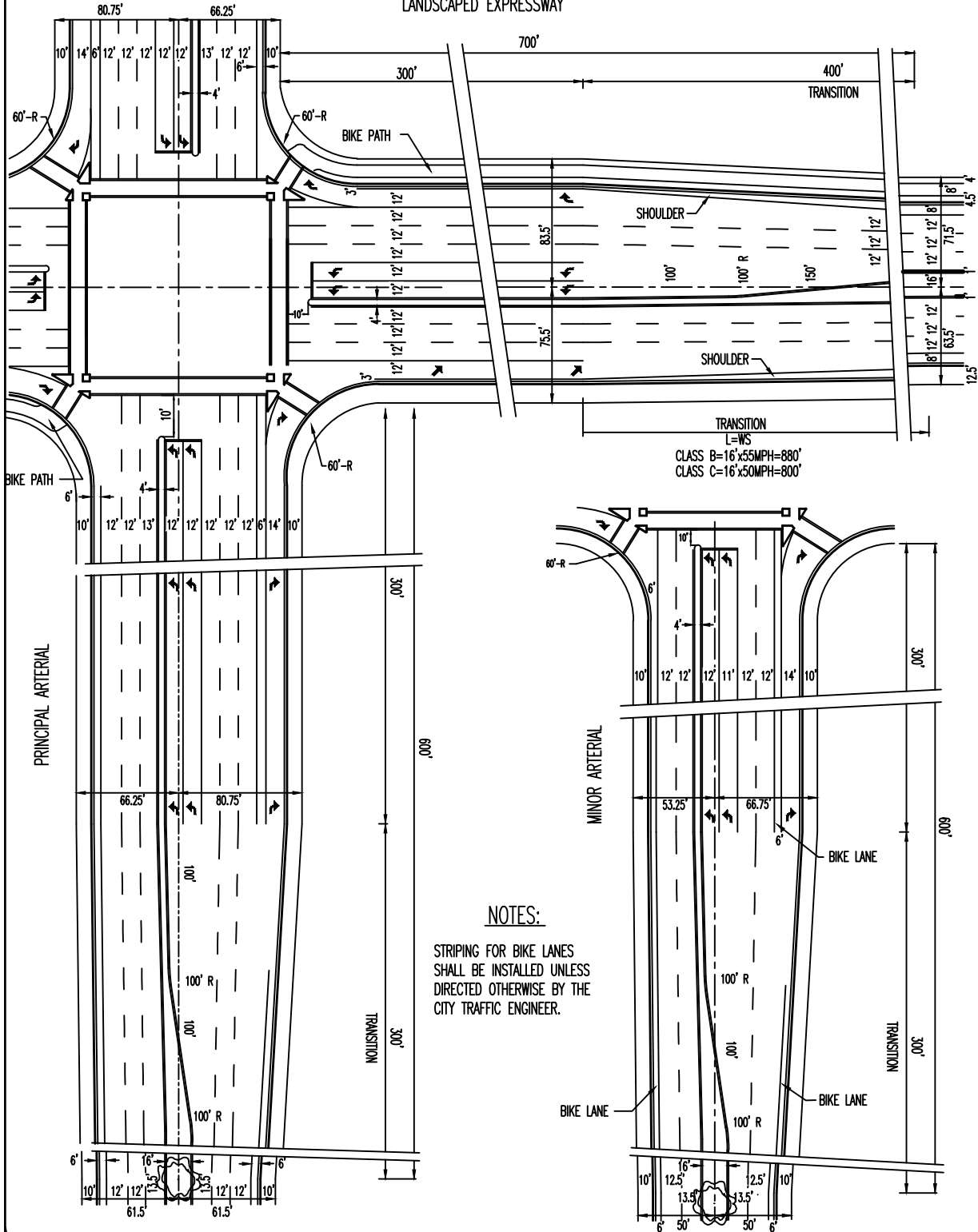
STREETS
PELANDALE EXPRESSWAY
AT A PRINCIPAL AND
MINOR ARTERIAL

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

DETAIL NO.
361A

CLASS B & C 6-LANE
LANDSCAPED EXPRESSWAY



APPROVED BY:
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C59650

REVISED: DATE:

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REVISED: DATE:

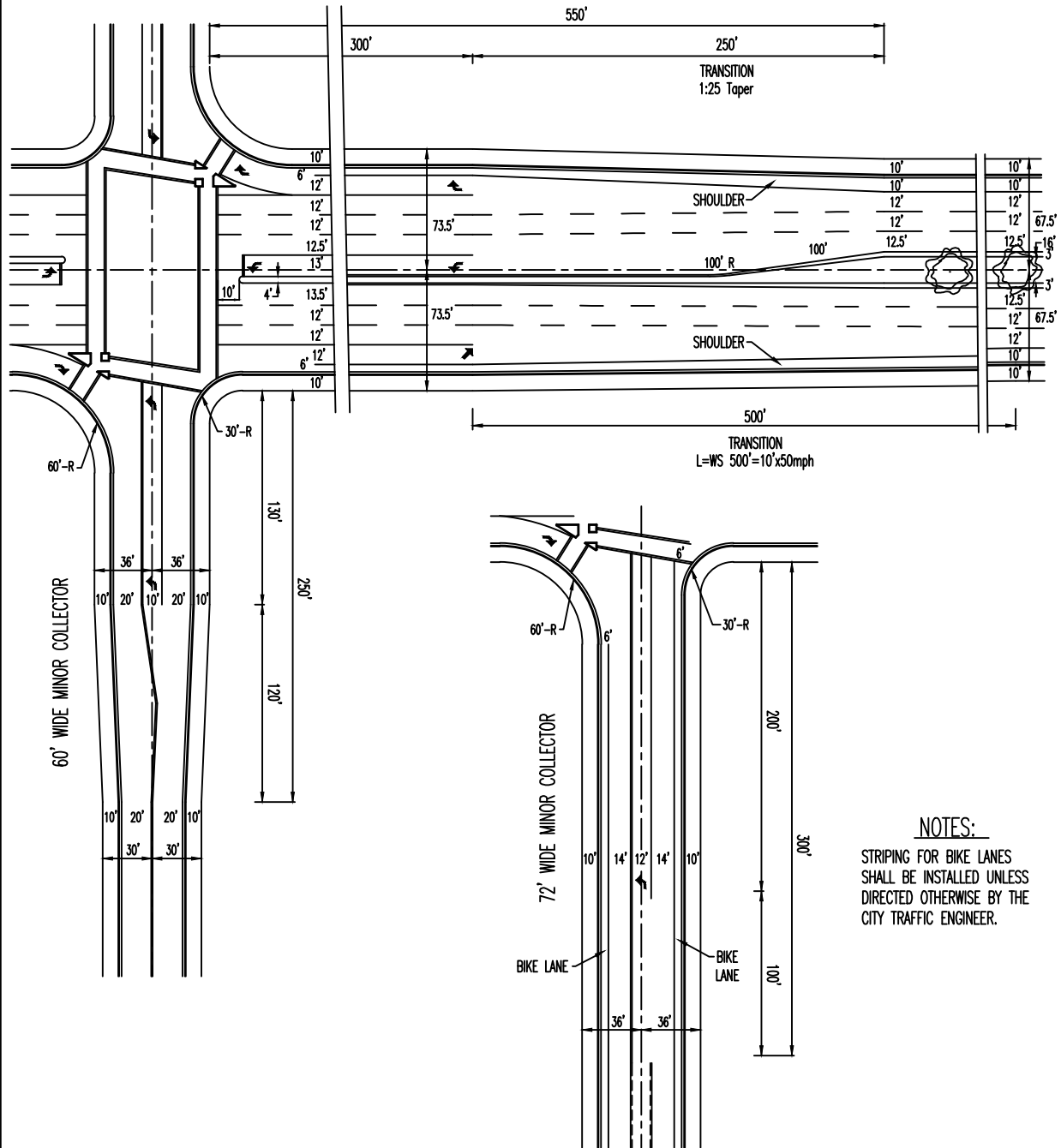
STREETS
CLARATINA EXPRESSWAY
AT A PRINCIPAL AND
MINOR ARTERIAL

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



DETAIL NO.
361B

CLASS C 6-LANE
LANDSCAPED EXPRESSWAY



NOTES:
STRIPING FOR BIKE LANES SHALL BE INSTALLED UNLESS DIRECTED OTHERWISE BY THE CITY TRAFFIC ENGINEER.

APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
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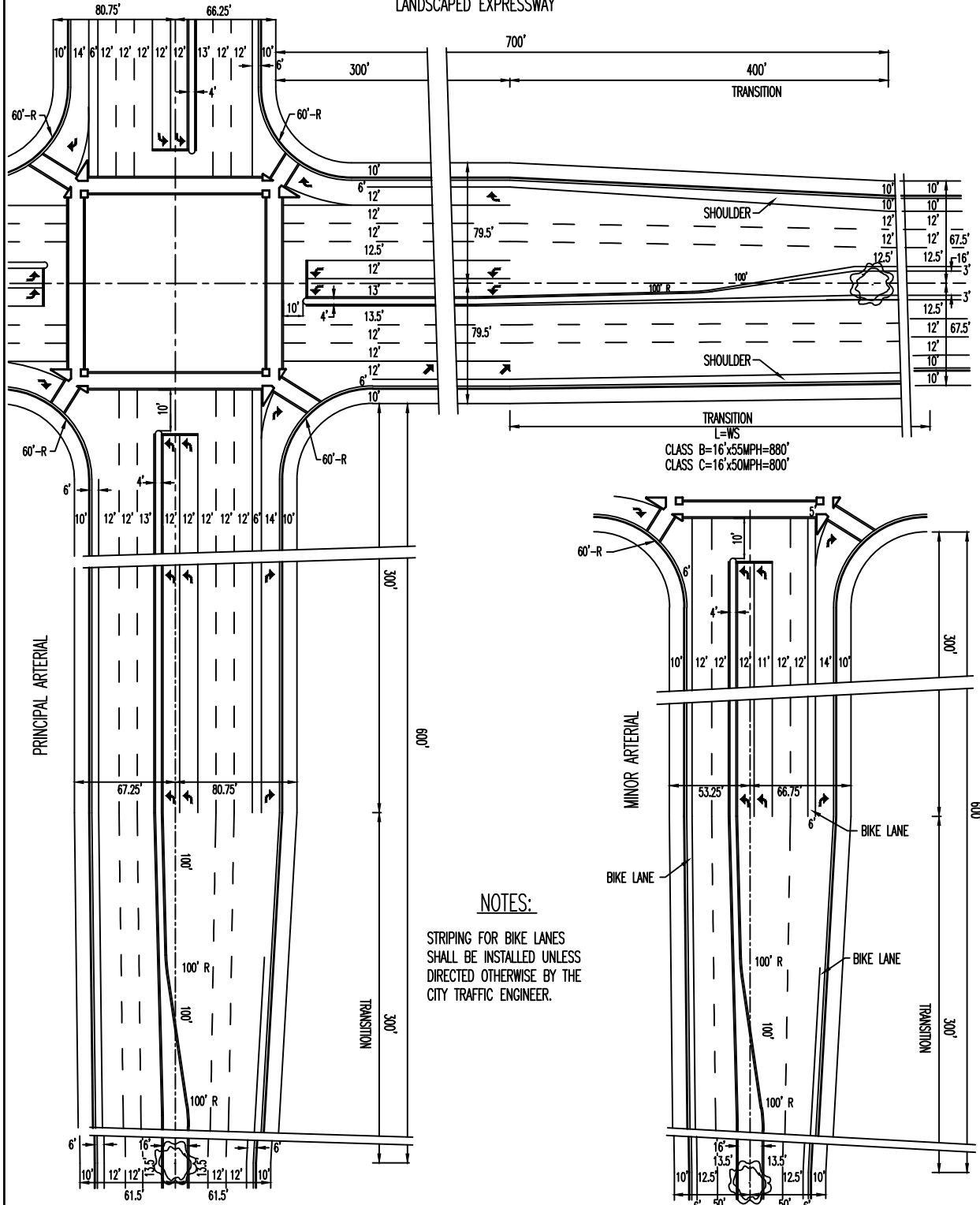
STREETS
**CLASS C 6-LANE
LANDSCAPED EXPRESSWAY
AT A MINOR COLLECTOR**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

DETAIL NO.
362

CLASS B & C 6-LANE
LANDSCAPED EXPRESSWAY



APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

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REVISED: DATE:

STREETS

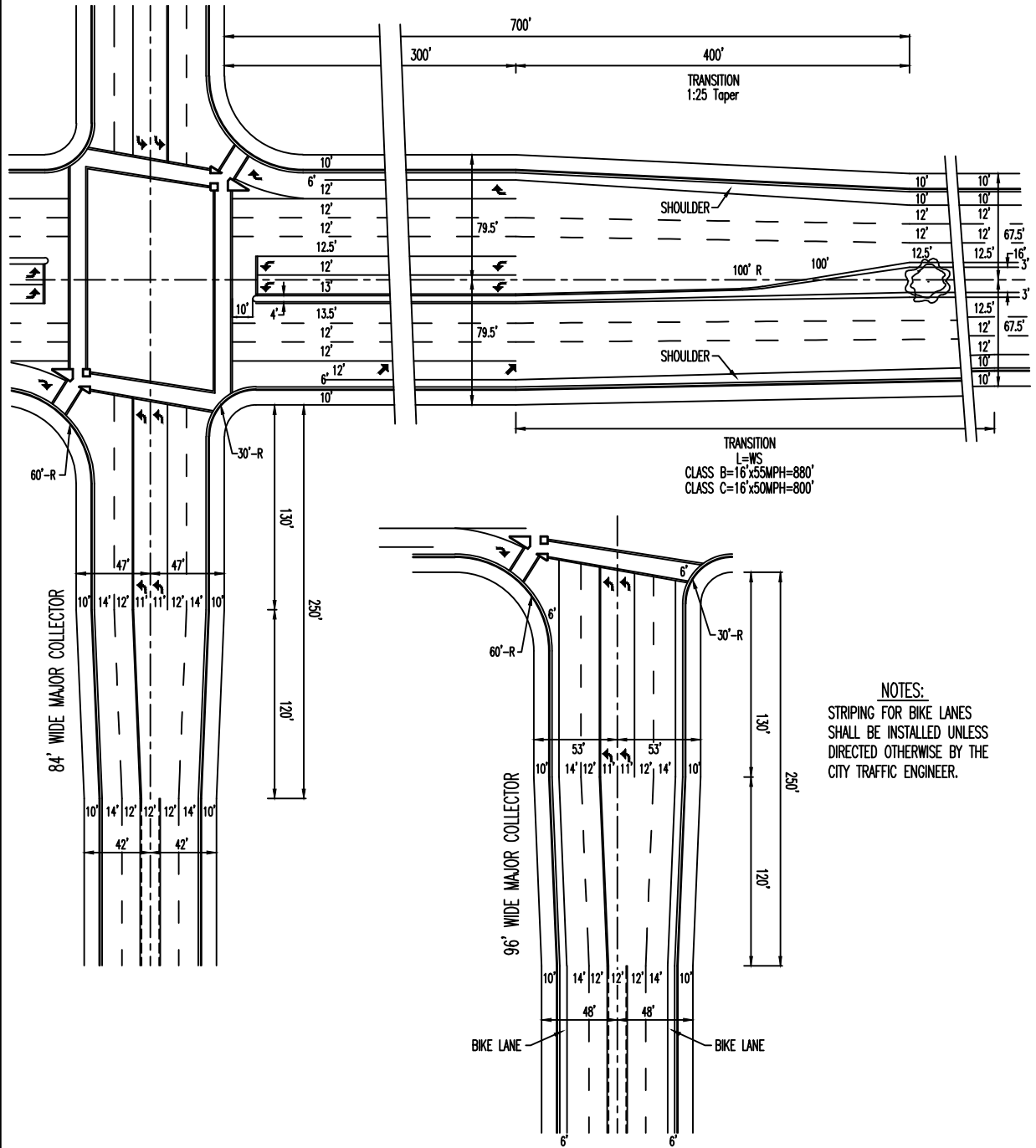
CLASS B & C 6-LANE
LANDSCAPED EXPRESSWAY
AT A PRINCIPAL ARTERIAL



ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

DETAIL NO.
363

CLASS B & C 6-LANE
LANDSCAPED EXPRESSWAY



APPROVED BY:
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C59650

REVISED: DATE:

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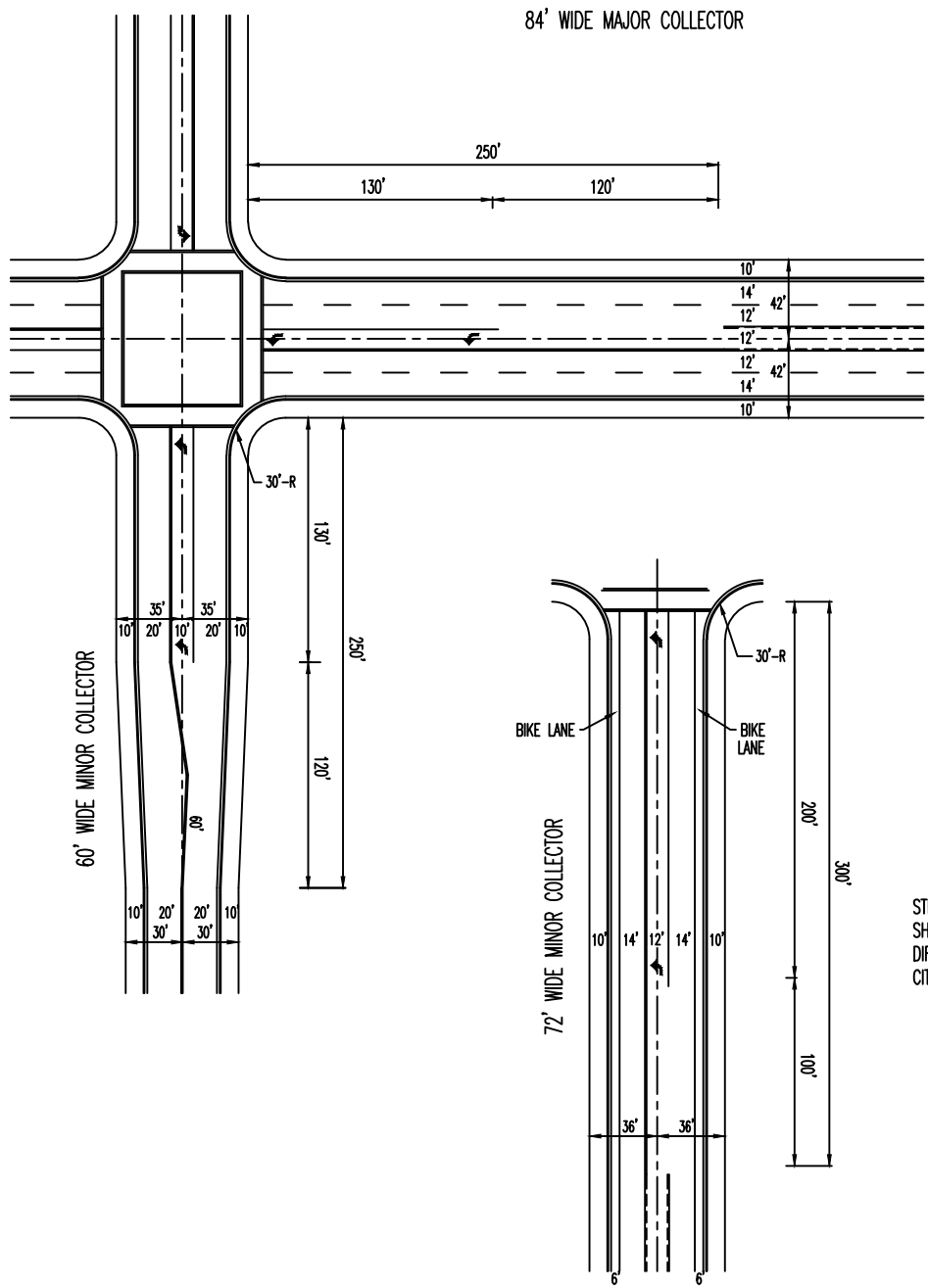
STREETS

CLASS B & C 6-LANE
LANDSCAPED EXPRESSWAY
AT A MAJOR COLLECTOR

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



DETAIL NO.
364



NOTES:
 STRIPING FOR BIKE LANES SHALL BE INSTALLED UNLESS DIRECTED OTHERWISE BY THE CITY TRAFFIC ENGINEER.

APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
REVISED:	DATE:
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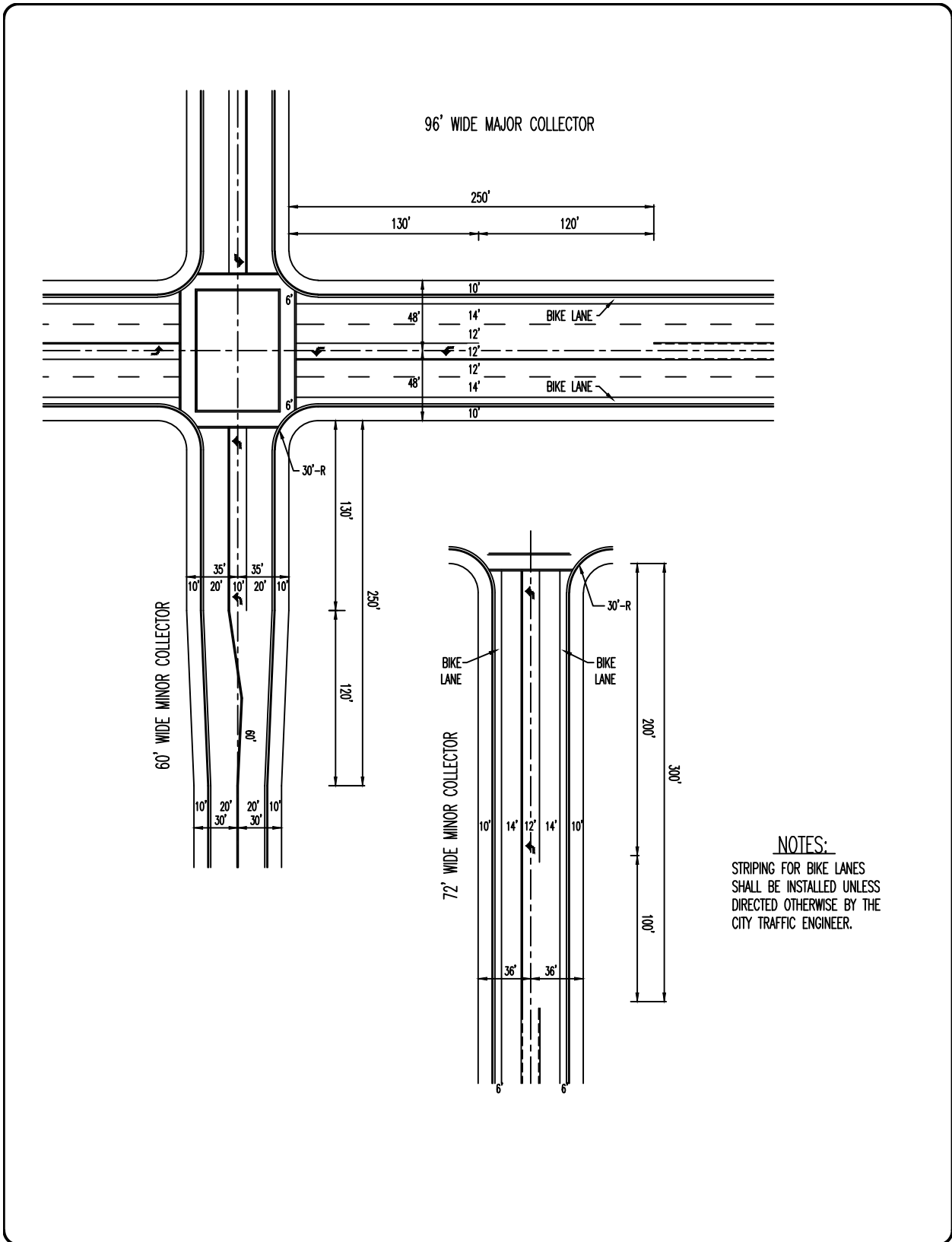
STREETS

84' WIDE MAJOR COLLECTOR AT A MINOR COLLECTOR

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

DETAIL NO.
365



APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
REVISED:	DATE:
REVISED:	DATE:
REVISED:	DATE:

STREETS

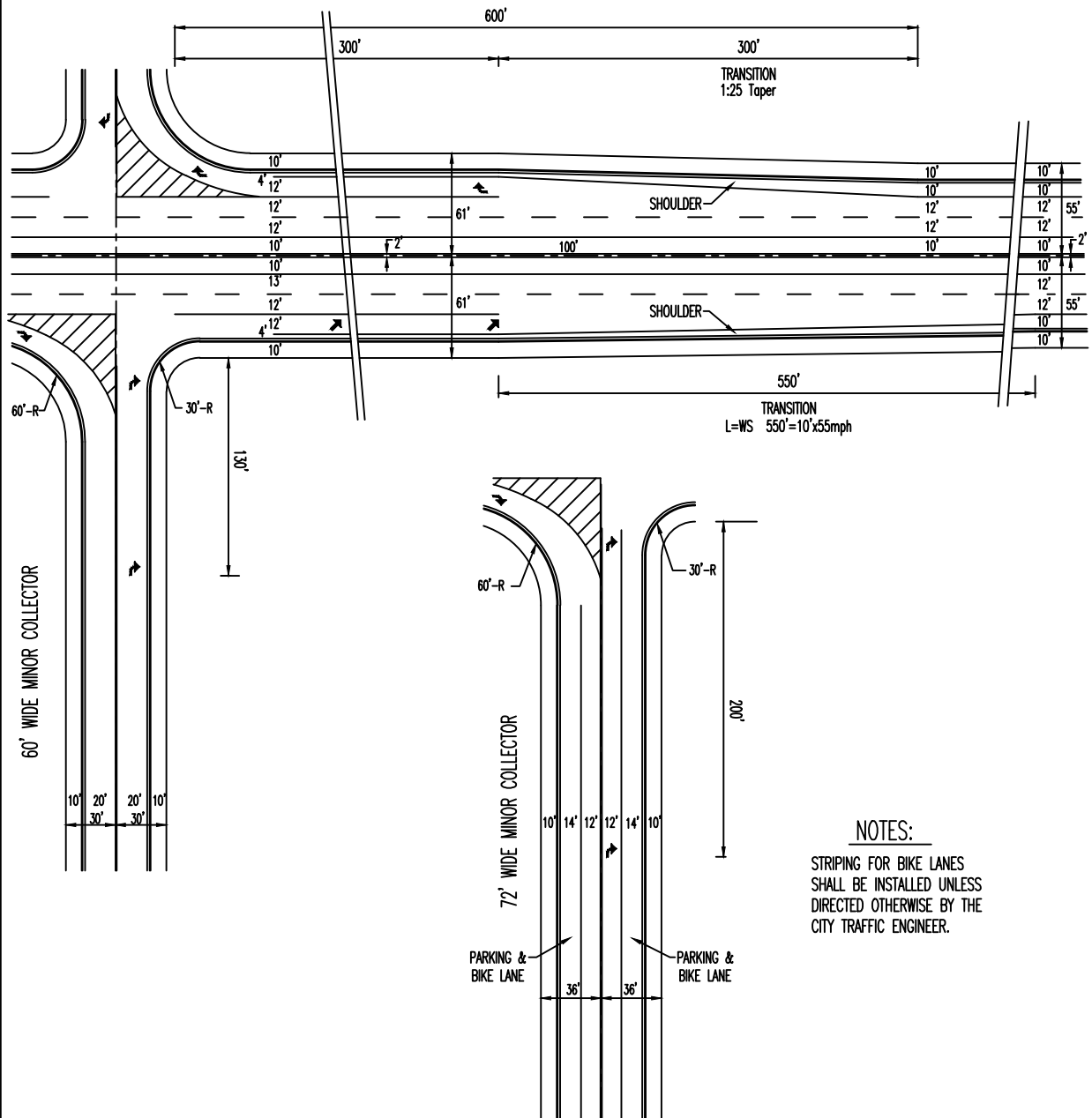
96' WIDE MAJOR COLLECTOR AT A MINOR COLLECTOR

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

DETAIL NO.
366

CLASS B 4-LANE
EXPRESSWAY



NOTES:

STRIPING FOR BIKE LANES
SHALL BE INSTALLED UNLESS
DIRECTED OTHERWISE BY THE
CITY TRAFFIC ENGINEER.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

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STREETS

CLASS B 4-LANE
EXPRESSWAY AT A
MINOR COLLECTOR

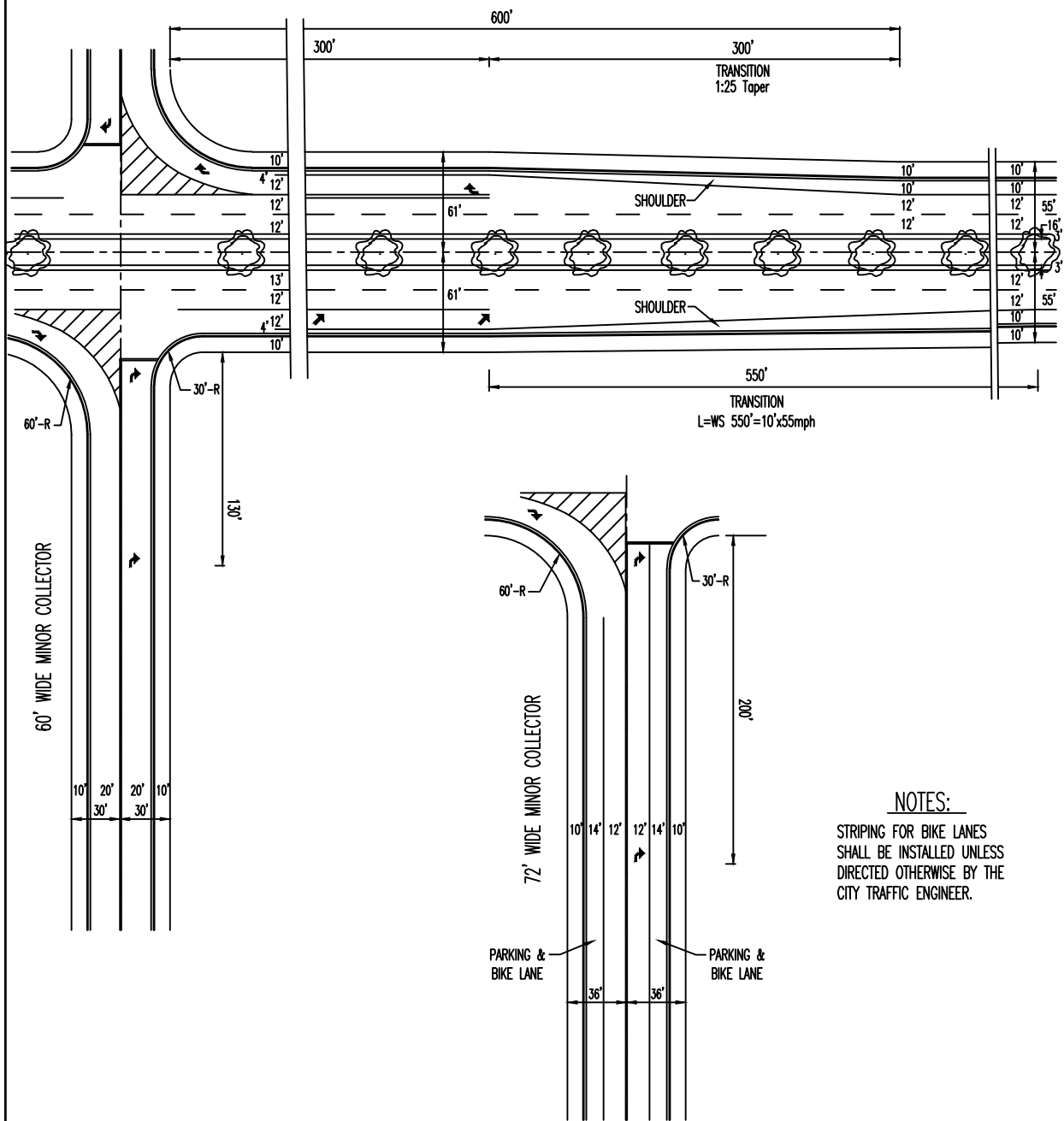
ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



MODESTO
CALIFORNIA

DETAIL NO.
367

CLASS B 4-LANE
LANDSCAPED EXPRESSWAY



APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

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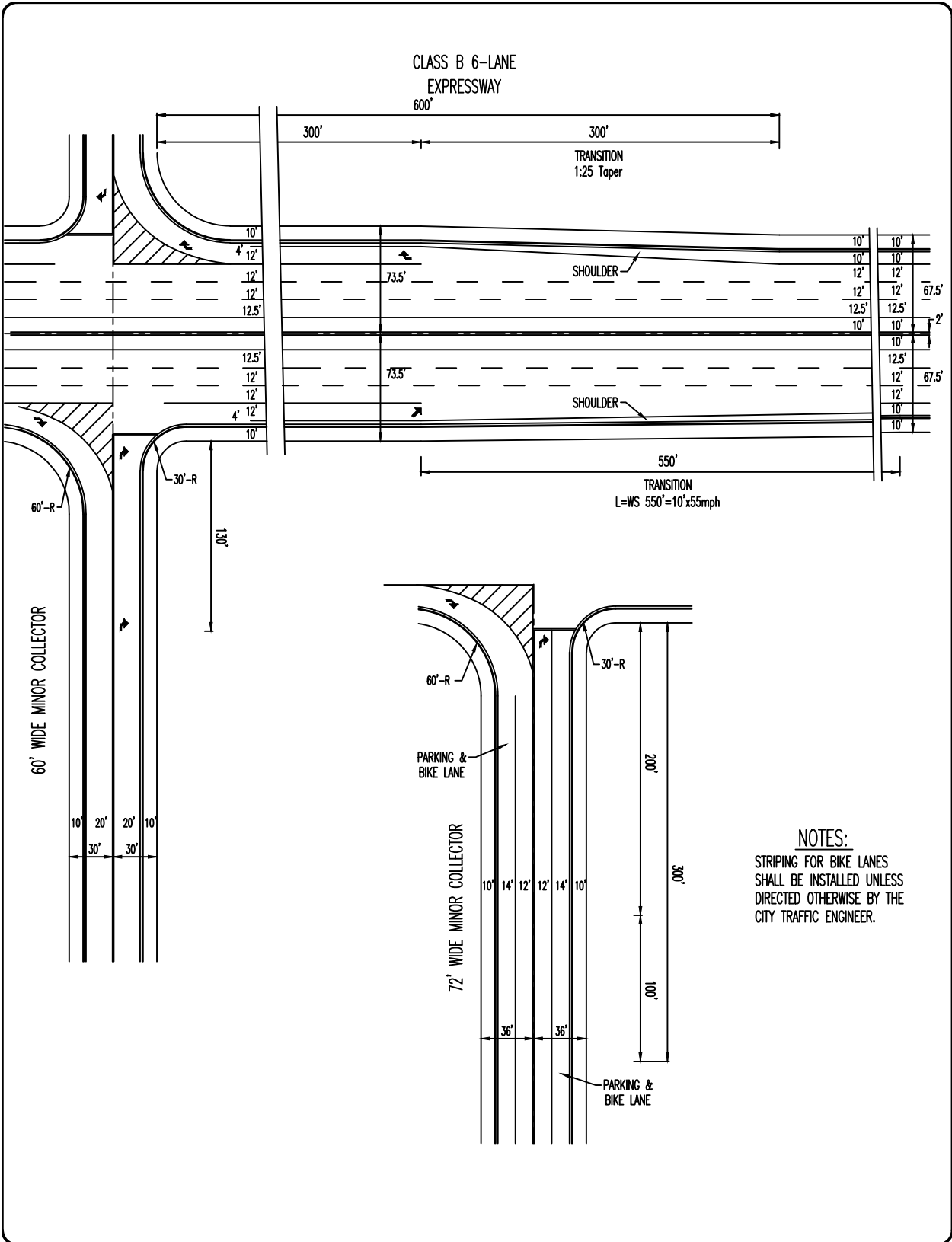
REVISED: DATE:

STREETS
CLASS B 4-LANE
LANDSCAPED EXPRESSWAY
AT A MINOR COLLECTOR

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



DETAIL NO.
368



NOTES:
 STRIPING FOR BIKE LANES
 SHALL BE INSTALLED UNLESS
 DIRECTED OTHERWISE BY THE
 CITY TRAFFIC ENGINEER.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

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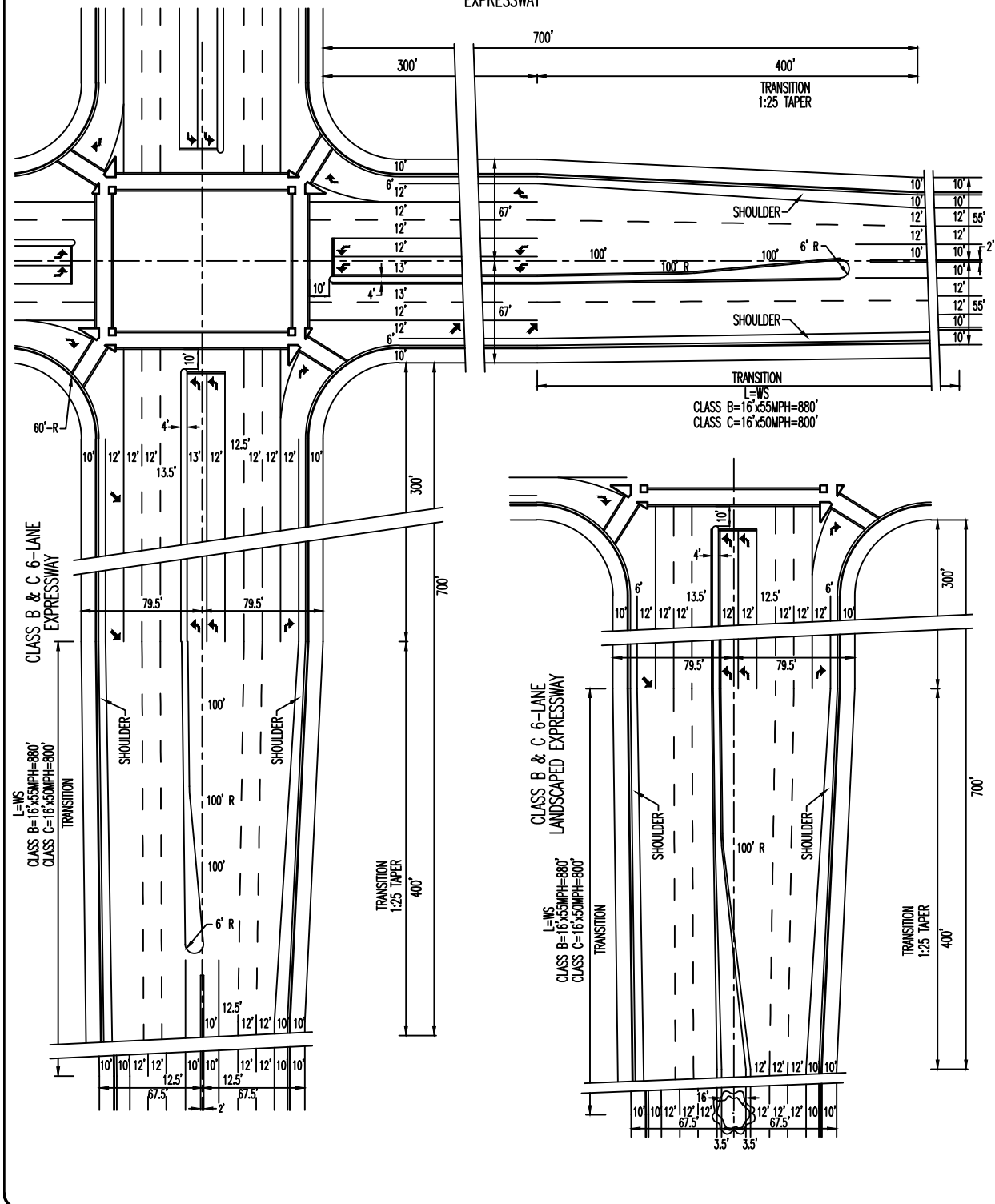
STREETS
CLASS B 6-LANE
EXPRESSWAY AT A
MINOR COLLECTOR

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345



DETAIL NO.
369

CLASS B & C 4-LANE EXPRESSWAY



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BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

STREETS

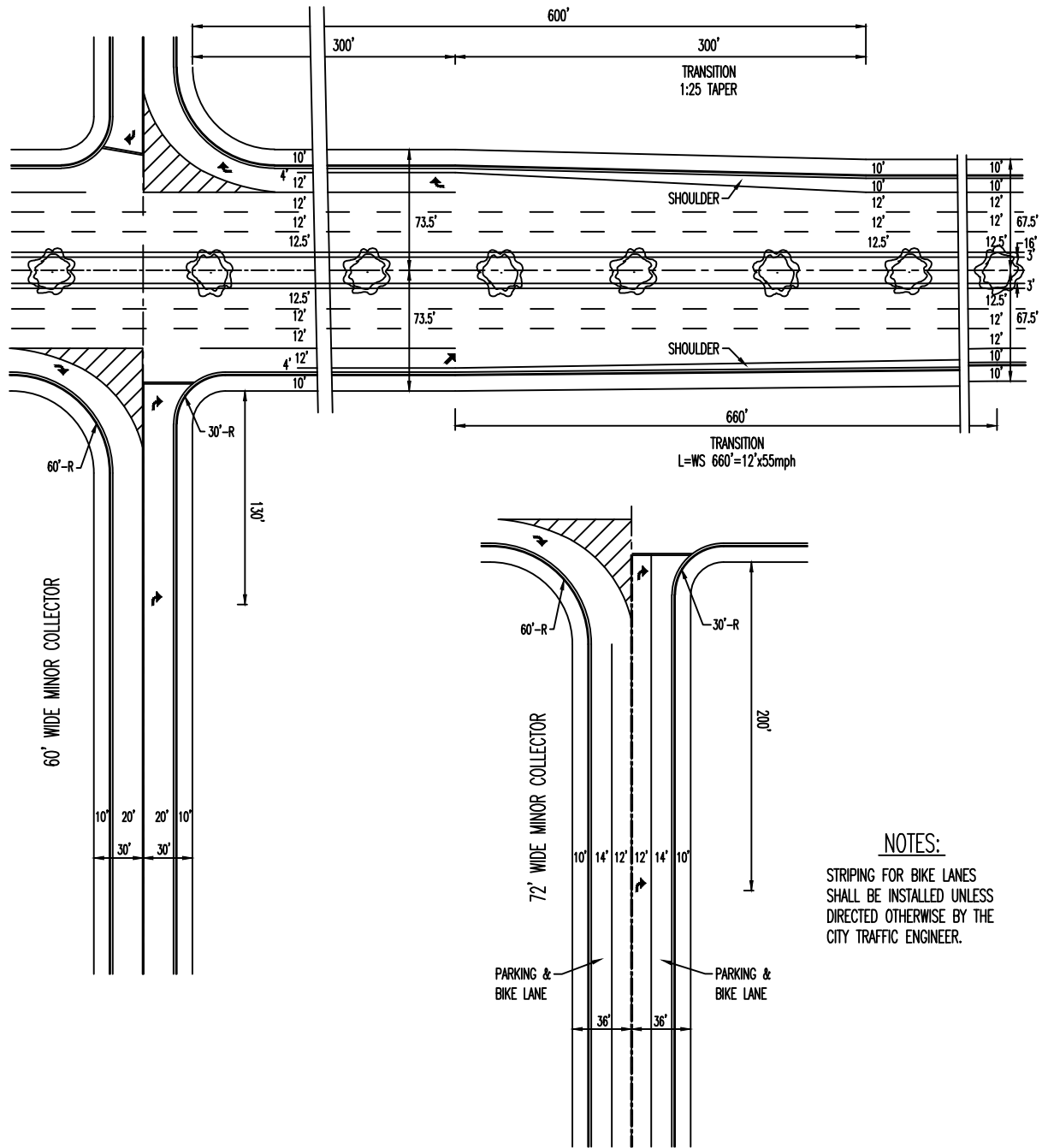
CLASS B & C 4-LANE EXPRESSWAY AT A CLASS B & C 6-LANE EXPRESSWAY

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345



DETAIL NO.
370


CLASS B 6-LANE
LANDSCAPED EXPRESSWAY



APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
REVISED:	DATE:
REVISED:	DATE:
REVISED:	DATE:

STREETS
**CLASS B 6-LANE
 LANDSCAPED EXPRESSWAY
 AT A MINOR COLLECTOR**

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345



MODESTO
CALIFORNIA

DETAIL NO.
371

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APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

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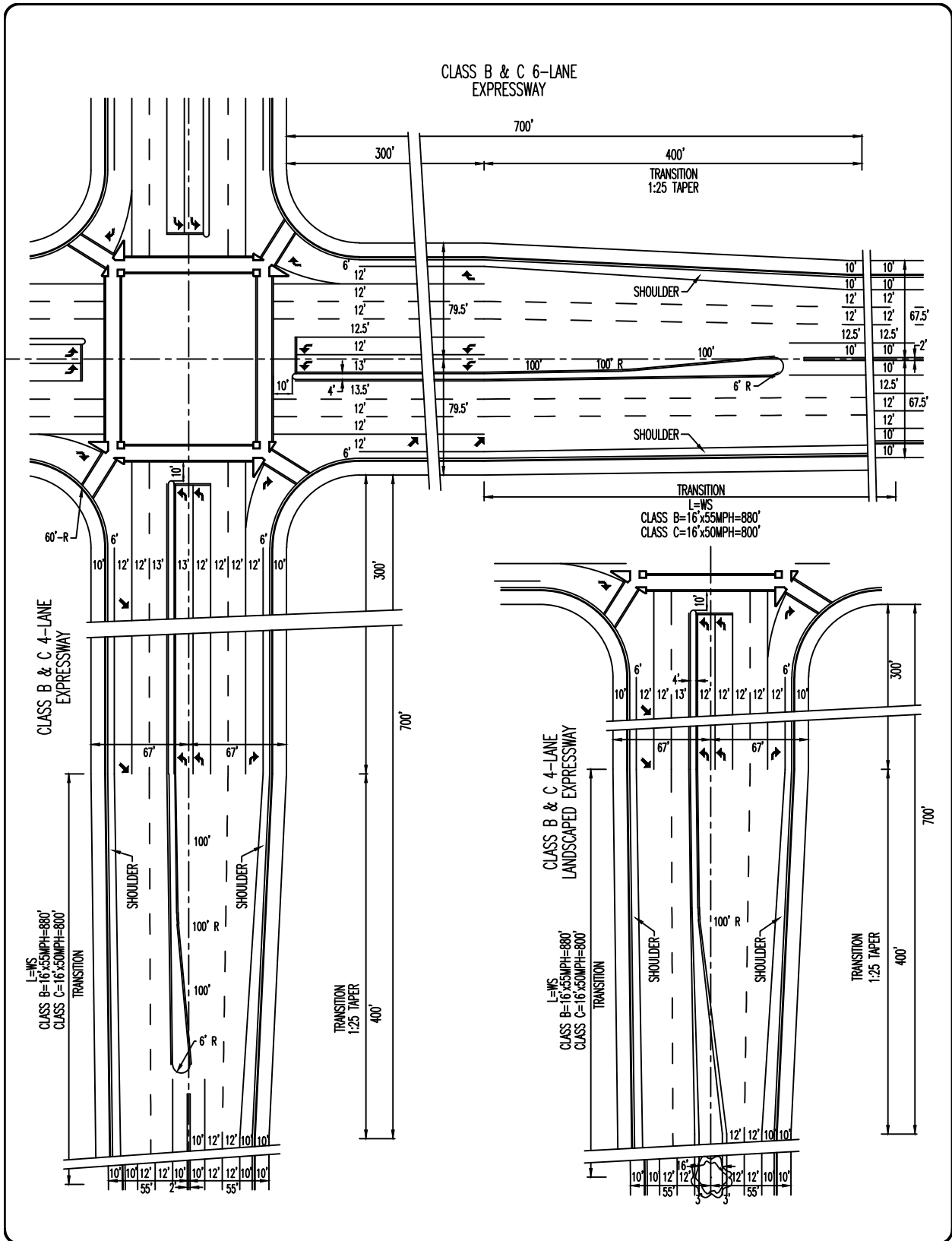
STREETS



MODESTO
CALIFORNIA

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

DETAIL NO.
372



APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
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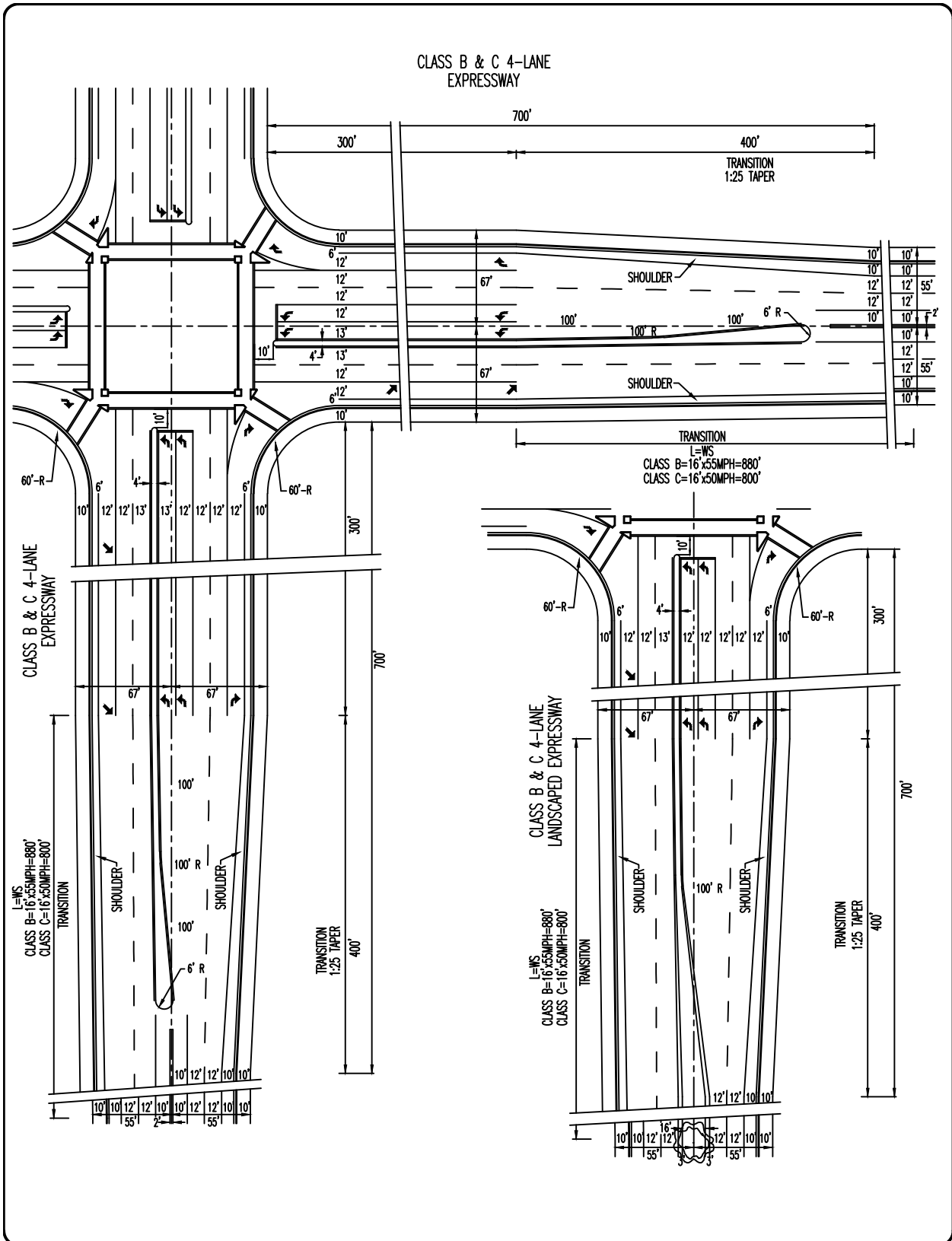
STREETS

CLASS B & C 6-LANE EXPRESSWAY AT CLASS B & C 4-LANE EXPRESSWAY

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

DETAIL NO.
373



APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

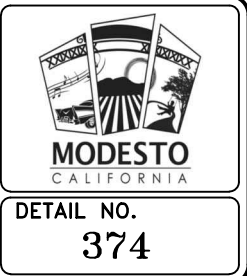
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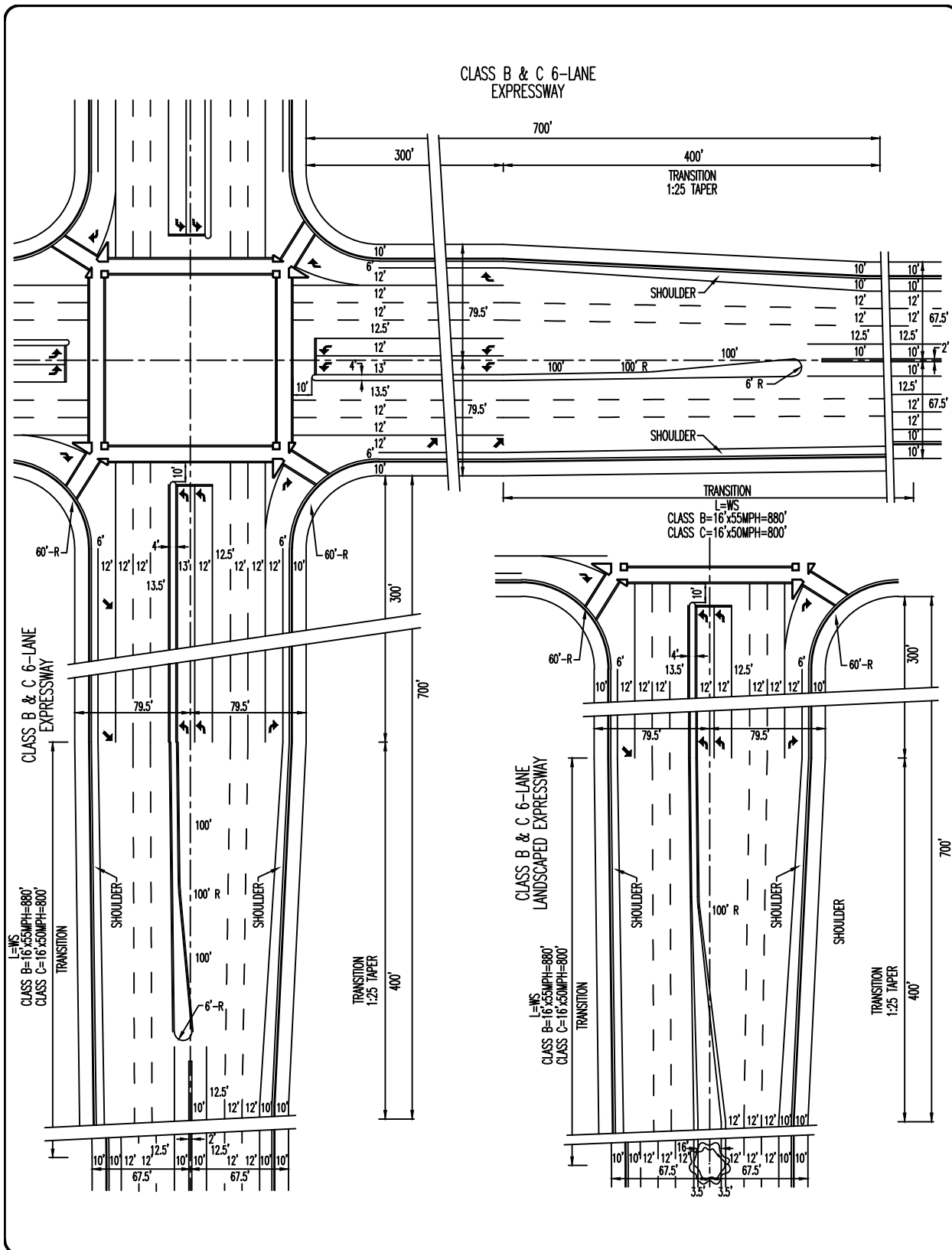
REVISED: DATE:

STREETS

CLASS B & C
4-LANE EXPRESSWAY

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345





APPROVED BY:
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 C59650

REVISED: DATE:

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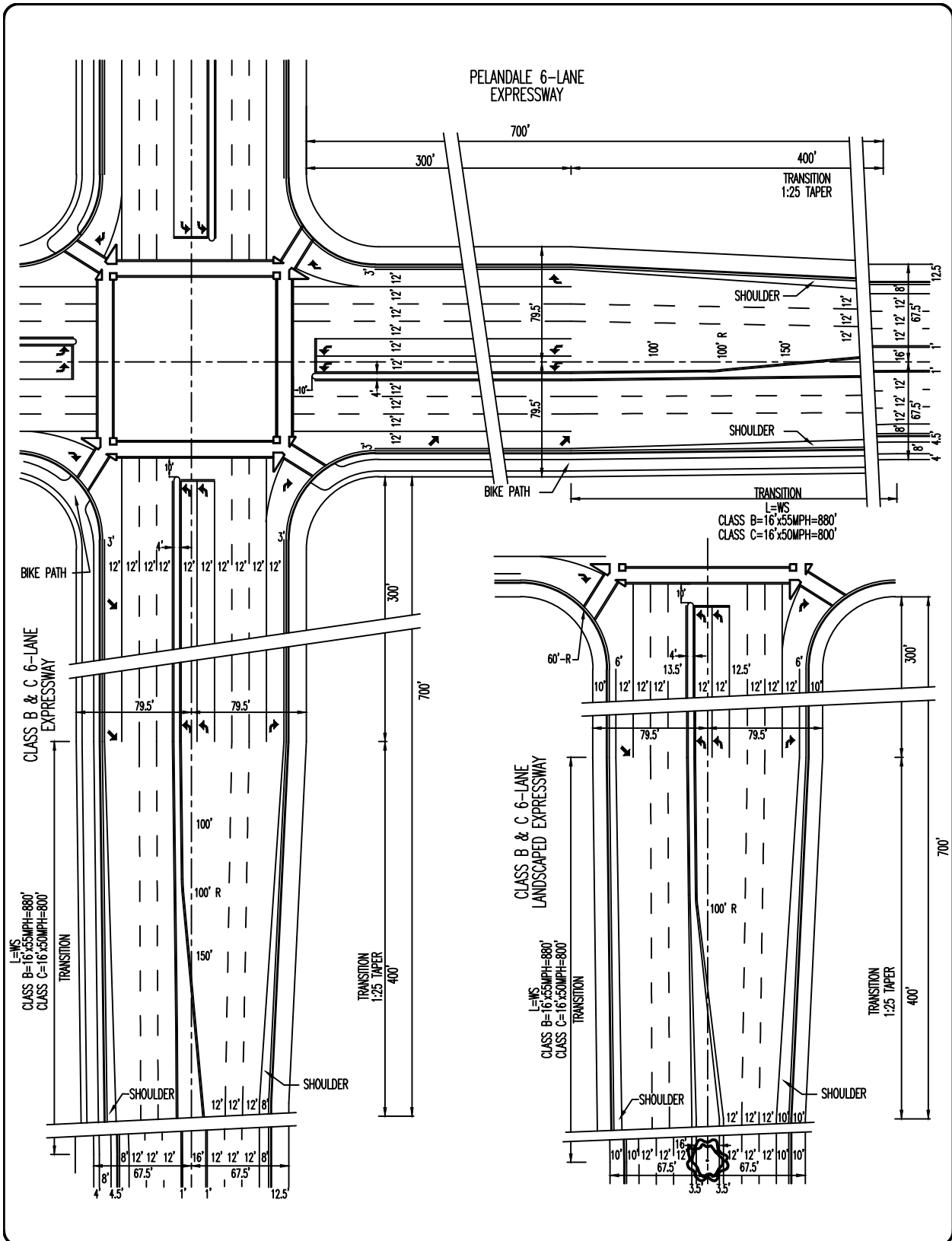
STREETS

CLASS B & C
6-LANE EXPRESSWAY

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

MODESTO
 CALIFORNIA

DETAIL NO.
375



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 C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

STREETS

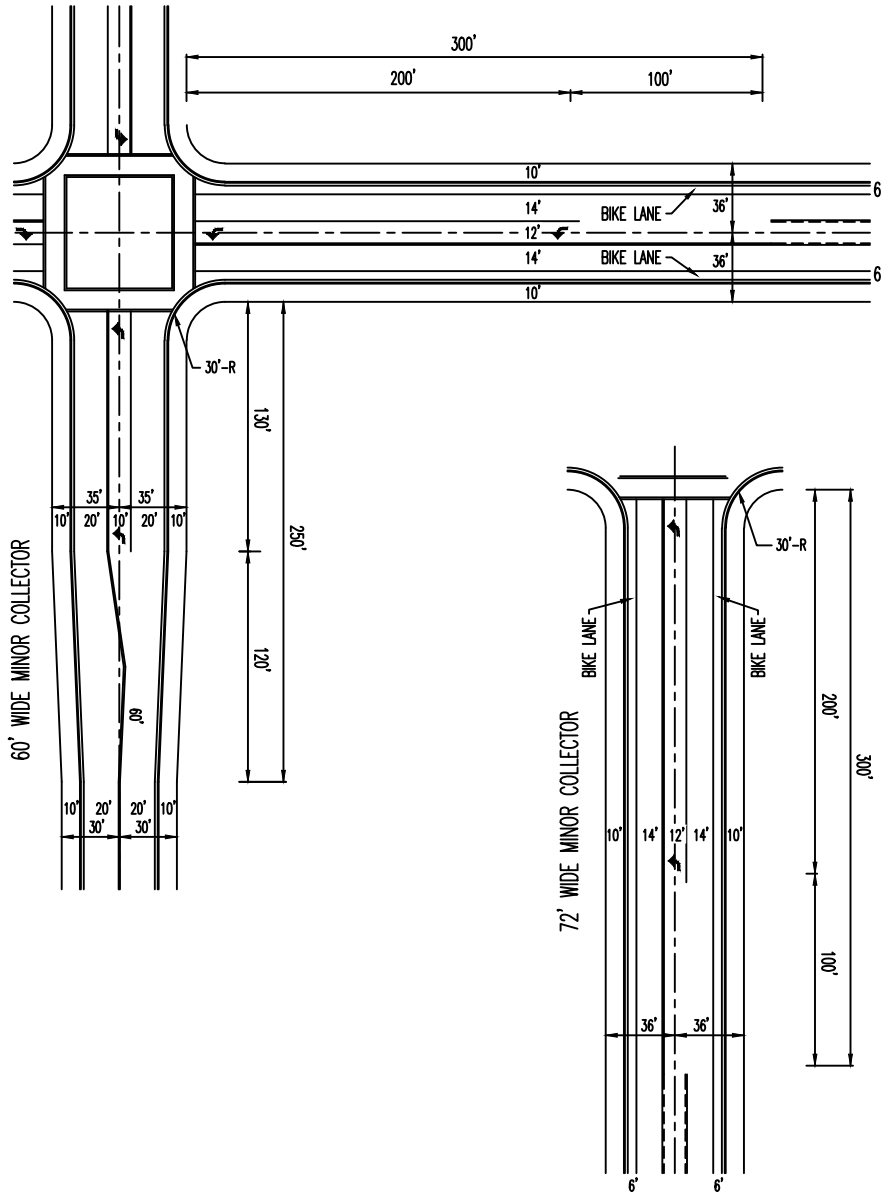
PELANDALE AVENUE
6-LANE EXPRESSWAY

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

MODESTO
 CALIFORNIA

DETAIL NO.
375A

72' WIDE MINOR COLLECTOR



NOTES:

STRIPING FOR BIKE LANES SHALL BE INSTALLED UNLESS DIRECTED OTHERWISE BY THE CITY TRAFFIC ENGINEER.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

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REVISED: DATE:

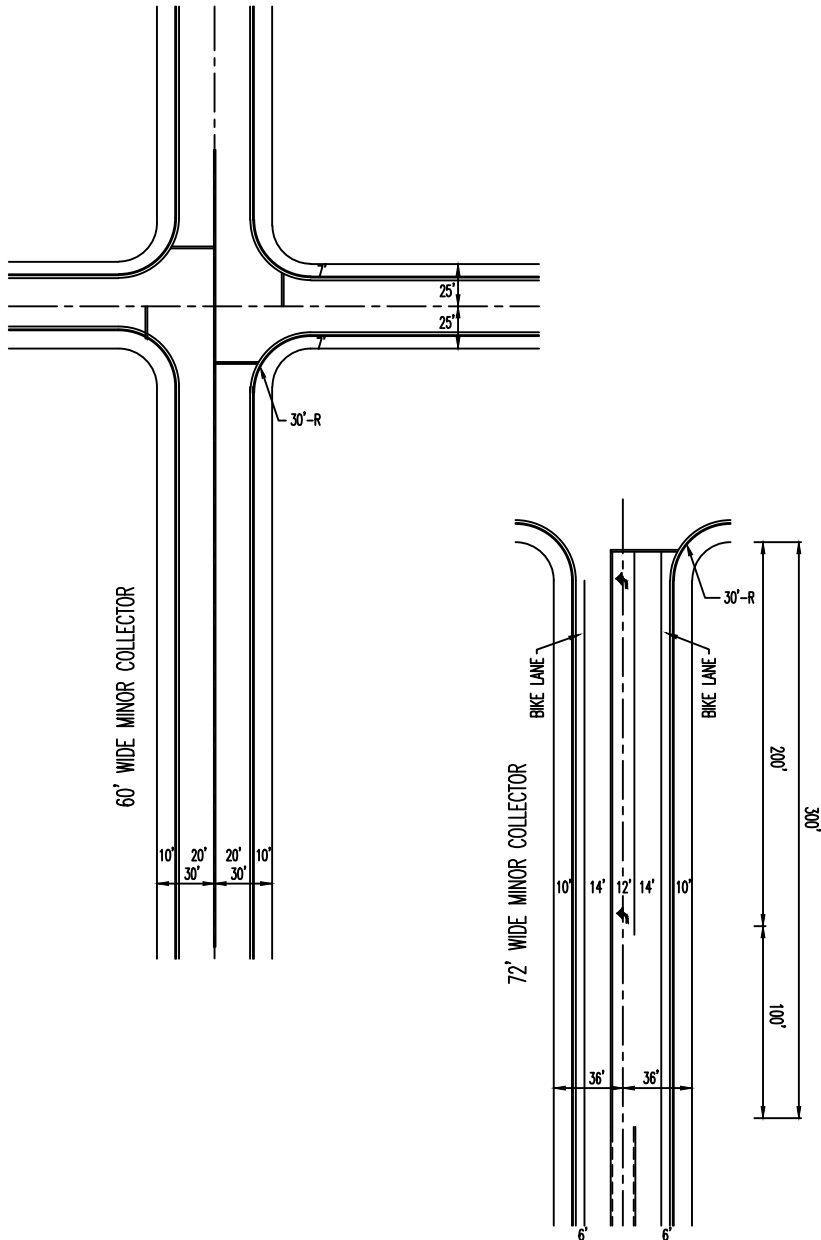
STREETS
MINOR COLLECTOR
AT A MINOR
COLLECTOR

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345



DETAIL NO.
376

LOCAL STREET



NOTES:
 STRIPING FOR BIKE LANES
 SHALL BE INSTALLED UNLESS
 DIRECTED OTHERWISE BY THE
 CITY TRAFFIC ENGINEER.

APPROVED BY:
 BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

STREETS

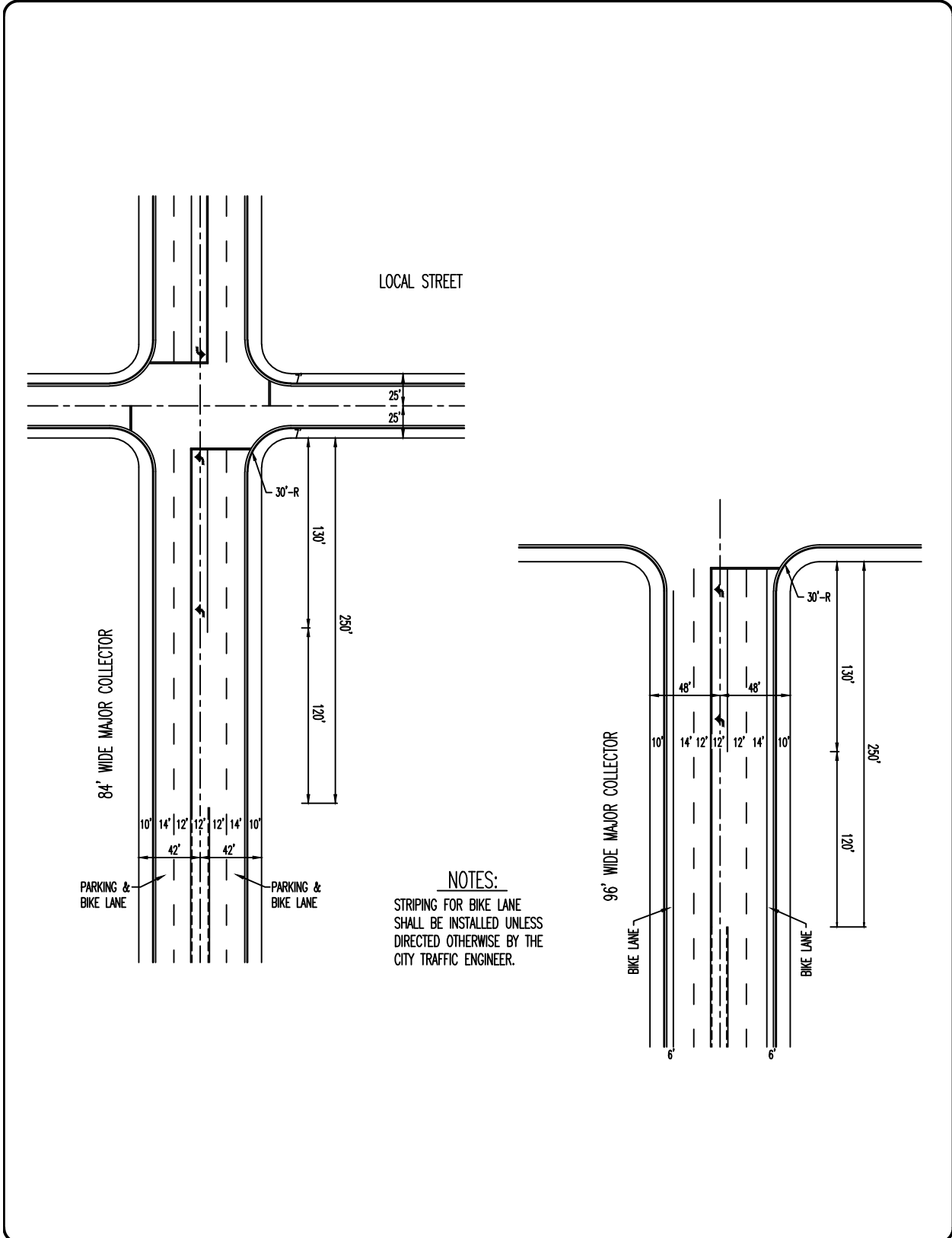
**LOCAL STREET AT A
 MINOR COLLECTOR**

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345



MODESTO
 CALIFORNIA

DETAIL NO.
377



LOCAL STREET

84' WIDE MAJOR COLLECTOR

96' WIDE MAJOR COLLECTOR

PARKING & BIKE LANE

PARKING & BIKE LANE

BIKE LANE

BIKE LANE

NOTES:

STRIPING FOR BIKE LANE SHALL BE INSTALLED UNLESS DIRECTED OTHERWISE BY THE CITY TRAFFIC ENGINEER.

APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
REVISED:	DATE:
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REVISED:	DATE:

STREETS

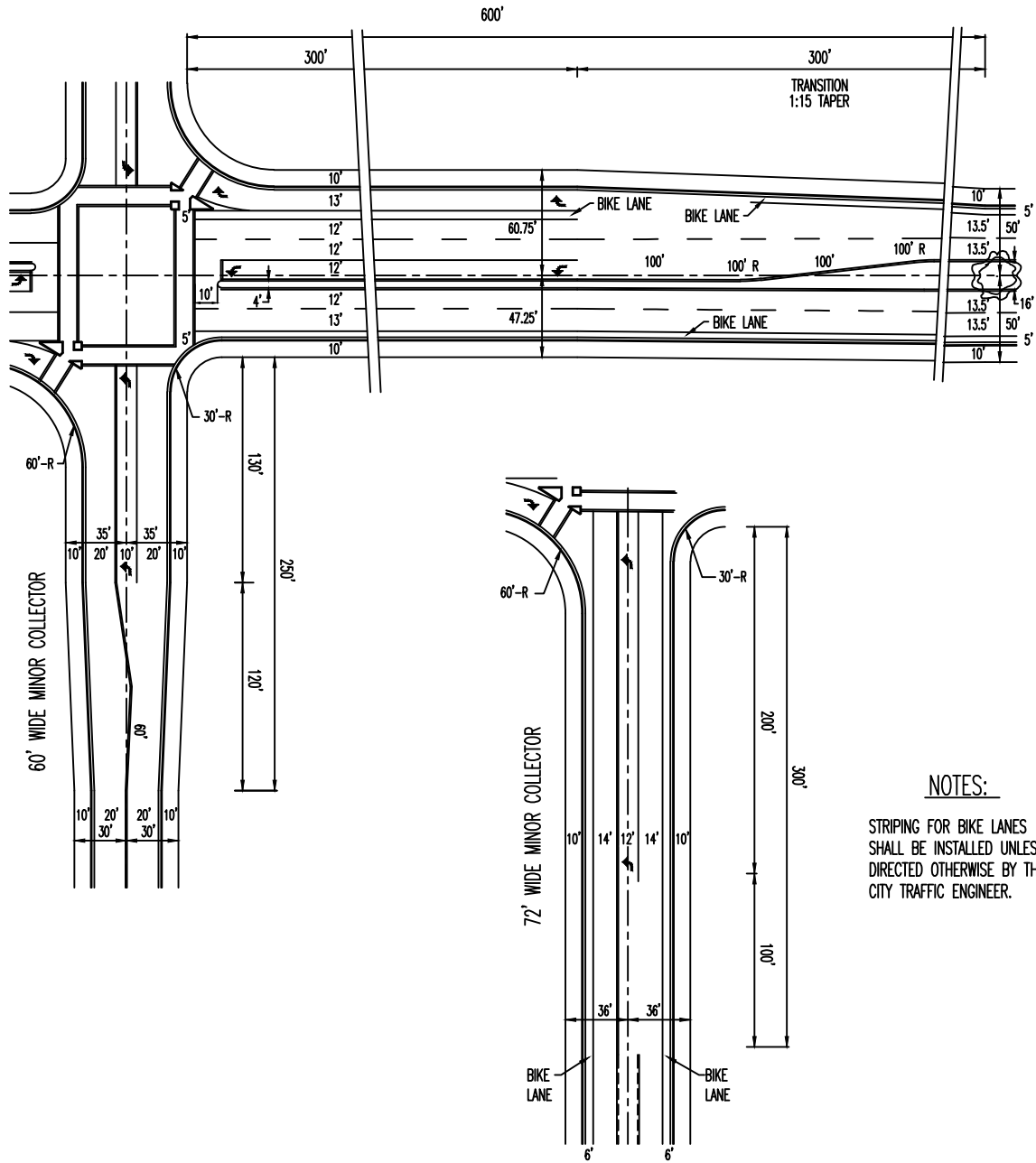
LOCAL STREET AT A MAJOR COLLECTOR

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

DETAIL NO.
378

MINOR ARTERIAL



NOTES:

STRIPING FOR BIKE LANES SHALL BE INSTALLED UNLESS DIRECTED OTHERWISE BY THE CITY TRAFFIC ENGINEER.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

STREETS

MINOR ARTERIAL AT
 A MINOR COLLECTOR

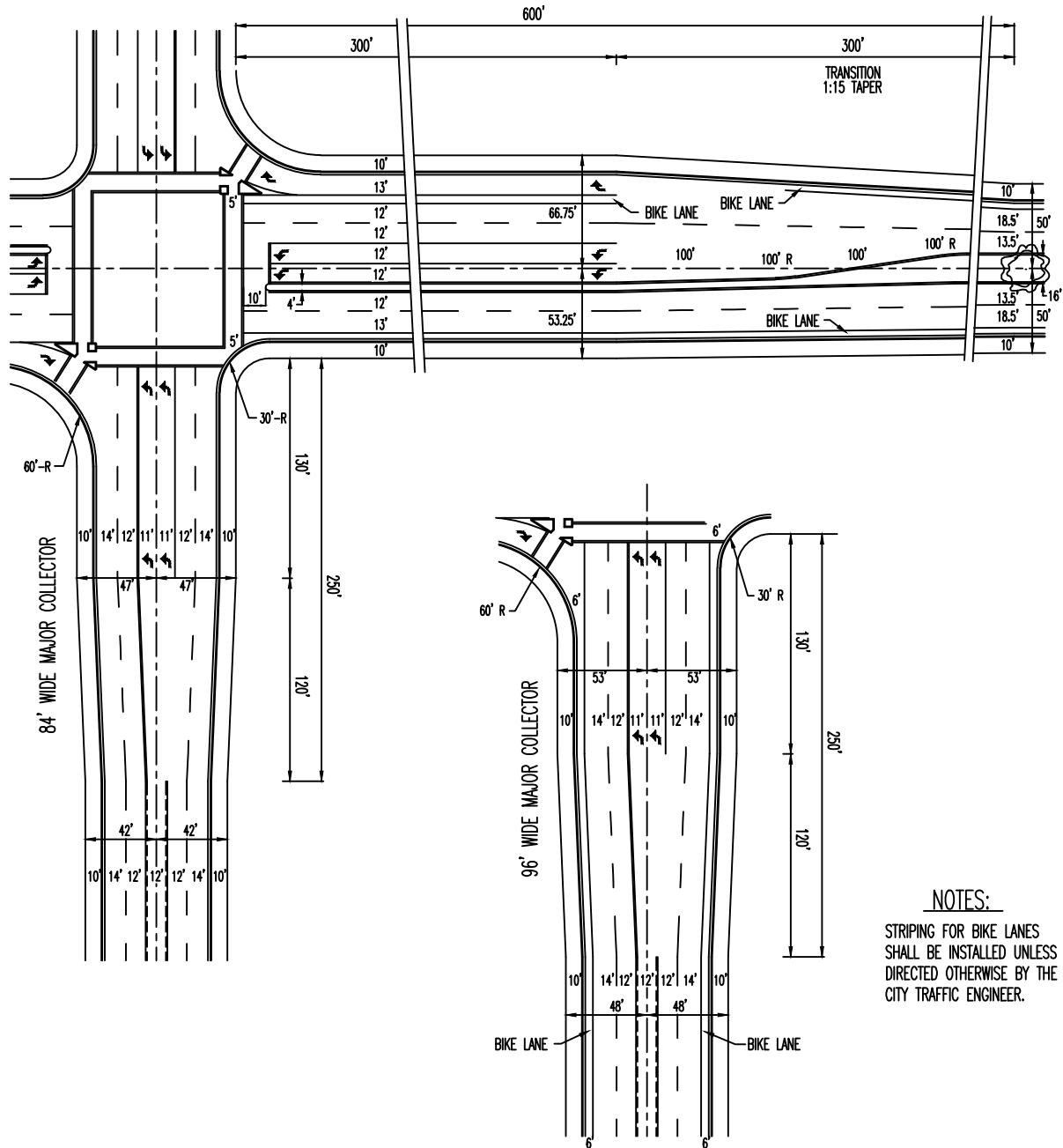
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 RESOLUTION NO. 2014-345



MODESTO
 CALIFORNIA

DETAIL NO.
379

MINOR ARTERIAL



NOTES:

STRIPING FOR BIKE LANES SHALL BE INSTALLED UNLESS DIRECTED OTHERWISE BY THE CITY TRAFFIC ENGINEER.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

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STREETS

**MINOR ARTERIAL AT
 A MAJOR COLLECTOR**

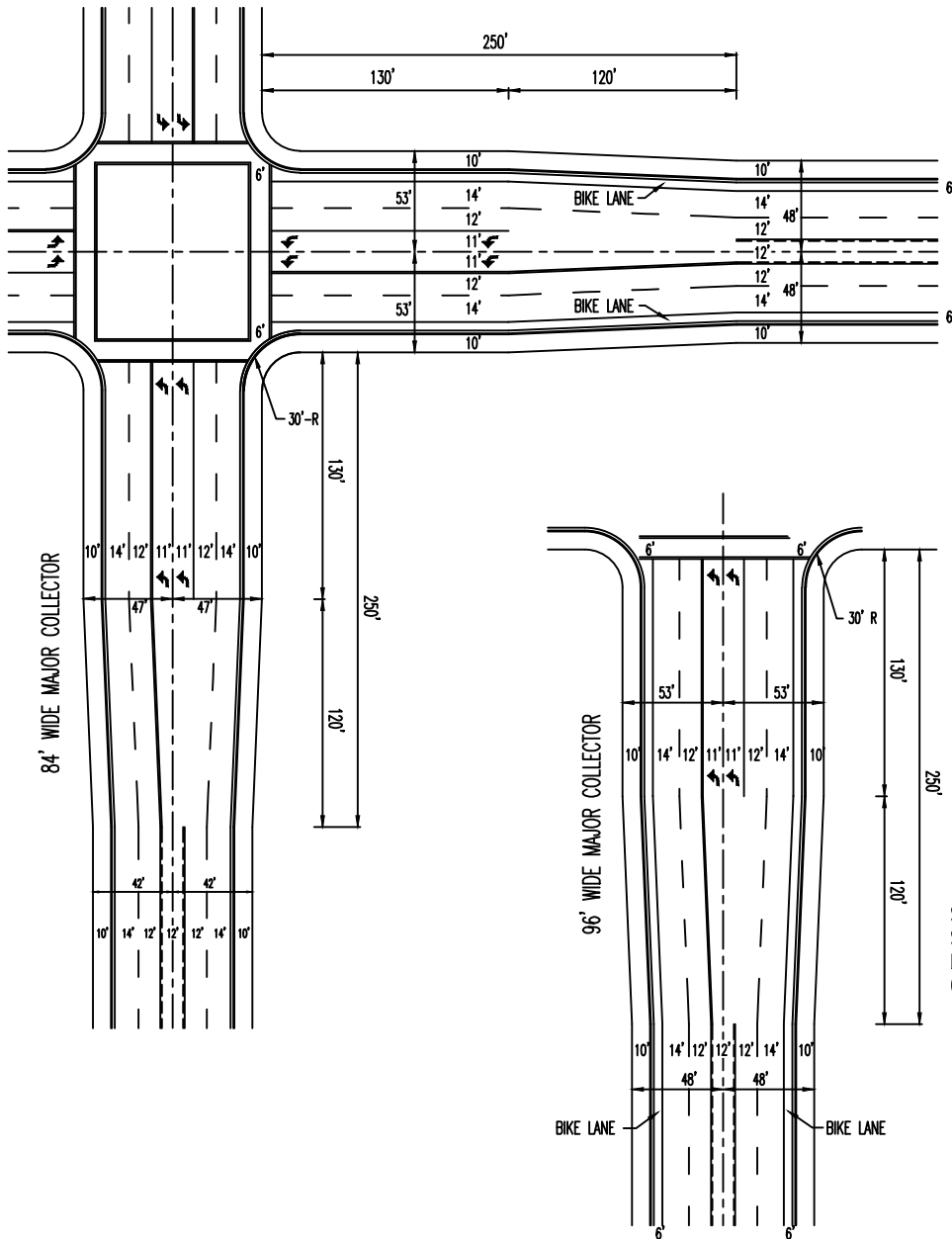
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MODESTO
 CALIFORNIA

DETAIL NO.
380

96' WIDE MAJOR COLLECTOR



NOTES:
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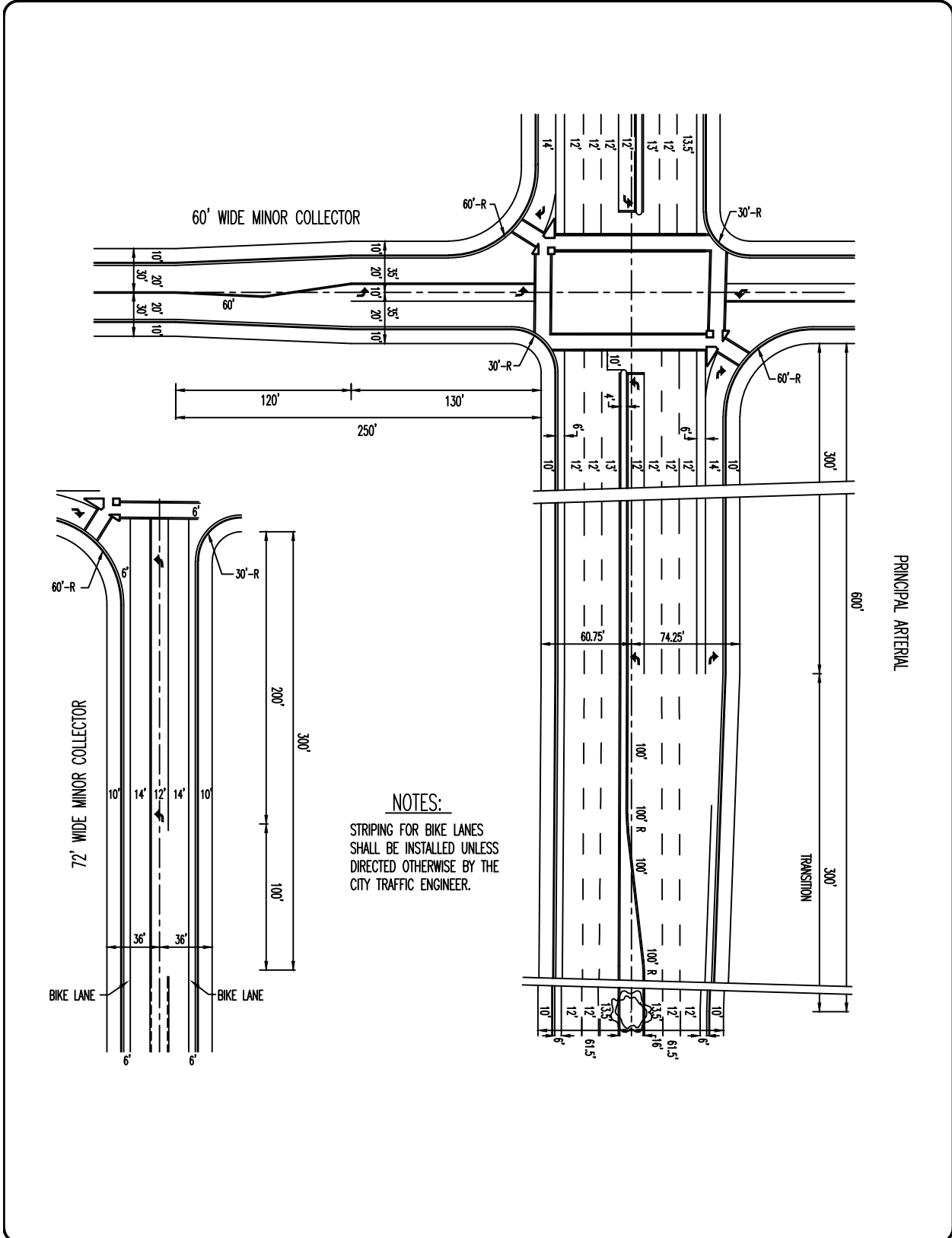
STREETS

**MAJOR COLLECTOR AT
A MAJOR COLLECTOR**

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RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

DETAIL NO.
381



NOTES:
 STRIPING FOR BIKE LANES SHALL BE INSTALLED UNLESS DIRECTED OTHERWISE BY THE CITY TRAFFIC ENGINEER.

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STREETS

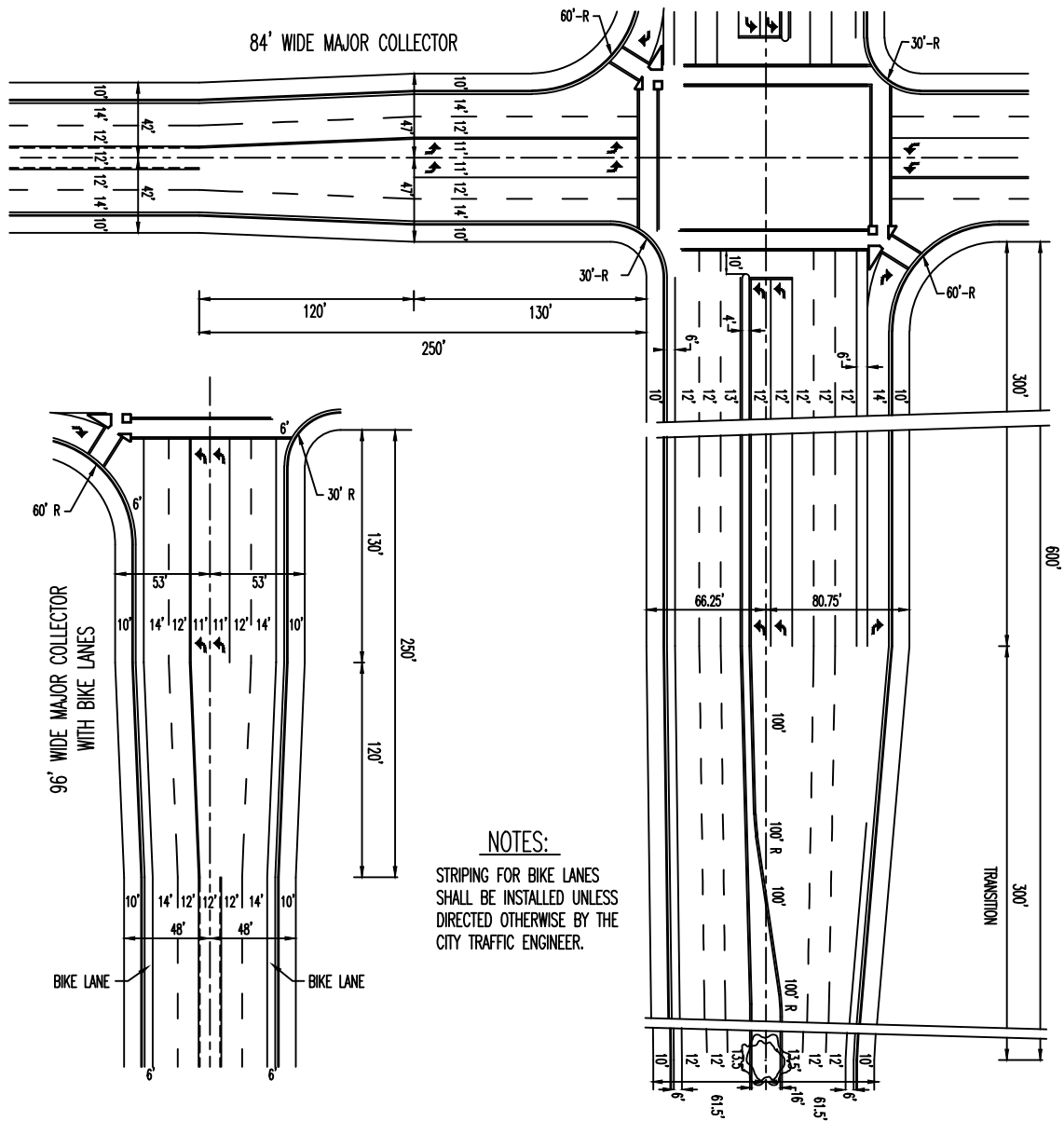
**PRINCIPAL ARTERIAL AT
A MINOR COLLECTOR**

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RESOLUTION NO. 2014-345



MODESTO
CALIFORNIA

DETAIL NO.
382



NOTES:

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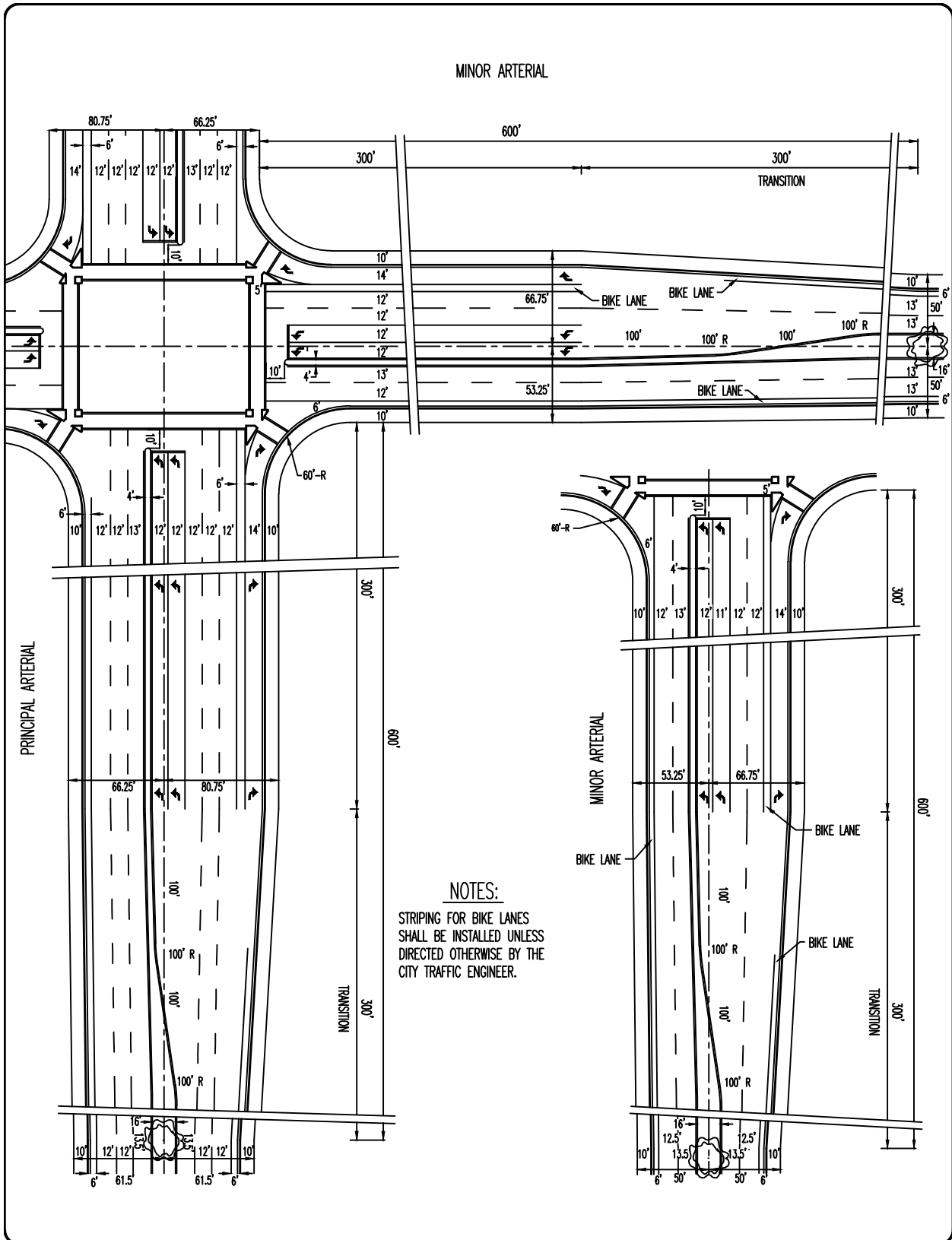
STREETS

**PRINCIPAL ARTERIAL AT
A MAJOR COLLECTOR**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

DETAIL NO.
383



NOTES:
 STRIPING FOR BIKE LANES
 SHALL BE INSTALLED UNLESS
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 CITY TRAFFIC ENGINEER.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

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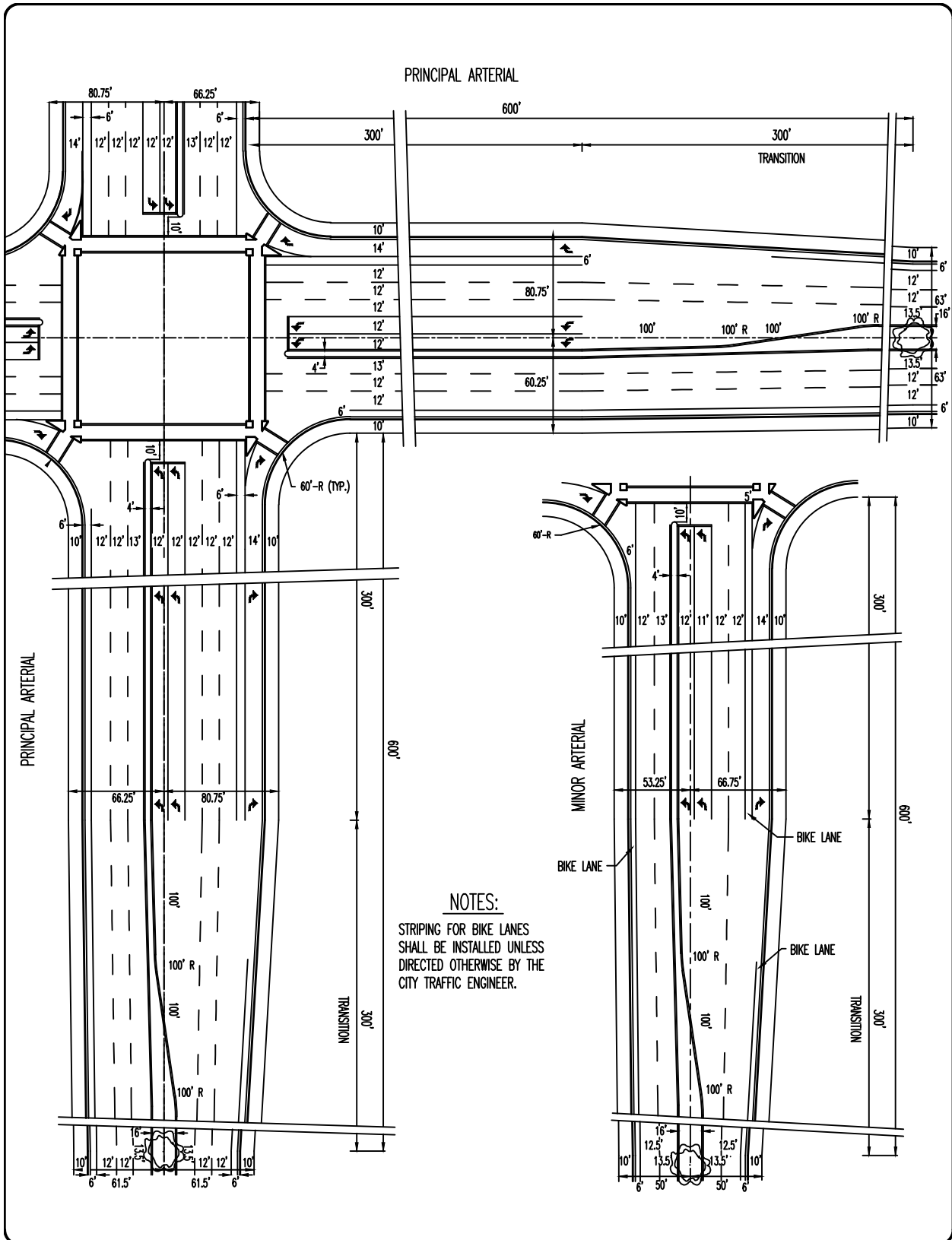
STREETS

**MINOR ARTERIAL AT A
 PRINCIPAL ARTERIAL**

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MODESTO
 CALIFORNIA

DETAIL NO.
384



NOTES:
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REVISED:	DATE:
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STREETS

**PRINCIPAL ARTERIAL AT
 A PRINCIPAL ARTERIAL**

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MODESTO
CALIFORNIA

DETAIL NO.
385

LEFT BLANK
INTENTIONALLY

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STREETS

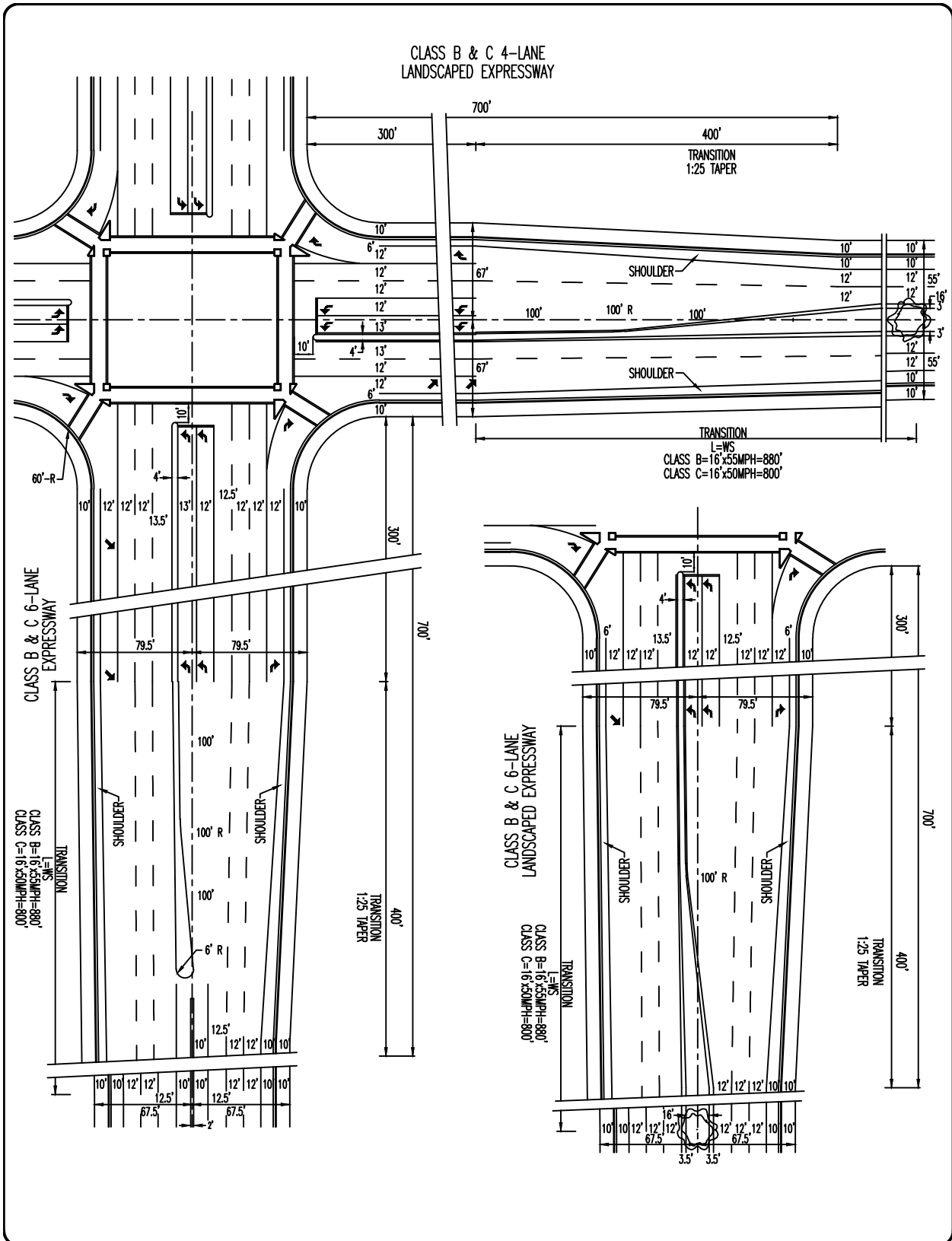


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RESOLUTION NO. 2014-345

DETAIL NO.
386

CLASS B & C 4-LANE
LANDSCAPED EXPRESSWAY



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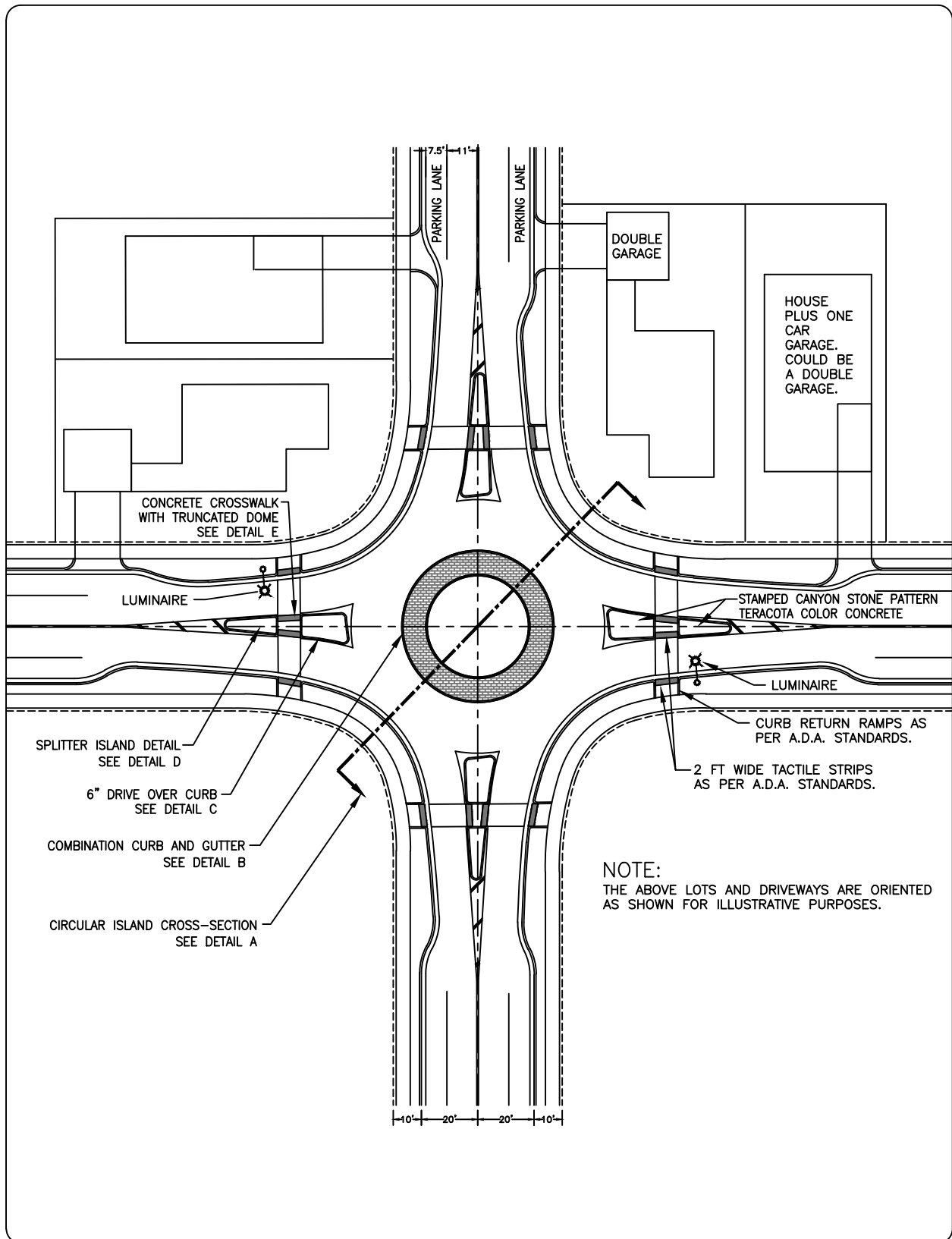
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STREETS
**CLASS B & C 4-LANE
LANDSCAPED EXPRESSWAY
AT CLASS B & C 6-LANE
EXPRESSWAY**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



DETAIL NO.
387



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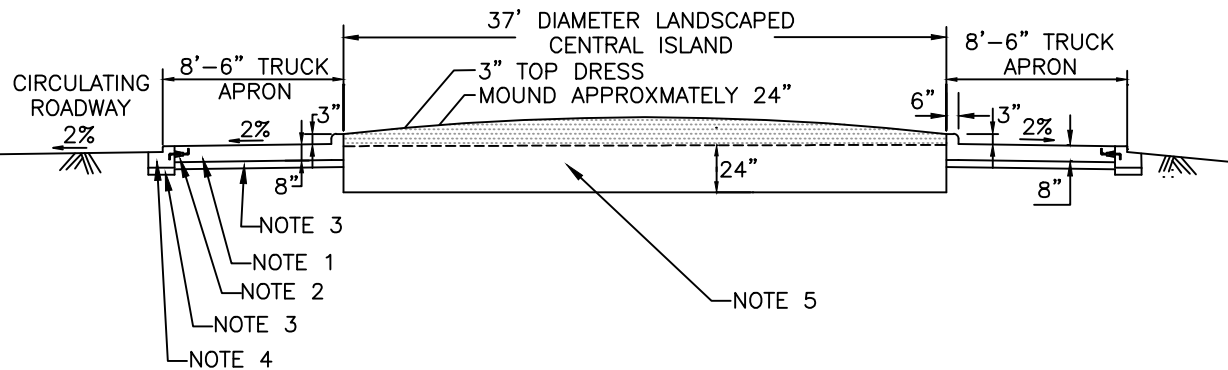
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ROUNDAABOUT
TYPICAL
ROUNDAABOUT

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

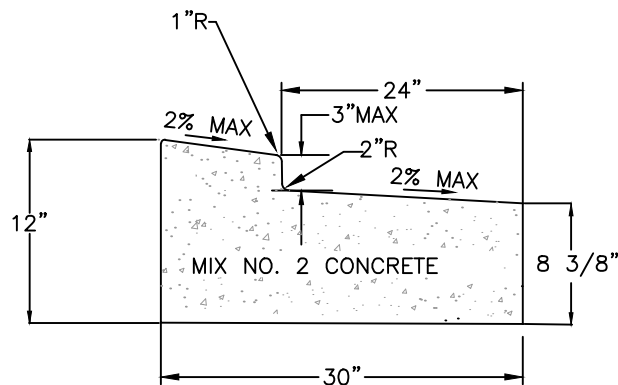


DETAIL NO.
388




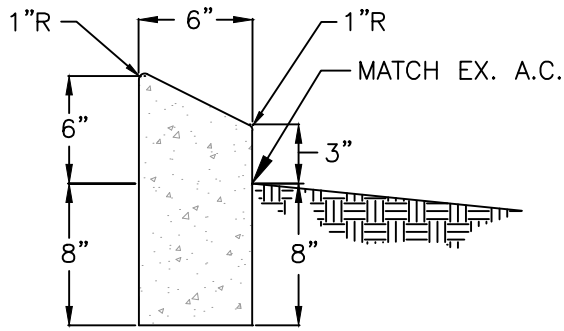
DETAIL A: TYPICAL SECTION OF ROUNDABOUT CIRCULAR ISLAND

- NOTE 1: 8" JOINTED REINFORCED CONCRETE WITH NO. 4 REBAR, 12" O.C. BOTH WAYS, MIX NO.6 MODIFIED (HIGH EARLY STRENGTH) WITH STAMPED CONCRETE FINISH REMOVE EX. A.C. PAVEMENT PRIOR TO CONCRETE INSTALLATION.
- NOTE 2: LONGITUDINAL TIE NO. 4 REBAR AT 24" SPACING CENTER TO CENTER WITH 2" HOOKS OUT OF 90° BENDS ON EACH END 24" LONG.
- NOTE 3: 3 1/2" DENSE GRADED AGGREGATE BASE
- NOTE 4: VERTICAL FACE CURB THREE INCHES ABOVE PAVEMENT.
- NOTE 5: EXCAVATE TO REMOVE EXISTING SOIL (2' MIN) OR AS APPROVED BY CITY ENGINEER. BACKFILL WITH AGENCY APPROVED TOPSOIL. MOUND APPROXIMATELY 24 INCHES AT CENTER TOP DRESS WITH 3 INCH MINIMUM TOP SOIL.

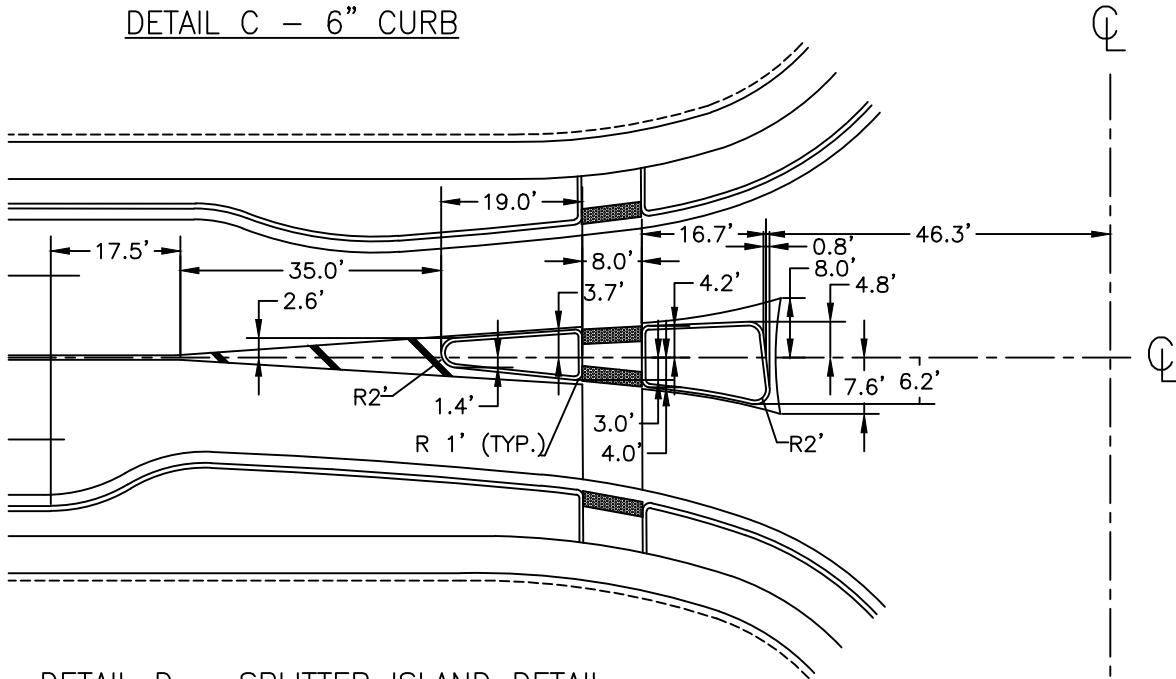


DETAIL B – COMBINATION CURB AND GUTTER

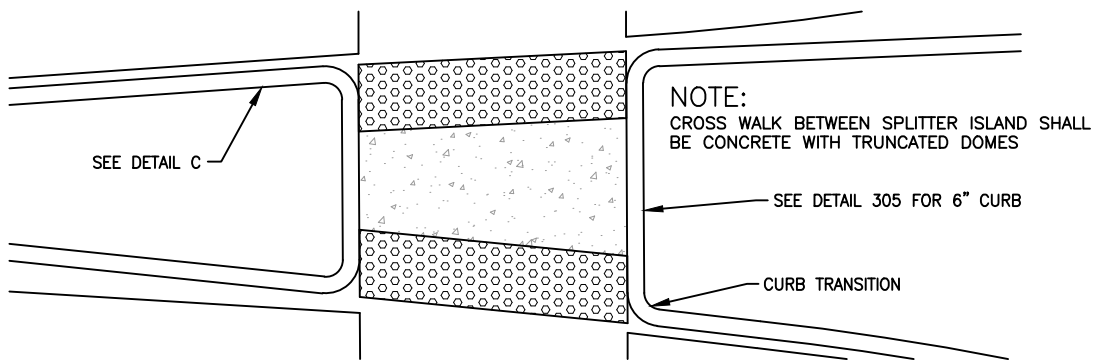
APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	ROUNDABOUT	 MODESTO CALIFORNIA
REVISED: DATE: REVISED: DATE: REVISED: DATE:	TYPICAL DETAILS	ADOPTED BY CITY COUNCIL RESOLUTION NO. 2014-345
		DETAIL NO. 388A



DETAIL C - 6" CURB



DETAIL D - SPLITTER ISLAND DETAIL



DETAIL E - ISLAND CROSSWALK DETAIL

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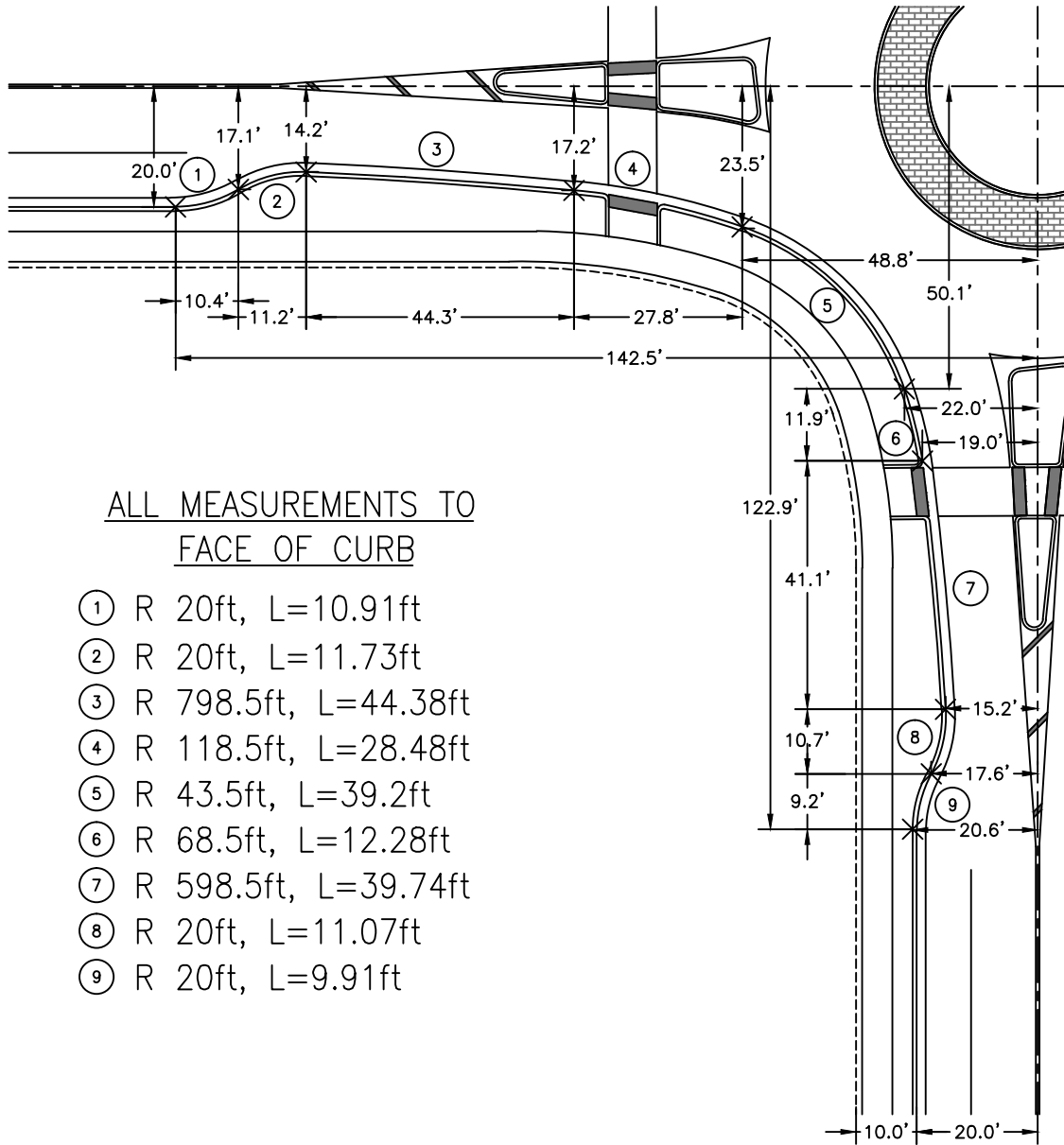
ROUNDABOUT

TYPICAL DETAILS

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

DETAIL NO.
388B



ALL MEASUREMENTS TO
FACE OF CURB

- ① R 20ft, L=10.91ft
- ② R 20ft, L=11.73ft
- ③ R 798.5ft, L=44.38ft
- ④ R 118.5ft, L=28.48ft
- ⑤ R 43.5ft, L=39.2ft
- ⑥ R 68.5ft, L=12.28ft
- ⑦ R 598.5ft, L=39.74ft
- ⑧ R 20ft, L=11.07ft
- ⑨ R 20ft, L=9.91ft

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C59650

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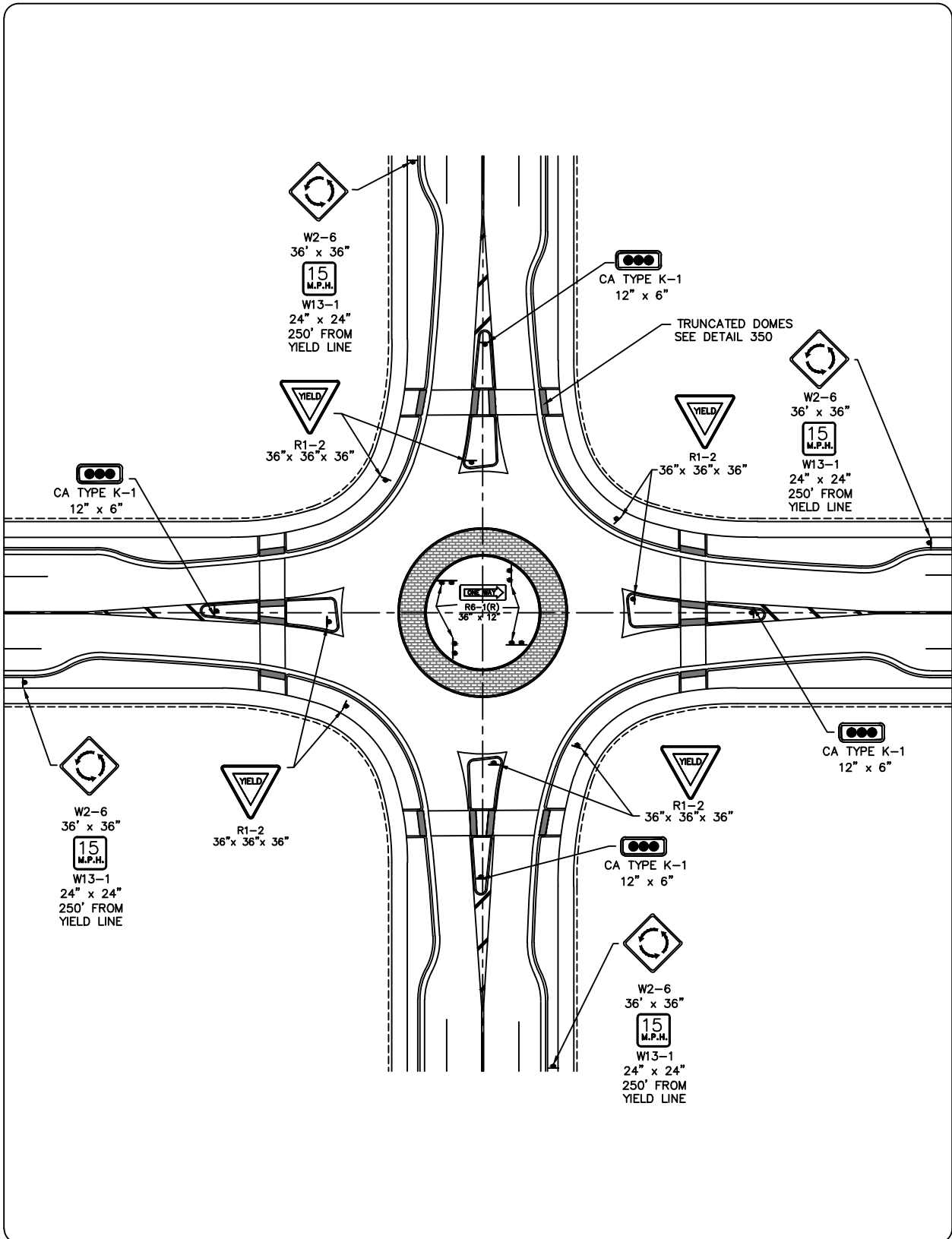
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**ROUNDABOUT
ROUNDABOUT
DIMENSIONS**

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RESOLUTION NO. 2014-345



DETAIL NO.
388C



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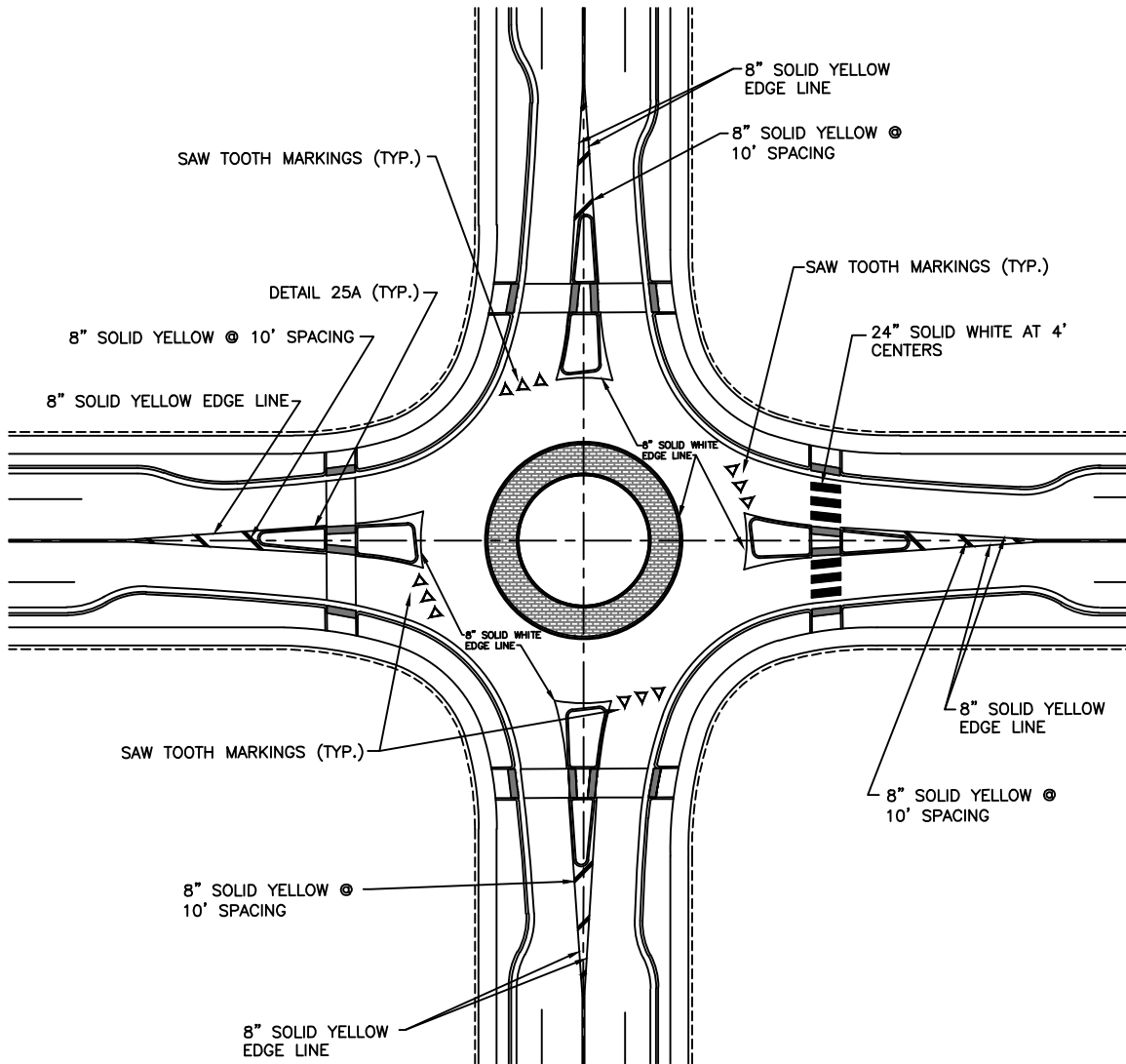
ROUNDABOUT

SIGNING PLAN

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

DETAIL NO.
388D



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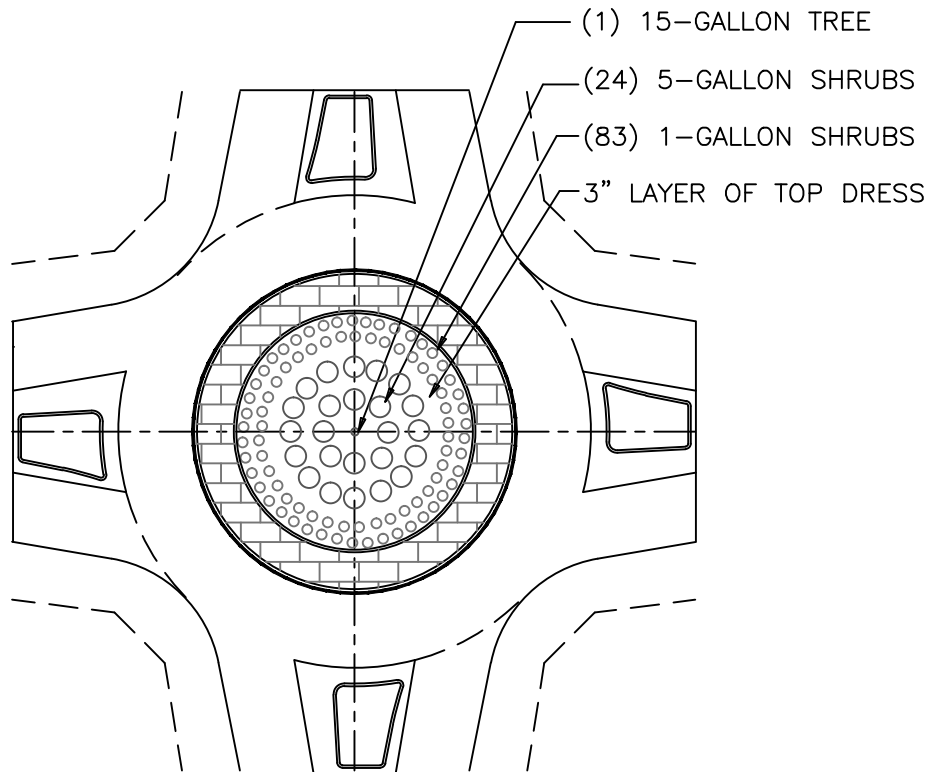
ROUNABOUT

MARKING PLAN

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345



DETAIL NO.
388E



EXAMPLES OF AGENCY APPROVED PLANT MATERIALS LIST (PARTIAL)*

1-GALLON SHRUBS:

- NANDINA DOMESTICA 'NANA PURPUREA'
- MYRTUS COMMUNIS 'COMPACTA'
- TRACHELOSPERMUM ASIATICUM
- ARTEMISIA STELLERANA
- ILEX CRENATA (DWARF VARIETIES)

5-GALLON SHRUBS:

- RHAPHIOLEPIS INDICA 'BALLERINA'
- PIREA BUMALDA 'ANTHONY WATERER'
- COTONEASTER APICULATUS
- ESCALLONIA 'NEWPORT DWARF'
- ABELIA GRANDIFLORA 'EDWARD GOUCHER'

15-GALLON TREES:

- LAGERSTROEMIA INDICA 'CHEOROKEE', 'CATAWBA', 'TUSCARORA' OR 'MUSCOGEE' OR 'NATCHEZ'
- CERCIS CANADENSIS 'FOREST PANSY' OR 'OKLAHOMA'
- TRISTANIA LAURINA 'ELEGANT'
- GINKGO BILOBA 'FAIRMONT' OR 'AUTUMN GOLD'

*VARIATIONS FROM THE APPROVED LIST WOULD BE AT THE DISCRETION OF THE PARKS, RECREATION AND NEIGHBORHOODS DEPARTMENT

MATERIALS AND INSTALLATION OF LANDSCAPE PLANTING SHALL BE AS PER CITY STANDARD SPECIFICATIONS SECTION 12.

SEE CITY STANDARD DETAILS FOR THE FOLLOWING:
NO. 1200: TREE PLANTING
NO. 1200A: SHRUB + GRINDCOVER PLANTING

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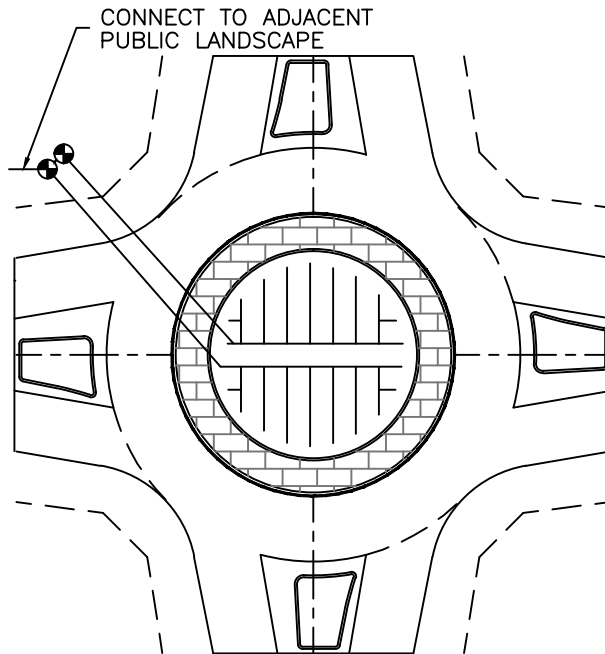
ROUNDABOUT

LANDSCAPING PLAN

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



DETAIL NO.
389



IRRIGATION LEGEND

- SCHEDULE 40 PVC LATERAL LINES—SIZE AS NOTED (MINIMUM 1" IN SIZE)
- RAINBIRD NO. 1401 BUBBLERS
- ⊕ RAINBIRD NO. PEB 1" IRRIGATION VALVE IN CONCRETE VALVE BOX WITH LOCKING METAL LID.

MATERIALS AND INSTALLATION OF IRRIGATION SYSTEM SHALL BE AS PER CITY STANDARD SPECIFICATIONS SECTION 12.

SEE CITY STANDARD DETAILS FOR THE FOLLOWING:
 NO. 1202: REMOTE CONTROL VALVE
 NO. 1207: BUBBLER

NOTE: REMOTE CONTROL VALVES SHALL BE CONTROLLED BY THE ADJACENT PUBLIC LANDSCAPE CONTROLLER.

VARIATIONS FROM THIS DESIGN WOULD ONLY BE AT THE DISCRETION OF THE PARKS, RECREATION AND NEIGHBORHOODS DEPARTMENT.

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REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

ROUNABOUT

IRRIGATION PLAN



**ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345**

**DETAIL NO.
 390**

1. THE TRUCK APRON IS SEPARATED FROM THE LANDSCAPING AREA IN THE CENTRAL ISLAND BY A SIX INCH HIGH VERTICAL FACE CURB.
2. THE LANDSCAPED SECTION OF THE CENTRAL ISLAND SHOULD BE MOUNDED BY SEVERAL FEET TO HELP DRIVERS RECOGNIZE THE ROUNDABOUT. TOO MUCH MOUNDING CAN RESTRICT DRIVERS VISIBILITY AND CAUSE DRIVER DISCOMFORT.
3. A LARGE TREE OR SEVERAL TREES, OR OTHER SIGNIFICANT VERTICAL FEATURE SHOULD BE LOCATED IN THE CENTRAL ISLAND TO PROVIDE LONG RANGE VISIBILITY OF THE ROUNDABOUT FOR APPROACHING DRIVERS.
4. THE CIRCULATING ROADWAY HAS A TWO PERCENT CROSS FALL OUTWARDS AS A STANDARD REQUIREMENT BUT CAN BE VARIED FROM 4 PERCENT ON THE HIGH SIDE OPPOSITE THE SPLITTER ISLAND TO A NEGATIVE 4 PERCENT ON THE LOW SIDE.
5. THE SPLITTER ISLANDS SHALL BE STAMPED CANYON STONE PATTERN WITH TERACOTA COLOR CONCRETE, CONCRETE CURB LINED WITH PAVERS OR LOW HEIGHT LANDSCAPING NO TALLER THAN 18 INCHES.
6. THE ONE-WAY SIGNS MUST BE LOCATED IN LINE WITH APPROACHING DRIVERS, SQUARE TO THESE DRIVERS, AND TO THE RIGHT OF THE YIELD SIGNS TO PROVIDE CLEAR DIRECTION TO DRIVERS AND ARE INSIDE THE LANDSCAPE AREA.
7. THE COMPOUND CURVES ARE SPECIFICALLY DESIGNED TO MINIMIZE VEHICLE SPEEDS AND TO MATCH VEHICLE SWEEP PATHS AND ANY CHANGE TO SIMPLE RADII IS NOT RECOMMENDED.
8. STREET LIGHTING NEEDS TO BE DESIGNED TO MATCH THE PROPOSED ROUNDABOUT TRAFFIC NEEDS.
9. THE DESIGN WAS BASED ON STANDARD AASHTO TRUCK TURNING TEMPLATES, WITH A WB-50 MAKING THE THROUGH MOVEMENTS AND POSSIBLE RIGHT TURNS, AND A NON-ARTICULATED LADDER TRUCK MAKING ALL MOVEMENTS.
10. SPLITTER ISLANDS SHOULD BE SET OUT AS A SINGLE ISLAND THEN THE OPENING IS CREATED.
11. THE TRUCK APRON SHOULD BE CONSTRUCTED IN A RED COLORED STAMPED CONCRETE.

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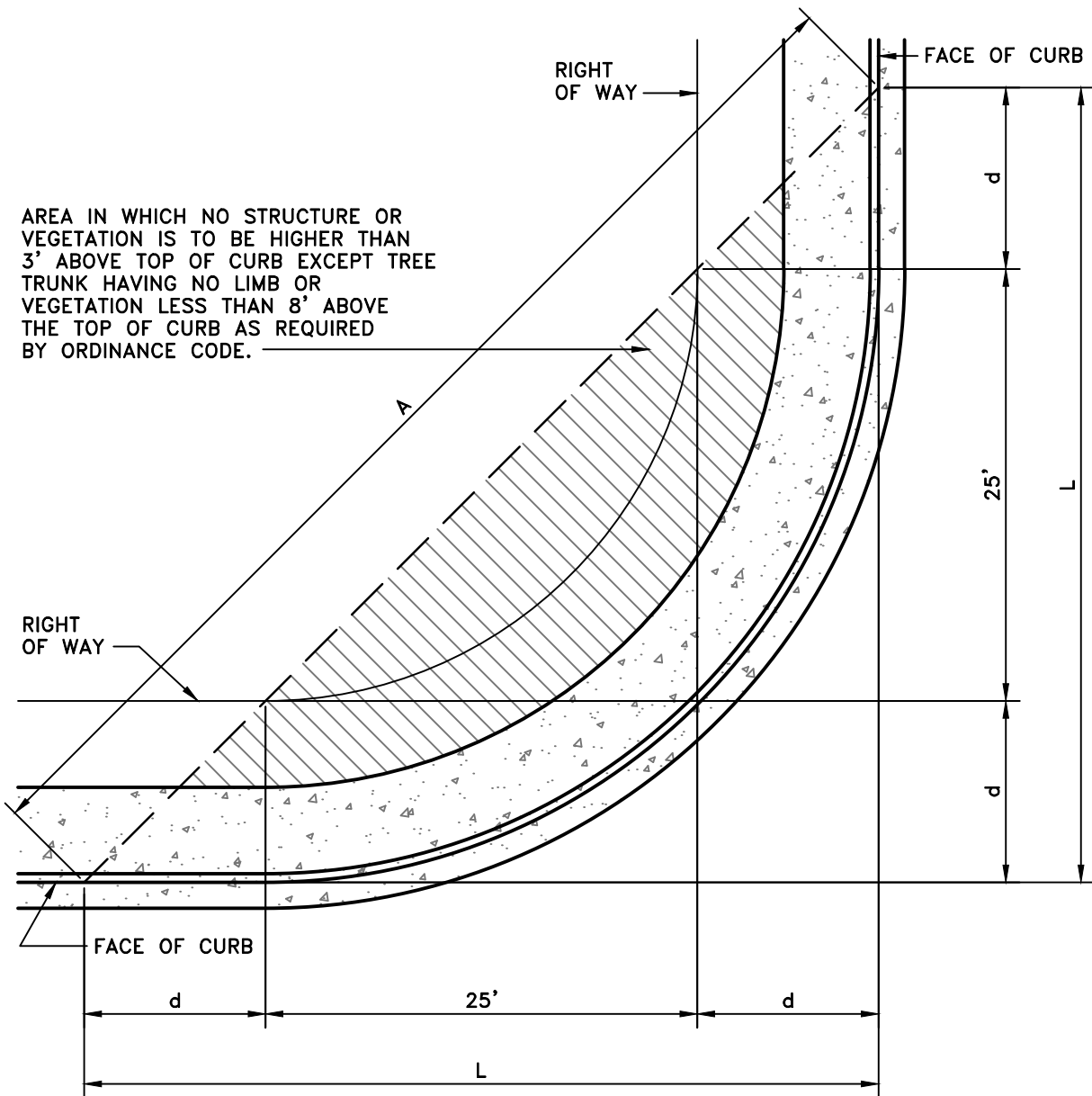
ROUNDABOUT
CONSTRUCTION
NOTES



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RESOLUTION NO. 2014-345

DETAIL NO.
390A

AREA IN WHICH NO STRUCTURE OR VEGETATION IS TO BE HIGHER THAN 3' ABOVE TOP OF CURB EXCEPT TREE TRUNK HAVING NO LIMB OR VEGETATION LESS THAN 8' ABOVE THE TOP OF CURB AS REQUIRED BY ORDINANCE CODE.



TOTAL DISTANCE (L) = 25 + 2d

EXAMPLE: $L = 25' + 2(10') = 45'$
 $A = 1.412 \times L$
 $A = 1.412 \times 45' = 63.5'$

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STREETS

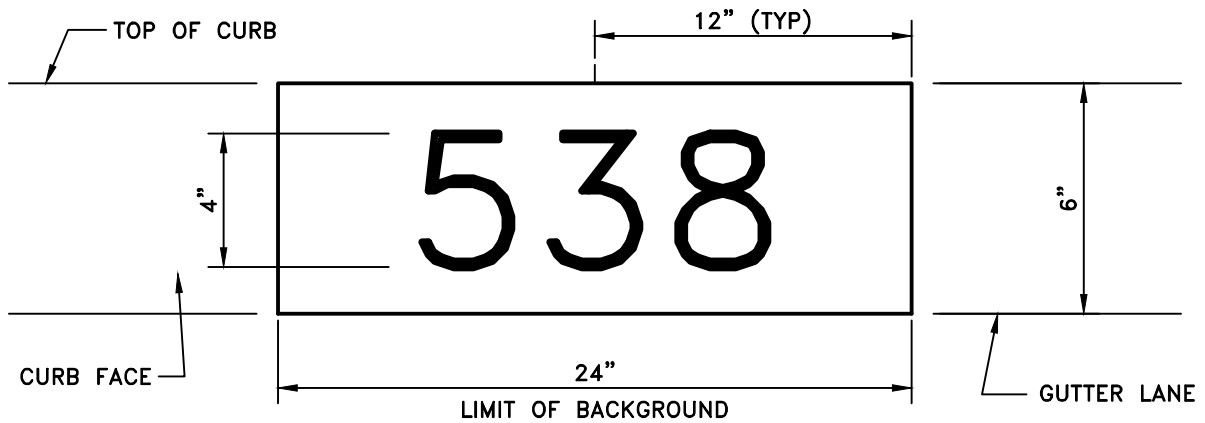
**CLEAR VISION
 TRIANGLE AREA**



MODESTO
 CALIFORNIA

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DETAIL NO.
391



CURB PAINTING STANDARD

NOTES:

1. BUILDING NUMBERS MAY BE PAINTED ON CURB SURFACES IN ACCORDANCE WITH CITY COUNCIL POLICY AND THIS STANDARD DRAWING.
2. NUMBERS SHALL BE PAINTED WITH BLACK 4" BLOCK LETTERS HAVING A 1/2" STROKE ON A WHITE REFLECTORIZED BACKGROUND.
3. NUMBERS SHALL BE PAINTED WITHIN 2 FT. OF THE DRIVEWAY TO THE PROPERTY.
4. AN APPROVED ENCROACHMENT PERMIT FROM THE OFFICE OF THE CITY ENGINEER SHALL BE OBTAINED BEFORE CURBS MAY BE PAINTED.
5. PAINT MUST BE APPROVED BY THE CITY ENGINEER.
6. PAINTING CONTRACTOR MUST HAVE A VALID BUSINESS LICENSE IN THE CITY OF MODESTO.
7. A SPECIFIED FEE SHALL BE CHARGED FOR WORK PERFORMED (NO DONATIONS).
8. APPROVAL IN WRITING OF THE PROPERTY OWNER PRIOR TO PAINTING SHALL BE SUBMITTED TO THE CITY ENGINEER.
9. NUMBER SHALL BE CENTERED ON 24" BACKGROUND.

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REVISED: DATE:

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REVISED: DATE:

STREETS

CURB NUMBERS



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 RESOLUTION NO. 2014-345

DETAIL NO.
392

CHAPTER 4

STORM DRAINAGE DESIGN

4.01 GENERAL

A. Description:

This work shall include furnishing of all the labor, materials, tools, and equipment to construct and complete all drainage facilities designed in accordance with accepted engineering principles, the approved plans, Standard Details and these Specifications.

B. Storm Drain Master Plan Requirements:

The Storm Drainage Master Plan requires a multiple criteria policy for all drainage system design within the City. The criteria are as follows:

1. The 100-year storm is to be contained below the lowest flow line (provided finished grade pads are a minimum 1' above top of curb). Commercial projects finished floor pads may be lower than 1' above the adjacent top of curb. However, commercial projects must provide a high point on-site of at least 0.8' above street flow line. This is to prevent flooding between street and site. This also assumes the commercial development has mounded landscaping to prevent the 0.8' of street water from entering the parking area over the landscaping. Typically, the high point in a commercial drive is placed 10' to 35' behind the property line within the driveway lane.
2. The hydraulic grade line (HGL) for a 10-year, 24-hour duration storm shall be below the gutter pan (flowline). Engineer will assume the storm basin is at HGL when modeling with these criteria.

All proposed storm drainage facilities shall include provisions for future upstream development. This would entail indicating on plans a storm drain pipe stub 5' beyond the development for pipe depths less than 6' and an additional 1' per foot of depth over 6'. All developments connecting to a pipe network discharging directly to a creek, river, or stream shall not exceed the pre-development storm release rates and no development shall discharge at a rate, which exceeds the capacity of any portion of the existing downstream system. Calculations for storm drainage design within a development as well as calculations for runoff generated by upstream areas within the contributing watershed shall be submitted to the City Engineer for approval.

3. Storm drainage discharges for all capital improvement, commercial, industrial, or residential, development projects, regardless of project size, shall include Stormwater Quality Control Measures. A City of Modesto document entitled "Guidance Manual for Development Stormwater Quality Control Measures" has been adopted to establish minimum requirements for stormwater quality control measures and to provide guidance to the Developer, Contractor, and Engineer in selecting appropriate control measures. This document is incorporated into these Standard Specifications by reference. The Contractor and Developer assume full responsibility for conforming to the requirements

stated in this document. In the event of conflict between the requirements stated in this document and these Standard Specifications, the requirements of the Standard Specifications shall take precedence.

4. The Contractor's attention is directed to a City document entitled "Design Standards for Dual Use Flood Control/Recreational Facilities". This document is incorporated into these Standard Specifications by reference. The Contractor assumes full responsibility for conforming to the requirements stated in this document. In the event of conflict between the requirements stated in this document and these Standard Specifications, the requirements of the Standard Specifications shall take precedence.

These adopted criteria are intended primarily for new construction and make use of the surface capacity of the new streets as a part of the detention/discharge system. Small in-fill projects in areas without positive gravity storm drainage system shall utilize rockwells for the street right-of-way and all on-site drainage shall be stored and disposed of on-site with rockwells or some other approved method.

The diversion of natural drainage will be allowed only within the limits of a proposed improvement. All natural drainage must leave the improved area at its original horizontal and vertical alignment unless a special agreement, approved by the City Engineer, has been executed with adjoining property owners.

Containment of floodwaters shall be within the top of curb. Adjacent finished grade pads are a minimum of 1' above top of curb or where provisions are made to provide a high point, which prevents floodwaters from entering the finished floor pads. Floodwater shall be confined to streets or other approved right-of-ways by grading, levees or alternative means acceptable to the City Engineer. In no instance shall an improvement be designed such that floodwaters can reach a point greater than 1' below finished pad elevations before overland release occurs.

The design of all bridges, box culverts, levees, detention basins, spillways, and other applicable structures shall comply with the latest Federal Emergency Management Agency (FEMA), Department of Water Resources (DWR) Division of Safety of Dams regulations and Caltrans Standard Plans

At intersection of pipes, the downstream pipe shall have a crown elevation which is less than or equal to the crowns of all upstream connecting pipes. Pipe diameters shall not decrease in the downstream direction.

C. Storm Water Quality:

The City of Modesto is required by State and Federal regulations to develop programs to control the discharge of pollutants to the municipal storm drain system. As a result, all new development and redevelopment projects are subject to requirements designed to protect stormwater quality, such as expanded plan check and review, stormwater treatment and source control measures and Low Impact Development (LID) measures.

The City of Modesto Guidance Manual for Development Stormwater Quality Control Measures contains guidelines for the design, construction and maintenance of stormwater treatment and source controls and Low Impact Development practices. This document can be viewed on the City's website at:

<http://www.modestogov.com/ced/pdf/engineering/general/modesto%20SW%20Guidance%20Manual.pdf>.

The California Stormwater Quality Association (CASQA) Stormwater Best Management Practice Handbook for New Development and Redevelopment contains design standards and detailed information on stormwater treatment and source controls. The CASQA handbook can be viewed online at: www.cabmphandbooks.com.

Contact the Community and Economic Development Department, Land Development Engineering Division for information on stormwater quality requirements for a specific project at (209) 577-5264.

D. Submittal of Drainage Calculations:

Drainage calculations are required for all projects and shall be done on standard form Figure 4.1, a spreadsheet reproducing this information, or a software program designed for hydrology output such as StormCAD. Submittal of drainage calculations shall include the following items:

1. Topographic map showing the relationship between the proposed development and the remainder of the watershed, including acreage of all sub-areas.
2. Hydrologic and hydraulic analysis of the storm drainage system based on a 10-year storm, while assuming that the basin or storage facility is holding its design volume. The analysis shall include hydrologic and hydraulic calculations, assumptions, charts tables, references and the methodology used.
3. A plan, preferably at 1" = 100' scale, showing proposed street system, existing and proposed drainage system, tributary sub-areas (including offsite drainage), the magnitude and direction (indicated by arrows) of flow in each pipe and flow to each structure contributed by its tributary area. All flow rates shall be in cubic feet per second (cfs).
4. The hydraulic calculations shall show as a minimum the HGL, the proposed storm drain, including slopes and sizes, the flow in the pipes, velocities in pipes, elevation of pipe inverts at structures, top of structure elevation at each structure and top of curb elevations (or freeboard at structures).

E. Easements:

Publicly owned drainage pipelines and channels will not be allowed on private property unless they lie within a dedicated public easement. This option is not preferred, and must be approved by the City Engineer prior to construction. Where minor improvement of a drainage channel falls on adjacent property, such as day lighting a ditch profile, written permission from the adjacent property owner(s) for such construction shall be required. A copy of the document which grants said approval shall be submitted to the City Engineer prior to the approval of the Improvement Plans.

Easements for closed conduits shall meet both of the following width criteria:

1. Minimum width of any easement for a closed conduit shall be 20'.

2. All easements for closed conduits shall have a minimum width in feet equal to the required trench width according to the standard detail for trench backfill plus 2 (two) additional feet of width for every foot of depth of the pipe as measured from the bottom of the pipe to finished grade. All conduits shall be centered within their easements.

Drainage easements for open channels shall have sufficient width to contain the open channel and a 16' wide service road. The toe of a bank shall not be within 5' of an easement boundary. Easement boundary lines shall, at changes of alignment, have a radius sufficient enough to provide turning room for vehicles operating on the service road.

F. Discharge Approval and Permits:

The Developer shall have the responsibility of obtaining written approval and encroachment permits from all agencies controlling the discharge of drainage into the receiving waterways.

G. Fencing:

All basins and open channels shall be enclosed by a chain link fence or masonry wall as determined by the City Engineer and complying with the City Standard Details and Specifications. The fence or wall shall be located a minimum of 6" within the required easement boundary. Vertical green slats inserted in the fence shall be used to screen the service road or site. A masonry wall will be required for all permanent basins except dual-use basins and a fence will be required along open channels or long and narrow access roads to a basin.

Masonry walls shall be constructed of 8" block and at a minimum of 6' high. Landscaping around the outside perimeter shall be a minimum of 10' wide.

H. Service Roads:

A service road shall be provided within the boundary of all open channels. It shall be a minimum of 16' wide, 10% maximum graded for vehicular traffic and clear of trees, shrubbery, and other obstructions for its full width. Fourteen (14) feet of the road's width shall be concrete paved (surface type to be determined by the City Engineer for each case) with a minimum unpaved rock shoulder width of 1' on each side of the roadway. Turning radii of 45' for maintenance vehicles shall be maintained. Service roads extending into the basin shall have a turnaround. Service roads may be required on both sides of the channel as determined by the City Engineer.

4.02 DESIGN

Design storm methods shall be according to the following guidelines:

TABLE 4.1 DESIGN STORM METHODS

Design Area or Item	Design Method	Design Return	Comments
Less than 400 acres	Rational Method	10-year	Refer to this section and details
Greater than 400 acres	Rational Method	100-year 24-hour	Rainfall depths shall be taken from NOAA Atlas 2, Volume XI, or Rainfall Intensity Curves (Detail No. 400).
Detention Basin	$V = CAR/12$	100-year 24-hour	Peak discharge from a detention basin shall not exceed 90% of the undeveloped peak flow from the 24-hour, 100-year event or MID limits.

A. Rational Method:

Storm runoff for areas smaller than 400 acres shall be computed using the Rational Method according to the formula:

$$Q = CIA$$

- Where:
- Q** = Design runoff, in cubic feet per second (cfs)
 - C** = Coefficient of runoff based on ultimate development of the drainage area, as defined in Table 4.2
 - I** = Rainfall intensity from Detail 400 (inches/hour)
 - A** = Area of drainage basin in acres

TABLE 4.2 BASIC RUNOFF COEFFICIENTS

<u>Surface</u>	<u>Coefficient (C)</u>
Pavement	0.95
Roofs	0.95
Compacted earth without paving	0.75
Lawns and Open Lands	0.20

TABLE 4.3 COMPOSITE RUNOFF COEFFICIENTS

<u>Land Use</u>	<u>Coefficient (C)</u>
Residential Areas	
Suburban Density (0.5 to 1.0 acre lots)	0.40
Low Density (2.1 or more lots per acre)	0.60
Medium Density (Cluster Housing)	0.70
High Density (Apartments)	0.85
Commercial	0.90
Industrial	
Light	0.80
Heavy	0.90
Schools	Determined by City Engineer

TABLE 4.4 MANNING COEFFICIENT

<u>CONDUIT MATERIAL</u>	<u>MANNING COEFFICIENT</u>
<u>Closed conduits</u>	
Asbestos cement (not for new const.)	0.013
Cast iron pipe	0.013
Concrete pipe	0.013
Corrugated metal pipe	
Plain	0.024
Pave invert	0.020
Fully paved	0.013
Vitrified clay	0.013
<u>Open channels</u>	
Lined channels	
Asphalt	0.015
Concrete	0.015
Rubble or riprap	0.030
Vegetal	0.040
<u>Excavated or dredged</u>	
Earth, straight & uniform	0.030
Earth, winding, fairly uniform	0.040
Unmaintained	0.100

(Adapted from Table XIV, ASCE Manual No. 37, 1970)

TABLE 4.5 JUNCTION LOSSES

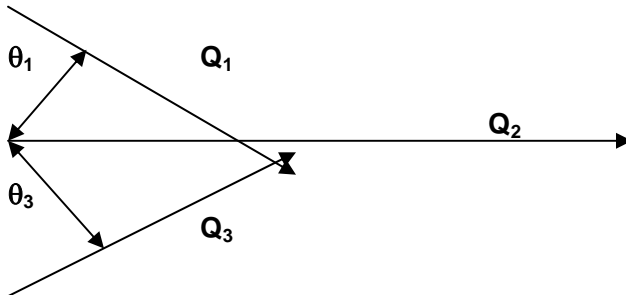
At point of change in the hydraulic parameters of flow rate or section (including manholes and catch basins), the HGL shall be calculated considering velocity heads and losses due to bends, entrances, exits, turbulence, etc.

Losses may be determined using energy equations (with appropriate coefficients), or by using the pressure-momentum method as outlined below. Junction losses used in the hydraulic calculations shall not be less than those calculated by the pressure-momentum method.

The pressure-momentum method may be used to calculate the change in water surface at junctions and section changes, as follows:

$$\Delta y = \frac{Q_2 v_2 - Q_1 v_1 \cos(\theta_1) - Q_3 v_3 \cos(\theta_3)}{\frac{g(A_1 + A_2)}{2}}$$

Where:



- Δy = Change in hydraulic gradient through junction, in feet
- Q = Flow in cubic feet per second (cfs)
- V = Velocity in feet per second (fps)
- A = Area of flow in square feet (sf)
- θ_3 = Angle of convergence between the center line of the main and the center line of the lateral in degrees ($^{\circ}$)
- θ_1 = Angle of deflection between the upstream and downstream centerlines, in degrees ($^{\circ}$)
- g = Acceleration due to gravity, 32 ft/sec²

However, the minimum loss through a junction shall not be less than one-tenth (0.10) of the outflow pipe velocity head.

B. Unit Hydrograph:

Detention basin capacity and storm runoff for areas larger than 400 acres shall be computed using the Unit Hydrograph Method.

C. Line Size:

The minimum allowable inside diameter of any gravity flow storm drain pipe shall be 12" and designed to flow with a minimum velocity of 2' per second when flowing full.

D. Vertical Alignment:

All storm drain pipe alignments shall be designed to allow a minimum of 2' of cover as measured from finished grade to top of pipe or 1' below the subgrade, whichever is greatest. If, for sound engineering reasons, 2' of cover cannot be obtained, the pipe shall either be encased in control density fill (CDF) or provide protective engineered concrete slab cover.

E. Horizontal Alignment:

See Detail No. 805

F. Manhole and Junction Boxes:

1. Manhole and junction boxes shall conform to the City Standard Details. They shall be located at changes in grade or conduit size, at junction points, on curved pipe at the EC or BC or the curve, and at 300' intervals along the curve. Manhole spacing along the alignment shall not exceed 500'.
2. For channelization of manhole base, refer to Standard Details No. 416.
3. A 48" diameter barrel may be used for pipe up to 36" diameter, a 60" diameter barrel for pipe up to 54" diameter and a 72" diameter barrel for pipe up to a 60" diameter.
4. A custom designed box structure for pipe over 60" in diameter shall be approved by the City Engineer. Concrete shall be furnished, mixed, placed and cured in accordance with the provisions of the City of Modesto Standard Specifications and shall be 4,000 psi with 1" maximum aggregate size.
5. The inside dimension of manholes and junction boxes shall be such as to provide a minimum of 3" clearance on the outside diameter of the outfall pipe and the minimum wall thickness shall be 6".
6. In easement areas (i.e. outside surfaced public road), the casting grade shall conform to the surrounding surface unless special elevations are required. If the future use of the area may require lowering the grade for streets or parking areas, a maximum of 24" of grade rings shall be used.

G. Catch Basins:

1. Catch basins shall conform to the City Standard Details. Catch basins shall be designed and spaced such that they intercept and fully contain the 10-year storm. Under no circumstances shall the spacing of catch basins exceed 1,000'.
 - a. Type 1: Catch basins shall be a minimum of one Type 18 bicycle proof grate with 12" detention sump and shall have curb inlets with cast iron hoods, except in rollover curb applications.
2. Temporary inlets and outlets shall conform to accepted engineering practice and shall be specifically designed and detailed on plans.

Storm water runoff in gutters shall be conveyed in underground structures when any of the following criteria is met:

- Gutter runoff exceeds 3.0 cfs.
 - Length of gutter exceeds 1,000'.
3. Access points for the storm drain system shall not exceed 400'. Both catch basins and manholes are considered access points.

H. Rockwells:

Rockwells, when approved by the City Engineer, shall be constructed as shown in the Standard Details. The rockwells shall be located at least 150' from domestic water wells. All rockwell floors shall be at least 10' above existing ground water and have a 20' minimum horizontal separation from all other vertical rockwells. Caution: This type of rapid infiltration should not be used without pretreatment. See Guidance Manual for Development for details of applicable treatment controls.

1. For small multi-family and/or cluster housing for in-fill development, additional storm drainage design will be necessary beyond the standard rockwell spacing. Spacing shall be determined by the City Engineer.
2. All rockwells shall be constructed per Modesto rockwell standard details. The maximum street right-of-way drained shall be as follows:
 - Single Rockwells shall be a maximum of 10,000 square feet of street right-of-way from right-of-way line to center line for each side of street.
 - Double Rockwells may be used for a maximum of every of 14,000 square feet of street right-of-way.
 - Triple rockwells may be used for every 18,000 square feet of right-of-way.A minimum horizontal distance of 20' shall separate rockwells. Any exceptions shall be reviewed by the City Engineer.
3. Provisions shall be made by means of street geometric design to minimize the overflow of one (1) rockwell service area into adjacent areas. Where possible, the street geometric design shall be such that overflow from a rockwell service area into adjacent areas shall only occur for storms with a return frequency of greater than 5 years.

I. Box Culverts:

Box culverts shall be required when specified by the City Engineer and designed on an individual basis.

J. Headwalls, Wingwalls and Endwalls:

Headwalls, wingwalls, endwalls, etc. shall be considered on an individual basis and, in general, designed in accordance with the State Specifications and Standard Plans.

K. Drainage Pump Stations:

Drainage pump stations may be permitted on an individual basis with the written approval of the City Engineer.

L. Service Connections:

1. Private on-site development shall not drain into the public right-of-way unless the right-of-way has gravity storm drain pipes with sufficient capacity to handle additional runoff. Under no circumstances, can development tie into existing off-site rockwalls.
2. Service connections include lines from drain inlets in the public right-of-way, private lines from drain inlets on private property, and private lines from roof drains of private buildings.
3. Service lines from drain inlets and roof drains on private property shall be connected to an on-site catch basin or junction structure before entering the public right-of-way. Tie-ins are restricted to catch basins, junction boxes or manholes.

M. Storm Water Basins:

The City will accept for maintenance two (2) different types of basins – retention (infiltration) and detention. A third type of basin, temporary retention, will not be accepted for maintenance by the city and will remain the Developers' responsibility. Temporary basins may be used only when storm pipelines and right-of-ways to the basin do not exist. A temporary basin is the minimum required to allow the sales of homes. The ultimate connection to a basin or pipeline to a basin must be shown in the plan set. All basins, temporary or permanent, shall meet the following conditions and conform to the standard details.

The Developer and/or Consulting Engineer shall use the City of Modesto Design Standards for Dual Use Flood Control/Recreational Facilities for all basins designed for dual use. Go to:

<http://www.modestogov.com/ced/pdf/engineering/general/Dual%20Basins%20Screen%20QI%20t.pdf>

Final basin location shall be approved by the City Engineer.

All storm drainage basins (retention/detention/temporary) shall be fully landscaped in accordance with the criteria established in the "Design Standards for Dual Use Flood

Control/Recreation Facilities' Manual" and the "City of Modesto Guidance Manual for Development Stormwater Quality Control Measures".

1. Retention (Infiltration) Basins

Retention basins shall be designed to allow the entire volume of a 100-year frequency, 6-day duration storm (R=5.6") to infiltrate, thus not requiring any pumping. Infiltration rates can vary significantly, depending on the soil types encountered at various depths. The actual design infiltration rate for retention basins must be based on a minimum of two (2) infiltration tests performed by a Geotechnical Engineer on the actual basin site at the design elevation at the time of design.

a. Volume

The volume of the basin shall be large enough to hold a 100-year, 6-day frequency storm. The volume shall be determined with no allowance for percolation. This volume is based on average infiltration rates, which is much greater than pumped basins, based on the City's experience with percolation basins.

b. Soils Testing for Retention Basins

A minimum of two (2) soils tests shall be conducted for all retention basins. The soils tests shall identify the infiltration rates and the depth an infiltration trench must be constructed to fulfill the requirements for emptying a 100-year, 24-hour storm event within 48 hours, including the conduit system's water. Also, two (2) soil borings must be made to water table or a minimum of 60', the shallower of the two. The deepest portion of the exposed basin floor must be constructed a minimum of ten feet above the existing water table.

c. Infiltration Trench

The infiltration trench shall be excavated to a depth such that 10' of sand strata is exposed to the sidewalls of the trench. The required soils test shall identify this depth. The preferred location of the infiltration trench shall be at the top of slope of basin walls. The width of the trench shall be a minimum of 12". The trench shall be lined with a 4oz. woven filter fabric with 6' of overhang to wrap up the rock. Engineer rock 3" to 12" in size shall be used to backfill the trench. The trench shall initially be filled to the surface, with the fabric overlapping the rock. An additional pile of rock 4' wide by 3' high shall be placed over this trench in the low basin.

The trench floor shall be constructed a minimum of ten feet above the highest recorded level of groundwater. Caution: This type of rapid infiltration should not be used without pretreatment. See Guidance Manual for Development for applicable treatment controls.

2. Detention Basins

Detention basins shall allow the option of a dual use or multi-use basin with turfed bottoms (for parks, softball, soccer, etc.). Basin design shall conform to a City of

Modesto document entitled Design Standards for Dual Use Flood Control / Recreation Facilities.

a. Volume

The volume of the basin shall be large enough to hold a 100-year, 24-hour storm.

The volume is calculated by the formula:

$$V = CAR/12$$

where **V** = Volume in acre-feet

C = Runoff coefficient

A = Area in acres and

R = 100-year, 24-hour rainfall

From Detail No. 400, $R_{100}=(0.12 \times 24)=2.88"$. Use appropriate C values determined from Tables 4.2 and 4.3.

b. Pumping to an Irrigation Canal

The Developer shall obtain City and Modesto Irrigation District (MID) or Turlock Irrigation District (TID) approvals for construction of a basin pump station. A 48 hour settling period is required for water quality control purposes, prior to pumping into the canal.

c. Pump Station Design

The storm basin design must hold the 100-year, 24-hour storm. The pumps shall be designed to drain a 1-year frequency, 3-day duration storm within the next 48 hours. The Water Quality Volume (typically 0.5 inches) shall be detained a minimum of 48 hours. Criteria for pump station design including the electrical work shall be established on a case-by-case basis and submitted for approval by the City Engineer.

d. Layout

A square or rectangle basin layout is recommended, as this is the most efficient use of the land.

e. Depth

The maximum water depth of basin shall be 20' and basin floor shall be at least 10' above the existing water table. Water table measurements shall be taken by drilling two (2) geotechnical borings to groundwater at opposite ends of proposed basin and letting stabilize 24 hours, then recording and reporting groundwater depth. The measurements must be taken during the months of January through May. The basin floor shall be graded to direct the water to the inlet/outlet area where either infiltration or pumping will take place.

f. High Water Elevation

The high water elevation in the basin shall be 6" below the lowest gutter flow line elevation.

g. Side Slopes

Side slopes shall be at 4:1 for all basins.

h. Access

A 16' wide access road shall be constructed to the bottom of the detention basin and around the top perimeter of the basin. The road surface shall be 8" concrete (5 sack with fibermesh) over 4" Class II aggregate base over 6" of native compacted at 95%. Road stabilization fabric will be required within the basin itself. A 12" wide shoulder consisting of 12" aggregate base over native shall be constructed. The access road shall extend to the street. Access road grade shall not exceed a 10:1 with 3:1 side slopes. A turning radius of 45' is required for maintenance vehicles on the floor of the basin. Basins shall be provided with a minimum of a 25' wide strip around the top perimeter for a 16' access road and a 9' buffer zone for landscaping, fencing, and/or screen walls.

i. Inlet Structure

Temporary basins shall use either a concrete Flared End Section (FES) or a head wall. Permanent basins shall construct headwalls on inlet pipes. A 2' deep x 12" wide concrete cutoff wall shall be constructed at the outlet to prevent scouring. Engineer rock (20 lbs.+) w/ engineer fabric under rock shall be installed to prevent erosion and vegetative growth under the rock.

j. Fencing

Fencing is not allowed on Dual Use basins. See section 4.01G for fencing specifications.

k. Trash Separator

All inlets and outlet structures shall meet Cal-OSHA Standards that will prevent access by small children, and also prevent clogging of structures. This will include the installation of trash racks or rebar across the open areas of said structures and pipes.

l. Inlet/Outlet Locations

The inlet and outlet location shall be at least 3' deeper than the remainder of the basin. This area shall trap the nuisance water on a daily basis and allow percolation. The entire basin shall have a slope toward this area of a minimum of 2%.

m. Irrigation

All drainage basins will be designed with an automatic irrigation system to include side slopes and floor. This is to produce grasses for preventing erosion

and settling out pollutants. The City's Park Planning and Development Division shall approve the irrigation system design.

N. Storm Drain Requirements for Infill and Redevelopment:

1. APPLICABILITY

Infill and redevelopment for commercial parcels 3 acres or less shall be defined by all of the following criteria for the property:

- a. Must not be located in a specific plan area.
- b. Must be one legal lot surrounded by urban development on at least three sides (does not have to be directly adjacent to surrounding development)
- c. Must be served by existing underground utilities (sewer and water).
- d. Must be infill and/or redeveloping site with existing development (site does not need to lie within the City's Redevelopment Area).

2. SCOPE

There are two methods for draining storm water within infill and redevelopment areas: Gravity Storm Drainage System (available only in certain areas) and Containment On-Site, where no gravity storm drainage is available (rockwell areas). Stamped and signed storm drainage calculations shall be required upon improvement plan submittal, regardless of storm drainage method used.

- a. Gravity Storm Drainage System – Defined as areas that drain to a gravity system or to a MID or TID lateral. If gravity storm drainage is available, the following criteria, as well as all other federal and state requirements are applicable. (i.e. the City of Modesto Guidance Manual for Development Stormwater Quality Control Measures and the California Stormwater Quality Association's Best Management Practice Handbook for New Development and Redevelopment)

- 1) The site must store the volume of the 100 year, 24 hour storm (R = 2.88") less the volume of the 5 year, 24 hour storm (R = 1.80") which is allowed to flow to the gravity storm drainage system. This equates to storing 1" of storm water over the entire site (2.88" – 1.80" ~ 1")* which must percolate within 48 hours. To prove the required volume can percolate within 48 hours, a geotechnical boring and percolation report are required. Percolation test shall be in the proposed percolation areas and at the correct depth. An absorption rate based upon the observed percolation rate (with a minimum safety factor of 2) shall be incorporated into the design.

* The volume of percolation cannot be included when calculating overall storage volume.

Note: The property owner shall be responsible for maintaining all on-site storm drainage infrastructures. The City of Modesto is not responsible for maintenance.

- 2) A hydrology study will be required to show no increase in discharge to the gravity storm drainage system. If discharging to an MID or TID lateral, restricted flow rates are currently established by existing drainage

agreements in some locations. However, a flow rate of 1 to 5 cfs for the entire storm drainage area has been allowed pending approvals for construction of a basin pump station from either MID or TID.

Note: Neither MID or the City of Modesto will execute a discharge agreement with a private developer because there is no control of the on-site facilities in terms of discharge quantity and quality.

- 3) In areas that have historically experienced localized flooding, a downstream facility capacity analysis will be required before connecting to the gravity storm drainage system.
- b. No Gravity Storm Drainage System – For areas where no gravity storm drainage is available (rockwell areas) the following design criteria is applicable:
- 1) The volume of the 100-year, 24-hour storm (R = 2.88") must be completely contained on-site and percolate within 48 hours. A minimum of 50% of the volume shall be stored underground or in a basin in the percolation area. The remaining 50% of the storm volume may be stored above ground within the on-site top-of-curb provided the 100-year, 24-hour water level is at least 1' below the building(s) finished floor elevation.
 - 2) A geotechnical boring and percolation report are required. Percolation test shall be in the proposed percolation areas and at the correct depth. An absorption rate based upon the observed percolation rate (with a minimum safety factor of 2) shall be incorporated into the system.

4.03 MATERIALS

A. Reinforced Concrete Pipe (RCP):

Reinforced Concrete Pipe shall conform to the specifications of ASTM designation C76 and shall be Class III, IV or V, unless otherwise specified on the plans. Reinforcing shall be the minimum requirements for circular reinforcing wire mesh cages as specified in ASTM designation C76. Portland Cement used in the manufacture of reinforced concrete pipe shall conform to the requirements of the specifications for Type II Portland Cement, ASTM designation C150.

The following chart lists the minimum allowable classes of RCP. For use in this chart, cover is defined as the distance from the outside top of pipe to either the top of curb or finished grade, whichever is applicable.

<u>Cover in Feet</u>	<u>Minimum Class, RCP</u>
Less than 2.5'	Class IV (2000 D)
2.5' to 14.5'	Class III (1350 D)
14.6' to 23.0'	Class IV (2000 D)
23.1' to 37.0'	Class V (3000 D)

Any storm drain pipe which lies wholly or in part within the structural section of a street shall be Class V.

B. Cast-In-Place Concrete Pipe (CIPP):

CIPP shall require the prior approval of the City Engineer and shall conform to the requirements of Section 63 of the State Standard Specifications, except that the concrete shall be placed around the full circumference in one operation. Concrete shall be a minimum of 4,000 psi. CIPP shall have a minimum cover in conformance with the following:

1. CIPP shall not be used if the finished grade is less than 30" above the top of pipe or a distance of 18" below subgrade, whichever is greater.
2. If the paving surface is 18" or more above the top of pipe, backfill shall be placed in accordance with the City of Modesto standard backfill requirements for utility trenches.
3. The City Engineer may seasonally or permanently deny the use of CIPP if, in his/her judgment, local conditions make the use of said pipe undesirable.
4. CIPP stubs which will need to be tied onto in the future with additional pipe shall have a connection piece of CL IV RCP installed as a stub. Design Engineers shall indicate any pieces of RCP needed for connection with the CIPP on the Improvement Plan profile.

C. Asbestos Cement:

Asbestos Cement pipe shall not be allowed.

D. Manholes:

Manhole frame and cover shall be as per Standard Detail No. 422.

1. All manhole frames and covers shall be circular and interchangeable with other like frames and covers. If the frames and covers are not concentric and interchangeable and do not conform to the standard City frame and cover, they shall be removed, rejected and replaced by the Contractor or Developer at no cost to the City.
2. For storm drains of less than 48" diameter, precast reinforced concrete manholes shall be used. Manholes shall conform to the specifications of sanitary sewer manholes.
3. Storm manhole covers shall have a minimum of four (4) 1" vent holes.

E. Catch Basins:

Storm drain catch basins shall be cast-in-place conforming to the Standard Details. Concrete shall be 3,000 psi with 1" maximum aggregate.

The structural channel iron shall be galvanized to conform to the requirements of Section 75-1.05 "Galvanizing" of the State Standard Specifications. Damaged galvanizing shall conform to Section 66-1.02E(4) "Damaged Galvanizing of the State Standard Specifications.

F. Rockwells:

All City of Modesto standard rockwells shall have an 8" diameter core pipe specified as follows:

1. 8" C900, Class 200 PVC pipe, 20' long, installed Bell-up.
2. Perforations shall consist of 4 rows of ½" diameter holes at 90° apart, on 6" centers vertically, to within 6" of each end. Pre-fabricated perforated pipe will be allowed with City Engineer approval.
3. A rockwell shall have at least 250 linear feet of gutter to pond in the street before releasing to another drainage structure. The catch basin shall be located at the low point of the 250 linear feet of gutter, but not at either end.

G. Headwalls, Wingwalls and Endwalls:

All headwalls, wingwalls and endwalls shall be of 3,000 psi reinforced Portland Cement Concrete constructed in accordance with the plans and Section 51 of the State Standard Specifications. Temporary bank protection may be provided by sack rip-rap in accordance with Section 72 of the State Standard Specifications.

H. Fencing:

Fence Materials shall include green slats in chain link fence and masonry walls. Masonry walls shall be reinforced with rebar and control density fill (CDF).

4.04 INSTALLATION

A. Storm Drain Pipe:

1. Testing Prior to Construction

Tests on reinforced concrete pipe shall be required to determine conformance with "D" load and reinforcing requirements of these specifications.

Pipe samples for testing shall be furnished, without charge, by the Contractor one (1) week in advance of construction. The cost of testing the pipe shall be borne by the Contractor. One (1) section of pipe from each lot to be used shall be tested in accordance with the procedures outlined in ASTM C76. Lots tested shall be marked with the date manufactured as well as by lot number for shipment to the specific project for which that lot has been tested. Any pipe arriving on the job without the appropriate markings shall be rejected and sent back to the supplier until such lot(s) can be tested and accepted for use.

In lieu of the above testing of reinforced concrete pipe, the Contractor may submit to the City Engineer the manufacturer's "Certificate of Compliance" guaranteeing that the pipe meets the requirements of ASTM C76.

2. Laying Pipe

The pipe shall be laid in conformity with the prescribed lines and grades, which shall be obtained by means of a laser beam or by measuring from a tightly stretched line

parallel with the grade and supported on at least three (3) points over the center line of the pipe. The Contractor shall field verify the depth and alignment of any existing storm drain line prior to construction. If the existing storm drain line is not exactly as shown on the Improvement Plans, the Contractor shall obtain the approval of the City Engineer before proceeding. All adjustments of pipe to line and grade shall be made by scraping away or filling in and tamping under the body of the pipe and not by blocking or wedging. All pipe shall be laid with bell end upstream and shall be laid upstream from structure to structure.

3. Pipe Penetration

Construction of storm drain manholes and pipe penetrations into storm drain manholes shall conform in method and materials to the specifications as directed in Section 5.04 C -"Manholes" of the City of Modesto Standard Specifications.

4. Testing After to Construction

The Contractor shall inspect all new lines and manholes with Closed Circuit Television (CCTV) and furnish a written or printed PACP (Pipeline Assessment and Certification Program) report and CD/DVD copy of the PACP coded inspection to the City inspector at time of inspection. All inspections shall be recorded in an unprotected .mpg digital format. The Contractor shall give the City at least 2 (two) working days notice prior to televising the line(s), so that a City representative can verify the work.

The Contractor shall **CLEAN** all lines and manholes of dirt and other debris, remove pipe crowns, compact trenches, raise manhole rims to grade and correct all visible infiltration, leaks and deficiencies **PRIOR** to inspection. Areas adjacent to manholes shall be leveled and made accessible to the television trailer. All inspection, equipment time and costs for the inspection shall be the responsibility of the Contractor.

All defects and deficiencies discovered during this inspection shall be corrected by the Contractor to the satisfaction of the City Engineer at the Contractor's expense. Low spot defects to be measured with appropriate sized target viewed clearly by CCTV camera.

Measuring devices and depth tolerances for trapped water shall be:

- For 12" inch and larger pipe, a depth tolerance of 10% of pipe area.

Broken, cracked or damaged ends of pipe shall be rejected. Minor chipped ends of ¼" or less shall be permitted provided cracking and excessive damage is not evident.

If the City suspects any damage or break in the line, the televised inspection shall be repeated within the one-year warranty period. All defects discovered in this inspection as well as the cost of the televised inspection shall be corrected by the Contractor at his/her expense.

B. Catch Basins:

All storm drain catch basins and drain inlets shall be labeled with the City's approved stormwater quality message, prior to acceptance by the City.

C. Rockwells:

1. Boring

For new rockwells, contractor shall drill one (1) geotechnical boring to groundwater or 60', whichever is less, let stabilize 24 hours, then record and report groundwater elevation to City Engineer. This data shall be submitted to the City Engineer a minimum of ten (10) days prior to construction of the rockwell. City Engineer shall evaluate the data from each proposed site and make the final determination of rockwell depth. The rockwell floor depth shall not be within 10' of groundwater. A single geotechnical boring shall represent underlying groundwater elevation for sites of five (5) acres or less. For sites greater than five (5) acres, additional geotechnical borings may be required, at the discretion of the City Engineer. Alternately, at the City Engineer's discretion, the Department of Water Resources website for historical groundwater may be used to help establish the historical high groundwater elevations at <http://www.water.ca.gov/waterdatalibrary>. The Driller or Developer shall submit to the Engineer a well drilling log for each rockwell as soon as possible after drilling is completed and prior to acceptance of the improvements by the City.

2. Modesto Rockwells

Modesto rockwells shall be drilled to a standard depth of 50', provided that groundwater levels are lower than 60', unless otherwise determined by the City Engineer.

3. Where groundwater is less than 45' deep, Horizontal Drains shall be constructed as shown in the Standard Detail No. 421.

Testing

Rockwells shall be tested for adequacy after completion of all work in their designed service area. This service area shall include nearby on-site development. The Developer may have all street improvements accepted except the rockwells by replacing the bonds with a lower bond amount while waiting for on-site development to be completed. This is to guarantee that silts produced by on-site development are strictly controlled and damaged rockwells are rejuvenated prior to acceptance. Testing shall consist of flooding with water until static head is obtained at the well inlet. Rockwells shall absorb this static water head within 24 hours. If the maximum practical input flow has been applied continuously for 1 hour without obtaining a static head, the rockwell will be approved.

4.05 MEASUREMENT AND PAYMENT

A. Pipe

Payment for storm drain pipe complete in place shall be per linear foot measured from center-of-manhole to center-of-manhole or catch basin, or from center of manhole to wall of outlet structure, as the case may be. Measurement shall be along a line parallel to the grade of the storm drain.

Payment shall include the furnishing of all labor, materials, water, tools and equipment required to construct and complete, in an efficient and workmanlike manner, the installation of storm drain pipe in accordance with the plans and these specifications.

Full compensation for all incidentals arising from this work shall be considered as included in the price paid per linear foot measure and no further compensation shall be allowed.

B. Structures, Manholes, Catch Basins and Rockwells

The unit of measure for payment shall be per each unit. Payment shall be made at the bid price per item for each structure complete in place and shall include the cost of excavation, backfill, frames, covers, plates or reinforcing steel where required.

Full compensation for all incidentals arising from this work shall be considered as included in the price paid per each unit and no further compensation shall be allowed.

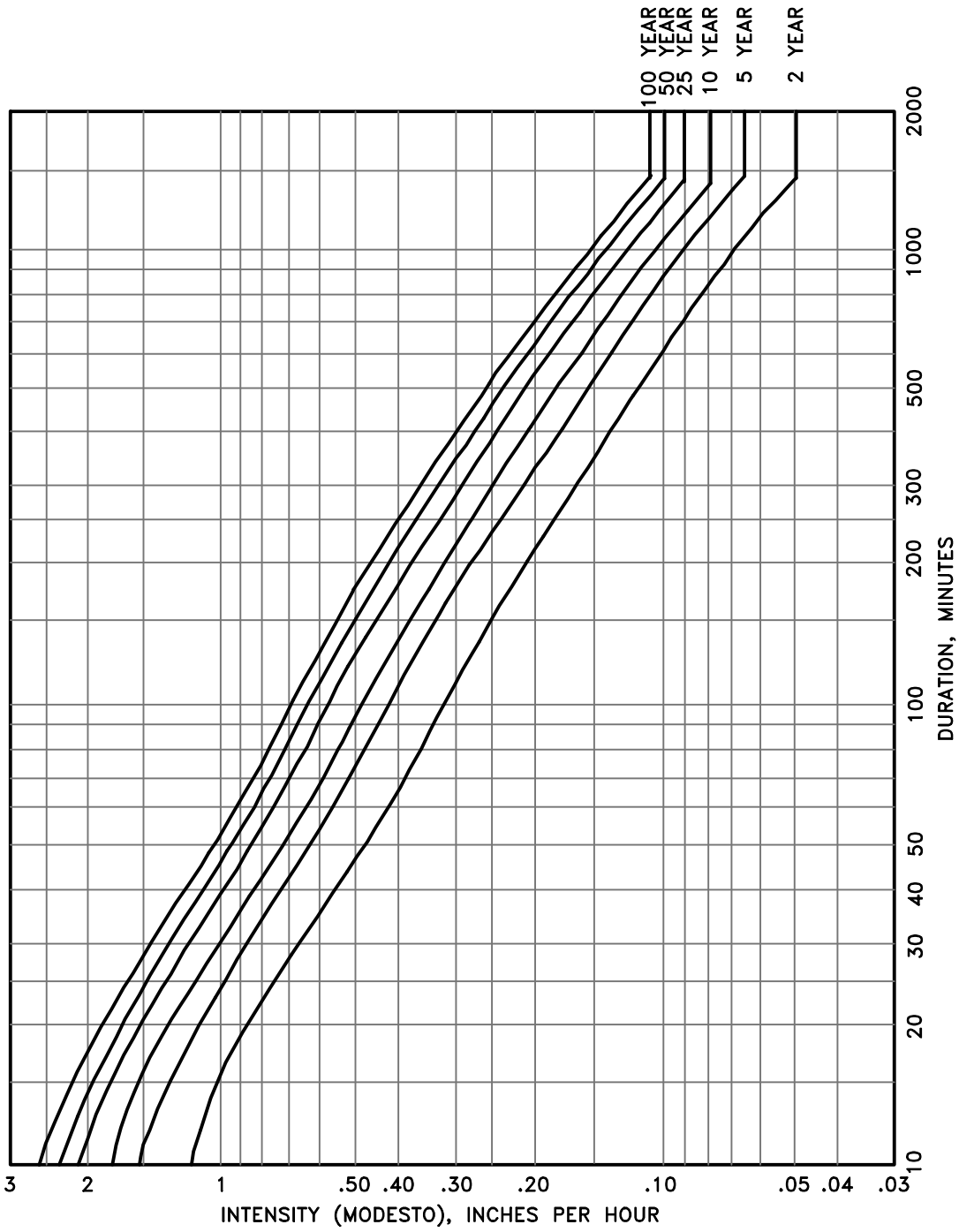
C. Basins:

Excavation for basins shall be measured for payment by cubic yard. Access ramps and service roads shall be measured per square feet of material laid (i.e. asphaltic concrete, aggregate base, geotextile fabric). Fencing and walls shall be measured by linear foot.

Payment shall include the furnishing of all labor, materials, water, tools and equipment required to construct and complete, in an efficient and workmanlike manner in accordance with the plans and these specifications.

D. Community Facilities District (CFD)

All basins that will be maintained as part of a designated CFD shall include the cost of pump maintenance, structural integrity, mowing and planting of grasses, weed control, vector control, periodic removal of sediments and an irrigation system.



THESE CURVES ARE BASED ON CALIFORNIA DEPARTMENT OF WATER RESOURCES DATA FROM THE MODESTO RAINFALL GAGING STATION. (MEAN ANNUAL PRECIPITATION = 11.95 INCHES).

TO OBTAIN INTENSITIES FOR LOCATIONS OTHER THAN MODESTO, MULTIPLY INTENSITY ON THIS CHART BY MEAN ANNUAL PRECIPITATION AT THE POINT IN QUESTION DIVIDED BY 11.95.

APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
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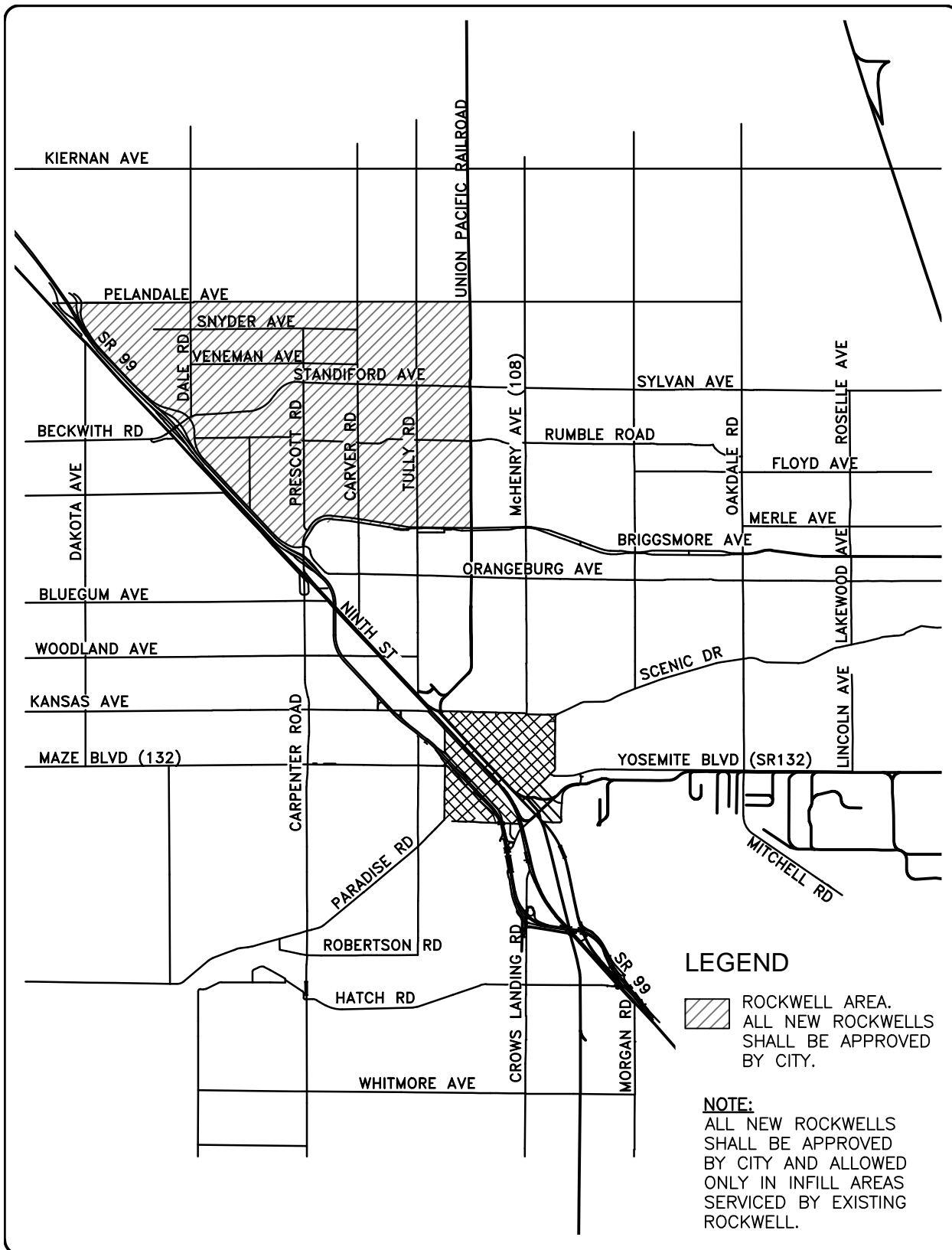
STORM DRAINAGE

**RAIN INTENSITY
FREQUENCY CURVES**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

DETAIL NO.
400




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STORM DRAINAGE

ROCKWELL SERVICE AREA
CITY STANDARD ROCKWELLS

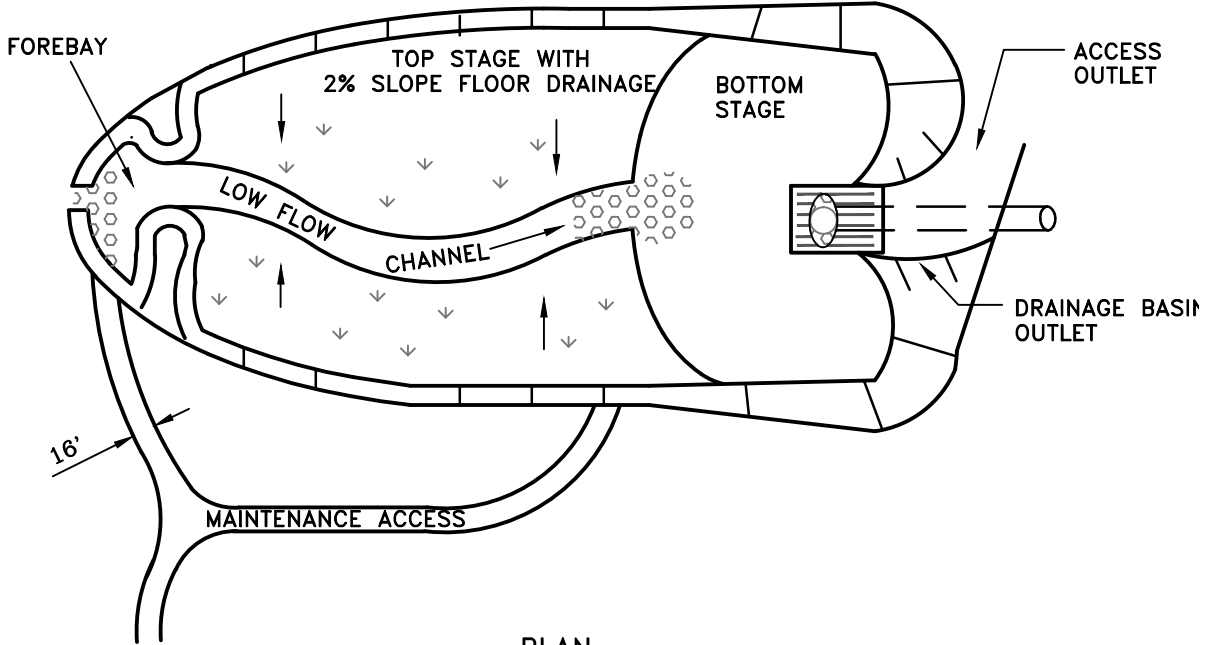
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RESOLUTION NO. 2014-345



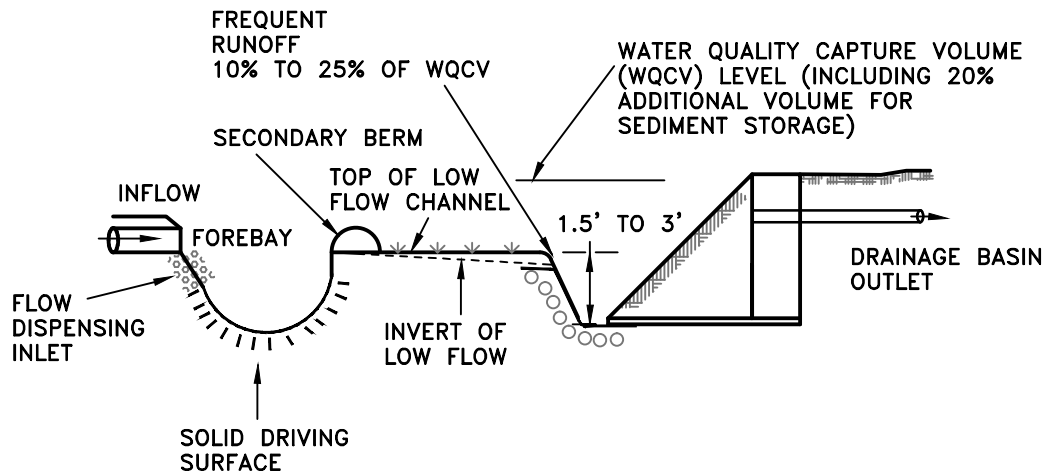
MODESTO
CALIFORNIA

DETAIL NO.
401

SLIDE SLOPES NO STEEPER THAN 4:1



PLAN
NOT TO SCALE



SECTION
NOT TO SCALE

LOW FLOW CHANNELS AND GUIDANCE TO DESIGNING BASINS SHOULD FOLLOW GUIDELINES ESTABLISHED IN THE BMP'S (BEST MANAGEMENT PRACTICES) FOUND IN FIGURE 5A. PLAN AND SECTION OF AN EXTENDED DETENTION BASIN.

NOTE:

REFER TO GUIDANCE MANUAL FOR NEW DEVELOPMENT STORM WATER QUALITY CONTROL MEASURES (CURRENT EDITION)

APPROVED BY:
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C59650

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STORM DRAINAGE

DRAINAGE BASIN

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



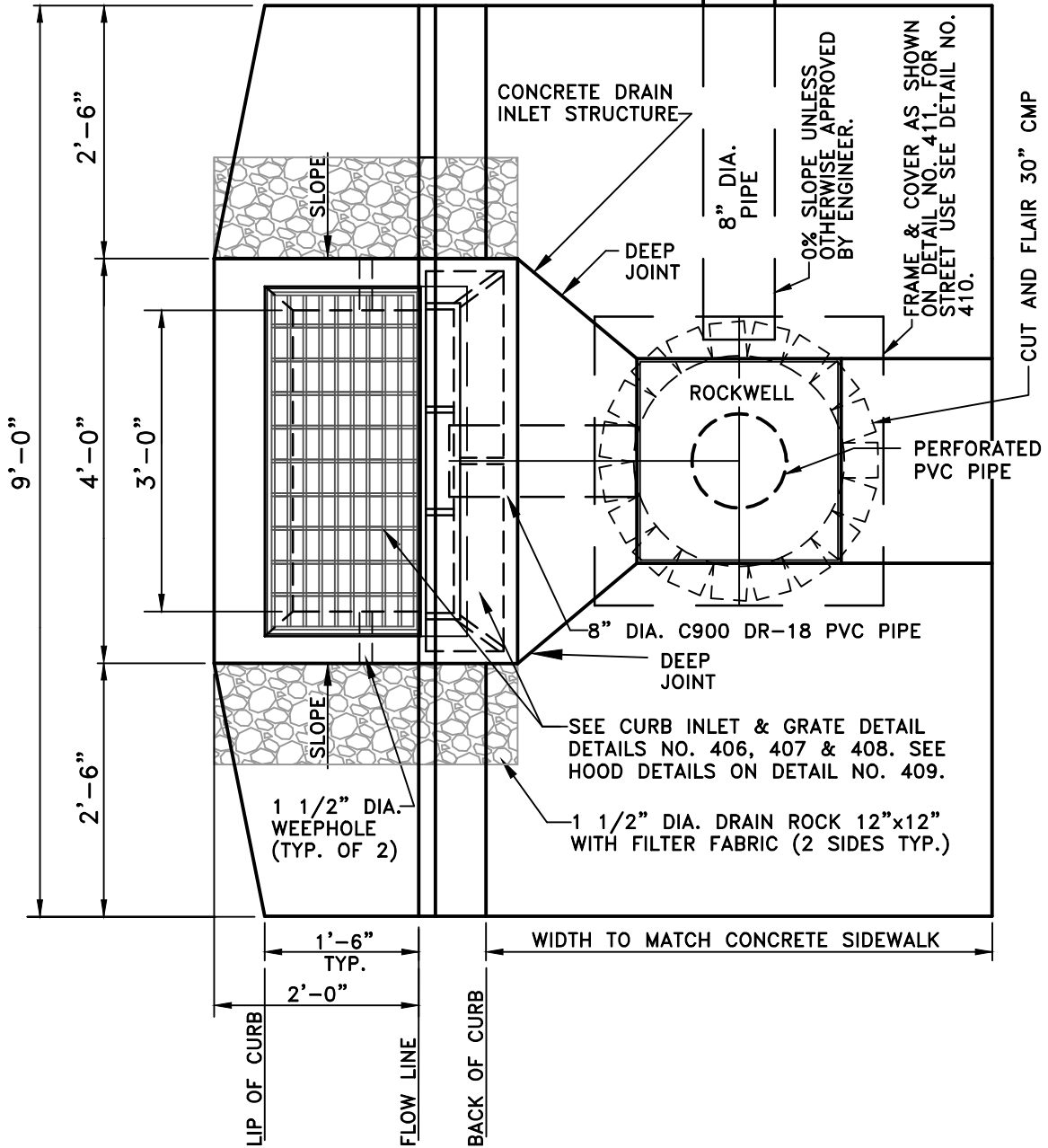
MODESTO
CALIFORNIA

DETAIL NO.
402

NOTE:

OPTION 1. FOR MULTIPLE WELL SYSTEM IN THE SIDEWALK AREA C900 DR-14, IN 20 FOOT LENGTHS, IS REQUIRED. ELEVATION OF PVC PIPE SHALL MATCH 8" DIAMETER PIPE FROM CATCH BASIN. SEE STANDARD DETAIL NO. 407.

OPTION 2. FOR MULTIPLE WELL SYSTEM BEHIND CURB, CLASS 160 PVC PIPE, IN 20 FOOT LENGTHS IS REQUIRED. ELEVATION OF PVC PIPE SHALL MATCH 8" DIAMETER PIPE FROM CATCH BASIN.



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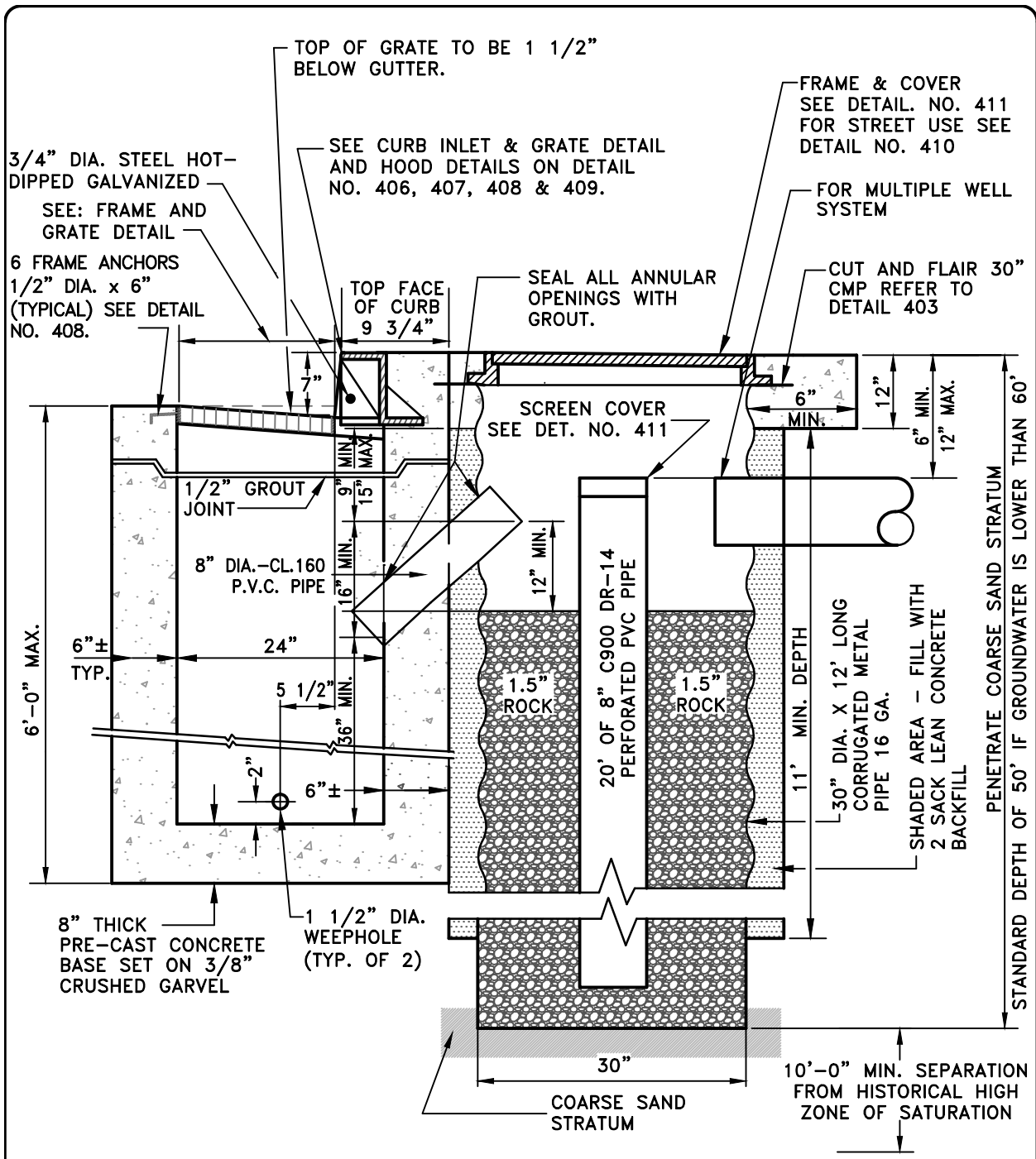
REVISED: DATE:

**STORM DRAINAGE
ROCKWELL ASSEMBLY WITH
TYPE I CATCH BASIN
(PLAN VIEW)**



ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

DETAIL NO.
403



NOTE: DRAIN INLET BASE:
 TYPICAL BASE SECTION OF
 CATCH BASIN MAY BE
 PRE-CAST OR CAST IN
 PLACE TO SUIT.

NOTE: CORE PIPE (SEE DETAIL 405)
 1. ROCKWELLS: 8" DIA., C900 SEWER PIPE, 20'
 LENGTH.
 2. SHALL BE INSTALLED BELL END UP.

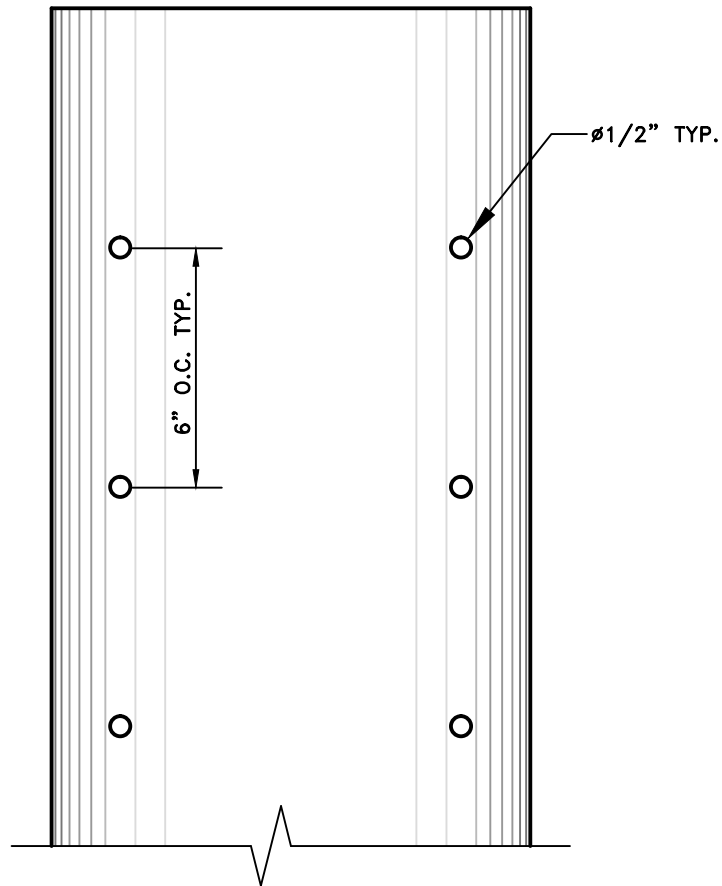
APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
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**STORM DRAINAGE
 ROCKWELL ASSEMBLY WITH
 TYPE I CATCH BASIN
 (PROFILE VIEW)**

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

**MODESTO
 CALIFORNIA**

DETAIL NO.
404



SPECIFICATIONS:

CITY OF MODESTO ROCKWELLS SHALL HAVE A 20' LINEAR FOOT, 8" DIAMETER, C900, DR-14 PVC PERFORATED CORE PIPE. THE PERFORATIONS SHALL BE 1/2" DIAMETER HOLES, AT 90°. THERE SHALL BE 4 ROWS OF PERFORATIONS VERTICALLY AT 6" O.C. AND 6" FROM EITHER END. CORE PIPES SHALL BE INSTALLED BELL END UP.

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STORM DRAINAGE

**CORE PIPE FOR STANDARD
 CITY ROCKWELL**



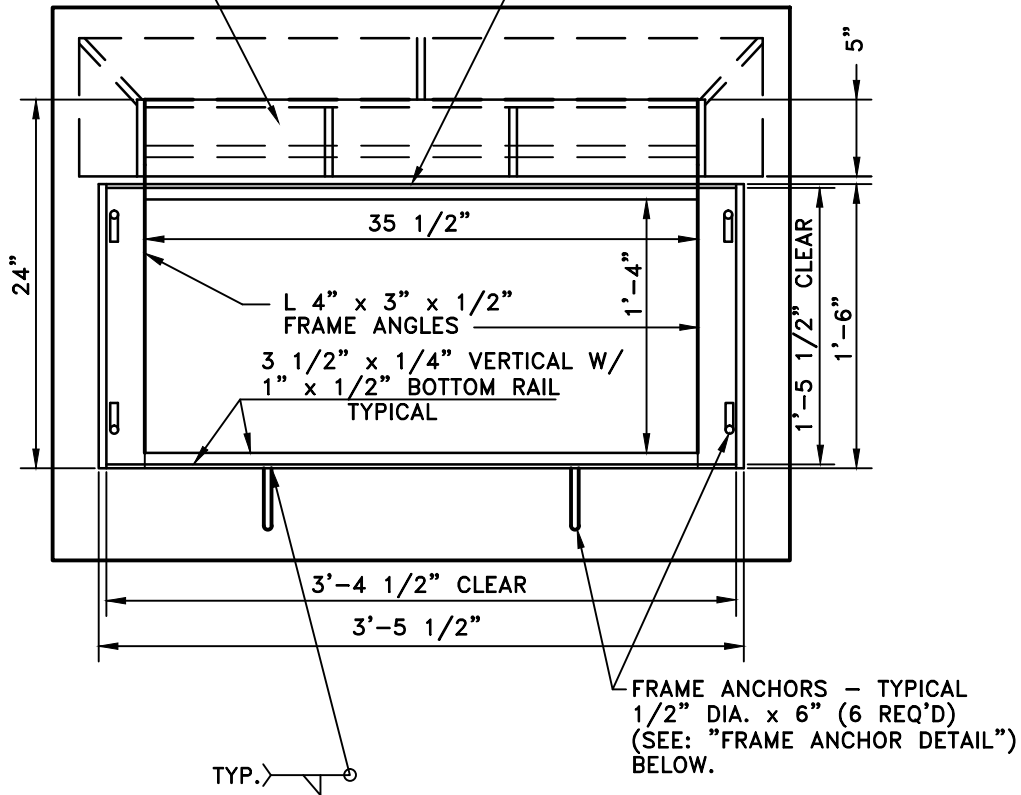
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 RESOLUTION NO. 2014-345

DETAIL NO.
 405

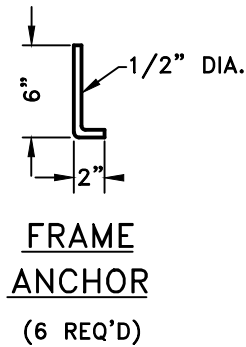
NOTE:
NOTE: CATCH BASIN HOOD OMITTED
FOR DRIVE OVER CURB APPLICATIONS.

CATCH BASIN HOOD
SEE: "HOOD DETAIL"
ON DETAIL NO. 409

1" x 1/2" VERTICAL W/
1" x 1/2" x BOTTOM RAIL
TYPICAL



PLAN VIEW



NOTES:

1. MATERIAL SHALL BE A-36 STEEL.
2. GRATE SHALL BE RATED FOR H-20 LOADING.
3. GRATE SHALL BE HOT DIPPED GALVANIZED.
4. GRATE SHALL BE BICYCLE PROOF.
5. INSTALLED GRATE SHALL BE PERMANENTLY SECURED SECURED TO ONE CORNER OF THE INLET FRAME WITH A 12" LENGTH OF 1/4" GALVANIZED CHAIN.
6. LOCATE FRAME ANCHORS TO PROVIDE A MINIMUM OF 2" CLEAR COVER.
7. CLEARANCE BETWEEN CATCH BASIN FRAME AND GRATE SHALL BE A MINIMUM OF 1/8" AND NO GREATER THAT 1/4", AS SHOWN.

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C59650

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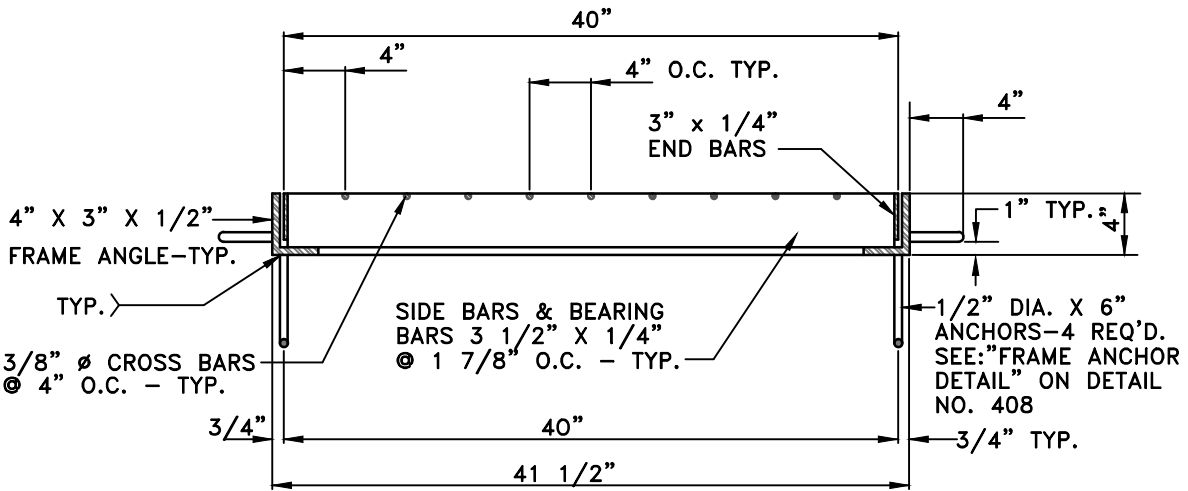
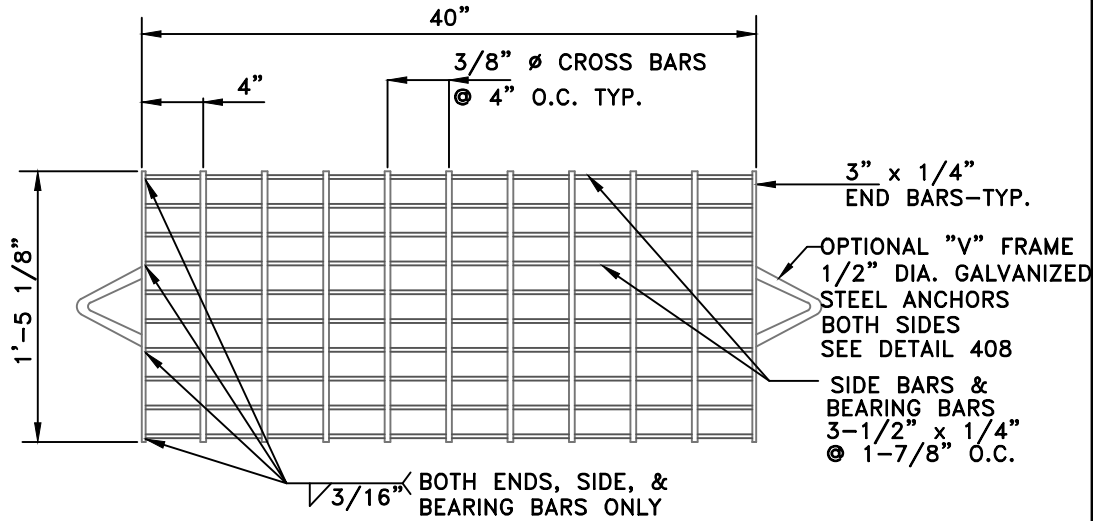
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**STORM DRAINAGE
CONCRETE CATCH BASIN W/
HOOD AND FRAME FOR
TYPE I CATCH BASIN**

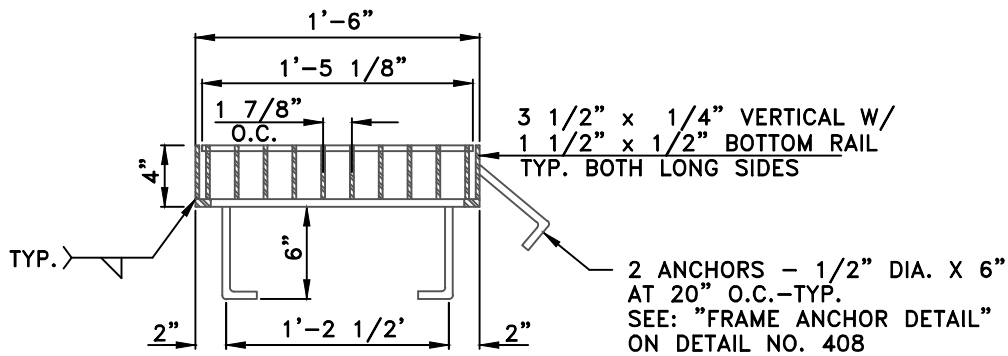
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RESOLUTION NO. 2014-345



DETAIL NO.
406



PLAN VIEW AND FRONT ELEVATION



END VIEW/SECTION

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C59650

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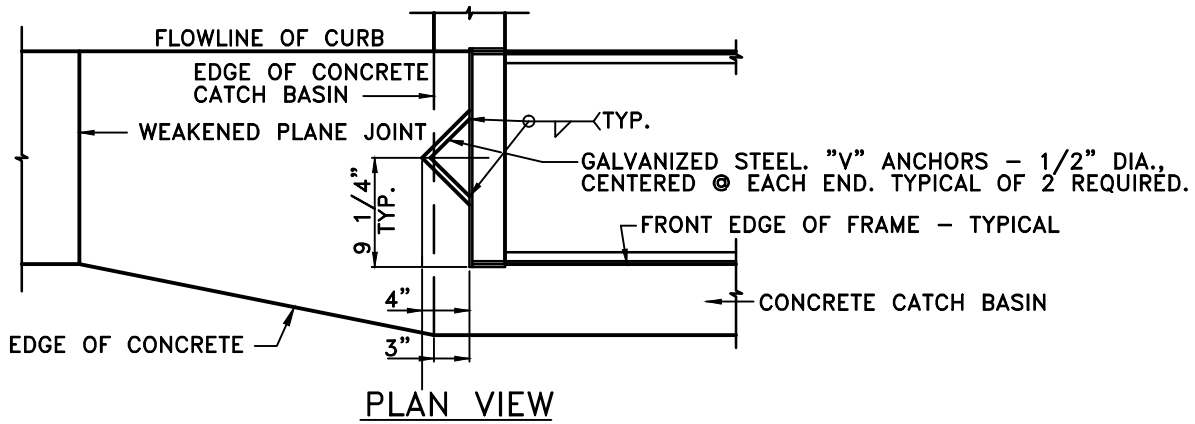
STORM DRAINAGE

FRAME AND GRATE W/ HOOD
INCLUDING DRIVE OVER CURB FOR
TYPE I CATCH BASIN

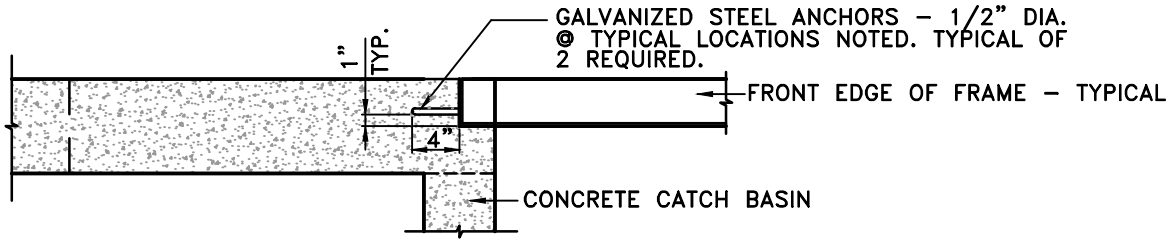
ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



DETAIL NO.
407

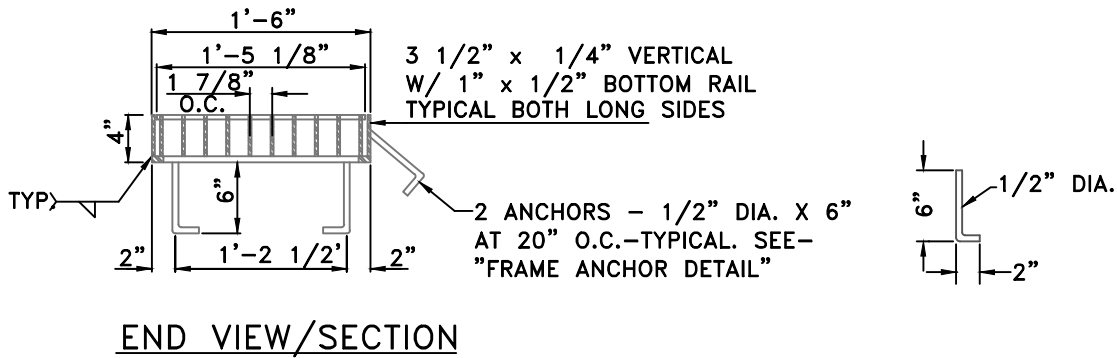


PLAN VIEW



TYPICAL SECTION

OPTIONAL "V" FRAME ANCHORS



END VIEW/SECTION

TYPICAL STANDARD FRAME ANCHOR

(6 REQ'D)

NOTES:

- MATERIAL SHALL BE A-36 STEEL.
- GRATE SHALL BE RATED FOR H-20 LOADING.
- FRAME, GRATE AND HOOD ASSEMBLY SHALL BE HOT DIPPED GALVANIZED.
- GRATE SHALL BE BICYCLE PROOF.
- INSTALLED GRATE SHALL BE PERMANENTLY SECURED TO ONE CORNER OF THE INLET FRAME WITH A 12" LENGTH OF 1/4" GALVANIZED CHAIN.
- LOCATE FRAME ANCHORS TO PROVIDE A MINIMUM OF 2" CLEAR COVER.
- CLEARANCE BETWEEN CATCH BASIN FRAME AND GRATE SHALL BE A MINIMUM OF 1/8' AND NO GREATER THAT 1/4", AS SHOWN.

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STORM DRAINAGE

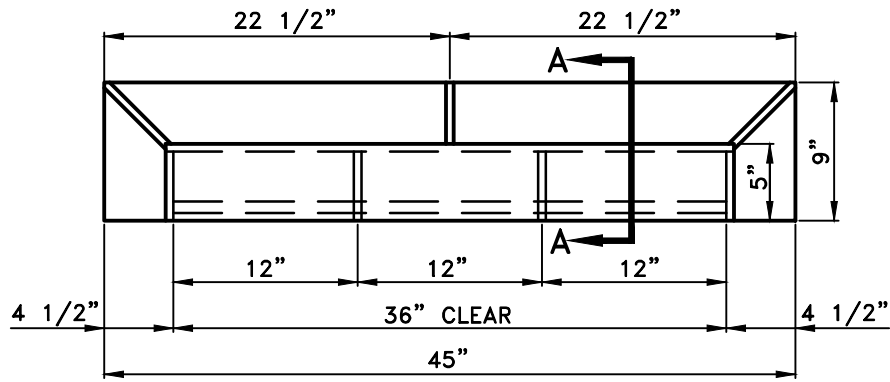
ROCKWELL CATCH
BASIN ANCHORS

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

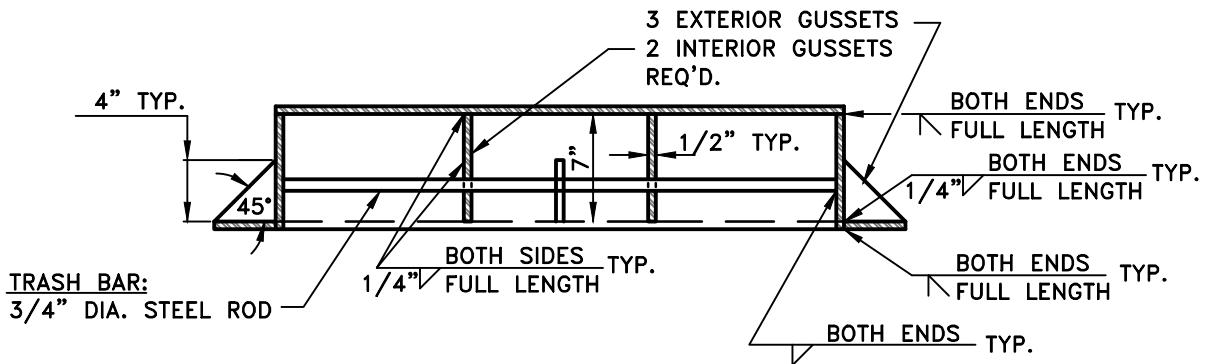


MODESTO
CALIFORNIA

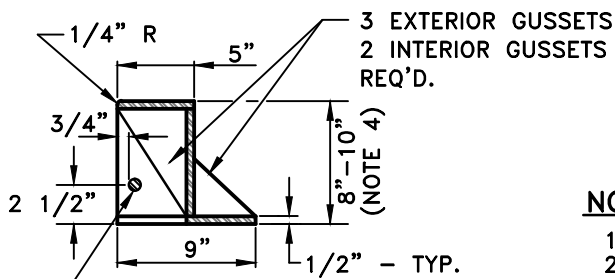
DETAIL NO.
408



PLAN VIEW



FRONT VIEW



TRASH BAR:
3/4" DIA. STEEL ROD
HOT-DIPPED GALVANIZED

SECTION A-A

NOTES:

1. MATERIAL SHALL BE A-36 STEEL.
2. HOOD SHALL BE RATED FOR H-20 LOADING.
3. HOOD SHALL BE HOT DIPPED GALVANIZED.
4. 8" FOR 6" HIGH CURB, 10" FOR 8" CURB.

* MAX ALLOWABLE VARIATION IS 1/4"
FOR ALL DIMENSIONS

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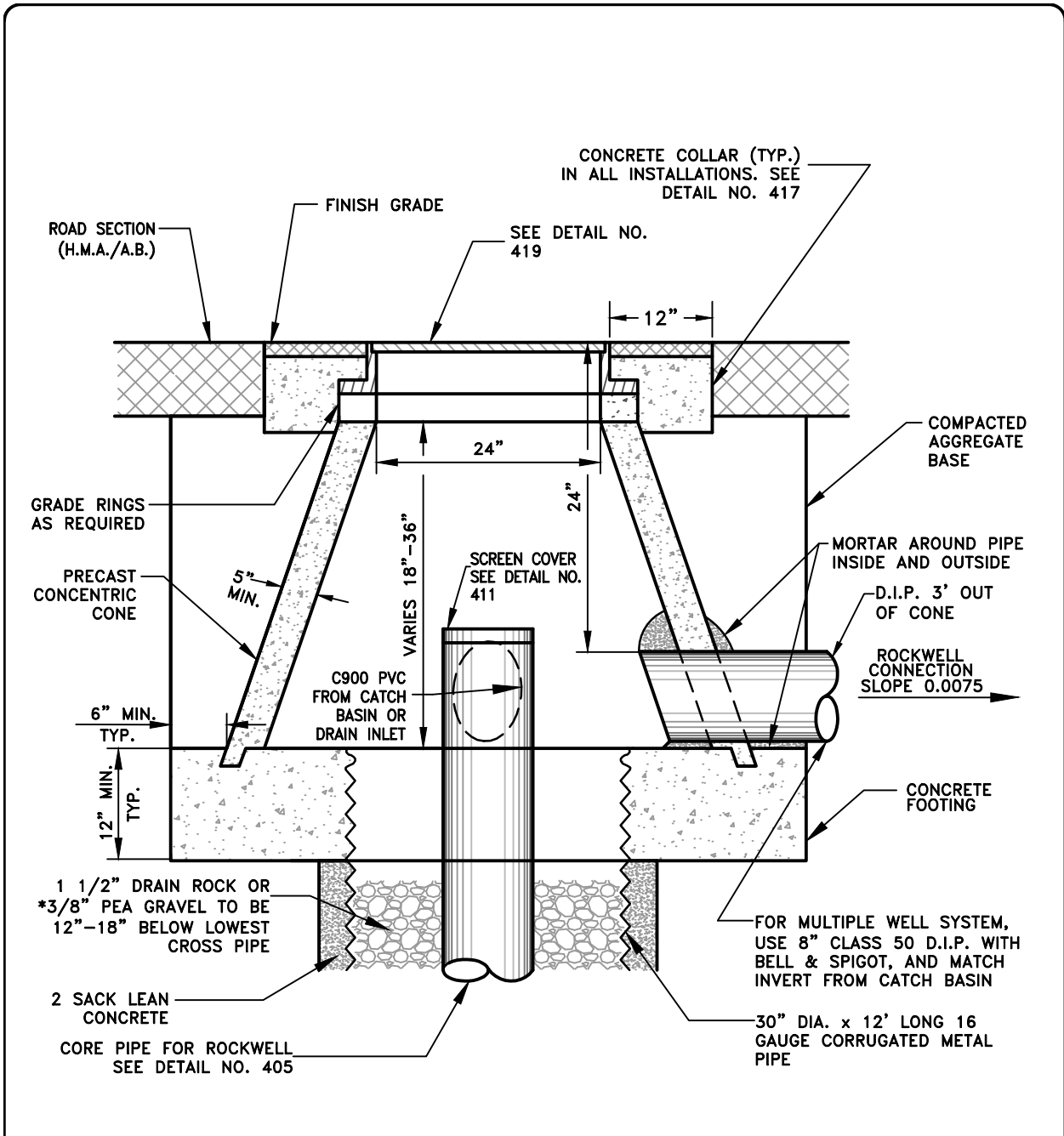
STORM DRAINAGE

**HOOD DETAIL FOR
TYPE I CATCH BASIN**



ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

DETAIL NO.
409



NOTES:

1. ADJUST FRAME TO GRADE AFTER PAVING.
2. IN TRAFFIC AREAS CONCRETE COLLAR SHALL BE MADE WITH HIGH EARLY STRENGTH CONCRETE. BARRICADES SHALL BE REMOVED IN 24 HOURS.
3. ALL PRECAST CONCRETE SHALL BE DESIGNED TO WITHSTAND H-20 LOADING.
4. 3/8" PEA GRAVEL FOR HORIZONTAL DRAIN AND 1 1/2" DRAIN ROCK FOR CITY STANDARD.

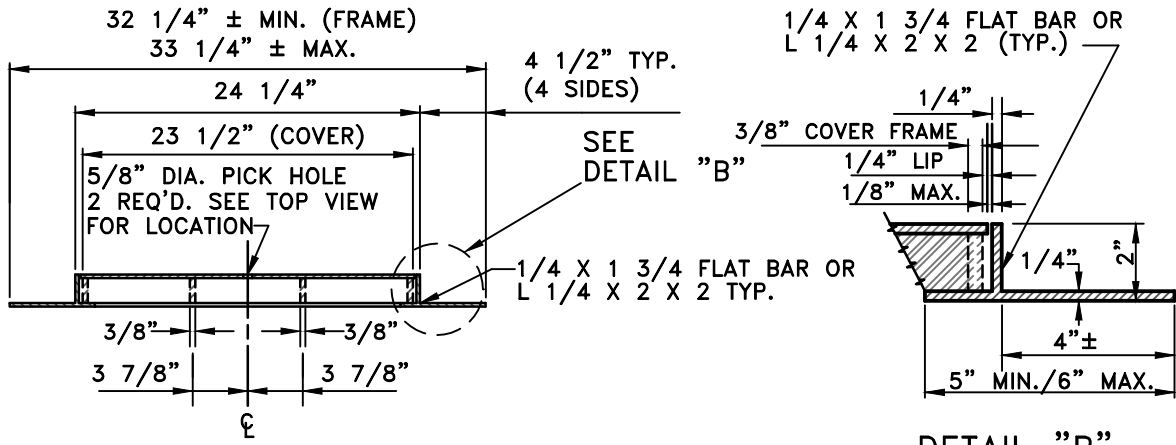
APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
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**STORM DRAINAGE
MANHOLE CONE FOR
ROCKWELLS IN VEHICULAR
TRAFFIC AREAS**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

**MODESTO
CALIFORNIA**

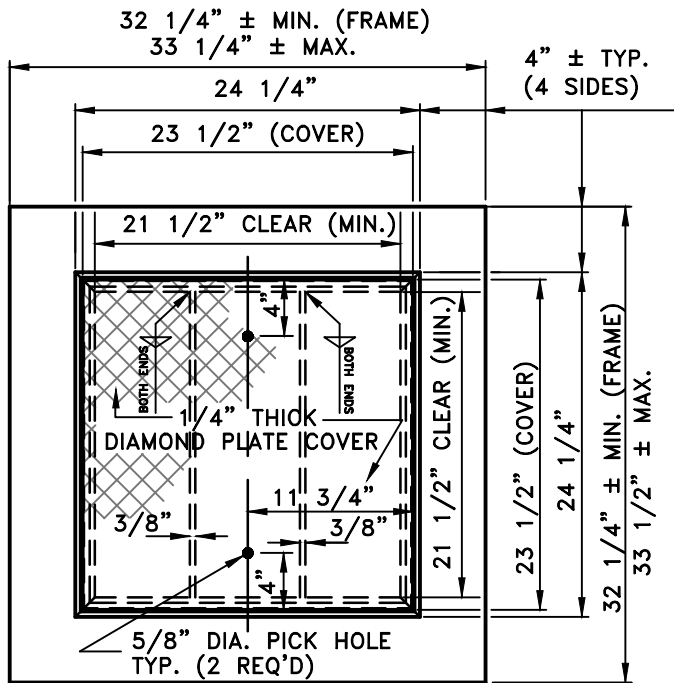
DETAIL NO.
410



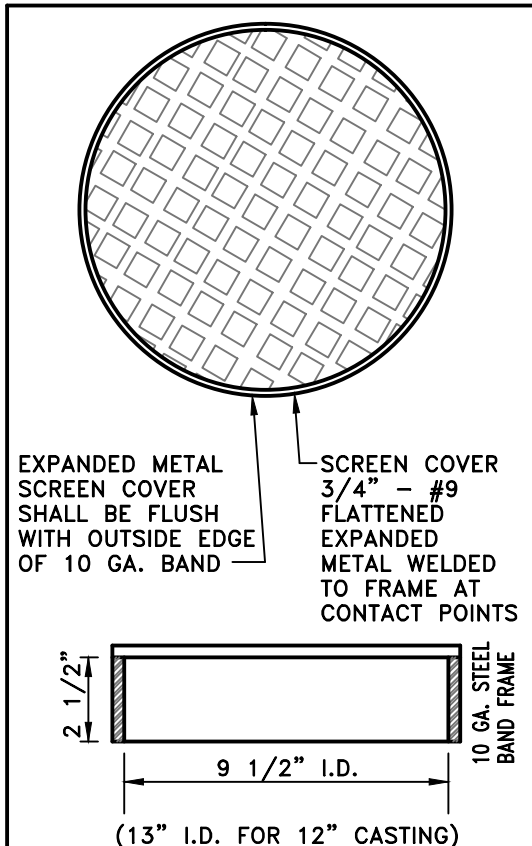
SIDE VIEW

DETAIL "B"

*IN LANDSCAPE AREAS, INSTALL 6" CONCRETE COLLAR AROUND PERIMETER.



TOP VIEW



NOTE:
UNIT TO BE HOT DIPPED GALVANIZED AFTER MANUFACTURE.

SCREEN COVER DETAIL

NOTE:

1. FRAME AND COVER TO BE HOT DIPPED GALVANIZED AFTER MANUFACTURE.
2. FRAME SHALL HAVE A MINIMUM CLEAR OPENING OF 21"+ TO ROCKWELL FOR MAINTENANCE.
3. PLUS OR MINUS DIMENSION (±) SHALL EQUAL 1/4"

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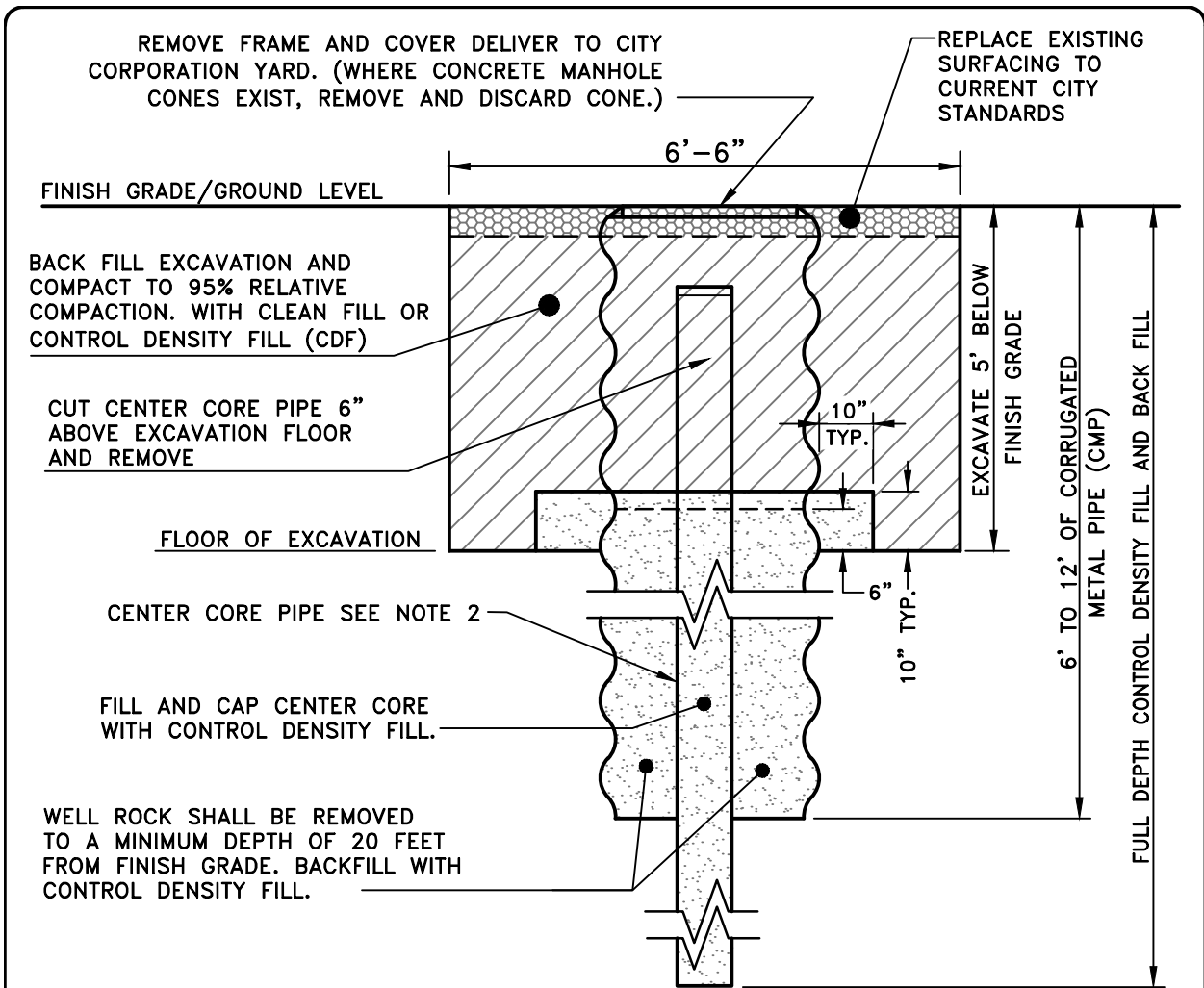
STORM DRAINAGE

**ROCKWELL FRAME & COVER
AND SCREEN COVER**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

**MODESTO
CALIFORNIA**

DETAIL NO.
411



NOTE:

1. EXCAVATE AND REMOVE CMP TO A MINIMUM DEPTH OF 6 FEET.
2. CENTER CORE PIPE: REMOVE CENTER CORE PIPE ON CITY STANDARD ROCKWELL (20 LF OF 8" DIA, SDR 35 PERFORATED PVC PIPE). CUT AND REMOVE CENTER CORE PIPE 6" ABOVE FLOOR OF EXCAVATION AND LEAVE REMAINING CASING TO BE BACK FILLED ON TURLOCK ROCKWELLS (50 TO 70 LF OF SLOTTED 12" DIA, 16 GAUGE, STEEL WELL CASING).
3. REFERENCE: CALIF. ADMIN. CODE TITLE 17 & WATER RESOURCES BULLETIN 74, AND WATER WELL STD. SECTION 23.
4. ALL WORK SHALL BE INSPECTED AND APPROVED BY THE CITY OF MODESTO.
5. THE AMOUNT OF EXCAVATION REQUIRED SHALL BE A MINIMUM OF 5'.
6. WHERE A ROADWAY OR BUILDING IS PLANNED FOR A PRIVATE DEVELOPMENT, OVER A ROCKWELL ABANDONMENT, A GEOLOGICAL REPORT AND APPROVAL SHALL BE REQUIRED.
7. THIS DRAWING CONFORMS TO STANISLAUS COUNTY WELL ORDINANCE 443-SEC.3-310
8. THE ENVIRONMENTAL PROTECTION AGENCY (EPA) HAS CLASSIFIED ROCKWELLS AS CLASS 5 INJECTION WELLS AND THEREFORE ABANDONMENT SHALL CONFORM TO THE REQUIREMENTS IN 40 CFR 144.09, 144.12, AND 144.82.

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STORM DRAINAGE

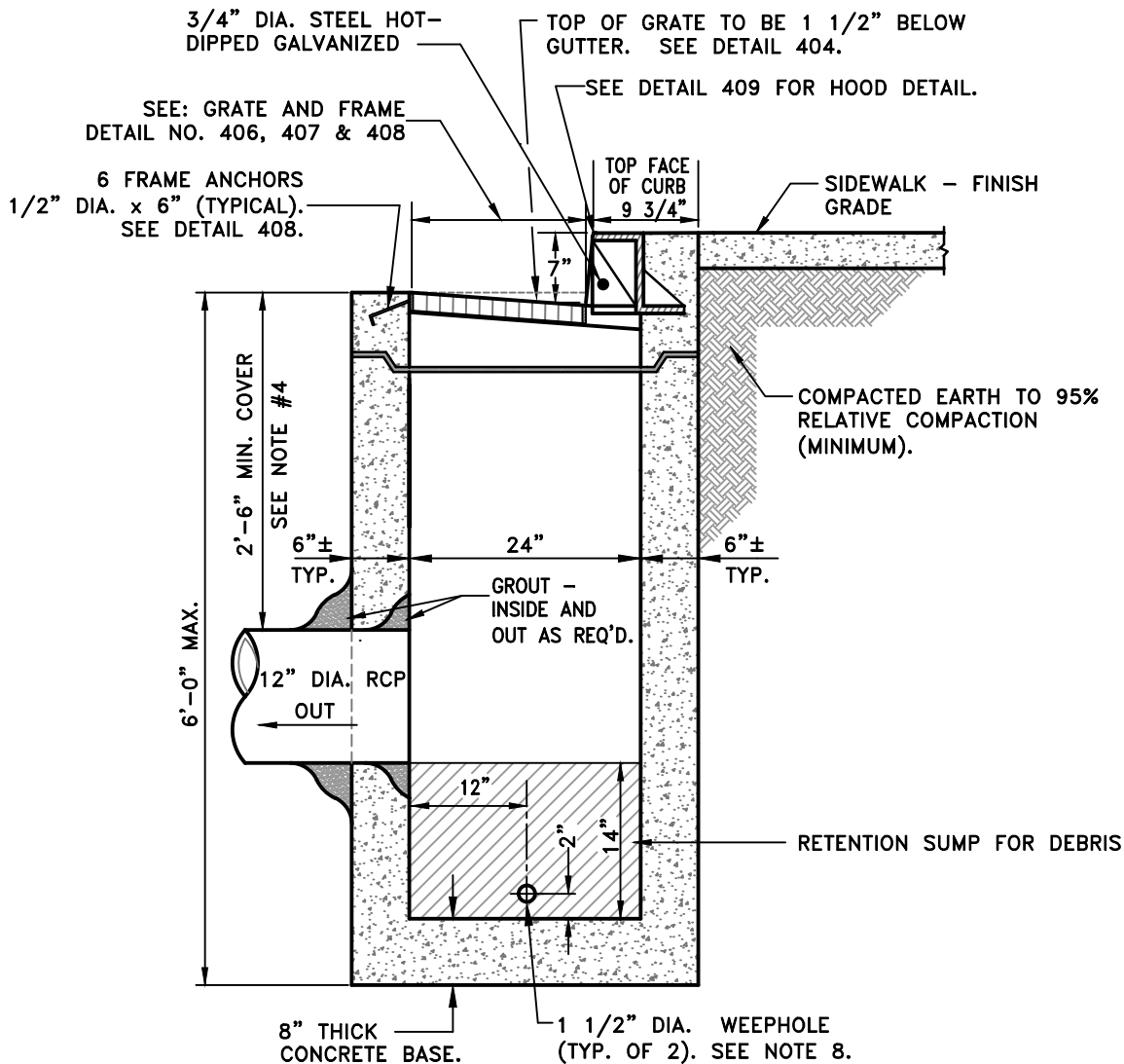
ABANDONED

ROCKWELL TYPICAL



ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
412



TYPICAL SECTION

NOTE:

1. REFER TO CITY STANDARD DRAWINGS 403, 404, 406, 407, AND 409 FOR THE CONSTRUCTION OF THE CITY OF MODESTO STANDARD CATCH BASIN/DRAIN INLET COMPLETE IN PLACE.
2. CATCH BASIN/DRAIN INLET GRATE, FRAME AND HOOD SHALL BE FABRICATED FROM A-36 STEEL AND HOT-DIPPED GALVANIZED COATED.
3. TYPICAL DRAIN INLET BASE SECTION MAY BE PRECAST OR CAST IN PLACE TO SUIT CONSTRUCTION CONDITIONS.
4. OUTLET PIPE SHALL BE 12" DIA. RCP WITH A MINIMUM VERTICAL COVER OF 2'-6". WHEN VERTICAL COVER IS LESS THAN 2'-6", ENGINEERED BACKFILL, DUCTILE IRON PIPE OR A COMBINATION OF BOTH SHALL BE REQUIRED AND APPROVED BY THE CITY.
5. SEE DETAIL 403 FOR PLACEMENT OF 1 1/2" DRAIN ROCK.
6. STRUCTURES > 6' IN DEPTH SHALL HAVE REINFORCEMENT DESIGNED BY A LICENSED CIVIL ENGINEER.
7. TYPE 1 CATCH BASINS SHALL BE USED EXCEPT WHERE DISCHARGE WATER GOES TO A STORM DRAIN BASIN.
8. 1 CY OF DRAIN ROCK IN GEOTECH BAG TO BE LOCATED OUTSIDE OF WEEP HOLES.

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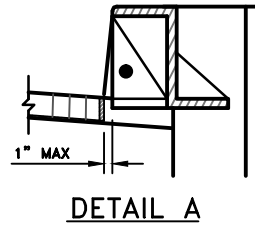
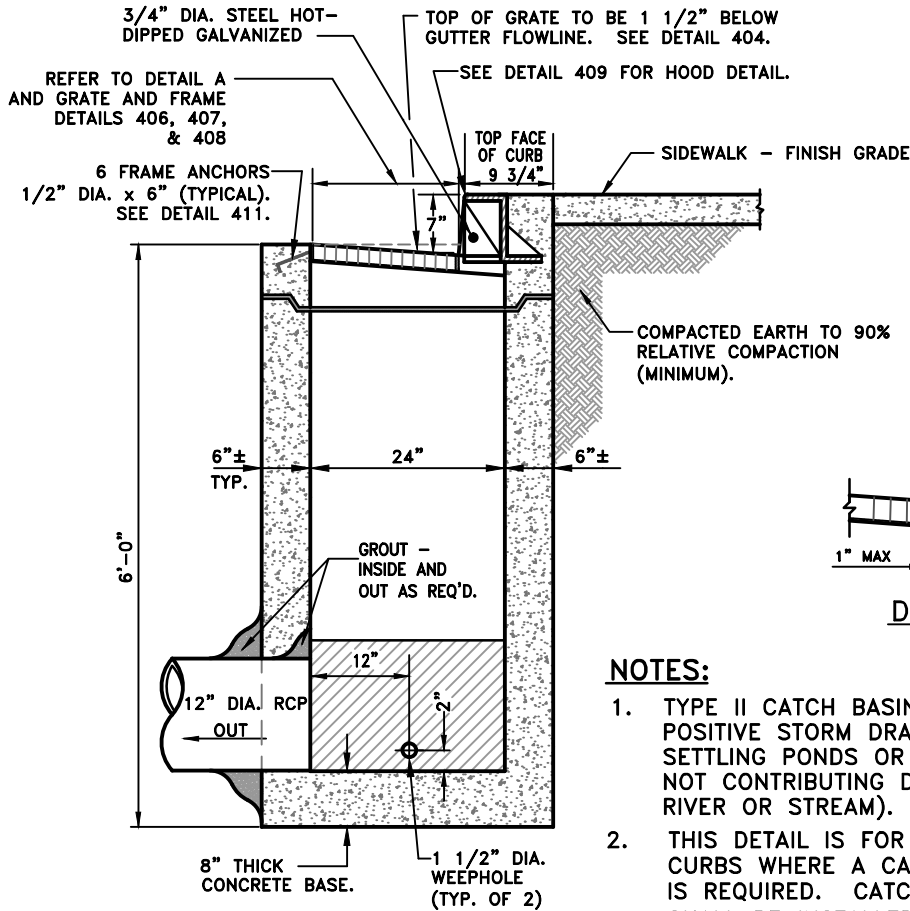
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STORM DRAINAGE TYPE I CATCH BASIN W/ RETENTION SUMP



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RESOLUTION NO. 2014-345

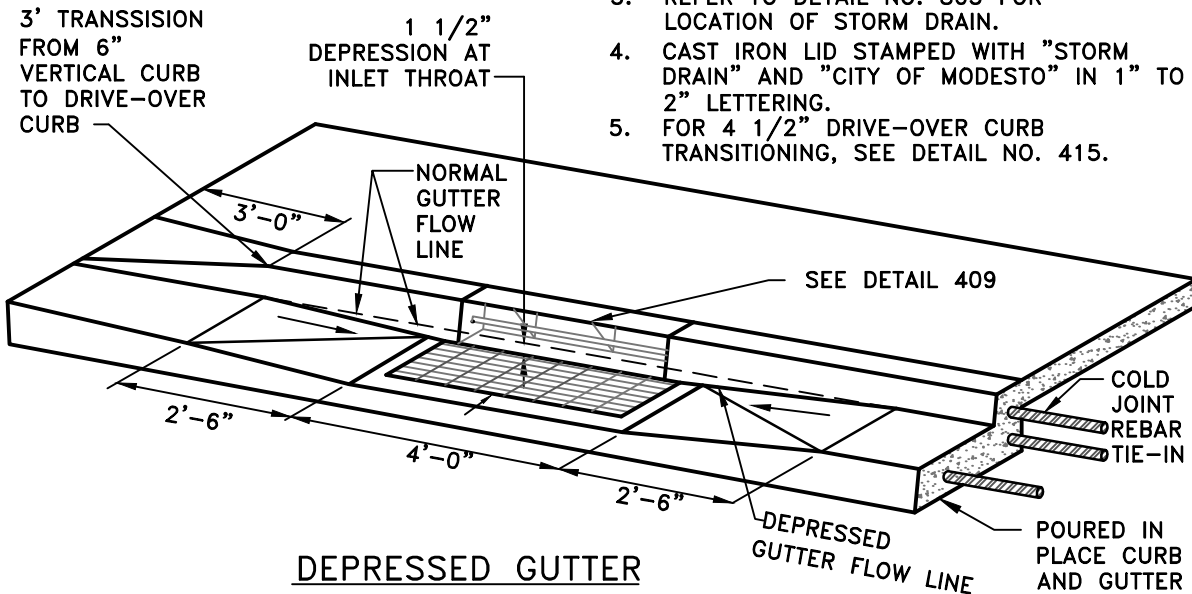
DETAIL NO.
413



TYPICAL SECTION

NOTES:

1. TYPE II CATCH BASIN TO BE USED WITH POSITIVE STORM DRAIN SYSTEM WITH SETTLING PONDS OR SEPARATOR (I.E.- NOT CONTRIBUTING DIRECTLY TO A RIVER OR STREAM).
2. THIS DETAIL IS FOR DRIVE-OVER CURBS WHERE A CATCH BASIN IS REQUIRED. CATCH BASIN SHALL BE INSTALLED IN 6" VERTICAL CURB SECTION.
3. REFER TO DETAIL NO. 805 FOR LOCATION OF STORM DRAIN.
4. CAST IRON LID STAMPED WITH "STORM DRAIN" AND "CITY OF MODESTO" IN 1" TO 2" LETTERING.
5. FOR 4 1/2" DRIVE-OVER CURB TRANSITIONING, SEE DETAIL NO. 415.



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STORM DRAINAGE

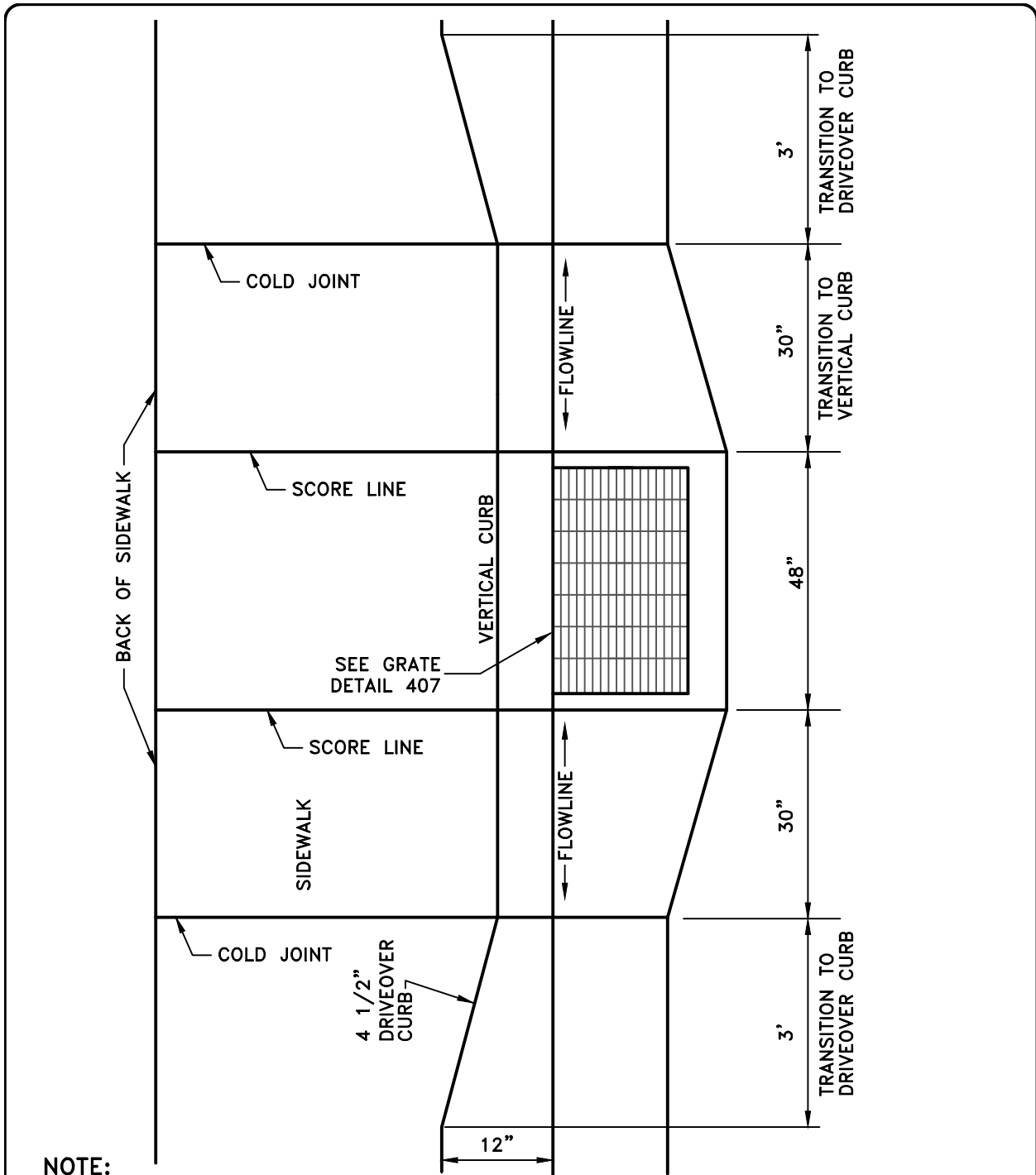
TYPE II CATCH BASIN FOR STORM DRAIN BASINS

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



DETAIL NO.

414



NOTE:

1. THIS TYPE OF CATCH BASIN MAY BE USED TO UPGRADE EXISTING ROCKWELL OR POSITIVE STORM AREAS WHERE DRIVE-OVER CURB IS EXISTING.
2. STORM DRAINAGE LINES SHALL RUN PARALLEL WITH THE CENTERLINE OF THE STREET.
3. ALL CATCH BASINS SHALL DISCHARGE INTO A MANHOLE. THERE SHALL BE NO CATCH BASIN TO CATCH BASIN DISCHARGE, UNLESS APPROVED BY THE CITY ENGINEER.

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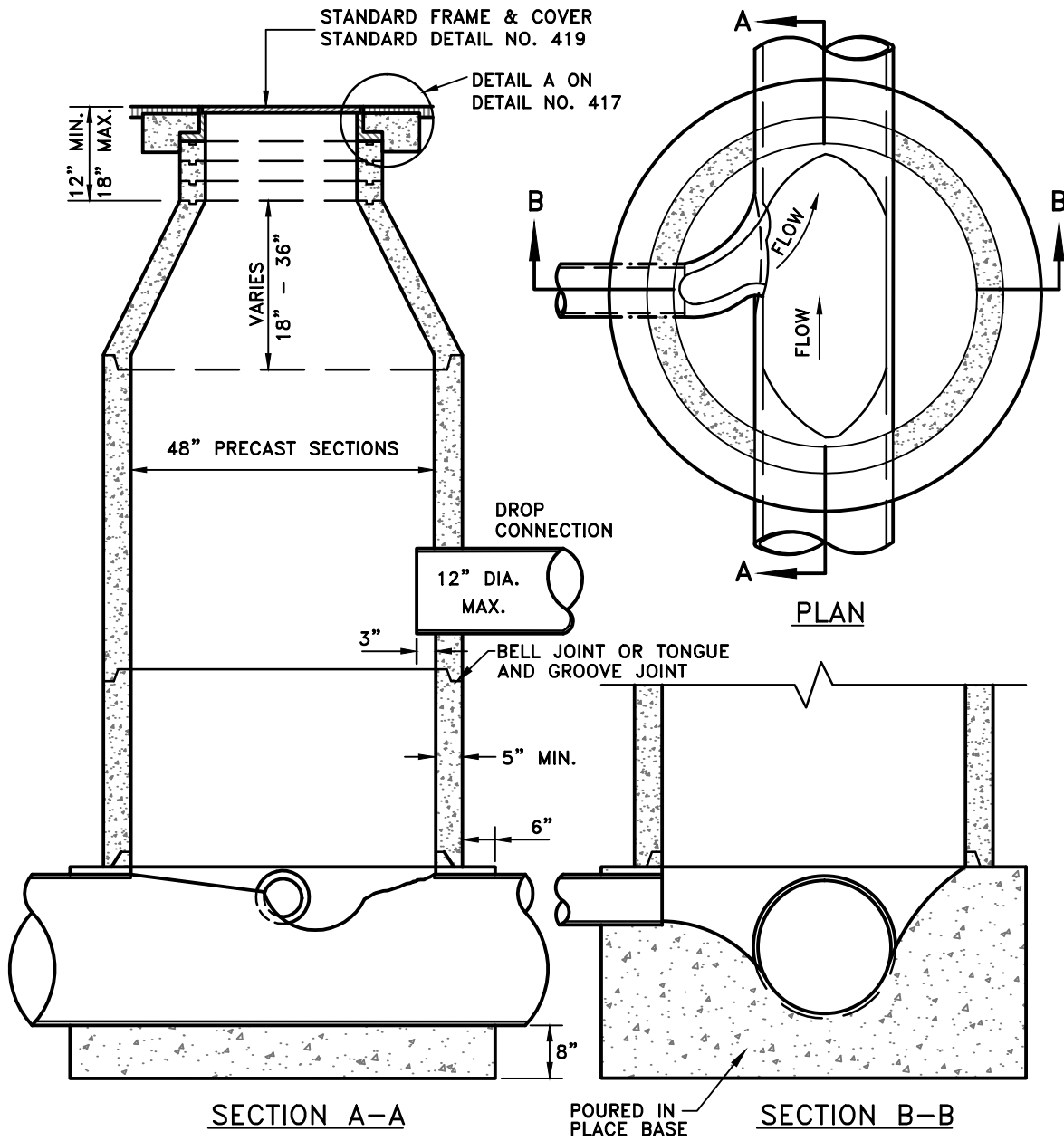
STORM DRAINAGE

**DRIVE OVER CURB
 FOR CURB INLET**



ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
415



NOTES:

1. PIPE TO BE LAID THROUGH MANHOLE AND TOP PORTION REMOVED AFTER CONCRETE HAS SET.
2. MORTAR ALL JOINTS INSIDE AND OUT.
3. INCOMING SMALLER PIPES SHALL MATCH CROWNS OF THE LARGER PIPE.
4. ADJUST FRAME TO GRADE AFTER PAVING.
5. ALL PRECAST CONCRETE SHALL BE DESIGNED TO WITHSTAND H2O LOADING.
6. IN TRAFFIC AREAS CONCRETE COLLAR SHALL BE MADE WITH 3000 PSI PCC, HIGH-EARLY STRENGTH. BARRICADES TO BE REMOVED IN 24 HOURS.
7. PRECAST BASES ARE NOT PERMITTED.

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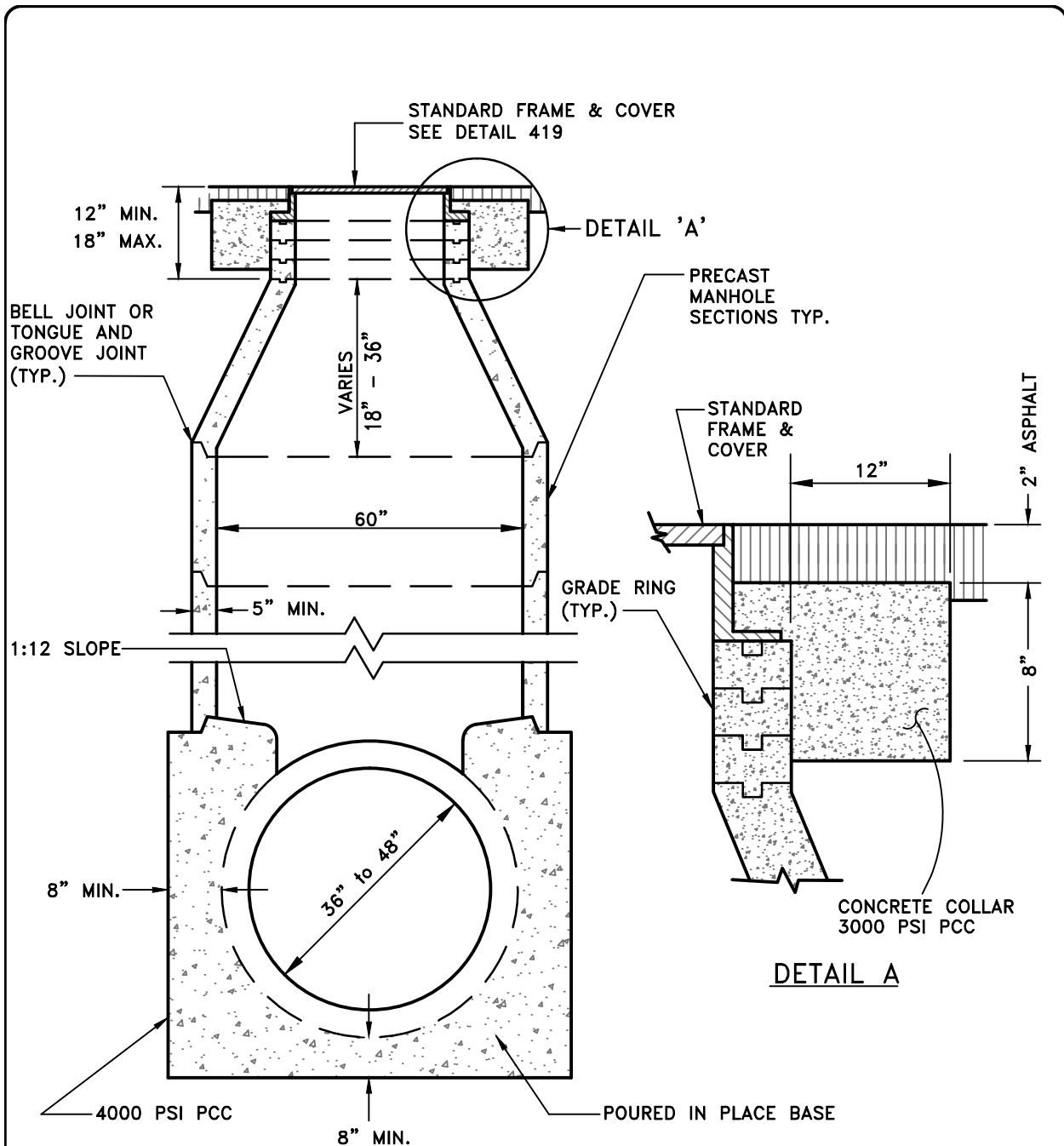
STORM DRAINAGE

LATERAL MANHOLE

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



DETAIL NO.
416



NOTES:

1. PIPE TO BE LAID THROUGH MANHOLE AND TOP PORTION REMOVED AFTER CONCRETE HAS SET.
2. MORTAR ALL JOINTS.
3. INCOMING SMALLER PIPES SHALL MATCH CROWNS OF THE LARGER PIPE.
4. ADJUST FRAME TO GRADE AFTER PAVING.
5. ALL PRECAST CONCRETE SHALL BE DESIGNED TO WITHSTAND H2O LOADING.
6. IN TRAFFIC AREAS, CONCRETE COLLAR SHALL BE MADE WITH 3000 P.S.I. PCC, HIGH-EARLY STRENGTH. BARRICADES SHALL BE REMOVED IN 24 HOURS.
7. PRECAST BASES ARE NOT PERMITTED.

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BILL SANDHU, CITY ENGINEER
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STORM DRAINAGE
POURED-IN PLACE
TRUNK MANHOLE

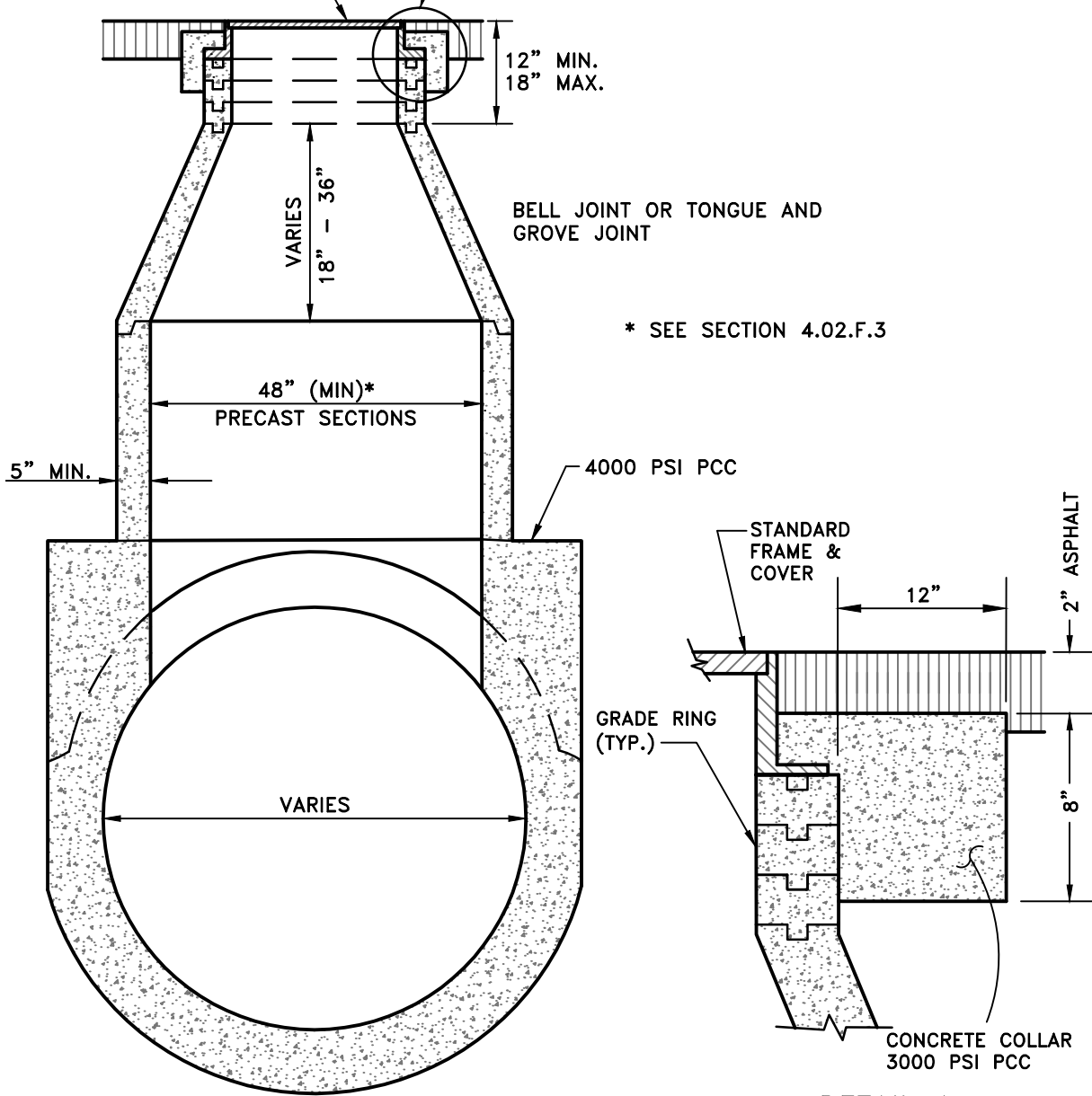
ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345



DETAIL NO.
417

STANDARD FRAME & COVER
SEE DETAIL NO. 419

DETAIL "A"



* SEE SECTION 4.02.F.3

DETAIL A

NOTES:

1. MAKE MANHOLE OPENING IN TOP OF PIPE BEFORE CONCRETE SETS AND PLACE BARREL WITHIN 7 DAYS.
2. MORTAR ALL JOINTS.
3. ADJUST FRAME TO GRADE AFTER PAVING.
4. ALL PRECAST CONCRETE SHALL BE DESIGNED TO WITHSTAND H2O LOADING.
5. IN TRAFFIC AREAS, CONCRETE COLLAR SHALL BE MADE WITH 3000 P.S.I. PCC, WITH HIGH-EARLY STRENGTH CEMENT. BARRICADES TO BE REMOVED IN 24 HOURS.
6. PRECAST BASES ARE NOT PERMITTED.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

REVISED: DATE:

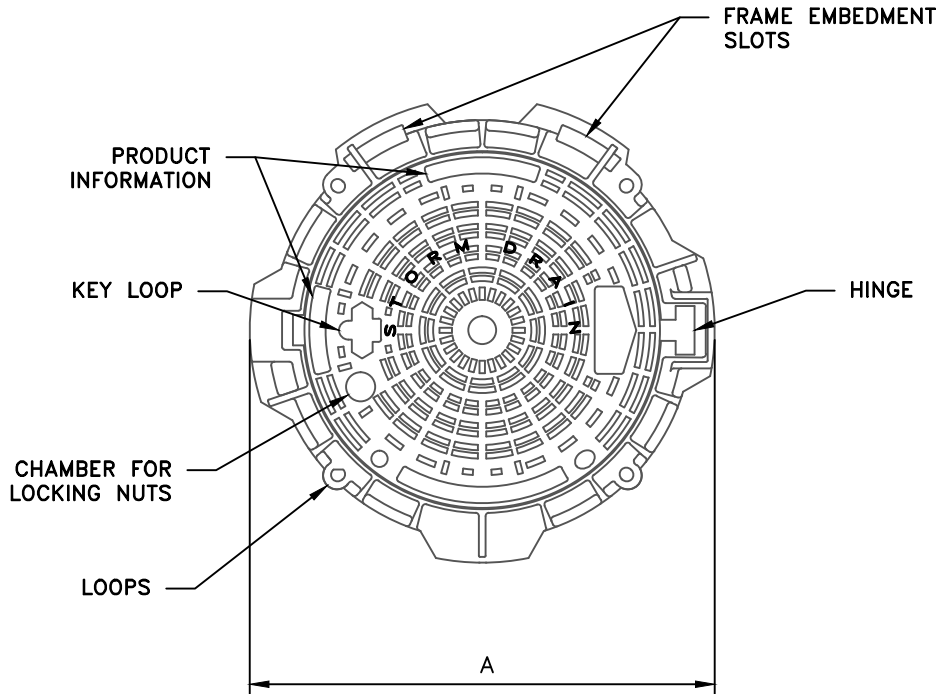
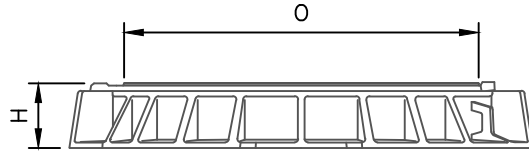
REVISED: DATE:

STORM DRAINAGE
CAST-IN-PLACE
TRUNK MANHOLE



ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

DETAIL NO.
418



MODEL	A INCHES	H INCHES	O INCHES	REFERENCE	WEIGHT LBS	COVER WEIGHT LBS
NON VENTILATED	33-1/4	4	24	REXUS CDRU60EHDR OR EQUAL	155	91

NOTES:

- HINGE SHOULD BE PARALLEL WITH THE CENTER LINE OF STREET.
- ALLOW "CITY OF MODESTO" STORM DRAIN BADGE.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

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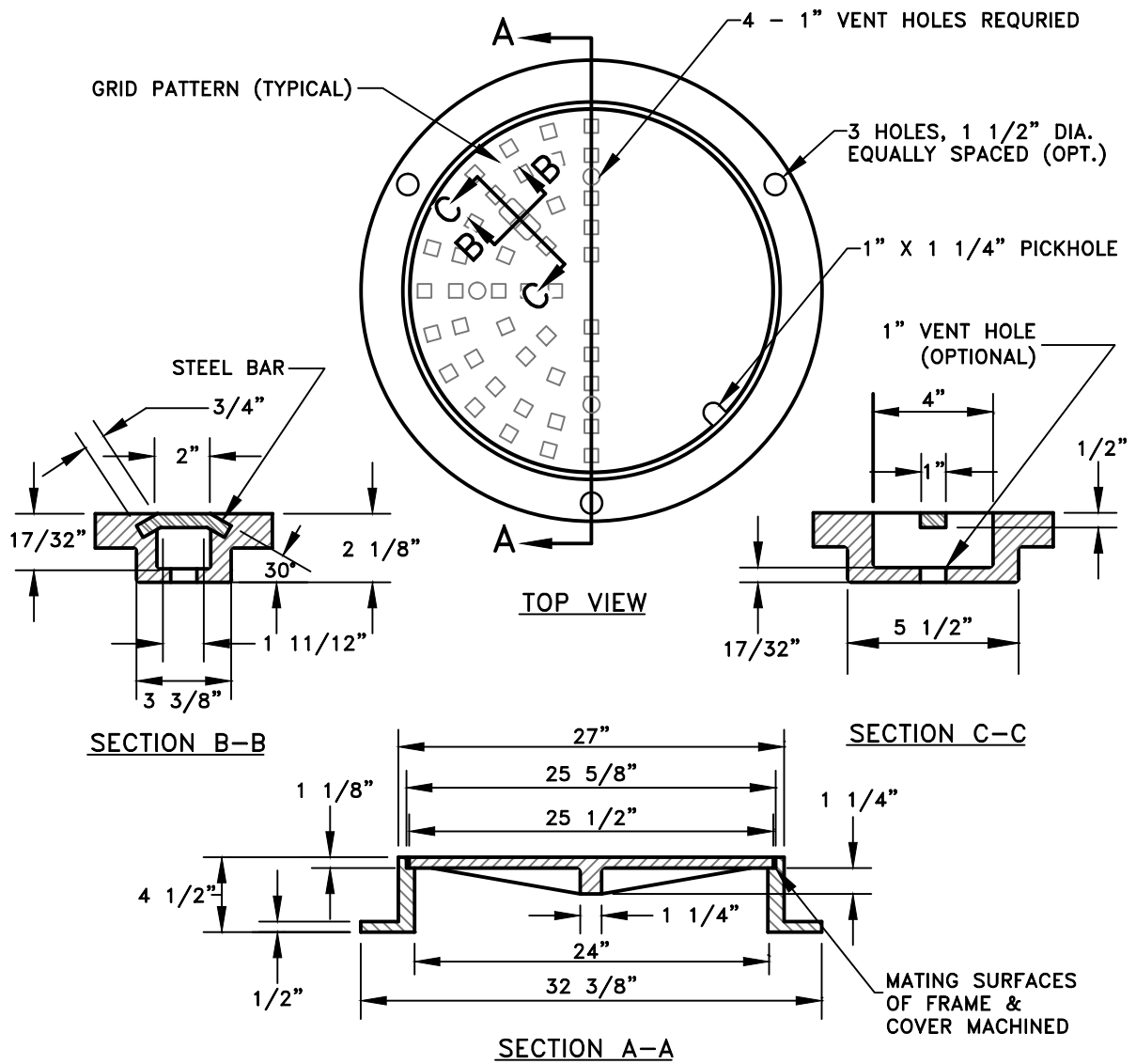
STORM DRAINAGE

**HINGED 24 INCH
MANHOLE COVER AND FRAME**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



DETAIL NO.
419



NOTES:

1. DIMENSIONS FOR FRAME AND COVER SHALL MATCH. MATCHING SURFACES OF FRAME AND COVER SHALL BE MACHINED TO INSURE NO-ROCK FIT.
2. COVER SHALL HAVE VERTICAL SIDES. NO TAPERED COVERS SHALL BE INSTALLED.
3. WEIGHT OF COVER SHALL BE NO LESS THAN 130 POUNDS. WEIGHT OF FRAME SHALL BE NO LESS THAN 140 POUNDS.
4. SOUTH BAY FOUNDRY SBF 624 FRAME AND COVER OR APPROVED EQUAL.
5. EACH MANHOLE COVER SHALL BE STAMPED "CITY OF MODESTO" WITH 1" TO 2" LETTERING.

APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
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REVISED:	DATE:

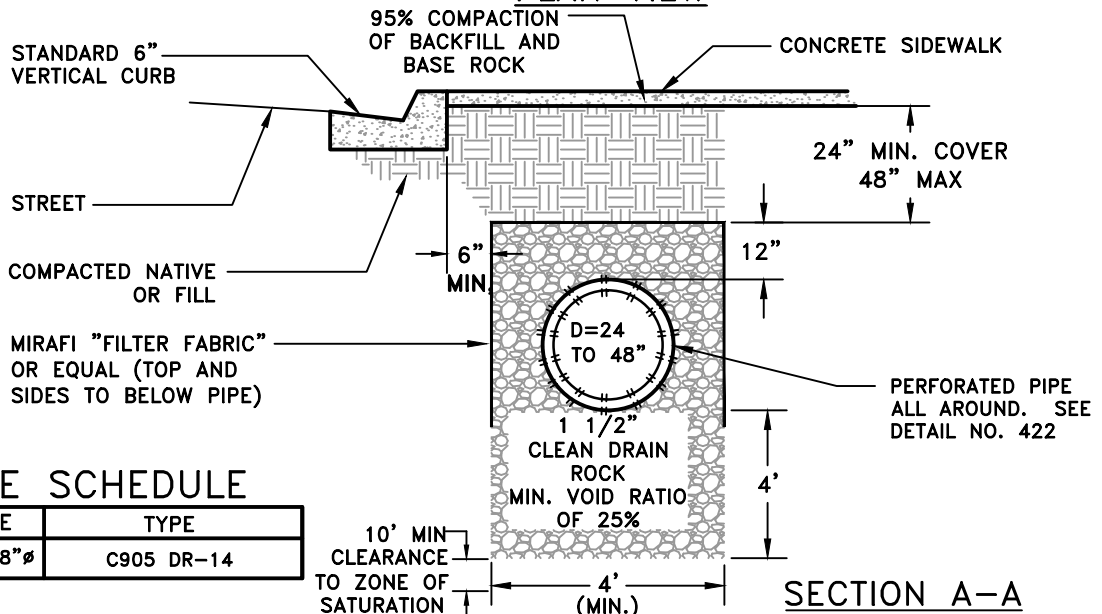
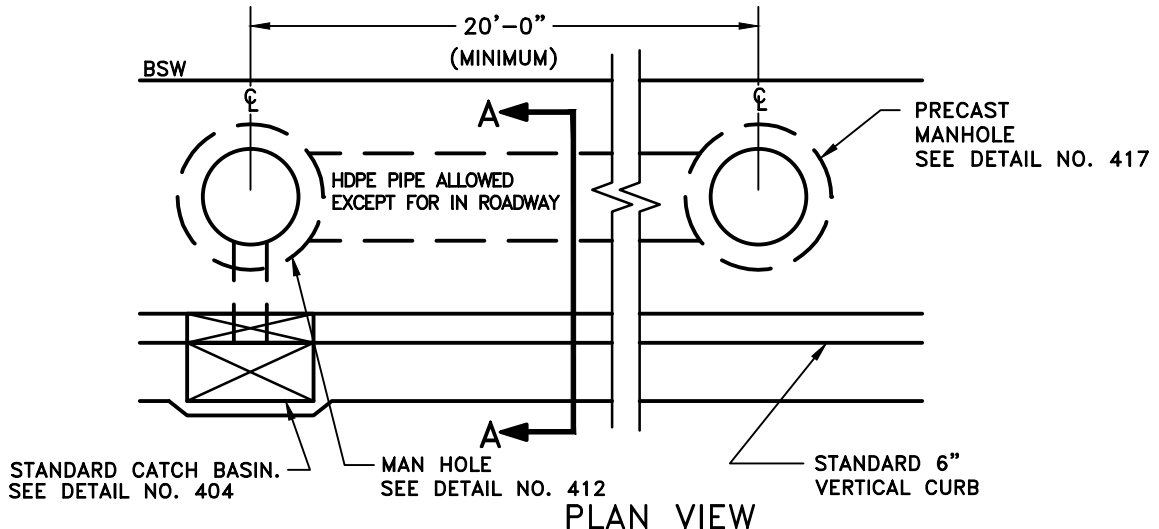
STORM DRAINAGE

**MANHOLE FRAME AND COVER
FOR FEDERAL PROJECTS**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

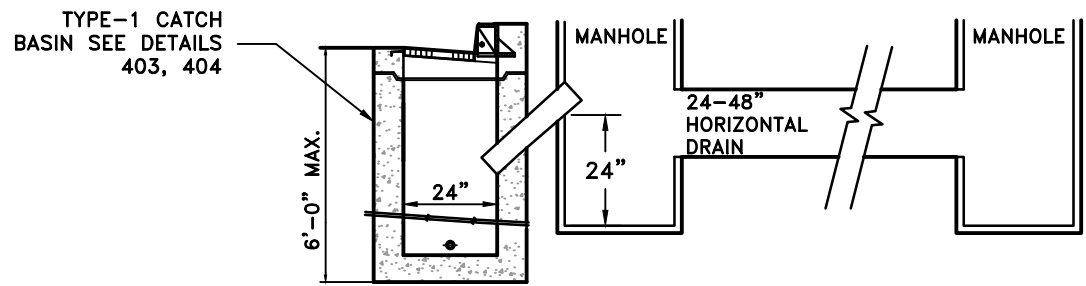
MODESTO
CALIFORNIA

DETAIL NO.
420



PIPE SCHEDULE

SIZE	TYPE
24"-48"ø	C905 DR-14



NOTE:
 THIS HORIZONTAL DRAIN SYSTEM HAS BEEN DESIGNED FOR DEVELOPMENT AND INFILL AREAS WHICH HAVE NO ROOM FOR ON-SITE BASINS. ENGINEERING AND CALCULATIONS ARE REQUIRED AND SHALL MEET THE DESIGN STANDARD VOLUME REQUIREMENTS. CITY SHALL APPROVE ALL SUBMITTALS PRIOR TO CONSTRUCTION.

APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
REVISED:	DATE:
REVISED:	DATE:
REVISED:	DATE:

STORM DRAINAGE

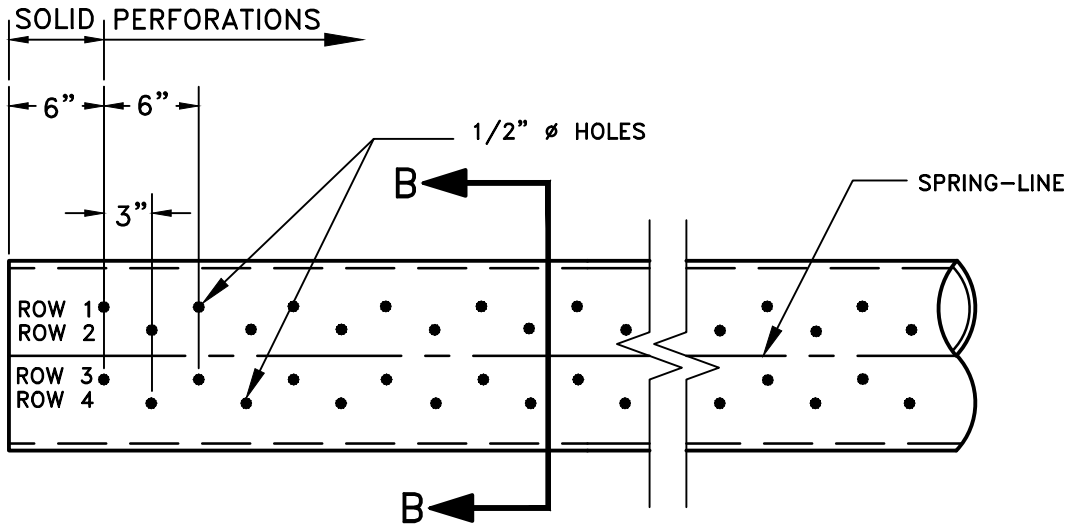
HORIZONTAL DRAIN

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

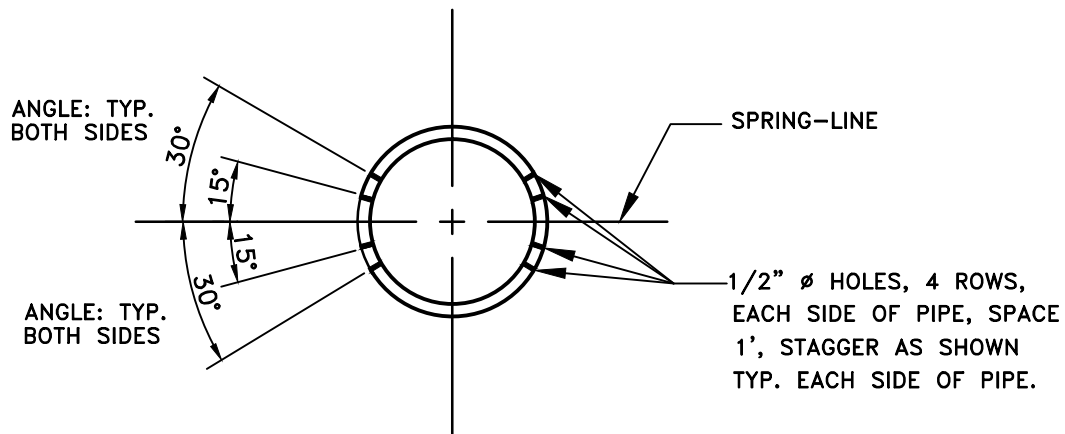
MODESTO
CALIFORNIA

DETAIL NO.
421

TYP. BOTH ENDS OF PIPE



PERFORATED HORIZONTAL PIPE



NOTE:

PRE-FABRICATED PERFORATED PIPE WILL BE ALLOWED WITH CITY ENGINEER APPROVAL.

PIPE SECTION B-B

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

STORM DRAINAGE

HORIZONTAL DRAIN
PERFORATED PIPE

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



MODESTO
CALIFORNIA

DETAIL NO.
422

CHAPTER 5

SANITARY SEWER DESIGN

5.01 GENERAL

A. Description

This work shall include the furnishing of all the labor, materials, tools and equipment to construct and complete the installation of the sanitary sewer mains and laterals in accordance with the approved plans, City of Modesto Standard Details and these specifications. Standards and specifications for pump systems, sewer lift stations, and force mains are available upon request. Systems and station designs shall be submitted for review and approval prior to installation and construction.

B. Definitions of Sewer Lines (MMC 5-6.103):

1. House sewer line - The line connecting a user's property to the sewage system (Service Lateral).
2. Sewer main - A pipeline, which collects sewage from one (1) or more individual users and transports it to subtrunk and trunk sewers. (8" and 10" diameter pipe).
3. Subtrunk sewer - A pipeline designed to transport sewage from the subtrunk sewer service area to the trunk sewer (12" and 15" diameter pipe).
4. Trunk sewer - A pipeline designed to transport sewage to treatment plant (>15" diameter pipe).
5. Sewer system - The facility designated and used for the collection, treatment, and disposal of industrial wastes and sanitary sewage.
6. Sewer service - The services and facilities for the collection, treatment, and disposal of industrial wastes and sanitary sewage.
7. Subtrunk sewer service area - An area that is 160 acres or larger that is not adjacent to a trunk sewer that is served by a subtrunk sewer.

C. Submittal Map & Calculations

Sanitary sewer system design within a developing area must include provisions for size and capacity to adequately convey all domestic and industrial waste that can be reasonably anticipated under conditions of full ultimate development. Engineering calculations to support the sewer system design shall be submitted to the City Engineer for approval.

The calculations shall include:

1. Map indicating service area, including section/page block MH#, within the sewer system including any future contributing development with projected land use, zoning, and any physical features contributing to the sewer system design.
2. Sanitary sewer waste volumes, existing and proposed, within the service area of the system.
3. Size and slope of each pipe between appurtenant structures.
4. Invert/Rim elevations of each pipe and appurtenant structure.

D. Service Policy

The construction, maintenance and repair of the House Sewer Line (service lateral) from the property line to the main shall be the property owner's responsibility. The property owner's responsibility extends into the streets, alleys, and/or easements to the City main. The pipe size and material shall meet City Standards when located in the City right-of-way.

E. Sewer Laterals

In all new subdivision work, the house sewer lines and risers from the sewer to the property line shall be installed at the time the sewer is constructed. Wherever a sanitary sewer is installed which will serve existing houses or other buildings, a house sewer line shall be constructed for each existing house or building. Each house sewer line shall be referenced to the plan stationing. A separate house sewer line shall connect each individual building parcel.

Exceptions to separate sewer and water services may be granted by the City Engineer in residential or commercial centers with associations or management agencies and appropriate private easements. The Public ownership will, in all cases, stop at the right-of-way line of the street. No dedicated public easement will be accepted.

The following are requirements for sewer laterals:

1. Building drains (i.e. floor drains, roof leaders, etc.) shall not be connected to the sanitary sewer system.
2. All wash racks and car washes must be connected through an oil/water separator before connection to the sanitary sewer. An overhead cover must be installed to prevent rainwater infiltration. ~~See Appendix P for wash rack specifications.~~
3. Sewer Laterals shall be connected to main with a wye fitting in accordance with City Standard Details.
4. Cleanouts shall be constructed in conformance with the City Standard Details.
5. Backflow prevention devices may be required as specified in City Standard Details.

6. The maximum depth of a sewer service connection to the main shall be 12'. A parallel sewer main (fly line) must be constructed for services deeper than 12'.
7. Grease traps and interceptors shall be constructed by the Developer on the private property on the sewer service lateral for any facility whose operation will result in oil, grease, sand or other solids being discharged into the City's sanitary sewer system.
8. The traps or interceptor shall conform to Section 708 and 711 of the current Uniform Plumbing Code adopted by the City and it shall be constructed where the City Engineer can easily inspect it for proper operation.
9. For additional information regarding specific requirements for grease traps contact the Chief Building Official.
10. The service policy of the Modesto Municipal Sewer District #1 requires that all properties served must annex into the District.
11. A property already inside the district may extend sewer mains and laterals to connect to the system.
12. As a minimum, sewer mains shall be extended across frontage, unless otherwise approved by the City Engineer.
13. Service Laterals shall not connect directly into manholes without prior approval from the City Engineer.
14. Refer to Section 5.03.C for additional requirements.

F. Right-of-Way Policy

Public sewers shall be located in a dedicated right-of-way, not easements for sewers and/or public use. Sewer services are not permitted in a dedicated right-of-way, outside the paved roadway, without prior written approval of the City Engineer. This approval may be given only when insufficient grade makes it impossible to serve the property directly from a sewer main in the roadway within the right-of-way.

Dedicated right-of-way, outside the roadway, for sanitary sewers shall meet both of the following width criteria:

1. Minimum width of any dedication shall be 15'.
2. All dedications shall have a minimum width in feet equal to the required trench width according to the standard detail for trench backfill plus 2 additional feet of width for every foot of depth of the pipe as measured from the bottom of the pipe to finished grade. All sewer pipes shall be centered within the dedications.

In a residential cul-de-sac where the sewer is extended through the cul-de-sac to another street, a dedicated right-of-way shall be constructed with a 10' wide drive (6" concrete) and landscaped on both sides of the drive. One (1) removable bollard

shall be installed at each end of the dedicated right-of-way. Drive approaches to accommodate the access drive will not be allowed.

G. Parallel Sewer Mains (Fly Lines)

Parallel sewer lines are required to be constructed when:

1. The diameter of the existing main is 12" or greater or,
2. When the existing main is deeper than 12'. The standards of construction are outlined in Detail 508.

5.02 DESIGN

A. Line Size and Service Policy

1. Minimum size of any new public sewer main shall be 8" in diameter.
2. All intersecting sewer pipe 8" in diameter and larger shall be connected at a manhole.
3. Minimum service lateral size is 4". Six inch (6") or larger service laterals shall be installed where the intended use is industrial, commercial or greater than single-family residential flows. Joint use of laterals will not be permitted except in multi-family residential uses.
4. No direct connections are permitted on 12" or larger sewer mains.

B. Velocity

Sewer velocity shall be equal to or greater than 2' per second for all sewers when flowing full. Design velocities for sewer mains shall not exceed 10' per second.

The following are the minimum slopes required for sewer lines:

<u>PIPE SIZE</u>	<u>MINIMUM SLOPE</u>
8"	0.35%
10"	0.25%
12"	0.20%

C. Flow

The design sanitary sewer flow shall be computed using the following formula:

$$Q_D = Q_P + I$$

Where:

- Q_D = Design Flow (gal per day)
- Q_P = Peak Flow
- I = Infiltration

The peak flow (Q_P) for residential service areas is defined as 3.0 times the average flow. The average flow for the service area shall be computed from two (2) basic assumptions:

1. 2.90 persons per single-family dwelling
2. 100 gallons per person per day

Acreege flows estimates for master planning and sizing mains when the exact numbers of residential services are not specified are as follows:

TABLE 5.1 ACREAGE FLOWS ESTIMATES

Land Use	Density Units/Acre	Persons Dwelling/Unit	Average Flow (Gal/Ac/Day)	Peak Flow (Gal/Ac/Day)
Very Low Density Residential	2	2.90	580	1740
Low Density Residential	5	2.90	1450	4350
Medium Density	8	2.90	2320	6960
High Density Residential	10	2.90	2900	8700
Multi-Family	22	1.90	4180	12540
Commercial			1000	3000
Office			1000	3000
Light Industrial			1000	3000
Heavy Industrial				*Note 1
Schools			20 GPCD	*Calculate*

*Note 1: Sewage flow rate shall be considered on a case-by-case basis and may require special design.

Infiltration and inflow (I & I) shall be computed by using 500 gallons per inch diameter mile per day for sewer mains and laterals or 1,000 gal/acre/day. Residential laterals shall be assumed to be a minimum of 75' in length.

Population, thousands

Reference: Modesto Sewage Survey, 1966C. Pipe Capacity

1. Manning's Formula, $Q = A (1.49/n) R^{2/3} S^{1/2}$, shall be used to determine pipe capacity. The "n" value shall be 0.013 or the pipe manufacturer's recommendation, whichever is greater.
2. All main sewers shall be sized to carry the design flows at 70% of pipe capacity.
3. Design capacities for trunk sewers shall require approval by the City Engineer.

D. Vertical Alignment

1. Minimum pipe cover and clearance shall be maintained in the design of sanitary sewers. If certain conditions exist which make it impractical to meet the minimum cover and clearance requirements, the conditions and locations shall be specifically noted above the sewer profile on the plans. Each location not meeting the minimum cover and clearance requirements will require special pipe, bedding and/or backfill and shall be approved by the City Engineer.

Under no conditions or circumstances shall other utilities be allowed to be installed directly over and parallel to any sanitary sewer installation.

2. Main and trunk sewers shall have a minimum depth of 42" from the top of pipe to the finished grade and a minimum depth of 2' to bottom of street sub-grade. Mains installed with 36" cover shall use ductile iron pipe or other engineered alternatives and shall require the approval of the City Engineer and Director of Public Works. Mains and trunks shall not be allowed with less than 36" cover from the top of pipe to finished grade.
3. Sewer laterals shall have a minimum depth of 3' from the top of the pipe to the finished grade at the right-of-way and a maximum depth of 5' at right-of-way for residential subdivisions. Commercial, industrial, and multi-family shall have a minimum depth of 5' to the finish grade at right-of-way and shall be increased by 1' for every 250' of lot depth.
4. Sanitary sewer pipe shall be laid with a minimum of 12" vertical clearance from all improvements and utilities, unless otherwise approved by the City Engineer.
5. At points of convergence of pipes of various sizes, the crowns of the pipes shall match.
6. Sewer lines shall be installed on a straight grade between manholes. Siphons are not permitted in Sanitary Sewer systems.
7. Whenever a change in the size of pipe, or an angle of 20° or more in alignment occurs at manholes, the flow line of the incoming pipe shall be a minimum of 0.10' above the flow line of the outgoing pipe, or an amount necessary to match pipe crowns, whichever is greater. The Improvement Plans shall show invert in and invert out of the manhole.

E. Horizontal Alignment

1. Alignment shall be at the street centerline wherever possible. See Detail 805.
2. Sanitary sewer mains shall be on a straight line between manholes. Whenever it is essential that a curved alignment be used, a minimum radius of 200' shall be required, but shall be greater whenever possible. The radius and delta of all curves shall be indicated on the plans adjacent to the curve. If the sewer line parallels the road centerline, then only the street centerline data on radius and delta needs to be indicated on the plans.

3. The deflection in the joint between any two successive pipe sections shall not exceed 80% of the maximum deflection as recommended in writing by the pipe manufacturer. Minimum 2' pipe lengths may be used to install short radius curves providing the requirements specified herein are met.
4. Sewer mains and laterals that are stubbed for future development shall be stubbed the greater distance of 5' or 2' for every 1' of depth below finished grade beyond the termination of developed landscaping or pavement (if right-of-way is available).

5.03 MATERIALS

A. General

The City Engineer shall approve the source and supply of materials.

B. Gravity Sewer Pipe

1. Vitrified Clay Pipe shall be extra strength, bell and spigot end compression joint pipe, conforming to ASTM C700 as it applies to unglazed vitrified clay pipe.
2. Ductile Iron Pipe shall be Pressure Class 350 and shall conform to ANSI/AWWA C151. All DIP shall be protected by a polyethylene encasement meeting the requirements of ANSI/AWWA C105. Fittings shall conform to ANSI/AWWA C110.

Ductile Iron Pipe for use in gravity sewer systems shall be lined with Protecto 401 Ceramic Epoxy Liner or equal.

3. Polyvinyl Chloride Pipe (PVC): gravity sewer pipe and fittings shall conform to the current ASTM D-3034 SDR 26 with a minimum pipe stiffness of 115 psi at 5% deflection. Additives and fillers including but not limited to stabilizers, antioxidants, lubricants, colorants, etc., shall not exceed 10 parts by weight per 100 parts of PVC resin in the compound. Pipe shall be made of PVC plastic having a cell classification of 12454 as defined in ASTM D 1784. The fittings shall be made of PVC plastic having a cell classification of 12454.
 - a. All pipe and fittings shall be suitable for use as a gravity sewer conduit, with provisions for expansion and contraction at each joint.
 - i. All joints shall be made with flexible elastomeric seals meeting the requirements of ASTM D3212, and shall be capable of passing all tests specified in said standard and within these specifications. Lubricant used for field assembly of gasketed PVC Pipe shall have no detrimental effect on the gasket, joint, fitting or pipe and shall be as recommended by the manufacturer
 - ii. A factory-applied reference mark shall be provided on the spigot end to ensure proper positioning in the adjoining bell.
 - iii. The pipe shall be uniform in color, opacity, density, and other physical properties.
 - iv. All pipe, fittings, and couplings shall be clearly marked at intervals not to exceed 5 feet as follows:

1. Nominal pipe diameter.
 2. Date of Manufacture.
 3. Manufacturer's name or logo.
 4. ASTM and SDR designation.
 5. Minimum pipe stiffness "E" of 400,000 psi
- b. The Contractor shall retest within 60 days prior to the installation of all PVC pipe and fittings that are more than 180 days old from the date of manufacture to ensure compliance with the requirements of the Specifications. The Contractor shall not install any pipe that is more than 2 years old from the date of manufacture.
 - c. Written certification, by the manufacturer, shall be submitted showing that all pipe and fittings meet the requirements herein.
 - d. Pipe stored on the job site shall be covered with canvas or other opaque material to protect it from the sun's rays. Air circulation shall be provided under the covering.
4. PVC Lined Concrete Reinforced Pipe for trunk lines larger than 36" and shall conform to ASTM C76 and ASTM 655. Pipe shall be provided with 360 degree internal PVC sheet liner, T-Lock or approved equal. RCP shall be Class III, Wall B, minimum or stronger to suit design conditions. Joint assembly shall be reinforced concrete bell and spigot type incorporating a fully retained, single or double gasket in accordance with ASTM C361. Steel joints will not be allowed.

C. Sanitary Sewer Force Mains

1. Ductile Iron Pipe shall be Pressure Class 350 and shall conform to ANSI/AWWA C151 and C150. All DIP shall be protected by a polyethylene encasement meeting the requirements of ANSI/AWWA C105. Flanged end pipe shall be Class 53, minimum. Fittings shall conform to ANSI/AWWA C110 and C111. Interior and exterior coatings shall conform to AWWA C210.
2. Valving of all systems shall be designed to facilitate the isolation of each section of pipeline as required.
3. Underground pressure piping systems shall be securely anchored by acceptable means at all tees, plugs, caps, bends and valves, and at all other locations where unbalanced forces exist or as directed by the City Engineer. Restrained joints shall be used in accordance with manufacturer's recommendations.

D. Service Laterals

1. Pipe material shall be the same type and class as that used for the main unless approved by the City Engineer.
2. Joints and Couplings for laterals shall be the same type and specifications as those used for the main unless otherwise specified in Section 5.04.
3. Existing service laterals may be replaced using any approved material in Section 5.03 (B), except where depth from the top of the pipe to the finished grade at the right-of-way is less than 3'. Ductile iron must be used when replacing service laterals with less than 3' depth and must have approval of the City Engineer.

E. Connections:

1. Sewer Main, Sub-trunk, and Trunk transitions in pipe diameter, pipe material, and horizontal alignment shall occur at manholes.
2. Sewer Laterals Connections to Manholes
 - a. When connecting a VCP sewer lateral directly from the manhole to the right-of-way line (as approved by City Engineer), ductile iron pipe shall be inserted into the manhole and extended a minimum of 4' from the outside of the manhole. The VCP shall then be cut, and joined to the remaining sections of the service lateral with a stainless steel and neoprene couplings with shear bands.
 - b. When connecting a PVC sewer lateral directly from the manhole to the right-of-way line (as approved by City Engineer), PVC shall be inserted into the manhole and brought to the right-of-way line.

F. Manholes

1. General

Pipes between 6" and 24" in diameter refer to Standard Modesto Details for "Lateral and Subtrunk Manhole". Pipes between 30" and 60" in diameter refer to Standard Modesto Details for "Trunk manhole".

Pipes larger than 72" shall have manholes constructed of custom boxes with 48" diameter sections with a cone and grade rings extending to the surface.

Manhole spacing along the alignment shall not exceed 500'.

2. Standard Precast

Sanitary sewer section manholes shall be precast reinforced concrete conforming to ASTM C 478, except that the Portland cement shall be Type II modified cement. The manhole base, riser and cone shall have a minimum compressive strength of 4,000 psi at 28 days. Manholes shall be constructed in accordance with the Standard Details. Manhole bases shall be pour-in-place concrete.

3. Lined Manholes

Manholes on trunk sewer lines shall be PVC Lined (T-Lock), Calcium Aluminate (SewperCoat) or Polyurethane lined. The scope of the lining shall include, unless otherwise shown on the plans, all unlined interior concrete surfaces of the manhole.

PVC Lined (T-Lock): The material used in the liner, welding strips and other accessory items, shall be a combination of poly-vinyl chloride resin, pigments and plasticizers, specially compounded to remain flexible. Poly-vinyl chloride resin shall constitute not less than 99 percent by weight, of the resin used in the formulation. Copolymer resins will not be permitted.

All plastic liner plate sheets, welding strips and other accessory items, shall have the following physical properties when tested at 77°F±5° (25°C±3°).

Property	Value
Tensile Strength, psi	2200 psi min (15MPa min.)
Elongation at break, %	200% min
Shore Durometer, Type D (with respect to initial test results)	1-sec. 50-60 10-sec. 35-50
Weight Change	±1.5%

HDPE Embedment Liner: Studliner, or approved equal, shall be applied by a licensed product applicator and in accordance to the product recommendations. The material used in the embedment liner and in all welding products shall be made from 97 to 98 percent virgin high-density polyethylene and 2 to 3 percent carbon black or pigmentation for the purpose of an otherwise specified color. Plasticizers shall not be added to the resin formulation.

Embedment sheets for field installation shall be produced in rolls that are 6.5 ft. (2 m) in width, by 200 ft. (61 m) in length with 120 mils (3 mm) thickness.

Locking studs of the same material as that of the liner shall be integrally extruded with the sheet to an approximate height of 0.40-inches (10 mm). Stud spacing shall be on approximate 1.25-inches (30 mm) centers, such that there are approximately 110 studs per square foot (1200 per square meter).

Joint strips, or welding strips, for seaming shall be approximately 4-inches wide and continuous along the length of the joint. Thickness of these strips shall be equivalent to that of the liner. Embedment sheets and welding strips shall be free of cracks, cleavages, or other defects adversely affecting the protective characteristics of the material. The Engineer may reject any materials which may be defective. All plastic embedment sheets, studs, and welding strips shall have the following physical properties when tested in accordance with test method specified below:

Nominal Properties for Embedment Liner

Test	Property	Value
ASTM D751, D5199	Thickness, mm (mil)	3.0 (120) +/- 10%
ASTM D1505	Density, g/cm ³	
ASTM D6693 Type IV, Dumbbell	Tensile Strength at yield, psi (MPa)	2,200 (15.3)
G.L. = 2.0 in (50mm)	Tensile Elongation at break, %	500
ASTM D5397	Notched constant tensile load, hrs	400
ASTM D1603	Carbon Black content, %	2-3
ASTM D1204	Dimensional stability, %	+/- 1
ASTM D696	Linear coefficient of thermal expansion, in/in/degrees C	1.2x10 ⁻⁴
ASTM D746	Low Temperature brittleness, degrees C	-77
-	Service Temperature, degrees F	-70 to 176
ASTM D570	Water Absorption, %	< 0.01
-	Stud pull out strength, psf	>14,000

Liner shall have demonstrated good chemical resistance via testing in accordance with EPA 9090.

Weld strips shall have good impact resistance, be flexible, and have an elongation sufficient to bridge up to 0.375-inch differential vertical movement without damage to the strip.

Materials furnished under this section shall be suitable for exposure to wastewater containing some industrial wastes and digested solids. The wastewater may be expected to contain gross waste solids, vegetable parts, small sections of lumber, rocks, sand, silt, petroleum products, industrial solvents, and animal fats and oils. The wastewater will have a temperature of 50 degrees F to 130 degrees F and will have pH which may range from 6 to 8. All lining shall be impermeable to sewage gases, sewage liquids, sewage treatment chemicals and shall be non-conductive to bacterial or fungus growth.

All material, adhesives and incidentals necessary for proper application of HDPE lining shall be furnished by the same manufacturer and shall be compatible with each other and with the adhesives employed.

Calcium Aluminates Mortar Lining: SewperCoat 200 HS lining, or approved equal, shall be applied by a licensed product applicator and in accordance to the product recommendations. The lining material shall be composed entirely of calcium aluminates, fiber reinforced, and high strength dry gunite material. The depth of the application shall be ¾" to 1" minimum.

Nominal Properties for Calcium Aluminates Mortar Liner

Test	Property	24 HRS	7 DAYS	28 DAYS
ASTM C 109	Compressive Strength, psi	>5,500	>6,000	>7,000
ASTM C 348	Flexural Strength, psi	>900	>1,100	>1,300
ASTM C 157	Shrinkage after 28d immersion, %	< 0.04	< 0.05	< 0.07
ASTM C 496	Splitting Tensile Strength, psi	>550	>600	>700
ASTM C 882	Bond Strength by Slant Shear, psi		>2500	>2500
ASTM C 666	Freeze-Thaw – 300 cyc, Rel. Dyn. Modulus	102		
ASTM C 642	Volume of Permeable Voids (40 days), %	15		
ASTM C 642	Apparent Density (40 days)	2.74		
ASTM C 469	Modulus of Elasticity (28 days), ksi	>5,000		

Polyurethane Lining: The lining material shall be an epoxy base coat under a polyurethane finish coat. The material shall be Sancon 100 or equal. The epoxy base coating shall be applied to a thickness of 5 mils. The polyurethane shall be

applied to a thickness of 125 mils (1/8") in one (1) continuous coat, without seams, free from any holes or defects.

Lining System Warranty: Lining System shall be warranted for five (5) years against any type of failure. The Contractor shall remove and replace all failures at his expense.

4. Frames and Cover

Sewer manhole frames and covers shall be PAMREX (reference number CDPA60EHSEW) or equal, or PAMTIGHT (reference number CDPE70AF) or equal or Cast Iron Lid 624 as shown in Standard Details.

In areas requiring lockable lids, as required by the City Engineer, PAMREX shall be installed. In areas within the flood way or flood plain or in areas where water intrusion is a factor, PAMTIGHT lids shall be installed.

Castings:

Iron castings for manhole covers and frames shall conform to ASTM A 48, Class 25 and be of the dimension shown on the Standard Details.

All castings shall be sound and free from shrinkage cracks, blowholes, and other defects. All fins and burnt sand must be removed. Excessive porosity and spongy surfaces will constitute causes for rejection.

The manhole cover shall seat evenly and firmly in the frame. Cast iron frames and covers shall be dipped or painted with asphalt, which will form a tough, tenacious, non-scaling coating which does not have a tendency to become brittle when cold or sticky when hot.

5. Drop Manholes

Shall be used where the difference in elevation between the top of the outlet pipe and the invert of the inlet pipe exceeds 24". Pipes for the drop inlet shall be the same material as the sewer unless approved adapters are used. If so, the pipe may be VCP or PVC. If two or more drop inlets are required in a single manhole, each shall be constructed separately. Refer to Details 503 and 504 for Drop Manholes.

G. Cleanouts

Cleanout frames and covers shall be manufactured, tested and otherwise furnished in accordance with the Standard Specification of Gray Iron Castings ASTM A 48, Class 30 when installed within the public right-of-way. The contact surfaces of frames and cover shall be machine surfaced to eliminate rattling and other movement under traffic. Castings shall be equal in materials and construction to Christy F08, or equal. Concrete shall be Grade B conforming to Section 3.05 and have a 28-day compressive strength of 2,500 psi.

H. Carrier or Casing Pipe

Pipe used as a conductor pipe under a highway or railroad shall be welded steel pipe. The Pipe shall conform to the Standard Specifications for Public Works

Construction SSPWC (Greenbook) Section 207-10, "Steel Pipe". The protective lining and coating, if any, shall be as shown on the plans or specified in the Special Provisions.

When the conductor pipe is to be installed by boring and jacking, the wall thickness shall be 1/4" for sizes up to and including 24" in diameter, and 5/16" for sizes 27" to 36" in diameter, unless otherwise specified.

5.04 INSTALLATION

A. Sanitary Sewer Installation:

All sanitary sewer pipe installations shall be accomplished as specified herein except where modified by the requirements specific to the various types of pipeline materials specified under Section 5.03. Refer to Section 8 for "Bedding and Backfill" requirements.

1. General Notes:

- a. All pipes shall be laid to conform to the prescribed line and grade as shown on the plans and each pipe length checked to the grade line, which the Contractor establishes from the grade stakes.
- b. Alternate use of commercial LASER grade setting systems in lieu of string lines specified herein are acceptable when the following requirements and conditions are met:
 - i. The Contractor shall have the responsibility of providing an instrument operator who is qualified and trained in the operation of the LASER and said operator must adhere to the provisions of the State of California Construction Safety Orders issued by the Division of Industrial Safety. Attention is particularly directed to Sections 1516, 1800, and 1801 of said orders for applicable requirements.
 - ii. All LASER control points shall be established benchmarks or construction offset stakes identified on cut sheets and set in the field for the work. LASER set up points shall be these control points or points set directly from them by instrument.
- c. Each length of pipe shall be laid on compacted, approved bedding material as specified and shall have full bearing for its entire length between bell holes excavated in said bedding material to allow for unobstructed assembly of all bell and spigot joints. All joints shall be cleaned on the inside of bell. "Stabbing", "Swinging In", or "Popping On" spigot ends of pipe into bell ends will not be permitted. After jointing is accomplished, all spaces between pipe and bell holes shall be packed with bedding material, taking care not to damage, move or lift the pipe from its bedding support.

- d. Adjustments of pipe to line and grade shall be made by scraping away or filling in and tamping approved material under the body of the pipe. No wedging or blocking to support the pipe will be permitted.
- e. A sewer line, unless otherwise approved by the City Engineer, shall be laid, without break, upgrade from point of connection to existing sewer and with the bell end forward or upgrade. Pipe shall not be laid when the City Engineer determines that the condition of the trench or the weather is unsuitable. When pipe laying is not in progress, the forward end of the pipe shall be kept effectively closed with an approved temporary plug or cap.
- f. Sewer pipes, branches, stubs, or other open ends which are not to be immediately connected, shall be plugged or capped with a standard watertight plug or cap, as approved by the City Engineer for use in the particular installation. The plug or cap shall be placed on a standard end.
- g. Pipe entering or leaving manholes or other structures shall have joints within 2½' of the manhole base.
- h. In all cases, flexibility of joints at the manhole base shall be preserved to prevent damage to the pipe by differential settlement.
- i. All sewer line connections to manholes, trunk sewers, main sewers, or side sewers shall be left uncovered until after the inspection has been made. After approval of the connection, the trench shall be backfilled as specified.
- j. If the sewer is to be laid in an area that is to be filled, and the cover prior to filling is less than 5', the pipe shall not be laid until the area has been filled to a level 5' above the proposed pipe and compacted to 90% relative compaction, unless otherwise authorized by the City Engineer.

2. PVC Installation:

- a. PVC pipe and fittings shall be installed in accordance with ASTM D-2321 and City Standards. All rubber rings shall conform to ASTM F-477.
- b. PVC sewer pipes shall be over excavated a minimum of 4 inches below the pipe or bell, whichever is lower in elevation.
- c. Connections of PVC pipe and fitting to a manhole shall be water tight. The use of manhole water stops per manufacturer's requirement shall be approved by engineer prior to the installation of any pipe or fitting.
- d. All pipe shall be unloaded in the original packaging using a forklift with fork arms long enough to reach beyond the last pipe bundle. Care shall be taken during transporting of the pipe to insure that the binding and tie down methods do not cut the pipe in any manner. Pipe bowed, deformed or otherwise damaged during shipping or storage shall be rejected.
- e. Do not roll the pipe off of the truck. Pipe shall not be handled or secured using chains or cables; a nylon or textile strap is recommended.

B. Service Laterals

Attention is directed to the Standard Details for additional requirements pertinent to lateral installations.

1. Install wye per Standard Detail 512. Tees shall not be used.
2. That portion of any lateral line to be placed under an existing curb and gutter and/or sidewalk shall be done by boring or cutting and replacing the existing curb and gutter and/or sidewalk.
3. The lateral line shall have a clean-out at back edge of sidewalk as shown on the Standard Details. A box shall be installed as noted on detail. Said cleanout shall consist of a combination wye and eighth bend. Laterals and cleanouts shall not be located in the driveway.
4. Where required, an approved backwater valve shall be installed ahead of the cleanout and behind the sidewalk. An appropriately sized valve box with adequate clearance to access and maintain the said device, along with the correct number of grade rings, (to bring the lid to finish grade), shall be installed.
5. The wye branches, unless otherwise specified, shall be inclined at any angle not greater than 45° degrees from the horizontal.
6. The end of the lateral service shall extend a maximum of 48" and a minimum of 24" beyond the rear edge of the sidewalk in streets having sidewalks adjacent to the curb and shall extend a maximum of 12" and a minimum of 6" beyond the back edge of the curb for sidewalks that are separated from the curb by a planter strip and in commercial sidewalks.
7. The location of every sewer service shall be marked with an "S" directly above the service on the face of the curb; the "S" shall be 2" in height and ¼" in depth.
8. Residential Service Laterals shall not be connected directly to manholes, unless approved by City Engineer.
9. Services for VCP: Services shall be new factory manufactured vitrified clay pipe wye and bend for each service connection on vitrified clay pipe sewer mains. The sewer couplings to connect the bend to the lateral shall be a band seal type with outside stainless steel sheer ring as supplied by Gladding McBean and Company or equal. Calder couplings will not be allowed.
 - a. For 6" VCP mains, a cut-in clay wye shall be used with plain ends along the "run" of the pipe, and a bell branch end may be used.
 - b. Cut-in wye connections are only allowed in mains less than 12".
 - c. When cutting in a wye, well graded, crushed stone or crushed gravel, meeting the requirements of ASTM C 33, Gradation 67 (3/4 to No. 4) shall be placed under the main line and the sewer service lateral within the right-of-way line.
 - d. When joining the cut ends of the existing main to the wye or tee, a "BAND SEAL" with stainless steel shear type sewer repair couplings, or equal;

shall be used. Calder couplings, No-Hub couplings or plastic couplings will not be permitted on the "run" of the pipe.

10. Services for PVC: Services shall be new factory manufactured PVC SDR26 wye and bend for each service connection on sewer mains. Reducing wyes for service laterals shall be in-line bell and spigot type, factory molded. Tee connections to PVC Pipe will not be allowed. Solvent type fittings are not allowed. Solvent type joints for pipe, wyes, and tees will not be allowed.

C. Manholes

1. Precast Manhole Construction - Excavation and backfill for all precast manholes shall be in conformance with the requirements of Section 19-3 of the State Specifications and installed as specified herein. All embedment materials under, around and at least 3" over all pipelines located within five feet of structure bases shall be compacted without jetting prior to section placements. All precast manholes shall be constructed to subgrade prior to adjoining sewer pipeline trench and/or structure backfill where such method of compaction is permitted and used. At no time shall pre-cast manhole bases be utilized.

Manholes installed in unimproved areas or areas outside of the street, shall have bolted manhole covers. Rim elevations shall be a minimum of 1' above ground. The exposed manhole above existing ground shall be constructed entirely of grade rings and noted on the plan sheets. If the manhole is outside an existing street, but in a future street area, then grade rings shall extend below ground at least 18". Four (4) bollards shall be installed around the manholes to protect it from farm machinery and other vehicles.

All joint surfaces of precast sections and face of manhole base shall be thoroughly clean prior to setting precast sections. These various sections shall be set in preformed plastic sealing gaskets of material conforming to the requirements of FEDERAL SPECIFICATION SS-S-00210.

- a. Installation of gaskets - Apply one (1) coat of primer to clean, dry joint surface (both tongue and groove) and of the two-piece wrapper on the gasket. The outside paper will protect the gasket and assure against stretching. Before setting the manhole section in the trench, attach the plastic gasket strips end-to-end to the tongue or groove of each joint, forming a continuous gasket around the entire circumference of the manhole joint.
- b. Handling of barrel sections after the plastic gasket has been affixed shall be carefully controlled to avoid bumping the gasket and thus displacing it or contaminating it with dirt or other foreign material. Any gaskets so disturbed shall be removed and replaced if damaged and repositioned if displaced.
- c. Care shall be taken to properly align the manhole section with the previously set section before it is lowered into position.

- d. During cold or wet weather, pass direct heat over the concrete joint surface lightly until ice, frost and moisture are removed and surface to be primed is dry and warm immediately before application of primer. Direct heat shall also be passed over plastic gasket strips immediately prior to attaching them to joint surfaces and immediately prior to insertion of tongue into groove.

The cast-in-place base shall be 4,000 psi, 28-day concrete with 1½" maximum size aggregate. It shall rest on firm, undisturbed soil, and shall be the dimensions shown on the Standard Details. Where sewer lines pass through manholes, the pipe shall be laid continuously as a whole pipe. After the manhole base and precast sections have been placed and sufficient time has elapsed to allow all concrete and grout to set, the top half of pipe within the manhole shall be carefully cut off and the sides mortared. All channels so formed shall be checked with a template and shall form a smooth flowing channel at all flow depths.

Temporary covers of 3/8" steel plate of sufficient size to adequately cover the opening shall be placed on the cone until the base is complete and the manhole casting shall then be installed. Suitably located ribs shall be welded to the underside of the cover to hold it in place during any grading operations.

The throat of the manhole shall be made of precast concrete rings of the proper inside diameter. The minimum depth of throat permitted shall be one 3" ring between the cone and the frame. The maximum depth permitted shall be 12" of rings between the cone and frame.

Frames and covers shall be installed with the hinge toward the closest curb and gutter, or the side opposite the crown of the road. See the City standard sewer manhole frame and cover installation detail for additional requirements.

When adjusting the manhole frame and cover to grade, the frame shall be wired to a 2" x 4" of sufficient length to span the excavation and the throat completed to the right level. Whenever the space between the bottom of the frame and the top of a ring is less than 3" inches, the void may be filled with concrete, poured against a suitable form on the inside of the structure.

When adjusting an existing manhole to grade and the total depth of the throat from the top of the frame to the bottom of the throat exceeds 18", the upper portion of the manhole shall be removed to the first full-size manhole section. The upper portion shall then be reconstructed as outlined above.

Penetrations for connections to existing manholes shall be core drilled by the contractor. Single cores shall be cored between 1/2" to ¾" larger than the pipe outside diameter and not to exceed 20" in diameter. Cores larger than 20" in diameter shall be performed by the contractor drilling multiple small diameter cores no larger than 1" diameter, spaced no greater than ¾" between outside diameters of cores, through the concrete manhole wall, in a symmetrical pattern, not to exceed ¾" of the diameter of the newly installed pipe. The cored area to be removed shall not be removed by the use of impact hammers including but not limited to sledge hammers or jack hammers. Use of a pneumatically

powered chipping hammer for use in the removal of the pre-drilled core shall be on a case-by-case basis and only with the prior approval of the on site inspector. The surface edge of the cored opening shall be ground or milled to the limits specified, with all reinforcing wire ground to the level of the surrounding concrete wall of the core opening. Reinforcing wire shall be removed and not be permitted to remain in the core cut. Bent wire left in core cut shall not be permitted.

The newly installed pipe shall be inserted into the cored opening 4" inches beyond the inside wall of the manhole, measured at the spring-line axes of the pipe. The contractor must contour the inserted end of the pipe, by grinding or other acceptable means of conforming to the contour of the manhole, to provide access to the interior of the manhole as required. If fittings are planned for the inserted end of the pipe, contouring may not be required. Finished ends of pipe shall be determined as shown on the plans or as determined in the field by the Engineer.

Sealing the pipe shall be performed by the contractor inserting the pipe through the cored hole in the manhole wall to the penetration depth required, contouring the end of the pipe (if required) and packing the annular space between the pipe and the edge of the cored opening (inside and outside of the manhole wall) with a stiff mix of concrete mortar thoroughly compacted or preferably premixed high strength non-shrink concrete grout. The mortar shall be composed of one (1) part of type 2 Portland cement and three (3) parts of clean sand. Brick, stone or other material shall not be used as filler or blocking. The interior mortared area shall have a smooth finish similar to the adjacent barrel section of the manhole wall which follows the contour of that interior wall. The exterior mortared area should fully cover the entire cut area and shall conform to approximately the same contour as the exterior wall of the manhole barrel. This exterior mortared area shall exceed the dimensions of the cored area and may extend to, but not beyond the first pipe joint. The exterior grout seal SHALL NOT BE aggregate based concrete. Connections shall be watertight.

Before any work is started on adjusting or repairing a manhole, the channels in the base shall be covered with strips of wood, and the entire base covered with a heavy piece of canvas. This cover shall be kept in place during all work. Upon completion of the work the wood strips and the canvas shall be removed from the manhole, allowing no debris to fall or remain in the manhole.

2. Lined Manholes

Installation of the PVC Liner (T-Lock), HDPE Embedment Liner, Calcium Aluminates Mortar Liner (SewperCoat), or Polyurethane lining shall conform to the requirements as specified by manufacturer.

Field Welding and Testing - Field welding and testing of the lining of structures and between pipe and structures shall be made in strict conformance with lining manufacturer's instructions and recommendations (excluding Calcium Aluminates Mortar Liner). The surface of the liner shall be cleaned to permit visual inspection and spark testing using a 20,000 Volt Tinker and Razor Spark Tester, Model No. AP-W with power pack, or equal. All tests shall be performed by the contractor in the presence of the City inspector. The inspector shall be notified at least 24 hours in advance of a scheduled test.

- a. PVC Liner (T-Lock) shall be used for new manholes.
 - i. Field Joints - All joints between lined pipe and lined structures shall be either Type C-1 or Type C-2 as defined in Section 311-1 of the Standard Specifications for Public Works Construction SSPWC (Greenbook). Field joints between sections of lined pipe shall be Type P-1 as defined in Section 311-1 of the SSPWC specifications. When transitioning between lined and unlined pipe, a factory "turn back" shall be used or a type 316 stainless steel band and neoprene gasket/termination secured with type 316 stainless steel wedge anchors provided at the transition for the full pipe circumference. Contractor shall provide transition details to the Engineer for review prior to installation. Unless shown otherwise, field joints in lined structures shall be one (1) of the following types defined in the SSPWC: Type C-1, Type C-2 or Type C-3.
- b. HDPE Embedment Liner shall be used for existing and new manholes.

Installation of the lining and the welding of all joints shall be done in strict accordance with the manufacturer's instructions and recommendations and the details and methods indicated on reviewed shop drawings by an experienced and qualified installer acceptable to the manufacturer and the Engineer. HDPE lining welders shall be trained and certified by the lining manufacturer prior to start of welding. All joints and other lined areas where welding is performed shall be numbered and initialed by the welder. The Contractor or precast manufacturer shall record on a daily basis at the end of each working day the identification of the joint areas and the welder who performed the work, and submit to Engineer in a timely manner.

Coverage of the lining shall not be less than the minimum specified or as shown on the Plans.

When needed, the lining shall be held snugly in place against inner forms by means of steel banding straps or other means recommended by the manufacturer. Banding straps must be located in the interstitial space between studs to prevent crushing or tilting of the embedment studs. Minimal amount of banding straps to perform requirements shall be used and shall not interfere with concrete consolidation.

Where liner is extended for the purpose of joint overlap, embedment studs shall terminate not more than 1/2-inches from the end of the inside surface of the pipe section. Joint flaps shall extend approximately 4-inches beyond the end of the inside surface.

Concrete poured against lining shall be vibrated in careful manner so as to protect the lining and produce a dense, homogenous concrete, securely anchoring the locking studs into the concrete.

Forms shall be properly cleaned and prepared to remove any abrasive areas that may damage the liner. In removing forms, care should be

taken to protect the lining from damage. Sharp instruments shall not be used to pry forms from lined surfaces. When forms are removed, any nails that remain in the lining shall be pulled, without tearing the lining, and the resulting holes clearly marked. Form tie holes shall be marked before ties are broken off and all areas of abrasion or damage shall be marked. Form ties and nails are not allowed except where specifically shown on the Plans.

Hot joint compounds, such as coal tar, shall not be poured or applied to the lining. Solvents or adhesives shall not be used in fusion of material in any manner.

The Contractor shall take all necessary measures to prevent damage to installed lining from equipment and materials used in or taken through the work area and shall immediately repair any damage per the manufacturer's recommendations.

- c. Calcium Aluminate (SewperCoat) Liner shall be used for existing manholes.

Preparation of the surface to be coated should be performed in accordance with applicable industry standards and specific project specification requirements. Sandblasting and/or hydro-demolition with high-pressure water may be used to remove existing deterioration and debris. The immediate bonding surface should be rough, damp and free of any existing coatings, sewer residue and running water. The structure itself should be fully saturated prior to a lining installation. Refer to manufacturer's specification language for detailed surface preparation recommendations.

Clean, potable water should be used for mixing per manufacturer's recommended specifications for mixing water. Lining shall be designed to be applied with dry gunite equipment.

Lining shall not be used as a "build-out" mix or underlayment for any other product. Lining shall not be used in conjunction with or adjacent to any inert or organic coatings, including but not limited to epoxy, polyurethane, and fiberglass. Curing should be implemented as soon as the surface begins to harden and dry (as early as one hour after application). Several layers of ASTM C309 liquid membrane curing compound or a 100%-humid moisture cure may be used.

Equipment used must always be clean and free of Portland cement build-up to avoid accelerated set.

Generally accepted concreting practices (water ratio per bag, compaction, curing, etc.) should be employed to obtain the best quality installation with respect to mechanical strength and corrosion resistance.

- d. Polyurethane Lining shall be used for wet pit manholes.

Surface Preparation: The Contractor shall furnish all labor, material and equipment necessary for the preparation of surfaces, application of lining, safety procedures, protection of existing surfaces, equipment and clean-up.

All new concrete surfaces shall be grit blasted to provide proper adhesion of coating system.

All debris produced from the blasting operation shall be removed from the structure prior to coating. No debris shall be allowed to enter the sewer system. The concrete surfaces shall be air dried prior to installation of the liner.

All unnecessary holes in structure shall be sealed prior to lining with acid resistant sealant recommended for surfaces being sealed.

Lining Installation: The lining application shall be performed only by workmen trained and experienced with the specified material. The lining shall be applied by high pressure airless equipment approved by the lining manufacturer. The equipment shall be in good working order to insure correct proportioning and mixing of the components.

The polyurethane shall be applied to a thickness of 125 mils (1/8") in one (1) continuous coat, without seams, free from any holes or defects. The lining shall be installed over dry concrete below the water level by using appropriate bypass equipment.

During the lining application the Contractor shall take wet gage thickness readings as required to insure correct lining thickness.

The finished coating shall be free from porosity, without bubbles or pinholes and uniform in color. All areas in question shall be removed and reworked to the satisfaction of the Engineer.

Application of the lining shall not take place when exposed to rain, fog or high winds. It is the Contractor's responsibility to insure protection of the work from the above-mentioned conditions.

Lining System Warranty: Lining System shall be warranted for five (5) years against any type of failure. Contractor shall remove and replace all failures at his expense.

D. Testing of Sewer Lines

All leakage tests shall be completed and approved after backfilling and prior to placing of permanent resurfacing.

1. Cleaning and Flushing

Prior to performing a leakage test, the pipe installation shall be thoroughly cleaned. Cleaning shall be performed by the Contractor by means of an inflatable rubber ball. The ball shall be of a size that will fit snugly into the pipe to

be flushed. The ball shall be placed in the last cleanout or manhole on the pipe to be cleaned, and water introduced behind it. The ball shall pass through the pipe with only the pressure of the water impelling it. All debris flushed out ahead of the ball shall be removed at the first manhole where its presence is noted. If any wedged debris or damaged pipe shall stop the ball, the Contractor shall remove the obstruction. When a new sewer is connected to an existing line, cleaning and flushing shall be carried out to the first existing manhole downstream from the point of connection.

2. Low-Pressure Air Test for Gravity Sewer

After completing backfill of a section of sewer line, the Contractor shall at his/her expense, conduct a Line Acceptance Test using low-pressure air. The test shall be performed using the equipment listed below, according to stated procedures and under the supervision of the City Engineer.

PROCEDURE:

The section of pipe to be tested shall be isolated by completely blocking all outlets in the section under test. Careful attention must be given to the bracing of all plugs, as the line will be under pressure. One (1) of the plugs used at the manhole must be equipped for an air inlet to fill the line from the air compressor. The air compressor which feeds air into the pipe section must be equipped to control the air entry rate and to prevent the pressure from exceeding 5.0 psig. The air compressor shall be fitted with a blow-off valve to operate at 5.0 psig to prevent an increase in pressure, which could be hazardous to the pipeline.

After the pipe has been wetted, the air shall be allowed to slowly fill the pipeline until a constant pressure of 4.0 psig is maintained. At this point, the air compressor shall be controlled so that the internal pressure in the line is maintained between 4.0 and 3.5 psig for at least two (2) minutes to permit the temperature of the entering air to equalize with the temperature of the pipe wall. If it is necessary to bleed off the air to repair a faulty plug, a new two (2) minute interval must be allowed when the line has been refilled.

When the temperature of the air has reached equilibrium with that of the pipe wall, the air source shall be disconnected. Before disconnecting the air supply, the pressure shall be at 4.0 psig. The gauge is then watched until the air pressure reaches 3.5 psig. When the pressure has reached 3.5 psig, a stopwatch will be started and stopped when the pressure has reached 2.5 psig. The time required, as shown on the watch, for the loss of 1.0 psig drop shall be in accordance with ASTM C 828 or NCPI Low Pressure Air Tables for Sanitary Sewer. The portion of line being tested shall be considered "Acceptable" if the time required in minutes for the pressure to decrease from 3.5 to 2.5 psig is not less than the time shown for the given diameters in the following table:

TABLE 5.2 AIR PRESSURE TEST

Main Line		4" House Connection				
Diameter (Inches)	Length (Feet)	House Connection Length				
		0 ft.	100 ft.	200 ft.	300 ft.	400 ft.
8	0	0	20	40	50	70
	50	40	50	70	90	80
	100	70	90	100	100	90
	150	110	120	110	100	100
	200	140	120	110	110	100
	300	140	130	120	110	110
	400	140	130	120	120	110

Main Line		6" House Connection				
Diameter (Inches)	Length (Feet)	House Connection Length				
		0 ft.	100 ft.	200 ft.	300 ft.	400 ft.
8	0	0	40	80	100	100
	50	40	70	110	110	110
	100	70	110	120	110	110
	150	110	120	120	120	110
	200	140	130	120	120	120
	300	140	130	120	120	120
	400	140	130	130	120	120

Time in Seconds for Pressure to Drop from 2.5 to 1.5 psi Gage Pressure

The air test shall be performed after the completion of backfill and compaction and prior to final paving and pouring of the curbs, gutters and sidewalks.

The Contractor shall furnish all equipment needed to complete this test.

If the installation fails to meet this requirement, the Contractor shall, at his/her own expense, determine the source of leakage. He/she shall then repair or replace all defective materials and/or workmanship and perform the air test as many times as necessary to achieve an acceptable test.

3. Pressure Testing for Force Mains

All mains shall be tested for leakage. Water shall be supplied to the main and pumped to the required 150 psi pressure. The main tested shall be isolated from existing connecting force mains

City shall be notified at least 48 hours in advance of any testing procedures. After flushing is completed, line pressure shall be applied to the complete sewer force main system to determine if any major defects are present. The complete system shall then be tested at a pressure of 150 psi for a period of not less than two hours. SLCU may, at its discretion, increase the period to four hours. No visible movement of the systems shall occur and leakage shall not exceed:

$$L = (N * D * \sqrt{P}) / 7400$$

Where L = Leakage in gallons
 N = Number of joints in test section
 P = Test pressure in psi
 D = Diameter of pipe in inches

(For P = 150 psi, L = ND (.001655))

4. Televised Inspection

The Contractor shall inspect all new lines and manholes with Closed Circuit Television (CCTV) and furnish a written or printed PACP (NASSCO) report and CD/DVD copy of the PACP coded inspection along with a hard copy report to the City inspector at time of inspection. All inspections shall be recorded in an unprotected (.mpg) digital format. The Contractor shall give the City Engineer at least 2 (two) working days' notice prior to televising the line(s), so that a City representative can verify the work.

The Contractor must provide a 1-1/2-inch camera target to judge the depth of trapped water.

The Contractor shall CLEAN all lines and manholes of dirt and other debris, remove pipe crowns, compact trenches, raise manhole rims to grade and correct all visible infiltration, leaks and deficiencies PRIOR to inspection. Areas adjacent to manholes shall be leveled and made accessible to the television equipment. All inspection, equipment time and costs for the inspection shall be the responsibility of the Contractor.

CCTV inspection shall use adequate lighting.

Defects such as high and low spots, joint separations, offset joints, chipped ends, cracked or damaged pipe, infiltration points and debris in lines shall be corrected by the contractor at their expense. Low spot defects to be measured with appropriate sized target viewed clearly by CCTV camera.

For joint separations, chipped ends and low spots, the following maximum acceptable limits will apply for 6", 8" and 10" pipes:

Joint separations - 1/2"

Chipped ends - 1/4"

Low spots -

Pipe size	Depth tolerance of trapped water
6"	1/2" (.04 feet)
8"	3/4" (.06 feet)
10"	1" (.08 feet)
12-" & larger	10% of pipe Diameter (in feet)

All defects and deficiencies discovered during this inspection shall be corrected by the Contractor to the satisfaction of the City Engineer at the Contractor's

expense. Low spot defects to be measured with appropriate sized target viewed clearly by CCTV camera.

Contractor responsible to perform a warranty inspection after 11 months. If a defective condition is found, it shall be presumed to be caused by defective workmanship or materials. The developer and/or contractor shall be notified and shall correct the work in a manner approved by the City Engineer.

5. DEFLECTION TESTING: Deflection testing shall be conducted following final compaction of the rock base in the streets but no sooner than 30 days following pipe installation. Percent allowable deflection shall follow the ASTM Standards.
 - a. All main line and random sections of service laterals shall be tested for deflection.
 - i. Any pipe subjected to any method or process other than removal, which attempts, even successfully, to reduce or cure any over deflection, shall be uncovered, removed from the worksite, and replaced with new pipe.
 - b. PVC pipe will require three (3) deflection tests be conducted.
 - i. Construction Deflection Testing.
 - ii. Initial Deflection Tests.
 - iii. Final Deflection Tests
 - c. All deflection tests shall be completed by the Contractor in accordance with ASTM D 3034, D 2321 and D3839 or as modified herein by City Engineer and under the supervision of a City Representative. All reports and records of deflection testing shall be given to the Engineer. The cost of the deflection testing shall be at the expense of the Contractor.
 - d. CONSTRUCTION DEFLECTION TESTING
 1. Deflection measurements will be conducted at the end of each day or between manholes or cleanouts by pulling the approved mandrel.
 - a. The mandrel shall be approved by the City Engineer prior to use. The mandrel shall be pulled by hand. The mandrel's diameter, length, and other requirements shall conform to Detail "A".
 - b. Use mandrels which are rigid, nonadjustable, odd numbered legged (minimum 9 legs- Detail "A") having a length not less than its nominal diameter. The diameter at any point shall not be less than the allowed percent deflection of the certified actual mean diameter of the pipe being tested. The mandrel shall be fabricated of metal, fitted with pulling rings at each end, stamped or engraved on some segment other than a runner with the nominal pipe size and mandrel outside

- diameter.
2. If the deflections are greater than the deflection shown on Table A, the Contractor shall remove and reinstall the PVC pipe until the pipe can pass.

Table "A" – Construction Deflection Limits

<u>Pipe Diameter</u>	<u>Ht. Cover</u>	<u>Percent Deflection</u>
See Table "B"	0-18 feet	0.5% X average I.D. Table "B"

e. INITIAL DEFLECTION TESTS

1. A deflection test will be no sooner than thirty days following final compaction and before final paving of all PVC installed as shown on (Table "B"- "Flexible Pipe"). The initial maximum deflection for shall be as shown on Table "B".
2. Deflection measurements will be conducted at the end of each day or between manholes or cleanouts by pulling the approved mandrel.
 - a. The mandrel shall be approved by the City Engineer prior to use. The mandrel shall be pulled by hand. The mandrel's diameter, length, and other requirements shall conform to Detail "A".
 - b. Use mandrels which are rigid, nonadjustable, odd numbered legged (minimum 9 legs- Detail "A") having a length not less than its nominal diameter. The diameter at any point shall not be less than the allowed percent deflection of the certified actual mean diameter of the pipe being tested. The mandrel shall be fabricated of metal, fitted with pulling rings at each end, stamped or engraved on some segment other than a runner with the nominal pipe size and mandrel outside diameter.

f. FINAL DEFLECTION TESTS

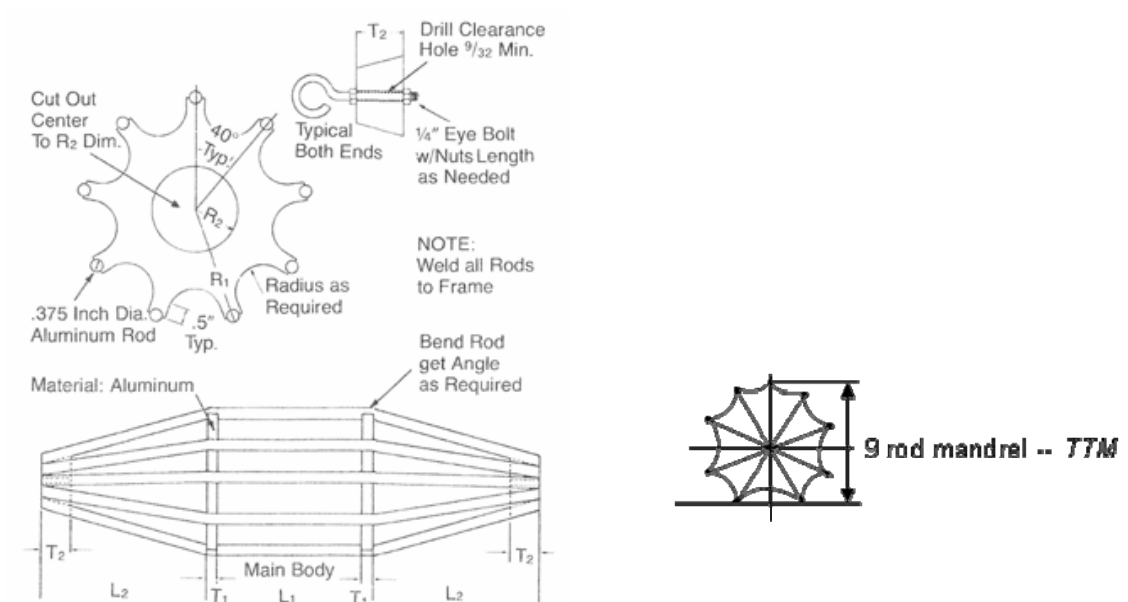
1. One month prior to final acceptance and no sooner than 11 months after initial deflection testing, a final deflection test shall be conducted and the maximum final deflection shall not be greater than shown on Table "B".

- g. Any pipe which has been replaced will be re-tested at contractor's expense.

Table "B" – Deflection Table for SDR 26 – 5%

Pipe Size	Avg. ID	Con. Def	30 Day	11 Month
8"	7.921	7.52	7.52	7.52
10"	9.874	9.38	9.38	9.38
12"	11.71	11.12	11.12	11.12

SDR26 - 5% Deflection - Mandrel Size		
Nominal Pipe Size	Base ID	Mandrel Size
8"	7.488	7.11
10"	9.342	8.87
12"	11.102	10.55



Detail "A"

F. Cleanouts

Cleanouts shall be constructed 1' inside the City right-of-way in accordance with the Standard Details.

5.05 MEASUREMENT AND PAYMENT

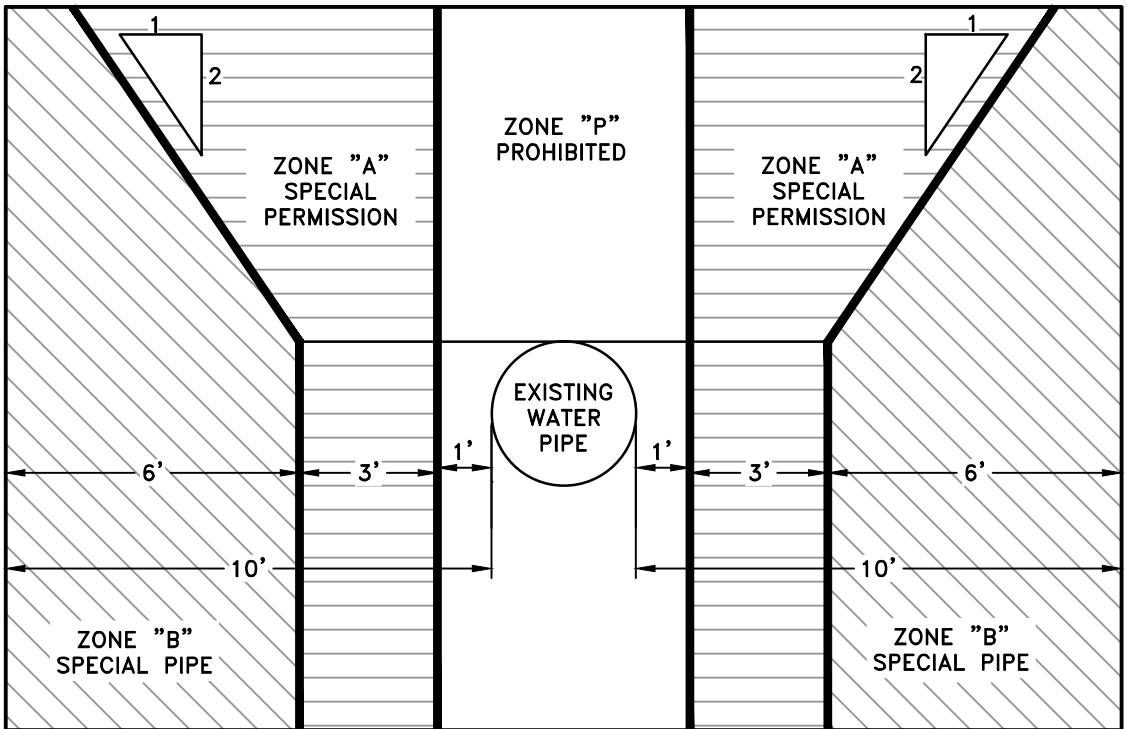
A. Pipe

Payment for sanitary sewer pipe complete in place shall be per linear foot measured from center of manhole to center of manhole following a line parallel to the grade of the sewer. Payment shall include the furnishing of all labor, materials, water, tools, and equipment required to construct and complete the installation of the sewer pipe in accordance with the plans and these specifications.

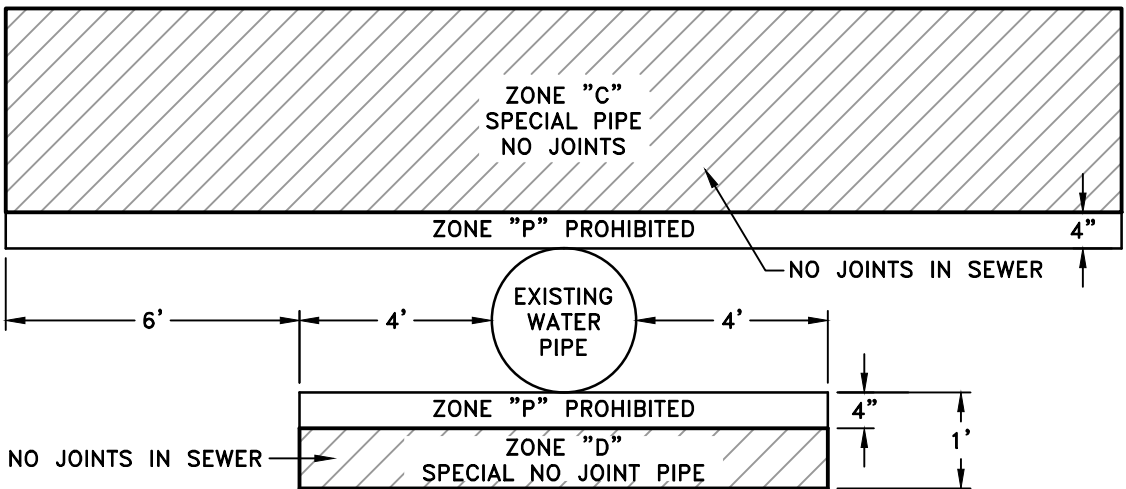
B. Structures & Manholes

The unit of measure for payment shall be per each unit. Payment shall be made at the bid price per item for each structure complete in place and shall include the cost of excavation, backfill, frames, covers, plates, or reinforcing steel where required.

SPECIAL CONSTRUCTION REQUIREMENTS
 (TO BE USED ONLY WHERE REQUIRED SEPARATION CANNOT BE OBTAINED)
CASE 2-NEW SEWER LINE BEING INSTALLED



PARALLEL CONSTRUCTION



PERPENDICULAR CONSTRUCTION

NOTES:

1. ZONE "P" IS A PROHIBITED CONSTRUCTION ZONE.
2. ZONE "C", SPECIAL PIPE, SHALL BE DUCTILE IRON, STEEL CASING PIPE OR APPROVED EQUAL.

APPROVED BY:
 BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

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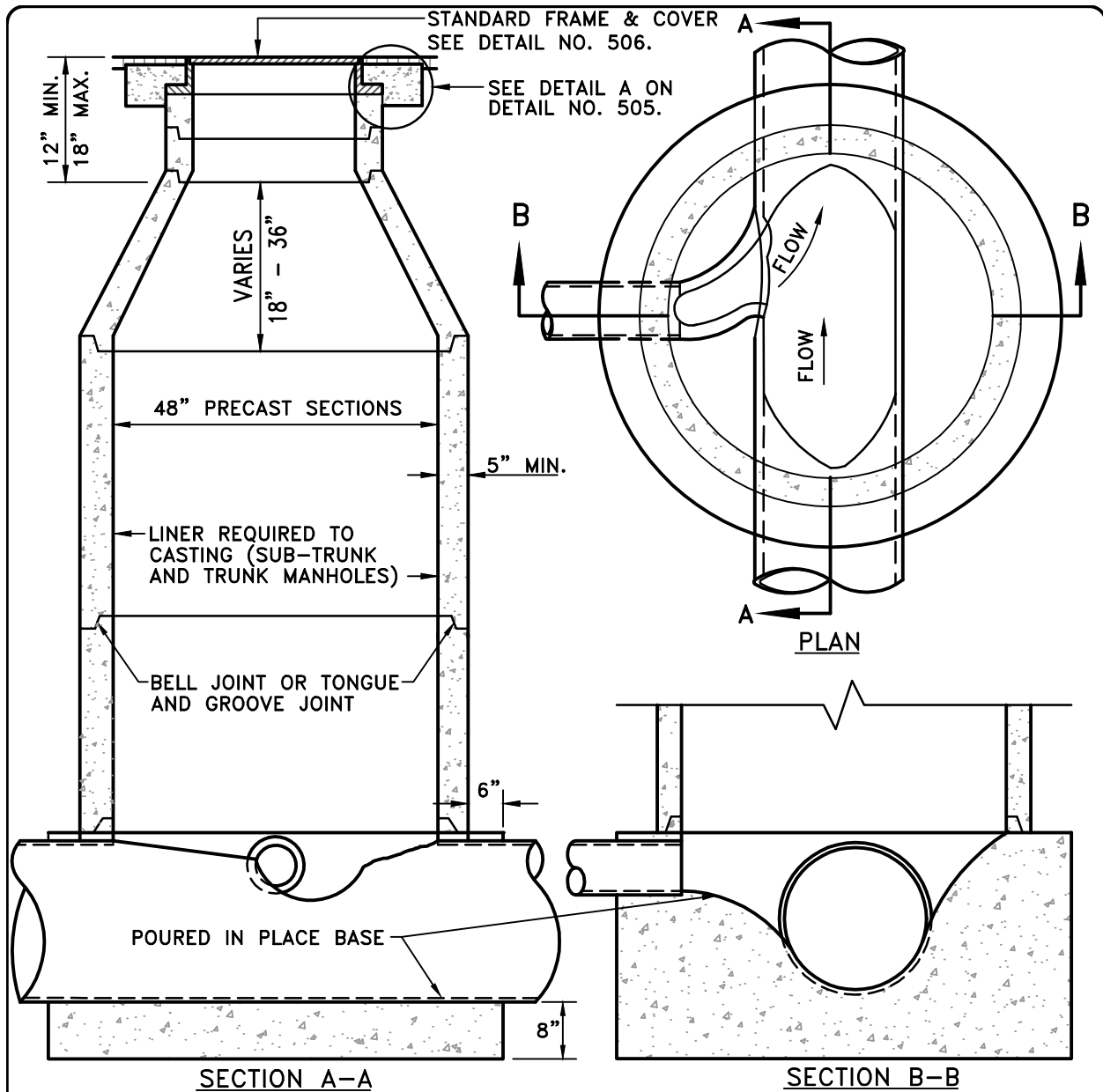
SANITARY SEWER

**CALIFORNIA HEALTH
 DEPARTMENT REQUIREMENTS**



ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
500



NOTES:

1. FOR VCP AND RCP, PIPE TO BE LAID THROUGH MANHOLE AND TOP PORTION REMOVED AFTER CONCRETE HAS SET. FOR PVC AND DIP, PIPE SHALL ENTER MANHOLE 2" AND HAVE WATER TIGHT GASKETS.
2. MORTAR ALL JOINTS INSIDE AND OUT.
3. INCOMING SMALLER PIPES SHALL MATCH CROWNS OF THE LARGER PIPE.
4. A CHANGE IN DIRECTION OF FLOW IN A MANHOLE REQUIRES A 0.10' FALL (MIN.).
5. ADJUST FRAME TO GRADE AFTER PAVING.
6. ALL PRECAST CONCRETE SHALL BE DESIGNED TO WITHSTAND H2O LOADING.
7. IN TRAFFIC AREAS CONCRETE COLLAR SHALL BE MADE WITH 3000 PSI PCC, HIGH EARLY STRENGTH. BARRICADES SHALL BE REMOVED IN 24 HOURS.
8. ALL INTERIOR SURFACES OF THE PRECAST MANHOLE SECTIONS FOR SUBTRUNK AND TRUNK MANHOLES SHALL BE LINED PER CITY STANDARD.
9. FOR PARALLEL LINE (FLY-LINE) INSTALLATION SEE DETAIL 508.

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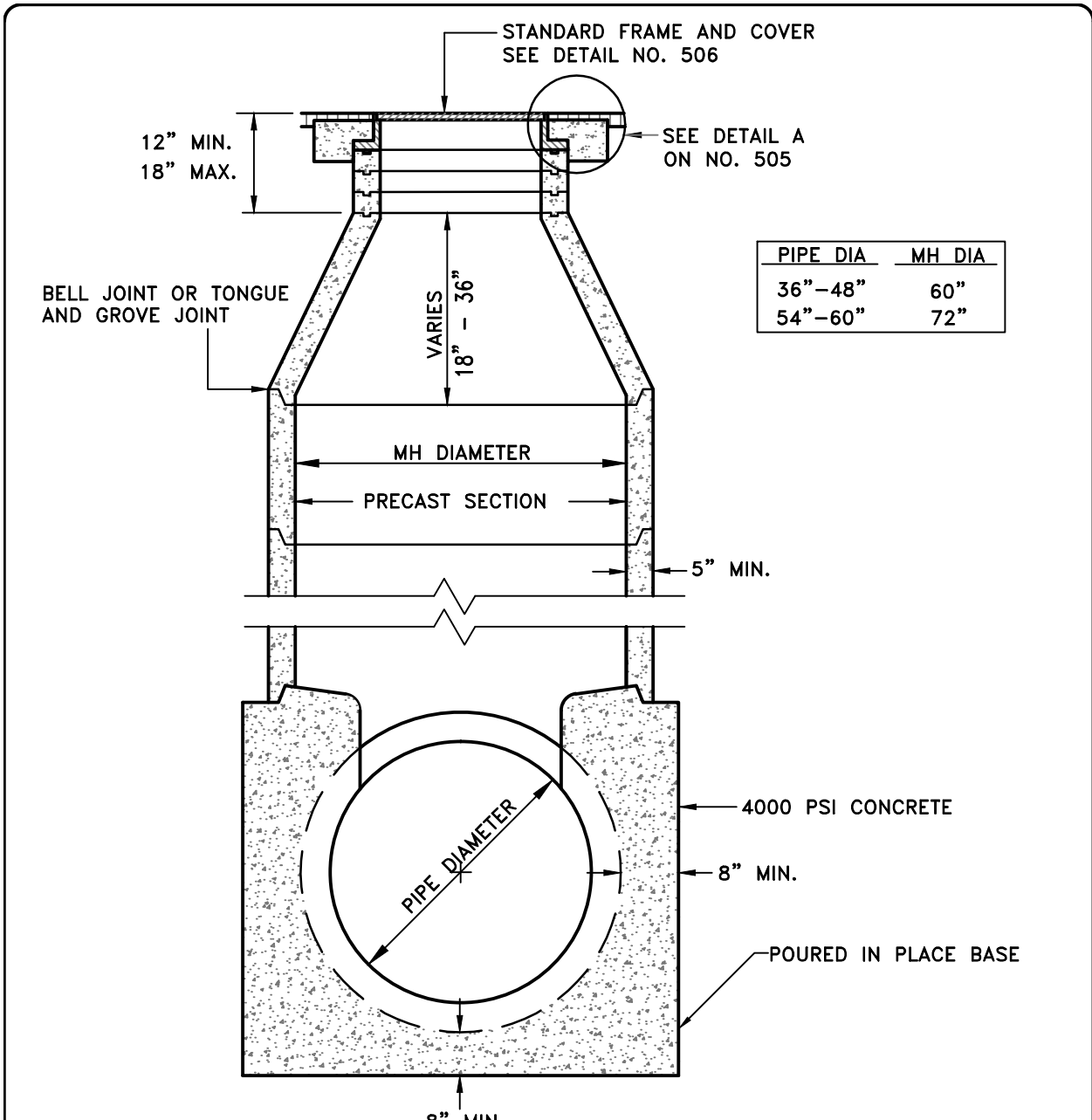
REVISED: DATE:

SANITARY SEWER
LATERAL AND SUBTRUNK
MANHOLE



ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
501



NOTES:

1. FOR VCP AND RCP, PIPE TO BE LAID THROUGH MANHOLE AND TOP PORTION REMOVED AFTER CONCRETE HAS SET.
2. INCOMING SMALLER PIPES SHALL MATCH CROWNS OF THE LARGER PIPE.
3. A CHANGE IN DIRECTION OF FLOW IN A MANHOLE REQUIRES A .10' FALL (MIN.).
4. ADJUST FRAME TO GRADE AFTER PAVING.
5. ALL PRECAST CONCRETE SHALL BE DESIGNED TO WITHSTAND H2O LOADING. IN TRAFFIC AREAS CONCRETE COLLAR SHALL BE MADE WITH 3000 PSI CONCRETE, HIGH EARLY STRENGTH. BARRICADES SHALL BE REMOVED IN 24 HOURS.
6. ALL INTERIOR SURFACES OF THE PRECAST MANHOLE SECTIONS SHALL BE LINED WITH PVC LINER OR HDPE EMBEDMENT LINER, PER CITY STANDARD.
7. FOR PARALLEL LINE (FLY-LINE) INSTALLATION SEE DETAIL 507.

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REVISED:	DATE:

SANITARY SEWER

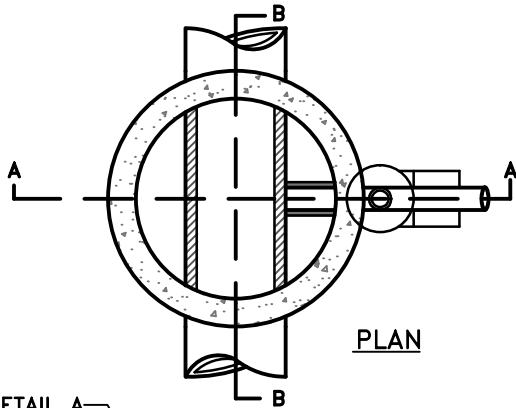
TRUNK MANHOLE

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

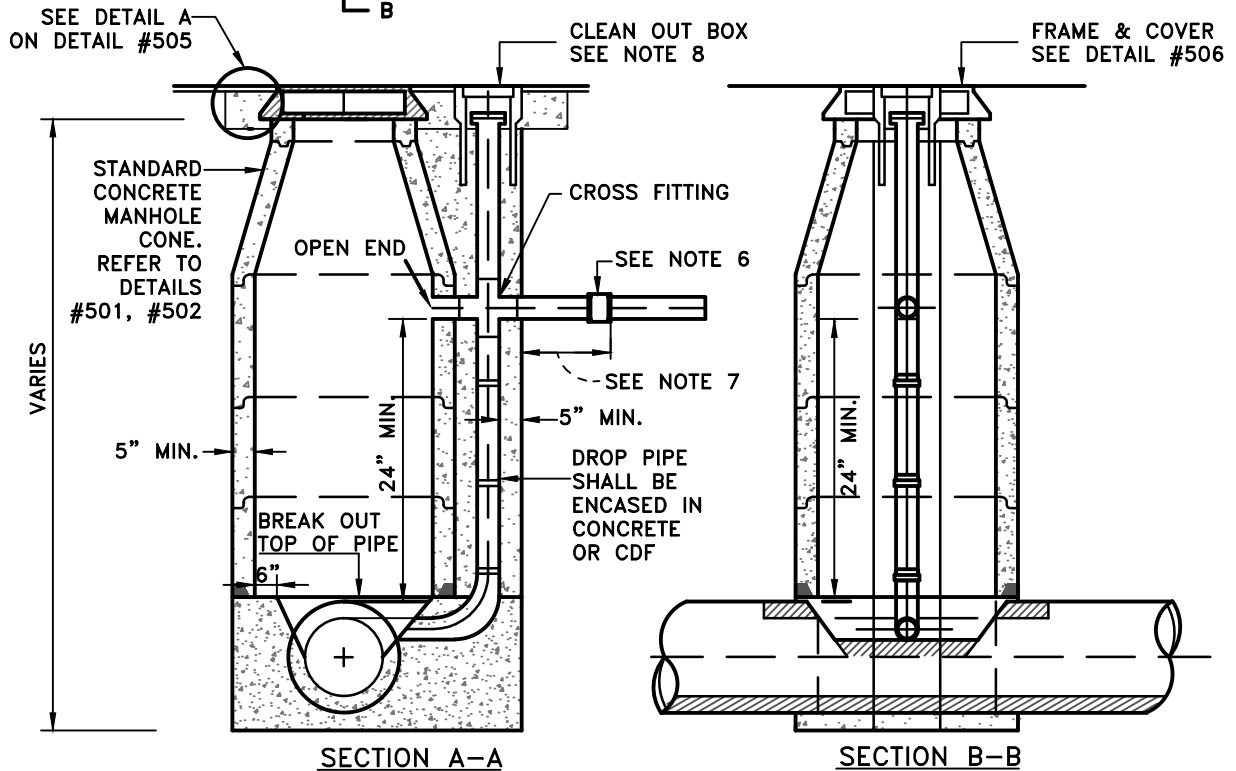


MODESTO
CALIFORNIA

DETAIL NO.
502



THIS TYPE MANHOLE SHALL BE USED WHERE THE DIFFERENCE IN ELEVATION BETWEEN THE TOP OF THE OUTLET PIPE AND THE INVERT OF THE INLET SEWER EXCEEDS 24".



NOTES:

1. FOR VCP AND RCP, PIPE TO BE LAID THROUGH MANHOLE AND TOP PORTION REMOVED AFTER CONCRETE HAS SET. FOR PVC AND DIP, PIPE SHALL ENTER MANHOLE 2" AND HAVE WATER TIGHT GASKETS.
2. MORTAR ALL JOINTS INSIDE AND OUT. ALL INTERIOR SURFACES OF THE PRECAST MANHOLE SECTIONS FOR SUBTRUNK AND TRUNK MANHOLES SHALL BE LINED PER CITY STANDARD.
3. ADJUST FRAME TO GRADE AFTER PAVING.
4. ALL PRECAST CONCRETE SHALL BE DESIGNED TO WITHSTAND H2O LOADING.
5. IN TRAFFIC AREAS CONCRETE COLLAR SHALL BE MADE WITH 3000 PSI PCC, HIGH EARLY STRENGTH. BARRICADES SHALL BE REMOVED IN 24 HOURS.
6. FLEXIBLE JOINT-BELL & SPIGOT OR ADJUSTABLE REPAIR COUPLING (ARC). SOLVENT WELDED NOT PERMITTED.
7. 12" MAX. FOR 8" OR LARGER PIPE. 24" MAX. FOR PIPES LESS THAN 8".
8. CLEANOUT BOX SHALL BE A CHRISTY F8, OR APPROVED EQUAL, WITH CAST IRON COVER WITH KEY, MARKED "C.O."

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 C59650

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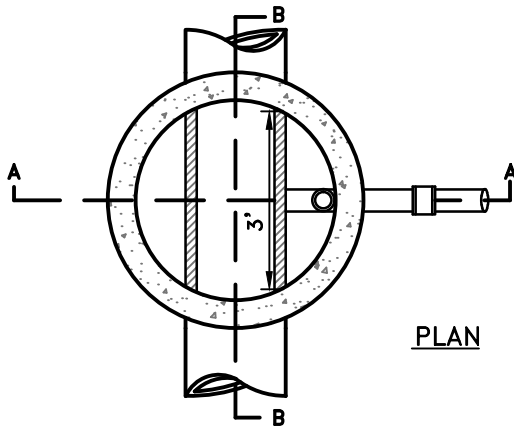
SANITARY SEWER
EXTERNAL DROP
MANHOLE



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 RESOLUTION NO. 2014-345

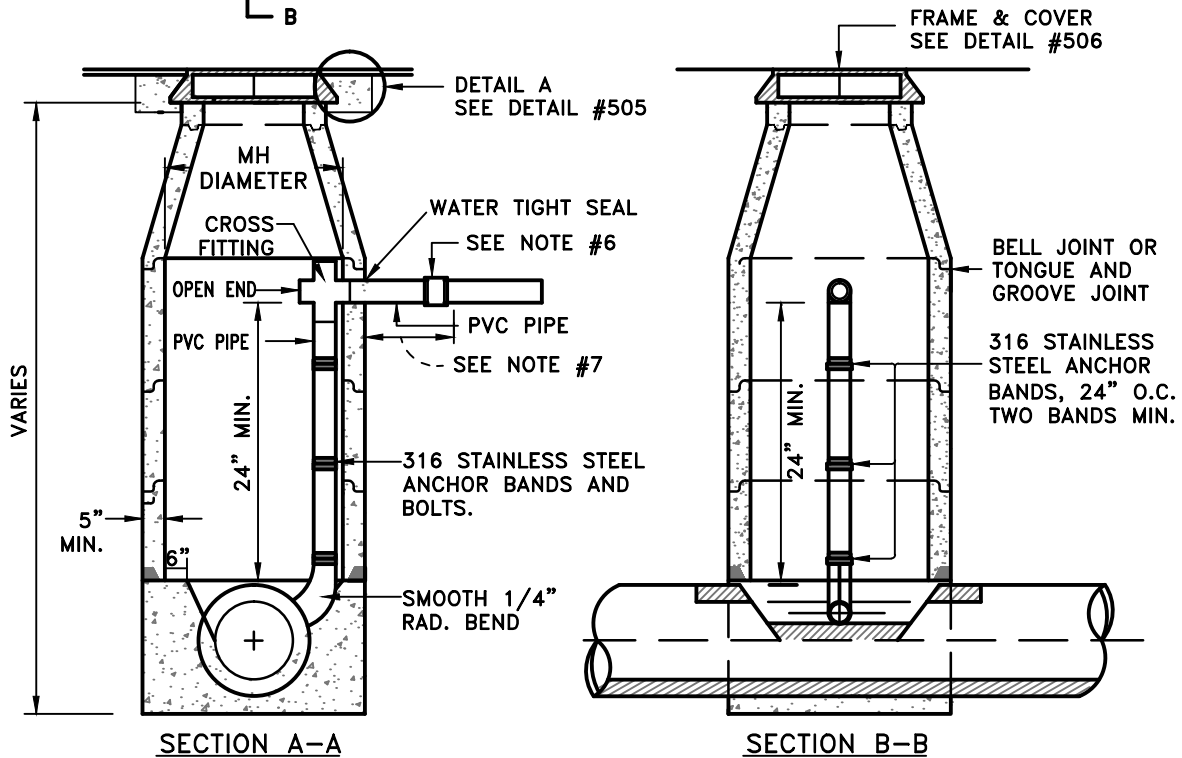
DETAIL NO.
503

THIS TYPE MANHOLE SHALL BE USED WHERE THE DIFFERENCE IN ELEVATION BETWEEN THE TOP OF THE OUTLET PIPE AND THE INVERT OF THE FEEDER OR COLLECTOR SEWER EXCEEDS 24".



PLAN

INLET PIPE DIA.	MH DIA
4"	48"
6"-12"	60"



SECTION A-A

SECTION B-B

NOTES:

1. FOR VCP AND RCP, PIPE TO BE LAID THROUGH MANHOLE AND TOP PORTION REMOVED AFTER CONCRETE HAS SET. FOR PVC AND DIP, PIPE SHALL ENTER MANHOLE 2" AND HAVE WATER TIGHT GASKETS.
2. MORTAR ALL JOINTS INSIDE AND OUT. ALL INTERIOR SURFACES OF THE PRECAST MANHOLE SECTIONS FOR SUBTRUNK AND TRUNK MANHOLES SHALL BE LINED PER CITY STANDARD.
3. ADJUST FRAME TO GRADE AFTER PAVING.
4. ALL PRECAST CONCRETE SHALL BE DESIGNED TO WITHSTAND H2O LOADING.
5. IN TRAFFIC AREAS CONCRETE COLLAR SHALL BE MADE WITH 3000 PSI PCC, HIGH EARLY STRENGTH. BARRICADES SHALL BE REMOVED IN 24 HOURS.
6. FLEXIBLE JOINT-BELL & SPIGOT OR ADJUSTABLE REPAIR COUPLING (ARC). SOLVENT WELDED NOT PERMITTED.
7. 12" MAX. FOR 8" OR LARGER PIPE. 24" MAX. FOR PIPES LESS THAN 8".
8. ONE DROP PIPE PER MANHOLE.

APPROVED BY:
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 C59650

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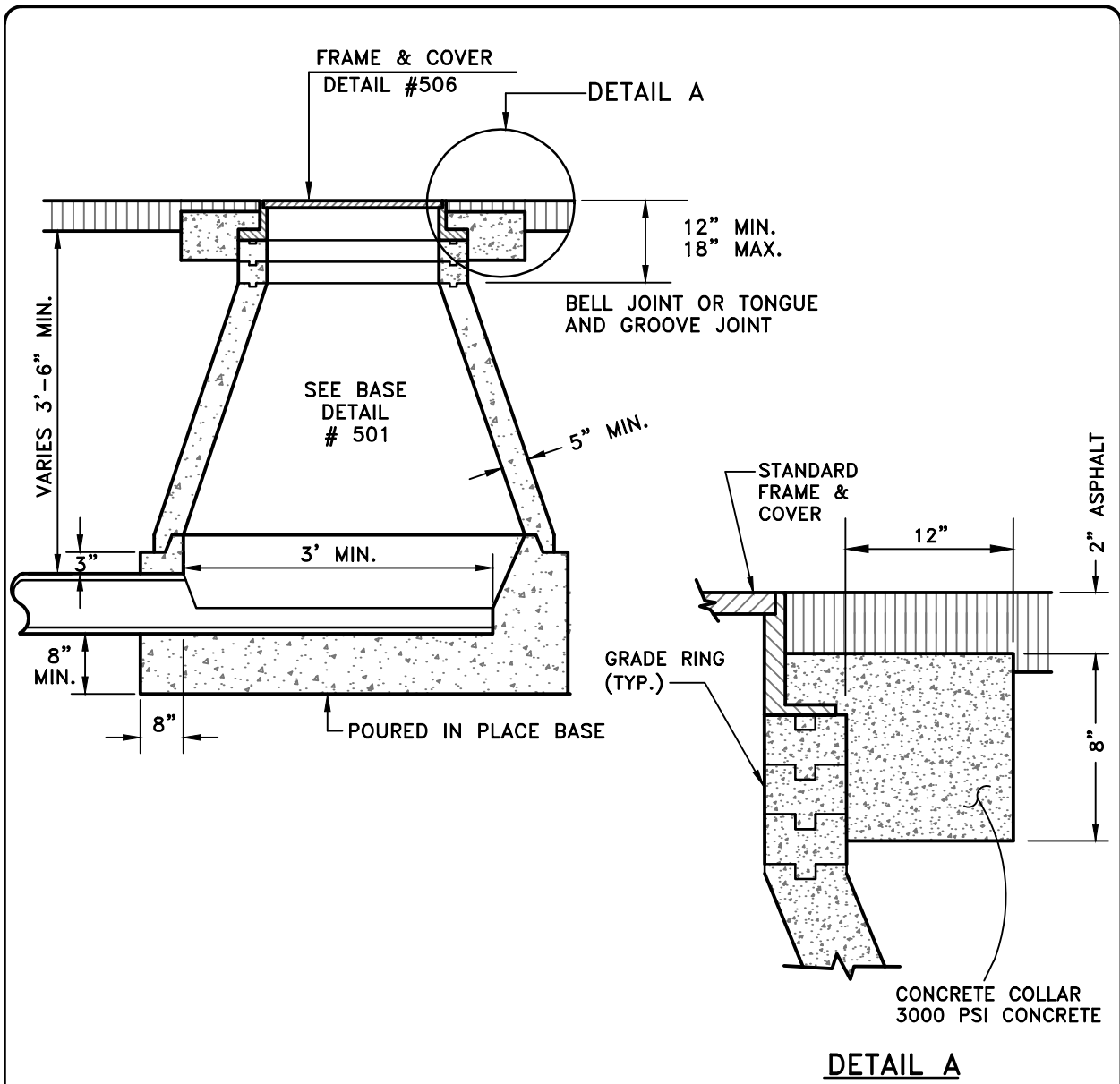
REVISED: DATE:

SANITARY SEWER
INTERNAL DROP
MANHOLE



ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
504



NOTES:

1. FOR VCP AND RCP, PIPE TO BE LAID THROUGH MANHOLE AND TOP PORTION REMOVED AFTER CONCRETE HAS SET. FOR PVC AND DIP, PIPE SHALL ENTER MANHOLE 2" AND HAVE WATER TIGHT GASKETS.
2. INCOMING SMALLER PIPES SHALL MATCH CROWNS OF THE LARGER PIPE.
3. A CHANGE IN DIRECTION OF FLOW IN A MANHOLE REQUIRES A .10' FALL (MIN.).
4. ADJUST FRAME TO GRADE AFTER PAVING.
5. ALL PRECAST CONCRETE SHALL BE DESIGNED TO WITHSTAND H2O LOADING.
6. IN TRAFFIC AREAS CONCRETE COLLAR SHALL BE MADE WITH 3000 PSI CONCRETE, HIGH EARLY STRENGTH. BARRICADES SHALL BE REMOVED IN 24 HOURS.
7. MORTAR ALL JOINTS INSIDE AND OUT.

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C59650

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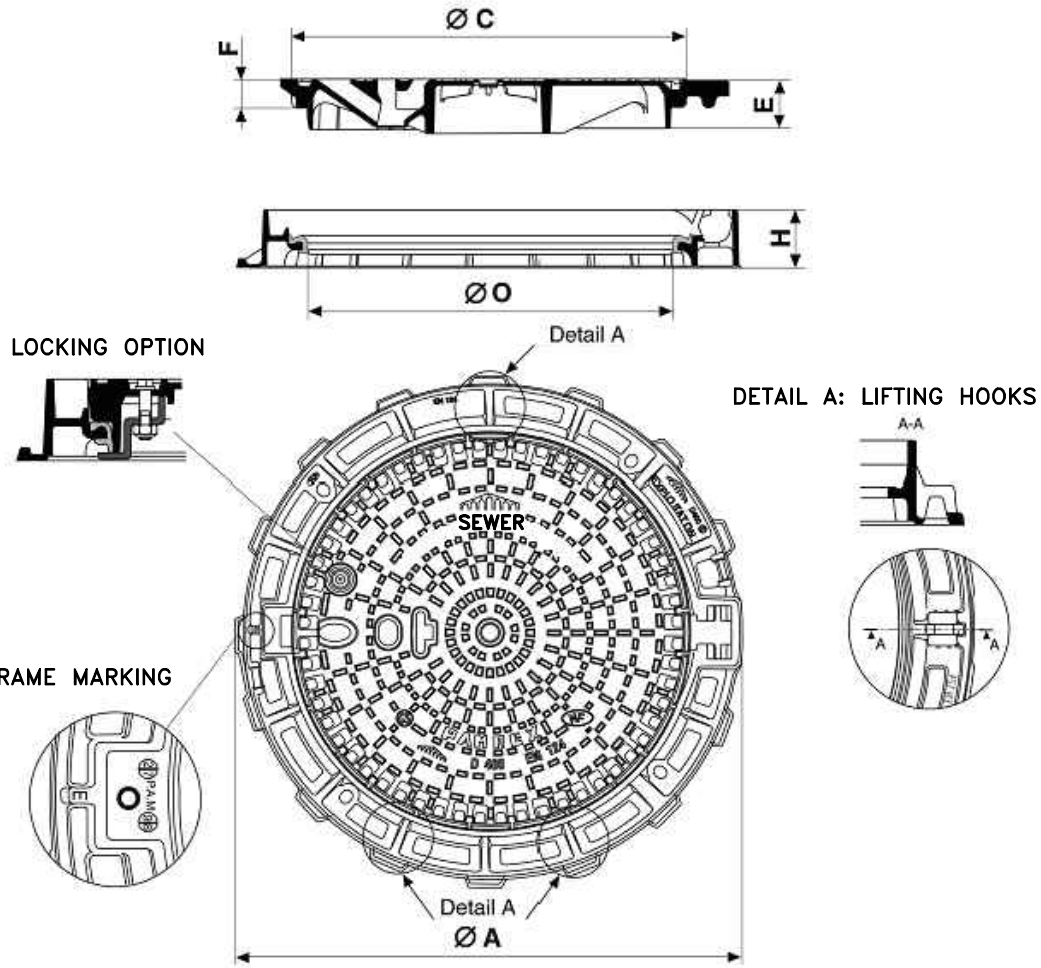
SANITARY SEWER

TERMINAL MANHOLE

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



DETAIL NO.
505



MODEL	A INCHES	C INCHES	E INCHES	F INCHES	H INCHES	O INCHES	REFERENCE	WEIGHT LBS	COVER WEIGHT LBS
NON VENTILATED	33	28	3 1/2	2	4	24	CDPA60EHSEW	195	122

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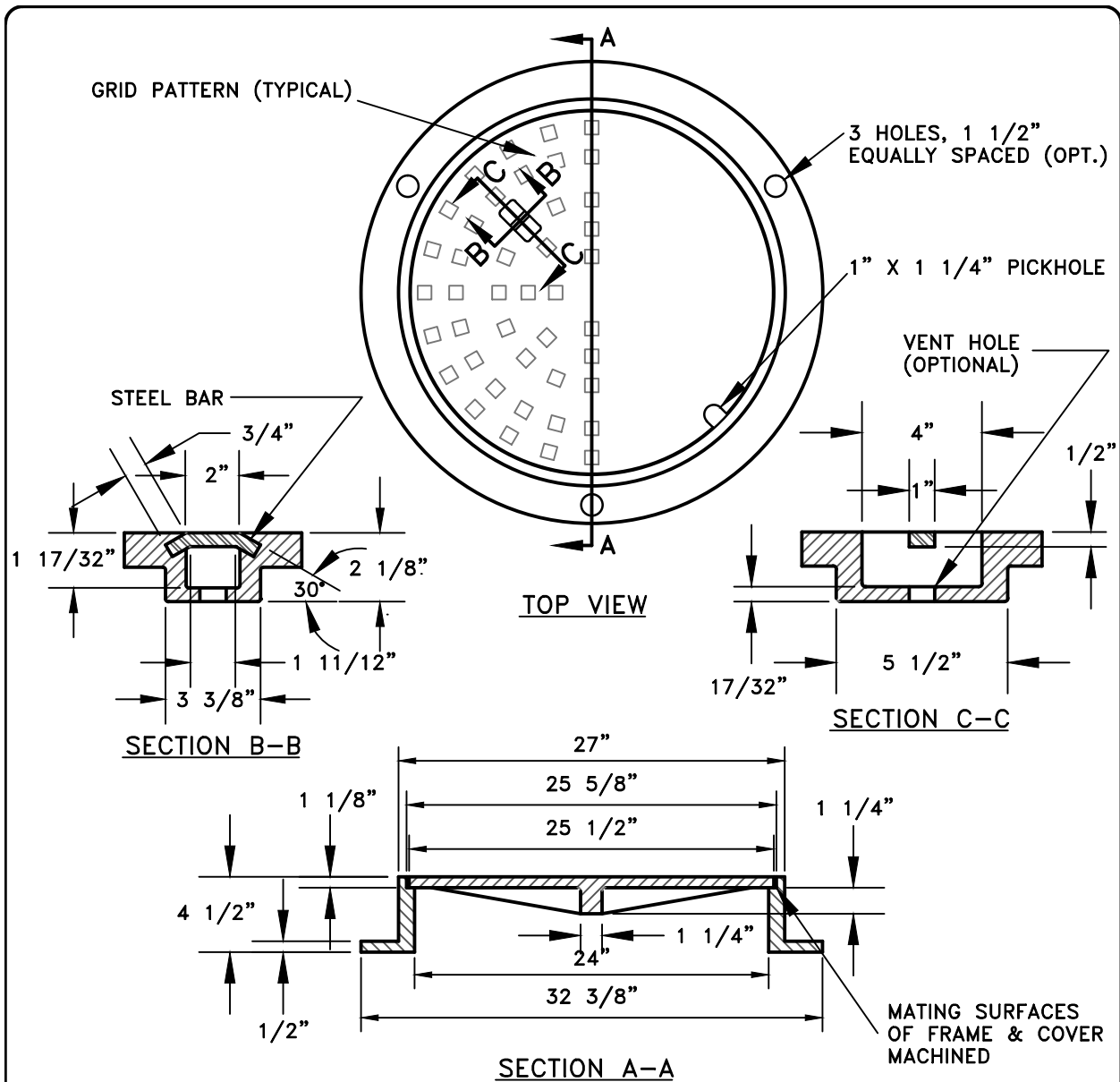
SANITARY SEWER

**PAMREX 24 INCH
 MANHOLE FRAME AND COVER**

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345



DETAIL NO.
506



NOTES:

1. DIMENSIONS FOR FRAME AND COVER SHALL MATCH. MATING SURFACES OF FRAME AND COVER SHALL BE MACHINED TO INSURE NO-ROCK FIT.
2. COVER SHALL HAVE VERTICAL SIDES. NO TAPERED COVERS SHALL BE INSTALLED.
3. WEIGHT OF COVER SHALL BE NO LESS THAN 130 POUNDS. WEIGHT OF FRAME SHALL BE NO LESS THAN 140 POUNDS.
4. SOUTH BAY FOUNDRY SBF A-515 W/624 COVER OR APPROVED EQUAL.
5. EACH MANHOLE COVER SHALL BE STAMPED "SEWER" AND "CITY OF MODESTO" WITH 1" TO 2" LETTERING.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

REVISED: DATE:

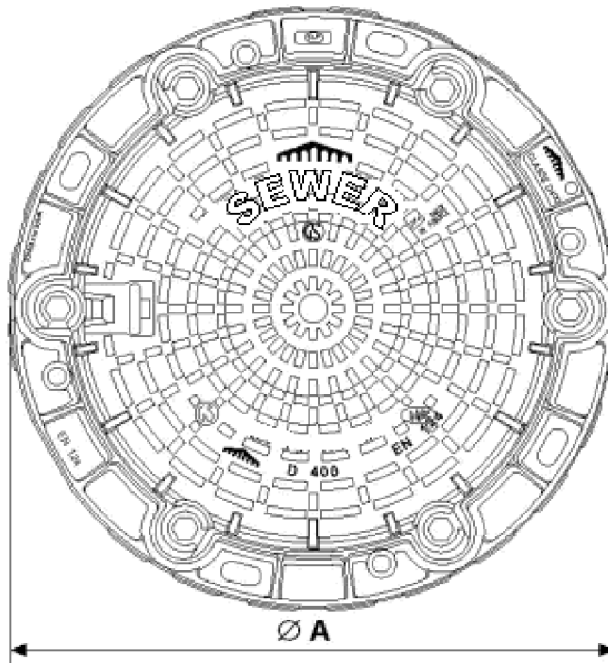
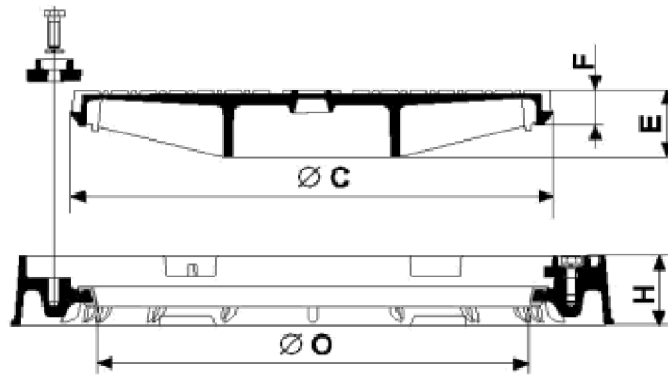
REVISED: DATE:

SANITARY SEWER
CAST IRON MANHOLE
FRAME AND COVER



ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
506B



MODEL	A INCHES	O INCHES	H INCHES	C INCHES	E INCHES	F INCHES	REFERENCE	WEIGHT LBS	COVER WEIGHT LBS
NON VENTILATED	33 1/2	24	4	26 7/9	3 5/7	2	CDPA60EHSEW	225	116

NOTE:

THIS MANHOLE FRAME & COVER SHALL BE USED IN AREAS WHERE INSTALLATION IS IN THE FLOOD WAY OR FLOOD PLAIN OR WHERE WATER INTRUSION IS A FACTOR.

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BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

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SANITARY SEWER

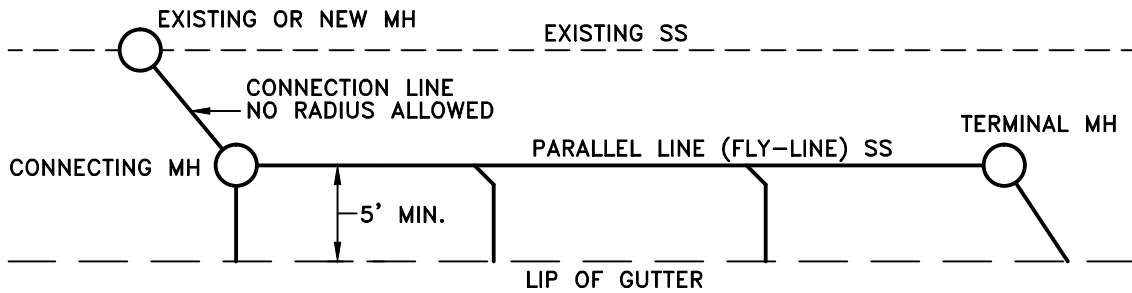
**PAMTIGHT 24 INCH
MANHOLE FRAME AND COVER**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

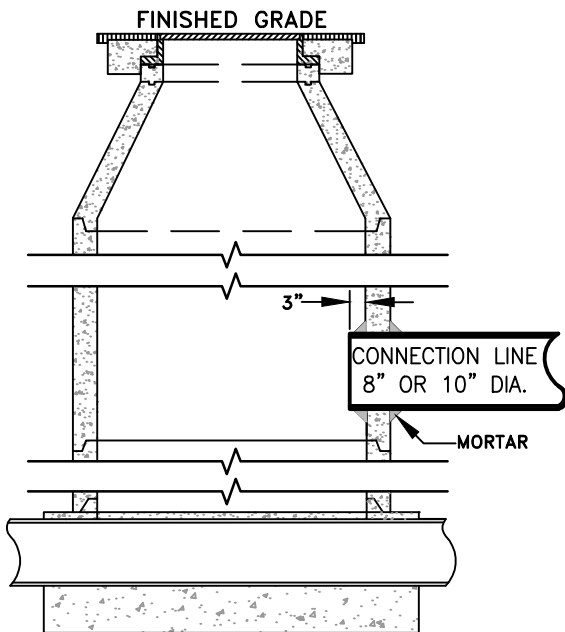


DETAIL NO.
507

LIP OF GUTTER



PLAN VIEW



SECTION: EXISTING OR NEW MH

NOTES:

1. PARALLEL LINE (FLY-LINE) PIPE SHALL FOLLOW STREET ALIGNMENT, BUT SHALL NOT HAVE A RADII LESS THAN 200' (FEET).
2. PARALLEL LINES (FLY-LINES) TO BE CONSTRUCTED PARALLEL TO CENTERLINE OF A ROAD OR PARALLEL TO THE EXISTING TRUNK LINE.
3. CONTRACTOR SHALL CONSTRUCT A MINIMUM OF TWO MANHOLES PER PARALLEL LINE (FLY-LINE), TERMINAL MANHOLE AND CONNECTING MANHOLE ADJACENT TO THE EXISTING LINE. NO RADIUS MAY BE INSTALLED BETWEEN THE CONNECTING MANHOLE AND EXISTING MANHOLE.
4. NO CLEANOUTS OR LAMP HOLES WILL BE ACCEPTED ON A PARALLEL LINE (FLY-LINE) IN A PUBLIC R/W OR EASEMENT.
5. PARALLEL LINE (FLY-LINE) TO BE CONSTRUCTED IN THE R/W NO CLOSER THAN 5' FROM THE LIP OF GUTTER.
6. PARALLEL LINE (FLY-LINE) TO HAVE A MINIMUM SEPARATION OF 5', MEASURED OUTSIDE BELL TO OUTSIDE BELL, FROM ANY OTHER PARALLEL UTILITY LINE EXCEPT WATER. A 10' SEPARATION BETWEEN PARALLEL SEWER AND WATER LINES IS REQUIRED.
7. PARALLEL LINE (FLY-LINE) MINIMUM SIZE SHALL BE 8".

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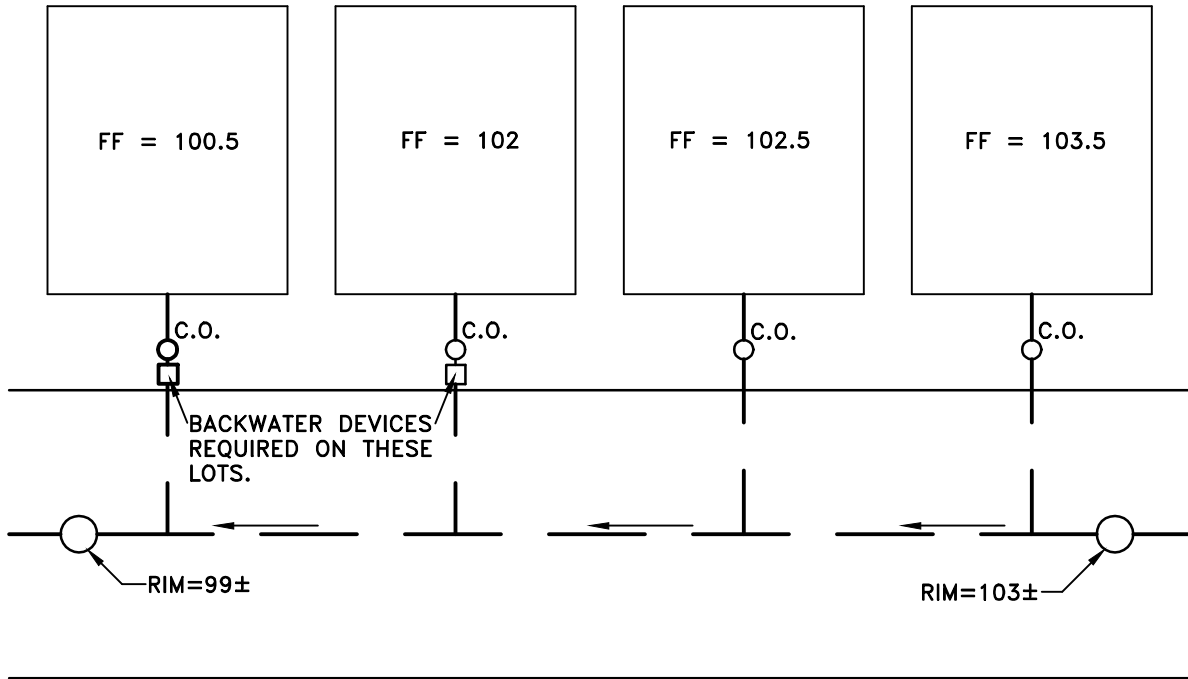
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**SANITARY SEWER
 SEWER PARALLEL
 ("FLY-LINE")
 CONNECTION**

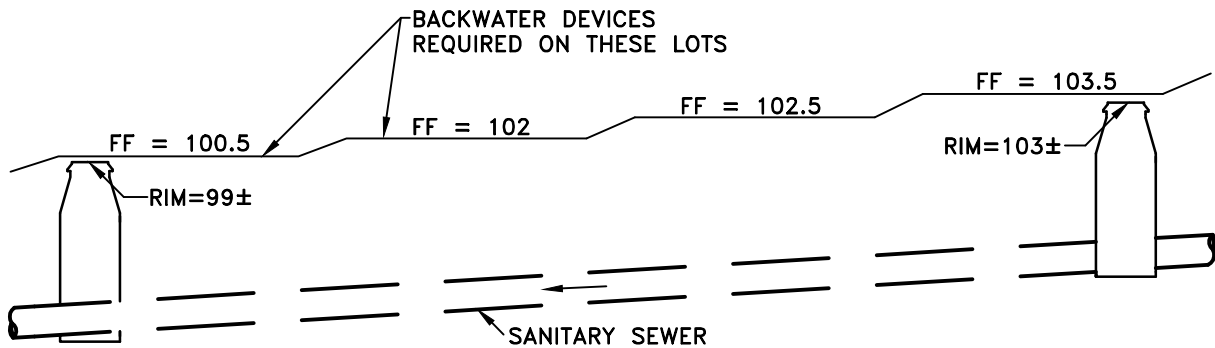
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 RESOLUTION NO. 2014-345



DETAIL NO.
508



PLAN VIEW



SECTION

NOTES:

1. BACKWATER DEVICE SHALL BE INSTALLED WHEN FINISHED FLOOR (FF) ELEVATION IS 12" OR MORE BELOW NEAREST UPSTREAM STRUCTURE (MANHOLE).
2. BACKWATER DEVICE SHALL BE INSTALLED AT R.O.W. ADJACENT TO CLEAN-OUT.
3. MAINTENANCE OF THE BACKWATER DEVICE IS THE RESPONSIBILITY OF THE PROPERTY OWNER.

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 C59650

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REVISED: DATE:

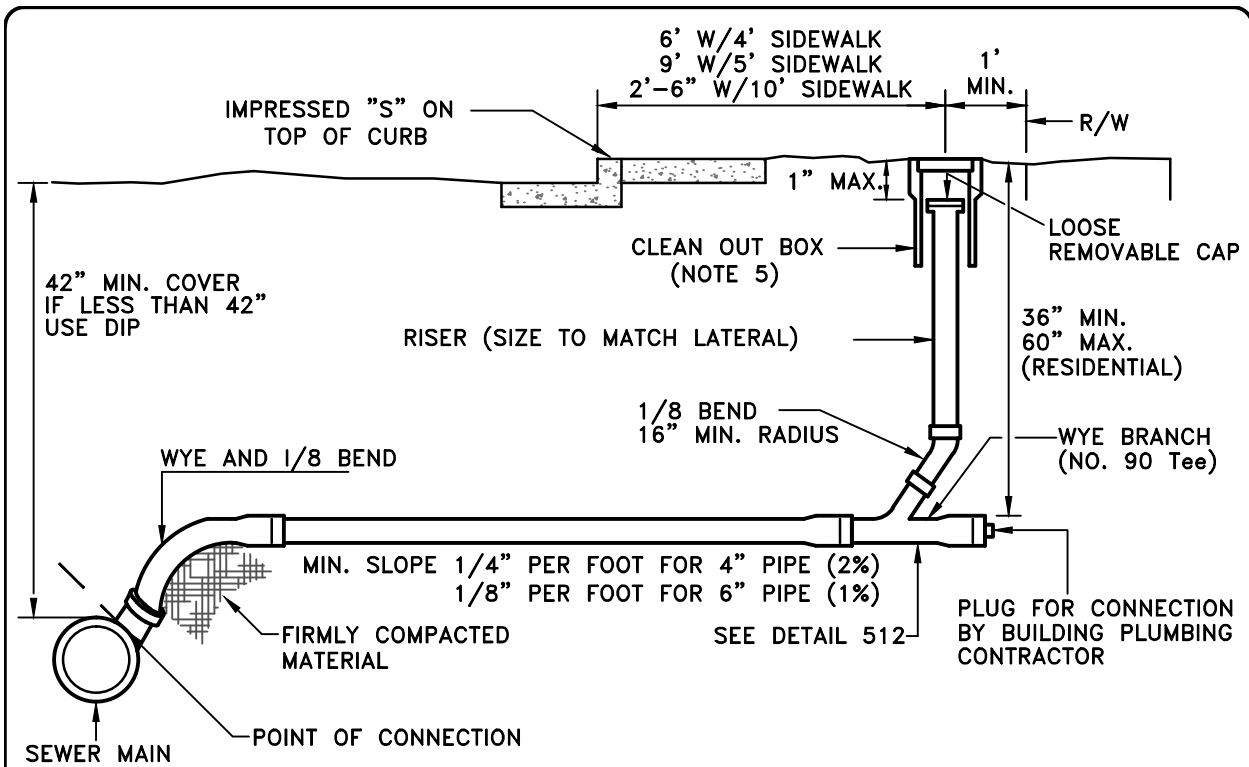
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**SANITARY SEWER
 LATERAL AND
 SUBTRUNK MANHOLE**



ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345


DETAIL NO.
509



PROFILE

NOTES:

1. NO CLEANOUTS SHALL BE LOCATED IN DRIVEWAYS.
2. IF THE SIDEWALK IS SEPARATE FROM THE CURB, THE CLEANOUT RISER SHALL BE INSTALLED IN THE APPROXIMATE CENTER OF THE PLANTING STRIP.
3. HOUSE CONNECTION SHALL BE MADE UNDER THE SUPERVISION OF THE CITY INSPECTOR.
4. SEWER LATERAL SHALL BE CONSTRUCTED WITH A STRAIGHT GRADE AND ALIGNMENT FROM THE MAIN TO THE PROPERTY LINE UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER.
5. CLEANOUT BOX SHALL BE A CHRISTY F8, OR APPROVED EQUAL, WITH CAST IRON COVER MARKED "C.O."
6. PIPE SLOPE MAY BE INCREASED TO ACCOMMODATE DEEP SEWERS AND PROVIDE A MINIMUM 36" COVER AT RIGHT OF WAY.
7. SEWER LATERAL SHALL BE EXTRA STRENGTH VCP WITH COMPRESSION JOINTS, SDR26, OR DIP.
8. PROPERTY OWNER WILL BE RESPONSIBLE FOR MAINTAINING THE LATERAL FROM THE POINT OF CONNECTION AT THE MAIN TO THE HOUSE.
9. LATERAL SHALL BE INSPECTED BY CONTRACTOR'S TV; INSPECTION REQUEST TO CITY WITH 48 HOUR NOTICE.
10. THE HOUSE LATERAL MAY BE PLACED UNDER EXISTING CURB AND SIDEWALK BY DRILLING 8" (MAX. DIA.) TUNNEL AND PLACING PIPE WITH NEOPRENE BANDED JOINTS.
11. TO MARK THE SERVICE LOCATION TO A PROPERTY, AN IMPRESSED "S" SHALL BE STAMPED IN WET CONCRETE OR CHISELED IN EXISTING CONCRETE ON TOP OF CURB.

APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	SANITARY SEWER SEWER SERVICE	 MODESTO CALIFORNIA
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SANITARY SEWER

SERVICE RISER

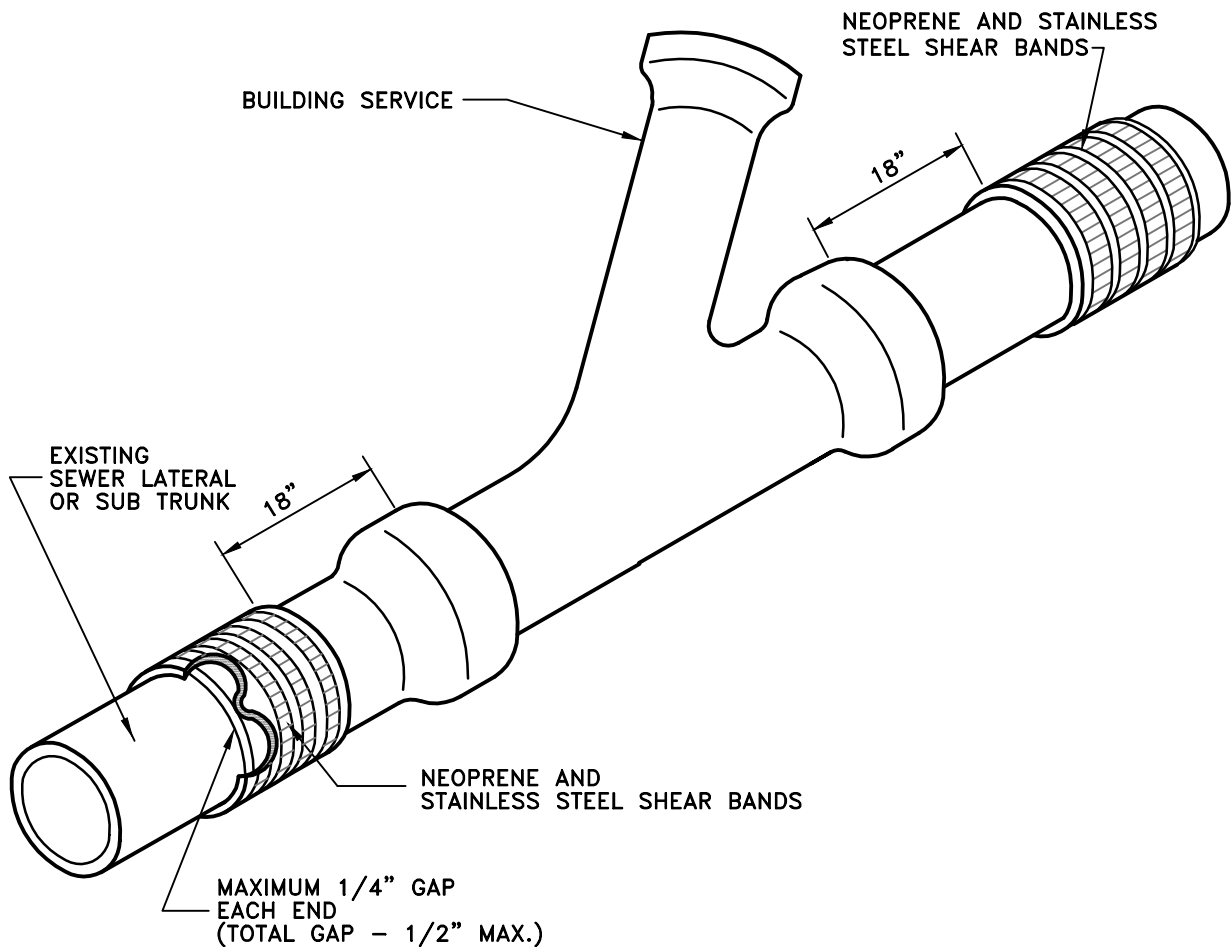
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RESOLUTION NO. 2014-345



MODESTO
CALIFORNIA

DETAIL NO.
511

NOTE: TEES AND WYES INSTALLED IN MAINS UNDER CONSTRUCTION SHALL BE INSTALLED CONCURRENTLY WITH THE MAIN. ALL FITTINGS, INCLUDING THE JOINTS, SHALL BE OF THE SAME TYPE AND MATERIAL AS THE MAIN. CUT-IN TEES AND WYES WILL NOT BE PERMITTED ON A MAIN UNDER CONSTRUCTION.



NOTES:

1. CUTS ARE TO BE MADE WITH A PIPE CUTTING TOOL.
2. THERE SHALL BE NO MORE THAN TWO BANDS IN FIVE FEET OF LATERAL OR SUB TRUNK RUN.
3. SHEAR BANDS OF A TYPE APPROVED BY THE ENGINEER SHALL BE INSTALLED ON ALL JOINTS.
4. CUT-IN TEE MUST BE USED FOR SEWER MAINS 10' OR DEEPER.
5. NO-HUB BANDS NOT ALLOWED.

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BILL SANDHU, CITY ENGINEER
 C59650

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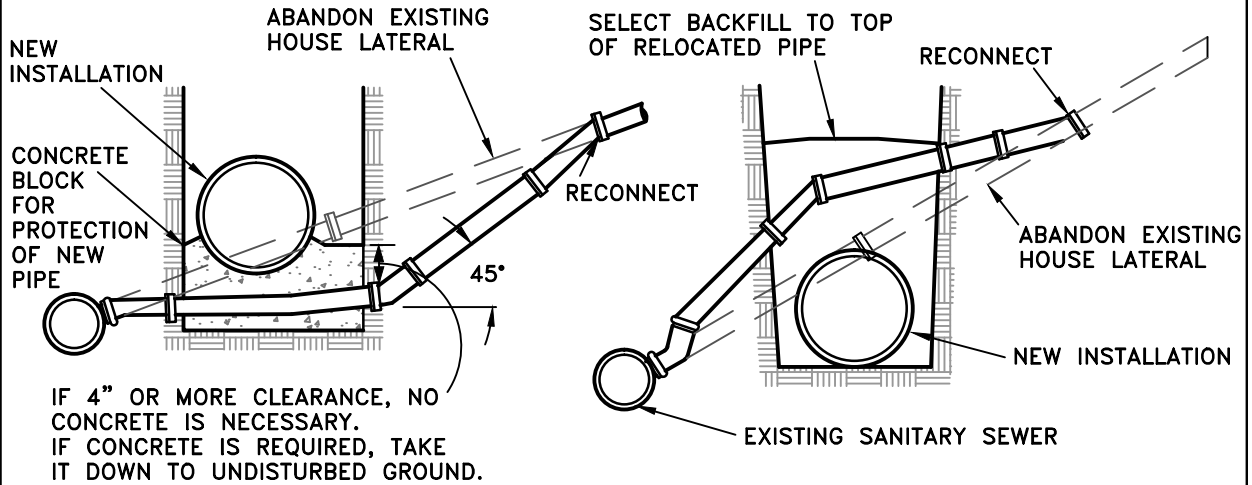
SANITARY SEWER

CUT-IN SERVICE



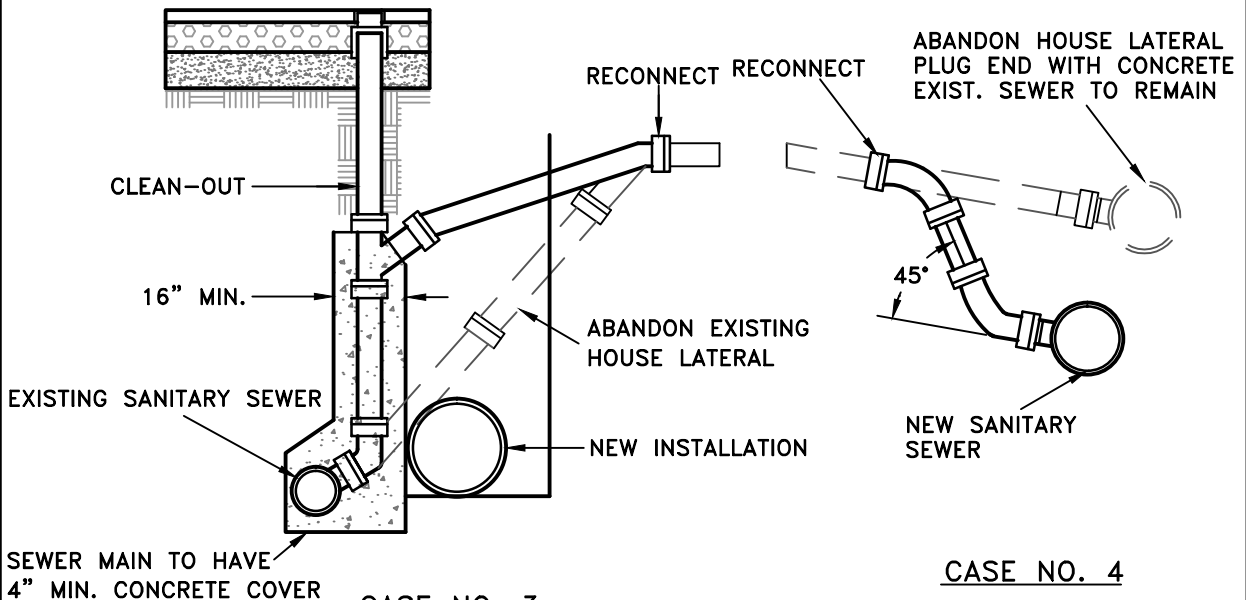
ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
512



CASE NO. 1

CASE NO. 2



CASE NO. 3

CASE NO. 4

NOTES:

1. ALL HOUSE LATERALS SHALL BE THICKNESS CLASS 22 CAST IRON PIPE WITH STAINLESS STEEL AND NEOPRENE SHEAR COUPLINGS.
2. THE MINIMUM SLOPE FOR HOUSE LATERALS SHALL BE 1/4" PER FOOT FOR 4" PIPE, 1/8" PER FOOT FOR 6" PIPE.
3. CASE NO. 3 SHALL BE USED ONLY WHEN CASE NO. 1 HAS LESS THAN REQUIRED SLOPE.
4. ALL MATERIALS SHALL BE AS DESIGNATED OR APPROVED EQUAL.
5. ABANDONED LATERALS SHALL BE PLUGGED AT THE SEWER MAIN WITH SIX INCHES OF CONCRETE. REMAINING LATERAL SHALL BE FILLED WITH CDF.

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C59650

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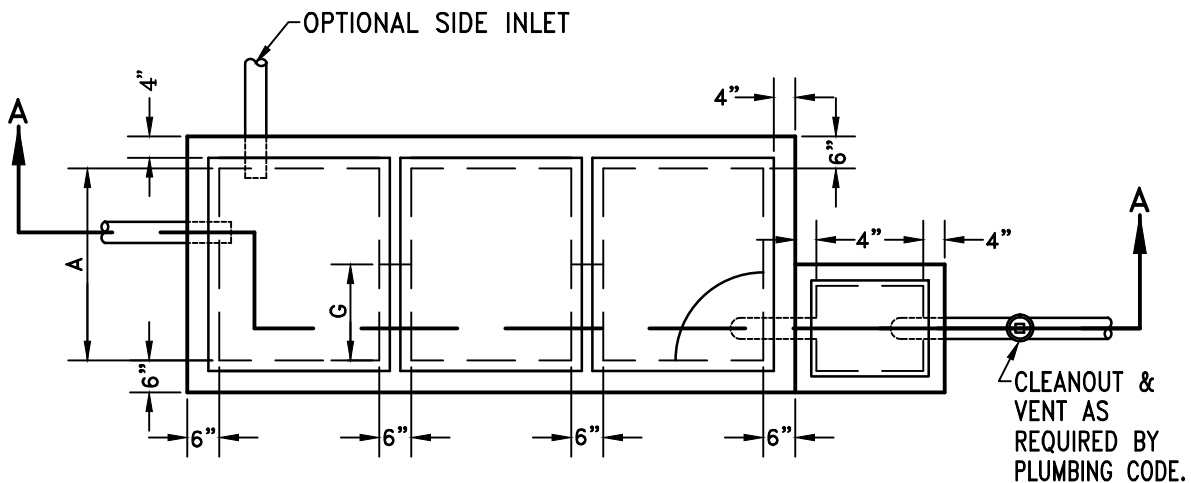
REVISED: DATE:

SANITARY SEWER
EXISTING HOUSE
LATERAL RELOCATION

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



DETAIL NO.
513



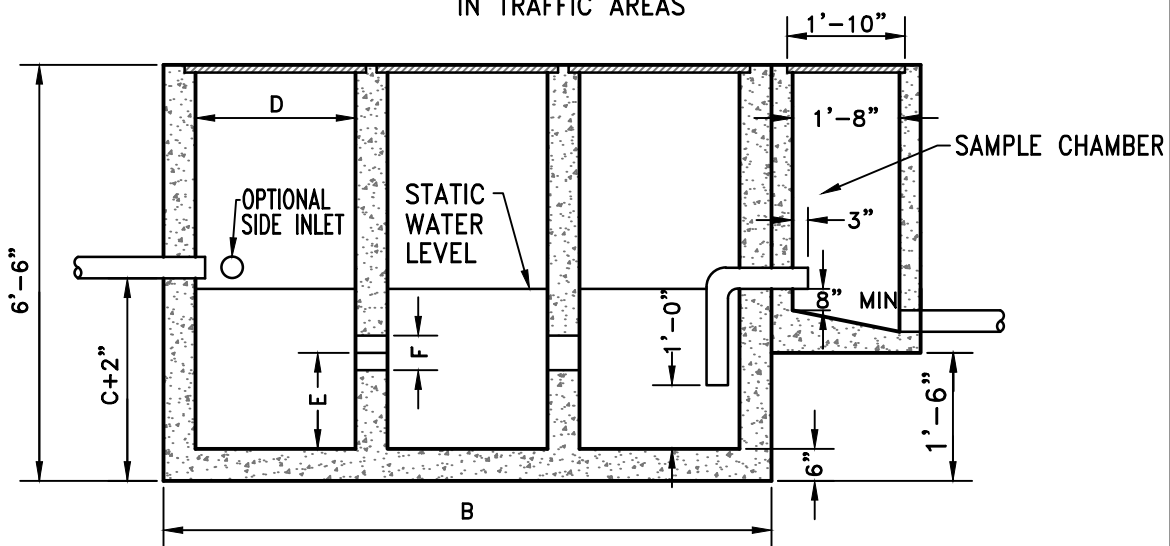
NOTE:

AN ACCEPTED ALTERNATE IS P&L CONCRETE PRODUCTS PRECAST GREASE TRAP WITH ADDED SAMPLE CHAMBER ON OUTLET END AS SHOWN ON THIS DRAWING.

PLAN VIEW

NOTE:

TRAFFIC LIDS TO BE INSTALLED IN TRAFFIC AREAS



SECTION A-A

CAPACITY GALLONS	DIMENSIONS							COVER SIZE	METAL COVERS	PIPE SIZE
	A	B	C	D	E	F	G			
510	3'-0"	9'-6"	3'-0"	2'-6"	1'-6"	4 1/2"	1'-6"	2'-10"x3'-4"	1/4" STEEL PLATE	4"
866	3'-5"	10'-3"	4'-0"	2'-5"	2'-0"	0'-6"	1'-9"	3'-10"x3'-10"	3/8" ALUMINUM PLATE	4"
1260	4'-0"	12'-6"	4'-0"	3'-6"	2'-0"	0'-6"	2'-0"	3'-10"x4'-4"	3/8" ALUMINUM PLATE	4"

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

SANITARY SEWER
GREASE AND OIL
INTERCEPTOR



ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
514

WHERE IS MY HOUSE SEWER LINE?

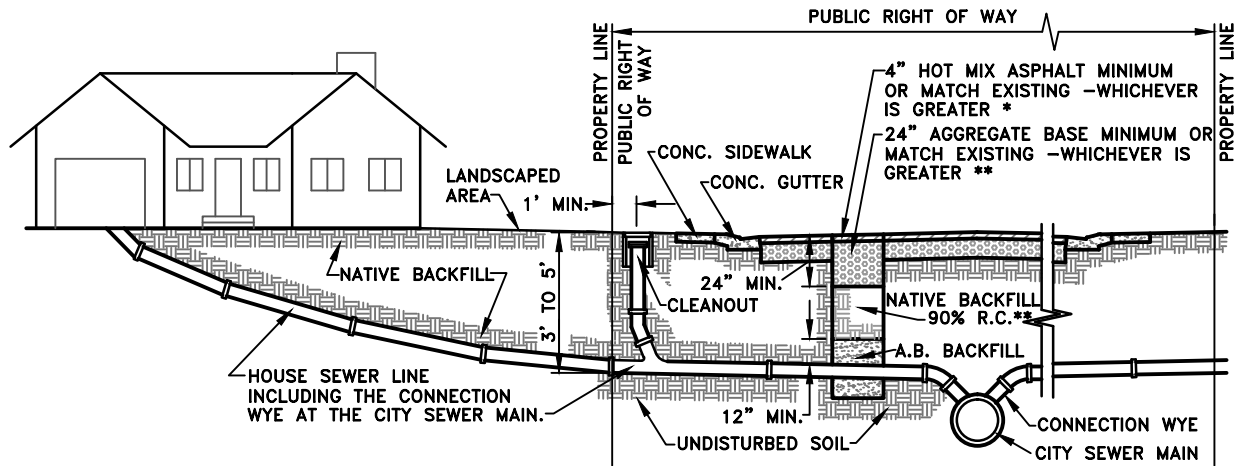
A PICTURE OF A HOUSE SEWER LINE IS SHOWN BELOW. YOU CAN SEE THAT IT STARTS AT YOUR HOUSE AND ENDS AT THE SEWER MAIN NEAR THE MIDDLE OF A STREET OR ALLEY. IT IS THE PROPERTY OWNER'S RESPONSIBILITY TO MAINTAIN AND REPAIR THE ENTIRE LENGTH OF THE HOUSE SEWER LINE, INCLUDING THE CONNECTION WYE AT THE MAIN.

WHAT DOES THIS PROGRAM DO?

THE CITY OF MODESTO OFFERS THIS PROGRAM TO ASSIST THE PROPERTY OWNERS IN THE COST OF REPLACING THE PAVEMENT AND/OR CONCRETE WHEN REPAIRING THAT PORTION OF THEIR HOUSE SEWER LINE THAT IS LOCATED UNDER A SIDEWALK, PAVED STREET OR PAVED ALLEY AND INSTALLATION OF A CITY STANDARD CLEANOUT IF NONE CURRENTLY EXISTS, IF YOUR HOUSE SEWER LINE IS BROKEN OR BLOCKED.


HOW CAN I APPLY?

IF YOU ARE HAVING A SEWER PROBLEM, CALL THE CITY FIRST AT 577-6200. THE CITY WILL CHECK TO SEE IF THE MAIN SEWER LINE IN THE STREET OR ALLEY IS BLOCKED. IF THE MAIN SEWER LINE IS CLEAR, THE CITY CREW WILL INFORM YOU THAT YOU SHOULD CONTACT A PLUMBER TO FIND OUT IF YOUR HOUSE SEWER LINE IS BROKEN UNDER THE SIDEWALK, PAVED STREET OR PAVED ALLEY. IF THE LINE NEEDS TO BE REPAIRED UNDER ANY OF THESE AREAS, THEN CALL THE CITY OF MODESTO FOR MORE INFORMATION ON THIS PROGRAM AT: (209) 342-4712.



GENERAL DIAGRAM OF HOUSE SEWER LINE REPAIR AND TRENCH SECTION IN PUBLIC RIGHT OF WAY

* FOR RESIDENTIAL STREET, USE DETAIL #800 FOR ALL OTHERS.
 ** NATIVE BACKFILL MAY ONLY BE USED IF SOIL IS SUITABLE.

APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	SANITARY SEWER		 MODESTO CALIFORNIA
REVISED: DATE:	HOUSE SEWER LINE REPAIR COST SHARE PROGRAM		
REVISED: DATE:	ADOPTED BY CITY COUNCIL RESOLUTION NO. 2014-345		
REVISED: DATE:			DETAIL NO. 515

CHAPTER 6

WATER SYSTEM

6.01 GENERAL

- A. All water system improvements, including City of Modesto Capital Improvement Projects (CIP), must conform to the requirements of these City Standard Specifications and Standard Details, the CIP Project Specifications or CIP Special Provisions (if any), the American Water Works Association (AWWA) Standards, the Modesto Municipal Code, and the approved plans.
- B. In all cases, water system improvements shall conform to the current City's Engineer's Report, the Public Health Agency and California Fire Code.

6.02 DEFINITIONS

- A. Approved Backflow Prevention Assembly – An assembly that has been investigated and approved by the administrative authority having jurisdiction for systems protection.
- B. Compression Joint – A push-on joint that seals by compressing the rubber ring or gasket between a spigot-end of the pipe and a bell-end of the next pipe or coupling.
- C. Design Engineer – A current, California licensed civil engineer. Either employed by a Developer or Contractor to design and engineer the system improvements.
- D. Dimensions – Dimensions are measured from outside edge of water mains, structures or appurtenances to outside edge of other utility infrastructure.
- E. Distribution Main – Water pipe used for the conveyance of safe drinking water throughout the water system to all end users. Service connections are made to distribution mains.
- F. Engineer's Report – The latest City of Modesto Water Engineer's Report, Water Master Plan or Water Hydraulic Model Report.
- G. Fused Joint – The joint of sections of pipe connected using thermal or chemical bonding processes.
- H. Ground Water – Subsurface water found in the saturation zone.
- I. Mechanical Joints – Bolted joints conforming to the AWWA Standards.
- J. Pressure Class – A pipe classification system based upon internal working pressure of the fluid in the pipe, type of pipe material, and the thickness of the pipe wall.
- K. Public Health Agency – The California Department of Public Health (CDPH).
- L. Restrained Joint – Bolted joints designed to resist the hydrostatic forces applied by water changing directions in the pipe.
- M. Sewer Line – pipeline or structure conveying untreated sewage, primary or secondary treated sewage, disinfected secondary-2.2 recycled water, disinfected secondary-23 recycled water or hazardous fluids.
- N. Sleeve – A protective tube of steel with a wall thickness of not less than 1/4-inch into which a pipe is inserted.

- O. Storm Line – pipeline or structure conveying disinfected tertiary recycled water or storm drainage fluids.
- P. Transmission Main – Water pipe used for the conveyance of safe drinking water from the City’s water storage tanks and wells to other City water facilities.
- Q. Water Main – A water distribution main or water transmission main.
- R. Water Supplier – “District or agency operating a public water system” or “supplier of water” means any district or agency who owns or operates a public water system.
- S. Water System – City of Modesto Water System includes the contiguous Modesto area and the outlying areas as defined in the latest adopted engineer’s report. Outlying areas include Salida, Del Rio, Hickman, Waterford, Grayson, Empire and portions of Ceres and Turlock.

6.03 WATER MAIN SEPARATION REGULATIONS

A. SEWER FACILITIES:

1. New water mains and new service lines shall not be installed in the same trench as, and must be at least 10 feet horizontally from, and one foot vertically above, any parallel pipeline conveying:
 - a. Untreated sewage,
 - b. Primary or secondary treated sewage,
 - c. Disinfected secondary-2.2 recycled water (defined in section CCR Section 60301.220),
 - d. Disinfected secondary-23 recycled water (defined in section CCR Section 60301.225), and
 - e. Hazardous fluids such as fuels, industrial wastes, and wastewater sludge.

B. STORM FACILITIES:

1. New water mains and new service lines shall not be installed in the same trench as, and must be installed at least 4 feet horizontally from, and one foot vertically above, any parallel pipeline conveying:
 - a. Disinfected tertiary recycled water (defined in section CCR 60301.230), and
 - b. Storm drainage.

C. RAW WATER FACILITIES:

1. New service lines conveying raw water to be treated for drinking purposes shall be installed at least 4 feet horizontally from, and one foot vertically below, any water main.
2. If a new water main crosses a pipeline conveying a fluid listed under Sewer or Storm Facilities, the new water main must be constructed perpendicular to and at least one foot above that pipeline. Connection joints in the water main must be 8 feet horizontally from the Sewer or Storm Facility pipeline.
3. The vertical separation specified for Sewer, Storm and Raw Water Facilities is required only when the horizontal clearance distance between a water main and pipeline is 10 feet or less.

4. New water mains shall not be installed within 100 horizontal feet of any sanitary landfill, wastewater disposal pond, or hazardous waste disposal site, or within 25 feet of any cesspool, septic tank, sewage leach field, seepage pit, or groundwater recharge project site.
5. The minimum separation distances set forth in this section shall be measured from the nearest outside edge of each pipe barrel, manhole, or sleeve.

6.04 ALTERNATIVE DESIGN CRITERIA FOR REDUCED SEPARATION

A. NEW WATER MAINS – PARALLEL

1. For water mains parallel with less than 10 feet and more than 4 feet of clearance to an existing pipeline conveying fluids listed under Sewer Facilities, written approval from the City Utility Projects and Planning Department is required prior to accepting the improvement plans and the construction of the improvements.
 - a. Water mains parallel to Sewer Facilities must be constructed of “Special Pipe” materials.
 - b. EXCEPTION: Water mains parallel to a sanitary sewer force main must be greater than 10 feet horizontally and 1 foot vertically.
 - c. More stringent requirements may be required by the City if conditions such as high groundwater exist or water main or sewer facilities are 24 inches in diameter or greater.

B. NEW WATER MAINS – CROSSING

1. For water mains crossing with less than 12 inches and more than 4 inches clear of the crown of an existing pipeline conveying fluids listed under Sewer, Storm or Raw Water Facilities, written approval from the Director of Utilities is required prior to accepting the improvement plans and the construction of the improvements.
 - a. Couplings and pipe joints in water mains crossing ABOVE Sewer, Storm or Raw Water Facilities must be greater than 8 feet from the closest edge of the existing pipeline.
 - b. Couplings and pipe joints in water mains crossing BELOW Sewer, Storm or Raw Water Facilities must be greater than 10 feet from the closest edge of the existing pipeline.
 - c. Water mains crossing BELOW Sewer, Storm or Raw Water Facilities must be constructed of “Special Pipe” materials.
 - d. More stringent requirements may be required by the City if conditions such as high groundwater exist or water main or sewer facilities are 24 inches in diameter or greater.

C. “SPECIAL PIPE” MATERIALS

1. “Special Pipe” materials permissible for the City of Modesto Water System are:
 - a. Ductile Iron pipe, or
 - b. Polyvinyl Chloride pipe, DR 14
2. The selection of pipe materials may be further restricted by the City if corrosive conditions are likely to exist. These conditions may be due to soil type and/or the nature of the fluid conveyed in the existing pipeline.

D. SPECIAL PERMISSION

1. When new water mains are being installed in existing developed areas, local conditions (e.g., available space, limited slope, existing structures) may create a situation in which there is no alternative but to install water mains at a distance less than that required by these regulations. In such cases, through permit action, the Public Health Agency may approve alternative construction criteria.
2. This alternative approach is allowed under the CCR Section 64551.100, “(a) A water system that proposes to use an alternative to a requirement in this chapter [Chapter 16] shall: (1) Demonstrate to the Department [Public Health Agency] that the proposed alternative would provide at least the same level of protection to public health; and (2) Obtain written approval from the Department [Public Health Agency] prior to implementation of the alternative.”

6.05 DESIGN

A. General

1. The distribution system, whenever possible, shall employ a “Grid System” for water mains to maximize the circulation of water and allow pressure equalization. All water system infrastructure designed for the City of Modesto Water System must be located within the public right-of-way.
2. The Design Engineer must include a profile view on the Improvement Plans showing inverts of the new water main at all changes in elevation and in all areas where conflicts with other existing utilities might arise.

B. Vertical Alignment

1. Water mains and services shall be installed at a depth which will provide a minimum of 42 inches from the top of the outside of pipe barrel to the top of finished grade or a minimum of 24 inches from the top of outside of pipe barrel to the top of the street sub-grade, whichever overall depth is greater.

C. Horizontal Alignment

1. Alignment shall be parallel to the street centerline wherever possible. Separation from other utilities must follow the requirements listed elsewhere in these standards.
2. In new developments, the horizontal alignment of water mains shall be 10 feet south or 10 feet east of the street centerline. When looping the system around the subdivision, the City will allow the utility lines to be reversed with water mains 10 feet north or 10 feet west of the street centerline.
3. In existing streets (residential and non-residential), and new non-residential streets, the alignment may vary from these Standards with approval from the City of Modesto, but in no case shall there be less than 10-foot horizontal clearance to a sanitary sewer or storm drain line.
4. Curved water mains are allowed for curved streets when the water main pipe curvature does not exceed 80 percent of the manufacturer’s published allowable deflection.

D. Water Main Requirements and Size

1. The minimum size pipe used for all water mains shall be in accordance with these Standards and designed using the Performance Criteria for flow, pressure, headloss and velocity established for each Demand Scenarios included in the City's Engineer's Report (Table 1 "City of Modesto System Performance Criteria for Planning & Design" in 2005 Hydraulic Model Update Report).
2. Demand Criteria shall be determined using the water use factors established in the City's Engineer's Report along with the "Average Day" demands, "Maximum Day" demands and "Peak Hour" demands also contained therein.
3. Fire Flow Criteria for new developments shall be based on the required fire flow for adjacent land uses. Minimum fire flows shall be as indicated in the California Fire Code and as approved by the Fire Marshal. In the absence of specific building data (e.g. building type and building square foot area), public water mains shall be designed to achieve the minimum fire flows:
 - a. Single-family Residential Areas: All water mains shall be sized to provide a minimum of 1500 gallons per minute with 20 psi of residual pressure for a duration not less than 2 hours at the fire service point of connection to the water main.
 - b. Multi-Family Residential Areas: All water mains shall be sized to provide a minimum of 2500 gallons per minute with 20 psi of residual pressure for a duration not less than 2 hours at the fire service point of connection to the water main.
 - c. Commercial Areas: All water mains shall be sized to provide a minimum of 4000 gallons per minute with 20 psi of residual pressure for a duration not less than 2 hours at the fire service point of connection to the water main.
 - d. Institutional, Industrial, or Business Park Areas: All water mains shall be sized to provide a minimum of 4000 gallons per minute with 20 psi of residual pressure for a duration not less than 4 hours at the fire service point of connection to the water main.
4. Different land uses, water demands and existing conditions may require increased pipe sizes. In most cases, designing the pipe sizes using the following minimums will oftentimes meet the required Performance Criteria.
 - a. 1/2-mile looped grid; use 12-inch mains or larger
 - b. 1/4-mile looped grid; use 8-inch mains
 - c. Distribution system, looped; use 8-inch mains
5. The minimum water distribution main pipe diameter required is 8 inches. Industrial and commercial areas may require 12-inch diameter distribution mains.
6. The minimum water transmission main pipe diameter required is 16 inches.
7. A hydraulic analysis report may be required for new developments to demonstrate the new system will meet the Performance Criteria. All reports must include an electronic copy of the computer water model with calculations that can be readily integrated with the City's current water system model. At a minimum, the report will also include:
 - a. Narrative, including project description, study methodology, description of results, recommendations and conclusions
 - b. Summary list of demands used for analysis (conforming to these standards)

- c. Description of the boundary conditions used in the model
- d. Evidence of model calibration based on field flow tests
- e. Maps and exhibits indicating land use and their sizes; and existing and proposed water facilities.

E. Water Service Requirements and Size

1. The limits of the water service size determined by these specifications include from the water distribution main connection point to the upstream side of the water meter.
2. Water services will NOT be permitted to be manifold without prior written approval by the Director of Utilities.
3. City of Modesto standard service sizes are 1-inch, 2-inch, 4-inch, 6-inch, 8-inch, 10-inch and 12-inch. For all domestic, fire or landscape services the City will NOT allow
 - a. any size less than 1-inch diameter
 - b. a 1-1/2 inch diameter or
 - c. a 3-inch diameter.
4. The minimum water service size for Single Family Dwellings is 1-inch diameter (nominal).
5. To determine water service size using hydraulic calculations, the maximum design pressure at the water main in the street shall be the Minimum Pressure available under the City's Engineer's Report (Table 1 "City of Modesto System Performance Criteria for Planning & Design" in 2005 Hydraulic Model Update Report) for Average Day Demand (50 psi) or available pressure from flow/pressure test adjacent to the service location, whichever pressure is lowest.
6. The minimum water service size for all other dwellings and structures shall be determined by the latest California Plumbing Code and the latest AWWA Manual M22 "Sizing Water Service Lines and Meters".
7. Each individual property shall have a separate water service complete from the water main to the property. Water services are not permitted in easements without prior approval by the Department of Utilities. Water services are not permitted to connect to a dedicated transmission main, fill or blending line.
8. For non-residential properties, individual services for irrigation, domestic, and fire water shall be installed from the water main. The City will not manifold the water services at property line from a fire service.
9. Water services are not permitted to be installed within the limits of any driveway or drive approach.

F. Water Meter Requirements and Size

1. All water services must be metered, except dedicated fire services. Dedicated fire services must have a detector system installed with the approved backflow prevention assembly.
2. City of Modesto Standard Meter Sizes:

Water Service Size	Water Meter Size
1-inch	1-inch
2-inch	1-1/2 inch
	2-inch
4-inch	4-inch
6-inch	6-inch
8-inch	8-inch
10-inch	10-inch
12-inch	12-inch

3. Meters located below grade shall be protected within a water meter box. Water meters and meter boxes shall not be located in vehicular traffic areas, driveways or drive approaches.
4. Water meters and meter boxes shall be located in the public right-of-way.

G. Backflow Prevention Requirements

1. All water services, except a Single Family Residence with a single dedicated domestic service, must include a backflow prevention assembly approved by the City of Modesto, Water Division Cross Connection Specialist. A Single Family Residence with an existing well or an auxiliary water supply requires an approved backflow prevention assembly.
2. All domestic and landscape water services shall require a Reduced Pressure Backflow Prevention (RPBP) Assembly.
3. All fire services must include a Detector Check Backflow Prevention (BP) assembly. For fire services, the BP may be a double check detector style or reduced pressure detector check style BP depending on fire system classification and the type of hazard. Final determination of which style BP allowed will be determined by the City of Modesto, Water Division Cross Connection Specialist.
4. All BP's must be above ground and within unobstructed view for the Fire Marshal's inspection. As a minimum, a DCDA is required at the point of connection at the property line for any private fire system, including for a single onsite private fire hydrant.

H. Fire Hydrants

1. Fire hydrants shall only be supplied from the largest available water main but shall not be supplied from transmission mains. Fire hydrants shall be fed from 2 directions, except:
 - a. At the end of the water main located in a cul-de-sac, or
 - b. Where approved by the City Engineer and Fire Marshal.
2. Fire hydrants shall be placed on both sides of a major street, including divided streets, planned divided streets or state highways, and shall be spaced on each side according to the maximum distance allowed and staggered. On streets where buildings and streets are separated by a 6 foot restrictive wall, hydrants shall be placed at all street intersections with a maximum distance of 1,000 feet

between hydrants for maintenance of the water system instead of a blow-off. Hydrant spacing and distribution shall be:

- a. 500 feet for R-1 and R-2 "Residential Zones"
 - b. 300 feet for all other zones
3. Fire hydrants shall be located at ends of curb returns or at lot lines. The preferred fire hydrant location is at curb returns. When a fire hydrant is located at a lot line, the fire hydrant assembly must be located within the public right-of-way. A fire hydrant shall be located at the end of all cul-de-sacs and permanent street dead ends instead of a blow-off.

I. Blow-offs

1. Blow-offs shall be constructed for temporary use only.
2. Blow-offs shall be provided at the end of all temporary dead end mains for future extension of the water main at a later date. The final length of pipe, past the last inline valve and prior to the blow-off, shall be a minimum of 18 inches to a maximum of 39 inches.

J. Valves

1. Distribution mains shall be designed with a sufficient number of inline, isolation valves so that no single shutdown will result in a water main length greater than 400 feet out of service. Additionally, in no case shall more than 2 fire hydrants be removed from service during any single shut down period.
2. Transmission mains shall have inline, isolation valves at a maximum spacing of 700 feet on center.
3. Valves shall be located directly adjacent to any water main fitting. The number of valves per fitting shall follow the formula, $v = n - 1$, where "n" is the number of outlets per fitting and "v" is the number of valves required (for example: 22-1/2 degree bend fitting has 2 outlets and requires 1 valve). For a tee or cross at a cul-de-sac, one valve must be in the direction of the cul-de-sac.
4. An inline, isolation valve is required on each side of the water main/service tee to all hospitals, schools, and major industrial sites as directed by the City Engineer.
5. A shutoff valve is required for fire hydrants, inline with the hydrant run and immediately adjacent to the hydrant tee at the water main.
6. A shutoff valve is required at the property line for each water service downstream of the water main/service tee except for fire department connections. The City gate valve may be used as the system control valve for water mains supplying only system fire hydrants.
7. Valves with a blow-off device shall be installed at the boundary of development.
8. Water mains 10-inch and smaller shall use gate valves. Water mains 12-inch and larger shall use butterfly valves. When butterfly valves are used, butterfly operating nut shall be located toward the nearest property line.

K. Thrust Blocking

1. Thrust blocking must be provided at all vertical alignment changes, horizontal alignment changes, tee or tapping sleeve fittings, dead ends, at the back of fire hydrants buries and where changes in pipe diameter occur.

2. Restrained joints may be used in areas requiring the use of fittings for vertical alignment changes or horizontal alignment changes with written approval by both the City Engineer and Director of Utilities.

L. Sample Stations

1. Sample Stations shall be included when new water mains are to be installed. Sampling stations shall be located at a maximum density of 1 sampling station per 1/4-square mile, or as otherwise determined by the Department of Utilities.

M. Air Release Valves

1. Air release valves (ARV) are required in instances of high points within the water system.
 - a. If the greatest difference in elevation for the entire water improvements is 18 inches or less, a fire hydrant will be required at the local high point(s) throughout the water improvements.
 - b. If the greatest difference in elevation for the entire water improvements is greater than 18 inches, an ARV will be required at the local high point(s) throughout the water improvements.

N. Tracer Wire

1. Tracer wire for the purpose of locating buried water mains and services is required for
 - a. Water mains (all material types)
 - b. Fire hydrant runs
 - c. Water services at
 - 1) all dead end streets,
 - 2) end of all cul-de-sacs, and
 - 3) services not perpendicular to the water main
2. Tracer wire shall be attached to the top of all pipes for distribution mains. Transmission mains shall include tracer tape in addition to the tracer wire. The tracer tape shall be placed between the top of the bedding zone and bottom of the backfill zone.

6.06 COST ALLOCATION FOR NON-CIP PROJECTS

- A. Water mains shall be measured horizontally by the linear foot with valves and fittings included. Valves shall each be measured as one completed installed unit in operable condition including valve, anchor block, valve box and riser, per Standard Details. Fire hydrants shall each be measured as one complete installed unit in operable condition including hydrant, break-off riser, bury thrust block, 6-inch valve, and piping from main to bury, per Standard Details. Air relief and blow-off assemblies shall each be measured as one complete unit in operable condition including all necessary valves and fittings per Standard Details. Fittings, anchors, and thrust blocks shall be considered in the unit price paid per linear foot of pipe.
- B. The price for water main, services and appurtenances shall constitute full compensation for all labor, materials, and tests necessary to furnish and install the main, services and appurtenances in accordance with the drawings and specifications.

Improvement Item	City Responsibility		Developer / Contractor Responsibility		
	Labor	Materials	Labor	Materials	Fees Paid to City
Water Main Connection	X	X			X
Water Main Pipe			X	X	
Water Main Fittings			X	X	
Thrust Blocking			X	X	
Restrained Joint			X	X	
Water Main Valve & Valve Box			X	X	
Fire Hydrant Assembly			X	X	
Blow-off Assembly			X	X	
Tracer Wire			X	X	
Water Service Connection	X	X			X
Water Service Pipe & Fittings			X	X	
Water Meter Box Assembly			X	X	
Water Idler (Meter*)			X	X	
Automated Meter Reader	X	X			X
Sample Station			X	X	
Air Release Valve			X	X	
Temporary Connection	X	X			X
Temporary Backflow Assembly			X	X	
Permanent Backflow Assembly			X	X	
Hydrostatic Pressure Test			X	X	
Disinfection			X	X	
Disinfection Sampling & Analysis	X	X			X
Flushing			X	X	

* Meters will only be furnished and installed by the Contractor for new subdivisions.

6.07 MATERIALS

A. General

All materials and components used for improvement to the City of Modesto Water System shall comply with the latest American Water Works Association (AWWA) Standards including amendments, the National Sanitation Foundation International (NSF International) listings for Water Treatment and Distribution Systems including annexations, and be constructed from "No Lead" materials.

B. Water Main Pipe

1. Ductile Iron Pipe (DIP)
 - a. Ductile iron pipe shall conform to the latest AWWA C151 standards for Class 350.
 - b. Ductile iron pipe shall have "Tyton Joints", "Ty-Seal Joints", or equal.
 - c. Ductile iron pipe shall be cement-mortar lined in conformance with AWWA Standard C104.
 - d. All ductile iron pipe shall be protected by a polyethylene encasement in conformance with AWWA Standard C105.
2. Polyvinyl Chloride Pipe (PVC)
 - a. PVC pipe 12-inch diameter or less shall be DR 18, or DR 14 where required, and shall conform to AWWA Standard C900.
 - b. PVC pipe 14-inch diameter or greater shall be DR 18, or DR 14 where required, and shall conform to AWWA Standard C905.
 - c. All PVC pipe shall be 20-foot laying lengths and shall have cast iron outside diameter (CIOD).
 - d. The color of the pipe shall be blue to match Under Ground Service Alert color code.
 - e. PVC pipe joints shall have elastomeric-gasket bell ends or couplings. The bell ends shall be an integral thickened bell end or integral sleeve-reinforced bell end.
 - f. Deflection in pipe joints shall not exceed 80 percent of the manufacturer's published allowable deflection.
 - g. Acceptable PVC pipe manufacturers are Pacific Western, John Mansville, Certainteed or equal.
3. Steel Pipe
 - a. Steel pipe shall be for above ground use only. Steel pipe shall conform to AWWA Standard C200, C207 and C213.
 - b. Steel pipe thickness shall be a minimum of Schedule 40, "Standard", or 1/4-inch, whichever thickness is greater.
 - c. Steel pipe shall be flanged, fusion-bonded and epoxy coated, inside and outside.
 - d. Flanges for steel pipe shall be Class D.
4. Water Main Fittings
 - a. Bends, tees and other fittings shall be Ductile Iron, Class 150, for use with Ductile Iron Pipe.
 - b. Steel pipe fittings must be flanged, fusion-bonded and epoxy coated, inside and outside
 - c. Flanges for steel pipe fittings shall be Class D.
 - d. Flange Fittings must conform to the AWWA Standard C110.
 - e. Mechanical Fittings must conform to the AWWA Standard C111.
 - f. Steel pipe fittings (for above ground use only) must conform to AWWA Standard C205, C207 and C213.

- g. All fittings for use with connection to PVC pipe must use mechanical joints unless a valve is shown adjacent in which case the fitting joint must be flanged.
 - h. All fittings required to maintain proposed alignment shall conform to these standards, whether or not they are specifically indicated on the plans.
5. Thrust Blocking
- a. Thrust blocking shall be constructed using the concrete mix design specified elsewhere by the City Standard Specifications. The minimum compressive strength for the concrete shall be 3000 psi.
 - b. All fittings in contact with concrete thrust blocks must be wrapped with a minimum of 6-mil polyethylene plastic. Water main pipe shall not be in direct contact with thrust block.
6. Restrained Joints
- a. Restrained flange adapters and mechanical joint restraint shall be made of ductile iron conforming to ASTM A536 and have flange bolt circles compatible with ANSI/AWWA C110/A21.10.
 - b. The restrained flange adapter or mechanical joint restraint shall consist of a plurality of individual actuated gripping wedges to maximize restrain capability. Torque limiting actuating screws shall be used to ensure proper initial set of gripping wedges.
 - c. The restrained flange adapter shall be capable of deflection during assembly, or allow lengths of pipe to be field cut and a minimum of 0.6 inch gap between the end of the pipe and the mating flange without affecting the integrity of the seal.
 - d. The restrained flange adapter and mechanical joint restraint coating shall consist of a minimum of two coats of liquid thermoset epoxy coating with heat cure to follow each coat.
 - e. Restrained flange adapter manufacturer and model: EBAA, Inc. Series 2100 Megaflange, or equal.
 - f. Mechanical joint restraint manufacturer and model: EBAA, Inc. Series 1100 Megalug, or equal.
7. Water Main Valves and Valve Boxes
- a. All valves shown adjacent to fittings shall have one mechanical joint and one flange joint. The flange joint will bolt to the fitting.
 - b. All gate valves shall be the rubber-seated, tight-closing type conforming to AWWA Standard C509. Valves shall open left and be equipped with a 2-inch AWWA operating nut and stainless steel stem.
 - 1) Clow Model 2639,
 - 2) AVK Series 45,
 - 3) Mueller Series 2300,
 - 4) Kennedy Model KS-FW, or equal
 - c. All butterfly valves shall conform to AWWA Standard C504. Butterfly valves may be installed on main runs only. Valves shall open left and be equipped with a 2-inch AWWA operating nut.

- d. Valve boxes shall be a traffic valve box and lid rated for H-20 traffic loads. The minimum inside diameter of the concrete box shall be 10-3/8 inches. The overall depth of the concrete box shall be a minimum of 12 inches. The valve box lid shall be cast iron.
 - 1) Valve cover lids must be labeled "WATER."
 - 2) An acceptable valve box manufacturer and product is Christy Concrete Products – G05TBOX "Traffic Valve Box" and G05CT "Cast Iron" lid, or equal.
 - 3) Materials to be used for extensions below valve box to valve operating nut shall be 8-inch PVC pipe.

C. Water Service Pipe

1. Services shall conform to the latest AWWA C800 and C901 including all amendments.
2. 1-inch and 2-inch Water Service Pipe
 - a. Water services pipe shall be High Density Polyethylene (HDPE) Pipe. The pipe shall be ultra-high molecular weight polyethylene flexible pipe constructed from PE 3408/3608 polyethylene for potable water systems. The minimum pressure class rating shall be 200 psi.
 - b. For 1-inch services, the HDPE pipe diameter shall conform to outside diameter-controlled Iron Pipe Size (IPS). The maximum standard dimension ratio shall be SDR 7.3.
 - c. For 2-inch services, the HDPE pipe diameter shall conform to outside diameter-controlled Copper Tube Size (CTS). The maximum standard dimension ratio shall be SDR 9.
 - d. Acceptable HDPE Pipe manufacturers and products:
 - 1) Endot Industries, Inc. – Endopure Pipe
 - 2) Performance Pipe – DriscoPlex 5100 Ultra-Line Pipe
 - 3) JM Eagle – High Density Polyethylene Water and Sewer, or equal
3. 4-inch and Larger Water Service Pipe
 - a. Water services pipe shall be Polyvinyl Chloride (PVC) Pipe. The pipe materials, fittings and valves shall conform to the requirements of the specifications for water mains and any referenced standards therein.
4. 1-inch and 2-inch Water Service Fittings and Valves
 - a. All fittings and valves must be constructed from "No Lead" materials.
 - b. Service saddles shall be sized to match the outside diameter of the pipe being tapped. The tap size shall be 1-inch or 2-inch to match the nominal service size. The saddle shall be a double strap style with a Female Iron Pipe Threaded (FIPT) coupling.
 - c. For C900 PVC pipe, acceptable saddle manufacturers and products are James Jones Co. – Bronze Saddle J-996 Series, or equal.
 - d. Ball corporation stop, curb stop, coupling, and meter coupling sizes shall match the diameter of the service pipe. Reducing fittings will not be allowed. Inserts for use with pack joint couplings shall be stainless steel. Fitting sizes

shall be National Pipe Threads (NPT) or Copper Tube Size (CTS) pack joints where required.

- 1) Quick Joint or Grip Joint fittings and couplings will not be allowed instead of pack joint fittings and couplings.
 - 2) Acceptable manufacturers for all water service fittings are Ford, Jones, Mueller, McDonald, Cambridge Brass or equal.
5. 1-inch and 2-inch Meter Box and Lid
- a. For 1-inch service lines, the meter box minimum opening clearance dimensions shall be 16 1/2-inch by 9 7/8-inch by 12-inch deep.
 - b. For 2-inch service lines, the meter box minimum opening clearance dimensions shall be a 29 1/16-inch by 16 1/4-inch by 12-inch deep.
 - c. The meter box lid shall be
 - 1) Non-Vehicle Areas: Composite material composed of polyester resin, fiberglass and calcium carbonate.
 - 2) Vehicle Areas: Galvanized steel checker plate with a 6-inch round, self-closing reading lid.
 - 3) Lids must be labeled "WATER"
 - d. Acceptable meter box and lid manufacturers and products shall be:
 - 1) 1-inch Service – Oldcastle Precast Inc. – FL12TBOX Box with FL12D (Non-Vehicle) lid or B12BOX Box with B12-61G (Vehicle) lid.
 - 2) 2-inch Service – Oldcastle Precast Inc – FL36TBOX Box with FL36D (Non-Vehicle) lid or N36BOX Box with B36-61G (Vehicle) lid.

D. Fire Hydrant Assembly

1. Fire hydrants shall be wet-barrel style and conform to AWWA Standard C503. All hydrants shall be painted with "Chrome Yellow" polyurethane high duty industrial enamel. "Chrome Yellow" is Federal Standard 595B, color: FS33538.
2. Fire Hydrants shall be equipped with one 2-1/2 inch fire hose connection and one 4-1/2 inch pumper connection. Caps for connections shall be metal painted per AWWA color requirements or "Chrome Yellow" to match hydrant.
3. Acceptable hydrants manufacturers and products are:
 - a. Clow Valve Co. – Model 850
 - b. James Jones Co. – Iron Fire Hydrant J-4040,
 - c. American AVK Co. – Series 2470, or equal
4. Breakable Flange shall be provided and installed between the fire hydrant base and the top of the bury section. The breakable flange shall be bolted to the hydrant flange with frangible bolts.
5. The bury section shall be one piece consisting of a straight midsection (spool) and a 90-degree elbow. The bury section shall be ductile iron pipe, flanged above ground, mechanical joint below ground with fittings conforming to ANSI/AWWA C110/A21.10.

E. Blow-offs

1. Blow-offs shall be constructed using the materials and manufacturers of fittings as specified for 2-inch water services.

2. Blow-off shutoff valves shall be ball corporation style valve.

F. Backflow Prevention Assemblies

1. All backflow prevention assemblies must conform to AWWA Standards.
 - a. Reduced-Pressure Principle Backflow-Prevention Assemblies, use the latest AWWA Standard C511.
 - b. Double Check Valve Backflow-Prevention Assemblies, use the latest AWWA Standard C510.
2. All backflow prevention assemblies must be approved by:
 - a. City Water Division, Cross Connection Specialist.
 - b. Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California

G. Sample Stations

1. Sample stations shall be constructed using the materials and manufacturers of fittings as specified for 1-inch water services.
2. The sample nozzle located in the station housing shall be threadless.
3. The above ground sampling pipe inside the station housing shall be “no lead” brass pipe, copper pipe or schedule 40 PVC pipe. All pipes above ground shall be insulated with foam pipe insulation.
4. The station housing shall be stainless steel or fusion-bonded epoxy (inside and outside) steel pipe or tubing. The station housing must be use mortise cabinet slabbed cylinder style lock.
5. An acceptable station housing manufacturer and model is Steel Source Construction, MX3000, or equal.

H. Air Release Valves

1. Air release valves (ARV) shall conform to AWWA Standard C512.
2. The ARV shall operate (open) while pressurized, allowing entrained air to escape from the water pipeline through the air release orifice. After entrained air escapes through the air release orifice, the valve orifice shall close by a lever mechanism actuated by a concave float to prevent water from escaping. The ARV shall stay closed until more air accumulates and the opening cycle will repeat automatically.
3. An acceptable air release valve manufacturer is Valve & Primer Corporation, APCO 200A ARV or equal.

I. Tracer Wire

1. Tracer wire for water mains and services shall be solid copper, soft drawn wire No. 10 American Wire Gauge (AWG).
 - a. For all pipe materials, provide THWN insulated wire at all locations
2. For splices at valves and fittings, remove insulation, use solid copper split-bolt style connectors and wrap all exposed copper with appropriate electrical tape.

6.08 INSTALLATION

A. General

Water mains shall be installed in accordance these City Standards and AWWA standards for pipe installation.

B. Handling of Pipes and Appurtenances

1. Proper implements, tools, equipment and facilities satisfactory to the City Engineer shall be provided and used by the Contractor for the safe and efficient execution of the work.
2. All pipe, fittings, valves, hydrants and appurtenances shall be lowered into the trench to prevent damage to pipe materials fittings.
3. Under no circumstance shall pipe or appurtenances be dropped or dumped into the trench. Special care shall be exercised so that the coating on pipe, valves and fittings are not damaged. If such damage occurs, the coating shall be repaired per the manufacturer's recommended procedures and to the satisfaction of the City Engineer. Chain slings are not permitted.
4. Pipe loaded on trucks or stacked one upon another shall be supported on wood blocking.
5. Pipe handled sideways shall not be skidded or rolled against pipe already on the ground.
6. All foreign matter, including soil, shall be removed from the interior of pipe before lowering into position in the trench. Pipe and appurtenances shall be kept clean before, during and after laying the material in the trench.
7. All pipe and appurtenances shall be inspected for defects prior to lowering into trench. Any defective, damaged or unsound pipe or appurtenance shall be replaced at no additional cost to the City.

C. Laying Pipe

1. The Contractor shall field verify by potholing, the size, depth and alignment of all existing water mains and services shown on the Improvement Plans or marked in the field by the Underground Service Alert (USA) markings prior to construction. The Contractor shall also field verify by potholing, the size, depth and alignment of all other existing utility crossings shown on the Improvement Plans or marked in the field by the Underground Service Alert (USA) markings prior to construction. If any existing utility is not exactly as shown on the Improvement Plans or otherwise omitted, the Contractor shall notify the City Engineer before proceeding with the installation of any new work until instructions for how to proceed are issued by the City Engineer.
2. Pipe and appurtenances must be installed in accordance with these City Standards and per the manufacturer's recommendations. Uniform bearing shall be provided under the full length of the barrel of the pipe. Bell holes shall be provided at each joint, but shall be no larger than necessary for joint assembly.
3. For water mains in a new subdivision, the mains and the fire hydrant runs and assemblies must be installed prior to the installation of gutter, curb and sidewalk.

4. All water mains and services shall be installed to the alignment, elevation and slope as shown on the Improvement Plans. When curved alignment is shown on the plans the maximum deflection at any joint shall not exceed 80 percent of the manufacturer's recommendation for the type of pipe and joint being used.
5. When work is stopped at the end of the work day, the open ends of all water mains shall be closed with watertight blind flange. The blind flange shall not be removed unless the trench is dry.

D. Thrust Blocks

1. Thrust Blocks shall be cast-in-place concrete between undisturbed ground and the fitting to be anchored. The thrust block area for bearing against the soil shall be determined by City Standard Details.
2. Prior to pouring concrete for thrust blocks, the ground must be properly moistened to prevent the ground from absorbing moisture from the concrete.
3. All concrete for thrust blocks shall be placed in the presence of the Engineer. Thrust blocking shall be placed so the joints of the pipe and fittings are accessible for future repair.
4. Backfill may be placed, but not compacted, on thrust blocks after the concrete surface has cured sufficiently to resist the weight of the backfill. Concrete shall be allowed to cure a minimum of 24 hours prior to compaction of backfill.
5. All wood forms and foreign materials used for forming thrust blocks and not suitable for backfill must be removed prior to backfilling.

E. Valves

1. Valves shall be set plumb and properly fitted to the adjacent sections of the water main.
2. A valve box shall be installed flush to final grade over each valve.

F. Connections to Water Mains

1. The City Water Division will make all connections to "existing" and "active" water mains and services.
 - a. "Existing" water mains means any water main or service 1/2-inch and larger installed previously by another contractor. Existing water mains are part of the current water system and deliver water to customers.
 - b. "Active" water mains means any new water main or service 1/2-inch and larger installed by a previous contractor or the current Contractor. Active water mains have been hydrostatically pressure tested, disinfected with passing negative bacteriological test results and flushed. Active mains are considered part of the current water system but may not yet deliver water to customers.
2. Temporary Connections for Construction
 - a. Only one temporary connection, including a construction water meter, is allowed for each project. Any remaining connections will be installed by the City upon acceptance of the water mains and before the street or trench is paved. If permanent pavement has been installed, permanent pavement replacement will be completed by the Contractor.

- b. The temporary connection between an existing or active water main and a new water main requires the installation of a new, unused Reduced Pressure backflow prevention assembly (RP).
- c. The RP must be installed above ground with the proper air gap provided. If the RP is located within a public street or an access road to a developing subdivision site, the RP must be located behind the curb or future curb adjacent to the tie-in point. The RP must be visible for inspection at any time.
- d. The RP assembly requires a minimum of 3 inspections by the City Water Division Cross Connection Specialist:
 - 1) Proper configuration and installation per these City Standards
 - 2) Testing for proper functioning
 - 3) Proper removal once all the newly installed water mains have successfully passed the hydrostatic pressure test, been disinfected with passing negative bacteriological results and flushed.
- e. The Contractor shall install the water main up to the existing active water main and connect to the City-designated valve and point of connection to the existing system for all points of connection. The Contractor must schedule with the City Inspector for a City representative from the Department of Utilities, Water Division to witness the connection to the existing system.
- f. Temporary connections shall be scheduled at times designated by the City Water Division to ensure the least inconvenience to all water users.
- g. For non-CIP projects, connections will NOT be scheduled by the City Water Division unless all appropriate connection fees have been paid.
- h. No connection (other than the initial temporary connection) shall be made until the new water has been successfully pressure tested, disinfected and flushed per these specifications.
- i. The Contractor is responsible for protecting the existing system from all physical damage and possible contamination during construction.
- j. For non-CIP projects, the City will provide the pipe, materials and labor necessary to make the final connection to the existing system after removal of the temporary backflow prevention assembly.
- k. Temporary Connection from Existing Fire Hydrant
 - 1) Prior to connecting to a Fire Hydrant for water use during construction, the Contractor shall obtain a City of Modesto Hydrant Use permit from the City of Modesto Finance Division.
 - 2) The permit shall be taken to the City of Modesto Corporation Yard: 501 N. Jefferson Street, Building 1B - Water Division. The City Water Division will issue a Hydrant Meter designate a single hydrant for water use during construction.
 - 3) The City will install an approved Reduced Pressure Principle Backflow Assembly after the Hydrant Meter. The hydrant and assembly shall be protected at times through the use of traffic delineators (cones), barricades, caution tape and other devices accepted by the City.
 - 4) The hydrant meter and backflow prevention assembly must be inspected and tested by the City of Modesto Cross Connection Specialist before use.

G. 1-inch and 2-inch Water Services

1. Excavate the entire trench for the service. Services shall be as close to perpendicular as possible to the water main.
2. Thoroughly clean the outside surface of the water main.
3. If the water main is newly installed and not considered an “active” or “existing” water main by the City Water Division, the Contractor will tap the water main at the proper angle and location for the new service.
4. If the water main is “active” or “existing” according the City Water Division, the Contractor must coordinate and schedule with the City all connections to the water main.
5. Once the water main tap is complete, immediately open the service valve to flush the valve and tapping hole thoroughly.
6. Service pipe shall be installed using proper fittings to maintain vertical and horizontal alignment. The slope of the service pipe shall match the slope of the final grade to maintain minimum cover required.
7. All connections between metal fittings and HDPE service pipe must use metal reinforcing sleeve inserts. Fitting connections must be properly tightened according to the manufacturer’s specifications.
8. Heat-flaring of service pipe is not permitted.
9. Service pipe crossing below gutter, curb and sidewalk shall be installed using horizontal boring or pushing methods. Water pressure washing methods are not permitted.
10. All service pipe trenches are to be backfilled and compacted.
11. Mark service location by chiseling the letter “W” on the face of the curb.

H. Water Meter and Meter Box

1. Special care shall be exercised to ensure proper compaction is made under curb stop so it is vertical and the meter idler is level. The meter idler must be installed with the minimum clear distance of 7 inches to a maximum of 8 inches from the centerline of the idler to the bottom side of the meter box lid. This clearance is required for proper installation of the automated meter reader (AMR) system by the City Water Division.
2. Compaction shall be made under and around the meter box so it remains level. The meter box shall be installed with a brick at the base of each corner to provide a stable footing for the box.
3. The meter box shall be installed at the correct elevation to match final grade of the adjacent sidewalk and curb.

I. 4-inch and Larger Water Service Pipe

- a. Water services shall be installed to the same specifications for water mains and any referenced standards therein.

J. Fire Hydrants

1. Fire hydrant lateral runs shall be installed to the same specifications for water mains and any referenced standards therein.

2. Fire hydrant assemblies shall be installed per the City Standard Details.

K. Permanent Backflow Prevention Assemblies

1. The backflow prevention assembly must be installed above ground with the proper air gap provided. The backflow prevention assembly must be visible for inspection at any time and located per these Standards.
2. The backflow prevention assembly requires a minimum of 3 inspections by the City Water Division Cross Connection Specialist prior to acceptance:
 - a. Proper configuration and installation per these City Standards
 - b. Testing for proper functioning
 - c. Final inspection once all the newly installed water mains have successfully passed the hydrostatic pressure test, been disinfected with passing negative bacteriological results and flushed.

6.09 HYDROSTATIC PRESSURE TEST

- A. After the pipe trench has been backfilled and compacted with 12 inches over the top of the pipe, each section of the pipe to be tested shall be slowly filled with water from the existing system through an accepted temporary backflow prevention assembly and all air shall be expelled from the pipe. Any temporary pipe, fittings, valves, couplings and other materials needed to fill the pipes with water shall be supplied and installed by the Contractor.
- B. All new, previously untested, fire hydrants, curb stop valves at service locations and blow-offs at dead ends must be opened to purge any air at those high points in the new system.
- C. The Contractor shall furnish and install any thrust blocks, temporary caps or plugs, and other necessary materials needed to maintain pressures in sections of pipes being tested.
- D. Partially opened valves will create turbulence through the valve and increase air bubbles in the system. To reduce all air in the new pipe, any inline valve(s) used to control the flow of water into the new section of pipe to be tested must be opened completely before closing the hydrants or blow-offs.
- E. After the system has been filled with water and all air expelled, all valves at the ends of the section to be tested shall be fully closed. The new main and any new hydrants and services (including any meter idler or meter unit) must be pressurized at system pressure for a period of not less than 24 hours.
- F. After the 24-hour pressure equalization period, additional water may be needed to complete the hydrostatic pressure test.
- G. The hydrostatic pressure test requires all mains, hydrants and services (including any meter idler or meter unit) to be pressurized to a minimum gauge pressure of 150 psi or the system pressure plus 50 psi, whichever pressure is greater. The hydrostatic pressure test shall be for a minimum of 2 hours and not vary more than 5 psi. The pump, gauge and all necessary apparatuses or equipment for the test shall be supplied and installed by the Contractor.
- H. During the test, all exposed pipe, fittings, valves, hydrants, and joints will be carefully examined. Any cracked or defective material shall be removed and replaced by the

Contractor to the satisfaction of the City Engineer. The test shall be repeated until no defects remain.

- I. The pipes in the section being tested will not be accepted if total leakage exceeds the allowable leakage. If leaks are detected, the Contractor shall permanently stop all leaks. All pipes, joints and/or appurtenances which prove defective shall be replaced and the mains on which such defect or defects occur shall be tested again to determine final acceptability of the installation.
- J. The formula to be used for allowable leakage of water during a hydrostatic pressure test is:

$$L = \frac{SD\sqrt{P}}{148,000}$$

L = testing allowable leakage, in gallons per hour

S = length of pipe tested, in feet

D = nominal diameter of pipe, in inches

P = average test pressure during hydrostatic pressure test, in psi (gauge)

- K. Allowable leakage per 1000 linear feet at 150 psi gauge pressure of water main is:

Water Main Size	Allowable Leakage (gallons per hour)
6-inch	0.50
8-inch	0.66
10-inch	0.83
12-inch	0.99
14-inch	1.16
16-inch	1.32
18-inch	1.49
20-inch	1.66
24-inch	1.99

6.10 DISINFECTION

- A. Water mains shall be hydrostatically pressure tested prior to any disinfection. Water mains shall be disinfected in accordance these City Standards and AWWA standards for disinfecting water mains. The Contractor must use one of the following 3 AWWA methods to disinfect all new water mains and appurtenances.
 - 1. Tablet Method (average chlorine dose of 25 mg/L),
 - 2. Continuous-Feed Method (24-hr average chlorine dose of 10 mg/L), or
 - 3. Slug Method (3-hr exposure chlorine dose of a minimum 50 mg/L)
- B. The Tablet Method consists of placing calcium hypochlorite granules or tablets in the water main as it is being installed and then filling the main with potable water when installation is completed. This method may be used only if the pipes and appurtenances are kept clean and dry during construction. This procedure must not be used on solvent-welded plastic or on screwed-joint steel pipe because of the

danger of fire or explosion from the reaction of the joint compounds with the calcium hypochlorite.

1. When using calcium hypochlorite granules, the granules shall be placed during construction at the upstream end of the first section of pipe, at the upstream end of each branch main, and at 500-ft intervals.
2. The minimum quantity of calcium hypochlorite granules required in ounces (oz) or grams (g) for commonly used pipe sizes are:

Water Main Size	Calcium Hypochlorite Granules	
	4-inch	1.7 oz
6-inch	3.8 oz	108 g
8-inch	6.7 oz	190 g
10-inch	10.5 oz	298 g
12-inch	15.1 oz	428 g
14-inch or larger	$D^2 \times 15.1$	$D^2 \times 428$

3. When using calcium hypochlorite tablets, 5-gram tablets shall be placed during construction in each section of pipe. Also, one tablet shall be placed in each hydrant, hydrant branch, and other appurtenance. The number of 5-g tablets required for each pipe section shall be equal to 0.0012 times the inside pipe diameter (in inches) squared times the length of the pipe section being disinfected (in feet) ($0.0012 \times d^2 \times L$) rounded to the next higher integer. The tablets shall be attached by a food-grade adhesive. There shall be adhesive only on the broadside of the tablet attached to the inside surface of the pipe. Attach tablets inside and at the top of the main, with approximately equal numbers of tablets at each end of a given pipe length. If the tablets are attached before the pipe section is lowered into place in the trench, the position of the tablets shall be marked on the outside section of the pipe to indicate that the pipe has been installed with the tablets at the top.
4. The minimum quantity of calcium hypochlorite 5-gram tablets required for commonly used pipe sizes are:

Water Main Size	Calcium Hypochlorite 5-gram Tablets		
	Pipe Section Length	13-ft & less	20-ft
4-inch		1	1
6-inch		1	1
8-inch		1	2
10-inch		2	3
12-inch		3	4
16-inch		4	7

5. For filling and disinfection contact with the use of the Tablet Method (granules or tablets), the main shall be filled with water at a rate to ensure that the water within the main will flow at a velocity no greater than 1 foot per second (fps). Precautions shall be taken to ensure that air pockets are eliminated. This water shall remain in the pipe for at least 24 hours. If the water temperature is less

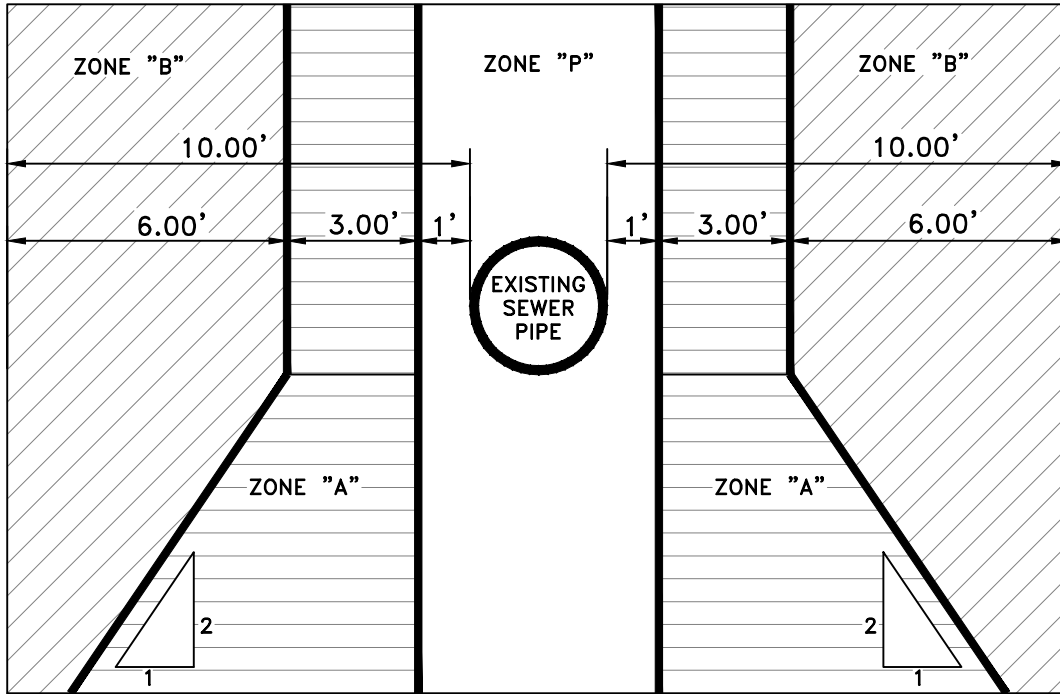
than 41 degrees Fahrenheit, the water shall remain in the pipe for at least 48 hours.

6. The City Water Division will collect and analyze all samples. A detectable amount of “free” chlorine residual should be found at each sampling point after the 24-hour (or 48-hour, when required) period.
- C. The Continuous-Feed Method consists of placing calcium hypochlorite granules in the main during construction (optional), completely filling the main to remove air pockets, flushing the main to remove particulates and re-filling the main with chlorinated potable water. The potable water shall be chlorinated so that after a 24-hour contact period in the main there will be a “free” chlorine residual of not less than 10 milligrams per liter (mg/L).
1. When using calcium hypochlorite granules in conjunction with the continuous-feed method, the granules shall be placed during construction in pipe sections as specified for the Tablet Method. The purpose of this procedure is to provide a strong chlorine concentration in the first flow of flushing water that flows down the main.
 2. Preliminary flushing shall be complete before the main is chlorinated, unless granules are used. Preliminary flushing shall be used to eliminate air pockets and remove particulates. The maximum flushing velocity must not exceed 2.5 feet per second. Flushing is not substitute for preventive measures during construction. Certain contaminants, such as caked deposits, resist flushing at any feasible velocity and pigging of the main may be required.
 3. Flushing for disinfection purposes shall be completed after the preliminary flushing. The water to be used for flushing must be from a temporary, backflow-protected connection to the existing distribution system. The water flow shall be at a constant, measured rate into the newly installed water main through the use of a calibrated and tested flow meter.
 4. At a point not more than 10 feet downstream from the beginning of the new main, water entering the new main shall receive a dose of chlorine fed at a constant rate such that the water will have not less than 25 mg/L free chlorine. To ensure that this concentration is provided, measure the chlorine concentration at regular intervals in accordance with the procedures described in the current edition of the AWWA Manual M12 “Simplified Procedures for Water Examination”.

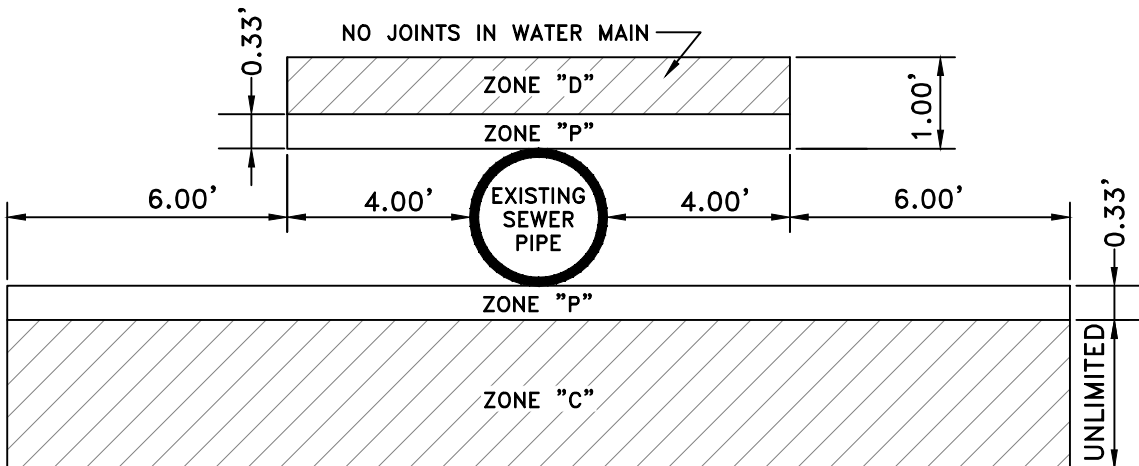
6.11 FINAL FLUSHING

- A. After the applicable retention period for disinfection, heavily chlorinated water should not remain in prolonged contact with pipe. In order to prevent damage to the pipe lining or to prevent corrosion damage to the pipe itself, the heavily chlorinated water shall be flushed from the main fittings, valves, and branches until chlorine measurements show that the “free” chlorine concentration in the water leaving the main is between a minimum of 0.4 mg/L and a maximum of 0.8 mg/L. In all cases, the minimum residual concentration shall be no lower than the existing distribution system or 0.4 mg/L, whichever is greater.
- B. All heavily chlorinated water must be de-chlorinated utilizing a neutralizing chemical applied to the water to be wasted to thoroughly neutralize the residual chlorine. Disposing of de-chlorinated water to the ground surface, the positive storm drainage system or the sanitary sewer system must be pre-approved by the City Environmental Regulatory Compliance Administrator before disposal.

**ALTERNATE DESIGN FOR REDUCED SEPERATION
(TO BE USED ONLY WHERE REQUIRED 10 FT. SEPARATION CANNOT BE OBTAINED)
NEW WATER LINE BEING INSTALLED**



PARALLEL CONSTRUCTION



PERPENDICULAR CONSTRUCTION

NOTES:

1. ZONE "A" REQUIRES SPECIAL PIPE AND SPECIAL PERMISSION FROM THE PUBLIC HEALTH AGENCY
2. ZONE "B" REQUIRES SPECIAL PIPE
3. ZONE "C" REQUIRES SPECIAL PIPE AND PIPE JOINTS ARE NOT ALLOWED
4. ZONE "D" REQUIRES STANDARD PIPE AND PIPE JOINTS ARE NOT ALLOWED
5. ZONE "P" IS A PROHIBITED ZONE.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

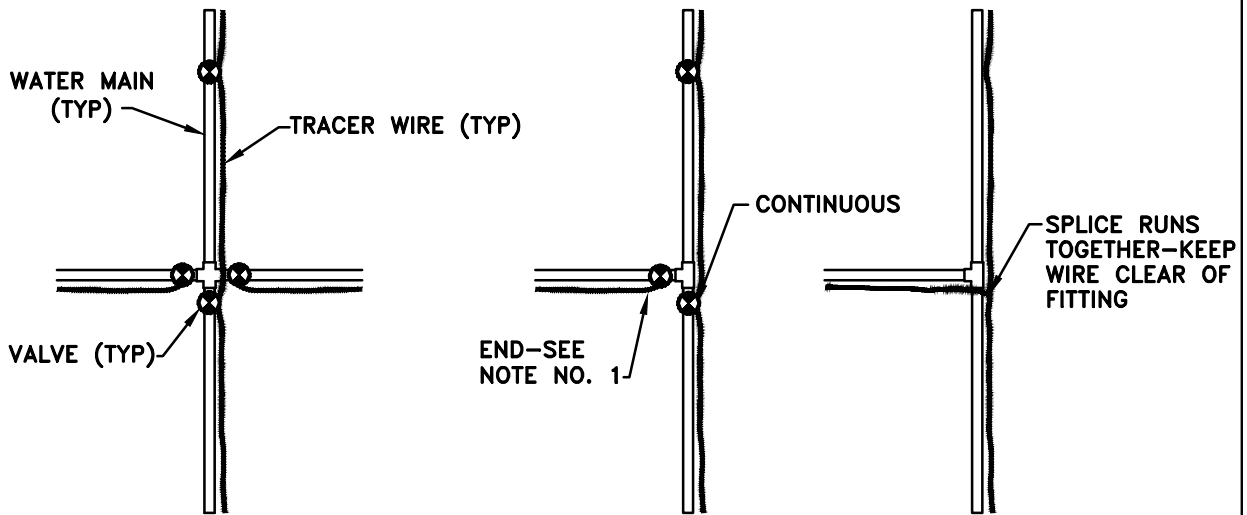
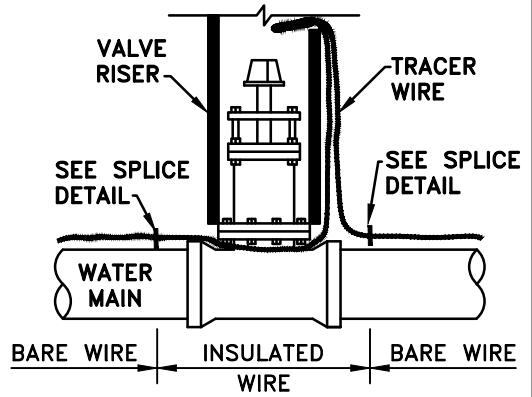
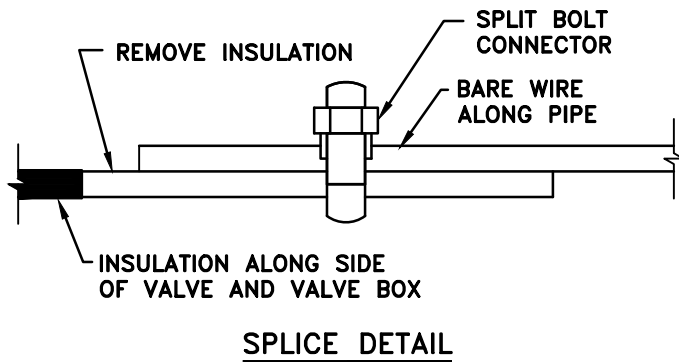
WATER

**WATER MAIN SEPARATION
REGULATIONS**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



DETAIL NO.
600



NOTES:

1. WIRE TO BE CONTINUOUS BETWEEN VALVE BOXES

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

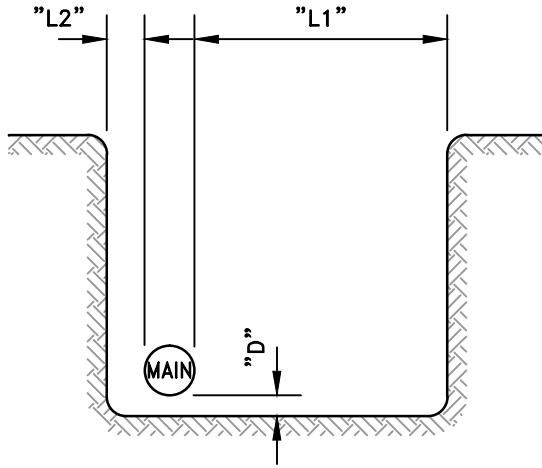
WATER

FIRE LOCATING WIRE

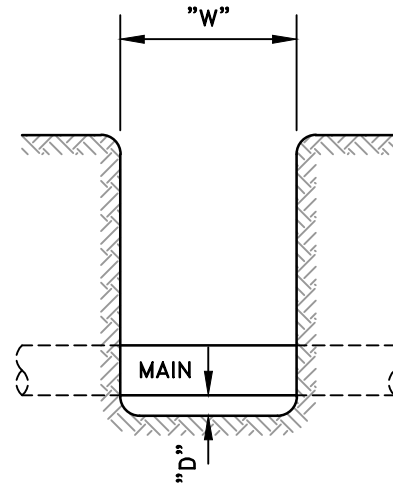


ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
601



PERPENDICULAR TO EXISTING MAIN



PARALLEL TO EXISTING MAIN

EXCAVATION REQUIREMENTS FOR CONNECTIONS TO EXISTING WATER MAINS

EXISTING PIPE SIZE	W	D	L1	L2
4"	3'-0"	0'-6"	7'-0"	1'-0"
6"	4'-0"	1'-0"	7'-0"	1'-0"
8"	5'-0"	1'-6"	7'-0"	1'-0"
10"	6'-0"	2'-0"	7'-0"	1'-6"
12" OR LARGER	6'-0"	2'-0"	7'-0"	1'-6"

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

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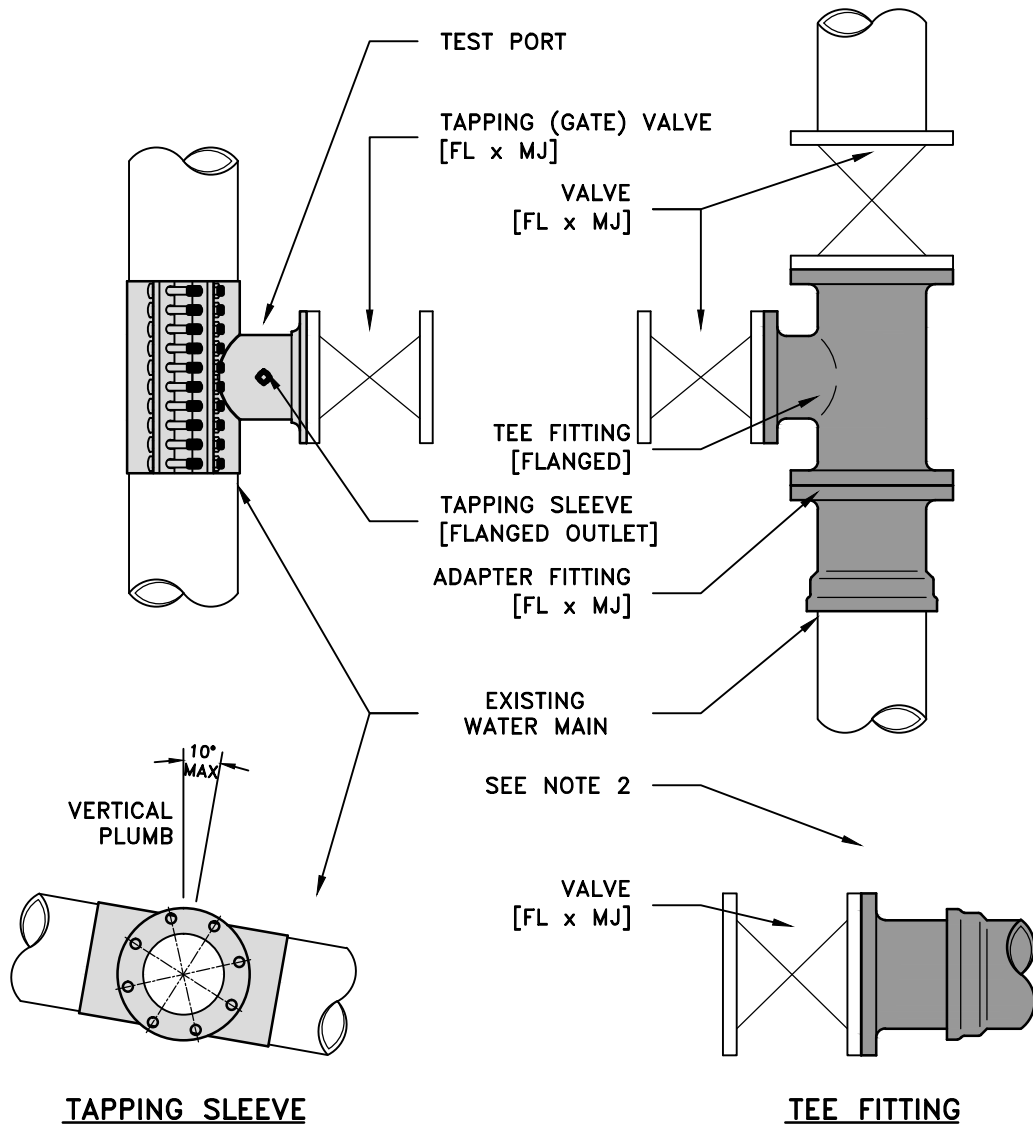
WATER

**EXCAVATION REQUIREMENTS
 FOR CONNECTIONS**

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345



DETAIL NO.
610



NOTES:

1. TAPPING SLEEVE MATERIALS MUST MATCH EXISTING PIPE MATERIAL. FOR PVC PIPE, USE A STAINLESS STEEL SLEEVE.
2. IF VALVE STEM IS MORE THAN 10 DEGREES FROM VERTICAL PLUMB, INSTALL A TEE FITTING WITH A MJ OUTLET AND USE ADAPTER FITTING (FL x PE) TO ALIGN VALVE STEMS VERTICALLY.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

WATER

**NEW WATER MAIN TO
 EXISTING WATER MAIN
 CONNECTION**

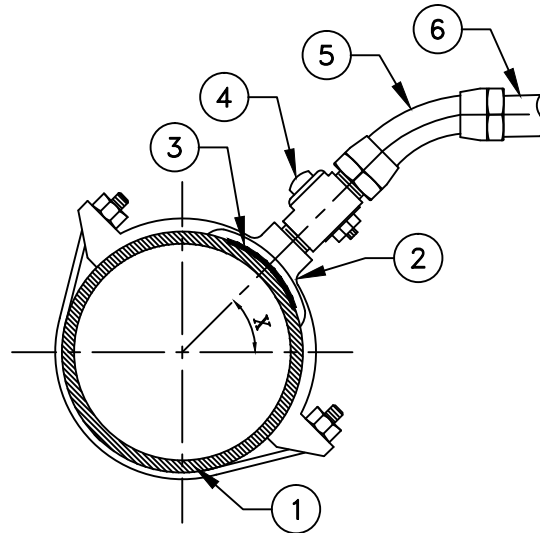
ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345



DETAIL NO.
611

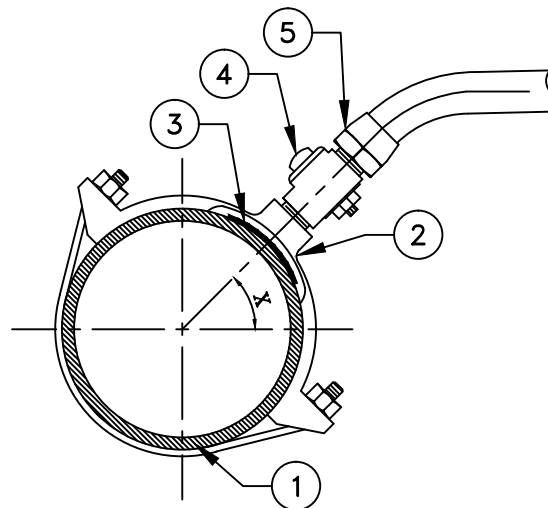
SERVICES FOR 1-1/2" AND 2" METERS

PART	DESCRIPTION
1	WATER MAIN
2	SERVICE SADDLE (2" FIPT OUTLET)
3	RUBBER OR NEOPRENE GASKET
4	BALL CORPORATION STOP (2" MIPT x 2" MIPT)
5	45° ELBOW FITTING (2" FIPT x 2" FIPT)
6	ADAPTER (2" MIPT x 2" COMP)



SERVICES FOR 1" METERS

PART	DESCRIPTION
1	WATER MAIN
2	SERVICE SADDLE (1" FIPT OUTLET)
3	RUBBER OR NEOPRENE GASKET
4	BALL CORPORATION STOP (1" MIPT x 1" MIPT)
5	ADAPTER w/STAINLESS SLEEVE (1" MIPT x 1" COMP)



DEGREES ABOVE SPRING LINE

	MINIMUM	MAXIMUM	APPLICATION
X	35°	55°	SERVICES
X	85°	95°	AIR RELIEF

NOTES:

1. ALL CONNECTION MATERIALS TO BE "LEAD FREE" PER CALIFORNIA DEPARTMENT OF PUBLIC HEALTH STANDARDS.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

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REVISED: DATE:

WATER

1" AND 2" WATER
CONNECTION

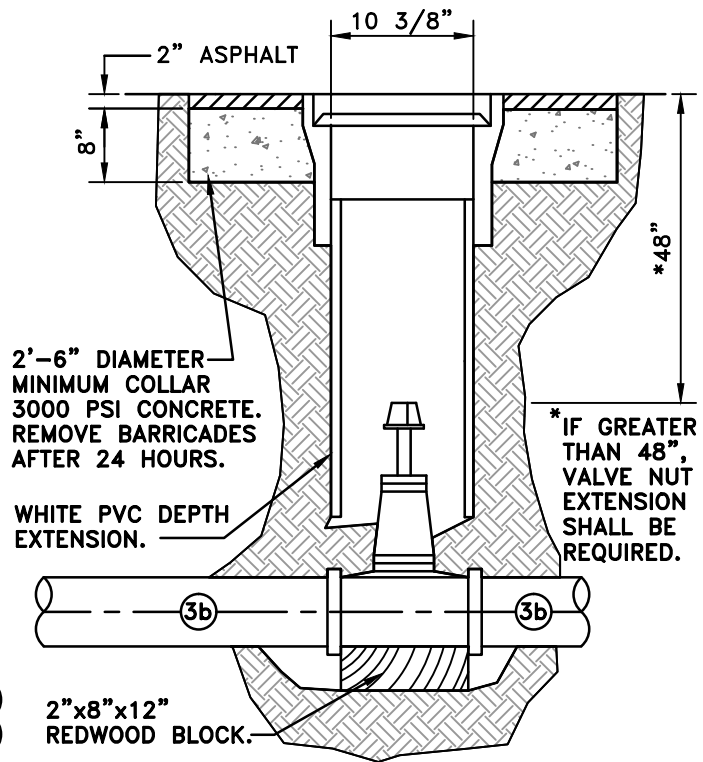
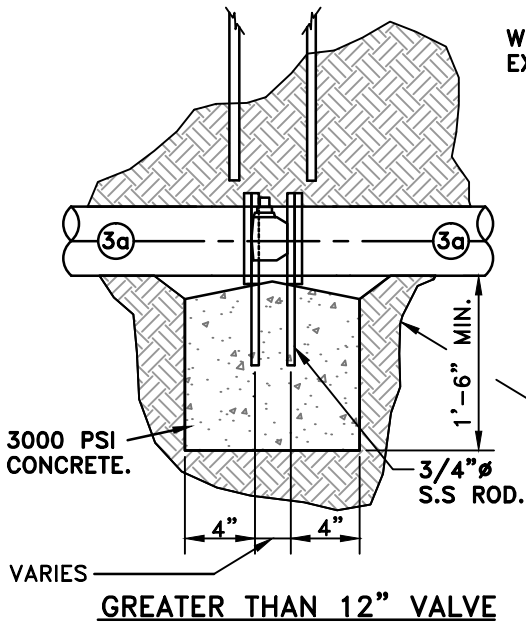
ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



DETAIL NO.
612



VALVE BOX AND COVER



12" VALVES AND SMALLER

AREA BEARING AGAINST UNDISTURBED EARTH SHALL BE A MIN. OF 9' SQUARE.

NOTES:

1. ALL VALVES SHALL HAVE FLANGED CONNECTIONS AT ALL TEES AND CROSSES.
2. REMOVE ALL DEBRIS FROM VALVE EXTENSION
3. SET VALVE BOX TO FINISH GRADE.
4. COMPACT EARTH AROUND BASE WITH MECHANICAL TAMPER TO 95% RELATIVE COMPACTION
5. VALVE BOXES IN UNPAVED AREAS SHALL HAVE CONCRETE COLLAR POURED TO GRADE (WITHOUT 2" ASPHALT).

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

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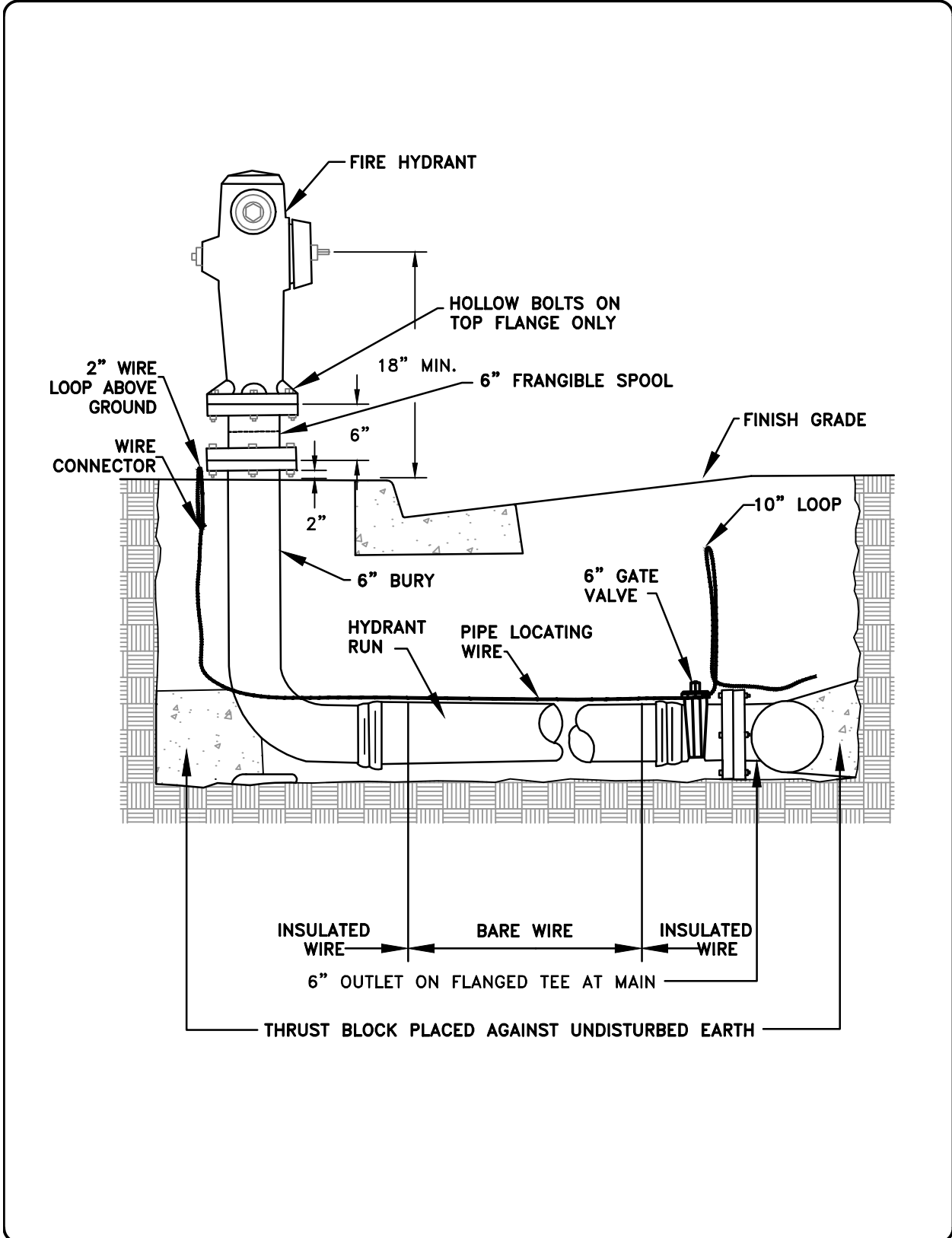
WATER

VALVE BOX



ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

DETAIL NO.
622



APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
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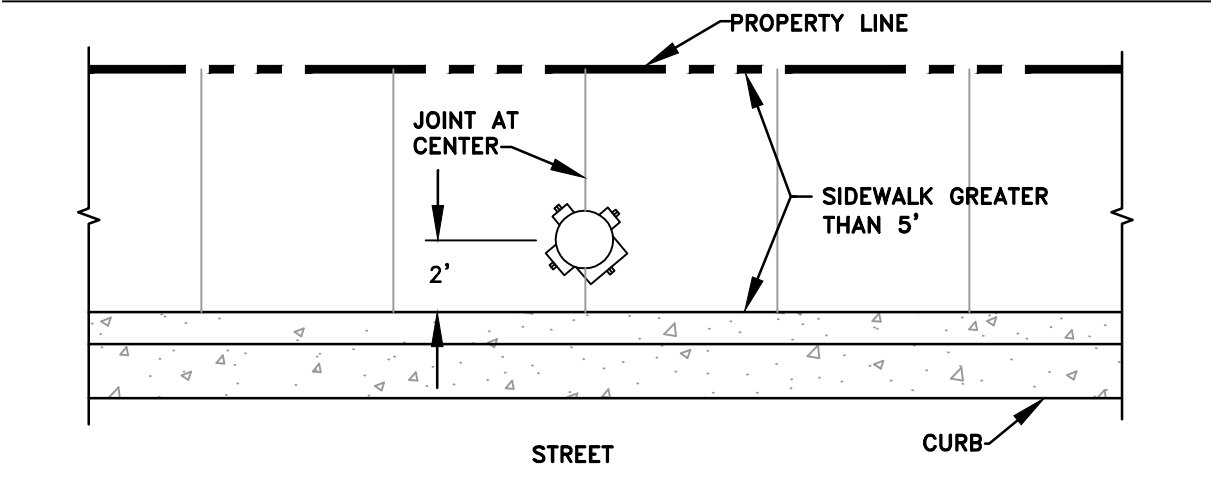
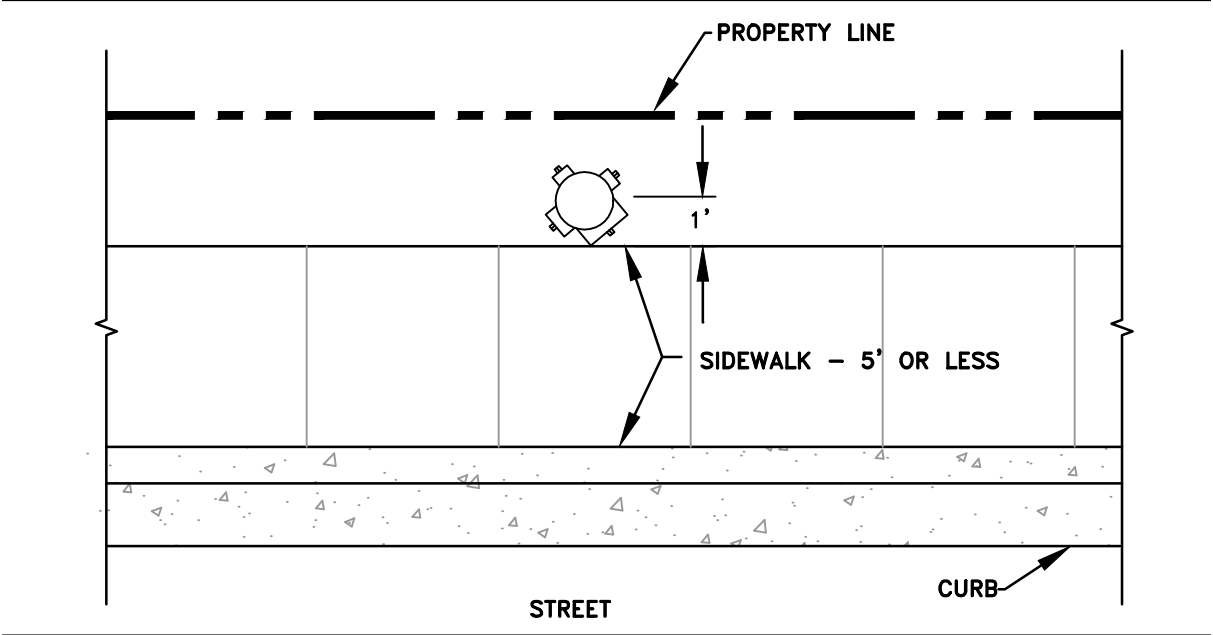
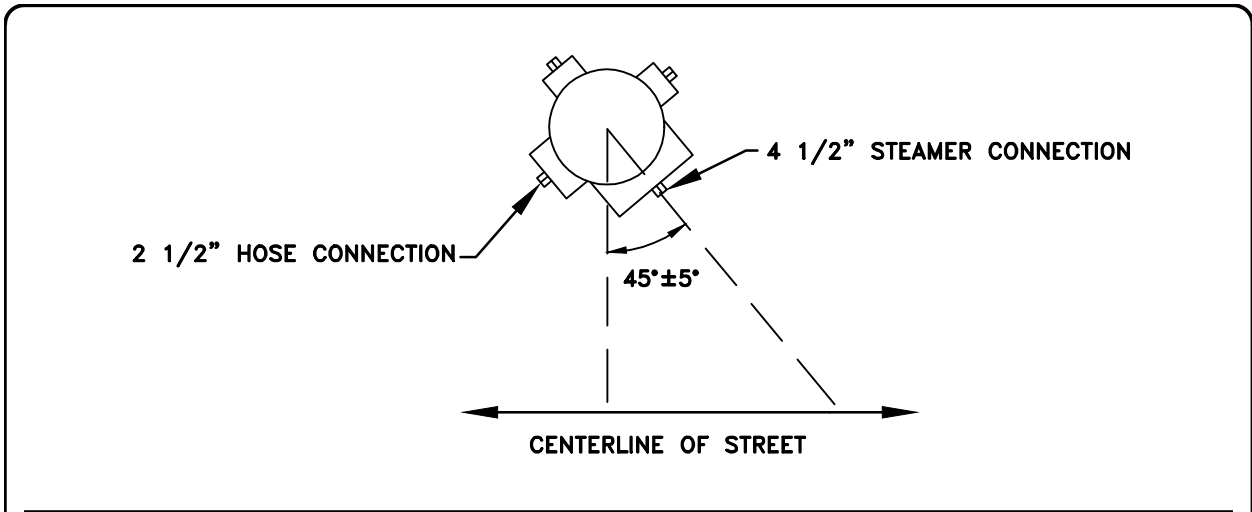
WATER

FIRE HYDRANT SECTION

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

DETAIL NO.
630



APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
REVISED:	DATE:
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WATER

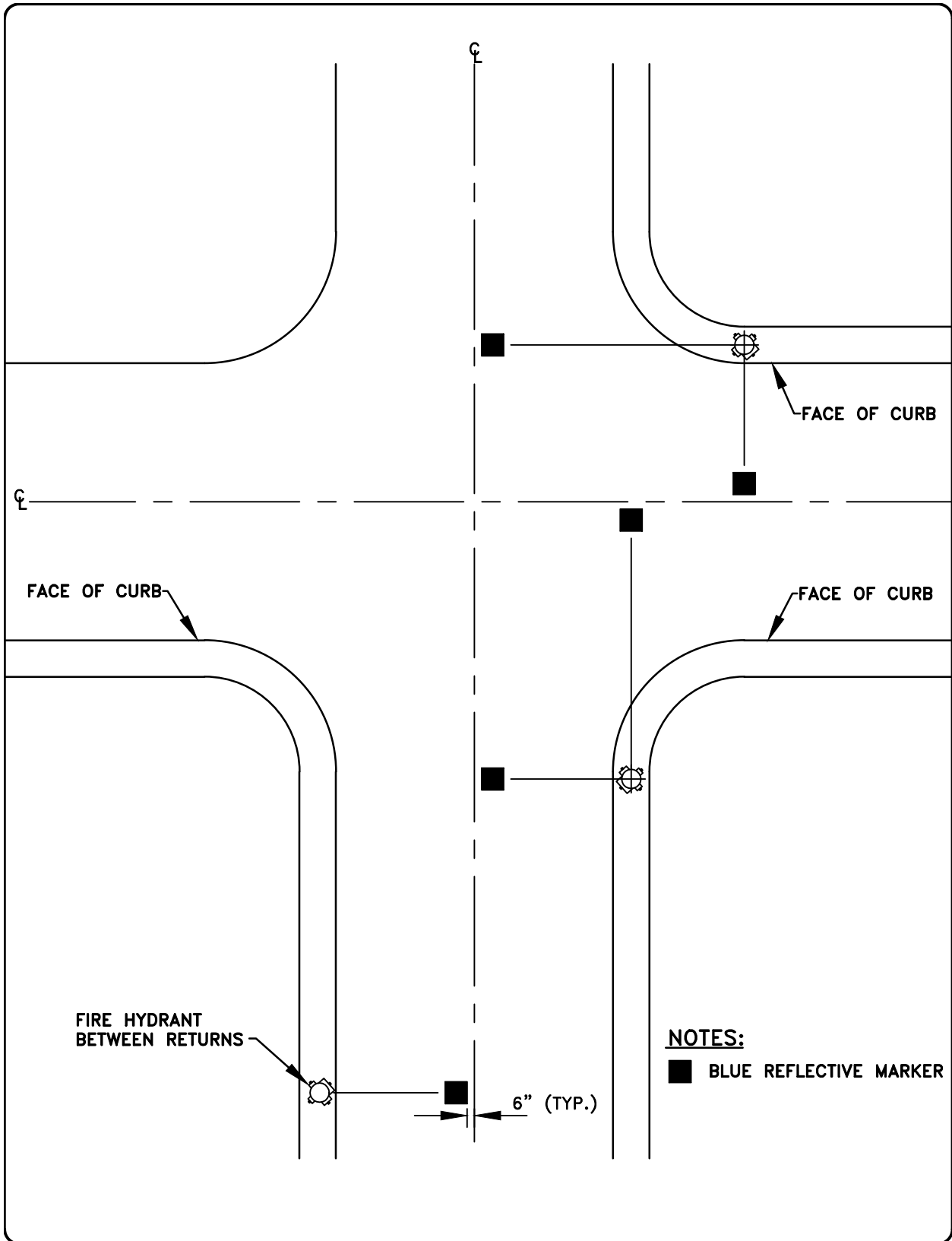
**FIRE HYDRANT
LOCATION**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



MODESTO
CALIFORNIA

DETAIL NO.
631



APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
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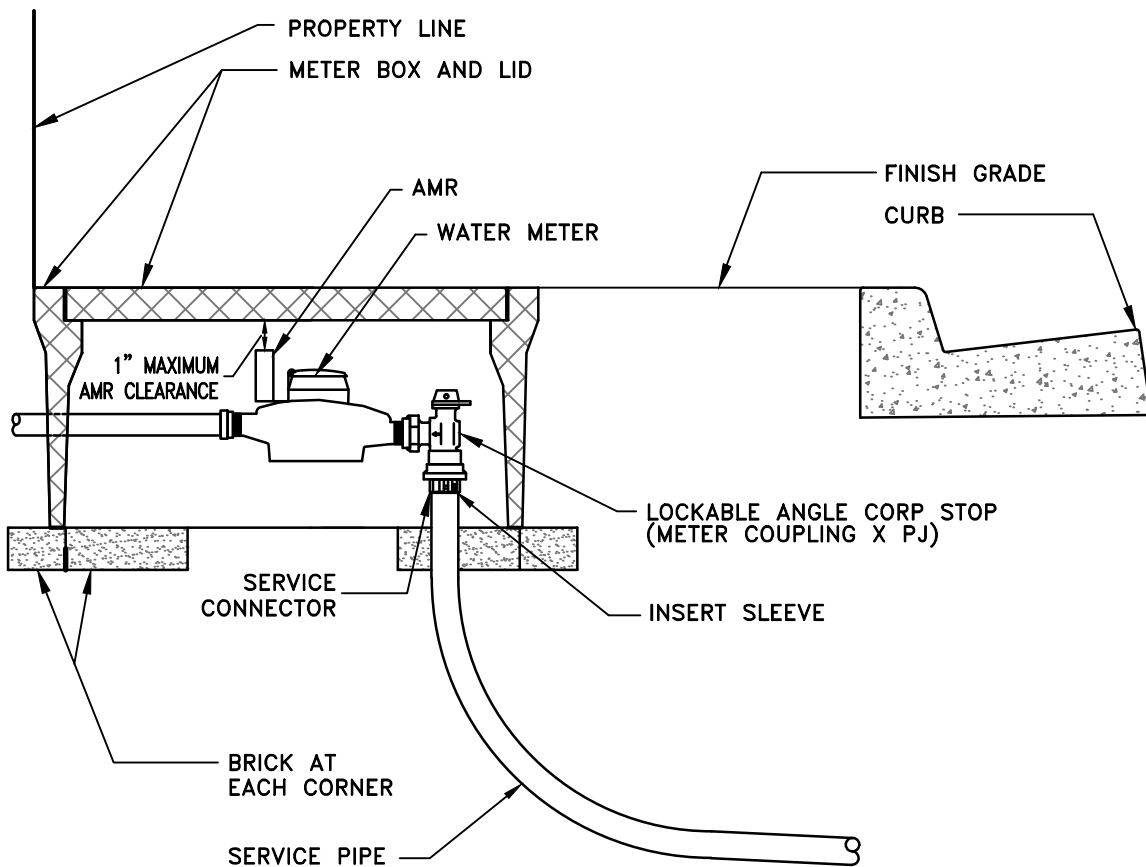
WATER

**BLUE REFLECTIVE
MARKER PLACEMENT**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345


MODESTO
CALIFORNIA

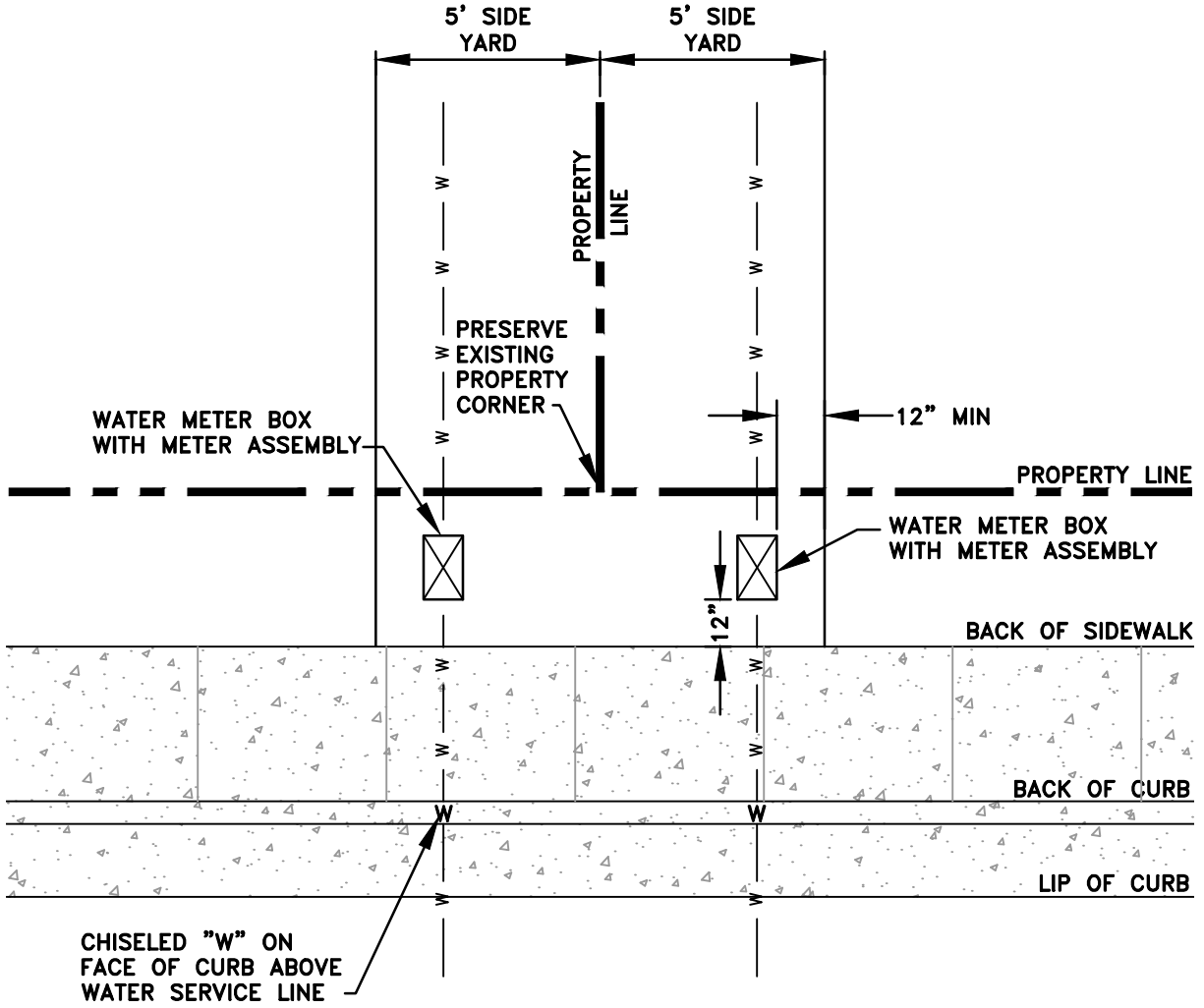
DETAIL NO.
632



NOTES:

1. IF THE SERVICE TRENCH IS IN EXISTING PAVING, THE PAVEMENT STRUCTURAL SECTION SHALL BE REPLACED WITH THE SAME PAVEMENT STRUCTURAL SECTION AS THE WATER MAIN TRENCH.
2. SERVICE SHALL BE A MINIMUM OF 24" BELOW BOTTOM OF CURB.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO WATER METER, METER BOX AND LID, CURB, GUTTER AND SIDEWALK, INCLUDING DAMAGE FROM SETTLING OF THE TRENCH.
4. 1" BADGER METER, MODEL 40, THERMO PLASTIC METER, SHALL READ IN CUBIC FEET.

APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	WATER WATER SERVICE WITH METER	 MODESTO CALIFORNIA
REVISED: DATE:		
REVISED: DATE:		
REVISED: DATE:	ADOPTED BY CITY COUNCIL RESOLUTION NO. 2014-345	DETAIL NO. 640



NOTES:


1. WATER SERVICE SHALL BE INSTALLED WITHIN 5 FT FROM THE PROPERTY LINE AND A MINIMUM OF 12" FROM THE SIDE YARD BOUNDARY.
2. NO WATER SERVICES SHALL BE INSTALLED WITHIN THE LIMITS OF ANY DRIVEWAY.
3. CONTRACTOR SHALL LOCATE AND PRESERVE PROPERTY CORNERS. REMOVAL OR DAMAGE TO PROPERTY CORNERS SHALL REQUIRE REPLACEMENT OF THE PROPERTY CORNER BY A CALIFORNIA REGISTERED ENGINEER (PRE 1982) OR A CALIFORNIA LICENSED LAND SURVEYOR.

APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
REVISED:	DATE:
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REVISED:	DATE:

WATER

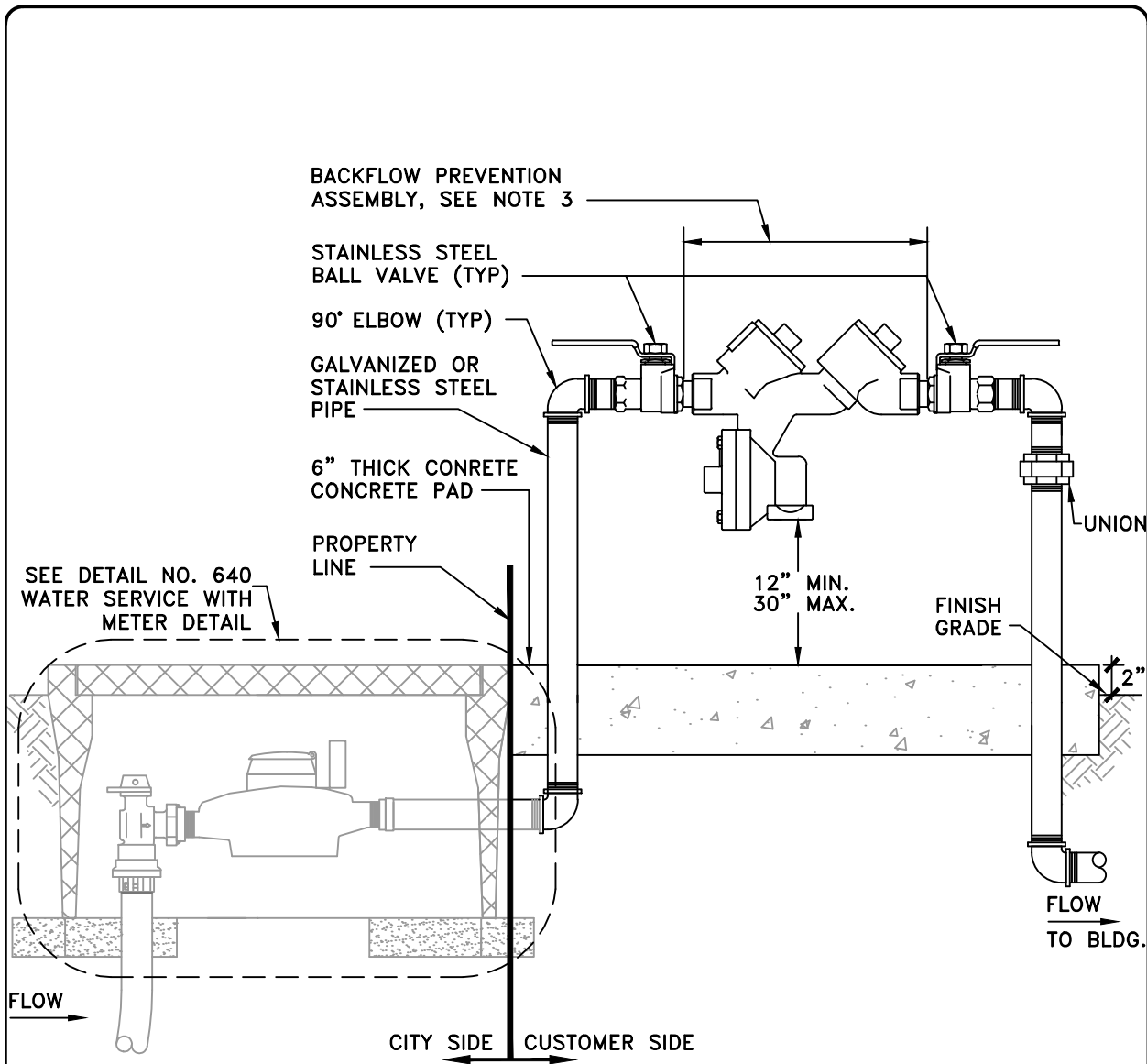
**RESIDENTIAL WATER SERVICE
METER BOX LOCATION**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



**MODESTO
CALIFORNIA**


DETAIL NO.
641

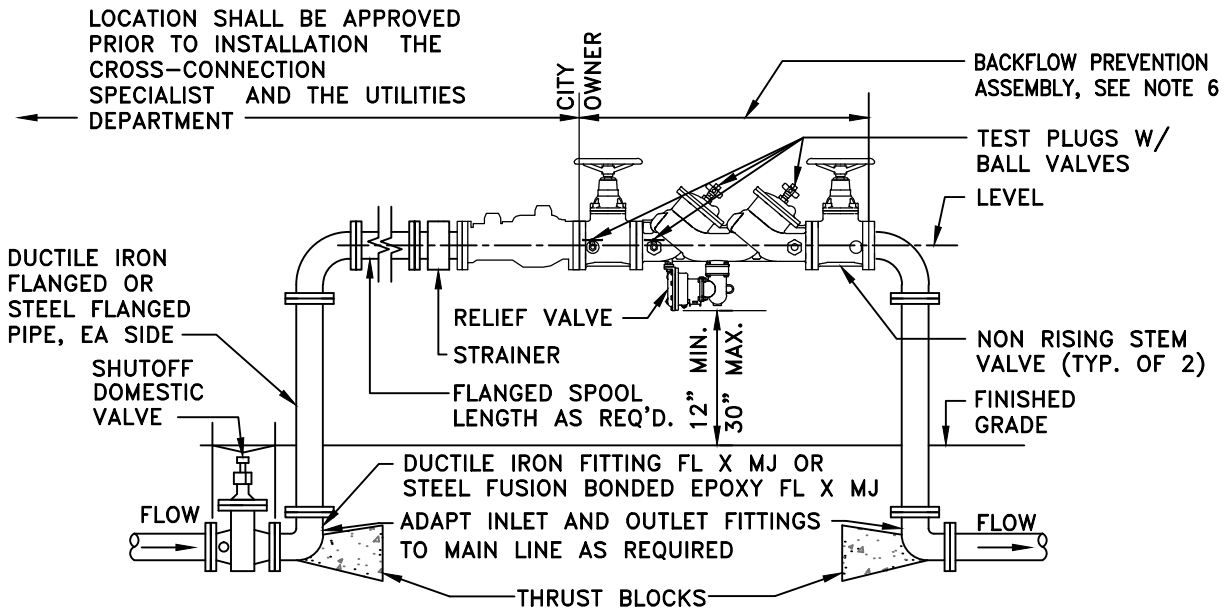
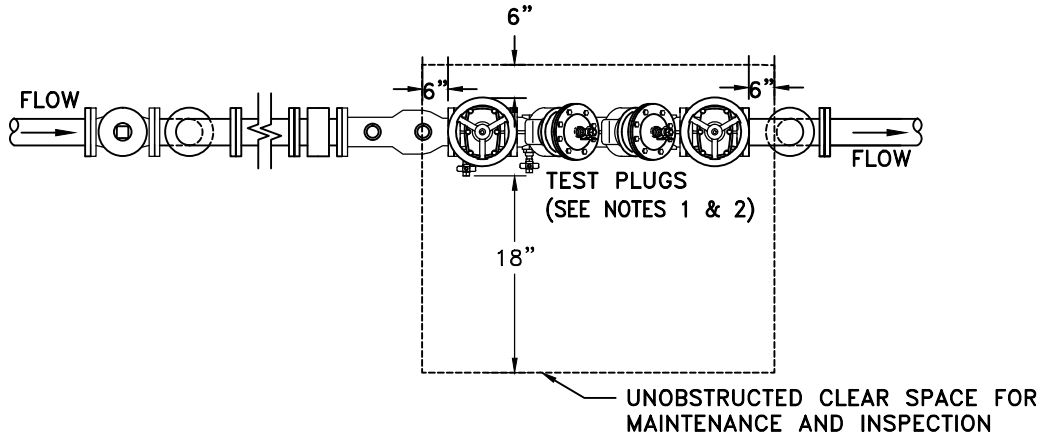


DOMESTIC SERVICE – BACKFLOW PREVENTION ASSEMBLY

NOTES:

1. NO CONNECTIONS WILL BE ALLOWED BETWEEN METER AND BACKFLOW PREVENTION ASSEMBLY OR AT ANY TEST PORT/COCK.
2. LANDSCAPING AND OTHER SITE FEATURES MUST BE MAINTAINED AND PLACED ACCORDINGLY TO ENSURE ASSEMBLY IS ACCESSIBLE FOR TESTING AND MAINTENANCE.
3. BACKFLOW PREVENTION ASSEMBLY MUST BE A REDUCED PRESSURE PRINCIPLE ASSEMBLY TYPE. A DOUBLE CHECK VALVE ASSEMBLY WILL ONLY BE PERMITTED FOR RETROFIT SERVICES AND MUST BE APPROVED BY THE CITY ENGINEER.

APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	WATER REDUCED PRESSURE PRINCIPLE ASSEMBLY FOR SERVICES 1" THRU 2"	 MODESTO CALIFORNIA
REVISED: DATE:	ADOPTED BY CITY COUNCIL RESOLUTION NO. 2014-345	
REVISED: DATE:		
REVISED: DATE:		
		DETAIL NO. 642



DOMESTIC SERVICE – BACKFLOW PREVENTION ASSEMBLY

NOTES:

1. NO CONNECTIONS WILL BE ALLOWED BETWEEN METER AND BACKFLOW PREVENTION ASSEMBLY OR AT ANY TEST PORT/COCK.
2. LANDSCAPING AND OTHER SITE FEATURES MUST BE MAINTAINED AND PLACED ACCORDINGLY TO ENSURE ASSEMBLY IS ACCESSIBLE FOR TESTING AND MAINTENANCE.
3. ALL METERS SHALL BE INSTALLED BY CITY CREWS.
4. ALL CONNECTIONS ON ASSEMBLY TO BE FLANGED.
5. METER AND BACKFLOW PREVENTION ASSEMBLY TO BE LOCATED AT THE PROPERTY LINE.
6. BACKFLOW PREVENTION ASSEMBLY MUST BE A REDUCED PRESSURE PRINCIPLE ASSEMBLY TYPE. A DOUBLE CHECK VALVE ASSEMBLY WILL ONLY BE PERMITTED FOR RETROFIT SERVICES AND MUST BE APPROVED BY THE CITY ENGINEER.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

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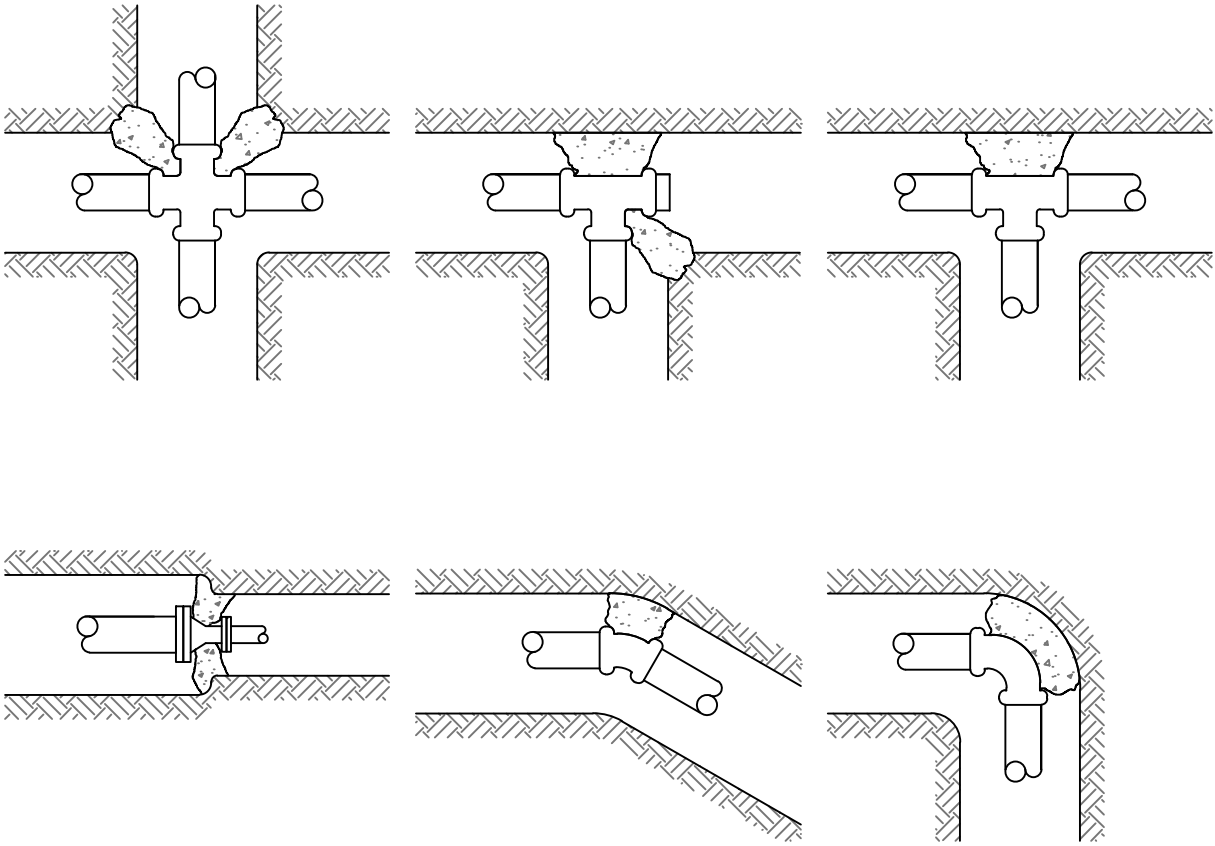
WATER

**REDUCED PRESSURE PRINCIPLE
 ASSEMBLY FOR SERVICES 4"
 OR LARGER**



ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
643



NOTES:

1. SIZES OF THRUST BLOCKS SHALL BE AS PER CITY SPECIFICATIONS.
2. ANCHOR AND THRUST BLOCKS SHALL BEAR AGAINST UNDISTURBED SOIL. IF THE SOIL IS DISTURBED IT SHALL BE COMPACTED TO 90%.
3. KEEP CONCRETE CLEAR OF ALL PIPE OPENINGS.

APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
REVISED:	DATE:
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REVISED:	DATE:

WATER

**THRUST BLOCK
LOCATION**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

DETAIL NO.
650

**MINIMUM THRUST BLOCK AREAS
(IN SQUARE FEET)**

PIPE SIZE	TEE/TAPPING SLEEVE	90° BEND	45° BEND	22 1/2° BEND	DEAD END
4"	1.5	2	1.5	1	1.5
6"	3	4.5	2.5	1.5	3
8"	5	7	4	2	5
10"	8.5	11.5	6.5	3.5	8.5
12"	11.5	16.5	9	4.5	11.5

NOTES:

1. AREAS ARE FOR 150 POUNDS PER SQUARE INCH WATER PRESSURE AND SANDY SOIL. AREAS SHALL BE DOUBLED FOR CLAYEY SOIL.
2. BLOCKING SHALL BE MADE OF CONCRETE AND SHALL BE PLACED BETWEEN UNDISTURBED GROUND AND THE FITTING TO BE ANCHORED. THE BLOCKING SHALL BE PLACED SO THAT THE JOINTS OF THE PIPE AND FITTINGS WILL BE ACCESSIBLE FOR REPAIR.
3. THRUST BLOCKS SHALL BE CONSTRUCTED AT PIPE DIAMETER CHANGES AND AT OTHER FITTINGS NOT LISTED, AND SHALL BE PLACED AS DIRECTED BY THE ENGINEER.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

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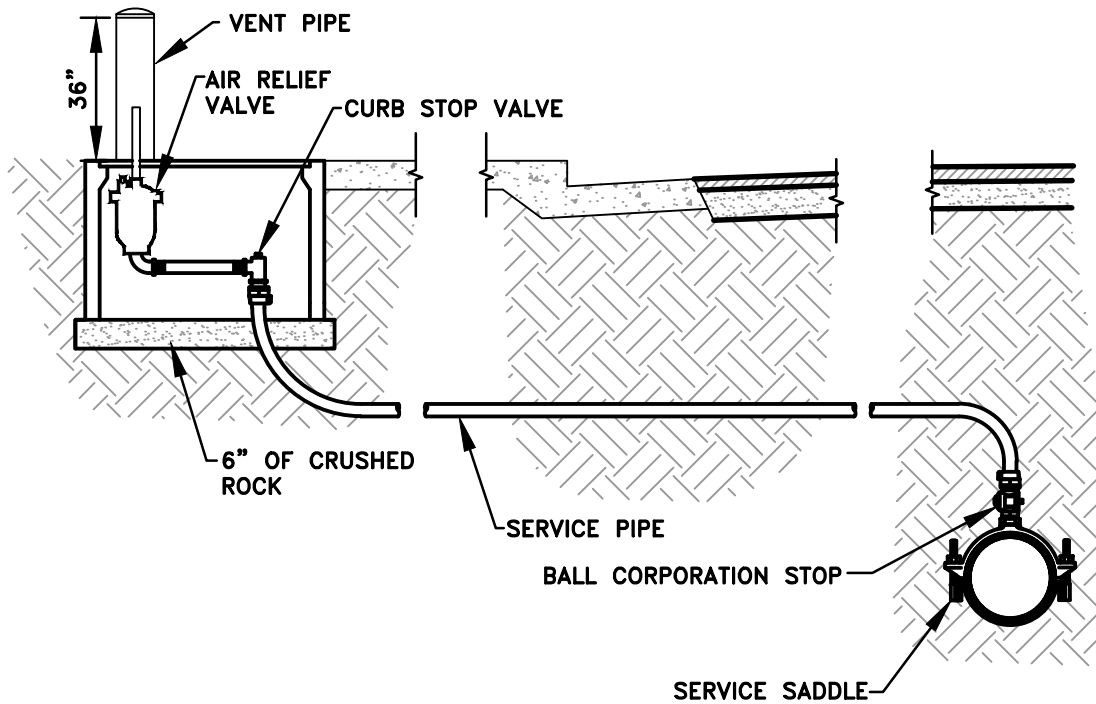
REVISED: DATE:

**WATER
THRUST BLOCKING
AREAS**



ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

DETAIL NO.
651



AIR RELIEF VALVE

NOTES:

1. AIR RELIEF VALVE SHALL BE LOCATED WITHIN A UTILITY BOX AND LID, WITH A VENT PIPE
2. PLACE 6 INCHES OF 3/4 INCH CRUSHED ROCK UNDER BOX.
3. 1 INCH AIR RELIEF VALVE FOR 6 INCH DIAMETER THROUGH 16 INCH DIAMETER PIPE. 2 INCH AIR RELIEF VALVE FOR 18 INCH DIAMETER AND GREATER.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

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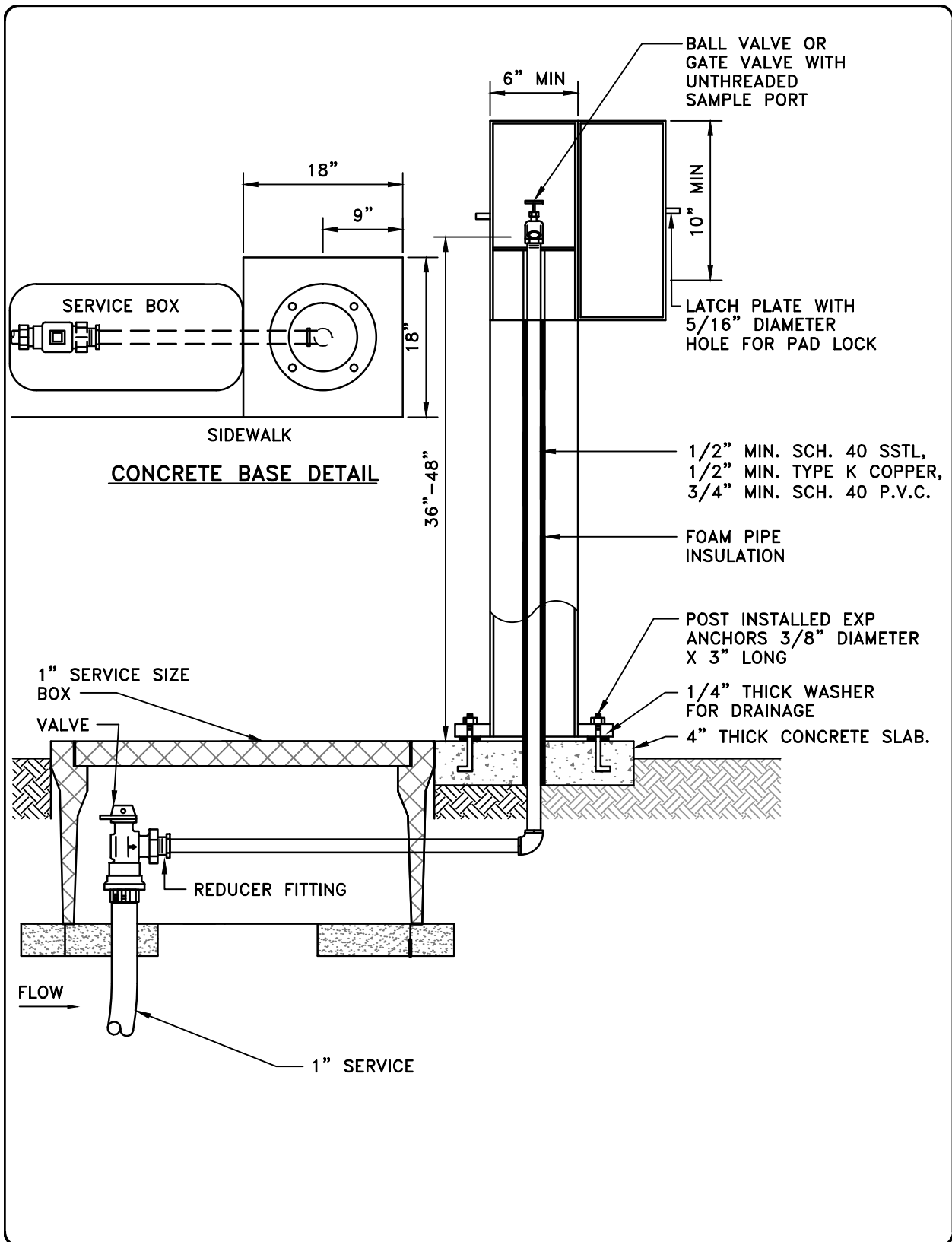
WATER

AIR RELIEF VALVE

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345



DETAIL NO.
653



APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
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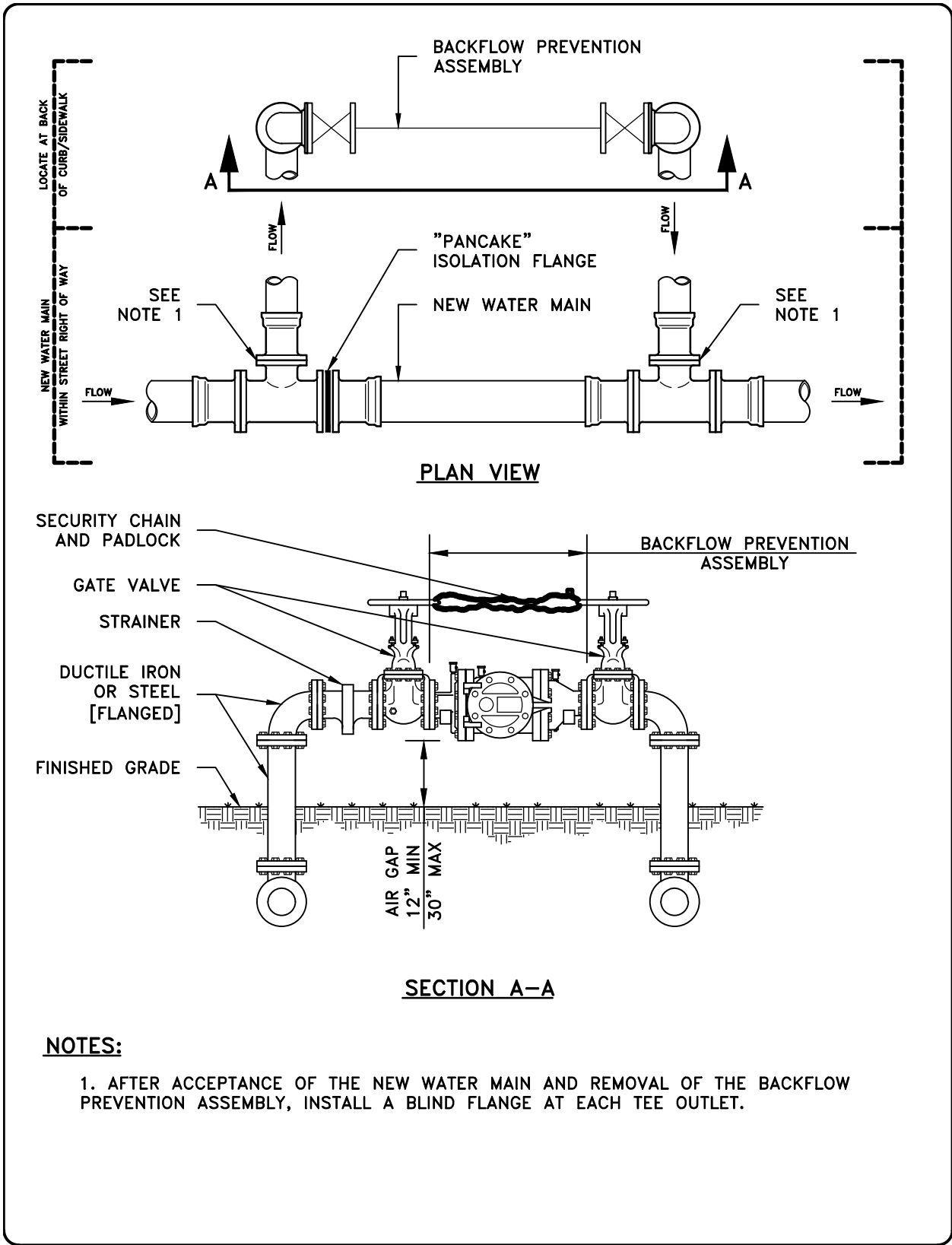
WATER


SAMPLE STATION

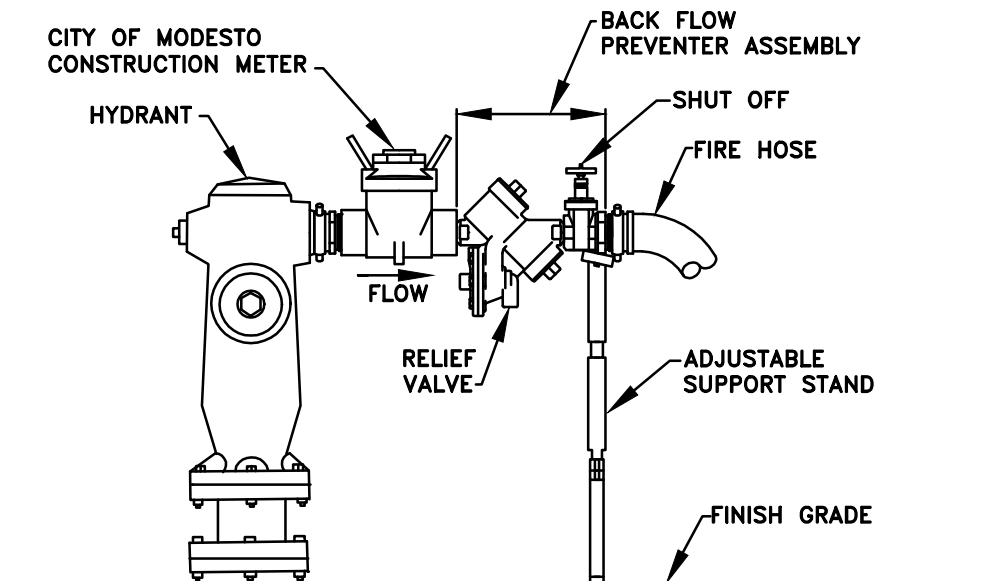
ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

DETAIL NO.
654



APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	WATER TEMPORARY CONSTRUCTION CONNECTION	 MODESTO CALIFORNIA
REVISED: DATE:		
REVISED: DATE:		
REVISED: DATE:	ADOPTED BY CITY COUNCIL RESOLUTION NO. 2014-345	DETAIL NO. 660



NOTES:

1. PRIOR TO CONNECTING TO A FIRE HYDRANT TO OBTAIN WATER FOR CONSTRUCTION PURPOSES, ALL CONTRACTORS SHALL OBTAIN A CITY OF MODESTO PERMIT.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

WATER

**HYDRANT METER
 BACKFLOW PREVENTER**



ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
661

CHAPTER 7

STREET LIGHTING

7.01 GENERAL

- A. This work shall include the furnishing of all labor, materials, tools, and equipment to construct and complete in an efficient and workmanlike manner the installation of the street lighting and electrical system in accordance with the approved plans, these specifications, the City of Modesto Standard Details, and the State Specifications and Standard Plans.

Electrical equipment shall conform to the requirements of the National Electrical Manufacturers Association and material and work shall conform to the requirements of the California Code of Regulations – Title 24, the Electrical Safety Orders of the Division of Industrial Safety, Department of Industrial Relations of the State of California, Rules for Overhead Line Construction G.O. 95, State of California, Public Utilities Commission, the Standards of the American Society for Testing Materials and the American National Standards Institute.

- B. These specifications shall cover the design and installation of street lights and park trail lights. The design and installation shall conform to these specifications, the City of Modesto, Standard Specifications and Plans, and Section 86 of the State Specifications.

The Consulting Engineer shall show the proposed street lighting system or park trail lighting system on the project Improvement Plans.

The plans shall include the following items:

1. Location of electroliers.
2. Intensity of luminaries.
3. Location of service points (Record Drawings).*
4. Location of pull boxes (Record Drawings).
5. Location of conduit runs (Record Drawings).

* Record Drawings – The Consulting Engineer shall provide the final Record Drawings prior to final acceptance of the construction improvements.

The Consulting Engineer shall submit three (3) copies of the street light plans to the City for preliminary review in the initial submittal. The Consulting Engineer shall furnish plans and obtain approvals from Modesto Irrigation District (MID) or Turlock Irrigation District (TID). The Consulting Engineer will then obtain service locations and identification numbers from MID or TID (where possible).

The City will not make a power application for service to MID or TID unless the plans have obtained prior approval from MID.

The cost for all MID or TID services shall be paid for by the Developer or Contractor. This shall include the MID or TID connection charge for energizing street lights.

7.02 DESIGN

A. Spacing, Intensity, and Mounting Heights

1. Street lights shall have the following spacing, intensity, and mounting heights according to the type of street they are to be installed on.

Table 7.02.1 Spacing, Intensity, and Mounting Heights

Type of Street	Spacing (feet)	Luminaire Wattage	Mounting Height
Local & Collector	330'	100W – A, B, C & D	25' H w/ 15' arm
Arterial & Expressway	150' staggered to each side	E	28' H w/ 15' arm (See Number 16.)

2. Street lights shall be placed at street intersections and curves. Additional lights may be added as required.
3. Pole height and arm length shall be as shown in the Standard Details.
4. If possible, street lights shall be located within 3' of a property line.
5. On streets with separated sidewalks, street lights shall be located at the front of sidewalk. The edge of the pole foundation shall meet the front of sidewalk.
6. On streets with monolithic curb, gutter, and sidewalk, street lights shall be located at the back of sidewalk. The edge of the pole foundation shall meet the back of sidewalk. On major streets, street lights shall be located directly behind curb.
7. Where there is only curb and gutter, the center of the street light foundation shall be located 4' from the back of curb.
8. T intersections – A street light shall be located on the through street within 12.5' of the projected centerline of the intersecting street (either direction).
9. Cul-de-sac – A street light shall be located within the bulb if longer than 150', from intersection to radius point of bulb.
10. Four-way intersection/major streets – Street lights shall be located at all curb returns.
11. Four-way intersection/major and minor street - Street lights shall be located at the far right curb returns of the major street in the direction of travel.
12. Four-way intersection/minor streets – A street light shall be located at one (1) of the returns.
13. Electroliers will normally be staggered on opposite sides of the street. Electroliers shall be placed on the inner edge of curves.

14. Electroliers are required at each knuckle. The electrolier shall be located on the outside of the knuckle.
15. Electroliers at roundabouts shall require street lighting to be installed at each crosswalk; two (2) per crosswalk.
16. Mounting height shall conform to overhead clearance specifications GO-95 (at least 10' from high voltage lines)

B. Pull Boxes

1. Pull boxes shall be spaced at a maximum of 200' to the collector location street standard.
2. One (1) pull box shall be located next to each electrolier.
3. One (1) pull box shall be located at each side of all street crossings, at or near the curb return.
4. Pull boxes shall be placed immediately behind the sidewalk in sidewalk areas or 4' behind the back of the curb in non-sidewalk areas.
5. Where a utility company transformer is designated as the service point, a pull box shall be installed adjacent to the transformer. Pull box shall conform to utility company specifications. Advanced arrangements shall be made to schedule delivery. Pull box shall be within 18" of wooden pole.

When a light is to be mounted on a wooden utility pole, Contractor shall furnish all materials as specified herein, including all conduit, conductors, through bolts, lag bolts, etc., for installation by City or MID or TID. Pull box shall conform to utility company specifications. The cost for installation shall be included in the cost for inspection of improvements.

C. Acceptance

Acceptance test – Upon completion of the installation of a circuit, the Contractor shall notify the City Traffic Engineer, who will make the necessary insulation and ground tests. The system will be further tested by two (2) weeks of operation prior to the acceptance of the contract. The street light system from the service point to the electroliers shall be tested for the following items:

1. Identification of light distribution patterns.
2. Acceptability of the ballasts, fixtures, and lamps for electrical and noise standards.
3. Verification that all connections are electrically and mechanically sufficient.
4. Conductors shall move, with minimal effort, within the conduit.

7.03 MATERIALS

A. Poles and Arms

All street light poles and arms shall be hot-dip galvanized steel. Poles shall be foundation mounted and shall not be painted. Twenty-eight (28') foot poles with 15' arms shall be Ameron Catalog No. N-2815-2 or an approved equal. Pole tops and base covers shall be furnished and installed with each pole. Where the pole is not located at the back of the sidewalk, the length of the luminaire arm shall be as directed by the City Engineer. Poles shall have hand-holes near their bases located on the downstream side of traffic.

B. Luminaires

The luminaires shall be as follows or an approved equal:

SN	Existing Fixture Wattage	Total Wattage of Existing Luminaire	Existing Initial Lumen Output	Replacement LED Luminaire Type	Max. LED System Wattage	Min. Initial LED Delivered Lumens
1	100W HPS, Type II	144 W	9,500	A	48	4,700
2	100W HPS, Type III	144 W	9,500	B	53	4,800
3	150W HPS, Type II	204 W	16,000	C	68 to 75	6,200 to 6,900
4	150W HPS, Type II-4	204 W	16,000	D	68 to 75	6,200 to 6,900
5	200W HPS, Type III	240 W	22,000	E	91 to 100	9,120 to 9,500
6	Higher Wattage Luminaires and Mercury Vapor	Varies	Varies	E	91 to 100	9,120 to 9,500

The LED luminaire minimum lumen, wattage, Back light, Up light, Glare (BUG) ratings and approved manufacture5r/model series shall be as follows:

Replacement LED Luminaire Type	Type of Lighting Distribution	Minimum BUG Rating or Better	Approved Manufacturer and Model/Series		
A	II	B1 U0 G1	Leotek GreenKingCobra	CREE XSP Series	
B	III	B1 U0 G1			
C	II	B2 U0 G1			
D	II-4	B2 U0 G1			
E	III	B2 U0 G1			

Luminaires shall have LED lamps, acrylic refractors, built-in receptacles for photoelectric cells with a power factor of not less than 92%.

C. Foundations

Foundations shall be constructed of Portland cement concrete per State Specifications 90-10 "Minor Concrete" and shall be located per City of Modesto

Standard Details. Foundations shall rest on firm ground. The area around each foundation shall be backfilled and compacted per Standard Details. The concrete shall have a minimum 28-day compressive strength of 3,000 psi.

D. Conductors

Conductors shall be No. 10 AWG copper or larger, THW single conductor, Underwriters Laboratory approved.

E. Conduits

Conduit and fittings shall be rigid galvanized metal or rigid PVC in locations where approved by the National Electrical Code, 1" minimum diameter, as shown on Standard Detail #702. All fittings installed in concrete shall be of the concrete tight type. All 90° elbows and risers shall be rigid metal.

Conduit shall be zinc-coated by the sheradizing, hot-dip, or electro-plating process. Each length shall bear the label of the Underwriters Laboratory, Inc.

F. Wood Pole Mount

Where use of existing wood poles is approved by the City Engineer, brackets for street lights mounted on wooden utility poles shall be Ameron Catalog No. 961-15N2 or approved equal. Brackets shall be 15' in length.

G. Pull Boxes

All pull boxes shall be according to City of Modesto Standard Details, or approved equal with bolt-down lids. The bolts for the bolt down lids shall be ½ inch. All pull box lids shall identify the circuit as Street Lights, or Service. Traffic lids shall be used when pull boxes are placed in areas traveled by vehicles. The traffic lids shall be per manufacturer's specifications (Caltrans No. 5 or Christy B1324 or equivalent). Pull boxes for utility company shall conform to utility specifications. A ground rod (3/4" & clamp) shall be installed at first pull box away from utility company pull box.

Approved Pull Boxes

Brand	Box With Cover	Cover Only	8" Extension	Notes
New Basis (Shown)	FCA132418T	PCC132418A1A20	FCE132408T	Fiber reinforced polymer (FPR) body polymer concrete box with polymer lid & SS Penta bolts
CDR	A10-1324-1870	C10-1324-0226	E00-13240833	Fiber reinforced polymer (FPR) body polymer concrete box with polymer lid & SS Penta bolts
Armorcast	A6001946TAX18	A6001969	A6001646EX8	Fiber reinforced polymer (FPR) body polymer concrete box with polymer lid & SS Penta bolts

H. Ballast

All street lights shall have regulator ballasts and shall be multi-tap 120/208/240/277 volt operational.

I. Trenching

Trenching for street lights shall be in a separate trench. Depth of trenching shall be, per Standard Details.

J. Photo Electrical Control

Photoelectric cells shall be adjustable, compatible with related equipment and adequate for the load. They shall be Acvity Brands Controls – DSS124F1.5 TJJE-Fail Off or an approved equal. Photoelectric control shall be placed at decorative light controller with multiple 30-amp contactors for residential and downtown installations. Maximum of five (5) contactors, per cabinet.

K. In-line Fuse Holders

Fused splice connectors shall be installed in pull box at the service location adjacent to an electrolier, and in pull box at each street light standard. All splices shall be made with wire connections, ITT No. 10-604, 10-606, 10-6010, or approved equal. Cabinet location for light circuit as approved by the City Traffic Engineer.

L. Fuses

All fuses to be rated at 30 amps at service point and 10 amp in pull box at each street light standard unless otherwise directed by the City Traffic Engineer. Fuse shall be the slow blowing type.

M. Anchor Bolts

Anchor bolts shall be 1" in diameter, 36" long with a 4" L-bend at the bottom end. Anchor bolts shall conform to ASTM Designation A 307.

N. Service Connections

Materials needed to connect street lighting circuits to MID or TID power shall be supplied by the Developer and forwarded to MID or TID. These materials will be from the power source on the pole to the fuse holder in the pull box.

7.04 INSTALLATION

A. Foundations

1. Foundations shall be placed monolithically to within 4" below sidewalk grade. After pole is installed, a 36" square cap shall be placed to bring the foundation to sidewalk grade.

2. In areas of reconstruction, all work on foundations must conform to Section 15-2.05, 86-2.02, and 86-2.03 of the State Standards. Sidewalk grade may be lowered a maximum of 2". In no case shall the base of the standard be permitted to be more than 2" above grade. Where the new grade will be higher than the original established grade, the standards may be raised as permitted by unused threads on the anchor bolts. In all cases, a full nut of threads must be maintained. Welding shall not be performed on the body of high strength anchor bolts. Base of standards may never be left below grade. Where these Standards cannot be met, a new pole foundation must be installed.

B. Conduits

1. All conductors shall be run in conduit. Conduit to be installed underground shall be rigid metal type conforming to Article 346 of the Electrical Code and Section 4.3, "Conduit," of the City Standards, Schedule 80 PVC plastic conduit shall be used on wood poles, with the first 10' above grade being rigid non-metallic type.
2. Conduit terminating in each standard or pull box shall be electrically connected to each other with a copper ground strip equivalent in area to No. 8 AWG copper wiring using insulated grounding bushings with the facilities to connect ground wire.
3. Metallic conduit shall be installed at a minimum depth of 18" below Portland cement concrete sidewalk finish grade and 30" below all finished grade in all other areas such as, top of curb, in streets, alleys, easements, park strips, planting strips, etc. Conduits shall be jacked or trenched with an earth saw to the specified depth. Depth of conduit shall not exceed 48".
4. An alternate method of placing conduit, as approved by the City Engineer, pertaining to straight line runs of Schedule 40 PVC conduit may be in street area only as follows:
 - a. Conduit shall be placed under existing pavement in a trench approximately 2" wider than the outside diameter of the conduit to be installed. Trench width shall not exceed 6". The top of the installed conduit shall be a minimum of 18" below Portland cement concrete sidewalk. All other areas shall be 30" minimum.
 - b. Install street light conduit 6" behind curb where no sidewalk exists, behind 5' sidewalk except on major streets, 6" behind curb on major streets with or without sidewalk, or as directed by the City Engineer.
5. The outline of all areas of pavement to be removed shall be cut to a minimum depth of 3" with an abrasive type saw or with a rock cutting excavator specifically designed for this purpose. Cuts shall be neat and true with no shatter outside the removal area.
6. The conduit shall be placed in the bottom of the trench and the trench shall be backfilled with commercial quality concrete, containing not less than 564 pounds of cement per cubic yard, to not less than 0.20' below the pavement

surface for asphalt surfaced roadways and 0.50' below the pavement surface for Portland cement concrete surfaces. The top 0.20' of asphalt surfaced roadways shall be backfilled with asphalt concrete produced from commercial quality paving asphalt and aggregates, and the top 0.50' of Portland cement concrete surfaced roadways shall be backfilled with commercial quality concrete containing not less than 705 pounds of cement per cubic yard and accelerating admixtures or other provisions for high early strength. Calcium chloride shall not be used in concrete which will be in contact with metal conduit. Conduit installed under street crossings, sidewalks, into pull boxes and foundations shall be Rigid Metal. Connections to PVC conduit shall be by approved fittings.

7. Exposed Conduit Installation. Run exposed conduits at right angles or parallel to structural members. Rigid metal conduit shall be installed the first 10' above grade. Conduits shall be securely fastened in place. All conduits regardless of size shall be secured with (2) hole straps. Conduits 1 1/4" and larger shall be secured with conduit hangers or two (2) hold galvanized straps. All straps shall be stand-off type. Plumbers tape shall not be used to secure conduits. Provide junction or pull boxes where required for pulling conductors due to excessive numbers of bends or length of conduit runs. All unused conduit openings shall be plugged or capped. Caulking compound or wooden plugs shall not be used.
8. Where factory bends are not used, conduit shall be bent without crimping or flattening using the longest radius practicable. In no case shall the bend radius be less than six (6) times the inside diameter of the conduit. Light conduit connection locations on MID or TID poles to be determined by MID or TID.

C. Conductors

1. Conductors for 120 volt lighting shall be No. 10 AWG THW copper, THWN copper wire, or as shown on the plans. The neutral conductor shall meet the Article 200 of the NEC and shall have a white outer finish up to and including No. 8 AWG. No. 8 and above shall be permanently marked. A No. 10 grounding conductor for all PVC run shall be AWG THW or THWN or as shown on plans and approved by the National Electrical Code. AUL listed lubricant shall be used in placing conductors in conduit.
2. Conductors shall be identified with street light pole number in the service box. Identification shall be by direct labeling, tags, or bands and shall be weather proof.
3. No conductors shall be drawn into the conduit until the conduit run is complete and the conduit is free of debris. If the conduit is installed in a pole foundation, the conductors shall not be drawn into the conduit for at least three (3) days after placement of the foundation concrete.
4. Conductors shall not be spliced except in pull boxes when approved by the City Engineer. The splices shall be made as follows:

- a. Where specifically approved by the City Engineer, splices in pull boxes shall be made using Ilson IK8 10 STP – 8 STP split bolt or approved equal to connect wire ends. Split bolt shall be wrapped first with Plymouth Bishop 122 Rubber Tape (splicing compound) #2002 or approved equal and then with 3M"33+" electrical tape or approved equal. The entire splice shall be coated with 3M "Scotchkote" electrical coating or approved equal.

D. Poles

Poles shall not be installed until the foundation has set at least five (5) days. Poles shall be plumbed by adjusting the leveling nuts; leveling shims shall not be used. The poles shall be grounded to conform to the provisions of the California Code of Regulations – Title 24.

E. Connection to Electrical Distribution System

1. Where lighting circuit and energy source meet, the circuit shall terminate in MID's or TID's service boxes or pull boxes, as shown in the Standard Plans. The circuit shall terminate with a Bussman TRON fuse-holder, with 30 amp, cartridge fuse, type HEB-AB or approved equal. All connection points shall be waterproofed.
2. For City projects, the fuse shall be taped to the cable and there shall be 4' of slack conductor coiled in service box. For private development of new subdivisions, deliver fuses and the fuse holders for the street lights to MID's Electric Maintenance Division at 929 Woodland Avenue (ph 209.526.7660).
3. MID or TID shall make service connections for light standard in pull box. Where service is from an overhead source, MID or TID shall supply and install conduit and cable on utility pole and make connections in pull box located at base of pole as per Standard Detail #702. Where service is from an MID or TID transformer, and no service or pull box exists, Contractor shall furnish and install a pull box at transformer location, as shown on the Standard Plans. Contractor shall furnish and install conduit and conductors from pull box into MID or TID transformer. Entrance into MID or TID transformer shall be coordinated with, and supervised by MID or TID.
4. The connection to either an overhead or underground energy source will be made by MID or TID, upon receipt of request for service by City. All necessary wiring, conduit, etc. to an existing and available power source shall be installed prior to acceptance by the City. Request for service is made upon completion of work by Contractor or upon development of adjacent property.

7.05 MEASUREMENT AND PAYMENT

A. Street Lights

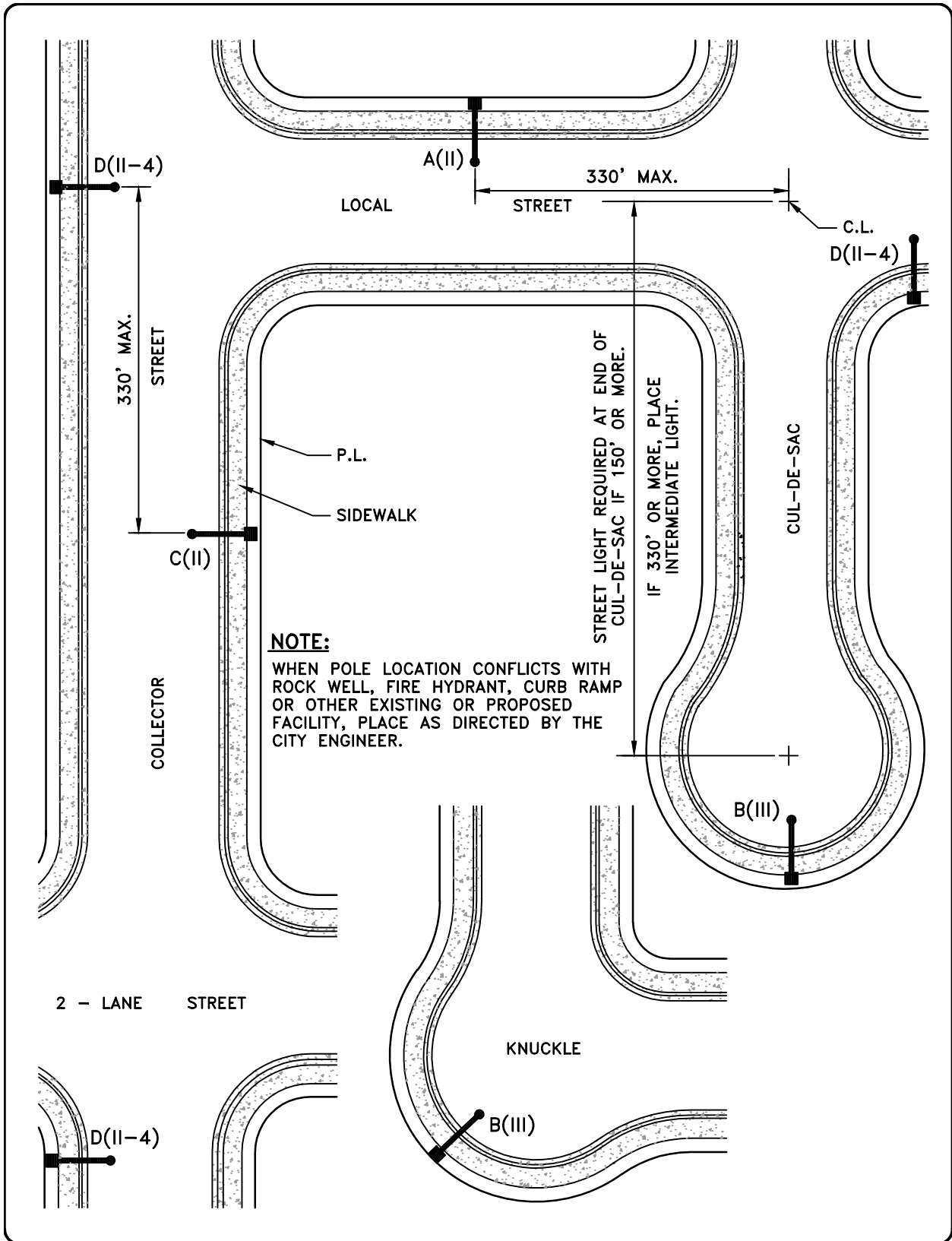
Street lights shall each be measured and paid for as one (1) complete installed unit in operable condition including concrete foundation, pole with mast arm(s), luminaire complete with ballast and lamp, photoelectric control, conductors in the pole and grounding.

B. Conduit and Conductors

Conduit plus all conductors to be paid for by the linear foot of conduit.

C. Pull Boxes

Pull boxes shall be measured and paid for as one (1) complete installed unit, including the base and lid.



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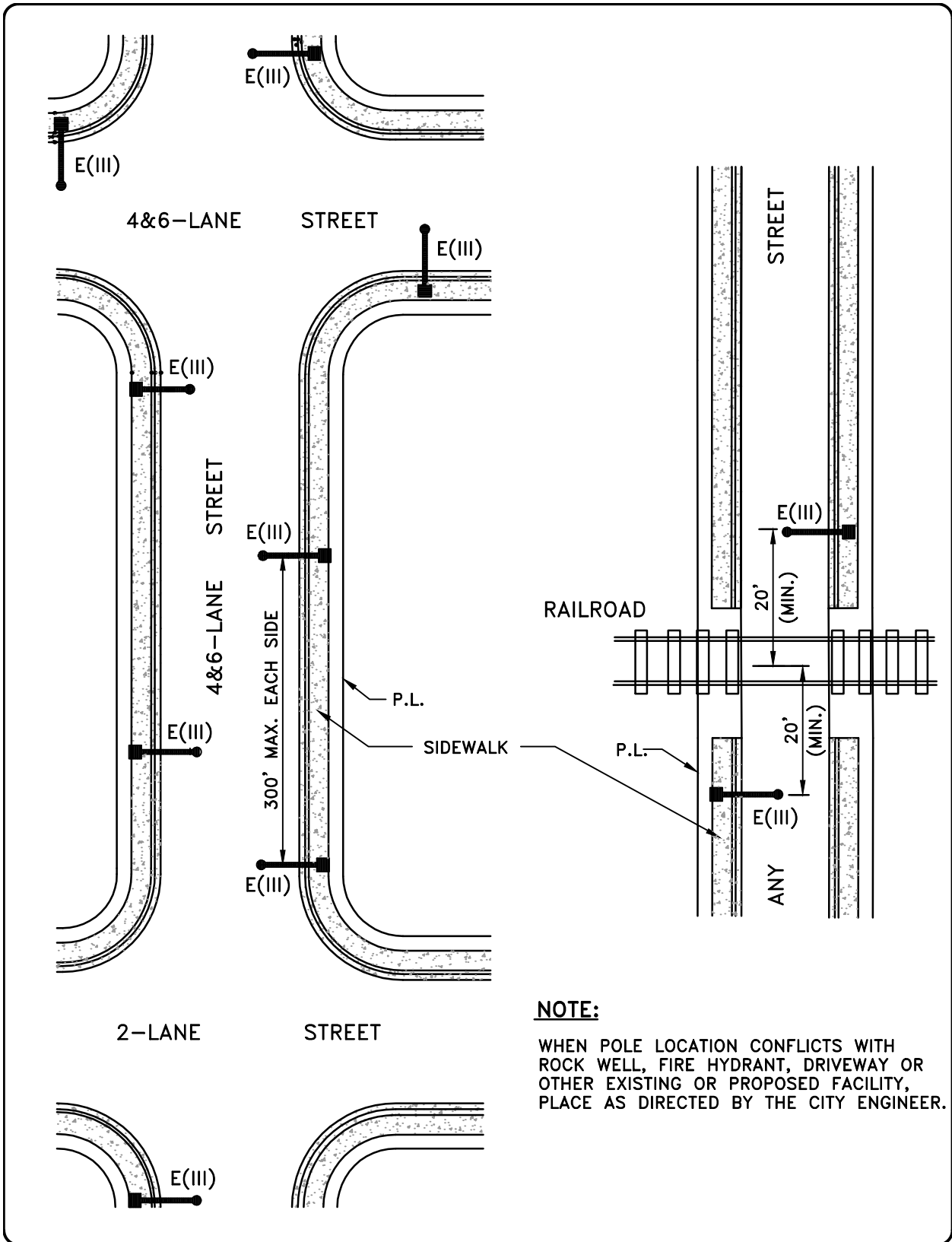
LIGHTING & TRAFFIC

LOCATIONS OF 25' POLES

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

DETAIL NO.
700



APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
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LIGHTING & TRAFFIC

LOCATIONS OF 28'

POLES

ADOPTED BY CITY COUNCIL
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MODESTO
CALIFORNIA

DETAIL NO.
701

NOTE:
LIGHTING FIXTURE AND STANDARD BY DEVELOPER OR CITY CONTRACTOR.

LUMINAIRE

100W OR 150W FOR 25' POLE
200W FOR 28' POLE

15'

NOTES:

1. LUMINAIRES SHALL BE 120V OR AS DIRECTED BY THE CITY ENGINEER, WITH BUILT-IN PHOTOELECTRIC CELLS.
2. CONTACT M.I.D. OR T.I.D. PRIOR TO ENTERING UNDERGROUND SERVICE BOX, OR PRIOR TO ATTACHING ANY MATERIAL TO M.I.D. POLES ABOVE 8'0" FROM GRADE.
3. M.I.D. OR T.I.D. WILL COMPLETE CONNECTION OF 120V CIRCUIT UPON RECEIPT OF SIGNED APPLICATION FOR SERVICE FROM THE CITY OF MODESTO.
4. CONDUIT IN POLE SHALL BE WITHIN 3" BELOW THE BOTTOM OF THE HANDHOLES

PRIMARY CROSSARM

9'-6" MIN. IF NO SECONDARY CROSSARM (MIN)

SECONDARY CROSSARM

15" MIN.

M.I.D. OR T.I.D. TO MAKE SERVICE CONNECTION AS PER STANDARDS

UTILITY POLE

1/2" FLEX CONDUIT TO SECONDARY ARM (WEATHERPROOF), MIN. 18" OF WIRE EXTENDING FROM CONDUIT.

NOTE:

DEVELOPER TO SUPPLY ALL MATERIALS AS PER STANDARDS WHEN SERVED FROM AN UNDERGROUND SOURCE.

M.I.D. OR T.I.D. TO SUPPLY AND INSTALL CONDUIT & CABLE & MAKE CONNECTIONS AS PER STANDARDS WHEN SERVED FROM AN OVERHEAD SOURCE.

18"

PULL BOX PER DETAIL 703

1" CONDUIT

100' OR LONGER - SEE SPECS

FUSE HOLDER AND FUSE W/4' OF CONDUCTOR COILED IN SERVICE BOX AS PER STANDARDS

IRRIGATION DISTRICT SERVICE BOX

PRIVATE SERVICE CONDUIT TO SECONDARY SYSTEM

MINIMUM CONDUIT COVER: 30" IN STREETS, ALLEYS AND EASEMENTS (FOR DEPTHS LESS THAN 30", SEE STANDARD DETAIL 705). 15" IN PARK STRIPS.

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LIGHTING & TRAFFIC

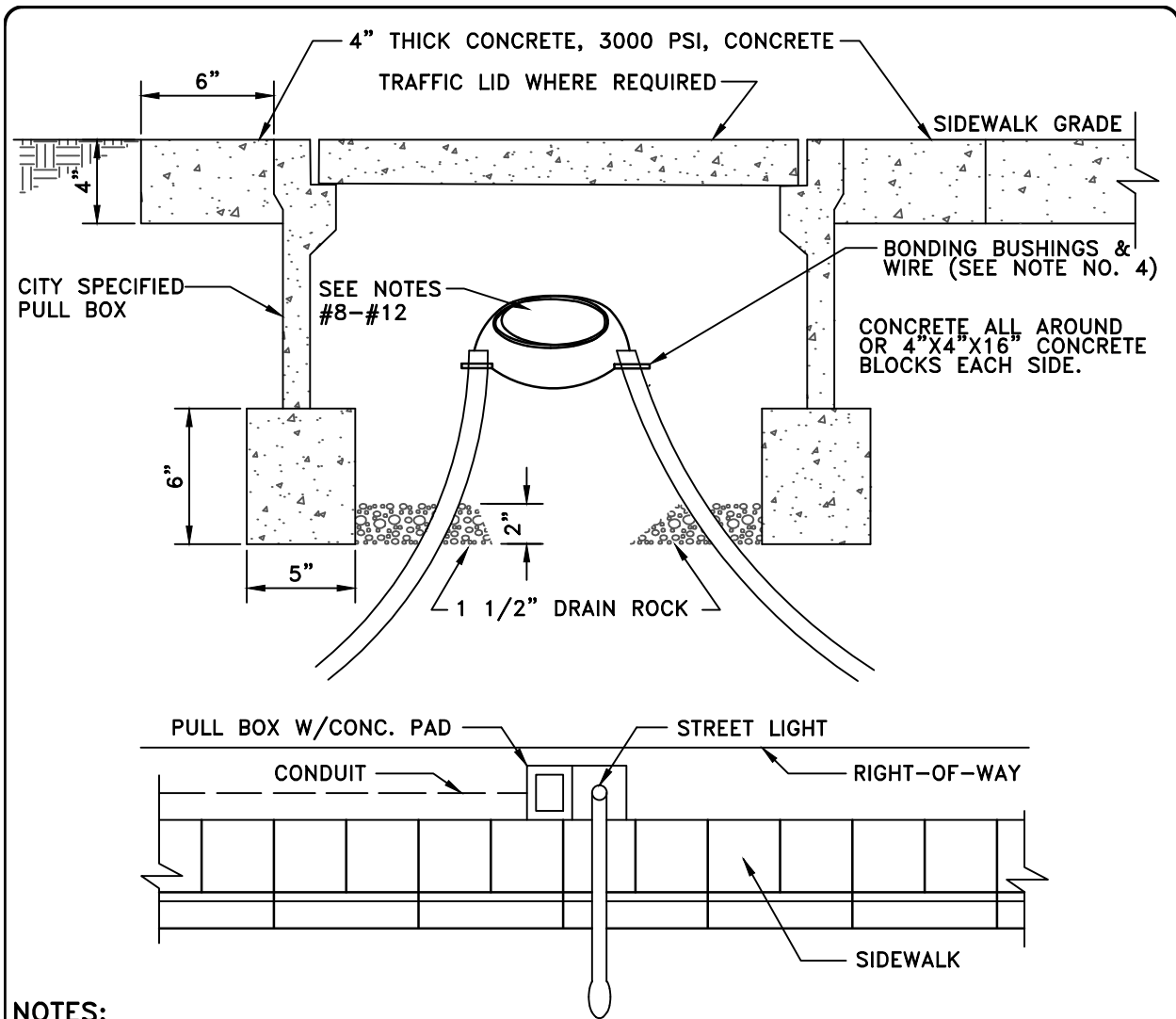
INSTALLATION LAYOUT

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



MODESTO CALIFORNIA

DETAIL NO.
702



NOTES:

1. CONDUIT SHALL BE A MINIMUM DEPTH OF 18" BELOW PORTLAND CEMENT CONCRETE SIDEWALK FINISH GRADE AND 30" BELOW ALL FINISHED GRADE IN ALL OTHER AREAS. DEPTH SHALL NOT EXCEED 48".
2. CONDUIT MAY BE INSTALLED AT DEPTHS LESS THAN 30" IN STREETS, ALLEYS AND EASEMENTS WITH PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER. SUCH APPROVAL MAY BE GRANTED ONLY UPON SPECIFIC REQUEST FROM THE DEVELOPER OR CITY CONTRACTOR. CONCRETE-ENCASED PVC CONDUIT MAY ALSO BE APPROVED UPON SPECIAL REQUEST.
3. WHERE SIDEWALK IS AGAINST PROPERTY LINE, THE CONDUIT SHALL BE PLACE 6" BEHIND CURB.
4. FOR BACKFILL & COMPACTION REQUIREMENTS, SEE STANDARD DETAILS #800 TO #803.
5. TURLOCK IRRIGATION DISTRICT (TID) CONDUIT TO BE PLACED AT A DEPTH OF 24".
6. REPLACE SOD IN LAWN AREA.
7. PULL BOX MAY BE SET ADJACENT TO OR BEHIND POLE IN THE RIGHT-OF-WAY.
8. IF PULL BOX IS MID-CIRCUIT, LEAVE 4' OF SLACK CONDUCTOR IN BOX.
9. IF PULL BOX IS A CIRCUIT TERMINUS AT POWER SOURCE, INSTALL FUSE HOLDER (PER SPEC.) WITH 4' OF SLACK CONDUCTOR. TAPE FUSE TO CONDUCTOR IN BOX.
10. CONDUIT ENTERING IRRIGATION DISTRICT SERVICE BOX SHALL CONFORM TO DISTRICT SPECIFICATIONS.
11. THE BONDING WIRE SHALL BE AT LEAST THE SAME GAUGE AS THE LARGEST CIRCUIT CONDUCTOR. (MIN. OF NO. 8 AWG COPPER WIRE)
12. 10 AMP FUSED SPLICE CONNECTION SHALL BE INSTALLED IN PULL BOX AT STREET LIGHT ON STREET LIGHT LEG OF CIRCUIT.

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LIGHTING & TRAFFIC

PULL BOX

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MODESTO
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DETAIL NO.

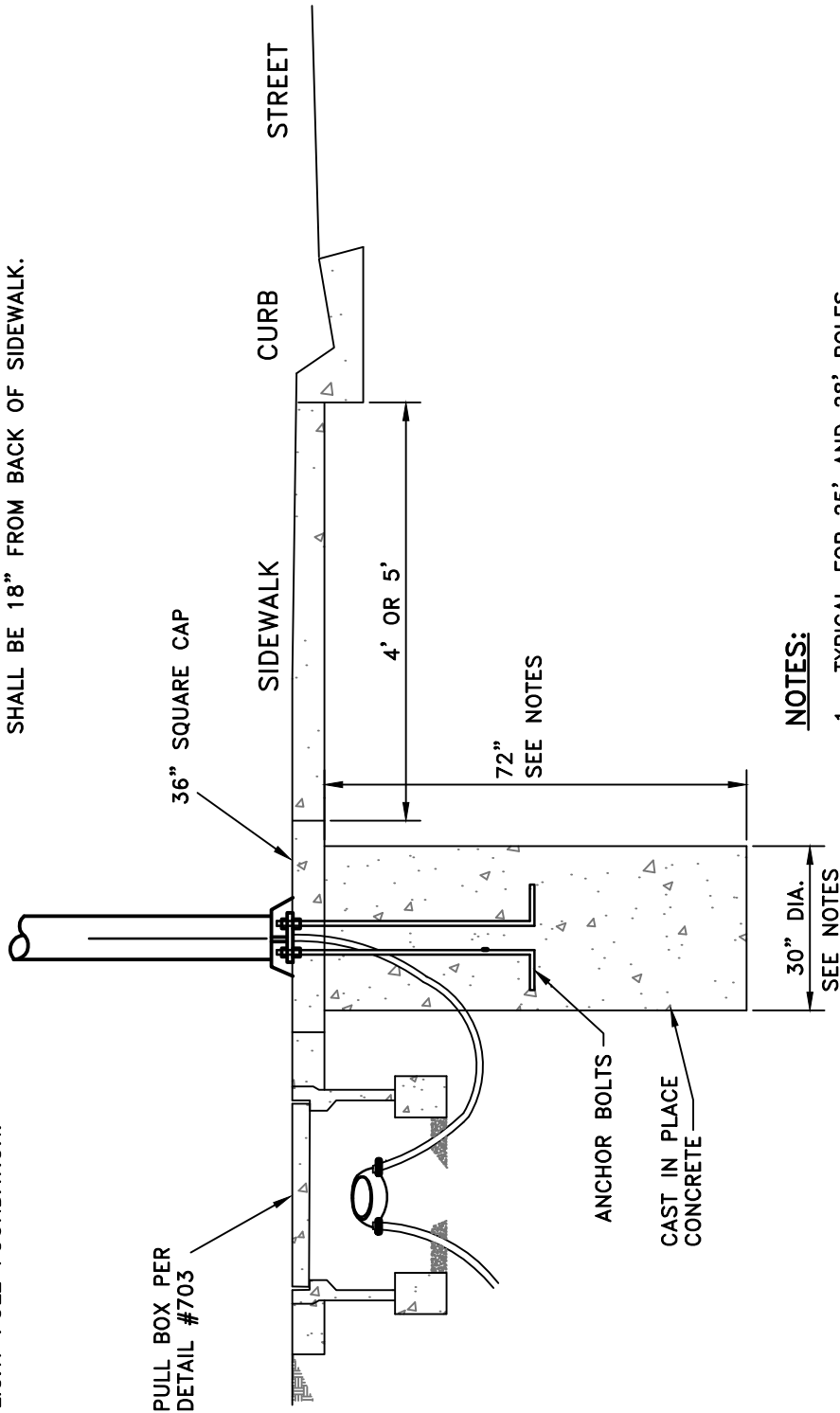
703

NOTE:

PULL BOX MAY BE LOCATED BEHIND OR ADJACENT TO LIGHT POLE FOUNDATION.

NOTE:

WHERE WALK IS SEPARATED FROM CURB & GUTTER OR A 10' SIDEWALK IS INSTALLED IN BACK OF CURB & GUTTER, PLACE POLE 18" FROM BACK OF CURB. ALL OTHER ZONES SHALL BE 18" FROM BACK OF SIDEWALK.



NOTES:

1. TYPICAL FOR 25' AND 28' POLES.
2. FOUNDATIONS MAY BE 36" SQUARE AND 60" DEEP.
3. CONCRETE TO BE PLACED AGAINST UNDISTURBED EARTH.
4. EACH LIGHT POLE MUST HAVE A PULL BOX.

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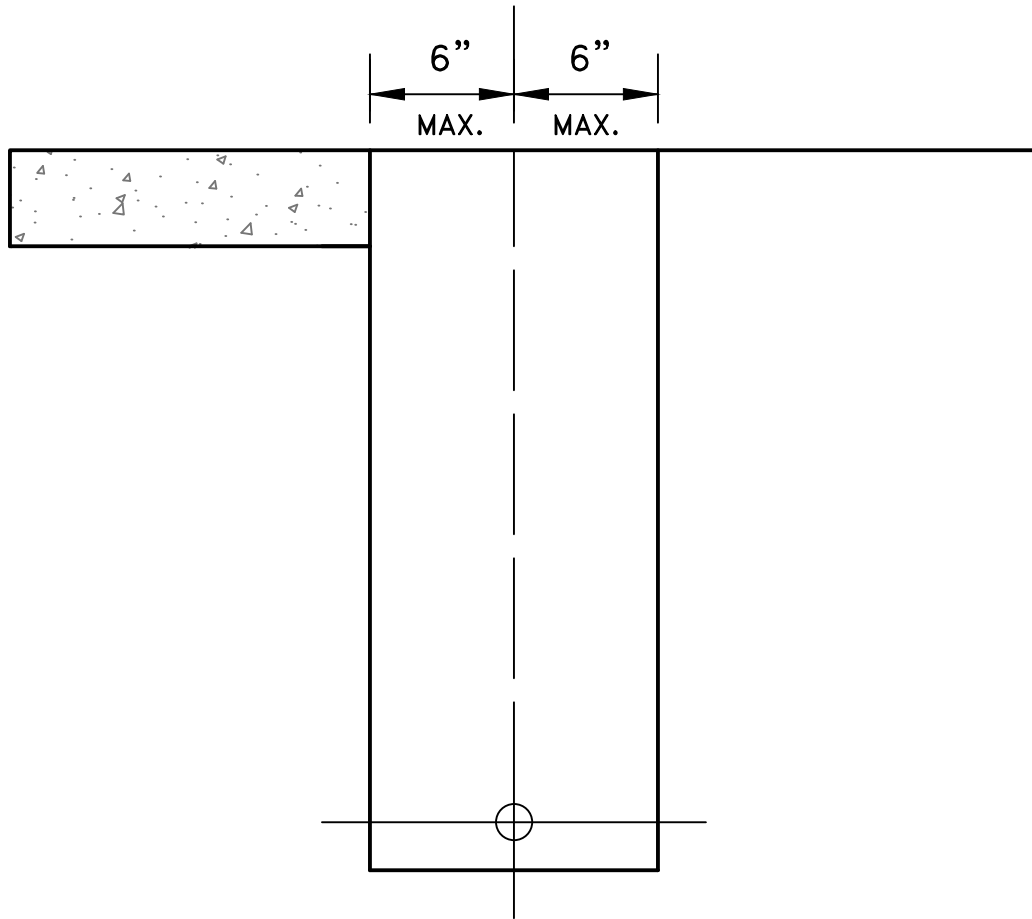
LIGHTING & TRAFFIC

POLE FOUNDATION

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345



DETAIL NO.
704



NOTES:

1. CONDUIT SHALL BE A MINIMUM OF 24" BELOW SIDEWALK GRADE IN PARK STRIPS, AND 30" BELOW TOP OF CURB GRADE IN STREETS, ALLEYS AND EASEMENTS NOT ADJACENT TO CURB OR SIDEWALK. DEPTH SHALL NOT EXCEED 48".
2. CONDUIT MAY BE INSTALLED AT DEPTHS LESS THAN 30" IN STREETS, ALLEYS AND EASEMENTS WITH PRIOR WRITTEN APPROVAL OF THE CITY ENGINEER. SUCH APPROVAL MAY BE GRANTED ONLY UPON SPECIFIC REQUEST FROM THE DEVELOPER OR CITY CONTRACTOR. CONCRETE-ENCASED PVC CONDUIT MAY ALSO BE APPROVED UPON SPECIAL REQUEST.
3. WHERE SIDEWALK IS AGAINST PROPERTY LINE, THE CONDUIT SHALL BE PLACED 6" BEHIND CURB.
4. FOR BACKFILL & COMPACTION REQUIREMENTS SEE STANDARD DETAILS #800 TO #803.
5. TURLOCK IRRIGATION DISTRICT (TID) CONDUIT TO BE PLACE AT A DEPTH OF 24".
6. REPLACE SOD IN LAWN AREA.

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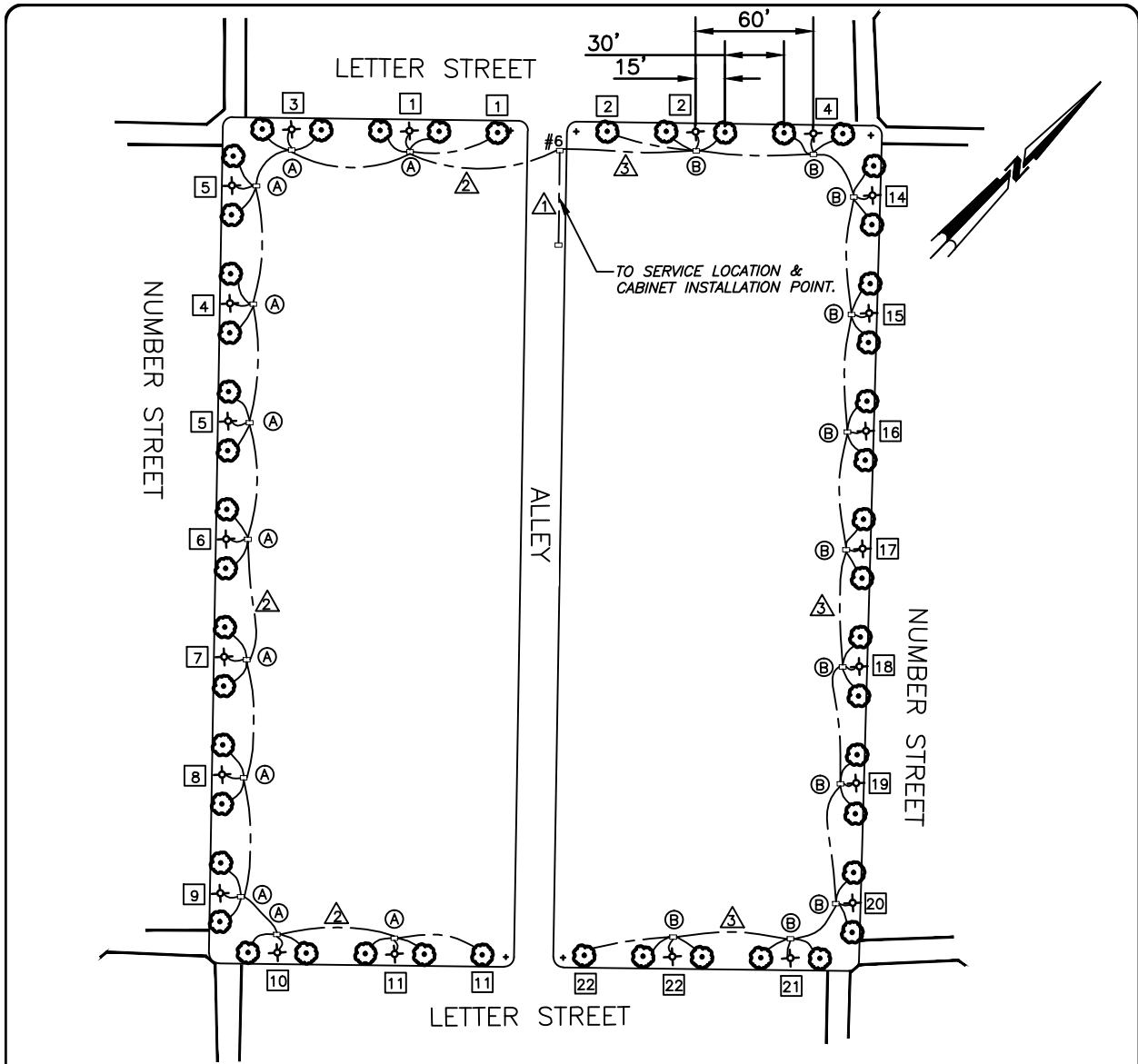
LIGHTING & TRAFFIC

TRENCH SECTION



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 RESOLUTION NO. 2014-345

DETAIL NO.
 705



NOTES

1. [#] = 15 AMP CIRCUIT BREAKER FOR GFI DUPLEX RECEPTACLES 3-GFI OUTLETS PER BREAKER EXCEPT 1, 11, 12, AND 22 WILL HAVE 4-GFI OUTLETS. CONTRACTOR SHALL USE #10 AWG CONDUCTORS.
2. STREET LIGHT CIRCUITS FOR BOTH (A) & (B) SHALL CONTAIN 30 AMP 2 POLE CIRCUIT BREAKER. CONTRACTOR SHALL USE #8 AWG CONDUCTORS.
3. CONDUIT FROM PULL BOX TO OUTLETS AND STREET LIGHTING SHALL BE 1".
4. PULL BOXES SHALL BE COM #1 COM DETAIL 710 UNLESS NOTED ON PLAN.

CONSTRUCTION NOTES

1. GROUND WIRE SHALL BE #8 AWG
2. PHOTO CELL SHALL BE INSTALLED AT CABINET LOCATION

△ 1 3 1/2" CONDUIT

△ 2 2 1/2" CONDUIT

△ 3 2 1/2" CONDUIT

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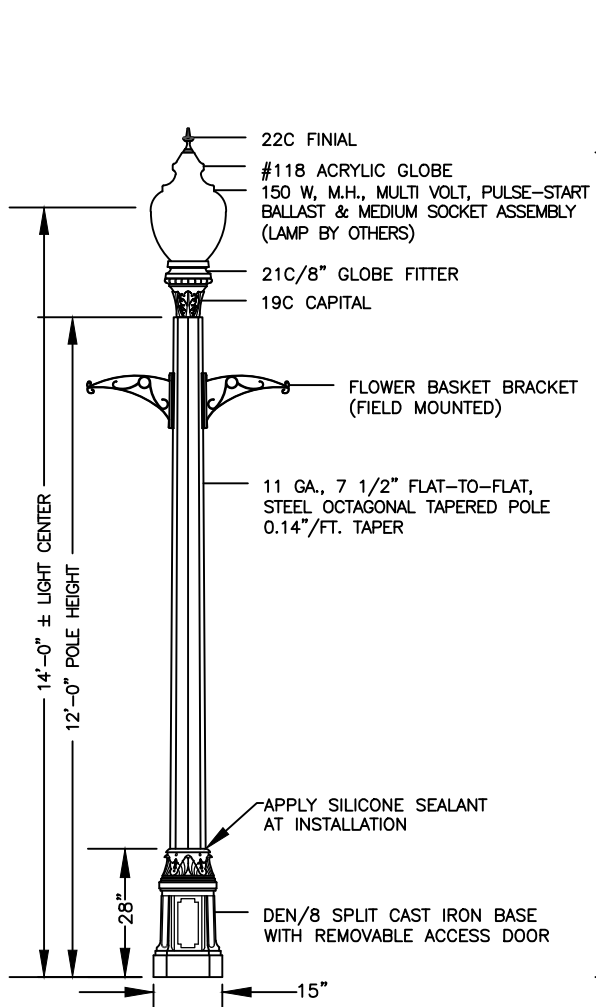
**DOWNTOWN
 STREETSCAPE**

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

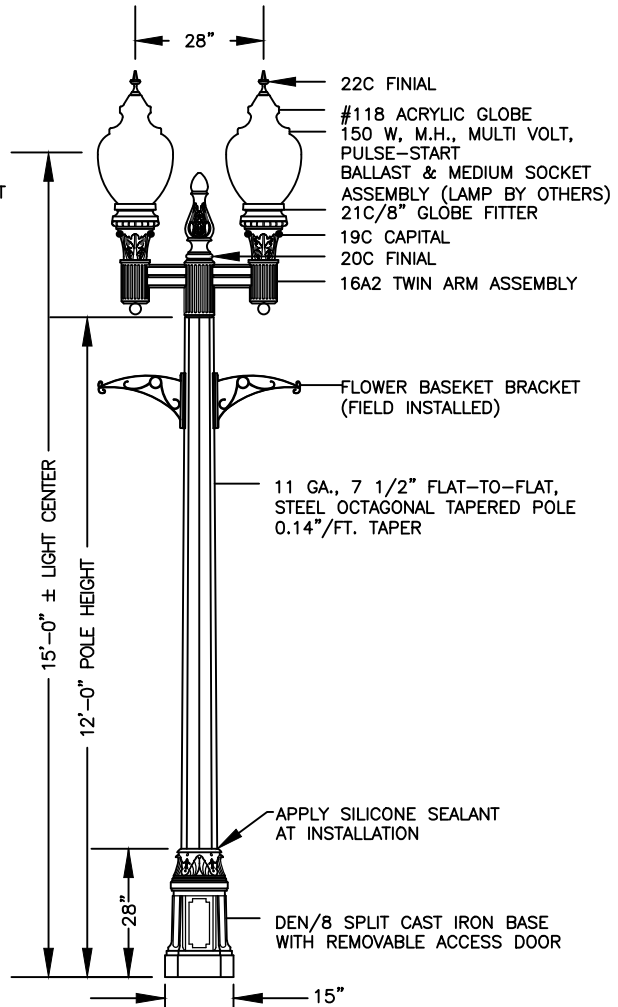


MODESTO
 CALIFORNIA

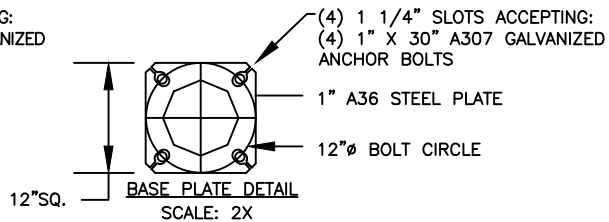
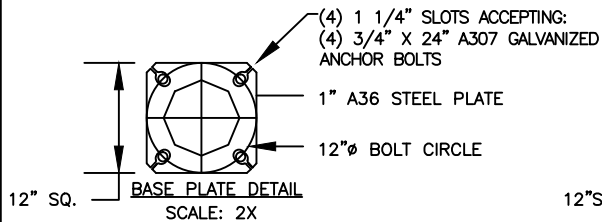
DETAIL NO.
706



VI-DEN/8-1-OCT/12'-118-22C-150MH-240V-FB



VI-DEN/8-A2-OCT/12'-118-22C-150MH-240-FB



PAINT SPECIFICATION:

ALL CAST IRON AND STEEL LIGHT POLE PARTS ARE TO BE FACTORY POWDER COATED "BLACK" OR "GREEN" WHEN REQUIRED.

NOTE: STREET LIGHT PARTS CALLED OUT REFER TO VISCO CAST IRON & STEEL DECORATIVE STREET LIGHTS. CONTRATOR SHALL USE THESE OR AN APPROVED EQUAL.

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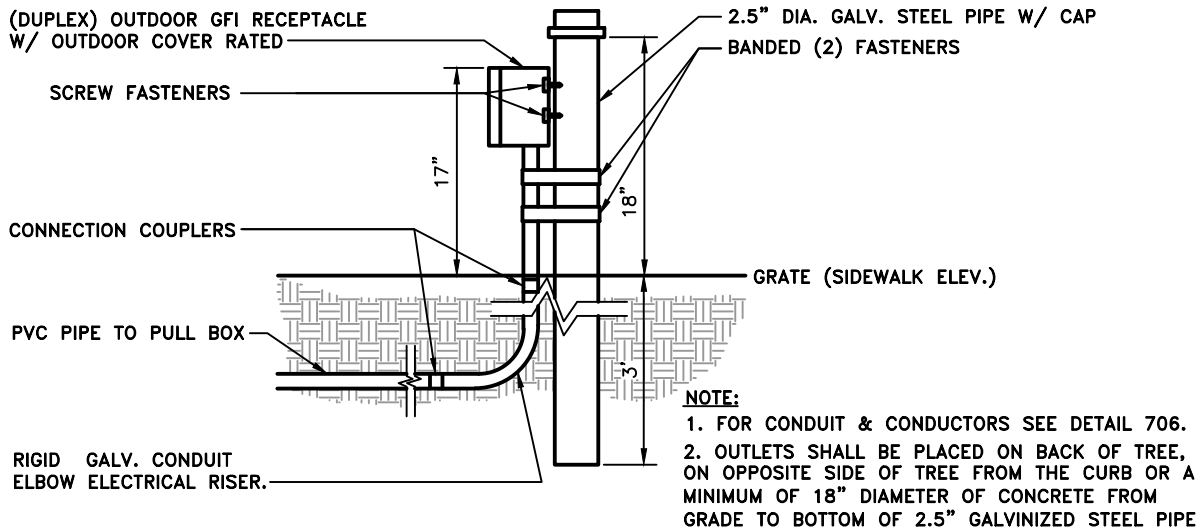
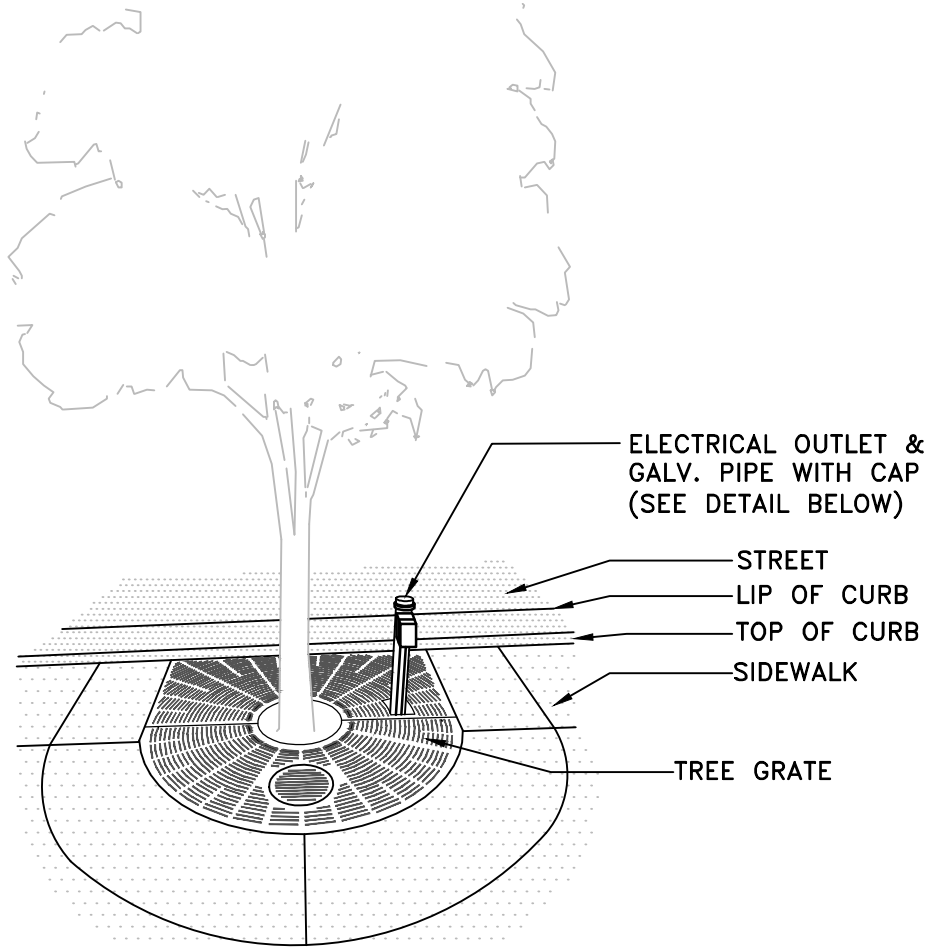
LIGHTING & TRAFFIC

DOWNTOWN LIGHTING

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DETAIL NO.
707



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LIGHTING & TRAFFIC

TREE WELL

ELECTRICAL OUTLETS



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 RESOLUTION NO. 2014-345

DETAIL NO.
708

CHAPTER 8

UTILITY, EXCAVATION AND TRENCH SECTION

8.01 GENERAL

This chapter establishes uniform locations and construction procedures for all underground utilities. If conflicts occur between this chapter and other utility-specific chapters within the City Standards, those specific chapters govern over this chapter. The City will not reimburse any cost incurred in conforming to these standards. In addition to these standards, any standards set forth by the individual utility companies shall be adhered to.

A. Encroachment Permits

1. All utilities shall obtain an encroachment permit a minimum of 2 business days prior to commencement of work, except for emergency work or emergency utility repair work which must obtain a permit within 48 hours after the start of work. The request shall be accompanied by a plan showing location, quantities, and sizes of all work in the existing right-of-way and easements including new subdivisions and parcel splits.
2. A minimum 48-hour notice is required for all City inspections. To schedule an inspection, call City of Modesto Construction Administration at (209) 577-5452.

B. Pavement Moratorium

1. Per City of Modesto Municipal Code Section 7-2.37 - Moratorium, excavation in newly renovated City streets is prohibited for 3 years after filing of a Notice of Completion or acceptance of a new street or structural overlay of an entire street.

C. Traffic Control

1. Proper traffic controls and covering of trenches must be approved prior to implementation and maintained in accordance with the City of Modesto Standard Specifications.

8.02 DEFINITIONS

- A. Backfill – Compacted material above the bedding and below the structural section for paved areas. For non-paved areas, compacted material above the bedding to the top of finished grade.
- B. Bedding – Compacted material from the bottom of the pipe and extending to 12 inches above the top of pipe.
- C. Foundation – Compacted material placed in the trench section between the compacted trench bottom and the bottom of the pipe or conduit.
- D. Relative Compaction – The ratio of the in-place wet density of a soil or aggregate to the test maximum wet density of the same soil or aggregate when compacted by a specific test method. The City of Modesto determines relative compaction by Department of Transportation, California Test 216 or California Test 231.
- E. Trench – an excavation in which the depth is greater than the width of the bottom of the excavation

8.03 DESIGN

A. Standard Location

1. Utilities in a common trench shall be located as shown in Standard Details #805 and #806. Revisions to these locations or separate utilities in an existing right-of-way should be noted on the plan submitted with the encroachment permit request, and shall be approved by the City Engineer.
2. Street crossings in new subdivisions shall be as shown in Standard Detail #805.

B. Potholing for Design and Construction Purposes

1. Exploratory excavations within the public right of way require an encroachment permit. The method of excavation must be done by potholing to discover or verify the actual horizontal and vertical location and size of existing underground utilities and structures. Potholing must expose underground utilities and structures to sufficiently determine:
 - a. Elevation of existing finished grade at center of pothole;
 - b. Elevation at the top and bottom of the utility or utility structure;
 - c. State plane coordinates of center of pothole (or horizontal distance to 3 fixed, permanent infrastructure features);
 - d. Utility type and owner;
 - e. Outside diameter of utility or width of duct bank/structure; and
 - f. Utility material, condition, coating or protection (i.e. cathodic protection).
2. The vertical position of the exposed underground utility must be tied to a survey benchmark.
3. The maximum size of a pothole shall be 12-inch diameter or 12-inch square.

C. Horizontal Alignment

1. Alignments shall be parallel to the street centerline wherever possible. In new developments, the horizontal alignment of joint trench shall be parallel to the centerline within the Public Utility Easement (PUE).

D. Overhead Utility Lines

1. Utility overhead lines are discouraged. Wherever reasonable, utility companies forced to relocate lines by street dedication or widening shall underground the facility. In the case where a pole facility cannot be economically undergrounded, other facilities may remain on the pole during and after relocation. For example, relocating a 69 KVA line underground may not be economically feasible, therefore, a 12 KVA line on the same set of poles would not be required to relocate underground. The utility lines must be consolidated as much as possible. A 69 KVA on one side of the street and a 12 KVA on the other side will be combined onto one set of poles.
2. Where utility poles are permitted, poles shall be located behind sidewalk wherever possible. Where a separated sidewalk is proposed or existing, the pole shall be placed a minimum of 18 inches behind the back of curb. Where the entire area behind curb is concrete, the pole shall be a minimum of 54 inches behind the back of curb.

E. Boring within Public Right-of-Ways

1. Improvement Plans shall show proposed boring locations, size conduit, and bore pit locations,
2. Improvement Plans shall show and correctly label existing utilities in the streets and within 10 feet of the proposed boring locations
3. Traffic control plans shall show bore pit locations.
4. All City Storm Drain and Sanitary Sewer utilities within 5 feet of the proposed bore locations are required to be video inspected (CCTV) before and after line installation.
5. A copy of the CCTV on a CD or DVD and recorded in an unprotected digital format (.mpg or .avi) shall be provided to the City of Modesto inspector within 1 week after the video inspection was completed.

Table 8.1 Non-City Utility Horizontal Alignment

Condition	Alignment
Extending or repairing an existing service through urbanized areas.	Trench and install conduit at either behind walk, under walk or within 3 feet of existing lip of gutter but in no case shall installation be closer than 36 inches to an existing sewer, water or storm drain line (outside wall to outside wall of conduits - see Standard Detail #810 - Case E).
Extending new service through a new area with a minimum of 10 feet of sidewalk and/or landscaping.	Install conduit behind curb, gutter and sidewalk. (Standard Details #809 & #810 - Cases A thru D).
Extending new service through rural areas with only 40 feet of right-of-way.	Install conduit(s) a minimum of 12 inches away from the existing right-of-way. All junction boxes shall be installed in easements outside the right-of-way. Utilities must negotiate the construction and permanent easement (Standard Detail #808).
Extending new service through right-of-way less than 40 feet and congested areas with 45 feet of right-of-way or less.	City Engineer shall engineer a location based on the master plan of utilities. In most cases with less than 40 feet of right-of-way, Developer or utility will acquire easement (Standard Detail #808).

8.04 MATERIALS

A. Description

1. Excavation for appurtenant structures such as, but not limited to, manholes, transition structures, junction structures, vaults, valve boxes, catch basins, thrust blocks, and boring pits shall be deemed to be in the category of trench excavation.
2. Excavation for the installation of conduit shall be by open trench unless otherwise specified or shown on the drawings. However, should the Contractor elect to

tunnel, or bore and jack any portion not so specified, he/she shall first obtain written approval from the City Engineer.

B. Maximum Length of Open Trench

1. The maximum length of open trench where prefabricated pipe is to be laid shall be the distance necessary to accommodate that amount of pipe which can be installed in a single day, or 400 feet, whichever is less. The distance is the collective length at any location, including open excavation, pipe laying and appurtenant construction and backfill which has not been temporarily resurfaced. Use of steel plates as open trench covers may be allowed only with prior approval of the City Engineer.

C. Minimum Width of Trench

1. PVC Gravity Pipe

- a. The clear width of the trench at the top of the pipe shall be the greater of the outside diameter plus 16 inches or 1.25 times the outside diameter plus 12 inches at any point.

2. All Other Pipe

- a. The clear width of the trench at the top of the pipe shall be the outside diameter of the pipe at any point plus minimum of 1 foot and no more than a maximum of 2 feet. Trenches wider than the maximum may be permitted only with written approval by the City Engineer.

3. If the pipe is installed in a compacted embankment, then the pipe embedment shall be compacted to a point of at least 2.5 pipe diameters from the pipe on both sides of the pipe or to the trench walls, whichever is greater.

D. Bracing Excavations

1. All trenches shall be shored or protected in accordance with OSHA and other state and federal safety codes, regulations, and ordinances. The manner of bracing excavations shall be as set forth in the rules, orders, and regulations of the Division of Industrial Safety of the State of California. In addition, the Contractor shall utilize shoring methods as necessary to prevent undermining of adjacent roadways, fences, utilities, and structures.

2. After the pipeline has been installed and sufficiently backfilled to protect the pipe, all shoring, bracing and sheeting shall be removed. All voids left by the removal of such bracing shall be carefully filled with suitable material compacted in place.

E. Trench Section

1. Existing, unsuitable soil material shall be excavated and replaced with acceptable material for that zone.

2. Foundation

- a. Where required based on utility pipe material and use (for example PVC, gravity), provide foundation material conforming to the requirements of Table 8.3 at a minimum depth of 4 inches below the bottom of the pipe on compacted trench bottom.

- 1) Where filter fabric is required by these specifications, the fabric shall be installed between the compacted trench bottom and the foundation material.
 - b. If soft, spongy, unstable, or similar other material is encountered upon which the bedding material or pipe is to be placed, this unsuitable material shall be removed to a minimum depth of 4 inches below the pipe. This over-excavated depth shall be backfilled with acceptable pervious material or other foundation material listed in these specifications and compacted to the specified relative compaction. Sufficient foundation material shall be installed to provide a stable base accepted by the City Engineer prior to installation of the utility, pipe, or structure.
 - c. When water is encountered, the trench shall be kept dry until laying and jointing of the pipe and placing of the bedding material has been completed, inspected, and approved. The Contractor shall place a minimum of 6 inches of foundation material and dewater the trench in a manner which has received prior written approval by the City Engineer.
3. Bedding
- a. Bedding material shall be sand, aggregate base, controlled density fill, or native material conforming to the gradation requirements of Table 8.3. When the Contractor requests to use native material, the City Engineer requires testing of the native material by an independent, state-certified testing laboratory to confirm the material meets the City's criteria. Materials testing is paid for by the Contractor. The bedding shall be free of rocks and clods greater than 3 inches in diameter and shall be free of organic material and other the unsuitable material.
 - b. For PVC gravity pipe, a registered Geotechnical Engineer shall provide soil boring results of existing soil conditions to determine which bedding material per Table 8.3 shall be used.
 - 1) Where existing soil conditions are classified as ASTM D2321 Soil Class 3, 4 or 5, the Contractor must use "PVC – Case 1" material with filter fabric. Filter fabric shall be nonwoven-type material and conform to Section 88-1.03 "Filter Fabric" in the State Standards. Filter fabric must be installed to prevent infiltration of fines as specified in Section 68-1.028 "Filter Fabric" in the State Standards.
 - 2) Where existing soil conditions are classified as ASTM D2321 Soil Class 1 or 2, the Contractor may use "PVC – Case 1" or "PVC – Case 2" material without filter fabric.
 - c. Bedding material shall first be placed so that the pipe is supported for the full length of the barrel with full bearing on the bottom segment of the pipe equal to a minimum width of 40 percent of the outside diameter of the barrel. The remainder of the bedding shall be carefully placed to the proper depth.
 - d. Bedding material shall be compacted to a minimum relative compaction of 90 percent.
 - e. Where pipe is to be installed in new embankment, the embankment shall first be constructed to a height of 12 inches above the top of pipe and for a distance on each side of the pipe location of not less than 5 times the diameter of the pipe, after which the trench shall be excavated with sides nearly vertical and the pipe installed.

- f. When installing potable water facilities and infrastructure, the open ends of the pipe shall be closed by using an acceptable pipe cap or blind flange to prevent entrance of water and dirt into the pipe. Adequate backfill shall be deposited on the pipe to prevent floating. Pipe which has floated shall be removed from the trench and reinstalled as directed by the City Inspector.
 - g. All existing gas pipes, water pipes, conduits, sewers, drains, fire hydrants and other structures shall be carefully supported and protected from damage which may be a result of dewatering by the Contractor. If damage occurs, the Contractor shall restore the damaged areas, without additional compensation, to their original condition.
 - h. When crossing an existing irrigation pipe, the bedding material shall be an acceptable CDF. This includes the entire area under the irrigation pipe, 2 feet on both sides and a minimum of 12 inches on top of the pipe.
4. Backfill
- a. Backfill, for cast-in-place structures such as, but not limited to, manholes, transition structures, junction structures, vaults, valve boxes and reinforced concrete box conduits shall start at the surface upon which the base of the structure rests.
 - b. When crossing an existing irrigation pipe, the backfill material shall be compacted with a pneumatic tamper. The backfill shall be compacted to a minimum of 95 percent relative compaction.
 - c. Backfill material shall be native material or select backfill. Native material shall be free of all organic material, rubbish, debris, large rocks, clay chunks, and other objectionable material. When satisfactory compaction of the native material cannot be obtained, select backfill shall be required.
 - d. Except where the pipe must remain exposed for force main leakage tests and subject to the provisions herein, the Contractor shall proceed as soon as possible with backfilling operations. Care shall be exercised to ensure the utility will not be damaged or displaced.
 - e. The Contractor shall not place backfill against or over the top of any cast-in-place pipe or structures for a period of 7 days or the concrete has attained a compressive strength equal to or greater than 85 percent of the specified design strength.
 - f. Where it becomes necessary to excavate beyond the limits of normal excavation lines in order to remove boulders or other interfering objects, the voids remaining after the removal of the boulders shall be backfilled as specified herein, or as otherwise approved by the City Engineer.
 - 1) Where the void is below the subgrade for bedding conduits or structures, backfill shall be compacted bedding material.
 - 2) Where the void is in the side of the trench, it shall be backfilled with suitable material and compacted as approved by the City Engineer.
 - g. The cost for the removal of all boulders or other interfering objects and the backfilling of voids left by such removals shall be at the expense of the Contractor and no direct payment for the cost of such work will be made.
5. Backfill Placement Requirements
- a. Existing Streets shall be backfilled as shown in Standard Detail #800.

- 1) Placement of aggregate base shall be in a maximum of 12-inch lifts, evenly placed and mechanically compacted to the specified relative compaction. Compaction testing shall be required at the discretion of the City Inspector. Costs related for passing tests within the City right-of-way or PUE will be paid for by the City of Modesto. The Contractor is responsible for the costs of failed tests.
 - 2) Placement of CDF will not require compaction testing.
- b. Previously undeveloped land (new construction) shall be backfilled in accordance with Standard Detail #801 unless otherwise specified herein this specification.
 - c. Unimproved or non-street right-of-way areas, the area of the trench between the bedding zone and the top of trench shall be backfilled with acceptable backfill material. Compaction shall be done mechanically in uniform lifts to attain a minimum relative compaction of 90 percent.
6. Control Density Fill (CDF) Requirements
- a. The CDF shall meet this design criteria and material requirements. With prior written approval from the City Engineer, CDF may be used for the Foundation, Bedding and Backfill zones. The Contractor shall submit compressive strength test data for the CDF mix design to the Engineer for approval prior to excavating the trench for which the controlled density fill material is proposed for use. CDF shall be batched and supplied by a ready-mixed concrete plant. CDF shall be non-segregating, highly flowable, self-consolidating, low shrink material that flows into place without leaving voids and cures into a stiff, non-plastic material. The intent of the CDF design mix is for the controlled density fill to be capable of future excavation using hand tools.

b. Table 8.2 CDF Design Mix

Description	Criteria	Materials	
Compressive Strength	25-100 psi at 28 days	ASTM D4832	
Cement	50-100 pounds per cubic yard	Type 1 or 2 Portland Cement conforming to ASTM C150	
Fly Ash	200-500 pounds per cubic yard	Conform to ASTM C618, Class C or F	
Water	325-600 pounds per cubic yard	Free of oil, salt, acid, alkali, sugar, vegetable matter, or other substances injurious to the finished product.	
Fine Aggregate or Sand	2,000-3,500 pounds per cubic yard	Conform to the gradation in ASTM C33	
		3/8-inch	100
		No. 4	95-100
		No. 8	80-100
		No. 16	50-85
		No. 30	25-50
		No. 50	5-30
No. 100	0-10		
Entrained Air, (maximum)	20 percent		
Slump, (minimum)	7 inches		

c. CDF shall be placed equally into the areas on both sides of the pipe, against the trench walls and over the top of the pipe. The CDF pour shall be made in 1 continuous lift and made equally to both sides of the pipe to prevent side thrust movement or displacement of the new pipe. CDF shall be discharged from the transit mixer truck into the areas to be filled. CDF shall cure for a minimum period of 48 hours or until a compressive strength of 15 psi is obtained before placement of the hot mix asphalt above it. The Contractor shall be responsible for providing evidence to the Engineer that the CDF has reached the above compressive strength.

7. Trench Materials Gradation Requirements

a. The materials used for the various trench zones shall meet these design criteria and material requirements.

b. Table 8.3 Trench Zone Materials

SIEVE SIZE	FOUNDATION						BEDDING						BACKFILL
	VCP (Gravity)	PVC* – Case 1 (Gravity)	PVC (Pressure)	Dewatered Areas	VCP (Gravity)	PVC* – Case 1 (Gravity)	PVC – Case 2 (Gravity)	PVC (Pressure)	All Other Materials	Native or Select			
1.5-inch	-	100		-	-	100	100	-	-	-	-		
1-inch	-	-		-	-	-	-	-	-	-	-		
0.75-inch	100	-		-	100	-	100	-	100	-	-		
0.5-inch	90-100	-		-	90-100	-	-	-	-	-	-		
0.375-inch	40-70	0-25		-	40-70	-	-	-	100	-	-		
No. 4	0-15	0-15		-	0-15	0-15	0-100	35-55	70-100	35-100	-		
No. 8	0-5	-		-	0-5	-	-	-	-	-	-		
No. 30	-	-		-	-	-	-	-	20-100	20-100	-		
No. 50	-	-		0-100	-	-	-	-	-	-	-		
No. 100	-	-		0-8	-	-	-	-	-	-	-		
NO. 200	-	0-12		0-4	-	0-12	0-12	3-9	0-15	-	-		
Sand Equivalent, CT 217 (min)	-	-		-	-	-	-	30	30	20	-		

*REQUIRES FILTER FABRIC

8. Compaction

- a. After the placing of backfill has been started, the Contractor shall proceed as soon as practicable with compaction. Backfill shall be mechanically compacted by means of tamping rollers, "sheepsfoot" roller, pneumatic rollers, vibrating rollers, rammers, or other mechanical tampers. The City Engineer shall approve all size and type of such equipment.
- b. Permission to use specific compaction equipment shall not be construed as guaranteeing or implying that the use of such equipment will not result in damage to adjacent ground, existing improvements, or improvements installed under the contract. The Contractor shall make his/her own determination in this regard.
- c. Tests for compaction shall be made in accordance with California Test Method 216 or 231. Backfill material in undeveloped streets shall be free of unsuitable material, such as vegetation, large clods, asphalt, and concrete material. Passing compaction tests shall be paid for by the City. Frequency of compaction testing is at the discretion of the City of Modesto Inspector.
- d. Material for mechanical compacted backfill shall be placed in lifts which, prior to compaction, shall not exceed the depths specified below for the various types of equipment:
 - 1) Impact, free-fall, or "stomping" equipment, and jetting or ponding are NOT permitted as a means of compaction.
 - 2) Vibratory equipment, vibratory smooth-wheel rollers, and vibratory pneumatic-tired rollers: maximum lift depth 24 inches.
 - 3) Rolling equipment, including sheepsfoot (both vibratory and non-vibratory), grid, smooth-wheel (not vibratory), pneumatic tired (non-vibratory), and segmented wheels: maximum lift depth of 12 inches.
 - 4) Hand-directed mechanical tampers, including vibratory plates: maximum lift depth of 8 inches.
- e. Mechanically compacted backfill shall be placed in horizontal layers of such depths (not exceeding those depths specified) compatible to the material being placed and the type of equipment being used. Each layer shall be evenly spread, moistened (or dried, if necessary), and then tamped or rolled until the specified relative compaction has been attained.

F. Restoring Surface

1. The existing asphalt concrete or Portland cement concrete pavement shall be sawcut full depth to the minimum trench width. Cutting the existing pavement with a jack hammer or drop hammer is not permitted. Final cut in street pavement will vary based on the location of the utility trench in the street, but not less than required in Detail 800. Final cut shall be sawcut in neat parallel lines.
2. The surface of all trenches shall be filled and compacted so that the surfaces will conform to the condition of the surrounding ground. The repaving requirements of the plans shall be met regardless of type of existing surfacing.
3. All trenches shall be backfilled and temporarily paved at the end of each working day.
 - a. The Contractor must submit current California licensed civil or structural engineer-stamped calculations for minimum plate design thickness for the

City Engineer to consider permitting the use of steel plates. The use of steel plates must be approved in writing by the City Engineer at least 48 hours prior to use.

4. Aggregate Base
 - a. Aggregate base shall be Class 2 compacted to 95 percent relative compaction. Aggregate base shall have 3/4-inch maximum combined grading.
5. Temporary Trench Pavement
 - a. The Contractor shall install and maintain a temporary trench pavement wherever excavation is made through the pavement, sidewalk, or driveway. The temporary trench pavement shall be placed and compacted with a vibratory plate or steel drum roller to grade immediately following trench backfill. Wheel rolling is NOT permitted.
 - b. Temporary bituminous surfacing (cold mix, cut back) shall be placed and mechanically compacted immediately above the trench following compaction and approved by the City Engineer.
 - c. Temporary trench pavement shall be a minimum of 2 inches thick in vehicle and pedestrian traffic areas and maintained to the grade of the adjacent pavement by the Contractor until permanent pavement is placed. Material, which is placed by the Contractor for convenience, is at no cost to the City.
6. Permanent Trench Pavement
 - a. Hot Mix Asphalt, Prime Coats, Paint Binders and Tack Coats shall be per the requirements of the Street Design Chapter of these Standard Specifications.
 - b. Final paving above the trench section shall be placed within 14 calendar days of its backfill and compaction. Extension may be granted by the City Engineer due to weather conditions. In the event permanent paving is not done within 14 calendar days, the City will consider this as incomplete work and will take necessary action in accordance with the prevailing City ordinances and policies.
 - c. Temporary cut back shall be completely removed before placement of final paving. Final paving shall be placed on undisturbed and previously inspected and compacted subgrade. Recomaction shall be required for any disturbed base or surface.
 - d. For a parallel trench longer than one half the length of the block,
 - 1) and Pavement Condition Index (PCI) between 70 – 100, a slurry seal course is required; or
 - 2) and PCI between 0 – 69, a microsurface seal course is required.The seal shall be applied to the entire half of the street where the trench is located. For streets with multiple lanes in one direction, the seal shall be the width of the entire lane, but not less than 12 feet wide and run the full length of the trench section.
 - e. Permanent pavement section shall be the depth specified in the Street Design Chapter of these Standard Specifications.
7. Portland Cement Concrete

- a. Unless noted on the plans, Portland cement concrete pavement, where required for alley approaches, driveways, and valley gutters, shall consist of a minimum of 8 inches of concrete over a minimum of 16 inches of aggregate base compacted to 95 percent relative compaction. Concrete shall conform to the requirements of the Street Design Chapter of these Standard Specifications.
8. Sidewalks, Curbs, Gutters, Curb Ramps, and Driveways
- a. All cuts to existing concrete shall be made and replaced from a score line or isolation joint. Any cuts to existing driveways will result in the removal and replacement of the full drive approach (or from existing score line to score line).
 - b. Replacement of concrete shall be in kind with existing surrounding area.

8.05 MEASUREMENT AND PAYMENT

- A. Utility trenching and backfill shall include all equipment, material, and labor required for the excavation, dewatering, bedding, backfilling, and compaction required for the installation of various utilities.
- B. Full compensation for utility trenching and backfill shall be included in the contract price for the utility pipe, conduit, or structure being installed and no additional payment shall be made therefore.
- C. Full compensation for providing and placing pervious rock or additional bedding material required to stabilize the bottom of the trench shall be included in the contract price paid for the utility and no additional payment will be made therefore.
- D. Full compensation for temporary trench pavement and permanent trench pavement shall be included in the contract price for each individual item of work.

8.06 FIBER OPTICS

- A. The City has been working to promote fiber optic lines and, at the same time, limit its impact to the streets' structural integrity and smoothness. All fiber optic permit applicants are required to fill out a questionnaire and sign a permit agreement. The City also has a trench cut ordinance which attempts to minimize street cuts by promoting horizontal boring and sharing costs with other utilities in constructing a joint trench.
- B. For Sample Fiber Optic Agreement and Questionnaire, see appendix.

SAMPLE FIBER OPTIC CITY PERMIT LETTER & AGREEMENT

3 February 2006

Fiber Company
1000 Anywhere Court, Ste. 3900
Anytown, CA 95000

SUBJECT: Proposed Encroachment Permit for Fiber Optics – Permit Agreement & Conditions

Dear Applicant:

PART I: AGREEMENT CONDITIONS

1. Permitted Uses

This Agreement only permits those uses of the Telephone System which California law specifically preempts the City from franchising. Company represents that it will use the Telephone System for the sole purpose of providing the services specifically described in its Certificate of Convenience and Necessity and for the following uses: FIBER OPTICS DATA COMMUNICATIONS. This Agreement does not authorize the use of the Telephone System to provide cable television service or open video system service, or other similar video services. Company represents and warrants that it will not use, or permit the use, of the Telephone System for cable television service, open video system service or similar video services without obtaining a separate franchise from City. Company agrees that in any agreement with any entity to use the Telephone System, Company will include a provision prohibiting such entity from using or permitting the use of the Telephone System for cable television service, open video system service or similar video services without obtaining a separate franchise from City, and agrees to take all reasonable actions necessary to enforce such a provision. Company shall notify City in writing at least three (3) months prior to any proposed change in use of the Telephone System. Company shall not provide any services over the Telephone System beyond those described above without the express written agreement of City.

2. Lease or Sale

Company agrees that it will not lease, sell or otherwise transfer (“Transfer”) any interest in any conduit, fiber, wire, cable or capacity in such fiber, wire or cable installed pursuant to this Agreement without the express written agreement of City, unless the Transferee is a Telephone Corporation that has obtained a Certificate of Public Convenience and Necessity from the California Public Utilities Commission and enters into a written agreement with City to be bound by the terms of this Agreement. Company shall notify City in writing at least three (3) months prior to any proposed Transfer.

3. Removal Due to City Project

Upon receipt of a demand from City, Company, at its sole cost and expense, shall remove and relocate any Telephone System facilities installed, used and/or maintained by Company under this agreement when such removal or relocation is

made necessary or convenient due to any work being done by or on behalf of City or other applicable governmental agency, including but not limited to any change of grade, alignment or width of any street, sidewalk or other public facility, installation of curbs or gutters, installation of landscaping, and/or construction, maintenance or operation of any underground or aboveground facilities by City. Company shall complete the removal or relocation within ninety (90) days of receipt of notice from City. Notwithstanding the foregoing, the City Engineer may require a shorter period due to exigent circumstances and may authorize a longer period if it will not delay the City's project. If Company fails to remove or relocate the facilities within the prescribed time period, City may remove the facilities at the expense of Company, and Company shall promptly reimburse the City any and all expenses, including administrative overhead. Any removal or relocation work by Company shall only be done pursuant to an encroachment permit.

4. Undergrounding

Upon the receipt of a demand of City, Company shall replace any or all of its aerial facilities with underground facilities in accordance with all applicable laws.

5. Abandonment

If the Telephone System, or any part thereof, is abandoned or not used for service for a period of six (6) months or more, Company shall notify City and shall promptly vacate and remove the Telephone System or the abandoned part thereof at Company's sole expense. Alternatively, City may allow, in its sole discretion, Company to abandon the Telephone System in place and convey it to City. If Company fails to remove the Telephone System as required by City within ninety (90) days after receipt of notice from City, City may, in its sole discretion, (a) remove the Telephone System at Company's sole expense, which Company shall promptly reimburse to City, or (b) deem the Telephone System, or any part thereof, to have been conveyed to City.

6. Repair of Right-of-Way

Whenever the removal or relocation of facilities is required under this Agreement, Company shall promptly repair and return the public right-of-way and adjacent property to a safe and satisfactory condition to City in accordance with its usual standards. If Company fails to do so, City shall have the option to perform such work at Company's sole expense, which Company shall promptly reimburse to City.

7. General

City reserves any and all rights it may have now or in the future to legally regulate or otherwise condition the use of the Telephone System and related activities. Any authority granted to Company by this Agreement shall be construed narrowly. City reserves any and all rights it may have now or in the future to franchise, impose rent or franchise fees on, or tax the Telephone System or any use thereof. Unless specifically prohibited by State or Federal law, City may impose a fee or other requirement for compensation for use of the public right-of-way by Company at any time on a prospective basis. Company agrees to either pay such compensation or to abandon the Telephone System. Company reserves any right it may have to challenge such compensation in court.

8. Uses Subordinate

This Agreement is not a grant by City of any property interest. This Agreement shall not create a vested right of any nature of Company to use the public right-of-way. This Agreement is subject and subordinate to the prior and continuing right of City and its assigns to use any and all of the public right-of-way for any lawful use. It is further subject to all deeds, easements, dedications, conditions, covenants, restrictions, encumbrances and claims of title which may affect the public right-of-way. Company shall be solely responsible for obtaining all necessary permits and approvals from all public and private entities.

PART II: FIBER OPTIC ENCROACHMENT PERMIT CONDITIONS

The City of Modesto Permits Office has reviewed the plans for installing fiber optic cables under various intersections within the City of Modesto. The following are comments and conditions regarding the plans and installation of this facility.

1. Contractor may not block a lane of traffic during peak traffic hours: between 7:30 am to 8:30 am, and between 4:30 pm to 5:30 pm.
2. If traffic plans become necessary, traffic plans and traffic controls shall be designed and maintained by a designated individual qualified in this responsibility. Evidence of qualification may be Certification of Completion of a course titled "Safety Through Maintenance and Construction Zones", issued by ITE.
3. If Contractor must block any portion of the right-of-way, the Contractor shall provide and deliver by hand a written notice to each homeowner or business owner located adjacent to the job site, 48 hours prior to the start of work. The notice shall describe the work, the anticipated duration of the work, the name and address of the Contractor, and the city telephone number to call for more information (577-5452).
4. Contractor shall coordinate his work within public right-of-way with the City's Inspector on a daily basis. Only the work under or in the public right-of-way will need coordination.
5. When warranted, traffic control must be provided per CALTRANS Standards and as required by the City's Inspector.
6. The Contractor applying for the permit and installing the fiber optics must have liability and workmens' compensation insurance on file with the City.
7. The encroachment permit fees will be based on staff time to review and process the application and to inspect construction.
8. Prior arrangements must be made 48 hours in advance with the City's Inspector to work outside the normal work week (Monday through Friday 7:00 am to 4:30 pm).
9. All overtime and weekend inspection work will be billed at time and a half of the City inspector's rate plus overhead and Materials rate.
10. If the deposit is insufficient to defray the actual cost, Fiber Company shall pay the difference between the deposit and actual expense. If any overtime is anticipated, an additional \$100/per day will be required on the deposit.

11. Before issuing the permit, a pre-construction meeting with the Contractor will be required. The Contractor will need to contact Construction Administration Office of the Public Works Department at 577-5452 to set up a date and time for this meeting.
12. A final As-built set of plans will be provided. Fiber Company shall provide both the CAD file and redlined prints by DATE. Permits will not be issued until Fiber Communications provides this data. CAD file shall be in the State Coordinates, NAD 83. The City has previously supplied a base map with all our utilities drawn on. Adding a layer with Fiber Communications work to this map will be sufficient. If another base map is required, please contact this office. Depth of the conduit at crossings and size of casing shall be noted at all the crossings. If a slope on the casing is used, then each end of the casing elevation shall be noted on the plans.
13. Contractor will install one (1) 3" conduit , for the City of Modesto, along the X STREET. City will furnish a pull box at each end for the Contractor to install.
14. Contractor and owner will design and construct facilities in accordance with the Modesto City Standard Specifications

If these conditions are acceptable to you, please have an authorized representative Fiber Company sign this letter where designated and return to this office. If you have any questions regarding this matter, please contact me at 209-577-5259.

Sincerely,

Name
CITY OF MODESTO
Public Works – Development Services

Acceptance of Conditions:

FIBER OPTICS COMPANY

By: _____

John Doe
Vice President and
General Counsel
Ph (916) 888-0707
Fax (916) 888-0715

Date: _____

Fiber Company
1000 Anywhere Court, Ste. 390
Anytown, CA 95000

CONTRACTOR

By: _____

John Doe
Vice President and
General Counsel
Ph (299) 888-0707
Fax (299) 888-0715

Date: _____

Construction XZ Company
P.O. Box 0007
Salida, CA 95000

Fiber Optic Encroachment Questionnaire

Please answer the questions to the best of your knowledge. No permits will be processed until this questionnaire is returned and the signed encroachment agreement is returned.

General Information

1. Name, address, phone, and fax numbers of the applicant: _____

2. Name, address, phone, and fax numbers of the agent: _____

3. Name, address, phone, and fax numbers of the contact person: _____

4. Contractor License class: _____

5. Contractor License number: _____

6. Explain the authority of the applicant to excavate the rights-of-way: _____

7. Is the applicant a Telephone Corporation in California? Yes No

8. If the answer to Question 7 is "Yes", please attach a copy of applicant's Certificate of Public Convenience and Necessity ("CPCN") from the California Public Utilities Commission and the Negative Declaration adopted in conjunction with the CPCN.

9. In an attachment hereto, identify any and all direct and indirect affiliates of applicant.

10. Does the applicant have an Open Video System (OVS) license issued by the FCC?
Yes No If yes, please attach a copy of the license.

11. Will the applicant use the telecommunications facilities, including cable television facilities, requested herein to carry traffic or information for:

- | | Yes | No |
|--|--------------------------|--------------------------|
| a. An affiliated company | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Another certificated Telephone Company | <input type="checkbox"/> | <input type="checkbox"/> |
| c. A competitive access provider | <input type="checkbox"/> | <input type="checkbox"/> |
| d. A cable television or other entertainment company | <input type="checkbox"/> | <input type="checkbox"/> |
| e. Other (Identify in an attachment hereto) | <input type="checkbox"/> | <input type="checkbox"/> |

12. If the answer to any part of Question 11 was "Yes", please explain the nature of the traffic to be carried and identify the companies involved in an attachment hereto.

13. Will the applicant sell or lease capacity, conduit, fiber or other facilities to any other person or entity? Yes No

14. If the answer to Question 13 was "Yes", please explain in an attachment the nature of the use by the other persons or entities, state whether such persons or entities are a LEC, CLEC, CAP, OVS operator, or cable operator, and identify all such persons or entities.

15. If the applicant intends to provide services to persons, residences, businesses, or others within the City, please explain the nature of the services and provide a general description of the intended customers.

16. Will the facilities proposed to be installed by the applicant be used by the applicant or any other person or entity for:

- | | Yes | No |
|--|--------------------------|--------------------------|
| a. Cable television or video entertainment services | <input type="checkbox"/> | <input type="checkbox"/> |
| b. An Open Video System under FCC rules | <input type="checkbox"/> | <input type="checkbox"/> |
| c. Any service not specifically authorized by applicant's CPUC Certificate | <input type="checkbox"/> | <input type="checkbox"/> |

17. If any part of Question 16 was answered "Yes", in an attachment hereto, please provide a full explanation of the services to be carried, the companies involved and the intended customers.

18. List below the application or permit numbers of all pending applications and permits issued by the City to applicant (or a related company) which relate directly or indirectly to this application.

Application/Permit No.	Date Filed	Date Issued
<hr/>	<hr/>	<hr/>
<hr/>	<hr/>	<hr/>

19. If applicant intends to attach any part of the telecommunications, including cable television infrastructure which is the subject, in whole or in part, of this application to a pole, please describe the pole attachment plans below, including route, schedule, equipment to be used, etc.

20. Attach an appropriate scale map to show the route that the telecommunications infrastructure will take through the City. Use colors and a clear legend to show the following: (1) the infrastructure that is proposed in the application, (2) overhead plant that will be installed, even if it is not subject to the application, (3) existing infrastructure owned by applicant (or its affiliate) to which the new plant will be attached or integrated, (4) to the extent known at the time of filing, the entire infrastructure that is planned for the City. If the map scale is too small to show the information clearly, the applicant will be required to supply a larger map.

Proposed Telecommunications Infrastructure

21. Describe the conduit that will be installed as part of the construction proposed in the application. Include size, number of conduits, nature of inner duct (if any), material (HDPE, PVC, etc.), manufacturer.

Indicate the number of conduits/inner ducts that will be occupied initially by applicant's cable.

23. Provide the following information on any conduit that will be installed as part of the construction proposed in this application.

	Yes	No
Will applicant use directional boring to install conduit?	<input type="checkbox"/>	<input type="checkbox"/>
Will applicant direct bury (trench) the conduit?	<input type="checkbox"/>	<input type="checkbox"/>
Will conduit be installed for other parties during this construction?	<input type="checkbox"/>	<input type="checkbox"/>
Is applicant willing to lease conduit to other parties?	<input type="checkbox"/>	<input type="checkbox"/>
Is applicant going to participate in joint trench?	<input type="checkbox"/>	<input type="checkbox"/>
Is applicant willing to participate in joint trench?	<input type="checkbox"/>	<input type="checkbox"/>

Describe the pull boxes, splice boxes and other vaults and pedestals to be installed by applicant (include size, model number, and manufacturer):

25. Describe the type and amount of cable (fiber-optic, twisted-pair copper, coaxial, etc.) that will be installed by applicant as part of, or as a result of the construction proposed in this application.

Impact on County Resources and Quality of Life

26. Assuming that a qualified party, such as a CLEC or a national CAP, approached the applicant about sharing facilities on economic terms that were reasonable, would the applicant be willing to share facilities:

	Yes	No
In general?	<input type="checkbox"/>	<input type="checkbox"/>
Share available conduit or inner duct?	<input type="checkbox"/>	<input type="checkbox"/>
Share fiber strands in a fiber cable?	<input type="checkbox"/>	<input type="checkbox"/>
Share splice boxes?	<input type="checkbox"/>	<input type="checkbox"/>
Share trenching costs in a joint construction project?	<input type="checkbox"/>	<input type="checkbox"/>

27. In order to minimize the impact of applicant's proposed construction, has the applicant:

	Yes	No
Checked pending applications and recently granted permits in the City to determine whether the opportunity to construct using joint trench, or the opportunity to share facilities is available.	<input type="checkbox"/>	<input type="checkbox"/>
Checked street resurfacing schedules?	<input type="checkbox"/>	<input type="checkbox"/>
Proposed to use directional boring in areas where it would minimize the impact on traffic, residents and businesses?	<input type="checkbox"/>	<input type="checkbox"/>

If no directional boring is proposed, please explain why below:

Applicant agrees to comply with the City's land use and planning process (including public notification) for the location of any structures or facilities to be placed in or adjacent to the City's public rights-of-way. The applicant further agrees to provide all necessary information requested by the City including required documentation to conduct applicable CEQA review.

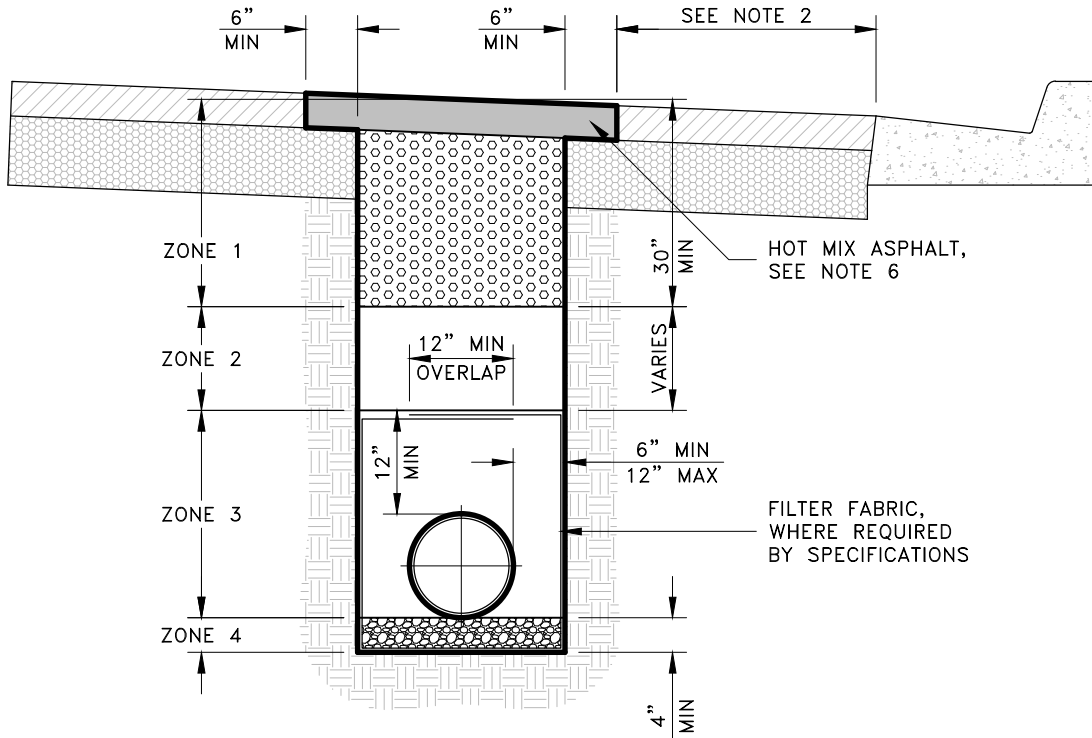
I declare under penalty of perjury that the foregoing information is true and correct.

Applicant: _____

(Owner of the facilities to be installed in the public rights-of-way)

Printed Name, Title and Company

ZONE	DESCRIPTION	ACCEPTABLE MATERIAL	RELATIVE COMPACTION (MIN)
1	STRUCTURAL SECTION	SEE NOTE 6	95
2	BACKFILL	SEE NOTE 4	95
3	BEDDING	SEE NOTE 4	90
4	FOUNDATION	SEE NOTE 4	90



NOTES:

1. TRENCH SECTION SHALL BE BACKFILLED AND MECHANICALLY COMPACTED TO GRADE. CONTRACTOR SHALL FURNISH, INSTALL, COMPACT AND MAINTAIN 2" TEMPORARY PAVEMENT UNTIL PERMANENT PAVEMENT IS PLACED.
2. IF TRENCH IS WITHIN 36" OF EXISTING GUTTER, CONCRETE FLATWORK, OR EDGE OF LANE (EITHER EDGE), CONTRACTOR SHALL REMOVE AC AND PAVE TRENCH AND ADJACENT PIECE (FULL DEPTH HMA PER NOTE 6) AS ONE COMPLETE TRENCH RESTORATION.
3. PRIME COAT REQUIRED ABOVE AGGREGATE BASE.
4. MATERIAL FOR THE VARIOUS ZONES SHALL CONFORM TO THE GRADATION REQUIREMENTS DESCRIBED IN TABLE 8.3, CHAPTER 8 OF THESE STANDARD SPECIFICATIONS.
5. FAVORABLE COMPACTION TESTS OF THE VARIOUS ZONES ARE REQUIRED FOR TRENCH ACCEPTANCE.
6. HOT MIX ASPHALT MINIMUM THICKNESS FOR TRENCH RESTORATION SHALL BE DETERMINED BY CHAPTER 3 OF THESE STANDARD SPECIFICATIONS. BASE MATERIAL SHALL BE CLASS 2 AGGREGATE BASE PER CHAPTER 8 OF THESE SPECIFICATIONS.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

UTILITIES

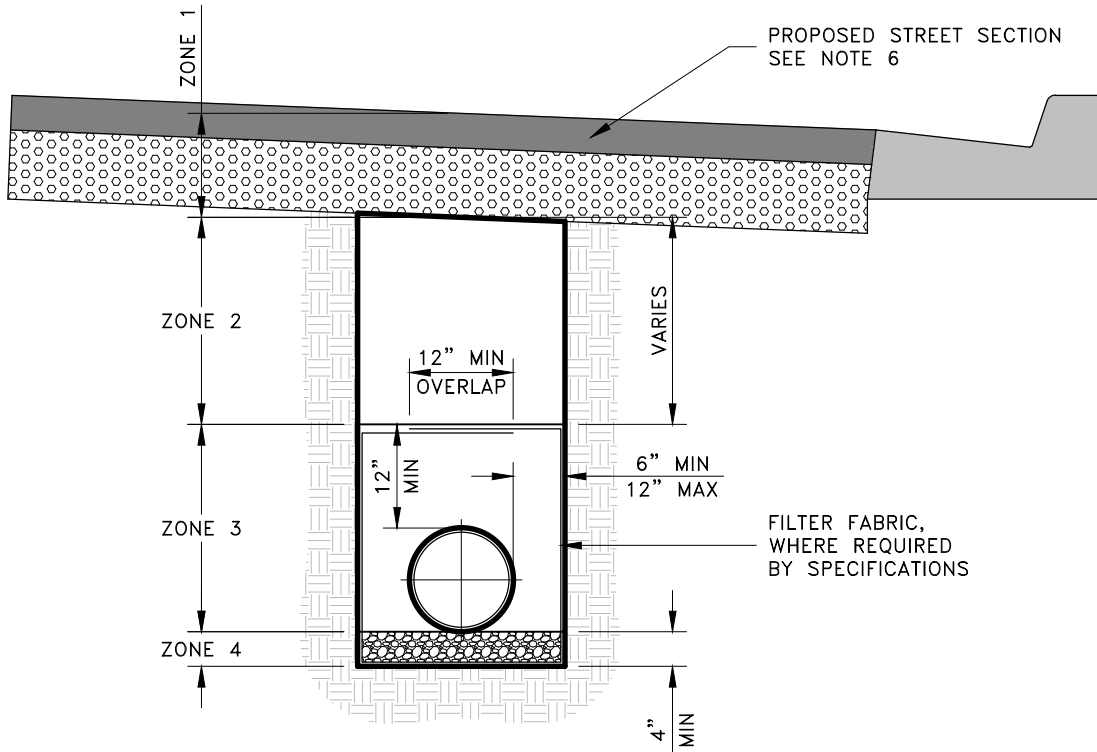
**STREET BACKFILL
 EXISTING STREETS**

**ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345**



**DETAIL NO.
 800**

ZONE	DESCRIPTION	ACCEPTABLE MATERIAL	RELATIVE COMPACTION (MIN)
1	STRUCTURAL SECTION	SEE NOTE 6	95
2	BACKFILL	SEE NOTE 3	95
3	BEDDING	SEE NOTE 3	90
4	FOUNDATION	SEE NOTE 3	90



NOTES:

1. TRENCH SECTION SHALL BE BACKFILLED AND MECHANICALLY COMPACTED TO GRADE.
2. PRIME COAT REQUIRED ABOVE AGGREGATE BASE.
3. MATERIAL FOR THE VARIOUS ZONES SHALL CONFORM TO THE GRADATION REQUIREMENTS DESCRIBED IN TABLE 8.3, CHAPTER 8 OF THESE STANDARD SPECIFICATIONS.
4. FAVORABLE COMPACTION TESTS OF THE VARIOUS ZONES ARE REQUIRED FOR TRENCH ACCEPTANCE.
5. IN LANDSCAPED AREAS, ZONE 1 IS ELIMINATED AND ZONE 2 SHALL BE COMPACTED TO 85% RELATIVE COMPACTION FROM TOP OF ZONE 3 TO FINISH GRADE.
6. HOT MIX ASPHALT AND BASE MINIMUM THICKNESS SHALL BE DETERMINED BY CHAPTER 3 OF THESE STANDARD SPECIFICATIONS. BASE MATERIAL SHALL BE CLASS 2 AGGREGATE BASE PER CHAPTER 8 OF THESE SPECIFICATIONS.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

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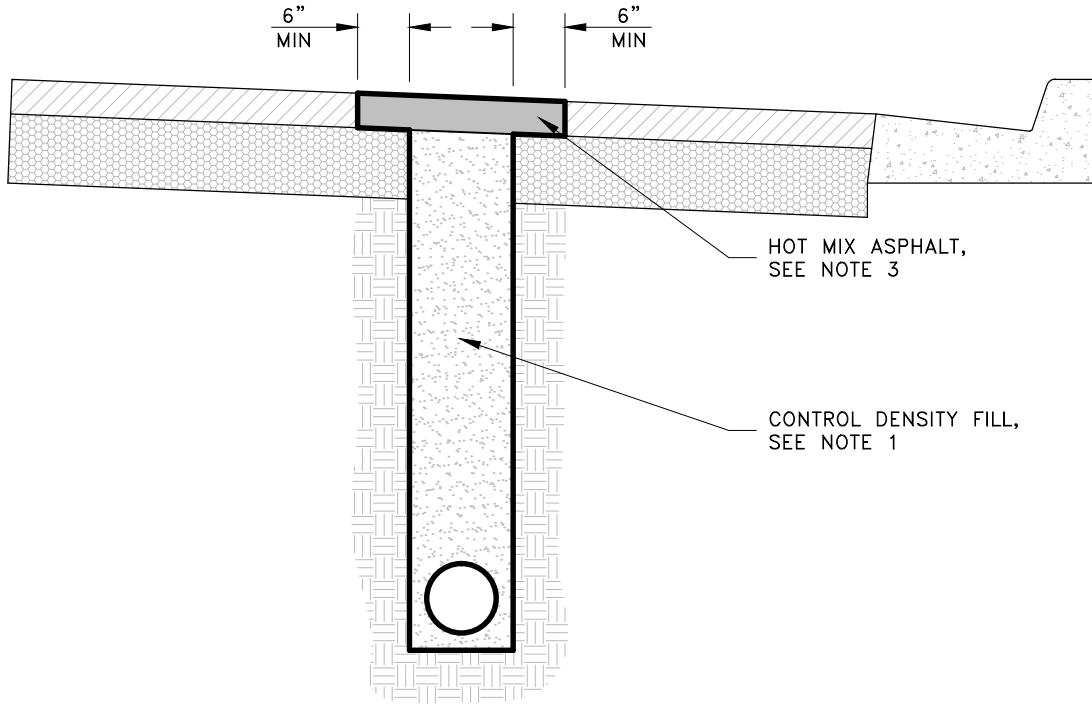
UTILITIES

**STREET BACKFILL
UNDEVELOPED STREETS**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



DETAIL NO.
801



NOTES:

1. TRENCH SECTION SHALL BE BACKFILLED ACCEPTABLE CONTROL DENSITY FILL. CONTRACTOR SHALL FURNISH, INSTALL, COMPACT AND MAINTAIN 2" TEMPORARY PAVEMENT UNTIL PERMANENT PAVEMENT IS PLACED.
2. PRIME COAT REQUIRED ABOVE CONTROL DENSITY FILL.
3. HOT MIX ASPHALT MINIMUM THICKNESS FOR TRENCH RESTORATION SHALL BE DETERMINED BY THE STREET DESIGN CHAPTER OF THESE STANDARD SPECIFICATIONS.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

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REVISED: DATE:

UTILITIES

**POTHOLING FOR DESIGN
 AND CONSTRUCTION**



ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
802

LEFT BLANK
INTENTIONALLY

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

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UTILITIES

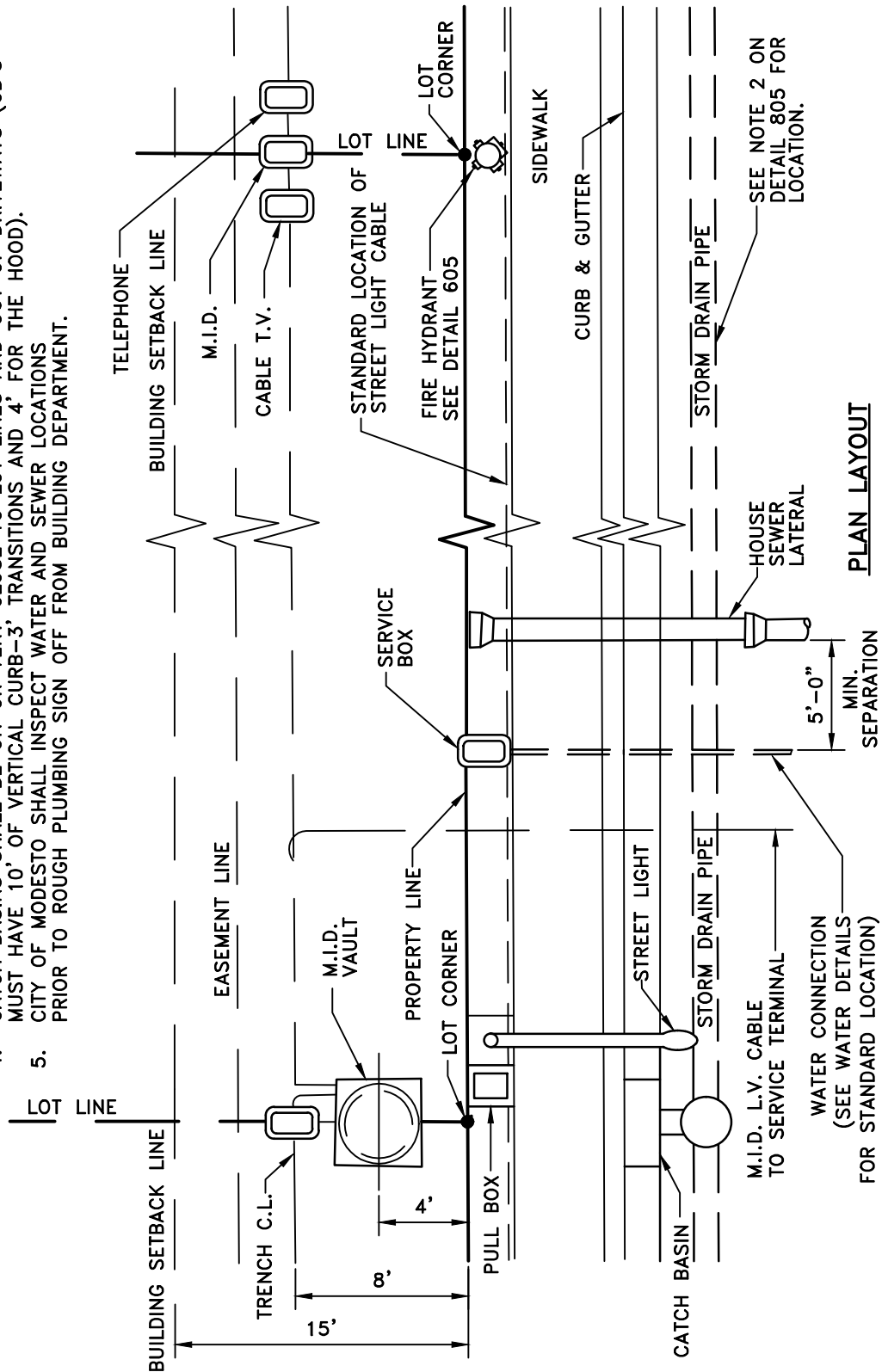


ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

DETAIL NO.
803

NOTES:

1. WATER AND SEWER SERVICES SHALL BE ON OPPOSITE SIDE OF LOT FROM THE ON-SITE PUBLIC UTILITY TRENCH.
2. WATER AND SEWER SERVICES SHALL NOT BE LOCATED IN THE DRIVEWAY.
3. STREET LIGHTS, BLOWOFFS, SAMPLING STATIONS AND FIRE HYDRANTS SHALL BE LOCATED WITHIN 3' OF LANE LINES.
4. CATCH BASINS SHALL BE ON OR VERY CLOSE TO LOT LINES AND OUT OF DRIVEWAYS (CB'S MUST HAVE 10' OF VERTICAL CURB-3' TRANSITIONS AND 4' FOR THE HOOD).
5. CITY OF MODESTO SHALL INSPECT WATER AND SEWER LOCATIONS PRIOR TO ROUGH PLUMBING SIGN OFF FROM BUILDING DEPARTMENT.



APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
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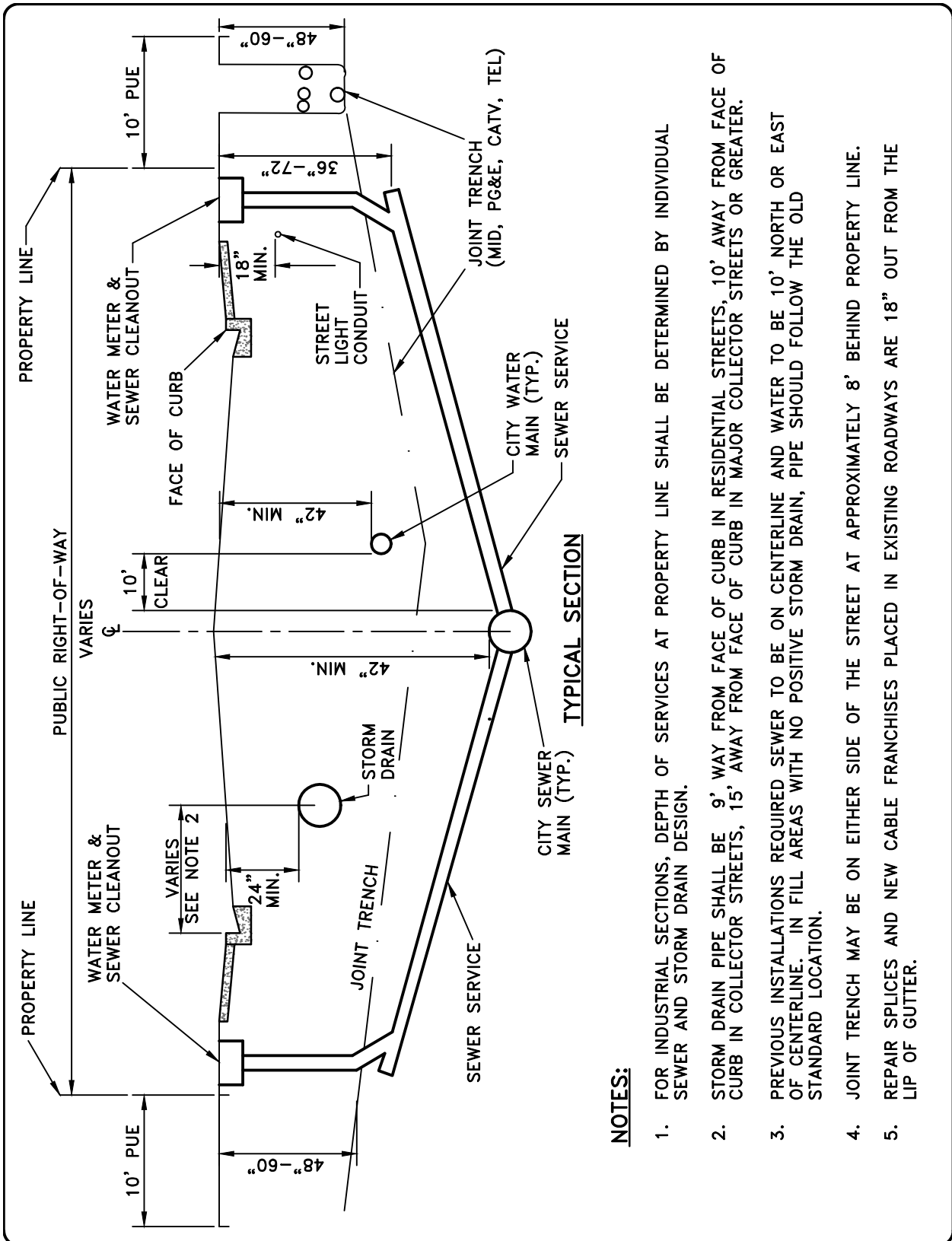
UTILITIES

**STANDARD LOCATIONS
FOR RESIDENTIAL**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

DETAIL NO.
804



NOTES:


1. FOR INDUSTRIAL SECTIONS, DEPTH OF SERVICES AT PROPERTY LINE SHALL BE DETERMINED BY INDIVIDUAL SEWER AND STORM DRAIN DESIGN.
2. STORM DRAIN PIPE SHALL BE 9' WAY FROM FACE OF CURB IN RESIDENTIAL STREETS, 10' AWAY FROM FACE OF CURB IN COLLECTOR STREETS, 15' AWAY FROM FACE OF CURB IN MAJOR COLLECTOR STREETS OR GREATER.
3. PREVIOUS INSTALLATIONS REQUIRED SEWER TO BE ON CENTERLINE AND WATER TO BE 10' NORTH OR EAST OF CENTERLINE. IN FILL AREAS WITH NO POSITIVE STORM DRAIN, PIPE SHOULD FOLLOW THE OLD STANDARD LOCATION.
4. JOINT TRENCH MAY BE ON EITHER SIDE OF THE STREET AT APPROXIMATELY 8' BEHIND PROPERTY LINE.
5. REPAIR SPLICES AND NEW CABLE FRANCHISES PLACED IN EXISTING ROADWAYS ARE 18" OUT FROM THE LIP OF GUTTER.

APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
REVISED:	DATE:
REVISED:	DATE:
REVISED:	DATE:

UTILITIES

STREET CROSS SECTION TYPICAL

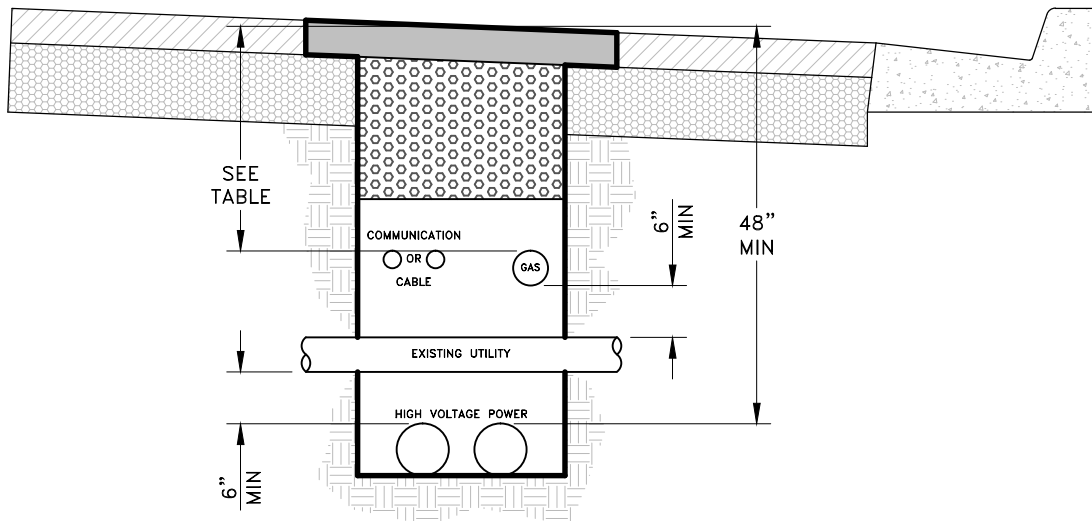
ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



MODESTO
CALIFORNIA

DETAIL NO.
805

TRAFFIC INDEX	MINIMUM COVER
4 - 6	30"
7 - 8	36"
9 - 10	42"
11 - 12	48"



NOTES:

1. A SINGLE UTILITY MAY BE PLACED IN A 4-INCH MINIMUM WIDTH TRENCH. SINGLE UTILITY TRENCHES MUST BE PARALLEL TO THE STREET CENTERLINE AND ADJACENT TO THE LIP OF THE GUTTER. OTHER LOCATIONS AND ALIGNMENTS MUST BE APPROVED IN WRITING PRIOR TO INSTALLATION BY THE CITY ENGINEER.
2. FOR BACKFILL, COMPACTION AND STREET STRUCTURAL SECTION REQUIREMENTS, SEE DETAIL 800.
3. WHEN EXISTING UTILITIES CONFLICT WITH THE VERTICAL LOCATION OF THE PROPOSED UTILITY, THE NEW UTILITY MUST CROSS UNDER THE EXISTING UTILITY, EXCEPT WHEN THE MINIMUM COVER AND MINIMUM CLEARANCE CAN BE ACHIEVED.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

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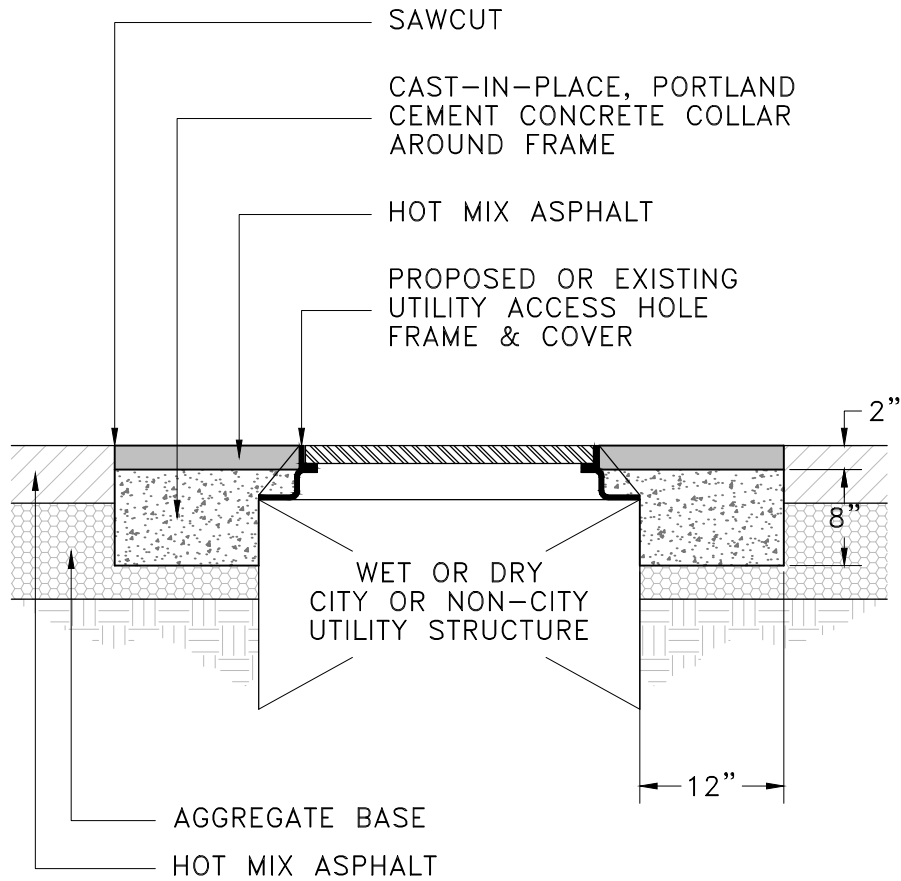
UTILITIES

**MINIMUM UTILITY COVER
 IN STREET TRENCH**



ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
806



APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

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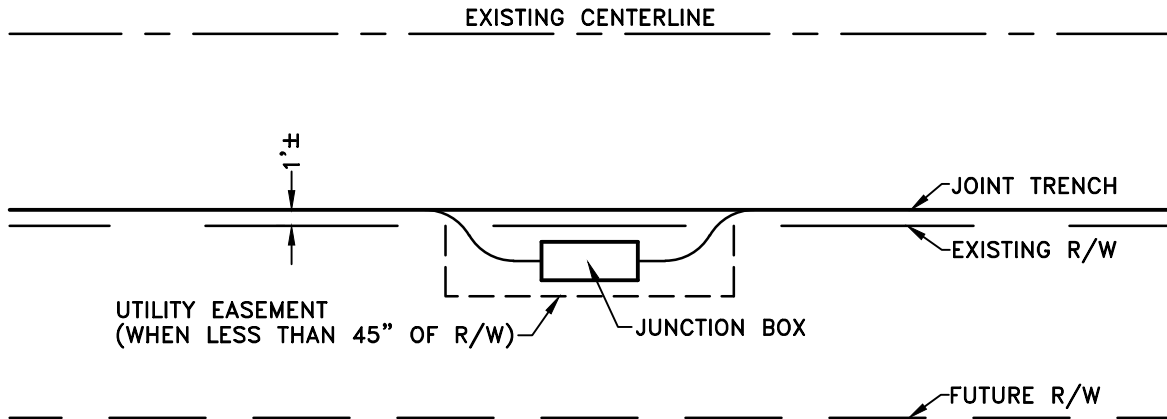
UTILITIES

**ADJUSTING UTILITY ACCESS
 HOLE FRAME TO GRADE**

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345



DETAIL NO.
807



UTILITY LOCATIONS WHEN NO DEDICATED P.U.E. EXISTS

EXISTING RIGHT OF WAY (R/W)

UTILITY LOCATION

LESS THAN 40' R/W

UTILITY MUST OBTAIN ITS OWN EASEMENT.

40'-45' R/W WITHOUT

IN NON-URBANIZED CONDITIONS, UTILITY PLACED 1'± FROM EXISTING R/W. UTILITY MUST OBTAIN CONSTRUCTION EASEMENT AS WELL AS ITS OWN EASEMENT FOR ANY JUNCTION BOXES. IN URBANIZED AREAS, CITY ENGINEER SHALL ENGINEER A LOCATION BASED ON EXISTING AND PROPOSED UTILITIES.

45' OR MORE

UTILITY LOCATED AS FAR AS POSSIBLE TOWARD EDGE OF THE R/W. EVERYTHING LOCATED WITHIN CURRENT R/W.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

REVISED: DATE:

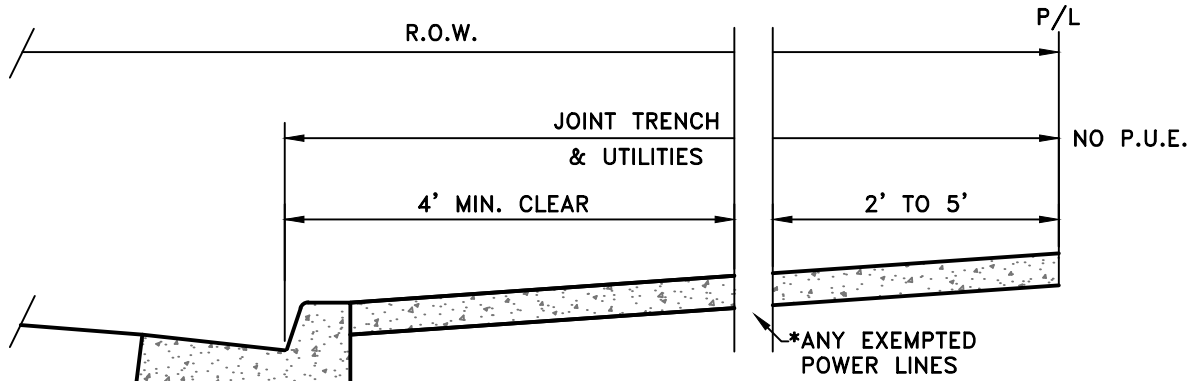
REVISED: DATE:

UTILITIES
UTILITY LOCATION W/O
ULTIMATE R/W

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

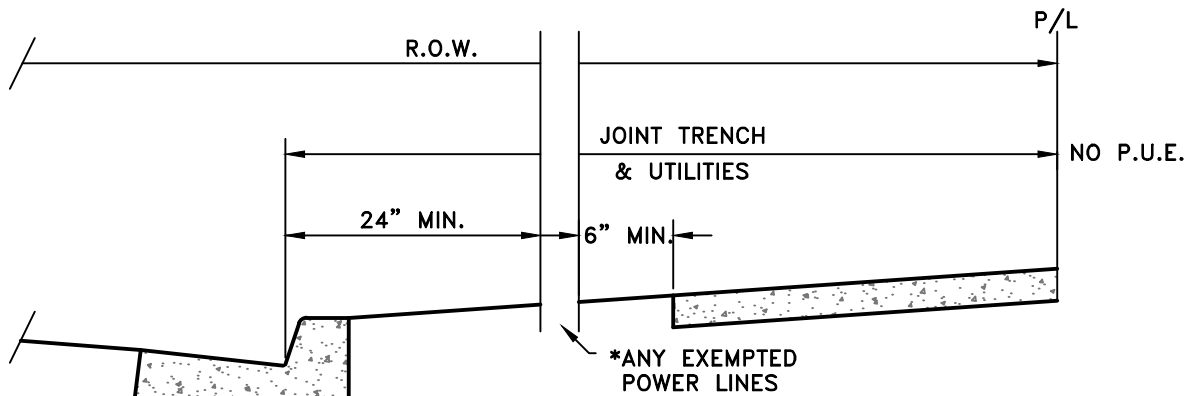


DETAIL NO.
808



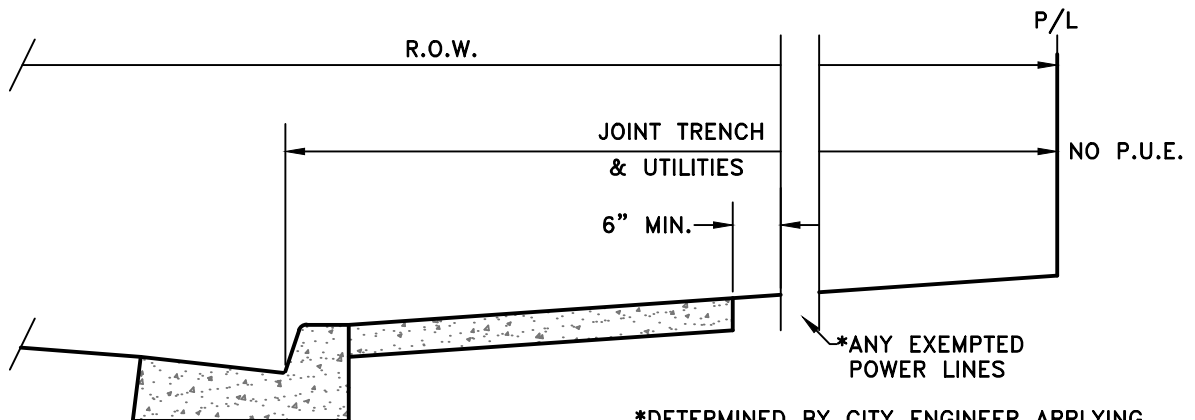
*DETERMINED BY CITY ENGINEER APPLYING P.U.C. RULE 20 AND ECONOMIC FEASIBILITY

CASE A



*DETERMINED BY CITY ENGINEER APPLYING P.U.C. RULE 20 AND ECONOMIC FEASIBILITY

CASE B



*DETERMINED BY CITY ENGINEER APPLYING P.U.C. RULE 20 AND ECONOMIC FEASIBILITY

CASE C

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

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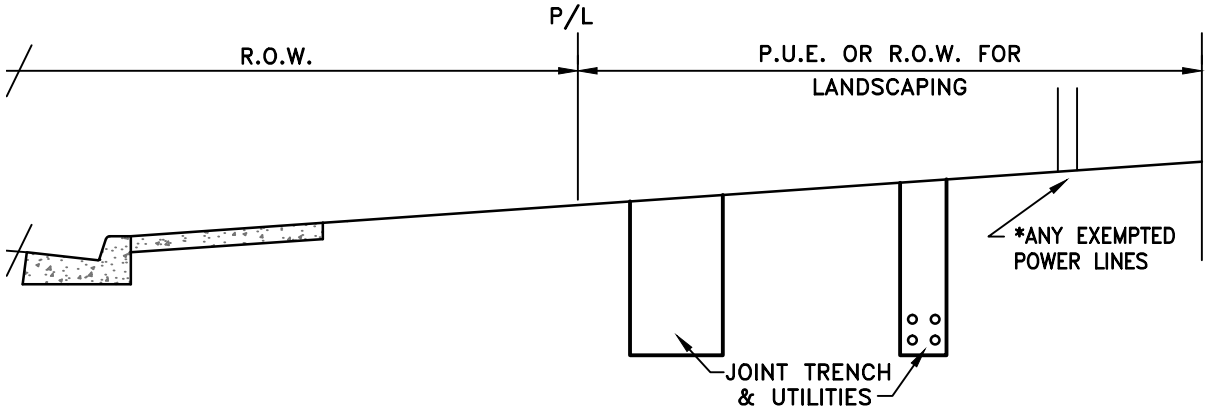
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UTILITIES
JOINT TRENCH LOCATIONS
CASE A, B AND C



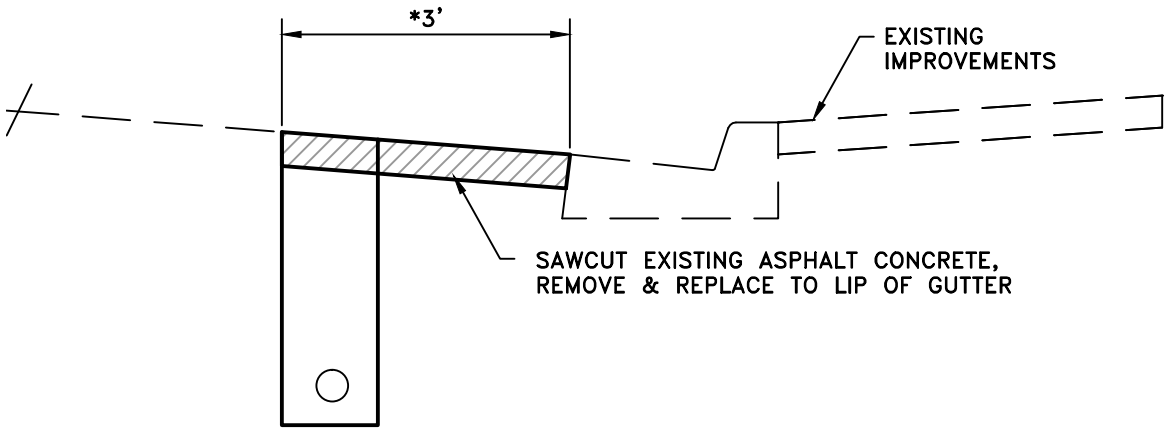
ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

DETAIL NO.
809



*DETERMINED BY CITY ENGINEER APPLYING P.U.C. RULE 20 AND ECONOMIC FEASIBILITY

CASE D



CASE E

NOTES:

1. A MINIMUM OF 3' SEPARATION REQUIRED BETWEEN ANY EXISTING SEWER, WATER OR STORM DRAIN AND A NEW UTILITY SERVICE (OUTSIDE WALL OR CONDUIT TO OUTSIDE WALL OF CONDUIT.)
2. NO POLE RELOCATION MAY BE PLACED INTO AN EXISTING SIDEWALK UNLESS THERE IS NO P.U.E. AND THE SIDEWALK COVERS THE R.O.W. BEHIND THE CURB. IN THIS CASE, THE POLE SHALL BE PLACED BETWEEN 2' AND 5' FROM THE EDGE OF THE EXISTING R.O.W..
3. WHEN INSTALLING ANY UTILITY TRENCH PARALLEL TO THE EXISTING LIP OF GUTTER IN THE EXISTING PAVEMENT, ALL PAVEMENT SLIVERS LESS THAN 3' FROM THE TRENCH TO LIP OF GUTTER SHALL BE REMOVED AND PATCHED WITH THE TRENCH PATCHING.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

UTILITIES
JOINT TRENCH LOCATIONS
CASE D AND E



ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

DETAIL NO.
810

CHAPTER 9

TRAFFIC STRIPING AND SIGNS

9.01 GENERAL

This work shall include the furnishing of all labor, materials, tools, and equipment to construct and complete in an efficient and workmanlike manner the installation of traffic signs and pavement delineation in accordance with the approved plans, these specifications, the City of Modesto Standard Details, the State Standards and Standard Plans.

9.02 DESIGN

All street striping will be designed and installed by the Developer and his/her Contractor. A striping plan shall be prepared and placed on the Street Lighting Plan sheet at a scale sufficient to clearly indicate all street striping, including centerline, stop street markings, crosswalks, etc. Street signs shall be shown on the same drawing. Plan sheet shall include any and all mergers and tapers beyond property limits and on both sides of the street. The striping plan shall be prepared using the most current Manual on Uniform Traffic Control Devices (MUTCD) and City/State Standards and Specifications.

Removal of striping and pavement markers shall be per the approved State Standards. Traffic striping and pavement marking work shall conform to the provisions in Section 15 "Existing Facilities", Section 84 "Traffic Stripes and Pavement Markings" and Section 85 "Existing Highway Facilities," "Traffic Stripes and Pavement Markings," and "Pavement Markers" of the California Standard Specifications, applicable sheets of the California Standard Plans, the details and notes as shown on the plans, and these special provisions.

A. Removal of Traffic Stripes and Pavement Markings

This work shall consist of removing existing traffic stripes (traffic lines) and pavement markings at the locations shown on the plans in conformance with Sections 15-1 "General," and 15-2 "Miscellaneous Highway Facilities" of the State Standards and these Standard Specifications.

B. Signing and Barricades

1. Street names shall be approved by the City Planning Staff.
2. Street name and traffic control signs shall be paid for by the Developer. City shall supply and install street name and traffic control signs.
3. Permanent barricades shall be installed where improvements cover only a portion of the ultimate development or as directed by the City Traffic Engineer. The barricade shall be constructed, erected, painted, and signed in accordance with the City of Modesto Standard Details.

C. Removable Bollards

Six-inch (6") minimum galvanized steel pipe (6' long minimum) with galvanized steel pipe sleeve at least 1/10" diameter larger installed 2' to 3' deep, painted or unpainted, welded galvanized lock boxes, minimum 42" of exposed pipe. Developer pays cost of lock, which will be provided by City.

D. Permanent Bollards

Six inch (6") or 8" minimum galvanized steel pipe, buried in 2' diameter hole at least 4' deep, 42" minimum of exposed pipe unless sloping ground and aesthetics requires longer exposure of pipe.

E. Bollard Spacing

Maximum of 5' spacing between bollards.

F. Bollard Locations

Must be a minimum of 1' behind the sidewalk of the cul-de-sac or intersection street.

9.03 MATERIALS AND INSTALLATION

A. Thermoplastic Traffic Stripes and Pavement Markings

This work shall consist of applying thermoplastic traffic stripes (traffic lines) and pavement markings, including applying glass spheres, at the locations shown on the plans in conformance with Section 84-1 "General," and 84-2 "Thermoplastic Traffic Stripes and Pavement Markings," of the State Standards and these Standard Specifications.

B. Pavement Markers

This work shall consist of furnishing and placing raised pavement markers at the locations shown on the plans in conformance with Section 85 "Pavement Markers," of the State Standards and these Standard Specifications. Reflective pavement markers shall be glass faced. Non-reflective pavement markers shall be ceramic.

C. Painted Traffic Stripes and Pavement Markings

Painted traffic stripes and pavement markings shall only be used where the roadway is to be resurfaced within one year. This work shall consist of applying painted traffic stripes (traffic lines) and pavement markings, including glass spheres, at locations shown on the plans in conformance with Section 84-1 "General" and 84-3 "Painted Traffic Stripes and Pavement Markings" of the California Standard Specifications and these Standard Specifications.

9.04 MEASUREMENT AND PAYMENT

Payment for all traffic stripes, pavement markings, and pavement markers shall include full compensation for furnishing all labor, materials, tools, equipment, adhesive and all

other incidentals to completely install the traffic stripes, pavement markings, and pavement markers.

A. Traffic Stripes and Pavement Markers

All traffic stripes shall be measured by the linear foot along the line of the traffic stripe, without deductions for gaps in broken (skipped) traffic stripes. Payment for all thermoplastic traffic stripes shall be for the widths designated in the contract document.

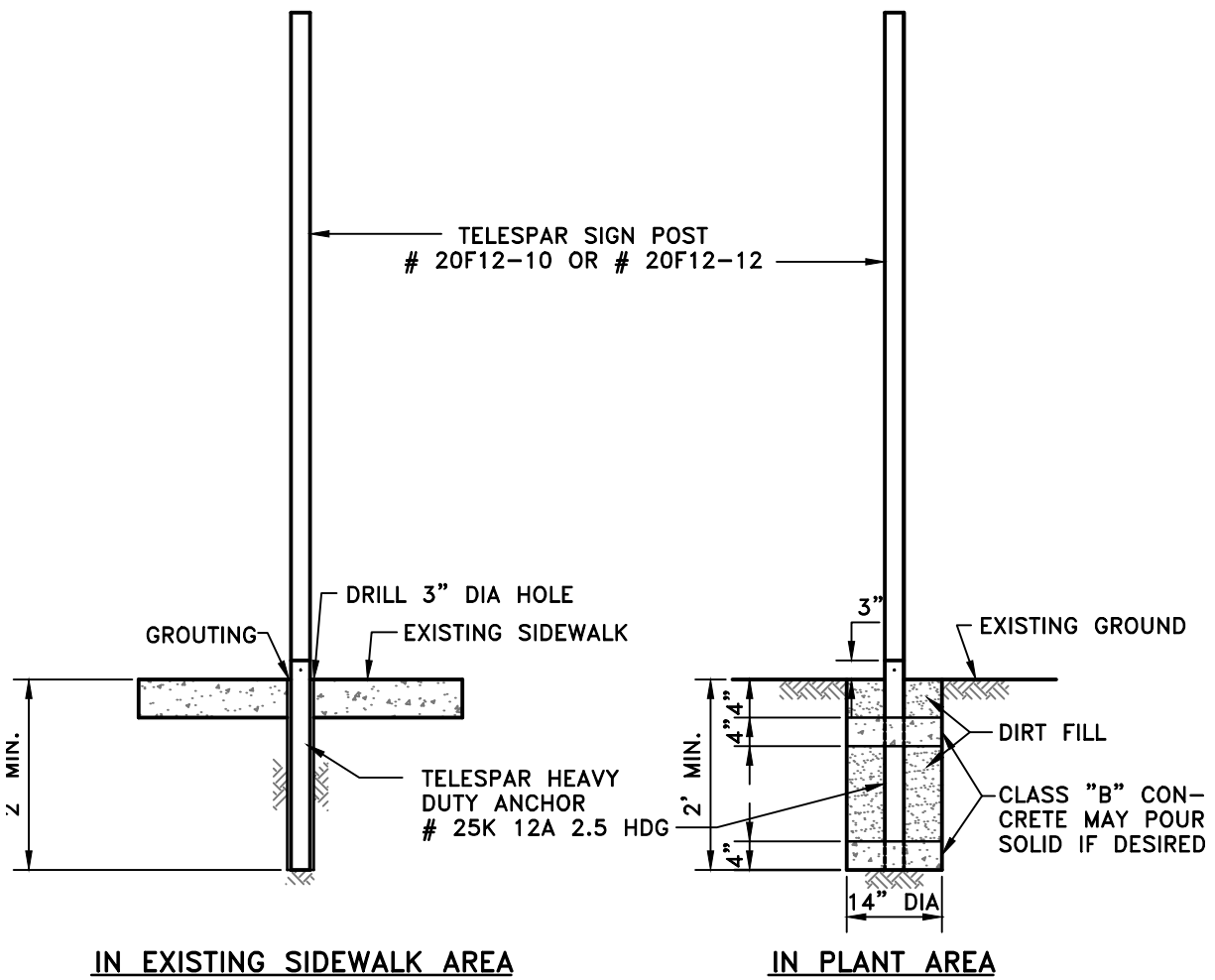
All pavement markings and legends shall be measured by the square foot of the actual area covered. All pavement markings and legends shall be paid for by the square foot of actual area covered.

B. Pavement Markers

All pavement markers shall be measured per each for reflective and non-reflective types.


C. Signs

The Contract unit price paid for roadside signs shall include all labor, materials, tools, equipment, concrete, and incidentals for installing the roadside signs complete.

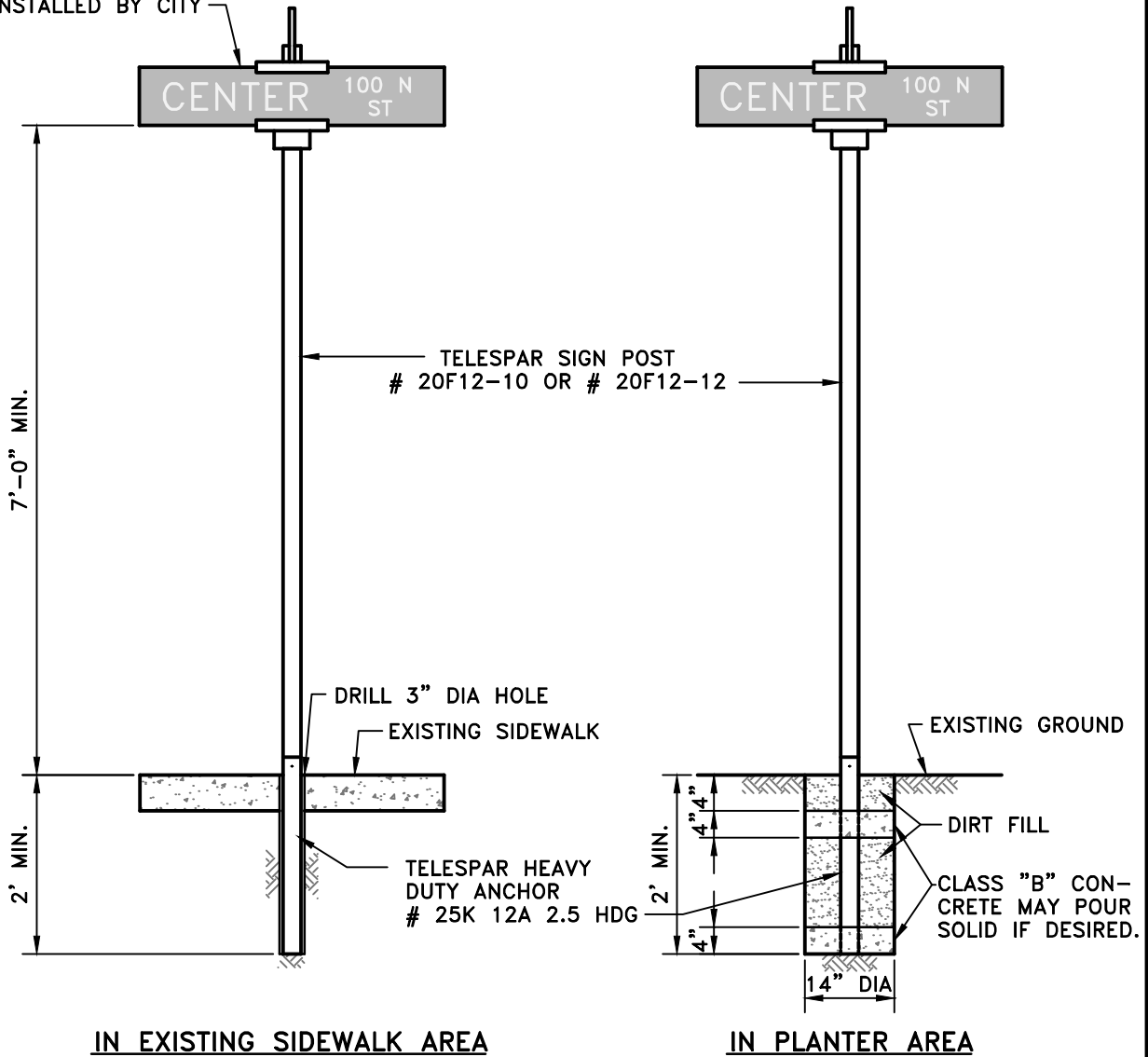


NOTE:

ANCHOR TO BE DRIVEN OR PLACED WITH 3" MAXIMUM ABOVE GROUND LEVEL.

APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	SIGNS & STRIPING	 MODESTO CALIFORNIA
REVISED: DATE:	SIGN POST	
REVISED: DATE:	ADOPTED BY CITY COUNCIL RESOLUTION NO. 2014-345	
REVISED: DATE:	DETAIL NO. 900	

STREET NAME SIGNS TO BE
INSTALLED BY CITY



NOTES:

1. SEE DRAWING OF STANDARDS FOR LOCATION OF STREET NAME SIGNS.
2. ANCHOR TO BE DRIVEN OR PLACED WITH 3" MAXIMUM ABOVE GROUND LEVEL.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

SIGNS & STRIPING

STREET NAME SIGN

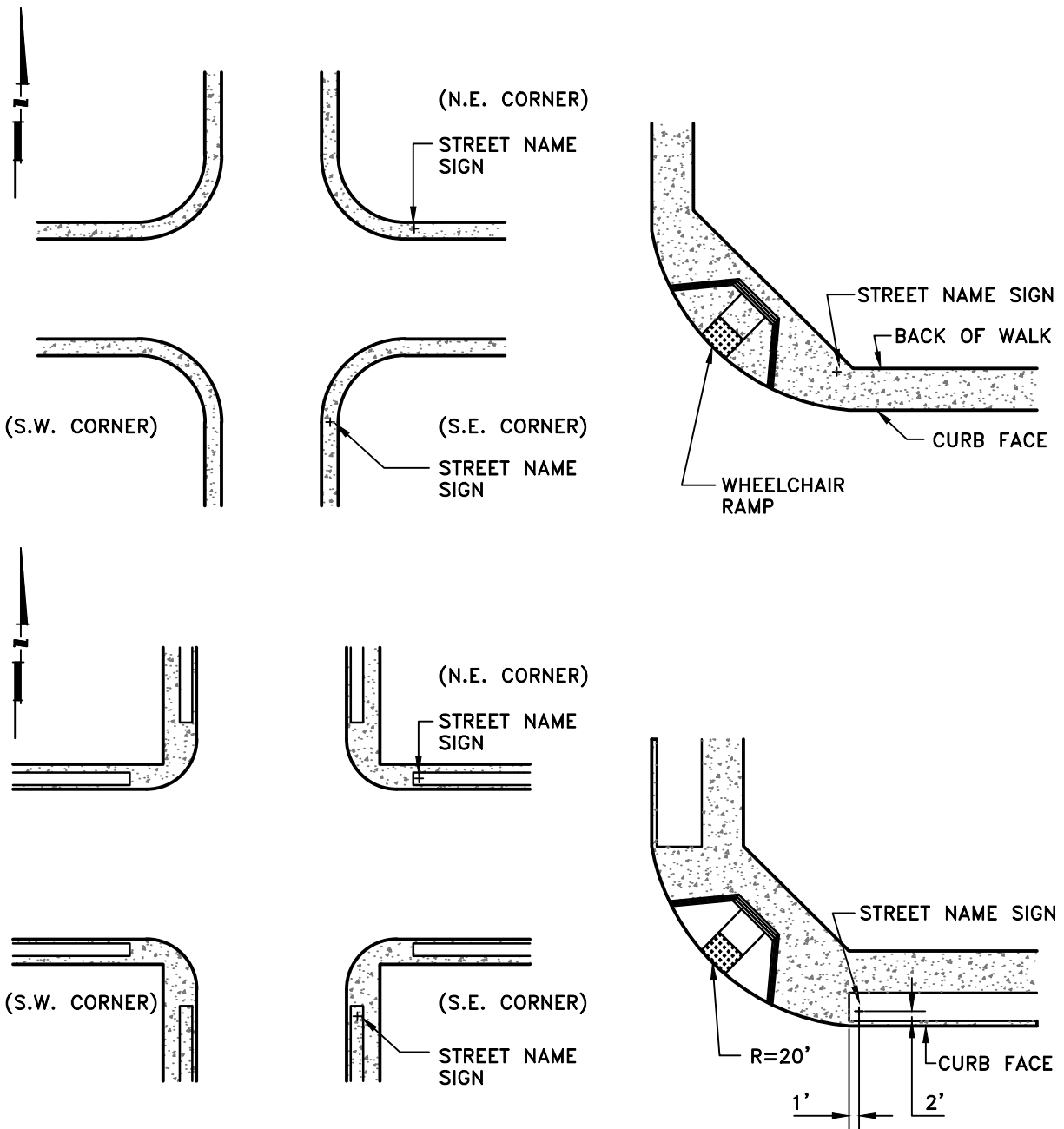
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RESOLUTION NO. 2014-345



MODESTO
CALIFORNIA

DETAIL NO.

901



NOTES:


1. DRILL 3" DIA. HOLE IN CONCRETE IF SIGN INSTALLED AFTER SIDEWALK HAS BEEN CONSTRUCTED.
2. SIGN LOCATION SHALL BE AS FOLLOWS:
 ON RESIDENTIAL STREETS: N.E. OR S.E. CORNER.
 ON MAJOR ARTERIALS: ON BOTH SIDES OF THE STREET.

APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
REVISED:	DATE:
REVISED:	DATE:
REVISED:	DATE:

SIGNS & STRIPING

**STREET SIGN
LOCATION**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



**MODESTO
CALIFORNIA**

DETAIL NO.
902

TYPICAL OVERHEAD STREET NAME SIGNS

FRONT VIEW



BACK VIEW



NOTES:

1. FIRST LETTER SHALL BE 12" CAPITAL AND ALL OTHERS SHALL BE 10" LOWER CASE FOR STREET NAME.
2. ALL BLOCK NUMBERS SHALL BE 4" NUMBERS.
3. ALL ARROWS SHALL BE 4" WIDE.
4. ALL TEXT SHALL BE SERIES "CLEARVIEW".
5. SIGNS SHALL BE WHITE ON A GREEN BACKGROUND.
6. SIGNS SHALL BE DIAMOND VIP GRADE SHEETING.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

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REVISED: DATE:

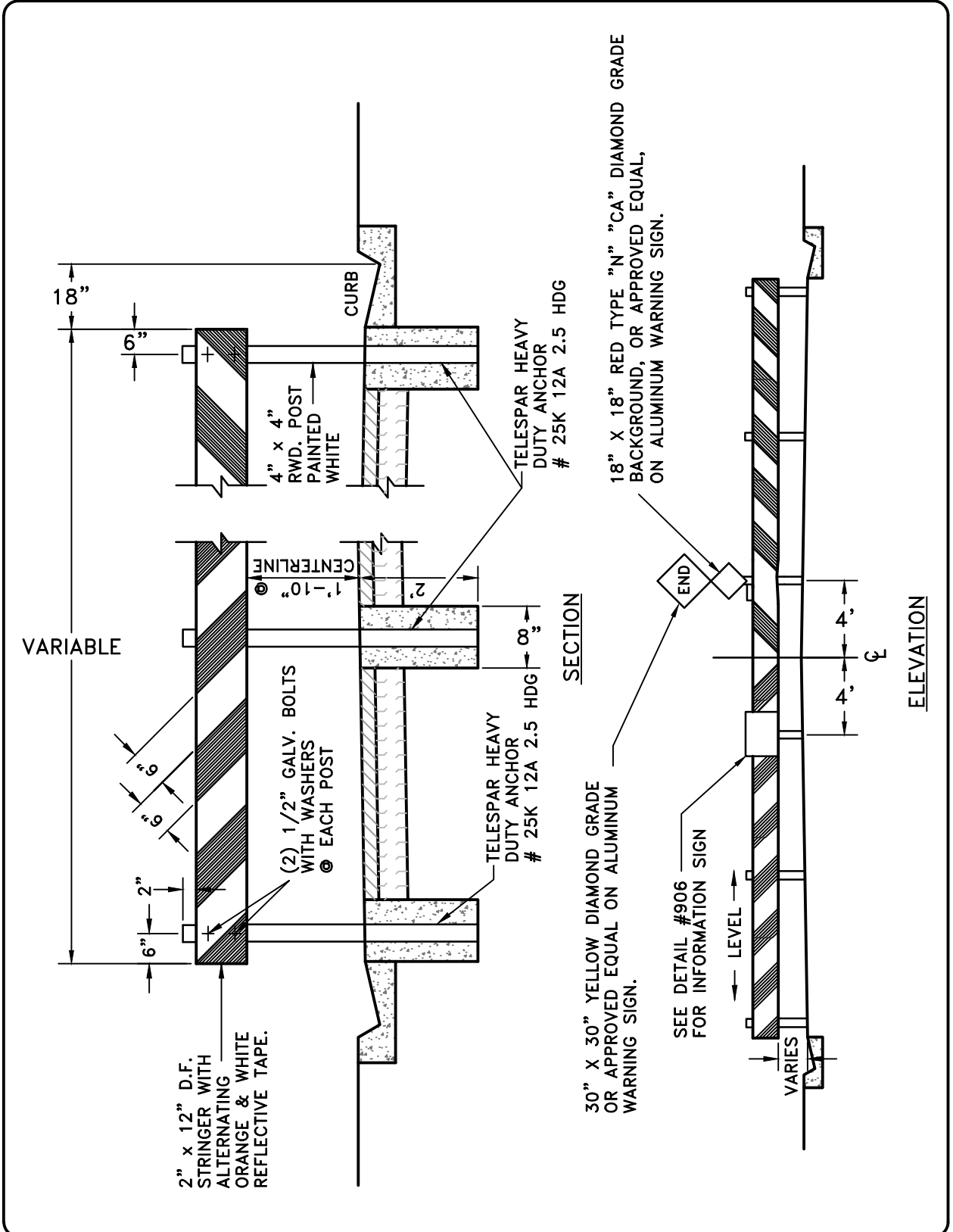
SIGNS & STRIPING

TYPICAL OVERHEAD STREET NAME SIGNS



ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

DETAIL NO.
903



APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
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REVISED:	DATE:

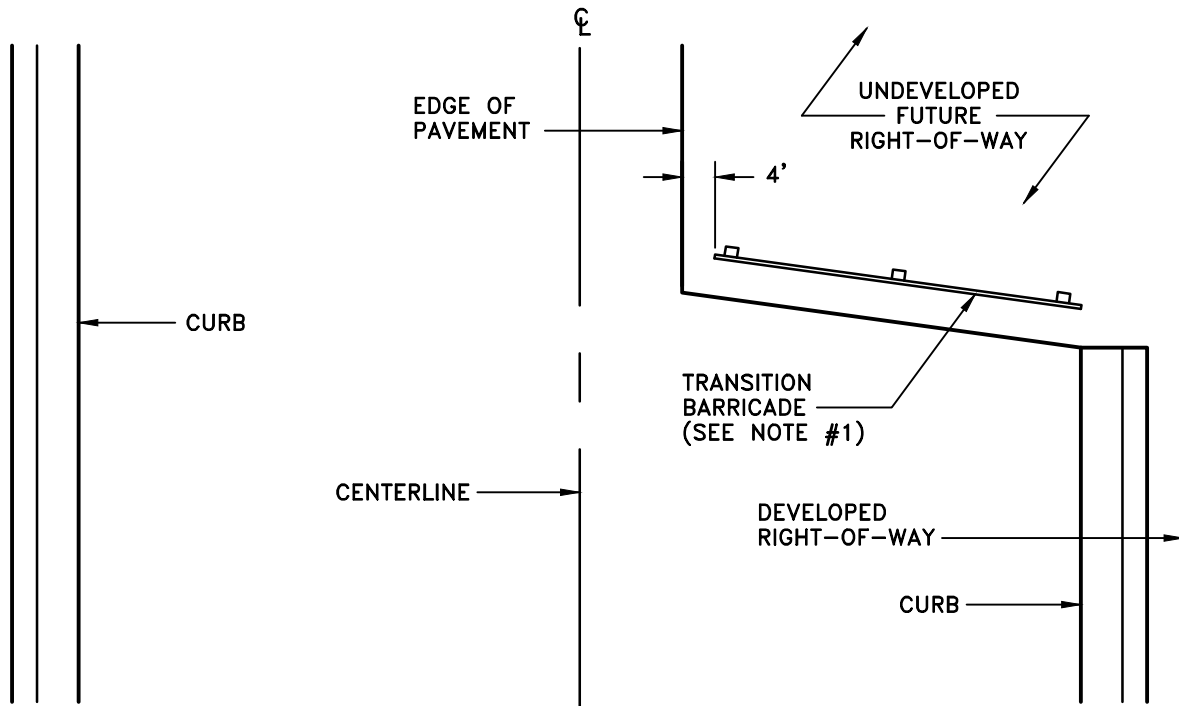
SIGNS & STRIPING

END OF STREET BARRICADE

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

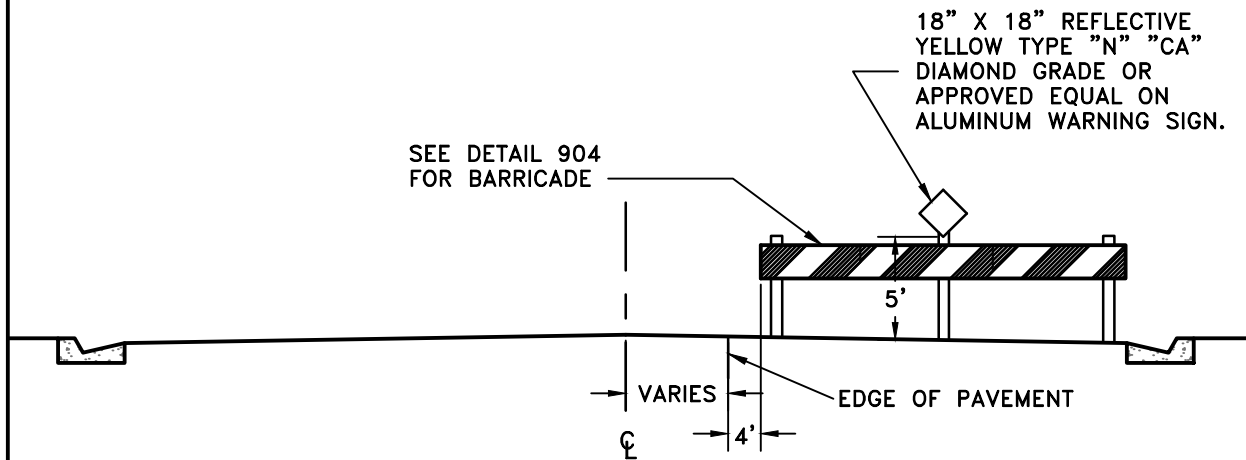
DETAIL NO.
904



PLAN

NOTE:

1. ALTERNATE LOCATION SHALL BE AS APPROVED BY THE CITY ENGINEER.



PROFILE

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

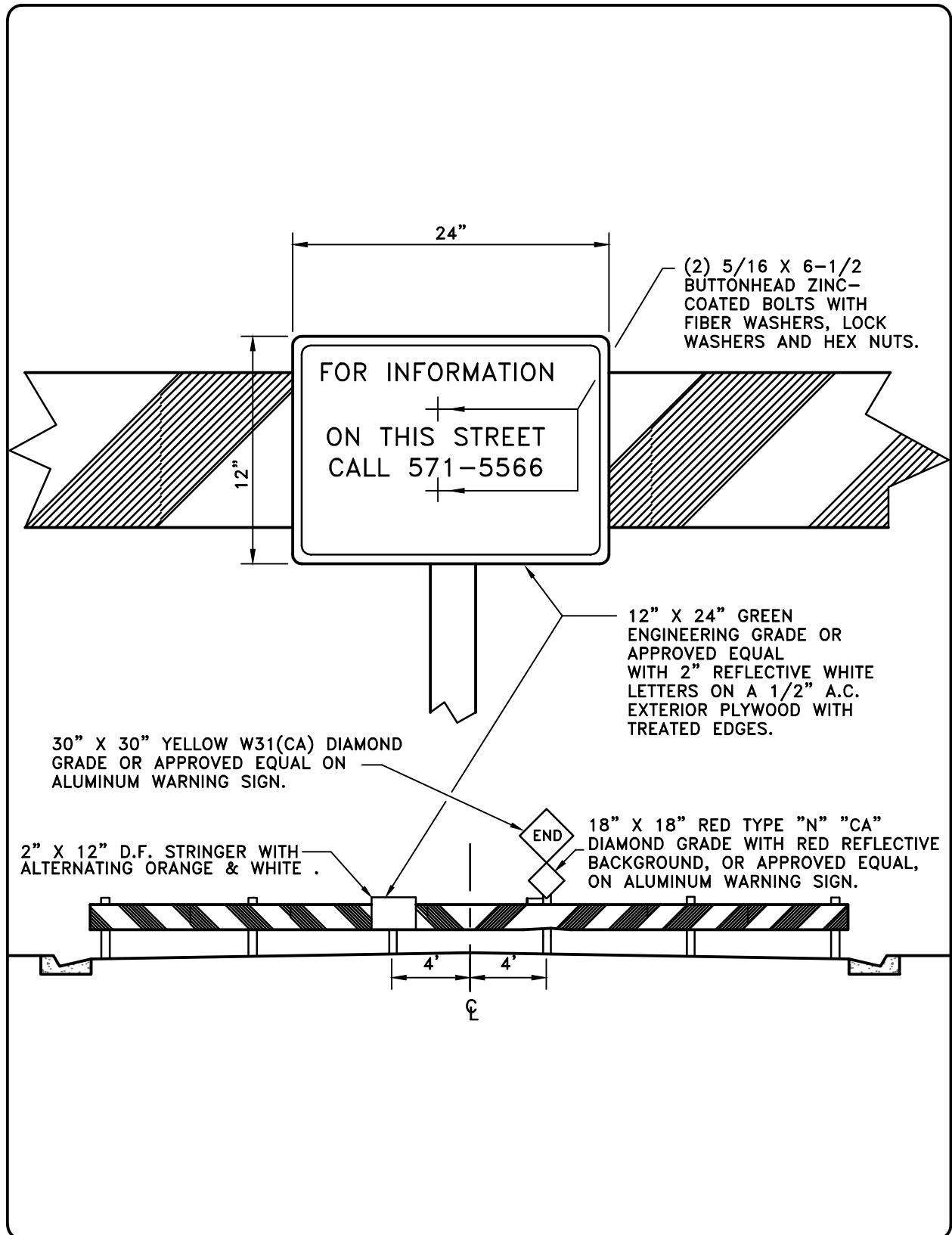
SIGNS & STRIPING

**STREET WIDTH
 TRANSITION BARRICADE**



ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
905



APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
REVISED:	DATE:
REVISED:	DATE:
REVISED:	DATE:

SIGNS & STRIPING

**INFORMATION ON DEAD
END BARRICADE**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

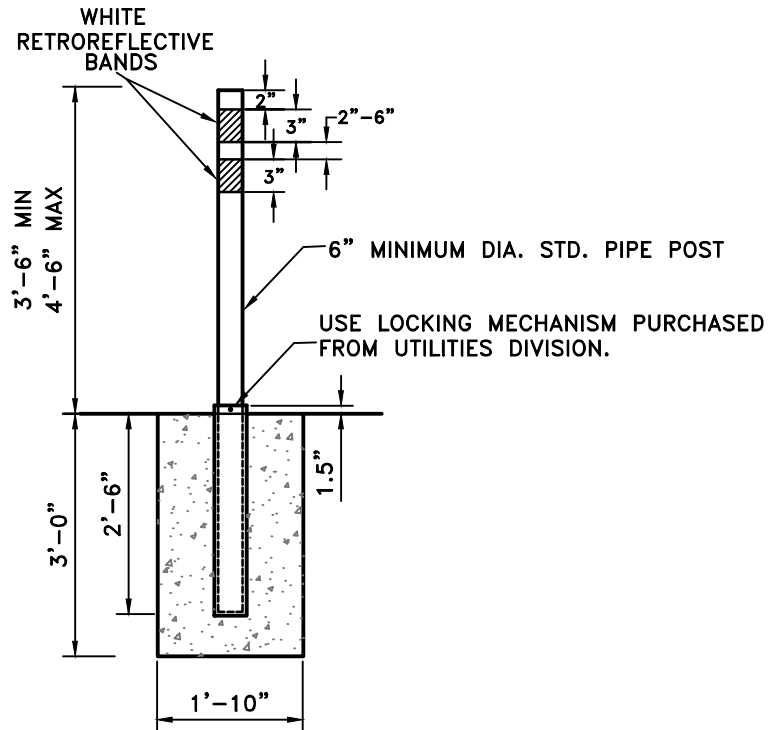


MODESTO
CALIFORNIA

DETAIL NO.
906

NOTES:

1. SEE DESIGN SECTION 9.02 FOR INFORMATION.
2. GALVANIZED STEEL SLEEVE TO BE CONSTRUCTED WITH A DIAMETER 1/10" LARGER THAN POST. WALL THICKNESS TO BE SAME AS POST OR LARGER.
3. CONTRACTOR MAY SUBMIT ALTERNATIVE DETAILS FOR APPROVAL BY THE CITY ENGINEER.



APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

SIGNS & STRIPING

**REMOVEABLE
 BOLLARD DETAIL**

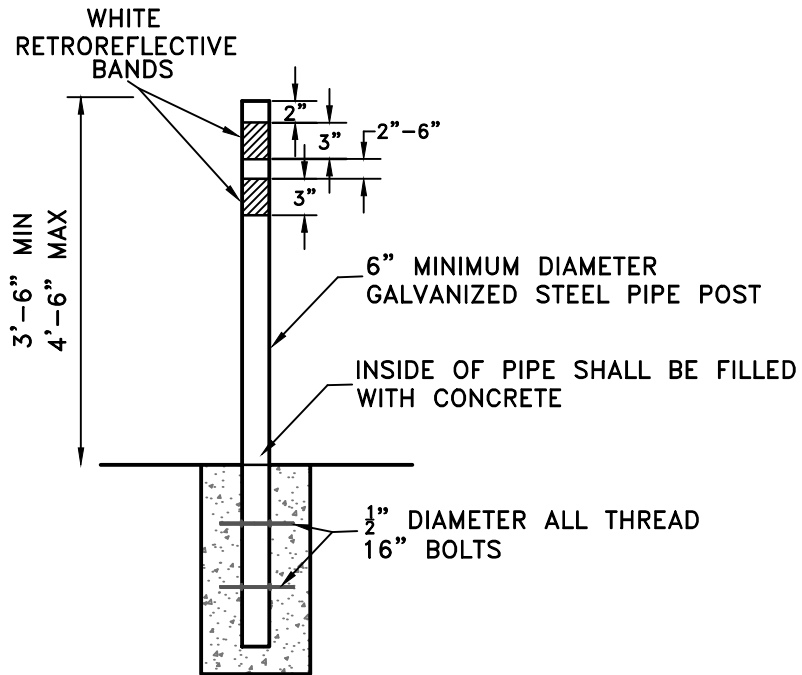


ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
907

NOTES:

1. SEE DESIGN SECTION 9.02 FOR INFORMATION.
2. CONTRACTOR MAY SUBMIT ALTERNATIVE DETAILS FOR APPROVAL BY THE CITY ENGINEER.



APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

SIGNS & STRIPING
PERMANENT BOLLARD
DETAIL



ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

DETAIL NO.
908

CHAPTER 10

DRIVEWAY ACCESS AND DESIGN

10.01 GENERAL

A. Purpose:

The purpose of this section is to ensure standards are met to protect the public health, safety and welfare. The standards are meant to apply to new developments which are not constrained by already existing improvements or severe topography. To the extent deemed reasonably possible by the City Engineer, in-fill developments will be required to match these standards. The City Engineer may approve modifications of these standards only when necessary to allow private and public construction, which is compatible with surrounding in-place improvements and conditions.

B. Driveway Design Definitions:

1. Auxiliary Lane - A separate right turn lane, left turn lane, deceleration lane or acceleration lane.
2. Commercial Property - Property regardless of zoning district upon which any structure is either wholly or partially used for offices or the wholesale or retail sale of goods or services. In addition, for purposes of this section, all properties other than residential, apartment or industrial shall be considered a commercial property.
3. Continuous Deceleration Lane - A deceleration lane that serves two (2) or more driveways, public streets or combination thereof.
4. Deceleration Lane - A lane, including tapered areas, in advance of a driveway or public street used to allow turning vehicles to exit the through traffic lane and slow before making the turn.
5. Peak Hour - The one (1) hour period with the highest volume of traffic on the roadway.
6. Driveway - Any approach or access that connects private property to the public right-of-way but may be considered to extend onto private property when necessary to ensure safe operation of the driveway/street intersection.
7. Driveway Throat Width - The shortest distance between the parallel edges of a driveway.
8. Drop approach driveway - Driveway approach requiring a curb return radius, no vertical lip, handicap ramps and concrete apron extending a minimum to the public right-of-way and a gradual slope to at least 15' back from curb line.
9. Flared Driveway - Driveway access requiring the curb to depress to street level and 3' flared aprons transition the sidewalk into the driveway. Driveway ends at the property line or at back of sidewalk. See Standard Details #1010 & #1010B.

10. Industrial Property - Property, regardless of zoning district, upon which all the structure(s) is used for warehousing or manufacturing.
11. Internal Driveway - A private road or access way on private property that connects buildings or abutting ground to the driveway.
12. Major Street Facility – Include any of the following:
 - Freeway frontage road
 - Principal or minor arterial street
 - Major Collector Street.
13. Median Type Driveway - A driveway having ingress and egress drives divided by a raised median.
14. Residential Property - Property that contains three (3) or less dwelling units.
15. Shared Driveway - A driveway allowing access between two (2) or more properties.
16. Street Class - The functional classification of a street as defined in the Circulation Element of the General Plan or as defined by the City Engineer for those streets not shown in the General Plan.

C. Variances

Where physical site development constraints exist such as the size of a parcel or existing (infill) development, the City Engineer may vary from the following standards where their strict application is determined to be infeasible or would create an undue hardship. Additional studies or documentation may be required by the City Engineer prior to a decision to vary from these standards. Such studies or documentation shall be the responsibility of the applicant.

D. Volume and Capacity Analysis

For commercial, industrial or apartment driveways on a major street facility, the City Engineer may require an applicant to submit a driveway volume and capacity analysis of the proposed driveway as part of the driveway permit application and review process. Traffic studies shall be submitted in accordance with the City's Traffic Study Procedures. This requirement may be waived if the City Engineer determines that the driveway has been adequately analyzed in a previous traffic study.

E. Joint Access Easements

A joint private access easement may be required between adjacent lots fronting on arterial and major collector streets in order to minimize the total number of access points along those streets and to facilitate traffic flow between lots. If a shared driveway is required for the project, the applicant shall record a joint-use access easement agreement for a shared driveway as approved by the City Engineer in a form provided and approved by the City Attorney.

F. Driveway Revisions

When an application for building permit or change in property use results in changes in the type of driveway operation, and the driveway is not in conformance with these standards, the reconstruction, relocation or conformance of the access to these standards may be required. The City Engineer may require driveway revisions when one or both of the following access change conditions occurs:

1. The existing use of the driveway is projected in the opinion of the City Engineer using generally accepted transportation engineering standards to increase in actual or proposed daily vehicular volume on the driveway by 20% or more.
2. The "change in the use of the property or modifications to the property restricts the flow of vehicles entering the property in a manner which is anticipated to disrupt normal traffic flow on the public street, thereby creating a hazard.

"Change in property use" may include but is not necessarily limited to: change in type of business; expansion in existing business; change in zoning; and subdivision which creates new parcels. It does not include modifications in advertising, landscaping, remodeling less than 25% of a building, general maintenance or aesthetics that do not affect internal or external traffic flow or safety (per Modesto Municipal Code).

G. Drainage

Driveways shall not be constructed at such locations or in such manner that water is diverted from the street onto private property, unless requested in writing and specifically approved in writing by the City Engineer. Likewise, the driveway may not be used as a drainage channel for the onsite runoff. Driveways located in areas utilizing rock wells will be scrutinized much closer due to the capacities and cost of City rock wells.

10.02 DESIGN

The values in Tables 10.1 thru 10.4 represent minimum and/or maximum standards to be applied in designing and locating driveways on streets in the City of Modesto. For each driveway, the City Engineer may require a specific combination of dimensions within these ranges based on the anticipated traffic flow and safety characteristics of the driveway and public street. New subdivisions will use drive over curb.

A. Flared Driveways

Flared driveways are allowed where some or all the following conditions exist:

1. on-street parking creates extra width to maneuver,
2. The street facility is residential or minor collector, and
3. Traffic volume over the driveway is less than 1,000 vehicles per day.

Table 10.1 Driveway Design Standards and installation

Requirements	Street Class	Residential Driveway	Apartment-Commercial Driveway	Industrial Driveway
Driveway Throat Width ¹	Local	10' - 28'	24' - 40'	24' - 45'
	Minor Collector	10' - 28'	24' - 40'	30' - 45'
	Major Collector	12' - 28'	24' - 40'	35' - 45'
	Arterial & Larger	14' - 28'	30' - 40'	40' - 45'
Driveway Curb Radius (Drop Approach Type Only)	Major Street Facility	N/A	10'	10'
Minimum Centerline Driveway Spacing Along Roadway ²	Local	N/A'	100'	100'
	Minor Collector	28'	150'	150'
	Major Collector	100'	200'	200'
	Arterial & Larger	100'	350' ³	350' ³
Driveway Angle ⁴	All	70' - 90'	90'	90'
Minimum Distance ⁵ From Driveway to Intersection ⁶ Along:	Local	30'	75'	75'
	Minor Collector	50'	150'	100'
	Major Collector	100'	150' ⁷	150' ⁷
	Arterial & Larger	150'	350' ⁸	350' ⁸
Maximum Approach Grade ⁹ (Drop Approach Only)	Major Street Facility	+6%	+3%	+3%
Minimum Distance to Property Line ¹⁰	All	2' ¹⁰	2'	2'
Minimum Approach Length ¹¹ (Drop Approach Only)	Major Street Facility	9'	17'	17'

NOTES:

1. The requirements for Driveway Throat are standard for undivided one-way and two-way operation and may be varied by the City Engineer if, in that person's discretion, traffic volumes, truck usage, shared driveways, physical constraints of the site and other factors warrant the variance. An on-site transition from the driveway throat to the on-site driveway aisle is required. Not more than 50% of the frontage of any parcel shall be devoted to driveways. Lots fronting on a cul-de-sac are exempt from this requirement. See Table 10.2 for throat depth requirements.
2. For residential parcels only, the minimum distance between driveways serving the same parcel shall not be less than 20' as measured between the ends of the driveway flare or curb return.

3. Driveways on major collectors and larger streets served by deceleration lanes may be spaced at 200' minimum intervals.
4. Required driveway angle is measured as intersection of the tangent centerline of driveway with the tangent portion of the public street curb line, extending a minimum of 20' from the future curb line.
5. Distance measured from the intersection as measured from the intersection right-of-way line to the driveway centerline (see Standard Details #1002, #1004 & #1005).
6. If the lot width does not allow the standard to be met, then the driveway shall be located as far from the intersection as possible.
7. If the driveway has to be located less than 150' from an intersection with a major street facility right-of-way line, the approach shall be placed at or near the farthest property line from the intersection and a 250' long raised median from the stop bar at the intersection may be required to be installed by the Developer at Developer's expense. The median shall extend a minimum of 100' past the farthest edge of the driveway from the intersection.
8. If the driveway needs to be located less than 350' from an intersection with a major street facility right-of-way line, the approach shall be placed at or near the farthest property line from the intersection and 450' long raised median from the stop bar at the intersection may be required to be installed by the Developer at Developer's expense. The median shall extend a minimum of 100' past the farthest edge of the driveway from the intersection.
9. The percent of slope measured along the centerline of the driveway from the flow line of the future curb line.
10. The minimum distance over which the maximum approach grade must be maintained measured from the flow line of the present curb or a known future curb, as determined by the City Engineer, or his designee.
11. Driveway locations for single family property shall not be permitted within 2' of a property line unless a property fronts on a cul-de-sac bulb in which case a driveway may be constructed up to the property line. Shared driveways or unusual situations may be approved by the City Engineer.

TABLE 10.2 DRIVEWAY THROAT DEPTH

LAND USE	SIZE	Minimum Throat Length L (ft)	
		Collector	Arterial**
Light Industrial	<100,000 sq. ft.	25	50
	100,000-500,000 sq. ft.	25	100
	>500,000 sq. ft.	25	100
Free Standing Retail	<30,000 sq. ft.	25	50
	>30,000 sq. ft.	25	75
Shopping Center	<20,000 sq. ft.	25	50
	20,001-100,000 sq. ft.	25	75
	100,001-200,000 sq. ft.	50	100
	200,001-300,000 sq. ft.	50	125
	300,001-500,000 sq. ft.	50	150
	500,001-750,000 sq. ft.	50	200
	>750,000 sq. ft.	50	250
Apartments	<100 units	25	50
	101-200 units	50	75
	>200 units	75	125
Sit-down Restaurant	<15,000 sq. ft.	25	50
	>15,000 sq. ft.	25	75
Drive-through Restaurant	<2,000 sq. ft.	25	75
	>2,000 sq. ft.	25	100
General Office	<50,000 sq. ft.	25	50
	<50,000-100,000 sq. ft.	25	75
	>100,001-200,000 sq. ft.	50	100
	200,001-500,000 sq. ft.	50	150
	>500,000 sq. ft.	50	250
Motel	<150 rooms	25	75
	>150 rooms	25	100

* This table is based on Table 6-4 in Transportation and Land Development by Institute of Transportation Engineers.

** The City Engineer will decide driveway throat length in Downtown Modesto.

TABLE 10.3 STORAGE DEPTH FOR GATED COMMUNITIES

Condition Dwelling Units	Storage Depth (ft)
2-10	25
11-60	50
61-150	75
151-265	100
266-325	100
326-380	100

Notes:

1. These storage depths apply only on driveways accessing Major Street Facilities. The storage depth for driveways accessing local or collector streets shall be a minimum of 25 feet and a maximum of 50 feet.
2. Storage depths are measured from the street right-of-way line to the gate.
3. Greater than ten (10) dwelling units shall provide a 2nd lane for guest.
4. The storage depth outside of the gate shall be adequate for PM peak-hour traffic conditions. The entry vehicles shall not block any travel lane or shoulder.
5. A minimum length should be required at the front of the gate to allow vehicles to turn around and back onto the street.

TABLE 10.4 Vehicle Queuing Requirement for Drive-through Facilities

Type of Facility	Vehicle Queue
Drive-through Bank	5 spaces per window ¹
Drive-through Restaurant/Drink Stands	10 spaces per window ²
Full-service Car Wash	5 spaces per wash line
Self-service Car Wash	1 space per wash line
Service/Gas Station/Lube	3 spaces per pump island/service bay
Drive-through Retail	3 spaces per window ²

Table Notes:

1. For drive-through Savings and Loans and Credit Union institutions the five spaces per window requirement may be reduced to three (3) spaces per window
2. The vehicle queue for Drive-through restaurants/Drink Stands and Drive-through retail is measured from the ordering location. For some types of restaurants, a shorter stacking distance may be permitted.
3. Driveways may be prohibited where adequate sight distance is not available for the established speed limit or the design speed of a future street improvement, if higher. Sight distances shall be calculated in accordance with the latest edition of the State Standards for Highway Design Manual. If an inspection by the City Engineer indicates that driveway sight distance may be insufficient, the applicant will be

required to submit vertical and horizontal information to the City that verifies adequate sight distance is available for the proposed driveway location. The City Engineer may deny access or a specific driveway location to any abutting public street if said access cannot be provided in a reasonable and safe manner.

4. Temporary driveways shall only be permitted when a contractual agreement is executed between the property owner and the City. Said agreement shall require annual reviews of driveway use, and the City may require removal of driveway at no cost to the City. The City Engineer may require an escrow fee be provided to the City for a maximum ten (10) year period for the removal of the driveway and related expenses.
5. Any abandoned driveway shall be completely removed and replaced with standard sidewalk, curb, and gutter.
6. Parking lot driveways shall be designed in such a manner as to preclude the use of the abutting public street for vehicular circulation solely related to the parking lot.

B.. Drop Approach Driveways

1. Drop approaches are required where the street facility is a Major Street Facility.
2. When a drop-type driveway approach is required for an apartment, commercial, or industrial property because of its connection to a major street facility, the driveway shall conform to Table 10.2.
3. Unless contained on the building permit site plan, a drop approach type driveway shall have a site plan showing all existing right-of-way, easements, curbs, storm drain inlets, flumes, underground and overhead utilities, trees and sidewalks shall be required for each non-residential driveway permit application. The proposed driveway grade profile shall also be shown for a minimum distance of 15' past the right-of-way line. All driveways and median openings within 150' of the subject property on both sides of each abutting street shall be shown on the site plan. If an adjacent street contains a raised median, showing driveway(s) on the opposite side of the street shall not be required unless a median opening is present or proposed.
4. Handicap ramps not exceeding 12:1 slope shall be required on all driveway drop approaches.
5. Any driveway drop approach shall have an initial positive approach grade not to exceed the values shown in Table 10.2. The initial approach grade shall have a length equal to or greater than the appropriate minimum approach length value shown in Table 10.1, as measured from the present curb or any known future curb line, as determined by the City Engineer. The initial approach shall extend onto private property if necessary, but driveways shall not be constructed at locations or in such manner that water is diverted from the street onto private property. Any sidewalk affected by driveway approach construction shall be adequately transitioned with the driveway using a maximum 8% grade.

C. Residential Standards

1. A circular residential driveway may be allowed provided that the minimum distance between driveways shall not be less than 50' as measured from the centerline of the driveways.

2. Driveway access to a residential lot from any major street facility or minor collector shall not be permitted unless that lot has no other public access. If such a driveway is approved on a major street facility, an off-street maneuvering area approved by the City Engineer shall be provided, if feasible, to ensure that vehicles will not back into the public street. Driveway access to a residential lot from a minor collector street or major street facility may be denied if the proposed access would create a traffic flow or safety problem.
3. Shared residential driveways may be required for adjoining residential lots on major street facilities to reduce the number of access points on those roadways.
4. To provide adequate vehicle storage and maneuvering area, a minimum 20' driveway space shall be required between the street right-of-way and all garages or other structures served by the driveway. For side-yard driveways to local streets, a 15' driveway space will be allowed. A minimum 24' maneuvering space shall be required for all rear-entry garages, which may extend into an adjacent access easement or alley.

D. Auxiliary Lanes

1. The City Engineer may require the applicant to provide a deceleration lane for any driveway located on an arterial street if the right-turn ingress volume exceeds fifty (50) vehicles in the peak hour of the street. If the existing or future speed limit on the street facility is equal or greater than 40 miles per hour (mph), a deceleration lane may be required if forty (40) right-turn ingress vehicles occur in the peak hour. Such calculation shall be made by the City Engineer, unless a traffic study is provided by the applicant. The design of such a deceleration lane shall conform to the dimensions shown in Standard Detail #1006, unless authorized by the City Engineer.
2. When a driveway is approved within the separate right-turn lane of a public street intersection, the lane shall be extended a minimum of 150' in advance of the driveway. No driveway shall be permitted within the transition area of any separate right-turn or deceleration lane.
3. A continuous deceleration lane may be required as a condition of driveway permit when two (2) or more driveways are planned, and their proximity necessitates that they be combined for proper traffic flow and safety. The transition taper for a continuous deceleration lane shall not extend into or beyond a public street intersection.
4. On undivided arterial and collector roadways, a left-turn lane and taper may be required as a condition of the driveway permit when the left-turn ingress volume (fifty (50) minimum) and the opposing volume per lane exceed 750 in any peak hour. In such cases, the City Engineer will analyze the present and future traffic volumes to verify that the left-turn lane is necessary to maintain minimum levels of traffic flow and safety.
5. The City Engineer may require a temporary auxiliary lane to be constructed on existing arterial roadways that are planned for future improvement.
6. In the event an applicant chooses to locate a driveway that requires an auxiliary lane to extend wholly or partially across one (1) or more adjacent properties, the City Engineer may require the applicant to attempt to obtain any necessary right-of-way for such lane.
7. In the event the applicant is allowed to locate a driveway with deceleration lane within 100' of an arterial intersection, he/she shall be required to extend the deceleration lane to such intersection. The 100' shall be measured from the center of the driveway to the intersection of the extended right-of-way lines of the arterial intersection.

8. The applicant shall be responsible for the design, right-of-way, adjustment of utilities and construction costs of any auxiliary lane and street widening required as a condition of the driveway permit.

E. Signalized Driveways

1. As a condition of a driveway permit on a major street facility, the City Engineer may require the applicant to submit driveway volume and capacity information when signalization is requested or expected at the driveway intersection. When signal warrants are met and an overall public benefit is shown, the City Engineer may require as a condition of the permit that the applicant pay for the traffic signal installation costs necessary to serve the subject driveway. The applicant may also be required to construct on-site and off-site improvements necessary to provide proper alignment, adequate signal capacity, smooth traffic flow, and safety for the public street/driveway intersection.
2. If a driveway is installed at an existing or proposed signalized intersection, the applicant must provide a traffic signal access easement the width of the driveway, plus 10' on either side of the driveway by 60' deep must be provided to allow the City to install and/or maintain the signal detectors placed in the driveway.
3. If a driveway is permitted and installed at an existing signalized intersection, the applicant shall pay any costs necessary to modify the existing signal, striping and intersection to accommodate the new driveway.

F. Special Driveway Designs

1. The Director may require internal driveway improvements, turning movement prohibitions, auxiliary lanes and traffic control devices to address safety and/or capacity problems within the property, which will have a detrimental effect on the adjacent public street system.
2. All driveways on undivided arterial roadways having a projected exiting left-turn volume that will operate at a level of service "E" or worse shall be required to be constructed with a left-turn egress control median. Likewise, any driveway having a projected ingress left-turn volume that will have a level of service "E" or worse may be required to have a left-turn ingress control median. If both conditions exist, the City Engineer shall require a right-in/right-out driveway design.

10.03 MATERIAL

Refer to Chapter 90 "Concrete" of the Caltrans Standard Specifications.

10.04 INSTALLATION

A. All Driveway Types (Flared, Drop Approach, Drive-Over Curb)

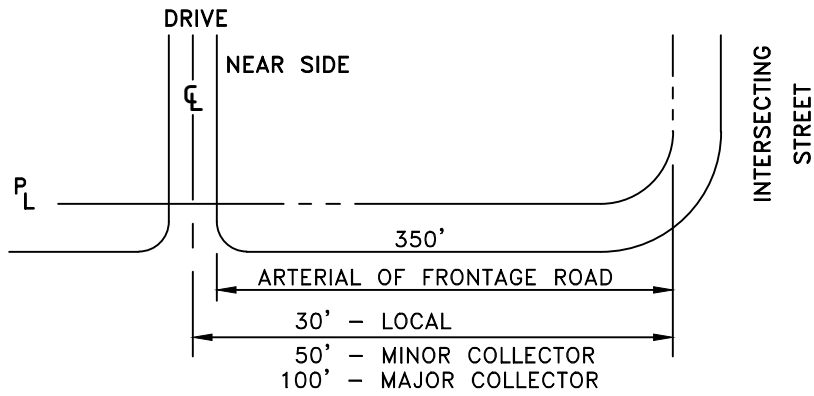
1. If a shared driveway is required for the project, the applicant shall record a joint-use access easement agreement for a shared driveway as approved by the City Engineer in a form approved by the City Attorney.
2. No portion of any driveway shall be located within 4' of any fire hydrant, electrical pole or any other surface public utility. At the applicant's expense, applicant may have the

surface utility moved if the public utility agency involved determines that the move will not detrimentally affect the service.

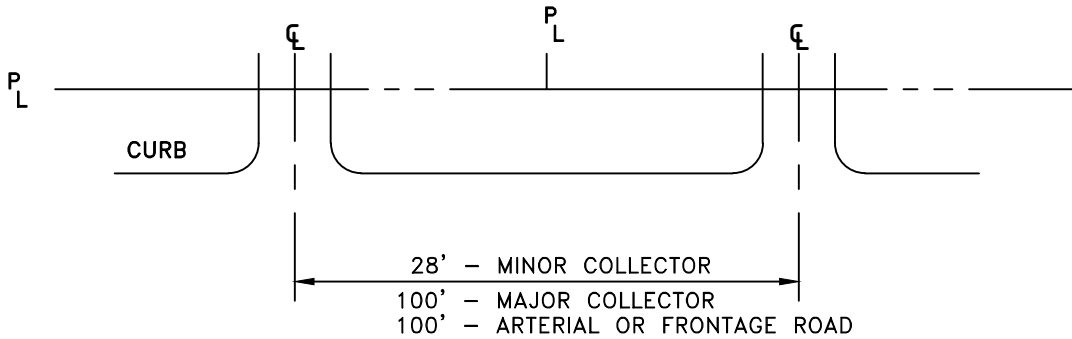
3. The driveway curb return (drop approach type) at the point of tangency with the street curb or driveway flare (ramp approach type) shall not be located within (a) 4' of the downstream edge, or 8' of the upstream edge of a straight curb inlet or inlet extension; nor (b) within 10' of a recessed inlet without prior written permission of the City Engineer.
4. All vehicle maneuvering on apartment, commercial and industrial properties into a parking space or up to a loading dock or into any other area shall be accomplished by off-street maneuvering areas and internal driveways. No back-in or back-out vehicle maneuvering from a driveway shall be allowed to occur on any public street or right-of-way with the exception of residential drives on local and minor collector streets (Low Volume < 3,000 vehicles per day (VPD)).

10.05 MEASUREMENT AND PAYMENT

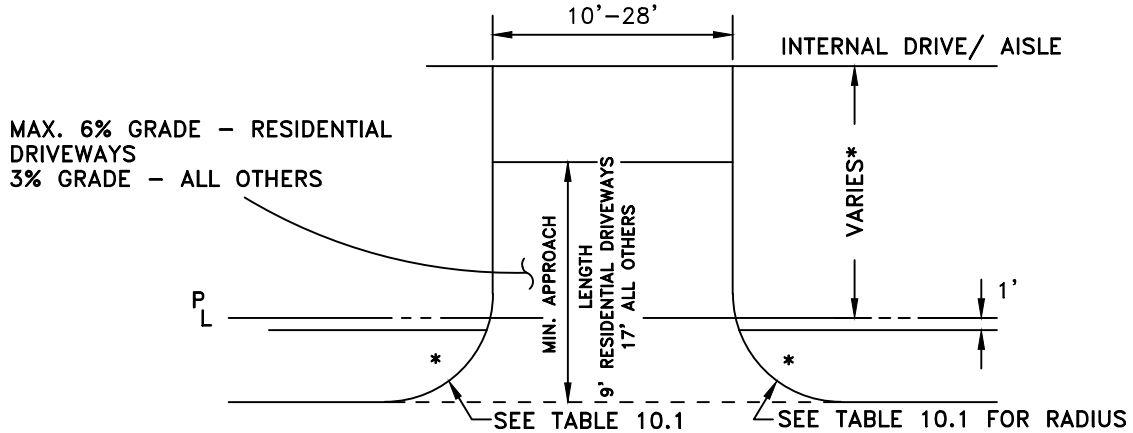
Approaches shall be measured to the "back of curb line" when payment is made by the square foot. Curbs and gutters shall be measured continuous through driveways (approaches) and through curb ramps. Payment shall include full compensation for the furnishing, placing, and curing of the concrete together with the excavation, cushion material and all incidentals.



MINIMUM DISTANCE FROM INTERSECTION



MINIMUM SPACING



- * CURB RAMP-WARP TO FIT MAX. SLOPE 12:1
- * SEE TABLE 10.2

TYPICAL DESIGN

NOTE:

TYPICAL RESIDENTIAL DRIVEWAY SHALL BE DRIVEOVER CURB. RESIDENTIAL PROPERTIES FACING ON COLLECTORS SHALL BE DRIVEOVER CURB OR FLARED DRIVEWAYS. RESIDENTS ON MAJOR STREET FACILITIES SHALL BE DROP APPROACH OR FLARED DRIVEWAYS.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

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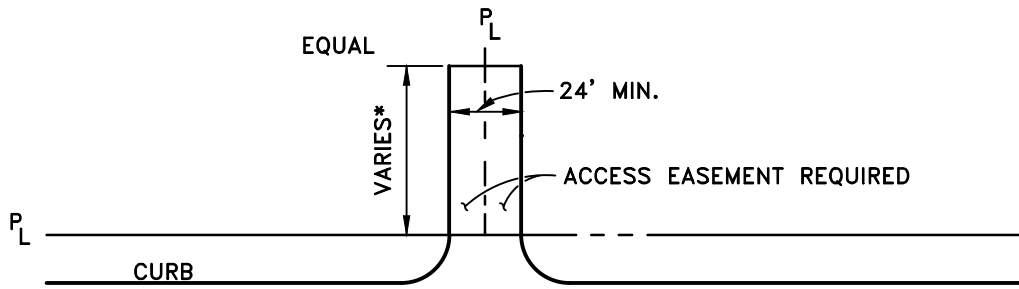
DRIVEWAYS

RESIDENTIAL DRIVEWAYS

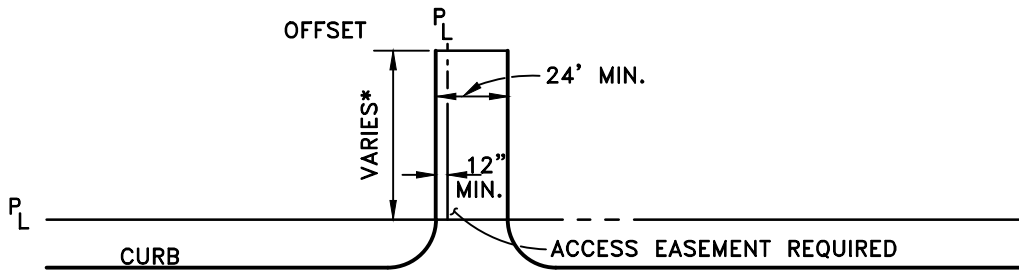


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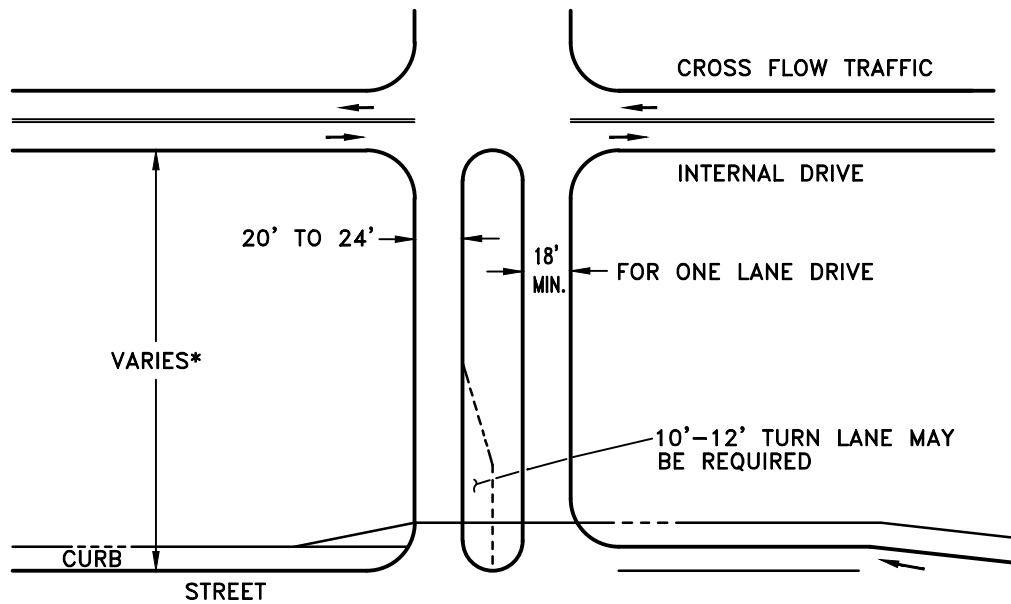
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DROP APPROACH OR FLARED DRIVEWAY



SHARED DRIVEWAYS



**DROP APPROACH ONLY FOR LARGE VOLUME DRIVEWAYS
(OVER 5,000 VEHICLES/DAY)**

* SEE TABLE 10.2

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

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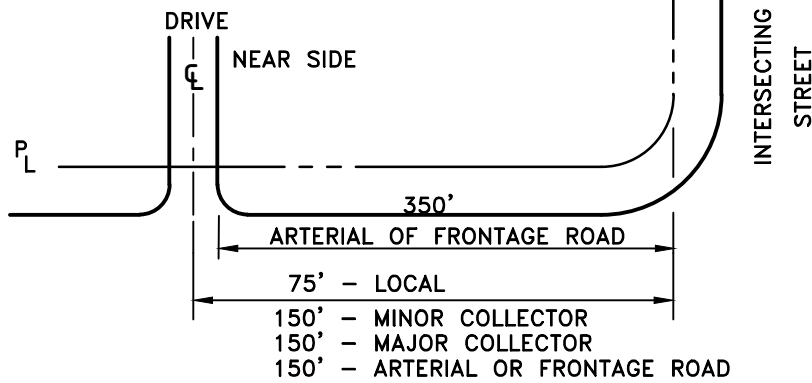
DRIVEWAYS

**NON-RESIDENTIAL
DRIVEWAYS**

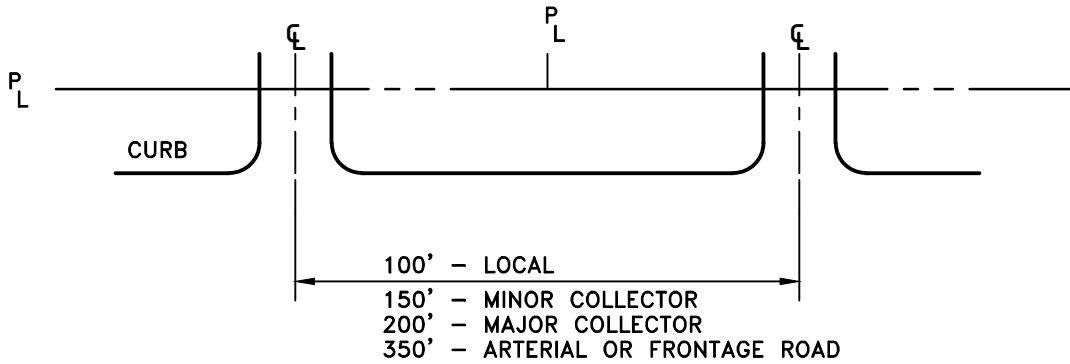
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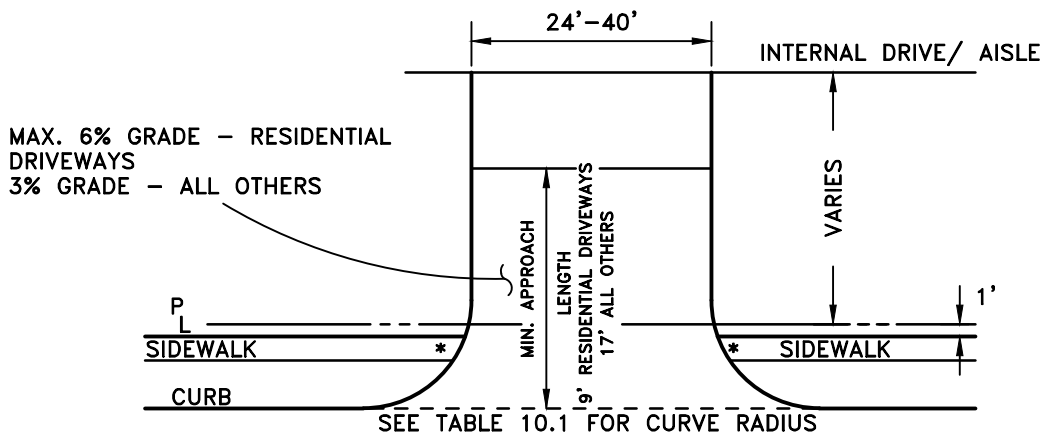
DETAIL NO.
1001



MINIMUM DISTANCE FROM INTERSECTION



MINIMUM SPACING



* CURB RAMP-WARP TO FIT MAX. SLOPE 12:1

TYPICAL DESIGN

NOTE:

TYPICAL DESIGN MAY BE DROP APPROACH OF FLARED DRIVEWAY DEPENDING ON DRIVEWAY COUNTS AND LEVEL OF SERVICE ON THE ROAD WHERE THE DRIVEWAY CONNECTS.

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BILL SANDHU, CITY ENGINEER
C59650

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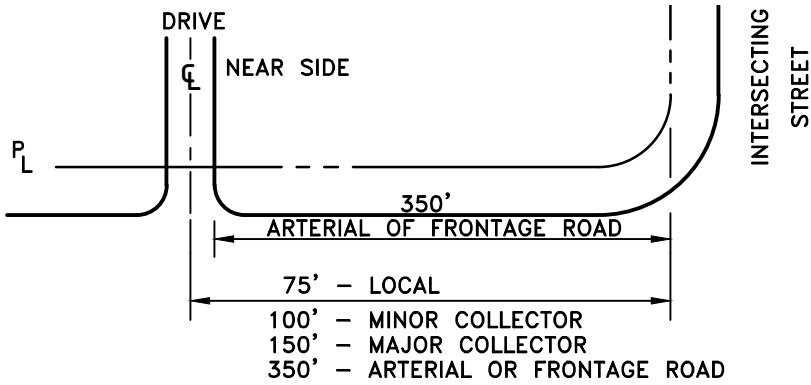
DRIVEWAYS

**APARTMENT/
COMMERCIAL
DRIVEWAYS**

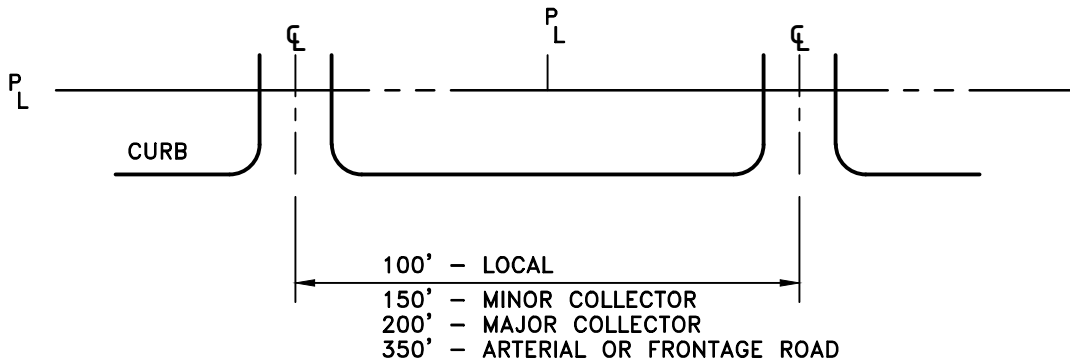


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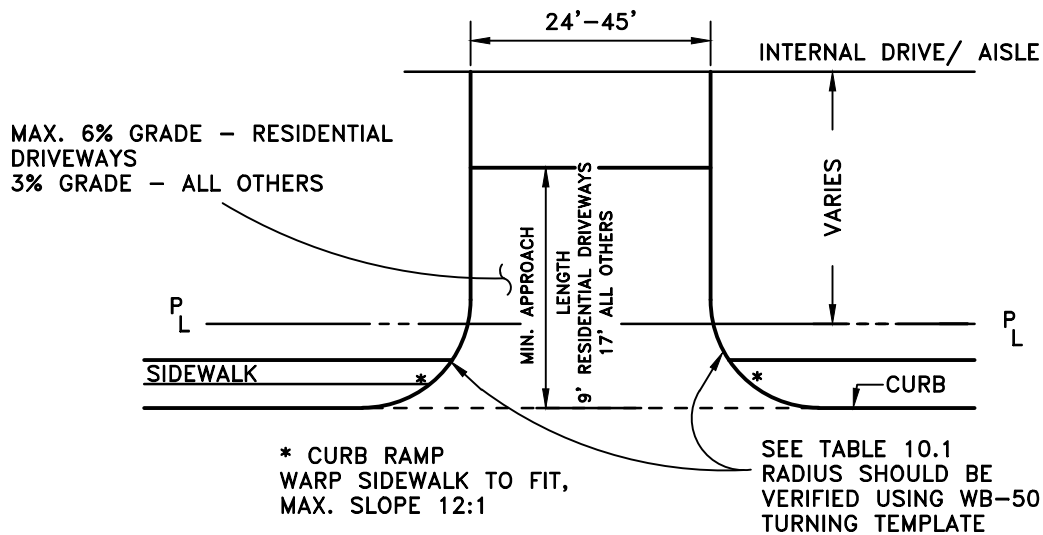
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MINIMUM DISTANCE FROM INTERSECTION



MINIMUM SPACING



DROP APPROACH TYPICAL DESIGN

APPROVED BY:
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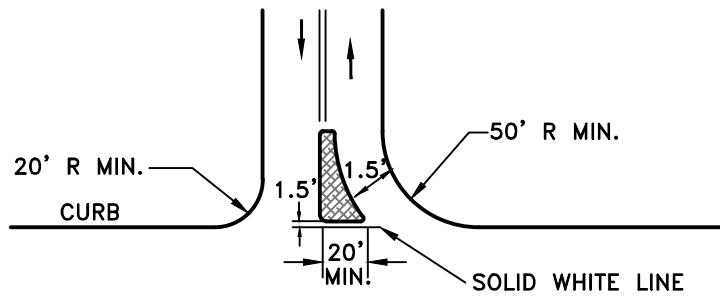
DRIVEWAYS

INDUSTRIAL DRIVEWAYS

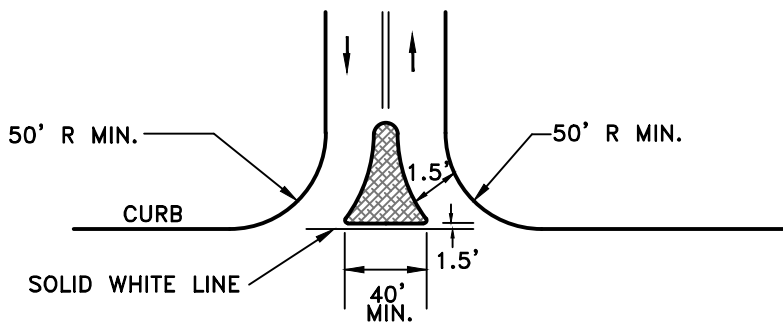


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RESOLUTION NO. 2014-345

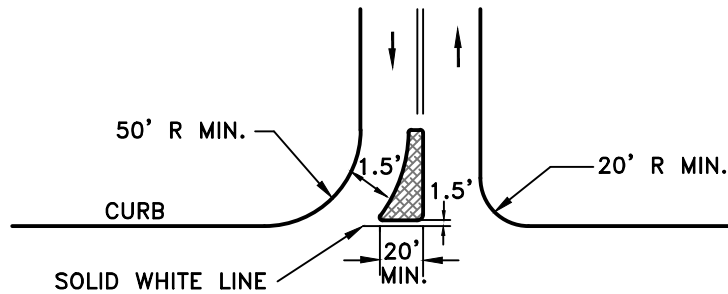
DETAIL NO.
1003



**RIGHT-IN, RIGHT-OUT, LEFT-OUT
ACCESS DESIGN**



**RIGHT-IN, RIGHT-OUT
ACCESS DESIGN**



**RIGHT-IN, RIGHT-OUT, LEFT-IN
ACCESS DESIGN**

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

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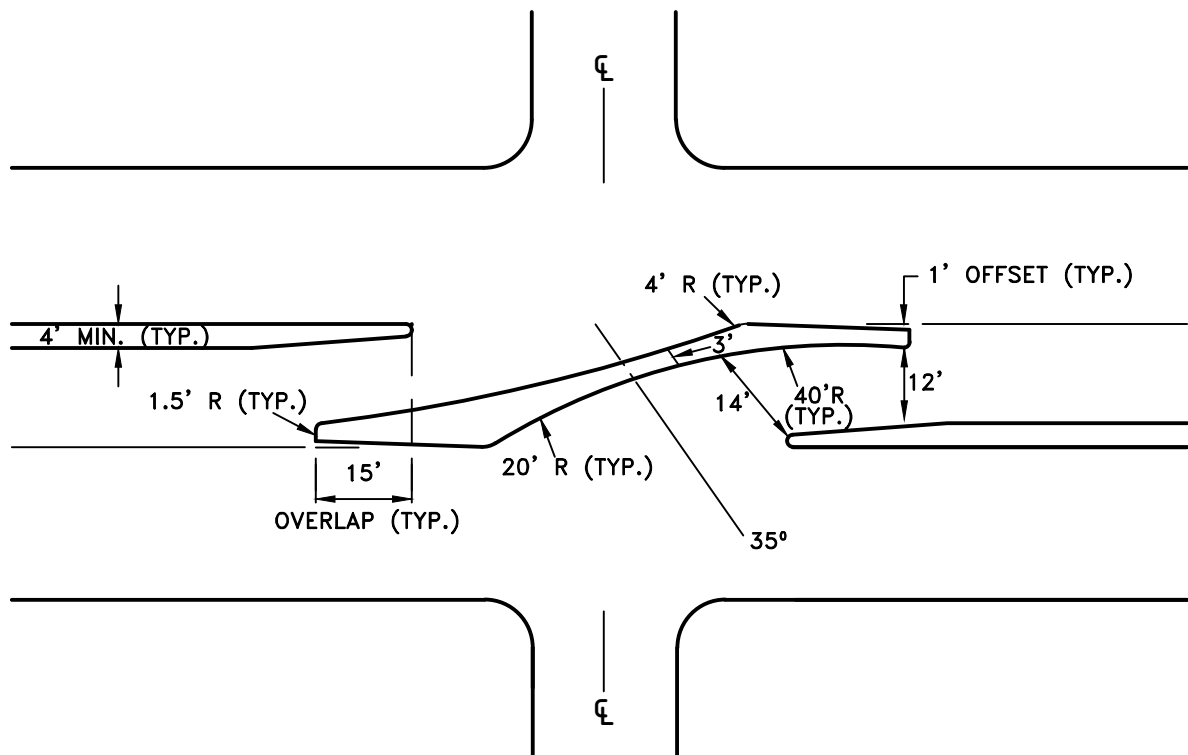
DRIVEWAYS

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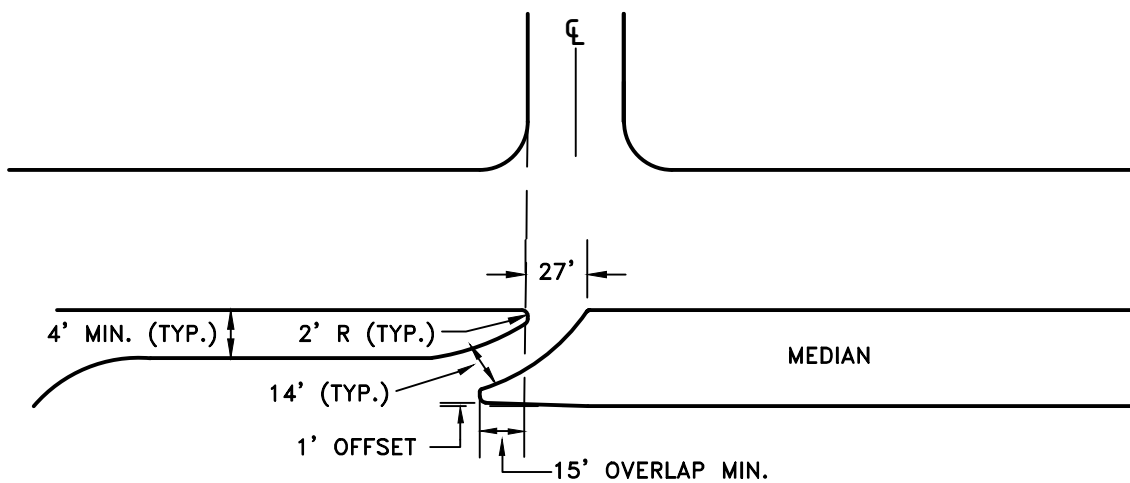
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DETAIL NO.
1004



LEFT-IN ONLY MEDIAN DESIGN



MEDIAN DESIGN TO RESTRICT EXITING LEFT TURNS

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 C59650

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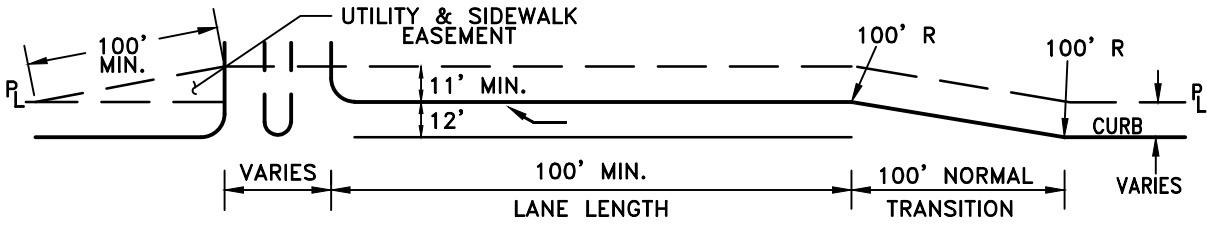
DRIVEWAYS

MEDIAN DESIGN

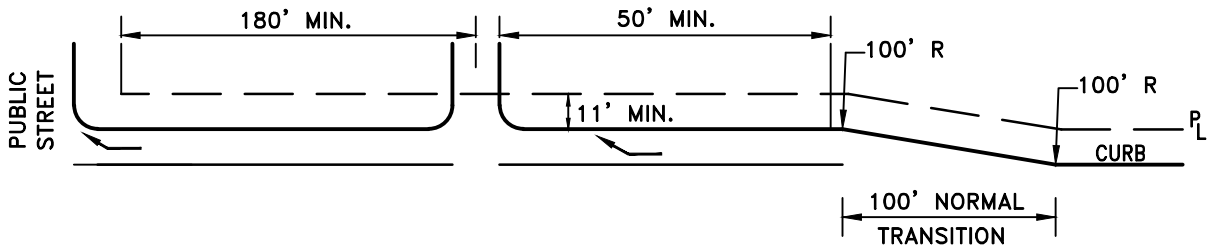
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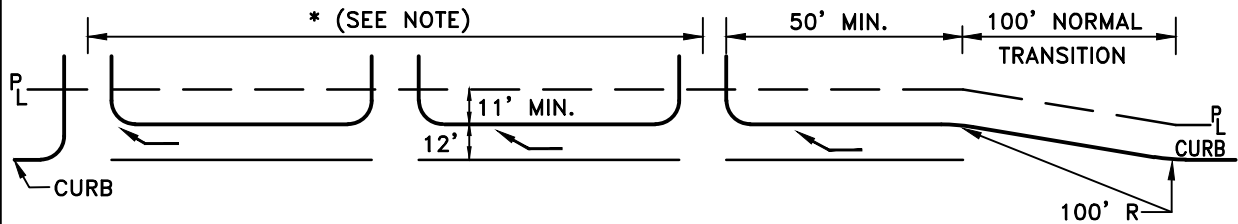
DETAIL NO.
1005



TYPICAL



IN INTERSECTION RIGHT TURN LANE



CONTINUOUS DECELERATION LANE

NOTE:

A MAXIMUM OF THREE DRIVEWAYS CAN BE CONNECTED WITH A CONTINUOUS DECELERATION LANE, UNLESS THE LANE IS AN EXTENSION OF A RIGHT TURN LANE AT AN INTERSECTION. THE MAXIMUM LENGTH OF A COMBINATION DECELERATION-RIGHT TURN LANE IS 1,320 FEET. DRIVEWAY SPACING SHALL BE AS IN TABLE 10.1.

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BILL SANDHU, CITY ENGINEER
C59650

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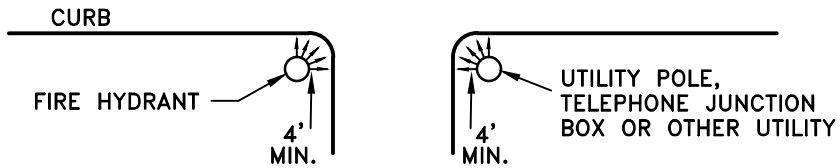
DRIVEWAYS

**DECELERATION LANES
FOR DRIVEWAYS**

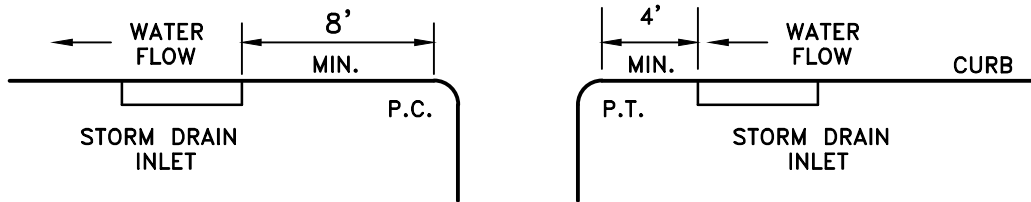
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RESOLUTION NO. 2014-345



DETAIL NO.
1006



ABOVE GROUND UTILITIES



STRAIGHT CURB INLET

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 C59650

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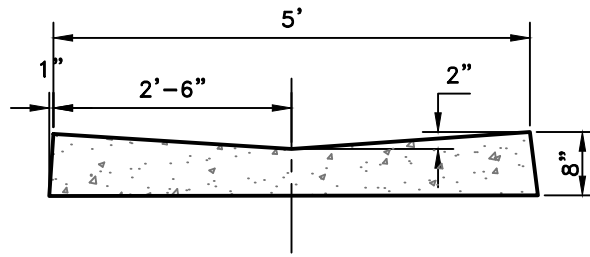
DRIVEWAYS

**DRIVEWAY DETAILS,
 UTILITIES**

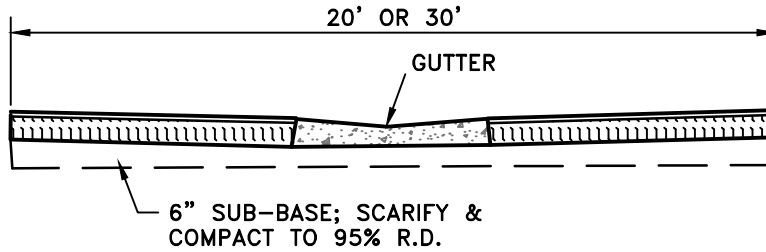


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 RESOLUTION NO. 2014-345

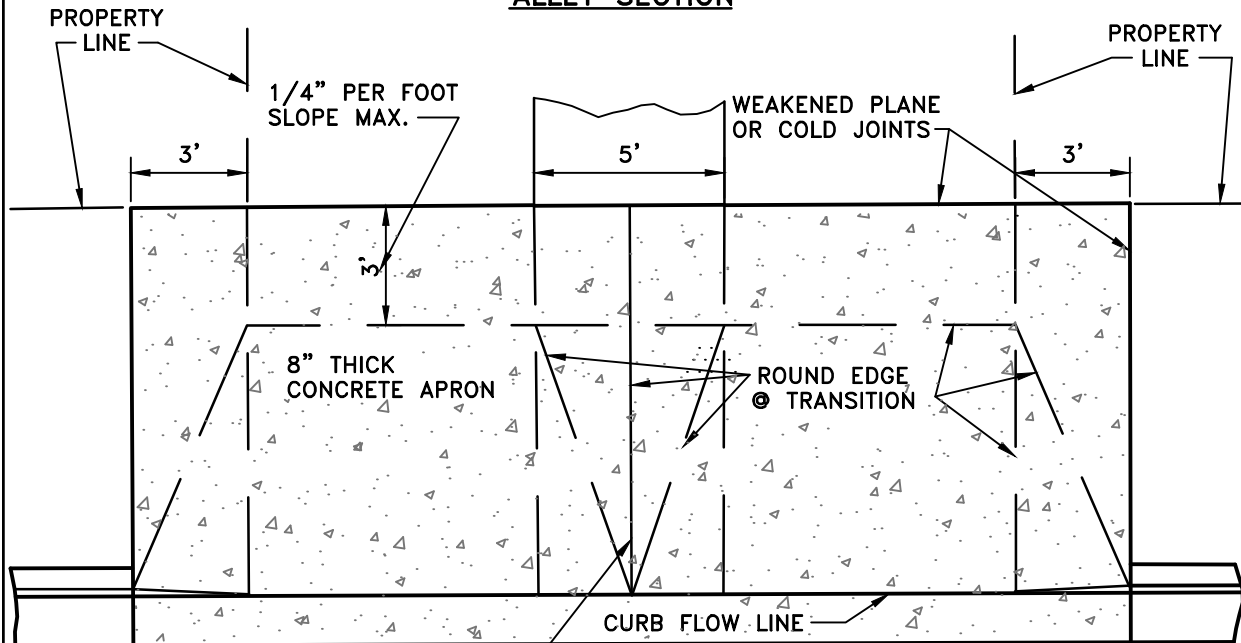
DETAIL NO.
1007



**CONCRETE GUTTER
DETAIL**



ALLEY SECTION



SEE NOTE

PLAN

NOTE:

INTERMEDIATE WEAKENED PLANE JOINT.

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BILL SANDHU, CITY ENGINEER
C59650

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REVISED: DATE:

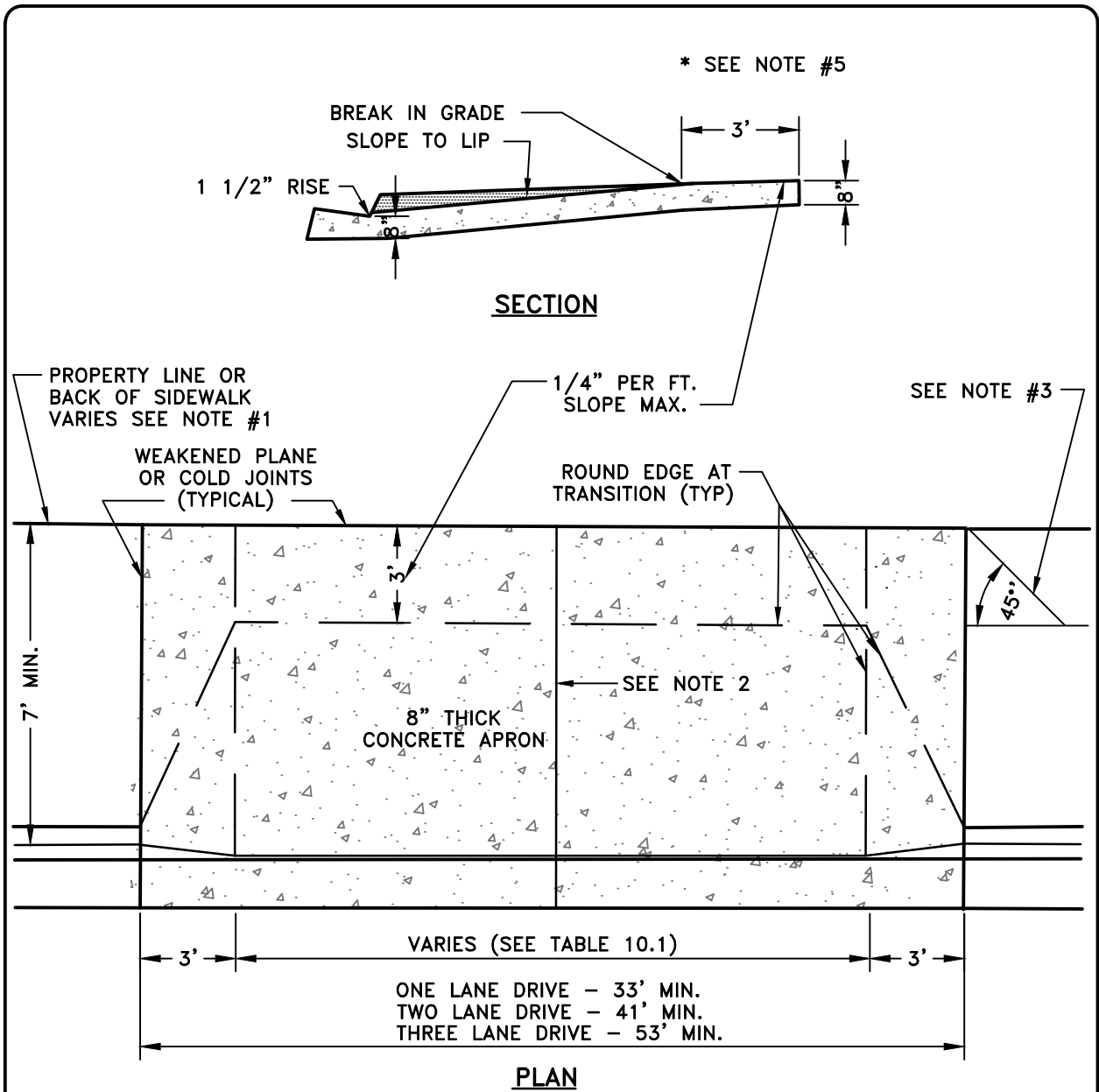
REVISED: DATE:

**DRIVEWAYS
CONSTRUCTION DETAILS
FOR ALLEY
FLARED DRIVEWAYS**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



DETAIL NO.
1008



NOTES:

1. REFER TO TYPICAL STREET SECTIONS OR CALL THE LAND DEVELOPMENT ENGINEERING DIVISION AT (209) 342-4712 FOR PROPERTY LINE LOCATION.
2. INTERMEDIATE WEAKENED PLANE JOINT IN ACCORDANCE WITH CONSTRUCTION STANDARDS.
3. PROVIDE TRANSITION FOR SIDEWALKS THAT ARE LESS THAN FULL WIDTH.
4. IN RETROFIT AREAS, ASPHALT SHALL BE CUT A MINIMUM OF 1' FROM LIP OF CURB.
5. OPTIONAL IN P-O AND M ZONES.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

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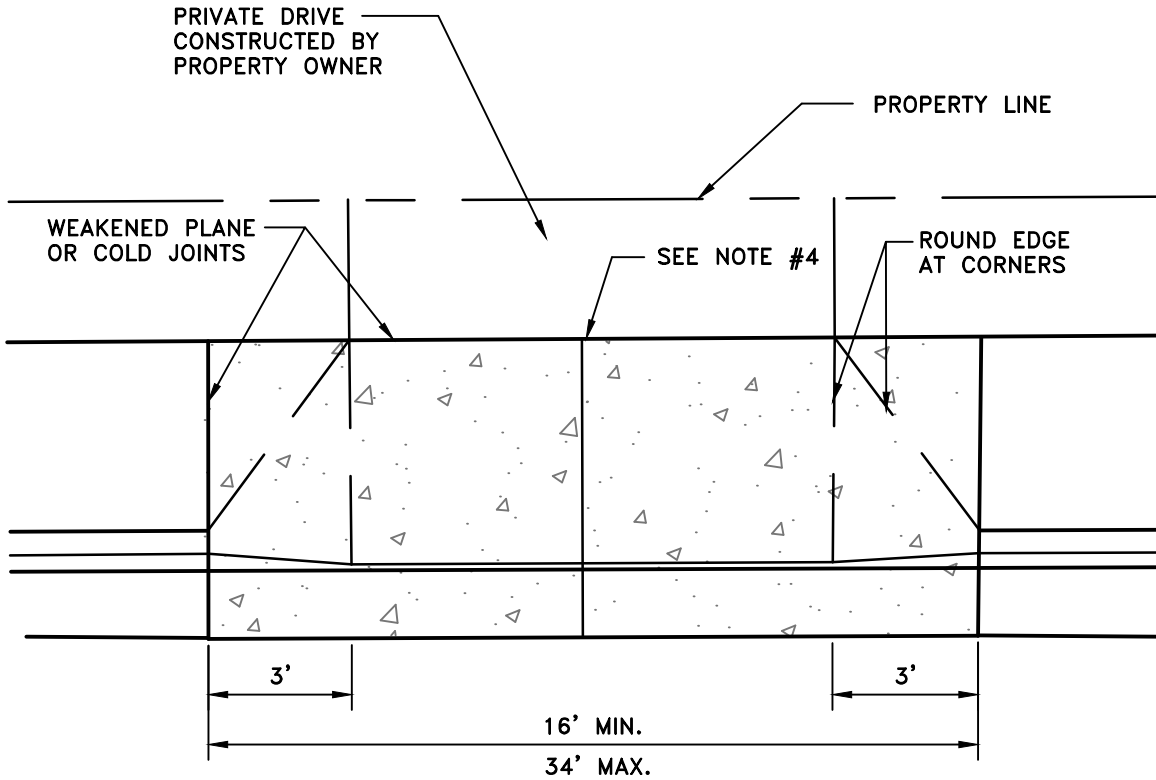
DRIVEWAYS

**CONSTRUCTION DETAILS
FOR COMMERCIAL/APTS
FLARED DRIVEWAYS**

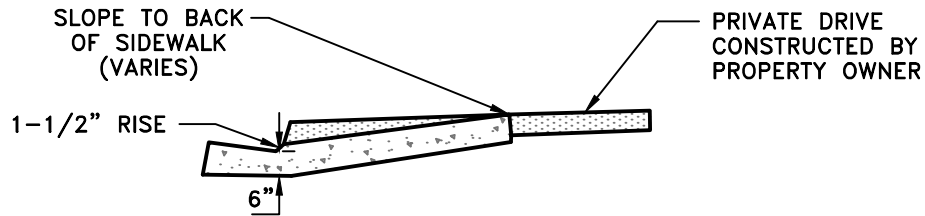


ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

DETAIL NO.
1009



PLAN



SECTION

NOTES:

1. UNSUITABLE SOIL SHALL BE REMOVED AND REPLACED WITH SAND.
2. NON-MONOLITHIC DRIVEWAY APPROACHES MAY BE CONSTRUCTED WHERE DEPRESSED CURB EXISTS OR WHERE CURB IS PLACED WITH A SLIP FORM MACHINE.
3. IN RETROFIT AREAS, THE WIDTH OF THE STREET PATCH SHALL BE A MINIMUM OF 1'.
4. INTERMEDIATE WEAKENED PLANE JOINTS IN ACCORDANCE WITH THE CONSTRUCTION STANDARDS.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

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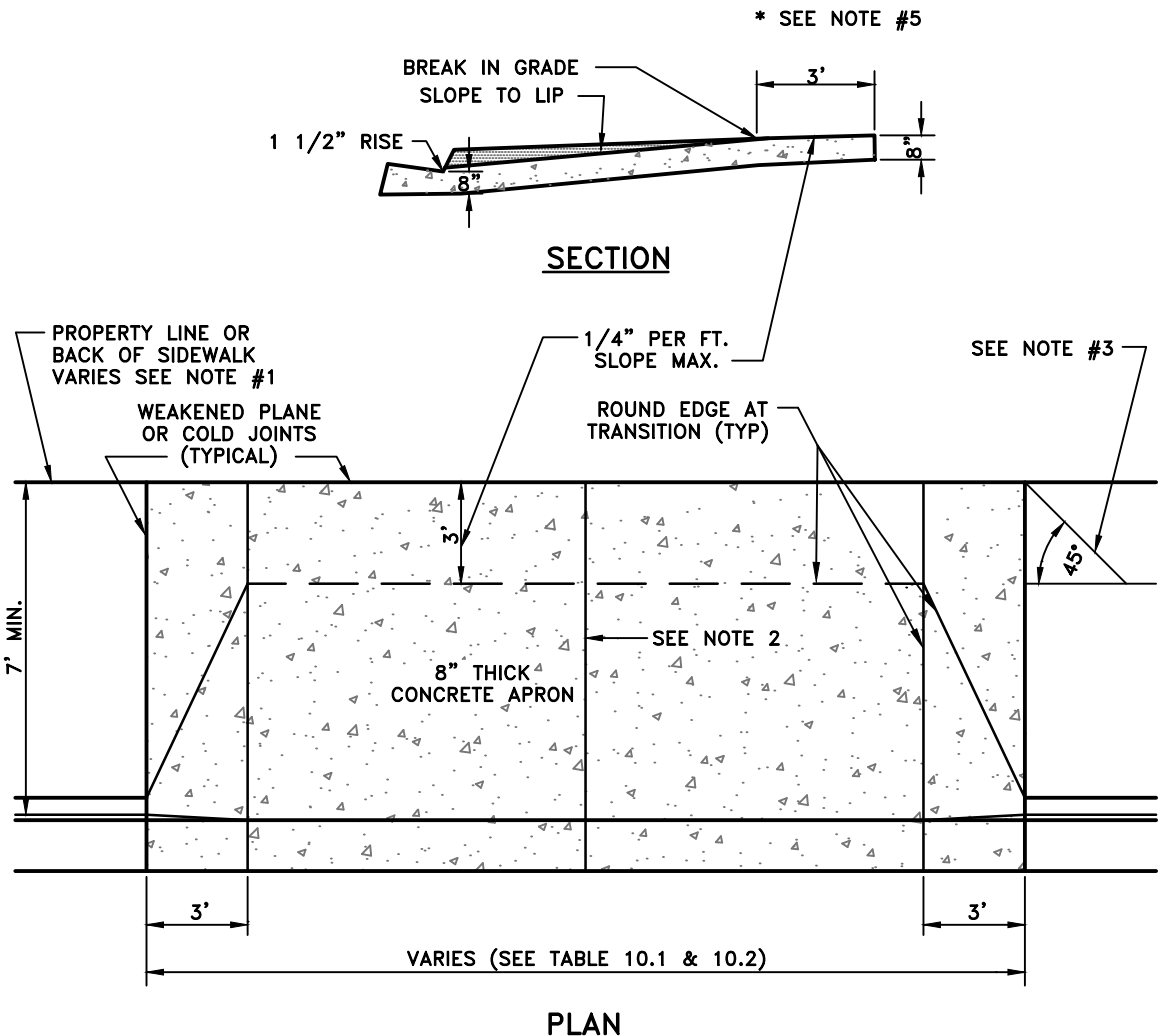
REVISED: DATE:

**DRIVEWAYS
CONSTRUCTION DETAILS
FOR RESIDENTIAL FLARED
DRIVEWAYS**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



DETAIL NO.
1010



NOTES:

1. REFER TO TYPICAL STREET SECTIONS OR CALL THE LAND DEVELOPMENT ENGINEERING DIVISION AT (209) 342-4712 FOR PROPERTY LINE LOCATION.
2. INTERMEDIATE WEAKENED PLANE JOINT IN ACCORDANCE WITH CONSTRUCTION STANDARDS (SECTION 8.01 E).
3. PROVIDE TRANSITION FOR SIDEWALKS THAT ARE LESS THAN FULL WIDTH.
4. IN RETROFIT AREAS, ASPHALT SHALL BE CUT A MINIMUM OF 6" FROM LIP OF CURB.
5. OPTIONAL IN P-O AND M ZONES.

APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
REVISED:	DATE:
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REVISED:	DATE:

DRIVEWAYS

CONSTRUCTION DETAILS

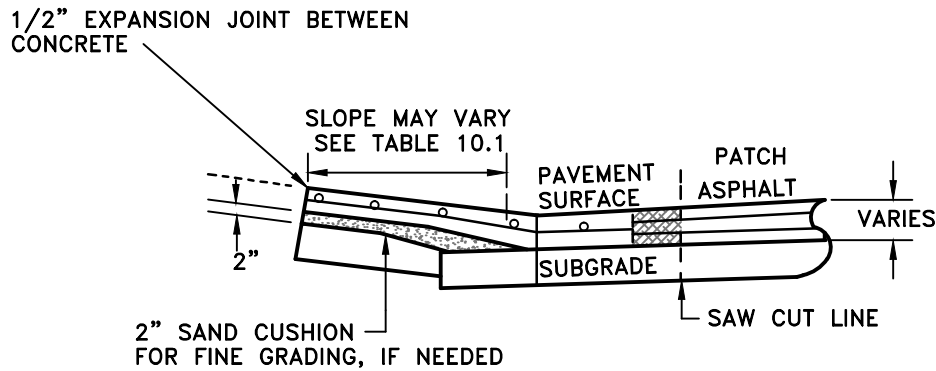
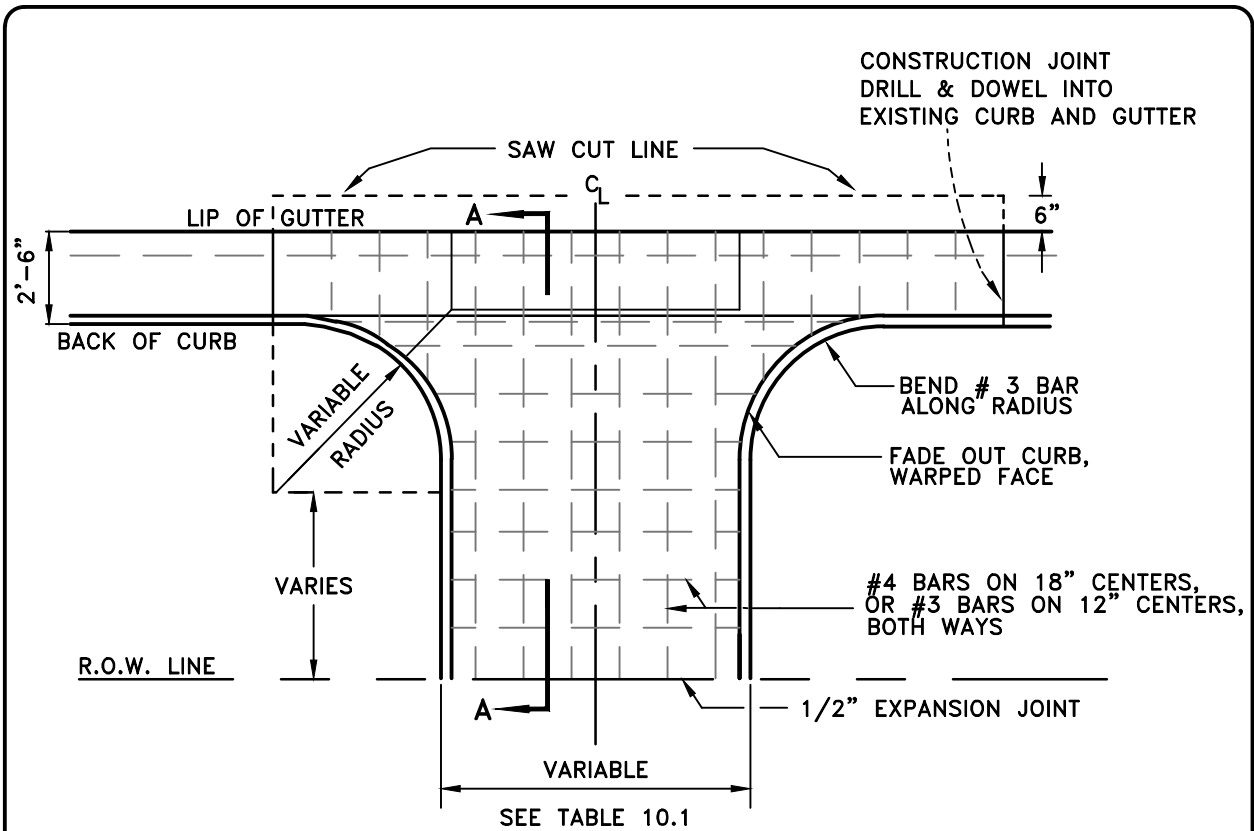
FOR COMMERCIAL FLARED

DRIVEWAYS

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

DETAIL NO.
1010B



SECTION A-A

DESIGN CRITERIA

DRIVEWAY TYPE	SLAB THICKNESS	STEEL
RESIDENTIAL	6"	NONE
ALL OTHERS	6"	# 4 BAR ON 18" CENTERS OR # 3 BAR ON 12" CENTERS, BOTH WAYS OR 8" PCC W/NO STEEL

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

DRIVEWAYS

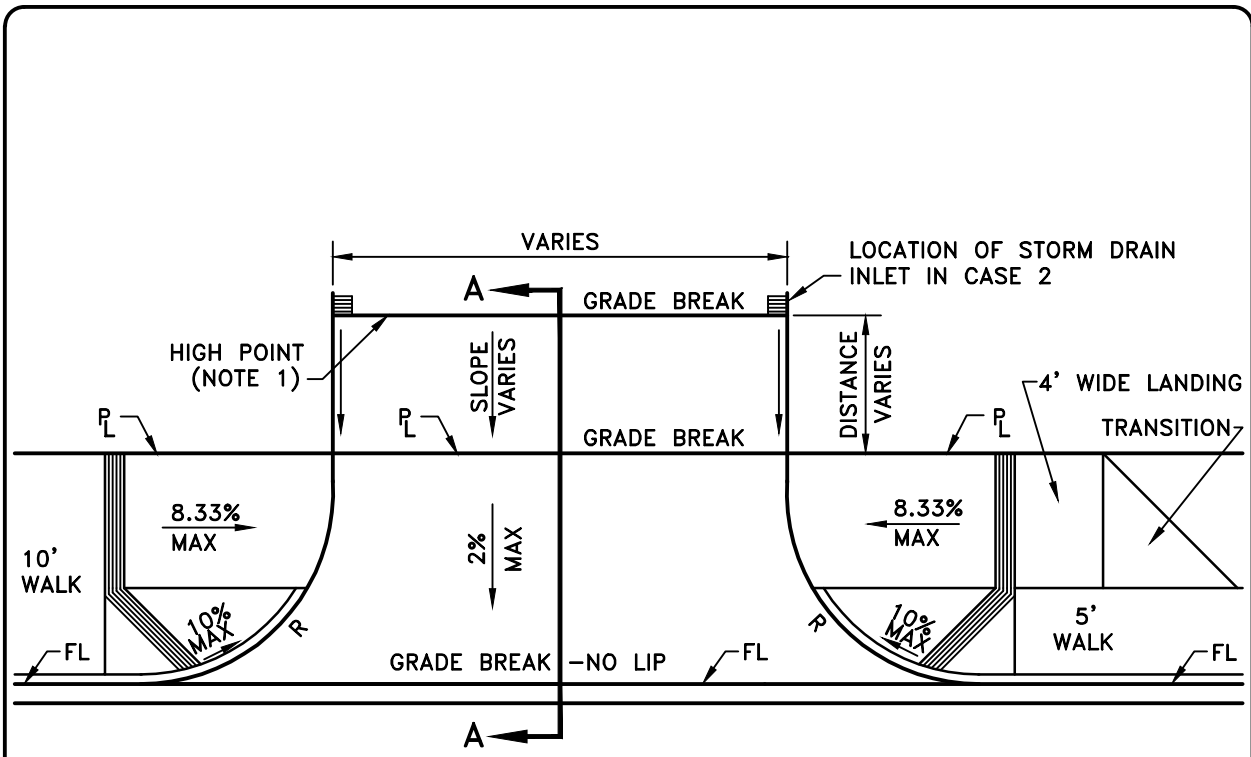
**CONSTRUCTION DETAILS
FOR DROP APPROACH
DRIVEWAYS**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



DETAIL NO.

1011



PLAN VIEW

NOTES:

1. RAMPS SHALL BE SLOPED AND GROOVED PER DETAIL # 345.
2. THE APPROACH SHALL HAVE COLD JOINTS AT THE PROPERTY LINE AND AT EACH END. A WEAKENED PLANE JOINT IS REQUIRED AT THE CENTER OF THE APPROACH.
3. THE APPROACH AND CURB RADII SHALL BE DESIGNED IN ACCORDANCE WITH TABLE 10.1 DRIVEWAY DESIGN STANDARDS AND INSTALLATION.
4. WIDTHS GREATER THAN 50' MUST BE APPROVED BY THE CITY ENGINEER.
5. IN ROCKWELL AREAS, THE LOCATION OF THE DROP CURB APPROACH SHALL BE APPROVED IN WRITING BY THE CITY ENGINEER PRIOR TO INSTALLATION.
6. INTERMEDIATE WEAKENED PLANE JOINTS IN ACCORDANCE WITH SECTION 3.04.
7. SEE DETAIL #1013 FOR SECTION A-A PROFILE VIEWS FOR CASE 1 AND CASE 2.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

DRIVEWAYS

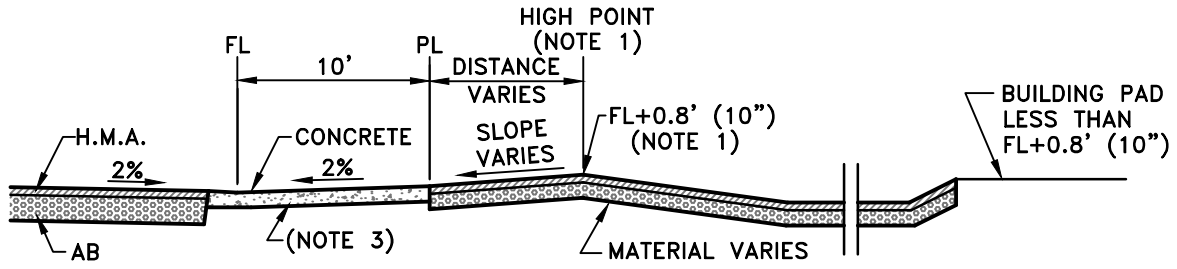
**DROP CURB APPROACH
 RAMPS AND GRADES**



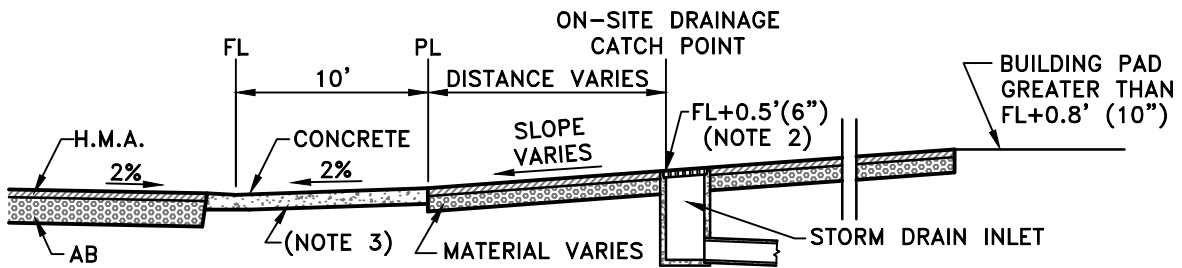
MODESTO
 CALIFORNIA

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
1012



SECTION A-A
DROP APPROACH - CASE 1



SECTION A-A
DROP APPROACH - CASE 2

NOTES:

- CASE 1 - LOT/PAD ELEVATION EQUAL TO OR LESS THAN TEN (10) INCHES (0.8') ABOVE FLOWLINE.
- CASE 2 - LOT/PAD ELEVATION GREATER THAN TEN (10) INCHES (0.8') ABOVE FLOWLINE.
- NOTE 1 - HIGH POINT ESTABLISHED AT 0.8' ABOVE FLOW LINE TO CONTROL STREET FLOODING AND LOT FLOODING. CITY ENGINEER MAY LOWER STANDARD IN POSITIVE DRAINAGE AREAS.
- NOTE 2 - CATCH POINT FOR ON-SITE DRAINAGE AT A MINIMUM OF 0.5' ABOVE FLOWLINE TO CONTROL ON- AND OFF-SITE FLOODING. CITY ENGINEER MAY LOWER STANDARDS IN POSITIVE DRAINAGE AREAS.
- NOTE 3 - CONCRETE DRIVEWAY TO EXTEND TO LIMITS OF SIDEWALK WIDTH UNLESS THIS IS A SIGNALIZED DRIVEWAY WITH TRAFFIC LOOPS. SIGNALIZED DRIVEWAYS SHALL HAVE A 6' WIDE VALLEY GUTTER.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

DRIVEWAYS

**DROP CURB APPROACH
PROFILE VIEW**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



MODESTO
CALIFORNIA

DETAIL NO.
1013

CHAPTER 11

GRADING DESIGN STANDARDS

11.01 GENERAL

All grading shall be designed in accordance with the project soils report, Modesto Municipal Code Title 5, Chapter 10, Article 3 Grading and Erosion Control and Appendix J of the latest California Building Code.

11.02 GRADING PERMIT

Grading Permits shall be required to grade, fill, excavate, store or dispose of more than 350 cubic yards of soil or earth material or to clear and grub more than one-half an acre of land within the City in accordance with Modesto Municipal Code Title 5, Chapter 10, Section 301(a).

11.03 GRADING PERMIT APPLICATION CONTENTS

Grading Permits are available at City Hall, 3rd Floor, Development Services Permit Counter.

1. The name, address, telephone number and e-mail address of the applicant and the applicant's engineer.
2. The address and parcel number of the construction site.
3. A copy of all entitlements granted for the property by the City, including Conditions of Approval and environmental documentation.
4. A copy of the Notice of Intent (NOI) and Waste Discharge Identification Number (WDID) submitted to the State Water Resources Control Board for site, if applicable.
5. A Local Stormwater Pollution Prevention Plan (SWPPP) conforming to the requirements of MMC 5-10.204 and / or the current State Water Resources Control Board Construction General Permit for Stormwater Discharges.
6. Grading Plans conforming to requirements of MMC 5-10-304.
7. Specifications conforming to the requirements of MMC 5-10.305, if required by the City Engineer.
8. Right of Entry conforming to the requirements of MMC 5-10.306.
9. Fees conforming to the requirements of MMC 5-10.307.

10. The City Engineer may require other information as necessary, to fulfill the intent of MMC 5-10, Article 3.

11.04 GRADING PLANS

Plans shall be prepared by a civil engineer and shall include, but are not limited to, the following:

1. A vicinity map indicating the site location and significant geographic features.
2. A site delineation map indicating boundary lines of the property and each lot or parcel into which the site is proposed to be divided.
3. The location of on-site and surrounding watercourses and wetlands, existing and proposed drainage systems, and drainage area boundaries and acreages. Additional hydrologic analysis may be required by the City Engineer.
4. The location of existing and proposed roads and structures on the site, and on adjacent property.
5. Accurate contours at two (2) foot intervals for slopes up to ten (10) percent, and five (5) foot intervals for slopes over ten (10) percent showing topography of existing ground, location of existing vegetation, including all oak trees, and all other trees over six (6) inches in diameter measured at four and one half (4.5) feet above the ground, groves of trees, and natural features such as rock outcroppings. Spot elevations will be required where relatively flat conditions exist. The spot elevations shall be extended off-site for a minimum distance of fifty (50) feet, or one hundred (100) feet in flat terrain.
6. Elevation, location, extent and slope of all proposed grading shown by contours, cross-sections or other means, and location of any disposal areas, fills or other special features to be included in the work.
7. A statement of the quantity of material to be excavated, the quantity of material to be filled, whether such excavation or fill is temporary or permanent, and the amount of such material to be imported or exported from the site.
8. A delineation of the area to be cleared and grubbed.
9. A statement of the estimated starting date, grading completion date, and date site improvements will be completed and final stabilization achieved.
10. The location, implementation schedule, and maintenance schedule of all erosion and sediment control measures to be implemented or constructed prior to, during or after grading activities.
11. A description of measures designed to control dust and stabilize the construction site road and entrance.

12. A description of the location and methods of storage and disposal of construction materials.

13. Any additional plans or control measures required by the City Engineer.

11.05 SOILS REPORT

A comprehensive soils report shall be prepared for each project in the City. The report must be prepared, signed and sealed by a licensed Geologist experienced in soil work or licensed Geotechnical Engineer. It shall include R-values (if greater than 5) taken at the site with a map showing the locations and depths of the test samples. Additionally, it shall include ground water elevations, stripping and grading recommendations, pavement recommendations, determination if expansive soil is present, etc. The Subdivision Improvement Plans shall provide a chart of the pavement sections. The chart shall contain the R value and the design T1. Below the chart shall be a reference to the soils report indicating the soils report title, project #., and preparer of the report and date of report.

11.06 GRADING AT PROPERTY LINES

- A. The property line within any proposed or existing site or parcel located within the grading project shall be set back a minimum 1.5' from the top of the slope.
- B. Excavation and fill slopes shall be set back a minimum of 2' from the project boundary line except as provided below.
- C. Pad excavations may cross a phasing line of a project as long as a method has been provided to allow construction on the newly created parcel, which will protect the rights of any future owners of either phase of the project. The pad extension shall extend a minimum 2' across the phasing boundary line of the project.
- D. Cut or fill slopes may be allowed on adjacent existing parcels with a recorded slope easement from the current property owners of the existing parcel.
- E. A 12" maximum wood retaining wall (2" x 12" redwood) may be installed along project boundaries to preclude grading on adjacent property.
- F. Retaining walls higher than 12" shall be masonry or reinforced concrete. Structural calculations shall be provided for review and approval prior to obtaining a Grading Permit.

11.07 LOT GRADING

Lots shall be graded or swaled to slope a minimum of 1% toward a public street from the rear property line or swale flow line high point in the rear of the lot to the front property line. Pad elevations for buildings shall be at least 0.1' above the high point as determined above. Alternative lot grading may be approved by the City Engineer if special conditions exist as long as disposal of all site drainage can be provided in a safe

manner. A typical detail for the lot grading for a subdivision shall be provided in the plan set.

11.08 POST-GRADING REQUIREMENTS

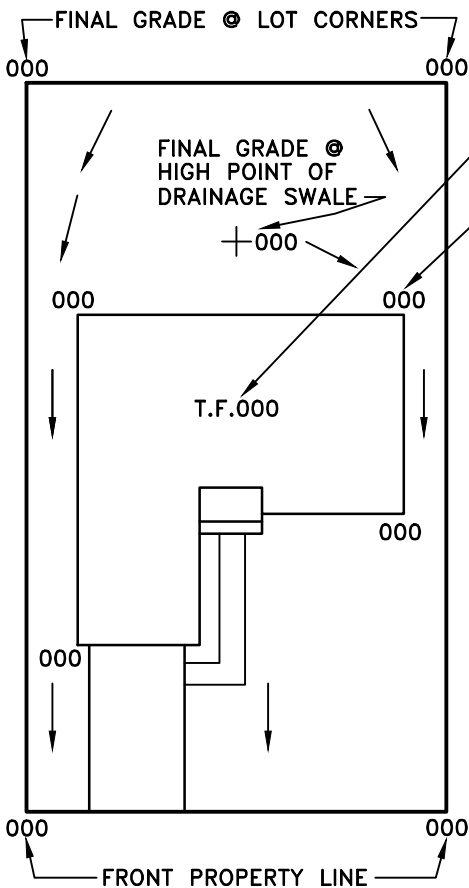
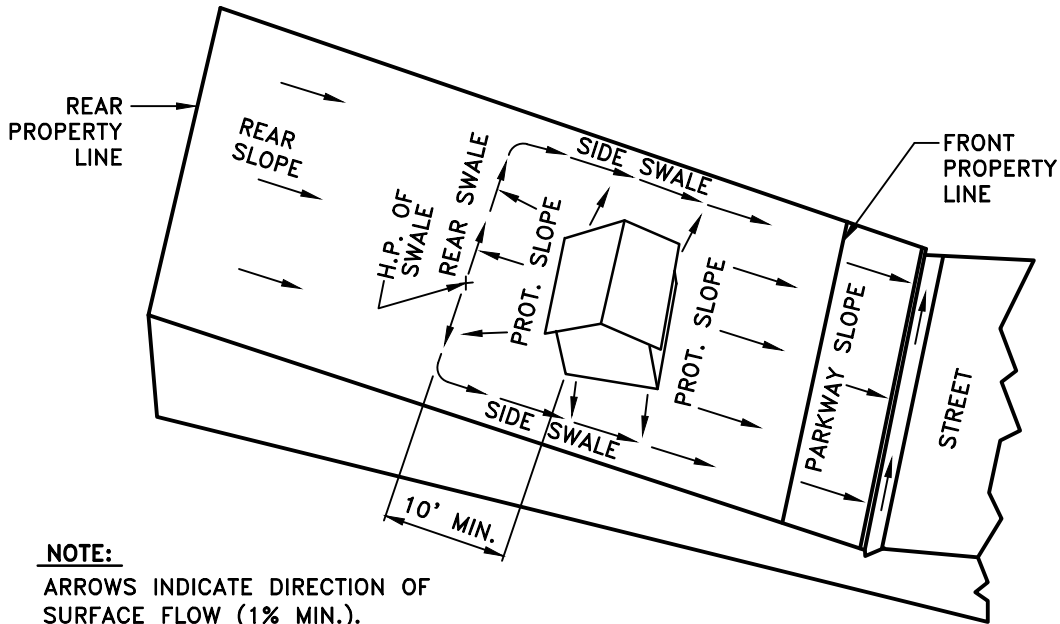
The project Consultant Engineer and project Geotechnical Engineer shall file with the City of Modesto as required the following for each subdivision, commercial site or street improvement project at the conclusion of rough grading:

- A. The project Consultant Engineer shall submit a letter verifying that the lot, site and/or streets have been graded (within 0.1'±) to the elevations as shown on the approved grading plan. This letter shall be signed and stamped by the civil engineer or surveyor prior to the improvements being accepted or the project permit being signed off;
- B. The project Geotechnical Engineer shall submit a letter verifying that each lot has been observed tested and then constructed in accordance with the recommendations in the project soils report and as supplemented by additional recommendations as provided during construction by the project Geotechnical Engineer. The letter shall include a statement that the lot is now suitable for construction and will be provided prior to a building permit. The letter shall be signed and stamped by the project Geotechnical Engineer, and;
- C. The project Geotechnical Engineer shall supply to the City of Modesto a letter stating that he/she has R-value tested the actual street subgrades exposed during rough grading **after** completion of the utility construction in the street and prior to base rock. The project Geotechnical Engineer shall confirm the preliminary pavement designs based upon the **final** R-value testing performed. The R-value tests and pavement calculations shall be submitted to the City of Modesto Public Works Department prior to base rock operations. Should the pavement section be altered by lower R-values, such that additional subgrade removals would be necessitated, the pavement section may be altered to a full-depth pavement section.

11.09 STORM WATER BEST MANAGEMENT PRACTICES (BMPs)

The project Consultant Engineer shall place applicable Best Management Practices (BMPs) details on the Erosion Control Plan and / or Grading Plans. All grading plans shall be reviewed and approved by the City's Land Development Engineering Division prior to the issuance of a Grading Permit. The Contractor and Developer must apply BMPs at the project site to control erosion and sediment run-off to the maximum extent practicable.

Grading projects greater than 1 acre in size shall obtain coverage under the State Water Resources Control Board Construction General Permit for Stormwater Discharges. See Chapter 15 – Erosion & Sediment Control Measures for details.



FINAL TOP OF FOUNDATION ELEVATION (T.F.)
MINIMUM 8" ABOVE PROTECTIVE SLOPE.

PROTECTIVE SLOPE ELEVATION
@ FOUNDATION, SAME ALL CORNERS.

GENERAL NOTES:

1. FINISHED GRADING IS TO BE COMPLETED BY OTHERS AFTER HOUSE CONSTRUCTION.
2. PAD ELEVATIONS ARE DESIGNED FOR 12" SLAB & BASE ROCK FOUNDATION SECTIONS OR AS RECOMMENDED BY A LICENSED GEOTECHNICAL ENGINEER.
3. PAD ELEVATIONS ARE DESIGNED SUCH THAT THE PAD ELEVATION SPECIFIED WILL ACCOMMODATE REAR SLOPES AND SIDE SWALES TO BE GRADED AT A MINIMUM GRADIENT OF 1% IN ACCORDANCE WITH CITY STANDARDS.
4. ACTUAL LOT GRADING IS TO BE DESIGNED WITH THE HOUSE PLOT PLAN AND MAY VARY FROM THIS TYPICAL DETAIL DEPENDING ON HOW THE HOUSE IS PLOTTED.
5. EACH LOT MUST RETAIN AND TREAT 0.5 INCHES OF STORMWATER RUNOFF FROM THE PROPERTY THROUGH A COMBINATION OF LID AND TREATMENT CONTROL MEASURES AS OUTLINED IN THE 2011 GUIDANCE MANUAL FOR DEVELOPMENT STORMWATER QUALITY CONTROL MEASURES.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

STREETS

**TYPICAL FINISHED
LOT GRADING**



ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

DETAIL NO.
1100

CHAPTER 12

LANDSCAPE PLANTING & IRRIGATION

12.01 GENERAL PLANTING

Landscaping that conforms to these Standards by shall be installed by a Contractor holding an appropriate license for such work under the provisions of the State of California Business and Professional Code.

Furnish all labor, materials, supplies, tools and transportation and perform all operations in connection with and incidental to the complete installation of all plantings as shown on the Drawings.

A. The work shall include, but shall not necessarily be limited to the following:

1. Finish Grading (fine)
2. Soil Preparation
3. Tree Supports
4. Furnishing Plants and Planting
5. Fertilizer, Iron Sulfate and Soil Amendment
6. Watering
7. Plant Establishment Period: 60 calendar days
8. Landscape Maintenance Period: 60 calendar days
9. Cleanup, Inspection and Approval
10. Weed Control

B. Work not included in this section:

1. Rough Grading

C. Samples - if required

The Contractor shall submit to the City Engineer, 14 days prior to installation, samples of materials for approval. For standard products, the manufacturer's analysis will be acceptable.

D. Verification of Material

The Contractor shall, upon demand, produce records to verify the ordering and delivery of specified quantities and types of material.

E. Personnel

Planting and seeding shall be performed by personnel familiar with planting procedures and under the supervision of a qualified planting foreman. The planting foreman shall be on the job site whenever planting is in progress.

F. Weather

No planting shall occur during weather conditions which will adversely affect plant materials or when soil is in a muddy condition.

G. Abbreviations

1. o.c. – on center
2. gal. – gallon can

H. Approvals

All irrigation work, except for placement of polyethylene lines, shall be inspected and approved before starting any work of this section.

All landscape planting shall be installed and approved prior to the commencement of the plant establishment period.

I. Preservation of Property

The planting operations shall be conducted in such a manner that no damage shall result to existing site improvements and plantings. The Contractor shall be responsible for any damage resulting from his/her operations, and shall repair or replace such damage at his/her own expense. Vehicles of any kind shall not be allowed to pass over curbs, sidewalk, planting areas, etc., unless proper protection is provided.

J. Plant Establishment and Landscape Maintenance

Plant Establishment consists of the establishment of all landscape elements, such as trees, shrubs, groundcover and turf and shall commence when all plant material has been installed to the satisfaction of the City Engineer or designee assuming that the majority of the construction work is substantially complete. All the guidelines following for the Landscape Maintenance Period shall apply to the Plant Establishment Period as applicable. The Plant Establishment period will be considered complete when all new plantings are in good health and have been in the ground for a minimum of 60 calendar days, all turf areas have achieved an even, close stand of grass and all areas have been reviewed and approved by the City Engineer or designee. If the Plant Establishment Period continues beyond the designated 60 calendar days it will be at the expense of the contractor and will delay the start of the 60-calendar day Landscape Maintenance Period.

Landscape Maintenance will consist of a period of 60 calendar days, which will begin after completion of the Plant Establishment period and notification by the City Engineer or designee.

12.02 PLANTING DESIGN

A. Planting Design

For general planting guidelines see Modesto Municipal Code-Section 12.

All landscape designs for private commercial and public owned lands shall be reviewed and approved by the Park Planning and Development Division prior to installation.

1. Finished grades shown on plans are given in feet and decimals of feet. Slope uniformly between given spot elevations. Planting areas, including lawns, shall be true to grade within 1" when tested in any direction with a 10' straightedge.
2. Grades not otherwise indicated shall be uniform levels or slopes between points where elevations are given, or between points established by walks, paving, curbs, or catch basins. Finish grades shall be smooth, even and on a uniform plane with no abrupt change of surface. Minor adjustments of finish grades shall be made at the direction of the City Engineer if required.
3. All grades shall provide for natural runoff of water without low spots or pockets. Flow line grades shall be accurate and shall not be less than 2% gradient wherever possible unless otherwise indicated.
4. Finished grade of all shrub, annual, and ground cover areas shall be 1" below top of adjacent pavement, headers, curbs or walls unless otherwise indicated on the drawings. Finished grade of lawn areas shall be $\frac{3}{4}$ " below top of adjacent pavement, curbs, and headers.
5. Tops and toes of all slopes shall be rounded to produce a gradual and natural-appearing transition between relatively level areas and slopes.
6. Tree Supports: All trees shall be supported at time of planting as called for on the planting plan.

12.03 PLANTING MATERIALS

A. Imported Topsoil

Topsoil shall be an imported fertile, friable soil of loamy character containing a normal amount of organic matter. It shall be obtained from well-drained stable land and shall be free from refuse, roots, heavy or stiff clay and stones larger than 1" in size.

Soil shall, by particle examination, contain the following percentages:

- Sand - Between 45 and 52
- Silt - Between 26 and 50
- Clay - Between 6 and 26

Soil shall, by particle examination, shall contain the following ranges in diameter:

- Sand - 2 to 0.05 millimeters
- Silt - 0.05 to 0.002 millimeters
- Clay - Less than 0.002 millimeters

B. Soil Amendment

Soil amendment shall be an organic material composted from wood and plant material under optimum conditions to destroy viable weed seeds and pathogens (i.e. 4-8 weeks at temperature of 130°-150° Fahrenheit with moisture levels of 35-50%, and turned with a commercial compost turner to thoroughly mix and incorporate all of the product to ideal temperature and moisture conditions). Final product shall be screened to ½" and cured to stabilize.

Soil amendment shall be dark brown, fine texture, and shall have a minimum of 1% available nitrogen content (% dry weight). Submit complete analysis of the proposed soil amendment to the City Engineer for approval. Prior to amending soil, the Landscape Contractor shall review the results of the soils test and report recommendations to the City Engineer. The soils report recommendations shall take precedence over the minimum amendment and fertilizer application rates specified on the plans.

C. Fertilizer

1. Planting Tablets

Tightly compressed, long-lasting, slow-release fertilizer tablets weighing 21 grams, with a potential acidity of not more than 5% by weight and having an analysis of 20-10-5 derived from the sources listed in the following guaranteed analysis:

Guaranteed Analysis:

Total Nitrogen (N) 20%

- Derived from urea-formaldehyde
- 7.0% water soluble Nitrogen, 13.0% water insoluble Nitrogen

Available Phosphoric Acid (P₂O₅) 10%

- Derived from calcium phosphate

Soluble Potash (K₂O) 5%

Combined Calcium (Ca) 2.60%

- Derived from calcium phosphates

Combined Sulfur (S) 1.60%

- Derived from ferrous and potassium sulfates

Iron (expressed as elemental Fe) 35%
- Derived from ferrous sulfate

Potential Acidity: 5% or 100 lbs.
- Calcium Carbonate Equivalent per ton

2. Fertilizer 16-7-12

Fertilizer shall be a long lasting, slow-release fertilizer compound having an N-P-K ratio of 16-7-12 (+ Iron), and shall be derived from the sources listed in the following analysis and be a blend of coated prills (which supply controlled release nitrogen, phosphorus, and potassium) and uncoated, rapidly soluble prills containing nitrogen and phosphorus.

Guaranteed Analysis:

Total Nitrogen (N) 16%
- 8.5% Ammoniacal Nitrogen
- Derived from Ammonium Nitrate, Ammonium Phosphates, and Ammonium Sulfate

Available Phosphoric Acid (P_2O_5) 7%
- Derived from Ammonium and Calcium Phosphates

Soluble Potash (K_2O) 12%
- Derived from Potassium Sulfate and Potassium Nitrate

Combined Sulfur (S) 5%
- Derived from Potassium Sulfate and Iron Sulfates

Iron (Fe) expressed as Elemental 2.5%
- Derived from Iron Sulfates

Potential Acidity: 5% or 100 lbs
- 800 Calcium Carbonate Equivalent per ton

3. Fertilizer 12-12-12

Fertilizer shall be rapidly soluble prills containing equal amounts of nitrogen, phosphorous, and potash plus sulfur and calcium and derived from the following sources:

Guaranteed Analysis

Total Nitrogen (N) 12%
- As Ammoniacal derived from Ammonium Sulfate and Ammonium Phosphate

Available Phosphoric Acid (P_2O_5) 12%
- Derived from Ammonium Phosphate

Soluble Potash (K_2O) 12%
- Derived from sulfate of potash

Sulfur (S) expressed as elemental 15%
- Derived Sulfate

Calcium (Ca) 2.10%
- Derived from Gypsum

4. Fertilizer 6-24-24

Fertilizer shall be dust-free, homogenous pellets containing equal amounts of nitrogen, phosphorous, iron, and potash plus sulfur and calcium and derived from the following sources:

Guaranteed Analysis

Total Nitrogen (N) 6%

- As Ammoniacal derived from Ammonium Sulfate and Monoammonium Phosphate

Available Phosphate 24%

- Derived from Monoammonium Phosphate

Soluble Potash (K₂O) 24%

- Derived from sulfate of potash
- Muriate of Potash

Sulfur (S) 5%

- Derived from Sulfate of Potash and Iron of Oxysulfide

Iron (Fe) 1.5%

- Derived from Iron of Oxysulfide

D. Ammonium Sulfate: Conforming to the requirements of the Agricultural Code of the State of California.

E. Iron Sulfate: Ferric sulfate or ferrous sulfate in pellet or granular form containing not less than 18.5% iron expressed as metallic iron, and shall be registered as an agricultural mineral with the State Department of Agriculture in compliance with Article 2, "Fertilizing Materials," Section –1030 of the Agricultural Code.

F. Rock Cobbles: Rock shall be a rounded cobble with the following percentage larger than:

10 lb = 0-5%
5 lb = 25-75%
1 lb = 90-100%

G. Metal Edging: All metal edging shall be ¼" thick – Reyerson, or approved equal. (Reyerson phone number: 510-653-2933)

H. Trees and Shrubs:

1. Quality and size. Plants shall be vigorous and of normal habit of growth and shall be free of girdling roots, sunscald, abrasions, disease, insects, insect eggs and larvae. Plants shall equal or exceed the standards as outlined by the

American Standards for Nursery Stock and to applicable California Agricultural Codes.

2. Nursery grown. Plants shall be nursery grown under climatic conditions similar to those in the locality of the project for a period of one (1) year prior to planting on site.
3. Substitutions are not desired. When substitutions are allowed, all requirements of the plant shall be met, and in no case shall substitutions be made without the written approval of the City Engineer or his qualified representative.
4. Boxed trees shall be well established in boxes before delivery to job.
5. Trees shall have straight trunks with the leader and side limbs intact, unless otherwise specified. All abrasions and cuts shall be completely calloused over.
6. Plants not approved are to be removed from site immediately and replaced with suitable plants.
7. Inspection and approval of specimens required before delivery to site; all others on delivery. City may reject entire lots of plants represented by defective samples. Random samples will be inspected for root condition.
8. Stakes for trees shall be round, treated Lodge Pole pine, made from the entire bole of the tree with bark. They shall be at least 2" in diameter, conically pointed at one (1) end, 10" long tapered point and chamfered at the other end.

Tree ties shall be as noted on drawings.

9. No plants shall be transported to the planting area that are not thoroughly wet throughout the ball of earth surrounding the roots. Plants should not be allowed to dry out, nor shall any roots be exposed to the air except during the Act of Placement. Any plants that, in the opinion of the City Engineer, are dry or in a wilted condition when delivered or thereafter, whether in place or not, will not be accepted and shall be replaced at the Contractor's expense.
 10. Tree root barriers shall be manufactured of extruded recycled polyethylene. Panels shall measure 24 inches in width by 24 inches in depth, with a mean thickness of 0.08 inch. Each panel shall have not less than four raised ribs protruding ½ inch from the face of the panel and running from top to bottom thereof. Each panel shall have an integral male/female sliding lock, the male down the length of one side and the female down the length of the other side.
- I. Herbicide
Submit written chemical weed control program prepared by a licensed pest control advisor for approval by the City Engineer.
 - J. Seed
Seed mixture shall be 98% pure, not to exceed 0.20 other crop, both noxious and weed free, with a minimum of 88% Germination. Seed variety or mix shall be as

specified on the plans or in the special provisions. All seed shall be re-cleaned Grade A “new crop” seed, delivered in the original unopened containers, and shall bear a guaranteed analysis and dealer’s label. The dealer may mix the seed provided a guaranteed statement of composition of mixture and percentages of purity and germination of each variety is attached to the sealed container. The seed shall be pre-treated with a pre-emergence fungus preventative such as “Thiram” or approved equal in accordance with manufacturer specifications. The seed containers shall be stored immediately in a dry, weather and moisture-proof structure. Seed Supplier shall be approved by the City Engineer prior to delivery.

K. Hydromulch Seed

1. Seed – as specified, on the plans or in the special provisions.
2. Fertilizer – use 16-7-12, 870 lbs. per acre.
3. Cellulose: The mulch shall be green colored, fibrous, wood cellulose mulch containing no growth or germination inhibiting factors. It shall be manufactured in such a manner that, after addition and agitation in slurry tanks with fertilizer, seed, water, and other approved additives, the fibers in the material will become uniformly suspended to form a homogeneous slurry, and that when hydraulically sprayed on the ground, the material will form a blotter-like ground cover impregnated uniformly with seed and, which after application, will allow the absorption of moisture and allow the rainfall to percolate to the underlying soil. Cellulose shall be certified to indicate that laboratory and field-testing of the product has been accomplished and that it meets all of the foregoing requirements. Weight specification of this material from suppliers and for all applications shall refer only to air-dry weight of the fiber material. Each package of the cellulose fiber shall be marked by the manufacturer to show the air-dry weight content, 1800 lbs. per acre.
4. Water: Water for hydromulching shall be clean, potable and added to the slurry mixture in sufficient amount to spread uniformly the required quantity of hydromulch solids (approximately 3,000 gallons per acre).
5. Equipment: Hydromulching equipment used for the application of the seed, fertilizer and slurry of prepared wood pulp shall be of the type as approved by the City Engineer. This equipment shall have a built-in agitation system and operating capacity sufficient to agitate, suspend and homogeneously mix a slurry containing up to 40 lbs of fiber plus combined total of 70 lbs fertilizer solids and seed for each 100 gallons of water. The slurry distribution lines shall be large enough to prevent stoppage. This discharge line shall be equipped with a set of hydraulic spray nozzles which will provide a continuous non-fluctuating discharge and delivery of the slurry in the prescribed quantities uniformly, without misses, waste, or erosion. The slurry tank shall have a minimum capacity of 1,000 gallons and shall be mounted on a traveling unit which may be either self-propelled or drawn. The City Engineer may authorize equipment with smaller tank capacity provided that the equipment has the necessary agitation system and sufficient capacity to spray the slurry in a uniform coat.

L. Mulch

Mulch shall be a fibrous, woody bark mixture called "Superior Walk on Bark" as distributed by Superior Soil Supplements, Inc., "Walk on Fir Bark Shredded with Nuggets" as distributed by My Bark Company, Inc. or approved equal.

12.04 PLANTING INSTALLATION

A. Agronomic Soils Tests

Prior to soil preparation and water tests, the Contractor shall obtain agronomic soils tests for all planting areas. Tests shall be performed by an approved agronomic soils testing laboratory and shall include a fertility and suitability analysis with written recommendations for soil amendment, fertilizer, and chemical conditioner application rates for soil preparation, planting backfill mix, auger hole requirements, and post-maintenance fertilization program. Tests shall also include an analysis for soil contaminants and sterilants. Recommendations from approved soil labs shall supercede those guidelines herein described elsewhere in this Chapter.

Soil found to be unsuitable for sustaining healthy plant growth, i.e. soil contaminated with sterilants, excessive construction materials, etc., shall be removed and replaced with suitable topsoil as directed by the City Engineer.

B. Soil Preparation and Fine Grading

1. Before any planting operations start in any area, all trash and deleterious materials on the surface of the ground shall be removed and disposed of. After completion of fine grading and prior to soil preparation, the Contractor shall review Agronomic Soils Test and Report recommendations as required. The soils report recommendations shall take precedence over the minimum amendment and fertilizer application rates specified on the plans.
2. All weed growth within the areas to receive planting shall be removed.
3. All planting areas shall be cultivated until the soil is brought to a loose friable condition to a depth of 12". Remove all debris and rocks that are greater than 1" in any dimension. Evenly distribute soil amendment and fertilizer over all areas.
4. After approval of amendment and fertilizer applications by the City Engineer, incorporate into top 12" of soil by repeated rotary-hoe cultivation.
5. When rough grading and soil preparation have been completed, all areas to receive planting shall be finish graded. Grading shall be done when soil is at optimum moisture content for working. The finish grade shall be smooth, uniform, and free of abrupt grade changes and depressions to ensure surface drainage.
6. The finish grade below adjacent paving, curbs or headers shall be 3" in shrub or ground cover areas prior to placing a 3" layer of mulch that tapers to 2 ½" at hardscape surfaces..

C. Planting

All trees and shrubs shall be planted, staked and tied as noted:

1. Rock and/or other underground obstructions shall be removed to a depth necessary to permit proper planting, if possible. Note drainage requirements for plant pits. Plant locations which interfere with underground construction or where obstruction cannot be removed shall be adjusted and the new location approved by the City Engineer.
2. Tree and shrub locations as shown on planting plan are relative, and the City Engineer reserves the right to make adjustments in the location of trees and shrubs in order to achieve the intended results. No planting shall be done without prior approval of location by City Engineer. The Contractor shall locate trees no closer than 10' to sidewalks and 15' to mow strips and curbing, unless planting trees in parkway strips for streetscape landscaping.
3. Tree locations that are next to curb and gutter, sidewalk or any paved surface shall include the placement of tree root barriers, as described within Section 12.03J.11 of these Specifications. Trees within linear planters shall have root barriers placed between tree planting hole and edge of pavement. Trees planted within pavement knock-outs shall have root barrier surrounding the root ball, as shown in Detail No. 1200.
4. Tree holes shall at all times be in accordance with standard tree planting specifications of City of Modesto.
5. Place backfill in bottom of plant hole after making sure base of hole is loose enough for good drainage.
6. Soil excavated from holes may be reused for planting operations.
7. Proper drainage of tree and shrub pits is necessary. Any subsoil conditions causing the retention of water in plant holes for more than 24 hours shall be brought to the attention of the City Engineer with proposals for correction before the planting proceeds. When extensive hardpan conditions are encountered, a 6' x 6' tapered pit must be provided for tree plantings.
8. Glazed sides of augured holes shall be scarified.
9. Trees and shrubs shall be carefully removed from containers.
10. Trees and shrubs shall be set true and plumb with the top of the plant ball, as grown in the nursery can container, set approximately 1" above the finish grade of the planting area. The Contractor shall be responsible for any settling and shall raise and replant any tree whose crown settles below the finish grade. Form a "berm" or ridge of soil at drip line of plant in a neat circle to facilitate watering and hold top mulch.
11. Pruning of 10% of trees and shrubs to be done in field as directed by City Engineer. No pruning to be done without inspection and approval of City Engineer.

12. Position the plant in the hole and backfill no higher than halfway up the root ball. Place the recommended number of tablets evenly around the perimeter of, and immediately adjacent to, the root ball at a depth, which is between the middle and bottom of the root ball. Complete the backfilling, tamp and water
- 13 Specimen Plants: Use one tablet for each ½" of tree trunk diameter or for each one foot of height. Sink tablets 6"-8" inches deep evenly spaced around the drip line.
14. After thoroughly watering in all plant material, apply a 3" layer of mulch to all planter areas having new plant material. Keep mulch away from root ball of plant.

D. Hydromulch Seeding

1. Preparation: The slurry preparation shall take place on-site. The slurry preparation shall begin by adding water to the tank when the engine is at half throttle. When the water level has reached the height of the agitator shaft, good recirculation shall be established; and at this time, the seed shall be added. Fertilizer shall then be added, followed by wood pulp. The wood pulp shall only be added to the mixture after the seed.

The engine throttle shall be opened to full speed when the tank is half filled with water. All the wood pulp shall be added the time the tank is two-thirds to three-fourths full. Spraying shall commence immediately when the tank is full.

2. Application: All areas to receive hydromulch shall be sprayed with a uniform, visible coat by using the green color of the wood pulp as a guide. The slurry shall be applied in a sweeping motion, in an arched stream, so as to fall like rain on each other until a good coat is achieved, and the material is spread at 1,800 pounds wood fiber per acre plus seed and fertilizer. Hydromulch shall not be allowed to fall on the ground cover and shrub areas.
3. Time Limit: Any slurry mixture which has not been applied to the slopes within 4 hours after mixing will be rejected by the City Engineer and shall be removed from the project at the Contractor's expense.
4. Using Hydromulch for Bioswales: The application of hydromulch to be used in areas designated for use as a stormwater treatment bioswale shall be completed in sufficient time to allow appropriate growth be completed before October 1. If there is not adequate time to allow for complete germination and growth to be completed by October 1, then hydromulch will not be an approved installation.

E. Sod Planting

Care should be given to prevent heel or foot prints in the grade as the sod is planted. Unroll the sod fitting each strip tightly to the preceding strip. Do not stretch the sod. Force each strip together as tightly as possible. Stagger the strips of sod as a bricklayer places bricks to prevent the seams from matching.

As soon as sod is placed, roll it with a light roller, making certain that no air space is left under the sod. After the first rolling moisten the sod lightly and then allow the grass to dry off before the second rolling. The second rolling should be at a cross-angle from the first rolling.

Upon completion of the rolling, apply sufficient water to wet the sod and soil to a depth of 6". Sod shall be kept moist for the next 10 days. At the end of the 10-day period, mow to a height of not less than 2". Care should be taken to leave no footprints in the sod.

F. Cleaning Up

The Contractor shall at all times keep the premises from accumulations of waste material or rubbish caused by his/her employees or work, or the employees or work of any Subcontractor and at the completion of the work he/she shall remove all rubbish from and about the site and all his/her and his/her Subcontractor's tools, scaffolding, and surplus materials.

G. Watering

Apply water to all plants during operations and thereafter, until acceptance of work.

Plants which cannot be watered efficiently with the existing irrigation system shall be watered by means of a hose.

Immediately after planting, apply water to each tree and shrub. Apply water in a moderate stream in the planting hole until the material about the roots is completely saturated from the bottom of the hole to the top of the ground.

Apply water in sufficient quantities and as often as seasonal conditions require to keep the planted areas wet at all times, well below the root system of plants.

H. Inspection

1. No planting shall be done until all materials have been approved for quality and placement by the City Engineer or designee.
2. A daily log of maintenance at the park site shall be kept by the Landscape Contractor. Entries to log shall commence with plant establishment and end upon final acceptance of project. Log shall be legible and include man-hours at job site, equipment and materials used. A copy of this log shall be given to the City Engineer prior to final acceptance of project.
2. Certificates of Inspection to accompany shipments of plant material shall be furnished and may be required by the City (such as Pinto Tag). Written certifications required which are to be submitted to the City Engineer upon delivery to the job site include:

Quantity of commercial fertilizer used

- Quantity of soil amendments
- Quantity of iron sulfate
- Quantity of soil sulfur
- Quantity of seed
- Quantity of hydromulch materials

I. Preliminary Inspection to the Maintenance Period

A notice requesting an inspection should be submitted to the City Engineer or designee at least 7 days prior to the anticipated date. Prior to this inspection, the site must be thoroughly cleaned up and all excess material and debris removed.

Prior to the start of the 60-calendar day plant establishment and 60-calendar day project maintenance periods, the Contractor will be required to have a complete inspection and approval of all landscape construction items.

The following inspections are required:

- At 30th calendar day.
- At 60th calendar day, completion of plant establishment period.
- At 90th calendar day.
- At completion of the maintenance period.

J. Landscape Maintenance Period

The Landscape Maintenance Period shall begin after the 60-day Plant Establishment Period, and shall last a total of 60 calendar days. The Contractor must notify the City Engineer or designee 7 days prior to the anticipated date of inspection to establish the end of the Plant Establishment Period.

During the Landscape Maintenance Period, the site shall be kept free of all weeds, debris and trash. During this period, plants found to be missing, vandalized, diseased, dead, or in any unhealthy condition by the City Engineer must be replaced by the Contractor, at their expense, within 5 working days. The 5-day period will begin when the Inspector notifies the Contractor of the existing condition in writing. If for any reason replacement is not made, the Landscape Maintenance Period will be considered void and will start over again when all plant material is in a healthy condition.

Landscape maintenance work shall consist of applying water (except initial watering of plants), weeding, caring for plants, sweeping walks, litter pickup, and performing all general project maintenance.

During the Landscape Maintenance Period, all plants and planted areas shall be kept well watered and kept weed free at all times. Weeds, Dallas and Johnson grass, and Bermuda grass shall be removed and disposed of.

The Contractor shall keep project site reasonably free of rodents as required to maintain healthy plant material.

In order to carry out the project maintenance work, the Contractor shall maintain a sufficient number of men and adequate equipment to perform the work herein specified from the time any planting is done until the end of the Landscape Maintenance Period or until the final approval.

The Contractor may be relieved from maintenance work required in these special provisions when the project maintenance work has been satisfactorily completed and accepted in writing by the Agency.

Lawn shall be mowed as specified herein. Clippings and debris shall be removed from the site. Lawn shall be trimmed at the edges of curbs, paving, drains, and headers. Lawn areas which fail to germinate shall be re-seeded at maximum 10-day intervals until a vigorous, even stand of turf is established. Lawn areas shall be kept free of weeds by hand pulling, or may be sprayed with the approved selective chemical herbicide before they exceed 2" in height. Any lawn or plants damaged by herbicide shall be replaced by the Contractor at his/her expense. Lawn shall be mowed for the first time after establishment of a vigorous, uniform stand of turf has reached a height of 3". Lawn shall be mowed a second time when it again reaches a 3" height, except that the second cutting shall be performed no sooner than 10 days after the first. Mowing shall take place thereafter at maximum 1-week intervals until final acceptance. After second mowing of grass, apply second application of fertilizer. Apply fertilizer (12-12-12) at a rate of 6 lbs. per 1,000 square feet uniformly over turf area. Apply again at the same rate just prior to final inspection.

Plants installed shall be properly maintained by regular watering, cultivating, weeding, re-mulching, repair of stakes, pruning, and treatment of insects and pests. Maintenance shall also include treatment for fungus, diseases, rodents, and insects, the requirements for approval being the same for herbicide.

Weed all areas at intervals of not more than 10 days. Rocks, clods, and debris which appear on the surface shall be removed. Heaved, settled, or eroded areas shall be restored by excavating, filling, finish grading, rolling, and re-seeding as required.

Maintenance includes all items constructed under the contract. All items shall be maintained in an optimum working condition. The site shall be kept free of debris, including emptying of trash containers, by means of a general clean up twice a week.

K. Final Inspection and Acceptance

Final inspection will be conducted at the end of the Maintenance Period. Notice requesting final inspection shall be submitted by the Contractor to the City Engineer at least 7 days prior to the anticipated date.

Acceptance of the project by the City will be contingent upon proper maintenance and the establishment of a vigorous, uniform stand of turf over all areas seeded. Any portion thereof which does not show a vigorous, uniform stand shall make all lawn areas subject to continued maintenance at the Contractor's expense.

Prior to the final inspection, the Contractor shall also have performed weeding, repair or touch-up of paving, equipment, and structures, and the thorough cleaning of the site.

Just prior to the final inspection, 16-6-8 granular form commercial fertilizer shall be applied as follows:

Specimen	1 pint
15 gal. plants	1 cup
5 gal. plants	½ cup
1 gal. plants	¼ cup

Ground cover 10 lbs./1,000 square feet
Lawn Areas 6 lbs./1,000 square feet
Fertilizer shall be spread around plant base and thoroughly watered.

At the final inspection, the City Engineer will determine the condition of improvements, planting, and lawn. Plants which are missing, vandalized, dead, or unhealthy shall be replaced by the Contractor at his expense with the same species and sizes originally specified. The Contractor shall make replacements within 2 weeks after final inspection, and maintain plants for an additional 30 days.

If project improvements, corrective work, and maintenance have not been performed as specified and to the satisfaction of the City Engineer, maintenance shall continue at the Contractor's expense until such time as work has been successfully completed. Should work have been performed as specified and to the City Engineer's satisfaction, the City will assume maintenance responsibilities following the final inspection.

L. Guarantee

All grass areas are to be guaranteed against any defects for 120 calendar days, all trees and shrubs for 1 year and groundcover for 120 calendar days after completion of the landscape maintenance period.

Any trees or other plant materials that die back and lose the form and size originally specified shall be replaced, even though they have taken root and are growing after the dieback.

Within 15 days of written notification by the City, remove and replace all guaranteed plant materials which, for any reason, fail to meet requirements of guaranty. Replacements shall be made to same specifications as required for original materials and shall carry the same guaranty from the time they are replaced.

12.05 PLANTING MEASUREMENT AND PAYMENT

The landscaping shall be measured and payment made at the contract lump sum or unit price and shall include full compensation for furnishing all labor, materials, tools, equipment, incidentals and for doing all work in landscaping and planting areas and tree areas including staking as shown on the plans and as specified in these specifications and as directed by the City Engineer.

12.06 GENERAL IRRIGATION

Irrigation System that conforms to these standards shall be installed by a Contractor holding an appropriate license for such work under the provisions of the State of California Business and Professional Code.

Furnish all labor, materials, supplies, tools, and transportation and perform all operations in connection with and incidental to the complete installation of the irrigation system in accordance with the approved plans and these specifications.

A. The work shall include, but shall not necessarily be limited to the following:

1. Ordering materials to complete the irrigation system.
2. Trenching, stockpiling excavation materials and refilling and compacting trenches.
3. Furnishing materials and installation for complete system including piping, valves, fittings, sprinklers, bubblers, emitters, backflow prevention assemblies, controllers, and final adjustment of valves and pressure regulators to ensure proper operation of irrigation system.
4. Replacement of unsatisfactory materials.
5. Tests.
6. As-built drawings.
7. Cleanup, inspection and approval.
8. All work of every description mentioned in the specification and/or addenda thereto, and all other labor and materials incidental to the satisfactory completion of the work, including cleanup of the site as directed by the City Engineer.

B. Rules and Regulations

All work and materials shall be in full accordance with the latest rules and regulations of the Uniform Plumbing Code, published by the Western Plumbing Officials Association, and other applicable State or local laws or regulations. Nothing in these drawings or specifications is to be considered to permit work not conforming to these Codes.

1. When the specifications call for materials or construction of a better quality or larger size than required by the above-mentioned rules and regulations, the provision of the specifications shall take precedence over the requirements of the said rules and regulations.
2. The Contractor shall furnish without any extra charge any additional material and labor when required by the compliance with these rules and regulations, though the work be not mentioned in these particular specifications as shown on the drawings.
3. The Contractor shall erect and maintain barricades, guards, warning signs, and lights as necessary or required by OSHA regulation for the protection of the public and/or workers.
4. Any existing buildings, equipment, domestic water piping, pipe covering, sewers, storm drains, electrical wiring, sidewalks, landscaping, etc., damaged by the Contractor during the course of his work shall be replaced or repaired by the Contractor in a manner satisfactory to the City Engineer and at the Contractor's own expense, and before final payment is made. The Contractor shall be

responsible for damage caused by leaks in the piping systems, being installed or having been installed by him. The Contractor shall repair, at his/her expense, all damage so caused, in a manner satisfactory to the City Engineer.

Supervision and Workmanship: The Contractor, personally or through an authorized and competent representative, shall supervise the work constantly, and shall as far as possible, keep the same foreman and workers on the job from commencement to completion. The workmanship of the entire job must in every way be first class, and only experienced and competent workers will be allowed on the job.

Layout of Work: The Contractor shall stake out the irrigation system as shown on the drawings, using a different color flagging for: heads, valves, tie-in point and trench. These areas shall be checked by Contractor and City Engineer before construction is started. Any changes, deletions, or additions shall be determined at this check. Trenching shall be started only after layout has been checked by the City Engineer. The Contractor shall be responsible to provide uniform and complete coverage of the entire landscaped area.

12.07 IRRIGATION DESIGN

For general irrigation guidelines see Modesto Municipal Code-Section 12.

All irrigation designs for private commercial and public owned lands shall be reviewed and approved by the Park Planning and Development Division of the City of Modesto prior to installation.

12.08 IRRIGATION MATERIALS

A. General

Certain numbers on the drawings and in the specifications are taken from the catalogs of the manufacturer named. Equipment equal in quality and utility will be accepted, upon approval by the City Engineer in writing.

B. Materials

1. Main line (from point of connection to RCVs) shall be PVC 1120 Schedule 40 2" or under and Class 315 over 2" diameter. Use schedule 40 PVC fittings.
2. Lateral lines (non-pressure) shall be 1120-Schedule 40 PVC plastic pipe with Schedule 40 Type 1, Grade 1, PVC solvent weld fittings. Lateral lines under sidewalk shall be PVC 1120 Schedule 40. Lateral lines no smaller than 1¼" on turf rotors and 1" on spray heads or drip systems. Velocity not to exceed 5' per second.
3. Connections between main lines and RCVs shall be of Schedule 80 PVC nipples and fittings.
4. Riser stock shall be as follows:

- a. Risers connecting PVC lateral line to drip branch line shall be Dura Flex Hose (MIPT x MIPT) or approved equal.
 - b. Risers, in no case, shall be of smaller nominal diameter than the IPS size of joint provided on the sprinkler or QCV to be installed.
5. Control wire shall be copper with UL-approved for direct burial in ground. Common ground wire shall have white insulating jacket; control wires shall have jacket of color other than white. Common ground and control wire shall be #12-1 AWG-UF and control wire shall be #14-1 AWG-UF. Splices shall be made with 3M-DBY connector or equal. Run one (1) extra control wire for every 4 RCV's. Provide a minimum of 18" linear length of wire, coiled for each wire to be spliced. Coil wire individually so as not to tangle wires in splice box.
6. Emitters shall be of the types listed on the Drawings or approved equal.
7. Controllers shall conform to the Standard Details. Controller shall not be mounted on access control wall. Electrical service and meter shall be mounted in a pedestal-type cabinet. With the approval of the City Engineer, the controller and the meter may be mounted in a single pedestal type cabinet. Controller must be 120 Volt automatic and have a weather-sensing capability. The controller must have the potential of 8-hour continuous irrigation and be installed in a vandal- resistant case. Controller to be as specified and approved by City of Modesto Park Planning and Development Division representative. A flow sensor, master valve, cluster control unit and related equipment may be required, at the request of the City Engineer.
8. Controller enclosure shall be stainless steel, NEMA Type 3 rated, with back panel, padlocking hasp and padlock, as manufactured by Strong Box, Le Meur, or equal. Enclosure shall include rain switch enclosure option: Strong Box No. RGVR SS or equal.
- 9 Remote Control Valves (RCV) shall be globe glass filled nylon body and bonnet pattern with brass flow stem and manual bleed petcock. Sizes of remote control valves shall be as listed on the drawings.
10. Weather sensor shall be as specified on drawings and mounted as shown on Drawings.
11. Gate valves 2½" and smaller shall be bronze construction with operating wheel and screwed connections. Three inch (3") and larger shall be cast iron and operating nut (2" square) and "O" ring connections for PVC plastic pipe. Install in 8" diameter concrete valve box with bolt down cast iron lid marked "IRRIGATION" as detailed, Brooks 1R or approved equal.
12. Backflow prevention device shall be the bronze reduced pressure type with gate valves, check valves, test cocks, reduced pressure chamber and air vent. It shall be USC approved and conform to the Standard Details. It shall consist of two (2) check valves, an automatic operated differential relief valve located between the two (2) check valves, a tightly closing shut-off valve on each side of the check valve assembly, and equipped with necessary test cocks for testing. Components of the device shall be factory matched. Backflow prevention device

shall be sized as required by flow or irrigation circuit and installed 12" above finish grade per Standard Details #1209 or 1210, as appropriate.

13. Backflow prevention device enclosure shall be "Smooth Touch" enclosure without sharp edges, by Strong Box or approved equal. Enclosure to include hasp and staple for padlock.
14. Weather blanket for backflow prevention device shall be "Frost Guard" as manufactured by BPD I or approved equal. Blanket to be sized appropriately for correct fit over backflow and within enclosure.
15. Filter strainer shall have a plastic housing, 1" Female (NPT) with removable screen.
16. Pressure reducing valve shall have a plastic housing, with a preset outlet pressure of 25 psi.
17. Boxes for RC valve/filter/strainer/PRV assembly shall be concrete 17" x 30" with concrete body, bolt down steel traffic cover marked "IRRIGATION" and 6" extension, Brooks 66 series or approved equal.
18. Sprinklers and quick coupler valves shall be of the types listed on the drawings or an approved equal. Provide two (2) quick coupler valve keys for each project.
19. Miscellaneous installation materials:
 - a. Solvent cement and primer for solvent weld joints shall be of marked and type approved by the manufacturer(s) of pipe.
 - b. Lubricant for assembling rubber rings and seal joints shall be of make and type recommended by manufacturer(s) of pipe.
 - c. Pipe joint compound shall be non-hardening, non-toxic materials designed specifically for use on threaded connections in water carrying pipe. Performance shall be same as Teflon, or approved equal.

12.09 IRRIGATION INSTALLATION

- A. Preparation

Schedule and coordinate placement of materials and equipment in a manner to effect earliest completion of work in conformance with construction and progress schedule.
- B. Handling and Storage
 1. Protect work and materials from damage during construction and storage.
 2. Plastic pipe. Handle carefully; protect from prolonged exposure to sunlight.
- C. Layout
 1. Lay out work as correctly as possible in accordance with diagrammatic drawings.

2. Where site conditions do not permit locating piping, valves and heads where shown, notify the City Engineer immediately and determine relocation in joint conference.
3. Run pipelines and automatic control wiring in common trenches wherever practical.
4. A minimum spray/rotor pattern overlap of 115% (pattern of each head's radius to overlap all adjacent heads by minimum of 15%) shall be measured. If pattern fails this test additional heads are to be installed or existing heads relocated to conform to this standard.
5. All heads to have matched precipitation rates. Documentation to be provided by Contractor.

D. Excavating and Trenching

1. Excavation shall be in all cases ample in size to permit the pipes to be laid at the elevations intended and to permit ample space for joining.
2. Make trenches for pipelines deep enough to provide minimum cover from finish grade as follows:
 - a. 24" minimum cover over main lines to control valves and quick coupling valves.
 - b. 24" minimum cover over control wires from controller to valves.
 - c. 18" minimum cover over RCV-controlled lines (lateral) to sprinkler heads and emitter branches.

E. Assembling Pipelines

1. All pipe shall be assembled free from dirt and pipe scale. Field cut ends shall be reamed only to full pipe diameter with rough edges and burrs removed. All pipe labeling to be installed facing upward.
2. Solvent Weld Joint
 - a. Prepare joint by first making sure the pipe end is square, then deburring the pipe end and cleaning pipe and fittings of dirt, dust, and moisture.
 - b. Dry-insert pipe into fitting to check for mis-sizing. Pipe should enter fitting 1/3 to 2/3 depth of socket.
 - c. Coat the inside socket surface of the fitting and the external surface of the male end of the pipe with primer. Then, without delay, apply solvent cement lightly to the inside of the socket. At this time, apply a second coat of cement to the pipe end.
 - d. Insert pipe immediately into fitting and turn ¼ turn to distribute cement and remove air bubbles. The pipe must seat to the bottom of the socket and fitting. Check alignment of the fitting. Pipe and fitting shall be aligned properly without strain to either.
 - e. Hold joint still for approximately 30 seconds and then wipe the excess cement from the pipe and fitting.

- f. Cure joint a minimum of 30 minutes before handling and at least 6 hours before allowing water in the pipe.
 3. Threaded joints:
 - a. All threaded PVC and /or plastic joints to be made using Teflon tape. All threaded brass and/or galvanized joints to be made using pipe compound. Apply compound to male threads only.
 - c. Where assembling to threaded plastic fitting, take up joint no more than one (1) full turn beyond hand tight.
 - d. Where assembling threaded plastic fittings, use strap-type friction wrench only; do not use metal jawed wrench.
 4. Cap or plug openings as pipeline are assembled to prevent entrance of dirt or obstruction. Remove caps or plugs only when necessary to continue assembly.
 5. Where pipes or control wires pass through sleeves, provide removable non-decaying plugs at ends of sleeve to prevent entrance of earth.
 6. PVC plastic main lines not having control wire running in same trench shall have 2" plastic coated metallic tape running continuously on top of pipe for future detection.
- F. Remote Control Valves (RCV)
1. Install where shown and group together where practical. Limit one (1) RCV per box (below grade valves only).
 2. Install valves no farther than 12" from main line unless absolutely necessary.
 3. Locate valves adjacent to walkways, pads, mow strips, but no closer than 12" from edge of concrete. Locate RCV's and QCV's outside future construction areas.
 4. Thoroughly flush main line before installing valve.
 5. Provide 4" of pea gravel in bottom of valve box. No soil shall be in contact with RCV.
 6. Support valve box with four (4) bricks with one (1) block at each corner). Maintain a minimum of 2" clearance between PVC pipe and valve box (below grade valves only).
 7. Label control line wire at each RCV with a 2¼" x 2¾" Polyurethane ID Tag, indicating identification number of valve (controller and station number). Attach label to control wire and place next to solenoid.
- G. Automatic Control Wiring
1. Connections shall be made with 3M-DBY connectors.
 2. If splicing is required between controller and remote control valve, splices shall be located in valve box and so noted on as-built drawings.

3. All splices and connections to include 3' of excess wire shaped into a coil.

H. Backfilling

1. Backfill only after piping has been inspected and approved.
2. Backfill material shall be the earth excavated from trenches, free from rock, concrete chunks, and other foreign or coarse materials. If additional backfill material is needed, it shall be import material to match existing soil. Carefully select backfill that is to be placed next to plastic pipe to avoid any sharp objects which may damage pipe.
3. Place backfill materials in 6" layers and compact by tamping to a minimum compaction of 90% of original soil.
4. Dress off areas to obtain finish grades and remove excess soil, rocks, or debris remaining after backfill is completed.
5. If settlement occurs along trenches and adjustments in pipes, valves, sprinkler heads, soil, sod or paving are necessary to bring the system, soil, sod or paving to the proper level of the permanent grade, the Contractor, as part of the work under this contract, shall make all adjustments without extra cost to the City.
6. Install a 2" wide continuous flexible metal or direct burial irrigation wire. Detection tape or wire shall be used on all main lines that do not have control wire sharing a common trench.
7. Mark ends of pipe sleeves or capped mainline with galvanized pipe with attached fluorescent tape for future use. All such locations shall be indicated on As-Built Drawings.

I. Emitters

1. Thoroughly flush lines before installing emitters.
2. Locate emitters as shown in plan and detail.

J. Sprinkler Heads

1. Thoroughly flush lines before installing heads.
2. Locate heads as shown in plan and detail.
3. Adjust sprinkler heads for proper distribution and trim.
4. Use Teflon tape on all swing joints. No pipe compounds are to be used.

K. Testing

Perform tests as specified. Remake any faulty joints with all new materials. Use of cement or caulking to seal leaks is absolutely prohibited.

After the entire sprinkling system has been completely installed, complete test of the entire installation shall be made by the Contractor in the presence of a representative

of the City Engineer before final acceptance of the system by the City. The Contractor shall perform testing at his/her own expense.

L. Testing of Service Lines and Irrigation Main

Service lines and irrigation main shall be tested in accordance with applicable provisions of the Water Distribution Specifications.

M. Testing Plastic Pipe

After all new sprinkler piping and risers are in place and connected, and all necessary division work has been completed and prior to the installation of sprinkler heads, control valves shall be opened and a full head of water used to flush out the system. After the system is thoroughly flushed, risers shall be capped off and the system pressure tested.

Request the presence of the City Engineer in writing at least 72 hours in advance of Testing. All Testing shall be in the presence of the City Engineer or his/her representative. Center load piping with small amount of backfill to prevent arching or slipping under pressure. No fitting shall be covered. Apply a continuous static water pressure when welded plastic joints have cured at least 24 hours and with the risers capped as follows:

1. Test main lines and submains at 125 psi for 4 hours.
2. Test lateral lines at line pressure for 4 hours.
3. Repair leaks resulting from tests. Pressure testing shall continue until no leakage or loss of pressure is shown over the entire prescribed test period. At the conclusion of the pressure test, the heads shall be installed and tested for operation in accordance with design requirements under normal operating pressure.

N. Testing of Electrical System

Prior to acceptance of the work the Contractor shall cause the following tests to be made:

1. For continuity of each circuit.
2. For grounds in each circuit.
3. A megger test on each circuit.
4. A functional test in which it is demonstrated that each and every part of the system functions as specified or intended herein.

12.10 GUARANTEE

It shall be the responsibility of the Irrigation Contractor to fill and repair all depressions and replace all ground cover and planting lost due to the settlement of irrigation trenches for one (1) year following completion and acceptance of the job. The Contractor shall also guarantee all materials, equipment and workmanship and

shall agree to replace at his/her expense, at any time within one (1) year after installation is accepted, and all defective parts that may be found.

12.11 RECORD DRAWINGS

- A. The Contractor shall maintain in good order in the field office one (1) complete set of As-Built prints of all sprinkler drawings which form a part of this contract, showing all water lines, sprinklers, valves, controllers, and stub-outs. In the event any work is not installed as indicated on the drawings, such work shall be corrected and dimensioned accurately from sidewalks, fence posts or other permanent park elements on these As-built drawings.
- B. All underground stub-outs for future connections, gate valves and remote control valves shall be located and dimensioned accurately from sprinkler heads, walks, on all As-built drawings.
- C. As-built plans must be accurate and up-to-date with the approval of the City Inspector before each progress payment will be made.
- D. Upon completion of the work, provide As-Built prints to the City of Modesto for review and approval..
- E. Provide As-builts in AutoCAD 2010 or newer format on CD.

12.12 MEASUREMENT & PAYMENT

The work performed under these specifications will be measured by the unit or lump sum as designated in the contract item for constructing an irrigation system.

If measured by unit, quantities of sprinkler heads, quick coupling valves, backflow preventers, etc. will be determined from actual count of the items in place in the completed work. Quantities of conduit and the various sizes of pipe will be measured by the lineal foot in place in the completed work.

Payment will be made at the lump sum or unit price for sprinklers, sprinkler heads, bubbler heads, quick coupling valves, backflow preventers, control valves, control assemblies, or turning unions and the contract prices per linear foot for the various sizes and types of pipe. Full compensation for furnishing and installing swing joints and pipe used for risers shall be considered as included in the price paid for the contract item requiring the riser or swing joint and riser and no separate payment will be made therefore.

When there are no separate contract items for spray nozzles, valve protectors, valve boxes or any other materials necessary to complete the irrigation system, such materials shall be furnished and installed. Full compensation for this work and materials shall be considered as included in the prices paid for the various contract items of the irrigation system and no separate payment will be made therefore.

The above prices and payments shall include full compensation for furnishing all labor, materials tools, equipment, and incidentals, and for doing all the work involved in installing the irrigation systems, complete in place, as shown on the plans, and specified in these specifications and the special provisions, and as directed by the City Engineer, including any structure excavation, structure backfill and water involved.

* PLANT SO THAT TOP OF ROOT BALL IS 2" ABOVE THE FINISHED GRADE.

TREE, AS SPECIFIED.*

TREE TIES: FLAT CORDED RUBBER, INSTALL SECURELY AT LOWEST POINT NECESSARY TO HOLD TREE UPRIGHT. NAIL AT BACK OF STAKE WITH 1" GALVANIZED ROOFING NAILS.

STAKES: 2" DIA. X 10' TREATED LODGEPOLE PINE, DRIVEN (MIN. 24") FIRMLY INTO SUBGRADE PRIOR TO BACKFILLING. CUT STAKES 6" ABOVE TREE TIES. DO NOT TOUCH ROOTBALL WITH STAKE.

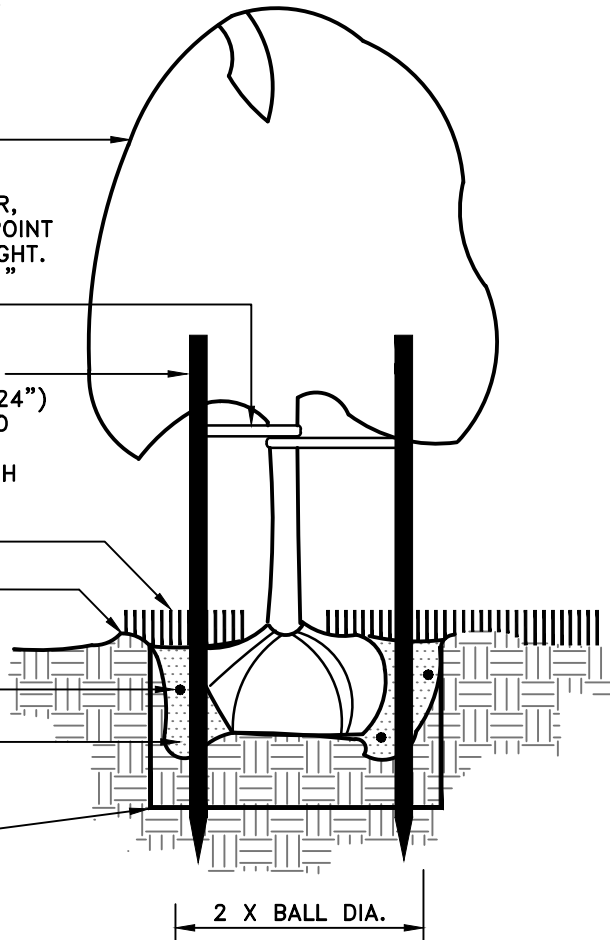
3" DEPTH OF BARK MULCH.

WATER BASIN, 4" HEIGHT.

FERTILIZER PACKETS, PER SPECIFICATIONS.

SPECIFIED PLANTING MIX WATER & TAMP TO REMOVE AIR POCKETS.

DEEP ROOT BARRIER IN KNOCK-OUT OR NEXT TO SIDEWALK—MINIMUM 24" DEPTH.



NOTES:

1. TOP SUPPORT OF TREES SHOULD BE AS LOW ON THE TRUNK AS POSSIBLE BUT HIGH ENOUGH THAT THE TREE WILL RETURN TO UPRIGHT AFTER DEFLECTION. TO FIND THE PROPER HEIGHT, HOLD THE TRUNK IN ONE HAND, PULL THE TOP TO ONE SIDE AND RELEASE. THE HEIGHT AT WHICH THE TRUNK WILL JUST RETURN TO UPRIGHT WHEN THE TOP IS RELEASED IS THE HEIGHT AT WHICH TO ATTACH THE TIES.
2. A LINE DRAWN BETWEEN THE ANCHOR STAKES SHOULD BE AT RIGHT ANGLES TO THE WIND DIRECTION.
3. TOP—MOST LOOP IS TIED FIRST TO HOLD THE TRUNK IN THE DESIRED POSITION. THE LOWER TIE IS THEN SECURED TO MAINTAIN THE TRUNK FIRMLY IN THE UPPER LOOP.
4. PLANT TREE WITH NURSERY STAKE FACING THE DOWNWIND SIDE OF PLANTING PIT.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

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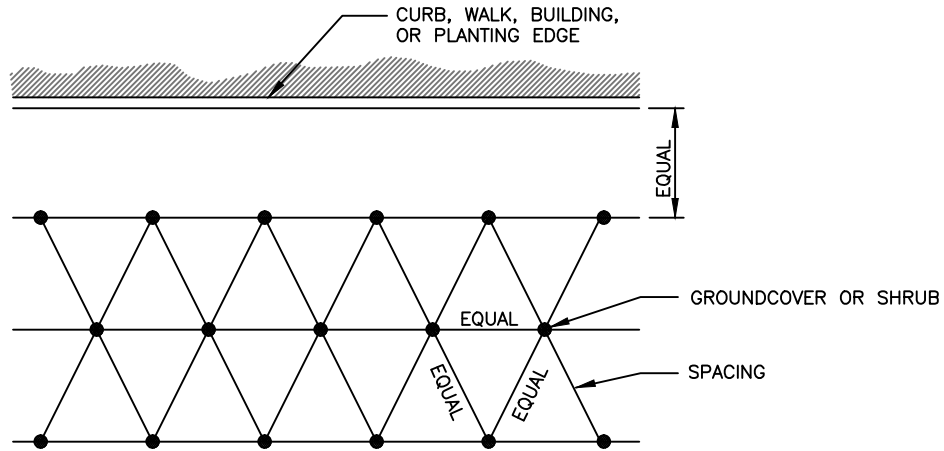
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**LANDSCAPING
PLANTING DETAIL
TREE**



ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

DETAIL NO.
1200



GROUNDCOVER & SHRUB SPACING
PLAN VIEW

* PLANT SO THAT TOP OF ROOT BALL IS 2" ABOVE THE FINISHED GRADE.

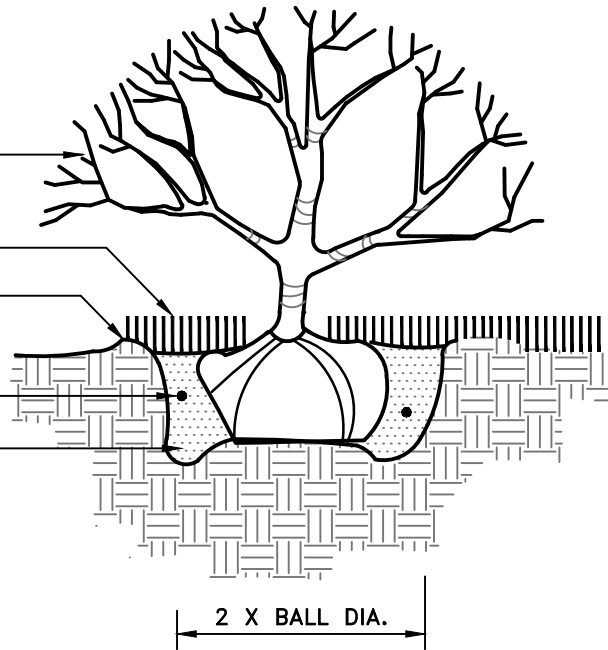
SHRUB OR GROUNDCOVER, AS SPECIFIED.*

3" DEPTH OF BARK MULCH.

WATER BASIN, 2" HEIGHT.

FERTILIZER PACKETS, PER SPECIFICATIONS.

SPECIFIED PLANTING MIX WATER & TAMP TO REMOVE AIR POCKETS.



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 C59650

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LANDSCAPING

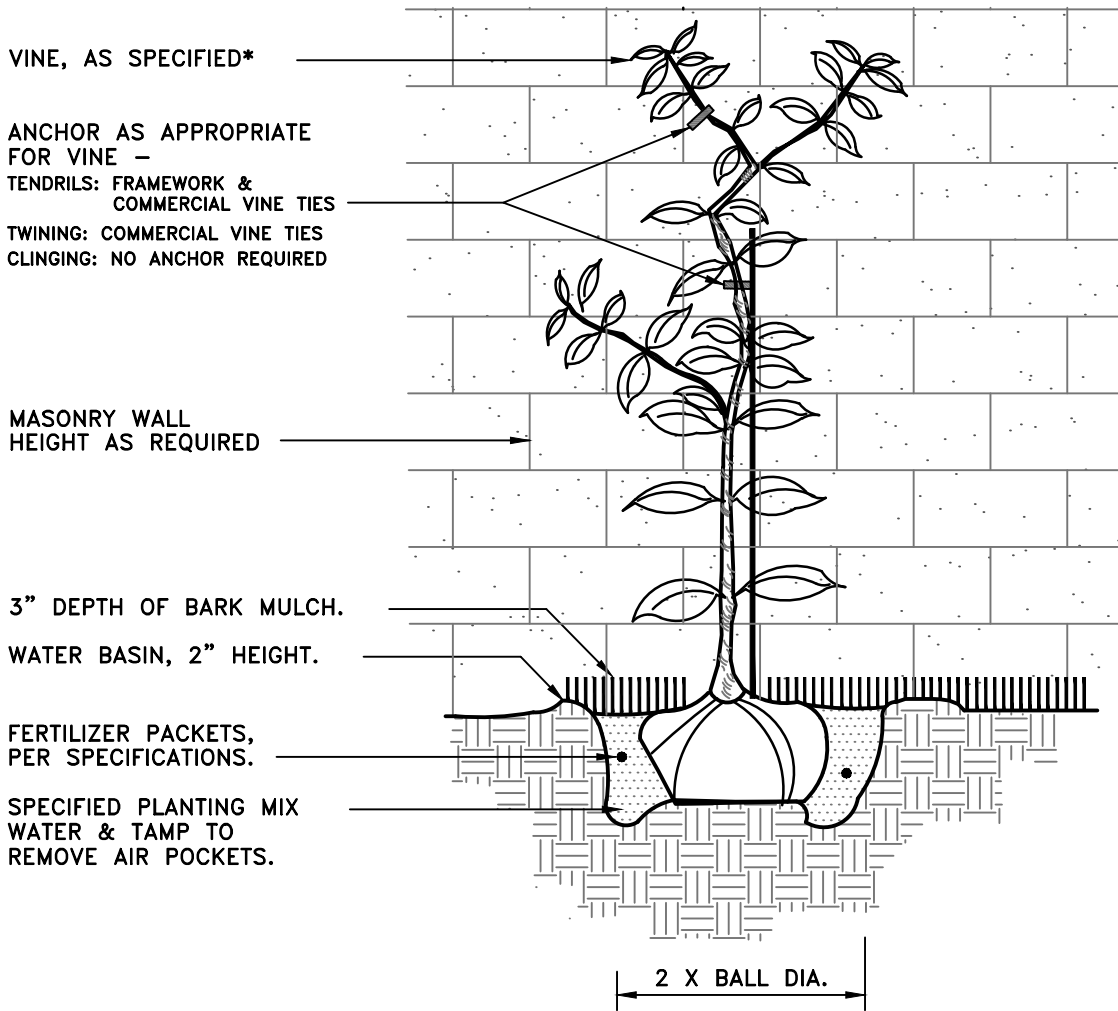
PLANTING DETAIL
SHRUB & GROUNDCOVER

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345



DETAIL NO.
 1200A

* PLANT SO THAT TOP OF ROOT BALL IS 2" ABOVE THE FINISHED GRADE.



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REVISED:	DATE:
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LANDSCAPING
PLANTING DETAIL
VINE



ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

DETAIL NO.
1200B

LEFT BLANK
INTENTIONALLY

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

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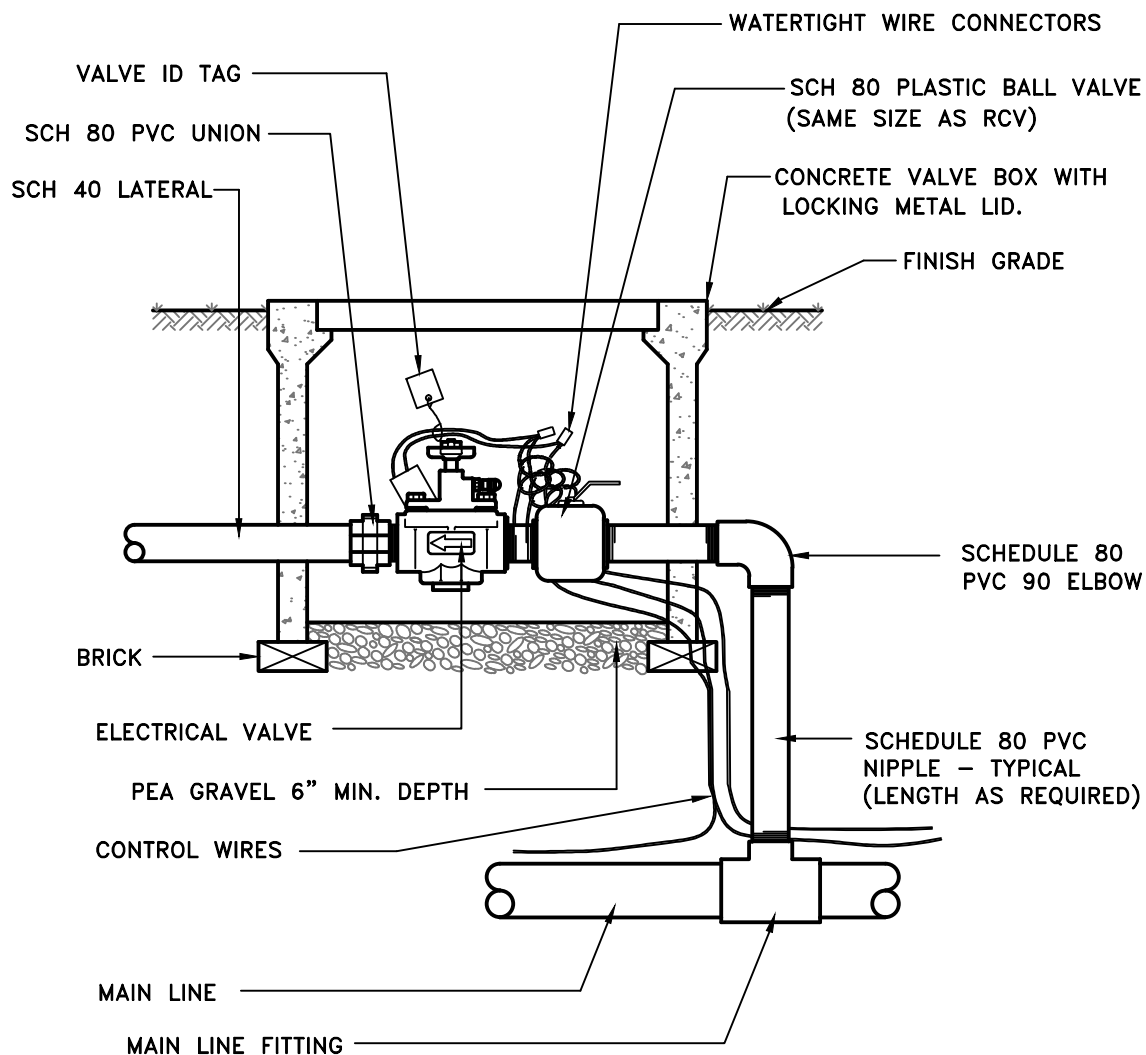
LANDSCAPING

BLANK

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



DETAIL NO.
1201



NOTES:

1. ALL WIRE TO BE INSTALLED AS PER LOCAL CODE.
2. BUNDLE AND TAPE WIRE EVERY 10 FEET.
3. PROVIDE 36" EXPANSION COILS AT EACH WIRE CONNECTION.
4. SIZE BOX TO INCLUDE RCV AND BALL VALVES.
5. COMPACT SOIL AROUND VALVE BOX TO SAME DENSITY AS UNDISTURBED ADJACENT SOIL.
6. ALL THREADED FITTINGS SHALL INCLUDE TEFLON TAPE.

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LANDSCAPING

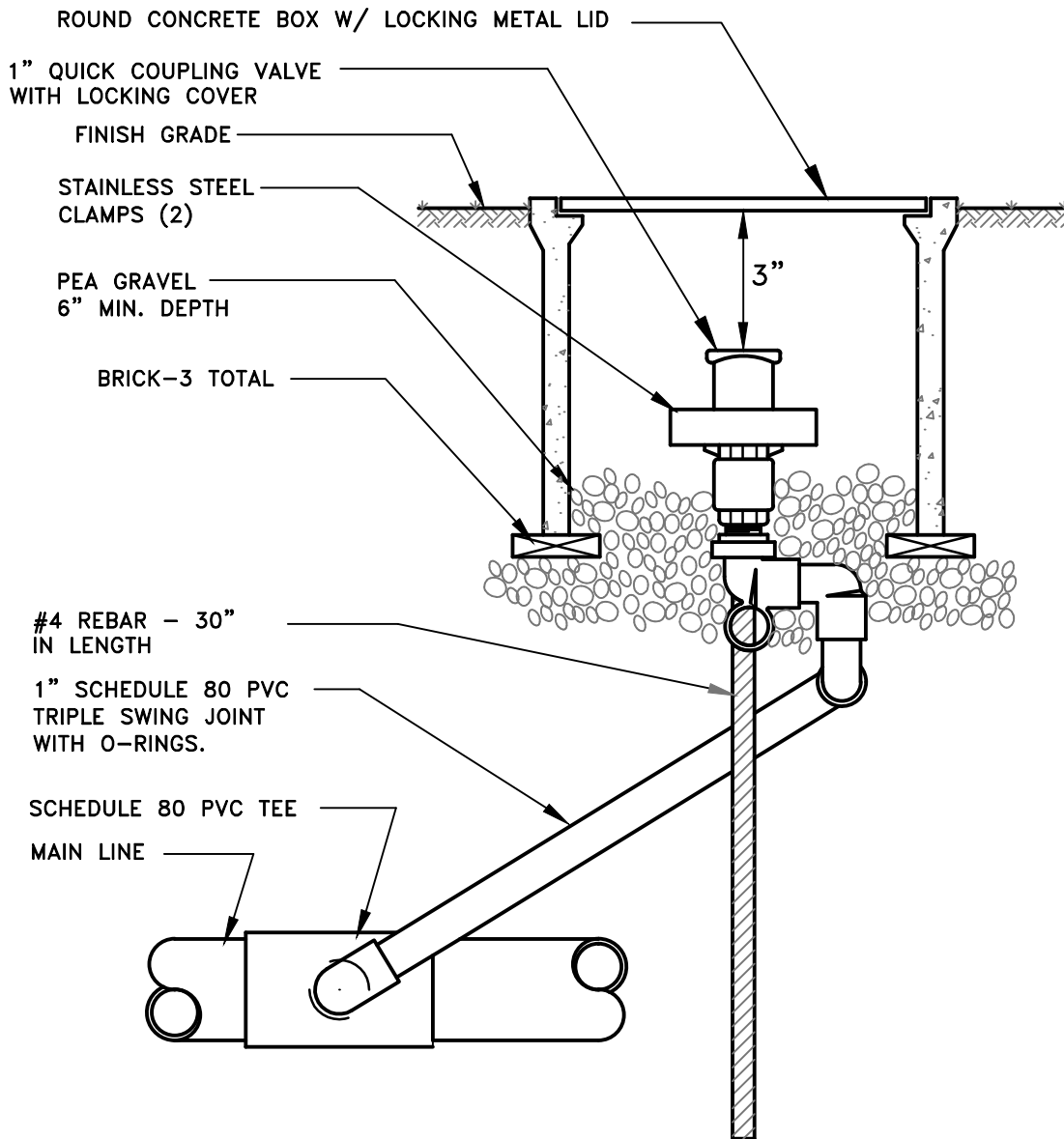
**REMOTE CONTROL
 VALVE ASSEMBLY**



MODESTO
 CALIFORNIA

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
1202



NOTES:

1. COMPACT SOIL AROUND VALVE BOX TO SAME DENSITY AS UNDISTURBED ADJACENT SOIL.
2. ALL THREADED FITTINGS SHALL INCLUDE TEFLON TAPE.

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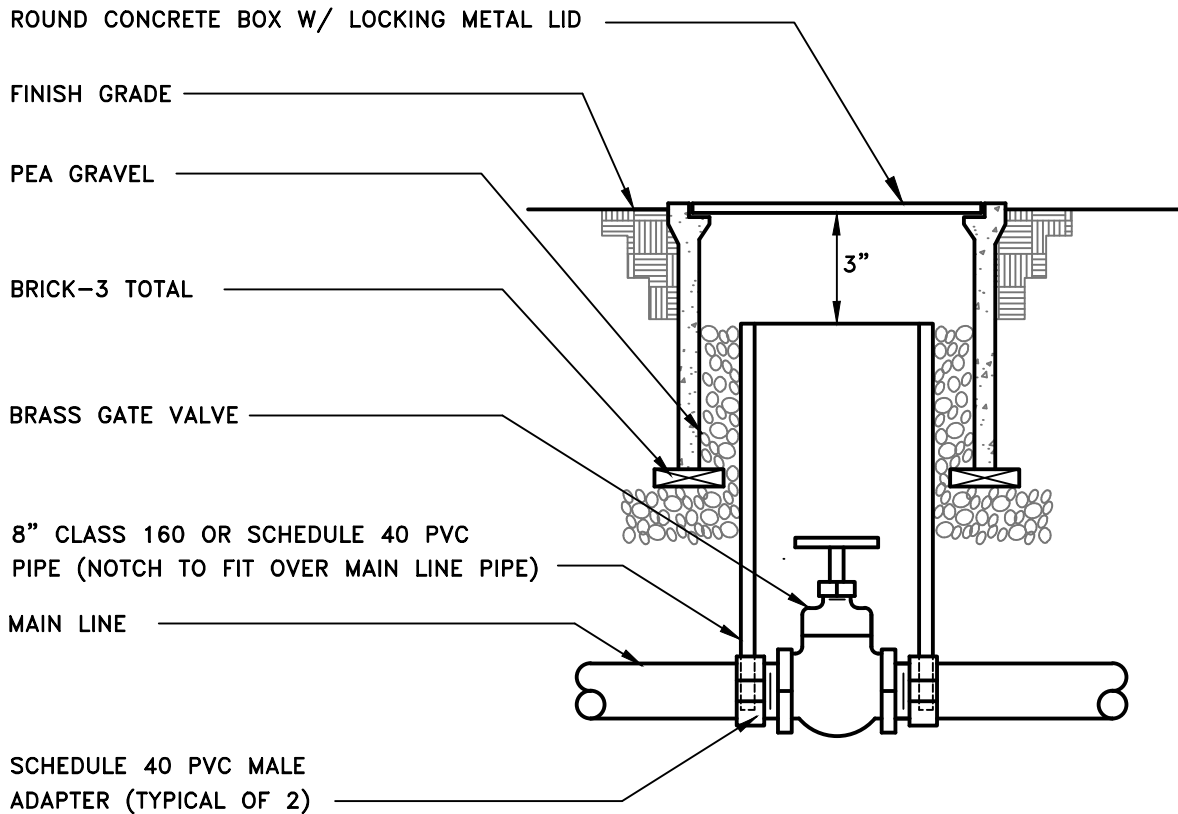
LANDSCAPING

QUICK COUPLING
 VALVE ASSEMBLY



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 RESOLUTION NO. 2014-345

DETAIL NO.
 1202A



NOTES:

1. COMPACT SOIL AROUND VALVE BOX TO SAME DENSITY AS UNDISTURBED ADJACENT SOIL.
2. ALL THREADED FITTINGS SHALL INCLUDE TEFLON TAPE.

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LANDSCAPING

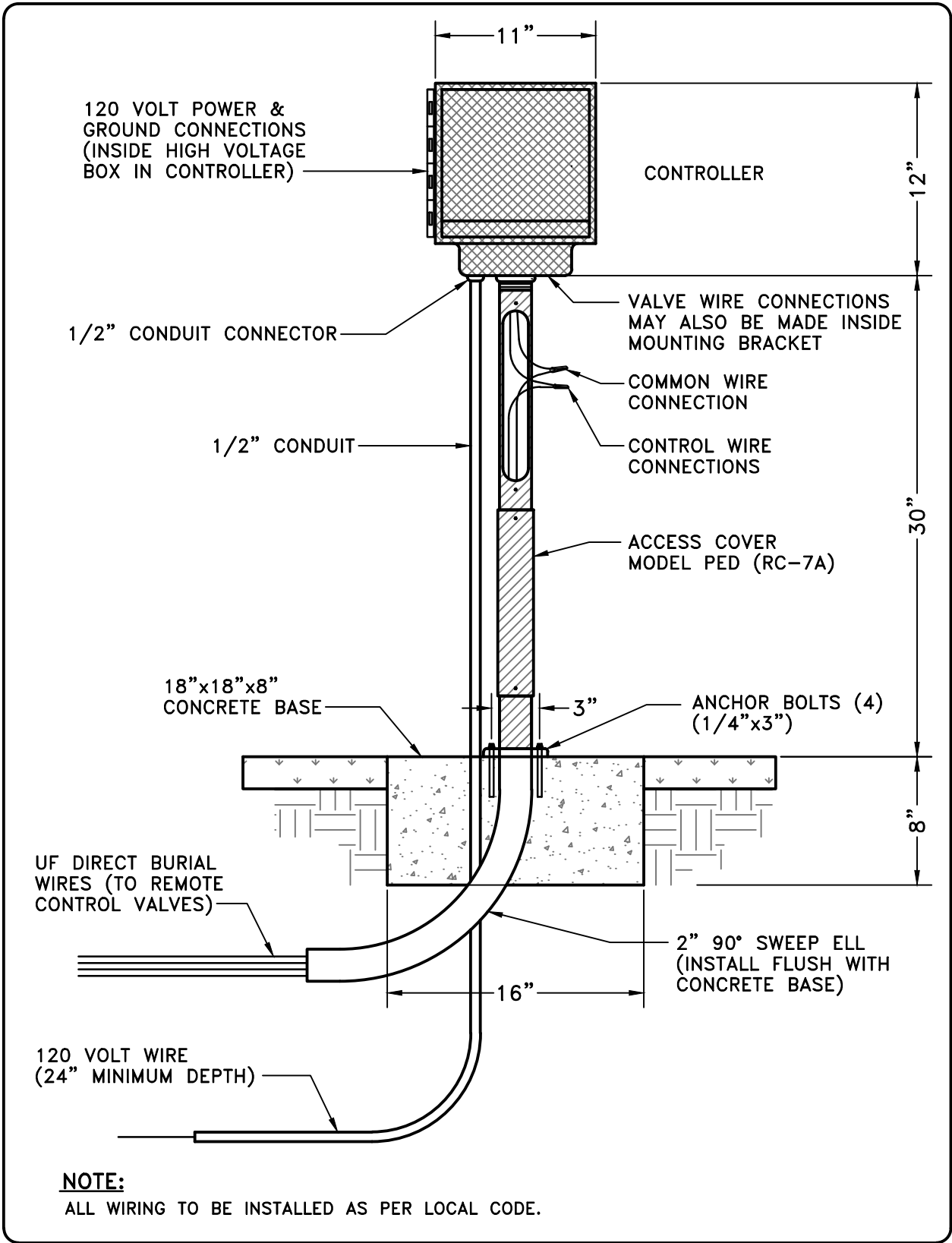
GATE VALVE

ASSEMBLY



ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
1203



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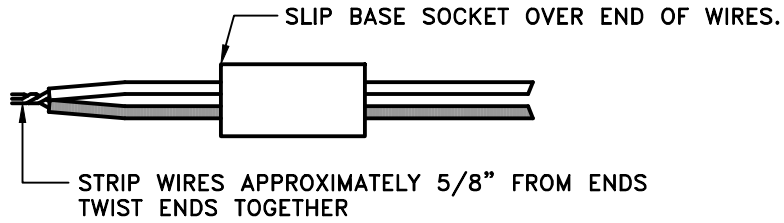
LANDSCAPING

**IRRIGATION
CONTROLLER**

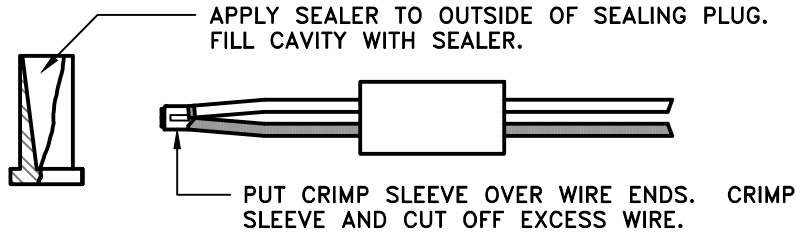
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RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

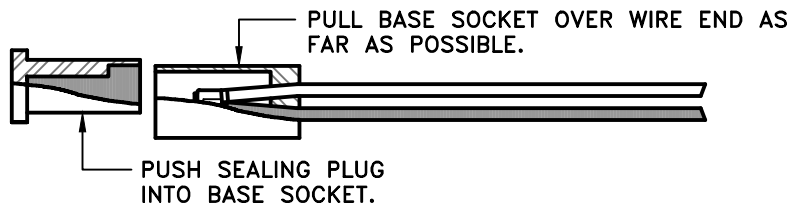
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1204



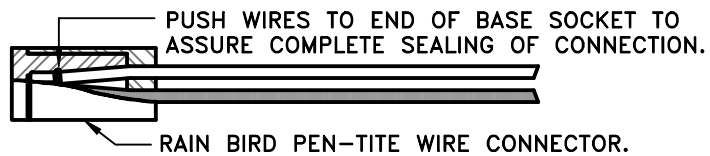
STEP 1



STEP 2



STEP 3



STEP 4

NOTES:

1. FOR WIRE SIZES NO. 14, NO. 12 AND NO. 10
2. WIRING SHALL BE DIRECT BURIAL WIRE

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BILL SANDHU, CITY ENGINEER
 C59650

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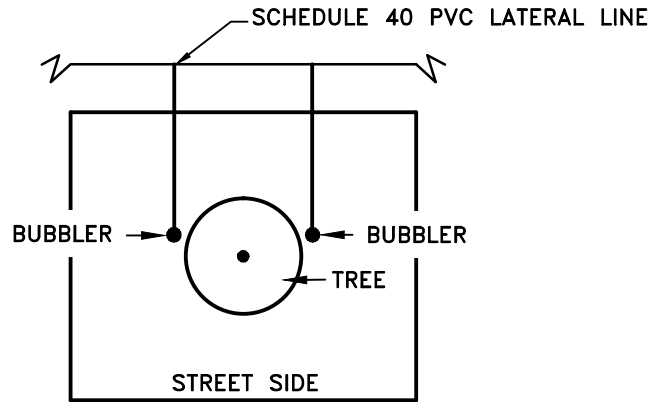
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LANDSCAPING
TYPICAL WIRE
CONNECTION

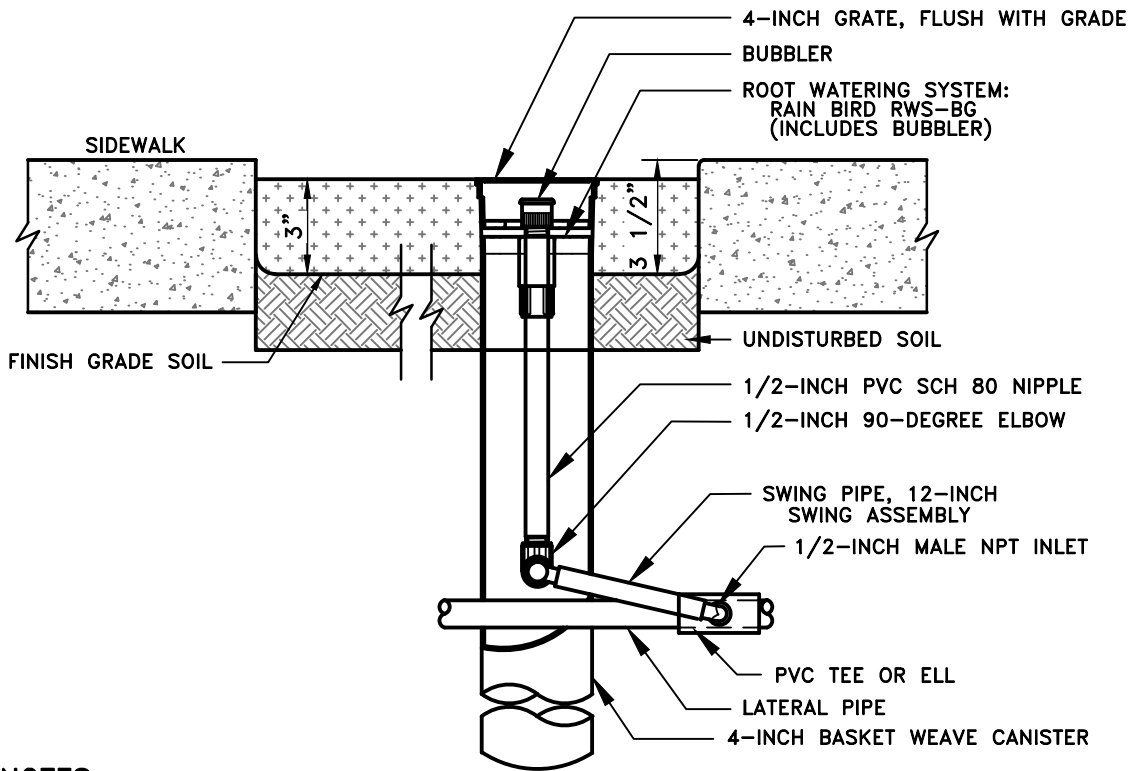
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 RESOLUTION NO. 2014-345



DETAIL NO.
1205



TREE BUBBLER DETAIL
PLAN VIEW
N.T.S.



NOTES:

1. USE RAINBIRD 1401 PRESSURE COMPENSATING FULL CIRCLE BUBBLERS.
2. USE "TEFLON TAPE" ON ALL PIPE CONNECTIONS.
3. A 3" LAYER OF BARK MULCH MUST BE INSTALLED IN PLANTER.
4. SEE CITY STANDARD DETAIL #337 & #342 FOR KNOCKOUT DETAIL.
5. ALL LANDSCAPE AND IRRIGATION PLANS MUST BE APPROVED BY THE PARKS, RECREATION AND NEIGHBORHOODS DEPARTMENT.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

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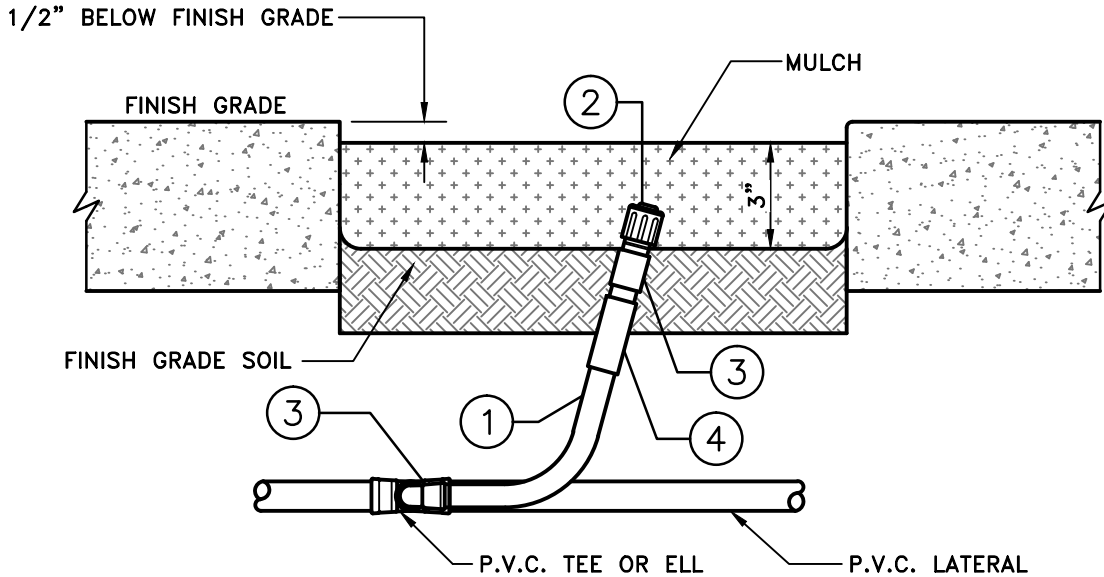
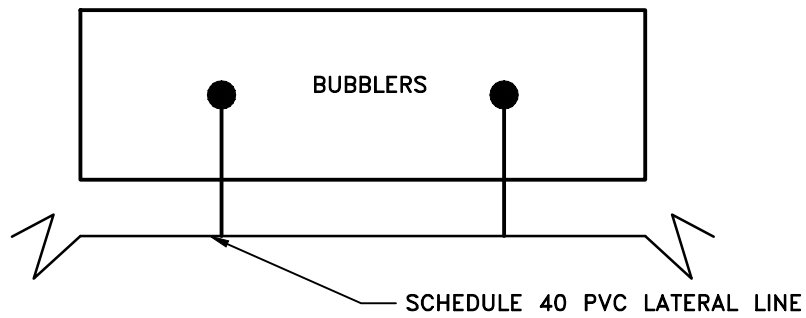
LANDSCAPING

SPRINKLER DETAIL
STREET TREE BUBBLER



DETAIL NO.
1206

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



- ① BLACK 1/2" IPS FLEXIBLE PVC HOSE –SECURE W/ STAPLE (LENGTH AS REQUIRED)
- ② BUBBLER HEAD – INSTALL W/IN PLANT BASIN ADJ. TO ROOTBALL
- ③ 1/2" SLIP X 1/2" MPT SCH 40 PVC MALE ADAPTER (2X)
- ④ OPTIONAL – 1/2" PVC CHECK VALVE AS REQUIRED BY CITY TO ELIMINATE LOW HEAD DRAINAGE.

NOTES:

- 1. USE RAINBIRD 1401 PRESSURE COMPENSATING FULL CIRCLE BUBBLERS.
- 2. USE "TEFLON TAPE" ON ALL PVC THREADED PIPE CONNECTIONS.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

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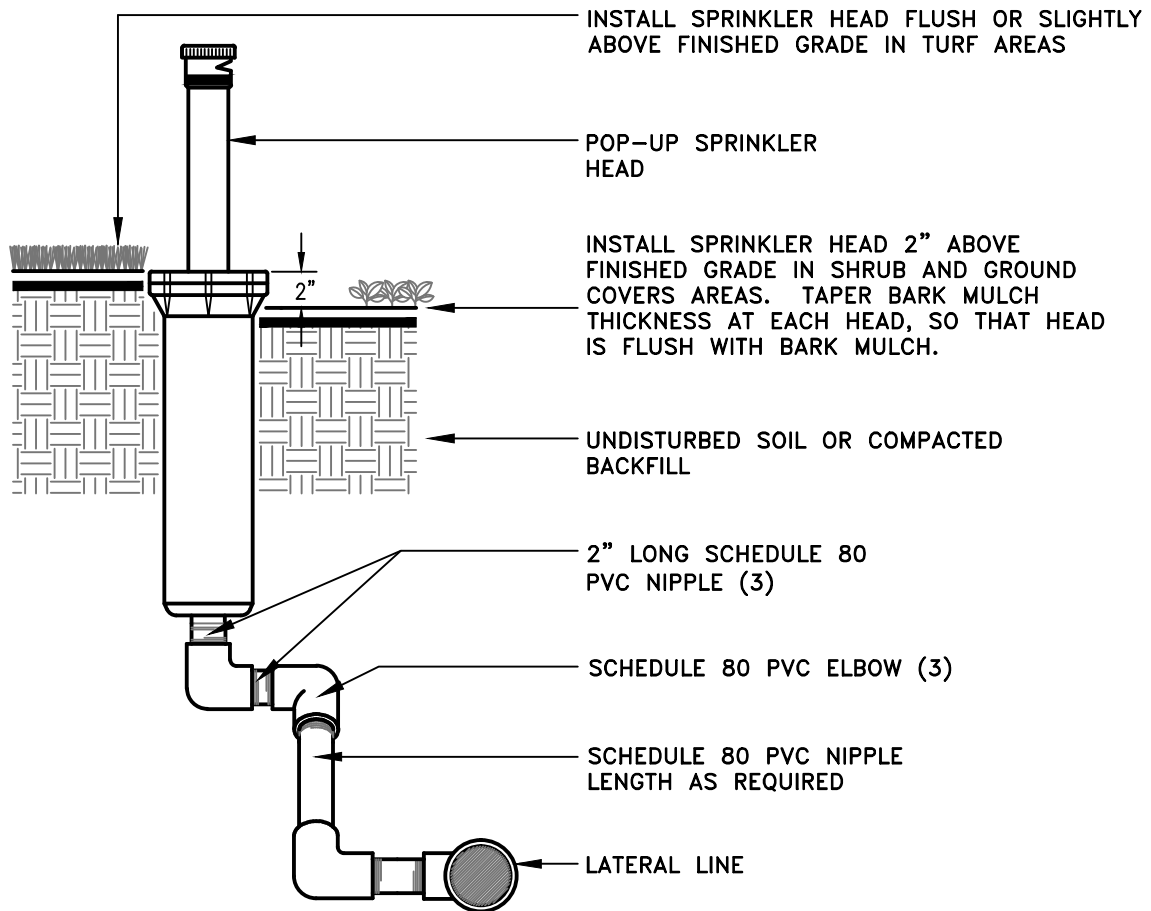
LANDSCAPING

BUBBLER DETAIL



ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
1207



NOTES:

1. USE POP-UP HEADS WITH INTEGRAL CHECK VALVES, AS DIRECTED BY PARKS, RECREATION AND NEIGHBORHOOD DEPARTMENT.
2. USE "TEFLON TAPE" ON ALL THREADED PIPE CONNECTIONS.
3. SCHEDULE 80 P.V.C. PRE-ASSEMBLED TRIPLE SWING JOINT WITH O-RINGS MAY BE SUBSTITUTED AS AN EQUAL.
4. INSTALL SPRINKLER HEADS 6" FROM FACE OF FENCE OR WALL. INSTALL SPRINKLER HEADS 2" TO 2' FROM PAVING EDGE, IN CONFORMANCE WITH STATE MWEO.
5. INSTALL SPRINKLER HEADS PLUMB. ADJUST SPRAYS OR NOZZLE STREAM TO COVER LANDSCAPE AREA WITHOUT OVERSPRAY ONTO PAVING, FENCES, WALLS OR BUILDINGS.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

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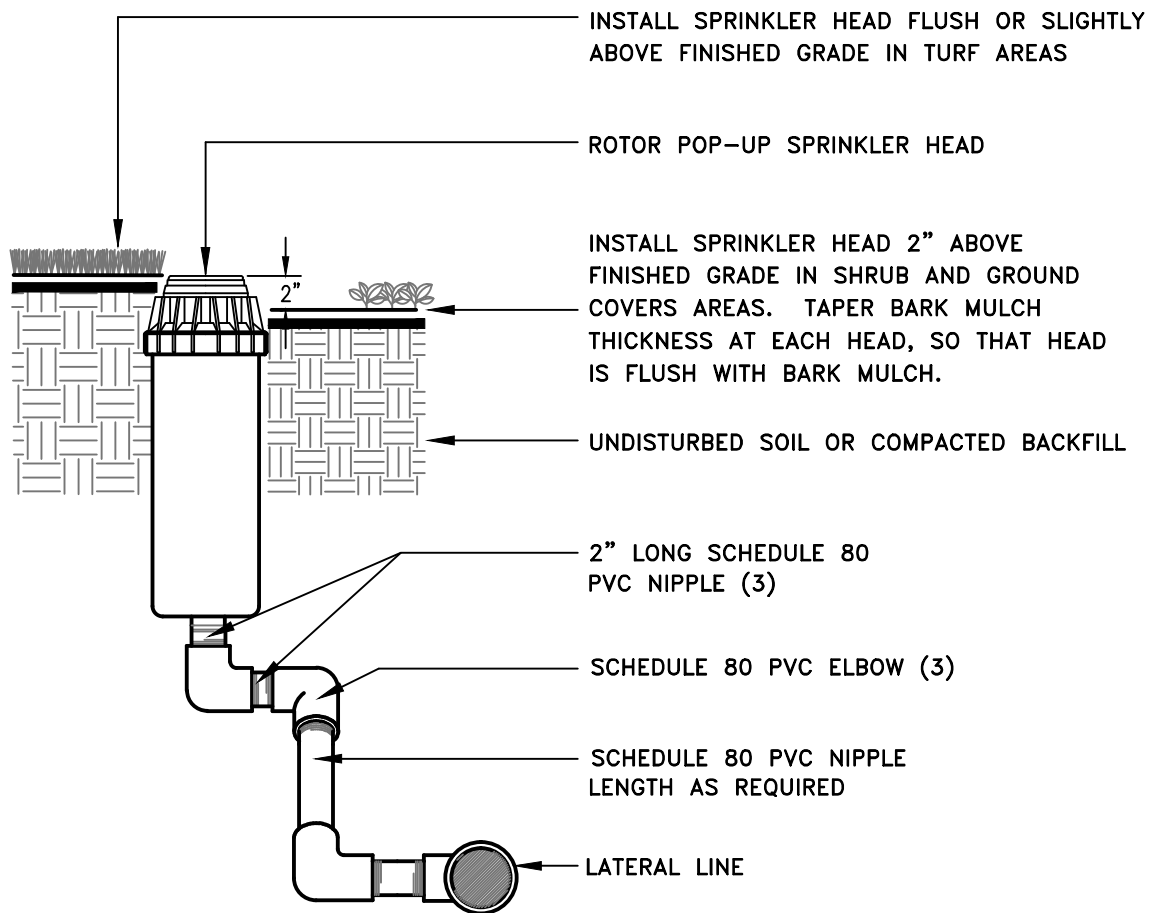
LANDSCAPING

**SPRINKLER DETAIL
 POP-UP SPRAY**



ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
1207A



NOTES:

1. USE ROTORS AS DIRECTED BY PARKS, RECREATION AND NEIGHBORHOODS DEPARTMENT. ALL ROTORS MUST HAVE INTEGRAL CHECK VALVES AND STAINLESS STEEL RISERS.
2. USE "TEFLON TAPE" ON ALL THREADED PIPE CONNECTIONS.
3. SCHEDULE 80 P.V.C. PRE-ASSEMBLED TRIPLE SWING JOINT WITH O-RINGS MAY BE SUBSTITUTED AS AN EQUAL.
4. INSTALL SPRINKLER HEADS 6" FROM FACE OF FENCE OR WALL. INSTALL SPRINKLER HEADS 2" TO 2' FROM PAVING EDGE, IN CONFORMANCE WITH STATE MWEL0.
5. INSTALL SPRINKLER HEADS PLUMB. ADJUST NOZZLE STREAM TO COVER LANDSCAPE AREA WITHOUT OVERSPRAY ONTO PAVING, FENCES, WALLS OR BUILDINGS.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

LANDSCAPING

SPRINKLER DETAIL

ROTOR HEAD



ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

DETAIL NO.
1207B

LEFT BLANK
INTENTIONALLY

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

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LANDSCAPING

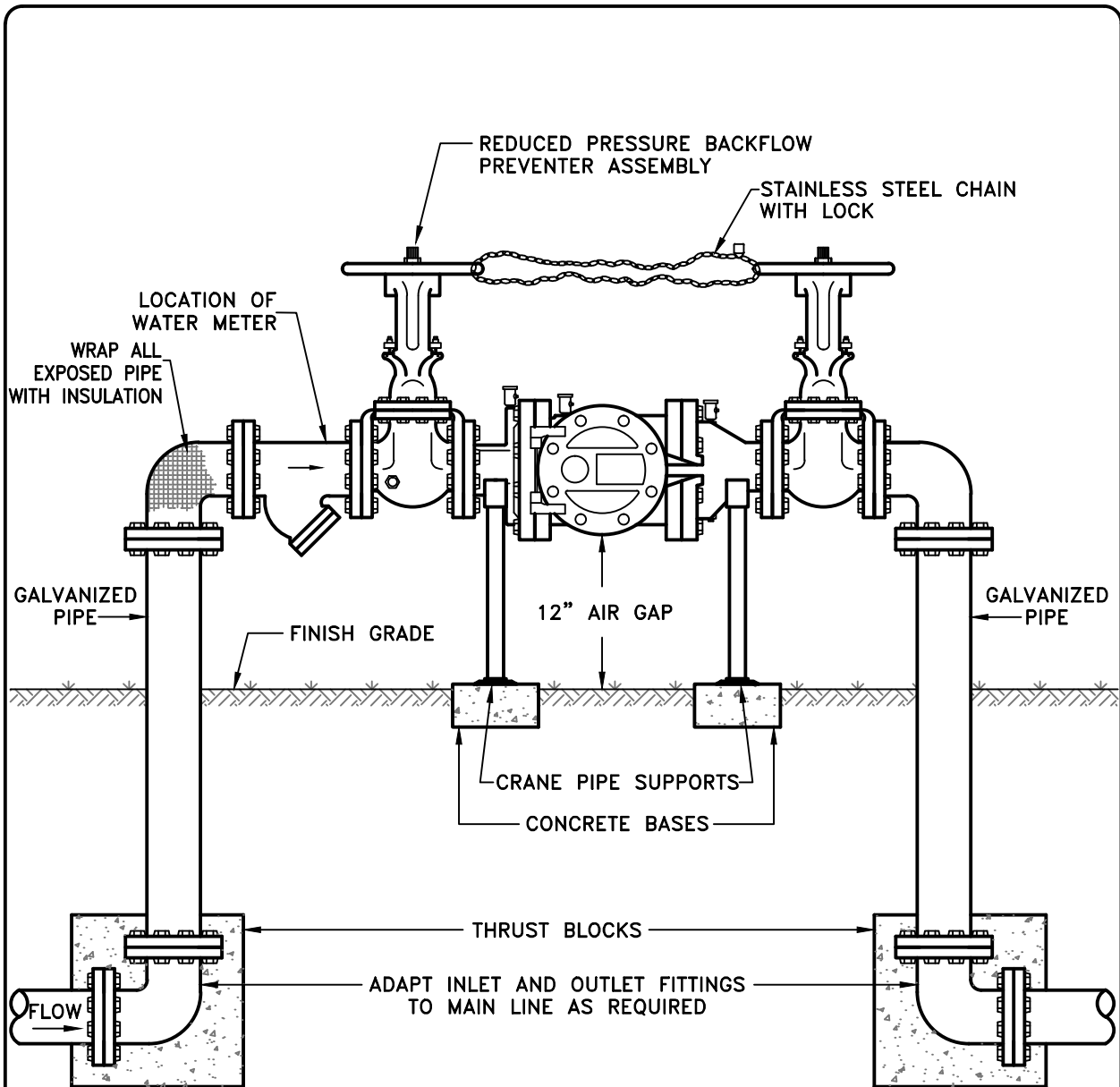
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ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



MODESTO
CALIFORNIA

DETAIL NO.
1208



NOTES: (SYSTEM PROTECTION)

1. INSTALL 12" AIR GAP MINIMUM (CONSULT LOCAL CODE)
2. ALL CONNECTIONS ON ASSEMBLY TO BE FLANGED.
2. BACKFLOW ASSEMBLY SHOULD BE PLACED IN A PLANTER SO THAT PLANT MATERIAL WILL SCREEN VIEW OF THE ASSEMBLY FROM THE STREET.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

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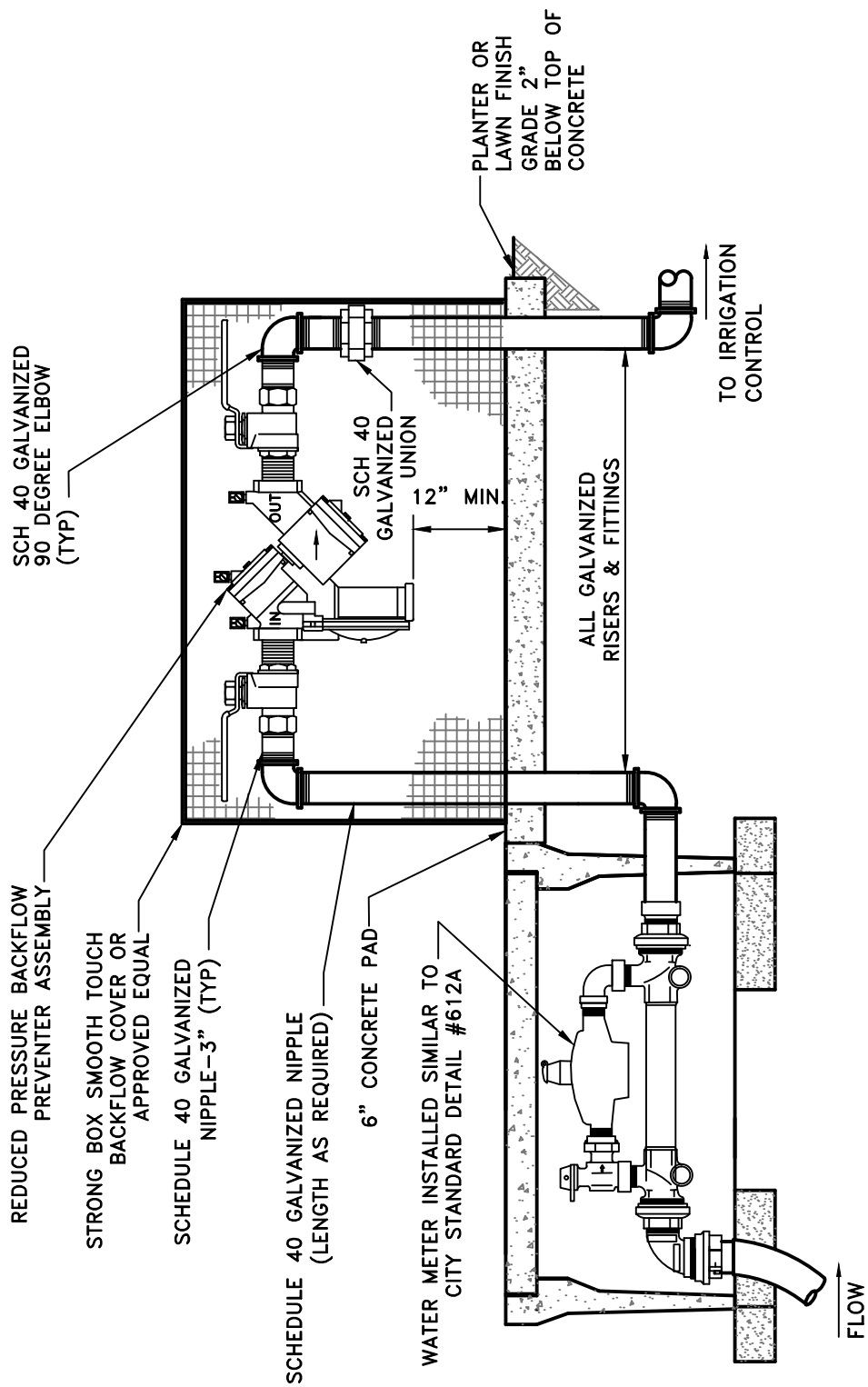
LANDSCAPING

**REDUCED PRESSURE PRINCIPLE
 BACKFLOW PREVENTION ASSEMBLY
 FOR 3" OR LARGER**

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345



DETAIL NO.
1209



NOTE:

1. INSTALL APPROPRIATELY SIZE WEATHER BLANKET TO ALL BACKFLOW PREVENTION DEVICES.
2. BACKFLOW ASSEMBLY SHOULD BE PLACED IN A PLANTER SO THAT PLANT MATERIAL WILL SCREEN VIEW OF ASSEMBLY FROM THE STREET.
3. ALL BACKFLOW PREVENTION DEVICES INSTALLED SHALL BE INSPECTED AND TESTED ANNUALLY AT OWNERS EXPENSE.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

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REVISED: DATE:

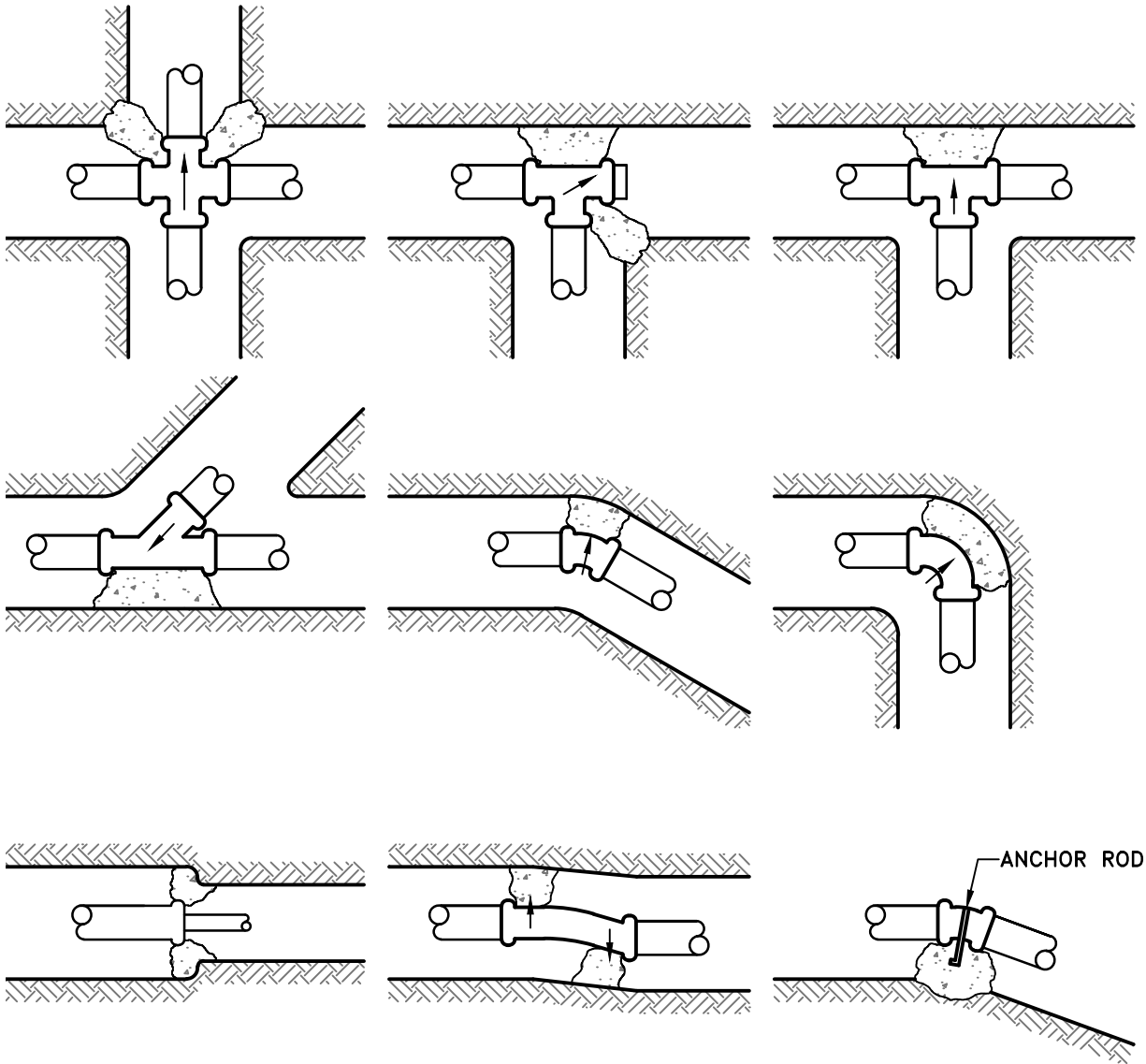
LANDSCAPING

**REDUCED PRESSURE PRINCIPLE
 BACKFLOW PREVENTION ASSEMBLY
 1" TO 2.5" SIZE**

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345



DETAIL NO.
1210



NOTES:

1. CONTRACTOR SHALL INSTALL PER MANUFACTURER'S INSTRUCTIONS.
2. SIZES OF ANCHOR AND THRUST BLOCKS SHALL BE AS RECOMMENDED BY PIPE MANUFACTURER.
3. ANCHOR AND THRUST BLOCKS SHALL BEAR AGAINST UNDISTURBED SOIL.
4. CONCRETE SHALL ATTAIN 2000 PSI COMPRESSIVE STRENGTH.
5. ANCHOR RODS SHALL BE 1/2" DIA. REINFORCING STEEL, ENCASED IN CONCRETE.
6. KEEP CONCRETE CLEAR OF ALL PIPE OPENINGS.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

REVISED: DATE:

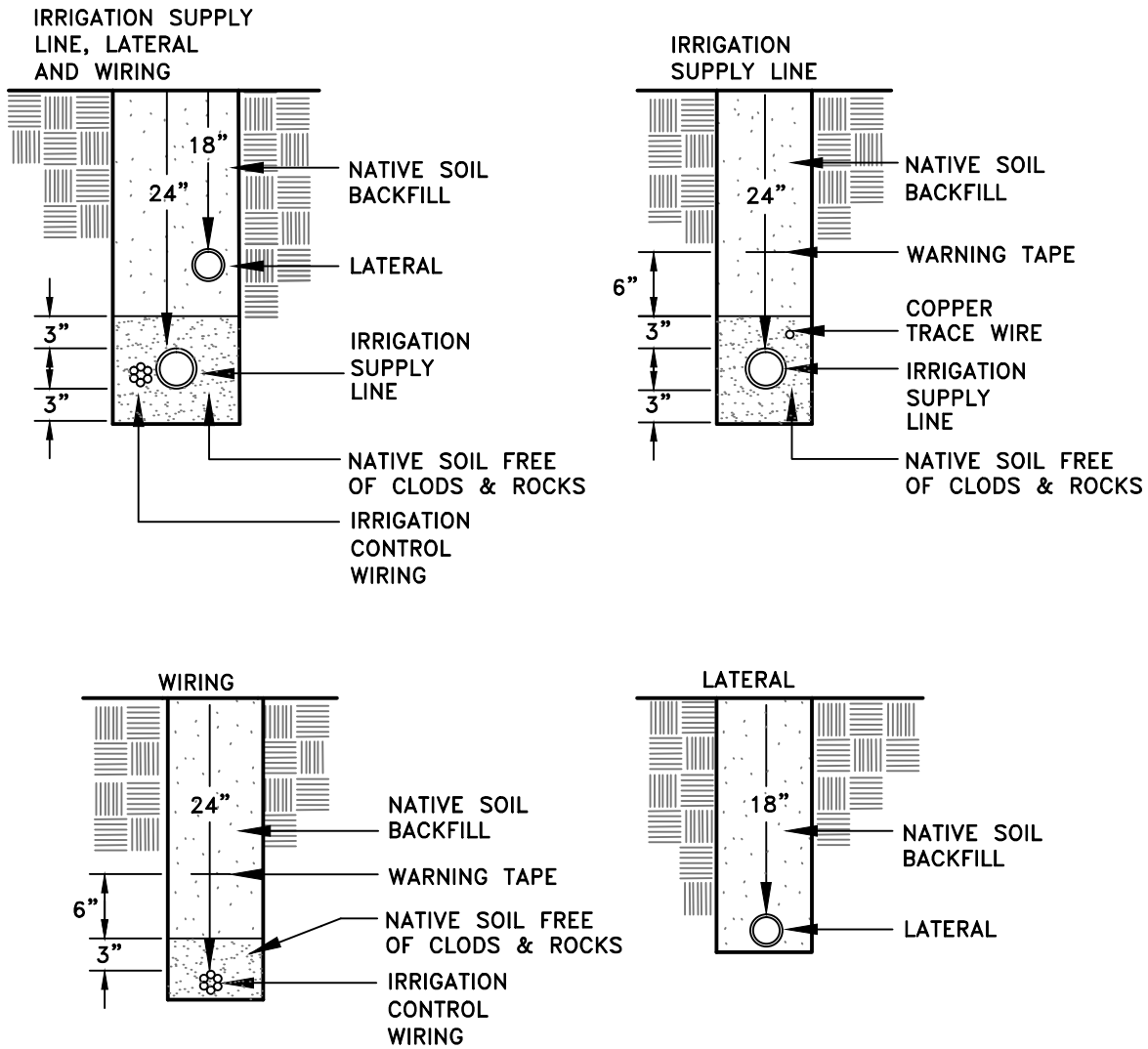
REVISED: DATE:

LANDSCAPING
TYPICAL CONCRETE
THRUST BLOCKS

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345



DETAIL NO.
1211



NOTES:

1. RUN WIRING BENEATH AND BESIDE IRRIGATION SUPPLY LINE.
2. BUNDLE AND TAPE WIRING EVERY TEN FEET.
3. TIE A LOOSE 24" LOOP IN ALL WIRING AT CHANGES OF DIRECTION. UNTIE AFTER ALL CONNECTIONS HAVE BEEN MADE.
4. TRACE WIRE NOT REQUIRED WHEN WIRING IS ADJACENT TO IRRIGATION SUPPLY LINE.
5. WARNING TAPE NOT REQUIRED WHEN A LATERAL IS PRESENT IN SAME TRENCH AS AS IRRIGATION SUPPLY LINE OR CONTROL WIRING.
6. ALL SOLVENT WELD PLASTIC PIPES TO BE SNAKED IN TRENCHES.
7. ALL 120 VOLT WIRING IN CONDUIT TO BE INSTALLED ACCORDING TO LOCAL CODE.
8. IN LANDSCAPED AREAS COMPACT BACKFILL TO 85% RELATIVE COMPACTION.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

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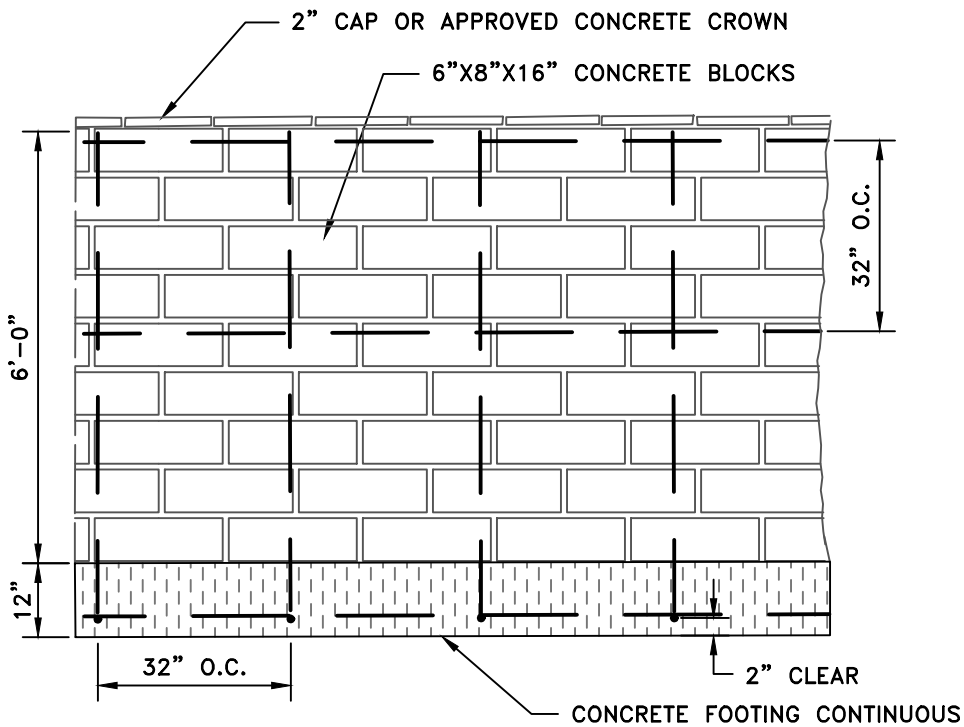
LANDSCAPING

TYPICAL TRENCHING

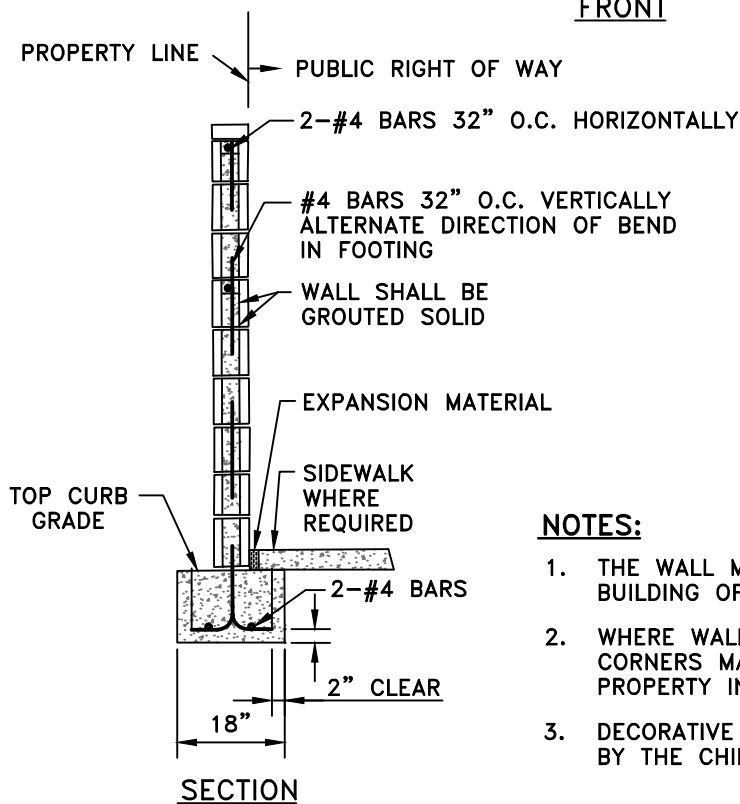
ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345



DETAIL NO.
1212



FRONT



SECTION

NOTES:

1. THE WALL MUST BE APPROVED BY THE CHIEF BUILDING OFFICIAL.
2. WHERE WALLS ARE CONSTRUCTED, WITNESS CORNERS MAY BE PLACED 3 FEET INSIDE PROPERTY IN LIEU OF PROPERTY CORNER.
3. DECORATIVE FEATURES SHALL BE AS REQUIRED BY THE CHIEF BUILDING OFFICIAL.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

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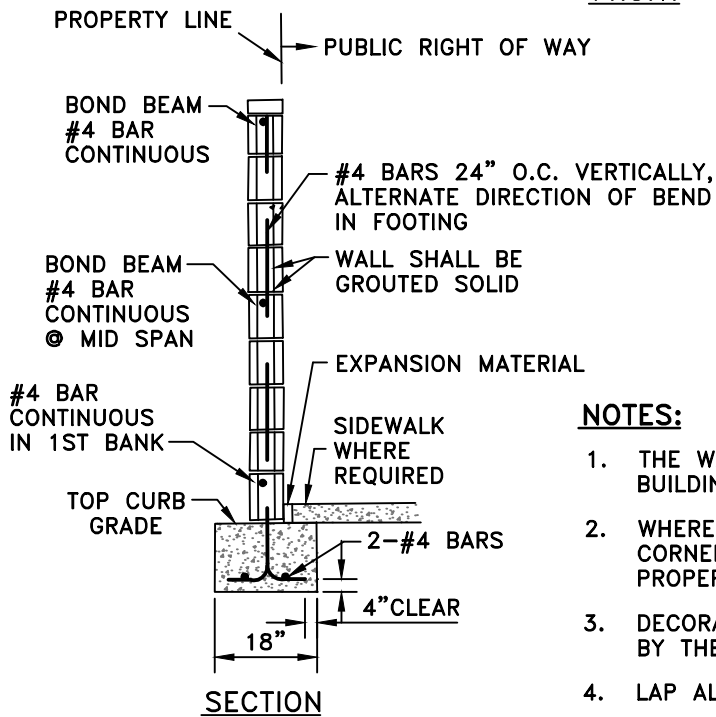
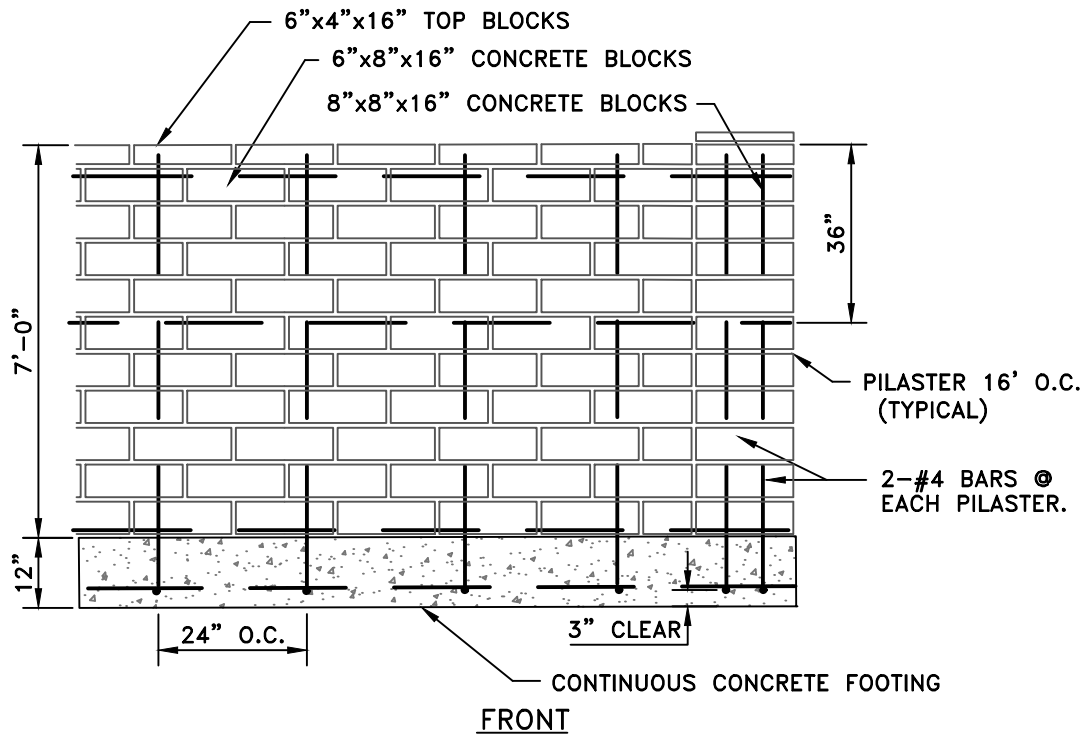
LANDSCAPING

ACCESS CONTROL WALL

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345



DETAIL NO.
1213



NOTES:

1. THE WALL MUST BE APPROVED BY THE CHIEF BUILDING OFFICIAL.
2. WHERE WALLS ARE CONSTRUCTED, WITNESS CORNERS MAY BE PLACED IN LIEU OF PROPERTY CORNER.
3. DECORATIVE FEATURES SHALL BE AS REQUIRED BY THE CHIEF BUILDING OFFICIAL.
4. LAP ALL STEEL SPLICES 12" MINIMUM.
5. PILASTER ENCROACHES INTO SIDEWALK.
6. ALTERNATIVE WALL CONSTRUCTION SHALL BE APPROVED IN WRITING BY THE CITY ENGINEER.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

LANDSCAPING

**7 FT. ACCESS
 CONTROL WALL**

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345



DETAIL NO.
1214

CHAPTER 13

DEMOLITION AND ABANDONMENT PLAN

13.01 GENERAL

A Demolition and Abandonment plan shall be prepared when the development site has existing improvements to be removed and/or abandoned. The City's primary purpose for preparing this plan is to identify those sites which may have wells, septic tanks, retention basins, etc. that require special treatments for abandonment or significant costs to prepare the site for construction. All Demolition and Abandonment plans shall be reviewed and approved by the City.

13.02 CONTENT

The Demolition and Abandonment Plan, when required, shall show all houses or other structures, wells, trees, septic tanks, septic tank leach fields, pipelines, storm drain retention or detention basins, street trees, ground elevations, irrigation facilities, utilities, streets or roads, bridges or other concrete structures that currently exist at the site of the planned development. See Chapter 2.02.F for further details.

The project Consultant Engineer is encouraged to contact the City staff as early as possible during the design process to determine if this plan is required, what scale will be acceptable and which existing improvements are required to be shown.

13.03 WELL ABANDONMENT AND EXCAVATIONS INTERSECTING GROUNDWATER

The Demolition and Abandonment Plan shall indicate location (if applicable) all proposed water, monitoring, and observation well(s) to be abandoned or excavations that may intersect with ground water. Project Consultant Engineer to place notes on the Demolition and Abandonment Plan indicating the Contractor or Developer to obtain a permit in accordance with Article 5 – Construction, Operation and Maintenance of Wells of the City of Modesto Municipal Code.

13.04 SEPTIC SYSTEMS

The Demolition and Abandonment Plan shall indicate location (if applicable) all proposed septic systems to be removed and/or abandoned. Project Consultant Engineer to place notes on the Demolition and Abandonment Plan indicating the Contractor or Developer to contact City of Modesto Building Department and Community and Economic Development Department, Land Development Engineering Division in regards to obtaining a permit.

13.05 SCALE

The drawings shall be prepared at a scale sufficient to clearly show all existing improvements, as described above.

CHAPTER 14

ENGINEER'S ESTIMATE FOR BONDING

14.01 GENERAL

An Engineer's Estimate shall be prepared to allow bonding all improvements to be constructed in the subdivision and to establish City fees. Bonds and/or equivalent securities shall be provided to the City by the Developer prior to the recording of any Final Map. A warranty bond is required prior to acceptance of the subdivision. Separate estimates are required for any reimbursable work or work involving Capital Facilities Fees, Community Facility District Fees, or public utility work.

14.02 COSTS (Recommended but not required)

- A. The City has established minimum unit costs for the most common items constructed. Please see APPENDIX A, Section 1.02 Bond Estimate Costs for estimate costs. Copies are also available from the City Engineer and are periodically updated.
- B. Unit costs have been used which reflect, as much as possible, the costs the City may incur in constructing the improvements. It is not the intent to estimate the costs private developers may incur.
- C. A 10% contingency fee shall be included to protect the City from inflation of costs and unforeseen conditions.

14.03 FORM

The Engineer's Estimate shall be in the form of a table listing items, units used, unit costs, quantity of each item and the total cost of the improvement. The estimate shall be in categories according to the type of facility i.e. sewer, water, storm, street work, etc.

14.04 GRADING

Estimates for grading shall indicate cubic yards to be moved on-site and cubic yards of import or export required, if any. Grading of temporary drainage basins shall be shown as a separate item. Estimates for grading shall include the costs of any grading performed under a grading permit. The grading permit shall be charged according to Appendix J, Grading of the California Building Code.

14.05 CONSTRUCTION OF EXISTING STREETS

When new facilities are to be installed in existing streets, unit prices for underground improvements shall be increased. To simplify the estimation of these costs the City will require a 50% increase in unit prices.

14.06 GROUNDWATER

If the soil report or other historical evidence or records indicates that groundwater will be encountered during construction, unit costs for all pipelines installed within 2' of the groundwater shall be increased by \$10 per lineal foot.

CHAPTER 15

EROSION & SEDIMENT CONTROL STANDARDS

FOR CONSTRUCTION ACTIVITIES

15.01 GENERAL

The City of Modesto is required by State and Federal regulations to develop programs to control the discharge of pollutants to the municipal storm drain system, including the discharge of pollutants from construction sites. As a result, all construction projects are subject to requirements designed to improve stormwater quality such as, expanded plan check and review, implementation of Best Management Practices, stormwater treatment and source control measures, Low Impact Development (LID) measures and increased construction site inspection.

To obtain stormwater design information or determine whether a construction project will be subject to stormwater treatment, source control or LID requirements, refer to the current edition of the City of Modesto Guidance Manual for Development Stormwater Quality Control Measures.

These Standards consist of regulations contained in State Water Resources Control Board (SWRCB) Order No. 2009-0009-DWQ, National Pollutant Discharge Elimination System (NPDES) Construction General Permit No.CAS000002, and the Central Valley Regional Water Quality Control Board Order No. R5-2008-0092 City of Modesto NPDES Stormwater Permit No.CAS083526, the City of Modesto Guidance Manual for Development Stormwater Quality Control Measures (current edition) and Modesto City Ordinance Chapter 10, Title 5: Stormwater Management and Discharge Controls.

15.02 WATER POLLUTION CONTROL PLANS

All construction projects occurring in the City of Modesto (City), regardless of size, require the submittal of a Water Pollution Control Plan (WPCP) or Local SWPPP to the City for review. The submittal shall include a description of the stormwater erosion, sediment, and pollution control Best Management Practices (BMPs) to be used to prevent sediment and other sources of pollution from entering the City storm drain system as well as a site plan showing their placement.

For privately owned construction projects, a WPCP shall be submitted to the City's Land Development Engineering Division with an application for a Grading, Demolition or Building Permit. The City's review comments will be provided to the Applicant within 15 working days. The Applicant shall revise the WPCP to address the City's review comments and re-submit to the City. The WPCP shall be completed to the satisfaction of the City prior to the issuance of a Grading, Demolition or Building Permit for the construction project.

For City owned construction projects, a WPCP shall be submitted to the City's Construction Administration Office a minimum of 21 working days prior to the start of any field work. The City's review comments will be provided to the Contractor within 10 working days. Contractor shall revise the WPCP to address the City's review comments and re-submit to the City. The WPCP shall be completed to the satisfaction of the City prior to the start of any field work.

All construction projects occurring within the City must implement the following BMPs, where and when applicable, regardless of project size. Additional BMPs may be required to ensure that sediment, construction waste and other pollutants from construction sites and parking areas, including runoff from equipment at construction sites, shall be retained on the site to the maximum extent practicable.

For more information about BMPs, refer to the California Stormwater Quality Association (CASQA) Stormwater Best Management Practice Handbook for Construction, November 2009 edition. <http://www.casqa.org>

1. Dust Control:

The Contractor shall comply with all City of Modesto and San Joaquin Valley Air Pollution Control District rules, regulations, ordinances, and statutes which apply to any work performed, including any air pollution control rules, regulations, ordinances, and statutes, specified in the Government Code. The Contractor shall be responsible for the control of dust within the limits of the project at all times including weekends and holidays in addition to normal working days. The Contractor shall take whatever steps are necessary or required by the City to eliminate the nuisance of blowing dust without causing sediment, debris or litter to enter the City storm drain system.

2. Erosion, Sediment, and Pollution Control:

The Contractor shall be responsible for controlling erosion and sedimentation within the limits of the project at all times during the course of construction including evenings, weekends, and holidays in addition to normal working days. The Contractor shall prevent any sediment and construction debris from entering the City storm drain system by implementing the following BMPs:

- Erosion control measures. Refer to CASQA Factsheets EC-1 to EC-16 and choose appropriate measures for project site.
- Sediment control measures. Refer to CASQA Factsheets SE-1 to SE-14 and choose appropriate measures for project site.
- Drain inlet protection. Refer to CASQA Factsheet SE-10. Mandatory for all projects.
- Stabilized entrance and egress from construction site. Refer to CASQA Factsheets TC-1, TC-2, & TC-3 and choose appropriate measures for project site.
- Stockpile management. Refer to CASQA Factsheet WM-3.

- Keep gutter flow line unimpeded and free of soil, debris and construction materials at all times.
- Use drainage controls as needed to protect site from run-on and prevent contaminated run-off. Refer to CASQA Factsheets EC-9 and EC-11.
- Use any other BMP's necessary to control the discharge of pollutants from the construction site.

Wash water, slurry and sediment from concrete or asphalt saw cutting operations shall not be allowed to enter the City storm drain system.

- When making saw cuts in pavement, use as little water as possible.
- Cover and place barricades around each catch basin during the sawing operation to contain the slurry. Shovel or vacuum the slurry residue from the pavement or gutter and remove from site. Refer to CASQA Factsheet NS-3

The Contractor is required to implement, at a minimum, the following housekeeping practices: site cleanup, solid waste management, material storage and delivery area, concrete waste management, and spill prevention and control.

- Site Cleanup: The Contractor shall keep the project site clean and free of dust, mud, and debris resulting from the Contractor's operations. Daily clean up throughout the duration of the project shall be required as the Contractor progresses with the work. Extra precautions and clean-up efforts shall be made prior to weekends, holidays and predicted storm events.
- Street Sweeping: Refer to CASQA Factsheet SE-7.
- Spillage of earth, gravel, concrete, asphalt, or other materials resulting from hauling operations along or across any public traveled way shall be removed immediately by the Contractor at Contractor's expense.
- Solid Waste Management: Refer to CASQA Factsheet WM-5 and WM-6.
- Material Storage and Delivery Area: Refer to CASQA Factsheet WM-1.
- Concrete Waste Management: Refer to CASQA Factsheet WM-8.
- Spill Prevention and Control: Refer to CASQA Factsheet WM-3.
- Temporary Sanitary Waste Facilities: Refer to CASQA WM-10

3. Non-Stormwater Discharges:

- The contractor shall prohibit non-stormwater discharges listed in Modesto City Ordinance Title 5, Chapter 10, Section 202.

- No washing of construction or other industrial vehicles shall be allowed on a construction site or property adjacent to a construction site. Refer to CASQA Factsheet NS-8.

4. Inspection

Throughout the duration of the project the Contractor will be required to inspect and maintain, in effective condition, all erosion, sediment, and pollution control BMPs. Inspections are required at minimum weekly, and before and after each storm event, and as needed. . The contractor shall immediately correct or replace any ineffective or damaged BMPs

15.03 REQUIREMENTS FOR CONSTRUCTION PROJECTS EQUAL TO OR GREATER THAN 1 ACRE

If the construction project will disturb one acre or more of land, coverage must be obtained under the Construction General Permit issued by the SWRCB for stormwater discharges associated with construction activity. To obtain coverage under the Construction General Permit, Permit Registration Documents (PRDs) including a Notice of Intent (NOI) must be electronically filed by the project Owner on the SWRCB Storm Water Multi-Application and Reports Tracking System (SMARTS) database. The SWRCB will subsequently issue the project a Waste Discharge Identification (WDID) Number. The Contractor will not be allowed to begin work until the PRDs have been submitted to the SWRCB and the WDID number has been received.

The Construction General Permit also requires the preparation of a “Stormwater Pollution Prevention Plan” or SWPPP. The SWPPP must identify appropriate stormwater pollution prevention measures or BMPs that will be used at the site to eliminate or reduce pollutants in stormwater discharges during construction. The SWPPP must be kept readily available on the construction site at all times. For more information on the Construction General Permit, call the SWRCB’s Stormwater Information Line at: (916) 341-5537 or visit the SWRCB’s website at http://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.shtml.

PRDS AND SWPPP

For City-owned construction projects, Contractor shall follow the Stormwater Quality Control Requirements found in the project specific Special Provisions or Project Specifications.

For privately owned construction projects, the Applicant shall submit one copy of the construction project PRDs and SWPPP to the City of Modesto Land Development Engineering Division and follow all requirements listed below.

1. The submittal shall consist of all required PRDs, including but not limited to a Notice of Intent (NOI), a Site Map and the project SWPPP. All PRDs shall be certified by the property Owner.
2. The Applicant shall submit construction project PRDs with an application for a Grading, Demolition or Building Permit. The City’s review comments will be provided within 15 working days (10 working days for a second submittal) and the Applicant shall revise the PRDs and re-submit to the City. The PRDs shall be completed to the satisfaction of the City prior to the issuance of a Grading, Demolition or Building permit.

3. The SWPPP shall be developed by a Qualified SWPPP Developer (QSD) as defined by the Construction General Permit.
 - a. The SWPPP shall be developed to implement the minimum required BMPs and any additional BMPs necessary to meet the Construction General Permit objectives.
 - b. The SWPPP shall include a construction stormwater monitoring program to implement water quality monitoring and data reporting.
 - c. The SWPPP shall include a detailed inspection, monitoring, and maintenance program that meets the requirements specified in the Construction General Permit and the manufacturers' recommendations for BMP inspection and maintenance.
 - d. The SWPPP shall briefly describe the general SWPPP training program for all subcontract personnel performing tasks that may result in pollution of storm water.
 - e. The SWPPP shall contain documentation of the training and qualifications for QSD, QSP, Contractor and any other personnel that implement BMPs and perform inspections.
 - f. All subsequent amendments to the SWPPP shall be made and certified by a QSD, and submitted to the City's Stormwater Inspector for review and acceptance.
4. The City's acceptance of the SWPPP does not relieve the property Owner of responsibility for the quality and adequacy of the SWPPP. Such acceptance does not warrant, acknowledge, or admit the quality and adequacy of the SWPPP.

ANNUAL REPORTS AND OTHER REPORTING

1. The property Owner shall submit annual reports to the SWRCB meeting the requirements of the Construction General Permit by September 1st of each year when field work has been underway during the preceding 12 months.
2. In the event of an exceedence of an applicable NAL, the property Owner shall submit an NAL Exceedence Report to the SWRCB within four Calendar Days of the end of the storm event in which the exceedence occurred. Exceedence and violation reports must contain proposed corrective actions and a time schedule to complete the actions. The property Owner shall provide the City a copy of any NAL Exceedence Reports when they are submitted to the SWRCB.
3. The property Owner shall provide the City a copy of any SWPPP amendments, sample results, Notices of Termination (NOT) or other documents or reports when they are submitted to the SWRCB.

BEST MANAGEMENT PRACTICES AND IMPLEMENTATION

1. The QSD, QSP and Contractor shall use the "California Stormwater Quality Association Stormwater Best Management Practice Handbook for Construction" 2009 edition, as guidance in developing and implementing a SWPPP for this project. To use the electronic version, go to the following internet website: www.casqa.org.
2. The property Owner shall provide a Qualified SWPPP Practitioner (QSP) as defined by the Construction General Permit who shall assume sole, complete, and continuous responsibility for storm water pollution prevention, runoff management and erosion and sediment control at the work site during construction.
3. The QSP shall implement all measures necessary to comply with the Construction General Permit; prepare all reports, plans, and documents as required by the Construction General Permit; perform all sampling and inspections as required by the Construction General Permit; furnish, install, and maintain all pollution prevention, erosion and sediment control measures required by the Construction General Permit or described in the SWPPP or REAPs; and implement monitoring programs, record keeping, maintenance, inspection, repair, training, and sampling as required in the Construction General Permit.
4. Prior to commencement of any field work, the QSP shall meet with the City Stormwater Inspector to review the implementation of the SWPPP. The purpose of the meeting will be to review the Contractor's procedures and to develop mutual understandings relative to compliance with the Construction General Permit, SWPPP and administration of the Contractor's erosion control and pollution prevention program.
5. The QSP shall immediately notify the City of any sample results that exceed a NAL and provide copies of the field logs by the end of the day the samples were collected. Deficiencies noted during the monitoring and inspections shall be corrected within 72 hours of identification, or sooner if a rain event is predicted.

ENFORCEMENT

Per Modesto Municipal Code, Section 5-10.501(e) and 5-10.702, the construction project shall be subject to Notices of Violation (NOVs) resulting in possible Administrative Compliance Orders, Stop Work Orders and Civil Penalties of up to \$25,000 per violation per day for failure to implement appropriate best management practices at the construction site.

Per the State's Porter Cologne Water Quality Act, the construction project shall also be subject to inspection by Staff from the Central Valley Regional Water Quality Control Board who have the authority to issue Notices of Violation (NOVs) and Penalties of up to \$10,000 per day and \$10,000 per gallon for non-compliance.

15.04 PERMITTING

The submittal process required to obtain a grading permit from the City of Modesto is detailed in Standard Specifications, Chapter 2, Section 2.02.

15.05 INSPECTION

Contractors (or other responsible party) shall conduct regular inspections and maintenance of stormwater BMPs on the construction site. Active construction sites may be visited at any time by City or State Water Board inspection staff. Violations will be enforced per the Modesto Municipal Code Title 5, Chapter 10, Article 5.

CHAPTER 16

PRIVATE FIRE PROTECTION SYSTEM

16.01 GENERAL

All onsite fire service improvements must conform to these City Standard Specifications and Standard Details, the requirements of the American Water Works Association (AWWA) Standards, the Modesto Municipal Code, the current California Fire Code including NFPA 13, Standard for Installation of Fire Automatic Sprinkler Systems, NFPA 24, Standard for Private Fire Service Mains and NFPA 1141, Standard for Fire Protection in Planned Building Groups, and the approved plans.

16.02 DESIGN

A. Vertical Alignment

1. Onsite fire service mains shall be buried a minimum of 36 inches under driveways and parking lots and 48 inches under railroad tracks. When vehicular traffic is not a concern, the piping may be buried with a minimum cover of 30 inches to prevent damage from surface loads.
2. Depth of covering shall be measured from the top of pipe to finished grade.

B. Onsite Fire Service Main Requirements and Sizes

1. Onsite fire service main(s) must be sized using the minimum demand flows and pressures set forth in the City Standards Water System chapter.
2. The minimum pipe diameter size for a dedicated fire sprinkler system is 4 inches (nominal) unless the hydraulic calculations show that the dedicated fire service will supply the total fire flow demand, including fire hose allowances at the design pressure, and the main size is at least as large as the riser.
3. The minimum pipe size for an onsite dead-end fire service main, not exceeding 300 feet in length and supplying only one onsite fire hydrant, shall have a minimum nominal diameter of 6 inches.
4. The minimum pipe size for an onsite dead-end fire service main, up to 600 feet in length and supplying one or more hydrants or a combination of a single fire hydrant and fire sprinkler system, shall have a minimum nominal diameter of 8 inches.
5. The minimum pipe size for an onsite dead-end fire service main exceeding 600 feet in length shall have a minimum nominal diameter of 10 inches.
6. The minimum pipe size for onsite looped fire service mains supplying one or more fire hydrants and fire sprinkler systems shall have a minimum nominal diameter of 6 inches.
7. Larger pipe sizes may be required when minimum fire flow demands and pressures, set forth in the City Standards Water System chapter, cannot be attained, or when hydraulic calculations dictate otherwise.

C. Fire Service Main Restrained Fittings

1. All changes of direction, caps, bends and hydrant branches shall be restrained against movement. Type of pipe, soil conditions and available space will determine the method.
2. Acceptable restraint methods are listed in the City Standards Water System chapter.

D. Fire Service Backflow Prevention Assembly

1. All private fire systems must have at least one approved backflow prevention (DCDA) assembly. When there is more than one connection to the public water main, a DCDA assembly must be installed at each connection. If no other single check valves or private fire hydrants are required onsite, a post indicating valve (PIV) may be required immediately downstream of the DCDA assembly followed by a fire department connection (FDC). The DCDA assembly cannot be used to meet the sprinkler system check valve requirement.
2. All DCDA assemblies require a bypass arrangement assembly. The detector assembly is connected to the BP assembly and runs parallel to the BP assembly. The detector check assembly detects illegal water use by the means of a flow meter and BF assembly
3. Private fire systems with a Hazard Category Class 1, 2 or 3, including all onsite fire hydrants (with or without a booster pump) must have a double check detector backflow prevention (DCDA) assembly. The DCDA assembly must be FM approved with OS&Y gate valves on either side of the DCDA assembly. For system protection, the DCBP assembly must be located at the property line where the fire service main enters the site.
4. Private fire systems with a Hazard Category Class 4, 5, or 6 (or any other category not listed) including all onsite fire hydrants (with cross-connection to fire pumps, unapproved water sources, or having materials or conditions that could contaminate the potable water) must have a reduced pressure detector backflow prevention (RPDA) assembly. The RPDA assembly must be FM approved with OS&Y gate valves on either side of the RP detector check assembly.

E. Post Indicator Valves

1. Post indicator valves shall be installed so the top of the post will be 36 inches above final grade. Post indicator valves should be located a minimum of 40 feet from the outside edge of the nearest building structure.
2. When a PIV cannot be placed at this distance, the alternate location shall be approved by the Fire Marshal.

F. Control (Shutoff) Valves

1. At least one control (shutoff) valve shall be installed for each fire sprinkler system. Outside stem and yoke (OS&Y) gate valves for use with a BP (or single check) assembly or PIV, where applicable, are acceptable to meet the control valve requirement.
2. If the fire service main supplies only an onsite private fire hydrant, the inline service valve at the public water main tee may be allowed to meet the control valve requirement – needs DCDA for system protection for on-site hydrant.

3. Sectional valves may be required on large systems. Exact location(s) and type shall be approved by the Fire Marshal.

G. Fire Sprinkler System Check Valve

1. When the fire department connection (FDC) for a building or structure is more than 90 feet from a public fire hydrant, a single check valve assembly is required downstream of the DCDA assembly and any onsite hydrant(s). This single check valve assembly must have a post indicator valve (PIV) immediately downstream of the check valve followed by the FDC.
2. When the required fire sprinkler system check valve is located below finished grade, the check valve must be located in a vault large enough to allow for State mandated inspection, maintenance, and repair of the valve – on-site only.

H. Fire Department Connection (FDC)

1. Except for residential systems with twenty (20) or fewer heads, every sprinkler system shall have installed an approved Fire Department Connection (FDC), with internal National Standard (NST) treaded swivel fittings. Listed caps shall be provided. All fire department connections shall be easily accessible, without interference from buildings, fences or other objects.
2. A listed check valve shall be installed in each FDC.
3. An FDC shall be installed on the system side of the system check and control valves, and on each side of a sectional valve.
4. The FDC shall not be connected to the suction side of a fire pump.
5. Parking shall be prohibited in front of and within 20' of the hose connections. FDC's shall be located within 18" and 48" of adjacent grade or access level; and when possible shall be located within 90' of a fire hydrant.
6. Two (2) 2 1/2" hose connections shall be supplied by a 4" pipe when the riser is 4" or larger; a single 2" hose connection supplied by a 3" pipe may be used when the riser is 3" or smaller.
7. All wall or building mounted FDC's shall be mounted on a 2-hour or greater fire rated wall only. There shall be no openings within 10 feet horizontal of the FDC and no openings above or below wall mounted FDC's.

16.03 MATERIALS

1. Materials for use with private fire protection systems must conform to the material requirements listed in the City Standards Water System chapter and be FM approved.
2. Private on-site fire hydrants shall conform to the City Standards Water System chapter. Onsite fire hydrants shall be painted "Red".

16.04 INSTALLATION

1. Onsite fire mains, valves and appurtenances shall be installed per the City Standards Water System chapter.
2. Fire sprinkler systems in building structures shall be installed in accordance with the California Fire Code, Plumbing Code and Building Code.

16.05 HYDROSTATIC PRESSURE TEST

1. Onsite fire mains, valves and appurtenances (including fire sprinkler systems) shall be hydrostatically pressure tested per the City Standards Water System chapter, except the minimum pressure to be tested shall be 200 psi gauge or onsite, maximum design system pressure plus 50 psi, whichever pressure is greater.
2. The hydrostatic pressure test shall be conducted in the presence of the Fire Marshal.

16.06 DISINFECTION

Onsite fire mains, valves and appurtenances shall be disinfected per the City Standards Water System chapter.

16.07 FLUSHING

Onsite fire mains, valves and appurtenances shall be flushed per the City Standards Water System chapter prior to final acceptance.

16.08 INSPECTION AND TEST PROCEDURES

All required inspections and tests shall be witnessed by Fire Department personnel. It is the installing Contractor's responsibility to schedule and be present during all inspections and tests. Contact the Fire Prevention Bureau 24 hours prior to desired inspection or test to schedule an appointment.

One set of APPROVED plans shall be kept on the jobsite during construction.

All private fire system trenches, piping, joints, valves and pipe restraints (thrust blocks or other approved method) shall be inspected prior to covering.

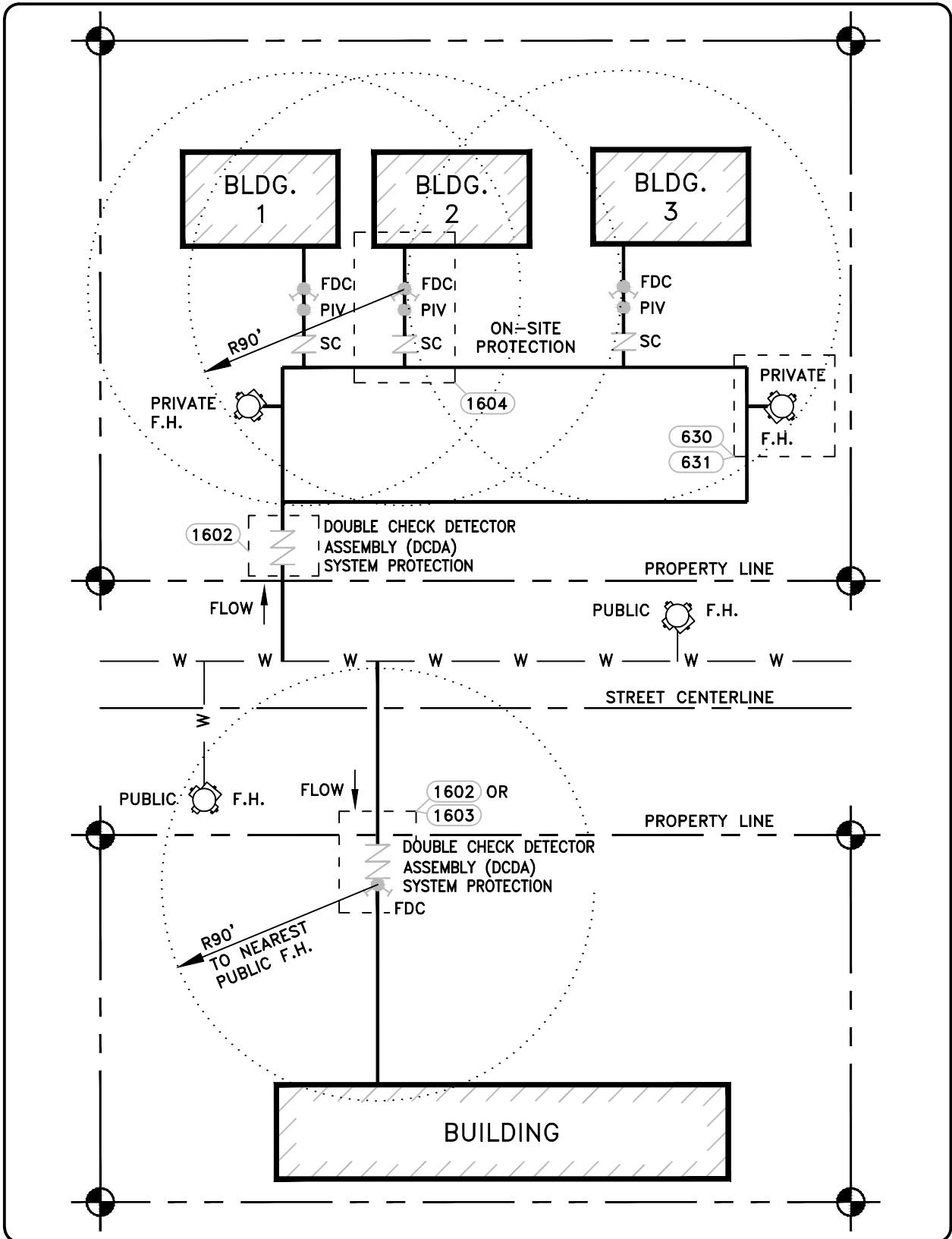
All private fire main piping, supplying only fire hydrants, shall be hydrostatically tested at 150 psi for 1 hour; all fire main piping supplying a sprinkler system shall be hydrostatically tested at 200 psi for 2 hours. This test will be against a blind flange (skillet). It is recommended that the pipe only be backfilled between joints during this test so that leaks can be easily detected. The hot tap to the City main will not be made until this test has been completed.

TABLE 16.1 FLOW RATE TO PRODUCE VELOCITY OF 10 FT/SEC

Pipe Size (in.)	Flow Rate (gpm)
4	390
6	880
8	1560
10	2440
12	3520

The main shall be thoroughly flushed to remove foreign materials. The minimum flow rate shall be the water demand rate of the system or the necessary flow rate to provide a velocity of 10' per second, whichever is greater.

All fire hydrants shall be installed and tested prior to building construction. Furthermore, the fire hydrant must have unobstructed access and be maintained operational at all times.



APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
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FIRE PROTECTION

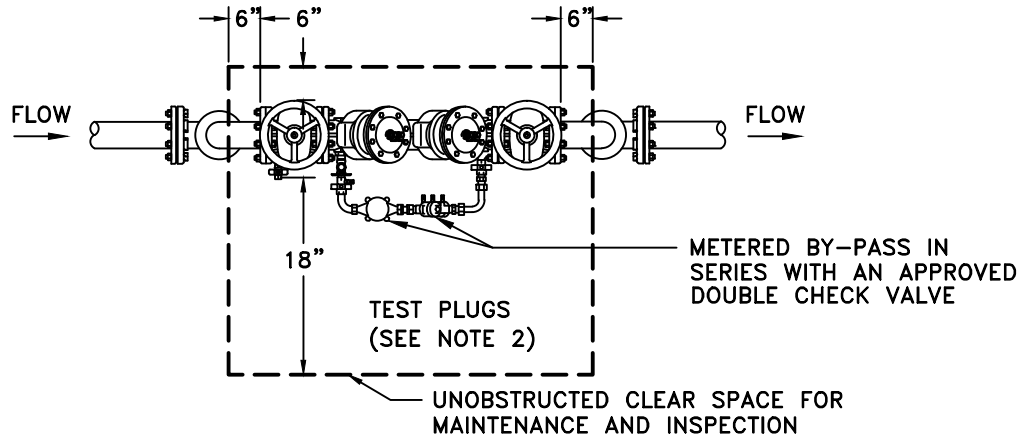
TYPICAL FIRE SERVICE LAYOUTS

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2013-345



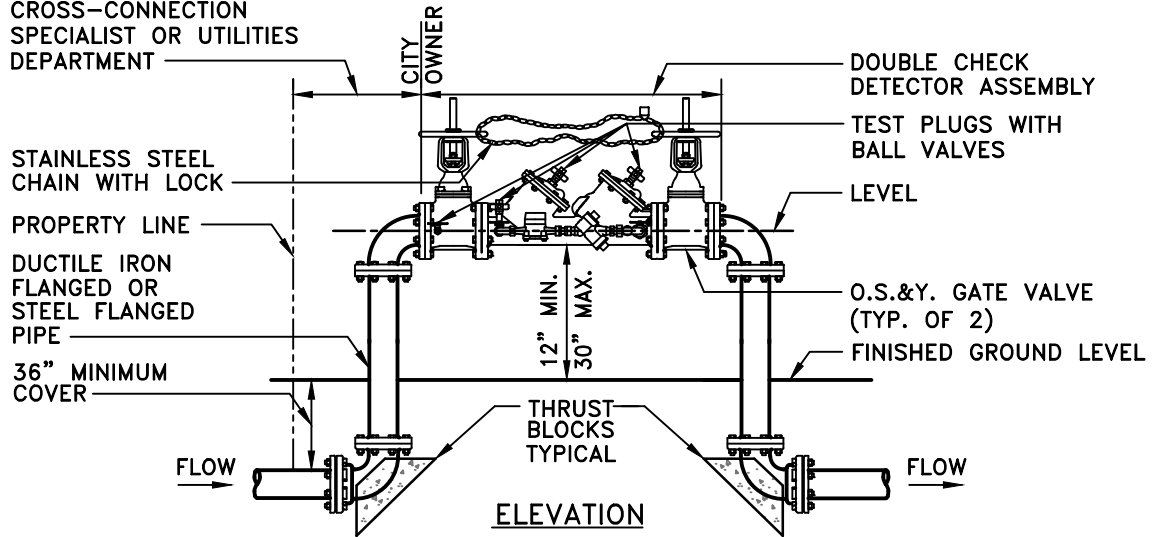
MODESTO
CALIFORNIA

DETAIL NO.
1601



PLAN

LOCATION SHALL BE APPROVED PRIOR TO INSTALLATION BY CROSS-CONNECTION SPECIALIST OR UTILITIES DEPARTMENT



ELEVATION

FIRE SERVICE-DOUBLE CHECK DETECTOR ASSEMBLY
WITHOUT FIRE DEPARTMENT CONNECTOR

NOTES: (SYSTEM PROTECTION)

1. NO CONNECTIONS WILL BE ALLOWED BETWEEN WATER MAIN AND BACKFLOW PREVENTION ASSEMBLY. NO CONNECTION WILL BE ALLOWED AT THE TEST COCKS FOR WATER USAGE.
2. ASSEMBLY SHALL BE ACCESSIBLE FOR TESTING AND MAINTENANCE.
3. ALL CONNECTIONS ON ASSEMBLY TO BE FLANGED.
4. BACKFLOW PREVENTION ASSEMBLY TO BE LOCATED AT THE PROPERTY LINE.
5. ELECTRONICALLY MONITORED TAMPER SWITCHES MAY BE REQUIRED IN ACCORDANCE WITH NFPA72.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

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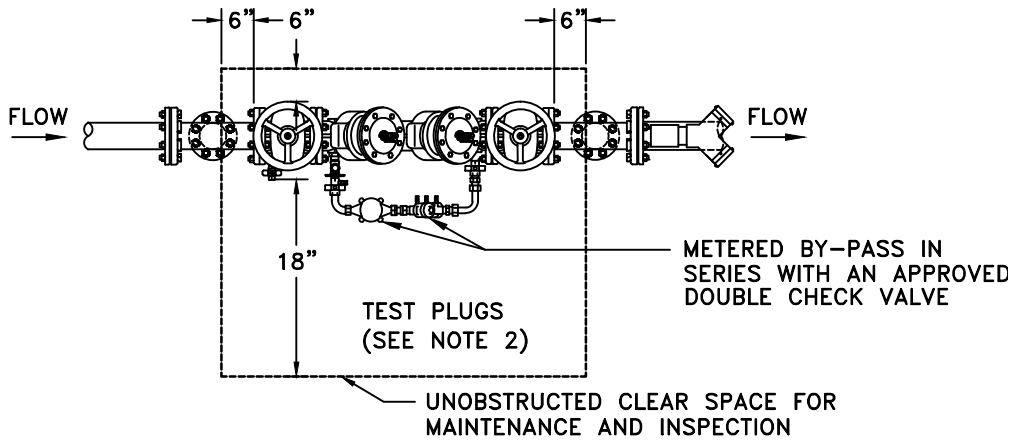
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FIRE PROTECTION
FIRE SERVICE
DOUBLE CHECK
DETECTOR ASSEMBLY

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

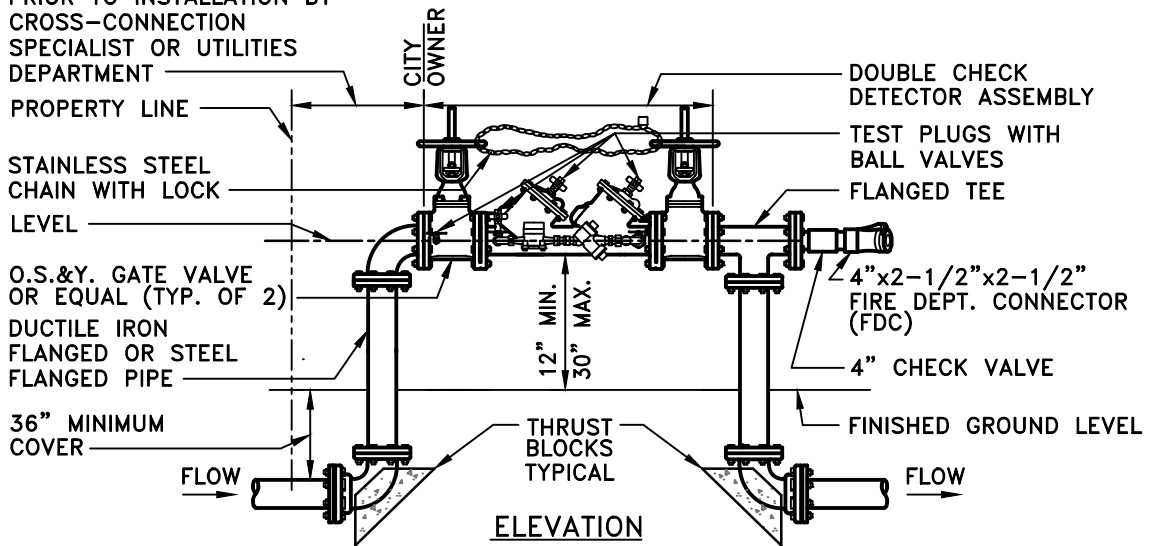


DETAIL NO.
1602A



PLAN

LOCATION SHALL BE APPROVED PRIOR TO INSTALLATION BY CROSS-CONNECTION SPECIALIST OR UTILITIES DEPARTMENT



ELEVATION

FIRE SERVICE-DOUBLE CHECK DETECTOR ASSEMBLY WITH FIRE DEPARTMENT CONNECTOR

NOTES: (SYSTEM PROTECTION)

1. NO CONNECTIONS WILL BE ALLOWED BETWEEN WATER MAIN AND BACKFLOW PREVENTION ASSEMBLY. NO CONNECTION WILL BE ALLOWED AT THE TEST COCKS FOR WATER USAGE.
2. ASSEMBLY SHALL BE ACCESSIBLE FOR TESTING AND MAINTENANCE.
3. ALL CONNECTIONS ON ASSEMBLY TO BE FLANGED.
4. BACKFLOW PREVENTION ASSEMBLY TO BE LOCATED AT THE PROPERTY LINE.
5. ELECTRONICALLY MONITORED TAMPER SWITCHES MAY BE REQUIRED IN ACCORDANCE WITH NFPA72.

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

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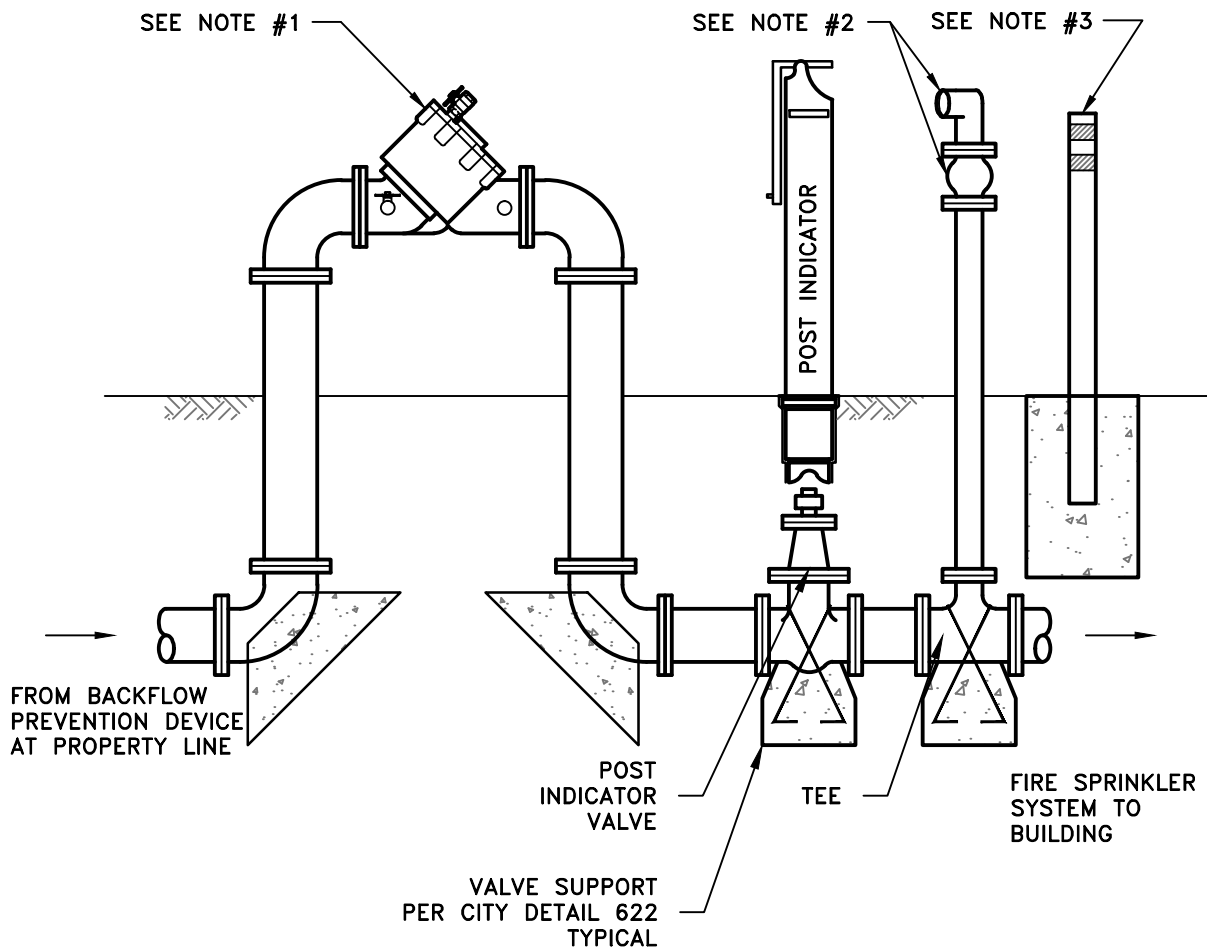
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**FIRE PROTECTION
FIRE SERVICE
DOUBLE CHECK
DETECTOR ASSEMBLY**

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



DETAIL NO.
1602B



NOTES: (ON-SITE PROTECTION)

1. SINGLE CHECK VALVE PER AWWA STANDARDS.
2. FIRE DEPARTMENT CONNECTION (FDC) WITH CHECK VALVE LISTED AND APPROVED PER CITY (OR COUNTY, WHERE APPLICABLE) FIRE MARSHAL REQUIREMENTS. FDC OUTLETS SHALL FACE STREET.
3. BOLLARDS AS REQUIRED PER CITY STANDARD DETAIL 908.
4. ELECTRONICALLY MONITORED TAMPER SWITCHES MAY BE REQUIRED IN ACCORDANCE WITH NFPA72

APPROVED BY:
BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

FIRE PROTECTION

**TYPICAL SINGLE
 CHECK ASSEMBLY**

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345



DETAIL NO.
1603

CHAPTER 17

LEFT BLANK INTENTIONALLY

CHAPTER 18

TRAFFIC SIGNALS SYSTEM

18.01 DESCRIPTION

This work shall include the furnishing of all labor, materials, tools, and equipment to construct and complete in an efficient and workmanlike manner the modification of the traffic signal system in accordance with the approved plans, these specifications, the City Standard Details, the State Standards and Standard Plans.

Traffic signal installation work is to be performed at the following intersections:

Any road and Modesto street

The Contractor shall furnish all labor, materials and equipment necessary to complete the work as shown on the Plans, as specified in these Standard Specifications of the Specifications, and in strict accordance with the conditions of the Contract. All incidental work not shown on the Plans or specified herein which is necessary to complete the work necessary to provide the system described, or shown, shall be furnished and installed as part of this contract at no additional cost to the City. The work shall be complete and ready for service as shown on the Plans and/or specified to the satisfaction of the City Engineer.

The Contractor is advised to inspect the site to observe actual field conditions prior to bidding the project.

Order of Work: Order of work shall conform to the provisions in Section 5-1.05, "Order of Work," of the State Standard Specifications and these Standard Specifications.

The first order of work shall be to place the order for the traffic signal equipment. The Contractor shall furnish the City Traffic Engineer with a statement from the vendor that the order for said equipment has been received and accepted by said vendor.

Installation of an approved substitution shall be the Contractor's responsibility, and any revisions necessary for the installation of approved substituted materials and/or equipment shall be made without additional expense to the City of Modesto.

Shop drawings shall be submitted in a complete package. Partial submittal will not be considered.

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

The Contractor shall furnish, in a three-ring binder, a maintenance manual for all controller units, auxiliary equipment, and vehicle detector sensor units, control units,

and amplifiers. The maintenance manual and operation manual may be combined into one manual. The maintenance manual or combined maintenance and operation manual shall be submitted at the time the controllers are delivered for testing or, if ordered by the City Traffic Engineer, previous to purchase. The maintenance manual shall include, but need not be limited to, the following items:

- a. Specifications
- b. Design characteristics
- c. General operation theory
- d. Function of all controls
- e. Trouble shooting procedure (diagnostic routine)
- f. Block circuit diagram
- g. Geographical layout of components
- h. Schematic diagrams
- i. List of replaceable component parts with stock numbers

18.02 PROGRESS SCHEDULES

The Contractor shall provide the City Traffic Engineer with a typewritten project schedule at the preconstruction meeting.

No signal standard shall be delivered on-site until Contractor has all signal materials on hand.

Signal heads shall not be installed before traffic signal controller is installed and wired.

18.03 CERTIFICATE OF COMPLIANCE, WARRANTIES, GUARANTEES AND INSTRUCTION SHEETS

Contractor shall conform to the provisions in Section 86-1.05, "Certificate of Compliance," and in Section 6-3.06, "Guarantee," of the State Standard Specifications and these Standard Specifications.

The Contractor shall be responsible for all work and materials and/or equipment installed under the Plans and Specifications, including but not limited to vandalism.

The Contractor shall repair or replace at his expense, any defective work, material, or equipment which may become evident within one year of the date of filing of the Notice of Completion. The Contractor shall be responsible for all damage to other materials, equipment, structures, etc., caused by defects for a one-year period if the defect is due to defective material, equipment, or workmanship.

If any part (or parts) is found to be defective in materials or workmanship within the one-year period, and it is determined by the City Traffic Engineer or by an authorized manufacturer's representative that said part (or parts) cannot be repaired on the site, the manufacturer shall provide a replacement part (or parts) of equal kind and/or type during the repair period, and shall be responsible for the removal, handling, repair or replacement, and reinstallation of the part (or parts) until such time as the traffic signal equipment is functioning as specified and as intended herein, the repair period

shall in no event exceed 72 hours, including acquisition of parts.

The one-year guarantee on the repaired or replaced parts shall again commence with the date of reassembly of the system.

18.04 INTERRUPTION OF EXISTING UTILITIES

The Contractor shall bear the cost of any utility interruption, temporary relocation, modification, or other modifications as needed to install or remove any traffic signal equipment.

18.05 MAINTAINING EXISTING AND TEMPORARY ELECTRICAL SYSTEMS

Existing traffic signal system shutdowns shall be limited to periods between the hours of 9:00 a.m. and 3:00 p.m.

The Contractor shall place "STOP AHEAD" and "STOP" signs to direct vehicle and pedestrian traffic through the intersection during traffic signal system shutdown. All signal faces shall be covered if the system must be shut down for a 24-hour period. Contractor must request in writing the City Traffic Engineer's approval 48 hours prior to a 24-hour signal system shutdown. The Contractor shall wait for the City Traffic Engineer's approval, in writing, prior to any 24-hour signal system shutdown. If written approval is not received by the Contractor within 48 hours of request, Contractor will assume the request has been denied. Temporary "STOP AHEAD" and "STOP" signs shall be either covered or removed when the system is turned on.

One "STOP AHEAD" sign and one "STOP" sign shall be placed for each direction of traffic. For two-lane approaches, two "STOP" signs shall be placed. Location of the signs shall be as directed by the Engineer.

"STOP AHEAD" and "STOP" signs shall be furnished by the Contractor and shall conform to the provisions in Section 12-3.06, "Construction Area Signs," of the State Standard Specifications except that the base material for the signs shall not be plywood.

Full compensation for furnishing, installing, maintaining and removing temporary "STOP AHEAD" and "STOP" signs and for covering signs not in use shall be considered as included in the contract lump sum price bid for the signal item involved and no additional compensation will be allowed therefore.

18.06 SIGNAL SYSTEM SHUTDOWN PENALTY

It is agreed by the parties to the contract that in case signal system shutdowns occur during hours other than the hours between 9:00 a.m. and 3:00 p.m., damage will be sustained by the City of Modesto, and that it is and will be impracticable to determine the actual damage which the City of Modesto will sustain, in the event of any, by reason of such signal system shutdowns that occur before 9:00 a.m. or after 3:00 p.m., and it is therefore agreed that the Contractor will pay to the City of Modesto the sum of One Hundred and no/100ths Dollars (\$100.00) per every hour (60 minutes),

or part thereof, of signal system shutdown before 9:00 a.m. or after 3:00 p.m. The Contractor agrees to pay such liquidated damages as herein provided, and in case the same are not paid, agrees that the City of Modesto may deduct the amount thereof from any money due the Contractor under the contract.

The Signal System Shutdown Penalty as provided for herein may be waived by the City of Modesto if the Contractor installs a temporary traffic signal system for signal system shutdowns which occur during hours other than the hours between 9:00 a.m. and 3:00 p.m.

The installation of a temporary traffic signal system by the Contractor as provided for herein shall require prior written authorization by the City Traffic Engineer. Prior to installation, the Contractor shall submit a supplemental Equipment List and Drawings to the City Traffic Engineer for approval of each such temporary traffic signal system and any modification thereto, including, but not limited to, equipment and location.

Full compensation for furnishing, installation, maintaining and removing temporary traffic signal equipment shall be considered as included in the contract lump sum price bid for the signal item involved and no additional compensation will be allowed therefore.

18.07 REGULATIONS AND CODE

All work and materials shall conform to the latest codes, rules, and regulations of the following:

- a. State Codes and Ordinances
- b. Local City and/or County Ordinances
- c. California Code of Regulations – Title 24
- d. California Building Code

Nothing in these Specifications is to be construed to permit work not conforming to the above; expense for compliance with the above shall be paid for by the Contractor. Whenever the Plans and Specifications require higher standards or larger sizes than those required by the Ordinances and Statutes, the Plans and Specifications shall take priority.

The Contractor shall have Special Dispensation from the California Occupational Safety and Health Administration to conduct operations no closer than 6 feet, but within 10 feet, of a high voltage line prior to erecting signal standards.

18.08 ENCROACHMENT PERMITS

The City of Modesto will issue a no-fee Encroachment Permit.

18.09 REMOVING, REINSTALLING, OR SALVAGING ELECTRICAL EQUIPMENT

Salvaged electrical materials shall be hauled to City of Modesto City/County Airport at 617 Airport Way at Tioga Drive, between Connie Way & Hillside Drive, Modesto,

California, or City of Modesto Electrical Division at 501 North Jefferson Street, Modesto, California, and stockpiled with 24-hour prior arrangement with the City of Modesto Electrical Supervisor. Electrical Supervisor shall have the right or discretion on location of damaged or destroyed parts.

Full compensation for hauling and stockpiling electrical materials shall be considered as included in the lump sum price bid for the signal item involved, and no additional compensation will be allowed therefore.

18.10 STANDARDS, STEEL PEDESTALS, AND POSTS

Paragraph four of Section 86-2.04, "Standards, Steel Pedestals and Posts," of the State Standard Specifications is amended by adding the following after the second subparagraph:

Standards with an outside diameter of 12 inches or less shall be round. Standards with an outside diameter of greater than 12 inches shall be round or multi-sided. Multi-sided standards shall have a minimum of 10 sides which shall be convex and shall have a minimum bend radius of 4 inches.

Section 86-2.04, "Standards, Steel Pedestals and Posts," of the State Standard Specifications is amended by adding the following after paragraph eleven:

All galvanized nuts, used on assemblies with a specified pre-load or torque, shall be lubricated in accordance with the requirements specified for galvanized Grade DH nuts in ASTM Designation: A 563.

The twelfth paragraph in said Section 86-2.04 of the State Standard Specifications is amended to read:

The sign mounting hardware, as shown on Detail U of Standard Plan ES-7N, shall be installed at the locations shown on the plans.

Where the plans refer to the side tenon detail at the end of the signal mast arm, the applicable tip tenon detail may be substituted.

Standards, steel pedestals and posts shall have ornamental base covers.

Standards, steel pedestals and posts shall be galvanized.

18.11 SOLID-STATE TRAFFIC ACTUATED CONTROLLER

The Contractor shall furnish Model 170E controller assemblies consisting of Model 170E controller units, wired Model 332 cabinets and all auxiliary equipment required to control the signal indications as shown on the Plans, and as specified in these Standard Specifications for each location. The controllers shall be furnished complete with all equipment conforming to the requirements in the "Traffic Signal Control Equipment Specifications," issued by the State of California. Controllers, cabinets, equipment, and all modifications thereto shall be type approved by the State of California Testing Laboratory, and shall have California State Quality

Product listing.

The City will provide a BI Tran System Program #233 for the controllers.

The controller cabinet layout and component locations shall conform to the requirements for Model 332 cabinet in said "Traffic Signal Control Equipment Specifications," and addendum thereto.

The controllers shall have four ACIA capability. Four ACIA's shall be integral to the controller units.

The controller memory modules shall be model 412C as described in the Caltrans specification and provide for 32K EPROM (27256), 16K RAM, and 8K zero power RAM (memory method 2, memory select 4).

All compression connectors that terminate inside controller cabinets for low voltage circuits shall be soldered.

The controllers shall be supplied with a Model 400F modem with anti-streaming capability module complete with terminal block and cable to connect to controllers ACIA port. The Contractor shall install terminal block and all cabinet wiring except incoming communication lines.

The cabinets shall be wired and fully equipped for traffic actuation and phasing shown on the Plans.

Cabinets shall be aluminum. Cabinets shall have the additional following items installed:

1. Fluorescent light with door switches
2. Auto/manual control with police panel cord.
3. Pull-out drawer/shelf assembly

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

The convenience receptacle shall have ground-fault circuit interruption as defined by the Code. Circuit interruption shall occur on 6 milliamperes of ground-fault current and shall not occur on less than 4 milliamperes of ground-fault current.

Model 332 cabinets shall be furnished with a Corbin lock, keyed "State #2."

Full compensation for conforming to the requirements of this section shall be considered as included in the lump sum price bid for the traffic signal item involved, and no additional allowance will be made therefore.

18.12 FIBER OPTIC MODEM

The Fiber Optic Transceiver shall provide highly reliable RS-232 serial data

communications via a 1310 nm Singlemode Fiber Optic communications link between multi-dropped interconnected field transceivers and the Traffic Control System. The Transceiver shall be microprocessor based and shall be configurable as a fully redundant, fault tolerant, self-healing ring that provides uninterrupted communications between network transceivers, even if a fiber break occurs between one or more transceivers in the ring. The Transceiver shall contain all required logic to sense a fiber break or transceiver failure and automatically execute counter rotated communications. The Transceiver shall support data rates from 300 bauds to 112 kbps. The field installed Transceiver shall be a stand-alone type in an aluminum housing to prevent corrosion. The Transceiver installed at the Traffic Operations Center shall be designed to fit into an existing vilink model VKS2300 System chassis. All stand-alone Transceivers shall be fully interchangeable throughout the project and all rack-type Transceivers shall be interchangeable within the chassis or rack. All Transceivers shall be ST type connectors.

The Fiber Optic Transceiver shall have AGC circuitry allowing for dynamic operation back to back and for budgets up to 29 dB. NO ATTENUATORS OR EXTERNAL ADJUSTMENTS SHALL BE ALLOWED. The Transmitter output power shall be a minimum of -3dBm @ 1300 nm. The receiver sensitivity shall be a minimum of -32dBm.

The Fiber Optic Transceiver shall be capable of operating at temperatures from -34 Celsius to +74 Celsius.

The Fiber Optic Transceiver must be compatible and operate with the City's traffic signal controller and system software. The Transceiver shall have a female DB25 connector and shall be compliant with EIA RS-232D/EIA RS-422. A cable shall be provided to connect each transceiver with a 170 Controller (C2).

Full compensation for furnishing and installing the Fiber Optic Transceiver unit shall be considered as included in the contract lump sum price paid for Traffic Operations Center equipment and no additional compensation will be allowed.

18.13 SERVICE ENCLOSURE

Traffic signal service enclosure shall be Type IIIAF (See pages ES-2D of the Caltrans Standard Plans), and include items 1 through 8, 15 through 17, 24, and a generator connection (30A 125U Hubble 2616 or equivalent).

Voltage ratings of the service equipment shall confirm to the service voltages indicated on the plans.

18.14 VEHICLE SIGNAL FACES AND SIGNAL HEADS

Signal housings shall be polycarbonate manufactured from virgin material using lexan polycarbonate black in color.

Backplates shall be polycarbonate material black in color.

All signals shall have polycarbonate tunnel visors, black in color. All sections of all signals shall be 12". Only MAS and not top mounted heads will be allowed.

All indications shall have Light Emitting Diode (LED's) signal modules that meet the latest Caltrans Specifications.

Top openings of signal heads shall be sealed in the interior with neoprene gaskets.

18.15 PEDESTRIAN SIGNALS AND PEDESTRIAN PUSH BUTTONS

Pedestrian signals shall be Type A polycarbonate black in color. International symbol indications shall be provided. The pedestrian signal indications shall have LED's signal modules that meet Caltrans Specifications "countdown type" with "full figure display." Pedestrian push buttons shall meet ADA requirements. The push buttons sign shall be porcelain enameled metal. Pedestrian push button assembly shall be black in color.

The following type of screen shall be provided:

A 1½ inch deep eggcrate-type screen either of 0.030-inch nominal thickness polycarbonate. The assembly shall be mounted in a frame constructed of polycarbonate black in color.

The eggcrate-type screen shall be installed parallel to the face of the message plate and shall be held in place by the use of stainless steel screws or molded one-piece door and egg crate type screen.

The hood described in Section 86-4.01C, "Visors," of the State Standard Specifications is not required.

The screen and frame shall be anodized flat black or may be finished with flat black enamel as specified in Section 91-4.05, "Paint, Acrylic, Emulsion, Exterior White and Light and Medium Tints," of the State Standard Specifications. Said enamel shall be applied in the shop at the Contractor's expense.

Alternate methods may be substituted for the above screening providing the results are equal to or superior to those obtained with the above-specified screen as determined by the City Traffic Engineer.

Full compensation for conforming to the requirements of this section shall be considered as included in the lump sum prices bid for the traffic signal item involved, and no additional allowance will be made therefore.

18.16 LUMINARIES

Glare shields are not required.

Luminaries shall be LED Beta- STR-LWY-3M-HT-08-D-UL-SV-525-43K-R, or Leotek-GC1-80C-MV-NW-3M-GY-530mA.

Full compensation for conforming to the requirements of this section shall be considered as included in the lump sum prices bid for the traffic signal item involved, and no additional allowance will be made therefore.

18.17 PHOTOELECTRIC CONTROLS

Photoelectric controls shall be Acvity Brands Controls DSS124F1.5TJJE-Fail off or approved equal.

Full compensation for conforming to the requirements of this section shall be considered as included in the lump sum prices bid for the traffic signal item involved, and no additional allowance will be made therefore.

18.18 EMERGENCY VEHICLE DETECTOR SYSTEM

The Contractor shall provide and install a 3M Emergency Vehicle Detector System per the plans and the Standard Specifications with two phase selectors inside the controller cabinet compatible with optically activated receiver units and Model 170E controller. The Contractor shall provide and install optically activated receiver units with optical detector cable. The phase selectors, optical emitter, optically activated receiver units, and optical detector cable shall meet specifications in the Standard Specifications.

The Contractor shall be responsible for making the optical Emergency Vehicle Detector System operational, as per supplier's requirements and per the intersection diagram.

18.19 TERMINAL COMPARTMENT

Slip-fitters and terminal compartments shall be cast bronze. All parts of signal mounting assembly shall be black in color.

18.20 DETECTORS

Loop wire shall be Type 1.

Detector loops shall be six feet by six feet in size unless otherwise noted on the Plans.

Unless shown otherwise, each loop shall consist of three turns of loop conductor.

Conductor of each loop shall be run continuous, without splice, to the termination pull box where splice to detector lead-in cable is made. Conductors from loop to termination pull box shall be twisted together three turns per foot, before inserting in the saw cut slot and conduit.

Each loop shall be installed with the conductor wound in a clockwise rotation. Each individual conductor shall be banded "Start" and "End" in the termination pull box.

Each pair of loop conductors shall be identified and banded together in pairs, by

lane, in the termination pull box. A minimum of five feet of loop conductors shall be provided, after splicing, in a termination pull box.

All banding shall be of the permanent, waterproof type.

Upon completion of the loop, and prior to connecting the loop to the lead-in cable, each loop shall be megohm tested and tested for continuity in the presence of the City Traffic Engineer. The insulation resistance of the loop conductors, lead-in cables, and splices shall not be less than 100 megohms. In addition, testing shall meet Section 10-18.28 "Testing" of these Standard Specifications.

Final loop connections shall be made such that each loop section is wound in the opposite rotation to an adjacent loop, whether such loop is in the same lane or in the adjacent lane.

The loops shall be joined in combination of series-parallel so that optimum sensitivity is obtained at the detector sensor unit, and shall be in accordance with the detector unit manufacturer's recommendation regarding series-parallel combinations.

Final splices between loops and lead-in cable shall not be made until the operation of the loops under actual traffic conditions is approved by the City Traffic Engineer.

Loop detector lead-in cable shall be Type B. Splices to lead-in cable shall be soldered, insulated and installed in heat-shrink tubing, or approved equal.

Each loop detector lead-in cable shall be identified and banded in each pull box and in the controller cabinet.

The sealant for filling slots shall be an ELASTOMERIC SEALANT, and shall conform to State Standard Specification 86-5.01A(5), 3M detector sealant, black 5000.

Full compensation for conforming to the requirements of this section shall be considered as included in the lump sum prices bid for the traffic signal item involved, and no additional allowance will be made therefore.

18.21 CONDUCTORS AND WIRING

Subparagraphs 2, 4, and 5 of the first paragraph of Section 86-2.09D, "Splicing," of the State Standard Specifications is deleted.

Splices shall be insulated by "Method B" of Section 86-2.09E, "Splice Insulation," of the State Standard Specifications except detector lead-in cables.

Conductors shall be cabled in bundles, by phase, and identified by phase with permanent labels in the controller cabinet and at terminal pull boxes.

Multiple lighting conductors, signal light grounded conductors, and bonding conductors only, may be spliced.

"C" shaped compression connectors, as shown on the Plans, shall be used.

Insulation shall be THW rated, and shall comply with Section 86-2.09E, "Splice Insulation," of the State Standard Specifications.

Per City of Modesto Drawing 1802, multiple conductor cable and detector lead-in cables shall be color coded as follows:

Color	Signal Standard	DLC
Brown	A	Phase 1
Red	B	Phase 2
Orange	C	Phase 3
Yellow	D	Phase 4
Green	E	Phase 5
Blue	F	Phase 6
Violet	G	Phase 7
Gray	H	Phase 8
White	I	
Black	J	

Signal Interconnect Cable (SIC) shall be Superior Essex Sealpic cable, or approval equal 19 AWG 6-pair cable with white/blue, white/orange, white/green, white/brown, white/slate, and red/blue color coding. No other color coding is acceptable.

Full compensation for conforming to the requirements of this section shall be considered as included in the lump sum prices bid for the traffic signal item involved, and no additional allowance will be made therefore.

18.22 FUSED SPLICE CONNECTORS

Fused splice connectors will not be required.

18.23 BONDING AND GROUNDING

Grounding jumper shall be attached by a 3/16 inch or larger brass bolt in the signal standard or controller pedestal and shall be run to the conduit, ground rod or bonding wire in adjacent pull box.

Grounding jumper shall be visible after cap has been poured on foundation.

Equipment grounding conductors will not be required in conduit containing loop lead-in cables only.

Green Wire #6 (cabinet ground) shall have a separate ground rod in pull box nearest to cabinet, with no other wire attached.

Full compensation for conforming to the requirements of this section shall be considered as included in the lump sum prices bid for the traffic signal item involved, and no additional allowance will be made therefore.

18.24 CONDUIT

Conduit shall be rigid galvanized metal or Type 3 Rigid non-metallic and shall conform to the provisions in Section 86-2.05, "Conduit," of the State Standard Specifications and these Standard Specifications.

When a standard coupling cannot be used for coupling metal-type conduit, a UL listed threaded union coupling, as specified in the third paragraph in Section 86-2.05C, "Installation," of the State Standard Specifications.

Insulated bonding bushings will be required on metal conduit. All conduit shall be grounded together in all pull boxes and cabinets by means of a grounding jumper.

Conduit to be installed under pavement shall be installed by bore and jacking, directional drilling, or other approved methods which do not damage pavement.

After conductors have been installed, the ends of conduits terminating in pull boxes, and in service and controller cabinets shall be sealed with an approved type of sealing compound.

If Type 3 non-metallic conduit is used it shall be installed with a rigid galvanized metal elbow and riser into the termination pullbox, service, cabinet, and all other termination locations.

Full compensation for conforming to the foundation requirements of this section shall be considered as included in the lump sum prices bid for the traffic signal item involved, and no additional allowance will be made therefore. Contractor shall also be responsible for restoring any damaged landscaping to existing conditions.

18.25 PULL BOXES AND DETECTOR HANDHOLES

All pull boxes shall be according to City of Modesto Standard Details, or approved equal with bolt-down lids. All pull box lids shall identify the circuit as traffic lids shall be used when pull boxes are placed in areas traveled by vehicles. The traffic lids shall be per manufacturer's specifications. "Traffic Signal," "Detector," OR "Service" stamped on lids.

Approved Pull Boxes

Brand	Box With Cover	Cover Only	8" Extension	Notes
New (Shown)	Basis FCA132418T	PCC132418A1A20	FCE132408T	Fiber reinforced polymer (FPR) body polymer concrete box with polymer lid & ½" SS Penta bolts
CDR	A10-1324-1870	C10-1324-0226	E00-1340833	Fiber reinforced polymer (FPR) body polymer concrete box with polymer lid & ½" SS Penta bolts
Armorcast	A6001946TAX18	A6001969	A6001646EX8	Fiber reinforced polymer (FPR) body polymer concrete box with polymer lid & ½" SS Penta bolts

All steel traffic lids utilized in areas of traffic shall have a means to ground the lid and it shall be connected to the grounding system.

The bottoms of pull boxes shall be grouted. Contractor's attention is directed to Section 86-2.06C, "Installation and Use," of the State Standard Specifications.

Pull boxes shall be per City of Modesto Detail No. 1800 Pull Box #1 at a minimum. Larger sizes shall be installed where required by the California Code of Regulations – Title 24 or where shown on the Plans, per City of Modesto Detail No. 1801, Pull Box #2.

The MID (Modesto Irrigation District) pull boxes shall be installed according to the MID Electric Service Guide 2006 and in coordination with the MID office.

Existing detector hand holes in pavement reconstruction areas shall be removed and replaced with new detector hand holes in accordance with State Standard Plan ES-5D. Hand holes shall be Type A. Pull box lids associated with detector hand holes shall be stamped "Detector."

Full compensation for conforming to the requirements of this section shall be considered as included in the lump sum prices bid for the traffic signal item involved, and no additional allowance will be made therefore.

18.26 FOUNDATIONS

Concrete shall conform to Section 90-10, "Minor Concrete," of the State Standard Specifications and shall contain no less than 505 pounds of cement per cubic yard, except concrete for reinforced pile foundations shall contain not less than 564 pounds of cement per cubic yard.

Full compensation for conforming to the requirements of this section shall be considered as included in the lump sum prices bid for the traffic signal item involved, and no additional allowance will be made therefore.

18.27 SIGNS

Signs shall be furnished and installed by the Contractor as shown on the Plans and as specified in the most current edition of the California Manual of Traffic Control Devices.

The G7 street name signs shall be on diamond-grade reflective sheeting.

Street name text shall be white with 12-inch upper case, first character followed by 10-inch lower case characters for each word ("Modesto Street"), Clearview font, on a green background. Block numbers and arrows shall be white, four inches high, on a green background. Block numbers and arrow shall be located on the right hand side of the sign. Arrows shall be orientated toward the highest block number. The block shall be located above the arrow, see detail on the plans. Messages shall be on both sides of the signs unless otherwise indicated on the plans.

The Contractor shall provide and install signs as called for on the plans.

Two wraps of stainless steel Band-It-Band Brand strapping 3/4" thick shall be used to hang all overhead signs. Band-It-Band Brand buckles type 201 stainless steel shall be used with strapping. Hawkins Swing Sign Brackets 250 Series, Part Number M10J-OCB250AL and M10J-OCB250FL with Adjustable Length Swing Sign Bracket M10J-OCB250AL or approved equal shall be used. Signs shall have 2" x 2" x 1/8" "L" aluminum bracket for additional support.

18.28 TESTING

The Contractor shall make the signals fully operational including entering timing settings provided by the Traffic Engineering Division into the controller and peripheral equipment.

The Contractor shall have present, a qualified field technician, who shall be qualified to perform testing and servicing on all systems of the installation.

Prior to scheduled turn on, the field technician shall perform all testing assignments. This testing shall include measurement of each loop installation utilizing a field loop tester/analyzer. Based on the measurement of each loop, the final loop configuration shall be established in such manner as to generate a unique frequency for each adjacent loop system, (detector channel). This unique frequency shall be set such that in the natural state and in the detect state, the frequency does not enter the frequency range of any adjacent loop system. In addition to the frequency setting and adjustments, the loop configuration shall be such that peak tuning characteristics shall be maximized; i.e., the detect state shall be a minimum of a 3.0 reference value based on natural state reference. For loops rated less than a 3.5 reference value, the loops shall be configured to maximize the sensitivity of the loop closest to the stop bar.

The Contractor shall provide the City Traffic Engineer with the detector test report as provided. This report shall include each detector as labeled on the drawing, and shall show the final loop configuration, the natural state frequency, the detect frequency, and the calculated reference value of each loop system.

The Contractor shall flash test all circuits of each signal phase and both circuits of each pedestrian phase to confirm that the signal is wired properly before the signal is requested to be energized. The Contractor shall provide the City Traffic Engineer with the signal flash report as provided.

Full compensation for conforming to the requirements of this section shall be considered as included in the lump sum prices bid for the traffic signal item involved, and no additional allowance will be made therefore.

18.29 SIGNAL ENERGIZING:

The Contractor, after fully testing the new traffic signal equipment, will contact the City Inspector to schedule signal energizing. Signals will only be allowed to be put into operation on Tuesdays, Wednesdays, and Thursdays. The Contractor will have the signal fully tested at least 24 hours before the signal is energized.

Full compensation for conforming to the requirements of this section shall be considered as included in the lump sum prices bid for the traffic signal item involved, and no additional allowance will be made therefore.

18.30 FUNCTIONAL TESTING:

The first paragraph in Section 86-2.14B, "Field Testing," of the State Standard Specifications is amended to read:

Prior to start of functional testing, the Contractor shall perform the following tests on all circuits, in the presence of the Engineer.

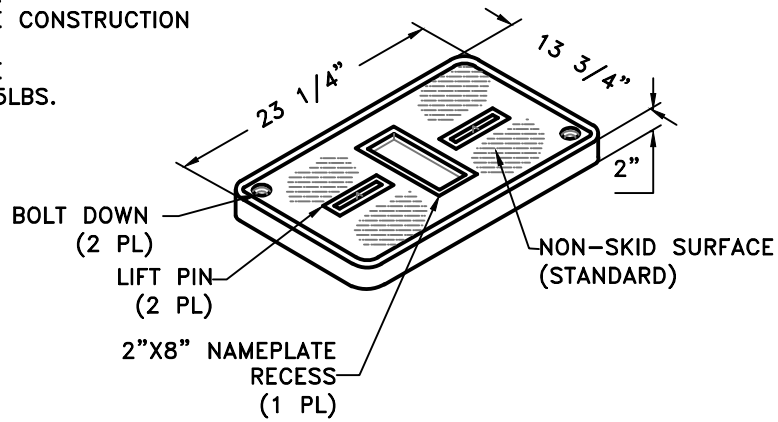
The functional test for each lighting system shall consist of not less than 14 days. If unsatisfactory performance of the system develops, the conditions shall be corrected and the test shall be repeated until the 14 days of continuous, satisfactory operation is obtained.

Full compensation for conforming to the requirements of this section shall be considered as included in the lump sum prices bid for the signal item involved, and no additional allowance will be made therefore.

1324/18 FRP/PC
ASSEMBLY

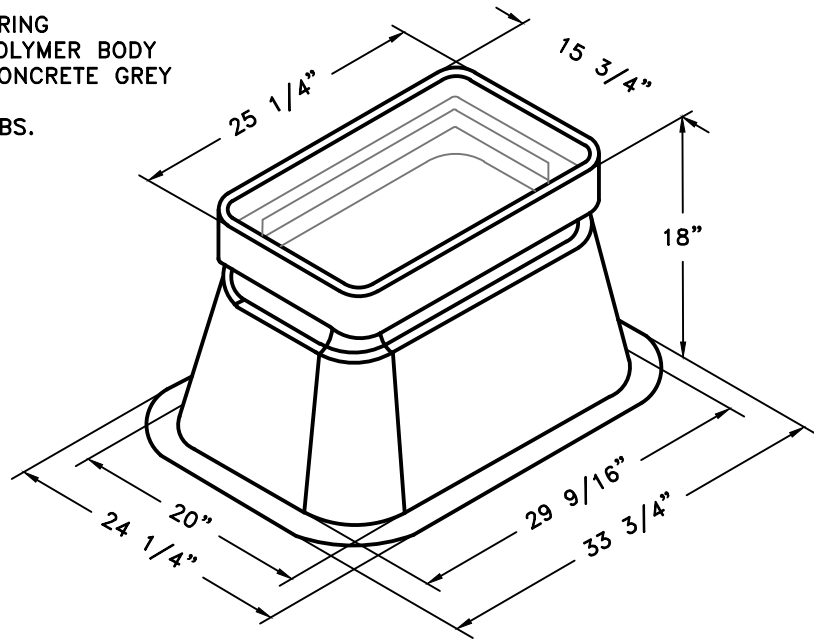
COVER FEATURES:

- * STANDARD LOAD RATING: 20,800LBS. WHEEL LOAD ON 10"X20" PLATE
- * POLYMER CONCRETE CONSTRUCTION
- * 2 BOLT DOWNS
- * NON-SKID SURFACE
- * APPROX. WEIGHT 35LBS.



BOX FEATURES:

- * POLYMER CONCRETE RING
- * FIBER REINFORCED POLYMER BODY
- * COLOR OF RING = CONCRETE GREY
- * LIGHTWEIGHT
- * APPROX. WEIGHT 45LBS.



APPROVED PULL BOXES

BRAND	BOX WITH COVER	COVER ONLY	8" EXTENSION	NOTES
NEW BASIS (SHOWN)	FCA132418T	PCC132418A1A20	FCE132408T	FIBER REINFORCED POLYMER (FPR) BODY POLYMER CONCRETE BOX WITH POLYMER LID & 1/2" SS PENTA BOLTS
CDR	A10-1324-1870	C10-1324-0226	E00-13240833	FIBER REINFORCED POLYMER (FPR) BODY POLYMER CONCRETE BOX WITH POLYMER LID & 1/2" SS PENTA BOLTS
ARMORCAST	A6001946TAX18	A6001969	A6001646EX8	FIBER REINFORCED POLYMER (FPR) BODY POLYMER CONCRETE BOX WITH POLYMER LID & 1/2" SS PENTA BOLTS

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

LIGHTING & TRAFFIC

PULL BOX #1

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

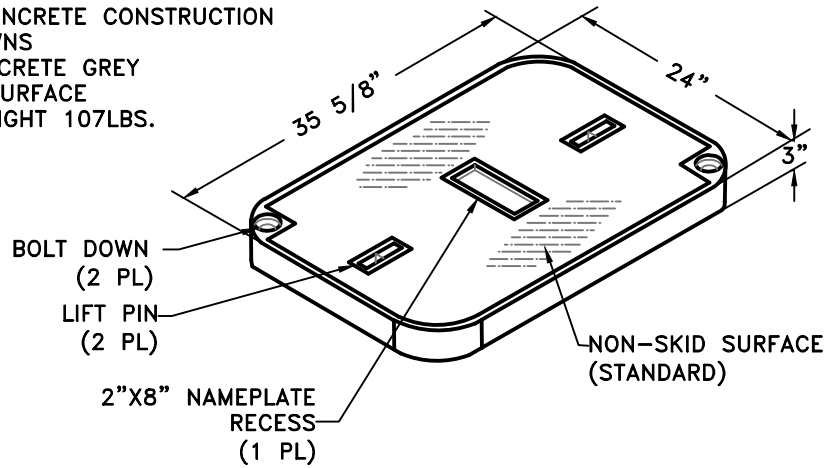


DETAIL NO.
1800

2436/18 FRP/PC
ASSEMBLY

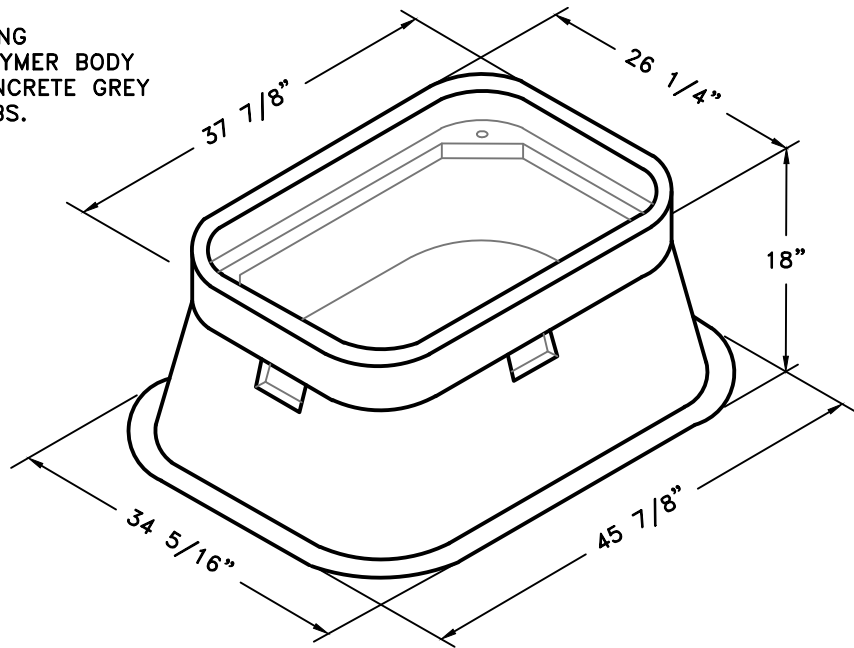
COVER FEATURES:

- * STANDARD LOAD RATING: 20,800LBS. WHEEL LOAD ON 10"X20" PLATE
- * POLYMER CONCRETE CONSTRUCTION
- * 2 BOLT DOWNS
- * COLOR: CONCRETE GREY
- * NON-SKID SURFACE
- * APPROX. WEIGHT 107LBS.



BOX FEATURES:

- * POLYMER CONCRETE RING
- * FIBER RIENFORCED POLYMER BODY
- * COLOR OF RING = CONCRETE GREY
- * APPROX. WEIGHT 110LBS.



APPROVED PULL BOXES

BRAND	BOX WITH COVER	COVER ONLY	8" EXTENSION	NOTES
NEW BASIS (SHOWN)	FCA243618T	PCC2436A1A20	FCE243608T	FIBER REINFORCED POLYMER (FPR) BODY POLYMER CONCRETE BOX WITH POLYMER LID & 1/2" SS PENTA BOLTS
CDR	A10-2436-18186	C10-2436-0386	E00-2436-0848	FIBER REINFORCED POLYMER (FPR) BODY POLYMER CONCRETE BOX WITH POLYMER LID & 1/2" SS PENTA BOLTS
ARMORCAST	A6001974TAX18	A6001974T	A6001974EX8	FIBER REINFORCED POLYMER (FPR) BODY POLYMER CONCRETE BOX WITH POLYMER LID & 1/2" SS PENTA BOLTS

APPROVED BY:
BILL SANDHU, CITY ENGINEER
C59650

REVISED: DATE:

REVISED: DATE:

REVISED: DATE:

LIGHTING & TRAFFIC

PULL BOX #2

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345



DETAIL NO.
1801

T. SIGNAL COLOR ASSIGNMENTS

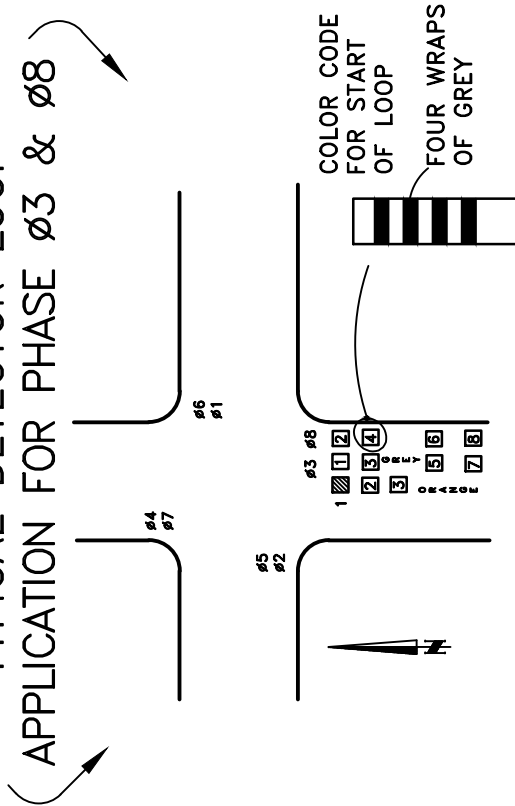
COLOR	POLE	D.L.C. PHASE
BROWN	A	ø1
RED	B	ø2
ORANGE	C	ø3
YELLOW	D	ø4
GREEN	E	ø5
BLUE	F	ø6
PURPLE	G	ø7
GREY	H	ø8

WHITE * I * *USED FOR
 BLACK * J * ADDITIONAL POLES.

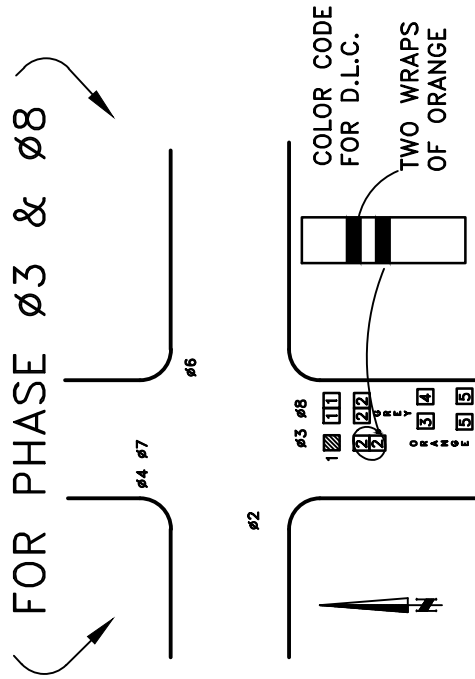
THE TYPICAL DETECTOR LOOP DRAWING SHOWS THE NUMBER OF WRAPS OF GREY TAPE AT THE START OF THE DETECTOR LOOP FOR PHASE 8. THE NUMBER SHOWN IN THE DETECTOR LOOP INDICATES THE NUMBER OF WRAPS OF TAPE FROM THE COLOR ASSIGNMENT CHART TO BE USED.

THE TYPICAL DLC DRAWING SHOWS THE NUMBER OF WRAPS OF ORANGE TAPE FOR THE DLC FOR A PHASE 3 LOOP. THE DLC SHALL BE MARKED AT THE LOOP SPlice, EVERY PULLBOX AND IN THE SIGNAL CONTROLLER CABINET.

TYPICAL DETECTOR LOOP APPLICATION FOR PHASE ø3 & ø8



TYPICAL DLC APPLICATION FOR PHASE ø3 & ø8



APPROVED BY:
 BILL SANDHU, CITY ENGINEER
 C59650

REVISED: DATE:

REVISED: DATE:

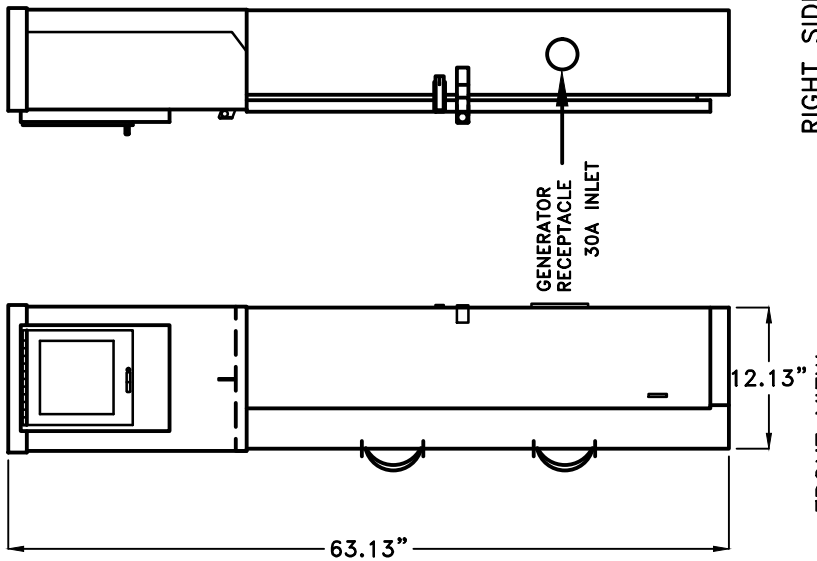
REVISED: DATE:

LIGHTING & TRAFFIC TRAFFIC SIGNAL COLOR ASSIGNMENTS

ADOPTED BY CITY COUNCIL
 RESOLUTION NO. 2014-345

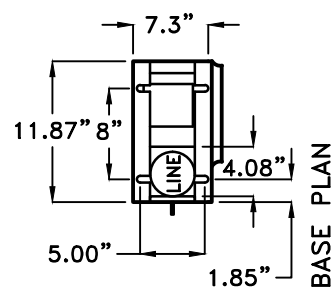


DETAIL NO.
 1802

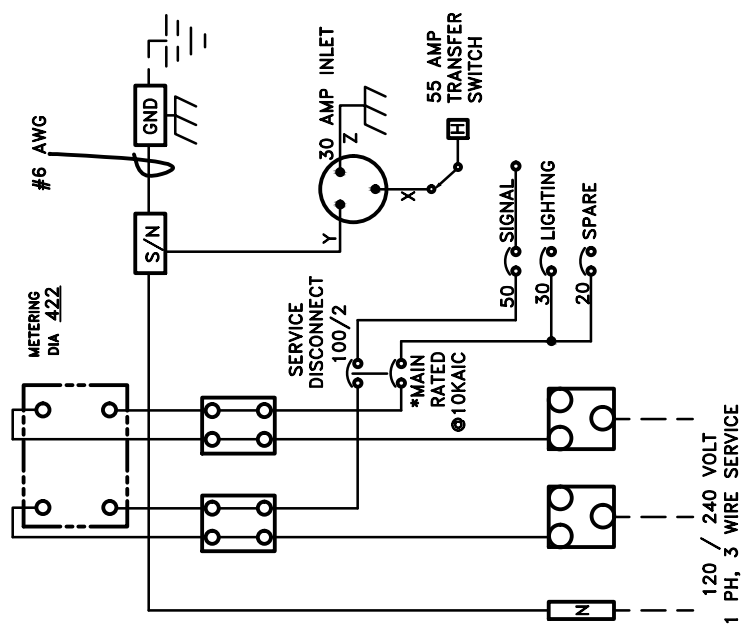


RIGHT SIDE

FRONT VIEW



BASE PLAN



WIRING DIAGRAM

****NOTE: LOAD CURRENT FOR ALL BREAKERS NOT TO EXCEED 80% OF BREAKER AMPERAGE**

ENCLOSURE CONSTRUCTION NOTES

1. EXTERIOR, 1/8" ALUMINUM, AND INTERIOR 14 GA COLD ROLLED STEEL ELECTRICALLY WELDED AND REINFORCED WHERE REQUIRED.
2. CONSTRUCTION WILL BE NEMA. 3R, RAIN TIGHT.
3. ALL NUTS, BOLTS AND SCREWS WILL BE STAINLESS STEEL.
4. NUTS, BOLTS & SCREWS WILL NOT BE VISIBLE FROM OUTSIDE OF ENCLOSURE.
5. NAMEPLATES WILL BE PROVIDED AS REQUIRED.
6. CONTROL WIRING WILL BE MARKED AT BOTH ENDS BY PERMANENT WIRE MARKERS.
7. A PLASTIC COVERED WIRING DIAGRAM WILL BE ATTACHED TO THE INSIDE OF THE FRONT DOOR.
8. ENCLOSURE WILL BE FACTORY WIRED AND CONFORM TO REQUIRED NEMA STANDARDS.
9. AND UL 508A STANDARDS.
9. ANODIZE AFTER FABRICATION

APPROVED BY: BILL SANDHU, CITY ENGINEER C59650	
REVISED:	DATE:
REVISED:	DATE:
REVISED:	DATE:

LIGHTING & TRAFFIC

WIRING DIAGRAM

ADOPTED BY CITY COUNCIL
RESOLUTION NO. 2014-345

MODESTO
CALIFORNIA

DETAIL NO.
1803

CHAPTER 19

OPTICALLY ACTIVATED, DATA-ENCODED, TRAFFIC SIGNAL PRIORITY CONTROL SYSTEM

19.01 SYSTEM DESCRIPTION

The required priority control system will employ data-encoded optical communication to identify the presence of designated priority or probe vehicles. A record of the vehicle by classification and identification number shall be created. In priority vehicle mode, the data-encoded optical communication will request the traffic signal controller to advance to and/or hold a desired traffic signal display selected from phases normally available. In probe vehicles mode, no traffic signal priority is requested-only a record of the probe vehicle's presence is generated.

The priority control system will consist of a matched system of optical emitters, optical detectors, optical detector cable, phase selectors, and system software.

The emitter will generate an infrared, data-encoded optical signal. The optical signal will be detected and recognized by the optical detectors at or near the intersection over a line-of-sight path of up to 2,500 ft. (762m) under clear atmospheric conditions. The phase selector will process the signal from the detector to ensure that the signal (1) is valid base frequency, (2) is correctly data-encoded, and (3) is within user-settable range. If these conditions are met, the phase selector will generate a priority control request (i.e., a green light) for the approaching priority vehicles, or record the presence of approaching probe vehicles by classification and identification number.

The system will require no action from the vehicle operator other than to turn the emitter on. The system will operate on a first-come, first-served basis. Higher priority (Command) requests will override lower priority (Advantage) requests. The system will interface with most traffic signal controllers and will not compromise normal operation or existing safety provisions.

19.02 MATCHED SYSTEM COMPONENTS

The required priority control data-encoded optical communications system will be comprised of five basic matched components: optical emitter, optical detector, detector cable, phase selector and system software. To ensure system integrity, operation, and compatibility, all components will be from the same manufacturer. The system will offer compatibility with most signal controllers, e.g., electromechanical, NEMA (National Electrical Manufacturers Association), 170. Interfacing to an electromechanical controller may require the use of an interface card.

- A. Data-Encoded Emitter. The data-encoded emitter will trigger the system. It will send the encoded infrared signal to the optical detector. It will be located on the priority or probe vehicle.
- B. Optical Detector. The optical detector will change the infrared signal to an electrical signal. It will be located at or near the intersection. It will send the

electrical signal, via the optical detector cable to the phase selector.

- C. Optical Detector Cable. The optical detector cable will carry the electrical signal from the detector to the phase detector.
- D. Phase Selector. The phase selector will accommodate data-encoded communication and will validate, identify, classify and record the signal from the detector. It will be located within the controller cabinet at the intersection. It will request the controller to provide priority to the requesting vehicle and/or record presence of a probe vehicle.
- E. Card Rack. The card rack will provide simplified installation of a phase selector into controller cabinets that do not already have a suitable card rack.
- F. System Software. The system software will be compliant with the most current Windows™ program. It supports system configuration and gathering of operational information.
- G. Electromechanical Card. The electromechanical card shall provide electrical interface between the phase selector and electromechanical-type traffic controllers.

19.03 SYSTEM COMPONENT SPECIFICATIONS

- A. Data-Encoded Optical Emitter
 - 1. The required data-encoded emitter will generate the optical signal, which serves as the trigger to the rest of the priority control system. The optical signal generated by the emitter will be a series of data-encoded flashes from a single light source. The flash signal will consist of a fixed frequency base signal and a coded overlay signal that can be used to transmit information.
 - 2. The data-encoded emitter will be powered by the DC voltage supplied from the vehicle's battery, 10 to 16 volts DC.
 - 3. The flash sequence generated by the data-encoded emitter will carry three types of information:
 - a. The first type will be the base frequency of either 9.63855HZ+/-0.0014HZ for an Advantage priority emitter, or 14.03509HZ +/-0.003HZ for a Command priority emitter.
 - b. The second type of information generated by the data-encoded emitter will be a vehicle classification and identification code that is interleaved into the base frequency flashes. Setting the vehicle classification and identification code will be accomplished through four, 10-position rotary switches located in the power supply of the data-encoded emitter. Each data-encoded emitter will be capable of setting a minimum of 10 different classifications with 1,000 different identification numbers per class for Command priority and an equal number for Advantage priority, for a total of 10,000 codes for each priority.

- c. The third type of information generated by the data-encoded emitter will be reserved for the intersection detection range. The system will enable the Traffic Engineer to manually activate the range code from his/her vehicle using an emitter ON/OFF switch equipped with a special SET RANGE push button. The system configured with a clear lens, will accommodate setting a separate range from 200 feet (61m) to 2,500 feet (762m) for both Command or Advantage priority signals. The system, configured with a visible light filter, will accommodate setting a separate range from 200 feet (61m) to 1,800 feet (549m) for both Command or Advantage priority signals.
4. While operating, the data-encoded emitter will conduct self-diagnostics designed to check for data transmission integrity. Any failures of the self-diagnostic tests shall be displayed by flashing of the indicator light.
5. Each data-encoded emitter will be supplied with ON/OFF switch. The switch will be equipped with an indicator light providing internal diagnostics that will assist in troubleshooting. The indicator light will operate as follows:
 - a. Steady on when the data-encoded emitter is operating.
 - b. Flash at 0.5HZ rate when the data-encoded emitter is disabled.
 - c. Flash at a 4HZ rate when the emitter is missing pulses.
6. The data-encoded emitter will be supplied complete with all cables needed for installation. The cable that connects the flash head to the power supply will be pre-assembled with connectors for both ends; it will be available in two lengths, 4 feet (1.2m) and 15 feet (4.6m). The cable that connects the power supply to the vehicle battery will have a connector on the power supply end and no connector on the battery end; it will be at least 25 feet (7.6m) in length.
7. The data-encoded emitter will be equipped with a disable input that, when activated, will cease unit operation, thereby eliminating the possibility of inadvertent signal transmission after the priority vehicle has arrived at its destination. The unit will start up with a disable input active.
8. The data-encoded emitter will operate over a temperature range of -30°F (-34°C) to $+140^{\circ}\text{F}$ ($+60^{\circ}\text{C}$).
9. The data-encoded emitter will operate over a relative humidity range of 5% to 95%.

B. Optical Detector

1. The required optical detector will be a lightweight, weatherproof device capable of sensing and transforming pulsed optical energy into electrical signals for use by the phase selection equipment.
2. The optical detector will be designed for mounting at or near an intersection

on mast arms, pedestals, pipes or span wires.

3. Each optical detector will be supplied with mounting hardware to accommodate installation on mast arms. Additional hardware shall be available for span wire installations.
4. The optical detector design shall include adjustable tubes to enable their reorientation for span wire mounting without disassembly of the unit.
5. The optical detector will accept optical signals from one or two directions and will provide single or dual electrical output signal(s).
6. The optical detector will be available in three configurations:
 - a. Uni-directional with one output channel.
 - b. Bi-directional with one output channel
 - c. Bi-directional with two output channels.
7. The optical detector will allow aiming of the two optical sensing inputs for skewed approaches or slight curves.
8. The optical detector will have a built-in terminal block to simplify wiring connections.
9. The optical detector will receive power from the phase selector and will have internal voltage regulation to operate from 18 to 37 volts DC.
10. The optical detector will respond to a clear lens data-encoded optical emitter at a distance of 2,500 feet (762m) under clear atmospheric conditions. If the emitter is configured with a visible light filter, the detector will respond at a distance of 1,800 feet (549m) under clear atmospheric conditions. The noted distances shall be comparable day and night.
11. The optical detector will deliver the necessary electrical signal to the phase selector via an optical detector cable up to 1,000 feet (305m) in length.

C. Optical Detector Cable

1. The optical detector cable shall deliver sufficient power from the phase selector to the optical detector and will deliver the necessary quality signal from the detector to the phase selector over a non-spliced distance of 1,000 feet (305m).
2. The cable will be of durable construction to satisfy the following installation methods:
 - a. Direct burial
 - b. Conduit and mast arm pull.

- c. Exposed overhead (supported by messenger wire).
- 3. The outside diameter of the optical detector cable will not exceed 0.3 inches (7.62mm).
- 4. The insulation rating of the optical detector cable will be 600 volts minimum.
- 5. The temperature rating of the optical detector cable will be +167° (+75C) minimum.
- 6. The conductors will be shielded with aluminized polyester and have an AWG #20 (7 x 28) stranded and individually tinned drain wire to provide signal integrity and transient protection.
- 7. The optical detector will allow aiming of the two optical sensing inputs for skewed approaches or slight curves.
 - a. Orange for delivery of optical detector power (+).
 - b. Drain wire for optical detector power return (-).
 - c. Yellow for optical detector signal #1.
 - d. Blue for optical detector signal #2.
- 8. The characteristic impedance of the detector cable shall be:
 - 0.6ohms/1000"
 - 14.3F/1000'
- 9. The shield wrapping will have a 20% overlap to ensure shield integrity following conduit and mast arm pulls.

D. Phase Selector

- 1. The phase selector, designed to be installed in the traffic controller cabinet, will accommodate data-encoded signals and is intended for use directly with numerous controllers. These include California/New York Type 170 controllers with compatible software, NEMA controllers, or other controllers along with the system chassis and suitable system interface equipment and controller software.
- 2. The phase selector will be a plug-in, two or four channel, multiple-priority device intended to be installed directly into a card rack located within the controller cabinet.
- 3. The phase selector will be powered from 115 volt (95 volts AC to 135 volts AC), 60Hz mains and will contain an internal, regulated power supply that supports up to twelve optical detectors.
- 4. Programming the phase selector and retrieving the data stored in it will be

accomplished using an IBM PC-compatible computer and the system interface software. The connection can be made either directly, via the computer's communication (COM) port, or remotely via a modem. The communication port on the phase selector will be an RS232 interface located on the front and back of the unit.

5. The phase selector will have the capability of storing up to 1,000 of the most recent priority control calls. When the log is full, the phase selector will drop the oldest entry to accommodate the new entry. The phase selector will store the record in non-volatile memory and will retain the record if power terminates. Each record entry will include nine points of information about the priority call, as follows:
 - a. Classification: Indicates the type of vehicle.
 - b. Identification number: Indicates the unique ID number of the vehicle.
 - c. Priority level: Indicates whether Command or Advantage priority, or Probe frequency is requested by the vehicle.
 - d. Director: Channel A, B, C, or D: Indicates the vehicle's direction of travel.
 - e. Call duration: Indicates the total time in seconds the priority status is active.
 - f. Final greens at end of call: Indicates which phases are green.
 - g. Duration of final greens: Indicates the total time of priority greens.
 - h. Time and date call ended: Indicates the time a priority status ended; provided in second, minute, hour, day, month, and year.
 - i. Maximum signal intensity: Indicates the strongest signal intensity measured by the phase selector during call.
 - j. Priority output active: Indicates if the phase selector requested priority from the controller for the call.
6. The phase selector will include several control timers that will limit or modify the duration of a priority control condition, by channel, and can be programmed from a PC-type computer. The control timers will be as follows:
 - a. MAX CALL TIME: Will set the maximum time a channel is allowed to be active. It will be settable from 120 to 65,535 seconds in one-second increments. Its factory default must be the maximum time.
 - b. CALL EXTENSION TIME: Will set the time a call is held on a channel after the priority signal is no longer being received. It will be settable from one to 255 seconds in one-second increments. Its factory default must be six seconds.

- c. CALL DELAY TIME: Will set the time a call must be recognized before the phase selector activates the corresponding output. It will be settable from zero to 255 seconds in one-second increments. Its factory default must be zero seconds.
- 7. The phase selector's default values shall be re-settable by the operator using an IBM PC-compatible computer, or manually using the switches located on its front.
- 8. The phase selector will be capable of three levels of discrimination of data-encoded optical signals as follows:
 - a. Verification of the presence of the base optical signal of either 14.03509Hz for Command priority, 9.63855Hz for Advantage priority or 11.25870HZ \pm 0.0114Hz for Probe frequency.
 - b. Determination of when the vehicle is within the predetermined range.
 - c. Validation of the optical signal data-encoded pulses.
- 9. The phase selector's card edge connector will include primary optical detector inputs and power outputs. Two additional detector inputs per channel will be provided on a front panel connector.
- 10. The phase selector will include one opto-isolated NPN output per channel that provides the following electrical signal to the appropriate pin on the card edge connector:
 - a. 6.25HZ \pm 0.1HZ 50% on/duty square wave in response to an Advantage priority call.
 - b. A steady ON in response to a Command priority call.
- 11. The phase selector will accommodate three methods for setting the high and low priority optical sensitivity (emitter range):
 - a. Using an encoded emitter with range-setting capability.
 - b. Using any optical emitter by manipulating the front panel switches.
 - c. Inputting the information via the communication port.
- 12. The phase selector will have a solid state POWER ON LED indicator that flashes to indicate unit diagnostic mode and illuminates steadily to indicate proper operation.
- 13. The phase selector will have internal diagnostics to test for proper operation. If a fault is detected, the phase selector will use the front panel LED indicators to display fault information.

14. The phase selector will have a Command (High) and Advantage (Low) solid state LED indicator for each channel to display active calls.
15. The phase selector will have a test switch for each channel to test proper operation of Command or Advantage priority.
16. The phase selector will properly identify a Command priority call with the presence of 10 Advantage priority data-encoded emitter signals being received simultaneously on the same channel.
17. The phase selector will have write-on pads to allow identification of the phase and channel.
18. The phase selector will have a test for each channel to test proper operation of Command or Advantage priority.
19. The phase selector shall provide one isolated confirmation light control output per channel. These outputs are user configurable through software for a variety of confirmation light sequences.
20. The NEMA model of the phase selector shall have outputs for the control of NEMA controllers that lack internal preemption capability. The function shall be accomplished through the use of Manual Control Enable, Interval Advance and Phase Omit signals.
21. The phase selector shall have the capability of recording the presence of a vehicle transmitting at the specified Probe frequency. The phase selector shall at no time attempt to modify the intersection operation in response to the Probe frequency.
22. The phase selector shall have the capability of providing Advantage priority in a mode where the output to the controller is gated or controlled by timing relationships within the controller cycle.
23. The phase selector shall have the capability to assign a relative priority to a call request within Command or Advantage priority. This assignment is based on the received vehicle ID class.
24. The phase selector shall have the capability to discriminate between individual ID codes, and allow or deny a call output to the controller based on this information.
25. The phase selector shall have the capability to log call requests by unauthorized vehicles.
26. The phase selector shall have the ability to command an emitter to relay a received code to the next intersection.
27. The selector shall have the capability of functionally testing connected detector circuits and indicating via front panel of LED's non-functional detector circuits.

28. The phase selector shall incorporate a precision real time clock synchronized to the utility AC power line frequency.
29. The phase selector shall include an auxiliary interface panel to facilitate interconnections between the phase selector and traffic cabinet wiring.

E. Card Rack

1. The required card rack will provide simplified installation of a phase selector into controller cabinets that do not already have a suitable card rack.
2. The card rack will be factory wired to one connector, located under the card slot, and a terminal block, located next to the phase selector slot, on the front of the card rack.
3. The card rack connector on the front will provide for all connections to the traffic controller.
4. The card rack will provide labeled terminal blocks for connecting the primary optical detectors to a phase selector.

F. Interface Card for Electromechanical Controllers

1. The required interface card for electromechanical controllers will provide electrical and logic interface between the phase selector and an electromechanical-type controller.
2. The inputs to the interface card for electromechanical controllers will be connected to the outputs of the phase selector.
3. The outputs of the interface card for electromechanical controllers will be connected to the Hand Control Switch or Police Panel where the dial motor and its self-generated solenoid advance pulses are disconnected from the cam/solenoid assembly and replaced by pulses generated by the action of the Hand Control Switch in the electromechanical-type controller.
4. The interface card for electromechanical controllers will decode the outputs of the phase selector(s) and advance the controller to the phase that is set for that channel by sensing the traffic controller signal indications.
5. The interface card for electromechanical controllers will have one input to disable the interface card.
6. The interface card for electromechanical controllers will include the following switches:
 - a. Channel 1 Green Time: 16-position rotary switch; Controls timing between advance pulses, in seconds, when in Phase 1 green.
 - b. Channel 2 Green Time: 16-position rotary switch; Controls timing

between advance pulses, in seconds, when in Phase 2 green.

- c. Channel 3 Green Time: 16-position rotary switch; Controls timing between advance pulses, in seconds, when in Phase 3 green.
- d. Channel 4 Green Time: 16-position rotary switch; Controls timing between advance pulses, in seconds, when in Phase 4 green.
- e. NON Green Time: 16-position rotary switch; Controls timing between advance pulses, in seconds, when no indications are green.
- f. Power Switch.

G. Interface Software

- 1. The priority control interface software will be provided on 3.5", 1.44MB diskettes to interface with the phase selector. It must run on most IBM-compatible computers equipped with at least 512 KB RAM, Windows™ 95 and color VGA display capability.
- 2. The priority control interface software must accommodate:
 - a. Setting up and presenting user-determined system parameters.
 - b. Viewing and changing settings.
 - c. Viewing activity screens.
 - d. Displaying and/or downloading records of previous activity showing class, code, priority, direction, call duration, final greens at end of call, duration of final greens, time call ended in real time plus maximum signal intensity (vehicle location information). This information may be used to reconstruct the route taken by a priority (or probe) vehicle to track the vehicle.
- 3. The priority control interface software must accommodate operation via a mouse or via the keyboard, or in combination.
- 4. The priority control interface software must provide menu displays to enable:
 - a. Setting of valid vehicle ID classes and codes.
 - b. Establishing signal intensity thresholds (detection ranges), modem initialization, intersection name and timing parameters.
 - c. Setting of desired green signal indications during priority control operation and upload and download capability to view.
 - d. Resetting and/or retrieving logged data and priority vehicle activity.
 - e. Addressing for each card in a multi-drop connected system.

- f. Confirmation light configuration.
- g. NEMA Control Parameters.

19.04 RELIABILITY

- A. All equipment supplied as part of the optical priority control system intended for use in the controller cabinet will meet the following electrical and environmental specifications spelled out in the NEMA Standards Publication TS2 1992, Part 2.
 - 1. Line voltage variations per NEMA TS2 1992, Paragraph 2.1.2.
 - 2. Power source frequency per NEMA TS2 1992, Paragraph 2.1.3.
 - 3. Power source noise transients per NEMA TS2 1992, Paragraph 2.1.6.1.
 - 4. Temperature range per NEMA TS2 1992, Paragraph 2.1.5.1.
 - 5. Humidity per NEMA TS2 1992, Paragraph 2.1.45.2.
 - 6. Shock test per NEMA TS2 1992, Paragraph 3.13.9.
 - 7. Vibration per NEMA TS2 1992, Paragraph 3.13.8.
- B. Each piece of equipment supplied as part of the priority control system intended for use in or on priority vehicles will operate properly across the entire spectrum of combinations of environmental conditions (temperature range, relative humidity, vehicle battery voltage) per the individual component specifications.

19.05 QUALIFICATIONS

- A. The manufacturer of the required optical priority control system will verify the proven, safe operation of the system's optical communication technology. Upon request, the manufacturer will produce a list of 20 user agencies having two years or more experience interfacing priority control equipment with electromechanical, solid-state and programmable controller types.
- B. The manufacturer will demonstrate the ability to finance ongoing technical support, written product warranties, and responsibility for product failure.
- C. Upon request, the manufacturer will produce a copy of its last full year and four previous years' corporate financial statements.
- D. The manufacturer will have an independent quality department that has complete authority to control product integrity and is answerable only to the senior officer of the organization.

19.06 RESPONSIBILITIES

- A. The manufacturer of the required optical priority control system and/or the

manufacturer's representative will provide responsive service before, during and after installation of the priority control system. The manufacturer and/or the manufacturer's representative, as consultants to the installer, will provide certified, trained technicians having traffic systems industry experience and operational knowledge of priority control systems.

- B. The lowest fully responsive bidder will be required to supply working production components specified in the Specifications with 14 calendar days from the bid opening date. Failure to do so will render the bid non-responsive.
- C. Paragraph B will not be required if, prior to the bid opening, the bidder demonstrated to the City that the equipment bid meets these specifications.

19.07 SUBSTANTIATED WARRANTY

- A. The manufacturer of the required optical priority control system will warrant that, provided the priority control system has been properly installed, operated and maintained, component parts of a matched component system (see Section II) that prove to be defective in workmanship and/or material during the first five years from the date of shipment from the manufacturer will be covered in a documented system-protection plan, plus an added five-year warranty for repair or replacement at a fixed deductible charge for a total of 10 years of product coverage.
- B. In addition, upon request, the manufacturer will provide documentation proving ability to financially support the 10-year provisions of the warranty. Documentation will include appropriate financial reports for the previous five business years.
- C. The protection plan will warrant that component parts of a matched component system that prove to be defective in workmanship and/or material during the first five years from the date of shipment from manufacturer will be repaired at no charge, and that extended coverage with a fixed repair deductible will be available for an additional five years.
- D. In total, the warranty coverage must assure that system components will be available to allow system operation during the 10-year warranty period.
- E. A copy of the manufacturer's written warranty outlining the conditions stated above will be supplied with the bid.

19.08 CERTIFICATE OF INSURANCE

The manufacturer of the required optical priority control system will provide a certificate of product liability insurance protection for \$5,000,000 assuring the priority control user that the manufacturer is insured against civil damages if proven to be at fault for an accident due to equipment failure within the system of matched priority control components. This certificate, however, need not, and is not meant to provide liability insurance protection to the priority control system dealer, installer or user.

19.09 USER SUPPORT SERVICES

The manufacturer of the required optical priority control system will offer support programs to

assist the purchase and implementation of a priority control system program, including:

- A. A preferred lease program to finance purchase of a system.
- B. Public relations assistance to promote the system within the user community.
- C. Intersection survey service to document appropriate equipment interfaces.
- D. Customized proposals to assist the procurement process.

19.10 CERTIFICATION

The manufacturer of the required priority control system will certify that all component products are designed, manufactured and tested as a system of matched components and will meet or exceed the requirements of this specification.

Full compensation for conforming to the requirements of this section shall be considered as included in the lump sum prices bid for the traffic signal item involved, and no additional allowance will be made therefore.

SIGNAL FLASH TEST REPORT

Intersection Of: _____ Date: _____

Tested By: _____

<u>PHASES</u>	<u>RED</u>	<u>AMBER</u>	<u>GREEN</u>
PHASE 1			
PHASE 2			
PHASE 3			
PHASE 4			
PHASE 5			
PHASE 6			
PHASE 7			
PHASE 8			

<u>PEDESTRIAN PHASES</u>	<u>WALK</u>	<u>DON'T WALK</u>
PHASE 2		
PHASE 4		
PHASE 6		
PHASE 8		

DETECTOR LOOP TEST REPORT

Intersection Of: _____

Date: _____

Tested By: _____

<u>LOOP</u>	<u>FREQUENCY NO CALL</u>	<u>FREQUENCY WITH CALL</u>
111U		
111L		
119U		
212U		
212L		
213U		
213L		
214U		
214L		
315U		
315L		
319L		
416U		
416L		
417U		
417L		
418U		
418L		

<u>LOOP</u>	<u>FREQUENCY NO CALL</u>	<u>FREQUENCY WITH CALL</u>
5J1U		
5J1L		
5J9U		
6J2U		
6J2L		
6J3U		
6J3L		
6J4U		
6J4L		
7J5U		
7J5L		
7J9L		
8J6U		
8J6L		
8J7U		
8J7L		
8J8U		
8J8L		

APPENDIX A

BONDING

1.01 GENERAL

Developers required to bond improvements within the City will be screened utilizing the proceeding cost schedule wherever possible. This schedule will be updated every few years based on numerous bids.

1.02 BOND ESTIMATE COSTS

A. EARTHWORK & PAVING

	<u>DESCRIPTION</u>	<u>UNIT COST</u>
1.	Clear, Grub & Mobilization	If total costs \$0 to \$200K then 15% If total costs \$200K to \$600K then 8% If total costs exceed \$600K then 4%
2.	Roadway Excavation	0 to 5,000 cy - \$40.00/cy Above 5,000 cy - \$24.00/cy
3.	General Excavation	\$12.00/cy
4.	Subgrade (concrete)	\$0.85/sf
5.	Import (incl. spread)	\$8.00/cy
6.	Export	\$12.00/cy
7.	Finish Grading	\$0.70/sf
8.	Grade Landscape	0 to 20,000sf - \$0.30/sf 20K & up - \$0.15/sf
9.	Channel Excavation	\$10/cy (incl. trimming banks)
10.	Engineer Rock	\$55/cy
11.	Cobbles	\$50/cy or \$3.50/sf
12.	Grouted Cobbles	\$65/cy or \$4.50/sf
13.	Bridge/Structure Excavation	\$35/cy
14.	3/4" AB or ASB	\$49/cy
15.	HMA	\$80/tn
16.	Prime Coat	\$775/tn
17.	Seal Coat (park top or =)	\$0.18/sf
18.	Crushed Rock	\$60/cy
19.	Geotextile Fabric (subgrade)	\$1.30/sf
20.	Petromat (overlays)	\$1.00/sy
21.	HMA Overlay	\$1.00/sf per in (w/Tack Coat)
22.	12" Lime Treated Base	\$0.80/sf (thru Final Trim)

B. CONCRETE WORK

	<u>DESCRIPTION</u>	<u>UNIT COST</u>
1.	8" Median Curb	\$27/lf
2.	6" Vertical Curb & Gutter	\$19/lf
3.	4.5" Drive Over Curb	\$19/lf
4.	6" Extruded Curb (epoxy)	\$12/lf
5.	Monolithic Curb, Gutter & Sidewalk	\$43/lf
6.	Sidewalk	\$5.80/sf
7.	Structural Concrete (Exclude exc. & backfill)	1 to 50 cy - \$900cy 50 cy & above - \$390/cy
8.	Catch Basin (Type I)	\$2,350/ea
9.	Catch Basin (Type II)	\$3,000/ea
10.	Junction Box	\$1,700/ea
11.	Concrete Flatwork	6" conc/4" AB - \$10/sf
12.	Bomanite	\$7/sf
13.	Paving Stones	\$5/sf
14.	Concrete Cap (on utilities)	\$5/lf
15.	Seeded Concrete Flatwork	Add \$0.70/sf to unit cost
16.	Colored Concrete	Add \$0.50/sf to unit cost
17.	Concrete Lining (Guniting)	\$3/sf
18.	Concrete Lining (w/mesh)	\$3.50/sf
19.	Rebar in Lining	\$1/lb
20.	Valley Gutter	\$25/lf
21.	Handicap Ramp (Labor Only)	\$425/ea

C. WATER SYSTEM

	<u>DESCRIPTION</u>	<u>UNIT COST</u>
1.	8" Water Main	\$50/lf
2.	8" Water Main DIP CL-350	\$130/lf
3.	10" Water Main	\$70/lf
4.	12" Water Main	\$85/lf
5.	12" Water Main DIP CL-350	\$140/lf
6.	15" Water Main DIP CL-350	\$150/lf
7.	18" Water Main DIP CL-350	\$160/lf
8.	24" Water Main DIP CL-350	\$180/lf
9.	8" Gate Valve	\$1,200/ea
10.	10" Gate Valve	\$1,500/ea
11.	12" Butterfly Valve	\$1,600/ea
12.	15" Butterfly Valve	\$2,200/ea
13.	16" Butterfly Valve	\$3,775/ea
14.	18" Butterfly Valve	\$4,000/ea
15.	24" Butterfly Valve	\$5,200/ea
16.	Air Release Valve (ARV)	\$2,500/ea
17.	Blowoff Valve	\$1,500/ea
18.	Water Service (Connect to Ex. Main)	\$1,500/ea
19.	Irrigation Service	\$350/ea
20.	Domestic Water Service	\$300/ea
21.	2½" dia PVC & Smaller	\$12/lf

C. WATER SYSTEM (Con't.)

	<u>DESCRIPTION</u>	<u>UNIT COST</u>
22.	Water Quality Sampler	\$2,000/ea
23.	Bore & Jack	\$12/lf per diameter inch
24.	Fire Hydrant	\$3,500/ea

D. SEWER SYSTEM

	<u>DESCRIPTION</u>	<u>UNIT COST</u>
1.	6" SS VCP	\$45/lf
2.	8" SS VCP	\$60/lf
3.	10" SS VCP	\$75/lf
4.	12" SS VCP	\$90/lf
5.	15" SS VCP	\$112.50/lf
6.	18" SS VCP	\$135/lf
7.	21" SS VCP	\$138.75/lf
8.	24" SS VCP	\$157.50/lf
9.	SS Lateral	\$1,000/ea
10.	Cleanout	\$1,000/ea
11.	SSMH	\$3,100/ea
12.	Trunk SSMH	\$15,000/ea
13.	Street Tie-In	\$3,000/ea
14.	Adjust Manhole to Grade	\$620.50/ea
15.	Bore & Jack	\$12/lf per diameter inch
16.	8" Plug	\$100/ea
17.	10" Plug	\$125/ea
18.	12" Plug	\$150/ea
19.	Connect to Ex. SSMH	\$2,000/ea

E. STORM DRAIN SYSTEM

	<u>DESCRIPTION</u>	<u>UNIT COST</u>
1.	12" RCP	\$45/lf
2.	15" RCP	\$50/lf
3.	18" RCP	\$55/lf
4.	21" RCP	\$60/lf
5.	24" RCP	\$65/lf
6.	30" RCP	\$100/lf
7.	36" RCP	\$110/lf
8.	36" CIPP	\$65/lf
9.	42" RCP	\$135/lf
10.	42" CIPP	\$80/lf
11.	48" RCP	\$155/lf
12.	48" CIPP	\$93/lf
13.	54" RCP	\$180/lf
14.	54" CIPP	\$108/lf
15.	60" RCP	\$225/lf
16.	60" CIPP	\$135/lf

E. STORM DRAIN SYSTEM (Con't.)

	<u>DESCRIPTION</u>	<u>UNIT COST</u>
17.	72" RCP	\$325/lf
18.	72" CIPP	\$195/lf
19.	84" RCP	\$415/lf
20.	84" CIPP	\$250/lf
21.	96" RCP	\$540/lf
22.	96" CIPP	\$324/lf
23.	48" SDMH	\$3,000/ea
24.	60" Manhole	\$3,500/ea
25.	Rockwell (complete)	\$7,800/ea
26.	Rip Rap/Engr. Rock	\$105/cy
27.	Bore & Jack	\$12 per diameter inch per lf
28.	12" Plug	\$250/ea
29.	15" Plug	\$275/ea
30.	18" Plug	\$300/ea
31.	Adjust Manhole to Grade	\$625/ea
32.	Connect to Ex. SD Stub	\$450/ea
33.	Connect to Ex. SDMH	\$1,500/ea

F. ELECTRICAL

	<u>DESCRIPTION</u>	<u>UNIT COST</u>
1.	Conduit and Cable/Trench	\$16/lf
2.	100W Electrolier	\$4,800/ea
3.	150W Electrolier	\$5,000/ea
4.	200W Electrolier	\$5,200/ea
5.	Pull Box	\$500/ea
6.	Traffic Signal New Rd. w/o Turn Lt	\$70,000/ea
7.	Traffic Signal New Rd. w/ Turn Lt	\$85,000/ea
8.	Joint Trench	\$15/lf

G. MISCELLANEOUS

	<u>DESCRIPTION</u>	<u>UNIT COST</u>
1.	AC Patching	\$6/sf
2.	Concrete.. Patching (SW gaps)	\$400/ea
3.	Hydroseeding	\$0.13/sf
4.	Landscape	\$7.50/sf
5.	Street Sign w/Stop Sign Attached	\$300/ea
6.	Signs	\$250/ea
7.	Relocate Signs	\$175/ea
8.	FH Markers	\$12/ea
9.	Striping (not thermoplastic)	\$0.40/lf
10.	Monuments	\$150/ea
11.	Barricades	\$40/lf
12.	6' Chain Link Fence	\$34/lf
13.	3 Strand Barbed Wire Fence	\$6/lf
14.	6' Masonry Sound Wall	\$70/lf

G. MISCELLANEOUS (Con't.)

	<u>DESCRIPTION</u>	<u>UNIT COST</u>
15.	Chain Link Gates	\$50/lf
16.	Header Board	\$7/lf
17.	Redwood Fence	\$25/lf
18.	Relocate Electrolier	\$1,000/ea
19.	Relocate Fire Hydrant	\$3,000/ea

APPENDIX B

FIRE DEPARTMENT STANDARDS FOR PRIVATE STREETS AND DEVELOPMENTS

1.01 GENERAL

All commercial, industrial, multi-family and private residential properties shall comply with the following minimum standards. These standards have been developed in accordance with the current California Fire Code, current department standards, current city standards and nationally recognized recommended standards.

1.02 AUTOMATIC SPRINKLER SYSTEMS

Automatic Sprinkler Systems shall conform to the requirements as set forth in the Modesto Municipal Code, Section 3-1.208 Automatic Sprinkler Systems and Section 903.2 of the 2010 California Fire Code.

1.03 ACCESS TO SITE

Commercial, industrial, and institutional complexes shall have two access ways, one from each of two public streets, preferably from one North-South and one East-West street.

Multi-family housing complexes and private residential subdivisions with 25 or more dwelling units shall have two access ways from a single public street.

Multi-family housing complexes and private residential subdivisions with 24 or fewer dwelling units may have a single access from a single public street.

1.04 ACCESS TO BUILDINGS

Every building shall be located in such a manner that the farthest point of the building, from a public or private fire access road, does not exceed one hundred fifty (150) feet. This distance shall be measured around the outside perimeter of the building and shall take into consideration any natural or man-made barriers that may impede rescue and firefighting efforts.

This distance may be increased to 200 feet when an automatic fire sprinkler system is installed throughout a building or buildings.

1.05 ACCESS ROADWAYS

Access roads shall be designed, constructed and maintained to support the 30-ton (60,000 pound) imposed load of the fire apparatus. These roads shall have a smooth hard surface of asphalt or concrete to provide all-weather driving capability.

Engineered alternative surfaces that incorporate turf with pavers may be permitted on emergency-only access roads and shall be designed to support the same apparatus loads

An unobstructed vertical clearance of 13 feet 6 inches shall be maintained.

All curves and changes in direction shall afford a minimum inside turning radius of 25 feet and outside radius of 45 feet.

Dead-end roads that exceed 150 feet in length shall be constructed with approved turnarounds.

Cul-de-sac streets shall be designed and installed in accordance with public street standards. See Standard Detail #311.

1.06 STREET WIDTHS

Parallel parking of vehicles is assumed when determining minimum widths.

Private one & two family residential and multi-family developments:

- 34 feet when parking is unrestricted
- 34 feet in cul-de-sacs and streets when parking is restricted to passenger vehicles only
- 28 feet when parking is restricted to one side only
- 20 feet when parking is prohibited on either side

Mobile homes parks (regulated by Title 25, CCR):

- 40 feet when parking is unrestricted
- 30 feet when parking is restricted to one side only
- 20 feet when parking is prohibited on either side

Commercial and Industrial developments:

- 40 feet when parking is unrestricted
- 30 feet when parking is restricted to one side
- 20 feet when parking is prohibited on either side

Upon approval of the chief, street width reduction may be considered when an automatic fire sprinkler system is installed throughout buildings or complexes. These reductions will be evaluated on a case-by-case basis and in no case shall the width be reduced to less than 20 feet.

Parking restrictions shall be posted in an approved manner.

1.07 FIRE LANE and FIRE HYDRANT MARKING

When parking is prohibited or restricted, approved signs or other approved notices shall be provided and maintained using one of the following methods:

Curb or road surface shall be painted bright red; the words "NO PARKING-FIRE LANE" shall be painted in white letters, 6 inches in height with a 1 inch stroke or

A sign shall be posted immediately adjacent to, and visible from, the designated place with the words "NO PARKING-FIRE LANE"; the letters shall be 3 inches in height with a 1/2 inch stroke. Signs shall be posted not less than four (4) feet and no more than eight (8) feet above finish grade. See Standard Detail #900.

Spacing for signage or curb marking shall be every 25 feet or as necessary to properly identify the designated area. A combination of red striping and signage may be used.

1.08 ELECTRONICALLY CONTROLLED VEHICLE ACCESS GATES

Plans shall be submitted to and approved by Fire Marshal prior to installation.

Plans shall be submitted to and approved by the Development Services Department to insure pedestrian and vehicular safety and compliance with established fence setback standards.

A building permit is required for ANY electrical installation, and for structural consideration if gates or fence exceeds 6 feet in height.

Recommended gate setback from property line is 35 feet but this distance may be modified when approved by both the Fire Marshal and Development Services Manager.

Entrance/exits 1) with one-way, physically divided, traffic lanes shall provide 15 feet of driving surface, 2) with undivided two way traffic lanes shall provide 20 feet of driving surface. Additional width will be required for parking or turnout areas.

Gates serving the one-way traffic lanes shall be capable of opening to a clear and unobstructed width of 12 feet; gates serving the two-way traffic lanes shall be capable of opening to a clear and unobstructed width of 16 feet.

Required gates shall be equipped with a Modesto Fire Department accessible, electrically operated KNOX key switch.

Required gates shall also be operable by remote telephone access. The telephone number which activates the gate shall be provided to the Fire Department for entry into the emergency dispatch file.

Other forms of remote gate activation will be considered and may be approved on a case-by-case basis.

All electrically operated controls shall unlock upon power failure.

1.09 PEDESTRIAN GATES AND BARRIERS INSTALLED ACROSS REQUIRED EXIT PATHWAYS

Latch gates and barriers shall be openable from the inside without the use of a key or any special knowledge or effort and handicap accessible.

Width: The clear width of the opening shall not be less than 36 inches or the exit width required by the Building Code.

Swing: The gate shall swing in the direction of travel when required by the Building Code for exit doors.

Exception: Grounds may be fenced and gates equipped with locks providing there are accessible safe dispersal areas located not less than 50 feet from buildings. Dispersal areas shall be sized to provide an area not less than three square feet per occupant.

1.10 BUILDINGS UNDER CONSTRUCTION

Access roads shall be constructed to within 150 feet of all buildings under construction.

Required access roads shall be constructed and approved prior to the start of any building construction.

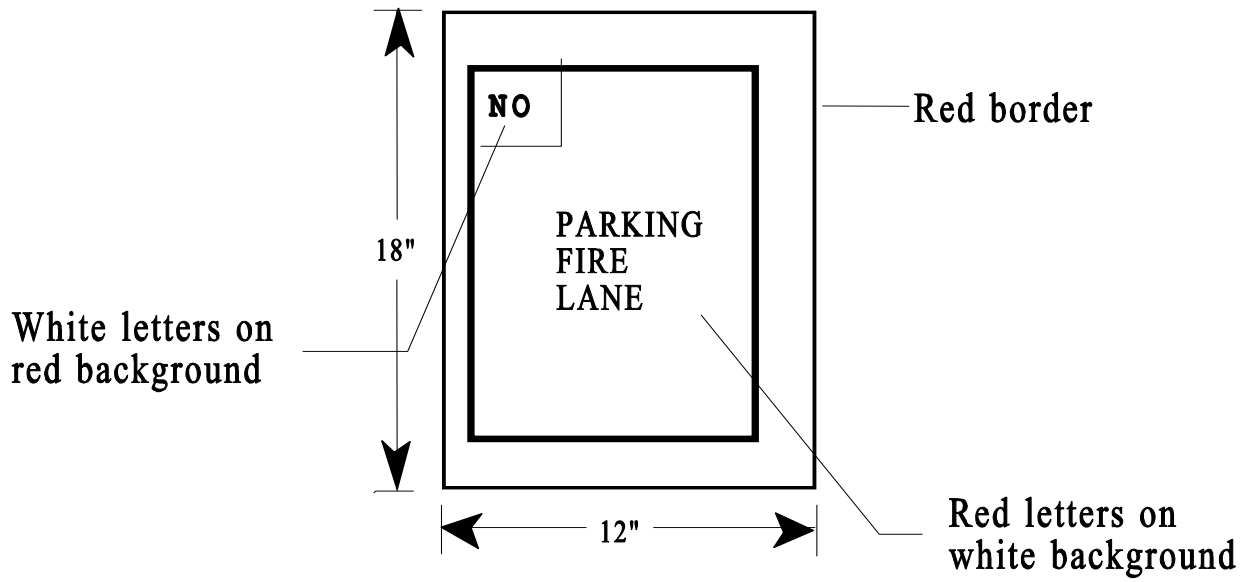
Temporary dead-ends created during project phasing shall be limited to 150 feet or less or approved temporary turnarounds shall be constructed.

Fire hydrants shall be installed and approved prior to the start of building construction.

1.11 SIDEWALKS

Private gated communities within the City limits shall conform to the guidelines set forth in Table B-1 - Guidelines for Installing Sidewalks.

**FIGURE B.1
FIRE DEPARTMENT NO PARKING SIGNS**



**TABLE B.1
GUIDELINES FOR INSTALLING SIDEWALKS.**

Land-Use/Roadway Functional Classification/ and Dwelling Unit	New Urban and Suburban Streets	Existing Urban and Suburban Streets
Commercial & Industrial (All Streets)	Both sides.	Both Sides. Every effort should be made to add sidewalks where they do not exist and complete missing links.
Residential/(Major Arterials)	Both sides.	Both sides.
Residential/(Collectors)	Both sides.	Multi-family - both sides. Single family dwellings - prefer both sides; require at least one side.
Residential/(Local Streets) More than 4 Units Per Acre	Both sides.	Prefer both sides; require at least one side.
1 to 4 Units per Acre	Prefer both sides; require at least one side.	One side preferred, at least 4 ft; shoulder on both sides required.
Less than 1 Unit per Acre	One side preferred, shoulder on both sides required.	At least 4-ft shoulder on both sides required.

Notes:

- 1) Any local street within two blocks of a school site that would be on a walking route to school - sidewalk and curb and gutter required.
- 2) Sidewalks may be omitted on one side of a new street where that side clearly cannot be developed and where there are no existing or anticipated uses that would generate pedestrian trips on that side.
- 3) Where there are service roads, the sidewalk adjacent to the main road may be eliminated and replaced by a sidewalk adjacent to the service road on the side away from the main road.
- 4) For rural roads not likely to serve development, a shoulder at least 4 ft in width, preferably 8 ft on primary highways should be provided. Surface material should provide a stable, mud-free walking surface.

Taken from INSTITUTE OF TRANSPORTATION ENGINEERS, "Sidewalks", by Fred N. Ranck, pg 17.

GENERAL PROVISIONS

SECTION 1

1.01 DEFINITIONS AND TERMS

Whenever in these specifications, or in any documents or instruments where these specifications govern, the following terms or pronouns in place of them are used, the intent and meaning will be interpreted as follows:

Agreement - See Contract.

Apparent Low Bidder – The bidder with the lowest, responsive bid. The apparent low bidder is announced on the City's website 1) after the bid opening and 2) after review of all bids for responsiveness.

ASTM - American Society for Testing and Materials.

AWWA - American Water Works Association.

Addenda - Written or graphic instruments issued prior to the opening of bids which clarify, correct or change the bidding documents or the contract documents.

Beneficial Use – Placement of Work or designated portion thereof in service for the purpose for which it is intended before reaching Substantial Completion of the Work. Beneficial Use or partial Beneficial Use is determined solely by the City and a Notice will be issued to the Contractor when such occurs

Bid - The offer by the bidder for the work. A bid must be submitted using the Bid Form with the appropriate signature and bid security.

Bidder - Any individual, firm or corporation submitting a proposal for the work contemplated, acting directly or through a duly authorized representative.

Bidder's Guaranty – See Bid Security.

Bid Form – The approved forms required for formal bids prepared and submitted for a City of Modesto project.

Bid Security – The cash, certified check, cashier's check, or bid bond accompanying the Bid submitted by the Bidder as a guaranty that the Bidder will enter into a contract with the City of Modesto for the construction of the work, if awarded to that Bidder.

Bonds - Bid, performance and payment bonds and other instruments of security.

Business Days – Monday through Friday, from 8:00 a.m. to 5:00 p.m., excluding City of Modesto observed holidays and City of Modesto closure days.

Change Order - A document which is signed by the Contractor and City and authorizes an addition, deletion or revision in the work, with possible adjustment in the contract price or the contract time, issued on or after the effective date of the Contract.

City - City of Modesto, California, employees acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties entrusted to them.

City Engineer - Utilities Director, City of Modesto, acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties entrusted to them.

City Standards:

City Standard Details – The details included in the various chapters of the City of Modesto Standard Specifications 2014.

City Standard Specifications – The City of Modesto Standard Specifications 2014.

Contract - The written agreement covering the performance of the work and the furnishing of labor and materials in the construction of the work.

Contractor - The person or persons, partnership or corporation, private or municipal, who have entered into a contract with the City of Modesto or their legal representatives.

Council - The City Council of the City of Modesto.

Days - Days shall mean calendar days unless otherwise specified.

Defective - An adjective which when modifying the word Work refers to work that is unsatisfactory, faulty or deficient, or does not conform to the contract plan and specifications, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the contract plans and specifications, or has been damaged prior to the Engineers' recommendations of final payment.

Department Of Public Works - Department of Utilities of the City of Modesto.

Director Of Public Works - The Director of Utilities of the City of Modesto acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties entrusted to them.

Easements - A recorded document in which the land owner gives the City permanent rights to construct and maintain water mains, sanitary sewers, storm drains and/or facilities across private property.

Engineer - See City Engineer

General Conditions – General Provisions section of the City Standard Specifications.

General Provisions – General Provisions section of the City Standard Specifications.

Hold Harmless - Agreement by one (1) party to indemnify and defend a second party when the second party is sued by a third party as a result of the first party's actions or inactions.

Liquidated Damages - The amount of dollars assessed for each and every calendar day required to complete the contract in excess of the contract time.

Plans - The official plans, typical cross-sections, general cross-sections, working drawings and supplemental drawings, or reproductions thereof, which show the location, character, dimensions and details of the work to be done, and which are to be considered as a part of the contract supplementary to these specifications.

Proposal – See Bid.

Proposal Form – See Bid Form.

Reference Specifications - Those standards, rules, method of tests or analysis, codes, and specifications of other agencies, engineering societies, or industrial associations referred to in the contract documents. These refer to the current edition of amendments in effect at the time of advertising the project unless specifically referred to by edition, volume or date.

Shop Drawings - All drawings, diagrams, illustrations, schedules and other data which are specifically prepared by or for the Contractor to illustrate some portion of the Work and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams and other information prepared by a supplier and submitted by the Contractor to illustrate material or equipment for some portion of the Work.

Special Provisions - Specific clauses of the Specifications setting forth conditions or requirements peculiar to the particular work called for by the plans and specifications.

Specifications - The textual directions, provisions and requirements contained herein.

Standard Specifications – See City Standards.

State - State of California.

State Standards:

State Standard plans – The Standard Plans of the State of California, Department of Transportation, 2010. A copy of which is on file in the office of the Utilities Director.

State Standards specifications – The Standard Specifications of the State of California Department of Transportation, 2010. A copy of which is on file in the office of the Utilities Director. Any reference therein to the State of California or a State agency, office or officer shall be interpreted to refer to the City or its corresponding agency, office or officer acting under this contract.

Substantial Completion – The stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents. Substantial Completion is determined solely by the City and a Certificate will be issued to the Contractor when such occurs.

Superintendent - The executive representative of the Contractor present on the project at all times during progress, authorized to receive and fulfill instructions from the Utilities Director.

Surety - Any individual, firm or corporation, bound with and for the Contractor for the acceptable performance and completion of the work and the satisfaction of all obligations incurred.

Surveyor - A land surveyor licensed in the State of California.

Testing Agency - The commercial laboratory designated by the Engineer to test materials involved in the contract.

GENERAL PROVISIONS

SECTION 2

AWARD AND EXECUTION OF CONTRACT

2.01 GENERAL TERMS

It is the intent of the Contract to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any work, materials or equipment that may reasonably be inferred from the Contract Documents as being required to produce the intended result will be supplied whether or not specifically called for. When words, which have a well-known technical or trade meaning are used to describe the work, materials or equipment, such words shall be interpreted in accordance with that meaning. Reference to Standard Specifications, manuals or codes of any technical society, organization or association, or to the Laws or Regulations of any governmental authority, whether such reference is specific or implied, shall mean the latest Standard Specification, manual, code or Laws or Regulations in effect at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated. However, no provisions of any referenced Standard Specifications, manual or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of City, Contractor or Engineer, or any of their consultants, agents or employees any duty or authority of supervising or directing the furnishing or performance of the Work or any duty or authority of undertaking responsibility for the Contractor. Clarifications and interpretations of the Contract Documents shall be issued by Engineer.

2.02 AWARD OF CONTRACT

A. Notice of Award

The City reserves the right to reject any and all proposals. The award of the contract, if it is awarded, will be to the lowest responsible bidder whose proposal complies with all the requirements prescribed. The award, if made, will be made within 90 days after the opening of the bids.

All bids will be compared on the basis of the Engineers' estimate of the quantities of work to be done.

B. Bid Alternates

This section shall prevail over other sections of these specifications and the bid forms whenever there is a conflict with said specification sections or bid forms regarding the award of the project.

If the contract is awarded, the contract shall be awarded to the lowest responsible bidder for the sum of the base bid plus any bid alternates the City chooses to award.

To ensure impartiality when selecting the bid alternates each bidder will be assigned an identification number when turning in his/her bid form to the City Clerk. The bidder's names will not be revealed to City staff selecting the bid alternates until the

selection of which bid alternates to award has been made. The selection of the apparent low bidder may or may not be announced at the bid opening. All bid forms shall be retained by the City Clerk until after the award selection has been made.

The bid alternates will be awarded as funding allows, and the City reserves the right to amend the budget for any particular project if it deems it is in the best interest of the City to do so.

C. Delivery of Signed Contract, Project Bonds, Insurance

Within 5 business days of the date of receipt of Notice of Intent to Award, the apparent low bidder shall return 2 signed copies of the Contract and 1 completed and signed copy of the Subcontracting Request Form and 1 completed and signed copy of the Financial Interest Disclosure Form to the City. If the signed contracts and completed Subcontracting Request and Financial Interest Disclosure Forms are not supplied to the City within the 5 business days, the apparent low bidder forfeits the right to the Contract and the Contract may be awarded to the next lowest responsible bidder at the discretion of the City.

Failure to return 2 signed copies of the Contract, a completed and signed Subcontracting Request Form and a completed and signed Financial Interest Disclosure Form within 5 business days after the apparent low bidder has received Notice of Intent to Award shall be just cause for forfeiture of the bid security to the City.

In the event that the apparent low bidder fails or refuses to return 2 signed copies of the Contract, a completed and signed Subcontracting Request Form, or a completed Financial Interest Disclosure Form, the award may be made to the next lowest responsible bidder. Upon the failure or refusal of the next lowest responsible bidder or any subsequent lowest responsible bidders to whom the Notice of Intent to Award is delivered to return 2 signed copies of the Contract, a completed and signed Subcontracting Request Form, and a completed and signed Financial Interest Disclosure Form, their bid security shall be likewise forfeited to the City.

D. Notice to Proceed

A preconstruction meeting must be held prior to starting any work on the project. The City will contact the Contractor no later than five (5) working days from the date the contract is signed by the City Manager to set up the preconstruction meeting, which shall be held no later than ten (10) working days from the contract signing date. The Notice to Proceed shall be issued at the preconstruction meeting.

E. Commencement of Work

Work shall commence as soon as possible from the date of the Notice to Proceed and shall be diligently prosecuted to completion within the time provided in the Special Provisions.

No work shall commence before contract bonds and insurance certificates have been filed with the City and the contract has been signed by the City Manager.

F. Return of Bidders Guaranty

The proposals of the two (2) lowest bidders will be considered in awarding the contract. All other proposal guarantees will be returned promptly by the City Clerk after tabulation of bids has been made. The proposal guarantees retained will be

returned after the successful bidder has executed the contract and the bonds accompanying the same are approved and filed.

2.03 CONTRACT BONDS

The Contractor shall furnish two (2) good and sufficient bonds. These bonds shall be in the amount and for the purpose specified below. They shall be surety bonds issued by corporations duly and legally licensed to transact business in the State of California. All bonds shall be issued only by companies listed in the latest edition of the publication titled "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds" published by the U.S. Department of the Treasury. They shall be issued at the expense of the Contractor, and shall be maintained by him or her at his or her expense during the entire life of the contract. All surety companies shall be approved by the City.

One (1) bond shall be in the amount of 100% of the contract price and shall guarantee faithful performance of the contract and insure the City during the life of the contract.

One (1) bond shall be in the amount of 100% of the contract price and shall secure the obligations set forth in Section 3248 of the Civil Code of the State of California.

All alterations, extensions of time, extra and additional work, and other changes authorized by these specifications or any part of the contract may be made without securing the consent of the surety or sureties on the contract bonds.

2.04 EXECUTION OF CONTRACT

Within 5 business days of the date of receipt of the Notice of Award, the Contractor shall obtain and deliver the required project bonds, insurance and a copy of a current City of Modesto business license, acceptable to the City. If the required bonds, insurance or copy of a current business license are not supplied to the City within 5 business days, the Contractor forfeits the right to the Contract and the Contract may be awarded to the next lowest responsible bidder at the discretion of the City.

Failure to return the required project bonds, insurance or a copy of a current business license within 5 business days after the Contractor has received Notice of Award shall be just cause for forfeiture of the bid security to the City.

In the event that the Contractor fails or refuses to return the required project bonds, insurance, or a copy of a current business license, the award may be made to the next lowest responsible bidder. Upon the failure or refusal of the next Contractor or any subsequent Contractor to whom the Notice of Award is delivered to return the required project bonds, insurance or a copy of a current business license, their bid security shall be likewise forfeited to the City.

No bid shall be considered binding upon the City until 2 signed copies of the Contract, a completed and signed Subcontracting Request Form, a completed and signed Financial Interest Disclosure Form, the required project bonds, insurance and a copy of a current City of Modesto business license are submitted to the City and the award of the Contract by the City Council.

2.05 SUBCONTRACTORS

- A. Nothing in this Section limits or diminishes any rights or remedies, either legal or equitable, which:
 - 1. An original or substituted subcontractor may have against the Prime Contractor, his or her successors or assigns.
 - 2. The City may have against the Prime Contractor, his or her successors or assigns, including the right to take over and complete the contract.
- B. Each bidder for the work specified shall set forth in the space provided in the proposal form of his or her bid:
 - 1. The name and the location of the place of business of each subcontractor who will perform work or labor or render service to the Prime Contractor in or about the construction of the work or improvement, or a subcontractor licensed by the State of California who, under a subcontract to the Prime Contractor, specially fabricates and installs a portion of the work or improvement according to detailed drawings contained in the plans and specifications, in an amount in excess of 0.5% of the Prime Contractor's total bid or \$10,000, whichever is greater.
 - 2. The portion of the work which will be done by each such subcontractor. The Prime Contractor shall list only one (1) subcontractor for each such portion as is defined by the Prime Contractor in his or her bid.

If a Prime Contractor fails to specify a subcontractor or if a Prime Contractor specifies more than one (1) subcontractor for the same portion of work to be performed under the contract in excess of 0.5% of the Prime Contractor's total bid or, in the case of bids or offers for the construction of streets or highways, including bridges, in excess of 0.05% of the Prime Contractor's total bid or \$10,000, whichever is greater, he or she agrees that he or she is fully qualified to perform that portion himself or herself, and that he or she shall perform that portion himself. If his or her bid is accepted, he or she shall not be permitted to subcontract any portion of the work which he or she is required to perform himself or herself, to substitute any person as subcontractor in place of the subcontractor listed in the original bid, or to permit any such subcontract to be voluntarily assigned or transferred or allow it to be performed by anyone other than the original subcontractor listed in the original bid, except under the conditions set forth below.

The Contractor agrees that he or she is as fully responsible to the City for the acts and omissions of his or her subcontractors and of persons either directly or indirectly employed by them, as he or she is for the acts and omissions of persons directly employed by him. The City will deal directly with, and make all payments to the Contractor only.

The Contractor shall be responsible for the coordination of all trades, subcontractors, and suppliers engaged upon the work. Neither the City nor the Engineer will undertake to settle any differences between the Contractor and his or her subcontractors or between subcontractors.

When the subcontracted work is not being prosecuted in a manner satisfactory to the City, the Contractor shall be notified to take corrective action within a specified time. If timely correction is not made, on receipt by the Contractor of written instructions from the City the subcontractor shall be removed immediately from the work. He or she shall not be re-employed on the work.

Nothing contained in the contract documents shall create any contractual relation between any subcontractor and the City.

C. A Prime Contractor whose bid is accepted may not:

1. Substitute a person as subcontractor in place of the subcontractor listed in the original bid, except that the City may, except as otherwise provided in this section consent to the substitution of another person as a subcontractor in any of the following situations:
 - a. When the subcontractor listed in the bid after having had a reasonable opportunity to do so fails or refuses to execute a written contract, when that written contract, based upon the general terms, conditions, plans and specifications for the project involved or the terms of the subcontractor's written bid, is presented to the subcontractor by the Prime Contractor.
 - b. When the listed subcontractor becomes bankrupt or insolvent.
 - c. When the listed subcontractor fails or refuses to perform his or her subcontract. When the listed subcontractor fails or refuses to meet the bond requirements of the Prime Contractor.
 - d. When the Prime Contractor demonstrates to the City, subject to the further provisions set forth in this Section, that the name of the subcontractor was listed as the result of an inadvertent clerical error.
 - e. When the listed subcontractor is not licensed pursuant to the Contractors License Law.
 - f. When the City determines that the work performed by the listed subcontractor is substantially unsatisfactory and not in substantial accordance with the plans and specifications, or that the subcontractor is substantially delaying or disrupting the progress of the work.
 - g. When the listed subcontractor is ineligible to work on a public works project pursuant to Section 1777.1 or 1777.7 of the Labor Code.
 - h. When the City determines that a listed subcontractor is not a responsible Contractor.

Prior to approval of the Prime Contractor's request for the substitution the City shall give notice in writing to the listed subcontractor of the Prime Contractor's request to substitute and of the reasons for the request. The notice shall be served by certified or registered mail to the last known address of the subcontractor. The listed subcontractor who has been so notified shall have five (5) working days within which to submit written objections to the substitution to the City. Failure to file these written objections shall constitute the listed subcontractor's consent to the substitution.

If written objections are filed, the City shall give notice in writing of at least five (5) working days to the listed subcontractor of a hearing by the City on the Prime Contractor's request for substitution.

2. Permit a subcontract to be voluntarily assigned or transferred or allow it to be performed by anyone other than the original subcontractor listed in the original bid, without the consent of the City.
 3. Other than in the performance of "change order" causing changes or deviations from the original contract, subcontract any portion of the work in excess of 0.5% of the Prime Contractor's total bid as to which his or her original bid did not designate a subcontractor.
- D. The Prime Contractor as a condition to assert a claim of inadvertent clerical error in the listing of a subcontractor shall within two (2) working days after the time of the prime bid opening give written notice to the City and copies of the notice to both the subcontractor he or she claims to have listed in error and the intended subcontractor who had bid to the Prime Contractor prior to bid opening.

Any listed subcontractor who has been notified by the Prime Contractor in accordance with this section as to an inadvertent clerical error shall be allowed six (6) working days from the time of the prime bid opening within which to submit to the City and to the Prime Contractor written objection to the Prime Contractor's claim of inadvertent clerical error. Failure of the listed subcontractor to file the written notice within the six (6) working days shall be primary evidence of his or her agreement that an inadvertent clerical error was made.

The City shall, offer a hearing as provided in this Section and in the absence of compelling reasons to the contrary, consent to the substitution of the intended subcontractor:

1. If (a) the Prime Contractor, (b) the subcontractor listed in error, and (c) the intended subcontractor each submit an affidavit to the City along with such additional evidence as the parties may wish to submit that an inadvertent clerical error was in fact made, provided that the affidavits from each of the three (3) parties are filed within eight (8) working days from the time of the prime bid opening , or
2. If the affidavits are filed by both the Prime Contractor and the intended subcontractor within the specified time but the subcontractor whom the Prime Contractor claims to have listed in error does not submit within six (6) working days, to the City and to the Prime Contractor, written objection to the Prime Contractor's claim of inadvertent clerical error as provided in this Section.

If the affidavits are filed by both the Prime Contractor and the intended subcontractor but the listed subcontractor has, within six (6) working days from the time of the prime bid opening, submitted to the City and to the Prime Contractor written objection to the Prime Contractor's claim of inadvertent clerical error, the City shall investigate the claims of the parties and shall hold a hearing as provided in this Section to determine the validity of those claims. Any determination made shall be based on the facts contained in the declarations submitted under penalty of perjury by all three (3) parties and supported by testimony under oath and subject to cross-examination. The City may, on its own motion or that of any other party, admit testimony of other Contractors, any bid registries or depositories, or any other party in possession of facts which may have a bearing on the decision of the City.

- E. Subletting or subcontracting of any portion of the work in excess of 0.5% of the Prime Contractor's total bid as to which no subcontractor was designated in the original bid shall only be permitted in cases of public emergency or necessity, and then only after a finding reduced to writing as a public record of the City setting forth the facts constituting the emergency or necessity.
- F. Circumvention by a general Contractor who bids as a Prime Contractor of the requirement under this Section for him or her to list his or her subcontractors, by the device of listing another contractor who will in turn sublet portions constituting the majority of the work covered by the Prime Contract, shall be considered a violation of this Section and shall subject that Prime Contractor to the penalties set for in this Section.
- G. Should the Prime Contractor violate any of these provisions, his or her so doing will be deemed a violation of his or her contract and the City may exercise the option, in its own discretion, of (1) canceling his or her contract or (2) assessing the Prime Contractor a penalty in an amount of not more than 10% of the amount of the subcontract involved. The funds recovered through the application of this penalty shall be deposited in the fund out of which the Prime Contract is awarded.
- H. The Prime Contractor is hereby prohibited from performing work on a public works project with a subcontractor who is ineligible to perform work on the public works project pursuant to Section 1777.1 and 1777.7 of the Labor Code.
- I. Submission of Subcontracting Request Form

Prior to award, the apparent low bidder shall submit for approval the Subcontracting Request Form. The form shall include all first-tier subcontractors proposed for use on the project regardless of the value of their subcontract.

The Subcontracting Request Form will be provided by the City of Modesto in the contract documents to be completed and signed by the apparent low bidder. All applicable sections and columns in the form must be completed for each first-tier subcontractor. If there are not any subcontractors that will be used on the project, the form needs to be completed accordingly with "none" shown in the subcontractor area.

2.06 RELIEF OF BIDDER

A bidder shall not be relieved of the bid unless by consent of the City nor shall any change be made in the bid because of mistake.

If the City consents to relieve a bidder of a bid because of a mistake, the Public Works Director shall prepare a report in writing to document the facts establishing the existence of each element required by this Section. The report shall be available for inspection as a public record.

The bidder shall establish to the satisfaction of the Public Works Director that:

- A. A mistake was made.
- B. He or she gave the City written notice within five (5) days after the opening of the bids of the mistake, specifying in the notice the detail how the mistake occurred.
- C. The mistake made the bid materially different than he or she intended it to be.
- D. The mistake was made in filling out the bid and not due to error in judgment or to carelessness in inspecting the site of the work, or in reading the plans or specifications.

A bidder who claims a mistake or who forfeits his or her bid security shall be prohibited from participating in further bidding on the project on which the mistake was claimed or security forfeited.

2.07 CITY BUSINESS LICENSE AND TAXES

Before commencing work, the successful Contractor shall obtain a business license from the City of Modesto as required by Title VI, Chapter 1, of the Modesto Municipal Code. The successful Contractor shall be responsible for paying the business license fee, including mill taxes. All bidders are urged to contact the City Finance Department, (209) 577-5389, concerning the required license and taxes prior to submitting bids.

2.08 EXPERIENCE OF BIDDERS

All bidders may be required to furnish a sworn statement of their financial responsibility, technical ability, and experience before award is made to any particular bidder.

GENERAL PROVISIONS

SECTION 3

NATURE OF CONTRACT/CHANGES IN WORK

3.01 ALTERATIONS

By mutual consent in writing of the parties signatory to the contract, alterations or deviations, increases or decreases, additions or omissions in the plans and specifications may be made and the same shall in no way affect or make void the contract.

3.02 LIMITED CITY POWER

The Contractor recognizes that the City is a public agency and that it can act only through its duly authorized agents, and in this regard agrees that only written change orders, executed as specifically authorized by the governing body of the City either directly or through properly authorized agents, shall be valid. The Consulting Engineer shall have no authority to issue a change order unless so specifically authorized, and no person shall have authority to issue any oral change order. Unless a valid change order is issued therefore, all changes in the work performed by the Contractor shall be at his own risk, and he or she shall not be entitled to any additional compensation on account thereof, and he or she may be required to make the work conform to the Specifications. No act or series of acts by the City during the course of the contract shall be deemed to constitute a waiver of the right of the City to rely upon the provisions of this subparagraph.

3.03 CHANGES IN WORK

A. Changes in Accordance with Specifications

Each change order shall be performed in accordance with the Specifications insofar as they may be applied without conflict with the conditions set forth in the change order.

B. Changes Requested by the Contractor

Changes in the plans and specifications, requested in writing by the Contractor, which do not materially affect the work and which are not detrimental to the work or to the interests of the City, may be granted to facilitate the work, when approved in writing by the Engineer.

If such changes are granted, they shall be made at a reduction in cost or at no additional cost to the City. Nothing herein shall be construed as granting a right to the Contractor to demand acceptance of such changes.

C. Changes Initiated By the City

At any time during the progress of the work, and without in any way rendering void the contract, the City may order alterations in, additions to, or deductions from the work, and when so ordered in writing, the Contractor shall proceed with the changes directed in such order.

The Contractor shall not be entitled to any extension of time for the completion of the work by virtue of any change order unless, with respect to a change order executed by the Contractor, the change order specifically provides therefore, or, with respect to a change order not so executed, the Contractor, within five (5) days after receipt of the order, files a written claim therefore with the Engineer, in which event he or she shall be entitled to a reasonable extension of time as determined by the Engineer.

The Contractor and the City may agree upon unit or lump sum prices which shall be used to increase or decrease the contract price on account of any change ordered. In the absence of any such agreement, the contract price shall be adjusted as hereinafter provided.

3.04 CONTRACT ITEMS

The quantities shown in the Proposal Form is the Engineer's Estimate of the work to be performed under the contract. Payment for the individual items will be based upon the actual work completed.

Increases or decreases in the quantity of a contract item of work will be determined by comparing the total pay quantity of that item of work with the Engineer's Estimate.

If the total pay quantity of any item of work required under the contract varies from the Engineer's Estimate by 25% or less, payment will be made for the quantity of work of the item performed at the contract unit price. Whenever said contract item increases or decreases in quantity by more than 25%, the addition or subtraction from the contract price shall be established in accordance with Section 4-1.03 of the State Standard Specifications.

3.05 EXTRA WORK

New and unforeseen work will be classed as extra work when such work cannot be covered by any of the various items, or combination of items for which there is a bid price. If extra work orders are given, such work shall be considered a part hereof and subject to each and all of its terms and requirements.

The Contractor shall do no extra work except upon written order from the City Director. For such extra work the Contractor shall receive payment as previously agreed upon in writing, or he or she shall be paid on a force account basis.

In case of neglect or refusal by the Contractor to perform any extra work which may be authorized by the City or to make satisfactory progress in the execution of the same, the City may employ any person or persons to perform such work and the Contractor shall not in any way obstruct, interfere with, or molest the person or persons so employed.

3.06 GUARANTEE

Except as otherwise expressly provided in the Specifications, and excepting only items of routine maintenance, ordinary wear and tear and unusual abuse or neglect, the Contractor guarantees all work executed by him and all supplies, materials and devices of whatsoever nature incorporated in, or attached to the work, or otherwise delivered to the City as a part of the work pursuant to the Contract, to be absolutely free of all defects of workmanship and

materials for a period of one (1) year after final acceptance of the entire work by the City Council. The Contractor shall repair or replace any or all such work or material, together with all or any other work or material which may be displaced or damaged in so doing, that may prove defective in workmanship or material within said one (1) year guarantee period without expense or charge of any nature whatsoever to the City. If subsequent repairs are required, the repaired items will be guaranteed free of defects for an additional year from the date of repair.

In the event that the Contractor shall fail to comply with the conditions of the foregoing guarantee within ten (10) calendar days time after the date of written notification of the defect, the City shall have the right, but shall not be obligated to repair, or obtain the repair of, the defect and the Contractor shall pay to the City on demand all costs and expense of such repair. Notwithstanding anything herein to the contrary, in the event that any defect in workmanship or material covered by the foregoing guarantee results in a condition which constitutes an immediate hazard to the health or safety, or any property interest, or any person, the City shall have the right to immediately repair, or cause to be repaired, such defect, and the Contractor shall pay to the City on demand all costs and expense of such repair. The foregoing statement relating to hazards to health, safety or property shall be deemed to include either temporary or permanent repairs which may be required as determined in the sole discretion and judgment of the City.

3.07 DISPUTED WORK

If the Contractor and the Engineer are unable to reach agreement on disputed work, the Public Works Director may direct the Contractor to proceed with the work. Payment shall be as later determined by GP Section 9.03.

Although not to be construed as proceeding under extra work provisions, the Contractor shall keep and furnish records of disputed work in accordance with GP Section 9.03.

SECTION 4

CONTROL OF WORK

4.01 AUTHORITY OF THE PUBLIC WORKS DIRECTOR

The Public Works Director shall decide any and all questions which may arise as to the quality or acceptability of materials furnished and work performed and as to the manner of performance and rate of progress of the work; all questions which arise as to the interpretation of the plans and specifications; all questions as to the acceptable fulfillment of the contract on the part of the Contractor; and all questions as to claims and compensations.

Any decision of the Public Works Director shall be final and he or she shall have executive authority to enforce and make effective such decisions and orders as the Contractor fails to carry out promptly.

4.02 PLANS AND SPECIFICATIONS

The Contractor shall keep at the worksite a copy of the plans and specifications, to which the Engineer shall have access at all times.

The plans, specifications and other contract documents will govern the work. Standard Specifications and plans which are referenced in the drawings or specifications are a part of the contract documents.

While the City has endeavored to accurately represent the physical conditions which may affect the cost of the proposed work shown on the plans or indicated in the specifications, the City does not warrant the completeness or accuracy of such information. It is the Contractor's responsibility to ascertain the existence of any such conditions affecting the cost of the work which would have been disclosed by reasonable examination to the site.

No test, investigation, statement or estimate of a factual situation not incorporated in the contract shall be relied on by the Contractor. Any test, investigation, statement or estimate of fact incorporated in the contract shall be considered by the Contractor to be a suggestion only, and he or she may request equal access to the underlying or background informative material or source and shall arrive at his or her own opinion thereon, including his or her own determination of how reliable any conclusion appearing in (or inferred from) the contract.

The Contractor may not rely on "drawings of record" or similarly final or accepted drawings or maps of facilities constructed on public or private property for or under inspection by the City. Such information may be used for reference only. Actual locations and depths shall be determined by field investigations by the Contractor.

The General and Special Provisions apply with equal force to all the work, including extra work authorized. In the case of conflict between the two (2) documents, the Special Provisions shall prevail.

For convenience, these Specifications are arranged in the several sections indicated, but such separation shall not be considered as the limits of the work required of any separate

trade. The terms and conditions of such limitations are wholly between the Contractor and his or her subcontractors.

In general, the drawings will indicate dimensions, position and kind of construction, and the written Specifications will indicate qualities and methods. Work not particularly detailed, marked or specified, shall be as similar parts that are detailed, marked or specified.

All work shall conform to the approved plans.

It is mutually agreed, however, that approval by the City of the Contractor's working plans does not relieve the Contractor of any responsibility for accuracy of dimensions and details and that the Contractor shall be responsible for agreement and conformity of his or her working plans with the approved plans and specifications.

4.03 CONFORMITY WITH PLANS AND ALLOWABLE DEVIATIONS

Finished surfaces in all cases shall conform to the dimensions shown on the approved plans. Deviations from the approved plans as may be required by the exigencies of construction will be determined in all cases by the City and authorized in writing.

4.04 COORDINATION OF PLANS, SPECIFICATIONS AND SPECIAL PROVISIONS

During the review of the contract plans, special provisions, or standard specifications, the Contractor and each of his or her subcontractors shall make a written report to the City describing any conflicts, deficiencies, errors or omissions detected, which may create construction problems. The report will enable the City to resolve the items in the report prior to the start of construction.

During the progress of construction, if any further errors, omissions, conflicts or discrepancies are detected, it shall be the Contractor's duty to immediately report them to the City and obtain written instructions resolving deficiencies prior to proceeding with affected work.

Should the Contractor deliberately proceed with any portion or phase of construction which is obviously incorrectly indicated in the contract plans or documents, he or she shall be responsible for any corrective measures required to make adequate repairs or adjustments.

These specifications, the plans, special provisions, and all supplementary documents are essential parts of the contract and a requirement occurring in one is as binding as though occurring in all. They are intended to be cooperative, to describe and to provide for a complete work.

Project plans shall govern over Standard Details; Standard Details and project plans shall govern over these specifications; and the special provisions shall govern over both these specifications and the plans. The City Standard Specifications, Standard Details, plans and special provisions shall govern over the State Standard Specifications and Plans.

4.05 INTERPRETATION OF PLANS AND SPECIFICATIONS

In case of conflicts between Plans and Specifications, the Specifications control quality, materials and installation requirements; the Plans control size, location and quantity. Should it appear that the work to be done, or any matter relative thereto is not sufficiently detailed or explained in these specifications, plans and the special provisions, the Contractor shall apply to the City for such further explanations as may be necessary and shall conform to such explanation or interpretation as part of the contract, so far as may be consistent with the intent of the original specification.

In the event of any discrepancy between any drawing and the figures written thereon, the figures shall be taken as correct.

4.06 RESERVED

4.07 HOURS OF WORK

A. General Hours of Work

Work areas will be available for performance of the contract between 7:00 am and 5:00 pm, excluding Saturday, Sunday, and City observed holidays and closure days. Work performed during hours and /or on days other than specified above shall be the subject of a written request to the City. If permission is granted, the Contractor shall bear all additional expenses of the City's personnel and inspection services created by change to extraordinary work hours.

4.08 CONSTRUCTION PROGRESS DOCUMENTATION

GENERAL

This section specifies the procedures for construction progress documentation for planning and management of construction activities. The documents listed in this section provide a basis for determining the progress status of the project relative to the completion time, specific dates, and for determining the acceptability of the Contractor's progress payment estimates.

CONSTRUCTION SCHEDULE

- A. The Contractor shall provide a construction schedule prepared by the critical path method (CPM) of analysis. The critical path schedule shall be prepared from estimates of the required duration and sequence for each item of work and task to be performed. A general guide for preparing such a schedule is contained in "The Use of CPM in Construction, a Manual for Contractors," published by the Associated General Contractors of America. No progress payments will be made until the Engineer has accepted the Contractor's construction schedule.
- B. The Contractor shall provide a schedule of the overall project at the preconstruction meeting in accordance with Section 01330 Submittal Procedures. Progress payments will NOT be made for any work until an acceptable schedule has been submitted to the Engineer.

- C. Tabulation and analysis of the work schedule shall be performed by a computer software program. The software program shall meet these minimum requirements:
1. latest version of software
 - a. Microsoft © Project
 - b. Oracle © Primavera
 - c. or equal
 2. capability to produce tabular reports
 3. capability to plot the construction schedule on a 24-inch by 36-inch sheet

The Contractor shall provide an electronic copy in *.MPP format and *.PDF format. Each electronic file shall bear a new file name, preferably a sequential number system, so that previous submittals may be distinguished from each other.

- D. The schedule shall depict all significant construction activities including submittal review, and shall include all activities with:
1. A value greater than one percent of the total contract amount or \$25,000 per task, which ever is less.
 2. A duration NO longer than 15 days; exceptions include activities comprising only of fabrication and delivery.
 3. Fabrication / Delivery periods which total an aggregate greater than 3 months.
 4. Cost loaded with a breakdown of contract prices submitted by the Contractor.
 5. Resource loaded including all equipment necessary for each task.
 6. All predecessor/successor items must be Finish-to-Start. No Start-to-Start or Delay/Lag time is permitted.
 7. All task constraints must be "As Soon As Possible."
 8. The following tasks must be shown as milestones with a duration shown as 0 days:
 - a. Pre-Construction Meeting / Notice to Proceed (NTP)
 - b. Work Start Date (WSD)
 9. City Submittal Review time must be shown in the schedule after the work start date.
 10. Sort all tasks by earliest start date.

The dependencies between activities shall be indicated so that it may be established what effect the progress of any one activity has on the schedule. The critical path shall be clearly indicated. Activities that exceed these limits shall be divided into more detailed components. The scheduled duration of each activity shall be based on the work being performed during the normal 40-hour work week with allowances made for City of Modesto holidays, closure days and normal weather conditions.

All activities must have at least one predecessor and one successor with the exception of the first and last activity.

- E. Any contingency within the schedule (i.e., a difference in the time between the project's early completion and required contract completion date) and float in the schedule will belong to the project and not to any of the parties to the contract.
- F. In addition to the overall schedule, a 3-week bar chart schedule shall be provided.
- G. The 3-week bar chart schedule shall be provided on a weekly basis after acceptance of the overall schedule, regardless of amount of work completed during the week. The format shall be one week of history and a minimum 2 weeks of look ahead. It shall be on a work crew level but with schedule activity numbers clearly indicated. It shall be directly produced from the accepted project CPM schedule database not independently from some other data (Microsoft Excel spreadsheets and/or charts are not acceptable).
- H. The Contractor shall not be permitted to sequester shared float through such strategies as extending duration estimates to consume available float time, extensive crew/resource sequestering, etc.

SCHEDULE OF VALUES

The Contractor shall submit a detailed schedule of values derived from the Bid Schedule for use in preparing pay estimates and in evaluating changes. Each activity in the schedule of values shall correlate to an activity in the construction schedule. When multiple activities on the construction schedule and schedule of values correlate to a Bid Schedule Item, the sum of those items on the Schedule of Values must equal the total Bid Item value. The data in these reports shall serve as the basis for processing the Contractor's progress payment requests. The Contractor shall be responsible for the adequacy of the schedule and for managing all construction activities including, but not limited to those of the subcontractors and suppliers. The schedule of values shall be submitted at the preconstruction meeting in accordance with Section 01330 Submittal Procedures.

MEETINGS

- A. Prior to commencing work and at any time during the progress of the work, the City shall have authority to call meetings with the Contractor and any of his employees or subcontractors on the project as deemed necessary to discuss details of construction or interpretation of contract documents. No additional compensation for attendance at such meetings will be allowed.
- B. A preconstruction meeting must be held prior to starting any work on the project. The City will designate a date and time for a preconstruction meeting. The City will

General Provisions

contact the Contractor no later than 5 business days from the date the contract is signed by the City Manager to set up the preconstruction meeting which shall be held within 10 business days from the contract signing date.

COMMENCEMENT OF WORK

- A. The Notice to Proceed shall be issued as soon as practicable after the preconstruction meeting.
- B. The Contractor shall begin work as soon as possible after receiving the Notice to Proceed from the City and shall diligently prosecute the same to completion as hereinbefore specified. No work shall commence before contract bonds and insurance certificates have been filed with the City and the contract has been signed.

CONSTRUCTION SCHEDULE

- A. Contractor shall complete a construction schedule conforming to requirements of these specifications and representing in detail all planned procurement and on-site construction activities. A computer data compact disc (CD) of the project schedule shall be provided to the Engineer to facilitate analysis. In addition to the CDs, one 11-inch by 17-inch reproducible paper copy of the construction schedule shall be submitted at the preconstruction meeting.
- B. Within 10 business days after receipt of the submittal, the Engineer shall review the submitted schedule and return one copy of the marked-up original to the Contractor. If the Engineer finds that the submitted schedule does not comply with specified requirements, the corrective revisions will be noted on the submitted copy returned to the Contractor for corrections and resubmitted in accordance with Section 01330 Submittal Procedures.
- C. Overall Project percent complete is based on each activity of COMPLETED work that has been assigned a value on the detailed schedule of values. The agreed upon percentage complete shall be the basis for determining the monthly progress payments.

SCHEDULE REVISIONS

- A. Revisions to the items which are on the critical path as shown on the accepted CPM schedule logic may be made ONLY with written approval of the Engineer. Changes in timing for activities which are not on the critical path may be modified within the available period of the activities' specific available float but not in a manner which will place them on the critical path.
- B. Proposed and approved contract change orders shall be added to the accepted schedule in a manner which conforms to their correct relationship to other project activities and a copy of the resultant schedule provided to the Engineer. Change orders shall not be approved until the schedule has been modified to show their effect. The schedule impact of any proposed change shall be calculated and submitted to the Engineer within 10 days of receipt by the Contractor of a request for proposal.

- C. At any time during the project, the project schedule shall be updated, in the opinion of the Engineer,:
 - 1. when the schedule falls more than 20 working days behind the current schedule,
 - 2. when one or more CPM activities fall behind schedule, or
 - 3. to reflect proposed and approved change orders, or inclement weather delays.
- D. The Contractor shall comply with this schedule revision at no additional cost to the City.

PAYMENT WITHHOLDING FOR PROGRESS DOCUMENTATION

Failure to comply with the requirements of this section shall entitle the City to withhold an additional 10 percent of the amount due on progress payments until the Contractor complies with these requirements.

4.09 AUTHORITY OF INSPECTORS

Properly authorized inspectors shall be considered to be the representatives of the City, limited to the duties and powers entrusted to them. It will be their duty to inspect materials and workmanship of those portions of the work to which they are assigned, either individually or collectively under instructions from the Public Works Director and to report any and all deviations from the drawings, specifications, and other contract provisions which may come to their notice. Any Inspector may be considered to have the right to order the work subject to his or her inspection stopped, if in his or her opinion such action becomes necessary, until the Public Works Director is notified and has determined and ordered that the work may proceed in due fulfillment of all contract requirements.

4.10 SUPERINTENDENCE

The Contractor shall personally supervise the work under the contract or shall designate in writing to the City the name of his or her representative who shall at all times be present at the site of the work. The authorized representative shall have full authority to direct the work and shall receive and obey orders from the City. The Contractor shall provide the City one (1) week's written notice of change to authorized representative.

4.11 SURVEYING

A. Construction Staking

The City will layout the work and stake the necessary control points for the Contractor's operations. The Contractor shall give notice to the City at least 2 working days in advance of the time he or she will require staking of any portion of work and he or she shall furnish such facilities and labor necessary for marking and maintaining points set by the City.

The Contractor shall preserve all stakes and points set for lines, grades, or measurements of the work in their proper places until authorized to remove them by the City. All expenses incurred in replacing stakes that have been removed without proper authority shall be paid by the Contractor. This charge will be deducted from monies due or to become due to the Contractor.

B. Permanent Survey Markers

1. The City employs a California licensed Land Surveyor to locate monuments. If survey work is to be completed by others, including locating monuments, the survey work shall be conducted according to the guidelines of Section 8771 of the Business and Professions Code of California. Monuments shall be located and referenced to a minimum of 3 durable ties, benchmarks or monuments prior to the start of construction and a pre-construction corner record of the references shall be filed with the County Surveyor's office. Any monument destroyed, damaged, covered, or otherwise obliterated by the Contractor shall be reset in its original position with a monument, and a post-construction corner record of the monument shall be filed with the County Surveyor's office.
2. The monuments shall be referenced to the City of Modesto's GPS Control Network (Record of Survey 22-51) and the coordinates shall be identified on the Corner Record.
3. The City will complete the following:
 - a. Record search for location and reference of existing monuments.
 - b. Pre-construction corner records.
 - c. Resetting and stamping of brass survey disk
 - d. Post-construction corner records and/or record(s) of survey as needed
4. The Contractor will complete the following:
 - a. Immediately stop work and notify the City if any monuments are found, but not shown in the contract documents
 - b. Rebuild destroyed, damaged, covered, or otherwise obliterated as a result of the 'means and methods' of construction by the Contractor per City Standards
 - c. Rebuild existing monuments identified in the contract documents, shown on existing record maps and/or found in the field that do not meet City Standards except Property/Lot Corners. Record maps can be found on the Stanislaus County website at: <http://www.stancounty.com/publicworks/division/surveyor/index.shtml>
 - d. Build new monuments identified in the contract documents.
 - e. When a change is made in the finished elevation of the pavement of any roadway in which a permanent survey monument is located, adjust the monument cover to grade unless otherwise specified.

4.12 INSPECTION

The City shall at all times have access to the work during construction and shall be furnished with every reasonable facility for ascertaining that the materials used and employed and the workmanship are in accordance with the requirements and intentions of these specifications. All work done and all materials furnished shall be subject to inspection. Work buried and/or covered without the favorable review of the City shall be uncovered for inspection at the Contractor's expense, at the discretion of the City.

Whenever the Contractor varies the period during which work is carried on each day, he or she shall give due notice to the City that proper inspection may be provided. Any work done without proper inspection will be subject to rejection.

The inspection of the work shall not relieve the Contractor of any of his or her obligations to fulfill the contract as prescribed.

If work is to be completed after normal business hours, the Contractor shall call the City 48 hours in advance to schedule an inspection to be made after normal business hours. Work shall not be covered without inspection.

TESTING

All tests required by the City shall be by the testing agency currently under contract to the City to provide such services. The City shall pay for only the tests which were successfully passed. Any failed test shall be paid for by the Contractor. The City shall require re-testing until all required tests are successfully passed.

The testing program, including the numbers and location of tests, shall be under the direction of the City. All test sites deeper than 5' below grade shall be properly shored by the Contractor to protect the testing personnel.

4.14 REMOVAL OF DEFECTIVE OR UNAUTHORIZED WORK

All work which is defective in its construction, or deficient in any of the requirements of these specifications, shall be remedied or removed and replaced by the Contractor in an acceptable manner, and no compensation will be allowed for such correction.

Any work done beyond the lines and grades shown on the plans, or established by the City, or any extra work done without written authority, will be considered as unauthorized and will not be paid for.

Upon failure of the Contractor to comply promptly with any order of the City made under the provisions of this article, the Public Works Director shall have the authority to cause defective work to be remedied or removed and replaced, and unauthorized work to be removed and to deduct the costs thereof from any monies due or to become due to the Contractor.

4.15 ADDITIONAL AND EMERGENCY PROTECTION

Whenever, in the opinion of the City, the Contractor has not taken sufficient precautions for the safety of the public, the protection of the works to be constructed under this contract, or of adjacent structures on property which may be injured by processes of construction on account of such neglect, and whenever, in the opinion of the City, an emergency shall arise and immediate action shall be considered necessary in order to protect public or private, personal or property interests, then and in that event, the City, with or without notice to the Contractor, may provide suitable protection to the said interests by causing such work to be done and such material to be furnished as shall provide such protection as the City may consider necessary and adequate.

The cost and expense of such work and material so furnished shall be borne by the Contractor and if the same shall not be paid on presentation of the bills therefore, then such costs shall be deducted from any amounts due or to become due the Contractor.

The performance of such emergency work under the direction of the City shall in no way relieve the Contractor from any damages which may occur during or after such precaution has been taken by the City.

4.16 SUBSURFACE DATA

All soil and test soil data, water table elevations, and soil analyses included or referred to in the Contract Documents apply only at the location of the test holes and to the depths indicated. Soil test reports for test holes which have been drilled are available for inspection at the Public Works Director's Office. Any additional subsurface exploration shall be done by the Contractor at his/her own expense, in accordance with the City's encroachment permit requirements.

The indicated elevation of the water table is that existing at the date the test hole data was determined. It is the Contractor's responsibility to determine and allow for the elevation of ground water at the date of project construction. A difference in elevation between ground water shown in soil boring logs and ground water actually encountered during construction will not be considered as a basis of extra work.

4.17 DIFFERING SITE CONDITIONS

During the progress of the work, if subsurface or latent physical conditions are encountered at the site differing materially from those indicated in the contract or if unknown physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work provided for in the contract, are encountered at the site, the party discovering such conditions shall promptly notify the other party in writing of the specific differing conditions before they are disturbed and before the affected work is performed.

Upon written notification, the City will investigate the conditions, and if the City determines that the conditions materially differ and cause an increase or decrease in the cost or time required for the performance of any work under the contract, an adjustment, excluding loss of anticipated profits, will be made and the contract modified in writing accordingly. The City will notify the Contractor of their determination whether or not an adjustment of the contract is warranted.

No contract adjustment which results in a benefit to the Contractor will be allowed unless the Contractor has provided the required written notice.

No contract adjustment will be allowed under the provisions specified in this section for any effects caused on unchanged work.

Any contract adjustments warranted due to differing site conditions will be made in accordance with GP Section 9.03 or 9.04.

4.18 BENEFICIAL USE

The City of Modesto may, at its option and convenience, occupy or otherwise make use of all or part of the project premises at any time. If the City elects to occupy or make use of all or a portion of the project premises, the Engineer will issue a Notice of Beneficial Use or multiple notices. This notice does not stop the counting of working days under the contract, nor relieve the Contractor from maintaining the required insurance policies and project bonds. However, this notice does relieve the Contractor from maintenance and protection of the specified portion(s) of Work explicitly listed in the notice. This includes relief of protection from damage caused by the public and elements for those specified portions, except for damages caused by the Contractor's own activities or negligence. Additionally, the Notice of Beneficial Use date does not constitute as a Certificate of Substantial Completion nor the beginning of the warranty period.

Nothing in any Notice of Beneficial Use shall be construed as relieving the Contractor from full responsibility for correcting latent, or otherwise obvious, defects in workmanship or materials. Regardless of any Notice of Beneficial Use, the Contractor shall complete a final cleaning of the entire project prior to the Engineer recommending final acceptance of the Work by City Council.

4.19 FINAL INSPECTION

Before final inspection of the work, the Contractor shall clean the project site and all ground occupied by him or her in connection with the work of all rubbish, excess materials, falsework, temporary structures and equipment. All parts of the work shall be left in a neat and presentable condition. Full compensation for final clean up will be considered as included in the prices paid for the various contract items of work and no separate payment will be made therefore.

When the Contractor considers the Work is substantially complete, the Contractor shall prepare and submit to the Engineer a comprehensive list of items to be completed or corrected prior to application for final payment. Failure to include an item on such list does not relieve the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

Upon the Engineer's receipt of the Contractor's list, the Engineer will inspect the Work and determine whether the Work is substantially complete. If the Engineer discovers any item, whether or not on the Contractor's list, is not sufficiently complete in accordance with the Contract Documents, the Contractor shall complete or correct such item(s) upon written notification by the Engineer. In such case, the Contractor shall request another inspection by the Engineer to determine Substantial Completion.

Once the Engineer determines the Work is substantially complete, the Engineer will prepare a Certificate of Substantial Completion establishing the date of Substantial Completion. A Certificate of Substantial Completion shall establish the last day counted for working days under the contract. This certificate does not relieve the Contractor from the responsibility for maintenance and protection of the Work, nor relieve the Contractor from maintaining the required insurance policies and project bonds. Additionally, the Certificate of Substantial Completion date does not constitute Beneficial Use nor the beginning of the warranty period.

The City of Modesto may issue a Certificate of Substantial Completion without a Notice of Beneficial Use. Nothing in a Certificate of Substantial Completion shall be construed as relieving the Contractor from full responsibility for correcting latent, or otherwise obvious, defects in workmanship or materials.

Upon completion of the final inspection, when the work and required contract documents are found to be in compliance with Contract Documents, the Utilities Director will recommend to the City Council acceptance of the completed work. The work is not complete until accepted by the City Council.

GENERAL PROVISIONS

SECTION 5

CONTROL OF MATERIALS

5.01 SAMPLES AND TESTS

At the option of the City, the source of supply of all materials furnished by the Contractor shall be approved by the City before delivery is started and before such materials are used in the work. Representative preliminary samples of the character and quality prescribed shall be submitted by the Contractor or producer of all materials to be used in the work for testing or examination as required by the City.

All tests of materials furnished by the Contractor shall be made in accordance with commonly recognized industry standards and such special methods and tests as are prescribed in these specifications.

The Contractor shall furnish without charge such samples of materials as are required by the City. No material shall be used until it has been approved by the City. Samples will be secured and tested whenever necessary to determine the quality of the materials.

The Contractor shall be responsible for, and shall pay for, all source quality control and all off-site tests of materials required, except laboratory work for soil relative compaction testing and concrete strength testing during construction. The City shall have the right to witness all off-site tests and the Contractor shall furnish adequate notice of when tests will be made.

The City shall furnish and pay for all initial on-site-testing services required by the Contract Documents. When initial tests indicate non-compliance with the Contract Documents, all subsequent re-testing occasioned by the non-compliance shall be performed by the same testing laboratory and the cost thereof will be deducted from monies due or may become due to the Contractor under the contract.

Inspection or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor. Functional testing of mechanical and electrical equipment shall be the sole responsibility of the Contractor.

When, in the opinion of the City, additional tests or inspections are required because of the manner in which the Contractor executes his or her work, such tests and inspections shall be paid for by the City, but will be deducted from monies due or become due to the Contractor under the contract. Examples of such tests and inspections are: tests of materials substituted for previously accepted materials or substituted for specified materials, re-tests made necessary by failure of materials to comply with the specifications, load tests made necessary because of portions of the structure not fully meeting specifications or plan requirements etc.

5.02 SUBMITTALS

GENERAL

Submittals covered by these requirements include manufacturers' information, shop drawings, test procedures, test results, samples, requests for substitutions, and miscellaneous work-related submittals. The Contractor shall furnish all drawings, specifications, descriptive data, certificates, samples, tests, methods, schedules, and manufacturer's installation and other instructions as specifically required in the Contract Documents to demonstrate fully that the materials and equipment to be furnished and the methods of work comply with the provisions and intent of the Contract Documents.

CONTRACTOR'S RESPONSIBILITIES

- A. The Contractor shall be responsible for the accuracy and completeness of the information contained in each submittal and shall assure that the material, equipment or method of work shall be as described in the submittal. The Contractor shall verify that all features of all products conform to the specified requirements. Submittal documents shall be clearly edited to indicate only those items, models, or series of equipment, which are being submitted for review. All extraneous materials shall be crossed out or otherwise obliterated. The Contractor shall ensure that there is no conflict with other submittals and notify the Engineer in each case where his submittal may affect the work of another contractor or the City. The Contractor shall coordinate submittals among his subcontractors and suppliers including those submittals complying with unit responsibility requirements specified in applicable technical sections.
- B. The Contractor shall coordinate submittals with the work so that work will not be delayed. The Contractor shall coordinate and schedule different categories of submittals, so that one will not be delayed for lack of coordination with another. No extension of time will be allowed because of failure to properly schedule submittals. The Contractor shall not proceed with work related to a submittal until the submittal process is complete.
- C. The Contractor shall certify on each submittal document that he has reviewed the submittal, verified field conditions, and complied with the Contract Documents.

TRANSMITTAL PROCEDURE

- A. Electronic submittals will NOT be accepted nor reviewed.
- B. Unless otherwise specified, submittals regarding material and equipment shall be accompanied by Transmittal Form. A separate form shall be used for each specific item, class of material, equipment, and items specified in separate, discrete sections, for which the submittal is required. Submittal documents common to more than one piece of equipment shall be identified with all the appropriate equipment numbers. Submittals for various items shall be made with a single form when the items taken together constitute a manufacturer's package or are so functionally related that expediency indicates checking or review of the group or package as a whole.
- C. The transmittal for all submittals must include the relevant, specific specification section, part and paragraph, and/or the relevant plan sheet and detail number for the

submittal. The name of each submittal must match the material or equipment type being submitted, NOT the product name or brand.

- D. If the Contractor proposes to provide material, equipment, or method of work which deviates from the project requirements, he shall indicate so under "Substitutions" on the transmittal form accompanying the submittal copies and comply with the requirements of the City of Modesto General Provisions Section 5.07 Substitutions.

SUBMITTAL REVIEW PROCEDURE

- A. Except where specifically described by the Contract Documents, review shall not extend to means, methods, techniques, sequences or procedures of construction. Furthermore, verification of quantities, dimensions, weights, gages, fabrication processes, safety precautions or programs incident thereto will not be reviewed unless specifically described by the Contract Documents. Review of a separate item, as such, will not indicate approval of the assembly in which the item functions.
- B. Seven copies, unless otherwise specified during the preconstruction meeting, of all submittals required shall be furnished to the Engineer for review. The Engineer shall review the submittal and return a minimum of 2 copies of the marked-up original and a submittal stamping page with the required Contractor action within 15 working days after receipt of a submittal for review and comment, unless otherwise specified. All shop drawings and layout drawings submittals shall be submitted a minimum of 20 working days before accepted submittal drawings will be required for the work.
- C. Submittals which do not have all the information required to be submitted, including deviations, are not acceptable and will be returned without review.

EFFECT OF REVIEW OF CONTRACTOR'S SUBMITTALS

- A. Review of contract drawings, methods of work, or information regarding materials or equipment the Contractor proposes to provide, shall not relieve the Contractor of his responsibility for errors therein and shall not be regarded as an assumption of risks or liability by the Engineer or the City, or by any employee thereof, and the Contractor shall have no claim under the Contract on account of the failure, or partial failure, of the method of work, material, or equipment so reviewed.
- B. Submittals will be marked with one of the 4 following actions with or without comments:
 - 1. No Exceptions Taken
 - a. Accepted subject to its compatibility with future submissions and additional partial submissions for portions of the work not covered in this submission. Does not constitute approval or deletion of specified or required items not shown in the partial submission.
 - 2. Make Corrections Noted
 - a. Same as "No Exceptions Taken", except that minor (No re-submittal required) Corrections as noted shall be made by the Contractor.

3. Amend and Resubmit
 - a. Major inconsistencies or errors shall be resolved or corrected by the Contractor prior to subsequent review by the City.
 4. Rejected – Resubmit
 - a. Submitted material does not conform to Contract Documents in major respect, i.e.: wrong size, model, capacity or material.
- C. “No Exceptions Taken” and “Make Corrections Noted” (no re-submittal required) are considered "favorable review" of a submittal. “Amend and Resubmit” and “Rejected – Resubmit” (correction and re-submittal required) are considered "unfavorable review.”
- D. Favorable review by the City will not constitute acceptance by the City of any responsibility for the accuracy, coordination and completeness of the shop drawings or the items of equipment represented on the drawings. Accuracy, coordination, and completeness of shop drawings shall be the sole responsibility of the Contractor, including responsibility to back-check comments, corrections, and modifications from the City’s review before fabrications.
- E. Preparation of submittals or re-submittals due to an unfavorable review, will not be reason for any portion of the compensation owed.

5.03 PROTECTION OF WORK AND MATERIALS

The Contractor shall provide and maintain storage facilities and employ such measures as will preserve the specified quality and fitness of materials to be used in the work. Stored materials shall be reasonably accessible for inspection. The Contractor shall also adequately protect new and existing work and all items of equipment for the duration of his or her contract. The Contractor shall not, without the City’s consent, assign, sell, mortgage, hypothecate, or remove equipment or materials which have been installed or delivered and which may be necessary for the completion of the contract.

The Contractor shall be responsible for all damage to any part of the work site caused as a result of his work in connection with the Contract. The responsibility shall extend for a period of one year after final acceptance of the project by the City Council.

5.04 DEFECTIVE MATERIALS

All materials not conforming to the requirements of these specifications shall be considered as defective, and all such materials, whether in place or not, shall be rejected and shall be removed immediately from the site of the work unless otherwise permitted or directed by the City. No rejected materials, the defects of which have been subsequently corrected, shall be used until approved in writing by the City.

Upon failure on the part of the Contractor to comply with any order of the City made under the provisions of this article, the City shall have authority to remove and replace defective material and to deduct the cost of removal and replacement from any monies due or to become due to the Contractor.

5.05 CERTIFICATES OF COMPLIANCE

A Certificate of Compliance shall be furnished prior to the use of any materials for which these specifications require that such a certificate be furnished. In addition, when so authorized in these specifications, the City may permit the use of certain materials or assemblies prior to sampling and testing if accompanied by a Certificate of Compliance. The Certificate shall be signed by the manufacturer of the material or the manufacturer of assembled materials and shall state that the materials involved comply in all respects with the requirements of the specifications. A Certificate of Compliance shall be furnished with each lot of material delivered to the work and the lot so certified shall be clearly identified in the certificate.

All materials used on the basis of a Certificate of Compliance may be sampled and tested at any time. The fact that material is used on the basis of a Certificate of Compliance shall not relieve the Contractor of responsibility for incorporating material in the work which conforms to the requirements of the plans and specifications and any such material not conforming to such requirements will be subject to rejection whether in place or not.

5.06 DISPOSAL OF EXCESS MATERIAL

Excess material shall be disposed of in a legal manner. Disposal on private property will be done only with the prior written consent of the property owner.

5.07 RESERVED

5.08 RECORD DRAWINGS

A. General

- a. Record Drawings refer to those documents maintained and annotated by the Contractor during construction to illustrate the final location of all structures, piping, equipment, electrical conduits and raceways, pull boxes, outlet boxes and cables.
- b. The Contractor shall record all changes or deviations that vary from the original Contract Documents including all addenda, if any. Identify buried or concealed construction and utility features, new and existing that are revealed during the course of construction. Record the horizontal and vertical location of buried utilities that differ from the locations described, or which were not described on the Contract Documents.
- c. When the configuration and arrangement of the Work is changed from that described in the Contract Documents, the authorizing document for the change, such as a Request for Information, Change Order, Shop Drawing, or Field Order, shall be clearly referenced on the Record Drawings as a comment.
- d. Supplement the Record Drawings with detailed layout sketches, schedules, installation drawings and fabrication drawings.

B. Execution

- a. Record Drawings shall be full size and maintained in a clean and legible condition. Engineer will provide one set of full size Drawings for use as a Record Drawing set.
- b. Do not use the Record Drawing set for construction purposes.
- c. At the completion of the work, but prior to final payment, submit the Record Drawing set to the Engineer.
- d. Marking of the drawings shall be kept current and shall be done at the time the material and equipment are installed.
- e. Annotations to the Record Drawings shall be legible and shall be made with an erasable colored pencil conforming to the following color code:
 - i. Additions and Final Dimensions – Red
 - ii. Deletions – Green
 - iii. Comments – Blue
- f. Engineer will review the Contractor's updated Record Drawing mark-ups on a monthly basis during the evaluation of each progress payment.
 - i. Progress payment approval is contingent upon complete and up-to-date Record Drawing mark-ups.
 - ii. Payment approval will be delayed if mark-up drawings are not up-to-date.

5.09 MANUALS

The Contractor shall furnish in a three-ring binder a manual for all Contractor installed components requiring maintenance manuals. These shall include electronic products such as traffic signals, vehicle detector systems, amplifiers, and various controllers as well as mechanical items. The manuals may be combined into one (1) manual. The manual or combined manuals shall be submitted at the time the controllers are delivered for testing or, if ordered by the City, prior to purchase. The manual shall include, but need not be limited to, the following items:

- A. Specifications
- B. Design characteristics
- C. General operations theory
- D. Function of all controls
- E. Trouble Shooting Procedure (diagnostic routine)
- F. Block circuit diagram

- G. Geographical layout of components
- H. Schematic diagrams
- I. List of replaceable component parts with stock numbers

GENERAL PROVISIONS

SECTION 6

UTILITIES

6.01 LOCATION

The City will search known records and indicate on the plans those utilities, except service connections, which may affect the work. Any available information regarding removal, relocation, or disconnection of utilities, or installation of new utilities, will be furnished to prospective bidders before the receipt of bids. The Contractor shall immediately report to the City those utilities omitted from the plans or found substantially at variance with the location shown.

At least two (2) working days prior to commencing work, the Contractor shall request utility owners to mark or otherwise indicate the location of their substructures. The location of utilities as shown on the plans are approximate and are not to be construed as certainty. It shall be the Contractor's responsibility to determine the true location and depth of all utilities and service connections affecting or conflicting with the work, prior to the performance of the work. He or she shall also familiarize himself or herself with the type, material, age and condition of any utility, which may be affected by the work.

6.02 PROTECTION

The Contractor shall not interrupt the service function or disturb the supporting base of any utility, without authority from the utility owner or order from the City.

Where protection is required to insure support of utilities located substantially as shown on the plans or in accordance with other information furnished bidders prior to receipt of bids, or for underground service connections, the Contractor shall, unless otherwise provided, furnish and place the necessary protection at his or her expense.

Upon learning of the existence and location of any utility omitted from or shown incorrectly on the plans, the Contractor shall notify the City and owner of the utility and be fully responsible for protecting such utility.

The Contractor shall immediately notify the City and the utility owner if he disturbs, disconnects or damages any utility. If the utility is located substantially as indicated on the plans or as marked in the field, the Contractor shall bear the costs of repair or replacement.

When placing concrete around or contiguous to any utility, the Contractor shall at his expense, furnish and install a cushion of expansion joint material, clear opening, sleeve, or by other suitable means shall prevent embedment in or bonding with the concrete.

6.03 NOTIFICATION

The Contractor shall give written 48-hour advance notice to all customers who will be affected during an outage of any utility.

6.04 REMOVAL

Unless otherwise specified, the Contractor shall remove all portions of interfering utilities shown on the plans as “abandoned” or “to be abandoned in place”. Before starting removal operations, the Contractor shall ascertain from the utility owner whether abandonment is complete. The costs involved in the removal and disposal shall be absorbed in the Contractor’s bid and no additional compensation will be allowed therefore.

6.05 RELOCATION

When feasible, the owners of utilities within the area affected by the work will complete their necessary installations, relocations, repairs, or replacements before commencement of work by the Contractor. When the Special Provisions or plans indicate that a utility is to be relocated, altered or constructed by others, the City will conduct all negotiations with the owners and the work will be done at no cost to the Contractor.

Utilities, found by the City to interfere with the permanent project work after award of the contract, will be relocated, altered, or reconstructed by the utility owners, or the City may order changes in the work to avoid interference. Such changes will be paid for in accordance with GP Section 3.05.

When the plans or specifications provide for the Contractor to alter, relocate, or reconstruct a utility, all costs for such work shall be absorbed in the Contractor’s bid. Temporary or permanent relocation or alteration of utilities desired by the Contractor for his or her own convenience shall be his or her responsibility, and he or she shall make all arrangements and bear all cost. The Contractor may, for his or her own convenience or to expedite the work, agree with the owner of any utility to disconnect and reconnect interfering service connections. The City shall not be involved in any such agreement.

6.06 DELAYS

The Contractor is responsible for notifying utility owners in time to prevent delays attributable to utility relocations or alterations as called for in the Contract Documents. The Contractor shall not be entitled to damages or additional payment if such delay does occur. The City will determine the extent of the delay on the project as a whole, and any commensurate extension of time.

6.07 COOPERATION

When necessary, the Contractor shall so conduct his or her operations as to permit access to the worksite and provide time for utility work to be accomplished during the progress of the contract work.

6.08 EXISTING UTILITIES

Should the Contractor desire to have any rearrangement made in any utility facility, or other improvement, for the Contractor's convenience in order to facilitate the Contractor's construction operations, which rearrangement is in addition to, or different from, the rearrangements indicated on the plans or in the special provisions, the Contractor shall make whatever arrangements are necessary with the owners of the utility for the rearrangement and bear all expenses in connection therewith.

The right is reserved to municipal corporations, county authorities, and to water, gas, telephone, telegraph and electric power transmission utilities, to enter upon any public highway, road or right of way, for the purpose of making repairs and changes that have become necessary by reason of the improvement thereof.

It shall be the sole responsibility of the Contractor to maintain in operating condition any ditches, canals, pipes, conduits, wires, diversion boxes, and other appurtenances therefore during such times as the same may be in use for irrigation or conveying and distributing irrigation water. The Contractor shall make any necessary arrangements with the distributors of such irrigation water to coordinate his or her construction under these specifications with said irrigation so as to cause no interruption thereof.

Any such irrigation works damaged or removed by the Contractor shall be repaired or replaced by him at his or her sole expense and to the satisfaction of the City.

The Contractor shall locate, preserve and protect from damage all surface and underground utilities within the area of construction. Call Underground Service Alert (USA), 1-800-642-2444 48 hours prior to start of construction for locating lines of member utilities.

6.09 UTILITY COMPANIES

The following utilities may be affected during construction and it shall be the Contractor's responsibility to contact the affected utility company, prior to commencement of the work and at such other times that it becomes necessary during construction, including but not limited to: water, sewer, storm drain, gas, electric, telephone, cable, fiber optics, and railroad.

GENERAL PROVISIONS

SECTION 7

LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC

7.01 LAWS TO BE OBSERVED

- A. All work and materials shall conform to the latest codes, rules and regulations of the following:
 - 1. All State and Federal laws and regulations including, but not limited to, Occupational Safety and Health Acts.
 - 2. Local City and/or County ordinances.
 - 3. All orders and decrees of bodies or tribunals having any jurisdiction or authority.
 - 4. City of Modesto Standard Specifications
 - 5. California Code of Regulations – Title 24
- B. Nothing in these Specifications is to be construed to permit work not conforming to the above; expense for compliance with the above shall be paid for by the Contractor. Whenever the Contract Documents require higher standards or larger sizes than those required by the Ordinances and Statutes, the Contract Documents shall take priority.
- C. Section 504 of the Rehabilitation Act of 1983 as incorporated in the Revenue Sharing Act. Each bidder shall submit with his or her bid, certification that he or she is in compliance with this Act as specified in Section 51.55 of the General Sharing Regulations, summarized in the City of Modesto policy statement on nondiscrimination of the handicapped, which laws, ordinances, regulations, orders or decrees in any manner affect those engaged or employed in the work or material used in the work, or which in any way affect the conduct of the work.
- D. Applying and receiving Special Dispensation from the California Occupational Safety and Health Administration to conduct operations no closer than 6 feet, but within 10 feet of a high voltage line prior to erecting signal standards.

7.02 EMPLOYMENT

- A. Nondiscrimination
In connection with the performance of work under this contract, the Contractor agrees that neither he or she nor any subcontractor who performs any work or labor or renders any service pursuant hereto shall discriminate against any employee or applicant for employment because of race, sex, creed, color, national origin or handicapped status.
- B. Affirmative Action Program Certification
Each bidder shall submit with his or her bid, certification that he or she is in compliance with the Civil Rights Act of 1964, Executive Order No. 11246, the California Fair Employment Practices Act, and any other applicable federal and state laws and regulations relating to equal opportunity employment.

The Contractor shall submit a statement each month while the project is in progress certifying that he or she is in compliance with the above laws and regulations. The certification shall be on a form approved by the City. The project is considered as being in progress upon issuance of the Notice to Proceed and until the project is accepted by the City Council.

If, on or before the 20th of any month, the Contractor has not submitted the required certificate for the current month, the City will retain from the monthly estimate an amount equal to 2% of the estimated value of the work performed during the month, except that such retention shall not exceed \$2,000.00 nor be less than \$500.00. Retentions for failure to submit a certificate shall be in addition to all other retentions provided for in this contract. After the required certificate is received, the retention for that certificate will then be released with the next monthly progress payment which is made.

C. Apprentices

The Contractor and all subcontractors shall comply with the provisions of Section 1777.5 et seq of the California Labor Code. The responsibility for compliance with these provisions is fixed with the Prime Contractor for all apprentice occupations.

If the Prime Contract involves less than \$30,000.00 or 20 days, Labor Code Section 1777.5 shall not apply.

7.03 HOURS OF LABOR

The Contractor shall forfeit as penalty to the City, \$25.00 for each worker employed in the execution of the contract by him or her or by any subcontractor, for each calendar day during which any worker is required or permitted to labor more than 8 hours in violation of the provisions of the Labor Code, and in particular, Sections 1810 to Section 1815. However, work performed by any worker in excess of 8 hours per day shall be permitted upon compensation for all hours worked in excess of eight hours a day at not less than 1½ times the basic rate of pay as provided in the Labor Code.

7.04 PREVAILING WAGES (WHEN REQUIRED BY SPECIAL PROVISIONS)

Bidders are hereby notified that pursuant to Section 1770 et seq. of the Labor Code of the State of California, the Director of the Department of Industrial Relations of the State of California has ascertained the general prevailing rate of hourly wages and rates for overtime, Saturday, Sunday and holiday work in the locality where this work is to be performed for each craft or type of worker or mechanic needed to execute the contract which will be awarded the successful bidder. Refer to "GENERAL WAGE DETERMINATION MADE BY THE DIRECTOR OF INDUSTRIAL RELATIONS PURSUANT TO CALIFORNIA LABOR CODE PART 7, CHAPTER 1, ARTICLE 2, SECTIONS 1770, 1773, and 1773.1 which is on file in the office of the Public Works Director, 1010 Tenth Street, Modesto, California, and is available to any interested party on request. The Contractor shall post a copy of the prevailing wage rates at each job site.

The Contractor and all subcontractors shall comply with the provisions of Section 1776 of the California Labor Code, regarding payroll records. Compliance with said Section 1776 shall be the Contractor's responsibility.

The Contractor shall comply with the provisions of Labor Code Section 1775. In accordance with said Section 1775, the Contractor shall forfeit, as a penalty to the City, \$25.00 for each calendar day, or portion thereof, for each worker paid less than the stipulated prevailing rates for such work or craft in which such worker is employed for any public work done under the contract by him or by any subcontractor under him. In addition to said penalty, the Contractor shall pay to each worker the difference between the stipulated prevailing wage rate and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the stipulated prevailing wage rate.

The Contractor may pay compensation to workers in excess of the prevailing wage rate as determined above; however, such payments shall not be the basis for any claim for additional compensation to the Contractor by the City. The possibility of wage increases is one of the elements to be considered by the Contractor in determining his or her bid, and will not under any circumstances be considered as the basis for any claim for additional compensation by the City to the Contractor.

The City will require submittal of Certified Payrolls from the Contractor when they are needed to verify that the Contractor is in compliance with the State Labor Code or when needed to confirm the cost of work being done or the cost of proposed changes on the project. The payrolls shall be on a form and at a frequency as required by the City.

If certified payrolls are requested and if, on or before the 20th of the month the Contractor has not submitted satisfactory certified payrolls for all work performed during the monthly period ending on or before the 6th of that month, the City will deduct an amount equal to 10% of the estimated value of the work performed during the month from the next monthly estimate, except that such deduction shall not exceed \$10,000 nor be less than \$1,000 for each month. Deductions for failure to submit satisfactory certified payrolls shall be in addition to all other deductions/retentions provided for in this contract or by State/Federal law. The deduction for failure to submit certified payrolls for each monthly period will be released for payment on the monthly estimate for progress payments next following the date that all the satisfactory certified payrolls for which the deduction was made are submitted. The total of all deductions being held for certified payroll record submittal can be more than the aforementioned limits, since each month's deduction stands on its own, and consequently, can accumulate beyond the \$10,000 limit.

7.05 PERMITS AND LICENSES

The Contractor shall procure all permits and licenses, pay all charges and fees and give all notices necessary and incidental to the due and lawful prosecution of the work.

7.06 PATENT FEES AND ROYALTIES

The Contractor shall absorb in his or her bid, the patent fees or royalties on any patented article or process which may be furnished or used in the work. The Contractor shall indemnify and hold the City harmless from any legal action that may be brought for infringement of patents.

7.07 COOPERATION AND COLLATERAL WORK

The Contractor shall be responsible for ascertaining the nature and extent of any simultaneous, collateral and essential work by others. The City, its workmen and Contractors, and others, shall have the right to operate within or adjacent to the worksite to perform such work.

The City reserves the right to award other contracts in connection with the total project, the work under which may proceed simultaneously with the work to be done under this contract. The Contractor shall coordinate his or her operations with those of other Contractors. Cooperation will be required in the arrangement for the storage of materials, and in the detailed execution of the work. The Contractor, including his or her subcontractors, if any, shall keep himself or herself informed of the progress and the detail work of other Contractors and shall notify the City immediately of lack of progress or defective workmanship on the part of other Contractors, where such delay or such defective workmanship will interfere with his or her operations. Failure of the Contractor to keep informed of the work progressing on the site and failure to give notice of lack of progress or defective workmanship by others shall be construed as acceptance by him or her of the status of the work as being satisfactory for proper coordination with his or her own work. The Contractor and each other Contractor shall adjust, correct and coordinate his or her work with the work of others, so that no discrepancies shall result in the whole work.

If the Contractor or any of his subcontractors or employees cause loss or damage to any separate Contractor on the work, the Contractor, by agreement or arbitration, if he or she deems it necessary, will settle any claim for such loss or damage. If such separate Contractor shall sue the owner, on account of any loss so sustained, the owner shall notify the Contractor, who shall indemnify and save harmless the owner against any loss or damage arising therefrom, including the cost and expense of defending any such suit.

The City, the Contractor, and each of such workmen, Contractors, and others, shall coordinate their operations and cooperate to minimize interference.

The Contractor shall absorb in his or her bid all costs involved in his or her part as a result of coordinating his or her work with others. The Contractor will not be entitled to additional compensation from the City for damages resulting from such simultaneous, collateral and essential work. If necessary to avoid or minimize such damage, or delay, the Contractor shall redeploy his or her work force to other parts of the work.

Where work of one trade joins or incorporates other work, there shall be no discrepancy when the work is completed. In engaging one kind of work with another, marring or damaging of the previously completed work will not be permitted. Should improper work of any trade be covered by another which results in damage or defects, the whole work affected shall be made good by the Contractor without expense to the City.

7.08 USE OF PREMISES

The Contractor shall confine construction equipment, the storage of materials and equipment and the operations of workers to the project site and land and areas identified in and permitted by the Contract Documents and other land and areas permitted by Laws and

Regulations, right-of-way, permits and easements, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. The Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereto or of any land or areas contiguous thereof, resulting from the performance of the work. Should any claim be made against the City by any such owner or occupant because of the performance of the work, the Contractor shall promptly attempt to settle with such other party by agreement or otherwise resolve the claim by arbitration or at law. The Contractor shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold the City harmless from and against all claims, damages, losses and expenses (including, but not limited to, fees of engineers, architect, attorneys and other professional and court and arbitration costs) arising directly or consequentially out of any action, legal or equitable, brought by any such other party against the City to the extent based on claim arising out of the Contractor's performance of the work.

7.09 PROJECT SITE MAINTENANCE

A. Cleanup and Dust Control

Throughout all phases of construction, including suspension of work, and until final acceptance of the project by the City Council, the Contractor shall keep the work site clean and free from rubbish and debris. The Contractor shall also abate dust nuisance by cleaning, sweeping, sprinkling with water, or other means as necessary. The use of water resulting in mud on public streets will not be permitted as a substitute for sweeping or other methods.

The Contractor shall be required to apply water for dust control at all times, including Saturdays, Sundays, designated legal holidays, and other such times in which construction activities are not currently in progress. If dust control is not adequate in the opinion of the City, the City will have this work done by others and will deduct such cost from any monies due the Contractor.

The Contractor shall take necessary precautions not to deposit material on public streets. If construction operations cause material to be deposited on public streets, the Contractor shall furnish and operate a self-loading motor sweeper with spray nozzles at least once each working day to keep paved areas clean whenever construction, including restoration, is incomplete.

Materials and equipment shall be removed from the site as soon as they are no longer necessary. Upon completion of the work and before final inspection the entire worksite shall be cleared of equipment, unused materials, and rubbish so as to present a satisfactory clean and neat appearance. All cleanup costs shall be absorbed in the Contractor's bid. All traffic, street and traffic control signs within the limits of work necessarily removed during the various phases of operations shall be temporarily reset by the Contractor at or near the original location upon completion of each phase of construction operations. Prior to removal of all traffic, street and traffic control signs, the Contractor shall take photographs of the site which show the existing location of these signs, so that upon completion the photographs will aid in resetting the signs at or near their original location. Traffic, street and traffic control signs will be replaced upon completion of the work and the cost of removal and replacement will be included in various bid items and no separate payment will be made. Rural type mail boxes shall be maintained by the Contractor in a manner

satisfactory to the property owner and postal service, and the Contractor shall relocate same as soon as possible to a permanent location in accordance with postal regulations and in a location acceptable to the property owner.

Care shall be taken to prevent spillage on haul routes. Any such spillage shall be removed immediately and the area cleaned.

Excess excavated material from catch basins or similar structures shall be removed from the site immediately. Sufficient material may remain for use as backfill if permitted by the specifications. Forms and form lumber shall be removed from the site as soon as practicable after stripping.

The Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall the Contractor subject any part of the work or adjacent property to stresses or pressures that will endanger it.

Earth dams will not be permitted at catch basin openings, local depressions, or elsewhere, except in time of emergency. Temporary dams of sand bags, asphaltic concrete or other acceptable material may be permitted when necessary to protect the work, provided their use does not create a hazard or nuisance to the public. Such dams shall be removed from the site as soon as their use is no longer necessary.

Failure of the Contractor to comply with the City's cleanup orders may result in an order to suspend work until the condition is corrected. No additional compensation will be allowed as a result of such suspension.

B. Vermin Control

At the time of acceptance, structures entirely constructed under the contract shall be free of rodents, insects, vermin and pests. Necessary extermination work shall be arranged and paid for by the Contractor as part of the contract work within the contract time and shall be performed by a licensed agency in accordance with requirements of governing authorities. The Contractor shall be liable for injury to persons or property and responsible for the elimination of offensive odors resulting from extermination operations.

C. Sanitation

The Contractor shall provide and maintain enclosed toilets for the use of employees engaged in the work. These accommodations shall be maintained in a neat and sanitary condition. They shall also comply with all applicable laws, ordinances and regulations pertaining to the public health and sanitation of dwelling and camps.

Sewage flows shall not be interrupted. Should the Contractor disrupt existing sewer facilities, sewage shall be conveyed in closed conduits and disposed of in a sanitary sewer system. Sewage shall not be permitted to flow in trenches or be covered by backfill.

7.10 TEMPORARY LIGHT, POWER, AND WATER

- A. Upon request, Contractor can utilize City water during the course of construction. The City will provide a meter and backflow prevention assembly for a security deposit in the amount of \$1,250. The Water Division service personnel will read the hydrant meters monthly. These meter readings will be processed by the Finance Department on a monthly basis for billing directly to the Contractor.
- B. The Contractor shall complete the Fire Hydrant Use Permit Application and submit to the Finance Department. Once a completed Fire Hydrant Use Permit Application is received, the Water Division will install the meter and test the backflow prevention assembly on the hydrant at the location provided on the permit within 2 business days.
- C. Any project found without a meter and backflow prevention assembly, the Contractor will be fined \$500.
- D. The Contractor must never remove or change the location of a hydrant meter. The City Inspector must be contacted to coordinate removal and re-installation of the hydrant meter and backflow prevention assembly at the new location. If the hydrant meter and backflow prevention assembly is found to have been moved to a new location without authorization, the Contractor will be fined \$500.
- E. All fines will be paid directly by the Contractor.
- F. It is the Contractor's responsibility to protect the fire hydrant, the fire hydrant meter and backflow prevention assembly from damage due to construction activities. In the sole opinion of the City Inspector, if any component of this complete assembly (including the hydrant) is damaged due to the Contractor, or Contractor's neglect, the Contractor will replace all damaged components at no additional cost to the City.

7.11 PROTECTION AND RESTORATION OF EXISTING IMPROVEMENTS

- A. This section specifies the procedures for protection and restoration of existing improvements and facilities, adjacent and within the work zone for construction activities.
- B. Construction Photographs and Video Recording
- C. The color photographs and color audio-video recordings are intended for use as indisputable evidence in ascertaining the extent of any damage which may occur as a result of the Contractor's operations and are for the protection of the public, the Contractor and the City. These documents will be a means of determining whether and to what extent damage, resulting from the Contractor's operations, occurred during the execution of the Contract work. All original pre- and post-construction video recording and photograph files shall be delivered to the City and shall become the property of the City.
 - 1. Photographs
 - a. Photograph documents shall meet the following requirements:
 - b. Color digital photographs with a minimum resolution of 2304 x 1728 pixels (3.0 MegaPixels)
 - c. Time & Date stamp on the photograph of when the image was taken
 - d. Location where the photograph was taken

2. The photographer shall be qualified and equipped to photograph both interior and exterior exposures with lenses ranging from wide angle to telephoto.

D. Video

1. Video recording documents shall meet the following requirements:
 - a. Video with audio shall be recorded to a Digital Video Disc (DVD)
 - b. The recorded file format shall be *.avi
 - c. The DVD case and disc labels shall list the date, name of contract, and the location where the images were recorded
 - d. The audio portion of the video recording shall narrate the progression through the site
 - e. All video recordings must display date and time of recording, and location.
2. Each recording shall be submitted to the Engineer in accordance with Submittal Procedures. The videographer shall be qualified and equipped to video both interior and exterior settings with appropriate use of lighting and lenses.

E. PROTECTION AND RESTORATION

1. The Contractor shall be responsible for the protection of public and private property adjacent to the work and shall exercise due caution to avoid damage to such property.
2. Unless otherwise specified, the Contractor shall repair or replace all existing improvements including, but not limited to, curbs, sidewalks, driveways, fences, signs, utilities, street surfaces, and structures damaged or removed as a result of construction activities. Repairs and replacements shall be at least equal in quality and finish to existing improvements, and shall match existing dimensions.
3. Landscaping, including but not limited to, trees, lawns, and shrubbery not designated for removal shall be protected from damage or injury. If damaged or removed because of the Contractor's activities, the landscaping shall be restored or replaced to match the original condition and location. As a minimum, lawns shall be reseeded and covered with suitable mulch.
4. All costs to the Contractor for protecting, removing, and restoring existing improvements shall be included in the related bid items of work.
5. Construction Photographs and Video Recording
6. After the Contract is awarded but before mobilization to the site, the Contractor shall make a thorough examination of all the existing structures, vegetation, utilities, and general condition of the work site and shall record all existing site conditions using photographs and video.
7. After the completion of the overall project, post construction video and photograph documents shall be done. A copy of all post construction recorded documents shall be provided to the Engineer. The Engineer will ascertain the extent of damage, if any, and will determine whether existing improvements, damaged or removed during construction, have been returned to specified or original condition. Final payment shall not be made until the Engineer has determined that the construction site meets or exceeds the specified or original condition.

8. All costs to the Contractor for photographs and video recording shall be included in the related bid items of work.

F. Video

1. The Contractor shall provide preconstruction video recording of the entire project, including staging, parking, and storage areas to the Engineer for each site prior to performing any work on the site.
2. For projects within the public right-of-way, provide recording along the alignment in both directions
3. For projects at a specific site, provide recording along the perimeter of the site in both directions as well as any other pertinent site features
4. No construction shall start until the preconstruction video recording has been completed and accepted by the Engineer.
5. After completion of construction, video recording shall be taken from the same points in both directions as the preconstruction recording within 7 calendar days after the acceptance of the project by the City. Final payment will not be made to the Contractor until the City receives copies of the video recordings which reflect the final conditions.

G. Construction Photography

1. The Contractor shall provide preconstruction photographs to the Engineer for each site prior to performing any work on the site.
2. Photographs shall be provided during construction to show all utility crossings, excavations for pipe, installation of pipe, removal and restoration of surface features such as trees, shrubs, rock retaining structures, fences, drainage canals and any items of special interest upon the request of the Engineer.
3. Provide photographs taken on cutoff date for each scheduled application for payment.

7.12 PUBLIC CONVENIENCE AND SAFETY

- A. The Contractor shall so conduct his or her operations as to cause the least possible inconvenience to the general public and residents of the vicinity. Public convenience and safety shall conform to Section 7-1.08 "Public Convenience" and Section 7-1.09, "Public Safety of the State Standards," and the Cal Trans Manual of Traffic Control. Where lane or street closures are required for the prosecution of the work, the Contractor shall submit a traffic control plan to the City for approval 72 hours before closure.

Traffic controls through the construction zone shall be designed and maintained by a designated individual qualified in this responsibility. Evidence of qualification may be a Certificate of Completion of a course titled "Safety Through Maintenance and Construction Zones," issued by ITE.

The Contractor shall furnish, erect, and maintain such fences, barriers, lights and signs as are necessary to give adequate warning to the public at all times that the work is in progress and of any dangerous conditions to be encountered as a result thereof, and he or she shall also erect and maintain such warning signs as may be

required by the City. Temporary traffic controls and markings shall be removed when no longer needed.

- B. Before excavating any trench 5' or more in depth, the Contractor shall submit a detailed plan to the City showing the design of shoring, bracing, sloping, or other provisions to be made for the workers' protection from the hazard of caving ground during the excavation of such trench. If the plan varies from the shoring system standards, the plan shall be prepared by a registered civil engineer. No excavation shall start until the City has accepted the plan and the Contractor has obtained a permit from the State Division of Industrial Safety. A copy of the permit shall be submitted to the City.
- C. Notice to Agencies - The Contractor shall notify in writing all agencies having jurisdiction at least 48 hours, excluding holidays and weekends, prior to instituting any lane closure or detour. At the end of each day's work, the Contractor shall inform the ambulance services, police and fire departments of the status of all detours and/or lanes or road closures. The Contractor shall cooperate with the U.S. Postal Service, the various parties involved in collection and removal of trash and garbage, and the bus services to maintain existing schedules for these services.
- D. Emergency Vehicle Access Through Detours - During all detours and/or street closures, the Contractor shall provide for movement of emergency vehicles through the work area. It is essential that the Contractor's work and equipment does not impede egress from any fire or police station to other areas of their service area.
- E. Access to Private Property - The Contractor shall schedule operations to minimize disruption of access to private property. Prior to blocking access to any private driveway or parking lot entrance, the Contractor shall notify the resident or business owner or tenant of pending closure and allow residents to remove vehicles. During non-working hours, no driveway, house or parking lot shall be denied access to a public roadway.
- F. Night Detours - The Contractor shall not be permitted to maintain any lane closure or road closure during non-working hours without first obtaining written approval of the City. During non-working hours the Contractor shall restore travel lanes to their original alignment and configuration by means of backfilling and temporary pavement or bridging. The Contractor shall place "ROUGH ROAD" signs conforming to the Manual of Traffic Control at uneven temporary pavement or bridging.
- G. Parking Restrictions - The Contractor shall post approved "No Parking" signs at all locations necessary to establish work areas and detour traffic. Signs shall read: "NO PARKING - CONSTRUCTION TOW-AWAY ZONE", show hours of parking restriction and indicate telephone number of police agency having jurisdiction. Signs shall be placed at least 48 hours in advance of restriction.
- H. Bridging Over Trenches and Excavations - Bridging shall be placed across all trenches and excavations of existing streets and at driveways when work is not in progress. Bridging for vehicular traffic shall be of sufficient width to accommodate the required number of travel lanes. Bridging shall be designed to support H-20 vehicular traffic. All bridging shall be set flush with travel surface or a satisfactory transition from travel surface to top of bridging shall be provided.

General Provisions

A satisfactory transition shall mean a change in elevation between the levels of not less than 12" horizontal to 1" vertical.

Transition may be accomplished by means of temporary pavement.

- I. Temporary Traffic Lanes - Temporary traffic lanes shall be at least 10' wide, with an additional 2' of clearance from curbs. The length of temporary lanes should be limited to the area under construction and the distance necessary to divert traffic.
- J. The Contractor will provide his or her own staging areas.

7.13 INDEMNIFICATION

The Contractor shall hold harmless, defend and indemnify the City, its agents, officers, officials, employees and volunteers from and against all claims, damages, losses and expenses including attorney fees arising out of the performance of the work described herein, caused in whole or in part by any negligent act or omission of the Contractor, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, except where caused by the active negligence, sole negligence, or willful misconduct of the City.

7.14 INSURANCE REQUIREMENTS

A. General

Contractor shall procure and maintain for the duration of the contract, *and for the entire duration covered by the warranty bond*, insurance as required by the Contract Documents and against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the Work by the Contractor, its agents, representatives, employees, or subcontractors.

B. Minimum Scope and Limit of Insurance

Coverage shall be at least as broad as:

1. **Commercial General Liability (CGL):** Insurance Services Office Form CG 00 01, including products and completed operations, with limits of no less than **\$2,000,000** per occurrence for bodily injury, personal injury, and property damage. If a general aggregate limit applies, either the general aggregate limit shall apply separately to this project/location or the general aggregate limit shall be twice the required occurrence limit.
2. **Automobile Liability:** Insurance Services Office Form Number CA 0001 covering Code 1 (any auto), with limits no less than **\$1,000,000** per accident for bodily injury and property damage.
3. **Workers' Compensation** insurance as required by the State of California, with Statutory Limits, and Employers' Liability insurance with a limit of no less than **\$1,000,000** per accident for bodily injury or disease.
4. **Builder's Risk** (Course of Construction) insurance utilizing an "All Risk" (Special Perils) coverage form, with limits equal to the completed value of the

project and no coinsurance penalty provisions, when required by the Special Provisions or Project Specifications.

5. **Professional Liability** with limits no less than **\$1,000,000** per occurrence or claim, and **\$2,000,000** policy aggregate, when required by the Special Provisions or Project Specifications.
6. **Contractors' Pollution Legal Liability** and/or Asbestos Legal Liability and/or Errors and Omissions (if project involves environmental hazards) with limits no less than **\$1,000,000** per occurrence or claim, and **\$2,000,000** policy aggregate, when required by the Special Provisions or Project Specifications.

C. Deductibles and Self-Insured Retentions

Any deductibles or self-insured retentions must be declared to and approved by the City. At the option of the City, either: the contractor shall cause the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the City, its officers, officials, employees, and volunteers; or the Contractor shall provide a financial guarantee satisfactory to the City guaranteeing payment of losses and related investigations, claim administration, and defense expenses.

D. Other Insurance Provisions

The insurance policies are to contain, or be endorsed to contain, the following provisions:

1. The City, its officers, officials, employees, and volunteers are to be covered as additional insureds on the CGL and automobile liability policies with respect to liability arising out of with respect to liability arising out of work or operations performed by or on behalf of the Contractor including materials, parts, or equipment furnished in connection with such work or operations and automobiles owned, leased, hired, or borrowed by or on behalf of the Contractor. General liability coverage can be provided in the form of an endorsement to the Contractor's insurance (at least as broad as ISO Form CG 20 10, 11 85 or both CG 20 10 and CG 23 37 forms if later revisions used).
2. For any claims related to this project, the Contractor's insurance coverage shall be primary insurance as respects the City, its officers, officials, employees, and volunteers. Any insurance or self-insurance maintained by the City, its officers, officials, employees, or volunteers shall be excess of the Contractor's insurance and shall not contribute with it.
3. Each insurance policy required by this clause shall provide that coverage shall not be canceled, except with notice to the City.

E. Builder's Risk (Course of Construction) Insurance

Contractor may submit evidence of Builder's Risk insurance in the form of Course of Construction coverage. Such coverage shall name the City as a loss payee as their interest may appear.

F. Claims Made Policies

If any coverage required is written on a claims-made coverage form:

1. The retroactive date must be shown, and this date must be before the execution date of the contract or the beginning of contract work.

General Provisions

2. Insurance must be maintained and evidence of insurance must be provided for at least five (5) years after completion of contract work.
3. If coverage is canceled or non-renewed, and not replaced with another claims-made policy form with a retroactive date prior to the contract effective, or start of work date, the Contractor must purchase extended reporting period coverage for a minimum of five (5) years after completion of contract work.
4. A copy of the claims reporting requirements must be submitted to the City for review.
5. If the services involve lead-based paint or asbestos identification/remediation, the Contractors Pollution Liability policy shall not contain lead-based paint or asbestos exclusions. If the services involve mold identification/remediation, the Contractors Pollution Liability policy shall not contain a mold exclusion, and the definition of Pollution shall include microbial matter, including mold.

G. Acceptability of Insurers

Insurance is to be placed with insurers with a current A.M. Best rating of no less than A: VII, unless otherwise acceptable to the City.

H. Waiver of Subrogation

Contractor hereby agrees to waive rights of subrogation which any insurer of Contractor may acquire from Contractor by virtue of the payment of any loss. Contractor agrees to obtain any endorsement that may be necessary to affect this waiver of subrogation. The Workers' Compensation policy shall be endorsed with a waiver of subrogation in favor of the City for all work performed by the Contractor, its employees, agents and subcontractors.

I. Verification of Coverage

- J. Contractor shall furnish the City with original certificates and amendatory endorsements, or copies of the applicable insurance language, effecting coverage required by this contract. The Contractor must deliver certificates evidencing existence of the insurance and specified endorsements listed above to the Director of Utilities within 5 business days after the Notice of Award is received. However, failure to obtain the required documents prior to the work beginning shall not waive the Contractor's obligation to provide them. The City reserves the right to require complete, certified copies of all required insurance policies, including endorsements, required by the Contract Documents, at any time.

K. Subcontractors

Contractor shall require and verify that all subcontractors maintain insurance for the duration of the project and through acceptance by City Council.

7.15 VERIFICATION OF COVERAGE

The Contractor shall furnish the City with Certificates of Insurance and with original endorsements effecting coverages required. The certificates and endorsements are to be

signed by a person authorized by the insurer to bind coverage. The certificates and endorsements are to be on forms approved by the City. All certificates and endorsements are to be received and approved by the City prior to the commencement of any work. The City reserves the right to require complete, certified copies of all required insurance policies at any time.

7.16 SUBCONTRACTORS

The Contractor shall include all subcontractors as insureds under its policies or shall furnish separate certificates and endorsements for each subcontractor evidencing coverages for each subcontractor in form and amount meeting all the requirements herein.

7.17 CONTRACTOR'S RESPONSIBILITY FOR WORK

Until the formal acceptance of the work by the City Council, the Contractor shall be responsible for and have care, custody, and control of the work and of the materials to be used therein, including materials delivered to the work site, materials for which partial payment has been received, and materials which have been furnished by the City; and the Contractor shall bear full risk of loss, injury or damage to any part of the work and materials by action of the elements, or from any other cause, whether arising from the execution or non-execution of the work. The Contractor shall rebuild, repair, restore and make whole all loss or damage to any portion of the work or materials before final acceptance and shall bear the expense thereof, except for such loss or damage occasioned by acts of the Federal Government or the public enemy, or by an act of God as defined in Section 4150 of the California Government Code.

Suspension of the work for any cause whatever shall not relieve the Contractor of his or her responsibility for the work and materials as herein specified.

The Contractor shall be responsible for and must make good any defects arising through faulty, improper or inferior workmanship or materials arising or discovered in any part of the work during one (1) year after the completion and acceptance by the City Council of the project.

The Contractor shall be responsible for any damage his activities cause to adjacent public or private improvements. The Contractor shall take all measures necessary to protect adjacent natural areas from runoff, sedimentation, debris, or other damage resultant from the project activities.

7.18 ADVERTISING

The names of Contractors, Subcontractors, Architects, or Engineers, with their addresses and designation of their particular specialties, may be displayed on removable signs. The size and location of such signs shall be subject to the City's approval.

Commercial advertising matter shall not be attached to or painted on the surfaces of buildings, fences, canopies, or barricades.

7.19 HAZARDOUS MATERIALS

Pursuant to Section 25914.2 of the California Health and Safety Code, in the event the Contractor encounters on the site materials he or she reasonably believes to be asbestos or a hazardous substance, and the asbestos or hazardous substance has not been rendered harmless, the Contractor may continue work in unaffected areas reasonably believed safe and shall immediately cease work on the area affected and report the condition to the City in writing. If the City determines that asbestos or hazardous substances which were not disclosed in the bid are present on the site, all work regarding the removal of those substances will be performed pursuant to a separate contract.

7.20 AIR POLLUTION CONTROL

The Contractor shall comply with all air pollution control rules, regulations, ordinances and statutes which apply to any work performed pursuant to the contract, including any air pollution control rules, regulations, ordinances and statutes, specified in Section 11017 of the Government Code.

The Contractor shall comply with all applicable provisions of Regulation VIII of the San Joaquin Valley Air Pollution Control District. The Contractor is hereby alerted to the fact that this regulation imposes specific restrictions and requirements on the Contractor related to the construction activities at the site. The Contractor assumes full responsibility for conforming to the requirements of this regulation.

In the event the regulatory agency levies any fine or charge against the City as a result of the Contractor's failure to comply with this regulation, the Contractor shall reimburse the City upon demand the full amount of said fine or charge. The City shall have the right to deduct funds from monies due the Contractor should the Contractor fail to reimburse the City as stated above. Copies of Regulation VIII may be obtained by contacting:

San Joaquin Valley Air Pollution Control District
4230 Kiernan Avenue, Suite #130
Modesto, CA 95356
(209) 557-6400

7.21 RESERVED

GENERAL PROVISIONS

SECTION 8

PROSECUTION AND PROGRESS

8.01 SUBLETTING AND ASSIGNMENT

The Contractor shall give his or her personal attention to the fulfillment of the contract and shall keep the work under his or her control, including the work of all subcontractors.

The Contractor shall perform, with its own organization, contract work amounting to not less than 30% (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the City. In order to meet the 30% requirement, the Contractor may propose to contract for direct payment by its own organization for any element or combination of elements of the original contract price, including, but not limited to, materials, manufactured products, labor, equipment rental, tools and incidentals, but excluding "specialty items" defined in (B) below, totaling not less than 30% of the original price. Specialty items may be performed by subcontract and the amount of any such specialty items so performed may be deducted from the total original contract price before computing the amount of work required to be performed by the Contractor's own organization.

- A. "Its own organization" shall be construed to include only workers employed and paid directly by the Prime Contractor and equipment owned or rented by the Prime Contractor, with or without operators. Such term does not include employees or equipment of subcontractor, assignee, or agent of the Prime Contractor.
- B. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid on the contract as a whole and in general are to be limited to minor components of the overall contract. Only those items of work specifically designated as "Specialty Items" on the contract proposal form shall be considered as such.

The contract amount upon which the requirement set forth above is computed includes the cost of materials and manufactured products which are to be purchased or produced by the Contractor under the contract provisions.

Subcontracts shall include provisions that the contract between the City and the Contractor is part of the subcontract, and that all terms and provisions of the contract are incorporated in the subcontract. Subcontracts shall also contain certification by the subcontractor that the subcontractor is experienced in and qualified to do, and knowledgeable about, the subcontracted work. Copies of subcontracts shall be provided to the City upon written request.

Before work is started on a subcontract, the Contractor shall file with the City a written statement showing the work to be subcontracted, the names of the subcontractors and the description of each portion of the work to be subcontracted.

The Contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work), and (b) such other of its own organizational resources (supervision, management, and engineering services) as the City determines is necessary to assure the performance of the contract.

No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the City and such consent when given shall not be construed to relieve the Contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the City is assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

Where a portion of the work sublet by the Contractor is not being prosecuted in a manner satisfactory to the City, the subcontractor shall be removed immediately on the request of the City and shall not again be employed on the work.

8.02 PROGRESS OF THE WORK

The Contractor shall begin work as soon as possible after receiving the Notice to Proceed from the City and shall diligently prosecute the same to completion as hereinbefore specified. No work shall commence before contract bonds and insurance certificates have been filed with the City and the contract has been signed.

A preconstruction meeting must be held prior to starting any work on the project. The City will contact the Contractor no later than 5 working days from the date the contract is signed by the City Manager to set up the preconstruction meeting which shall be held no later than 10 working days from the contract signing date. The Notice to Proceed shall be issued as soon as practicable after the preconstruction meeting.

The Contractor shall provide the City with a project schedule at the pre-construction meeting.

Subsequent to the time that submittal of a progress schedule is required in accordance with these specifications, no progress payments will be made for any work until a satisfactory schedule has been submitted to the Engineer.

At any time during the project when, in the opinion of the Engineer, the project falls more than 20 working days behind the current schedule, the Engineer may request a revised schedule. The Contractor shall comply with this request at no additional cost to the City.

The Engineer shall review the proposed schedule for completeness and reasonableness. If in the opinion of the Engineer the proposed schedule is incomplete or unreasonable, the schedule shall be revised at no additional cost to the City.

Failure to comply with the above provisions shall entitle the City to withhold an additional 10% of the amount due on progress payments until the Contractor complies with these provisions.

8.03 CHARACTER OF WORKERS

If any person employed by the Contractor shall fail or refuse to carry out the direction of the City, or shall appear to the City to be incompetent or to act in a disorderly or improper manner, that person shall be discharged immediately on the request of the City, and such person shall not again be employed on the work.

8.04 TEMPORARY SUSPENSION OF WORK

The City shall have the authority to suspend the work wholly or in part for such period as he or she may deem necessary due to unsuitable weather, or to such other conditions as are considered unfavorable for the suitable prosecution of the work, or for such time as he or she may deem necessary, due to the failure on the part of the Contractor to carry out orders given, or to perform any provisions of the work. The Contractor shall immediately obey such order of the City and shall not resume the work until ordered to do so in writing by the City.

In the event that a suspension of work is ordered as provided above, and should such suspension be ordered by reason of the failure of the Contractor to carry out orders or to perform any provision of the contract, or by reason of weather conditions being unsuitable for performing any item or items of work, which work, in the sole opinion of the City, could have been performed prior to the occurrence of such unsuitable weather conditions had the Contractor diligently prosecuted the work when weather conditions were suitable, the Contractor, at his expense, shall do all the work necessary to provide a safe, smooth, and unobstructed passageway through construction for use by public traffic during the period of such suspension as provided in Sections 7-1.08, "Public Convenience," and 7-1.09, "Public Safety," of the State Standards and as specified in the special provisions for the work. In the event that the Contractor fails to perform the work above specified, the City will perform such work and the cost thereof will be deducted from monies due or to become due the Contractor.

If the City orders a suspension of all of the work or a portion of the work which is the current controlling operation or operations, due to unsuitable weather or to such other conditions as are considered unfavorable to the suitable prosecution of the work, the days on which the suspension is in effect shall not be considered working days as defined in Section 8.05, "Time of Completion and Liquidated Damages." If a portion of work at the time of such suspension is not a current controlling operation or operations, but subsequently does become the current controlling operation or operations, the determination of working days will be made on the basis of the then current controlling operation or operations.

If a suspension of work is ordered by the City due to the failure on the part of the Contractor to carry out orders given or to perform any provision of the contract, the days on which the suspension order is in effect shall be considered working days if such days are working days within the meaning of the definition set forth in GP Section 8.05, "Time of Completion and Liquidated Damages."

In the event of a suspension of work under any of the conditions set forth in this Section, such suspension of work shall not relieve the Contractor of his responsibilities as set forth in Section 7, "Legal Relations and Responsibilities to the Public."

8.05 TIME OF COMPLETION AND LIQUIDATED DAMAGES

It is agreed by the parties to the contract that in case all the work called for under the contract is not completed before or upon the expiration of the time limit as set forth in these specifications, damage will be sustained by the City, and that it is and will be impracticable to determine the actual damage which the City will sustain, in the event of any, by reason of such delay, and it is therefore agreed that the Contractor, his or her heirs, assigns, and sureties, will pay to the City the sum of \$500.00 per day for each and every calendar day's delay beyond the time prescribed to complete the work; and the Contractor agrees to pay such liquidated damages as herein provided, and in case the same are not paid, agrees that the City may deduct the amount thereof from any money due or that may become due the Contractor under the contract.

It is further agreed that in case the work called for under the contract is not finished and completed in all parts and requirements within the time specified, the City shall have the right to extend the time for completion or not, as may seem best to serve the interest of the City; and if he or she decides to extend the time limit for the completion of the contract, he or she shall further have the right to charge the Contractor, his or her heirs, assignees, or sureties, and to deduct from final payment for the work, all or any part, as he or she may deem proper, of the actual cost of engineering, inspection, superintendence, and other overhead expenses which are directly chargeable to the contract, and which accrue during the period of such extension except that the cost of final surveys and preparation of final estimate shall not be included in such charges.

Liquidated damages shall not be assessed, nor shall the cost of engineering and inspection during any delay in the completion of the work caused by Acts of God or of the public enemy, acts of the Federal Government, City, fire, floods, epidemics, severe weather, or delays of subcontractors due to such causes; provided, that the Contractor shall within 10 days from the beginning of such delay notify the City in writing of the causes of delay, who shall ascertain the fact and extent of the delay, and his or her finding of the facts thereon shall be final and conclusive.

No extension of time will be granted for a delay caused by a shortage of materials unless the Contractor furnishes to the City documentary proof that he or she has made every effort to obtain such materials from all known sources within reasonable reach of the work in a diligent and timely manner, and further proof in the form of supplementary progress schedules, as required in Section 8.02 "Progress of the Work," that the inability to obtain such materials when originally planned, did in fact cause a delay in final completion of the entire work which could not be compensated for by revising the sequence of the Contractor's operations. The term "Shortage of materials," as used in this section, shall apply only to materials, articles, parts or equipment which are standard items and are to be incorporated in the work. The term "shortage of materials" shall not apply to materials, parts, articles or equipment which are processed, made, constructed, fabricated or manufactured to meet the specific requirements of the contract. Only the physical shortage of material will be considered under these provisions as a cause for extension of time. Delays in obtaining materials due to priority in filling orders will not constitute a shortage of materials.

It is the intention of the above provisions that the Contractor shall not be relieved of liability for liquidated damages or engineering and inspection charges for any period of delay in completion of the work in excess of that expressly provided for in this Section.

The Contractor shall complete the work within the number of calendar days or working days set forth in the Special Provisions.

A working day is defined as any day, except Saturdays, Sundays, City of Modesto observed holidays, City of Modesto closure days, days on which the Contractor is specifically required by the Contract Documents to suspend construction operations and days on which the Contractor is prevented from proceeding by inclement weather or its effects on the current controlling operations.

City of Modesto observed holidays are for: New Year's Day, Dr. Martin Luther King Day, Jr., Presidents' Day, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day, the day after Thanksgiving, and Christmas Day.

Work performed during hours and/or on days other than working days as defined above shall be the subject of a written request to the City. If permission is granted, the Contractor shall bear all additional expenses of the City's personnel and inspection services incurred by change order for extraordinary work hours.

The current controlling operation(s) is to be construed to include any feature of the work (e.g., an operation or activity, or a settlement or curing period) considered at the time by the City which, if delayed or prolonged, will delay the time of completion of the contract.

Determination that a day is a non-working day by reason of inclement weather or conditions resulting immediately therefrom shall be made by the City. The Contractor will be allowed 15 days from issuance of the Weekly Statement of Working Days in which to file a written protest, setting forth in what respects he or she differs from the City. Otherwise the decision of the City shall be deemed to have been accepted by the Contractor as correct. The City will furnish the Contractor a weekly statement showing the number of working days charged to the contract for the preceding week, the number of working days of time extensions being considered or approved, the number of working days originally specified for the completion of the contract, the number of working days remaining to complete the contract and the extended date for completion thereof, except when working days are not being charged in accordance with the provisions in GP Section 8.04, "Temporary Suspension of Work."

Should the Contractor prepare to begin work at the regular starting time in the morning of any day on which inclement weather, or the conditions resulting from the weather, or the condition of the work, prevents the work from beginning at the usual starting time and the crew is dismissed as a result thereof and the Contractor does not proceed with at least 75% of the normal labor and equipment force engaged in the current controlling operation or operations for a least 60% of the total daily time being currently spent on the controlling operation or operations, the Contractor will not be charged for a working day whether or not conditions should change thereafter during said day and the major portion of the day could be considered to be suitable for such construction operations.

8.06 SUSPENSION OF CONTRACT

If at any time, in the opinion of the City, the Contractor has failed to supply an adequate working force or material of proper quality, or has failed in any other respect to prosecute the work with the diligence and force specified and intended in and by the terms of the contract, notice thereof in writing will be served upon him or her, and should he or she neglect or refuse to provide means for a satisfactory compliance with the contract, as directed by the City, within the time specified in such notice, the City in any such case shall have the power to suspend the operation of the contract. Upon receiving notice of such suspension, the Contractor shall discontinue said work, or such parts of it as the City may designate.

Upon such suspension, the Contractor's control shall terminate and thereupon the City may take possession of all or any part of the Contractor's materials, tools, equipment, and appliances upon the premises, and use the same for the purpose of completing said contract and hire such force and buy or rent such additional machinery, tools, appliances, equipment and supplies at the Contractor's expense as may be necessary for the proper conduct of the work and for the completion thereof, or may employ other parties to carry the contract to completion, employ the necessary workmen, substitute other machinery or materials and purchase the materials contracted for in such manner as the City shall deem proper or the City may annul and cancel the contract and re-let the work or any part thereof. Any excess cost arising therefrom over and above the contract price will be charged against the Contractor and his or her sureties, who will be liable therefore. In the event of such suspension, all monies due the Contractor or retained under the terms of the contract shall be forfeited to the City, but such a forfeiture will not release the Contractor or his or her sureties from liability or failure to fulfill the contract. The Contractor and his or her sureties will be credited with the amount of money so forfeited toward any excess cost over and above the contract price arising from the suspension of the operations of the contract and the completion of the work by the City as above provided and the Contractor will be so credited with any surplus remaining after all just claims for such completion have been paid. In the determination of the question whether there has been any such noncompliance with the contract as to warrant the suspension or annulment thereof, the decision of the City shall be binding on all parties to the contract.

8.07 RIGHTS-OF-WAY

Rights-of-way or easements for work to be constructed will be provided by the City. The Contractor shall make his or her own arrangements and pay all expenses for additional area required by him or her outside of the limits of rights-of-way or easements unless otherwise especially provided. In the event of delay on the part of the City, its officers, agents or employees in obtaining any such rights-of-way or easements for the work to be constructed, then the Contractor shall have time for the completion of his or her contract for the period or periods caused by such delay or delays, but shall have no damages against the City, its officers, agents or employees.

8.08 DELAYS BY THE CITY OF MODESTO

Any act or omission of anything required to be done by the City, its officers, agents or employees, which shall cause the Contractor delay in the completion of the work shall be grounds for extension of time on the part of the Contractor to complete the work, but shall give the Contractor no damages for such delay.

GENERAL PROVISIONS

SECTION 9

MEASUREMENT AND PAYMENT

9.01 MEASUREMENT

All work to be paid for at a contract price per unit of measurement shall be measured by the City in accordance with the United States Standard Measurements. A ton shall consist of 2,000 pounds avoirdupois. Material paid for by the ton shall be weighed on platform scales furnished by and at the expense of the Contractor, or on public scales. If weighed on scales furnished by the Contractor, said scales shall be satisfactory to the City and shall be sealed by a representative of the State Division of Weights and Measures, at the expense of the Contractor, as often as the City may deem necessary to insure their accuracy. If weighed on public scales, the Contractor shall furnish Weighmaster's Certificates to the City. (If material is shipped by rail, car weight will be accepted provided that actual weight of material only will be paid for.) Trucks used to haul material to be paid for by weight shall be weighed empty daily at such times as the City directs, and each truck shall bear a plainly legible identification mark.

Where payment is to be made on the basis of lump sum amounts bid for the various items shown on the proposal form and included in the contract as awarded, no measurement will be made of included items for payment. Measurement to check compliance with the plans will be made. The Contractor shall submit a cost breakdown of their lump sum bid amounts for progress payment purposes. No partial progress payments will be made for lump sum items without the cost breakdown being submitted.

9.02 SCOPE OF PAYMENT

The Contractor shall accept the compensation as herein provided, as full payment for furnishing all materials, labor, tools, and equipment necessary to complete the work and for performing all work contemplated and embraced under the contract; also, for loss or damage arising from the nature of the work, or from the action of the elements, except as hereinbefore provided, or from any unforeseen difficulties which may be encountered during the prosecution of the work until the final acceptance by the City Council and for all risks of every description connected with the prosecution of the work; also, for all expenses incurred in consequence of the suspension or discontinuance of the work as herein specified; and for completing the work according to the plans and specifications. Neither the payment of any estimate, nor of any retained percentage, shall relieve the Contractor of responsibility for faulty workmanship or materials and unless otherwise specified, he or she shall remedy any defects due thereto and pay for any damage to other work resulting therefrom, which shall appear within a period of 1 year from the date of the Notice of Completion and acceptance by the City Council. The City shall give notice of defects with reasonable promptness. All questions arising under this Section shall be decided by the Engineer.

9.03 EXTRA AND FORCE ACCOUNT WORK

Extra work as described in GP Section 3.05, when ordered and accepted, shall be paid for under a written change order in accordance with the terms therein provided. Payment for extra work will be made at the unit or lump sum price previously agreed upon by the Contractor and the City or by force account.

If the work is done on a force account basis, the Contractor will be paid the direct costs for labor, materials and equipment used in performing the work determined as hereinafter provided. To the total of the direct costs computed, there will be added a markup of 33% to the cost of labor, 15% to the cost of materials and 15% to the equipment rental.

The above markups shall constitute full compensation for all overhead costs which shall be deemed to include all items of expense not specifically designated as cost or equipment rental. The total payment made as provided above shall be deemed to be the actual cost of the work and shall constitute full compensation therefore.

When extra work to be paid for on a force account basis is performed by a subcontractor, approved in conformance with the provisions in Section 8.01, "Subletting and Assignment," an additional markup of 5% will be added to the total cost of that extra work including all markups specified in this Section. The additional 5% markup shall reimburse the Contractor for additional administrative costs, and no other additional payment will be made by reason of performance of the extra work by a subcontractor.

A. Labor

The Contractor will be paid the cost of labor for the workers (including foremen when authorized by the City), used in the actual and direct performance of the work. The cost of labor, whether the employer is the Contractor, subcontractor or other forces, will be the sum of the following:

1. Actual Wages - The actual wages paid shall include any employer payments to or on behalf of the workers for health and welfare, pension, vacation and similar purposes.
2. Labor Surcharge - To the actual wages will be added a labor surcharge set forth in the State of California Department of Transportation publication entitled Labor Surcharge And Equipment Rental Rates, which is in effect on the date upon which the work is accomplished and which is a part of the contract. The labor surcharge shall constitute full compensation for all payments imposed by State and Federal laws and for all other payments made to, or on behalf of, the workers, other than actual wages and subsistence and travel allowance.
3. Subsistence and Travel Allowance - The actual subsistence and travel allowance paid to the workers.

B. Materials

The City reserves the right to furnish any materials it deems advisable, and the Contractor shall have no claims for costs and markup on those materials.

Only materials furnished by the Contractor and necessarily used in the performance of the work will be paid for. The cost of those materials will be the cost to the purchaser, whether Contractor, subcontractor or other forces, from the supplier thereof, except as the following are applicable:

1. If a cash or trade discount by the actual supplier is offered or available to the purchaser, it shall be credited to the City notwithstanding the fact that the discount may not have been taken.
2. If materials are procured by the purchaser by any method which is not a direct purchase from and a direct billing by the actual supplier to the purchaser, the cost of those materials shall be deemed to be the price paid to the actual supplier as determined by the City plus the actual costs, if any, incurred in the handling of the materials.
3. If the materials are obtained from a supply or source owned wholly or in part by the purchaser, the cost of those materials shall not exceed the price paid by the purchaser for similar materials furnished from that source on contract items or the current wholesale price for those materials delivered to the jobsite, whichever price is lower.
4. If the cost of the materials is, in the opinion of the City, excessive, then the cost of the material shall be deemed to be the lowest current wholesale price at which the materials were available in the quantities concerned delivered to the jobsite, less any discounts.

C. Equipment Rental

The Contractor will be paid for the use of equipment at the rental rates listed for that equipment in the State of California Department of Transportation publication entitled Labor Surcharge And Equipment Rental Rates, which is in effect on the date upon which the work is accomplished and which is a part of the contract, regardless of ownership and any rental or other agreement, if they may exist, for the use of that equipment entered into by the Contractor, except that for those pieces of equipment with a rental rate of \$10.00 per hour or less as listed in the Labor Surcharge And Equipment Rental Rates publication and which are rented from a local equipment agency, other than Contractor owned, the Contractor will be paid at the hourly rate shown on the rental agency invoice or agreement for the time used on force account work. If a minimum equipment rental amount is required by the local equipment rental agency, the actual amount charged will be paid to the Contractor.

If it is deemed necessary by the City to use equipment not listed in the Labor Surcharge And Equipment Rental Rates publication, a suitable rental rate for that equipment will be established by the City. The Contractor may furnish any cost data which might assist the City in the establishment of the rental rate. If the rental rate established by the City is \$10.00 per hour or less, the provisions above concerning rental of equipment from a local equipment agency shall apply.

The rental rates paid as above provided shall include the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance and all incidentals.

Operators of rented equipment will be paid for as provided in Section A, "Labor." All equipment shall, in the opinion of the City, be in good working condition and suitable for the purpose for which the equipment is to be used.

Unless otherwise specified, manufacturer's ratings and manufacturer approved modifications shall be used to classify equipment for the determination of applicable rental rates. Equipment which has no direct power unit shall be powered by a unit of at least the minimum rating recommended by the manufacturer.

Individual pieces of equipment or tools not listed in the Labor Surcharge and Equipment Rental Rate publication and having a replacement value of \$500 or less, whether or not consumed by use, shall be considered to be small tools and no payment will be made therefore.

Rental time will not be allowed while equipment is inoperative due to breakdowns.

All extra work done on a force account basis shall be recorded daily on report sheets made available by the City and signed by the Contractor. Daily reports shall thereafter be considered the true record of the extra work done. In the event of a dispute or failure of the Contractor to sign the daily reports, the Contractor shall have 7 calendar days to make a claim to the City in writing or said daily reports shall be the basis for payment.

When extra work is performed by subcontractors, the Contractor shall reach agreement with them as to the distribution of the payments made by the City, including the above percentages. No additional payment therefore will be made by the City by reason of the performance of the work by a subcontractor or other forces.

9.05 PROGRESS PAYMENTS

Once each month, the Contractor shall submit to the City an estimate of the value of the contract work completed between the 21st of the previous month and the 20th of the current month. The City will review the estimate, make the final determination of the work completed and determine the amount of the progress payment. Whenever the progress payment exceeds \$1,000, a minimum of **95 percent** of the progress payment will be paid to the Contractor on or before the 10th day of the following month.

The estimated value of work done may include 75% of the net invoice value of acceptable nonperishable material delivered to the work. The Contractor shall furnish to the City such detailed information as he or she may request to aid him as a guide in the preparation of the estimate.

The City will retain a maximum of 5 percent of the estimated value of the contract work completed, as part security for the fulfillment of the contract by the Contractor.

It is understood that the estimates from month to month will be approximate only and all monthly estimates and payments will be subject to correction in subsequent estimates, and

the making of progressive payments shall not in any respect be taken as an admission of the City of the amount of work done or of its quality or sufficiency, nor as an acceptance of the work or release of the Contractor of any of his or her responsibility under the contract. The Contractor will be allowed 15 days in which to protest in writing the correctness of the progress estimate; otherwise the progress estimate shall be deemed to have been accepted by the Contractor as correct.

No such estimate or payment shall be required to be made when, in the judgment of the City, the work is not proceeding in accordance with the provisions of the contract, or when in his or her judgment the total value of the work done since the last estimate amounts to less than \$1,000.00.

When the contract is a lump sum contract or includes lump sum items, the Contractor shall submit a cost breakdown for the City's approval before the first progress payment will be prepared.

9.06 FINAL PROGRESS PAYMENT & CLAIM

The City shall, after completion of the contract work, make a final progress payment of the amount of work done thereunder and the value of such work. The City shall pay 95% of such value after deducting therefrom all previous payments and all amounts to be retained under the contract. The payment of the retained amount shall be due and payable 35% days after recording the Notice of Completion and formal contract acceptance by the City Council.

The final progress payment shall be conclusive and binding against both parties to the contract on all questions relating to the performance of the contract and the amount of work done thereunder and compensation therefore, except in the case of gross error.

The Contractor agrees that the payment of the final amount due under the contract and the adjustment and payment of any work done in accordance with any alternation of the same, shall release the City and its employees or agents, from any and all claims or liability on account of work performed under the contract or any alteration thereof.

The Contractor shall submit written approval of the final progress payment or a written statement of all claims arising under or by virtue of the contract so that the Engineer receives such written approval or statement of claims no later than close of business of the 30th day after receiving the final progress payment. If the 30th day falls on a Saturday, Sunday or legal holiday, then receipt of such written approval or statement of claims by the Engineer shall not be later than close of business of the next business day.

Claims filed by the Contractor shall be in sufficient detail to enable the Engineer to ascertain the basis and amount of said claims. If additional information or details are required by the Engineer to determine the basis and amount of said claims, the Contractor shall furnish such further information of details so that the information of details are received by the Engineer no later than the fifteenth day after receipt of the written request from the Engineer. If the 15th day falls on a Saturday, Sunday or legal holiday, then receipt of such information or details by the Engineer shall not be later than close of business of the next business day. Failure to submit such information and details to the Engineer within the time specified will be sufficient cause for denying the claim.

The Contractor shall keep full and complete records of the costs and additional time incurred for any work for which a claim for additional compensation is made. The Engineer or any designated claim investigator or auditor shall have access to those records and any other records as may be required by the Engineer to determine the facts or contentions involved in the claims. Failure to permit access to such records shall be sufficient cause for denying the claims.

Claims submitted by the Contractor shall be accompanied by a notarized certificate containing the following language:

Under the penalty of law for perjury or falsification and with specific reference to the California False Claims Act, Government Code Section 12650 et. seq., the undersigned

_____,
(Name)

_____ of
(Title)

_____,
(Company)

hereby certifies that the claim for the additional compensation and time, if any, made herein for the work on this contract is a true statement of the actual costs incurred and time sought, and is fully documented and supported under the contract between parties.

Dated _____

Subscribed and sworn before me this _____ day of

_____.

Notary Public
My Commission Expires _____

Failure to submit the notarized certificate will be sufficient cause for denying the claim.

Any claim for overhead type expenses or costs, in addition to being certified as stated above, shall be supported by an audit report of an independent Certified Public Accountant. Any such overhead claim shall also be subject to audit by the City at its discretion.

Any costs or expenses incurred by the City in reviewing or auditing any claims that are not supported by the Contractor's cost accounting or other records shall be deemed to be damages incurred by the City within the meaning of the California False Claims Act.

The Public Works Director will make the final determination of any claims. A board or person designated by said Director will review such claims and make a written recommendation thereon to the Public Works Director. The Contractor may meet with the review board or person to make a presentation in support of such claims.

9.07 INCREASED OR DECREASED CONTRACT QUANTITIES

Whenever an item of work or materials is specified in the contract by unit prices and is changed, but by not more than 25% of the Engineers' estimate of that bid item quantity as specified in the Proposal Form, then the contract price shall be increased or decreased by the application of the unit prices so specified.

Whenever said contract item increases or decreases in quantity by more than 25%, the addition or subtraction from the contract price shall be established in accordance with Section 4-1.03 of that State Standard Specifications.

SUBSTITUTION OF SECURITIES FOR WITHHELD PAYMENTS

Except as otherwise prohibited by law, the Contractor may elect to receive all payments due under the contract pursuant to GP Sections 9.05 and 9.08 without any retention. As provided in Section 22300 of the California Public Contract Code, at the request and expense of the Contractor, securities equivalent to the amount withheld shall be deposited with the City, or with a State or federally chartered bank as the escrow agent. The Contractor may request and the City shall make payment of retentions earned directly to an escrow agent in accordance with the provisions of Section 22300 of the California Public Contracts Code. Upon satisfactory completion of the contract, the funds shall be released to the Contractor. The term "satisfactory completion of the contract" shall include the filing of a Notice of Completion and the retention of the funds for a period of 35 days thereafter.

Any of the following securities, which shall be approved by the City's Director of Finance, are eligible for investment under Section 22300 of the California Public Contracts Code.

- A. Securities eligible for investment under Government Code Section 16430, or
- B. Certificates of deposit issued by banks authorized to transact business in California which are members of the Federal Deposit Insurance Corporation, or by Savings and Loan Associations authorized to transact business in California which are members of the Federal Savings and Loan Insurance Corporation, or
- C. Interest bearing demand deposit accounts, or
- D. Standby letters of credit.

9.08 RIGHT TO WITHHOLD AMOUNTS

In addition to the amount which the City may otherwise retain under the Contract, the City may withhold a sufficient amount or amounts of any payment or payments otherwise due the Contractor, as in its judgment may be necessary to cover:

- A. Payments which may be past due and payable for just claims against the Contractor or any subcontractor for labor or materials furnished for the performance of this Contract.
- B. For defective work not remedied.

- C. For failure of the Contractor to make proper payments for the use of temporary utilities.
- D. Failure of the Contractor to make proper submissions, as herein specified.
- E. Failure to submit certified payrolls, when requested.
- F. Failure to submit, revise, resubmit or otherwise conform to the requirements herein for work scheduling.

The minimum amount to be withheld will be \$1,000.00 for each of the above reasons or the estimated value of the work involved in resolving the problem. When the above reasons for withholding amounts are removed, payment will be made to the Contractor for amounts withheld because of them on the next regularly scheduled progress payments.

The City in its discretion may apply any withheld amount or amounts to the payment of valid claims. In so doing, the City shall be deemed the agent of the Contractor for these purposes only, and any payment so made by the City shall be considered as a payment made under the contract by the City to the Contractor, and the City shall not be liable to the Contractor for such payment made in good faith. Such payments may be made without prior judicial determination of the claim or claims. The City will render to the Contractor a proper accounting of such funds disbursed on behalf of the Contractor.

9.09 DISPUTE RESOLUTION

All claims, controversies, or disputes, including claims, controversies, or disputes asserted by the City against the Contractor pursuant to the False Claims Act, Government Code Section 12650 et. seq., not settled by the Public Works Director pursuant to GP Section 4.01, arising out of, or relating to the contract, or the breach, termination, enforcement, interpretation, or validity of the contract, including the determination of the scope or applicability of this specification shall be determined by binding arbitration in Modesto, California by one arbitrator. The arbitrator is specifically empowered to determine any and all claims, controversies, or disputes asserted by the City against the Contractor pursuant to the False Claims Act. The American Arbitration association shall administer the arbitration under its Construction Industry Arbitration Rules then in effect, subject to the modifications of those rules contained in this specification. This agreement to arbitrate shall be specifically enforceable under the prevailing law of any court having jurisdiction, and the award rendered by the arbitrator may be entered in any court having jurisdiction. The appropriate venue for any arbitration under this specification shall be in Stanislaus County, California.

This specification is not intended to and does not waive the claim filing requirements found in California Government Code Section 900 et seq. In the event that a timely and legally sufficient, arbitrable claim is filed by the Contractor with the City, and the claim is rejected in whole or in part by the City, this specification shall result in the conclusive, final, and binding resolution of all the issues presented in the claim so long as any issues presented by the claim are arbitrable. Claims rejected by the City or by operation of law, shall be submitted by the Contractor to arbitration pursuant to the Construction Industry Arbitration Rules of the American Arbitration Association within 90 days after mailing of the written rejection by the City to the Contractor. Otherwise, the claim or claims shall be deemed waived in their entirety. The Contractor may submit to arbitration by advising the City Clerk in writing of its'

desire to arbitrate within the 90 day period, and thereafter following Association rules in good faith.

The "fast track" rules of the American Arbitration Association shall apply to any claim or counterclaim less than \$150,000.00. In arbitration not proceeding under the "fast track" rules, the arbitrator shall have the power to order that depositions be taken and other discovery be made. Both the City and the Contractor shall have the right, upon written notice, to take no more than three (3) depositions of the other as a matter of right in an arbitration not proceeding under the "fast track" rules.

Whether or not the City and the Contractor may be engaged in interstate commerce, any controversy or dispute mentioned above shall be determined by, and the parties shall be bound by, the substantive law of the State of California, and not the Federal Arbitration Act at 9 USC Section 1 et seq.

The arbitrator may grant any remedy or relief deemed by the arbitrator just and equitable under the circumstances, whether or not such relief could be awarded in a court of law. Notwithstanding anything in this specification to the contrary, the arbitrator shall have no power to award attorney's fees and cost to any party. Each party is to bear its own attorney fees and costs.

Notwithstanding anything in this specification to the contrary, the arbitrator shall have no power to award punitive damages or other damages not measured by the party's actual damages against any party. This limitation of the arbitrators' powers under this Contract shall not operate as an exclusion of the issue of punitive damages from this Contract to Arbitrate sufficient to vest jurisdiction in a court with respect to that issue.

The Contractor shall include in all subcontracts a specification whereby the subcontractor consents to being joined in an arbitration between the City and the Contractor involving the work of the subcontractor. The Contractor's failure to do so shall be a breach of the Contract.

The parties to any Contract of which this specification is made a part by reference or otherwise shall, and hereby do, waive any rights provided by Title 9.2 of the California Code of Civil Procedure, Section 1296. The arbitrators' award shall be deemed final, conclusive and binding to the fullest extent allowed by California law.

GENERAL PROVISIONS

SECTION 10

RESERVED

GENERAL PROVISIONS

SECTION 11

RESERVED

GENERAL PROVISIONS

SECTION 12

TEMPORARY TRAFFIC CONTROL

12.01 GENERAL

- A. This Traffic Control Section is intended to establish general principles of traffic control, worker protection and public safety measures to be taken in the performance of all work covered by the Standards.
- B. No specification contained herein shall be deemed to create a legal standard of conduct or duty toward the public nor shall it limit the City in the exercise of powers conferred by law in modifying these specifications under special conditions.
- C. The requirements of the current edition of the "California Manual on Uniform Traffic Control Devices" (California MUTCD), herein referred to as the State Traffic Manual, shall be incorporated by reference into this Section.
- D. It is the responsibility of the Contractor to prepare and submit Traffic Control Plans that accommodate each phase of the work schedule, provide written public notification, and install message boards as specified in this section before working within the roadway. All Traffic Control Plans shall be submitted for review and acceptance in accordance with the Submittal Procedures included these specifications. Contractor shall provide for traffic control during construction and coordinate his traffic control plan with the other contractors and utility companies, when and where as described in the Contract Documents.
- E. Construction is within City of Modesto right-of-way and/or property. Provisions shall be made for the safe passage of vehicular, bicycle and pedestrian traffic through the area of the work at all times when working within the public right-of-way. The Contractor shall apply for and obtain an encroachment permit from the Stanislaus County, if applicable, prior to performing any work within their right-of-way. As part of the encroachment permit, the Contractor shall submit the Traffic Control Plans to the City of Modesto for review and approval, and the City will forward plans to the permitting agencies for their review and approval.
- F. The Contractor shall provide traffic control within the project's work area and comply with the latest edition of the California Manual on Uniform Traffic Control Devices (MUTCD), the requirements described in these specifications, and as directed by the City Traffic Engineer, or designee.
- G. The requirements in this section will not relieve the Contractor from his responsibility to provide such additional devices or take such measures as may be necessary to comply with the provisions of Section 7.12, "Public Convenience and Safety", of the City of Modesto General Provisions. If any component in the traffic

control system is displaced, ceases to operate or function as specified from any cause during the progress of the work, the Contractor shall immediately repair said component to its original condition or replace said component and shall restore the component to its original location.

- H. Should the Contractor fail, in the opinion of the City, to provide all the materials, work force and equipment necessary to maintain traffic around the work area as set forth herein, the City upon the recommendations of the Engineer may take steps necessary to suspend the Contract. The City may then upon such suspension cause such work to be done as may be necessary to maintain traffic, and charge the cost of the work against the Contractor and sureties.
- I. The adjustment provisions in Section 3.03, "Changes In Work", of the General Provisions, shall not apply to the item of traffic control system.

12.02 DEFINITIONS

- A. **Traffic Control Devices:** Signs, signals, markings and other devices placed on or adjacent to a road to regulate, warn or guide traffic.
- B. **Traffic Control Measures:** Elements of the Traffic Control Plan including traffic control devices, personnel, materials, and equipment used to control traffic through the Work Zone.
- C. **Traffic Control Plan:** A written and drawn plan prepared by the Contractor for handling traffic on a specific roadway through the Work Zone.
- D. **Work Zone:** A traveled area within the construction used by vehicles, bicyclists and pedestrians.

12.03 TRAFFIC CONTROL PLAN

- A. Prepare and Submit a Traffic Control Plan in accordance with Section 01330 Submittal Procedures.
 - 1. The determination of required protective devices and directional measures is the responsibility of the Contractor.
 - 2. Traffic Control Plan shall be in accordance with the California Manual on Uniform Traffic Control Devices (MUTCD).
 - 3. Identify proposed traffic control measures, traffic control devices, barricade locations, lane width reductions and lane shutdowns.
 - 4. Do not start work within a Work Zone until the Traffic Control Plan is accepted and traffic control devices are in place.
 - 5. Traffic control plans shall consist of scaled drawings of each street where work is proposed with the detail of all traffic control measures proposed for each street.
 - 6. Submit Traffic Control Plans within 30 calendar days of Notice to Proceed.
 - 7. Implement the approved Traffic Control Plan.

12.04 TRAFFIC CONTROL REQUIREMENTS

- A. Conduct work within public right-of-ways in compliance with the following agency's requirements:
 - 1. City of Modesto
- B. Provide and maintain temporary traffic control measures to provide for the safe passage of vehicular and pedestrian traffic through and within the Project site.
- C. A minimum of one 11-foot wide lane shall be open in each direction at non-intersections, and a minimum of one 11-foot wide lane for each striped movement at an intersection, for traffic during working hours, unless otherwise described by the Contract Documents.
- D. Intersections may require additional lanes as directed by the Engineer.
- E. Normal work schedule is limited to the hours of 7:00 a.m. to 3:30 p.m. outside of the full path of the traveled way. Normal work schedule is limited to the hours of 8:30 a.m. to 3:30 p.m. when any work by the Contractor is within the traveled way, unless otherwise described by the Contract Documents.
- F. Traffic Control for Ingress and Egress
 - 1. Delineators shall be furnished and installed as directed by the City Engineer at each driveway or other point of ingress or egress. They shall be maintained, and removed when no longer required in accordance with the provisions in Section 12, "Construction Area Traffic Control Devices," of the State Standard Specifications and these specifications.
- G. When construction temporarily prevents access into private driveways:
 - 1. Specifically identify this situation in the Traffic Control Plan
 - 2. Notify the owner of the private driveway fifteen (15) calendar days prior to implementing the Traffic Control Plan.
 - 3. Limit disruption to no more than one hour, unless otherwise directed by the Engineer.
- H. All lanes and the full width of the traveled way shall be open to all traffic when construction operations are not actively in progress. Unless otherwise described by the Contract Documents:
 - 1. Backfill all trenches at the end of each work day.
 - 2. Provide aggregate base and compact all areas within the roadway and shoulder.
 - 3. Provide temporary paving and temporary delineators or striping at the end of each workday.
- I. Make provisions for pedestrian, bicycle and traffic access at all school sites; make provisions for student and public safety; all provisions shall be acceptable to the

school official for that school site. All provisions shall be approved by the Engineer.

- J. At the end of each workday remove all components of the traffic control system except portable delineators placed along pavement elevation differential, or as required by the City Traffic Engineer.
- K. Existing permanent traffic control signs, barricades and devices shall remain in effective operation unless a substitute operation is approved as part of the Traffic Control Plan.
- L. Construction site shall be ADA compliant for traverse by pedestrians during all phases of construction.

12.05 PUBLIC NOTICE

- A. Two weeks, one week and 24 hours prior to beginning any work in an area or the project, provide written public notice to all residents, businesses, churches, property owners, tenants, and applicable parties adjacent to and within a 1/4-mile radius of the project area.
 - 1. Notice shall state the following
 - a. Expected date for start of construction
 - b. Expected duration of activity (include tentative end date)
 - c. General description of construction activity
 - d. If on street parking will be prohibited during construction
 - e. If driveway(s) will be obstructed
 - f. Any inconvenience that may impact local residents or businesses.
 - g. Name, address and 24 hour telephone number for the General Contractor and the name of any subcontractor working on the project at that site.
- B. Written notification is required before work will be allowed within the roadway. Submit copy of notification letter / flyer for review and approval by the City prior to delivery. Also provide a copy of the mailing list. The Contractor shall submit this information in accordance with Section 01330 Submittal Procedures.
- C. Notify the following agencies two weeks, one week and 24 hours before implementing the approved Traffic Control Plan.
 - 1. City of Modesto Police Department
 - 2. City of Modesto Fire Department
 - 3. Modesto City School District
 - 4. AMR Ambulance
 - 5. Modesto Area Express (MAX)
 - 6. Stanislaus County Road Department

- 7. Stanislaus County Sheriff Department
- 8. Stanislaus Regional 911
- 9. Stanislaus Regional Transit (START)
- D. Notify schools within ½ mile of the work zone, two weeks, one week and 24 hours before implementing the approved Traffic Control Plan in the vicinity of the school.
- E. Notify US Post Office, waste haulers, recycling operations and buses within the project area.
 - 1. Coordinate to ensure no stoppage of mail delivery
 - 2. Schedule work in project area to minimize disturbance to bus service operations.
- F. Post “No Parking, Tow Away” signs on barricades along the roadway at least 48 hours prior to the construction work in that area.
- G. Provide message boards along the roadway at least 2 weeks prior to the construction in that area. Electronic message boards shall provide dates for impending construction and lane or road closures.
- H. The Contractor shall coordinate work performed with adjacent business owners to ensure prompt deliveries of all shipments to and from the business and minimize all inconveniences to the owner.

12.06 SIGNAL SYSTEM SHUTDOWN

- A. The signal system shutdown, or portion thereof, and installation of a temporary traffic signal system by the Contractor shall require prior written authorization by the Engineer. Prior to installation for each temporary signal system, the Contractor shall submit as a minimum, but not limited to, proposed modifications to existing system, an equipment list with product data sheets, wiring diagrams, and installation drawings to the Engineer for approval.
- B. If signal system shutdowns occur during hours other than the hours between 9:00 a.m. and 3:00 p.m. and/or are unscheduled and without advanced notification to the Engineer, damage will be sustained by the City of Modesto. It is and will be impracticable to determine the actual damage which the City of Modesto will sustain, in the event of any, by reason of such signal system shutdowns that occur before 9:00 a.m. or after 3:00 p.m. and/or are unscheduled and without advanced notification to the Engineer, and it is therefore agreed that the Contractor will pay to the City of Modesto the sum of \$100 per every hour (60 minutes), or part thereof, of signal system shutdown. The Contractor agrees to pay such liquidated damages as herein provided, and in case the liquidated damages are not paid, agrees that the City of Modesto may deduct the amount thereof from any money due the Contractor under the contract.
- C. The Signal System Shutdown Penalty as provided for herein may be waived by the City of Modesto if the Contractor installs a temporary traffic signal system for signal system shutdowns which occur during hours other than the hours between 9:00 a.m. and 3:00 p.m.

12.07 TEMPORARY SIGNS

- A. Temporary construction and warning signs used for nighttime conditions shall be reflectorized and illuminated. The use of orange flags in conjunction with signs is permitted during daylight conditions if they do not, at any time, interfere with a clear view of the sign face.
- B. All temporary signs fastened to barricades or similar supports shall have the face of the sign vertical and normal to the direction of traffic for effective visibility.
- C. Signs are to be used only as long as necessary and then removed. During periods when the signs are temporarily unnecessary, they shall be removed or have their message covered.
- D. All temporary signs shall comply with the California Manual on Uniform Traffic Control Devices.
- E. Erect information signs advising pending work and lane closures two weeks in advance of actual work. Place information signs so that they are readable to both directions of travel.
- F. Erect signs advising of rough road conditions when temporary pavement has been placed.
- G. Erect signs advising of steel plates in roadway when plates are in use.
- H. Electronic Signs & Lights:
 - 1. Contractor shall use electronic signs with sequential arrow or changeable message to advise traffic of approaching conditions.
 - 2. Warning lights shall be electric lanterns, electric markers or flashers provided to indicate an obstruction or restriction during periods of low visibility. Warning lights shall be placed to mark the location of obstructions. Motion may be imparted to warning lights.
 - 3. Flashing lights for delineating the path traffic is to follow shall be uniformly spaced as approved by the City Engineer.
 - 4. Warning lights may be fastened to signs, barricades and portable flasher supports in a manner satisfactory to the City Engineer.

12.08 TEMPORARY BARRIERS AND CHANNELIZING DEVICES

- A. Barricades are intended to impose an obstacle to or close off the normal flow of travel. Barriers and channelizing devices shall comply with the California Manual on Uniform Traffic Control Devices.
- B. Barricades shall not be used unless they are needed to separate the motorist from objects of greater hazard than the barricades themselves. Barricades should never be used primarily for delineation. The use of nonstandard types of barricades, such as drums, buckets, sandbags, etc., can be hazardous and their use is prohibited.

- C. Install temporary barricades to protect vehicles for areas with drop-offs.
- D. Channelizers shall consist of post and paddle type markers of cylindrical or cone shaped objects 18 to 48 inches in height as shown in the California MUTCD.
- E. Channelizers should be uniformly positioned laterally and longitudinally relative to the line of traffic and they must be maintained in an erect position.
- F. Delineators for nighttime use shall be reflectorized or illuminated to be visible from 500 feet under normal atmospheric conditions.
- G. When placed in proximity to the edge of a traffic lane, delineators should be made of a material that will withstand impact without damage to them or the striking vehicle. Consideration must also be given to the necessity for stability against knockdown from wind or the wash of passing traffic.

12.09 FLAGGERS

- A. Flaggers shall be required as necessary for safe conduct of the traffic through the construction area or as directed by the City Engineer. Flaggers shall not be used as a substitute for other warning signs and devices. Standard hand signals shall be used as shown in the California MUTCD.
- B. Section 12-2.02 “Flagging Costs,” of the State Standards is replaced by the following:

*The cost of furnishing all flaggers, including transporting flaggers, to provide for the passage of public traffic through the work under the provisions in Section 7-1.08, “Public Convenience” and 7-1.09, “Public Safety” shall be borne **100 percent** by the Contractor.*

- C. Flaggers shall wear high visibility safety apparel complying with ANSI/ISEA 107-2004 and the California Manual on Uniform Traffic Control Devices.
- D. Flaggers shall utilize highly visible STOP/SLOW sign paddles complying with the California Manual on Uniform Traffic Control Devices.
- E. Flaggers shall utilize portable, self-contained two-way radio when more than one flagger is used for traffic control
- F. Contractor shall provide Flaggers with the necessary equipment and training to perform their duties in accordance with the current “Instructions to Flaggers” of the California Departments of Transportation.

12.10 PREQUALIFIED AND TESTED SIGNING AND DELINEATION MATERIALS

- A. The City uses the following list of Prequalified and Tested Signing and Delineation Materials. The Engineer shall not be precluded from sampling and testing products on the list of Prequalified and Tested Signing and Delineation Materials.

- B. For those categories of materials included on the list of Prequalified and Tested Signing and Delineation Materials, only those products shown within the listing may be used in the work. Other categories of products, not included on the list of Prequalified and Tested Signing and Delineation Materials, may be used in the work provided they conform to the requirements of the Contract Documents.
- C. Materials and products may be added to the list of Prequalified and Tested Signing and Delineation Materials if the manufacturer submits a New Product Information Form to the New Product Coordinator at the Transportation Laboratory. Upon a Departmental request for samples, sufficient samples shall be submitted to permit performance of required tests. Approval of materials or products will depend upon compliance with the specifications and tests the City may elect to perform.

12.11 PAVEMENT MARKERS, TEMPORARY TYPE

- A. Temporary Markers For Long Term Day/Night Use (180 days or less)
 - 1. Vega Molded Products "Temporary Road Marker" (3-inch x 4-inch)
- B. Temporary Markers For Short Term Day/Night Use (14 days or less) (For seal coat or chip seal applications, clear protective covers are required)
 - 1. Apex Universal, Model 932
 - 2. Filtrona Extrusion, Models T.O.M., T.R.P.M., and "HH" (High Heat)
 - 3. Hi-Way Safety, Inc., Model 1280/1281
 - 4. Glowlite, Inc., Model 932

12.12 STRIPING AND PAVEMENT MARKING MATERIAL, TEMPORARY

- A. Temporary (Removable) Striping and Pavement Marking Tape (180 days or less)
 - 1. Advanced Traffic Marking, Series 200
 - 2. Brite-Line, Series 100
 - 3. Garlock Rubber Technologies, Series 2000
 - 4. P.B. Laminations, Aztec, Grade 102
 - 5. Swarco Industries, "Director-2"
 - 6. Trelleborg Industries, R140 Series
 - 7. 3M Series 620 "CR", and Series A750
 - 8. 3M Series A145, Removable Black Line Mask (Black Tape: for use only on Hot mix asphalt surfaces)
 - 9. Advanced Traffic Marking Black "Hide-A-Line" (Black Tape: for use only on Hot mix asphalt surfaces)
 - 10. Brite-Line "BTR" Black Removable Tape (Black Tape: for use only on Hot mix asphalt surfaces)
 - 11. Trelleborg Industries, RB-140 (Black Tape: for use only on Hot mix asphalt surfaces)

- B. Preformed Thermoplastic (Heated in place)
 - 1. Flint Trading Inc., “Hot Tape”
 - 2. Flint Trading Inc., “Premark Plus”
 - 3. Ennis Paint Inc., “Flametape”
- C. Ceramic Surfacing Laminate, 6-inch x 6-inch
 - 1. Highway Ceramics, Inc.

12.13 CHANNELIZERS

- A. Surface Mount Type, 36-inch
 - 1. Bent Manufacturing Company, Masterflex Models MF-360-36 (Round) and MF-180-36 (Flat)
 - 2. Filtrona Extrusion, Flexi-Guide Models FG300PE, FG300UR, and FG300EFX
 - 3. Carsonite, “Super Duck” (Round SDR-336)
 - 4. Carsonite, Model SDCF03601MB “Channelizer”
 - 5. FlexStake, Models 703, 753 TM, and EB3
 - 6. GreenLine, Model SMD-36
 - 7. Hi-way Safety, Inc. “Channel Guide Channelizer” Model CGC36
 - 8. Impact Recovery Model D36, with #101 Fixed (Surface-Mount) Base
 - 9. Safe-Hit, Guide Post, Model SH236SMA and Dura-Post, Model SHL36SMA
 - 10. Three D Traffic Works “Boomerang” 5200 Series
- B. Lane Separation System
 - 1. Filtrona Extrusion, “Flexi-Guide (FG) 300 Curb System”
 - 2. Qwick Kurb, “Klemmfix Guide System”
 - 3. Dura-Curb System
 - 4. Tuff Curb
- C. CONICAL DELINEATORS, 42-inch (For 28-inch Traffic Cones, see Standard Specifications)
 - 1. Bent Manufacturing Company “T-Top”
 - 2. Plastic Safety Systems “Navigator-42”
 - 3. Traffix Devices “Grabber”
 - 4. Three D Traffic Works “Ringtop” TD7000, ID No. 742143
 - 5. Three D Traffic Works, TD7500
 - 6. Work Area Protection Corp. C-42

12.14 OBJECT MARKERS

- A. Type “K”, 18-inch
 - 1. Filtrona Extrusion, Model FG318PE
 - 2. Carsonite, Model SMD 615
 - 3. FlexStake, Model 701 KM
 - 4. Safe-Hit, Model SH718SMA
- B. Type “K-4” / “Q” Object Markers, 24-inch
 - 1. Bent Manufacturing “Masterflex” Model MF-360-24
 - 2. Filtrona Extrusion, Model FG324PE
 - 3. Carsonite, “Channelizer”
 - 4. FlexStake, Model 701KM
 - 5. Safe-Hit, Models SH824SMA_WA and SH824GP3_WA
 - 6. Three D Traffic Works ID No. 531702W and TD 5200
- C. Three D Traffic Works ID No. 520896W

12.15 CONCRETE BARRIER MARKERS AND TEMPORARY RAILING (TYPE K) REFLECTORS

- A. Impactable Type
 - 1. ARTUK, “FB”
 - 2. Filtrona Extrusion, Models PCBM-12 and PCBM-T12
 - 3. Duraflex Corp., “Flexx 2020” and “Electriflexx”
 - 4. Hi-Way Safety, Inc., Model GMKRM100
 - 5. Plastic Safety Systems “BAM” Models OM-BARR and OM-BWAR
 - 6. Three D Traffic Works “Roadguide” Model TD 9304
- B. Non-Impactable Type
 - 1. ARTUK, JD Series
 - 2. Plastic Safety Systems “BAM” Models OM-BITARW and OM-BITARA
 - 3. Vega Molded Products, Models GBM and JD
 - 4. Plastic Vacuum Forming, “Cap-It C400”

12.16 METAL BEAM GUARD RAIL POST MARKERS

- A. For use to the left of traffic
 - 1. Filtrona Extrusion, “Mini” (3-inch x 10-inch)
 - 2. Creative Building Products, “Dura-Bull, Model 11201”
 - 3. Duraflex Corp., “Railrider”

4. Plastic Vacuum Forming, "Cap-It C300"

12.17 CONCRETE BARRIER DELINEATORS, 16-INCH

- A. For use to the right of traffic
 1. Filtrona Extrusion, Model PCBM T-16
 2. Safe-Hit, Model SH216RBM

12.18 CONCRETE BARRIER-MOUNTED MINI-DRUM (10-INCH X 14-INCH X 22-INCH)

1. Stinson Equipment Company "SaddleMarker"

12.19 GUARD RAILING DELINEATOR (PLACE TOP OF REFLECTIVE ELEMENT AT 48 INCHES ABOVE PLANE OF ROADWAY)

- A. Wood Post Type, 27-inch
 1. Filtrona Extrusion, FG 427 and FG 527
 2. Carsonite, Model 427
 3. FlexStake, Model 102 GR
 4. GreenLine GRD 27
 5. Safe-Hit, Model SH227GRD
 6. Three D Traffic Works "Guardflex" TD9100
 7. New Directions Mfg, NDM27
- B. Steel Post Type
 1. Carsonite, Model CFGR-327

12.20 RETROREFLECTIVE SHEETING

- A. Channelizers, Barrier Markers, and Delineators
 1. Avery Dennison T-6500 Series (For rigid substrate devices only)
 2. Avery Dennison WR-7100 Series
 3. Nippon Carbide Industries, Flexible Ultralite Grade (ULG) II
 4. Reflexite, PC-1000 Metalized Polycarbonate
 5. Reflexite, AC-1000 Acrylic
 6. Reflexite, AP-1000 Metalized Polyester
 7. Reflexite, Conformalight, AR-1000 Abrasion Resistant Coating
 8. 3M, High Intensity
- B. Traffic Cones, 4-inch and 6-inch Sleeves
 1. Nippon Carbide Industries, Flexible Ultralite Grade (ULG) II

2. Reflexite, Vinyl, "TR" (Semi-transparent) or "Conformalight"
 3. 3M Series 3840
 4. Avery Dennison S-9000C
- C. Drums
1. Avery Dennison WR-6100
 2. Nippon Carbide Industries, Flexible Ultralite Grade (ULG) II
 3. Reflexite, "Conformalight", "Super High Intensity" or "High Impact Drum Sheeting"
 4. 3M Series 3810
- D. Barricades: Type I, Medium-Intensity (Typically Enclosed Lens, Glass-Bead Element)
1. Nippon Carbide Industries, CN8117
 2. Avery Dennison, W 1100 series
 3. 3M Series CW 44
- E. Barricades: Type II, Medium-High-Intensity (Typically Enclosed Lens, Glass-Bead Element)
1. Avery Dennison, W-2100 Series
- F. Signs: Type II, Medium-High-Intensity (Typically Enclosed Lens, Glass-Bead Element)
1. Avery Dennison, T-2500 Series
 2. Nippon Carbide Industries, Nikkalite 18000
- G. Signs: Type III, High-Intensity (Typically Encapsulated Glass-Bead Element)
1. Avery Dennison, T-5500A and T-6500 Series
 2. Nippon Carbide Industries, Nikkalite Brand Ultralite Grade II
 3. 3M 3870 and 3930 Series
- H. Signs: Type IV, High-Intensity (Typically Unmetallized Microprismatic Element)
1. Avery Dennison, T-6500 Series
 2. Nippon Carbide Industries, Crystal Grade, 94000 Series
 3. Nippon Carbide Industries, Model No. 94847 Fluorescent Orange
 4. 3M Series 3930 and Series 3924S
- I. Signs: Type VI, Elastomeric (Roll-Up) High-Intensity, without Adhesive
1. Avery Dennison, WU-6014
 2. Novabrite LLC, "Econobrite"
 3. Reflexite "Vinyl"

4. Reflexite "SuperBright"
 5. Reflexite "Marathon"
 6. 3M Series RS20
- J. Signs: Type VII, Super-High-Intensity (Typically Unmetallized Microprismatic Element)
1. 3M Series 3924S, Fluorescent Orange
 2. 3M LDP Series 3970
- K. Signs: Type VIII, Super-High-Intensity (Typically Unmetallized Microprismatic Element)
1. Avery Dennison, T-7500 Series
 2. Avery Dennison, T-7511 Fluorescent Yellow
 3. Avery Dennison, T-7513 Fluorescent Yellow Green
 4. Avery Dennison, W-7514 Fluorescent Orange
 5. Nippon Carbide Industries, Nikkalite Crystal Grade Series 92800
 6. Nippon Carbide Industries, Nikkalite Crystal Grade Model 92847 Fluorescent Orange
- L. Signs: Type IX, Very-High-Intensity (Typically Unmetallized Microprismatic Element)
1. 3M VIP Series 3981 Diamond Grade Fluorescent Yellow
 2. 3M VIP Series 3983 Diamond Grade Fluorescent Yellow/Green
 3. 3M VIP Series 3990 Diamond Grade
 4. Avery Dennison T-9500 Series
 5. Avery Dennison, T9513, Fluorescent Yellow Green
 6. Avery Dennison, W9514, Fluorescent Orange
 7. Avery Dennison, T-9511 Fluorescent Yellow

12.21 SPECIALTY SIGNS

- A. Reflexite "Endurance" Work Zone Sign (with Semi-Rigid Plastic Substrate)

12.22 ALTERNATIVE SIGN SUBSTRATES

- A. Fiberglass Reinforced Plastic (FRP) and Expanded Foam PVC
1. Fiber-Brite (FRP)
 2. Sequentia, "Polyplate" (FRP)
 3. Intoplast Group "InteCel" (0.5 inch for Post-Mounted CZ Signs, 48-inch or less)(PVC)

- B. Aluminum Composite, Temporary Construction Signs and Permanent Signs up to 4 foot, 7 Inches
 - 1. Alcan Composites “Dibond Material, 80 mils”
 - 2. Mitsubishi Chemical America, Alpolic 350

12.23 EXECUTION – GENERAL

- A. Install, operate and maintain temporary traffic control devices in accordance with the approved Traffic Control Plan.
- B. Move traffic control devices as construction progresses.
- C. Turn, cover or remove existing permanent traffic control devices when they conflict with the temporary devices.
- D. Remove temporary traffic control devices when no longer needed and restore any permanent traffic control devices to the original location and quality.

12.24 LANE CLOSURES

- A. Do not close any lane until the area is signed in accordance with the approved Traffic Control Plan.
- B. Execute construction activities to maintain two-way traffic at all times. When one lane traffic control is approved, control one-way traffic by flaggers.
- C. At the end of each workday, restore all lanes in the full width of the traveled way using temporary pavement.
- D. Do not stop or hold vehicles for more that 10 minutes.
- E. Allow emergency vehicles immediate passage at all times.

12.25 STREET CLOSURES

- A. For any temporary street closure on all or part of a residential street, the street closure shall be made as shown in the State Traffic Manual. Prior to any street closure on a collector or major street, a traffic control plan shall be prepared and accepted by the City Engineer. In addition, a copy of the accepted traffic control plan shall be on the site at all times. One lane for each direction of through traffic must be maintained except where flaggers are provided to control traffic; then one lane may serve both directions. When trenching is necessary across intersecting streets, the work shall be done in such a manner as to maintain two-way traffic on cross streets at all times.
- B. Where the trench line crosses an entrance to private property, access to the property shall be maintained at all times by means of a suitable bridge, until the trench may be backfilled. Such bridges shall be properly guarded and illuminated at night. Where any crosswalk is cut by the trench, suitable bridging shall be

constructed. Such bridging shall be at least 4 feet in width, have suitable hand railing, be properly guarded and be illuminated at night.

- C. The complete closure of any street is allowed only when authorized in writing by the City Engineer, as provided by Section 7-2.14 of the Modesto Municipal Code. Such closure shall be accomplished only through the use of Type III barricades as shown in the California MUTCD.
- D. Permanent closures and temporary closures in new developments at dead end streets and where pavement narrows at the edge of the development shall be made as described in the Contract Documents.

12.26 TEMPORARY BARRICADES AND RAILING

- A. Temporary barricades shall be provided and installed in compliance with Section 12 of the State Standard Specifications.
- B. Temporary railing (Type K) shall be provided for excavations within the traveled way and greater than 1 foot deep if the excavation is to remain open during non-working hours.
- C. Temporary railing (Type K) end sections not protected by crash cushions must be flared so that the blunt end of the rail is at least 15 feet away from the outside lane of approaching traffic. Rail end sections within 15 feet of approaching traffic shall be protected by crash cushions.
- D. Anchor temporary rail to existing pavement when used.

12.27 TEMPORARY PAVEMENT DELINEATION

- A. Temporary pavement delineation shall be furnished, placed, maintained and removed in accordance with the provisions in Section 12-3.01, "General," of the State Standard Specifications and these specifications. Nothing in these specifications shall be construed as to reduce the minimum standards specified in the Manual of Traffic Controls published by the Department or as relieving the Contractor from his responsibility as provided in Section 7-1.09, "Public Safety," of the State Standard Specifications.
- B. Whenever the work causes obliteration of pavement delineation, temporary or permanent pavement delineation shall be in place prior to opening the traveled way to public traffic. Laneline or centerline pavement delineation shall be provided at all times for traveled ways open to public traffic. On multilane roadways, edgeline delineation shall be provided at all times for traveled ways open to public traffic.
- C. All work necessary, including any required lines or marks, to establish the alignment of temporary pavement delineation shall be performed by the Contractor. Surfaces to receive temporary pavement delineation shall be dry and free of dirt and loose material. Temporary pavement delineation shall not be applied over existing pavement delineation or other temporary pavement delineation. Temporary pavement delineation shall be maintained until superseded or replaced

with a new pattern of temporary pavement delineation or permanent pavement delineation.

- D. Temporary pavement markers and removable traffic-type tape which conflicts with a new traffic pattern or which is applied to the final layer of surfacing or existing pavement to remain in place shall be removed when no longer required for the direction of public traffic, as determined by the Engineer.

E. TEMPORARY LANELINE AND CENTERLINE DELINEATION

- 1. Whenever lanelines and centerlines are obliterated, the minimum laneline and centerline delineation to be provided shall be temporary reflective raised pavement markers placed at longitudinal intervals of not more than 24 feet. The temporary reflective raised pavement markers shall be the same color as the laneline or centerline the markers replace. Temporary reflective raised pavement markers shall be, at the option of the Contractor, one of the temporary pavement markers listed for short-term day/night use (14 days or less) or long-term day/night use (6 months or less) in "Pre-qualified and Tested Signing and Delineation Materials" elsewhere in these specifications.
- 2. Temporary reflective raised pavement markers shall be placed in accordance with the manufacturer's instructions and shall be cemented to the surfacing with the adhesive recommended by the manufacturer, except epoxy adhesive shall not be used to place pavement markers in areas where removal of the markers will be required.
- 3. Temporary laneline or centerline delineation consisting entirely of temporary reflective raised pavement markers placed on longitudinal intervals of not more than 24 feet, shall be used on lanes opened to public traffic for a maximum of 14 days. Prior to the end of the 14 days the permanent pavement delineation shall be placed. If the permanent pavement delineation is not placed within the 14 days, the Contractor shall provide, at his expense, additional temporary pavement delineation. The additional temporary pavement delineation to be provided shall be equivalent to the pattern specified for the permanent pavement delineation for the area, as determined by the Engineer.

F. TEMPORARY EDGELINE DELINEATION

- 1. Whenever edgelines are obliterated, the edgeline delineation to be provided for that area adjacent to lanes open to public traffic shall consist of, at the option of the Contractor, either solid 4-inch wide traffic stripe of the same color as the stripe the temporary edgeline delineation replaces, or shall consist of traffic cones, portable delineators or channelizers placed at longitudinal intervals not to exceed 50 feet.
- 4. Four-inch wide traffic stripe placed for temporary edgeline delineation, which will require removal, shall consist of temporary removable construction grade striping and pavement marking tape listed in "Pre-qualified and Tested Signing and Delineation Materials" elsewhere in these specifications. Temporary removable construction grade striping and pavement marking tape when used shall be applied in accordance with the manufacturer's recommendations. Where removal of 4-inch wide traffic stripe will not be required, painted traffic stripe used for temporary edgeline delineations shall conform to "Paint Traffic

Stripes and Pavement Markings” of the Contract Documents, except for payment and the number of coats shall be, at the option of the Contractor, either one or two coats. The quantity of painted traffic stripe used for temporary edgeline delineation will not be included in the quantities of paint traffic stripe to be paid for.

5. The lateral offset for traffic cones, portable delineators or channelizers used for temporary edgeline delineation shall be as determined by the Engineer. If traffic cones or portable delineators are used as temporary pavement delineation for edgelines, the Contractor shall maintain the cones or delineators while they are in use.
6. Channelizers used for temporary edgeline delineation shall be surface mounted type and shall be orange in color. Channelizer bases shall be cemented to the pavement in the same manner provided for cementing pavement markers to pavement in these specifications except epoxy adhesive shall not be used to place channelizers on the top layer of pavement. Channelizers shall be, at the Contractor's option, one of the surface mount types (365”) listed in “Pre-qualified and Tested Signing and Delineation Materials” elsewhere in these specifications.
7. Temporary edgeline delineation shall be removed when no longer required for the direction of public traffic, as determined by the Engineer.

12.28 PERMANENT PAVEMENT DELINEATION

- A. All pavement delineation, striping and markers altered, removed (partially or wholly), and destroyed during the course of construction within the work zone area shall be replaced in kind to the satisfaction of the Engineer, at no additional cost to the City.

12.29 TEMPORARY TRENCH PLATING

- A. Temporary trench plating is only allowed in emergency situations as directed by the Engineer.
 1. Place steel plates in a manner that provides at least 18 inches of bearing surface on all sides of the excavated trench.
 2. Anchor steel plates to prevent shifting by applying cold mix asphalt around plate edges.
 3. Submit structural calculations and details by a California registered civil or structural engineer for any trench plate exceeding 5 feet in width. Submittal shall demonstrate suitability of trench plate to sustain traffic loads for each installation.

12.30 FLAGGERS

- A. Provide flaggers to safely control movement of vehicles and pedestrians around areas disrupted by the Work.

- B. Locate flaggers in positions that provide adequate time for motorists to respond to the flagger's instructions
- C. Provide Flaggers with the necessary equipment and training to perform their duties in accordance with the current "Instructions to Flaggers" of the California Departments of Transportation.

12.31 MEASUREMENT AND PAYMENT

Full compensation for conforming to the requirements of this section, including preparing, implementing, maintaining and removal of the traffic control plan, all pavement delineations, signs, barricades, flasher supports, delineations, warning lights, and all flagging costs not otherwise provided for, shall be considered as included in the prices bid for the various contract items of work involved (or "Traffic Control,") and no additional compensation will be allowed therefore.

GENERAL PROVISIONS

SECTION 13

WATER POLLUTION CONTROL

13.01 GENERAL

These requirements consist of regulations contained in State Water Resources Control Board (SWRCB) Order No. 2009-0009-DWQ, National Pollutant Discharge Elimination System (NPDES) Construction General Permit No.CAS000002, the SWRCB Order No. R5-2008-0092, City of Modesto NPDES Stormwater Permit No.CAS083526 and Modesto City Ordinance Chapter 10, Title 5: Stormwater Management and Discharge Controls.

A. Project site(s) less than 1 acre:

1. The Contractor shall prepare and submit a Water Pollution Control Plan (WPCP) or Local Stormwater Pollution Prevention Plan (SWPPP) to the City for review. The submittal shall include a description of all stormwater, erosion, sediment, and pollution control BMPs to be used to prevent sediment and other sources of pollution from entering the City storm drain system as well as a site plan showing their placement.
2. All construction projects within the City of Modesto must implement the following Best Management Practices (BMPs), where and when applicable, regardless of size. Additional BMPs may be required to ensure sediment, construction waste and other pollutants from construction sites and parking areas, including runoff from equipment at construction sites, shall be retained on the site to the maximum extent practicable.
3. For more information about BMPs, refer to the California Stormwater Quality Association (CASQA) Stormwater Best Management Practice Handbook for Construction, November 2009 edition. <http://www.casqa.org>
4. Dust Control:
 - a. The Contractor shall comply with all City of Modesto and San Joaquin Valley Air Pollution Control District rules, regulations, ordinances, and statutes which apply to any work performed pursuant to the contract, including any air pollution control rules, regulations, ordinances, and statutes, specified in the Government Code. The Contractor shall be responsible for the control of dust within the limits of the project at all times including weekends and holidays in addition to normal working days. The Contractor shall take whatever steps are necessary or required by the City to eliminate the nuisance of blowing dust without causing sediment, debris or litter to enter the City storm drain system.
5. Erosion, Sediment, and Pollution Control:

- a. The Contractor shall be responsible for controlling erosion and sedimentation within the limits of the project at all times during the course of construction including evenings, weekends, and holidays in addition to normal working days. The Contractor shall prevent any sediment and construction debris from entering the City storm drain system by implementing these BMPs:
 - b. Erosion control measures. Refer to CASQA Factsheets EC-1 to EC-16 and choose appropriate measures for project site.
 - c. Sediment control measures. Refer to CASQA Factsheets SE-1 to SE-14 and choose appropriate measures for project site.
 - d. Drain inlet protection. Refer to CASQA Factsheet SE-10. Mandatory for all projects
 - e. Stabilized entrance and egress from construction site. Refer to CASQA Factsheets TC-1, TC-2, & TC-3 and choose appropriate measures for project site.
 - f. Stockpile management. Refer to CASQA Factsheet WM-3.
 - g. Keep gutter flowline unimpeded and free of soil, debris and construction materials at all times.
 - h. Use drainage controls as needed to protect site from run-on and prevent contaminated run-off. Refer to CASQA Factsheets EC-9 and EC-11.
 - i. Any other BMP's necessary to control the discharge of pollutants from the construction site.
6. Wash water, slurry and sediment from concrete or asphalt saw cutting operations shall not be allowed to enter the City storm drain system.
- a. When making saw cuts in pavement, use as little water as possible.
 - b. Cover and place barricades around each catch basin during the sawing operation to contain the slurry. Shovel or vacuum the slurry residue from the pavement or gutter and remove from site. Refer to CASQA Factsheet NS-3.
7. The Contractor is required to implement, at a minimum, the following housekeeping practices: site cleanup, solid waste management, material storage and delivery area, concrete waste management, and spill prevention and control.
- a. Site Cleanup: The Contractor shall keep the project site clean and free of dust, mud, and debris resulting from the Contractor's operations. Daily clean up throughout the project shall be required as the Contractor progresses with the work. Extra precautions and clean up efforts shall be made prior to weekends, holidays and predicted storm events.
 - b. Street Sweeping: Refer to CASQA Factsheet SE-7.
 - c. Spillage of earth, gravel, concrete, asphalt, or other materials resulting from hauling operations along or across any public traveled way shall be removed immediately by the Contractor at

his expense. If site is not kept sufficiently clean, the City will take measures to clean it and back charge the Contractor.

- d. Solid Waste Management: Refer to CASQA Factsheet WM-5 and WM-6.
 - e. Material Storage and Delivery Area: Refer to CASQA Factsheet WM-1.
 - f. Concrete Waste Management: Refer to CASQA Factsheet WM-8.
 - g. Spill Prevention and Control: Refer to CASQA Factsheet WM-3.
 - h. Temporary Sanitary Waste Facilities: Refer to CASQA WM-10
8. Non-Stormwater Discharges:
- a. The contractor shall prohibit non-stormwater discharges not allowed by City of Modesto NPDES Stormwater Permit and Modesto City Ordinance Chapter 10, Title, Section 202.
 - b. No washing of construction or other industrial vehicles shall be allowed on a construction site or property adjacent to a construction site. Refer to CASQA Factsheet NS-8.
9. Inspection
- a. Throughout the duration of the project the Contractor will be required to inspect and maintain, in effective condition, all erosion, sediment, and pollution control BMPs. Inspections are required at minimum weekly and before and after each storm event and as needed. The contractor shall immediately correct or replace any ineffective or damaged BMPs.
- B. For projects considered a Linear Underground/Overhead Project Type 1 / 2 / 3 (LUP) and the project site(s) equal to or greater than 1 acre; or a Traditional Construction Site Risk Level 1 / 2 / 3 and the project site(s) equal to or greater than 1 acre:
- 1. Coverage must be obtained under the Construction General Permit issued by the SWRCB for stormwater discharges associated with construction activity. The City will obtain coverage under the Construction General Permit by filing a Notice of Intent and the Contractor's Stormwater Pollution Prevention Plan (SWPPP) with the SWRCB. The SWRCB will subsequently issue the project a Waste Discharge Identification (WDID) Number. The Construction General Permit requires the contractor to prepare and implement a site-specific SWPPP. The SWPPP must identify appropriate stormwater pollution prevention measures or Best Management Practices (BMPs) that will be used at the site to eliminate or reduce pollutants in stormwater discharges during construction. The SWPPP must be kept readily available on the construction site at all times. The Contractor will not be allowed to begin work until the SWPPP has been reviewed and approved by the City, and a WDID number has been received from the State.
 - 2. For more information on the Construction General Permit, call the SWRCB's Stormwater Information Line at: (916) 341-5537 or visit the SWRCB's website at

http://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.shtml.

3. Storm Water Pollution Prevention Plan
 - a. The Contractor shall submit, in addition to the required paper copies, the SWPPP in an electronic document in pdf format to the City of Modesto, on compact disc (CD) in accordance with the submittal procedures.
 - (1) The City may designate an appropriately qualified Contractor representative as a Data Submitter to facilitate transmittal of SWPPP documents and reports to the State's Stormwater Multiple Application and Report Tracking System (SMARTS) database, as required by the Construction General Permit.
 - b. The SWPPP shall be completed to the satisfaction of the City at least 10 working days prior to the start of any field work on the project.
 - c. The SWPPP shall be developed by a Qualified SWPPP Developer (QSD) as defined by the Construction General Permit.
 - (1) The SWPPP shall be developed to implement the minimum required BMPs and any additional BMPs necessary to meet the Construction General Permit objectives.
 - (2) The SWPPP shall include a construction stormwater monitoring program to implement water quality monitoring and data reporting.
 - (3) The SWPPP shall include a detailed inspection, monitoring, and maintenance program that meets the requirements specified in the Construction General Permit and the California Stormwater Quality Association (CASQA) recommendations for BMP inspection and maintenance.
 - (4) The SWPPP shall briefly describe the general SWPPP training program for all subcontract personnel performing tasks that may result in pollution of storm water.
 - (5) The SWPPP shall include documentation of the training and qualifications for QSD, Qualified SWPPP Practitioner (QSP, and personnel that implement BMPs and perform inspections.
 - (6) All subsequent amendments to the SWPPP shall be made and certified by a QSD, and submitted to the City's Stormwater Inspector for review and acceptance.

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- d. The City's acceptance of the Contractor's SWPPP does not relieve the Contractor of responsibility for the quality and adequacy of the SWPPP. Such acceptance does not warrant, acknowledge, or admit the quality and adequacy of the SWPPP.
4. Annual Reports and Other Reporting
- a. The Contractor's QSP shall complete Annual Reports meeting the requirements of the Construction General Permit on the Stormwater Monitoring and Reporting Tracking System (SMARTS) database no later than August 1 of each year when field work has been underway during the preceding 12 months.
 - b. Except as otherwise noted, the Contractor shall submit SWPPP amendments and all other reports, sample results, or other documents to the City for review and approval at least 5 working days before they are required to be submitted to the SWRCB or posted to the Stormwater Monitoring and Reporting Tracking System (SMARTS) database.
 - c. The City will certify the QSP's or QSD's prepared SWPPP, Annual Reports, and any other required reports and information with the SWRCB including but not limited to monitoring data, SWPPP amendments and the Notice of Termination.
5. Best Management Practices and Implementation
- a. The Contractor shall use the "California Stormwater Quality Association Stormwater Best Management Practice Handbook for Construction" 2009 edition, as guidance in developing and implementing a SWPPP for this project. To use the electronic version, go to the following internet website: www.casqa.org.
 - b. The Contractor shall provide a QSP as defined by the Construction General Permit who shall assume sole, complete, and continuous responsibility for storm water pollution prevention, runoff management and erosion and sediment control at the work site during construction.
 - c. The Contractor and QSP shall implement all measures necessary to comply with the Construction General Permit; prepare all reports, plans, and documents as required by the Construction General Permit; perform all sampling and inspections as required by the Construction General Permit; furnish, install, and maintain all pollution prevention, erosion and sediment control measures required by the Construction General Permit or described in the SWPPP and implement monitoring programs, record keeping, maintenance, inspection, repair, training, and sampling as required in the Construction General Permit.
 - d. The Contractor's QSP shall submit BMP Inspection Reports, Rain-related BMP Inspection Reports, Visual Inspection Reports, Rain Event Action Plans and any other reports or documents required

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by the General Construction Permit to the City's Stormwater Inspector on a weekly basis. Reports can be scanned and submitted electronically.

- e. Prior to commencement of any field work, the Contractor and the Contractor's QSP shall meet with the City's Stormwater Inspector to review the implementation of the SWPPP. The purpose of the meeting will be to review the Contractor's procedures and to develop mutual understandings relative to compliance with the Construction General Permit, SWPPP and administration of the Contractor's erosion control and pollution prevention program.

C. Enforcement

1. Per Modesto Municipal Code, Section 5-10.501(e) and 5-10.702, the Contractor shall be subject to Notices of Violation (NOVs) resulting in possible Administrative Compliance Orders, Stop Work Orders and Civil Penalties of up to \$25,000 per violation per day for failure to implement appropriate BMPs at the construction site.
2. Per the State's Porter Cologne Water Quality Act, the Contractor shall also be subject to inspection by Staff from the Central Valley Regional Water Quality Control Board who have the authority to issue Notices of Violation (NOVs) and Penalties of up to \$10,000 per day for non-compliance. The Contractor shall be liable for any fines issued to the project by the State or Federal Government for NPDES non-compliance due to Contractor negligence.
3. The City reserves the right to take corrective action and withhold the City's costs for corrective action from progress payments or final payment to Contractor.
4. Any fines, including third-party claims, levied against the City as a result of Contractor's non-compliance are the Contractor's sole responsibility and will be withheld from progress payments or final payment to Contractor.

D. Payment

1. Full compensation for conforming to the provisions in this section shall be considered as included in the prices paid for one of the following
 - a. the lump sum bid price for "WPCP"
 - b. the lump sum bid price for "SWPPP," or
 - c. the various contract items of work involved
 - d. and no additional compensation will be allowed therefore.
2. The City will retain an amount equal to 25 percent of the estimated value of the contract work performed during estimate periods in which the Contractor fails to conform to the provisions in this section "Stormwater Quality Control Requirements" as determined by the City.
3. Retentions for failure to conform to the provisions in this section "Stormwater Quality Control Requirements" shall be in addition to the other retentions provided for in the contract. The amounts retained for

failure of the Contractor to conform to the provisions in this section will be released for payment on the next monthly estimate for progress payment following the date that project SWPPP has been implemented and maintained and stormwater pollution is adequately controlled, as determined by the City.