Standard Specifications – 2006

City of Modesto
Public Works Department

Standard Specifications

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City of Modesto
Public Works Department

1010 Tenth Street
Suite 4100
Modesto, CA 95353

Standard Specifications

2006

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ENGINEER DESIGN STANDARDS

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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 Design Standards is intended to be those improvements to be turned over to 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 Design Standards 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 Design Standards 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. It is also recognized that there may be developments where it is impossible to meet these Design Standards. It is suggested that these cases be reviewed with the City Engineer early in the design process to minimize reworking plans 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 Transportation Department.

B. CITY - Shall mean the City of Modesto, a municipal corporation.

C. CITY ENGINEER - Shall mean the Director of Public Works, City of Modesto, or his designated representative.

D. 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.

E. COUNTY - Stanislaus County.

F. 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.

G. 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.

H. EASEMENT - Shall mean an easement dedicated to the City or Public Utility which shall be continuing and irrevocable unless formally abandoned.

I. 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.

J. MANUAL OF WARNING SIGNS - Shall mean the “Manual of Warning Signs, Lights, and Devices for Use in Performance of Work Upon Highways” of the State of California, Department of Transportation - Current Edition.

K. NPDES – Shall mean the National Pollution Discharge Elimination System.

L. 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.

M. STANDARD DETAILS - Shall mean the Standard Details of the City of Modesto.

N. STATE HIGHWAY DESIGN MANUAL - Shall mean the State of California Department of Transportation Highway Design Manual, latest edition, unless otherwise stated.

O. 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.

P. 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.

Q. STATE SPECIFICATIONS - Shall mean the Standard Specifications of the State of California Department of Transportation, latest English unit edition, unless otherwise stated.

R. STANDARD PLANS - Shall mean the Standard Plans of the State of California Department of Transportation, latest edition, unless otherwise stated.

S. SUBDIVISION ORDINANCE - Shall mean the Subdivision Ordinance of the City of Modesto.

T. SWPPP – Shall mean Storm Water Pollution Prevention Plan.

U. UBC - Shall mean the edition, as approved by City Council, of the Uniform Building Code of the International Conference of Building Code of the International Conference of Building Officials.

V. UPC - Shall mean the edition, as approved by City Council, of the Uniform Plumbing Code.

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 Development Services Division of Public Works 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 - Division 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 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 Public Works Department for review of any construction in the public right-of-way. Improvement plans shall be prepared in accordance with the following requirements:

A. Minimum Requirements
The 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, TC, and existing obstructions).

3. Driveways (type, elevations to demonstrate control of on- & off-site drainage, HC 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 locations.

7. General notes with type of construction materials for utilities placed in the right-of-way.

   For additional information, refer to Appendixes D & E for submittal checklist.

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. Format – Title Sheet

1. Name of Subdivision or Project.
2. Vicinity Map with North Arrow.
3. Index of Sheets.
4. City Engineer's Signature Block (attached).
5. Consulting Engineer's Signature Block.
6. 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 Design Standards and may be placed on Sheet 2 instead of cover sheet.
7. List of applicable City Standards, with latest revision date.
8. Temporary and permanent benchmarks and horizontal control points including their description (NAV88 Datum).
9. Planning Commission, City Council or Board of Zoning Adjustment Resolution No. approving the project.
10. Plan view showing the limits of each sheet and sheet number within the plan set.
11. Typical Street Sections. Show storm drain open channels where applicable in these sections.
12. Pavement Design Chart showing street name (and station if section changes), TI, R-value, AC, AB and ASB thickness.

E. Utility Plan

1. Plan view and profile 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, especially 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 1" = 40' or 50' showing existing significant geographic features and proposed topography on site and a minimum 50' of the immediately adjacent areas.

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. Top of curb elevations at all property line extensions and grade breaks.

4. Street slopes at centerline.

5. Lot elevations.

6. Lot numbers.

7. Locations of proposed and existing storm drain structures to include adjacent developments which have an effect on the proposed drainage system.

8. Retaining walls and sound walls.

9. Typical lot grading details showing plans and section. Location of any disposal areas, fills or other special features to be included in the work.

10. 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.

11. A delineation of area to be cleared and grubbed.

12. Elevations at rear of all lots.

13. Elevations of all adjacent property to include the existing streets top of curb elevations.

H Street Plans & Profiles

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, survey monuments and other data required by the City Engineer.

3. Centerline stationing shall be shown with grades indicated in plan view for street intersections, drainage structure (include dimensions or station offsets from centerline), beginning and endings of curb returns and vertical and horizontal curve information as required.

4. Street plans shall include right-of-way lines and widths, street widths and 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, proposed top of curb, sanitary sewer mains, water mains, storm drains, utility crossings, 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, storm drain and sewer main slopes shall be shown.

9. Centerline curve data shall be shown in plan 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 plan view.

I. Signing & Striping Plan (combined with the electrical Street lighting Plan)

1. Provide a plan at a scale sufficient to clearly indicate all street striping and signing. 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.

2. Striping plan shall conform to Caltrans Standards.

J. Street Lighting Plan (incl. signing and striping information)

1. Plans shall be 1" = 40', 50' or 100' scale.

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 1" = 20' scale in AutoCAD version 12 or higher Windows format.

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 (ie. 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 Drawings
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 (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. List name of person responsible for implementation of and adherence to Local SWPPP.

7. State size of project in acres.

See Chapter 16, 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 (1) 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 RECORD DRAWINGS (For Construction Purposes)

After final approval and signatures on the vellums by the City Engineer and all agencies, the Consulting Engineer shall submit the following:

A. Eight (8) sets of blueline prints of the Improvement Plans

B. One (1) compact disk with a scan of the prints, a CAD drawing of the entire improvement area, a map of the lots. Scans shall be 200 DPI and saved into a single Adobe PDF file. CAD shall be either Autodesk DWG format (any version) or a generic CAD with a DXF output.

2.07 AS-BUILT 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 bluelines of the Improvement Plans with "As-Built" or "Record Drawing" stamped or printed on each sheet of the plans and a compact disk with scans of the As-builts. Scans shall be 200 DPI and saved into a single Adobe PDF file.

B. Traffic plans shall include all of the above plus a vellum or mylar.

C. 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.

As-built drawings will not require a re-survey of the improvements. As-builts 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 10' must be shown. Other data required in the As-builts is 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 Permits Division of the Public Works Department. 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.

Obtaining a permit for a large commercial project and residential subdivision will be billed on a time and materials basis.

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 on sewer pipes in the public right-of-way without the proper state contractors license.

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 Section 1.09 Street Closures of this manual.

For projects one (1) acre or greater, the Developer shall obtain coverage under the General Construction Activity Storm Water Permit (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 filed with the SWRCB. The General Construction Permit requires the applicant to prepare and carry out a Stormwater 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. 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 General Construction Activity Storm Water Permit (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 Development Services 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 MID at 209-526-7373 for utility locations at least 48 hours before digging. Other companies include: PG&E, SBC, 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.

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

2.15 CLOSING A PERMIT (Acceptance of Improvements)

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.

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:

A. Developer's Contractor must complete the punch list to the satisfaction of the Inspector.

B. Developer must submit and have approved warranty bonds.

C. Developer must pay all outstanding invoices to include inspection and water service fees.

D. Developer must have complied with all conditions placed on the Subdivision Map.

E. Developer's Engineer must submit a set of "As-builts" or "Record Drawings" and a compact disk with the scans and CAD file.

COMMERCIAL IMPROVEMENTS: Most commercial improvements do not have to be formally accepted by City Council. To have improvements accepted the following must be completed:

A. Developer's Contractor must complete the punch list to the satisfaction of the Inspector

B, Developer must pay all outstanding invoices.

C. 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 Specifications and Plans. 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 25' must be reviewed by the Public Works Department prior to construction and shall be accurately shown on revised plans stamped 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 do no 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 16).

12. Material Testing:
    a. All independent material testing and inspection called for by the City Engineer shall be furnished and paid for by the Developer or Contractor.
    b. Subgrade testing for R-values is required prior to the installation of base rock.
    c. 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 Standards.

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 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. City shall make all taps on existing water mains only.

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 Standards 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 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 also 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 16 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. Sanitary sewer pipe shall be V.C.P. extra strength (ASTM C-700).

2. All sanitary sewer mains shall be television inspected, flushed with an approved sewer ball 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.

3. One 4" V.C.P. 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 #509. Cover on lateral at property line to be 3' minimum to 5' maximum except as noted on plans.

4. 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.

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 permitee/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 coverages and indicate the policy aggregate limit applying to: premises and operation; broad form contractual; and products and completed operations.

The Certificate of Insurance:

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

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

ÿ 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.

ÿ 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
Public Works Department
(209) 577-5462
FAX (209) 571-5461

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 filed State Water Resources Control Board (SWPP)? 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 & AC & 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 E (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 ¼ 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 one (1) monument 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" long galvanized iron pipe or approved equal. The center of the top 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 Subdivision 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 Subdivision 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.

Boundary monuments shall be placed in the same manner and of the same material as street monuments except that in unpaved areas 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 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 that they may be ¾" O.D. and, in unpaved areas, 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 ¼ 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:

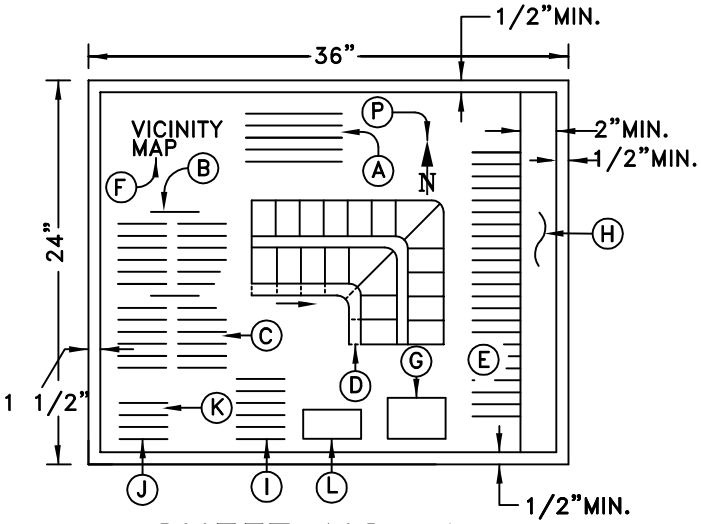
   1. They shall be reset in the surface of the new construction, a suitable monument box placed thereon, or permanent witness monuments set to perpetuate their location if any monument could be destroyed, damaged, covered, or otherwise obliterated, and a corner record or record of survey filed with the 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.

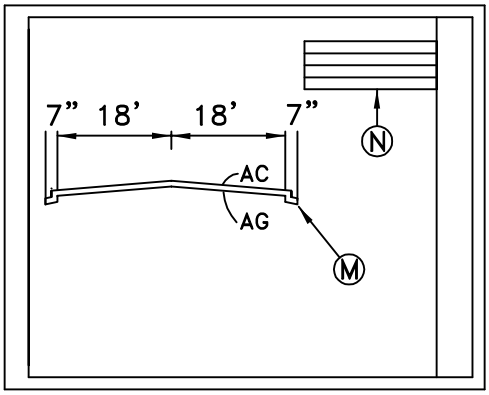
   3. It shall be the responsibility of the governmental agency or others performing construction work to provide for the monumentation required by this section. It shall be the duty of every land surveyor or civil engineer to cooperate with the governmental agency in matters of maps, field notes, and other 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



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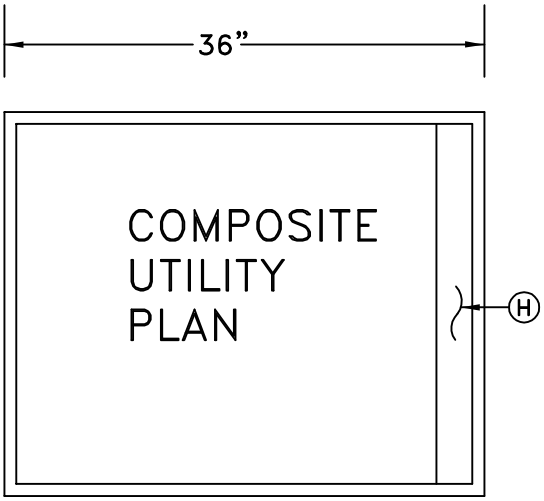

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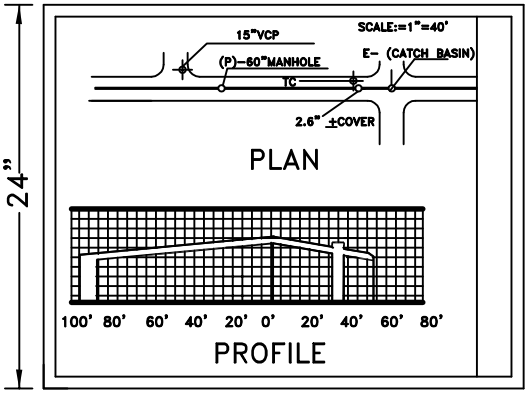


SHEET NO. 4

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wilson

ENGINEERING

TYPICAL LAYOUT FOR IMPROVEMENT PLANS

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

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 CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Ulm

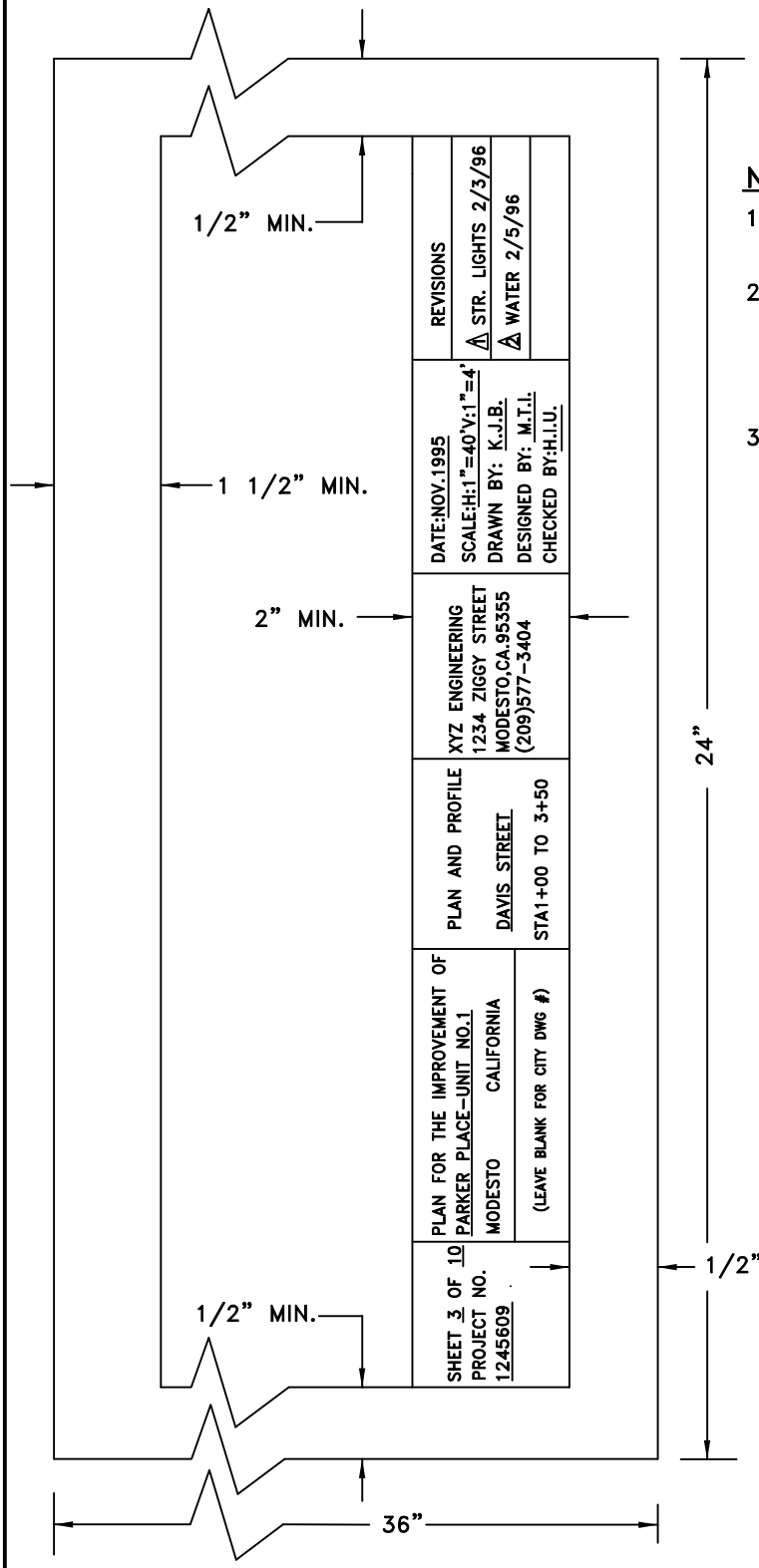
ENGINEERING

TYPICAL LAYOUT FOR IMPROVEMENT PLANS

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

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 CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

ENGINEERING

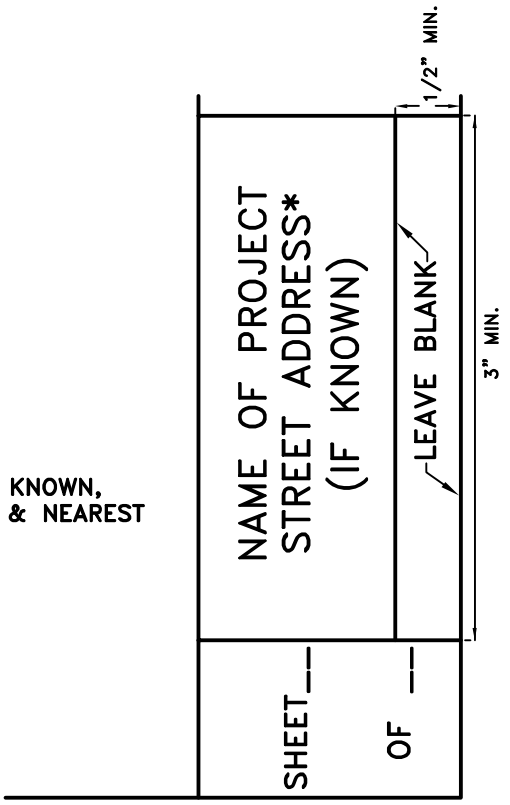
TYPICAL TITLE STRIP FOR CITY PROJECTS

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO. 202

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



APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	ENGINEERING	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	TITLE BLOCK FOR IMPROVEMENT PLANS	
	PUBLIC WORKS DEPARTMENT	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, ELECTICAL DEPARTMENT
(FOR STREET LIGHTING SERVICE
LOCATION ONLY)

BY_____ DATE:_____

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

BY_____ DATE:_____

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

ENGINEERING

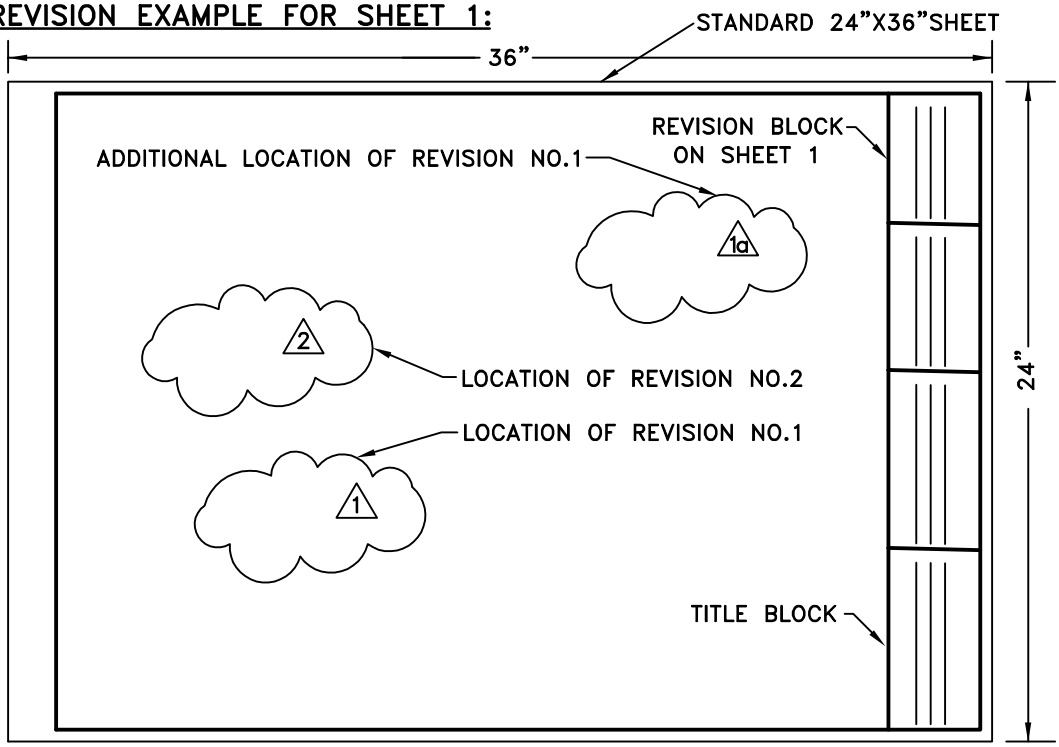
APPROVAL BLOCKS FOR IMPROVEMENT PLANS

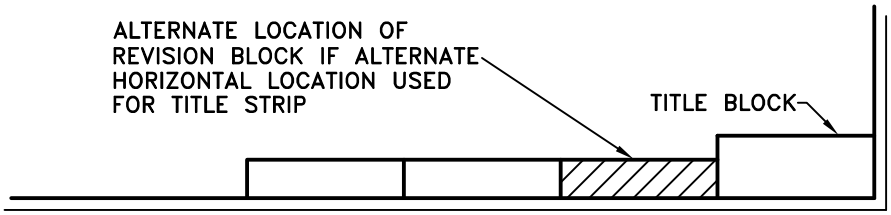
PUBLIC WORKS
DEPARTMENT

CITY of MODESTO

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: 1 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. 1 (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 CITY COUNCIL RESOLUTION NO. 2006-284	ENGINEERING	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Madden	DESIGN REVISIONS FORMAT	
	PUBLIC WORKS DEPARTMENT	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 CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

ENGINEERING

REVISION BLOCK

CITY of MODESTO

PUBLIC WORKS DEPARTMENT

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 DATA .....LETTERS 0.175" HIGH
COORDNATES,ECT. NO. 1 RAPIDOGRAPH

ADJACENT SUBDIVISIONS .....LETTERS 0.100"HIGH
NO. 0 RAPIDOGRAPH
SHADOW LETTERING

ADJACENT LOT NUMBERS .....LETTERS 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 RAPIDOGRAM PEN.

3.– IMPROVEMENT PLANS

DESCRIPTION	PROPOSED	EXISTING
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 CITY COUNCIL
RESOLUTION NO. 2006–284

APPROVED BY THE CITY ENGINEER:

Richard D. Ulm

ENGINEERING

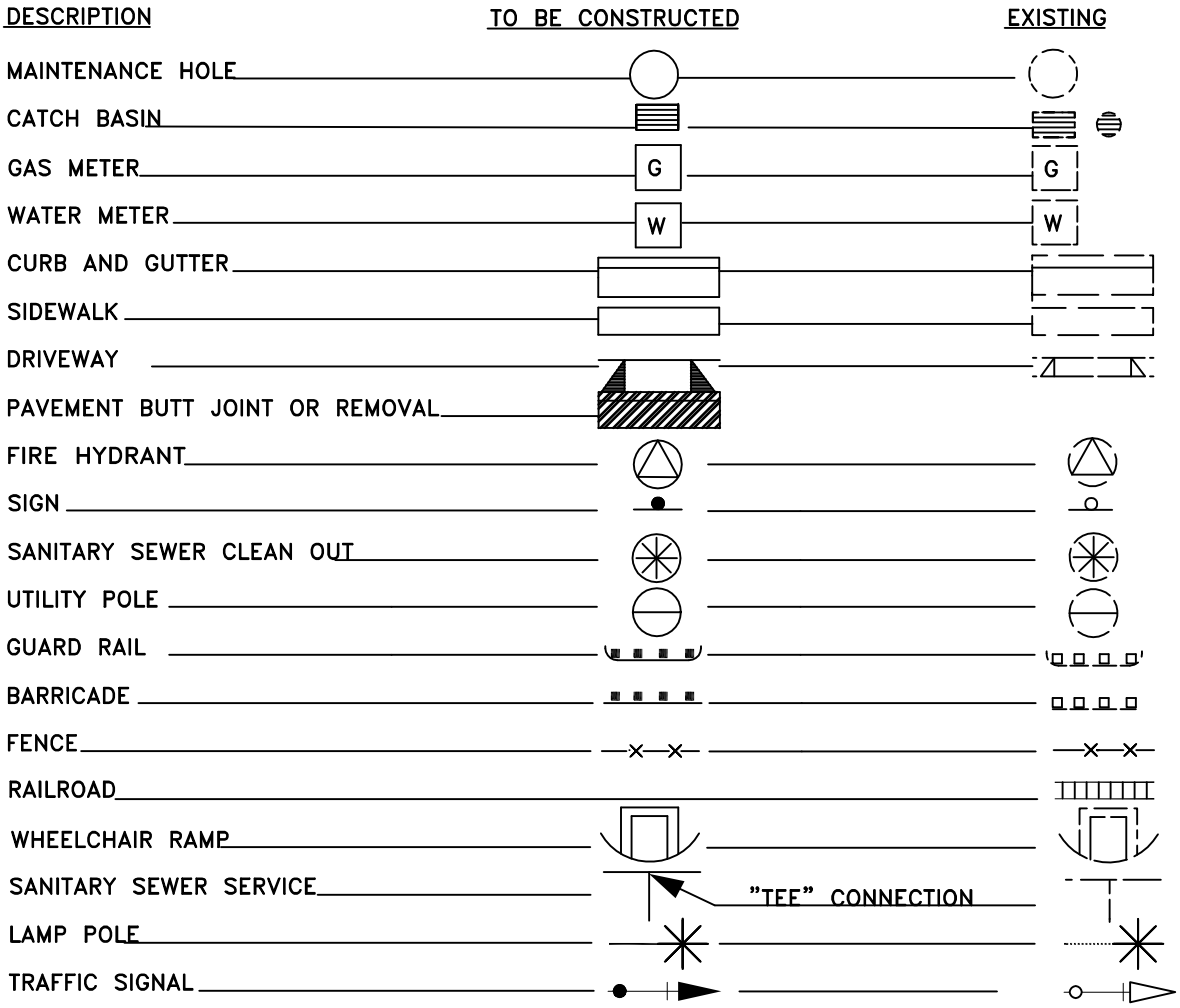
DRAFTING STANDARDS

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO. 204

IMPROVEMENT PLANS (CONTINUED)



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 SECTION 1–1.03 OF THE CITY OF MODESTO 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 CITY COUNCIL RESOLUTION NO. 2006–284	ENGINEERING	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	DRAFTING STANDARDS	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 205

TXT
AaBbCcDdEeFfGgHhIiJjKkLlMmNnOoPpQqRrSsTtUuVvWwXxYyZz
1234567890

MONOTXT
AaBbCcDdEeFfGgHhIiJjKkLlMmNnOoPpQqRrSsTtUuVvWwXxYyZz
1234567890

ROMANS
AaBbCcDdEeFfGgHhIiJjKkLlMmNnOoPpQqRrSsTtUuVvWwXxYyZz
1234567890

ROMAND
AaBbCcDdEeFfGgHhIiJjKkLlMmNnOoPpQqRrSsTtUuVvWwXxYyZz
1234567890

ROMANC
AaBbCcDdEeFfGgHhIiJjKkLlMmNnOoPpQqRrSsTtUuVvWwXxYyZz
1234567890

ROMANT
AaBbCcDdEeFfGgHhIiJjKkLlMmNnOoPpQqRrSsTtUuVvWwXxYyZz
1234567890

ITALICC
AaBbCcDdEeFfGgHhIiJjKkLlMmNnOoPpQqRrSsTtUuVvWwXxYyZz
1234567890

ITALICT
AaBbCcDdEeFfGgHhIiJjKkLlMmNnOoPpQqRrSsTtUuVvWwXxYyZz
1234567890

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

ENGINEERING

AUTOCAD STANDARDS (TEXT TYPES)

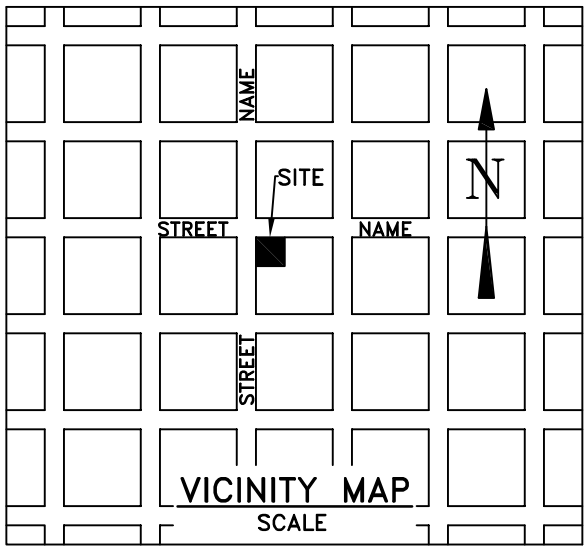
PUBLIC WORKS DEPARTMENT

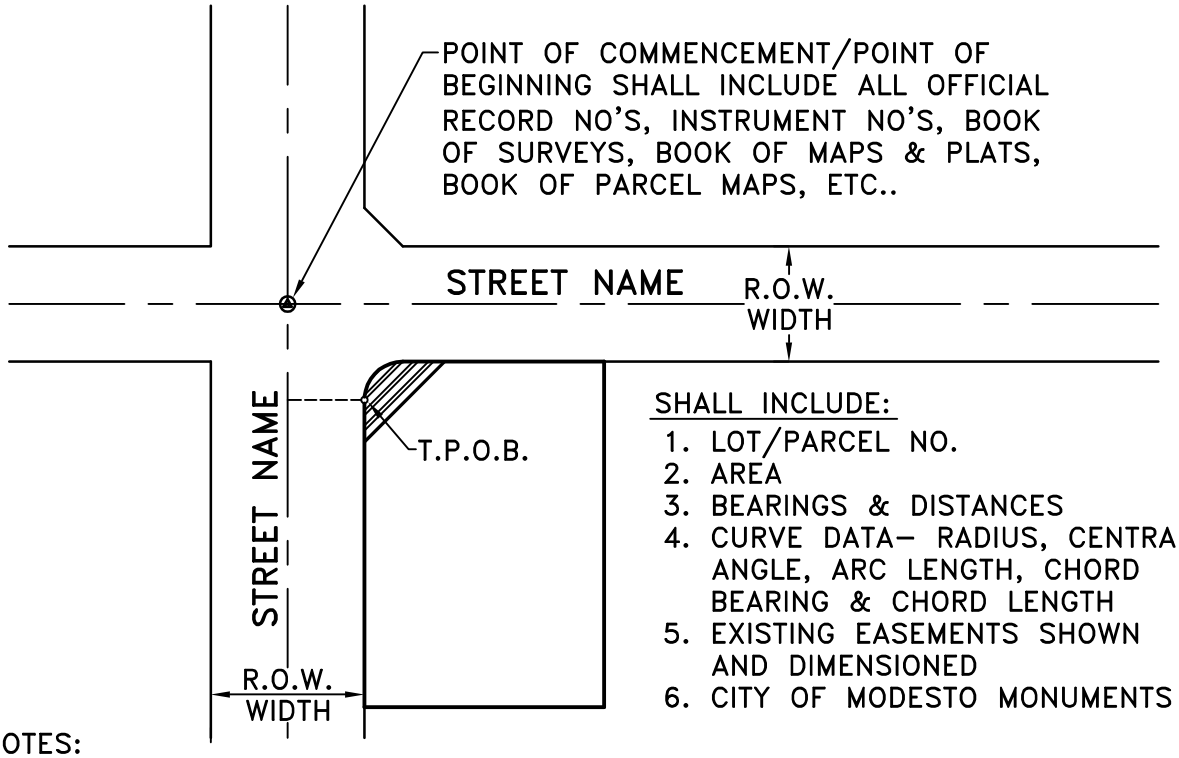
CITY of MODESTO

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 CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

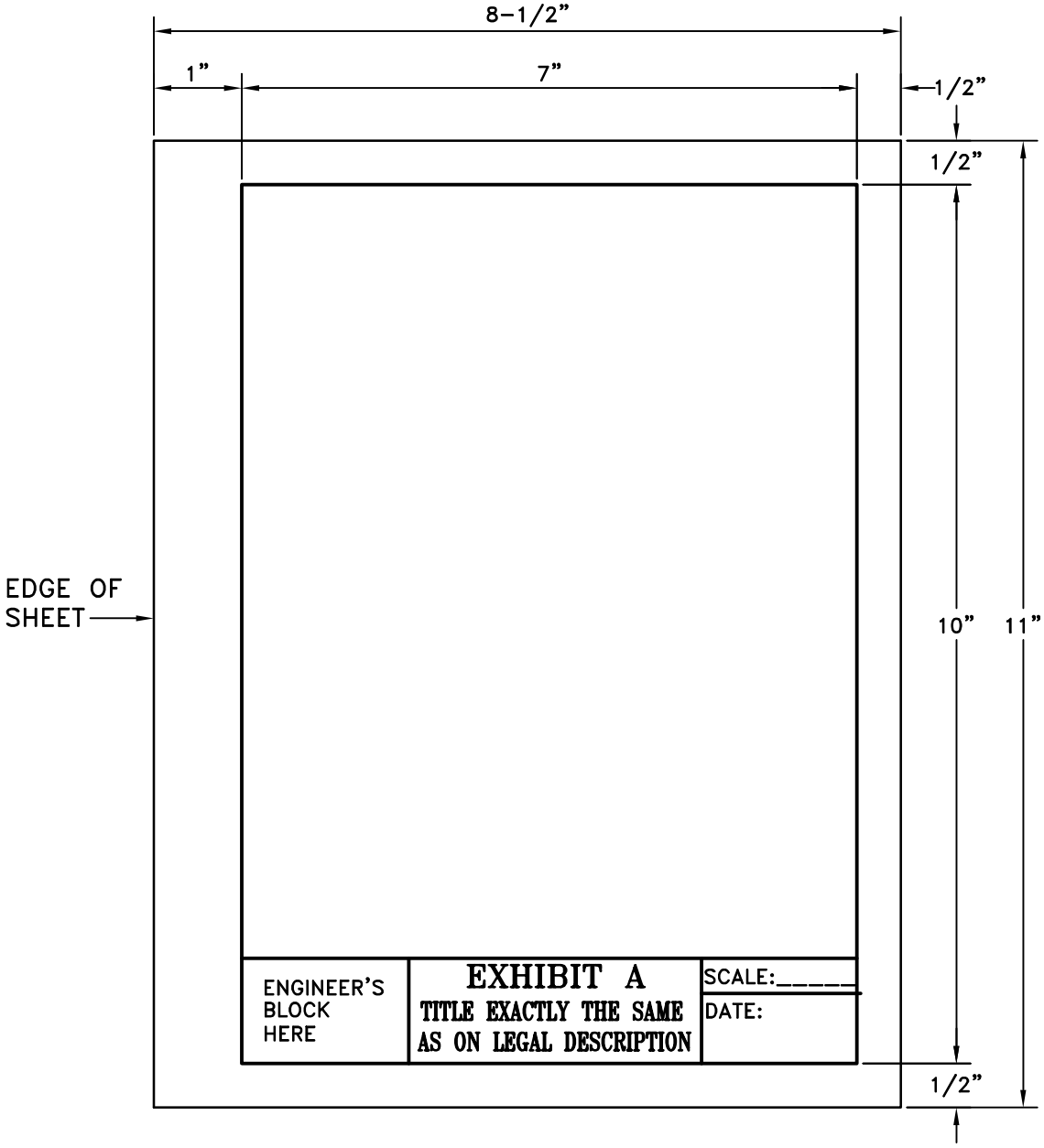
ENGINEERING

STANDARD MAP ASSOCIATED WITH LEGAL DESCRIPTION FOR 8-1/2" x 11" SHEET

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO. 207



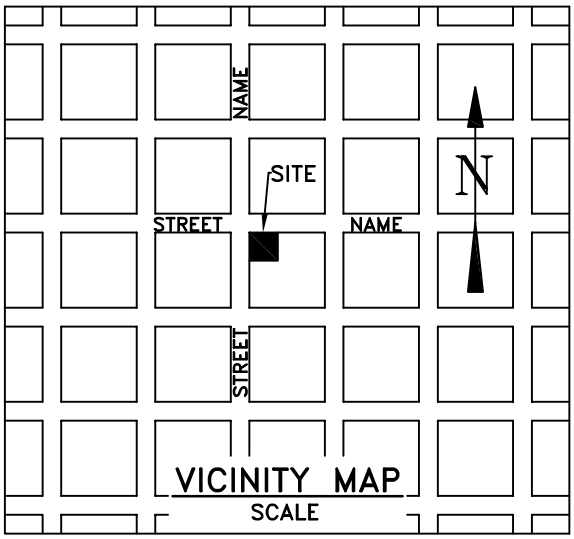
NOTES:

1. THIS DOCUMENT WILL BE RECORDED, THEREFORE IT MUST BE ACCEPTABLE TO THE COUNTY RECORDER.
2. TITLE MUST EXACTLY MATCH THE GRANT DEED AND THE LEGAL DESCRIPTION.
3. ALL TEXT MUST BE MINIMUM OF 0.1" HIGH.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	ENGINEERING	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	STANDARD BORDER & TITLE BLOCK FOR 8-1/2" x 11" SHEET	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 208

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 CITY COUNCIL
RESOLUTION NO. 2006–284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

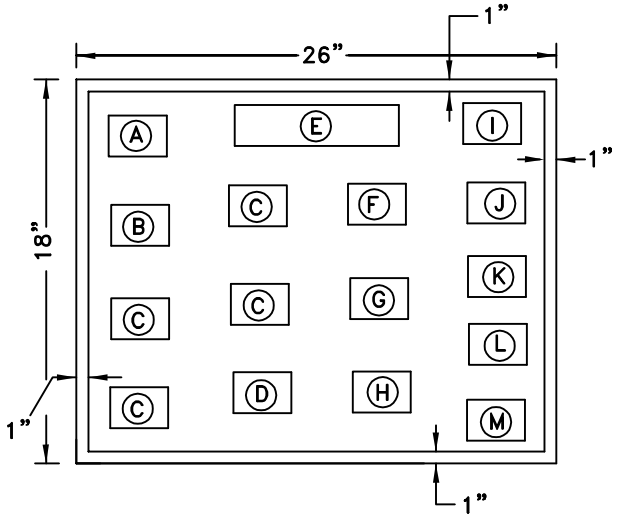
ENGINEERING

DRAFTING STANDARD FOR SUBDIVISION AND PARCEL MAPS

PUBLIC WORKS DEPARTMENT

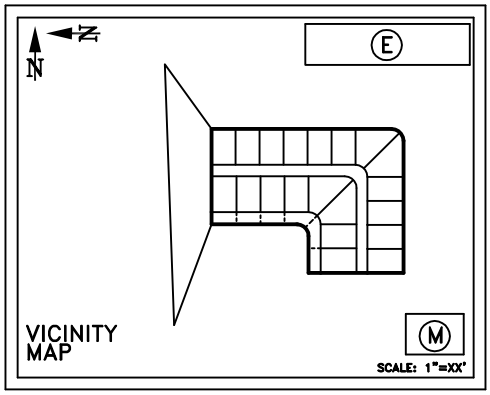
CITY of MODESTO

DETAIL NO. 209



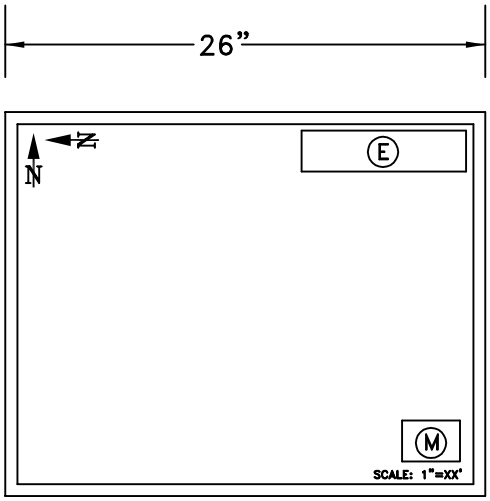
SHEET NO. 1

AFFIDAVIT SHEET



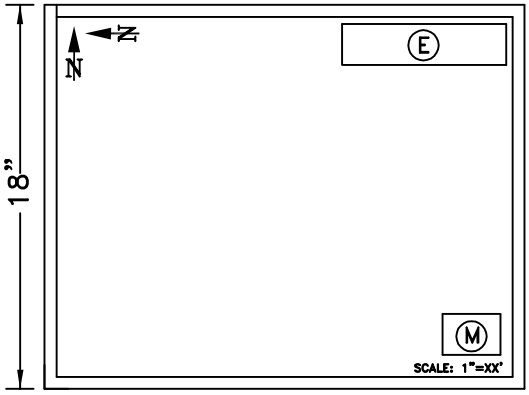
SHEET NO. 2

BLUE BORDER



SHEET NO. 3

LOT LAYOUT



SHEET NO. 4

LOT LAYOUT (CONT. IF NEEDED)

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	ENGINEERING	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	TYPICAL LAYOUT FOR SUBDIVISION MAPS	
	PUBLIC WORKS DEPARTMENT	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 CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wu

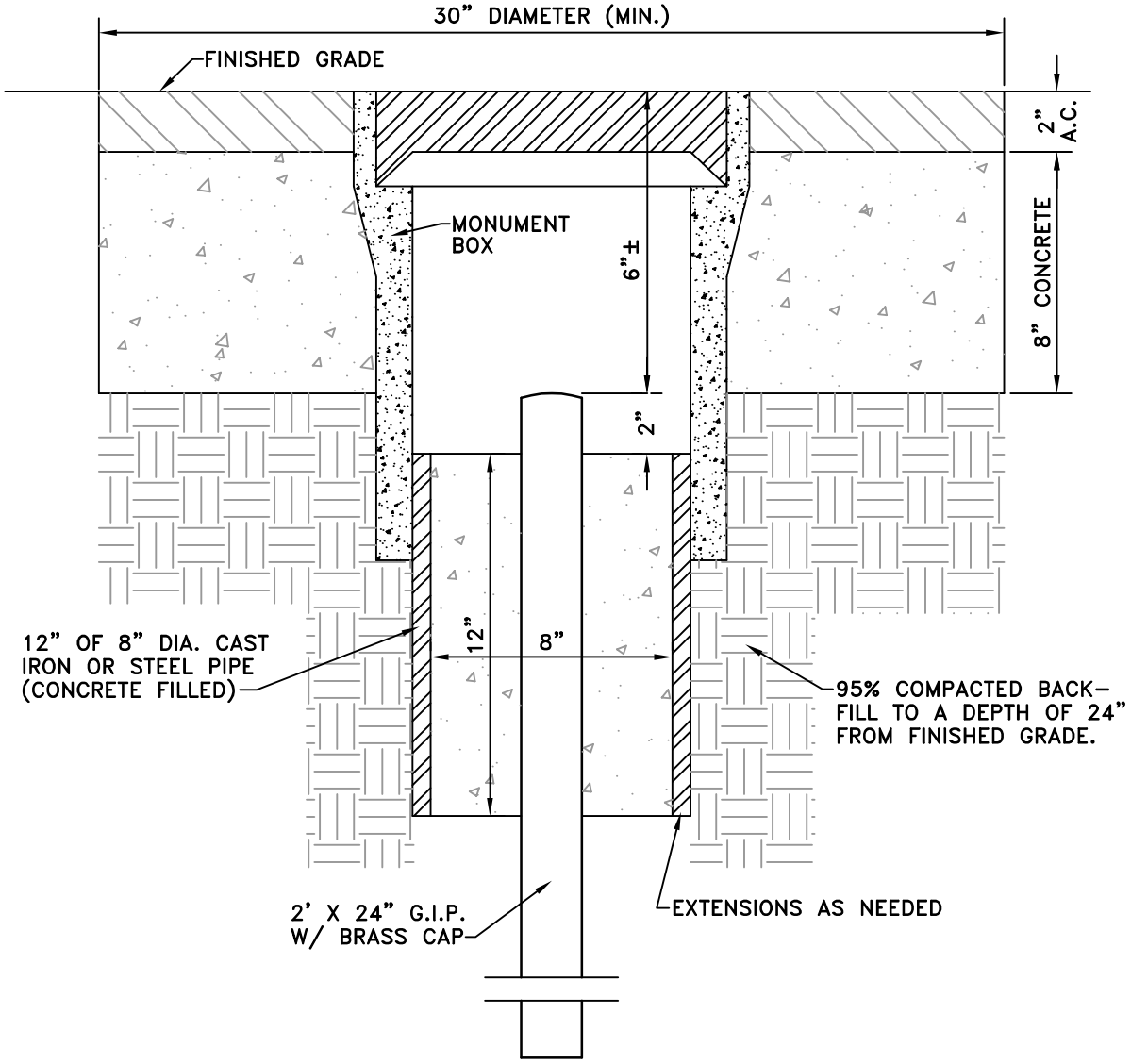
ENGINEERING

TYPICAL LAYOUT FOR SUBDIVISION MAPS AND PARCEL MAPS

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO. 211

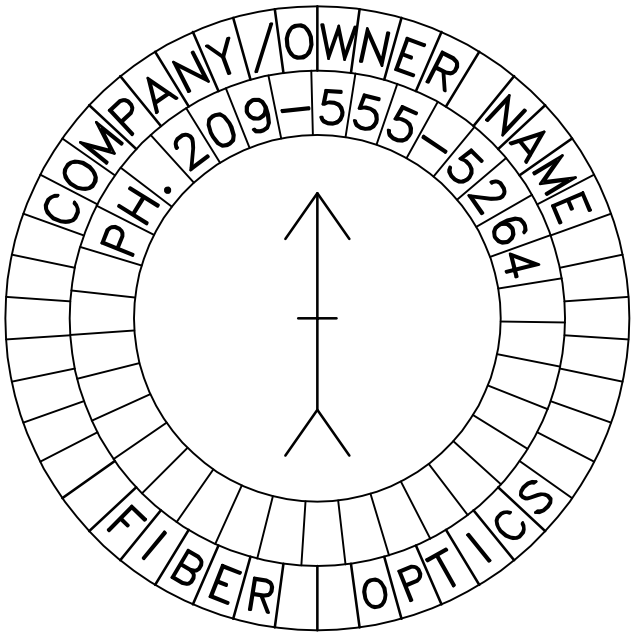


SECTION

NOTES:

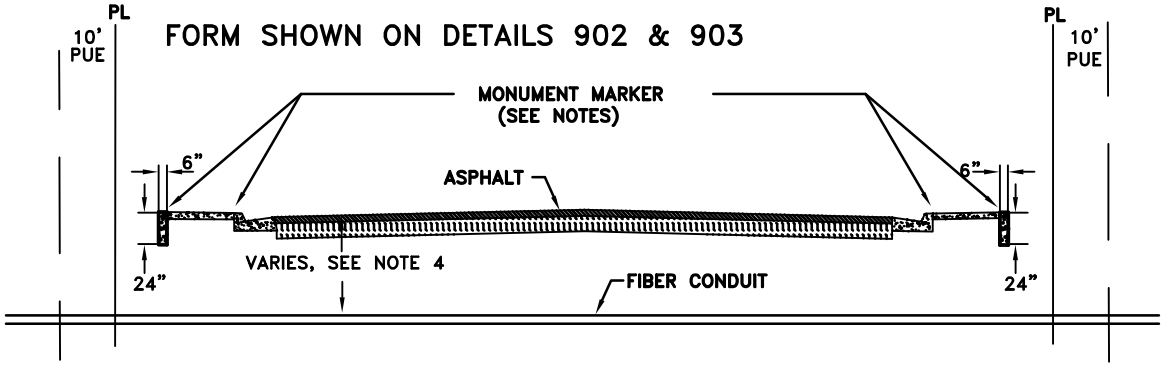
1. MONUMENT BOXES SHALL BE CHRISTY G5 WITH CHRISTY IRON COVER OR APPROVED EQUAL.
2. SET MONUMENT BOX TO FINISH GRADE.
3. COMPACT EARTH AROUND BASE WITH MECHANICAL TAMPER TO 95% RELATIVE COMPACTION AND ENCASE IN 8" OF CONCRETE.
4. AFTER CONCRETE SETS, PATCH WITH 2" A.C.
5. IN TRAFFIC AREAS, CONCRETE SHALL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

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	SURVEY	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	SURVEY MONUMENT	
	PUBLIC WORKS DEPARTMENT	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 21/2 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 MANUFACTUREER. SAMPLE ORDER FORM SHOWN ON DETAILS 902 & 903



APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	SURVEY	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	MONUMENT FOR PRIVATE UTILITY LINE CROSSING ROW	
	PUBLIC WORKS DEPARTMENT	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

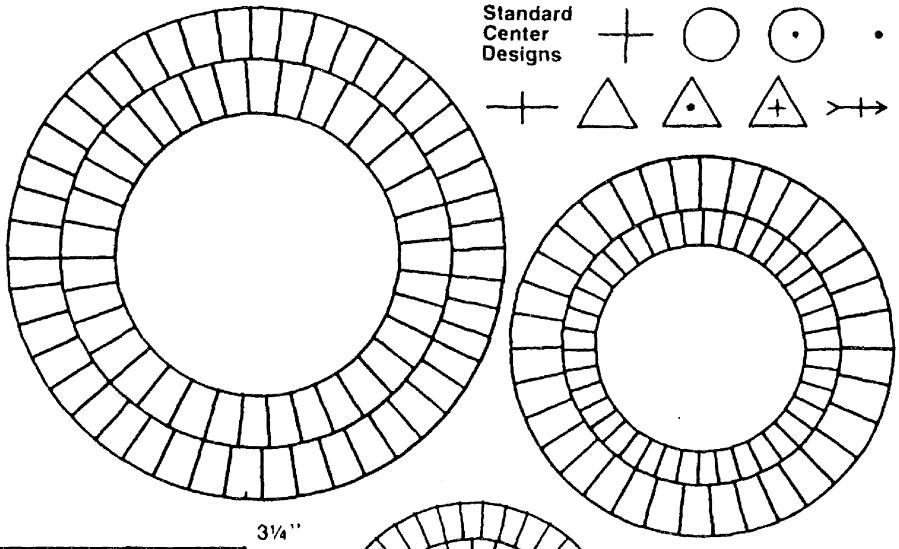
PERMAMARK® 3/4” Pipe or 1/2” Rebar Caps

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.

Standard Center Designs



NOTE: Drawings may not be to scale.

QuickShip Standard Layout

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	SURVEY MONUMENT FOR PRIVATE UTILITY LINE CROSSING ROW	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	PUBLIC WORKS DEPARTMENT	DETAIL NO. 0214

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

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.

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

Name on Card

My Credit Card Account No. is

Expiration Date _____

Signature _____ Date _____

Is this your first order from us? ☐ Yes ☐ No

CHARGE TO
Type or Print

Institution, Company or Individual (please print)

Address

City, State, Zip (Zip Code must be furnished)

Telephone FAX Number

(Signature of Duly Authorized Official)

SHIP TO (Shipments must have street or highway address)
Type or Print

Same as Charged

Street Address

City, State, Zip (Zip Code must be furnished)

Telephone

Attention

(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

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

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 & Permamark products for delivery in the 48 states (not including Alaska and Hawaii) or call for shipping charges to your destination anywhere in the world

☐ Check here and we'll send our FREE catalog.

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Ulm

SURVEY

MONUMENT FOR PRIVATE UTILITY LINE CROSSING ROW

PUBLIC WORKS
DEPARTMENT

CITY of MODESTO

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.

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 curbline 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 curbline.

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.

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):

1. Local streets internal to development shall be dedicated and improved by the Developer.

2. All other streets with the exception of expressways:
A width of 40' shall be dedicated and improved (40' dedication, improve 30' from face of curb and 10' behind face of curb). Thirty feet (30') of paved width provides sufficient width for one (1) parking lane and two-way travel. To make use of the parking an additional 4' feet of pavement shall be provided at the Developer's cost. This additional 4' feet serves as dust control and fulfills the air district requirement.

   In some cases, initial development of added width may be necessary. Such additional dedication and improvement would be subject to reimbursement.

   In existing circumstances, where at least 40' of dedication and improvements have previously been made and standards change requiring additional right-of-way, such additional right-of-way shall be acquired with reimbursement.

   Any extra facilities required specifically for the development (e.g. deceleration/acceleration lanes, slip ramps, median modification or construction in existing streets) shall be provided by and at the expense of the Developer. Median construction in new roadways may be included within the Community Facility Fees (CFF).

3. Expressways:
   Forty feet (40') of right-of-way shall be dedicated with development. Additional right-of-way shall be acquired with reimbursement.

   No expressway improvements shall be required to be dedicated. Where interim improvements are required to facilitate current development pending future expressway improvement, the Developer shall provide such interim improvements.

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 & Trench, gives some additional guidance to undergrounding utilities.

H. Fire Department Standards for Private Streets and Developments:
Design Appendix D 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 State of California Department of Transportation Highway Design Manual.

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 -
   - Downtown District (See Standard Detail #321) - the minimum radius shall be 15'.
   - Local - Minimum radius shall be as shown in the traffic details (300's).
   - Commercial and Industrial - Minimum radius for new construction shall be as shown in the traffic details (300's).
   - 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.

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.
   - 0.35' 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').

C. Pavement Design:

1. For purposes of geometric and structural design, streets shall be classified according to the following. Any deviation from the following standard will require the approval of the City Engineer.

   If there is insufficient soils data, specifically R-values, then streets shall be designed using an assumed R-value of 5. The maximum R-value allowed for street design in the City of Modesto shall be 60, per Standard Detail 301. The table on Standard Detail #301 lists street structural sections.

TABLE 3.1 STREET DESIGN STANDARDS

Class	Right-of-Way (Feet)	Mid-Block Width Between Curbs (Feet)	Design Speeds	*Traffic Index	Street Section Requirement	Minimum Pavement Section AC/AB	Minimum Centerline Radius for Horizontal Curve (ft.)
Expressway 4 lane	110	90	55	11	"	.55/.35	1300**
Expressway 6 lane	135	115	55	11	"	.55/.35	1300**
Principal Arterial	114	94	45	11	"	.55/.35	1000
Minor Arterial	100	80	40	10	"	.50/.35	750
Major Collector	84 96 w/bike lanes	64 76	35	10	"	.40/.35	525
Minor Collector	60 72 w/bike lanes	40 52	25	8	"	.40/.35	250
Local	50	36	25	6	"	.30/.35	250**
Cul-de-sac	50	34	25	4.5	"	.20/.35	250**
Major Industrial	110	94	45	10		0.50/0.35	1200**
Industrial	60	40	40	9	"	.45/.35	600**
Residential Alleys	20	N/A	15	5	"	.20/.35	200**
Commercial Alleys	20	N/A	15	5	"	.20/.35	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 asphalt concrete (AC) and 0.35' of aggregate base (AB). Aggregate base section may be comprised of an equivalent section of aggregate base and aggregate subbase, 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 AC. 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 AC. The Developer shall remove the temporary AC 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**
Minor Arterial x Major Collector	10 x 8	**10**
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.

   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.

G. Open Ended Cul-De-Sacs: (Standard Details #313-315, & 715)

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 unlandscaped cul-de-sac, a minimum width of 10' of concrete pavement is required, see Detail 313. Otherwise, see 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 a 0.3' asphalt concrete. 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' AC. Drainage shall also be provided with new alleys.

3. Existing residential alleys may be surfaced with a 0.2' AC 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 2.02 C 5 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 6” 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 6" 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 the approved plans and these 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, ¾" maximum AB. Thickness shown on the plans shall be the minimum section allowed.

E. Asphalt Concrete:
Asphalt Concrete shall conform to Section 39 of the Caltrans Standards and shall be Type A Asphalt Concrete using AR4000 paving asphalt. Aggregate used in all but the final course shall be ¾" maximum, medium grading.

Aggregate used in the final course shall be as follows:

- Expressway, Arterial, Collector and Industrial Streets – Type A, ¾" maximum, medium grading.
- Residential Streets – Type B, ½" maximum, medium grading

Asphalt for 0.1' overlays shall be concrete paving AR4000, Type B, ½" maximum, medium grading for each project.

F. Header Board:
Header Boards shall be constructed to protect the edges of the asphalt concrete 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 contract and application of LP22 waterborne preservative or approved equal.

The header board size shall meet or exceed the depth of the asphalt concrete section (i.e. 2" x4", 2" x6", 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) Portland cement concrete. Materials - Type II cement, 4" maximum slump, 1" maximum size aggregate.

I. Truncated Domes:
The Contractor shall furnish and install truncated dome tiles as detectable warnings on the curb ramps, as shown on the details. The tiles shall be either the 'Vitrified Polymer Composite (VPC) Cast-In-Place Tiles' manufactured by Armor-Tile Tactile Systems (1-800-682-2525), 'E-Z Set Ceramic Composite Detectable Warning Panels' manufactured by Detectable Warning Systems (1-866-999-7452), 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" (23 mm) minimum to 1.4" (36 mm) maximum, a top diameter of 50% of the base diameter minimum to 65% of the base diameter maximum, and a height of 0.2" (5 mm).
- Dome Spacing - Center-to-center spacing of 1.6" (41 mm) minimum and 2.4" (61 mm) maximum, and a base-to-base spacing of 0.65" (16 mm) minimum, measured between the most adjacent domes on square grid.
- Color - The tiles shall be provided in manufacturer specified brick red color. The tiles shall be uniform in color for the entirety of the project.

- Tile Size and Location - The truncated dome tiles shall extend 24" in the direction of travel and the full width of the curb ramp as shown on the plans. The Contractor may choose 24" x 24" or 24" x 48" tiles. 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.

J. Bus Turnouts:
Bus turnouts shall be constructed as shown in Standard Details #325-328. The minimum concrete mix design standards shall be 4,000 psi with a maximum water/cement ratio of 0.42 with a flexural design strength of 600 psi as measured by ASTM C 78-02 and a maximum slump of 3". A midrange water reducer/superplacticizer 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 Portland cement 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 39-4.03 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 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. Asphalt Concrete:

Asphalt concrete shall be spread to Section 39-6.01 of the Caltrans Standards.

1. Paving Spread

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

- The final course shall be paved starting from the curb and paving toward the centerline of the street.
- When paving the final surfacing course, there shall be a minimum of two (2) rakers and one (1) screed person per paving machine.

- Vibratory rollers may be used as approved by the City Engineer.
- All paving courses shall be laid with a paving machine except.
- Paving machines shall have automatic joint control.
- 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 to 0.10

Tack coat may be required between asphalt concrete 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 asphalt concrete 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 39-5 of the Caltrans Standards. Caltrans Standards are amended to allow use of a motorized latent box for projects involving less than 50 tons of asphalt concrete.

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 recompacted 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 with Section 73 of the State Specifications and Section 90 of the City of Modesto Standards 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" premolded 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 Public Works inspector.

9. Service and Lot Lines - Contractor shall clearly mark a **"W"** for water services, and a **"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 40-1.135 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 24" x 48". 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.
a. The subgrade should be moist but free of standing water and soft spots at the time of placement of concrete.
b. Whenever possible, erect temporary windbreaks to reduce wind velocity over the concrete surface.
c. Place concrete early morning or evening.
d. Supply sufficient workers to eliminate delays during construction.
e. Apply final curing immediately after final finishing.
f. Schedule transit-mix trucks for minimum wait time.
g. Minimize total mixing.
h. 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 Crafco Roadsaver Silicone Sealant part number 34903, as manufactured by Crafco 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 these standards.

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. Asphalt Concrete

Asphalt concrete 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 39-8.02 of the Caltrans Standards.

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, 805a, 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.

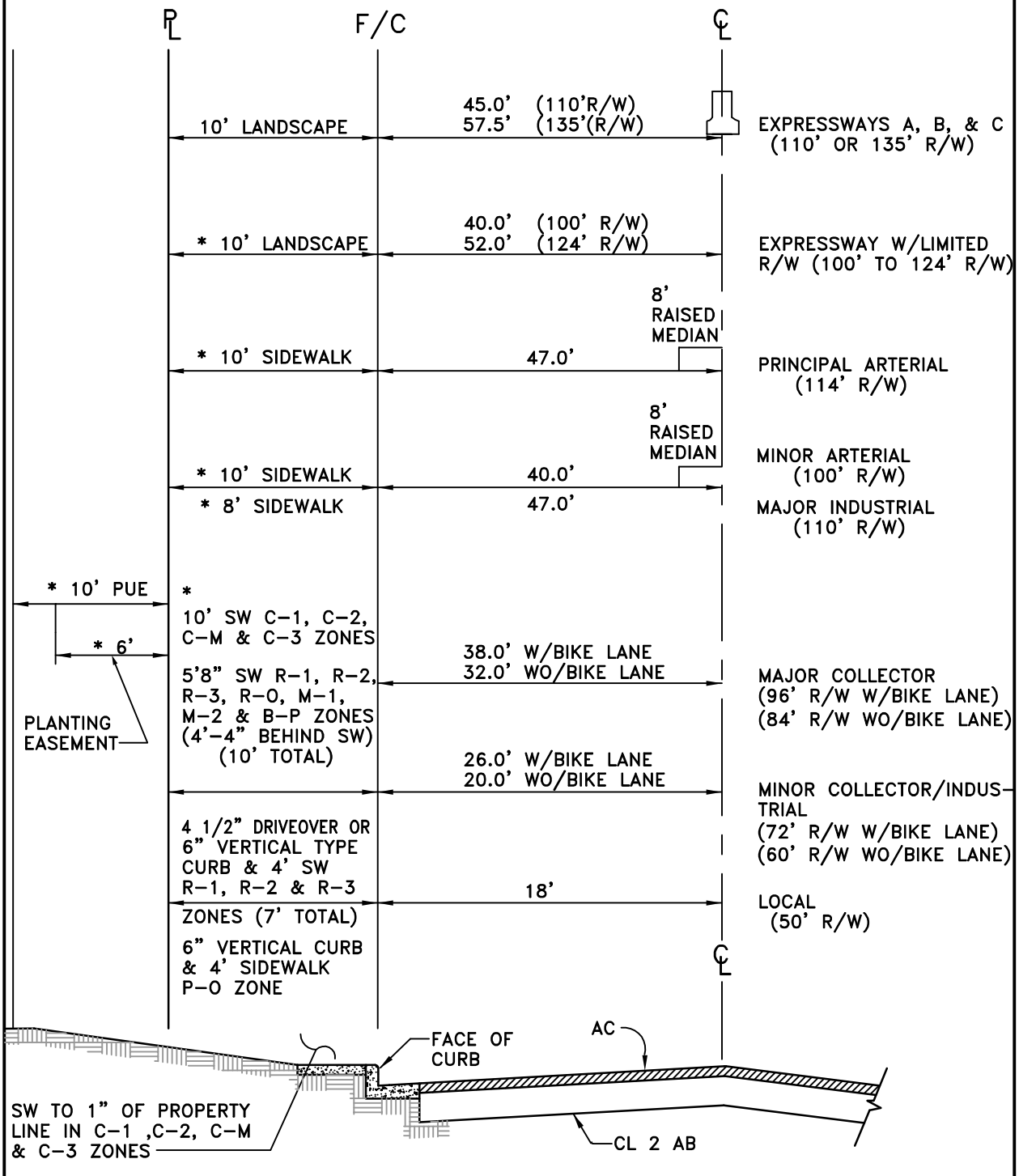
3.07 RELOCATING EXISTING IRRIGATION LINES

Existing cast-in-place irrigation lines in street right-of-way shall be replaced with rubber-gasketed, reinforced concrete pipe (RCP) conforming to Sections 65-1.02A and 65-1.06B 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.



* SEE EXCEPTIONS FOR PUE'S AND PE'S IN SECTION 3.01E.
ALSO, NO NEW PUE OR PE BEHIND APPROVED MASONRY WALLS.

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wu

STREETS

STREET SECTIONS

PUBLIC WORKS
DEPARTMENT

CITY of MODESTO

DETAIL NO.
300

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

STREETS

STRUCTURAL SECTION REQUIREMENTS

PUBLIC WORKS DEPARTMENT

DETAIL NO. 301

CITY of MODESTO

STRUCTURAL SECTION REQUIREMENTS

TI	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
	WITHOUT SAFETY FACTOR (5.0–8.0)				WITH SAFETY FACTOR (8.0–12.0)													
R–VALUE	REQUIRED AC THICKNESS (FEET)									REQUIRED AB THICKNESS (FEET)								
5	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60	0.60	0.95	1.25	1.45	1.50	1.70	1.95	2.20	2.40
10	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60	0.55	0.85	1.15	1.35	1.35	1.60	1.80	2.00	2.20
15	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60	0.50	0.80	1.05	1.25	1.25	1.45	1.65	1.85	2.05
20	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60	0.40	0.70	1.00	1.15	1.15	1.30	1.50	1.70	1.85
25	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60	0.35	0.65	0.90	1.05	1.00	1.20	1.35	1.55	1.70
30	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60	0.35	0.55	0.80	0.95	0.90	1.05	1.20	1.40	1.50
35	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60	0.35	0.50	0.70	0.85	0.80	0.95	1.10	1.20	1.35
40	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60	0.35	0.40	0.65	0.75	0.65	0.80	0.95	1.05	1.15
45	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60	0.35	0.35	0.55	0.65	0.55	0.65	0.80	0.90	1.00
50	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60	0.35	0.35	0.45	0.55	0.45	0.55	0.65	0.75	0.80
55	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60	0.35	0.35	0.35	0.45	0.35	0.40	0.50	0.60	0.65
60	0.20	0.20	0.20	0.25	0.40	0.45	0.50	0.55	0.60	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.40	0.45

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 UTILITIZED 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.

	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 CITY COUNCIL
RESOLUTION NO. 2006–284

APPROVED BY THE CITY ENGINEER:

Richard D. Madden

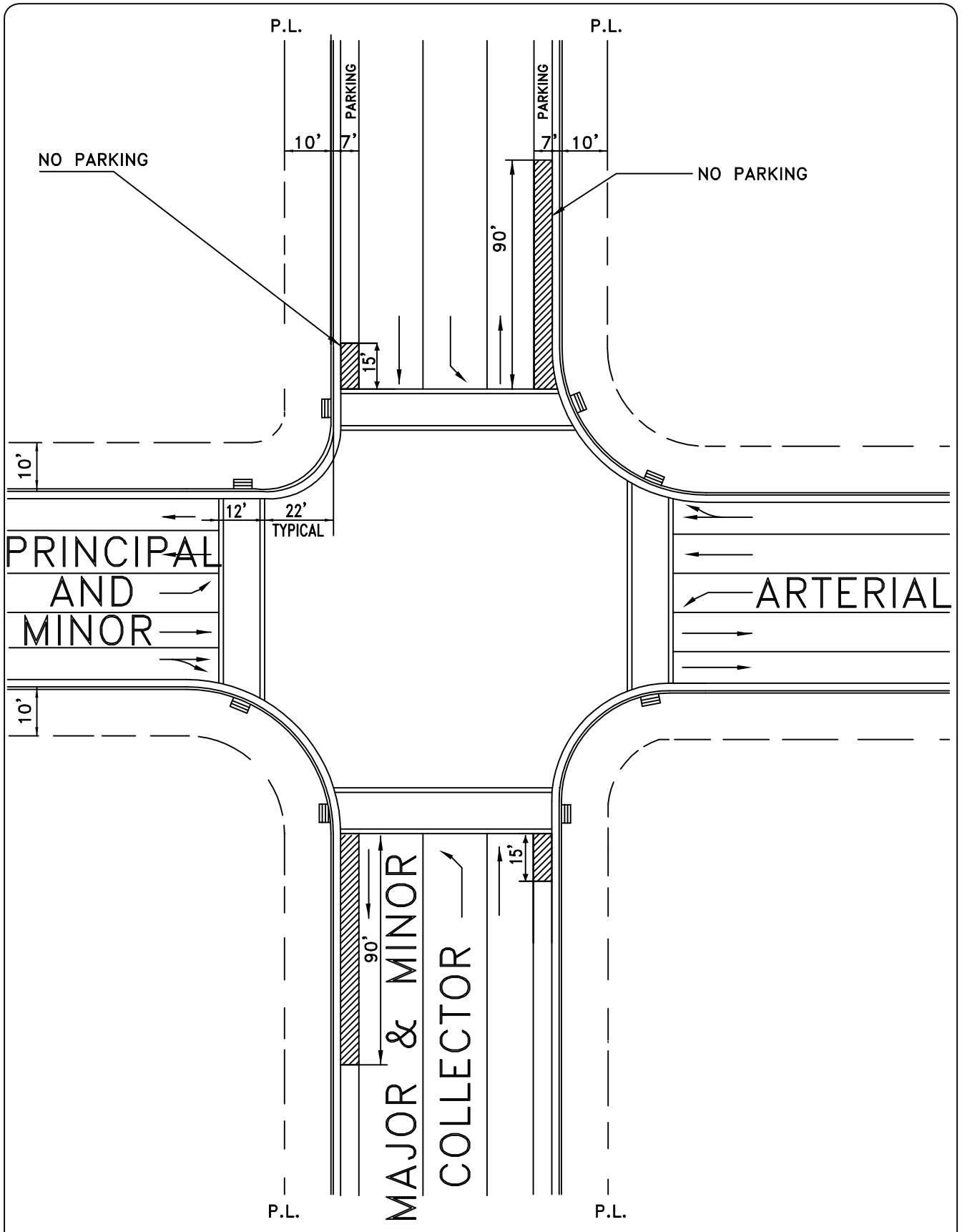
STREETS

INTERSECTION DETAILS

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO. 302



APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

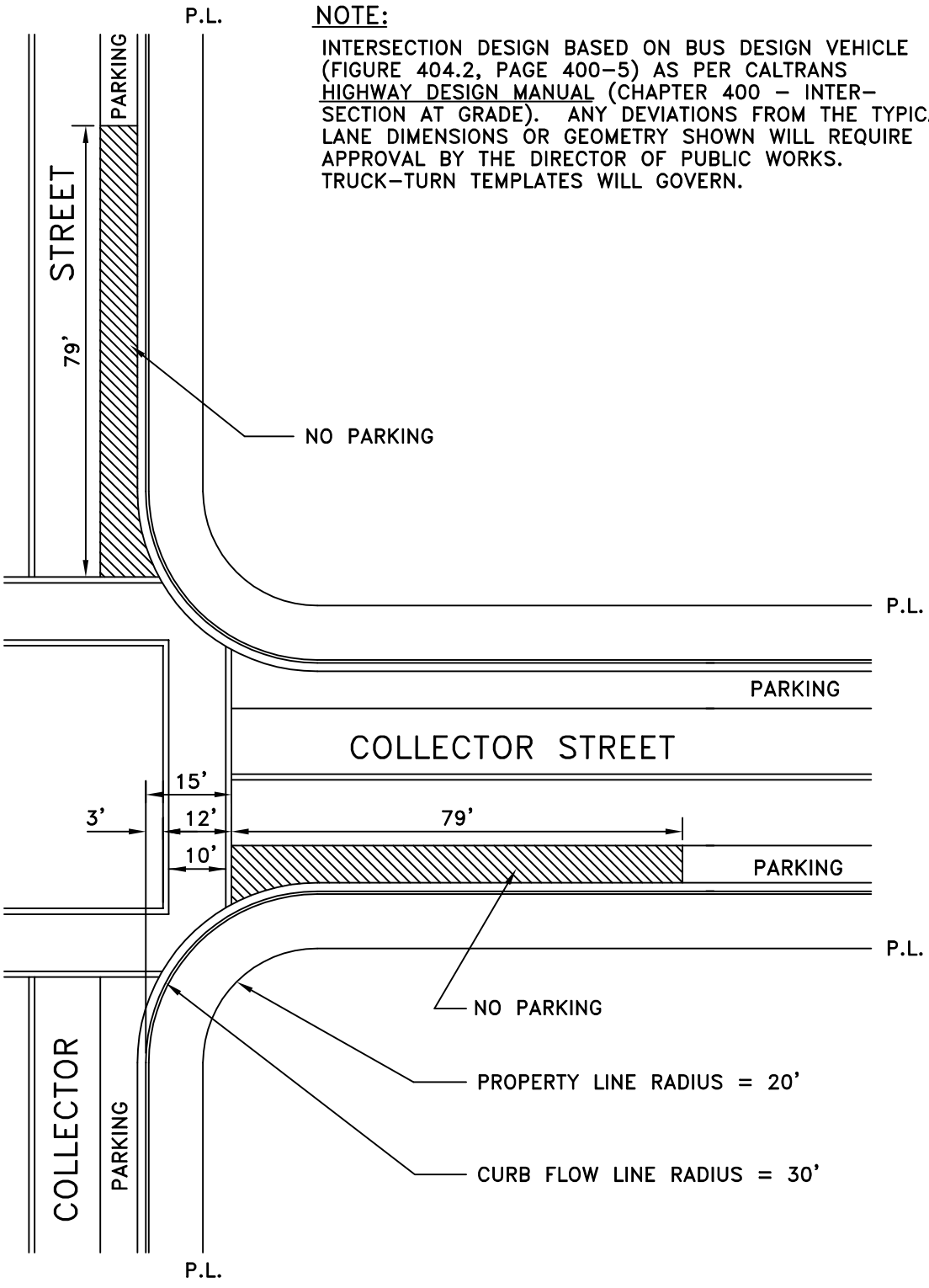
STREETS

NO-PARKING AREA COLLECTOR/ARTERIAL INTERSECTION

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO. 303



APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wu

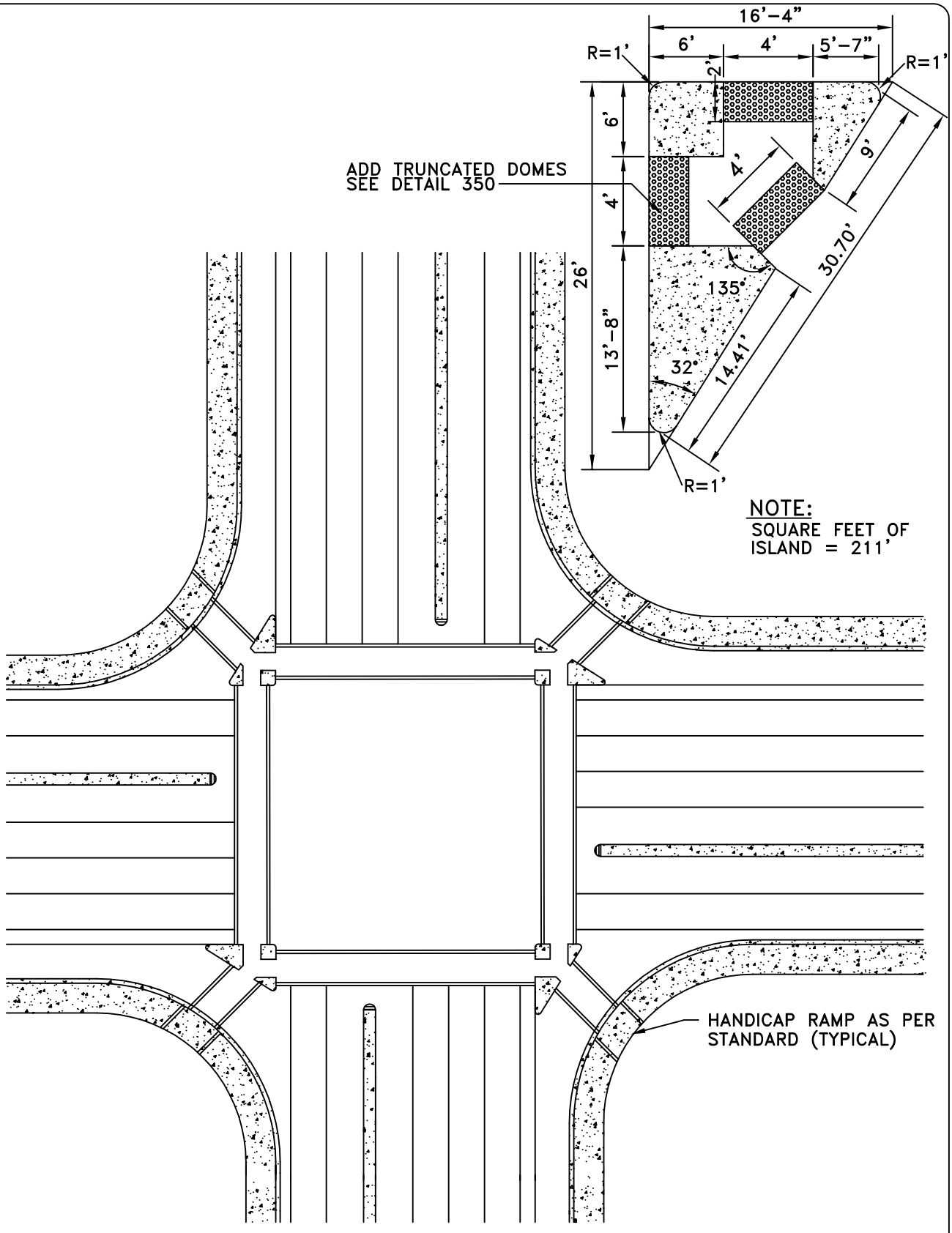
STREETS

NO PARKING AREA COLLECTOR/COLLECTOR STREET INTERSECTION

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO. 304



APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

STREETS

INTERSECTION PEDESTRIAN ISLAND DETAIL AT STREET INTERSECTION

CITY of MODESTO

PUBLIC WORKS
DEPARTMENT

DETAIL NO.
305

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

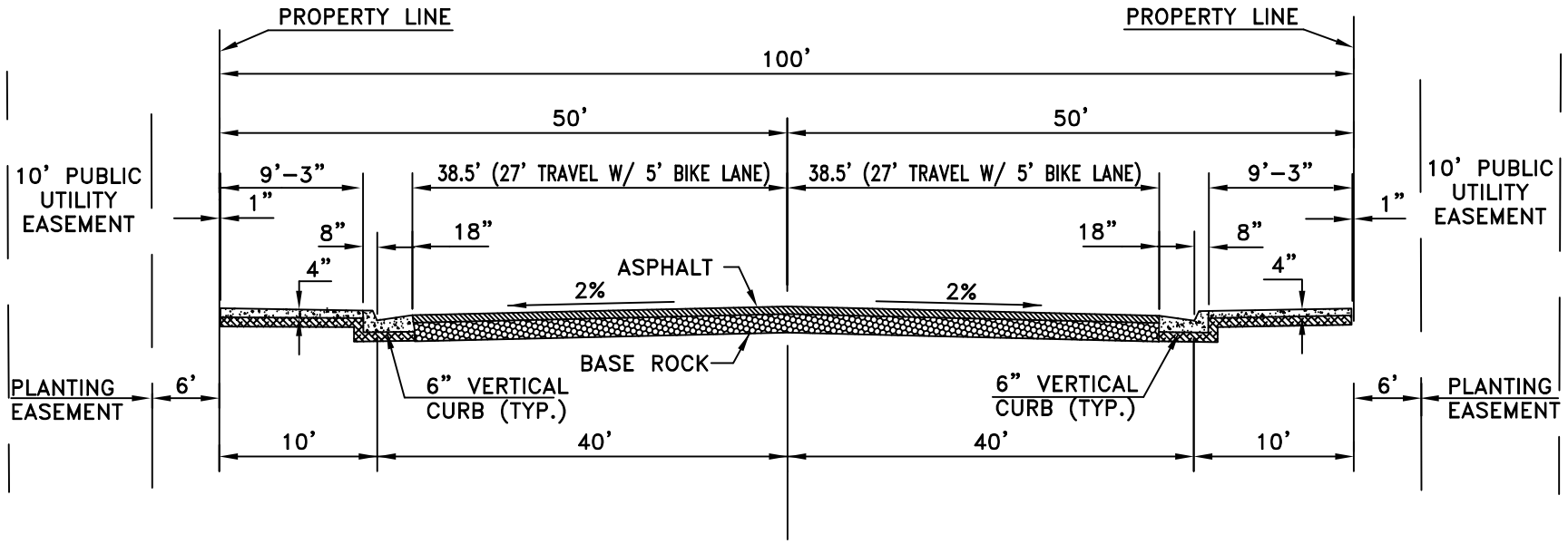
STREETS

MINOR ARTERIAL STREET SECTION

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO. 306



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 CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

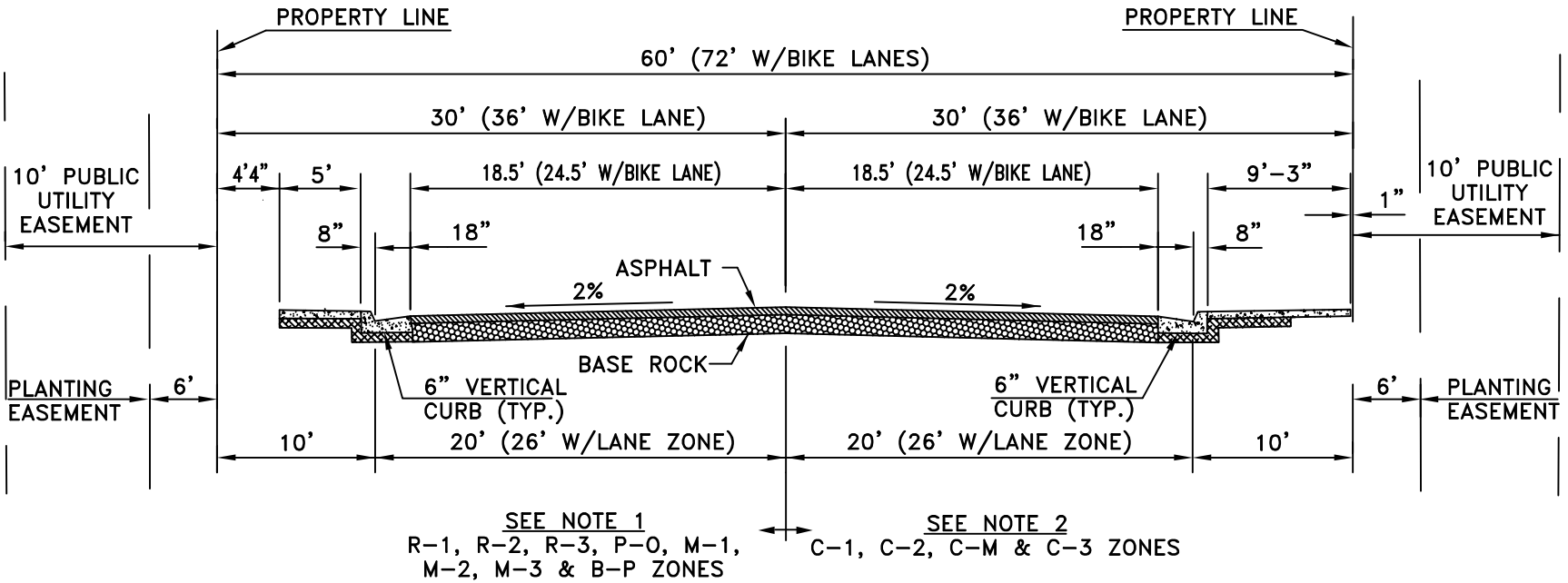
STREETS

MINOR COLLECTOR/ INDUSTRIAL STREET SECTION

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO. 307



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 CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

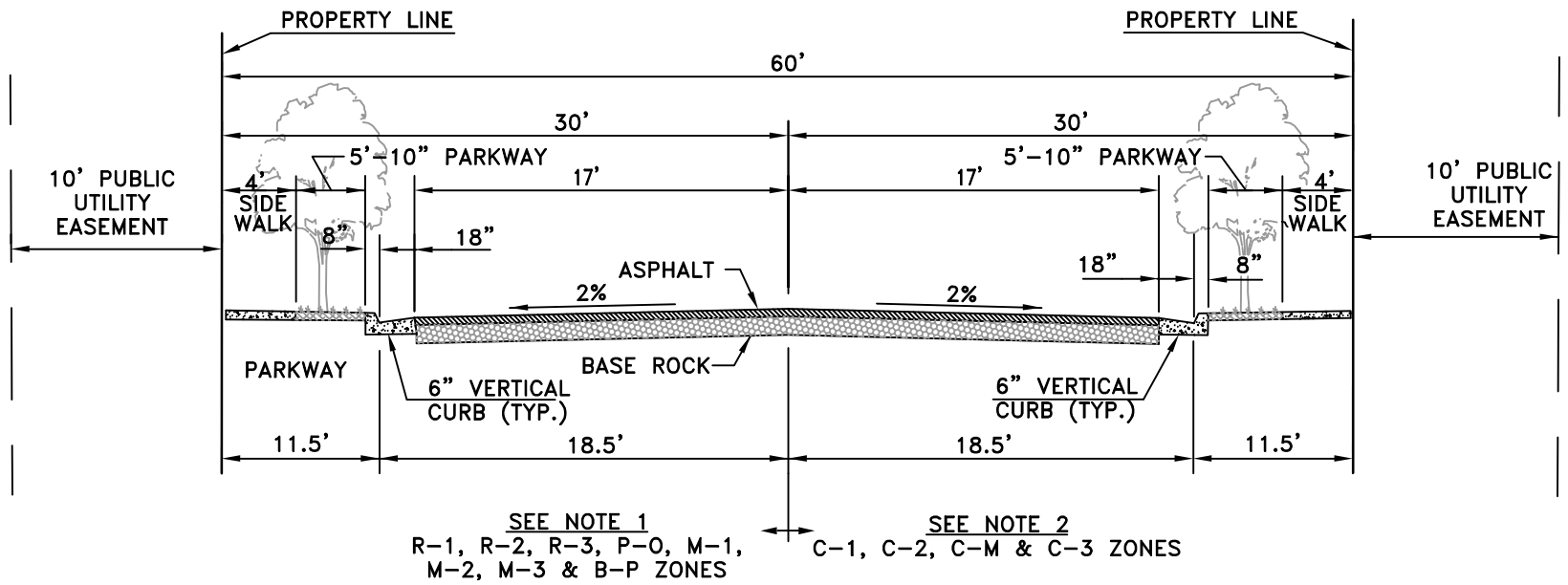
STREETS

ALTERNATE MINOR COLLECTOR
STREET SECTION

PUBLIC WORKS
DEPARTMENT

CITY of MODESTO

DETAIL NO.
307A

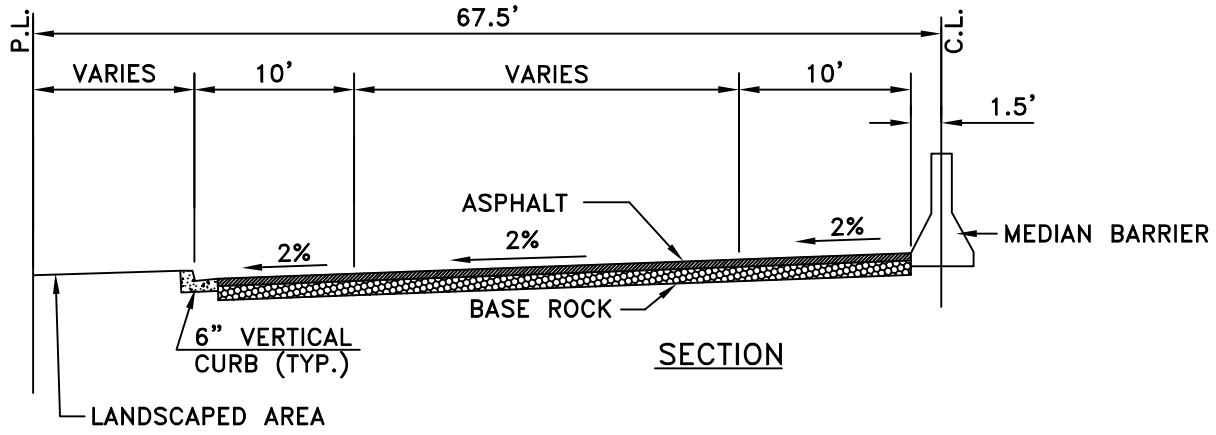


NOTE 1:

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:

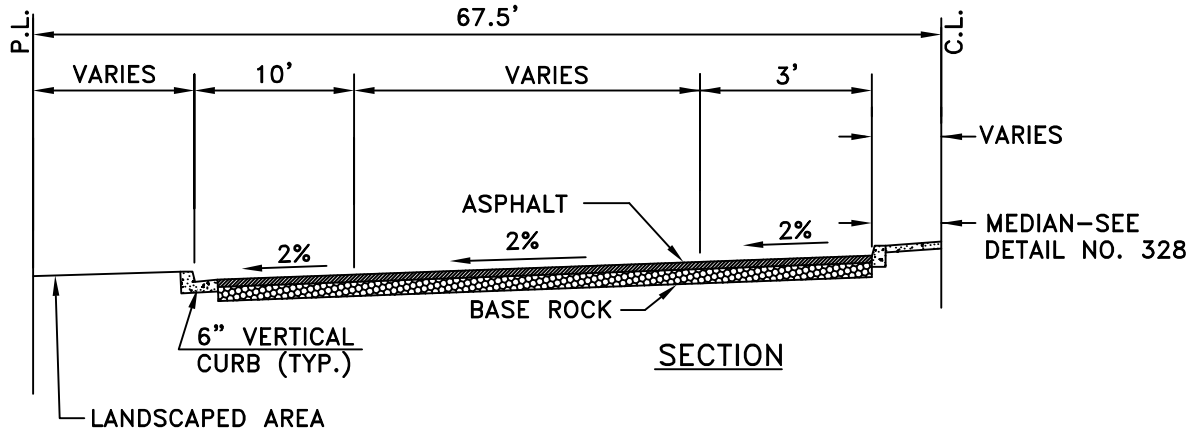
6" VERTICAL CURB AND SIDEWALK INSTALLED IN C-1, C-2, C-M AND C-3 ZONES TO BE EXTENDED TO WITHIN 1" OF THE PROPERTY LINE. (WIDTH MAY BE DETERMINED BY USE OR BY EXISTING CONDITIONS. IF SPECIFICALLY APPROVED IN WRITING BY THE CITY ENGINEER.) SEE STANDARD DETAIL #337 FOR STREET TREE BLOCK OUT ON FULL WIDTH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



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 CITY COUNCIL
RESOLUTION NO. 2006–284

APPROVED BY THE CITY ENGINEER:

Richard D. Madden

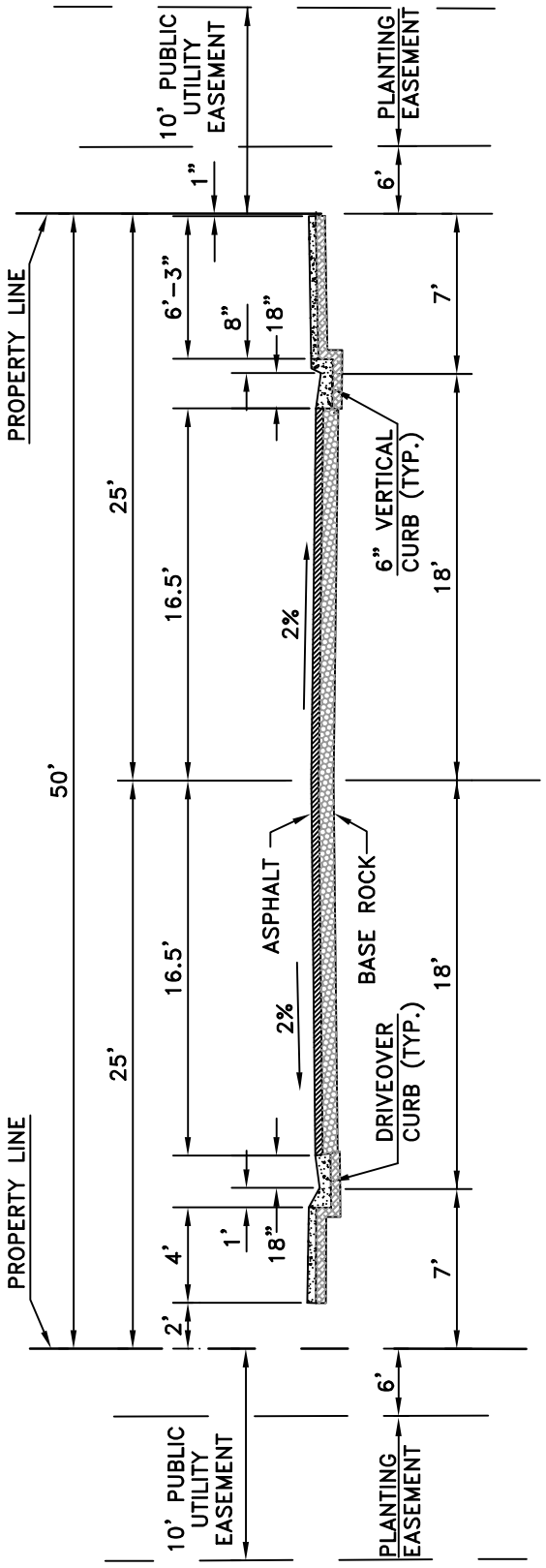
STREETS

EXPRESSWAY STREET SECTION

CITY of MODESTO

PUBLIC WORKS DEPARTMENT

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 CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

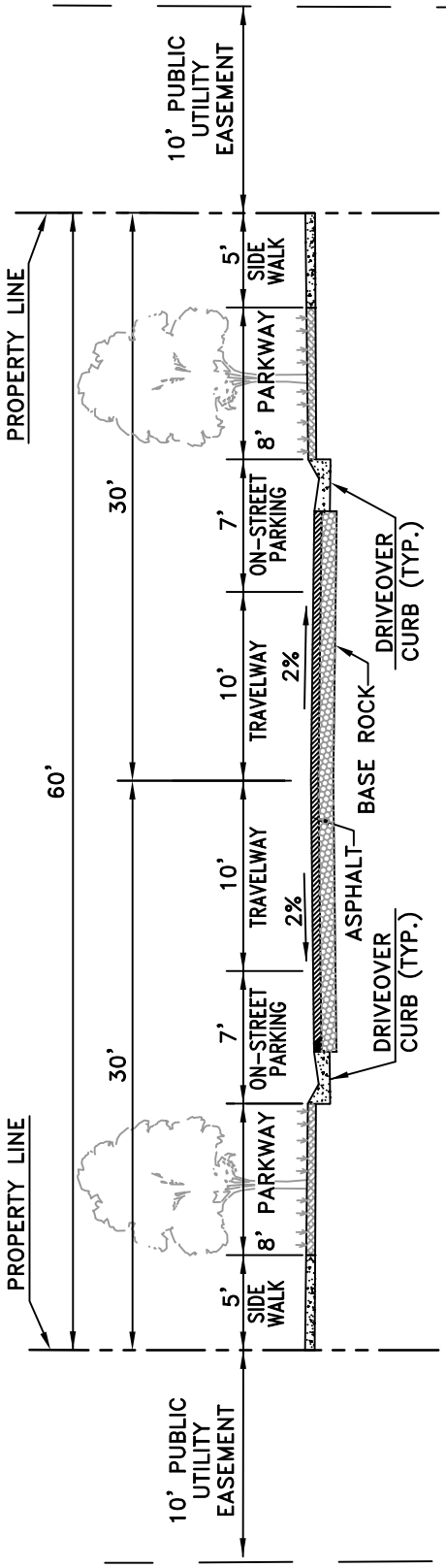
STREETS

LOCAL STREET SECTION

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

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 CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

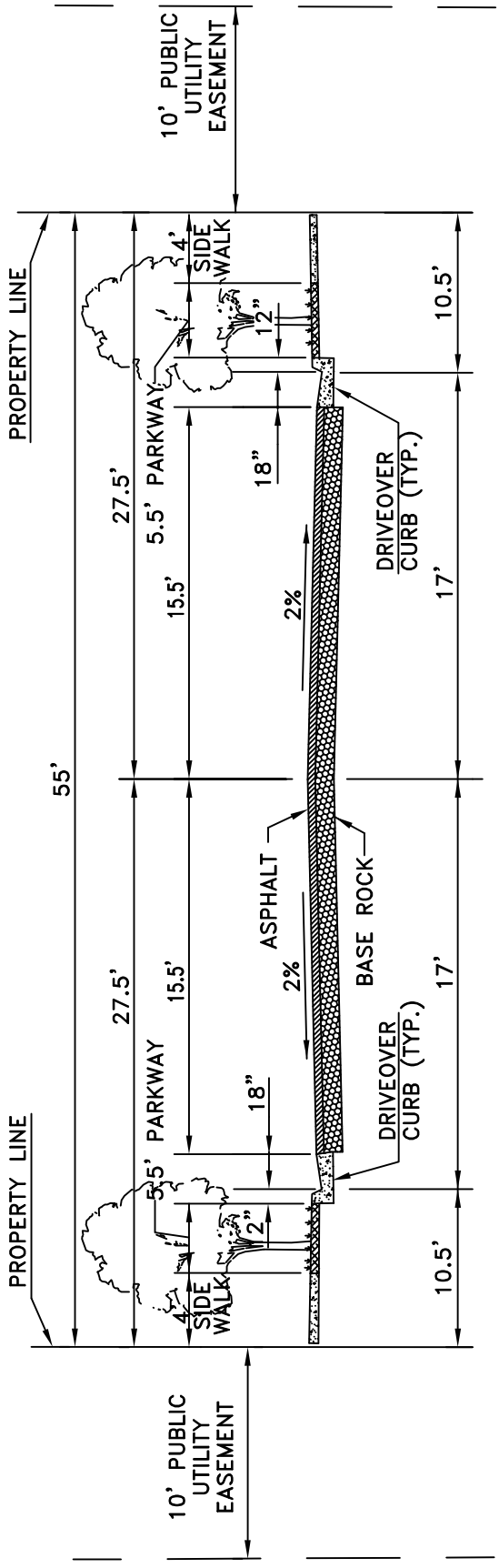
STREETS

ALTERNATE LOCAL STREET SECTION

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

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 CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wu

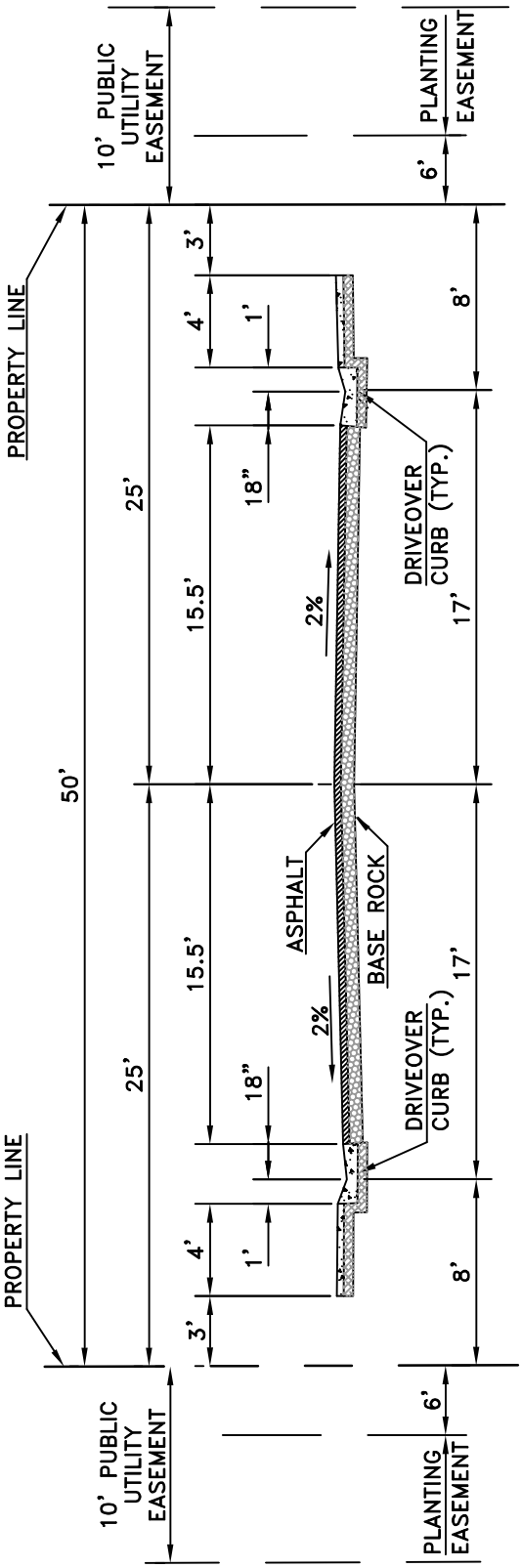
STREETS

ALTERNATE LOCAL STREET SECTION

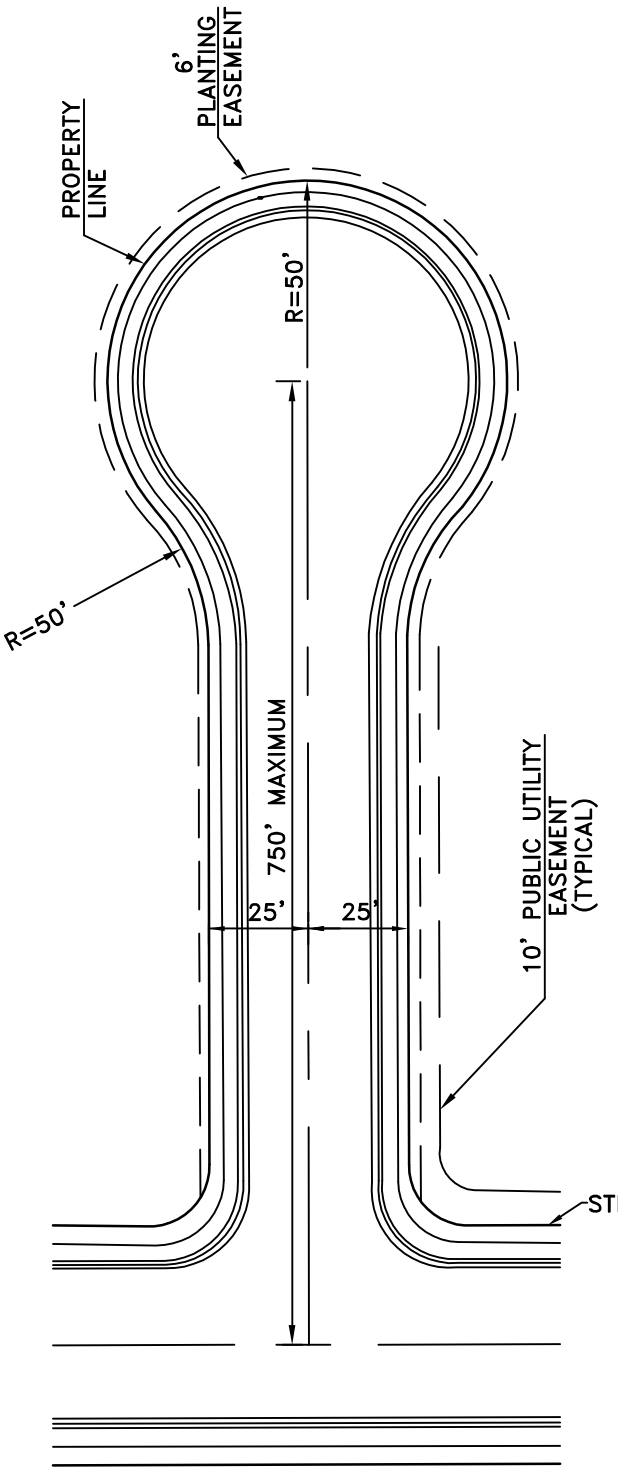
PUBLIC WORKS DEPARTMENT

CITY of MODESTO

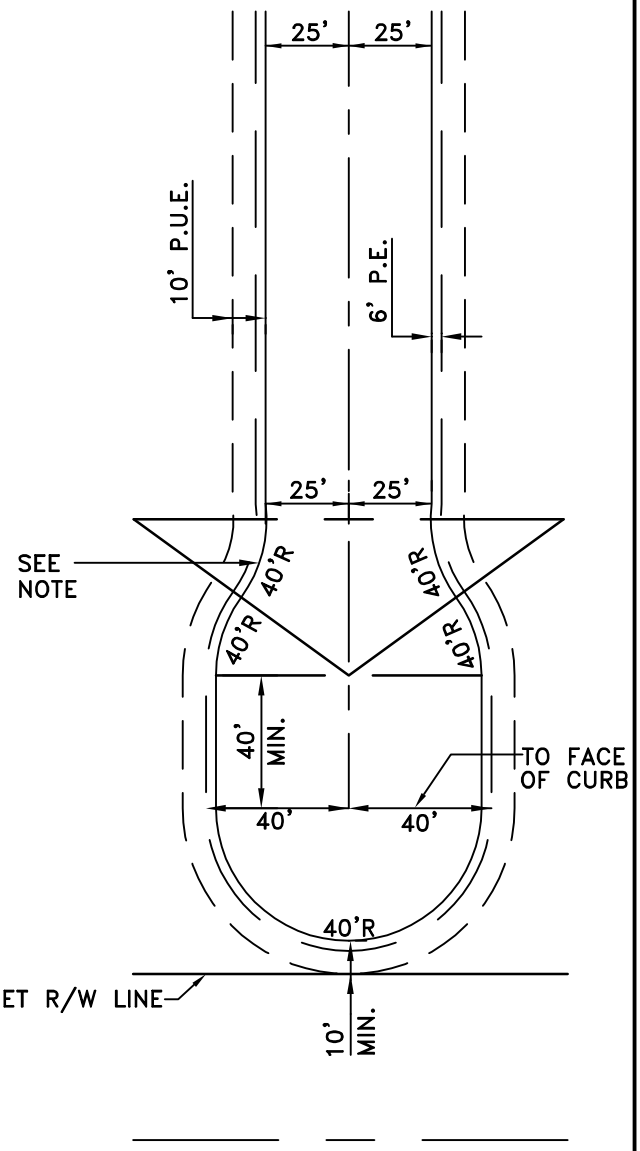
DETAIL NO. 309B



APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	CUL-DE-SAC STREET SECTION	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 310



TYPE 1



TYPE 2

NOTE:

RADII OTHER THAN 40 FEET SHALL BE AS APPROVED BY THE CITY ENGINEER.

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

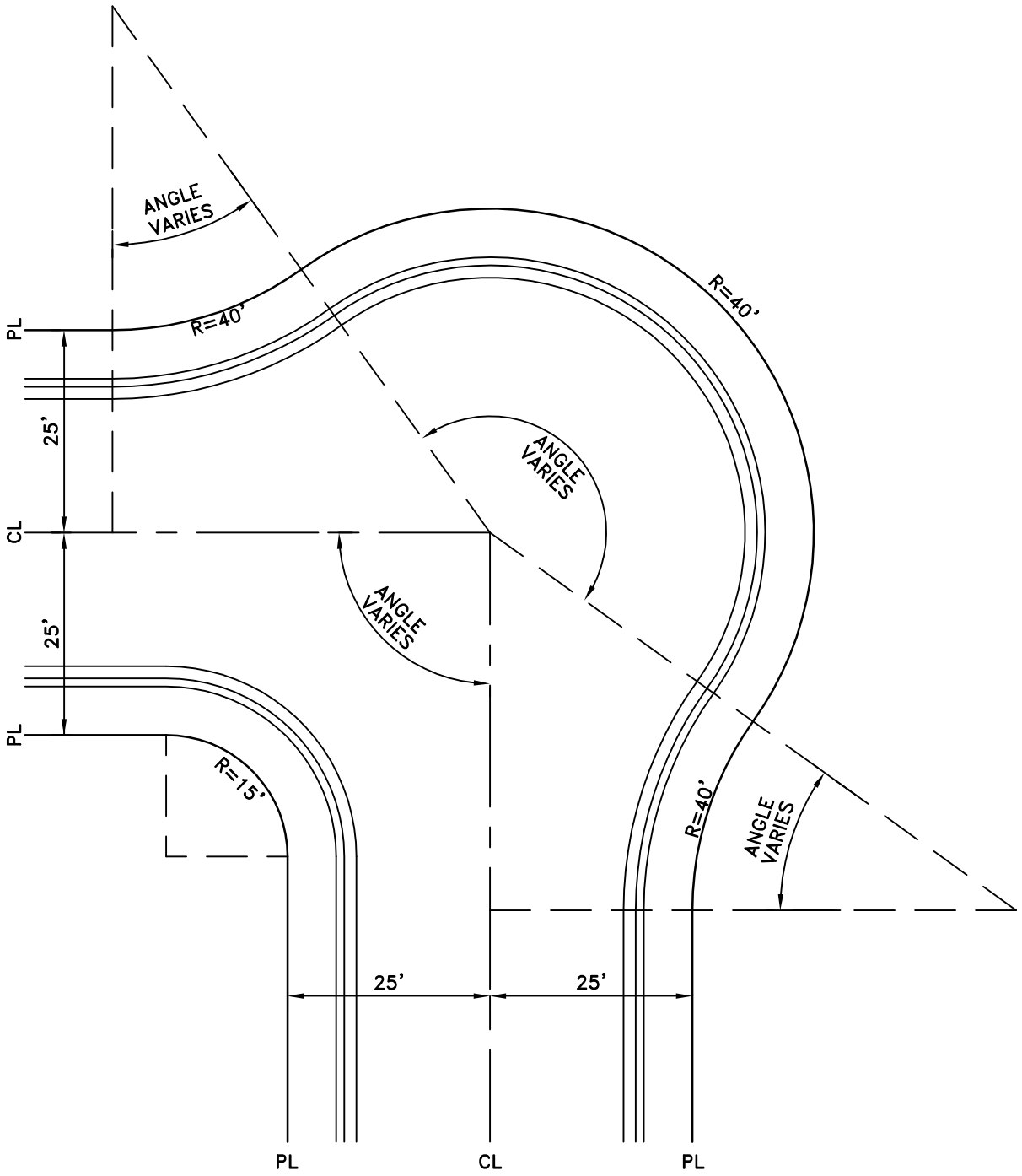
STREETS

CUL-DE-SAC STREET SECTION

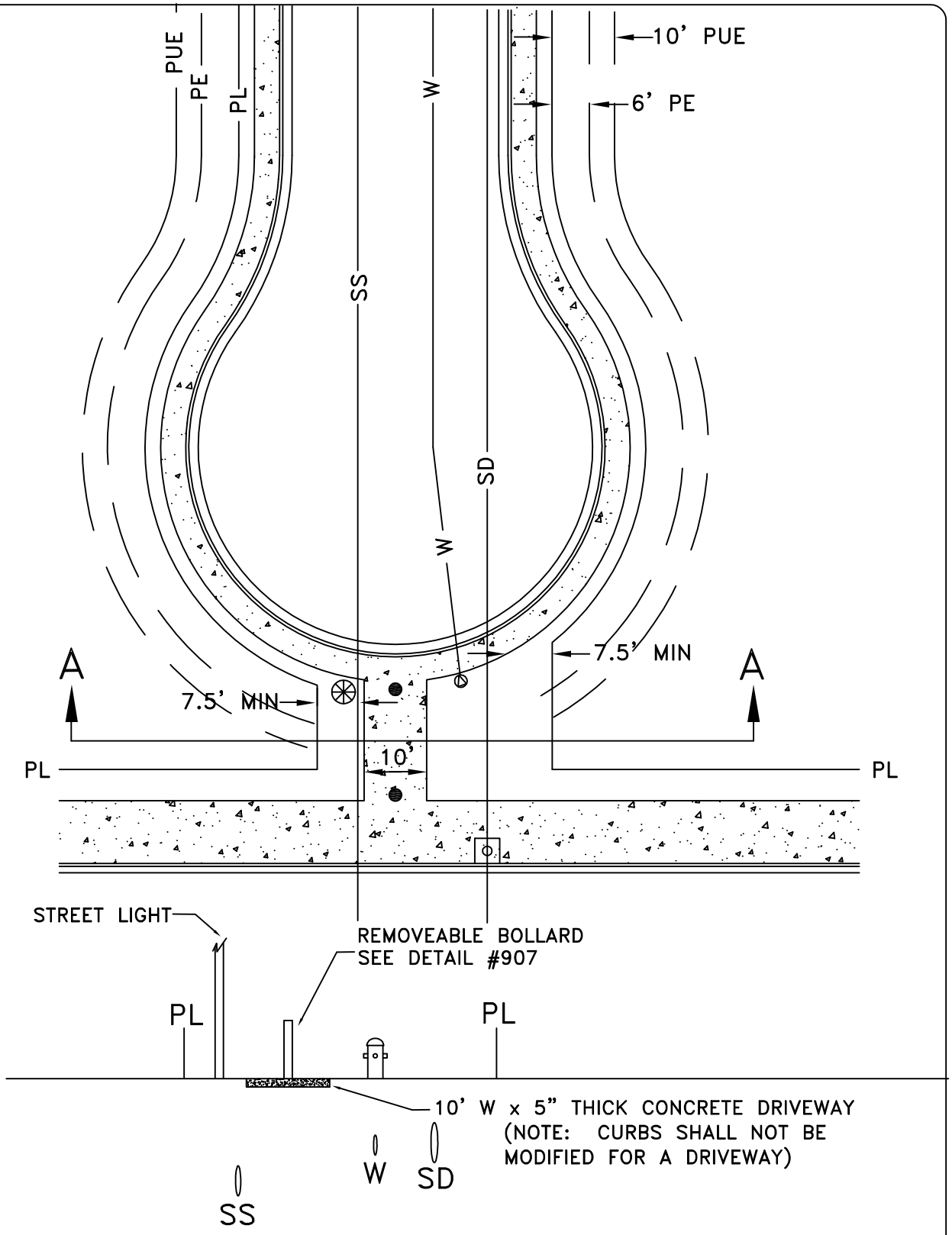
PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO. 311



APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	STREET INTERSECTION KNUCKLE	
	PUBLIC WORKS **DEPARTMENT**	DETAIL NO. **312**



SECTION A–A

TYPICAL UTILITY SECTION

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006–284

APPROVED BY THE CITY ENGINEER:

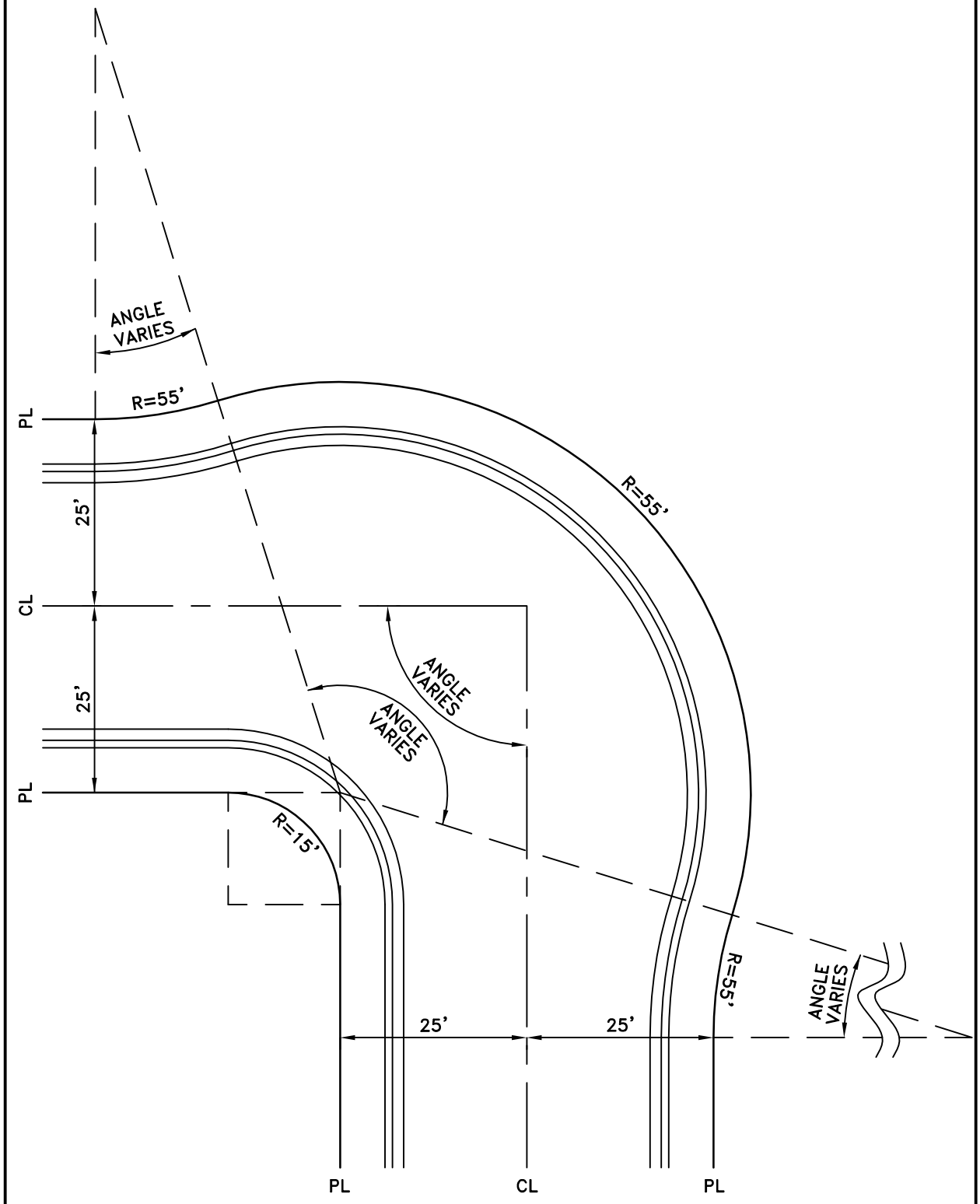
STREETS

WALK–THRU CUL–DE–SAC SECTION

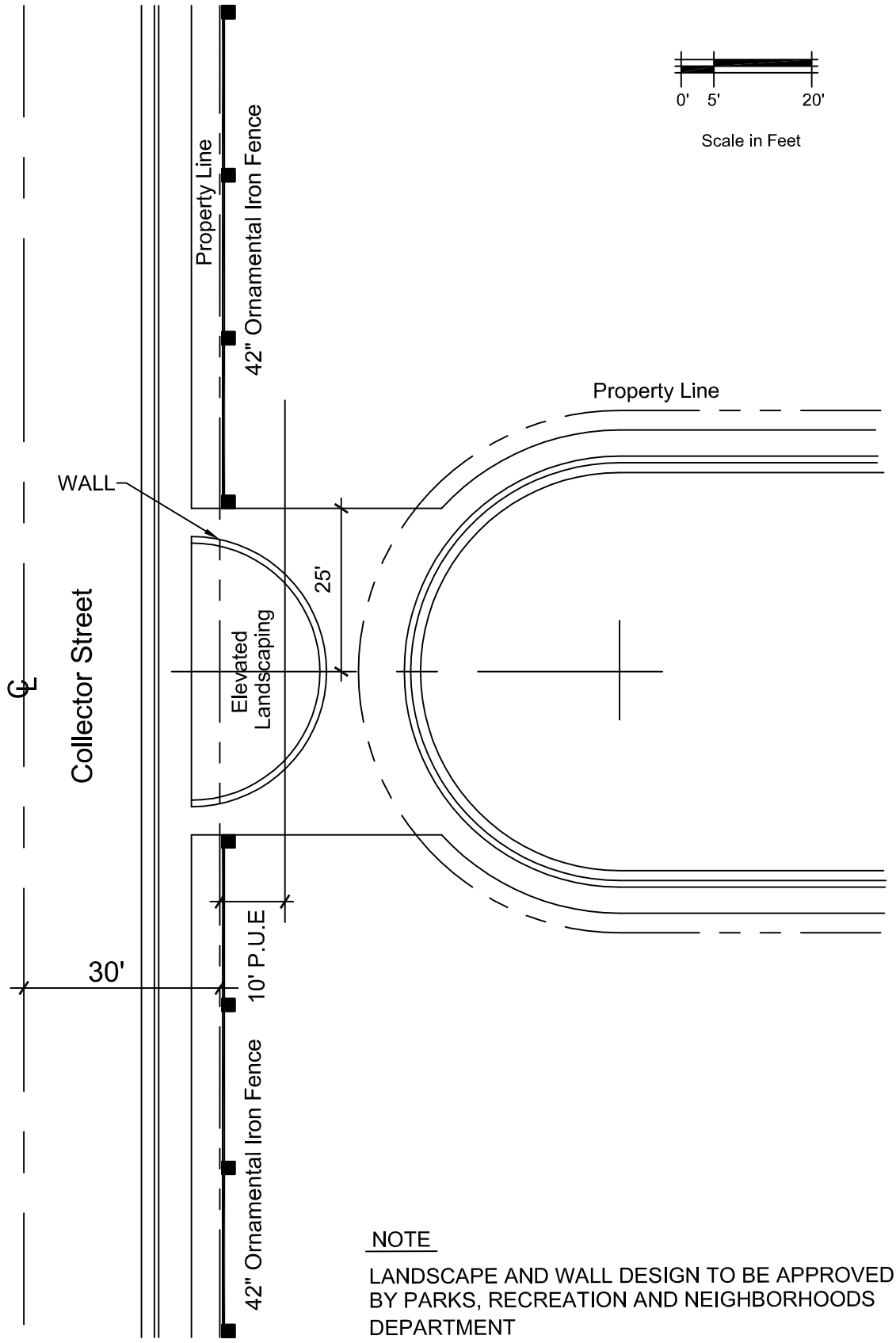
CITY of MODESTO

PUBLIC WORKS DEPARTMENT

DETAIL NO. 313



APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	ALTERNATE STREET INTERSECTION KNUCKLE	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 314



NOTE

LANDSCAPE AND WALL DESIGN TO BE APPROVED BY PARKS, RECREATION AND NEIGHBORHOODS DEPARTMENT

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

STREETS

OPEN-ENDED CULDESAC

CITY of MODESTO

PUBLIC WORKS DEPARTMENT

DETAIL NO. 315

LEFT BLANK INTENTIONALLY

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:		
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 316

Streetscape Amenities:

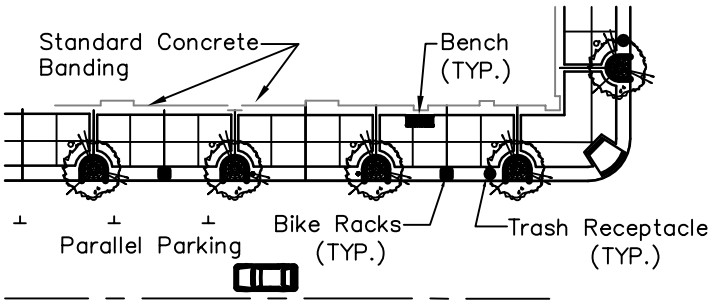
1. Pedestrian "bulb–outs" on sidewalks should be used at key intersections and at mid–block crosswalks when appropriate to encourage pedestrian connections.
2. Discourage the use of bollards. Round landscaped planters may be used in lieu of bollards especially at "bulb–outs" or other special use areas 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 appoved by the City Engineer, including minimum curb return radii.

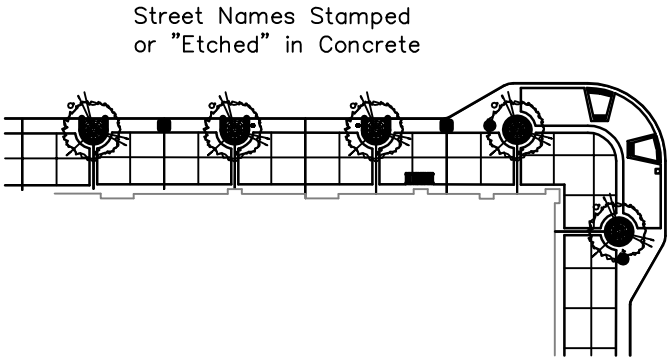
Signage:

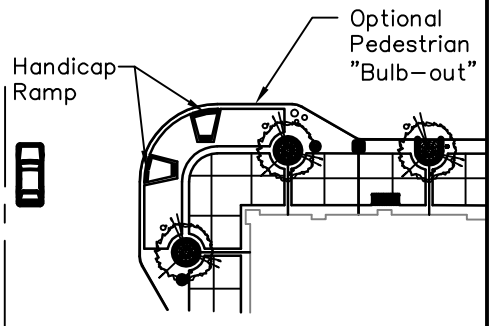
1. Guidelines should be created and implemented for storefront awnings and signage. Awnings should be encouraged if kept consistent with the streetscape character. Storefront signage should be provided at the pedestrian level (i.e. signs hanging perpendicular to sidewalks). Allow for variety, but unsightly 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.







APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006–284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

STREETS

DOWNTOWN STREETSCAPE

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

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.

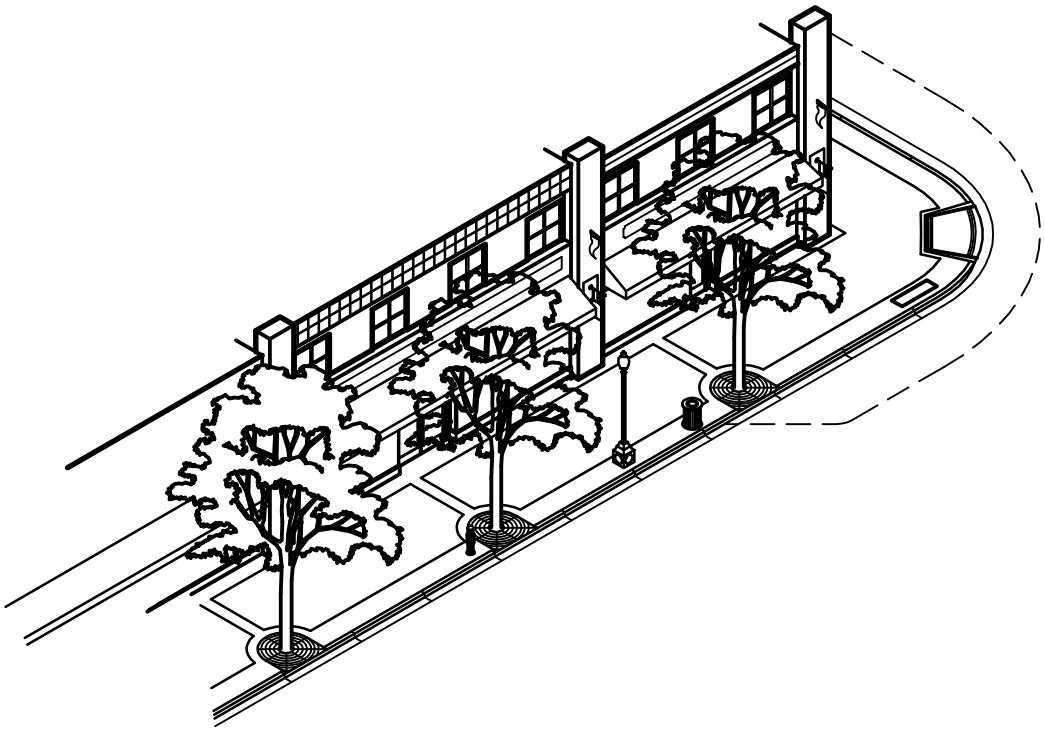
Benches:

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.

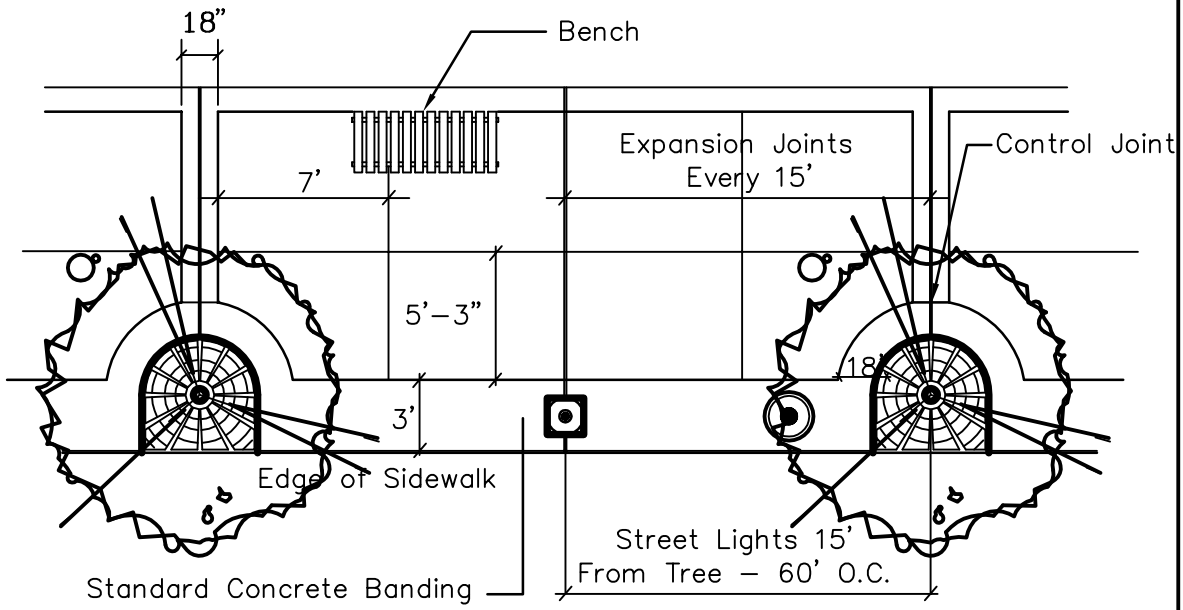


APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	DOWNTOWN STREETSCAPE	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 318

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) shall be used against the curb and a full circle tree grate (Neenah R–8838) 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.



APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	DOWNTOWN STREETSCAPE	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 319

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APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	PUBLIC WORKS DEPARTMENT	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

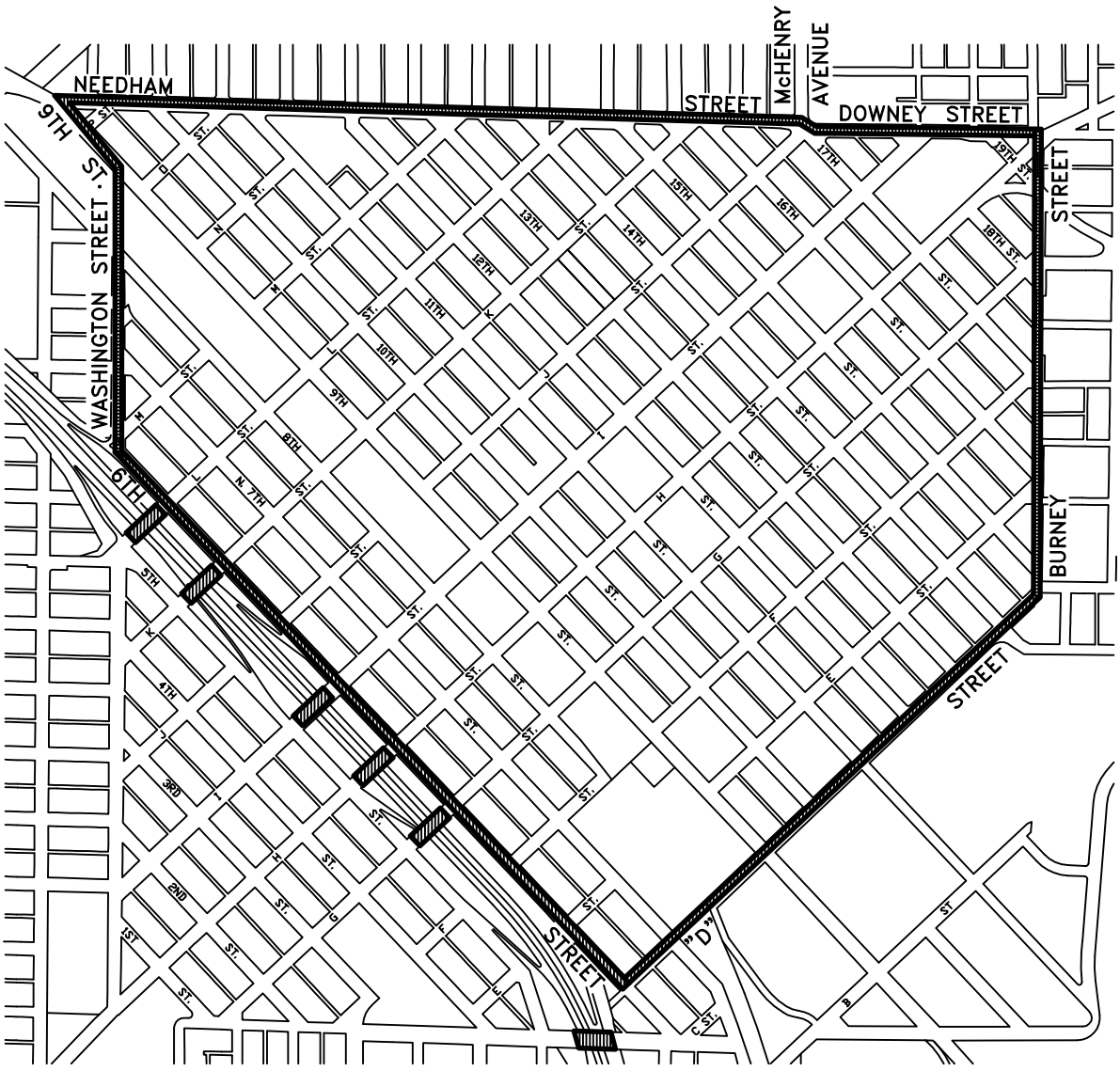
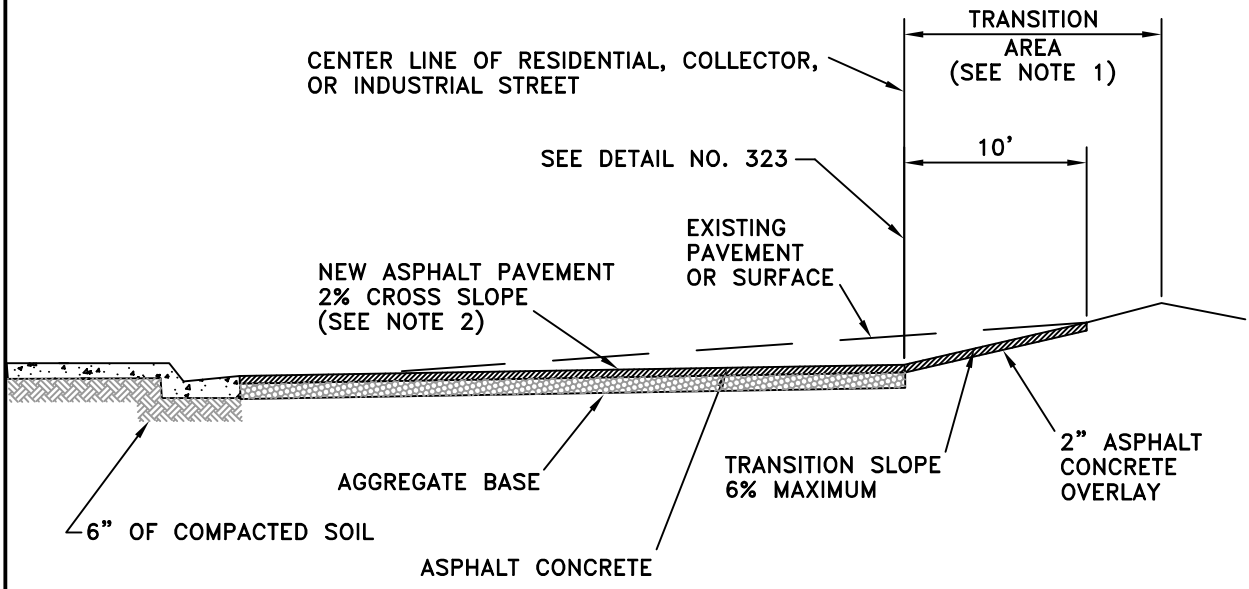


FIGURE 1

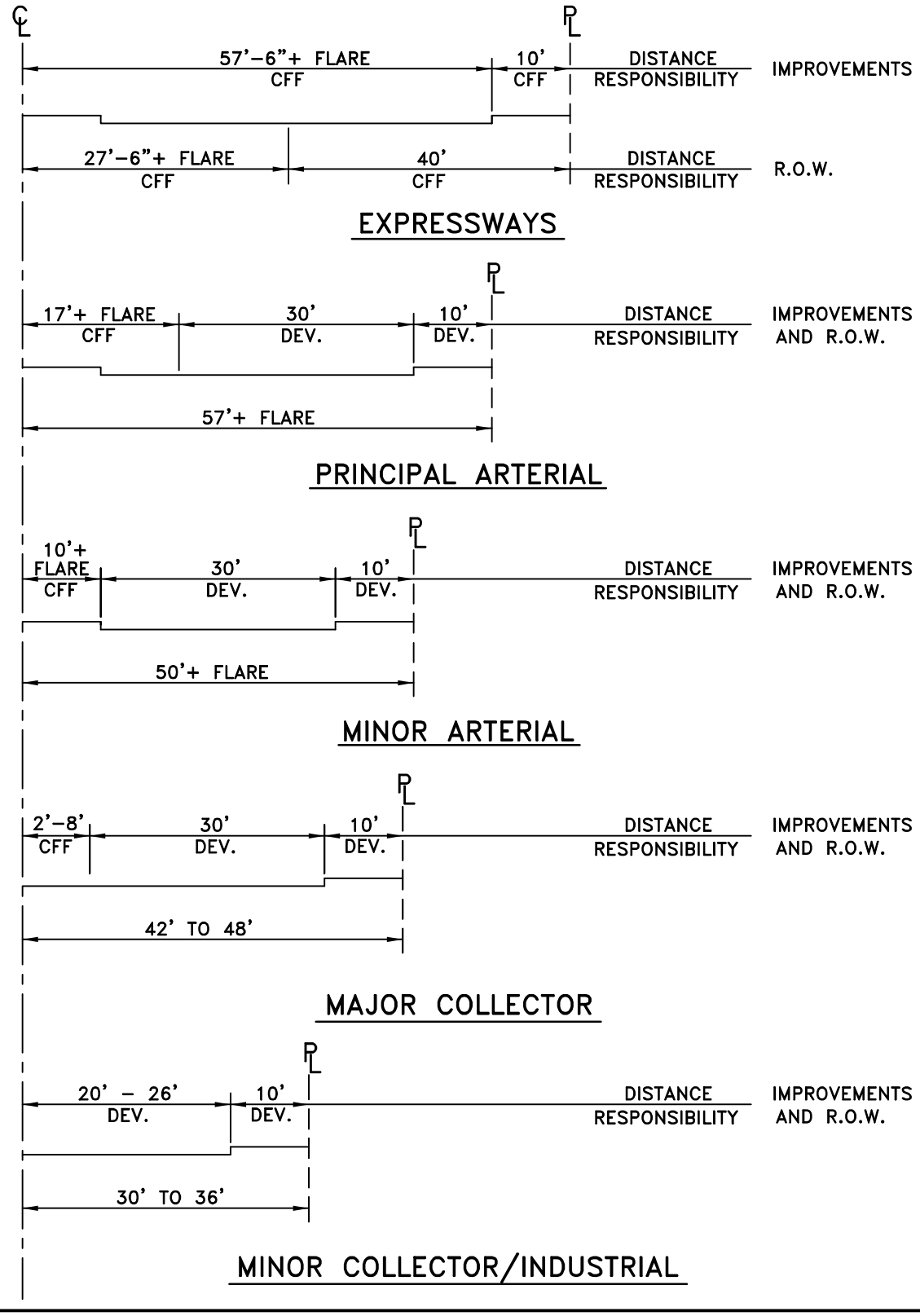
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	DOWNTOWN EXPOSED AGGREGATE SIDEWALK	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 321



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.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	STANDARD PAVEMENT ON EXISTING STREET SECTION	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 322



APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006–284

APPROVED BY THE CITY ENGINEER:

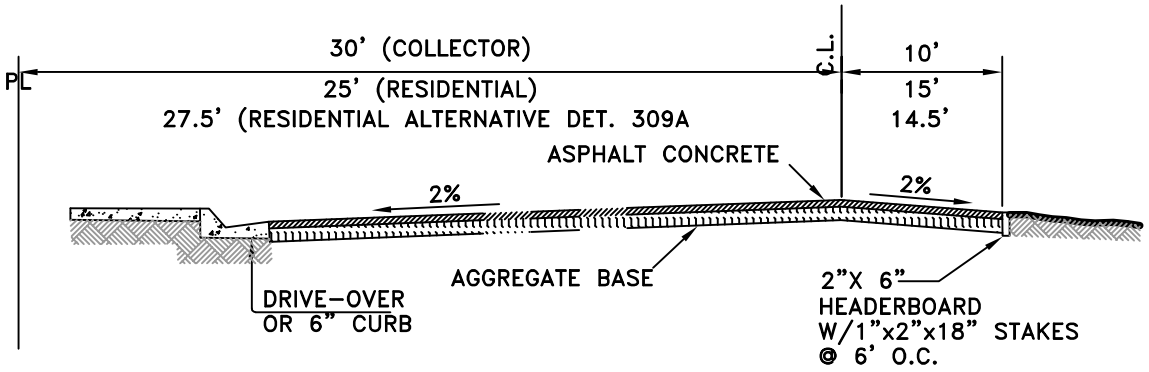
STREETS

STREET EXACTIONS POLICY

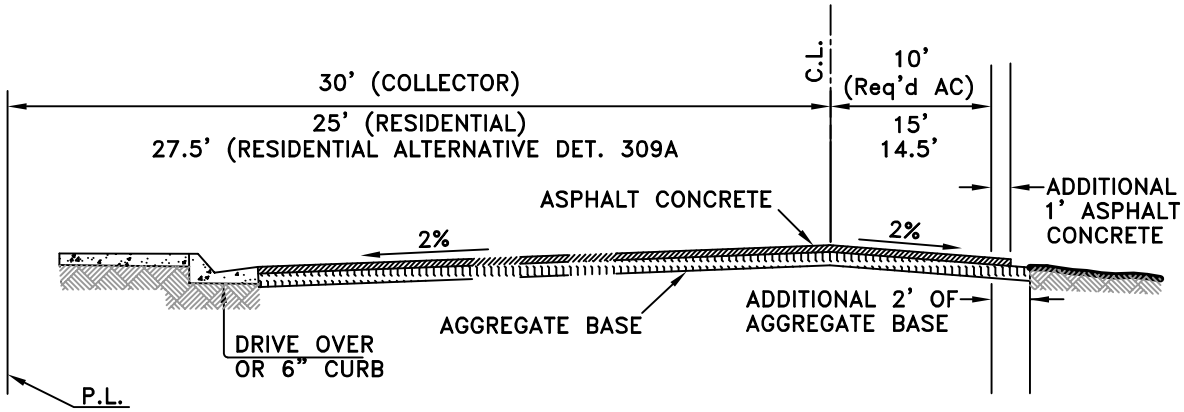
CITY of MODESTO

PUBLIC WORKS
DEPARTMENT

DETAIL NO.
323



SECTION

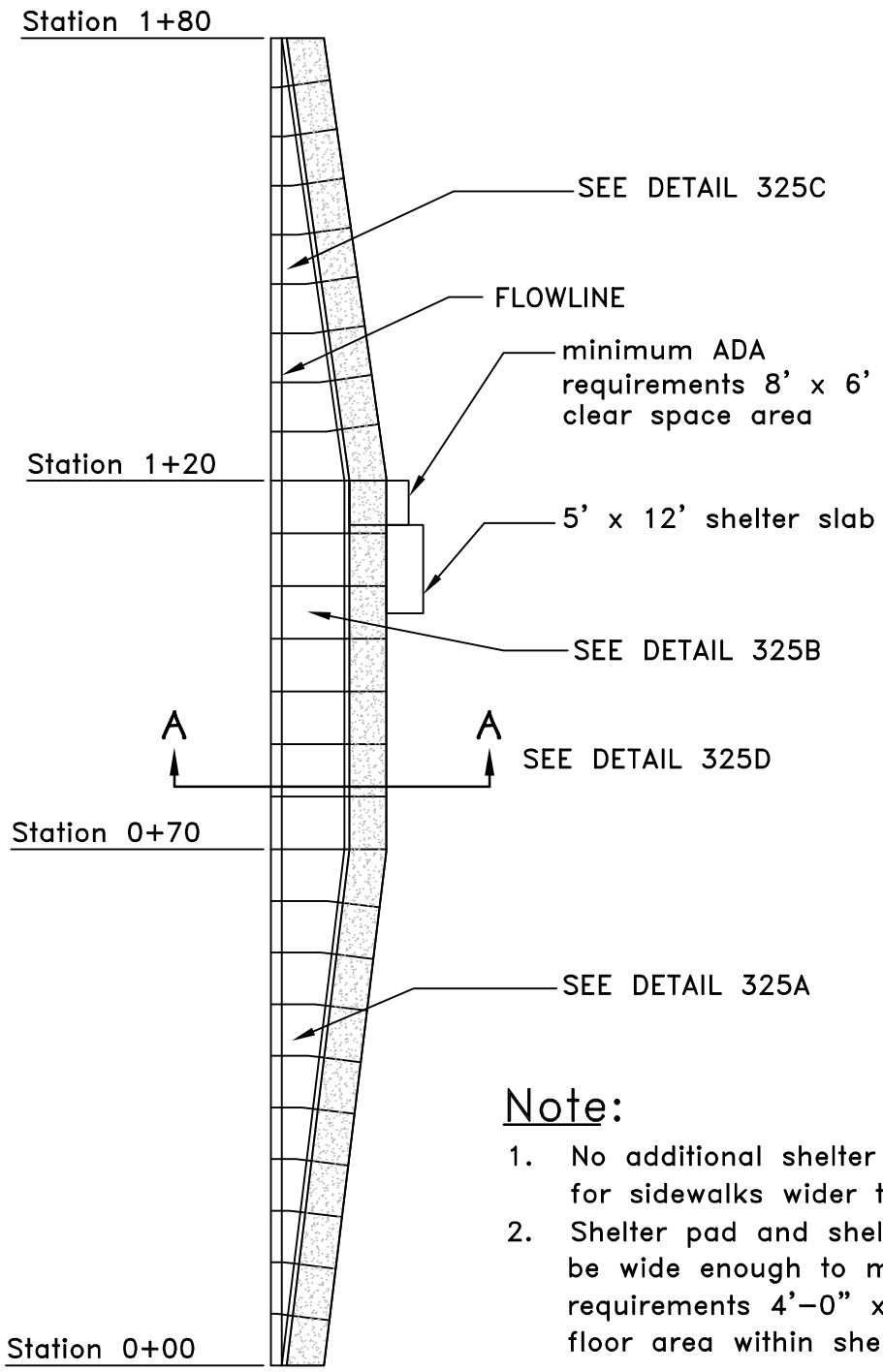


ALTERNATIVE SECTION

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.

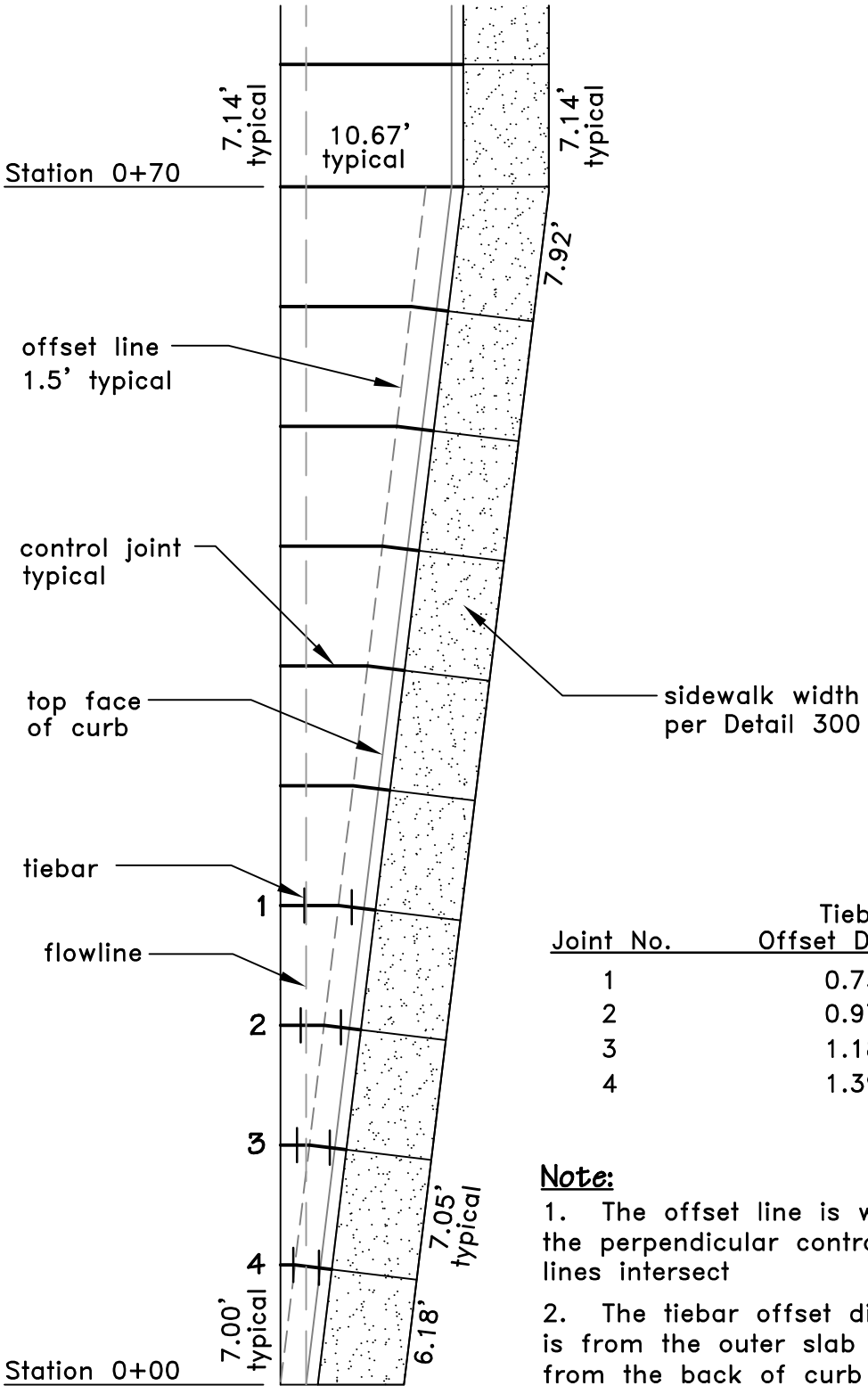
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Ulm	PART-WIDTH STREET SECTION	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 324



Note:

1. No additional shelter pad needed for sidewalks wider than 10'
2. Shelter pad and shelters must be wide enough to meet ADA requirements 4'–0" x 3'–0" clear floor area within shelter perimeter

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	BUS TURNOUT	
	PUBLIC WORKS DEPARTMENT	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

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

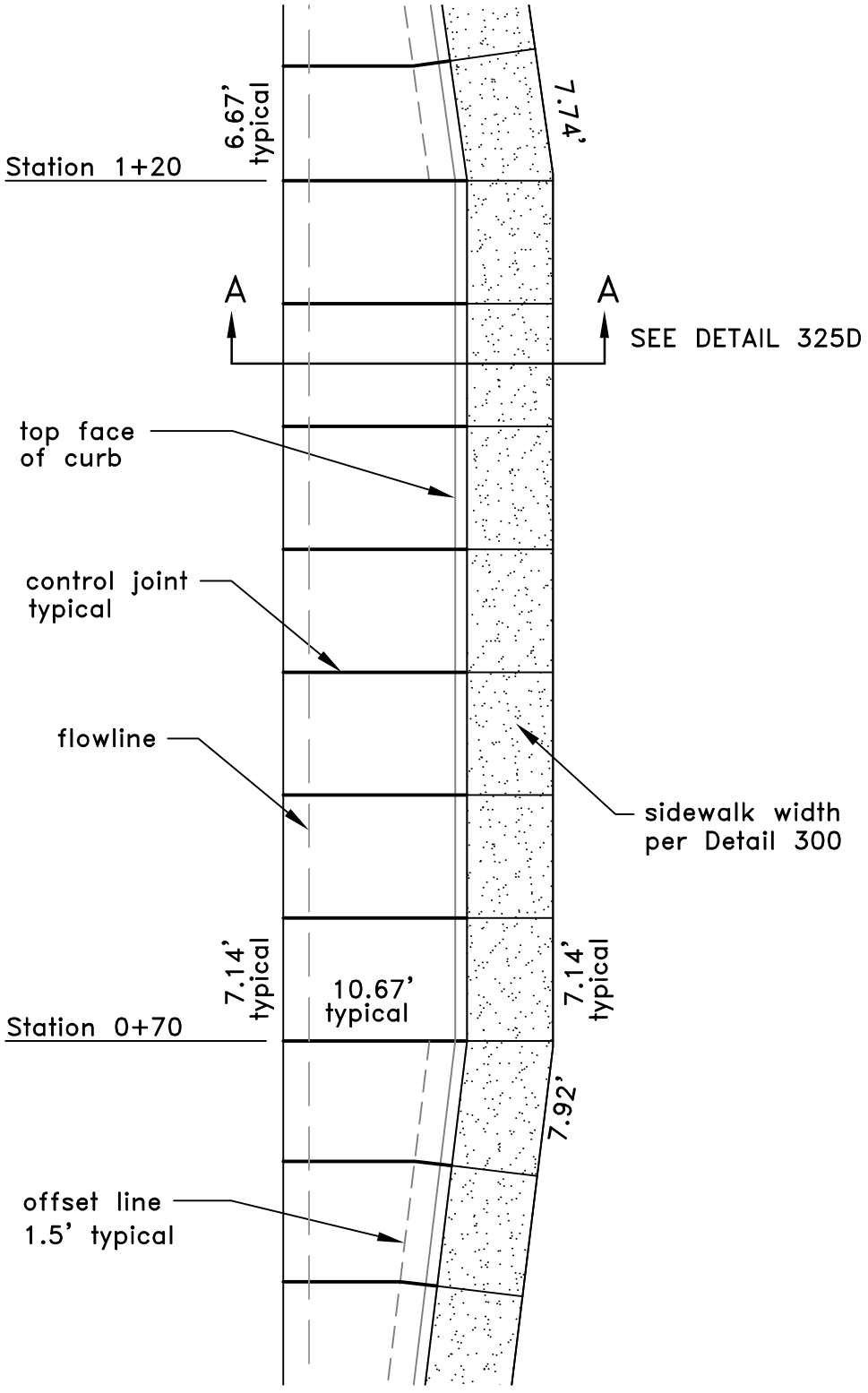
STREETS

BUS TURNOUT

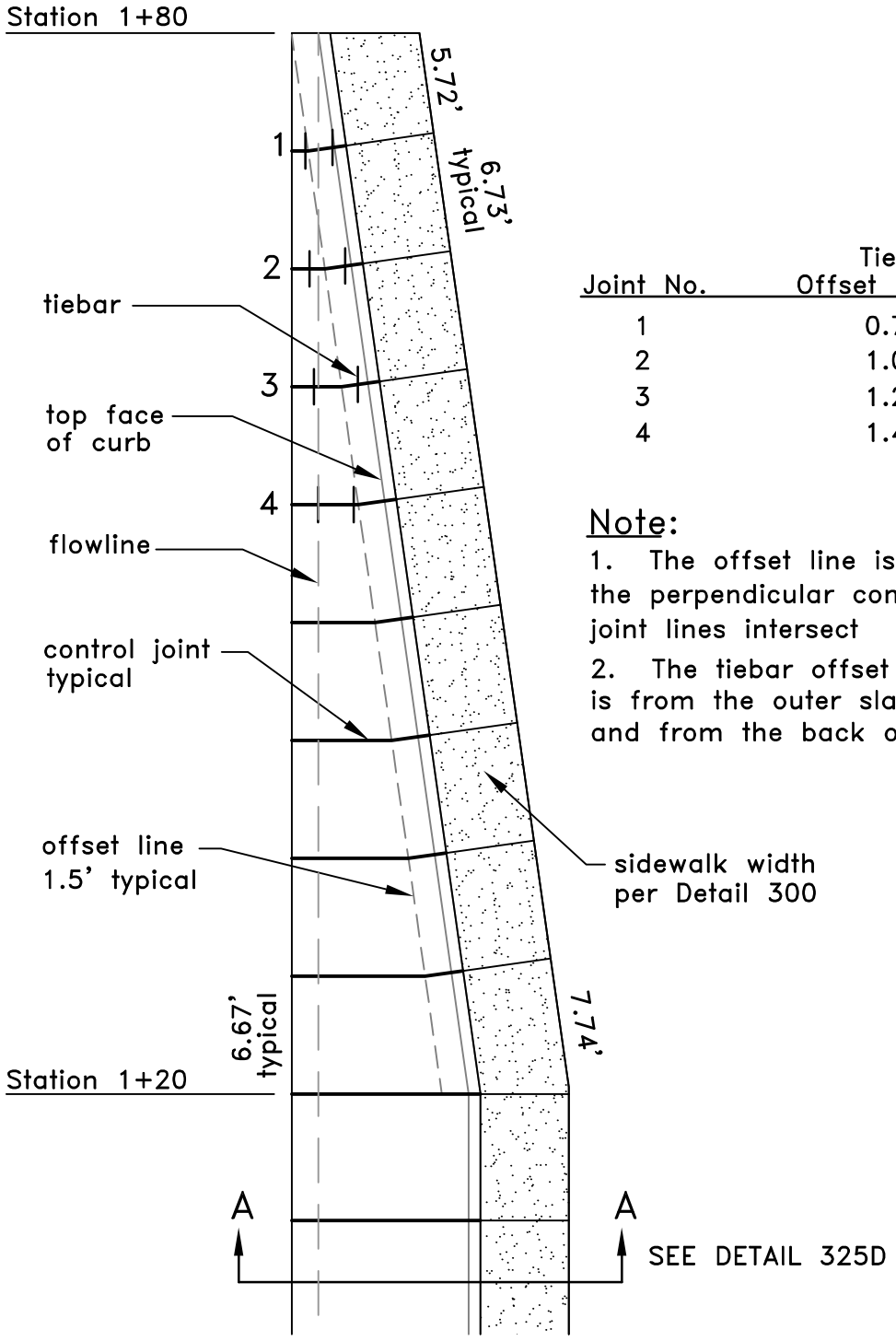
CITY of MODESTO

PUBLIC WORKS DEPARTMENT

DETAIL NO. 325A



APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	BUS TURNOUT	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 325B



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

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

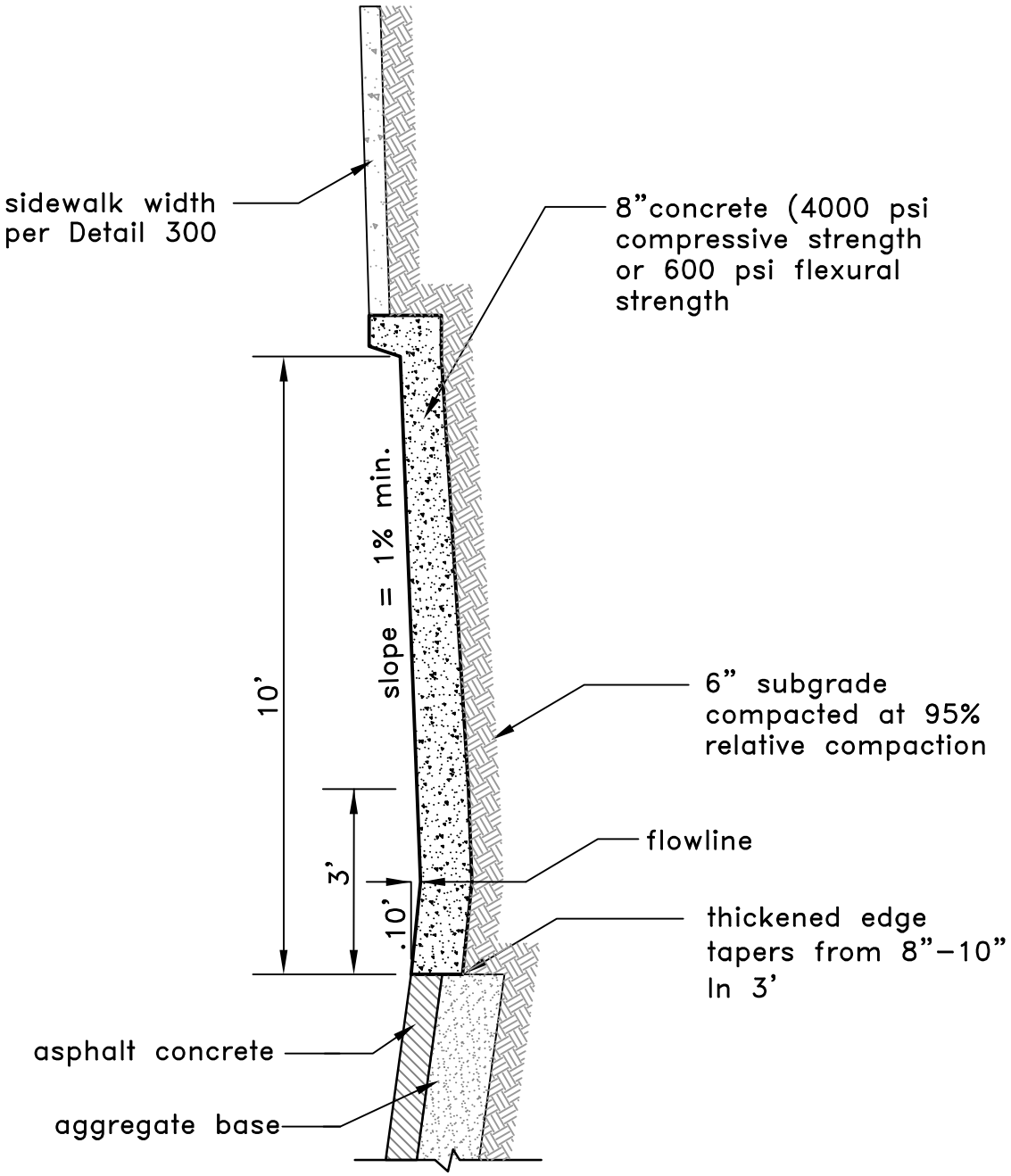
STREETS

BUS TURNOUT

CITY of MODESTO

PUBLIC WORKS DEPARTMENT

DETAIL NO. 325C



SECTION A–A

TYPICAL BUS TURNOUT

NOT TO SCALE

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	STREETS	
APPROVED BY THE CITY ENGINEER:	BUS TURNOUT	CITY of MODESTO
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 325D

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

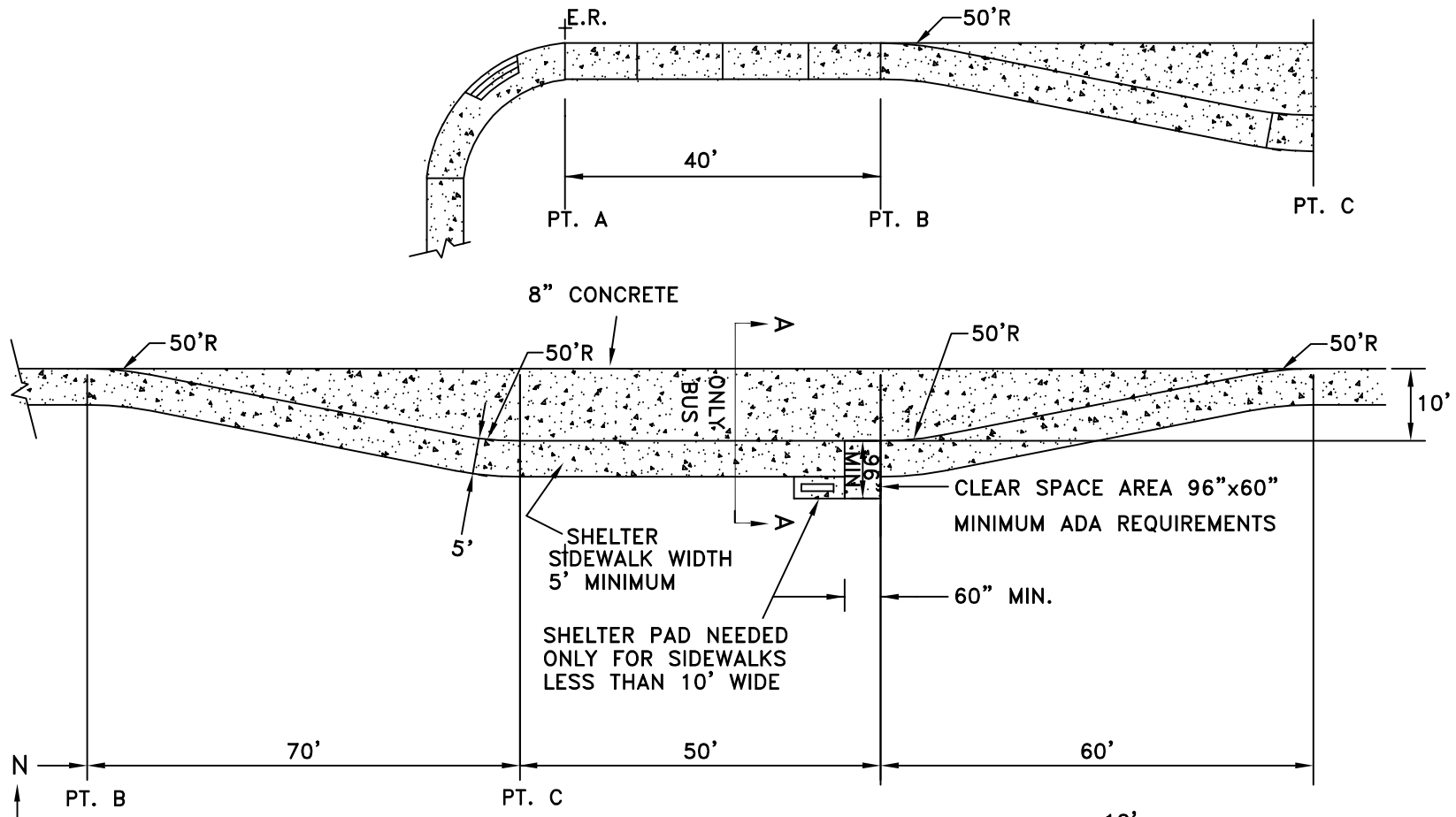
STREETS

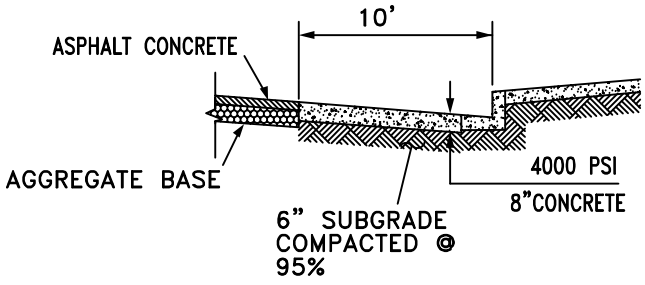
FARSIDE BUS TURNOUT

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO. 326

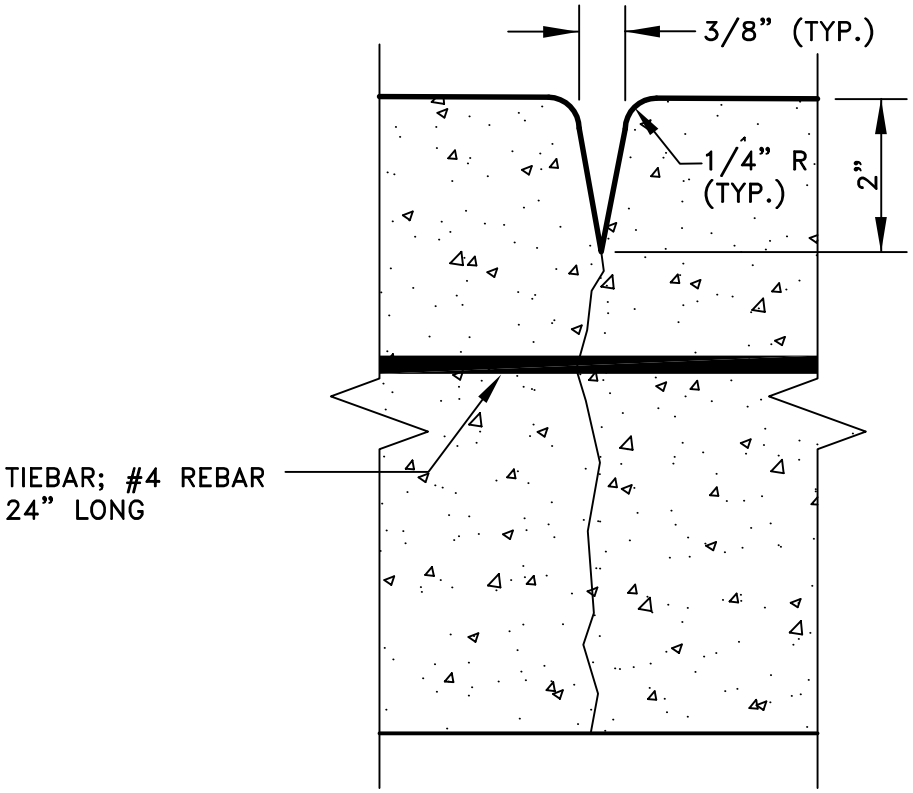




SECTION A-A
NTS

NOTES:

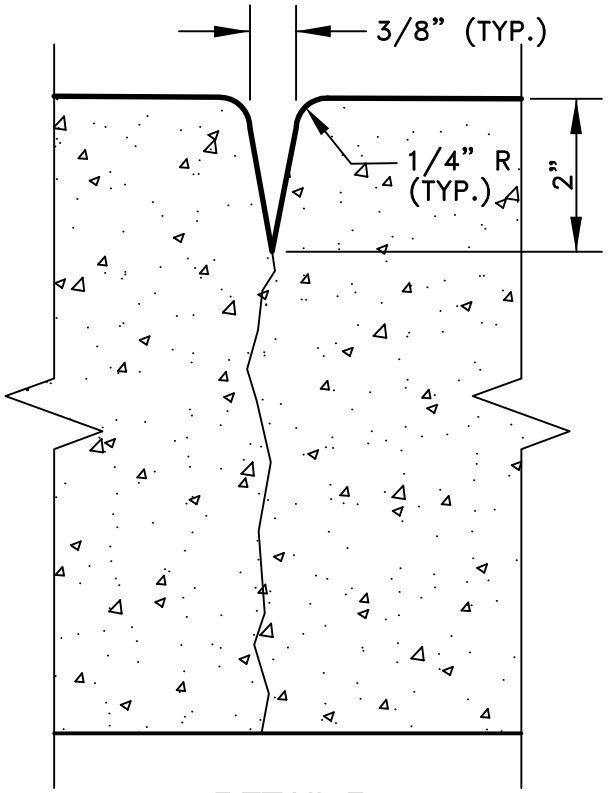
1. NO EXTRA SHELTER PAD NEEDED FOR SIDEWALKS WIDER THAN 10'.
2. SHELTER PAD & SHELTERS MUST BE WIDE ENOUGH TO MEET ADA REQUIREMENTS 4'-0" X 3'-0" CLEAR FLOOR AREA WITHIN SHELTER PERIMETER.



DETAIL A

TYPICAL TIED CONTROL JOINT

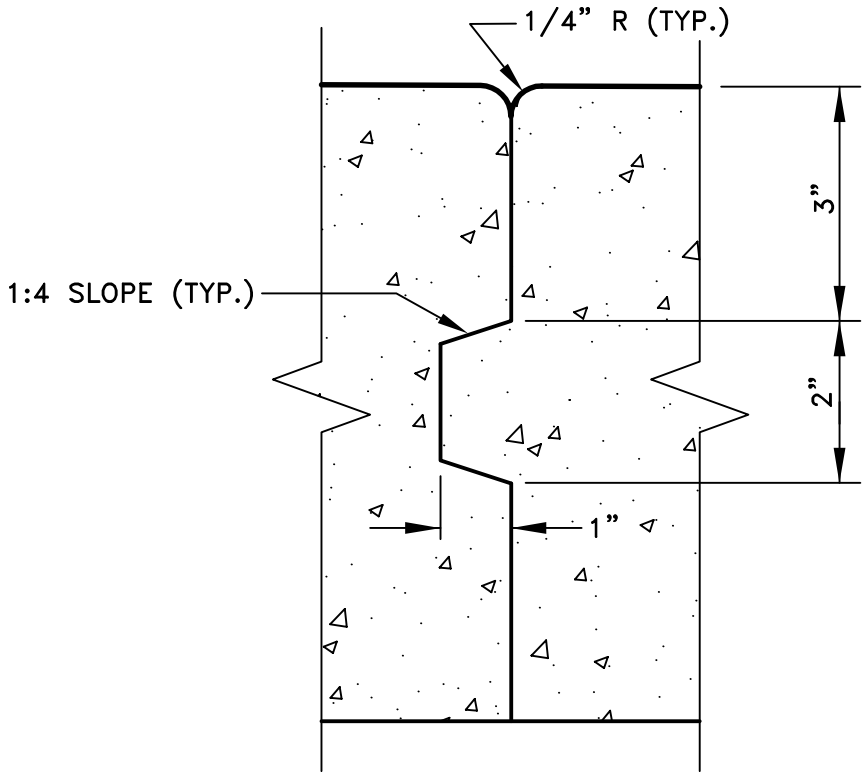
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	JOINT DETAIL	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 327



DETAIL B

TYPICAL CONTROL JOINT

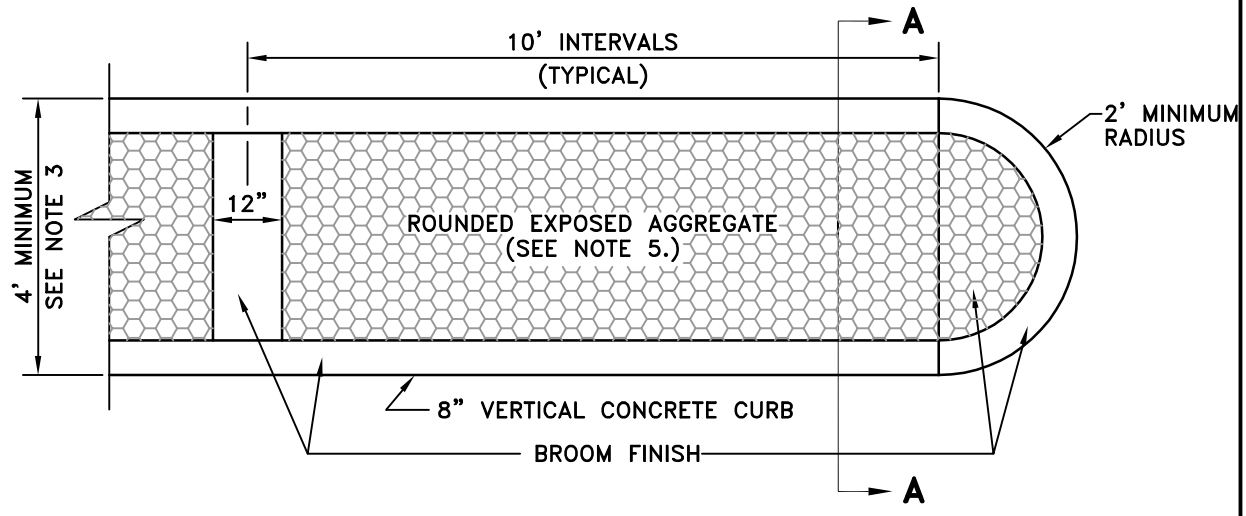
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	JOINT DETAIL	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 327A



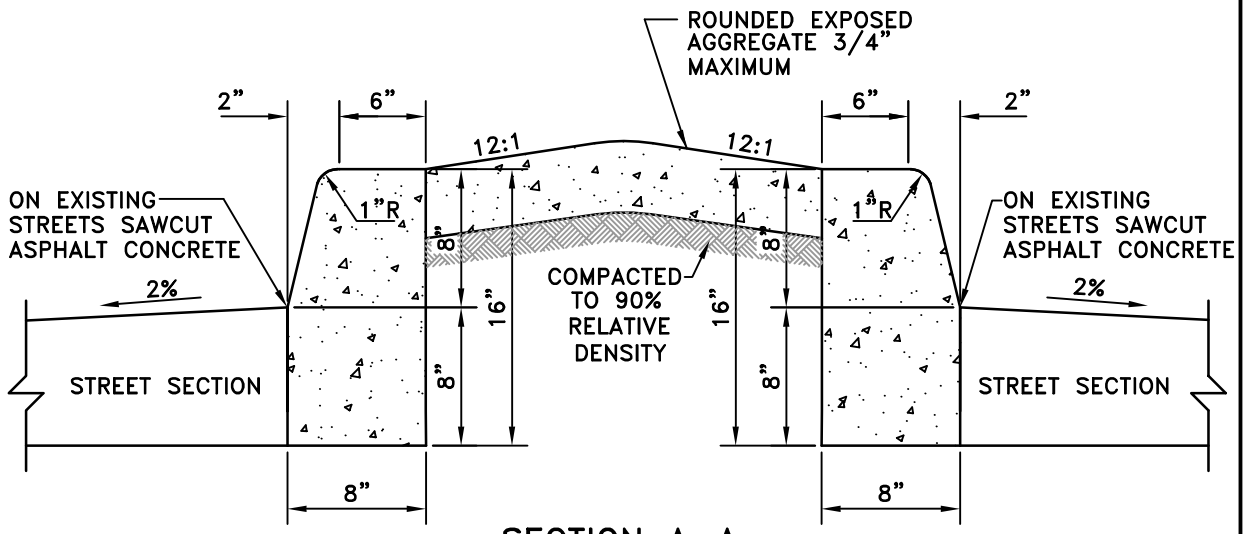
DETAIL C

FOR USE AT ALL COLD JOINTS (NON CONTINUOUS POURS)

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	JOINT DETAIL	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 327B



PLAN

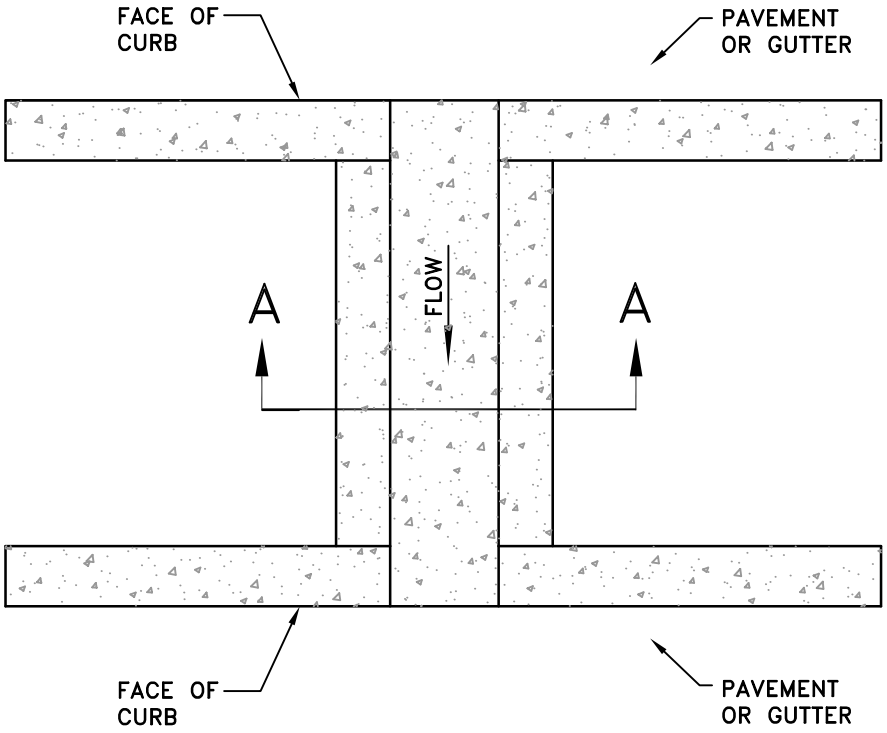


SECTION A–A

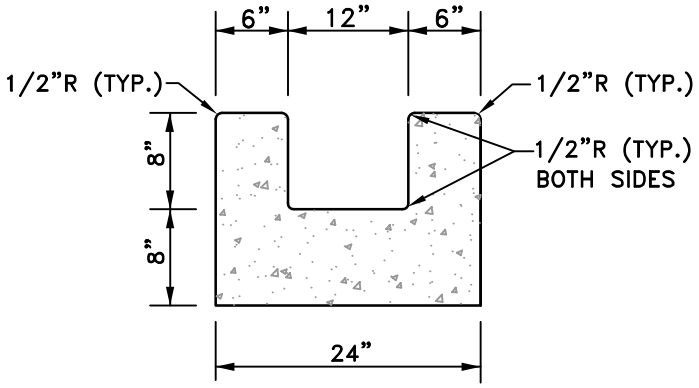
NOTES:

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 CITY COUNCIL RESOLUTION NO. 2006–284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	MEDIAN DETAIL	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 328



PLAN
NTS



SECTION A–A
NTS

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006–284

APPROVED BY THE CITY ENGINEER:

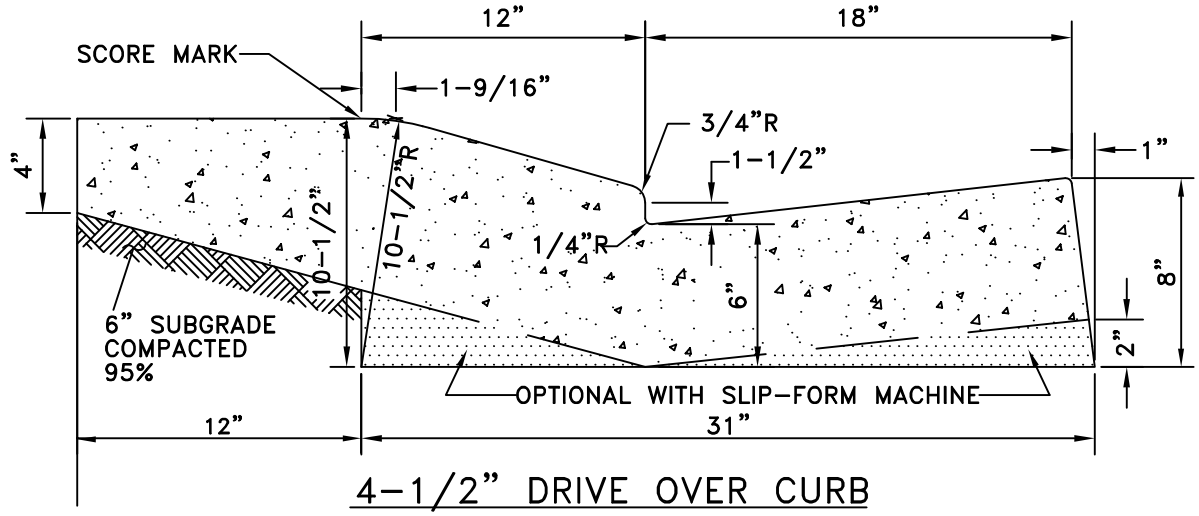
STREETS

THRU DRAIN DETAIL FOR MEDIANS

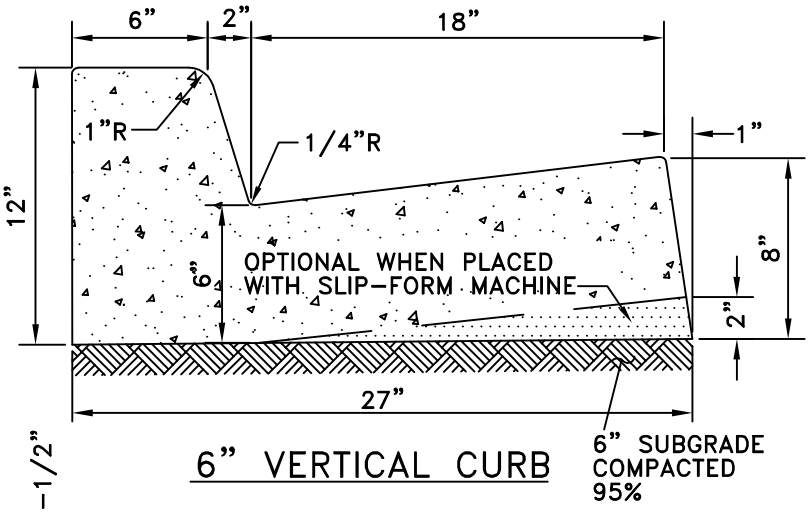
PUBLIC WORKS DEPARTMENT

CITY of MODESTO

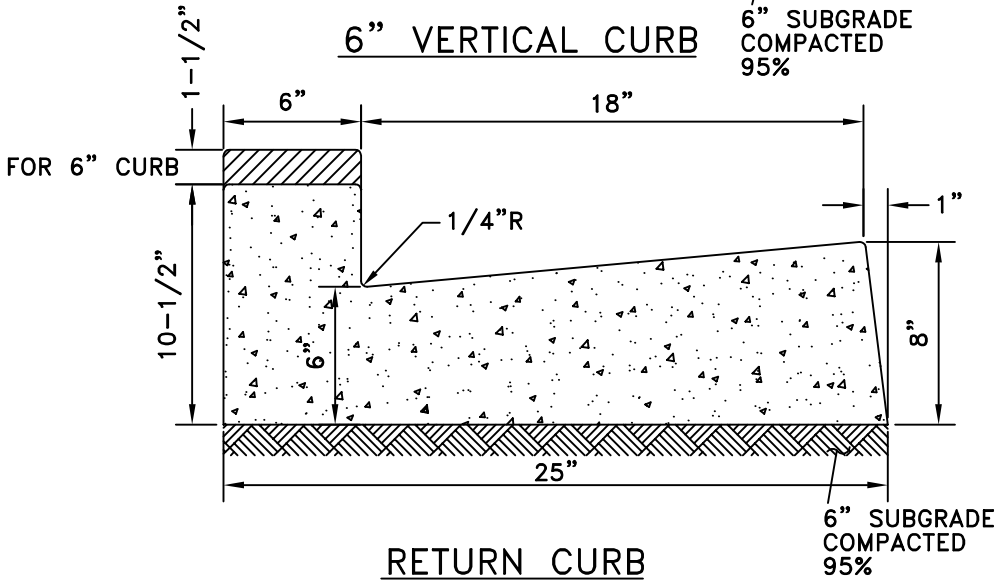
DETAIL NO.
329



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.

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wu

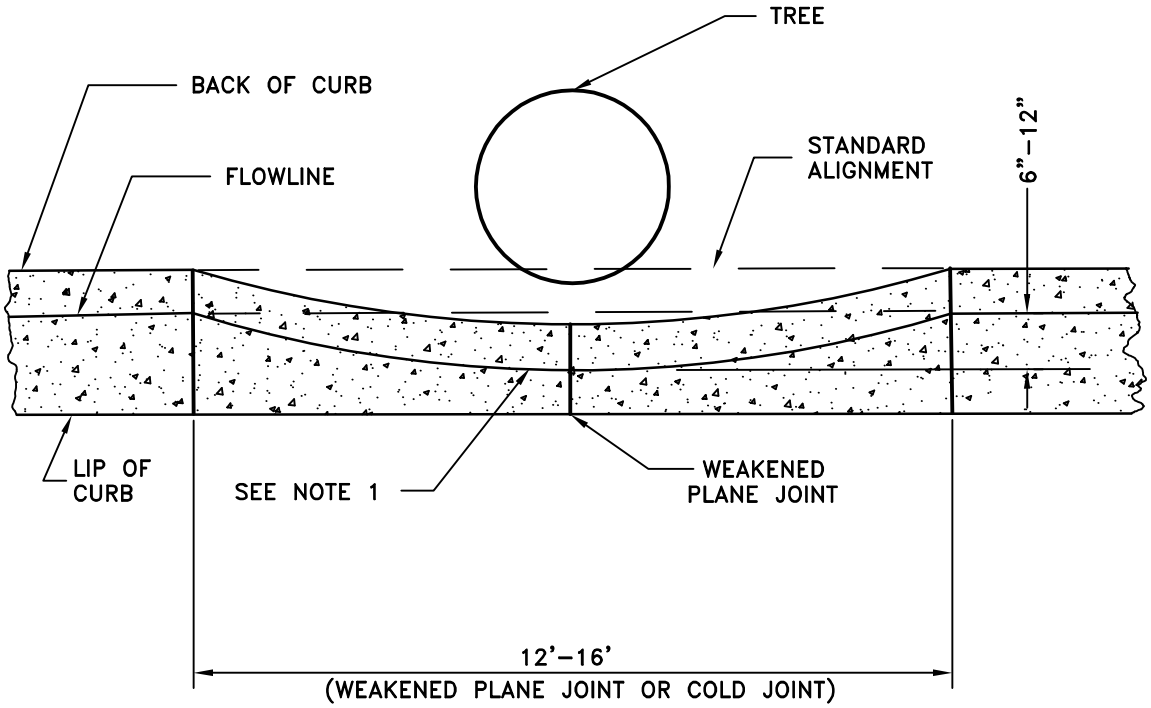
STREETS

CURB SECTIONS

CITY of MODESTO

PUBLIC WORKS
DEPARTMENT

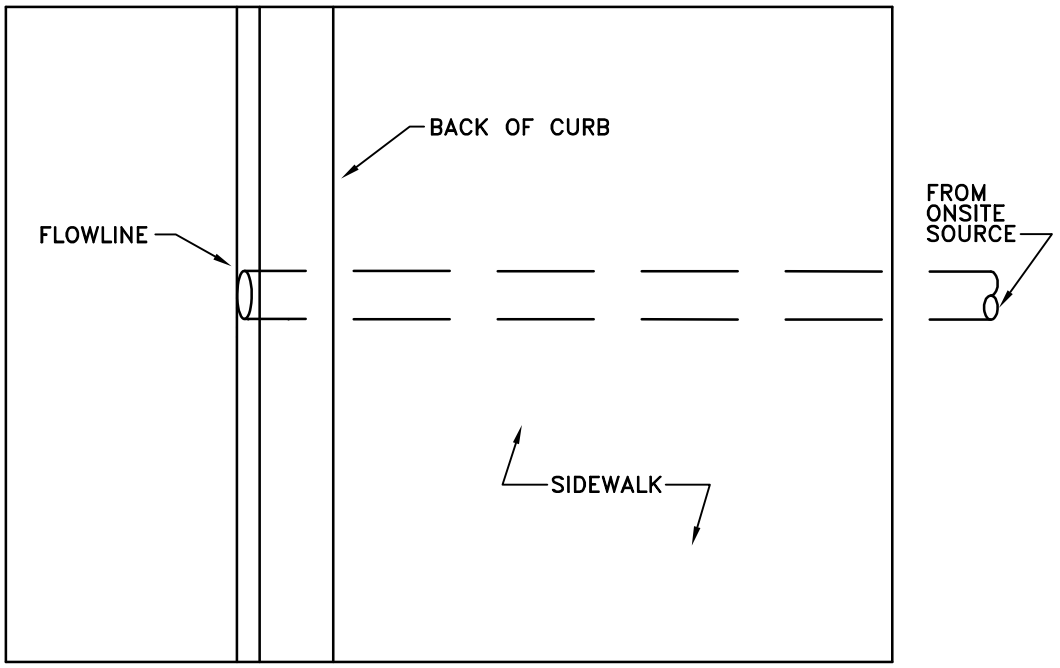
DETAIL NO.
330



NOTES:

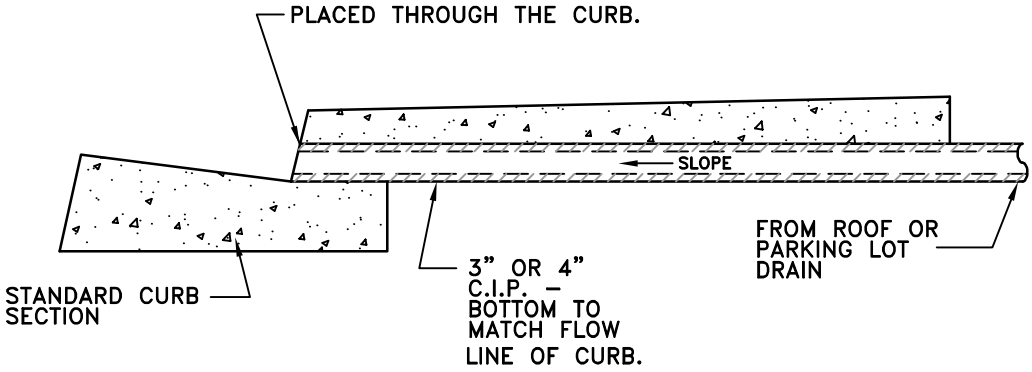
1. CURB ALIGNMENT SHALL BE MODIFIED WITH FLOWLINE GRADE MAINTAINED.
2. TREE ROOTS ARE TO BE CUT AT EDGE OF WALK TO 10" BELOW FINISH GRADE, AS DETERMINED BY THE CITY ENGINEER.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	CURB MODIFICATION FOR EXISTING TREE	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 331



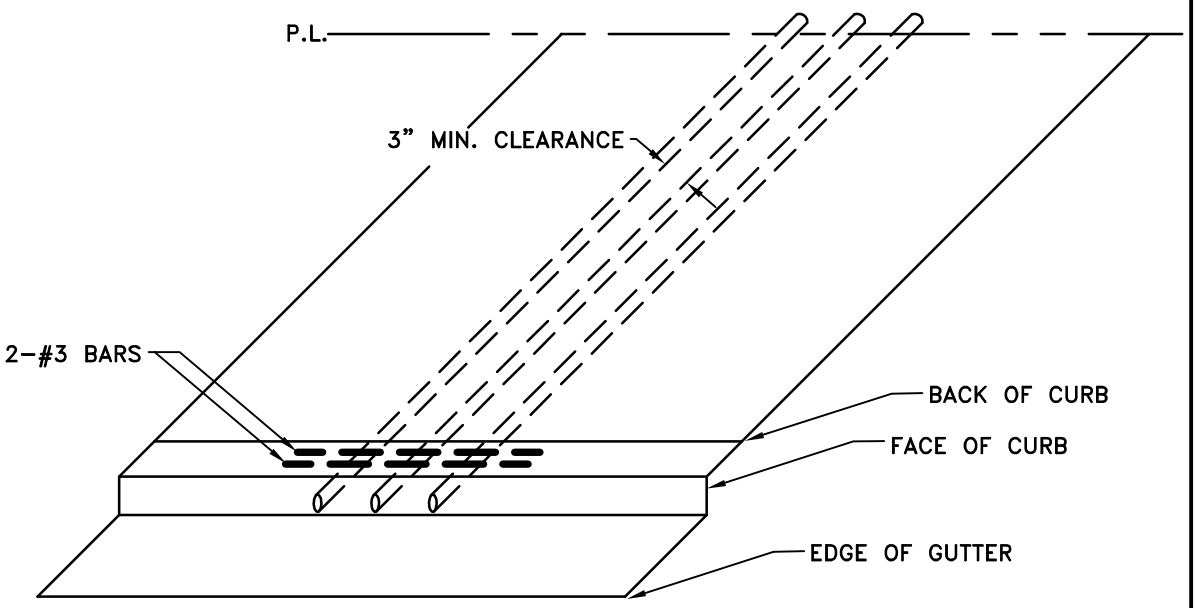
FIBERMESH OR WIRE MESH TO BE ADDED TO THE CONCRETE

PLAN

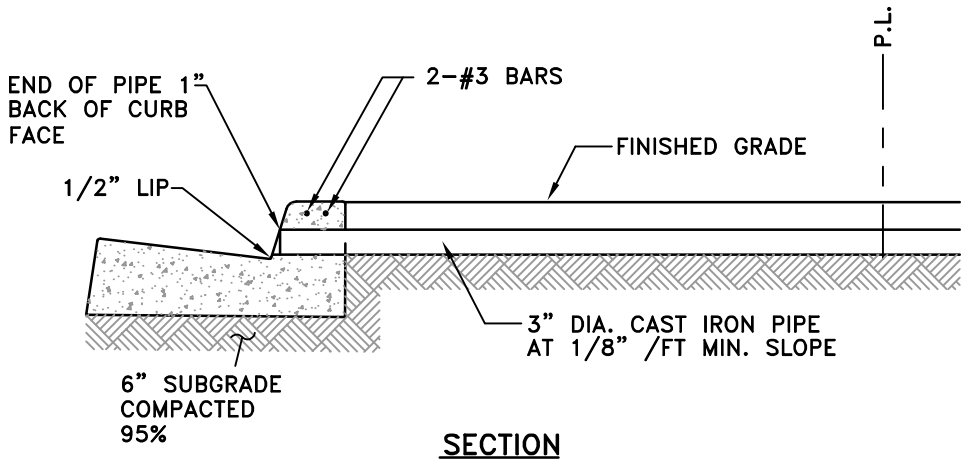


SECTION

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	CURB DRAIN UNDER SIDEWALK	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 332



PLAN

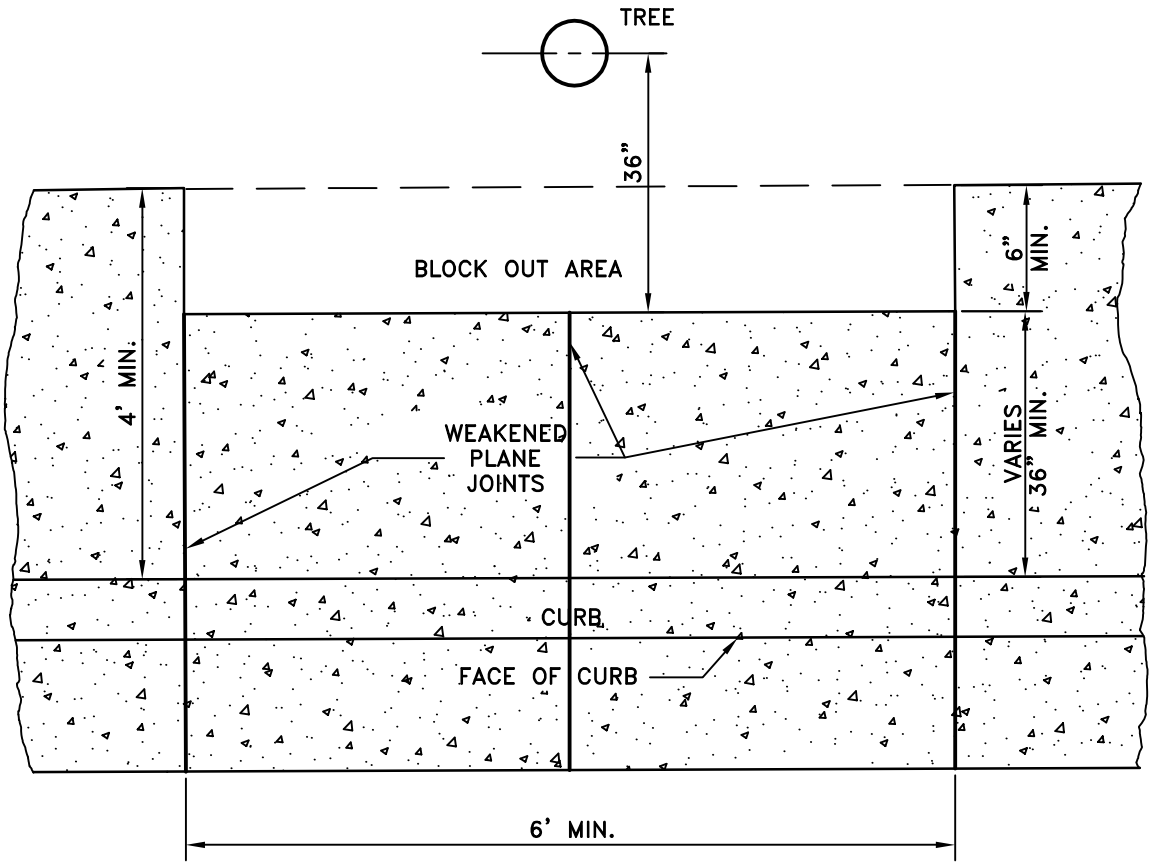


SECTION

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 CITY COUNCIL RESOLUTION NO. 2006–284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	CURB DRAIN UNDER SIDEWALK (MULTIPLE)	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 333

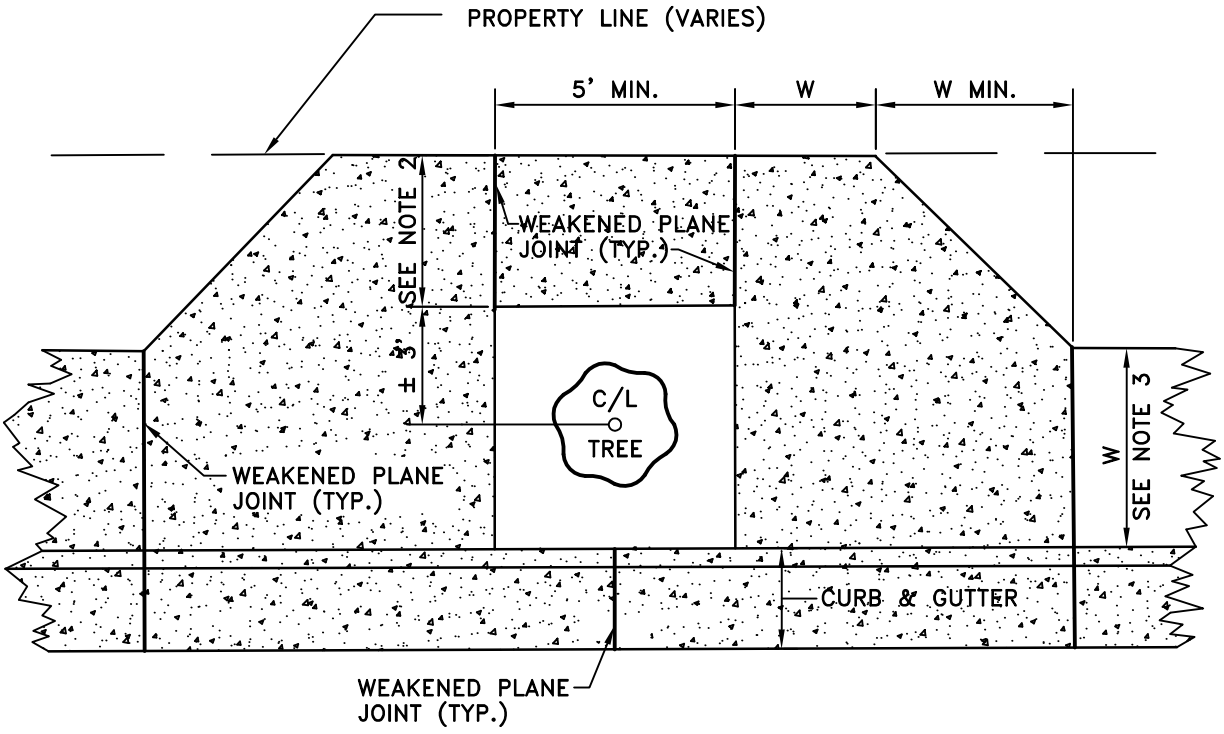


NOTES:

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) AN 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).

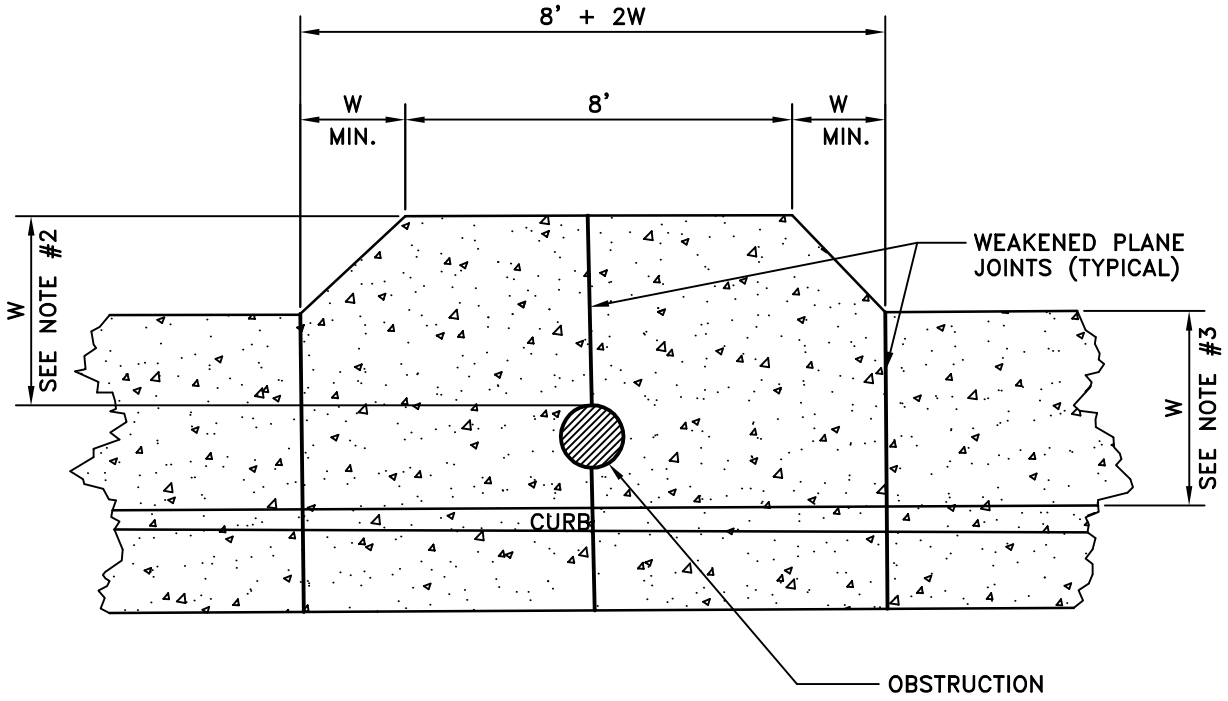
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	SIDEWALK MODIFICATION FOR TREE AT PROPERTY LINE	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 334



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.

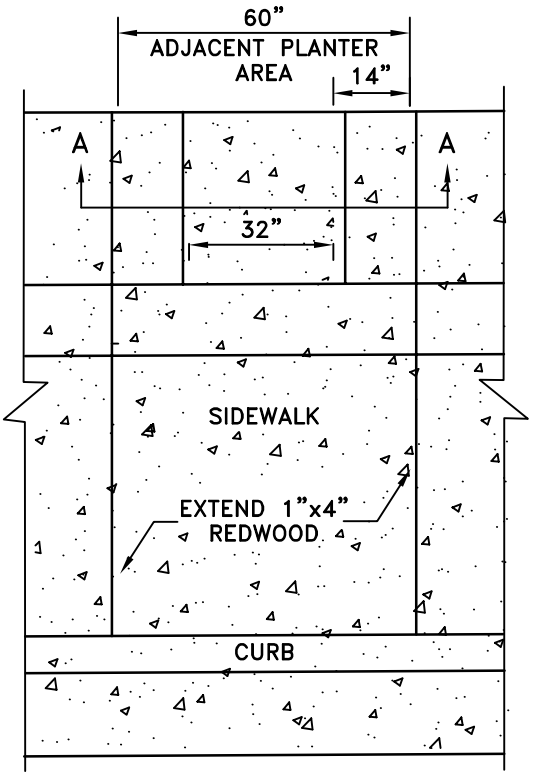
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STREETS	
APPROVED BY THE CITY ENGINEER: Richard D. Ulm	SIDEWALK MODIFICATION FOR TREE AT CURB	CITY of MODESTO
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 335



NOTES:

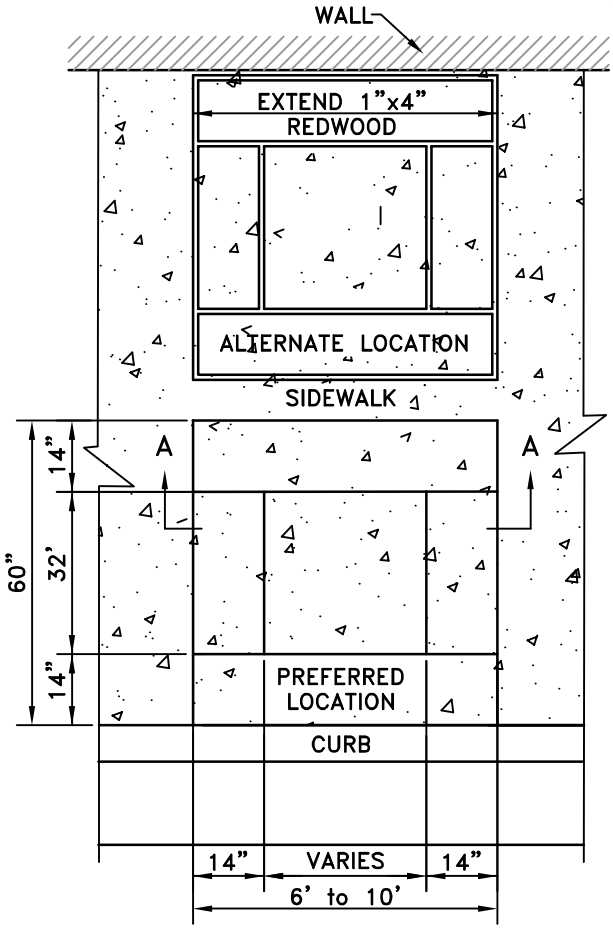
1. NO WIDENING IS NEEDED WHEN SPACE BETWEEN BACK OF CURB AND FACE OF OBSTRUCTION IS 36" OR MORE.
2. BACK OF WIDENED SIDEWALK SHALL REMAIN WITHIN THE STREET RIGHT OF WAY.
3. W = PROPOSED OR EXISTING SIDEWALK WIDTH.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	SIDEWALK WIDENING FOR OBSTRUCTIONS	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 336



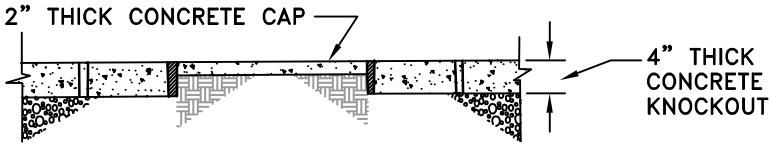
SIDEWALK WITH ADJACENT LANDSCAPING

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 CITY COUNCIL
RESOLUTION NO. 2006–284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

STREETS

TREE BLOCK OUTS FOR FULL WIDTH SIDEWALK

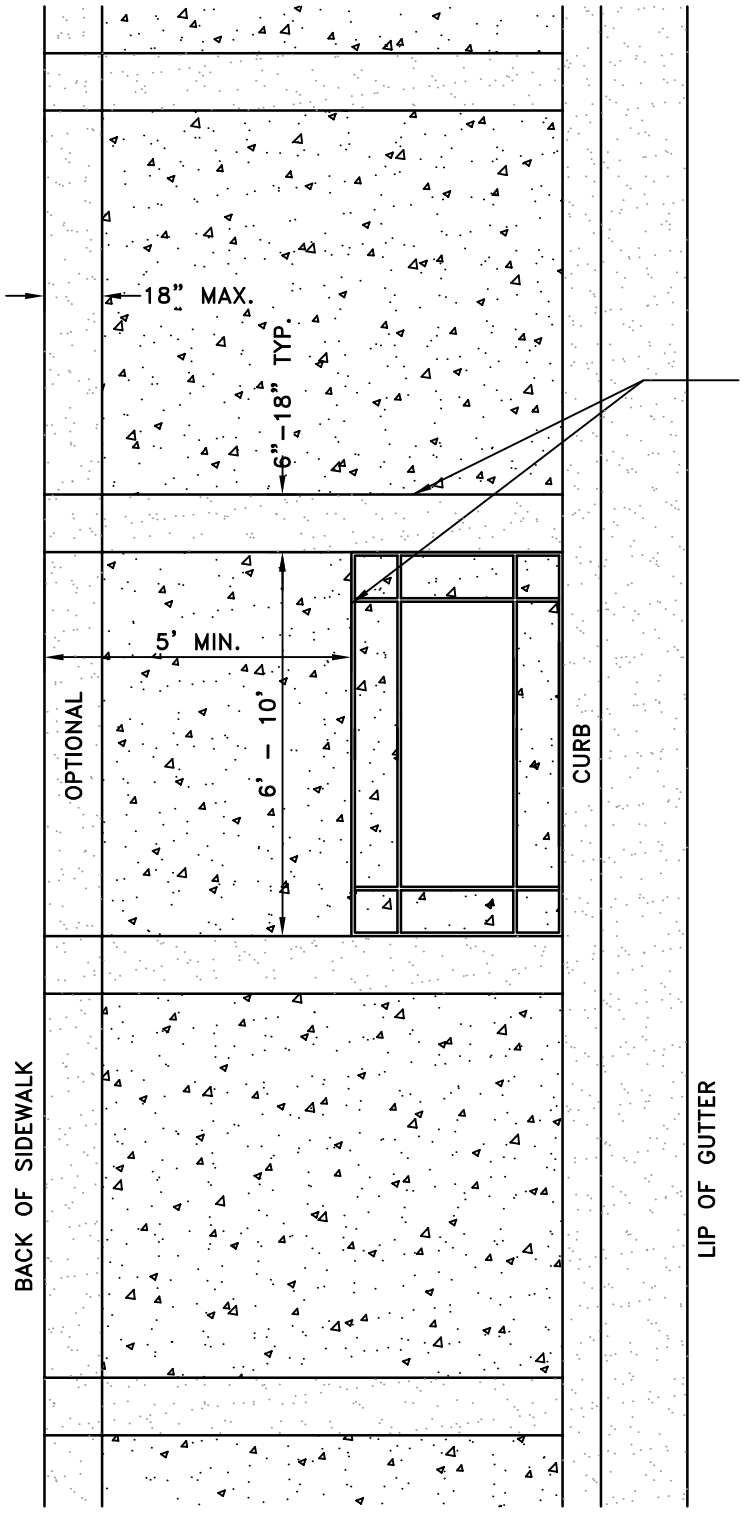
PUBLIC WORKS
DEPARTMENT

CITY of MODESTO

DETAIL NO.
337

LEFT BLANK INTENTIONALLY

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:		
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 338-341



EXPOSED AGGREGATE FINISH

STANDARD CONCRETE FINISH

NOTES:

1. FOR FULL WALK EXPANSION, MATERIAL SHALL BE PLACED ADJACENT TO STRUCTURE.
2. FOR ALTERNATE LOCATION OF BLOCK OUT, SEE DETAIL NO. 337.

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

STREETS

TREE BLOCK OUTS FOR INFILL ONLY

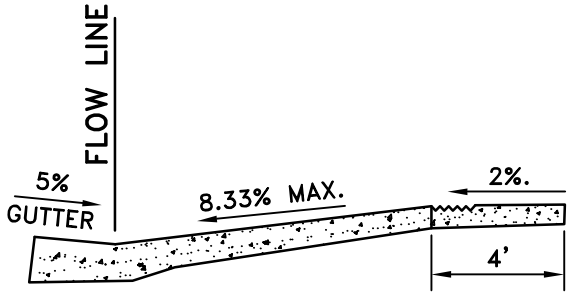
PUBLIC WORKS DEPARTMENT

CITY of MODESTO

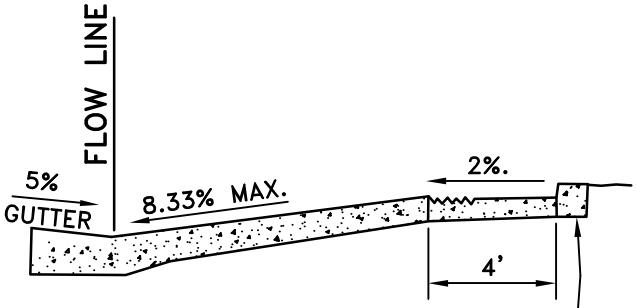
DETAIL NO. 342

LEFT BLANK INTENTIONALLY

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:		
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 343-344



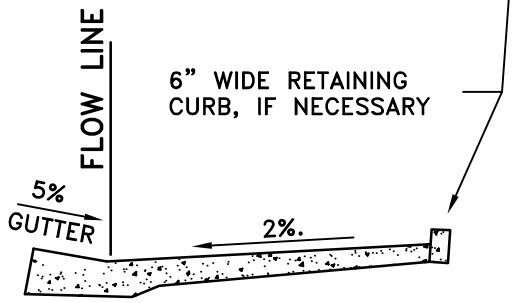
SECTION A–A



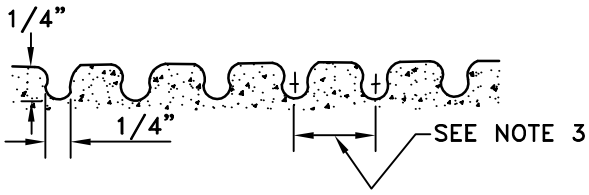
SECTION B–B

NOTE: (SLOPES)

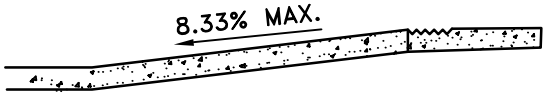
1. 2% IS 1 IN 50
2. 5% IS 1 IN 20
3. 8.33% IS 1 IN 12
4. 10% IS 1 IN 10



SECTION C–C



GROOVING DETAIL

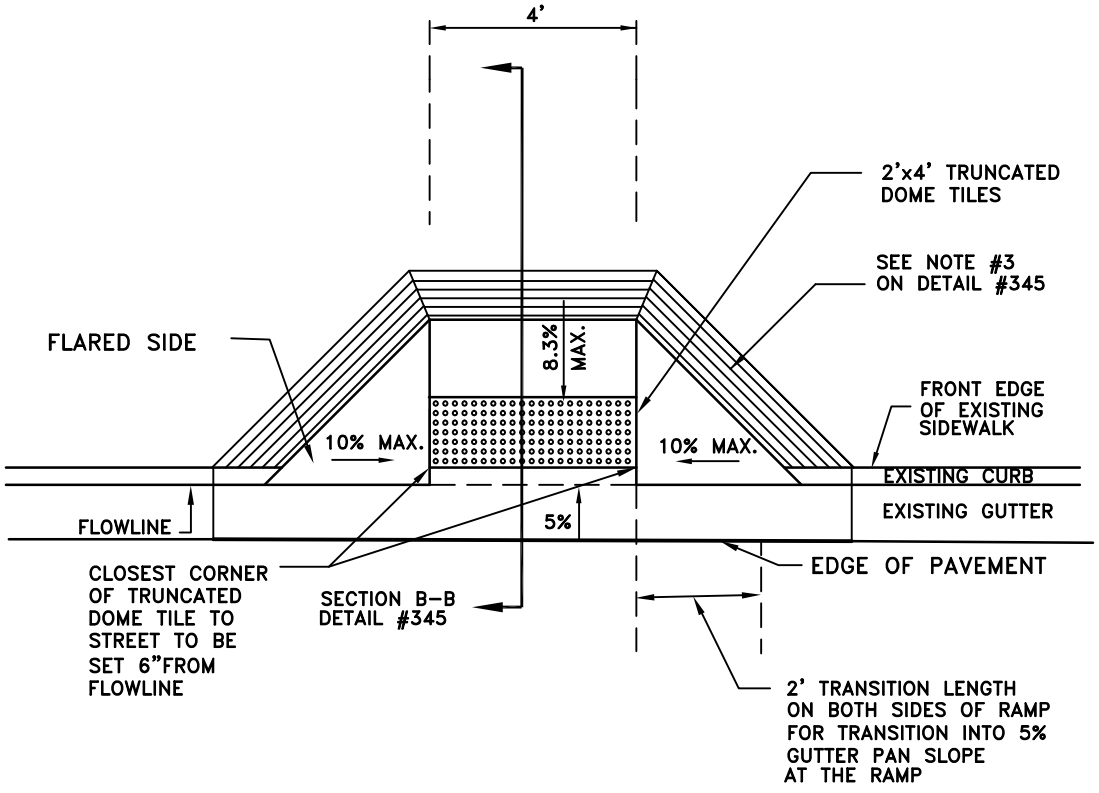


SECTION D–D

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.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wall	CURB RAMP NOTES AND DETAILS	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 345



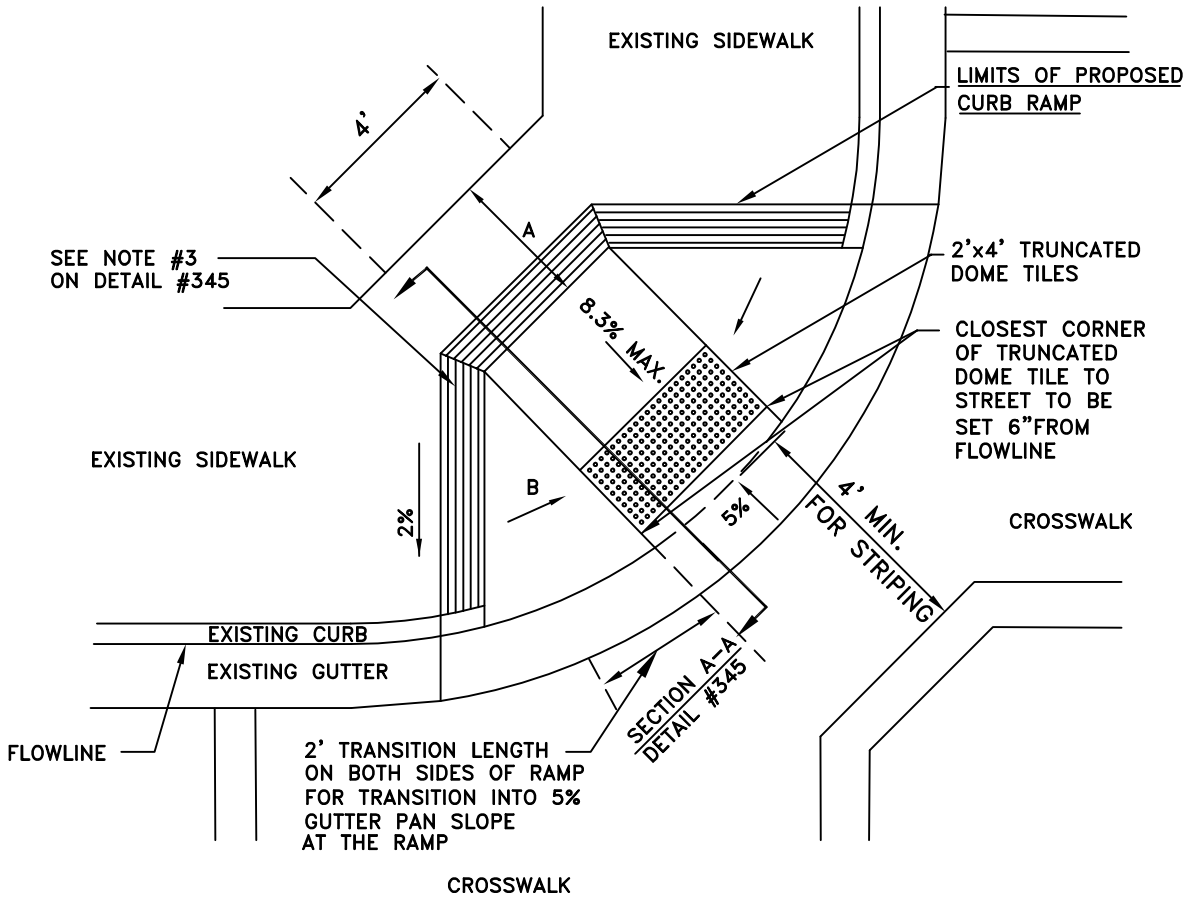
FLARED SIDE SHALL BE TRANSVERSE BROOMED TEXTURE ROUGHER THAN SURROUNDING SIDEWALK

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

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	CURB RAMP CASE A	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 345A



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

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wu

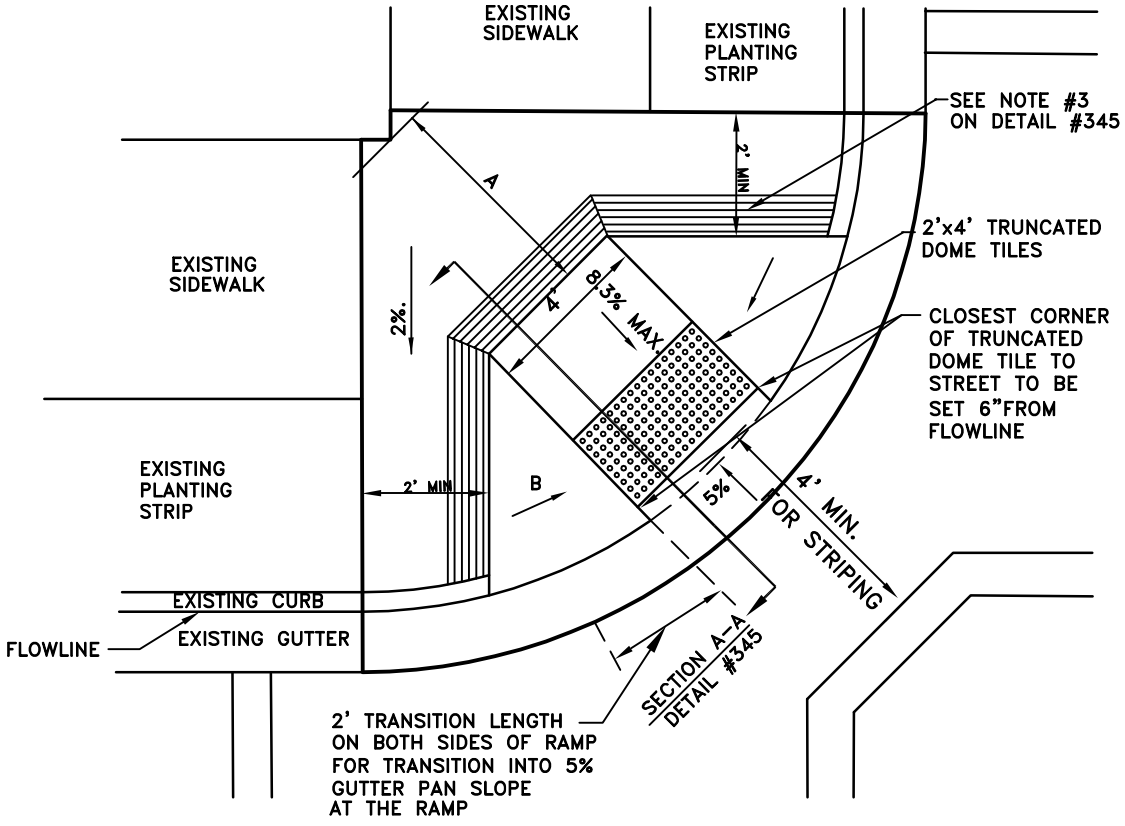
STREETS

CURB RAMP
CASE B

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO. 345B



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

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wu

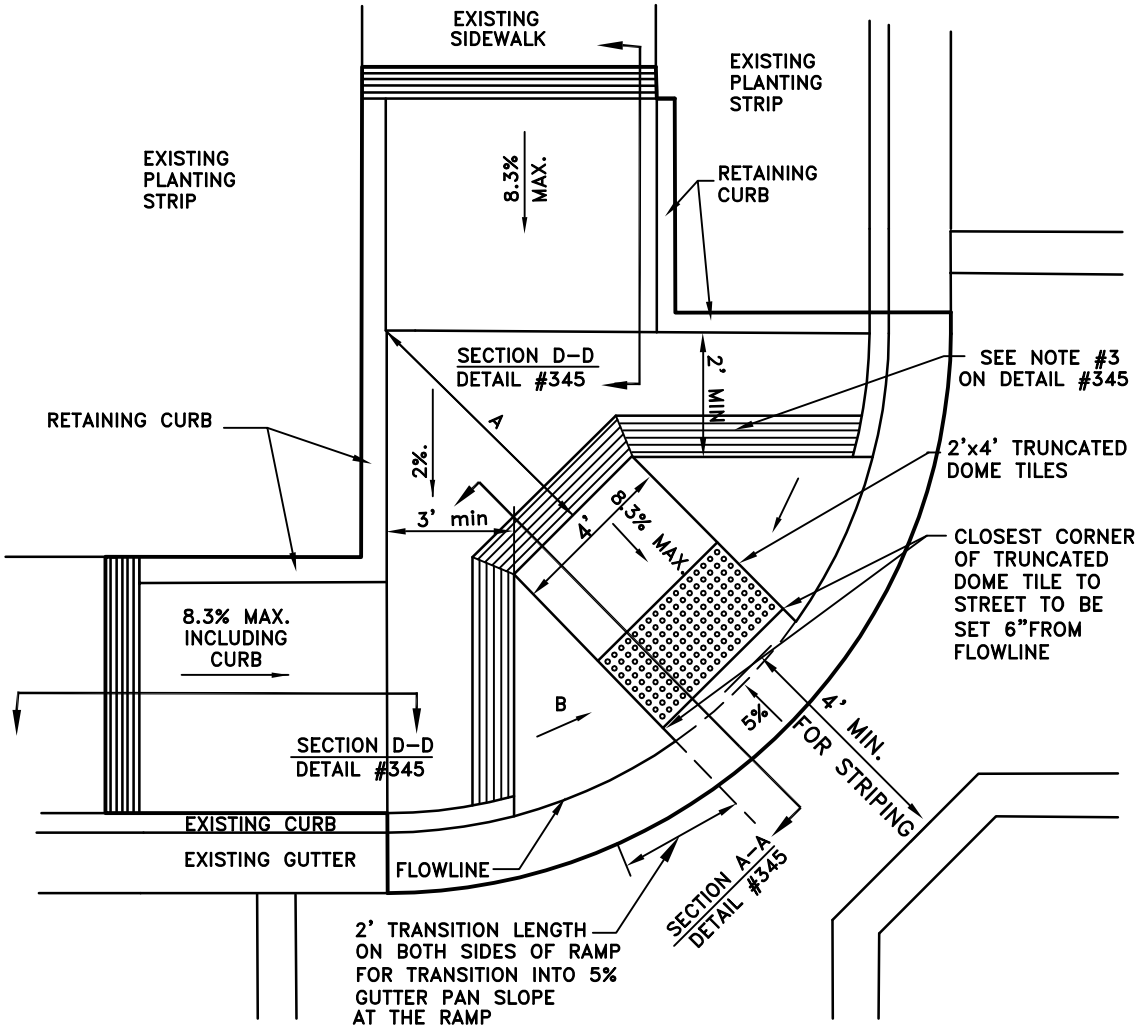
STREETS

CURB RAMP CASE C

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO. 345C



CROSSWALK

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

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006–284

APPROVED BY THE CITY ENGINEER:

Richard D. Wu

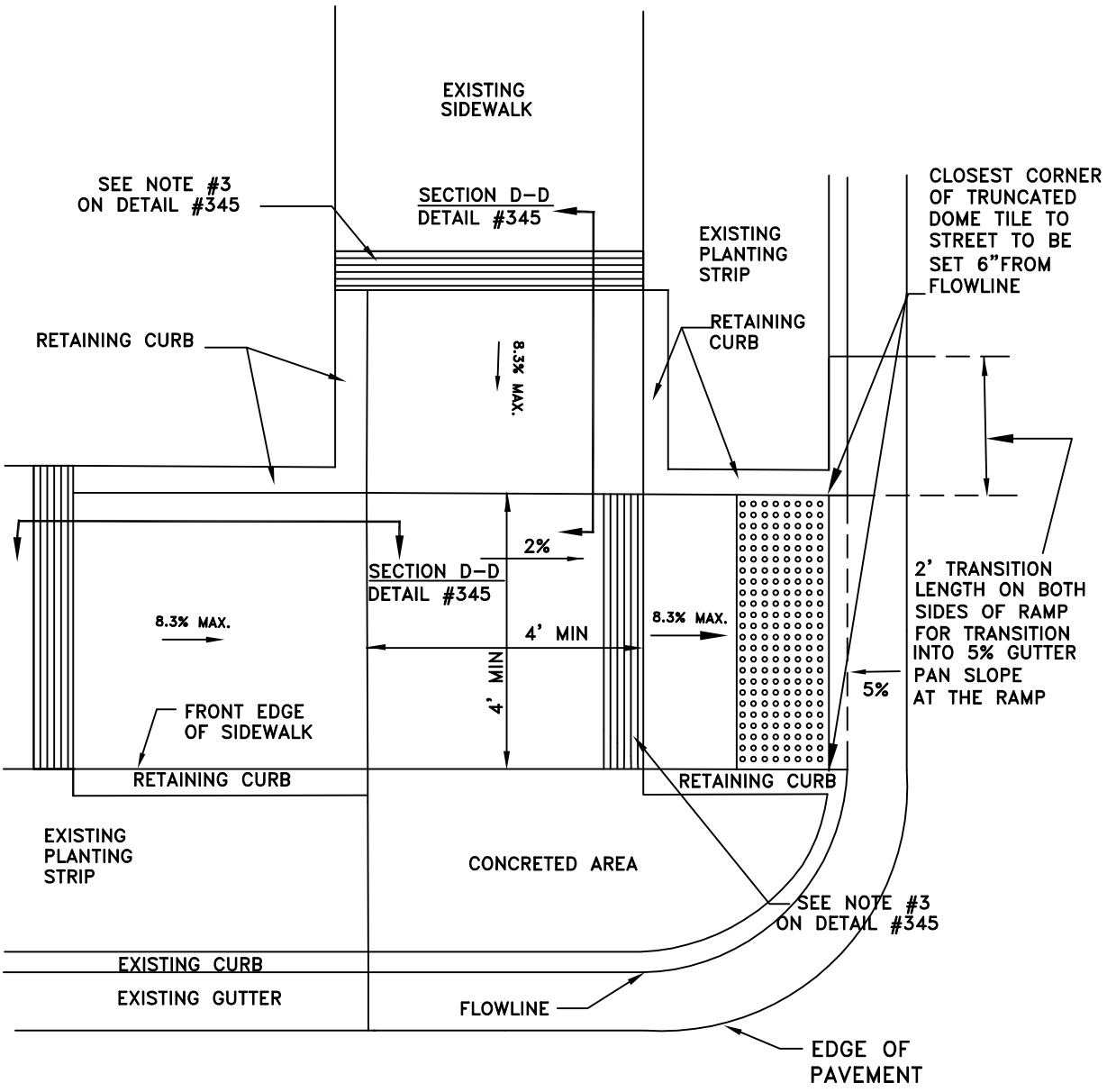
STREETS

CURB RAMP CASE D

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO. 345D

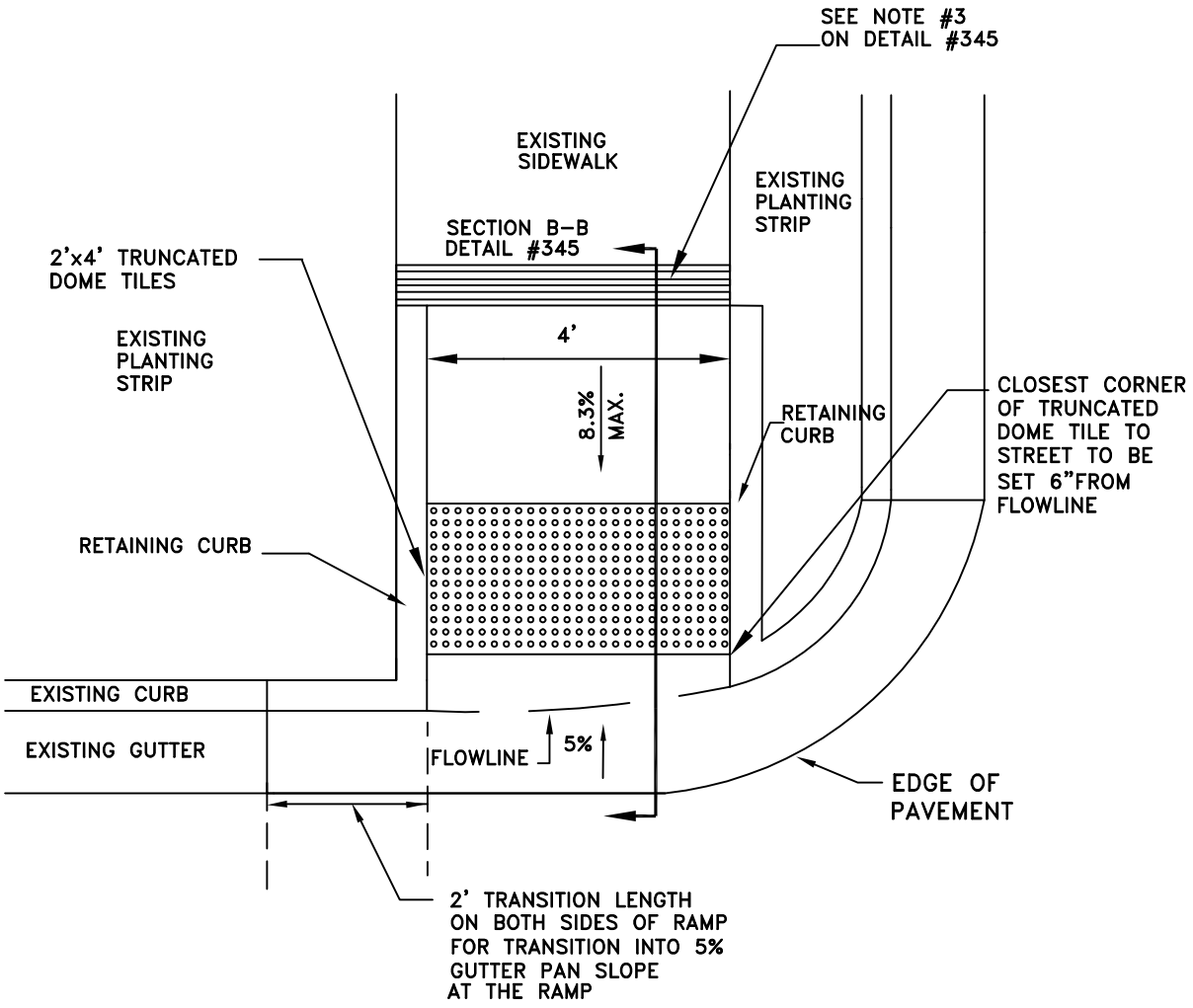


NOTE: (SLOPES)

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 CITY COUNCIL RESOLUTION NO. 2006–284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	CURB RAMP CASE E	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 345E

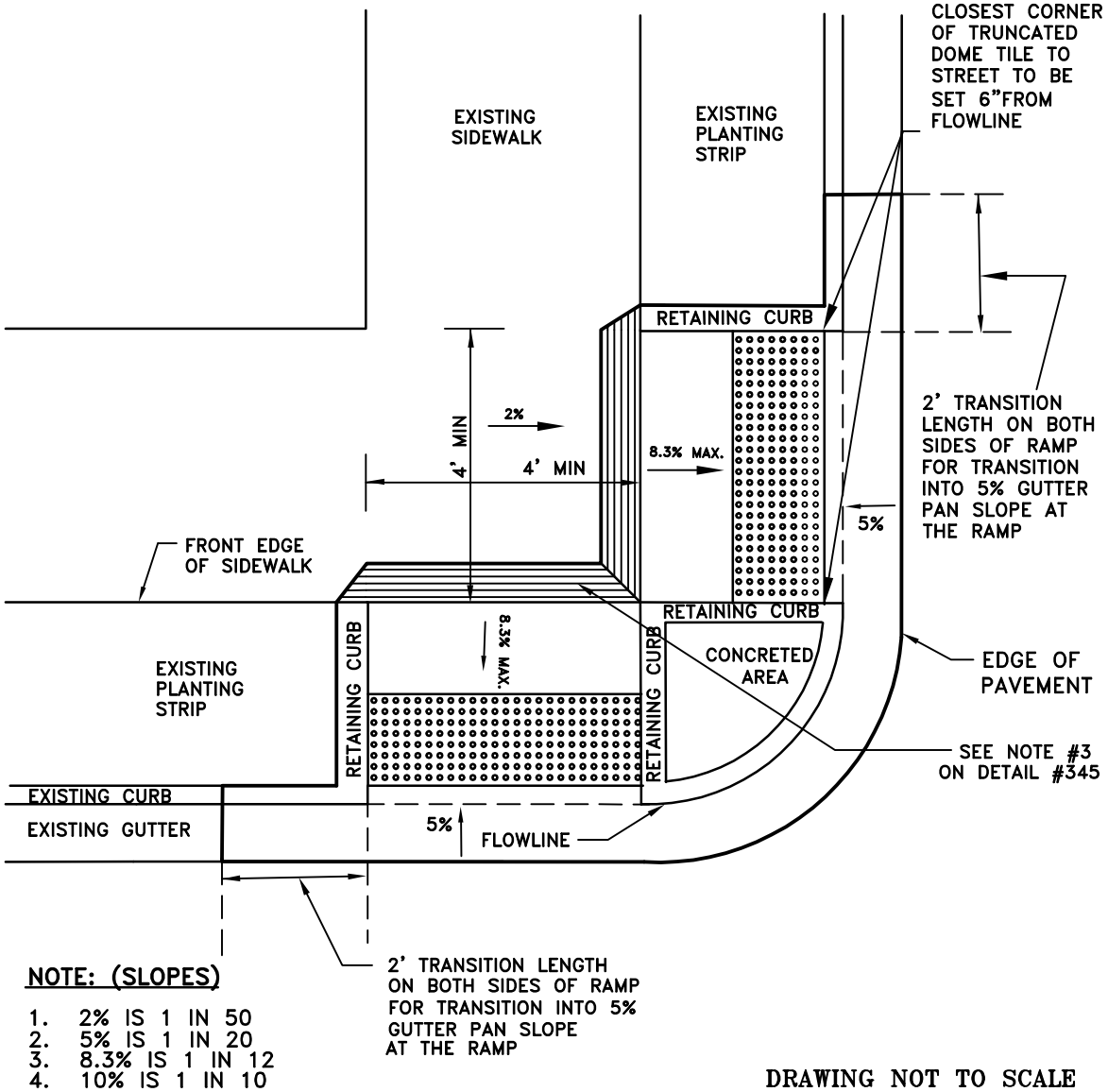


NOTE: (SLOPES)

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 CITY COUNCIL RESOLUTION NO. 2006–284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	CURB RAMP CASE F	
	PUBLIC WORKS DEPARTMENT	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

DRAWING NOT TO SCALE

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

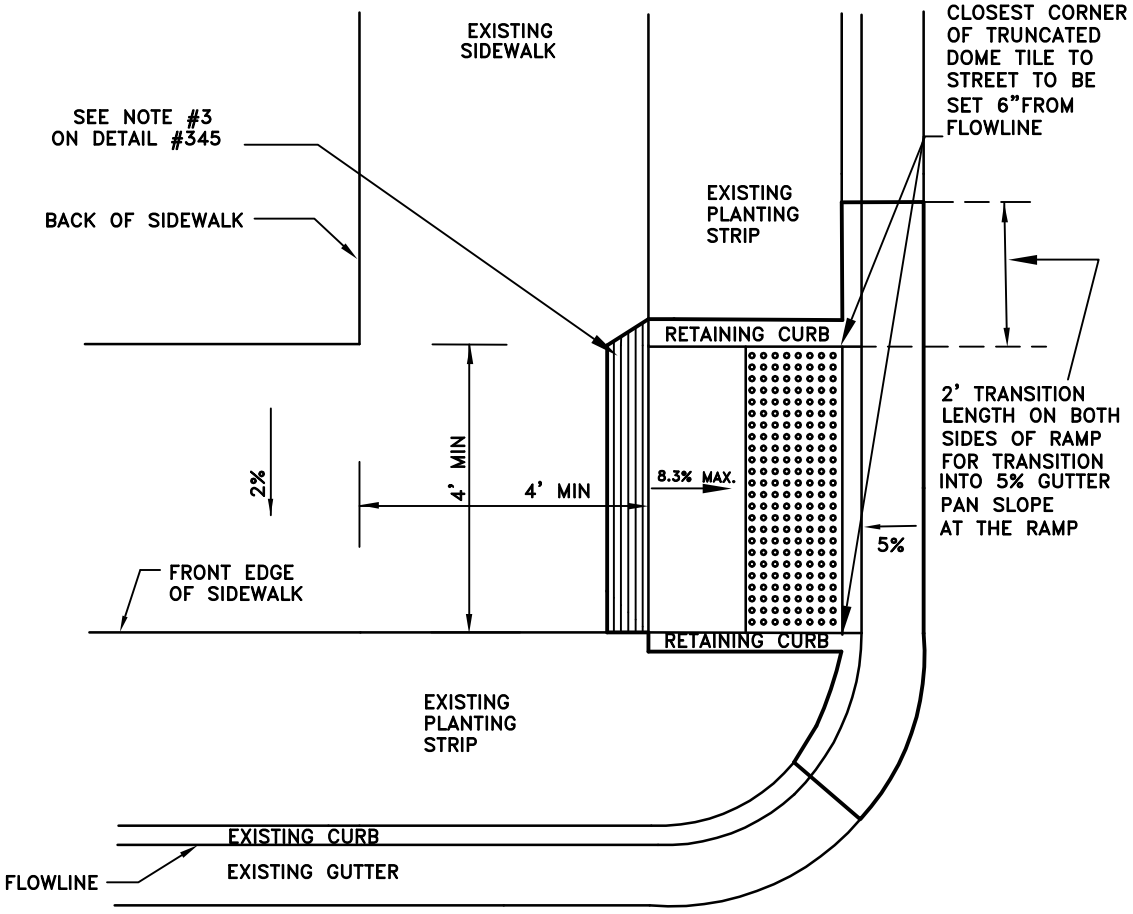
STREETS

CURB RAMP
CASE G

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO.
345G

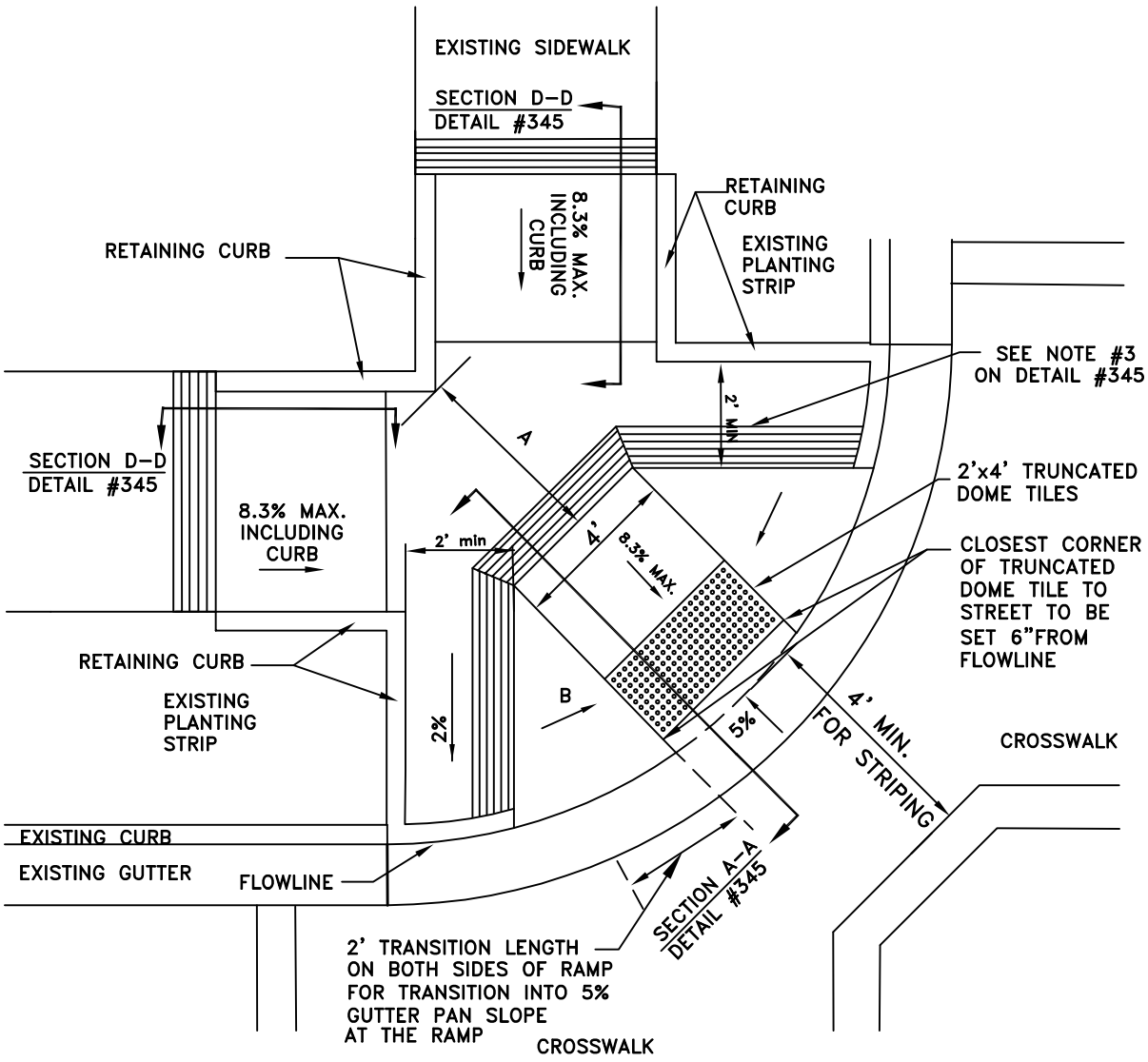


NOTE: (SLOPES)

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 CITY COUNCIL RESOLUTION NO. 2006-284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	CURB RAMP CASE H	
	PUBLIC WORKS DEPARTMENT	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

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006–284

APPROVED BY THE CITY ENGINEER:

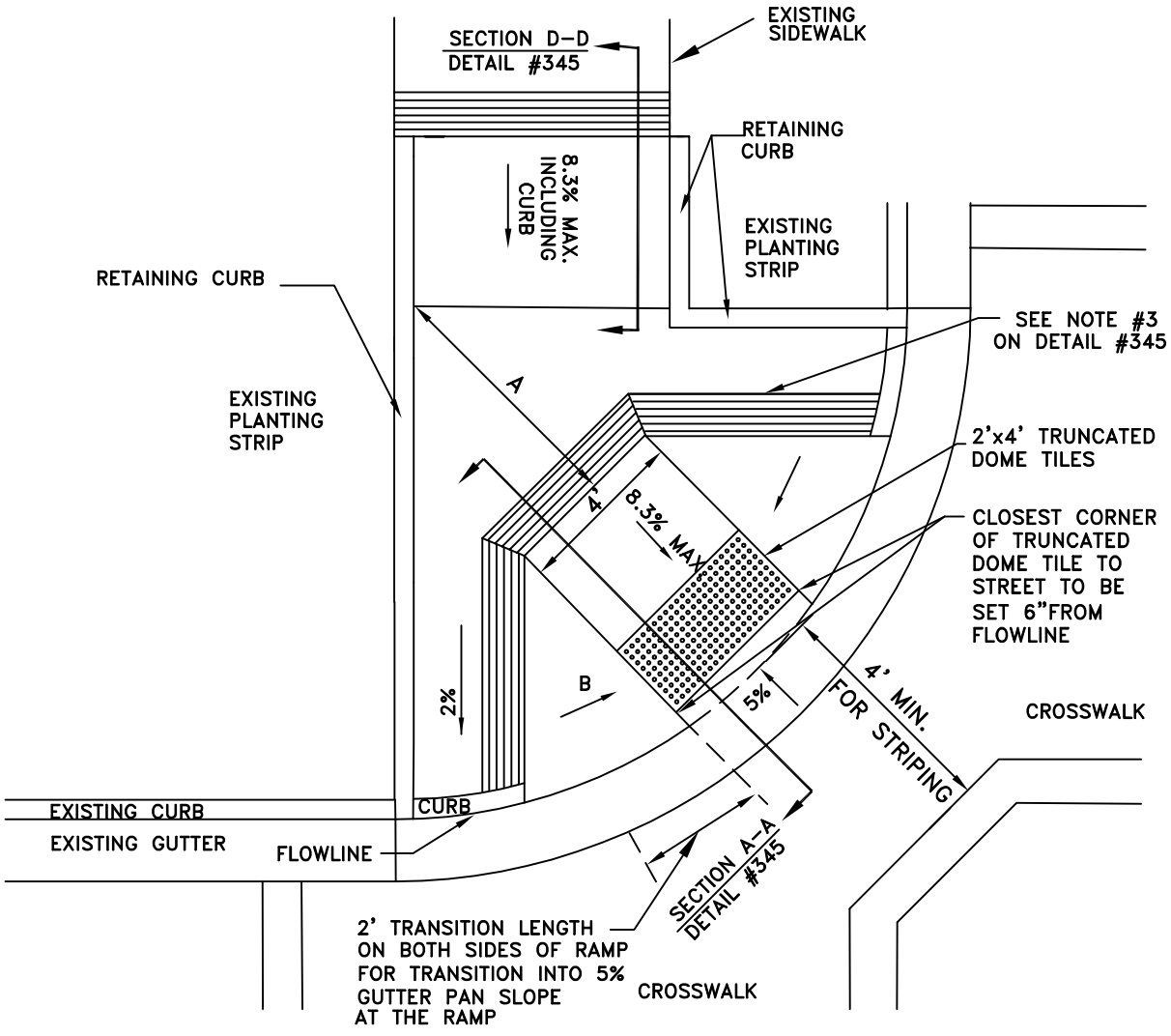
STREETS

CURB RAMP
CASE I

CITY of MODESTO

PUBLIC WORKS DEPARTMENT

DETAIL NO. 345I



FLARED SIDE SHALL BE TRANSVERSE BROOMED TEXTURE ROUGHER THAN SURROUNDING SIDEWALK

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

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

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006–284

APPROVED BY THE CITY ENGINEER:

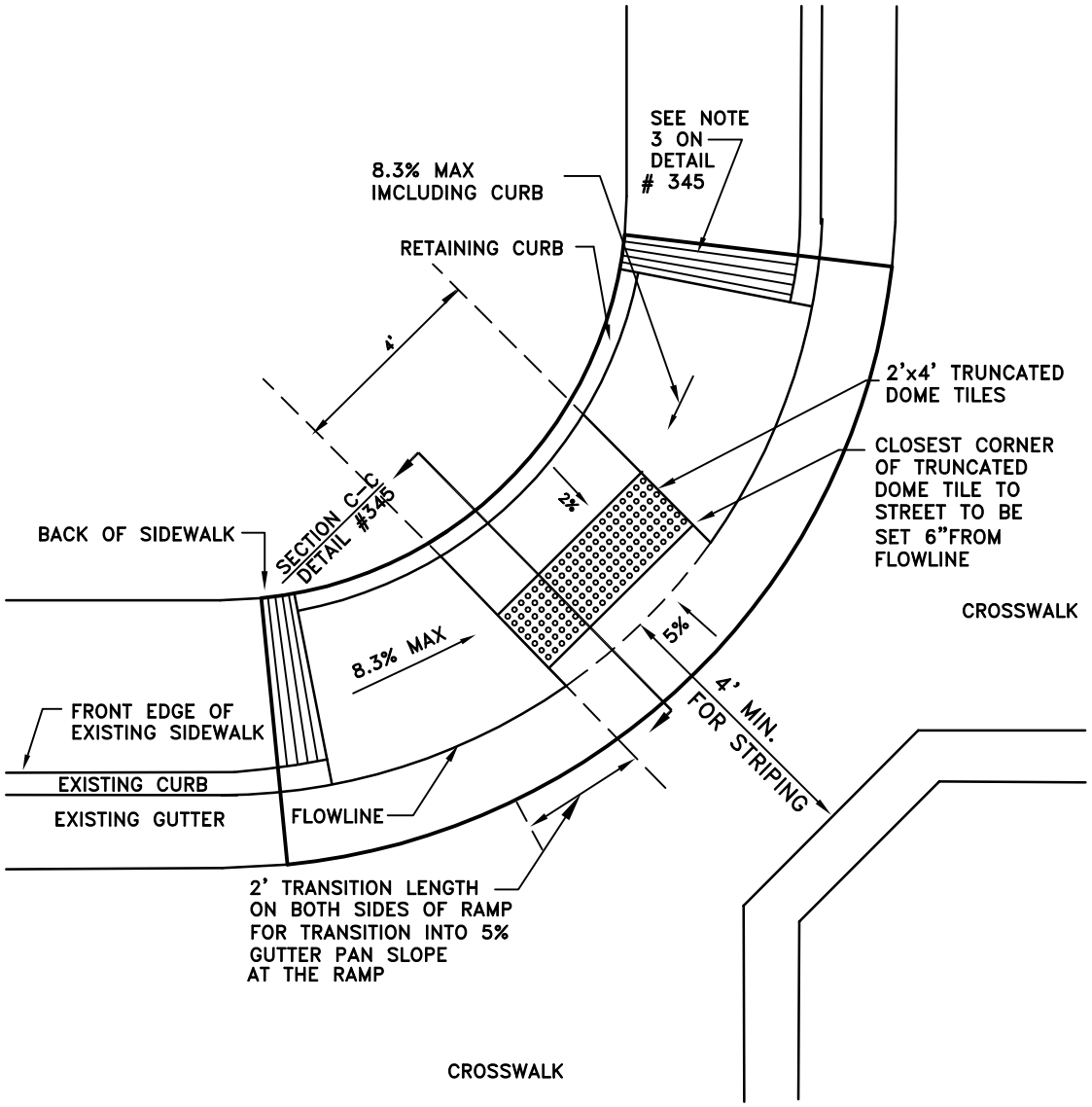
STREETS

CURB RAMP
CASE J

CITY of MODESTO

PUBLIC WORKS
DEPARTMENT

DETAIL NO.
345J

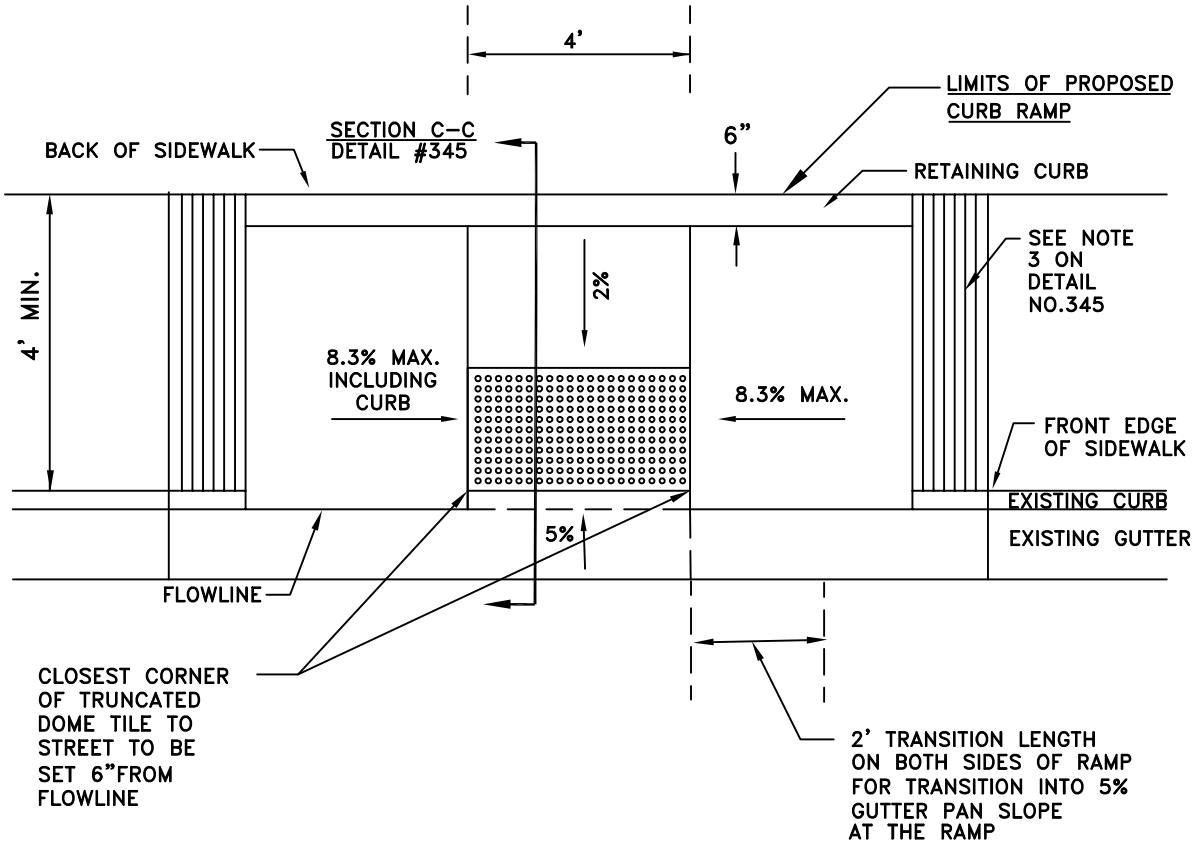


NOTE: (SLOPES)

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 CITY COUNCIL RESOLUTION NO. 2006-284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	CURB RAMP CASE K	
	PUBLIC WORKS DEPARTMENT	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

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	CURB RAMP CASE L	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 345L

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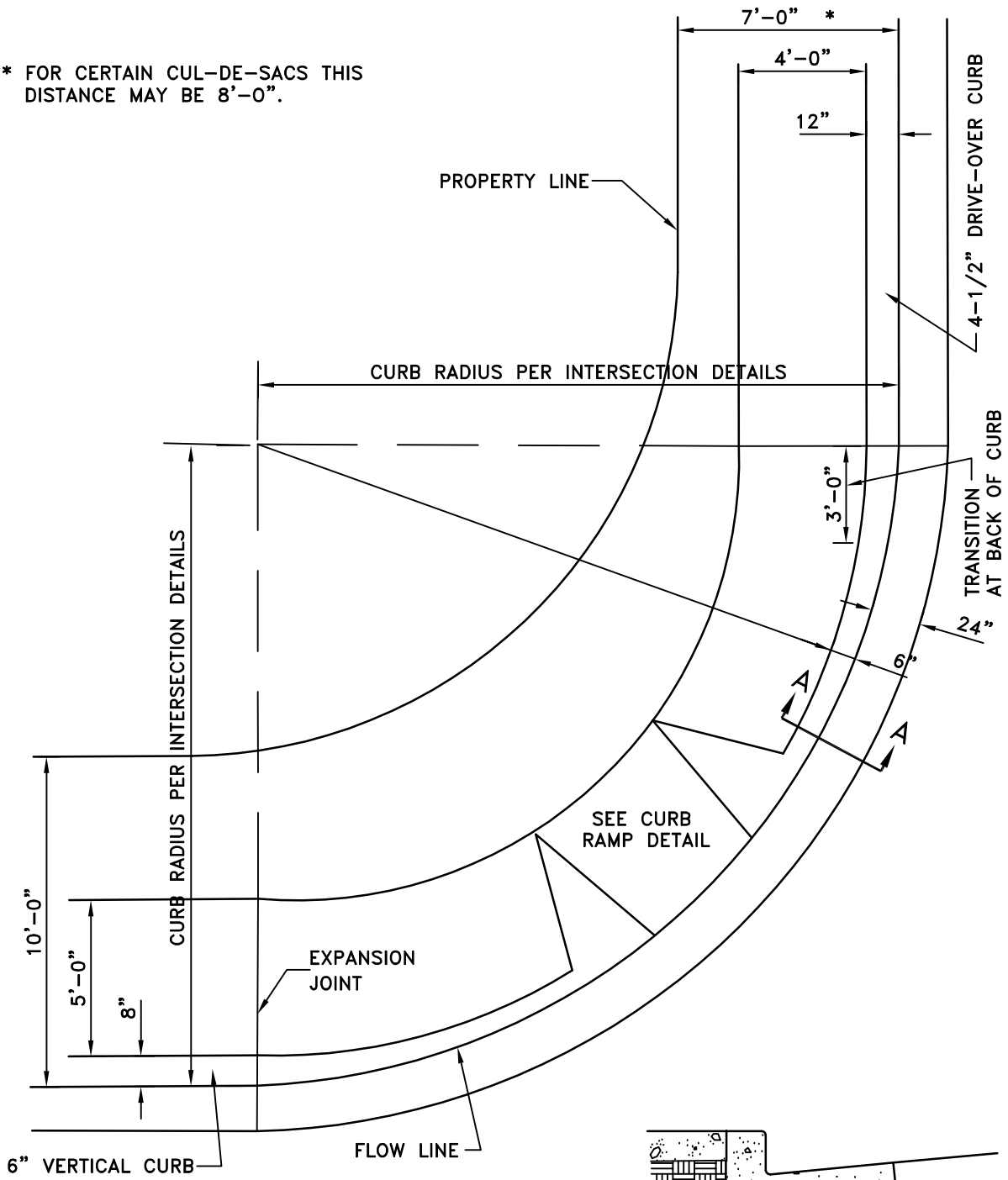
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	**STREETS**	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:		
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 346-348



NOTE:
DRIVE APPROACHES SHALL NOT ENCROACH IN RETURNS.

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

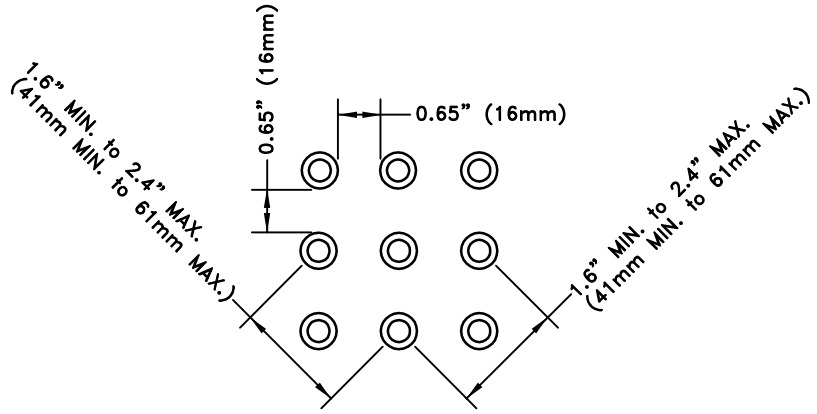
STREETS

CURB & SIDEWALK RETURNS WITH TRANSITIONS

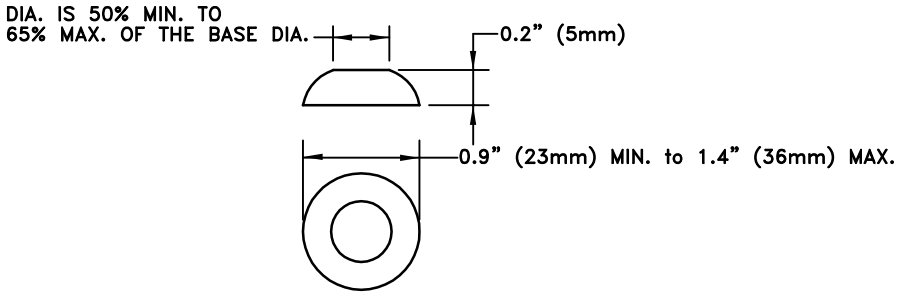
PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO. 349



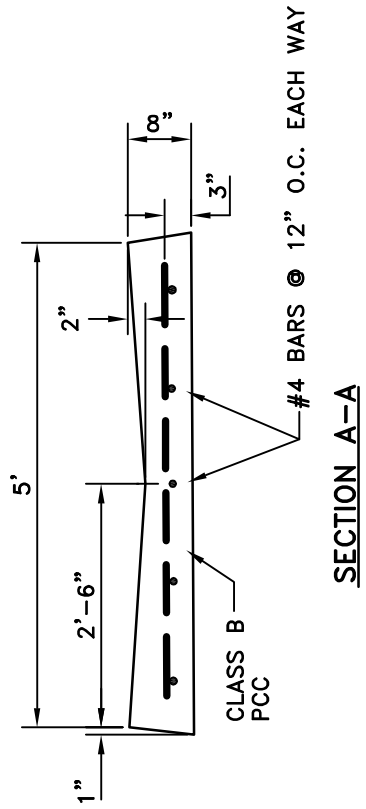
RAISED TRUNCATED DOME PATTERN



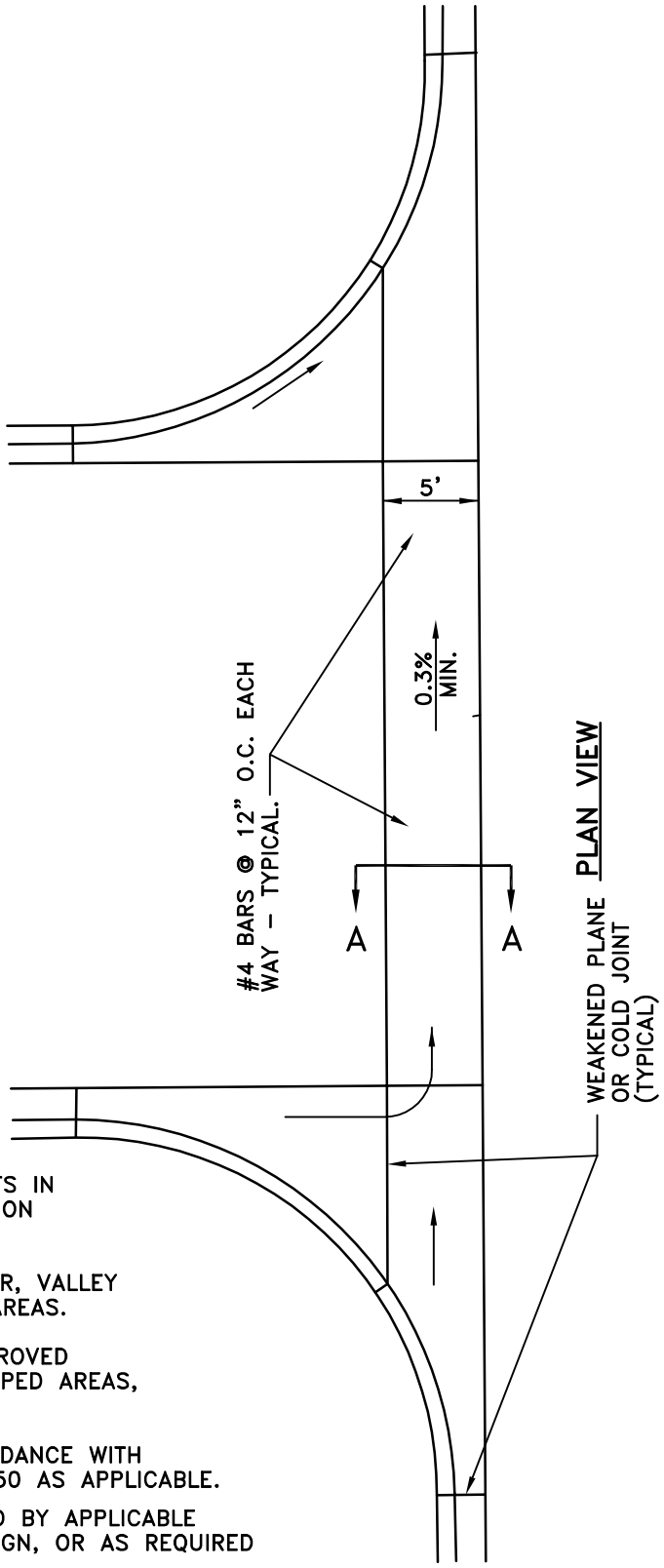
RAISED TRUNCATED DOME DETECTABLE WARNING SURFACE

DRAWING NOT TO SCALE

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	**STREETS**	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	**TRUNCATED DOME DETAIL**	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. **350**



SECTION A–A



PLAN VIEW

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 CITY COUNCIL
RESOLUTION NO. 2006–284

APPROVED BY THE CITY ENGINEER:

Richard D. Wu

STREETS

VALLEY GUTTER

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO. 351

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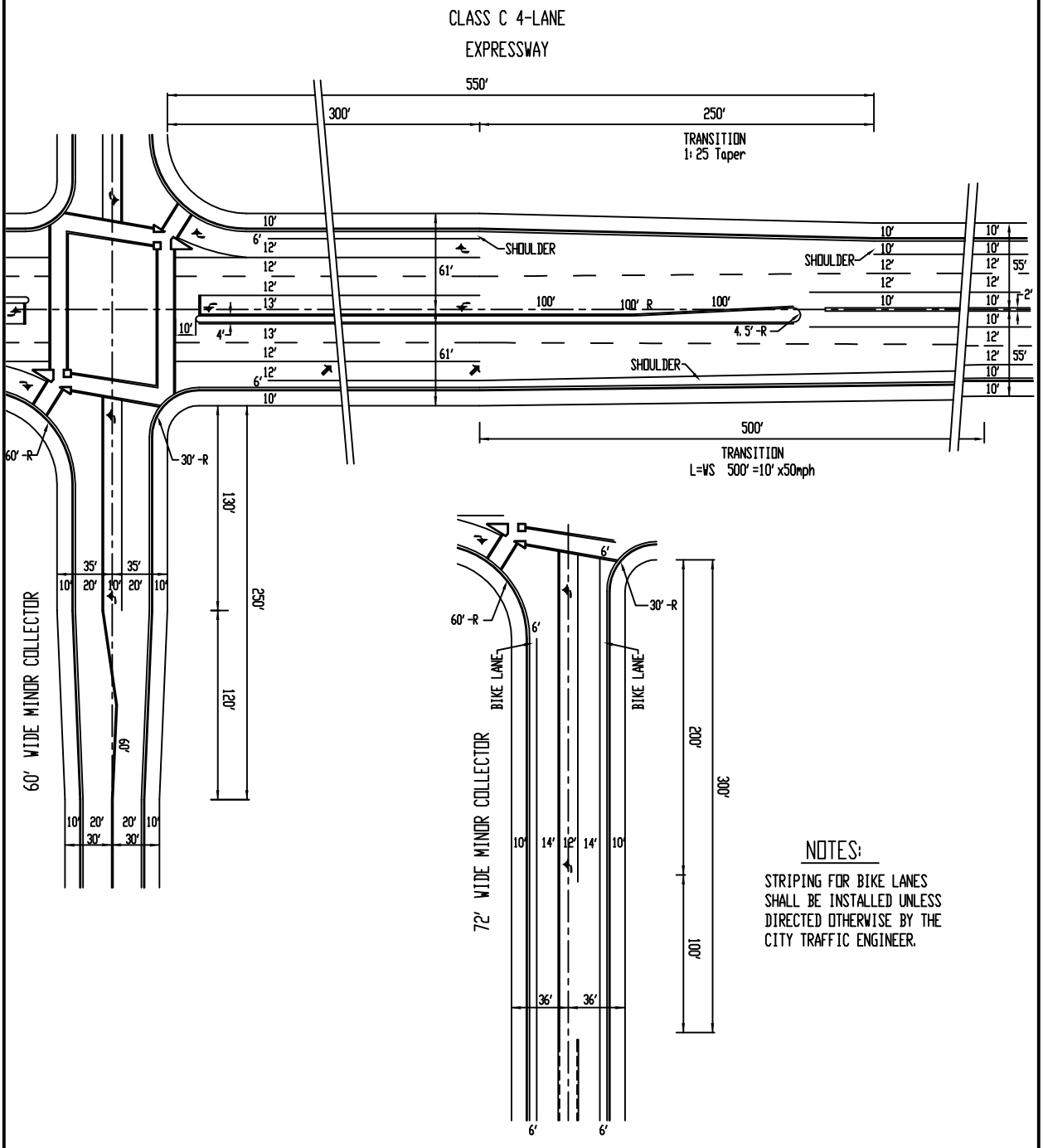
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:		
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 352



NOTES:

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

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

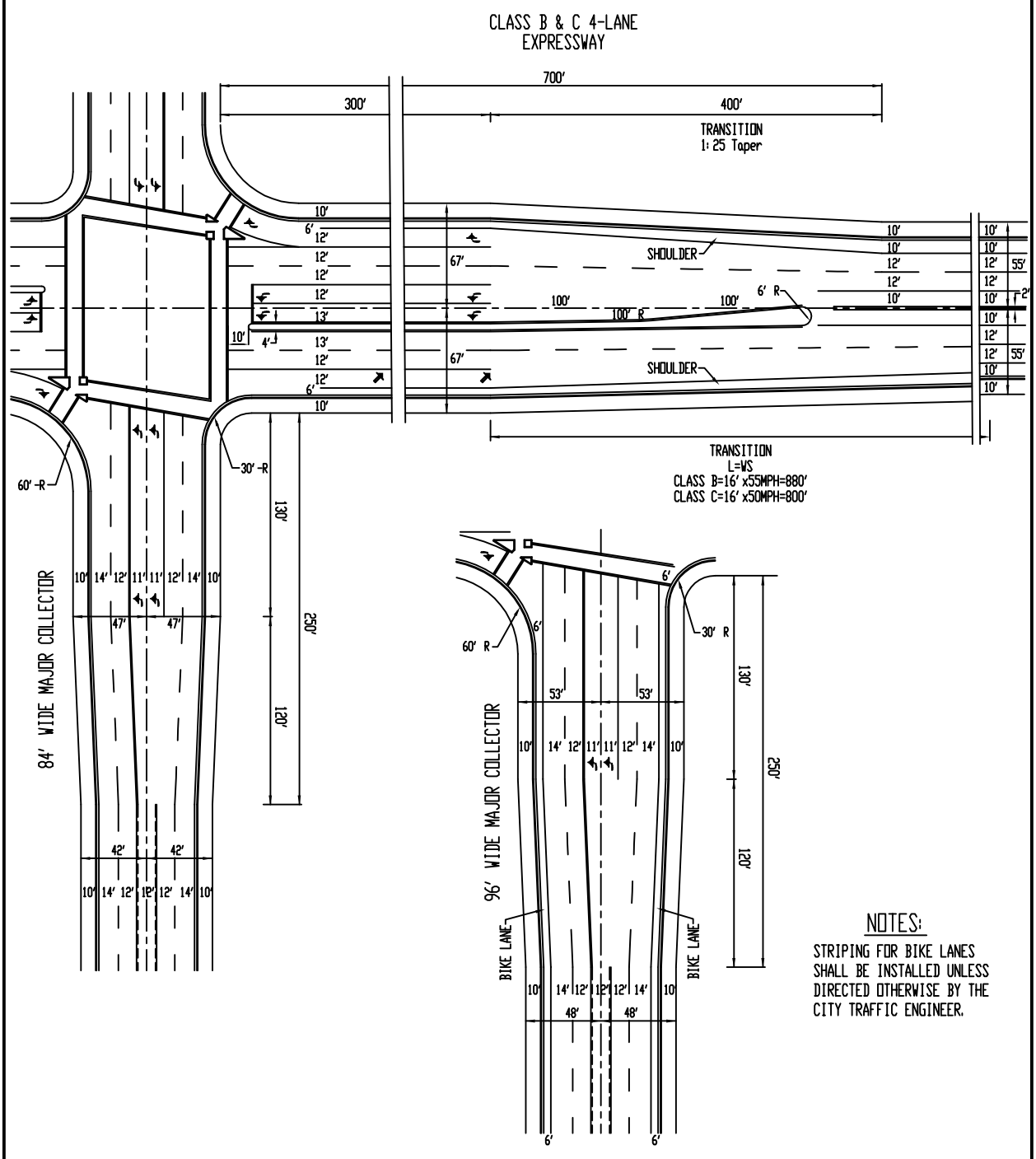
STREETS

CLASS C 4-LANE EXPRESSWAY AT A MINOR COLLECTOR

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO.
353



NOTES:

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

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

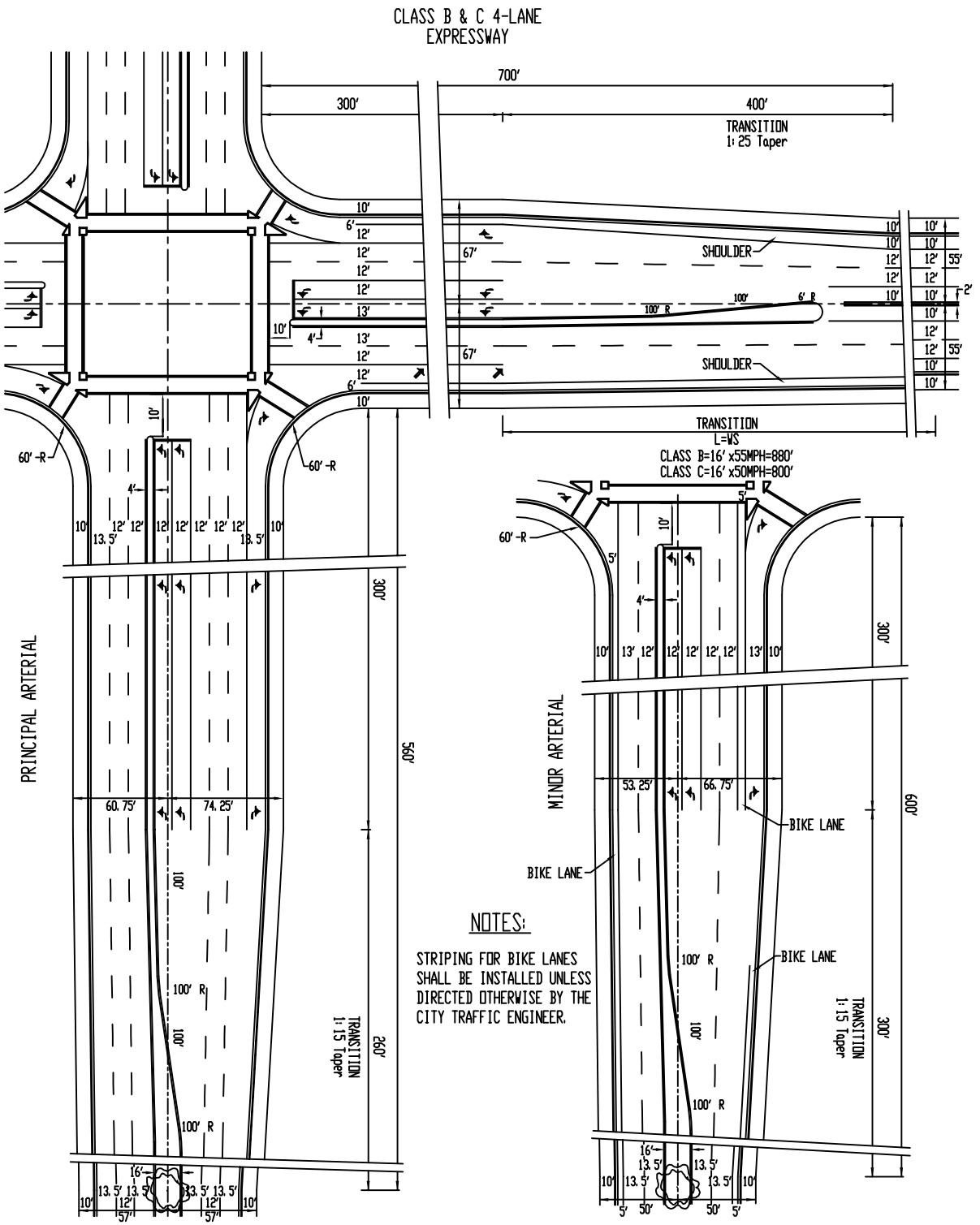
STREETS

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

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO. 354



APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

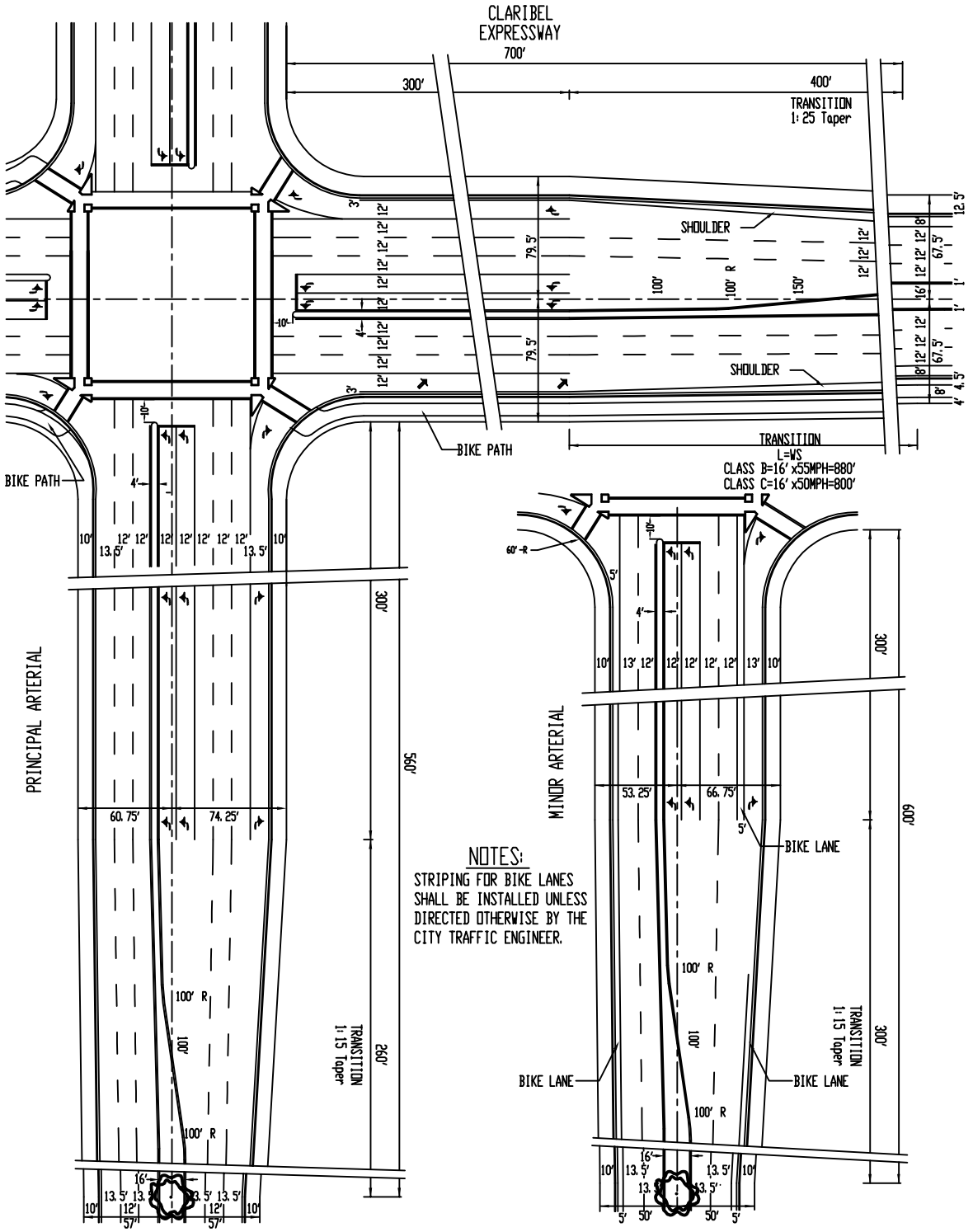
STREETS

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

CITY of MODESTO

PUBLIC WORKS DEPARTMENT

DETAIL NO. 355



APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

STREETS

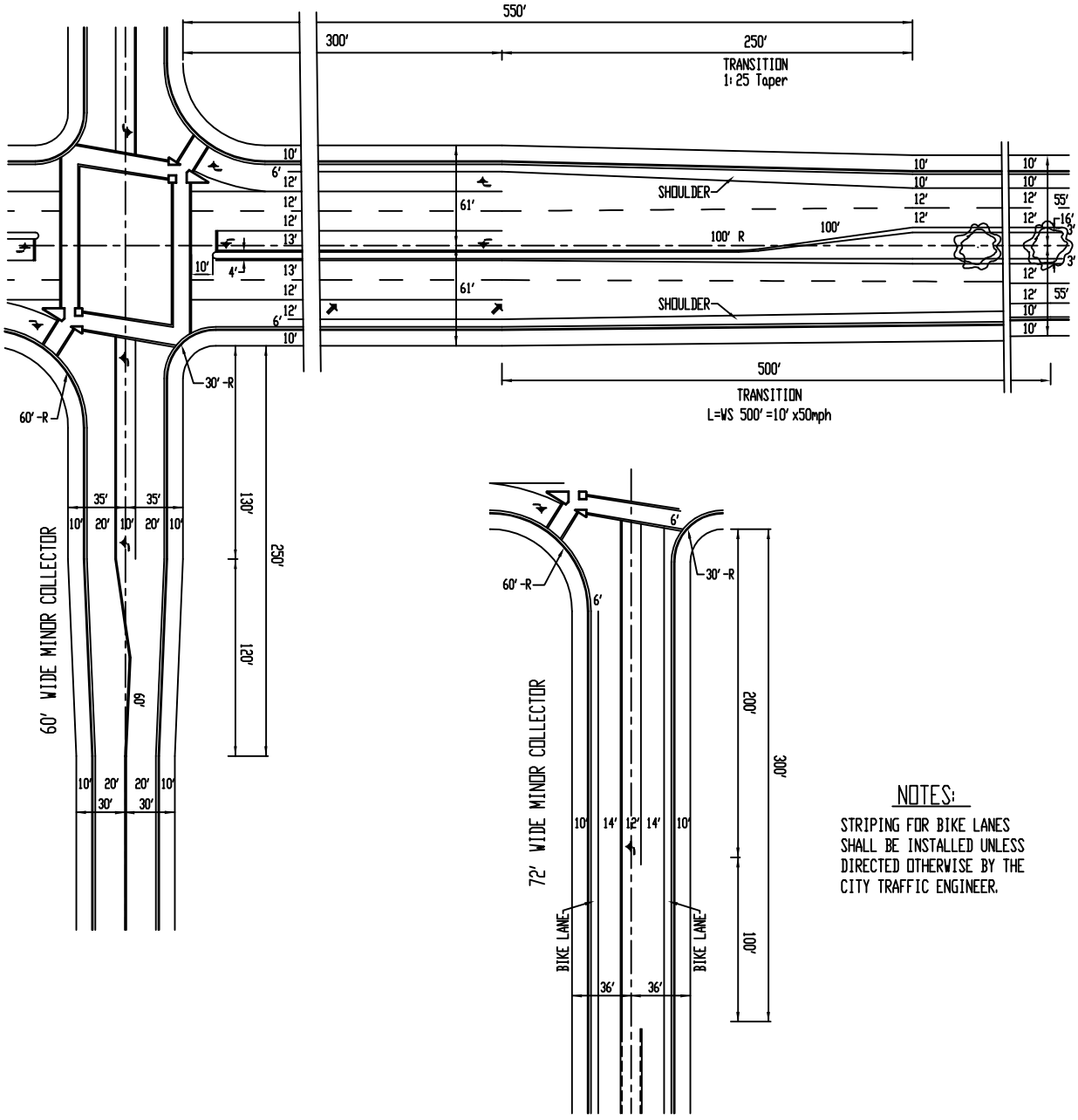
CLARIBEL EXPRESSWAY

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

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 CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wu

STREETS

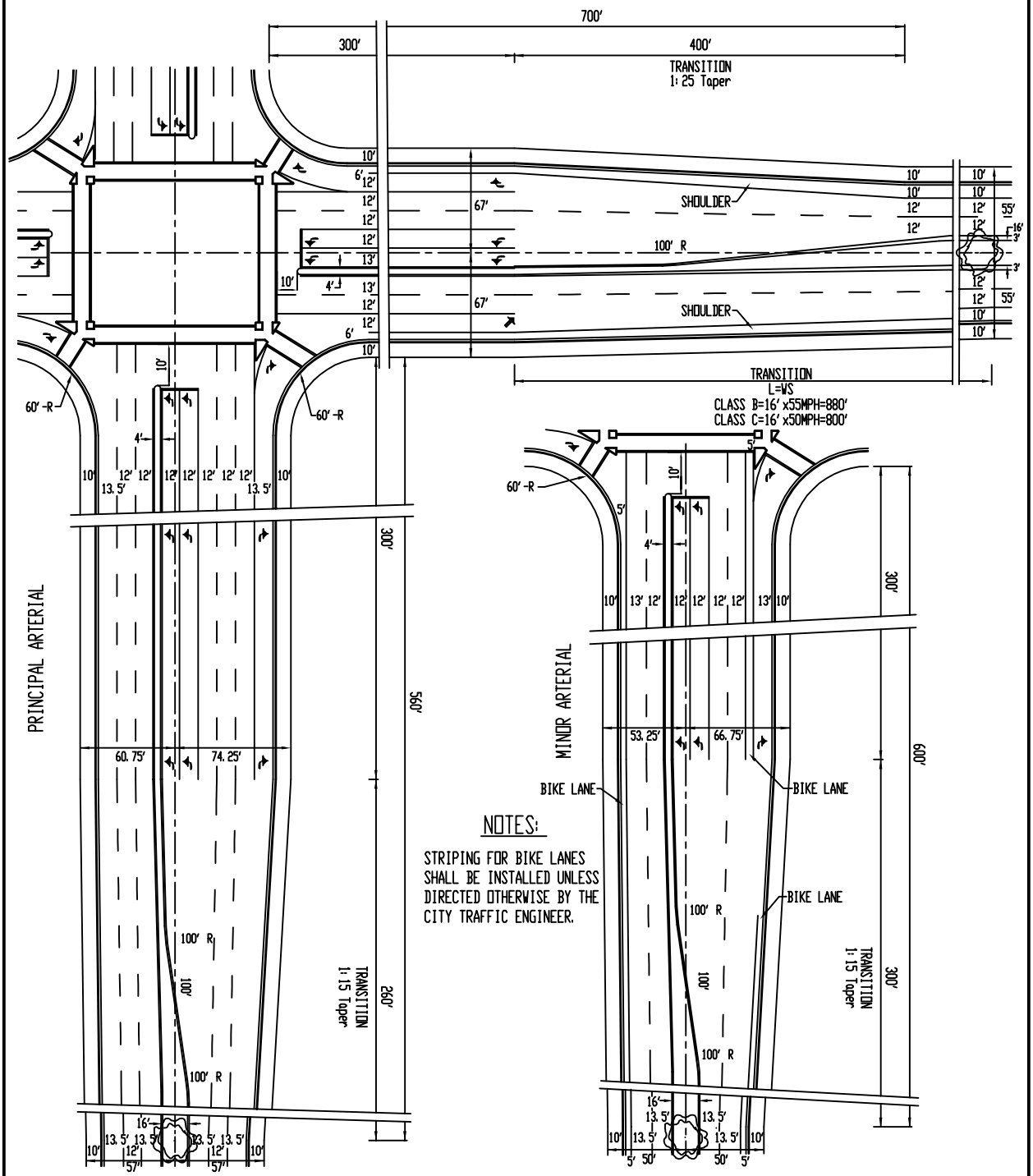
CLASS C 4-LANE LANDSCAPED EXPRESSWAY AT A MINOR COLLECTOR

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO.
356

CLASS B & C 4-LANE
LANDSCAPED EXPRESSWAY



NOTES:

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

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wu

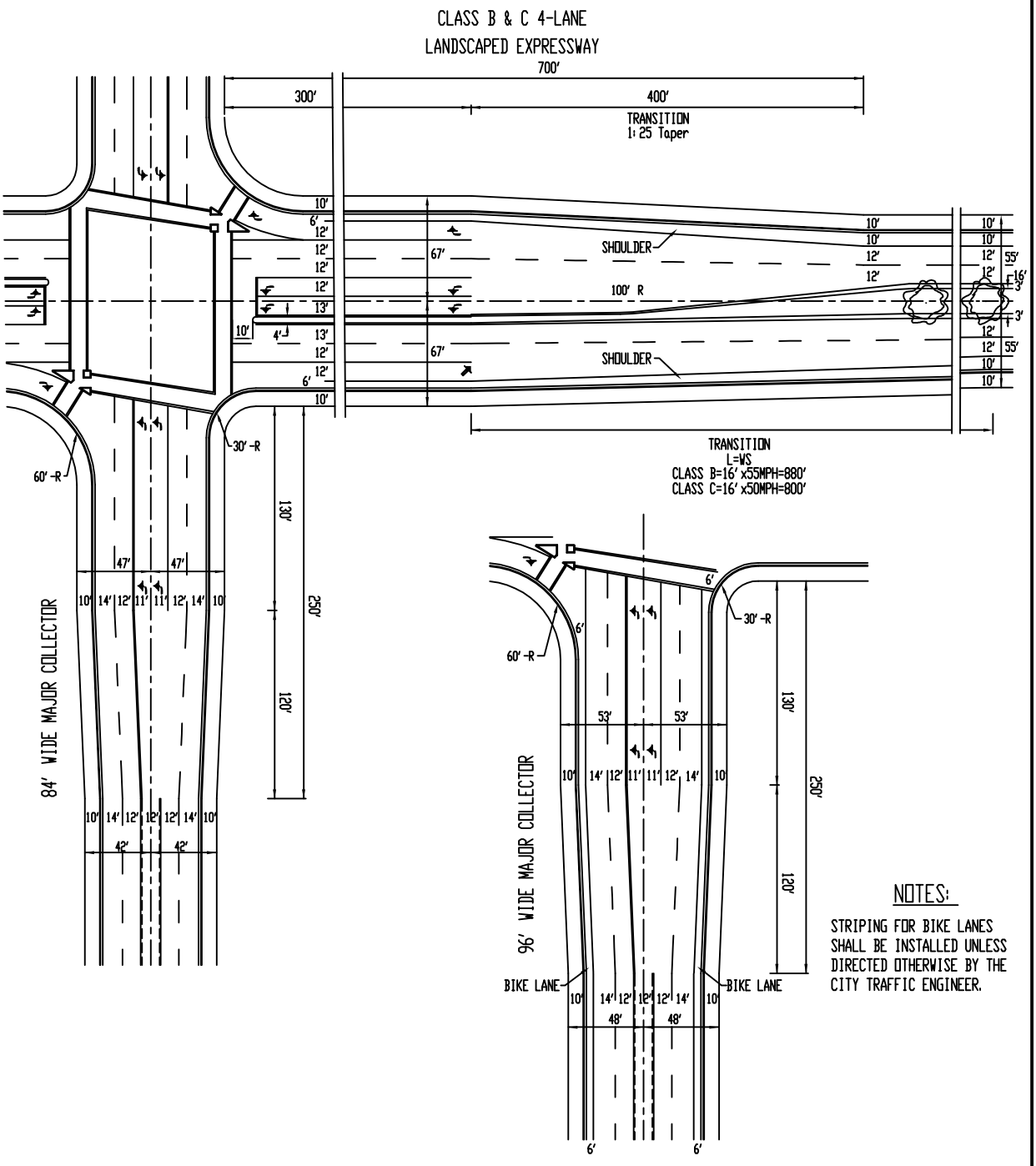
STREETS

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

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO.
357



NOTES:

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

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

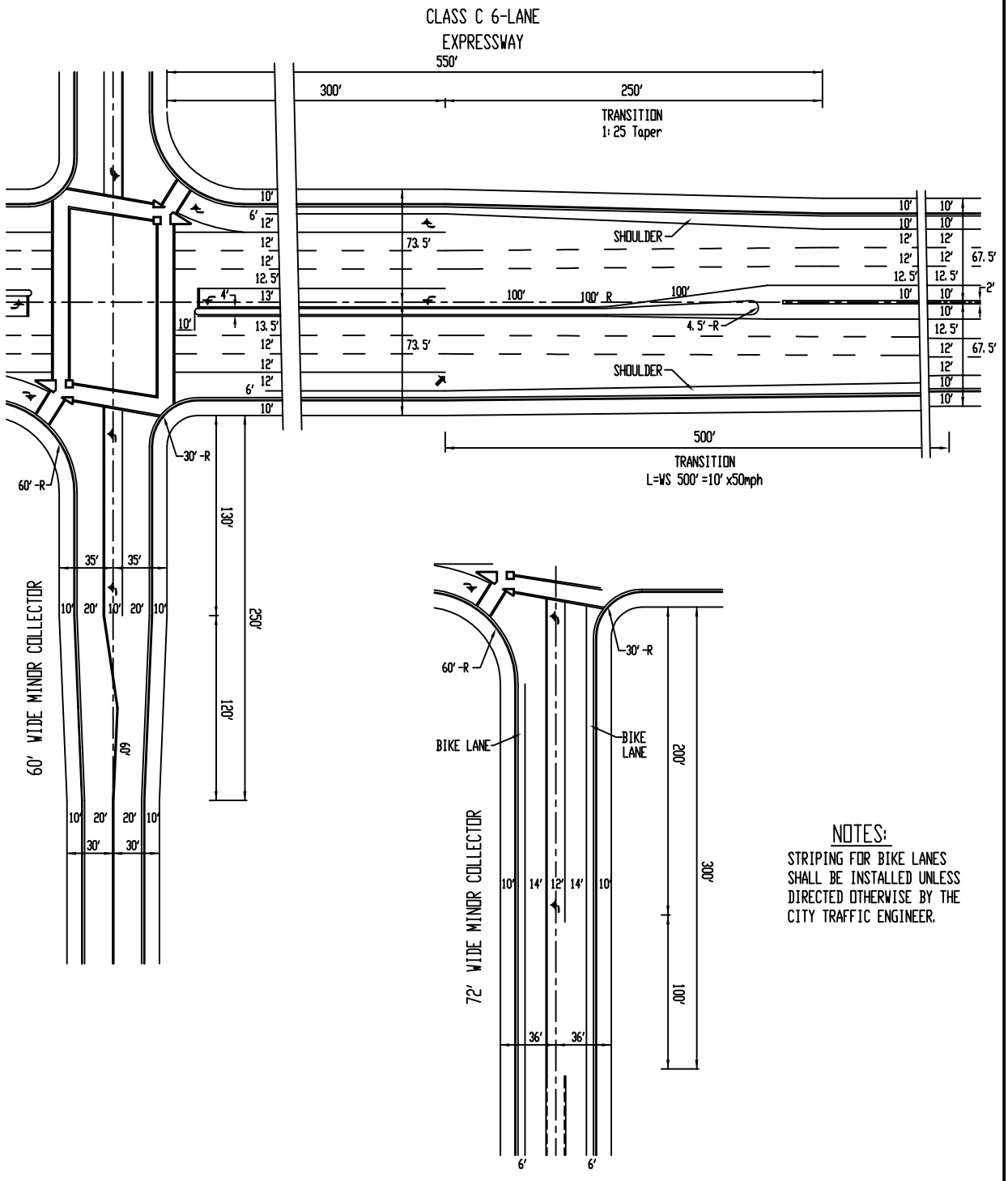
STREETS

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

CITY of MODESTO

PUBLIC WORKS DEPARTMENT

DETAIL NO. 358



NOTES:

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

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

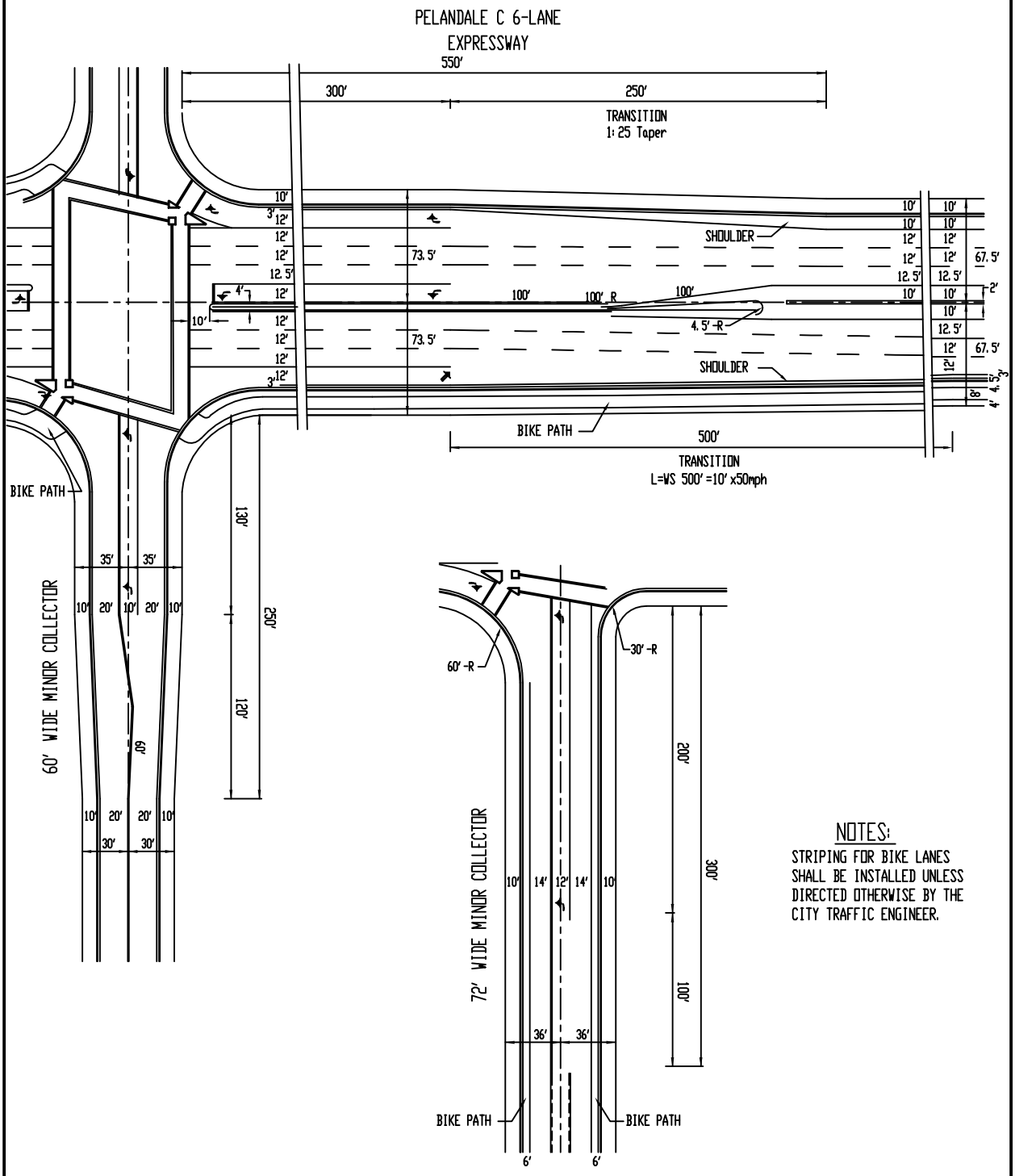
STREETS

CLASS C 6-LANE EXPRESSWAY AT A MINOR COLLECTOR

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO.
359



NOTES:

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

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

STREETS

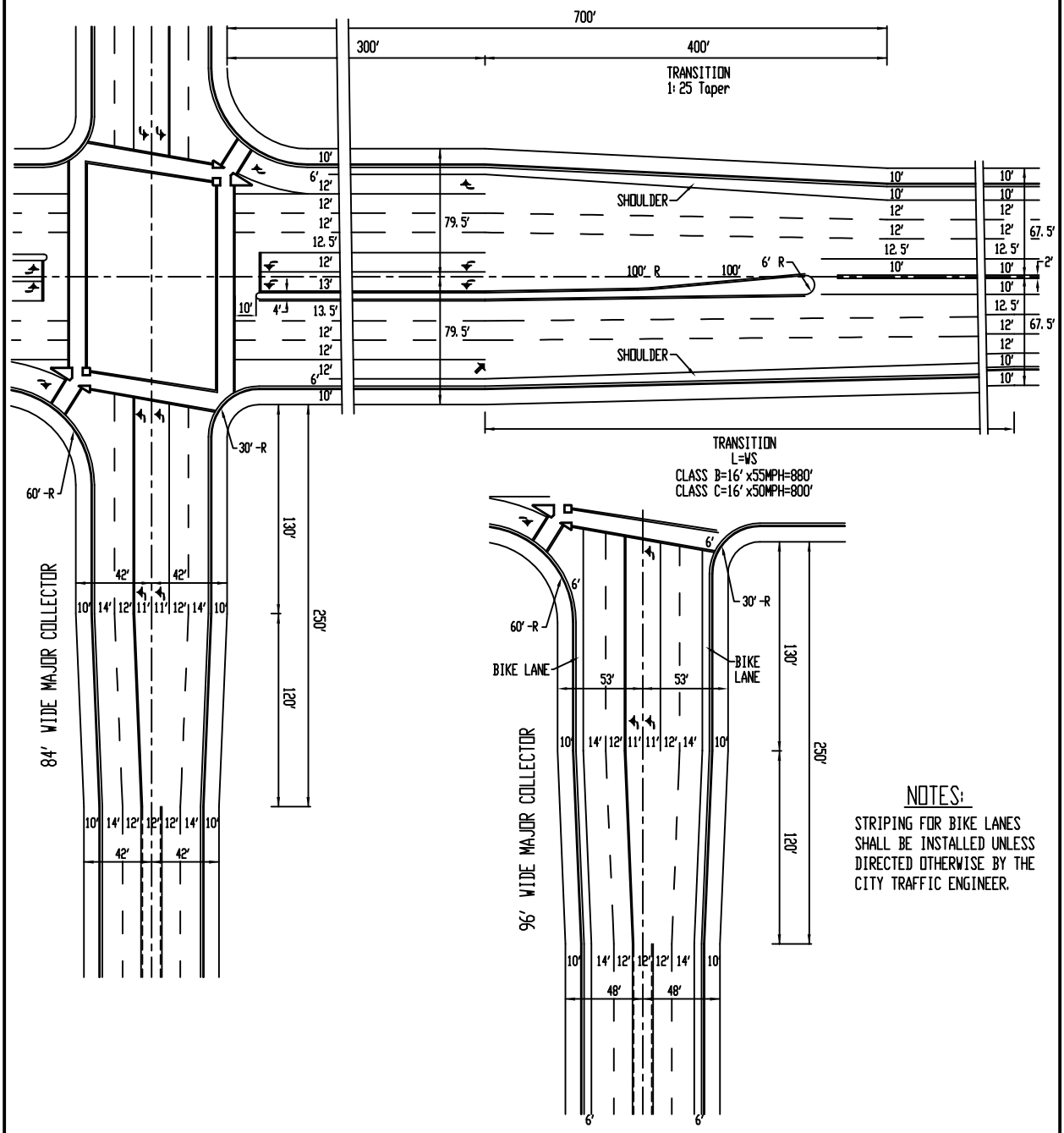
PELANDALE AVENUE CLASS C 6-LANE EXPRESSWAY

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO.
359A

CLASS B & C 6-LANE
EXPRESSWAY



NOTES:

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

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

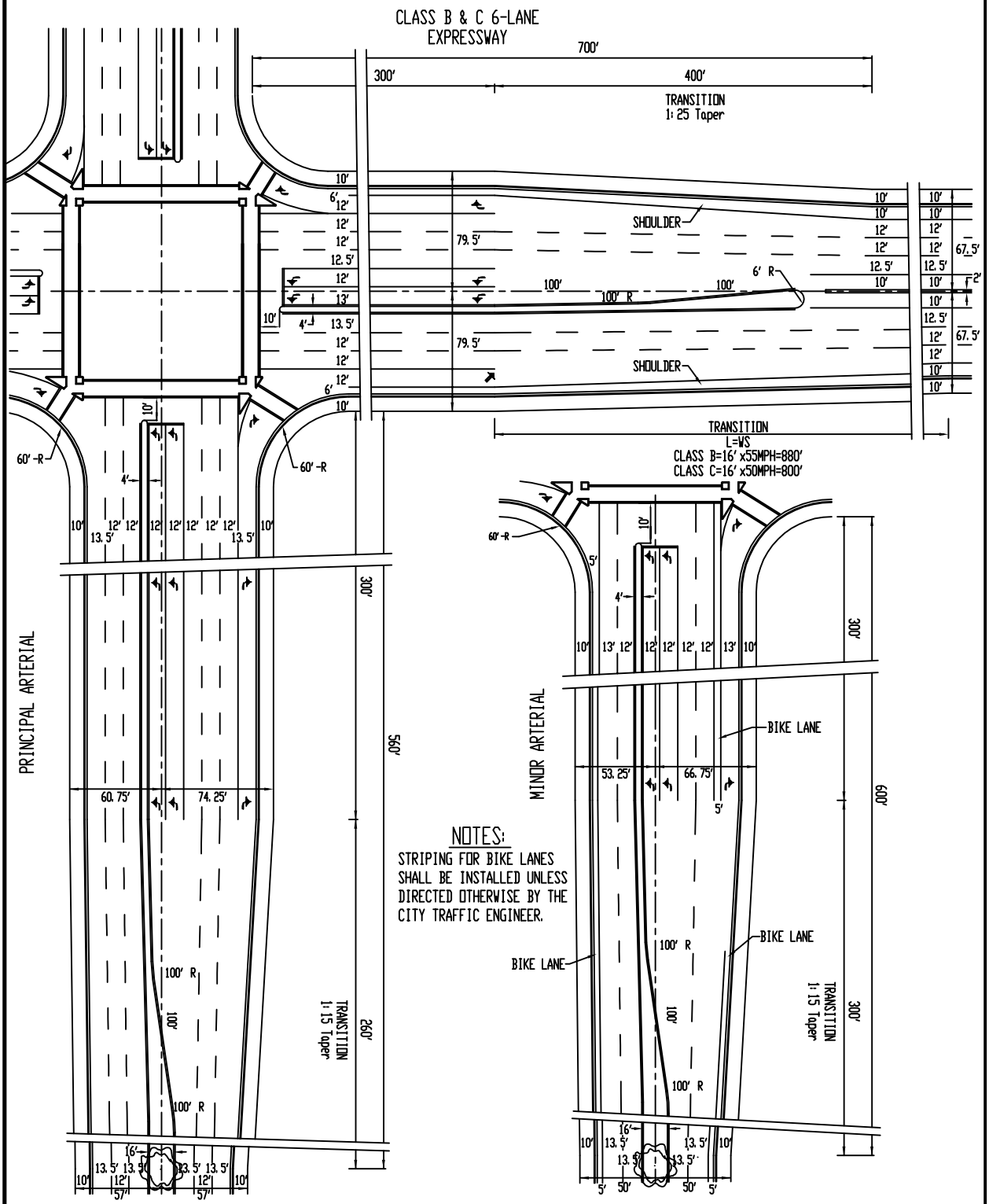
STREETS

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

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO.
360



APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

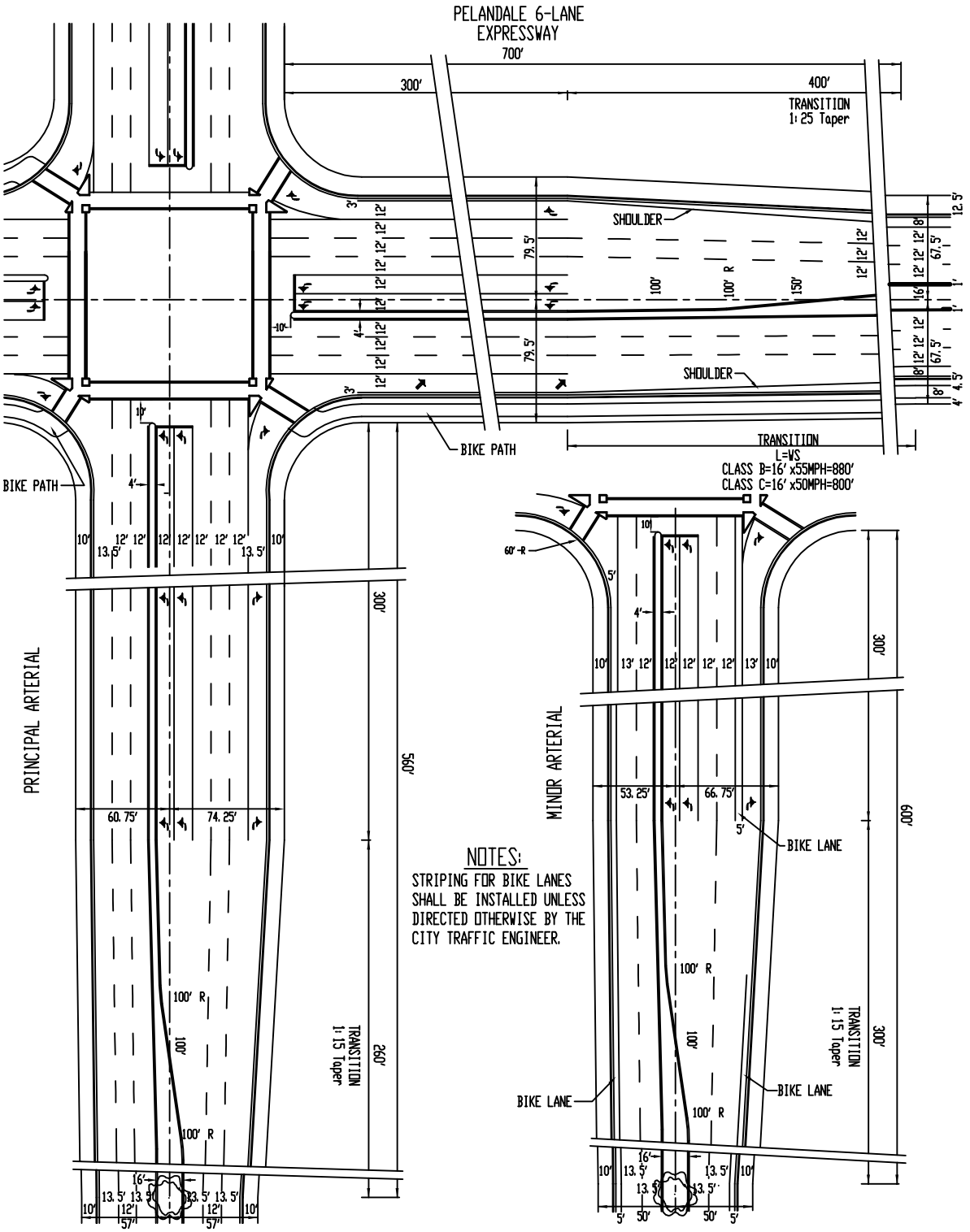
STREETS

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

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO. 361



APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Ulm

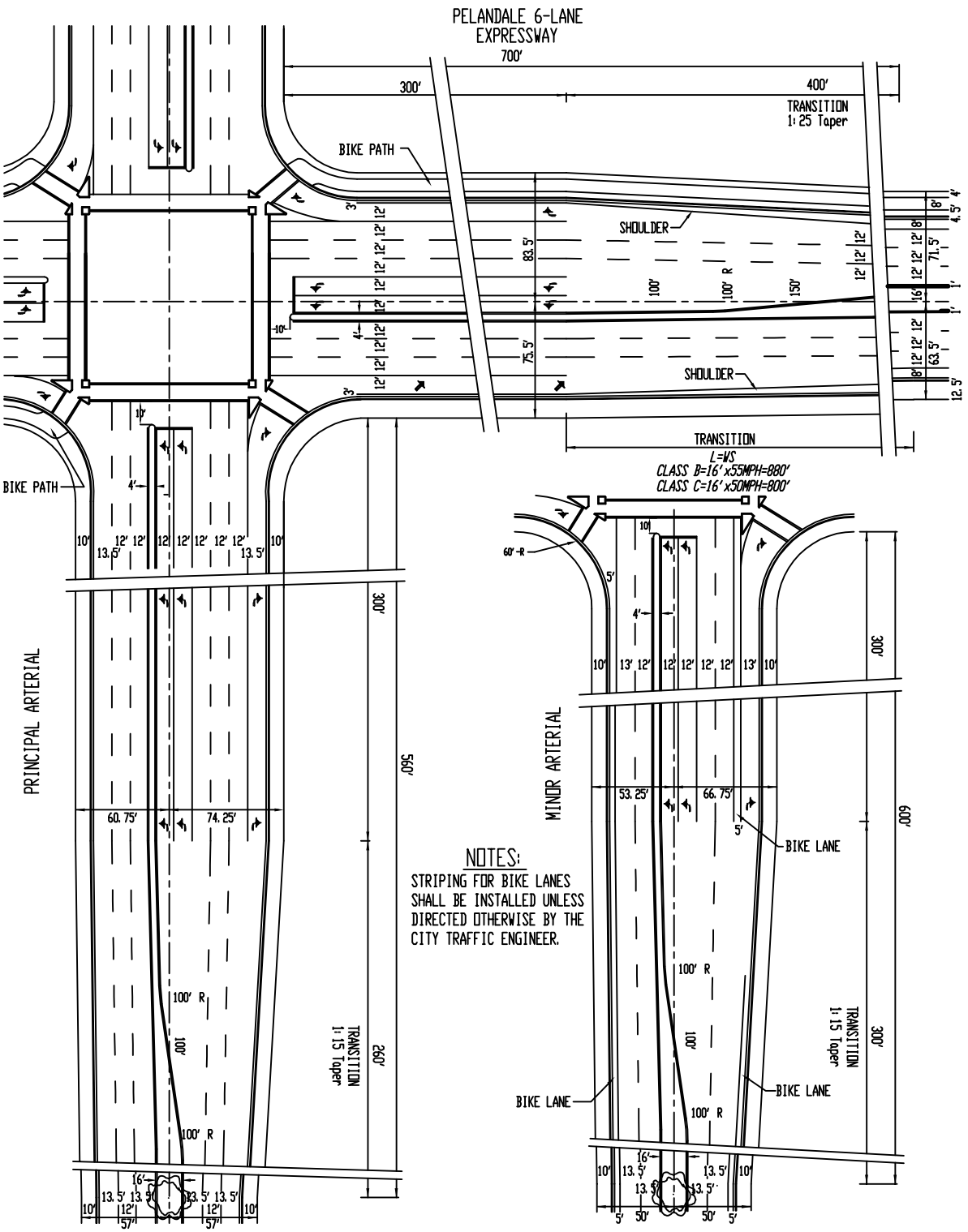
STREETS

PELANDALE EXPRESSWAY AT A PRINCIPAL AND MINOR ARTERIAL

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO.
361A



APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

STREETS

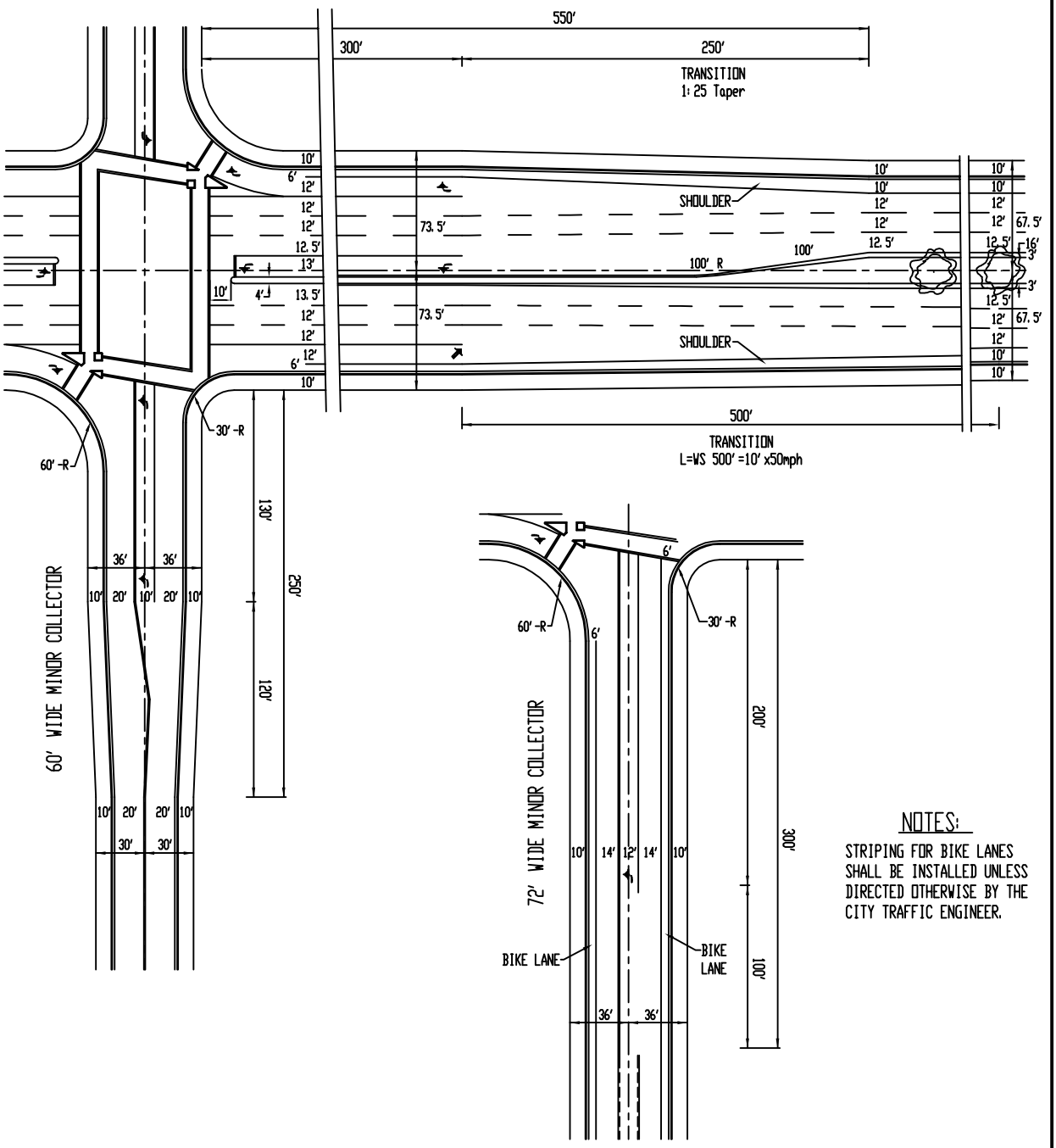
CLARATINA EXPRESSWAY AT A PRINCIPAL AND MINOR ARTERIAL

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

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 CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

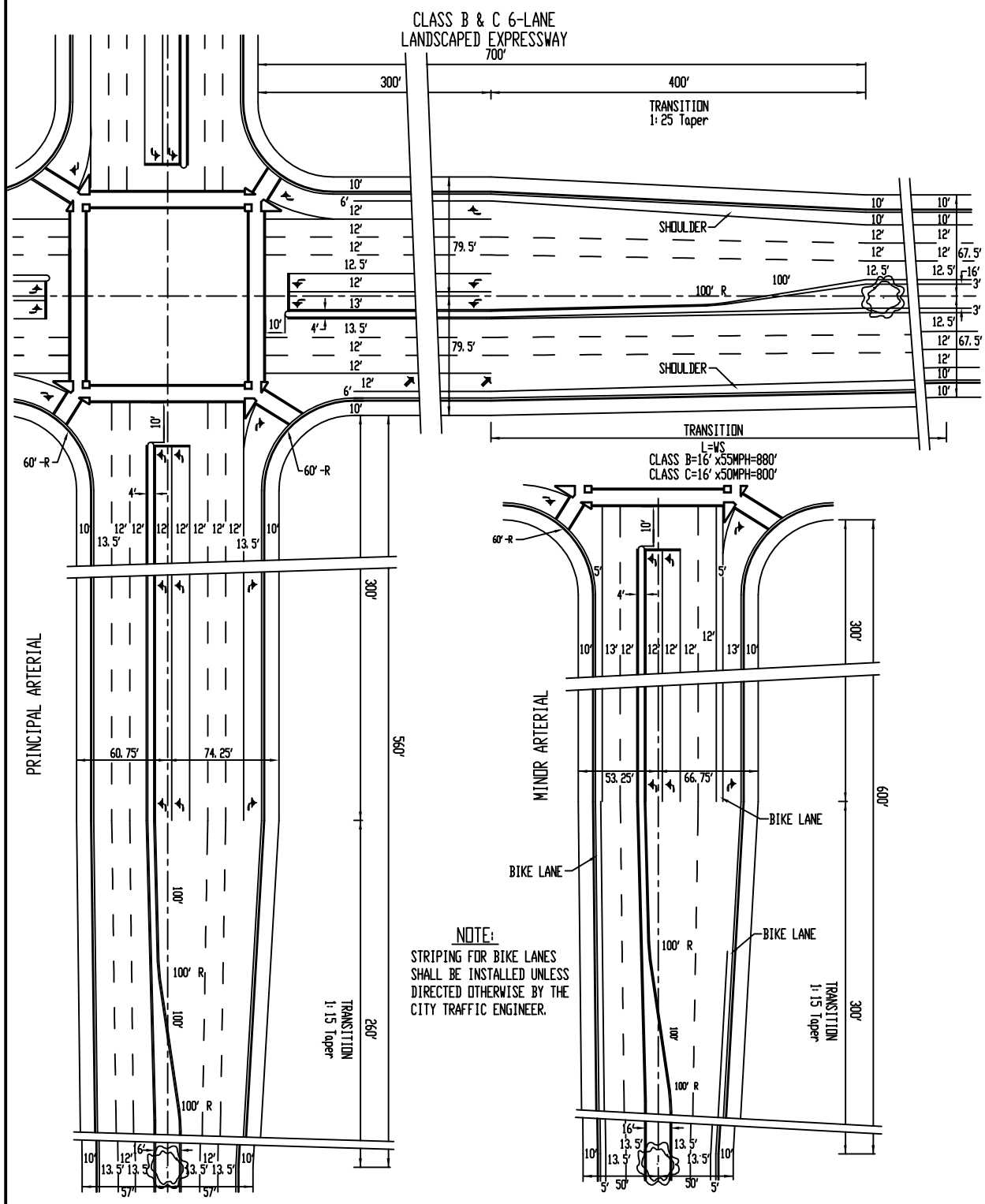
STREETS

CLASS C 6-LANE LANDSCAPED EXPRESSWAY AT A MINOR COLLECTOR

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO.
362



APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wu

STREETS

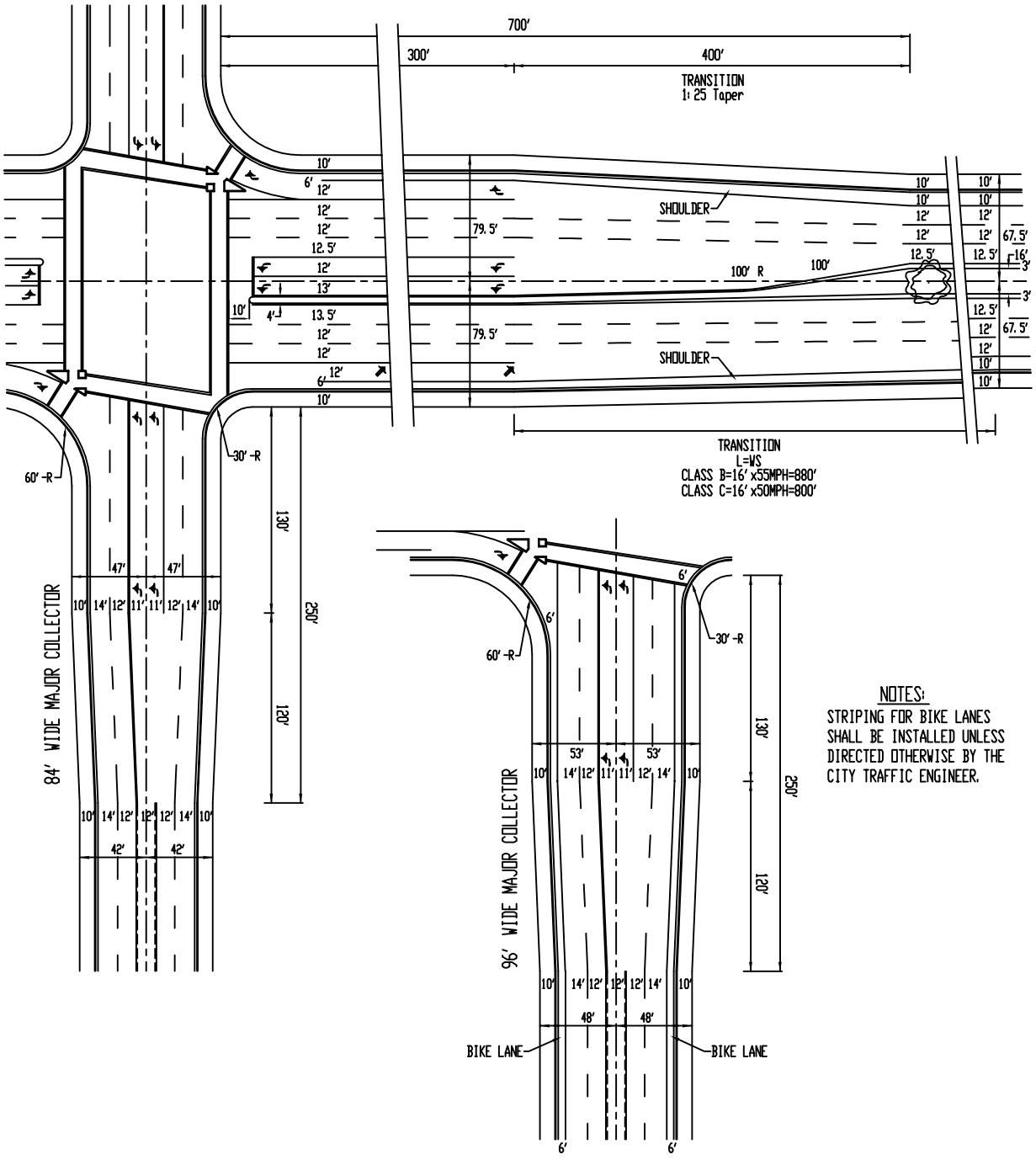
CLASS B & C 6-LANE LANDSCAPED EXPRESSWAY AT A PRINCIPAL AND MINOR ARTERIAL

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO.
363

CLASS B & C 6-LANE
LANDSCAPED EXPRESSWAY



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

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wagner

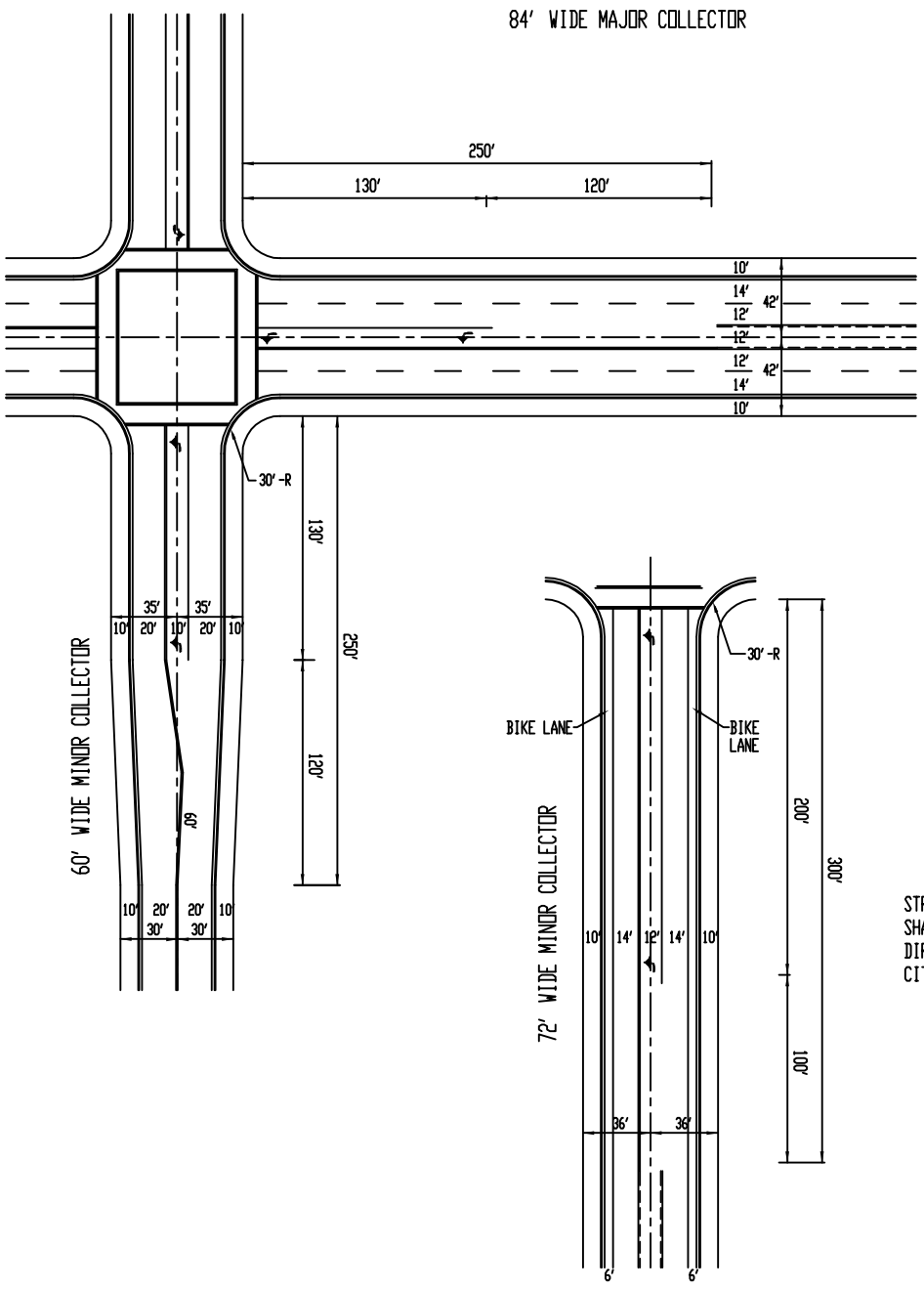
STREETS

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

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO.
364



NOTES:

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

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wu

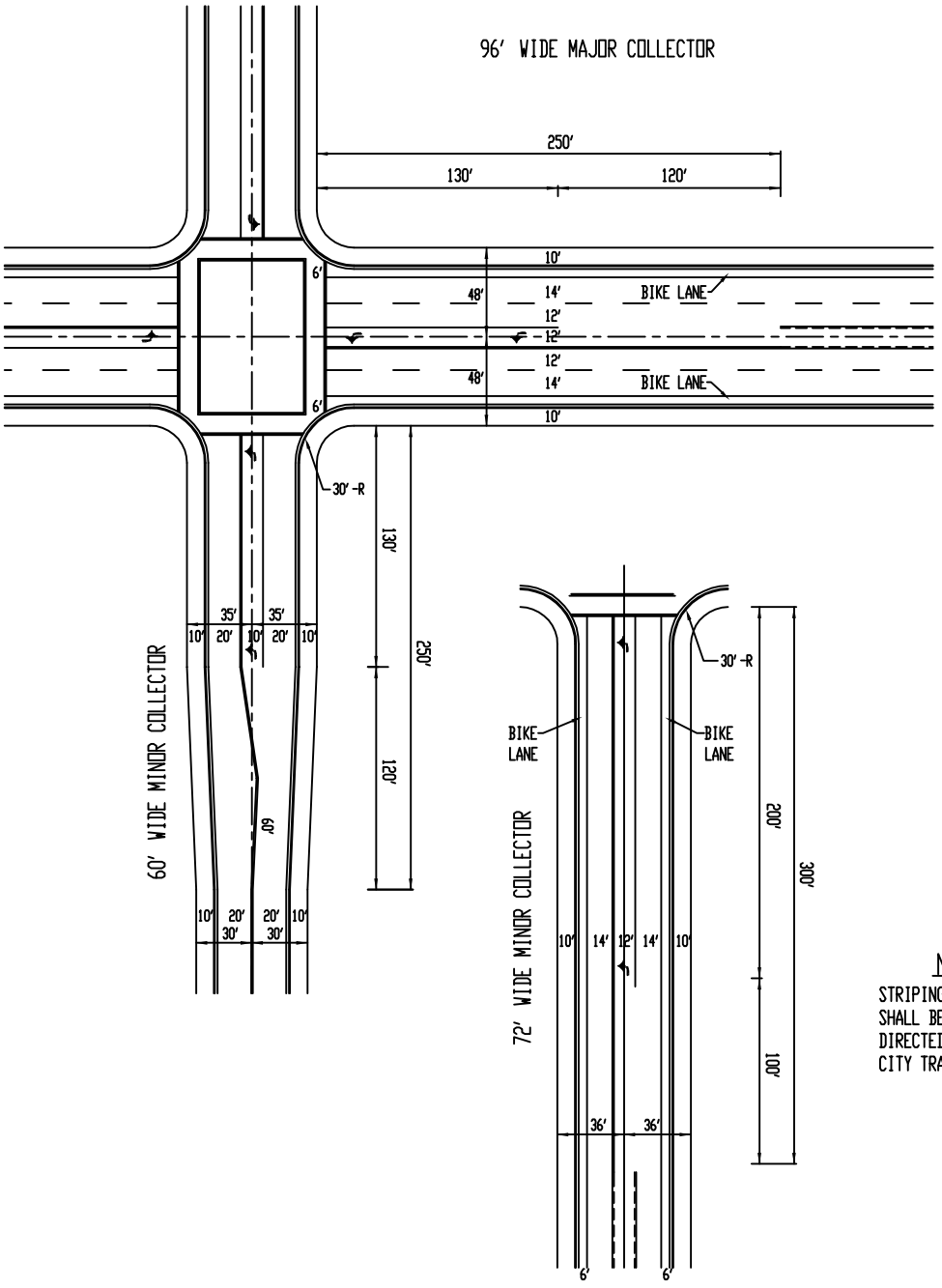
STREETS

84' WIDE MAJOR COLLECTOR AT A MINOR COLLECTOR

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO. 365



NOTES:

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APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Ulm

STREETS

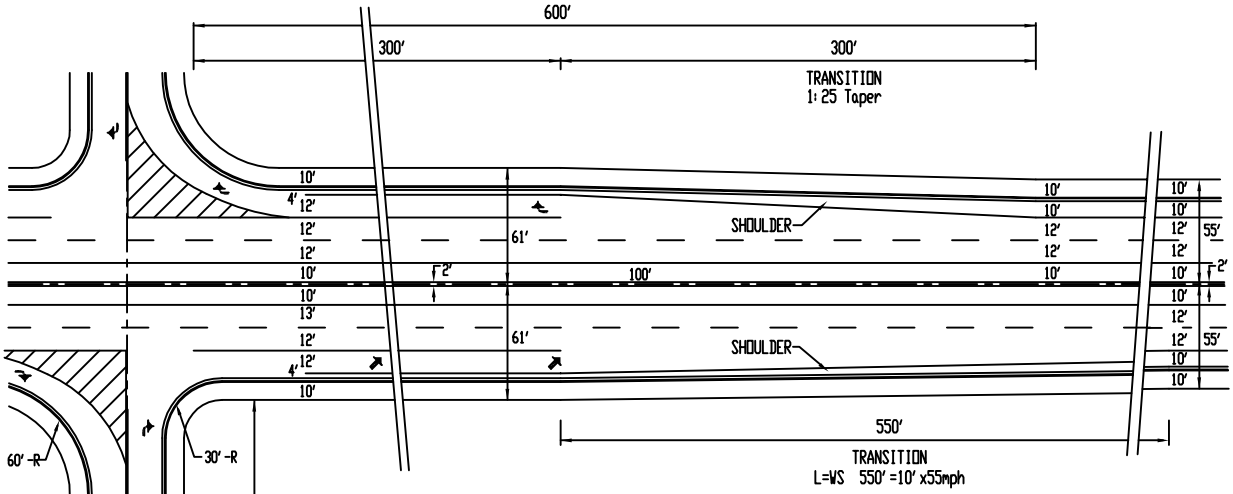
96' WIDE MAJOR COLLECTOR AT A MINOR COLLECTOR

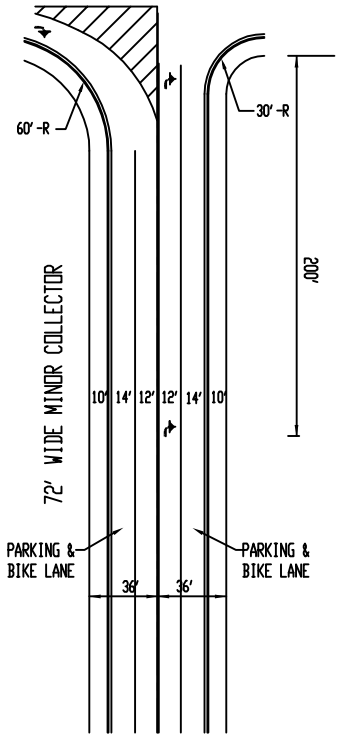
PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO.
366

CLASS B 4-LANE
EXPRESSWAY





NOTES:

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APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Ulrich

STREETS

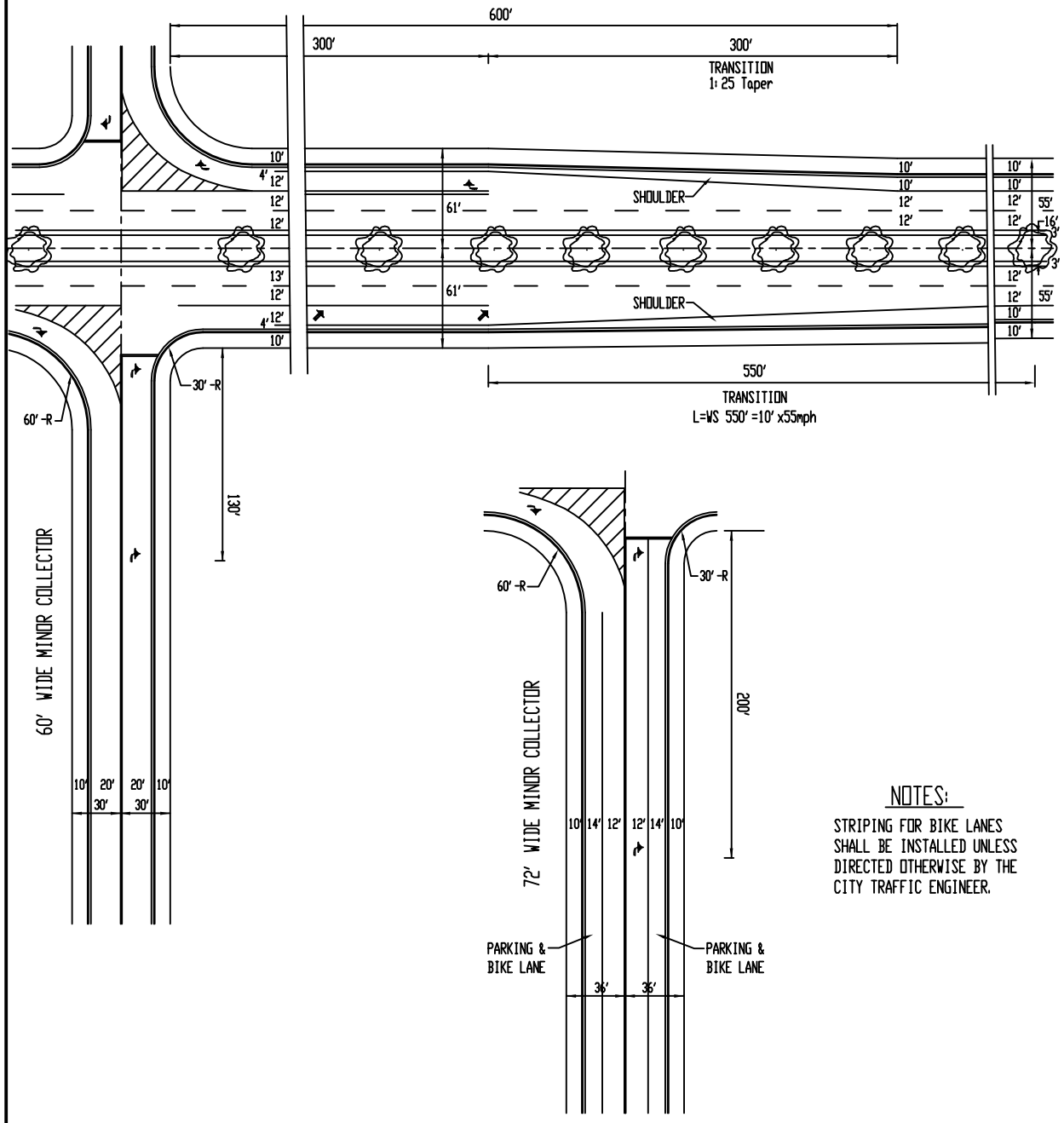
CLASS B 4-LANE EXPRESSWAY AT A MINOR COLLECTOR

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO.
367

CLASS B 4-LANE
LANDSCAPED EXPRESSWAY



NOTES:

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APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wu

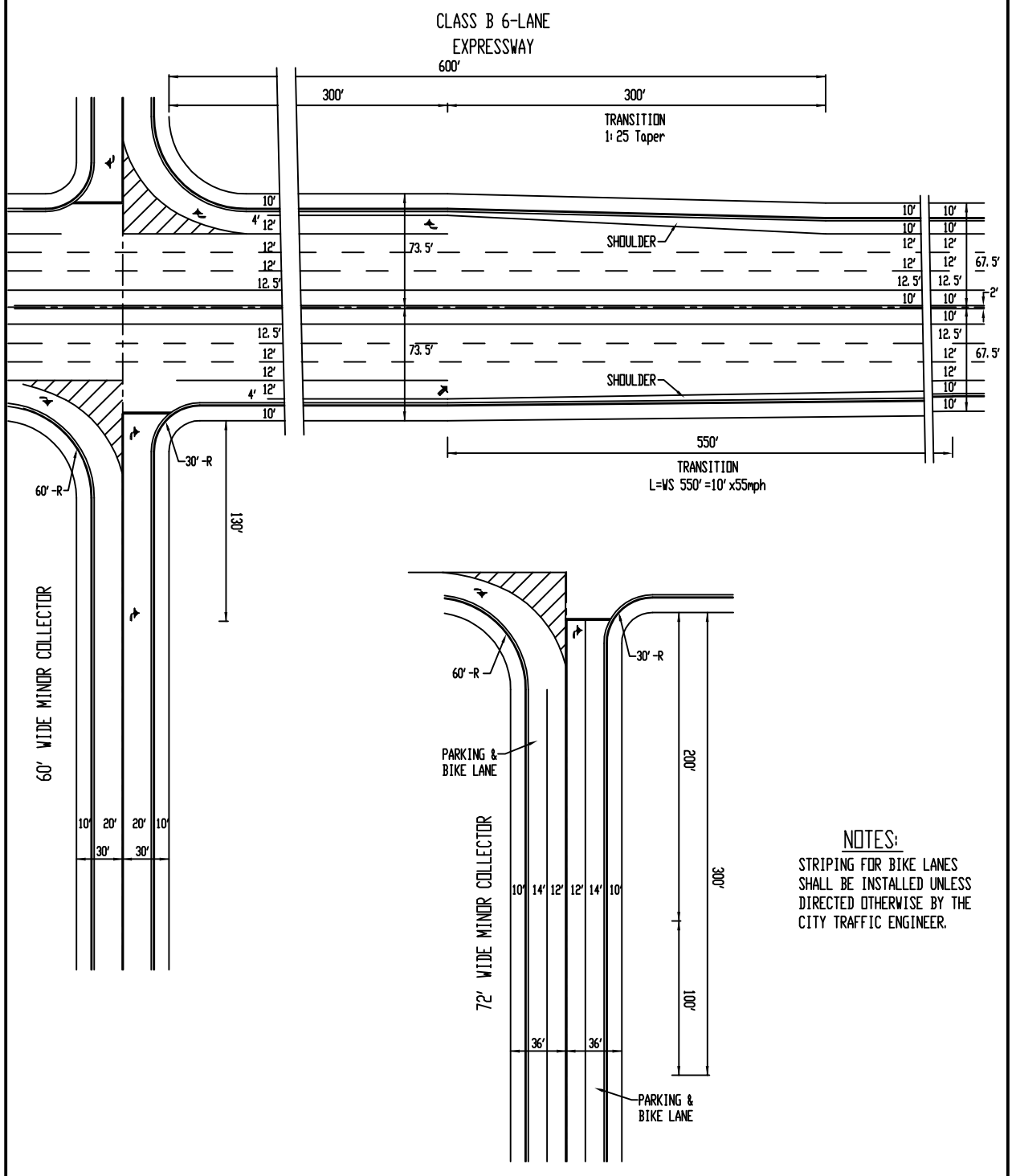
STREETS

CLASS B 4-LANE LANDSCAPED EXPRESSWAY AT A MINOR COLLECTOR

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO.
368



NOTES:

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APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Ulm

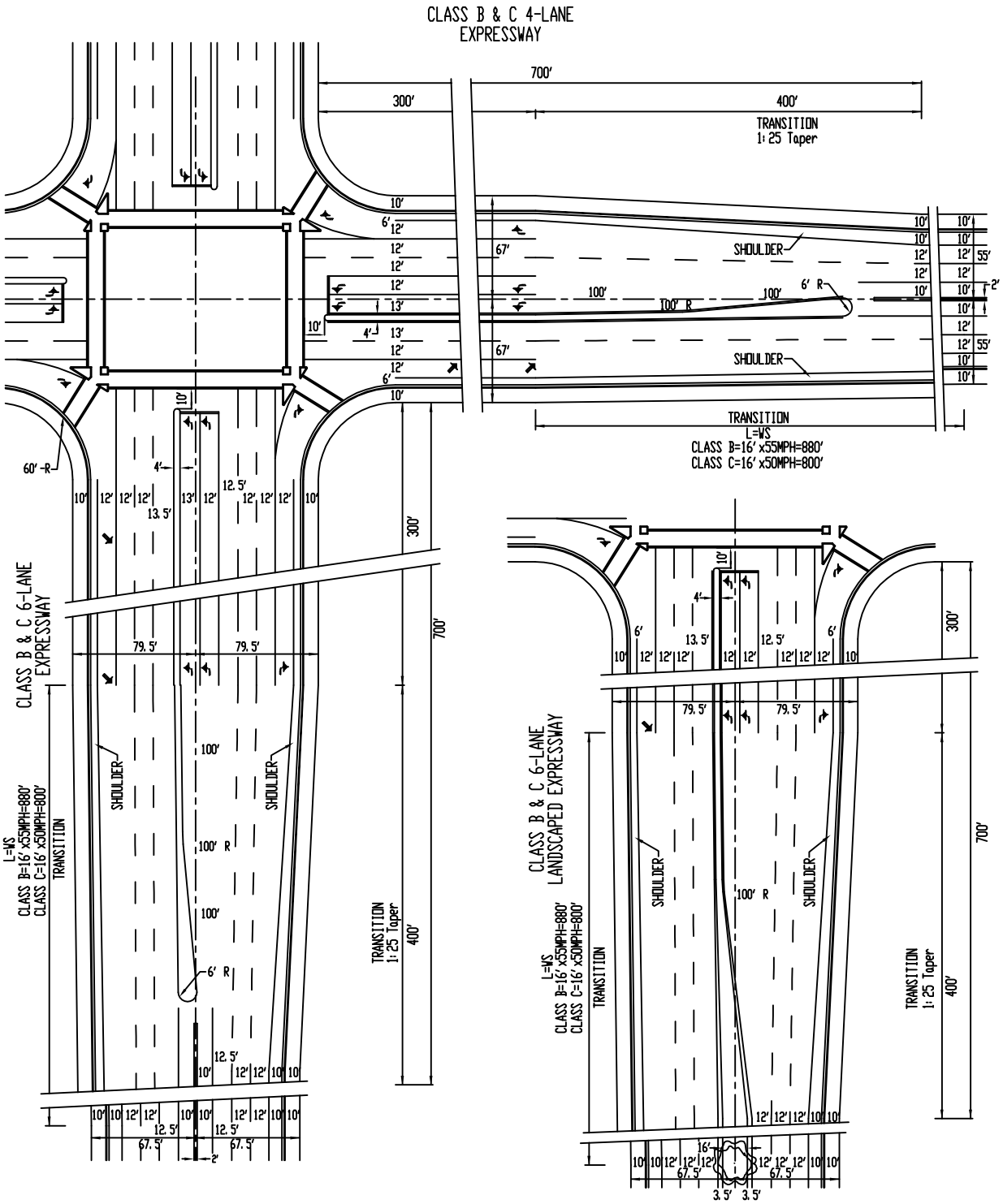
STREETS

CLASS B 6-LANE EXPRESSWAY AT A MINOR COLLECTOR

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO.
369



APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

STREETS

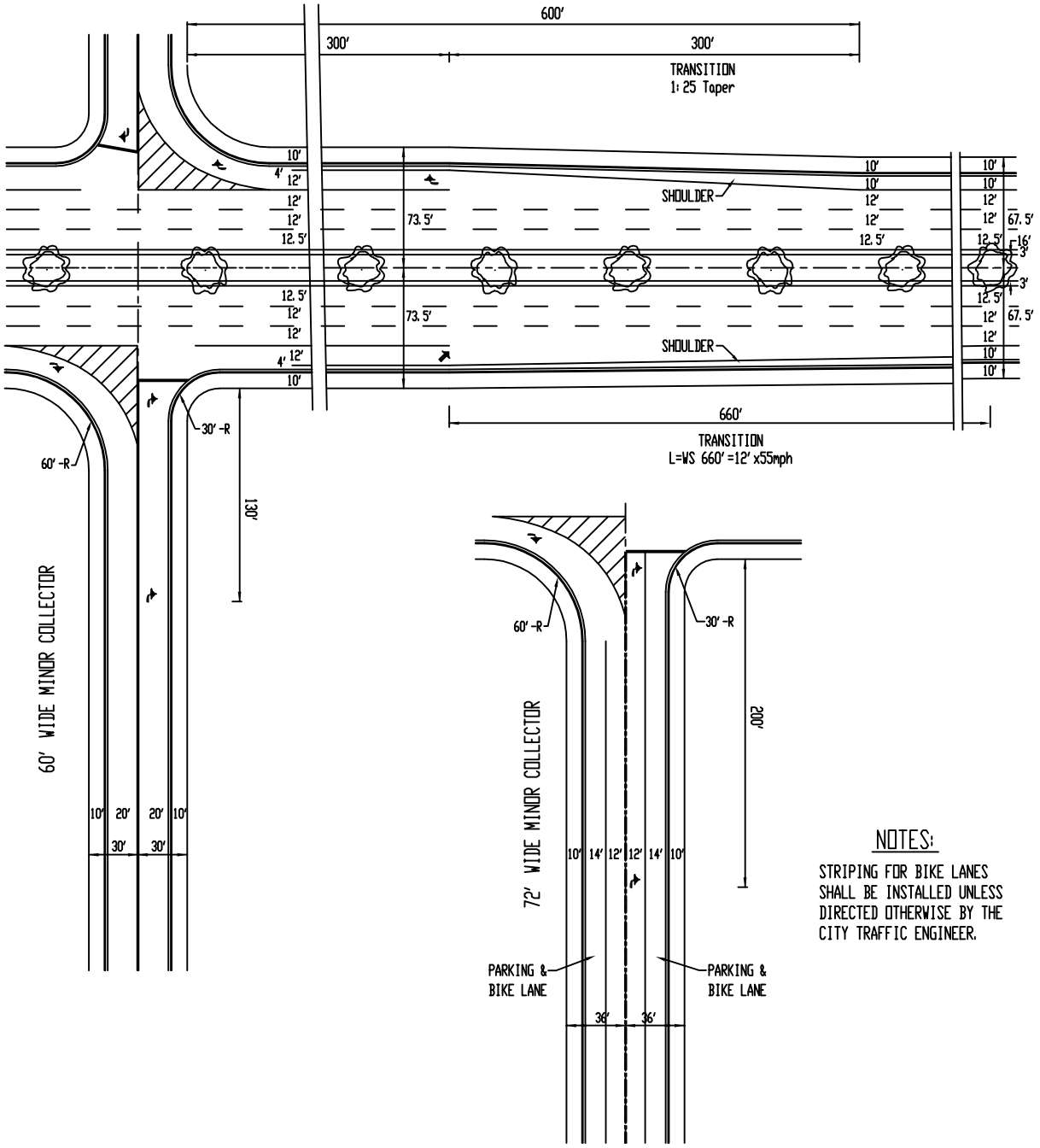
CLASS B & C 4-LANE EXPRESSWAY AT A CLASS B & C 6-LANE EXPRESSWAY

CITY of MODESTO

PUBLIC WORKS DEPARTMENT

DETAIL NO. 370

CLASS B 6-LANE
LANDSCAPED EXPRESSWAY



NOTES:

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

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wu

STREETS

CLASS B 6-LANE LANDSCAPED EXPRESSWAY AT A MINOR COLLECTOR

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO.
371

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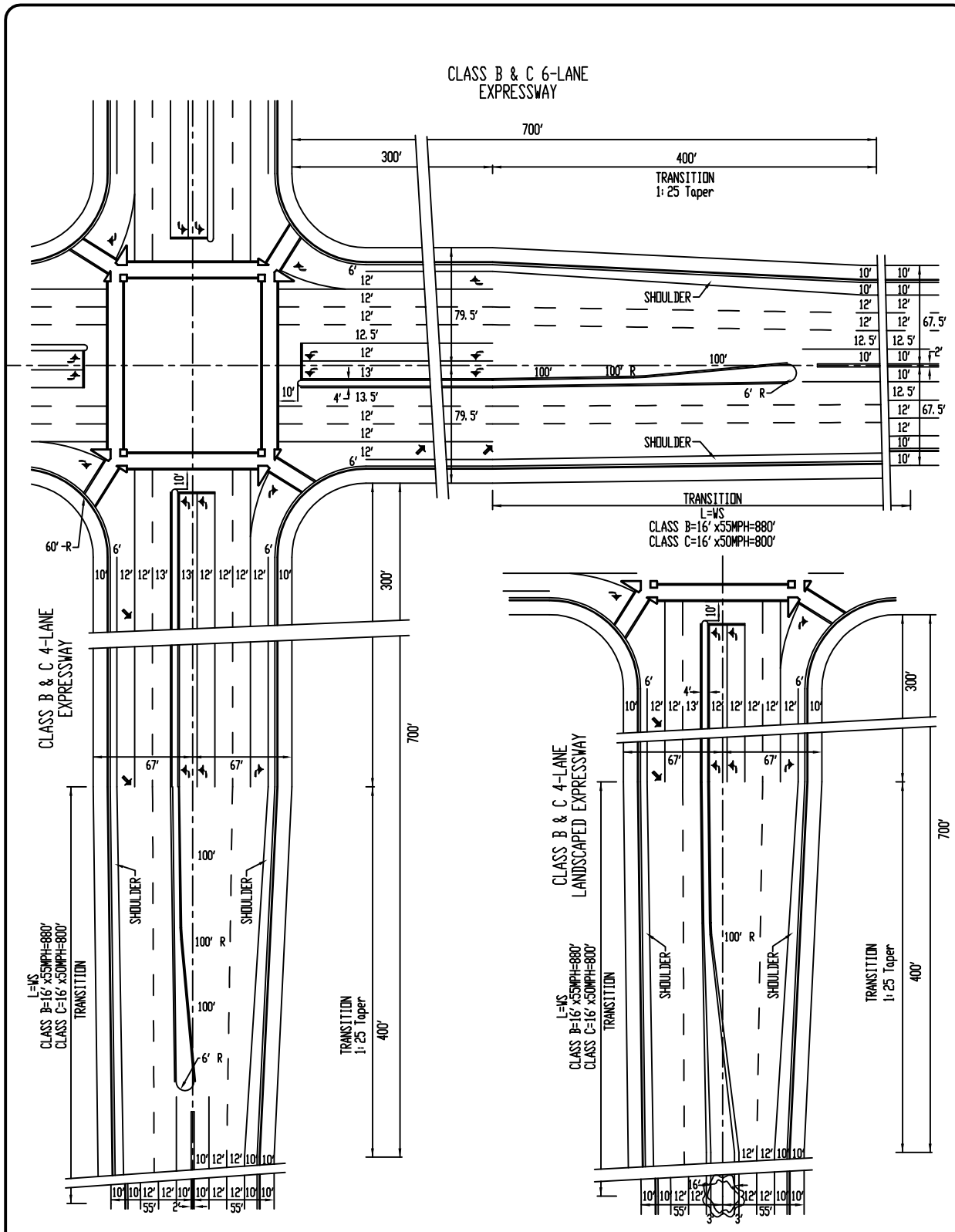
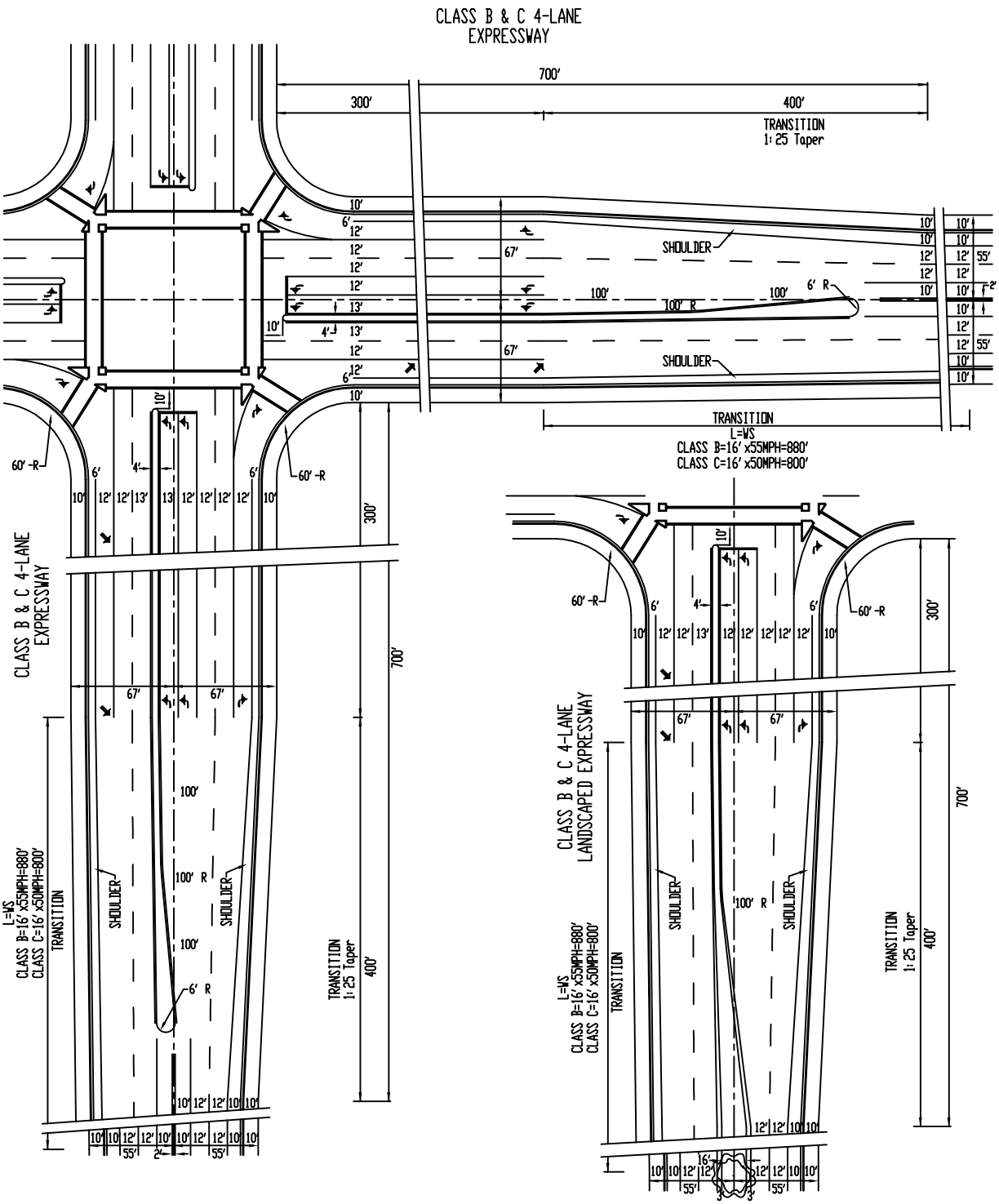
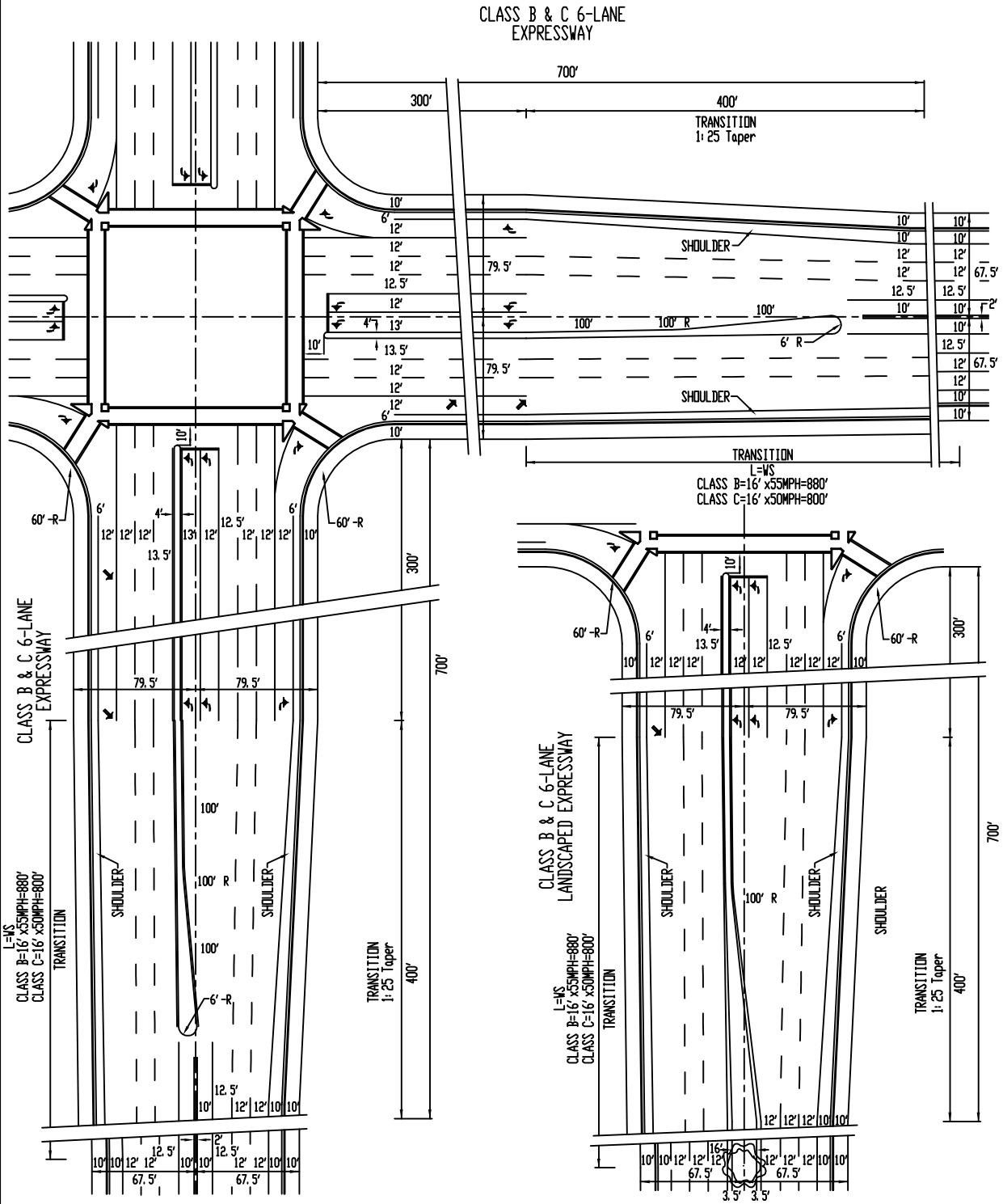
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	PUBLIC WORKS DEPARTMENT	DETAIL NO. 372



APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	CLASS B & C 6-LANE EXPRESSWAY AT CLASS B & C 4-LANE EXPRESSWAY	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 373



APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	CLASS B & C 4-LANE EXPRESSWAY	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 374



APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Ulm

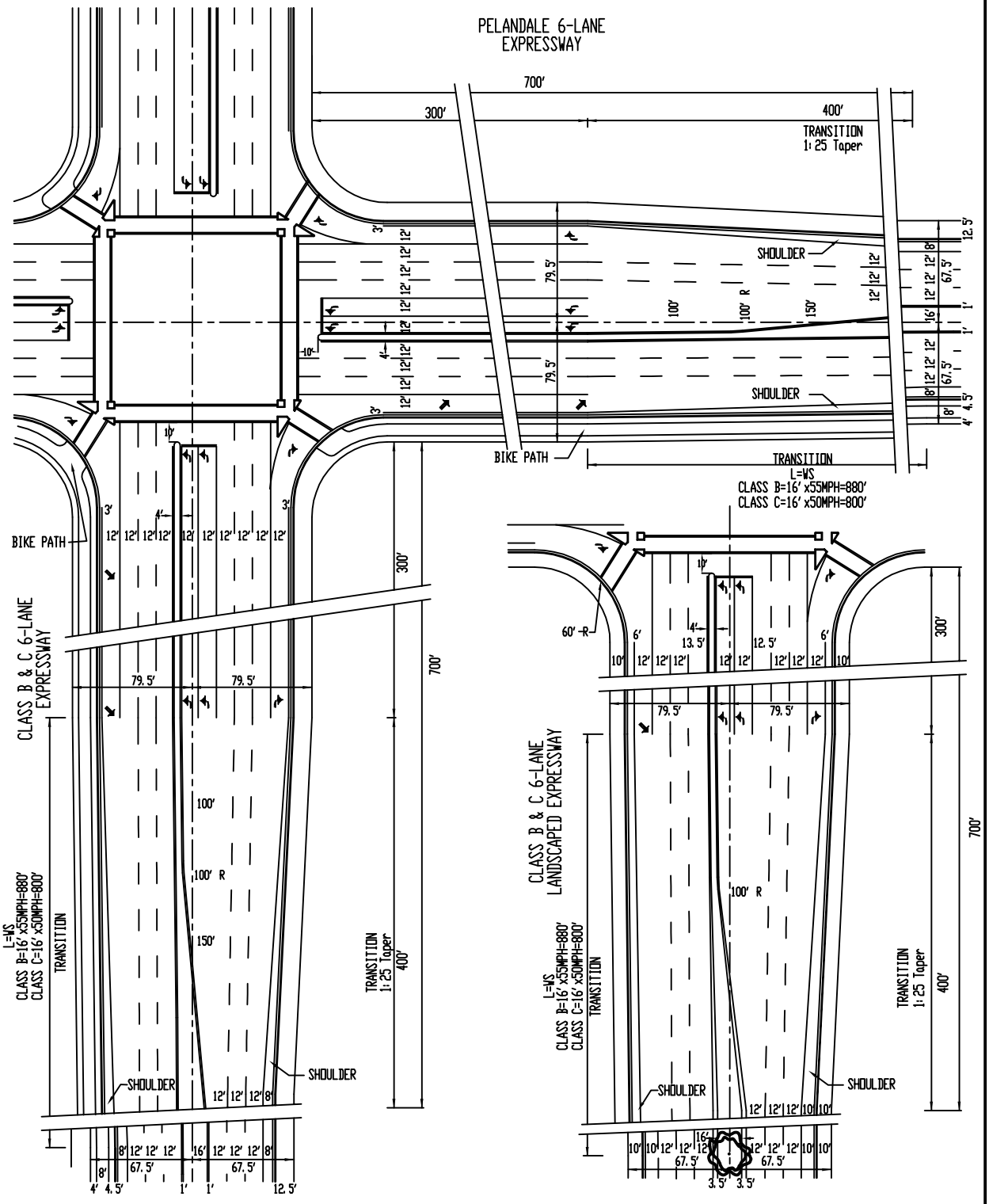
STREETS

CLASS B & C 6-LANE EXPRESSWAY

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO.
375



APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wu

STREETS

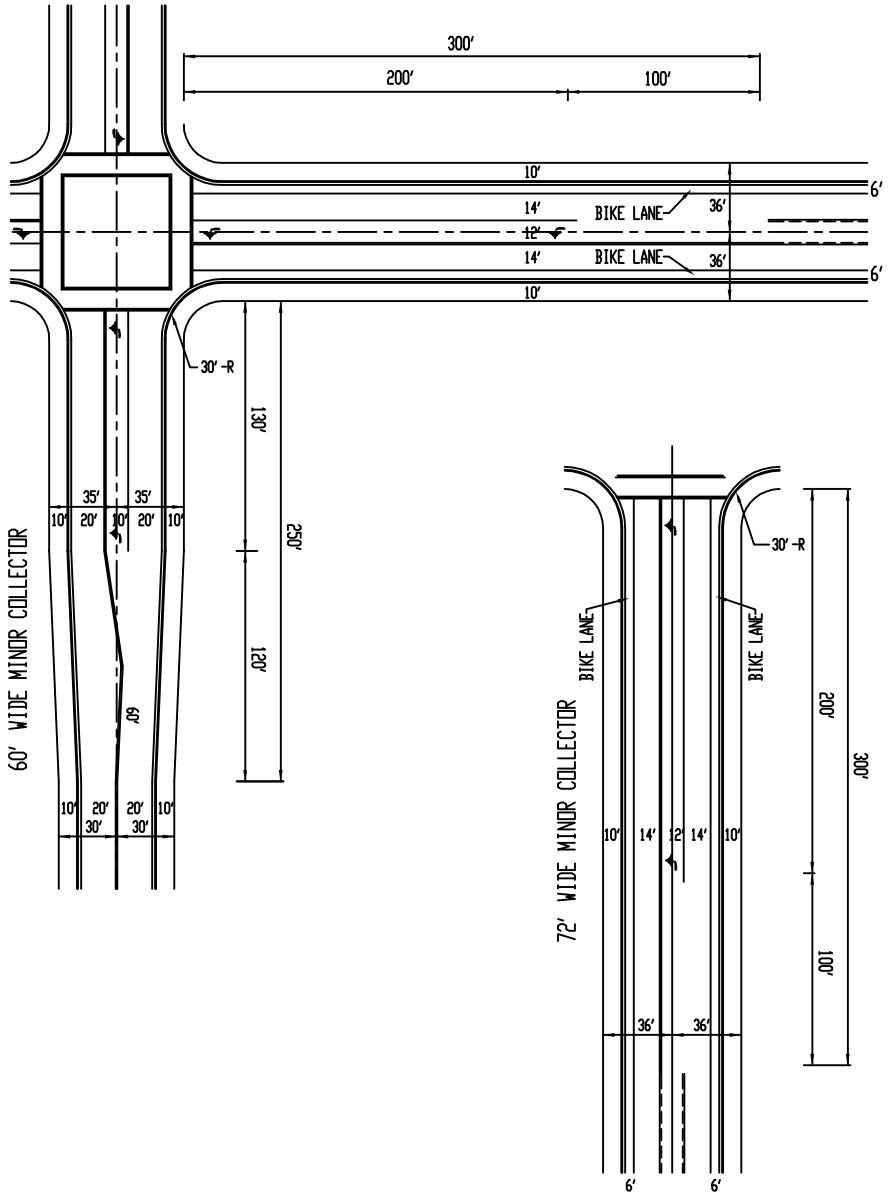
PELANDALE AVENUE 6-LANE EXPRESSWAY

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO.
375A

72' WIDE MINOR COLLECTOR



NOTES:

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APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wu

STREETS

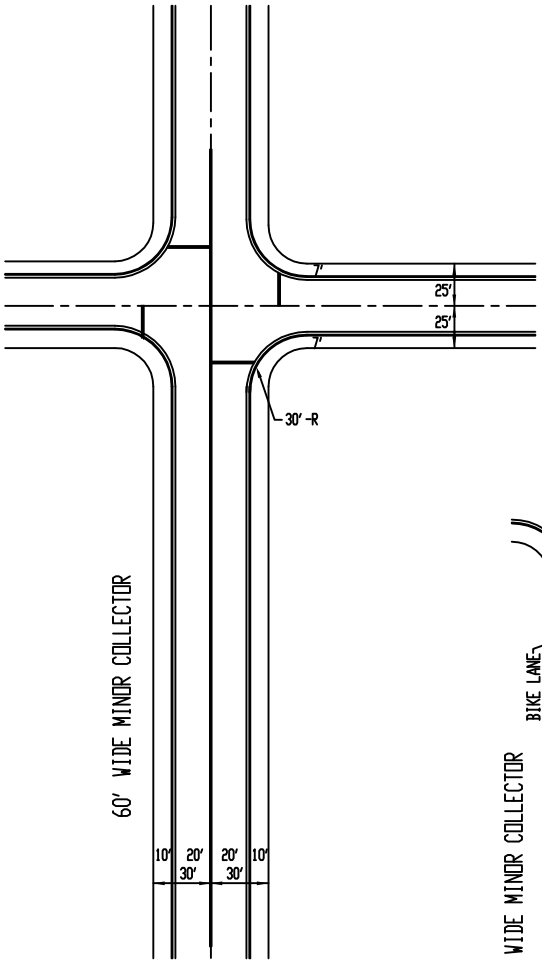
MINOR COLLECTOR AT A MINOR COLLECTOR

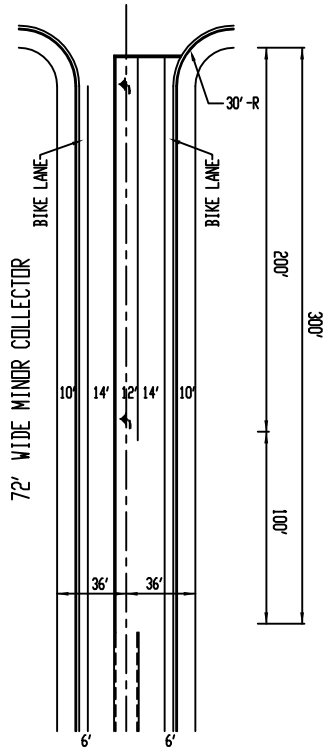
PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO.
376

LOCAL STREET





NOTES:

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APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wu

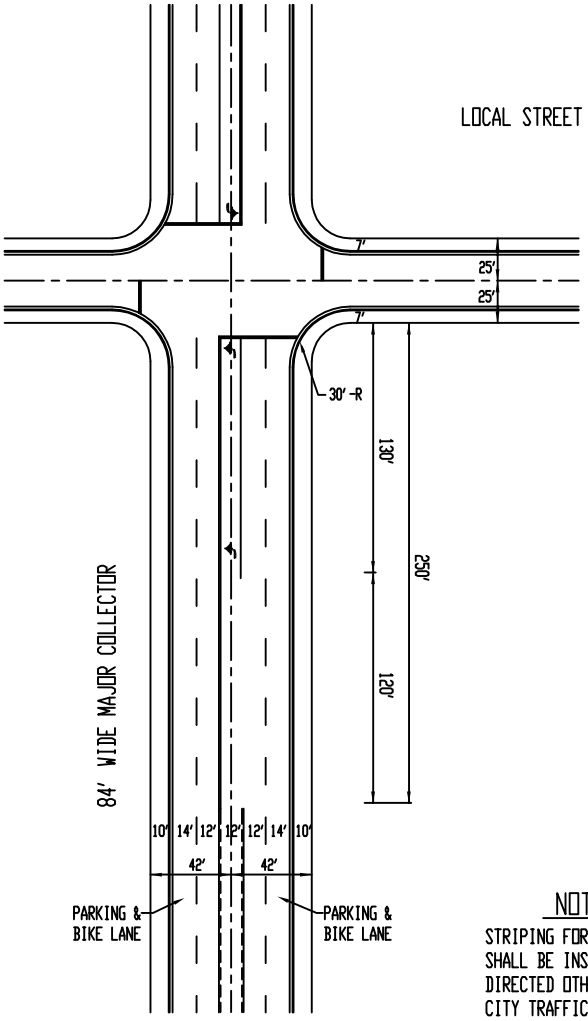
STREETS

LOCAL STREET AT A MINOR COLLECTOR

PUBLIC WORKS DEPARTMENT

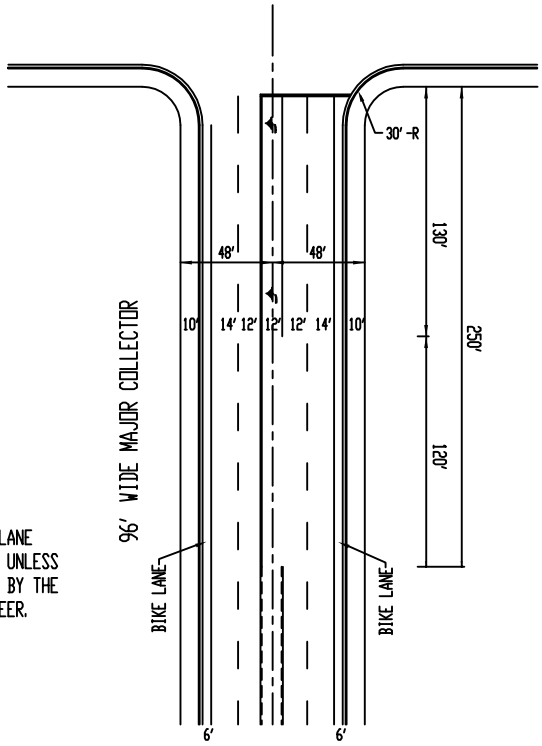
CITY of MODESTO

DETAIL NO.
377



NOTES:

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



APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Ulm

STREETS

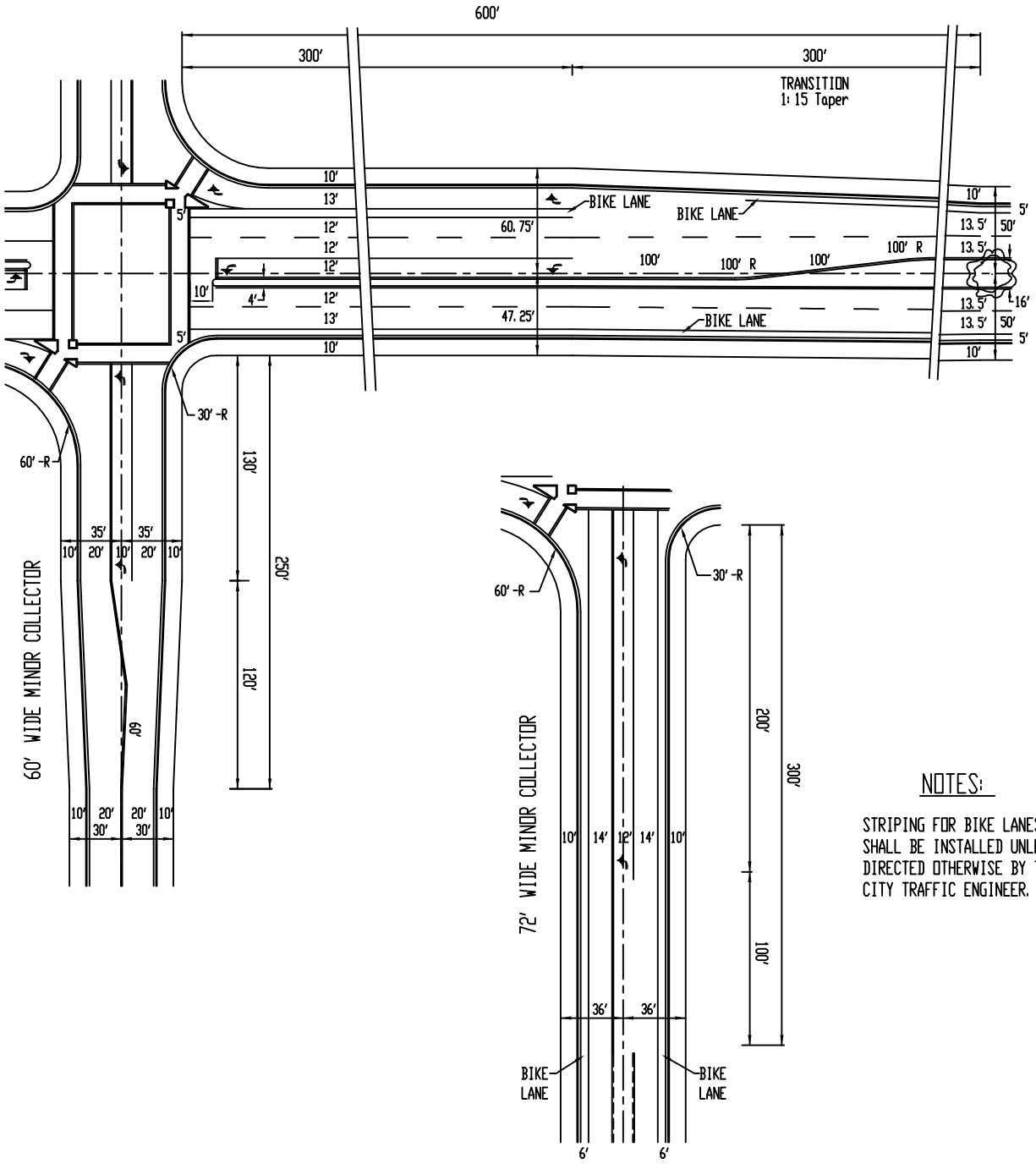
LOCAL STREET AT A MAJOR COLLECTOR

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO. 378

MINOR ARTERIAL



NOTES:

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APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

STREETS

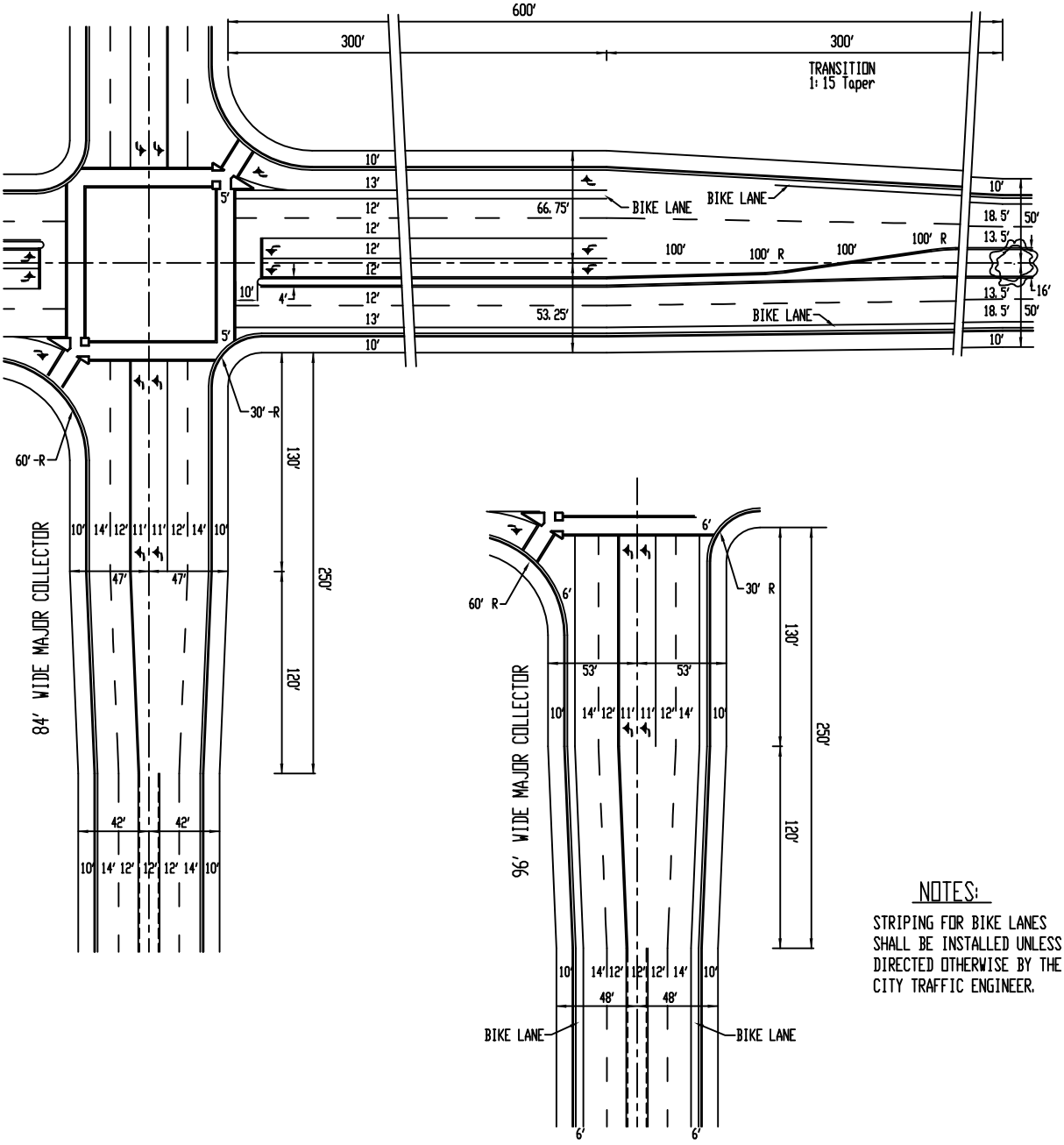
MINOR ARTERIAL AT A MINOR COLLECTOR

CITY of MODESTO

PUBLIC WORKS DEPARTMENT

DETAIL NO. 379

MINOR ARTERIAL



NOTES:

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APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wu

STREETS

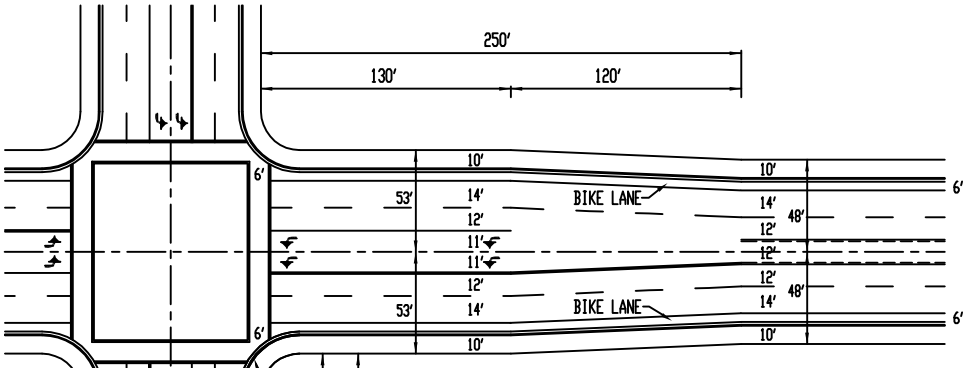
MINOR ARTERIAL AT A MAJOR COLLECTOR

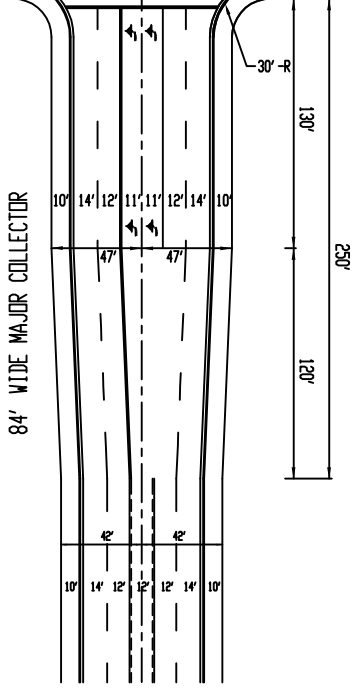
PUBLIC WORKS
DEPARTMENT

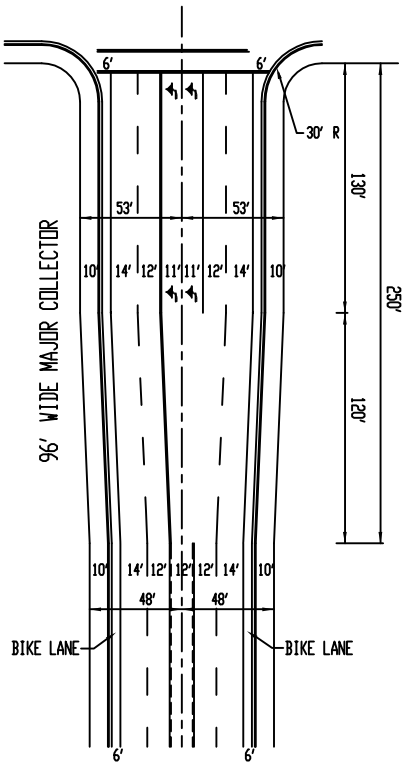
CITY of MODESTO

DETAIL NO.
380

96' WIDE MAJOR COLLECTOR







NOTES:

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APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Ulm

STREETS

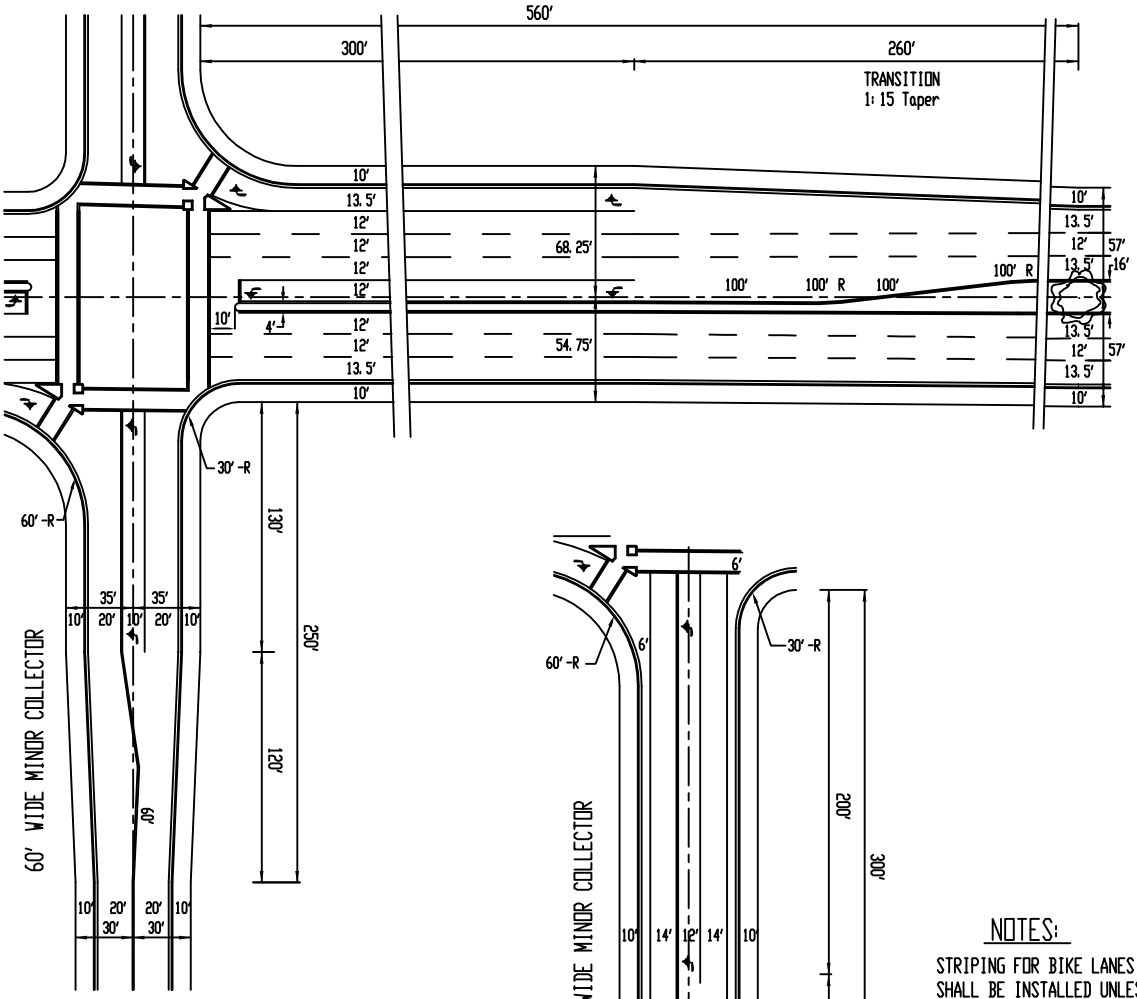
MAJOR COLLECTOR AT A MAJOR COLLECTOR

CITY of MODESTO

PUBLIC WORKS DEPARTMENT

DETAIL NO. 381

PRINCIPAL ARTERIAL



NOTES:

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APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Ulm

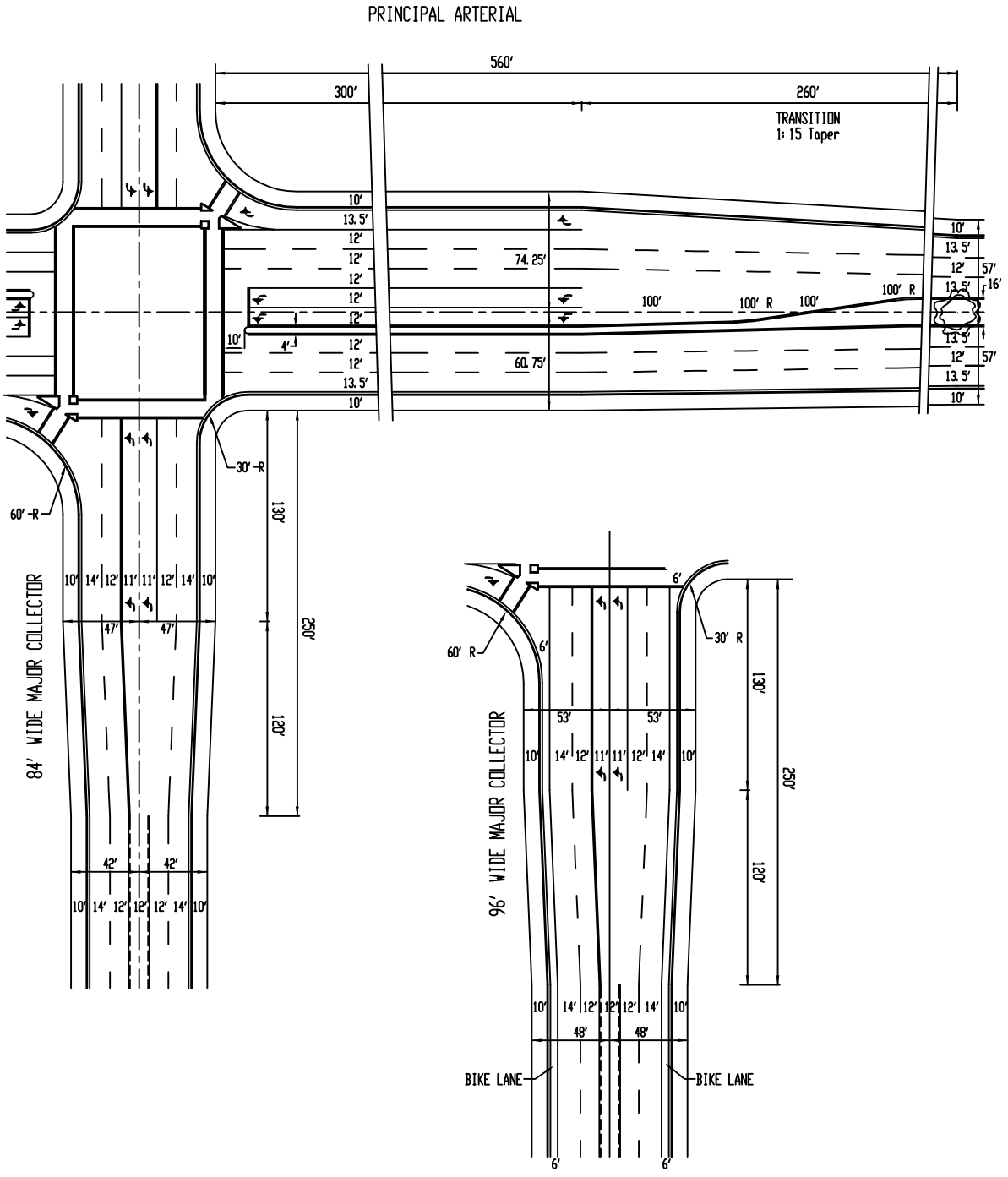
STREETS

PRINCIPAL ARTERIAL AT A MINOR COLLECTOR

CITY of MODESTO

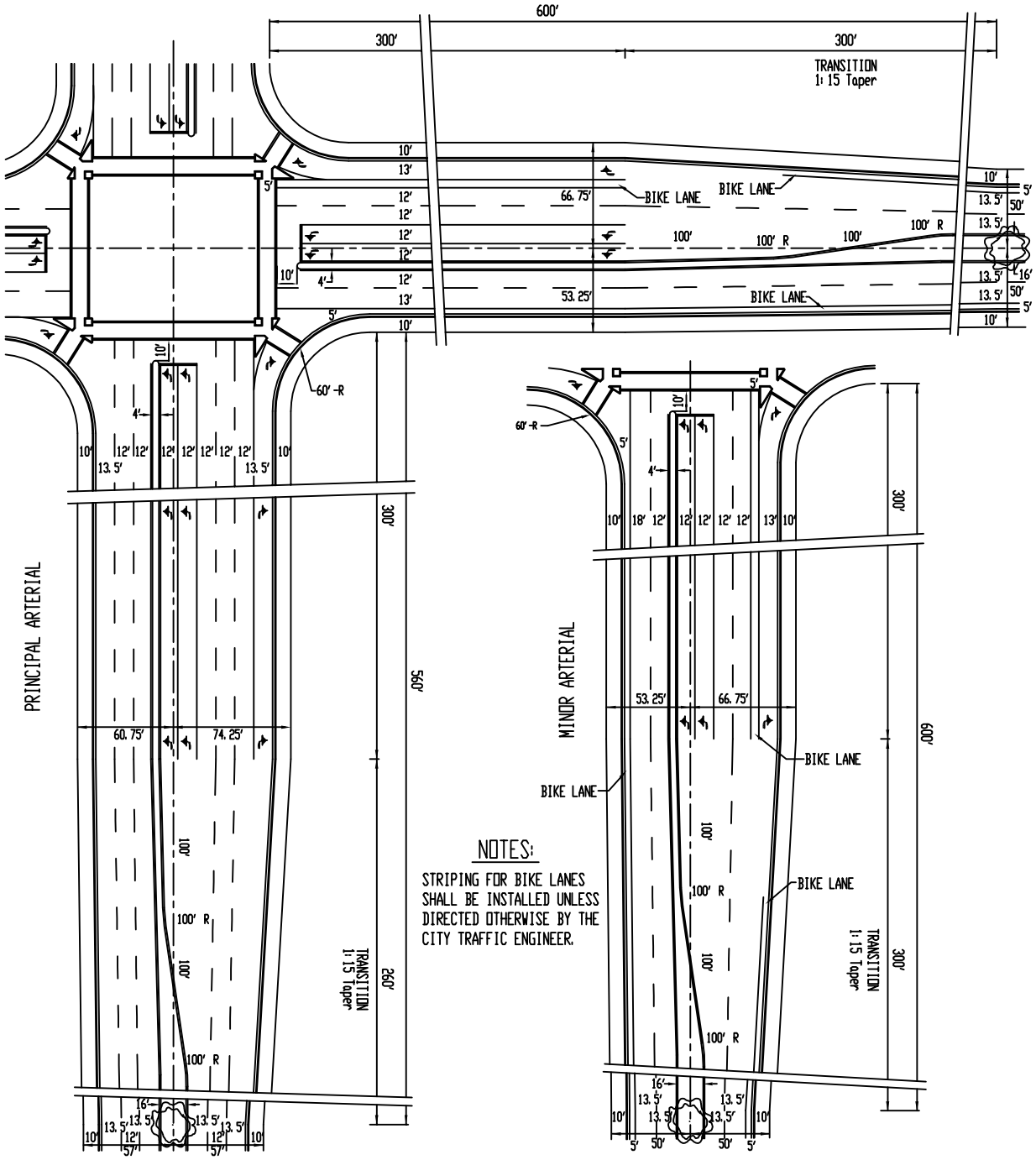
PUBLIC WORKS
DEPARTMENT

DETAIL NO.
382



APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	PRINCIPAL ARTERIAL AT A MAJOR COLLECTOR	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 383

MINOR ARTERIAL



APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wu

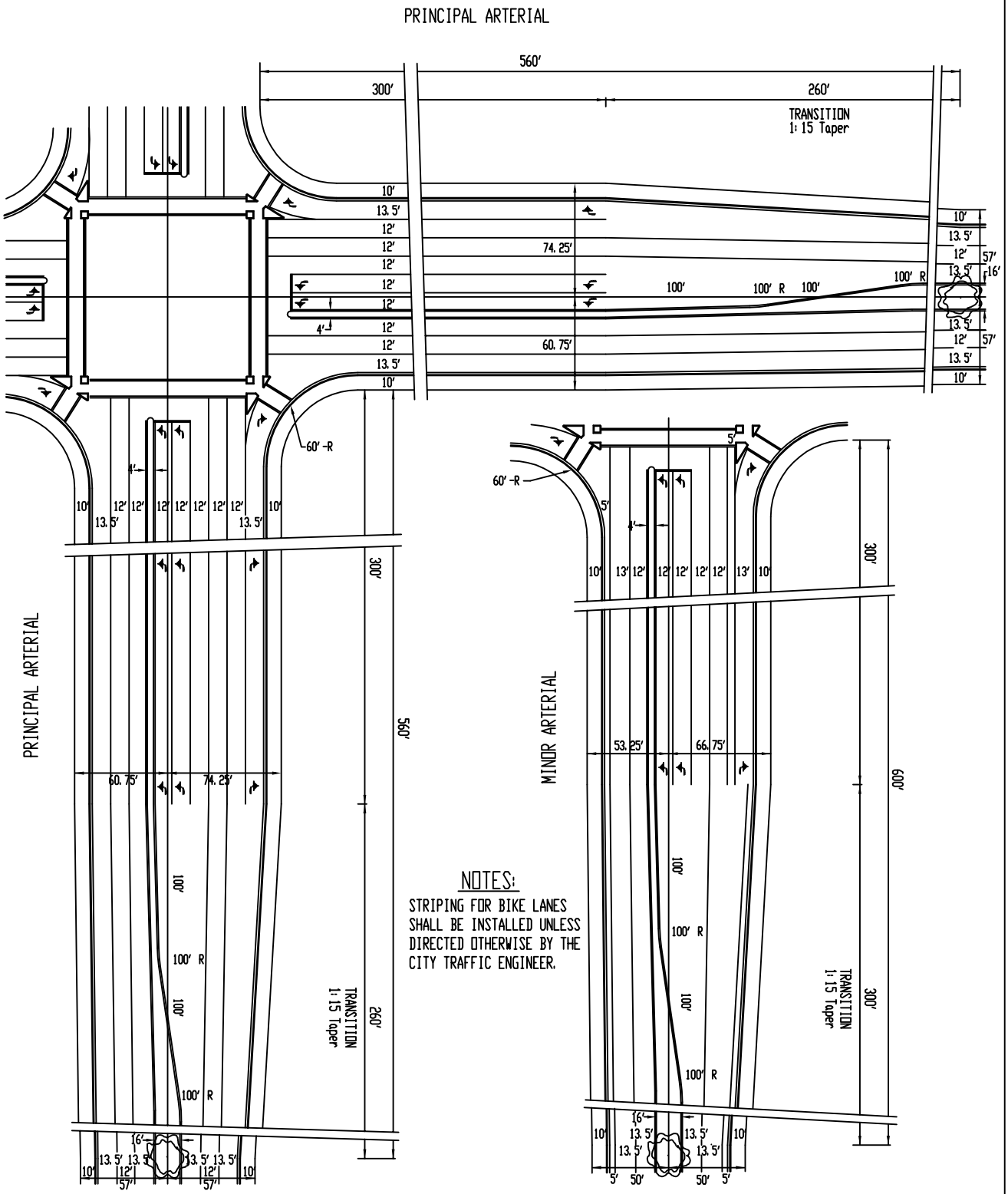
STREETS

MINOR ARTERIAL AT A PRINCIPAL ARTERIAL AND A MAJOR ARTERIAL

CITY of MODESTO

PUBLIC WORKS
DEPARTMENT

DETAIL NO.
384



APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

STREETS

PRINCIPAL ARTERIAL AT A PRINCIPAL ARTERIAL AND A MINOR ARTERIAL

CITY of MODESTO

PUBLIC WORKS DEPARTMENT

DETAIL NO. 385

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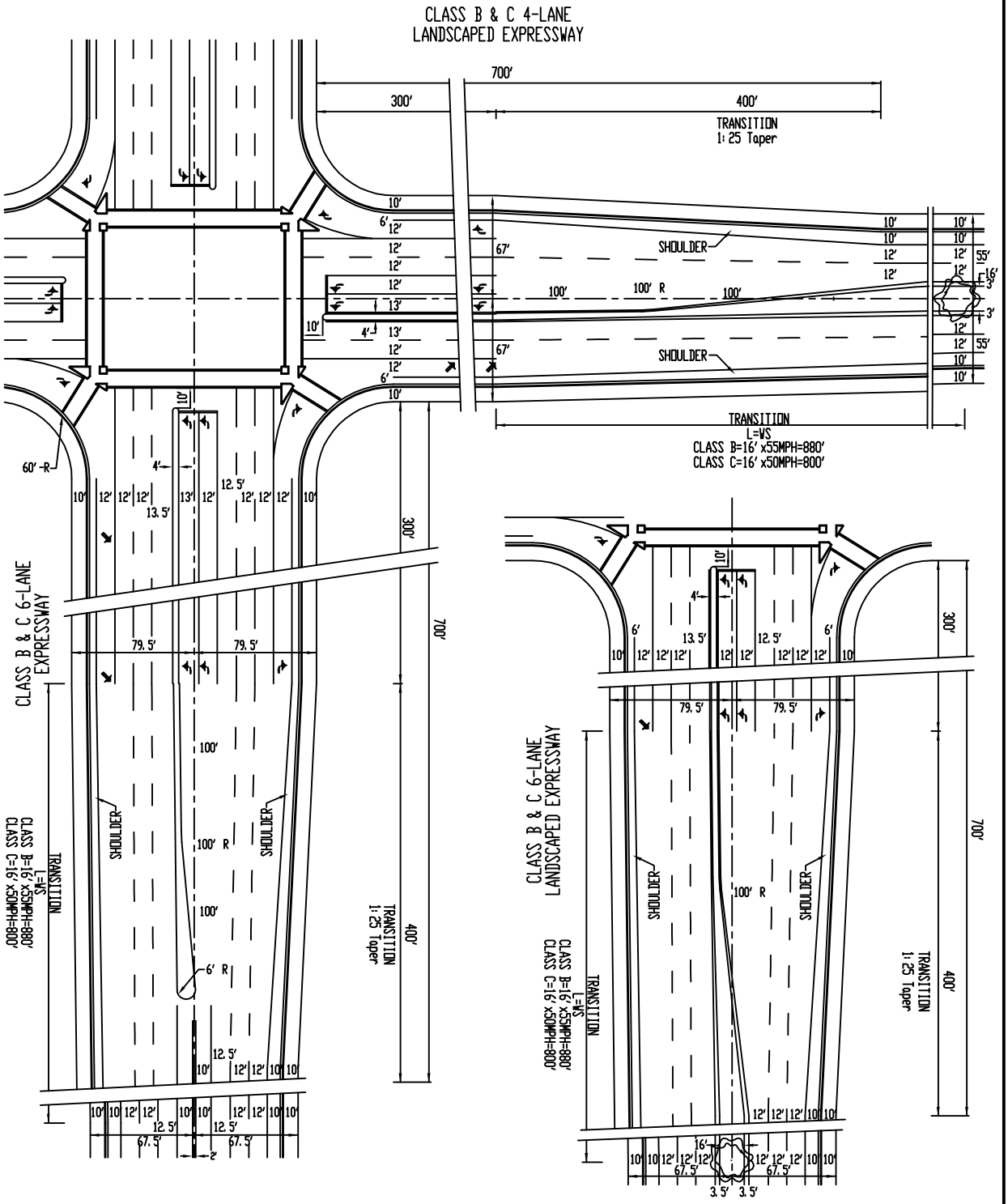
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:		
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 386



APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

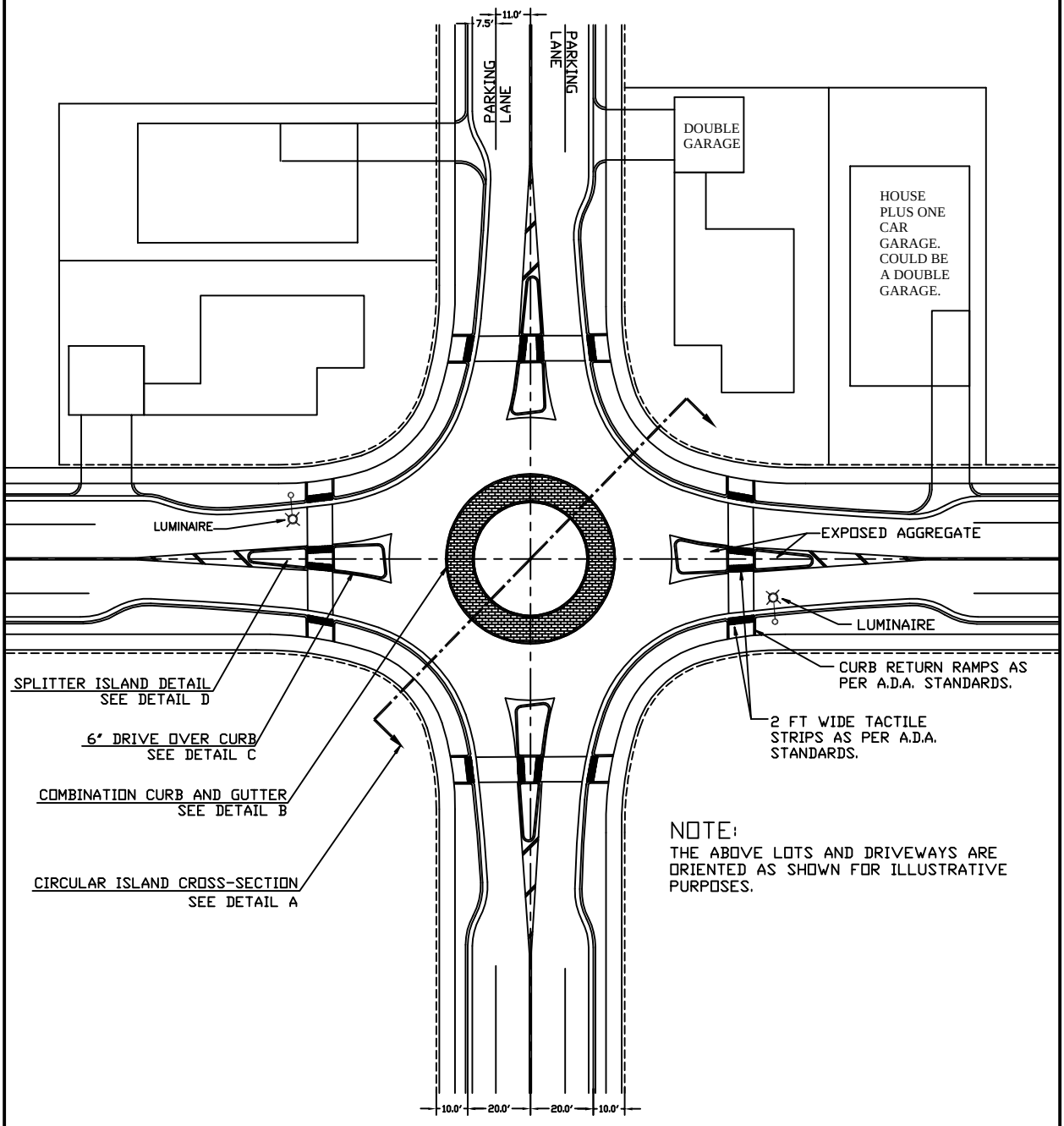
STREETS

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

CITY of MODESTO

PUBLIC WORKS
DEPARTMENT

DETAIL NO.
387



NOTE:
THE ABOVE LOTS AND DRIVEWAYS ARE ORIENTED AS SHOWN FOR ILLUSTRATIVE PURPOSES.

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

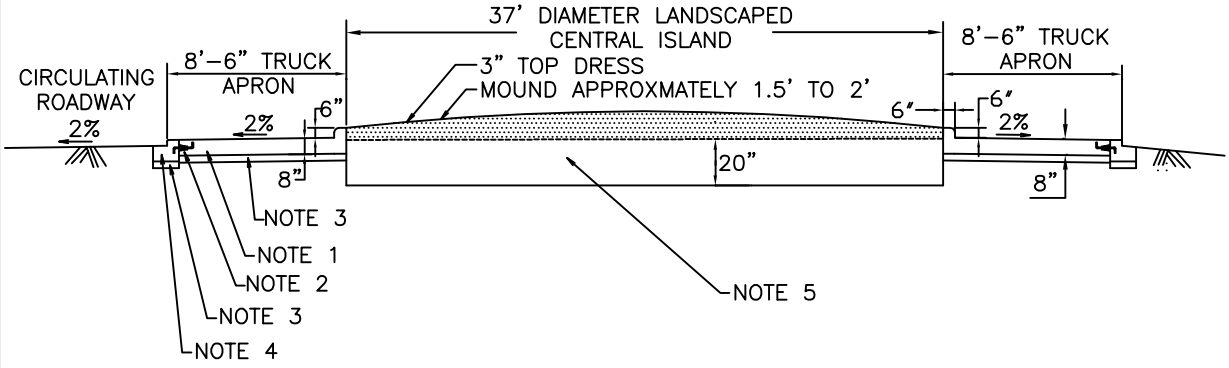
ROUNDABOUT

TYPICAL ROUNDABOUT

CITY of MODESTO

PUBLIC WORKS DEPARTMENT

DETAIL NO. 388



DETAIL A: TYPICAL SECTION OF ROUNDABOUT CIRCULAR ISLAND

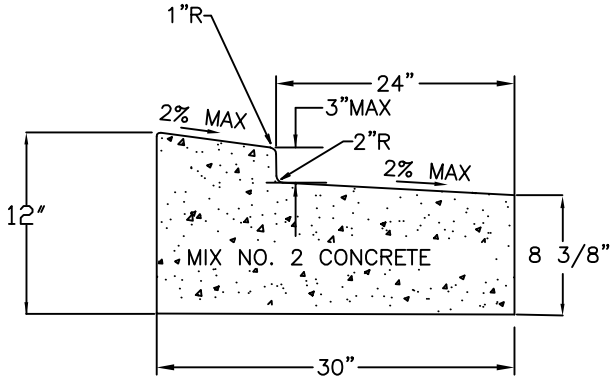
NOTE 1: 8" JOINTED REINFORCED CONCRETE WITH NO. 4 REBAR, 12" O.C. BOTH WAYS, MIX NO.6 MODIFIED (HIGH EARLY STRENGTH) WITH STAMPED CONCRETE FINISH REMOVE EX. A.C. PAVEMENT PRIOR TO CONCRETE INSTALLATION.

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

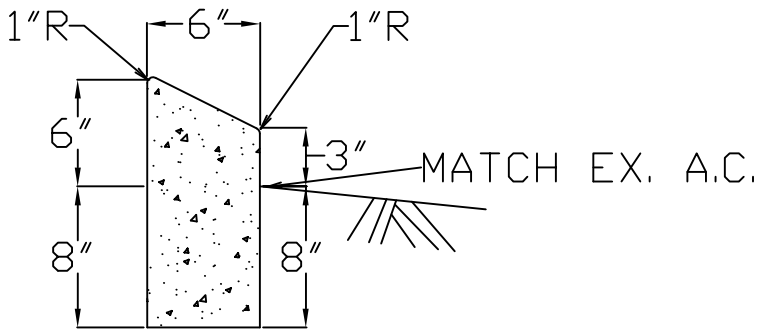
NOTE 4: VERTICAL FACE CURB THREE INCHES ABOVE PAVEMENT.

NOTE 5: EXCAVATE TO REMOVE EXISTING SOIL (2' MIN) BACKFILL WITH AGENCY APPROVED TOPSOIL. MOUND APPROXIMATELY 18 INCHES, TOP DRESS WITH 3 INCH MINIMUM TOP SOIL

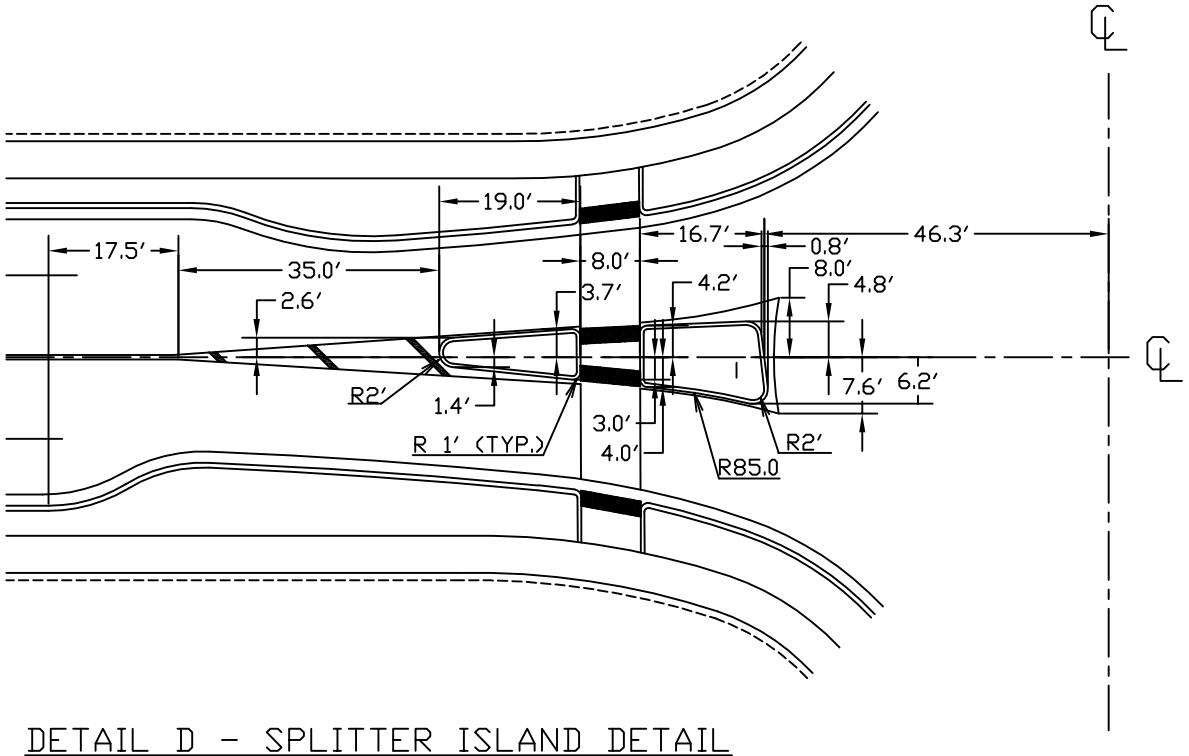


DETAIL B - COMBINATION CURB AND GUTTER

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	ROUNDABOUT	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	TYPICAL DETAILS	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 388 A

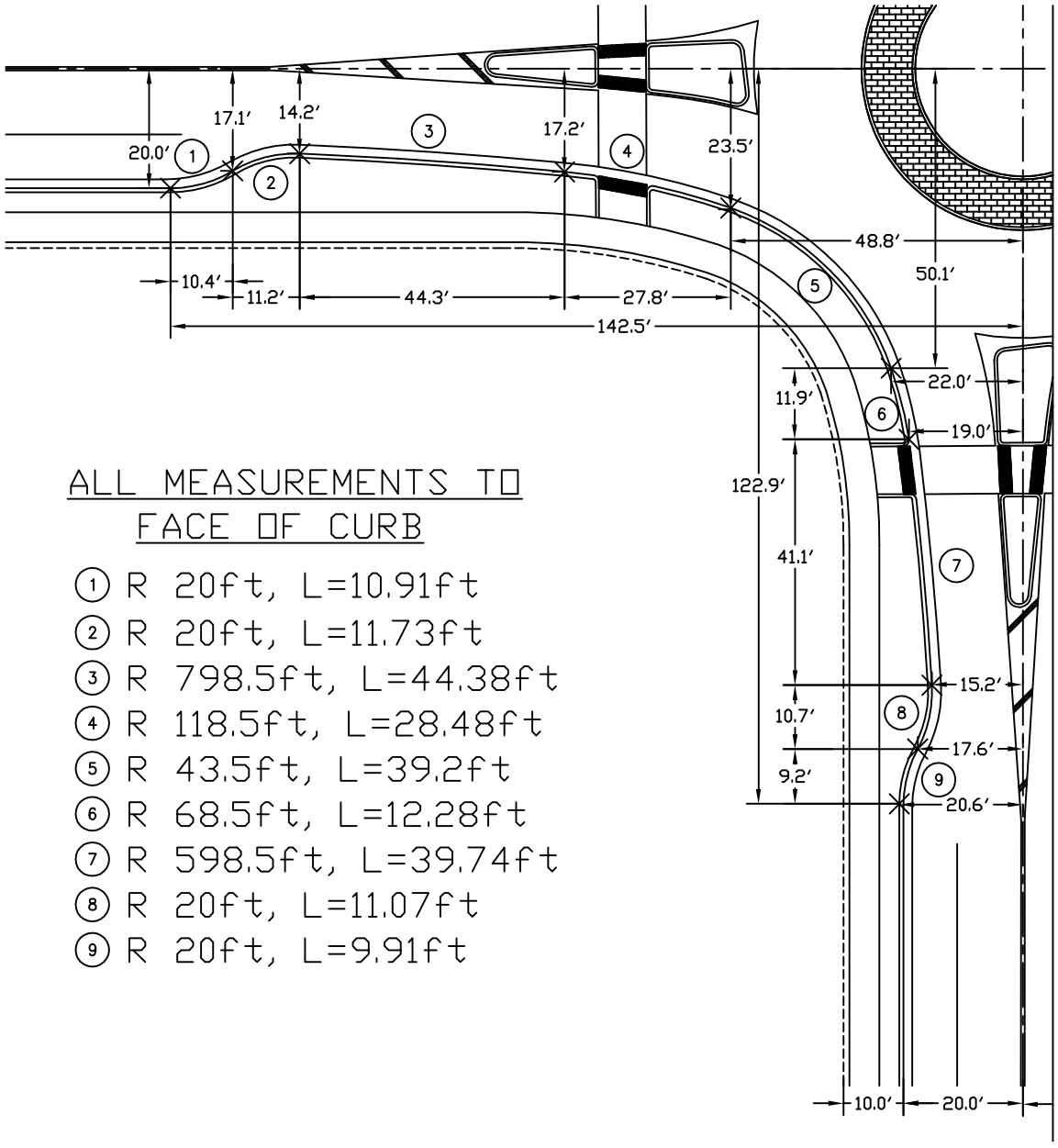


DETAIL C - 6" CURB



DETAIL D - SPLITTER ISLAND DETAIL

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	ROUNDABOUT	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	TYPICAL DETAILS	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 388 B



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

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

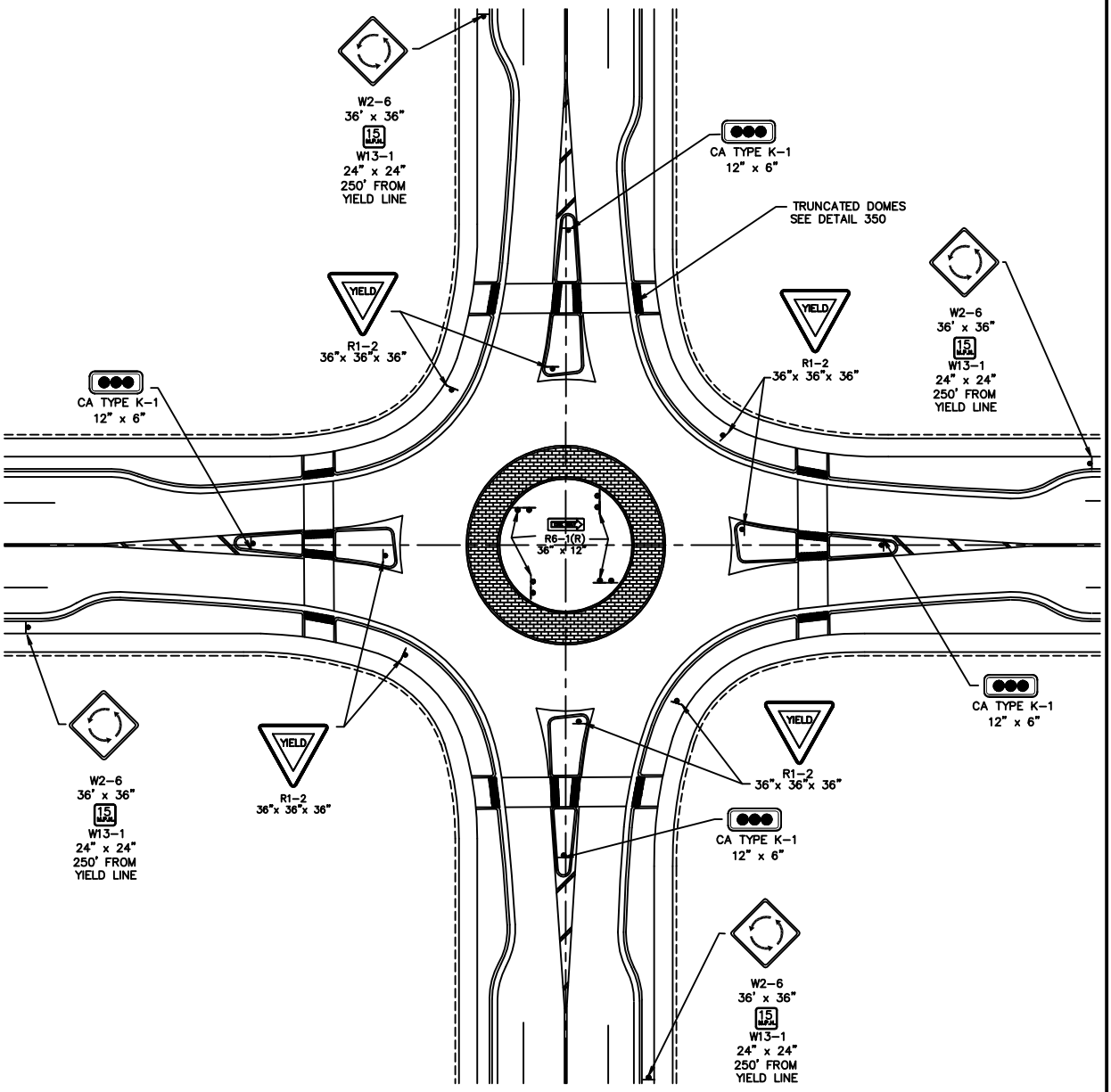
ROUNDABOUT

ROUNDABOUT DIMENSIONS

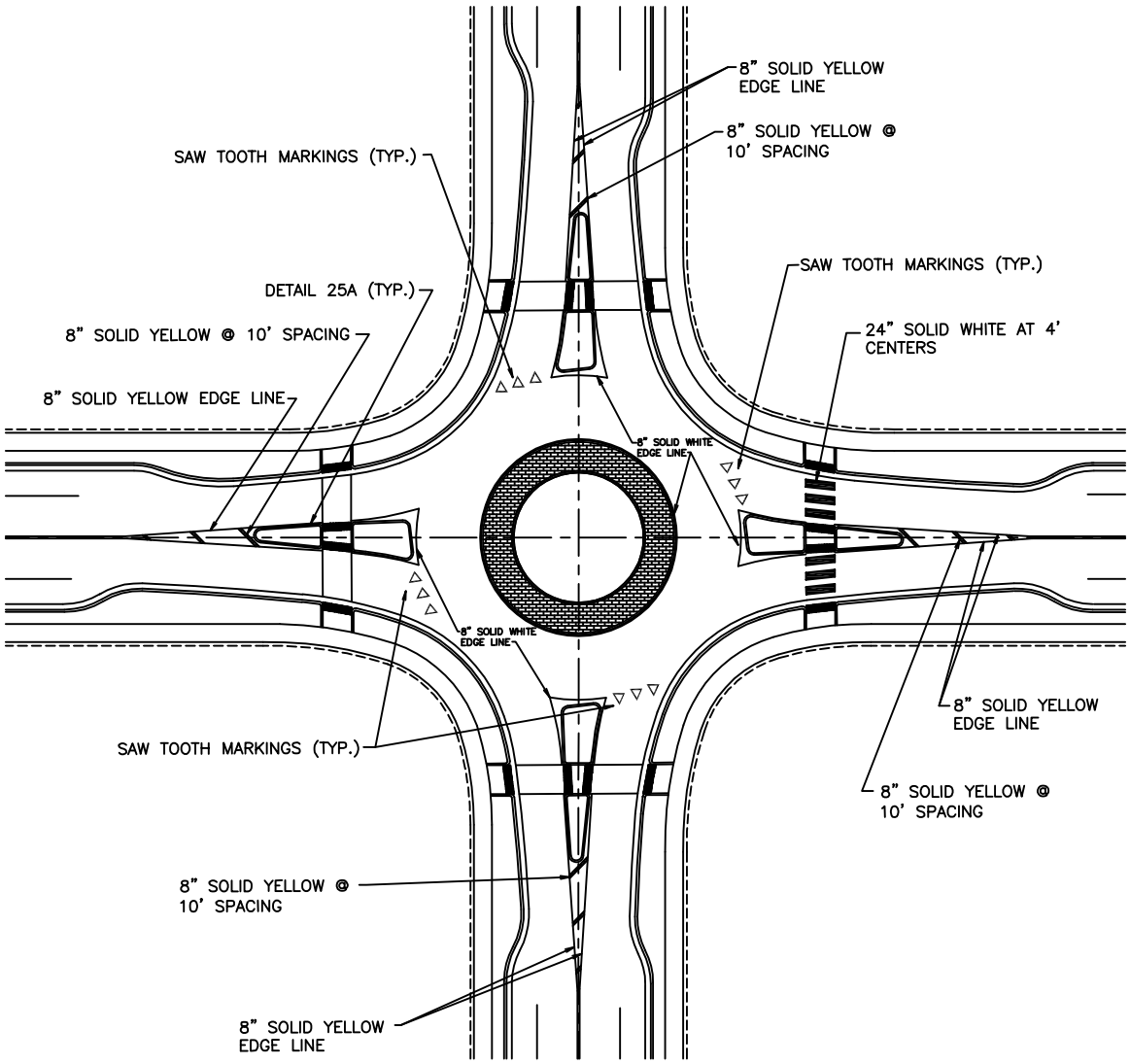
CITY of MODESTO

PUBLIC WORKS DEPARTMENT

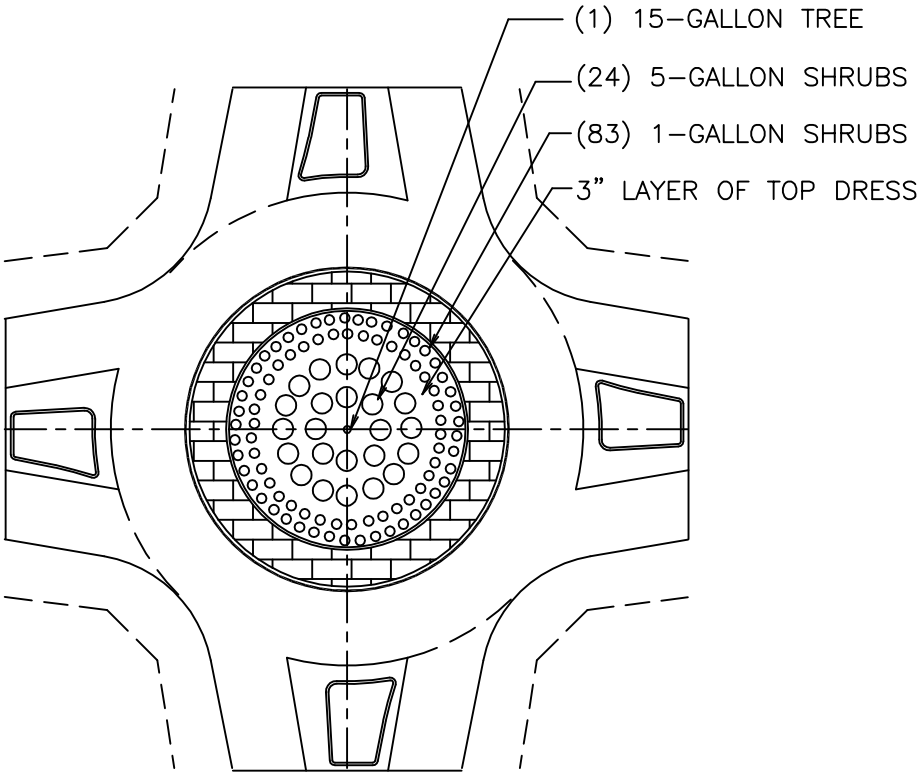
DETAIL NO. 388 C



APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	ROUNDABOUT	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	SIGNING PLAN	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 388 D



APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	ROUNDABOUT	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	MARKING PLAN	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 388 E



AGENCY APPROVED PLANT MATERIALS LIST *

1–GALLON SHRUBS:

Nandina domestica 'Nana Purpurea'
Myrtus communis 'Compacta'
Trachelospermum asiaticum
Artemisia stellerana
Ilex crenata (dwarf varieties)

5–GALLON SHRUBS:

Rhaphiolepis indica 'ballerina'
Spirea bumalda 'Anthony Waterer'
Cotoneaster apiculatus
Escallonia 'Newport Dwarf'
Abelia grandiflora 'Edward Goucher'

15–GALLON TREES:

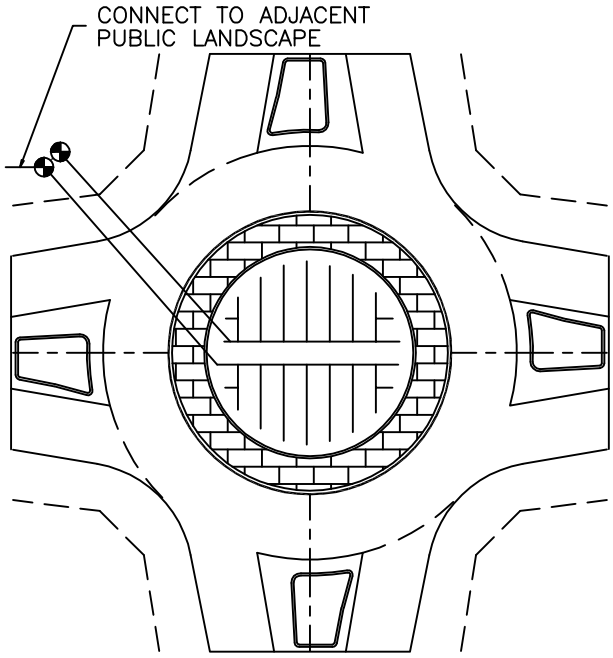
Lagerstroemia indica 'Cheorokee' or 'Catawba' or 'Tuscarora' or 'Muscogee' or 'Natchez'
Cercis canadensis 'Forest Pansy' or 'Oklahoma'
Tristania laurina 'Elegant'
ginkgo biloba 'Fairmont' or 'Autumn Gold'

*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

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	ROUNDABOUT	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	LANDSCAPING PLAN	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 389



IRRIGATION LEGEND

——— SCHEDULE 40 PVC LATERAL LINES–SIZE AS NOTED (MINIMUM 1" IN SIZE)

RAINBIRD NO. 1402 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 13.

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.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	ROUNDABOUT	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	IRRIGATION PLAN	
	PUBLIC WORKS DEPARTMENT	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 solid 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 swept paths and any change to simple radii is not recommended.

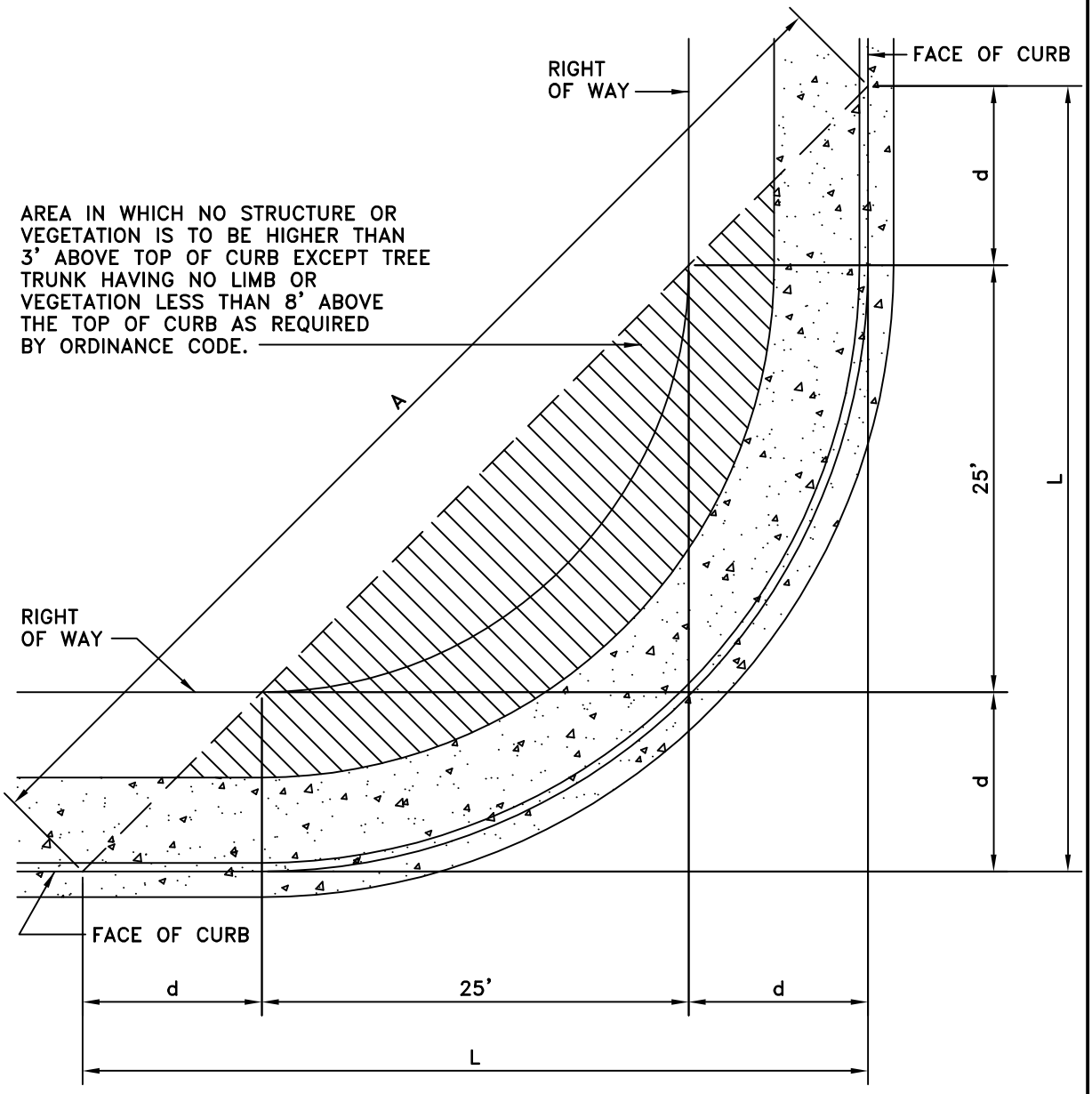
8. Street lighting needs to be designed to match the proposed roundabout traffic needs.

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. Splinter 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.

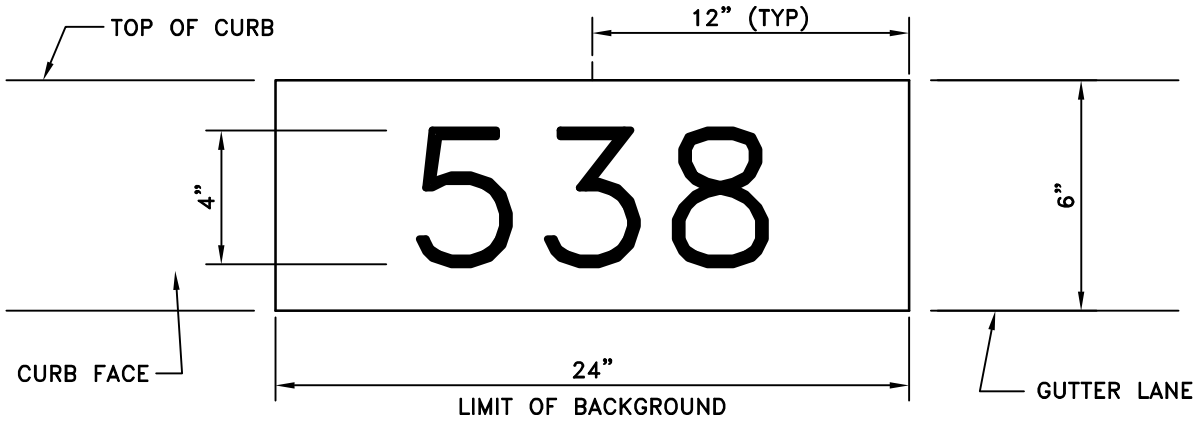
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	ROUNDABOUT	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	CONSTRUCTION NOTES	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 390 A



TOTAL DISTANCE (L) = 25 + 2d

EXAMPLE: L = 25' + 2(10') = 45'
A = 1.412 x L
A = 1.412 x 45' = 63.5'

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STREETS	
APPROVED BY THE CITY ENGINEER: Richard D. Wells	CLEAR VISION TRIANGLE AREA	CITY of MODESTO
	PUBLIC WORKS DEPARTMENT	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.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STREETS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wu	CURB NUMBERS	
	PUBLIC WORKS DEPARTMENT	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 within the top of curb grade (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 drain discharges for all projects, commercial, industrial, or residential, regardless of project size, shall include Stormwater Quality Control Measures. A City of Modesto document entitled “Guidance Manual for New 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 storm drain 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 depth greater than 1' below finished pad elevations, as measured from the low point flow line, 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 new requirements designed to protect stormwater quality, such as expanded plan check and review, stormwater treatment and source control measures. (Modesto Municipal Code Title 5, Chapter 10.205).

The City of Modesto Guidance Manual for New Development Stormwater Quality Control Measures contains guidelines for the design, construction and maintenance of stormwater treatment and source controls. This document can be viewed on the City website at: **www.modestogov.com/pwd/specs/Storm_Water_Quality.asp.**

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 Public Works Department, Development Services, Stormwater 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 any new subdivision or development 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. Hydrology calculations for the10-year 24-hour duration storm, with the design basin at capacity and a 100-year storm, together with assumptions, charts, tables, references and methods used.

   The pipe system shall be designed for the 10-year 24-hour storm.

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 17' 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 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, and in accordance with Standard Detail 1213 or 1214. 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 17' 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 400).
Detention Basin	Unit Hydrograph	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.

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 Figure 4.2 (inches/hour)
A = Area of drainage basin in acres

TABLE 4.2 BASIC RUNOFF COEFFICIENTS

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

TABLE 4.3 COMPOSITE RUNOFF COEFFICIENTS

Land Use	Coefficient (C)
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 (Multi-family)	0.70
High Density (cluster housing)	0.85
Commercial	0.90
Industrial	
Light	0.80
Heavy	0.90
Schools	Determined by City Engineer

TABLE 4.4 MANNING COEFFICIENT

CONDUIT MATERIAL	MANNING COEFFICIENT
Closed conduits	
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
Open channels	
Lined channels	
Asphalt	0.015
Concrete	0.015
Rubble or riprap	0.030
Vegetal	0.040
Excavated or dredged	
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

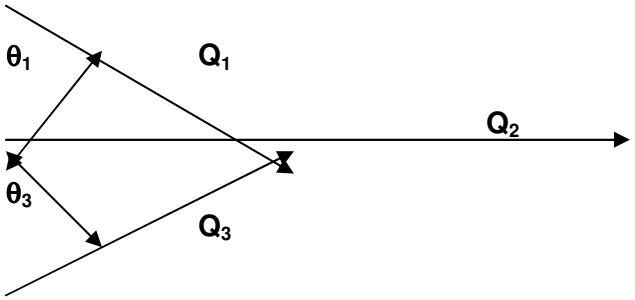
At point of change in the hydraulic parameters of flow rate or section (including manholes and catch basins), the HGL shall be calculated considering velocity heads and losses due to bends, entrances, exits, turbulence, etc.

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 (°)
θ_1 = Angle of deflection between the upstream and downstream centerlines, in degrees (°)
g = Acceleration due to gravity, 32 ft/sec^2

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

FIGURE 4-1 STANDARD FORM – RUNOFF CALCULATION

City of Modesto
Public Works
Storm Sewer Design

JOB TITLE: _____ RAINFALL CURVES PIPE: Type: _____
DES BY: _____ DATE: _____ Source: _____ Roughness Coefficient n = _____
CHK BY: _____ DATE: _____ M.A.P. _____ Minimum Velocity at
Frequency: _____ Design Flow: v = _____ fps

RUNOFF COEFFICIENTS: TIME OF CONCENTRATION
Land Use: _____ Initial: _____ min.
Weighted Coefficient: _____

Pipe ID / Designation	Description		Incremental Area, A	Runoff Coefficient C	Product	Sum Product	Duration	Rainfall Intensity	Runoff	Length	Pipe Dia	Slope	Capacity (Actual or Full)	Velocity (Actual or Full)	Flow Time	Fall	Gutter Flow, Depth	Invert Elevation		Finished Grade	Elevation	HGL		EGL		Remarks
	From	To	(acres)		(AxC)		(min.)	(In/Hr)	(Q=CIA)	(Feet)	(Inches)	(ft/ft)	(cfs)	(fps)	(min)	(feet)	(feet)	In	Out	In	Out	In	Out	In	Out	

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 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 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 400'.

2. For channelization of manhole base, refer to Standard Details #412 and 413.

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 that connect to positive drainage and do not contribute to a detention basin, retention basin or rockwell and shall be a minimum of one Type 18 bicycle proof gate.
b. Type 2: Catch basins that are connected to a positive drainage and settling basin or separator and shall be curb inlets with cast iron hoods.

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 (vertical and horizontal), 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. Vertical rockwells shall be at least 10' above average high ground water and have a 20' minimum horizontal separation from all other vertical rockwells.

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. Rockwells shall meet Modesto and Turlock rockwell standards. 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 positive storm drain pipes with sufficient capacity to handle additional runoff. Under no circumstances, can development tie into existing off-site rockwells.

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 – percolation (retention) 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 (See the Computer CD (Compact Disc) for these Standard Specifications). Final basin location shall be approved by the City Engineer.

All storm drainage basins (retention/detention) shall be fully landscaped in accordance with the criteria established in the "Design Standards for Dual Use Flood Control/Recreation Facilities' Manual".

1. Percolation (Infiltration) Basins
Percolation basins are designed to allow the entire volume of a 100-year frequency, 6-day duration storm 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 percolation 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.

- Volume
The volume of the basin shall be large enough to hold a 100-year, 6-day frequency storm. This volume is based on average infiltration rates, which is much greater than pumped basins, based on the City's experience with percolation basins.
- Soils Testing for Percolation Basins
A minimum of two (2) soils tests shall be conducted for all percolation 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 75', the shallower of the two. The deepest portion of the exposed basin bottom must be constructed a minimum of ten feet above the existing water table.

- 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.

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.

   - 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 Figure 4-2, R100=(0.12x24)=2.88". Use appropriate C values determined from Tables 4.2 and 4.3.

   - 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.

   - 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. Criteria for pump station design including the electrical work shall be established on a case-by-case basis.

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

4. Depth
   The maximum water depth shall be 20' and at least 10' above the 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 in the months January through May, or a post 1994

historical average. Basin must be designed with a minimum 10' separation between basin floor and highest recorded level of groundwater. The basin bottom shall be shaped to concentrate the water to the inlet/outlet area where either infiltration or pumping will take place.

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

6. Side Slopes
   Side slopes shall be at 4:1 for permanent basins and a minimum of 2:1 for temporary basins. Temporary basins will be defined as basins planned for less than 10 years of service and not maintained by City forces.

7. Access
   A 16' wide access road shall be constructed to the bottom of the detention basin and around 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 radii of 45' is required for maintenance vehicles. Basins shall be provided with a minimum of a 25' wide strip around the top perimeter for an access road and a buffer zone for landscaping, fencing, and/or screen walls. Inside the basin bottom, a turnaround shall be constructed.

8. 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 lb+) w/ engineer fabric under rock shall be installed to prevent erosion and vegetative growth under the rock.

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

10. 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.

11. 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%.

12. Irrigation
    All drainage basins will be irrigated to include side slopes. This is to produce grasses for settling out pollutants. The City's Parks, Recreation and Neighborhoods Department shall approve the irrigation system design.

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.

Cover in Feet	**Minimum Class, RCP**	
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 or 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. Manhole and Junction Boxes:

1. Manhole frame and cover shall be “Rexus” 24” diameter, or approved equal. Refer to Standard Detail #416.

2. Frame and cover shall be manufactured from ductile iron.

3. Covers shall be hinged and incorporate a 90% blocking system to prevent accidental closure. Covers shall be one man operable using standard tools and shall be capable of withstanding a test load of 100,000 lbs. The cover shall incorporate a spring bar locking system which automatically activates when the cover is closed. Additional security features to include a

device to prevent the cover from being completely removed from the frame. Device shall be capable of deactivation, if required.

4. Frames shall be circular, incorporate a seating ring, and have a 24" clear opening.

5. Frame depth shall not exceed 4".

6. Frame flange shall incorporate bedding slots and bolt holes. All components shall be protectively coated.

7. Frame weight shall be 64 pounds. Cover weight shall be 91 pounds. Total weight shall be 155 pounds.

8. Reference number CDR460EH, for Rexus D400 Round Frame. Manufacturer: Saint- Gobain, Distributer: Titus Industrial Group, Inc. www.titusneverleak.com.

9. Manufacturer shall cast "Storm" on the manhole cover.

10. If the City, Contractor, or Developer cannot acquire the Rexus from a supplier in a timely manner, then the standard City manhole ring and cover shall be used. Refer to Standard Detail 416.

11. 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.

12. 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.

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 of the State Standard Specifications. Damaged galvanizing shall conform to Section 66-3.05 of the State Standard Specifications.

F. Rockwells:
All City of Modesto standard rockwells are to have an 8" diameter core pipe, specified as follows:

1. 8" C900, Class 200 PVC pipe, 20' long, installed Bell-up.

2. Perforations consist of 4 (four) rows of ½" diameter holes at 90º apart, on 6" centers vertically, to within 6" of each end.

3. Turlock rockwells shall use a 12" diameter, 12 gage minimum steel perforated casing core pipe (see Standard Details).

4. 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.

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 with Closed Circuit Television (CCTV) and furnish a tape to the City Engineer. 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 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.

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 "Only Rain Down The Drain" placard with discharge hotline number, prior to acceptance by the City.

C. Rockwells:

1. Boring
For new rockwells, contractor shall drill one (1) geotechnical boring to groundwater, 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. 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 groundwater elevations at http://wdl.water.ca.gov/gw/gw_data/hyd/Rpt_Bas_Well_AllCal.asp. To comply with the City's NPDES permit, 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', unless otherwise determined by the City Engineer.

3. Turlock Rockwells
In areas of high groundwater elevation, a Turlock rockwell with Horizontal Drain shall be constructed, conforming to Standard Details #417A-D. Turlock Rockwells shall be drilled to a depth of 50' to 70'. The geotechnical boring must show penetration of a 10' continuous coarse sand stratum that is 50' or more below the surface. The core pipe of the rockwell shall penetrate the sand strata layer at least 3'.

Horizontal Drains shall be constructed as shown in the Standard Detail #417A-D.

4. 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.

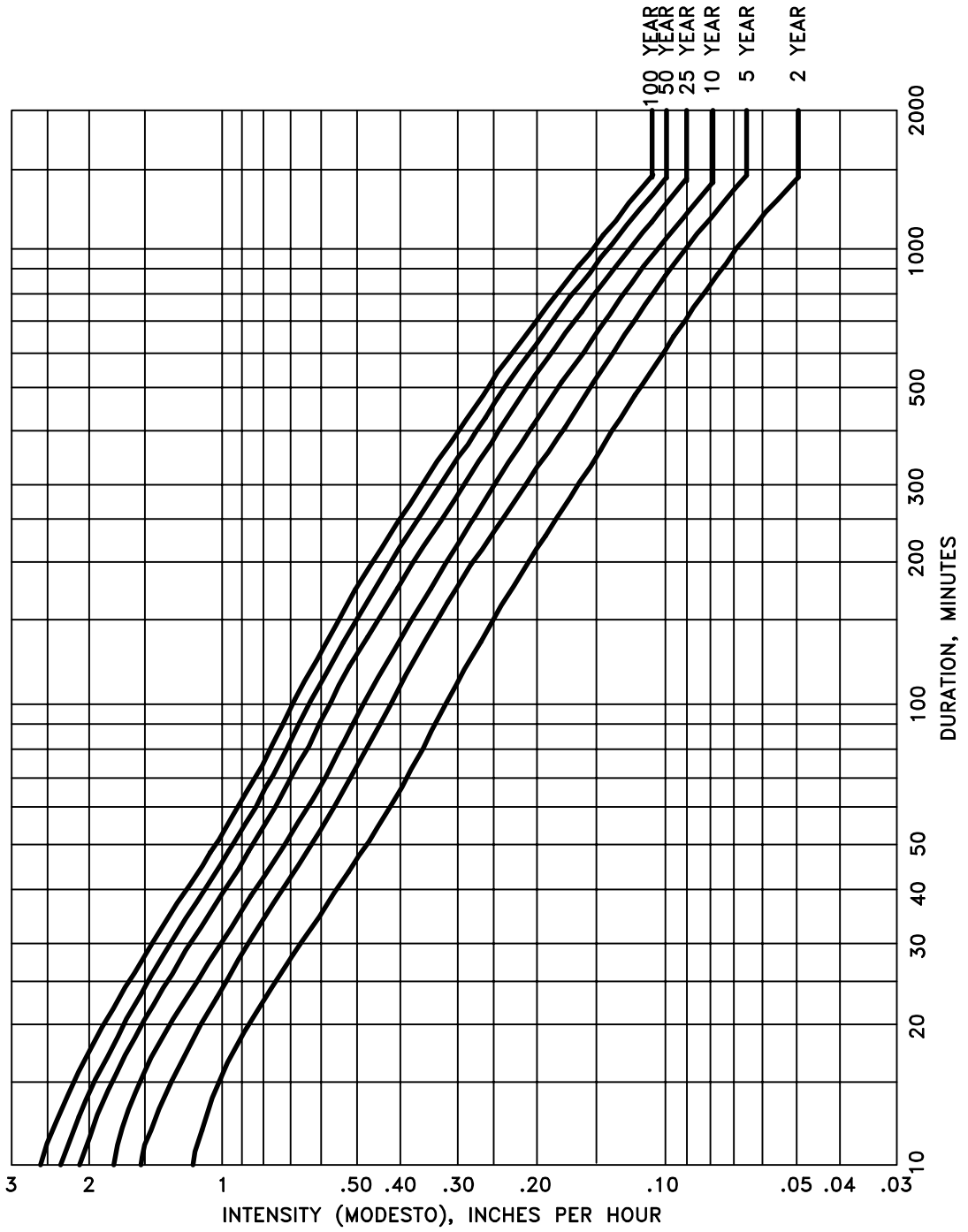
C. Basins:

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. aspaltic 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 CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

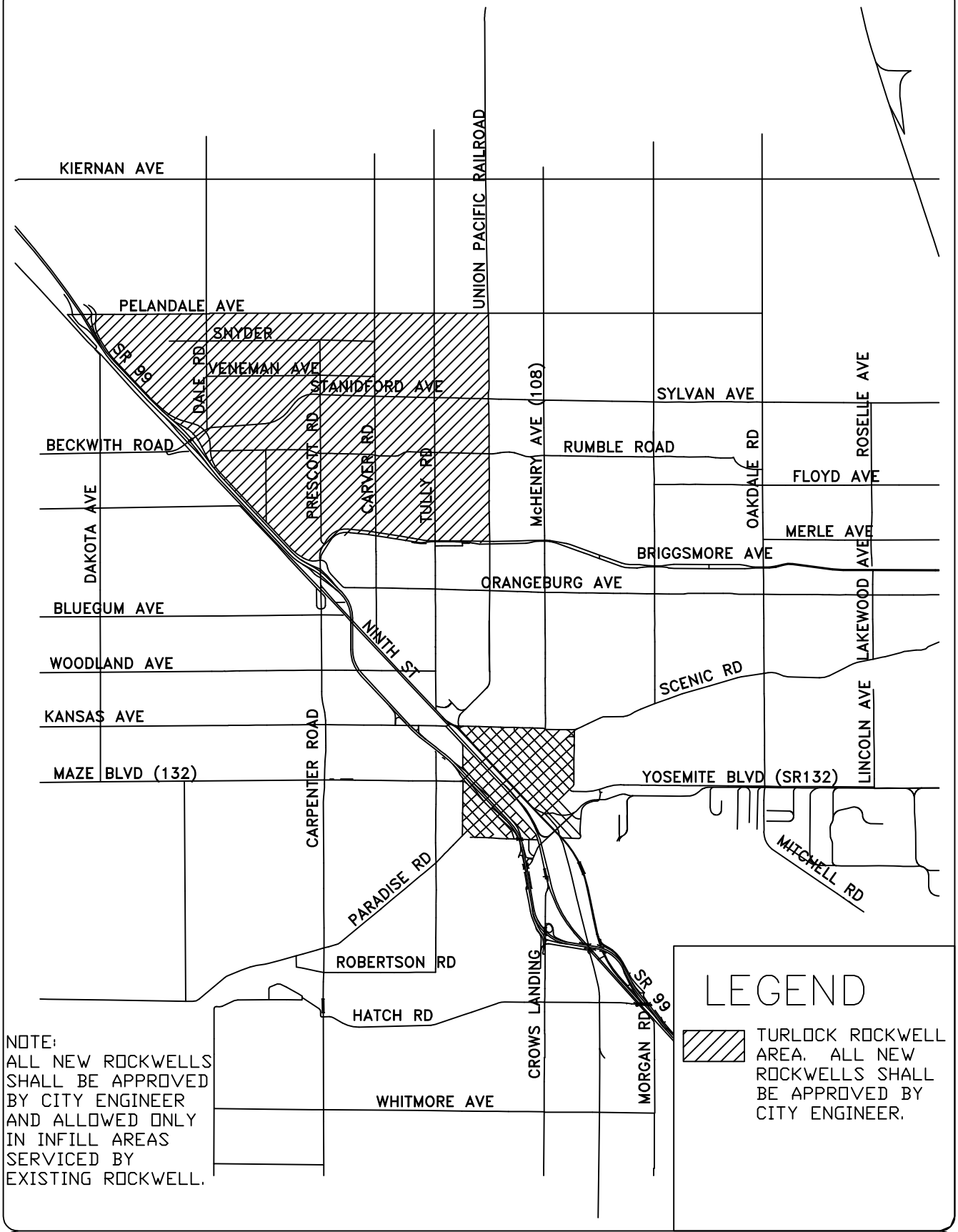
STORM DRAINS

RAIN INTENSITY FREQUENCY CURVES

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO.
400



APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

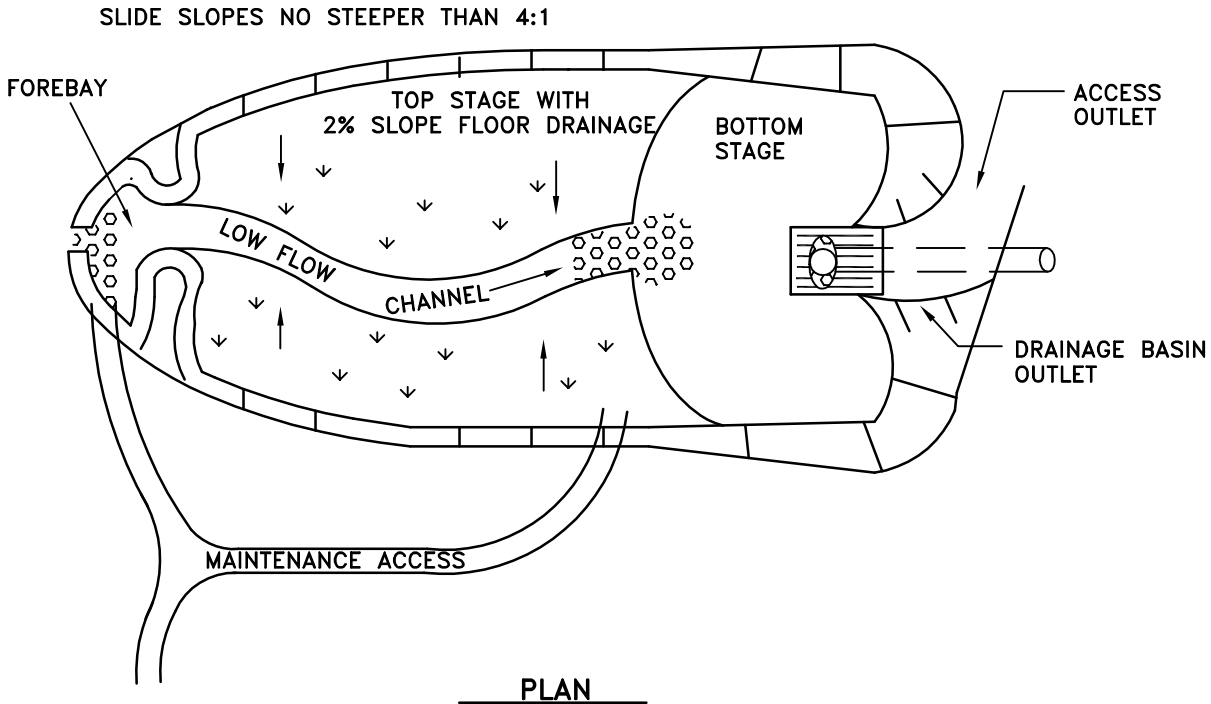
ROCK WELL SERVICE AREA

TURLOCK AND CITY STANDARD ROCK WELLS

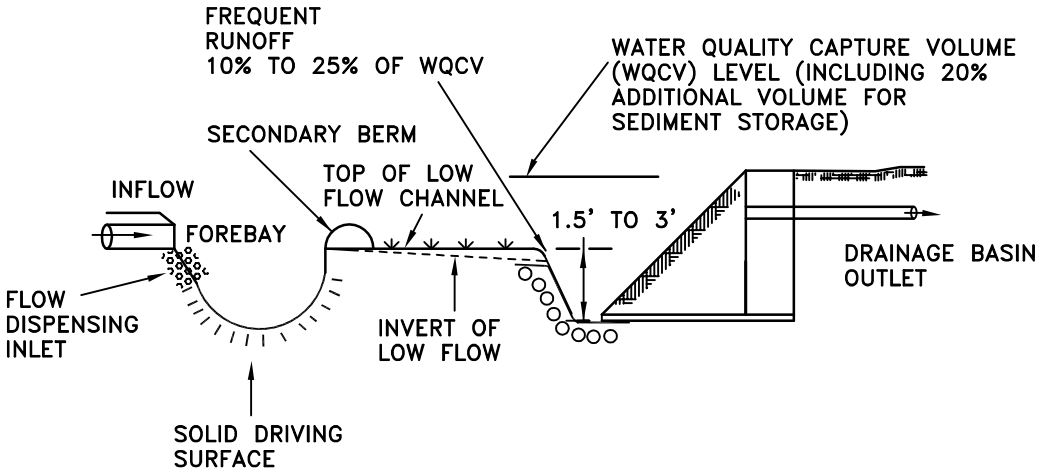
CITY of MODESTO

PUBLIC WORKS DEPARTMENT

DETAIL NO.
400B



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

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STORM DRAINS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	DRAINAGE BASIN	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 401

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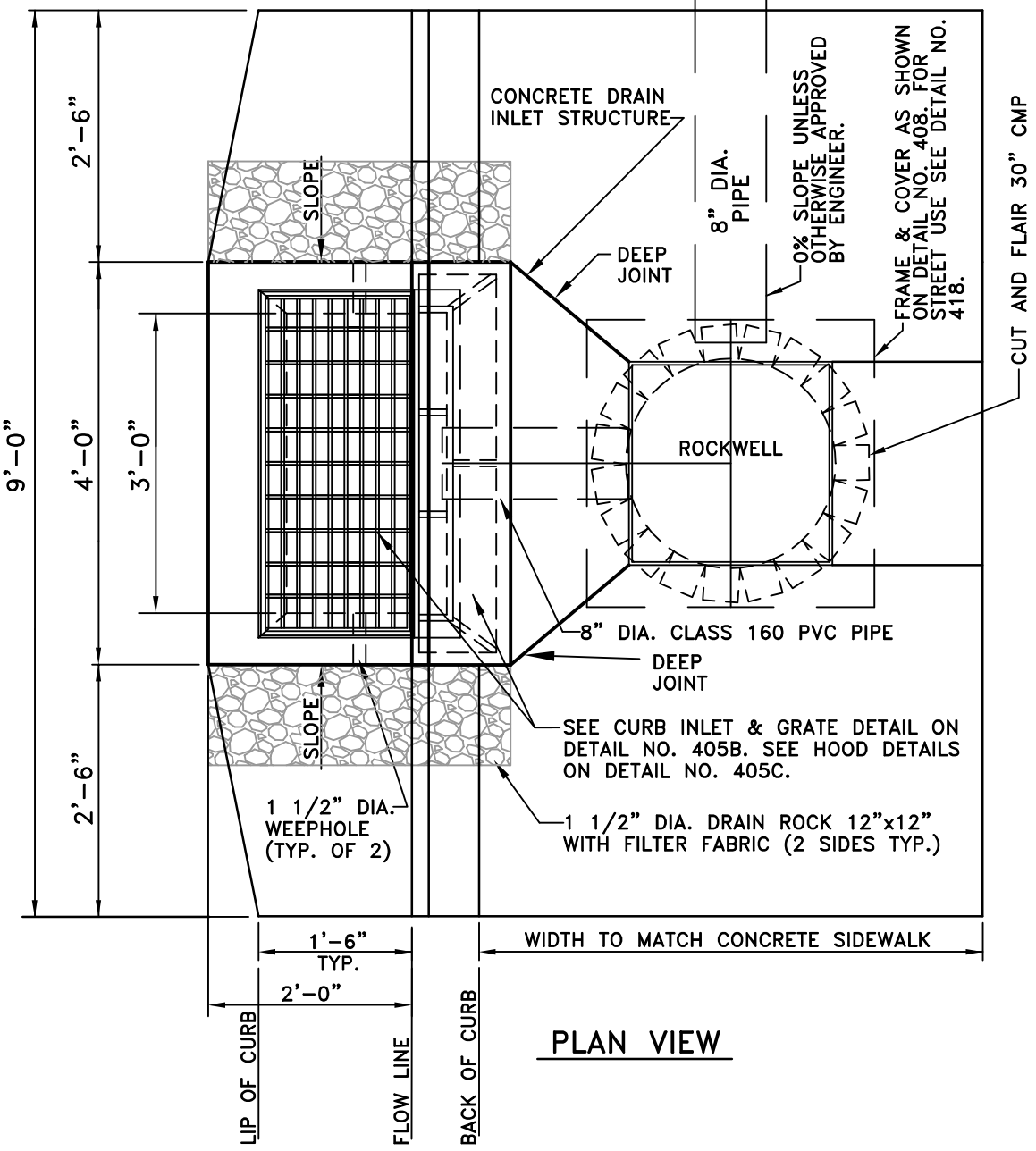
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STORM DRAINS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:		
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 402

NOTE:

FOR MULTIPLE WELL SYSTEM IN THE STREET AREA C900 CLASS 200, IN 20 FOOT LENGTHS, IS REQUIRED. ELEVATION OF PVC PIPE SHALL MATCH 8" DIAMETER PIPE FROM CATCH BASIN. SEE STANDARD DETAIL #418.

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.



PLAN VIEW

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

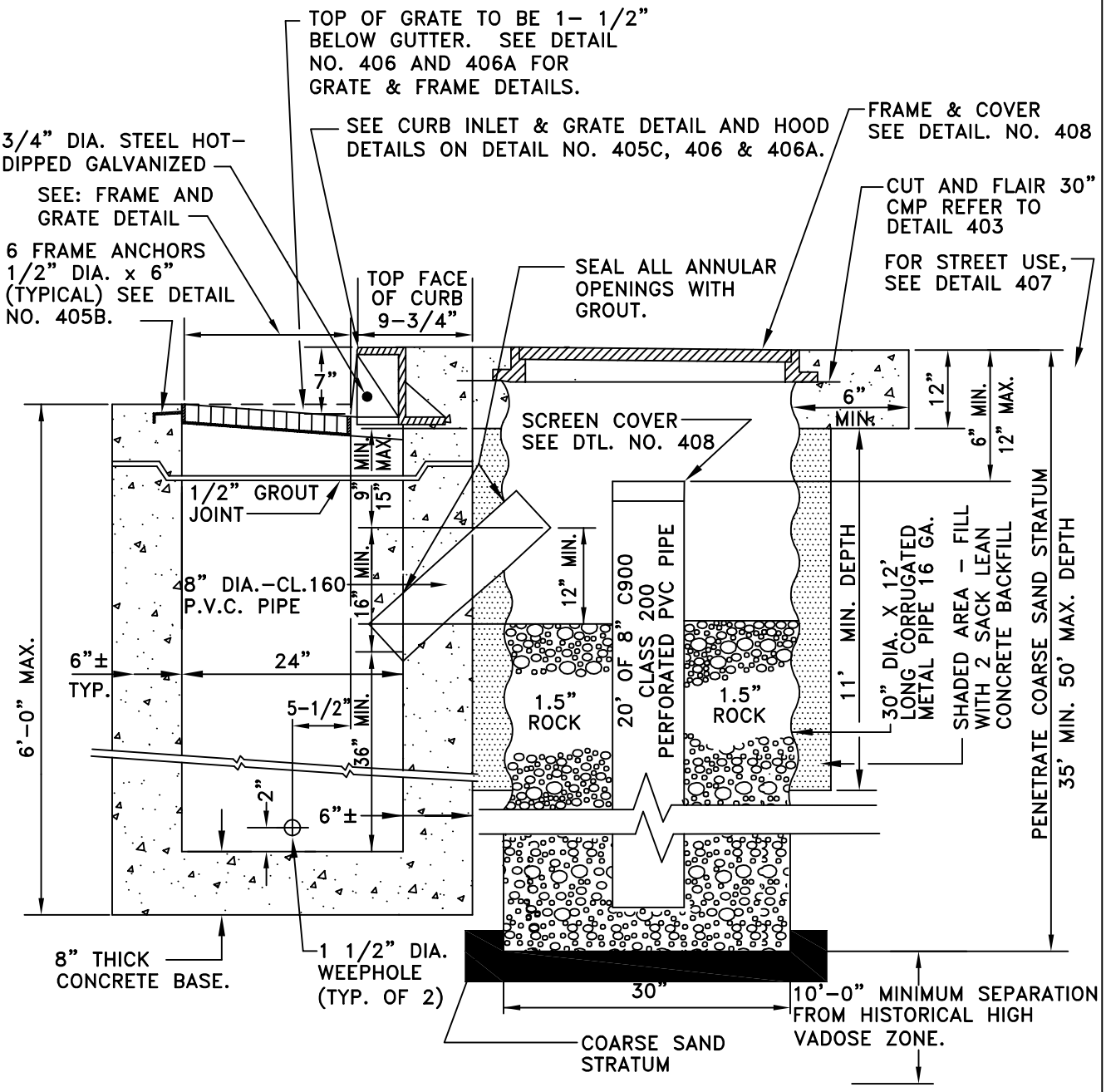
STORM DRAINS

ROCKWELL ASSEMBLY WITH TYPE 1-CATCH BASIN

CITY of MODESTO

PUBLIC WORKS DEPARTMENT

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 403B)
1. MODESTO STANDARD ROCKWELLS: 8" DIA., C900, CLASS 200, PVC SEWER PIPE, 20' LENGTH.
1A. PERFORATIONS: 4 ROWS OF 1/2" DIA. HOLES, 90° O.C. VERTICALLY AND TO WITHIN 6' OF EACH END.
2. SHALL BE INSTALLED BELL END UP.
3. FOR TURLOCK ROCKWELLS SEE DETAIL 404.

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006–284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

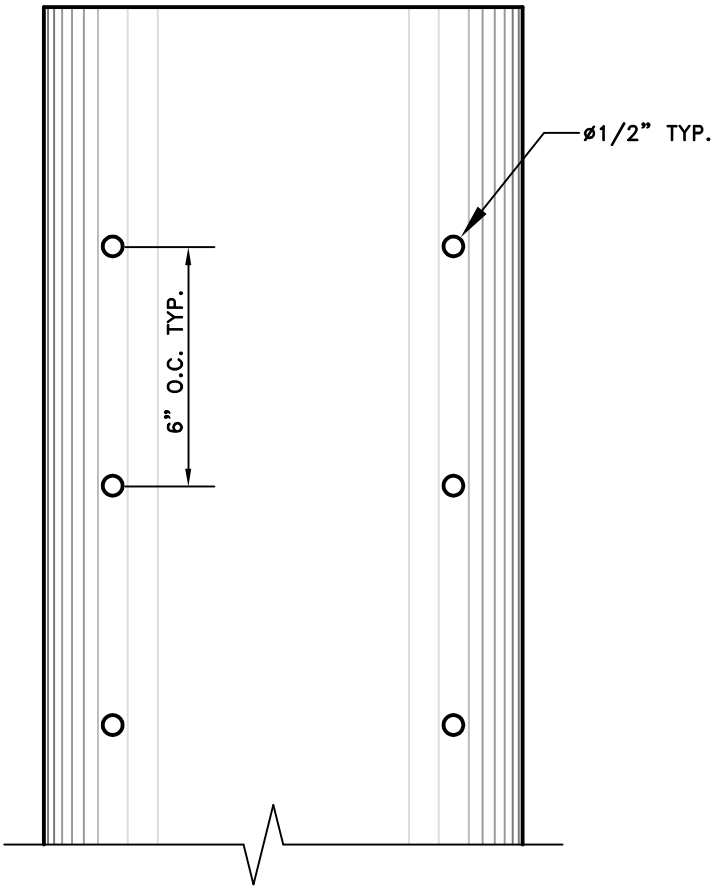
STORM DRAINS

ROCKWELL ASSEMBLY WITH TYPE 1–CATCH BASIN

CITY of MODESTO

PUBLIC WORKS DEPARTMENT

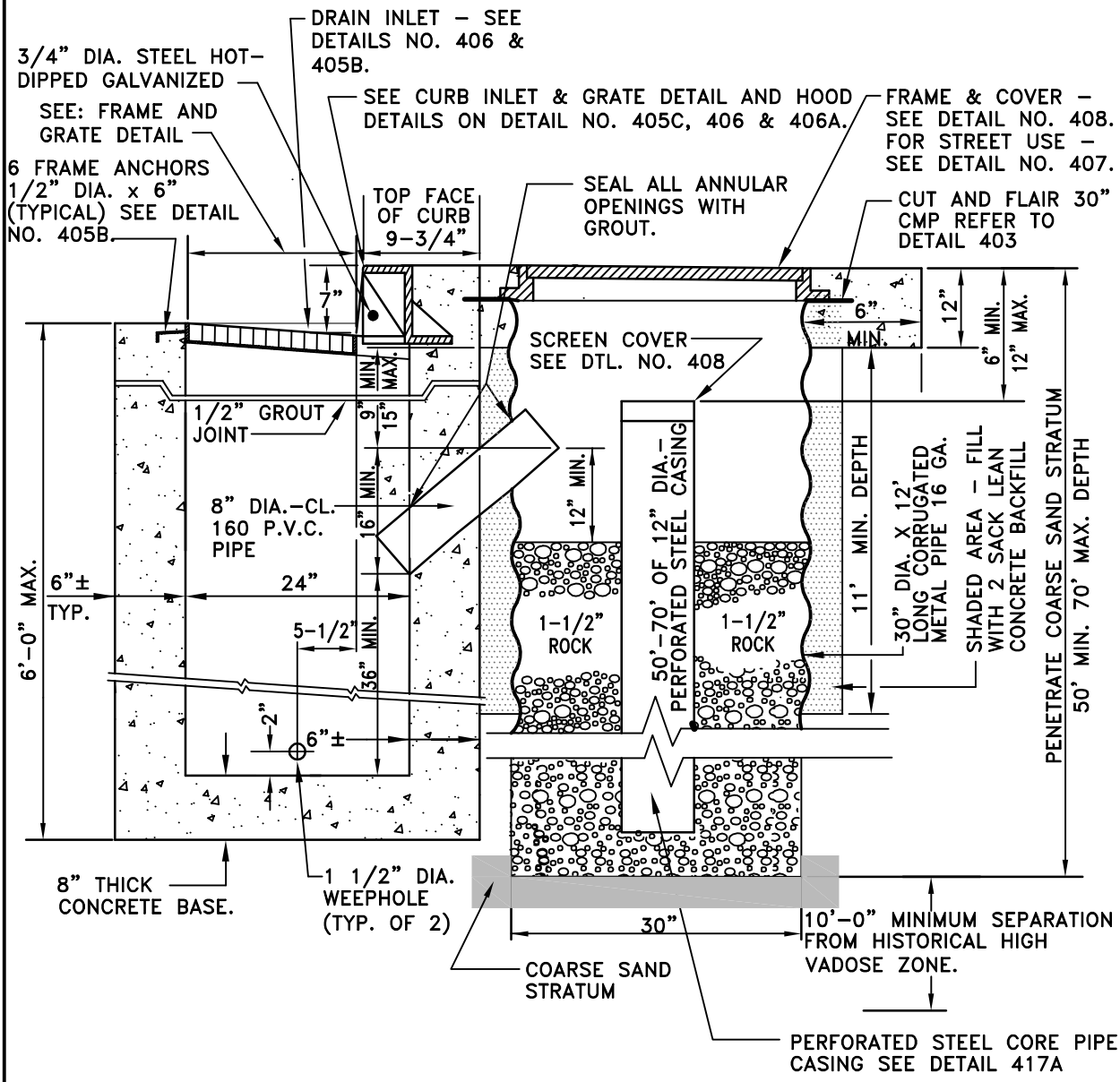
DETAIL NO.
403A



SPECIFICATIONS:

CITY OF MODESTO STANDARD ROCKWELLS SHALL HAVE A 20' LINIER FOOT, 8" DIAMETER, C900,CLASS 200 PVC PERFERATED CORE PIPE. THE PERFERATIONS SHALL BE 1/2" DIAMETER HOLES, AT 90°. THERE SHALL BE 4 ROWS OF PERFERATIONS VERTICALLY AT 6" O.C. AND 6" FROM EITHER END. CORE PIPES SHALL BE INSTALLED BELL END UP.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STORM DRAIN	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	CORE PIPE FOR STANDARD CITY ROCKWELL	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 403B



1. TURLOCK WELLS: CORE PIPE SHALL BE 12GA. (MIN.) 12" DIA. (I.D.) STEEL PIPE.

1A. PERFORATIONS: 10 ROWS, 6" O. C. X 2 1/2" LONG, 0.120" SLOT WIDTH, 6' O.C. VERTICALLY, 20 SLOTS PER FOOT.

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wu

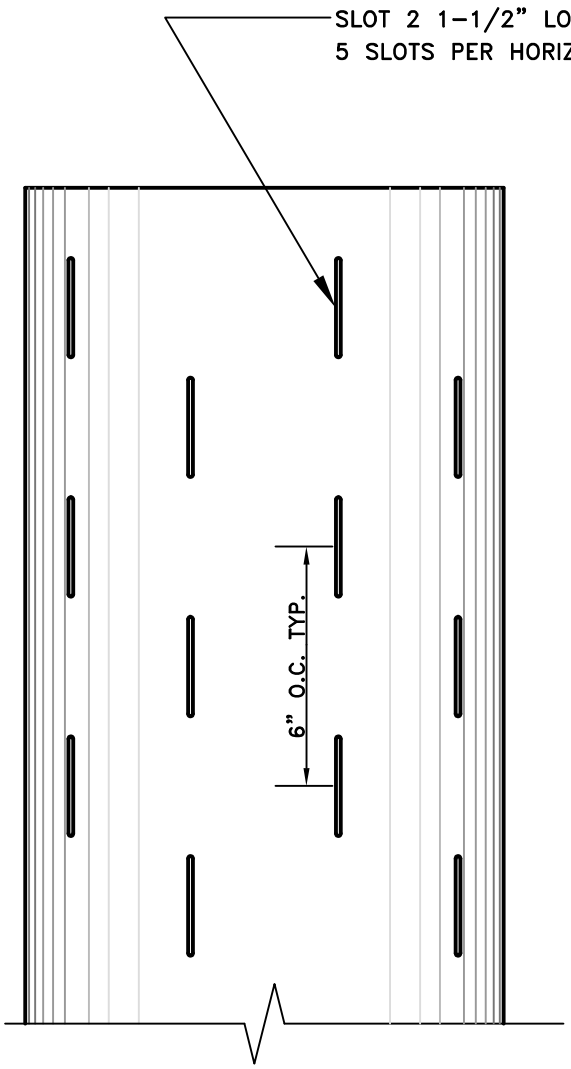
STORM DRAINS

TURLOCK ROCKWELL ASSEMBLY FOR TYPE 1–CATCH BASIN

CITY of MODESTO

PUBLIC WORKS DEPARTMENT

DETAIL NO. 404



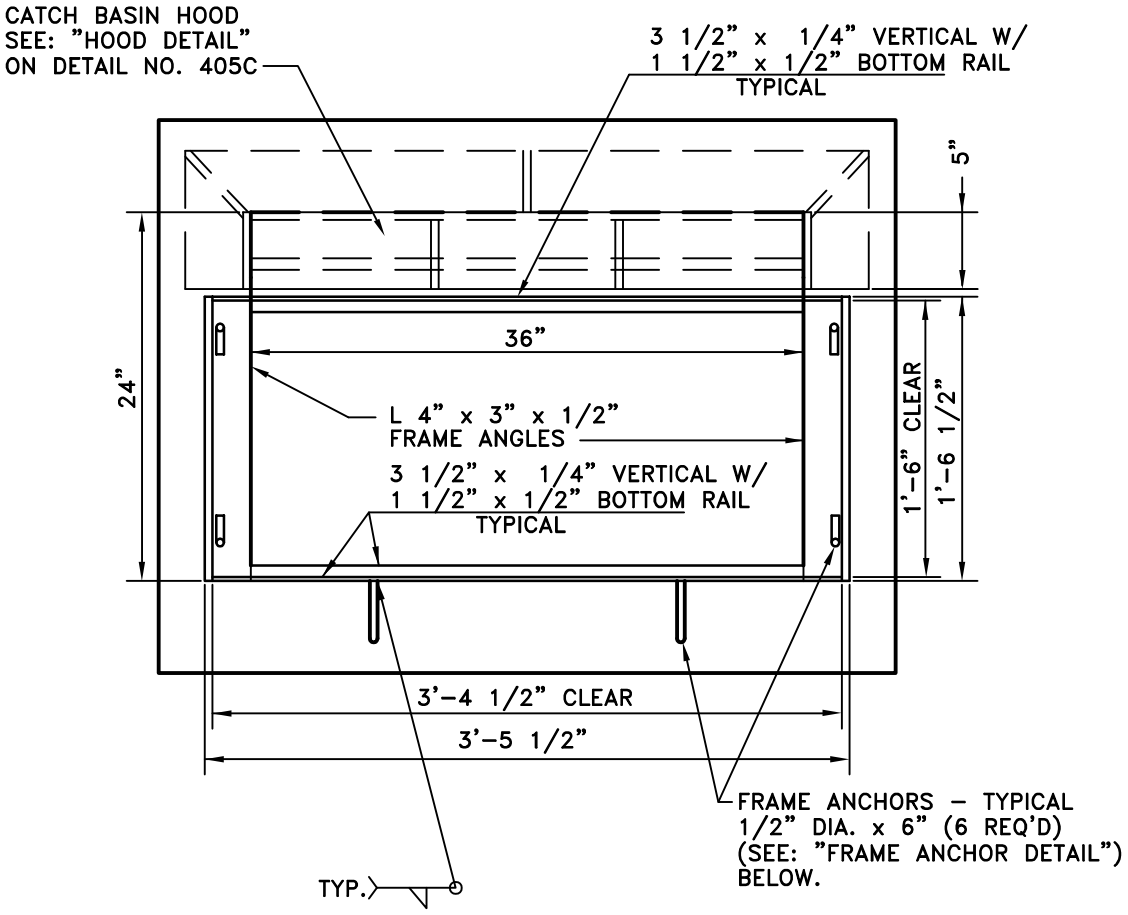
SPECIFICATIONS:

PERFORATED PATTERN FOR 12-3/4" O.D., 12GA (MIN.) STEEL CASING.
10 ROWS 6" O/C X 2-1/2" LONG., 1/8" (0.120") WIDE SLOTS
TOTAL NUMBER OF SLOTS PER FT. = 20
TOTAL OPEN AREA PER FT. = 6.24 SQ. IN.

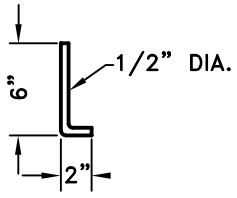
NOT TO SCALE

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STORM DRAIN	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	CORE PIPE FOR TURLOCK ROCKWELL	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 404A

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



PLAN VIEW



FRAME ANCHOR

(6 REQ'D)

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 PERMANENENTLY 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 MININUM 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.

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

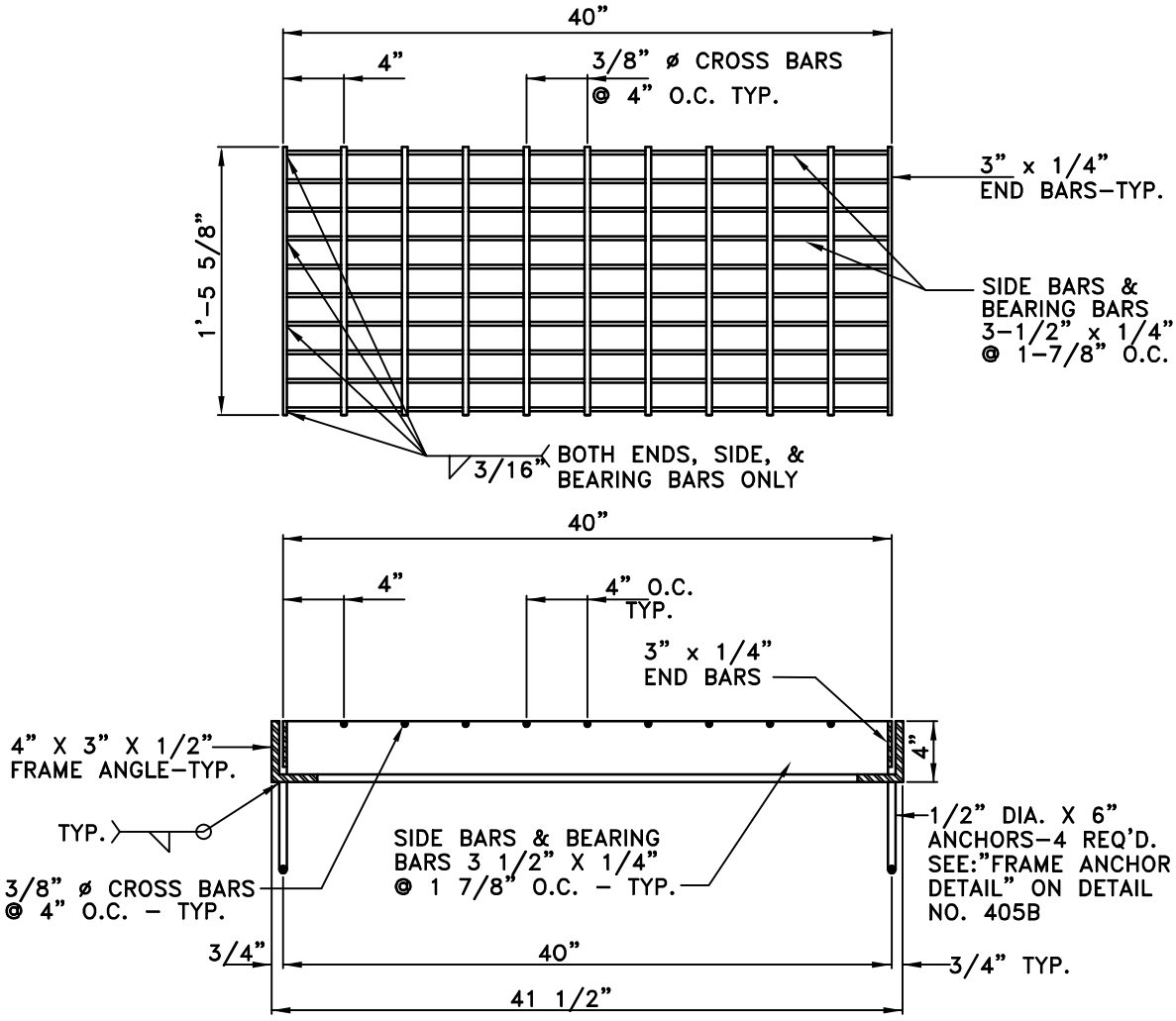
STORM DRAINS

CONCRETE CATCH BASIN & FRAME FOR TYPE 1-CATCH BASIN

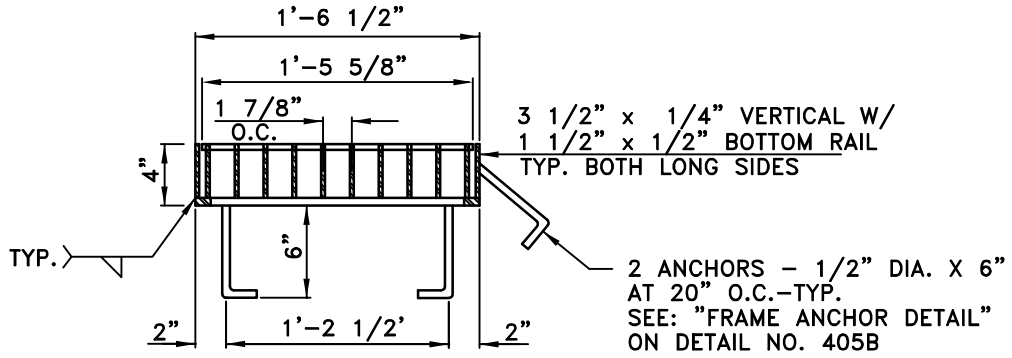
PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO. 405

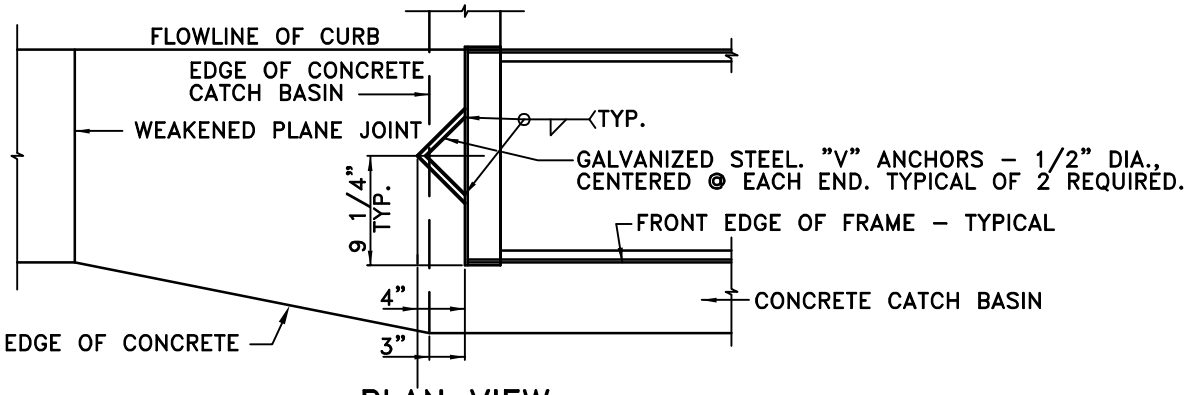


PLAN VIEW AND FRONT ELEVATION

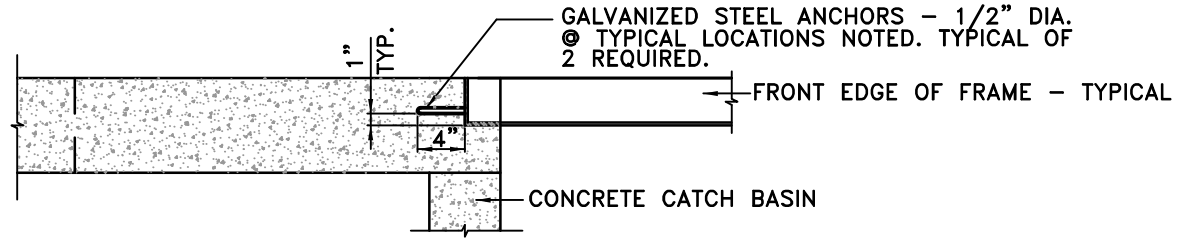


END VIEW/SECTION

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	STORM DRAINS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	FRAME & GRATE FOR TYPE 1–CATCH BASIN	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 405A

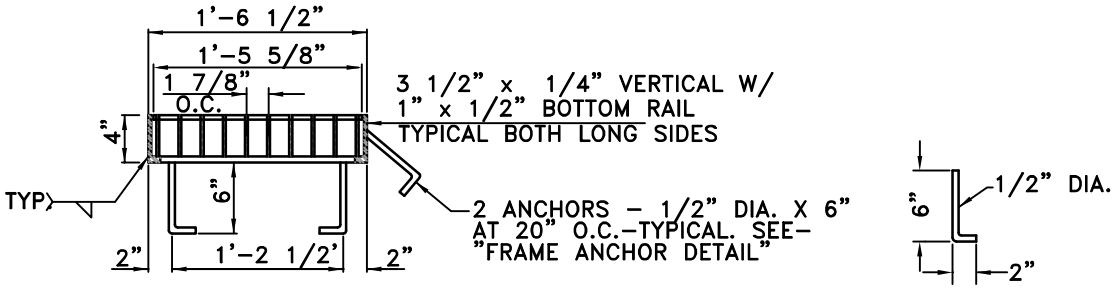


PLAN VIEW



TYPICAL SECTION

OPTIONAL "V" FRAME ANCHORS



END VIEW/SECTION

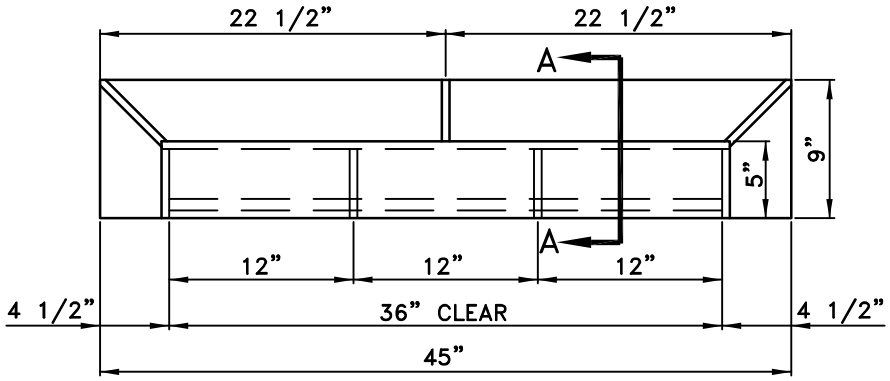
TYPICAL STANDARD FRAME ANCHOR

(6 REQ'D)

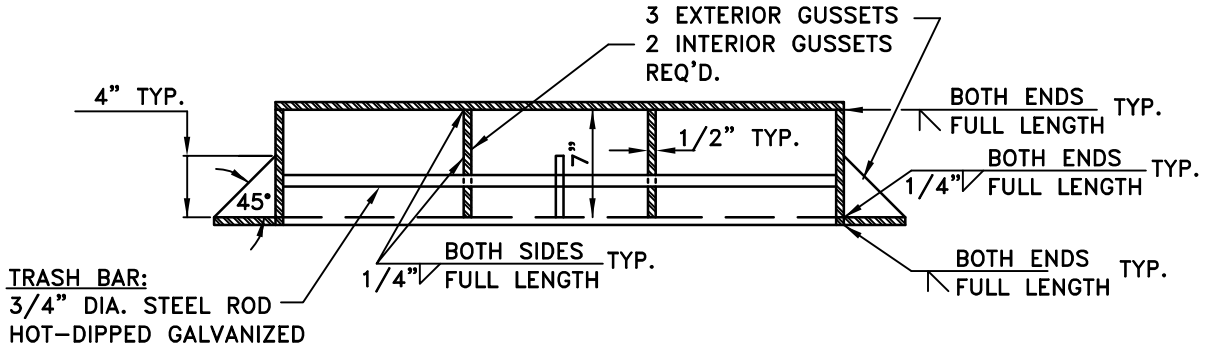
NOTES:

1. MATERIAL SHALL BE A–36 STEEL.
2. GRATE SHALL BE RATED FOR H–20 LOADING.
3. FRAME, GRATE AND HOOD ASSEMBLY SHALL BE HOT DIPPED GALVANIZED.
4. GRATE SHALL BE BICYCLE PROOF.
5. INSTALLED GRATE SHALL BE PERMANENENTLY SECURED TO ONE CORNER OF THE INLET FRAME WITH A 12" LENGTH OF 1/4" GALVANIZED CHAIN.
6. LOCATE FRAME ANCHORS TO PROVIDE A MININUMOF 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.

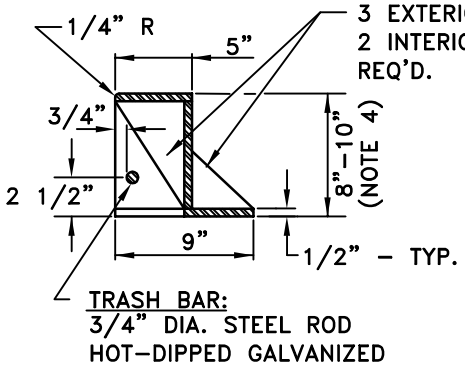
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	STORM DRAINS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	ROCKWELL CATCH BASIN ANCHORS	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 405B



PLAN VIEW



FRONT VIEW

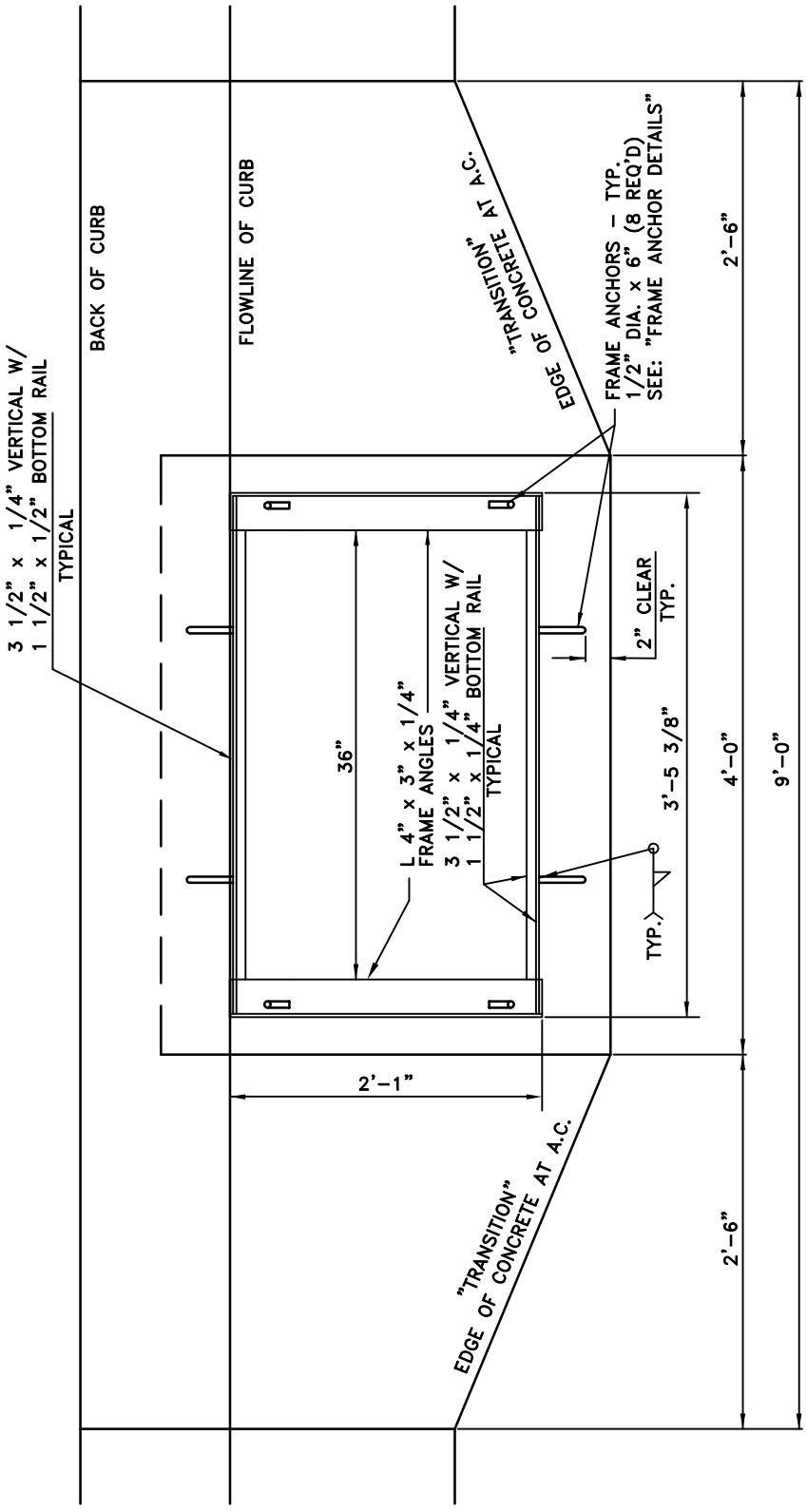


SECTION A-A

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.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STORM DRAINS	
APPROVED BY THE CITY ENGINEER:	HOOD DETAIL FOR TYPE 1-CATCH BASIN	CITY of MODESTO
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 405C



APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wu

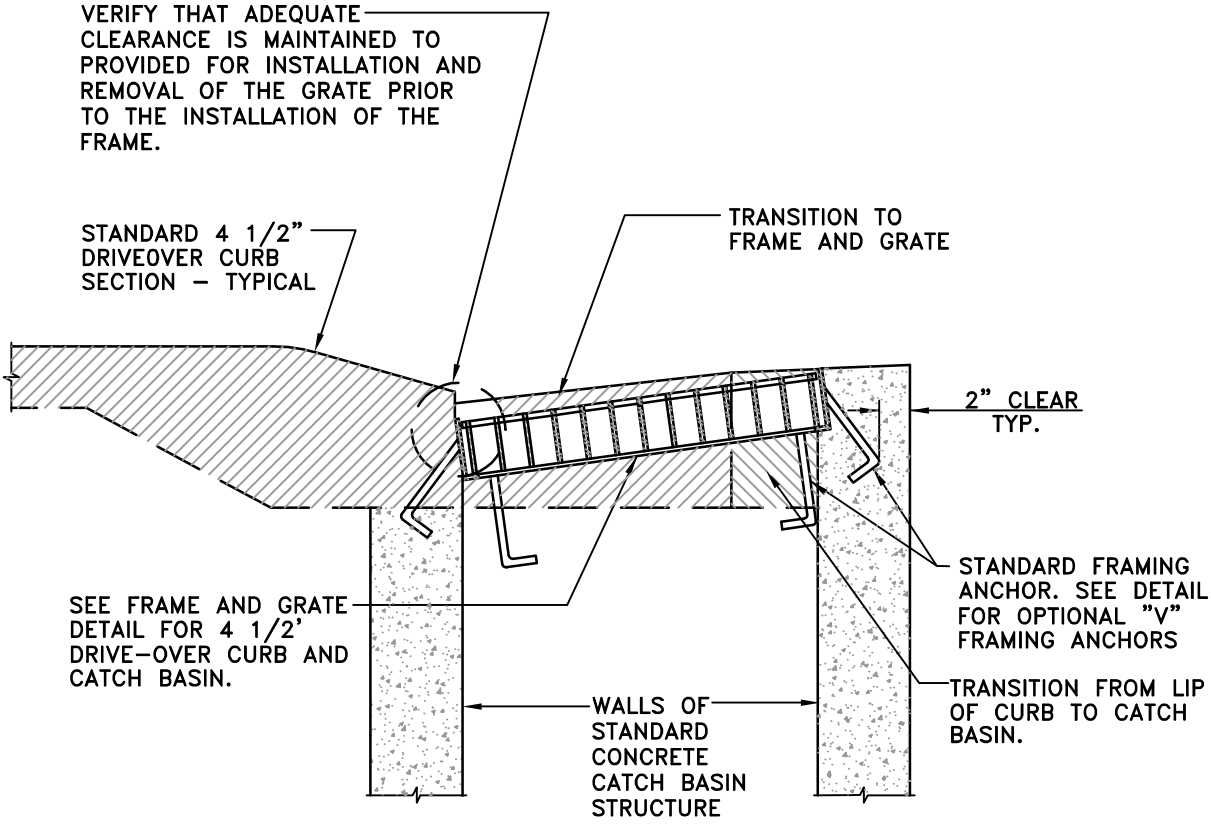
STORM DRAINS

CATCH BASIN AND FRAME (DRIVE OVER CURB)

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO.
406



APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006–284

APPROVED BY THE CITY ENGINEER:

Richard D. Wu

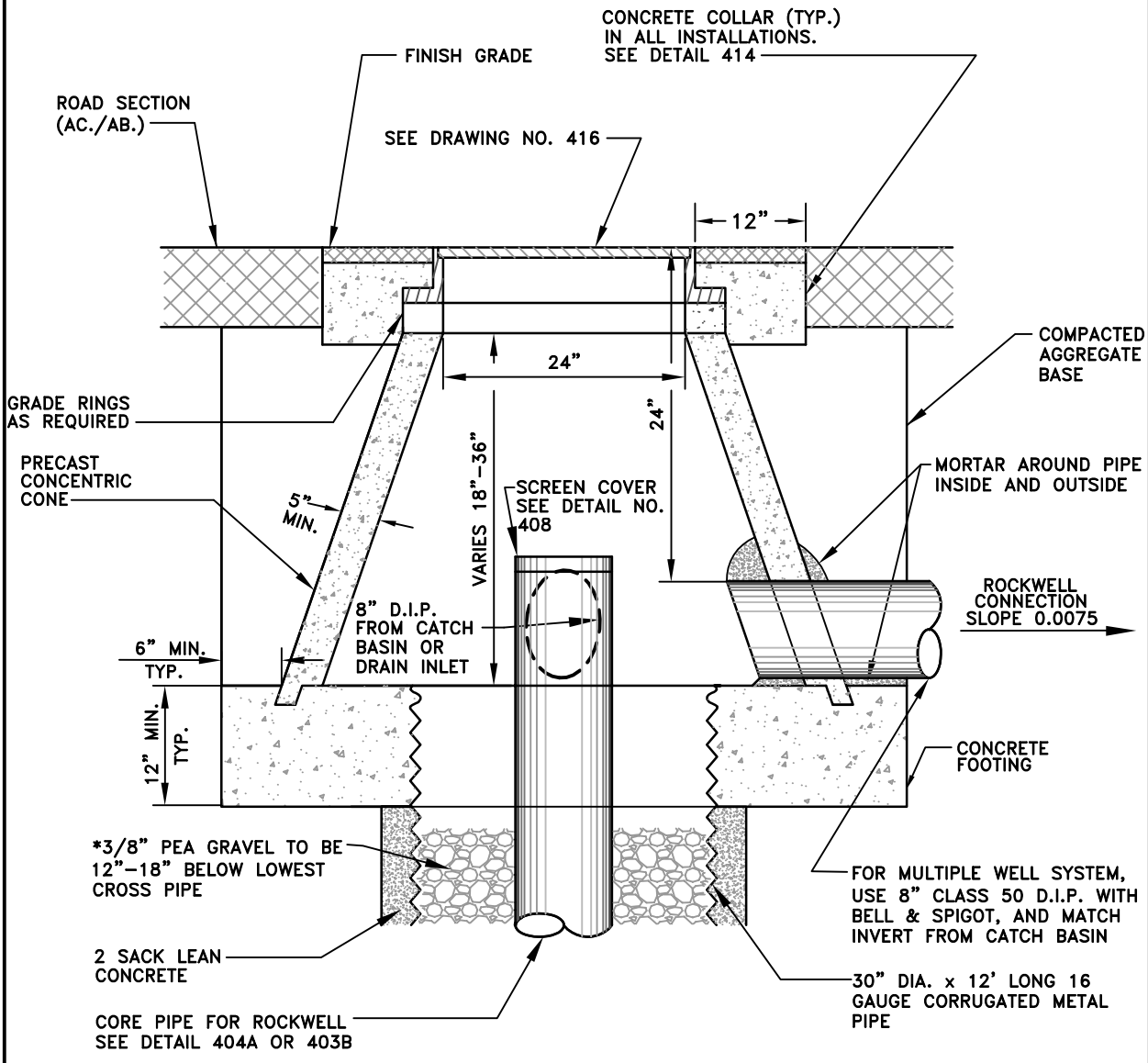
STORM DRAINS

CATCH BASIN GRATE DETAIL (DRIVE–OVER CURB)

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

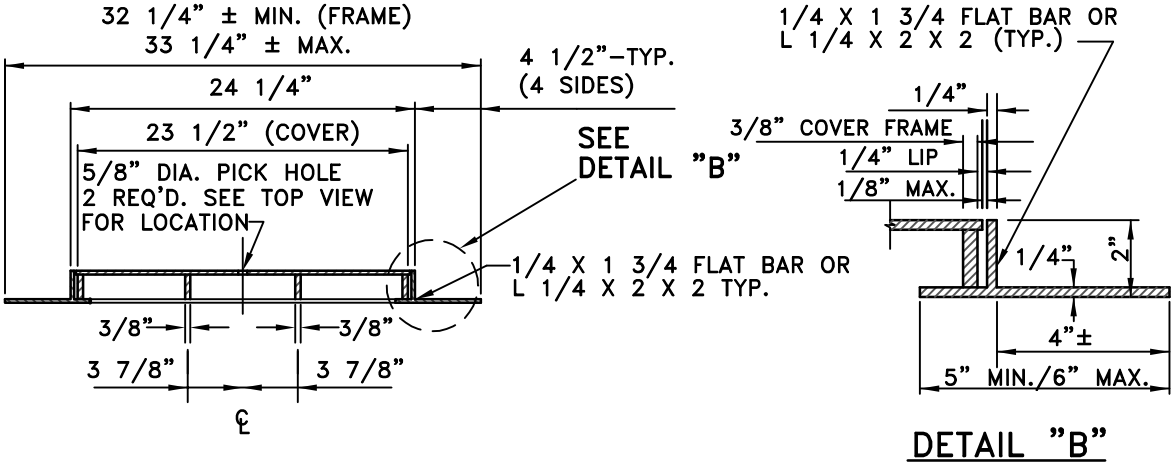
DETAIL NO.
406A



NOTES:

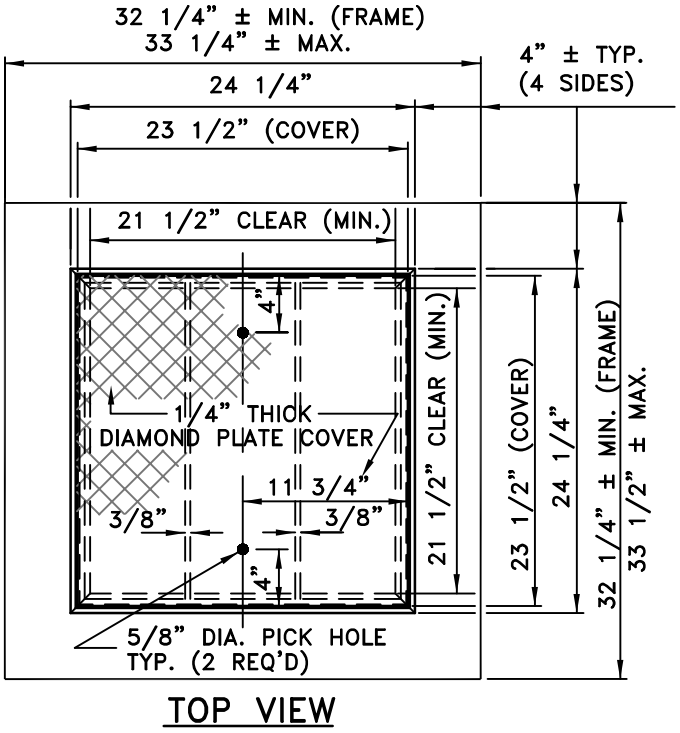
1. ADJUST FRAME TO GRADE AFTER PAVING.
2. IN TRAFFIC AREAS CONCRETE COLLAR SHALL BE MADE WITH HIGH EARLY STRENGTH CONCRETE. BARRICADES SHALL BE REMOVED IN 24 HOURS.
3. ALL PRECAST CONCRETE SHALL BE DESIGNED TO WITHSTAND H–20 LOADING.
4. 3/8" GRAVEL FOR TURLOCK WELL AND 1 1/2" DRAIN ROCK FOR CITY STANDARD.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	STORM DRAINS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	MANHOLE CONE FOR ROCKWELL IN VEHICULAR TRAFFIC AREAS	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 407

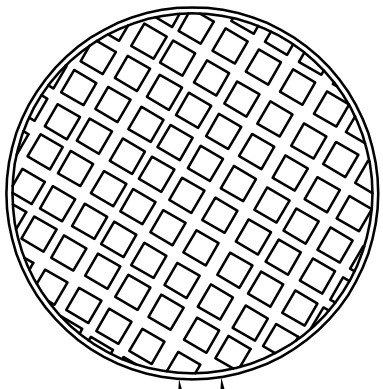


SECTION A–A

DETAIL "B"

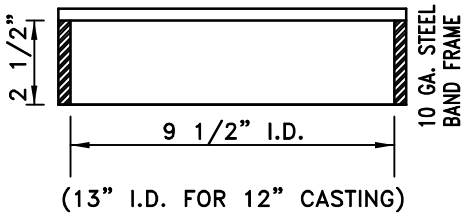


TOP VIEW



EXPANDED METAL SCREEN COVER SHALL BE FLUSH WITH OUTSIDE EDGE OF 10 GA. BAND

SCREEN COVER 3/4" – #9 FLATTENED EXPANDED METAL WELDED TO FRAME AT CONTACT POINTS



(13" I.D. FOR 12" CASTING)

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"

NOTE:

UNIT TO BE HOT DIPPED GALVANIZED AFTER MANUFACTURE.

SCREEN COVER DETAIL

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006–284

APPROVED BY THE CITY ENGINEER:

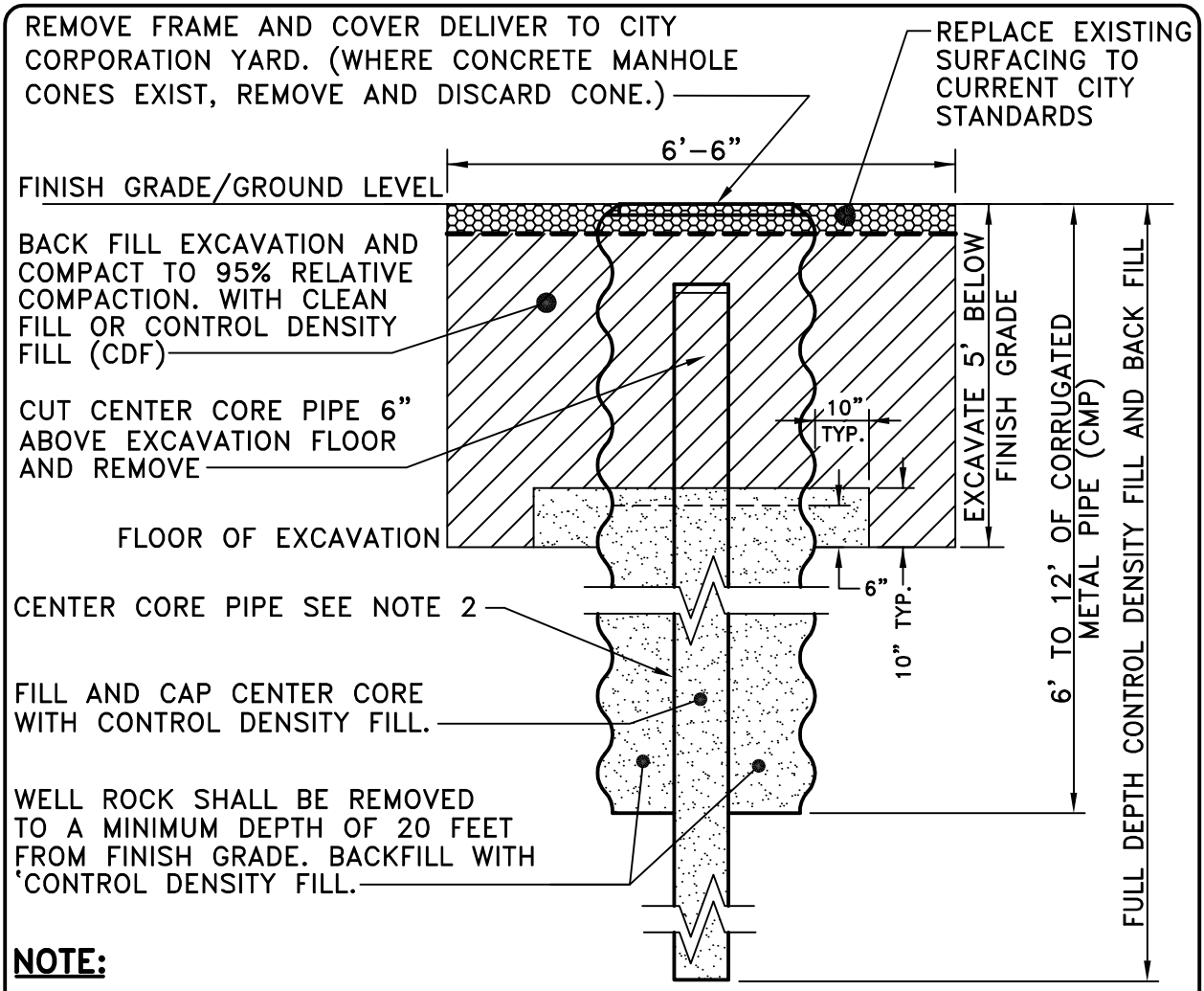
STORM DRAINS

ROCKWELL FRAME AND COVER AND SCREEN COVER

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

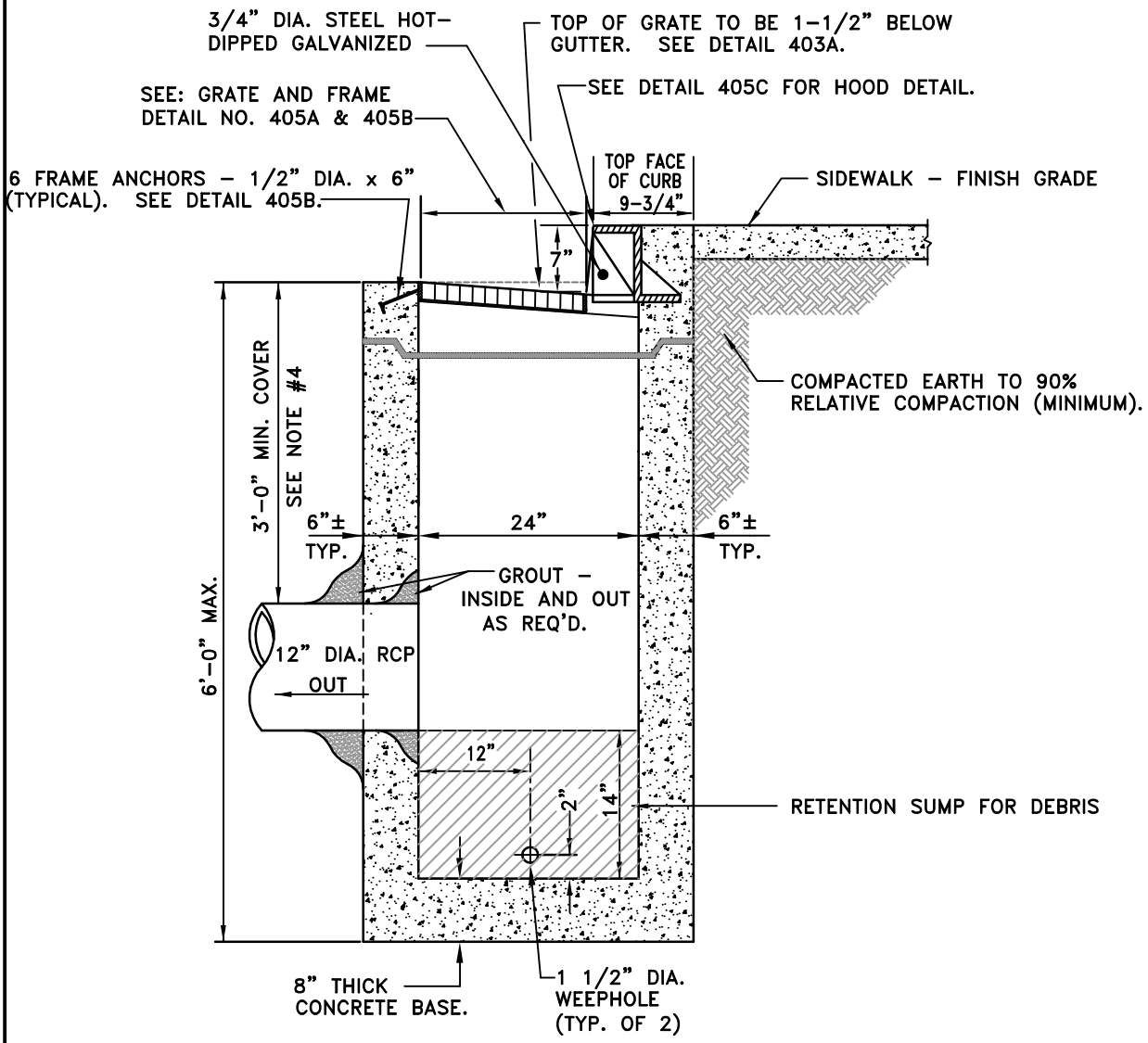
DETAIL NO.
408



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 ENVIROMENTAL 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.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STORM DRAINS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wu	ABANDONED ROCKWELL TYPICAL	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 408A

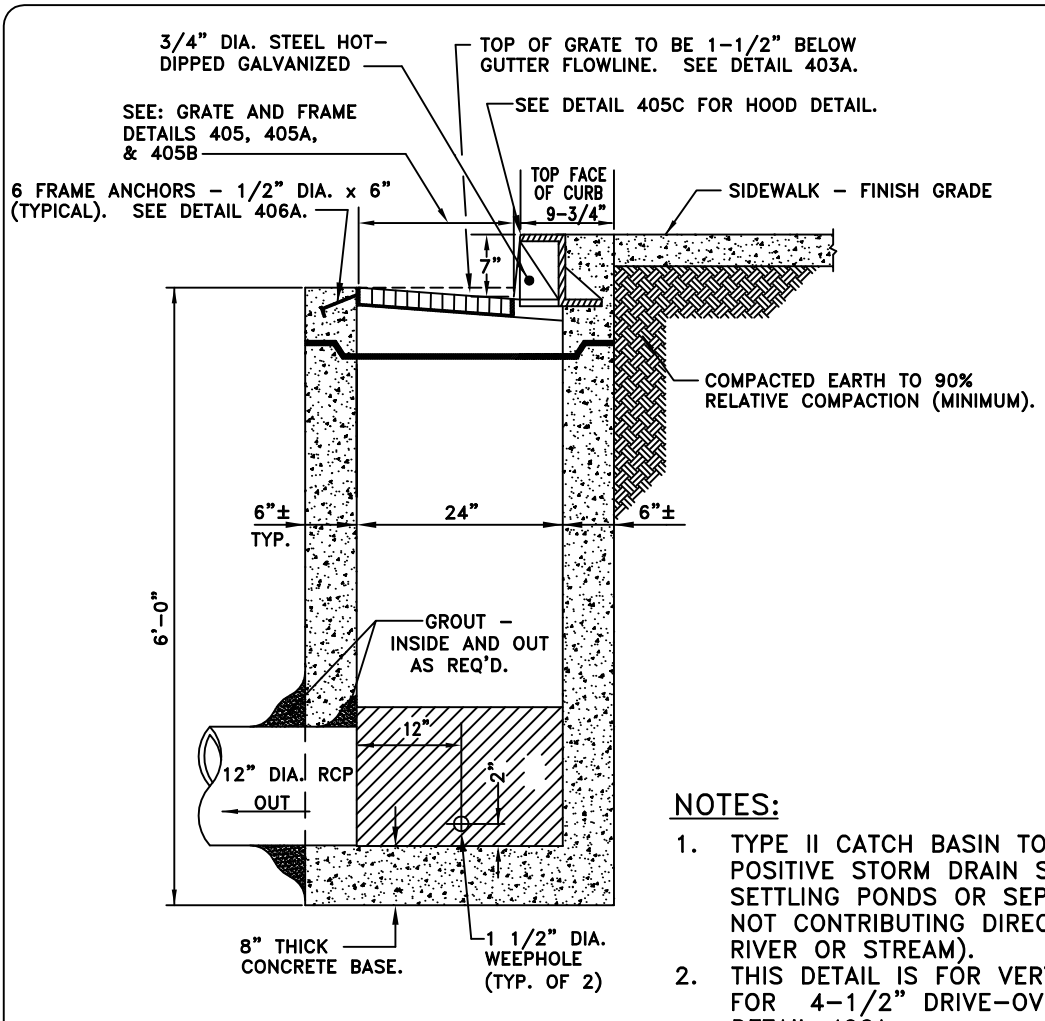


TYPICAL SECTION

NOTE:

1. REFER TO CITY STANDARD DRAWINGS 403, 403A, 405, 405A, AND 405C 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 3'. WHEN VERTICAL COVER IS LESS THAN 3', ENGINEERED BACKFILL, DUCTILE IRON PIPE OR A COMBINATION OF BOTH SHALL BE REQUIRED AND APPROVED BY THE CITY ENGINEER.
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 DISHARGE WATER GOES TO A STORM DRAIN BASIN.

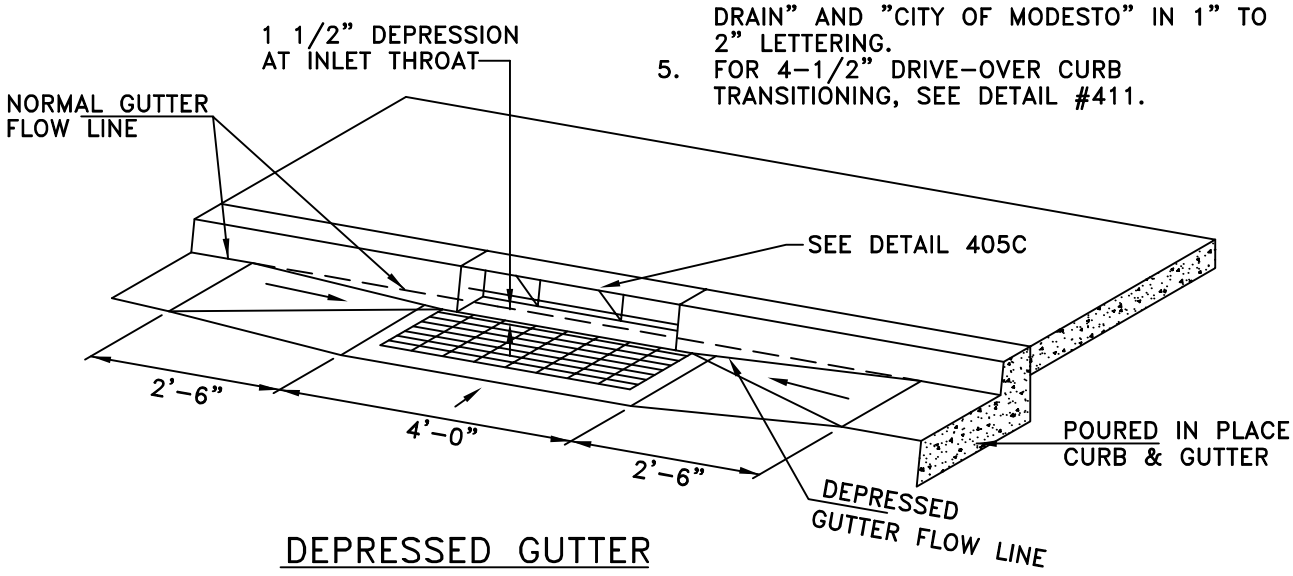
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STORM DRAINS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	TYPE I CATCH BASIN W/ RETENTION SUMP	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 409



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 VERTICAL CURB ONLY. FOR 4-1/2" DRIVE-OVER CURB SEE DETAIL 406A.
3. REFER TO DESIGN STANDARD 4.06 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 #411.



DEPRESSED GUTTER

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

STORM DRAINS

TYPE II CATCH BASIN FOR STORM DRAIN BASINS

CITY of MODESTO

PUBLIC WORKS DEPARTMENT

DETAIL NO. 410

NOTE:

1. THIS TYPE OF CATCH BASIN MAY BE USED ONLY IN POSITIVE STORM DRAIN AREAS WHERE A SETTLING BASIN OR SEPARATOR IS USED TO PREVENT LEAVES FROM ENTERING OUR STREAMS OR RIVERS.
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.

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

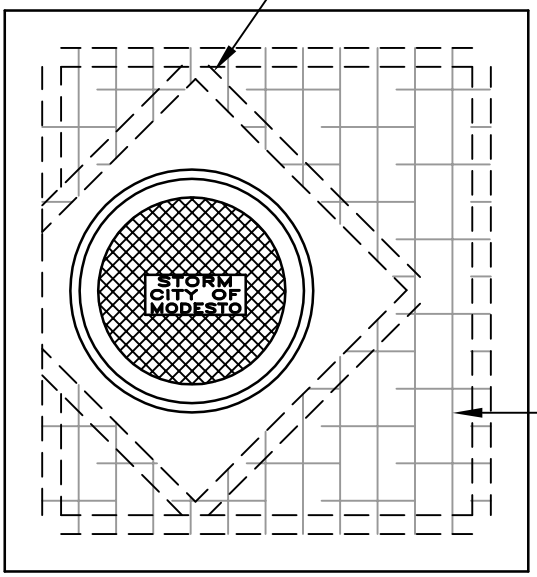
STORM DRAINS

DRIVE-OVER CURB FOR CURB INLET

PUBLIC WORKS DEPARTMENT

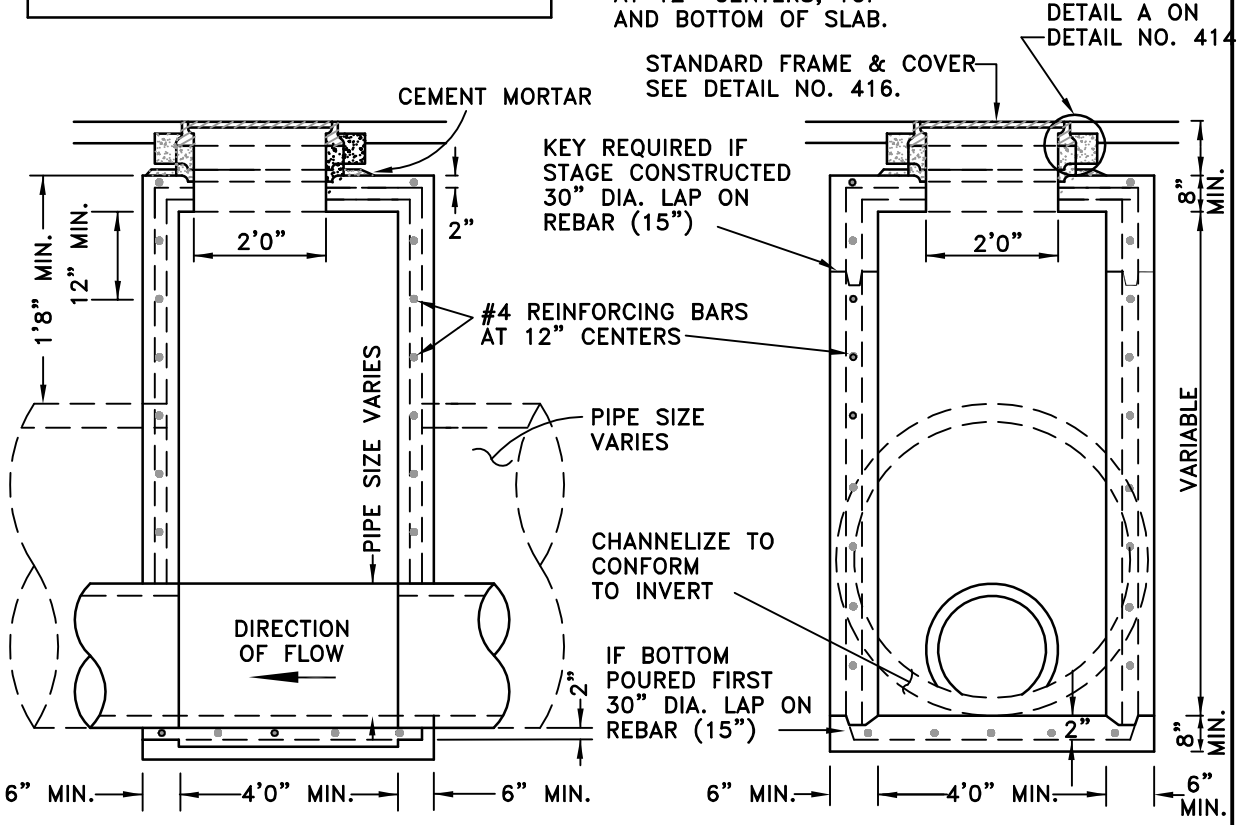
CITY of MODESTO

DETAIL NO.
411

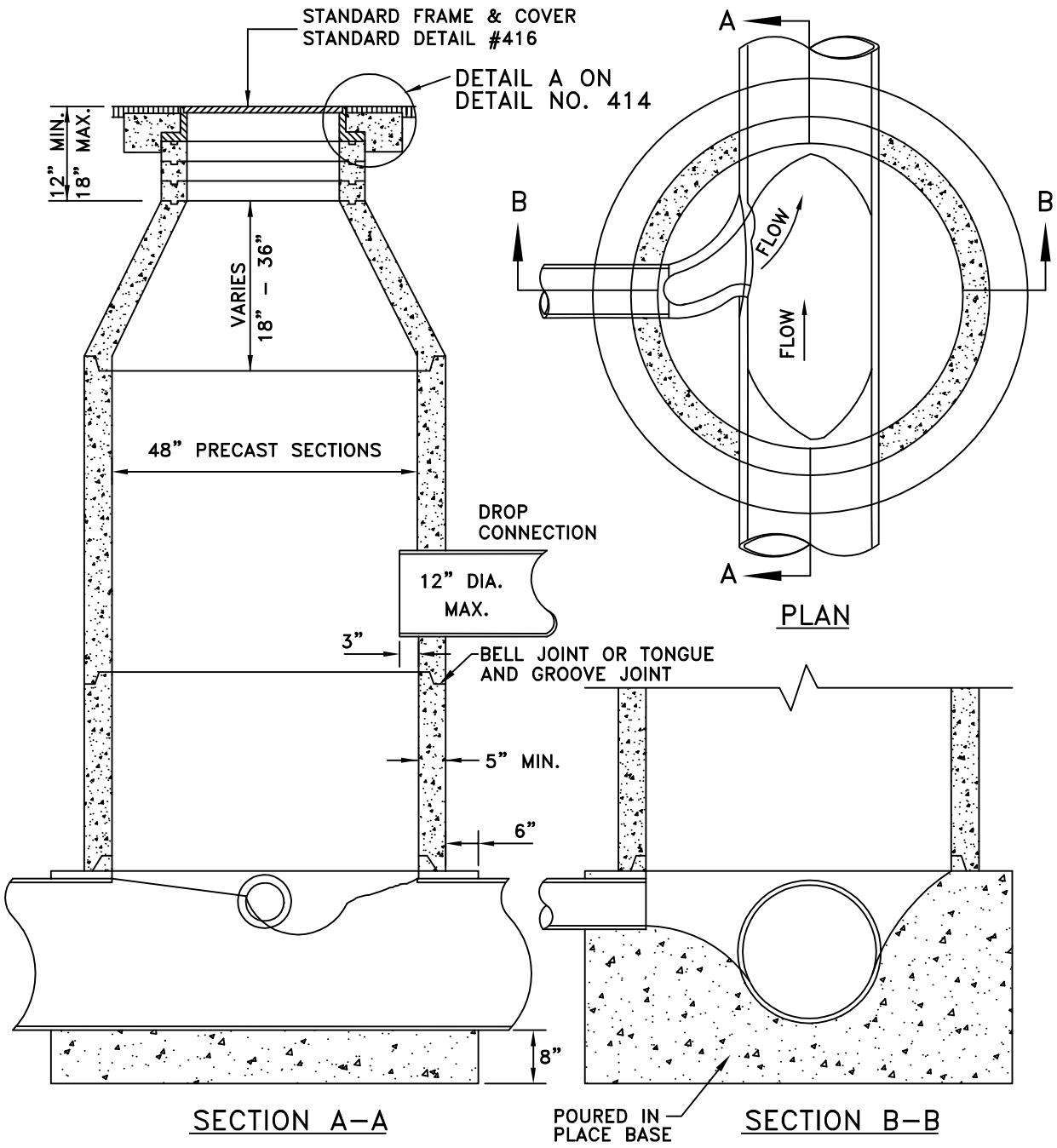


NOTES:

1. THIS INSTALLATION SHALL BE USED ON EXISTING MANHOLES ONLY WHERE THE DIFFERENCE IN ELEVATION BETWEEN THE TOP OF THE OUTLET PIPE AND THE INVERT OF THE FEEDER OR COLLECTOR SEWER EXCEEDS 24".
2. 12" MAX. FOR 8" PIPE, 24" MAX. FOR PIPES LESS THAN 8".
3. FLEXIBLE JOINT – BALL AND SPIGOT OR COULDER COUPLING. SOLVENT WELDED JOINT NOT PERMITTED.
4. ADJUST FRAME TO GRADE AFTER PAVING.
5. ALL PRECAST CONCRETE SHALL BE DESIGNED TO WITHSTAND H20 LOADING.
6. IN TRAFFIC AREAS CONCRETE SHALL BE MADE WITH 3000 PSI PCC HIGH–EARLY STRENGTH. BARRICADES SHALL BE REMOVED IN 24 HOURS.



APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	STORM DRAINS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	JUNCTION BOX	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 412



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 H20 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.

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006–284

APPROVED BY THE CITY ENGINEER:

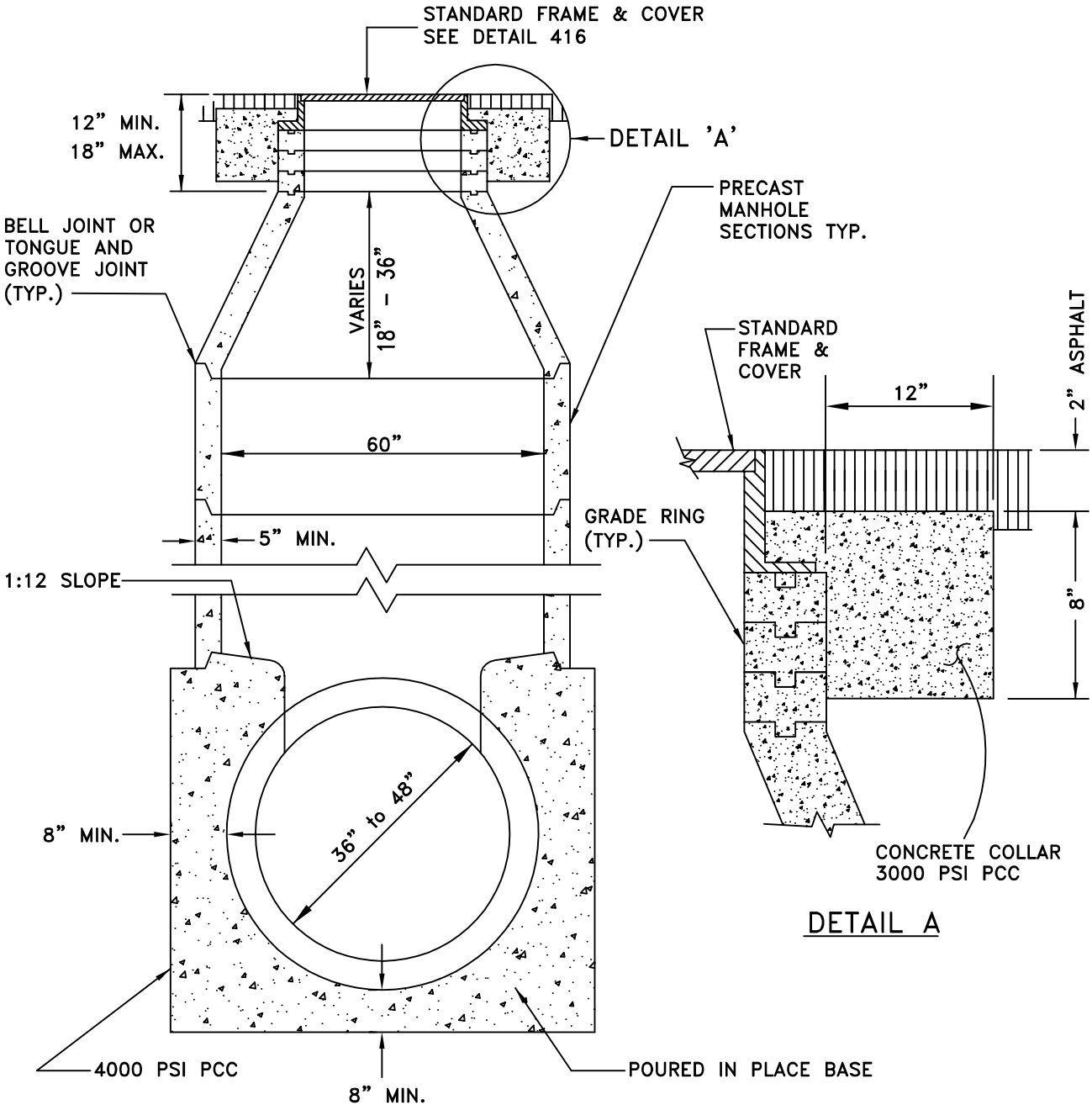
STORM DRAINS

LATERAL MANHOLE

CITY of MODESTO

PUBLIC WORKS DEPARTMENT

DETAIL NO. 413



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 H20 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.

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

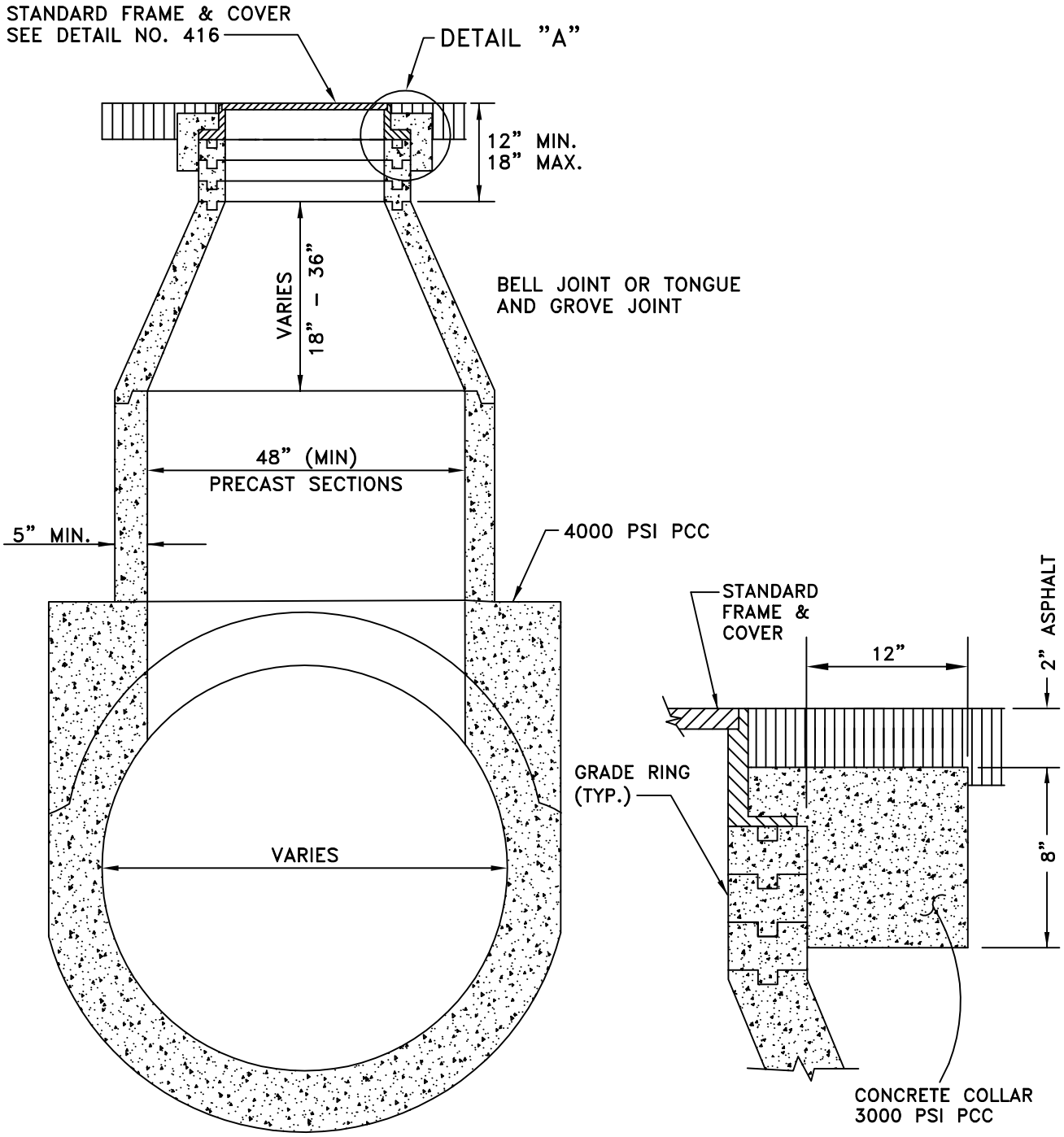
STORM DRAINS

"PRECAST TRUNK" MANHOLE

CITY of MODESTO

PUBLIC WORKS DEPARTMENT

DETAIL NO. 414

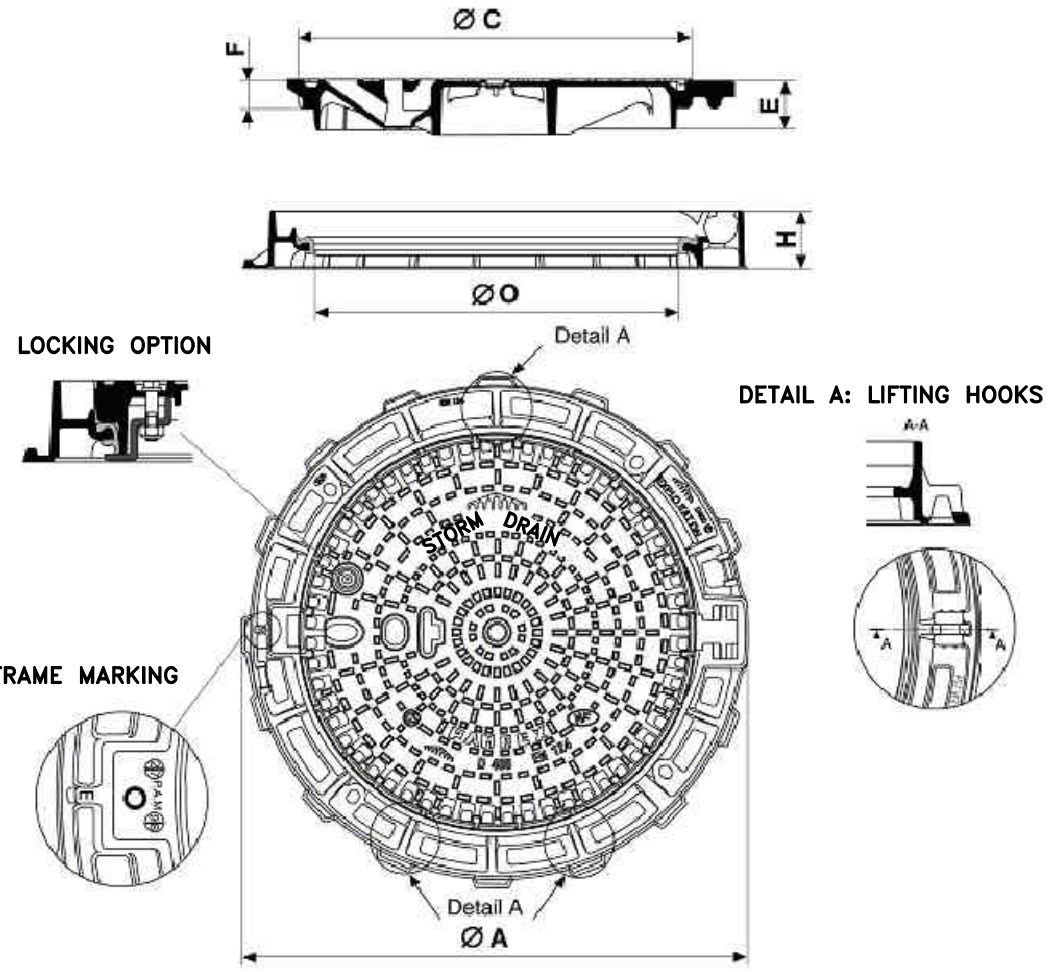


DETAIL A

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 H20 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 CITY COUNCIL RESOLUTION NO. 2006-284	STORM DRAINS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	CAST-IN-PLACE TRUNK MANHOLE	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 415



MODEL	A INCHES	C INCHES	E INCHES	F INCHES	H INCHES	O INCHES	REFERENCE	WEIGHT LBS	COVER WEIGHT LBS
NON VENTILATED	33	28	3.5	2	4	24	RE 60 R8 FD	195	122

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

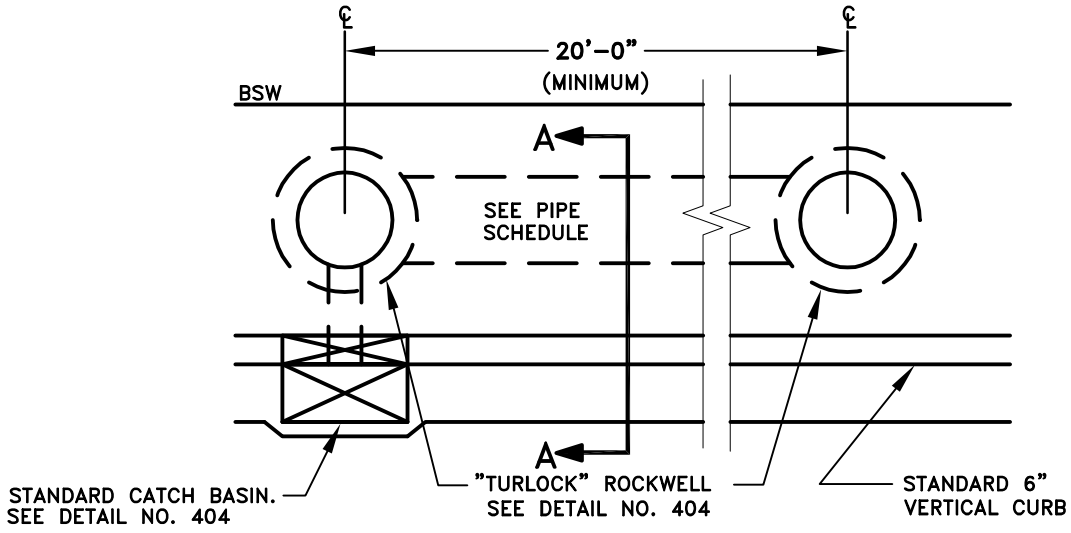
STORM DRAINS

PAMREX 24 INCH MANHOLE COVER & FRAME

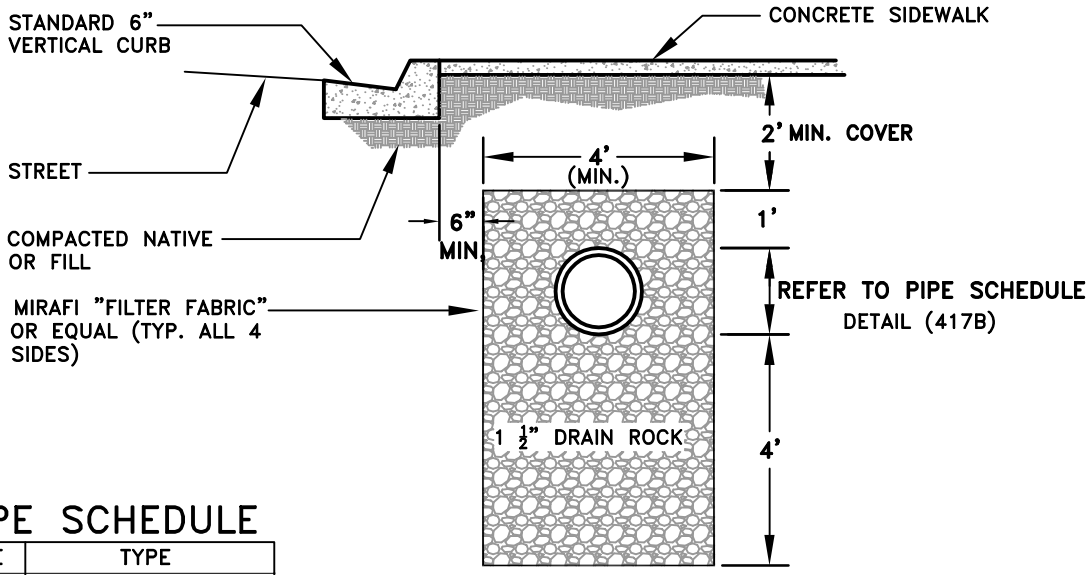
CITY of MODESTO

PUBLIC WORKS DEPARTMENT

DETAIL NO. 416



PLAN VIEW



PIPE SCHEDULE

SIZE	TYPE
18" ø	C905 CL 200 (C.I.O.D)*
24" ø	C905 CL 200 (C.I.O.D)

SECTION A–A

NOTE:
THIS HORIZONTAL DRAIN SYSTEM HAS BEEN DESIGNED FOR DEVELOPMENTS, AND INFILL AREAS WHICH HAVE NO ROOM FOR ON–SITE BASINS AND REQUIRE MULTIPLE ROCKWELLS. ENGINEERING AND CALCULATIONS ARE REQUIRED FOR ALL DRAINAGE CONSTRUCTION. CITY SHALL APPROVE ALL SUBMITTALS PRIOR TO CONSTRUCTION.

* C.I.O.D.– CAST IRON OUTSIDE DIAMETER.

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006–284

APPROVED BY THE CITY ENGINEER:

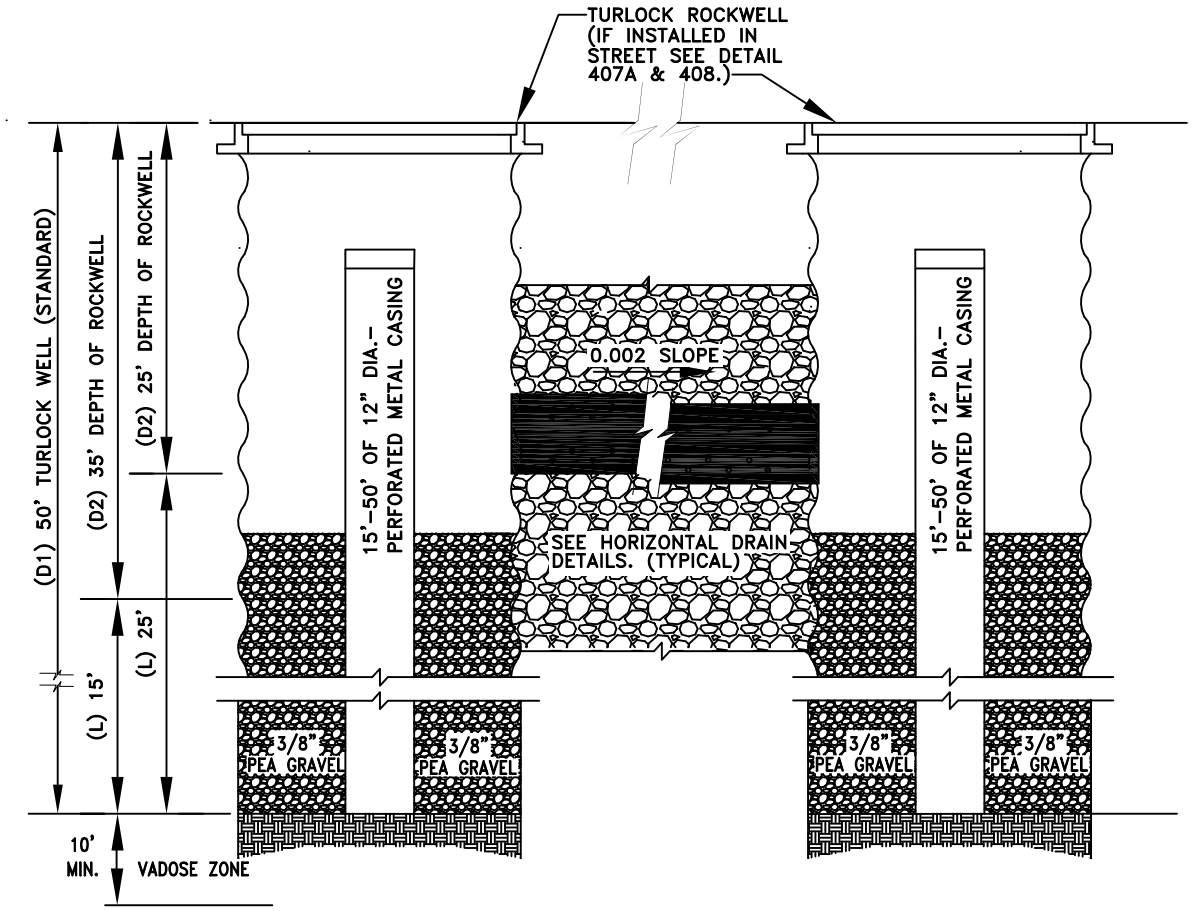
STORM DRAINS

TURLOCK ROCKWELL WITH HORIZONTAL DRAIN

CITY of MODESTO

PUBLIC WORKS
DEPARTMENT

DETAIL NO.
417A



$C = d\pi$, $A = \pi r^2$, RATIO 2:1 SURFACE AREA

VERTICAL (12"ø)

(C=dπ) X LENGTH

12"X π = 37.70" X 12"L = 452.39 SQ.IN per FT ÷ 144" SQ.IN= 3.14 SQ FT PER FT X 50'L = 157.08 SQ.FT

HORIZONTAL PIPE (18"ø)

C = dπ/2 (HALF PIPE)

18"ø X π = 56.55" ÷ 2 = 28.28" X 12" = 339.4 SQ.IN PER FT ÷ 144"SQ.IN = 2.36 SQ.FT PER FOOT

HORIZONTAL PIPE (24"ø) (HALF PIPE)

24"ø X π = 75.40" ÷ 2 = 37.70" X 12" = 452.4 SQ.IN PER FT ÷ 144" SQ.IN= 3.14 SQ.FT PER FOOT

SURFACE AREA OF PIPE (I.D.)/FOOT

12"ø VERTICAL PIPE 3.14 SQ.FT PER FT
18"ø HORIZONTAL PIPE 2.36 SQ.FT PER FT (HALF PIPE)
24"ø HORIZONTAL PIPE 3.14 SQ.FT PER FT (HALF PIPE)
> C dπ/2 = SURFACE AREA PER FOOT OF HALF HORIZONTAL PIPE

(D1) STANDARD TURLOCK ROCKWELL DEPTH = 50', (D2) CONSTRUCTED ROCKWELL DEPTH
D1 – D2 DIFFERENCE IN DEPTH OF EACH ROCKWELL (L)

3.14 SF (12"ø = SURFACE AREA/FOOT) X TOTAL (L) X NO. OF ROKWELLS =
TOTAL SURFACE AREA OF 12ø PIPE TO CONVERT TO HORIZONTAL PIPE.

TOTAL SURFACE AREA OF 12ø PIPE TO CONVERT/ FACTOR PER FOOT OF (18" OR 24")ø =
TOTAL LENGTH OF 18ø OF 24"ø PERFORATED PIPE REQUIRED BETWEEN ROCKWELLS

EXAMPLE

VERTICAL (12"ø) 3.14 SF X 15 LF X 2 = 94.2 SF ~ SURFACE AREA
VERTICAL (12"ø) 3.14 SF X 25 LF X 2 = 157.0 SF ~ SURFACE AREA
> FOR 2 ROCKWELLS MIN.

15' – (12"ø) 94.2 SF ÷ 2.36 SF = 39.92 LF ~ 18"ø PERFORATED PIPE
15' – (12"ø) 94.2 SF÷ 2.36 SF = 30.00 LF. ~ 24"ø PERFORATED PIPE
25' – (12"ø) 157.0 SF ÷ 2.36 SF = 66.53 LF~ 18"ø PERFORATED PIPE
25' – (12"ø) 157.0 SF ÷ 3.14 SF = 50.00 LF ~ 24"ø PERFORATED PIPE

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wu

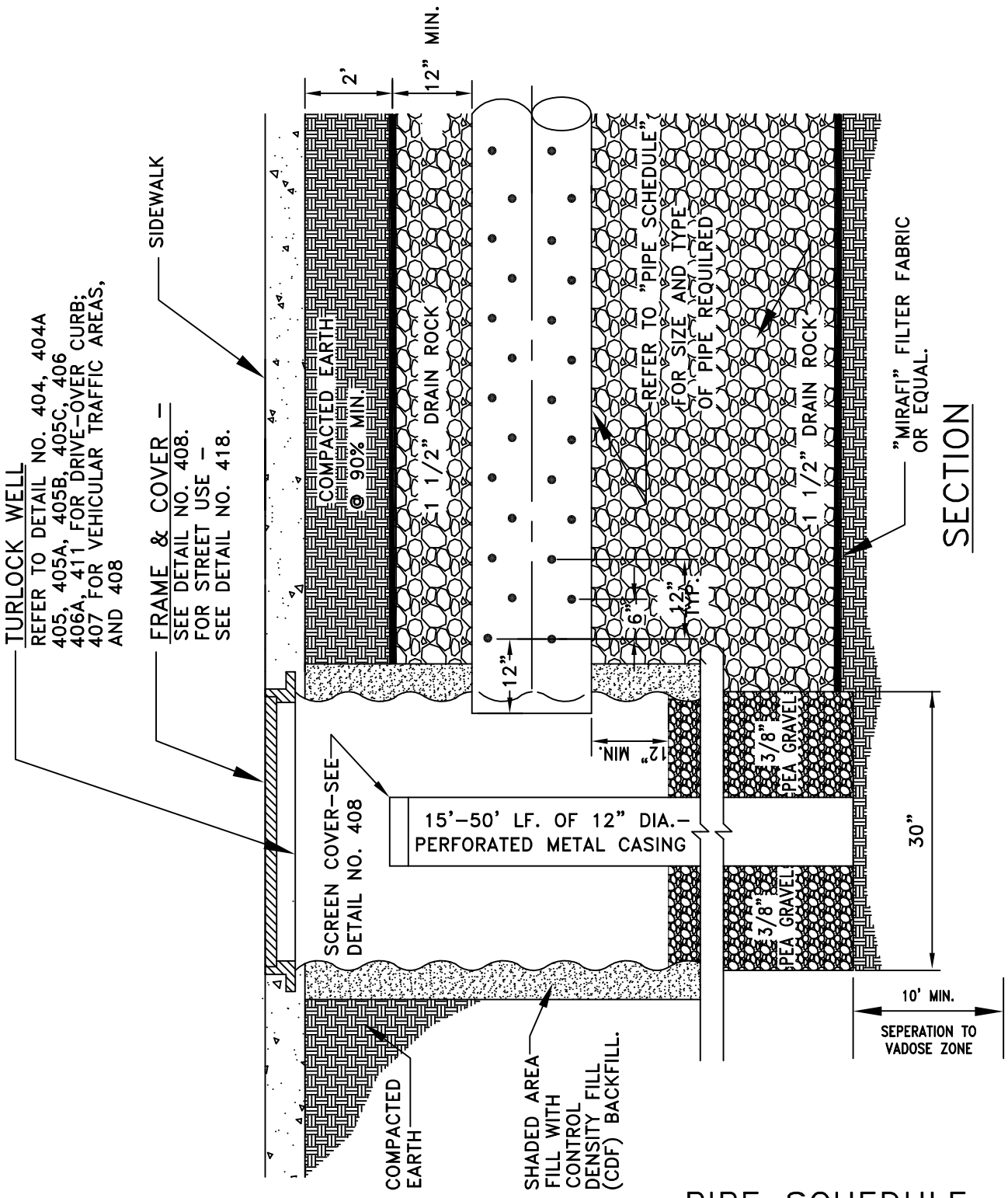
STORM DRAINS

TURLOCK ROCKWELL WITH HORIZONTAL DRAIN

CITY of MODESTO

PUBLIC WORKS DEPARTMENT

DETAIL NO. 417B



PIPE SCHEDULE

SIZE	TYPE
18" ø	C905 CL 200 (CIOD)*
24" ø	C905 CL 200 (CIOD)

* (C.I.O.D) - CAST IRON OUTSIDE DIAMETER

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

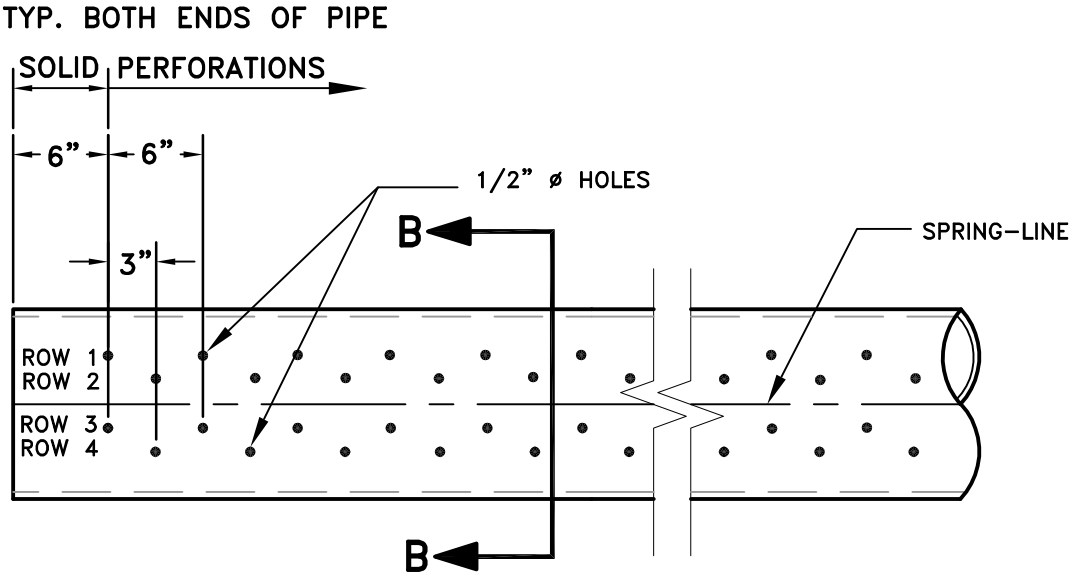
STORM DRAINS

TURLOCK ROCKWELL WITH HORIZONTAL DRAIN

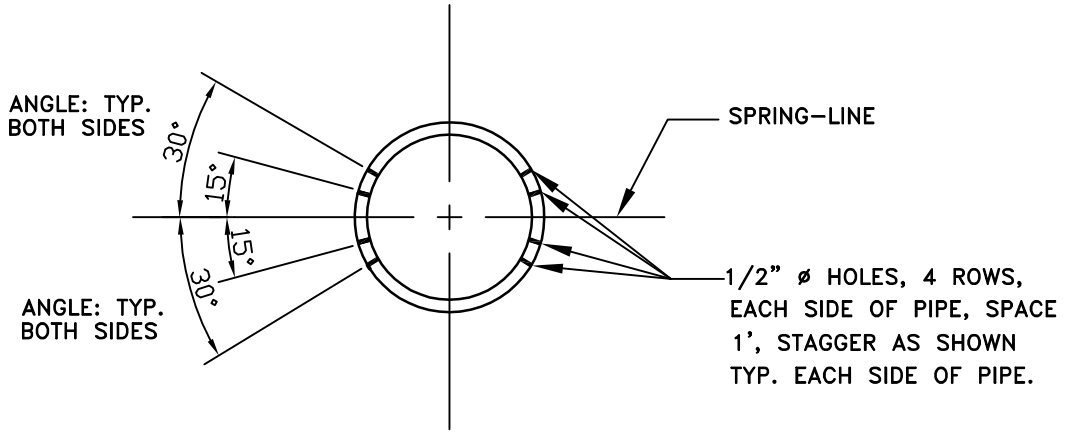
CITY of MODESTO

PUBLIC WORKS DEPARTMENT

DETAIL NO. 417C



PERFORATED HORIZONTAL PIPE



PIPE SECTION B-B

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	STORM DRAINS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	TURLOCK ROCKWELL WITH HORIZONTAL DRAIN	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 417D

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, Standard Details and these specifications. Standards and Specifications for Pump systems and Sewer lift stations 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 lateral/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. Sewer system - The facility designated and used for the collection, treatment, and disposal of industrial wastes and sanitary sewage.

5. Sewer service - The services and facilities for the collection, treatment, and disposal of industrial wastes and sanitary sewage.

6. 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.

7. Trunk sewer - A pipeline designed to transport sewage to treatment plant (>15" diameter pipe).

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 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. Line Size and Service Policy

The construction, maintenance and repair of the service lateral including the wye in the street at 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.

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 house sewer and water lines may be granted by the City Engineer in 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. Cleanouts shall be constructed in conformance with the City Standard Details.

4. Backflow prevention devices may be required as specified in City Standard Details.

5. When connecting a sewer lateral directly from an existing manhole to the right-of-way line, Ductile Iron Pipe (DIP) shall be inserted into the manhole and brought to the right-of-way line. Vitrified Clay Pipe (VCP) may be used with an adjustable repair coupling connecting to the DIP at least 4' from the outside face of the existing manhole.

6. The maximum depth of a sewer service connection to the main shall be 12'. A 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.

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 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.

3. 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. Fly Lines

Parallel sewer lines are required to be constructed when:

1. 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. Where design velocities for main sewers exceed 10' per second, ceramic epoxy-lined ductile iron pipe is required.

The following are the minimum slopes required for sewer lines:

PIPE SIZE	**MINIMUM SLOPE**
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

Acreage 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 of 2' to bottom of street sub-grade. Mains installed with less cover shall use ductile iron pipe or other engineered alternatives and shall require the approval of the City Engineer.

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 of 5' at right-of-way and shall be increased by 1' for every 250' of lot depth.

4. 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.

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.

C. Service Laterals
1. Pipe shall be the same type and class as that used for the main.

2. Joints and Couplings for laterals shall be the same type and specifications as those used for the main.

D. Connections
1. Vitrified Clay Pipe (VCP)
   a. For 6" VCP mains, a cut-in clay wye or tee 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 or tee, 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 will not be permitted on the “run” of the pipe.
   e. When connecting a sewer lateral directly from the manhole to the right-of-way line, cast iron pipe shall be inserted into the manhole and extended a minimum of 2' 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.

f. Whenever possible, all connections at new and existing manholes shall be made with matching crowns.

2. Cast Iron Pipe (CIP)
   a. Connections to CIP sewer mains shall be at manholes only.
   b. When connecting a sewer lateral directly from the manhole to the right-of-way line, CIP shall be inserted into the manhole and brought to the right-of-way line.

3. Ductile Iron Pipe (DIP)
   a. Connections to DIP sewer mains shall be at manholes only.
   b. When connecting a sewer lateral directly from the manhole to the right-of-way line, DIP shall be inserted into the manhole and brought to the right-of-way line.

4. Polyvinyl Chloride (PVC) Lined Concrete Pipe
   Connections to PVC Lined Concrete pipe sewer mains shall be at manholes only.

E. Manholes

1. General
   Pipes larger 72" shall have manholes constructed of custom boxes with 48" diameter sections with a cone and grade rings extending to the surface. See Standard Modesto Details of smaller size pipes. Manhole spacing along the alignment shall not exceed 400'.

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 SuperCoat or Polyurethane lined. The scope of the lining shall include, unless otherwise shown on the plans, all unlined interior concrete surfaces of the manhole.

   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. SuperCoat Lining: SuperCoat lining by Lafarge aluminates. The lining shall be applied by a licensed SuperCoat applicator and in accordance to the product recommendations. The depth of the application shall be ¾" to 1" minimum.

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. 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.

F. Cleanouts
   Cleanout frames and covers shall be manufactured, tested and otherwise furnished in accordance with the Standard Specification of Fray Iron Castings ASTM A 48, Class 30. 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 F14, or equal. Concrete shall be Grade B conforming to Section 3.05 and have a 28-day compressive strength of 2,500 psi.

G. 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 (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 ¼" 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 5.02.

   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.

   Whenever a change in the size of pipe, or an angle of 20º 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.

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:

1. 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.

2. 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.

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. “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.

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.

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.

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.

Pipe entering or leaving manholes or other structures shall have joints within 2½' of the manhole base.

In all cases, flexibility of joints at the manhole base shall be preserved to prevent damage to the pipe by differential settlement.

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.

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.

B. Service Laterals

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

Wyes or Tees: (wyes for VCP and tees for Cast or Ductile mains).

1. Excavate sewer main to a point 6" below required depth.

2. Make three (3) initial cuts in the main, 2" to 6" inches apart, and remove the rings. Cut the main to the required length to insert wye or tee.

3. Place 6" of well-graded, crushed rock, meeting the requirements of ASTM C 33, Gradation 67 (3/4 to No. 4) under the main line and the sewer service lateral within the right-of-way.

4. Install wye or tee per Standard Detail 512. Tee shall be used if main is 10' or deeper.

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.

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.

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.

The wye branches, unless otherwise specified, shall be inclined at any angle not greater than 45º degrees from the horizontal.

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.

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.

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 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 outside an existing street is 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.

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 diameter 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 l 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 SuperCoat, or Polyurethane lining shall conform to the requirements as specified by manufacturer.

   a. 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 Standards Specifications for Public Works Construction (SSPWC). 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. 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. The surface of the liner shall be cleaned to permit visual inspection and spark testing using a 20,000 Volt Tinker and Rasor 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.

   c. Polyurethane Lining

      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
   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.**
	0	0	20	40	50	70
	50	40	50	70	90	80
	100	70	90	100	100	90
8	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.**
	0	0	40	80	100	100
	50	40	70	110	110	110
	100	70	110	120	110	110
8	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. Televised Inspection

The Contractor shall inspect all new pipelines with closed circuit television and furnish a CD/DVD of the inspection, along with a hard copy report to the City. The Contractor shall give the City Engineer at least two (2) working days notice prior to performing the TV work so a city representative can verify the work.

The Contractor shall clean all lines of dirt and other debris, clean manholes, remove broken pipe, compact trench, raise manhole rims to grade, and pass the air test prior to television inspection. Areas adjacent to manholes shall be leveled and made accessible to the television trailer.

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. For joint separations, low spots and chipped ends, the following maximum acceptable limits will apply for 8" and 10" pipes:

Joint separations - ½"

Low spots	Pipe size	Depth tolerance of trapped water
	6"	½" (.04 feet)
	8"	¾" (.06 feet)
	10"	1" (.08 feet)
	12-" & larger	10% percent of pipe Diameter (in feet)

Chipped ends – ¼"

E. Cleanouts
Cleanouts shall be constructed 1' inside the City right-of-way in accordance with the Standard Details.

5.05 MEASUREMENT AND PAYMENT

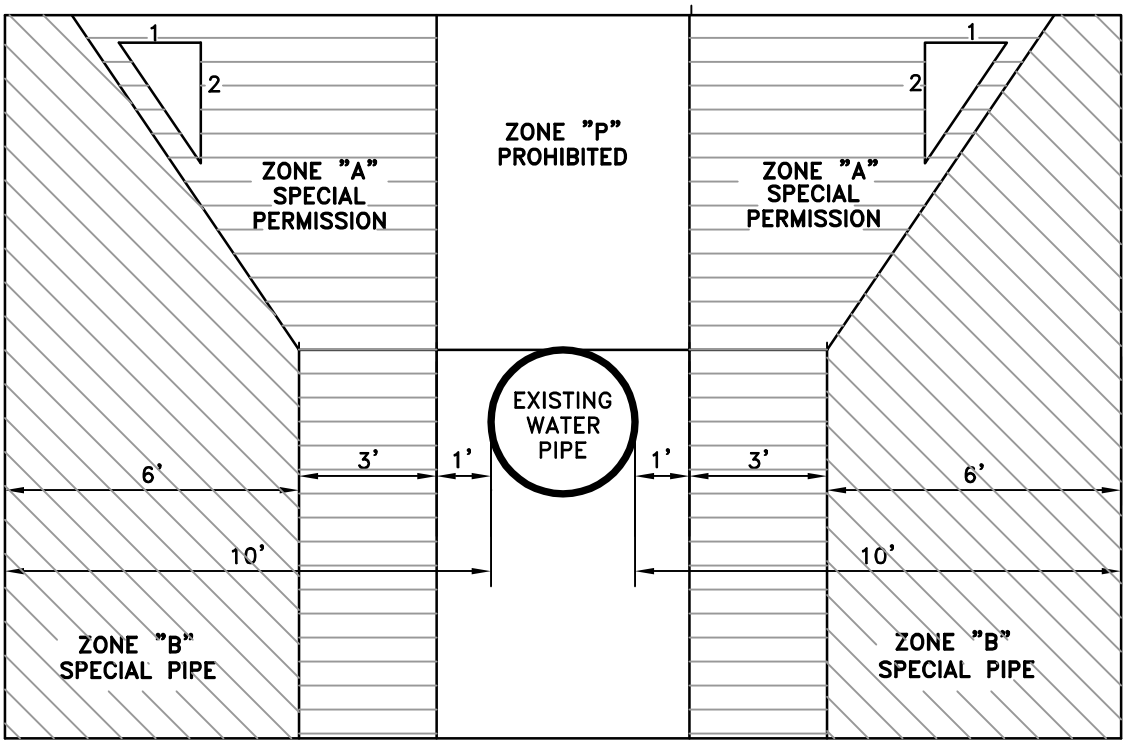
A. Pipe
Payment for sanitary sewer pipe complete in place shall be per linear foot measured from center of manhole to center of manhole following a line parallel to the grade of the sewer. Payment shall include the furnishing of all labor, materials, water, tools, and equipment required to construct 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.

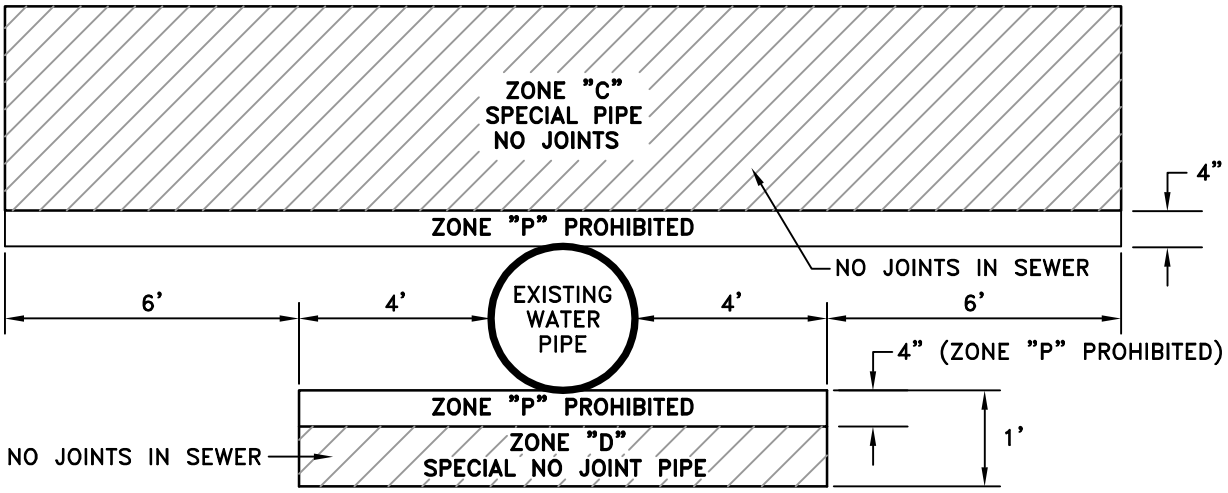
SPECIAL CONSTRUCTION REQUIREMENTS

(TO BE USED ONLY WHERE REQUIRED SEPARATION CANNOT BE OBTAINED)

CASE 2–NEW SEWER LINE BEING INSTALLED



PARALLEL CONSTRUCTION

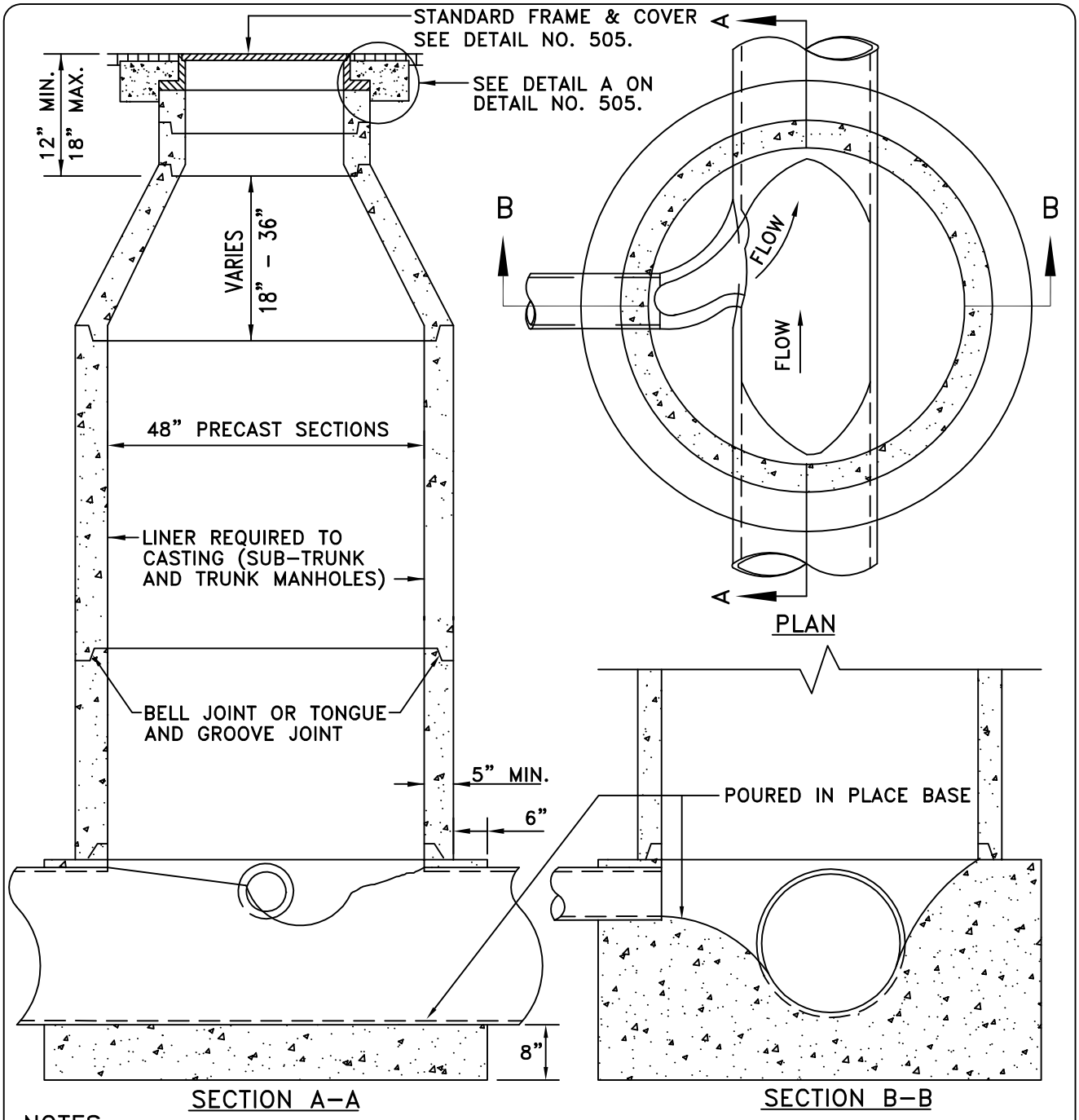


PERPENDICULAR CONSTRUCTION

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 CITY COUNCIL RESOLUTION NO. 2006–284	SEWERS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	CALIFORNIA HEALTH DEPARTMENT REQUIREMENTS	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 500



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. A CHANGE IN DIRECTION OF FLOW IN A MANHOLE REQUIRES A .10' FALL (MIN.).
5. ADJUST FRAME TO GRADE AFTER PAVING.
6. ALL PRECAST CONCRETE SHALL BE DESIGNED TO WITHSTAND H20 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.
9. NOT FOR PVC PIPE.
10. FOR FLY–LINE INSTALLATION SEE DETAIL 507.

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006–284

APPROVED BY THE CITY ENGINEER:

Richard D. Wu

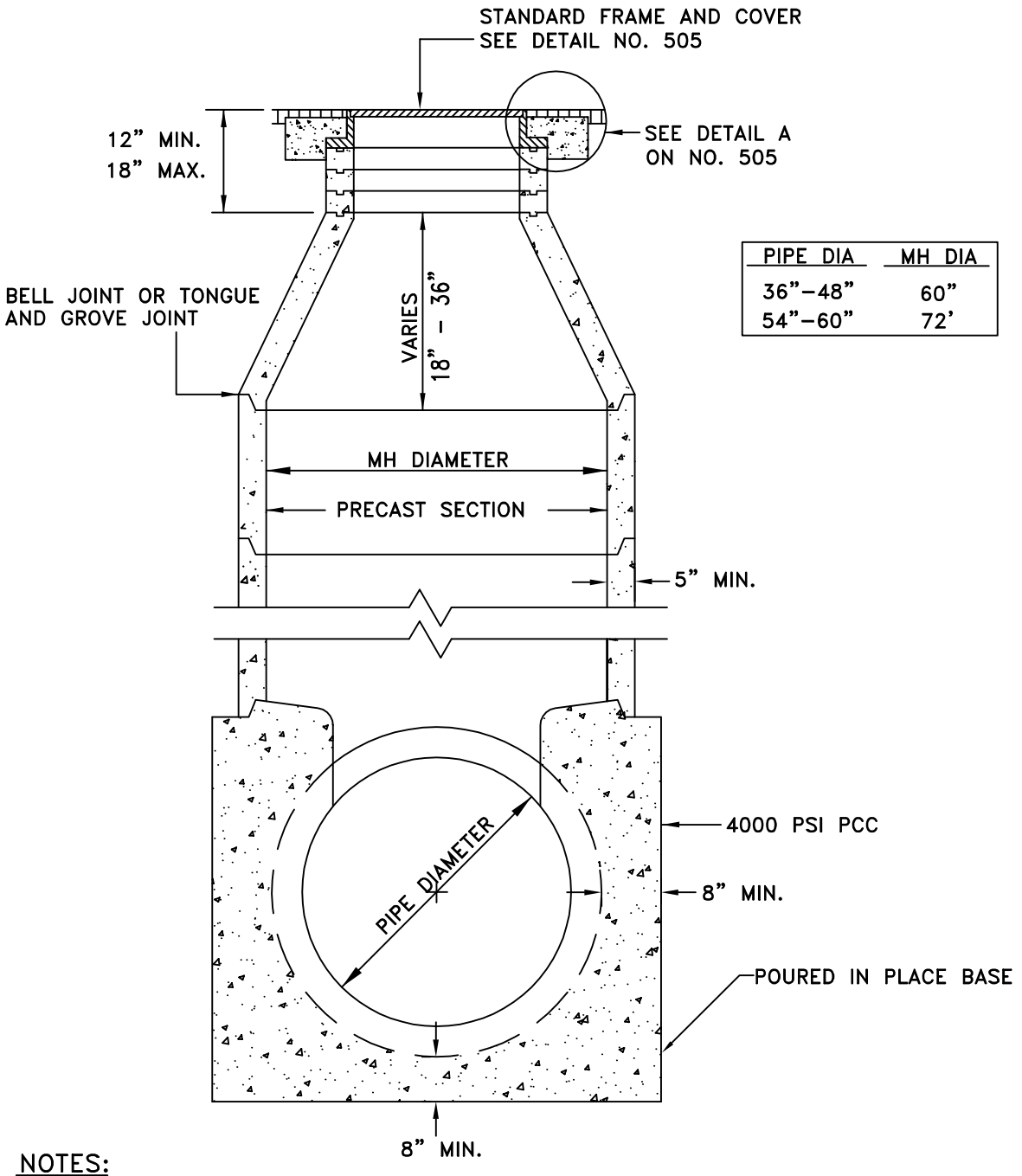
SEWERS

LATERAL & SUB TRUNK MANHOLE

PUBLIC WORKS
DEPARTMENT

CITY of MODESTO

DETAIL NO.
501



PIPE DIA	MH DIA
36"–48"	60"
54"–60"	72'

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 H20 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. ALL INTERIOR SURFACES OF THE PRECAST MANHOLE SECTIONS SHALL BE LINED WITH A POLYVINYL CHLORIDE LINING SYSTEM (PVC LINER).
8. FOR FLY–LINE INSTALLATION SEE DETAIL 507.

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006–284

APPROVED BY THE CITY ENGINEER:

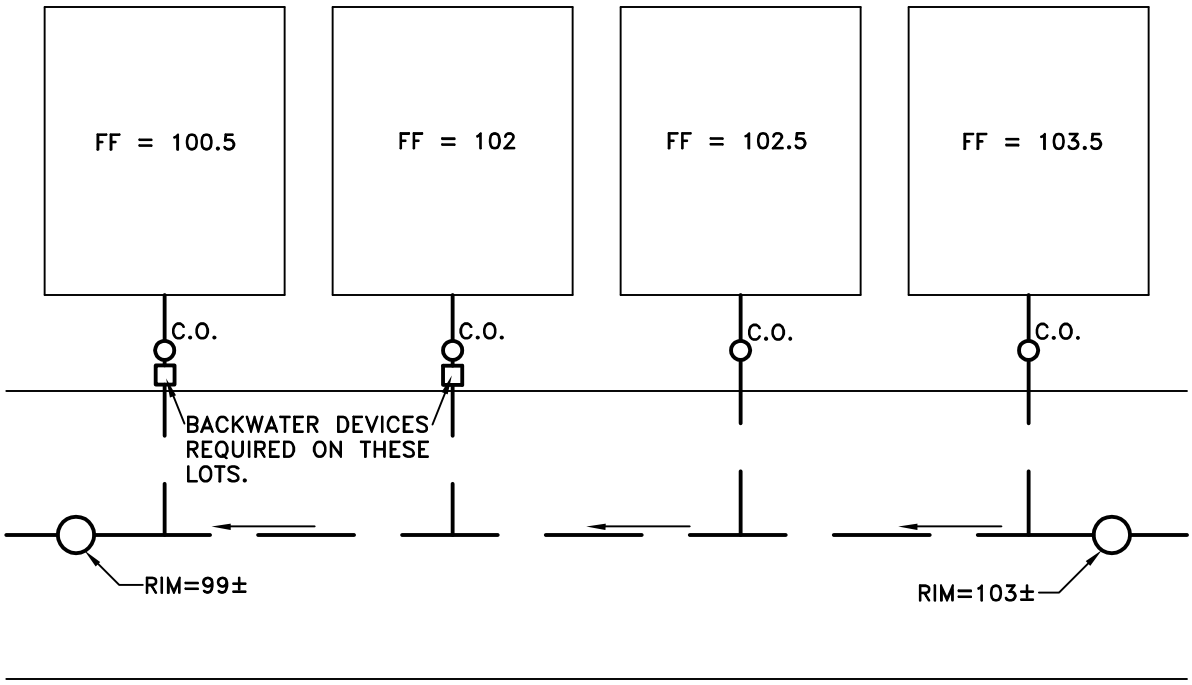
SEWER

TRUNK MANHOLE

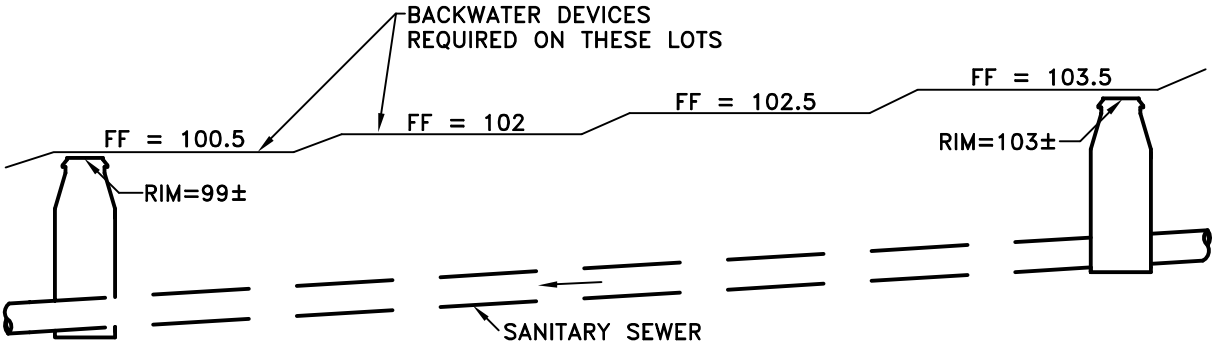
CITY of MODESTO

PUBLIC WORKS
DEPARTMENT

DETAIL NO.
502



PLAN VIEW

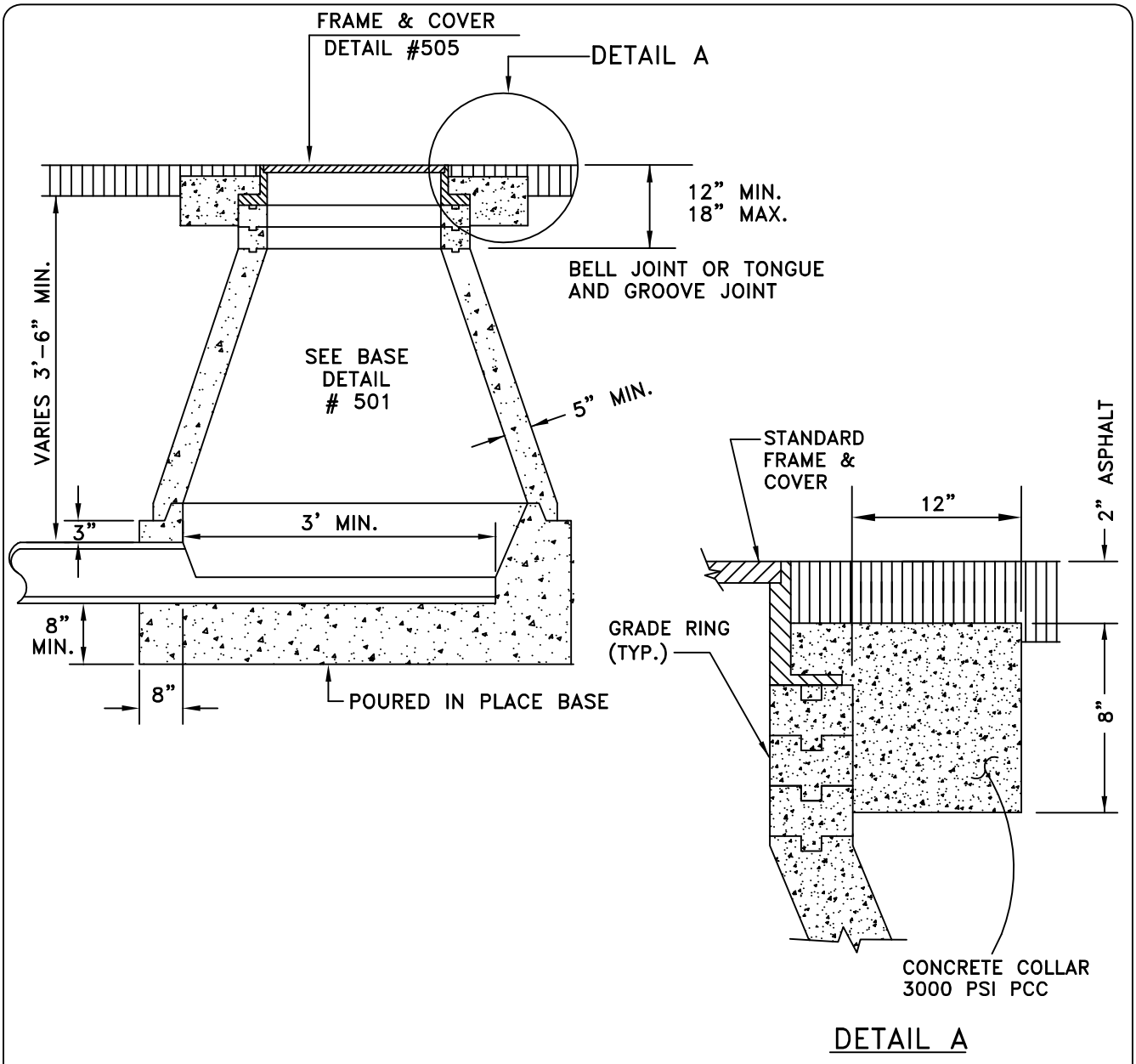


SECTION

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.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	SEWERS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Ulm	BACKWATER DEVICE	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 503

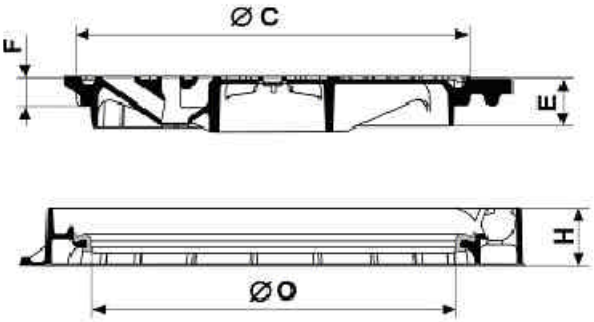


DETAIL A

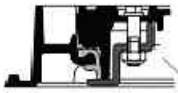
NOTES:

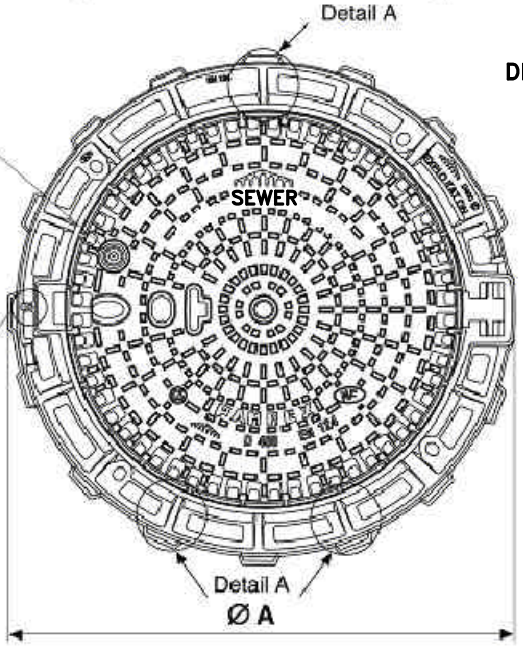
1. PIPE TO LAID THROUGH MANHOLE AND TOP PORTION REMOVED AFTER CONCRETE HAS SET.
2. MORTAR ALL JOINTS INSIDE AND OUT.
3. INCOMING SMALLER PIPES SHALL MATCH CROWNS OF THE LARGER PIPE.
4. A CHANGE IN DIRECTION OF FLOW IN A MANHOLE REQUIRES A .10' FALL (MIN.).
5. ADJUST FRAME TO GRADE AFTER PAVING.
6. ALL PRECAST CONCRETE SHALL BE DESIGNED TO WITHSTAND H20 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. FLEXIBLE JOINT-BELL & SPIGOT OR ADJUSTABLE REPAIR COUPLING. SOLVENT WELDED JOINT NOT PERMITTED.
9. 12" MAX. FOR 8" OR LARGER PIPE. 24" MAX. FOR PIPES LESS THAN 8".

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	SEWERS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	TERMINAL MANHOLE	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 504

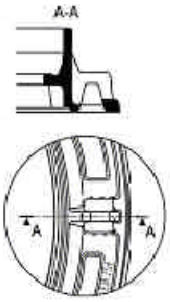


LOCKING OPTION

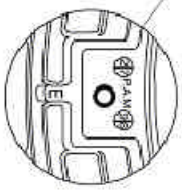




DETAIL A: LIFTING HOOKS



FRAME MARKING



MODEL	A INCHES	C INCHES	E INCHES	F INCHES	H INCHES	O INCHES	REFERENCE	WEIGHT LBS	COVER WEIGHT LBS
NON VENTILATED	33	28	3.5	2	4	24	RE 60 R8 FD	195	122

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

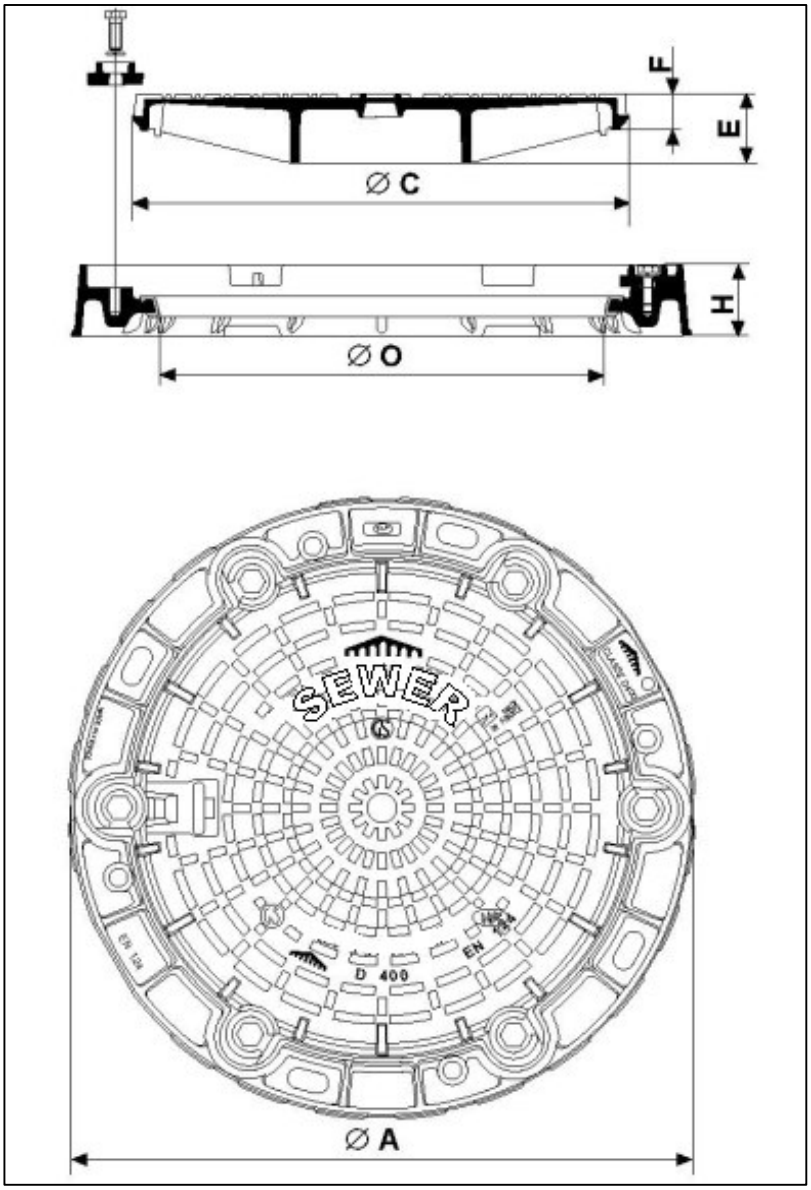
SEWER

PAMREX 24 INCH MANHOLE COVER & FRAME

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO. 505



A *in.*	O *In.*	H *in.*	C *in.*	E *in.*	F *in.*	Frame and cover Reference	Frame and cover Mass *lbs*	Cover Mass *lbs*
33 1/2	24	4	26 7/9	3 5/7	2	RE61R1FD	225	116

NOTE:

THIS MANHOLE FRAME & COVER SHALL BE USED IN AREAS WHERE INSTALLATION IS IN THE FLOOD PLAIN OR WHERE WATER INTRUSION IS A FACTOR.

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006–284

APPROVED BY THE CITY ENGINEER:

Richard D. Wu

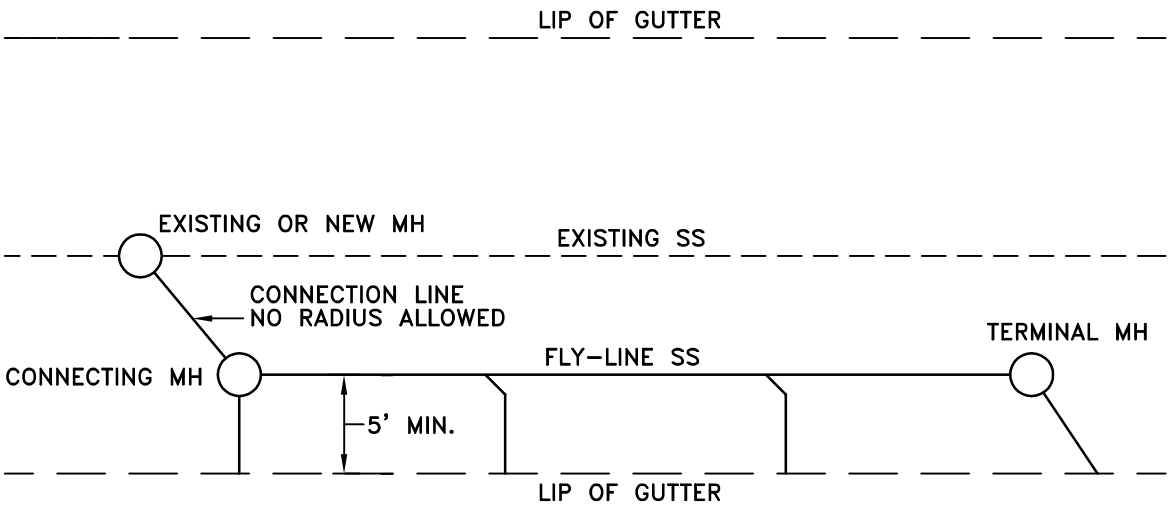
SEWER

PAMTIGHT 24 INCH PRESSURE TIGHT COVER

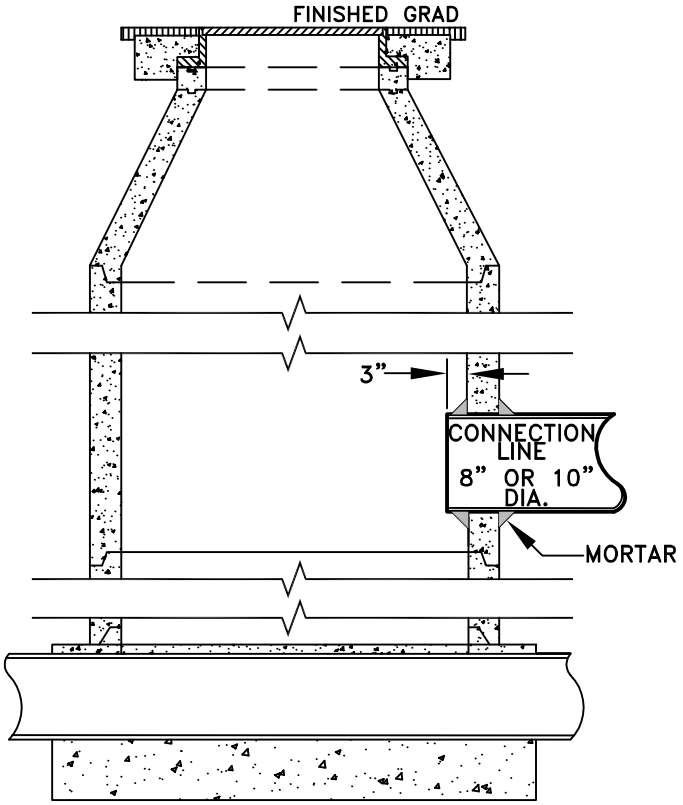
CITY of MODESTO

PUBLIC WORKS DEPARTMENT

DETAIL NO. 506



PLAN VIEW



SECTION: EXISTING OR NEW MH

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

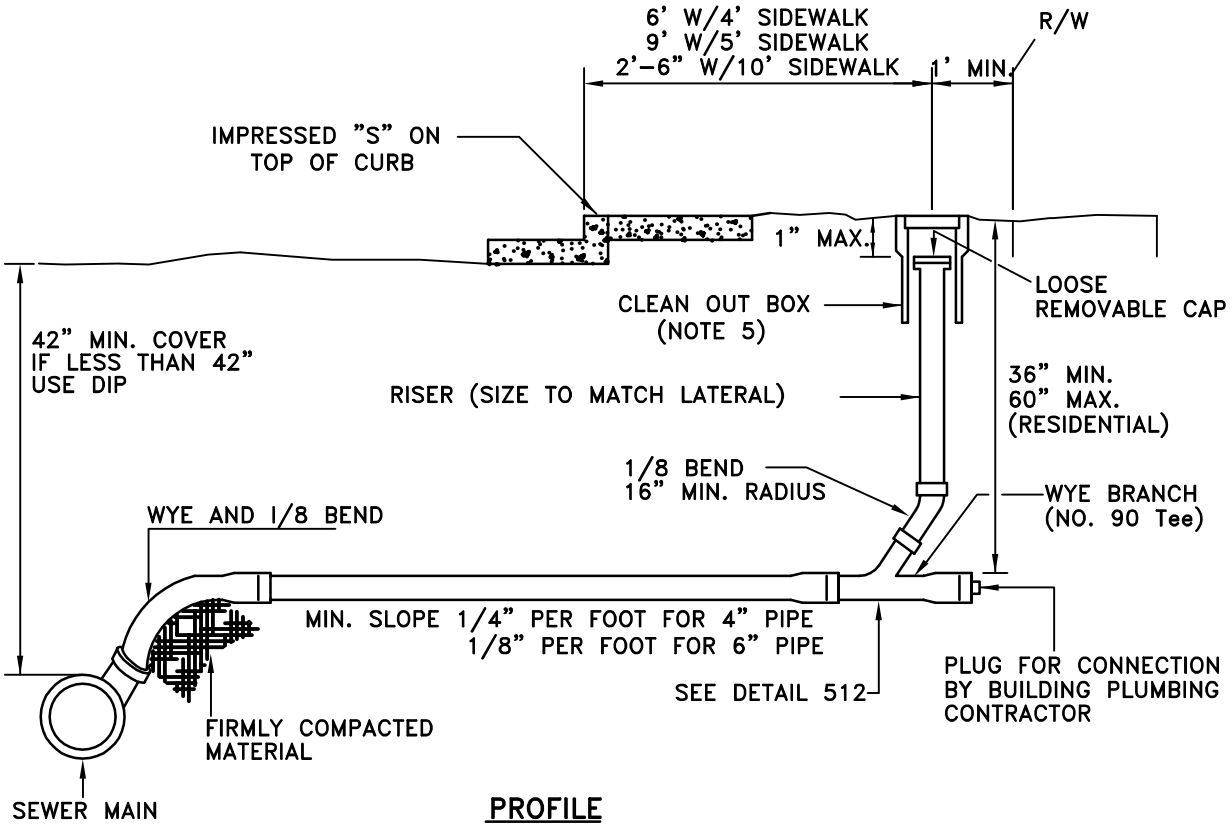
SEWERS

SEWER FLY-LINE CONSTRUCTION

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO. 507

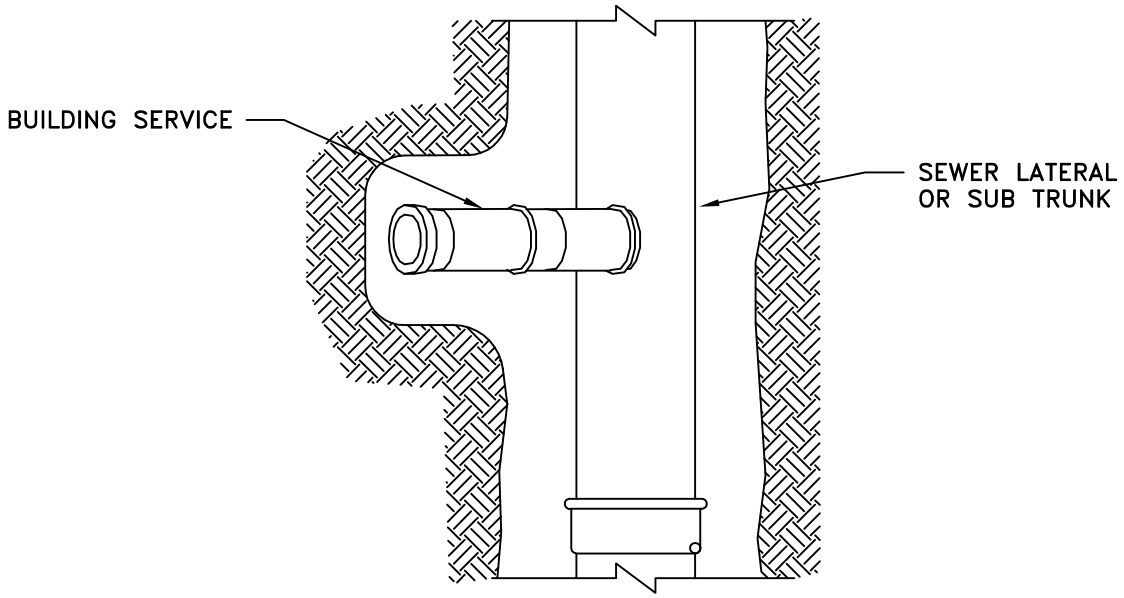


PROFILE

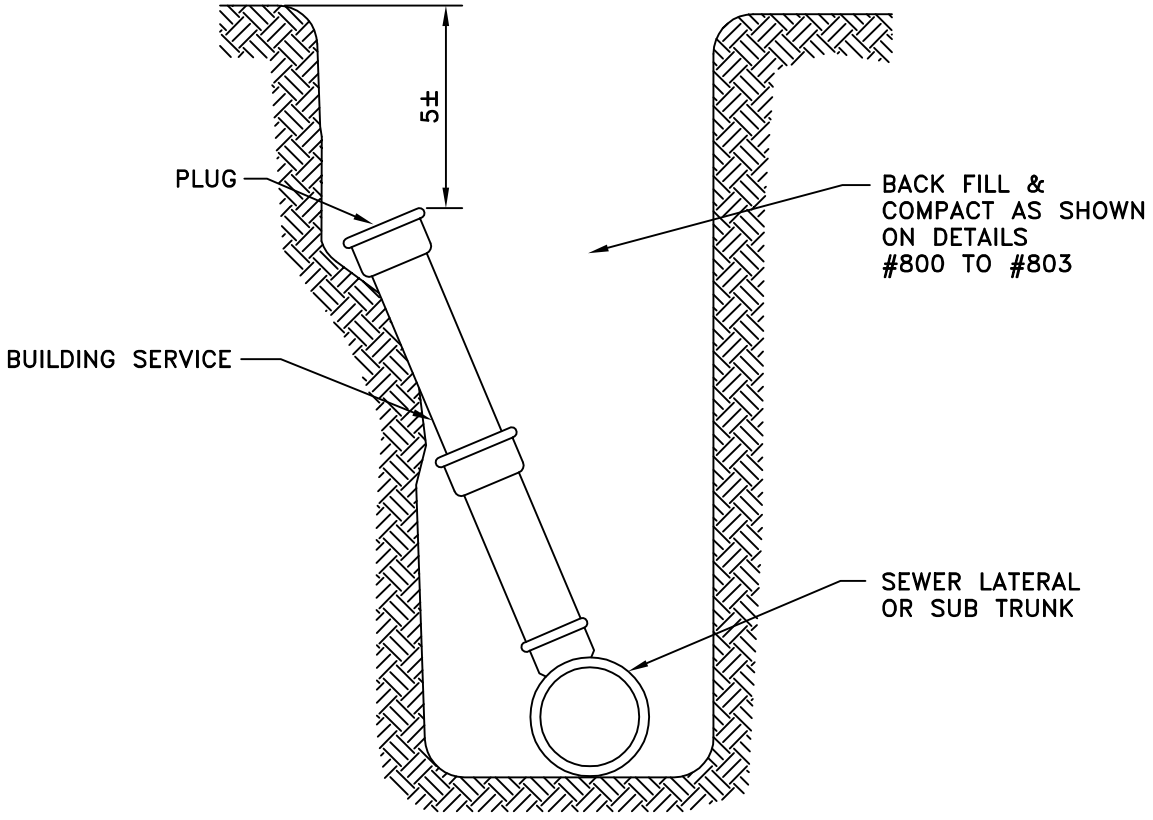
NOTES:

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.
8. PROPERTY OWNER WILL BE RESPONSIBLE FOR MAINTAINING THE LATERAL FROM THE 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 CITY COUNCIL RESOLUTION NO. 2006-284	SEWERS	
APPROVED BY THE CITY ENGINEER: Richard D. Wells	SEWER SERVICE	CITY of MODESTO
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 508



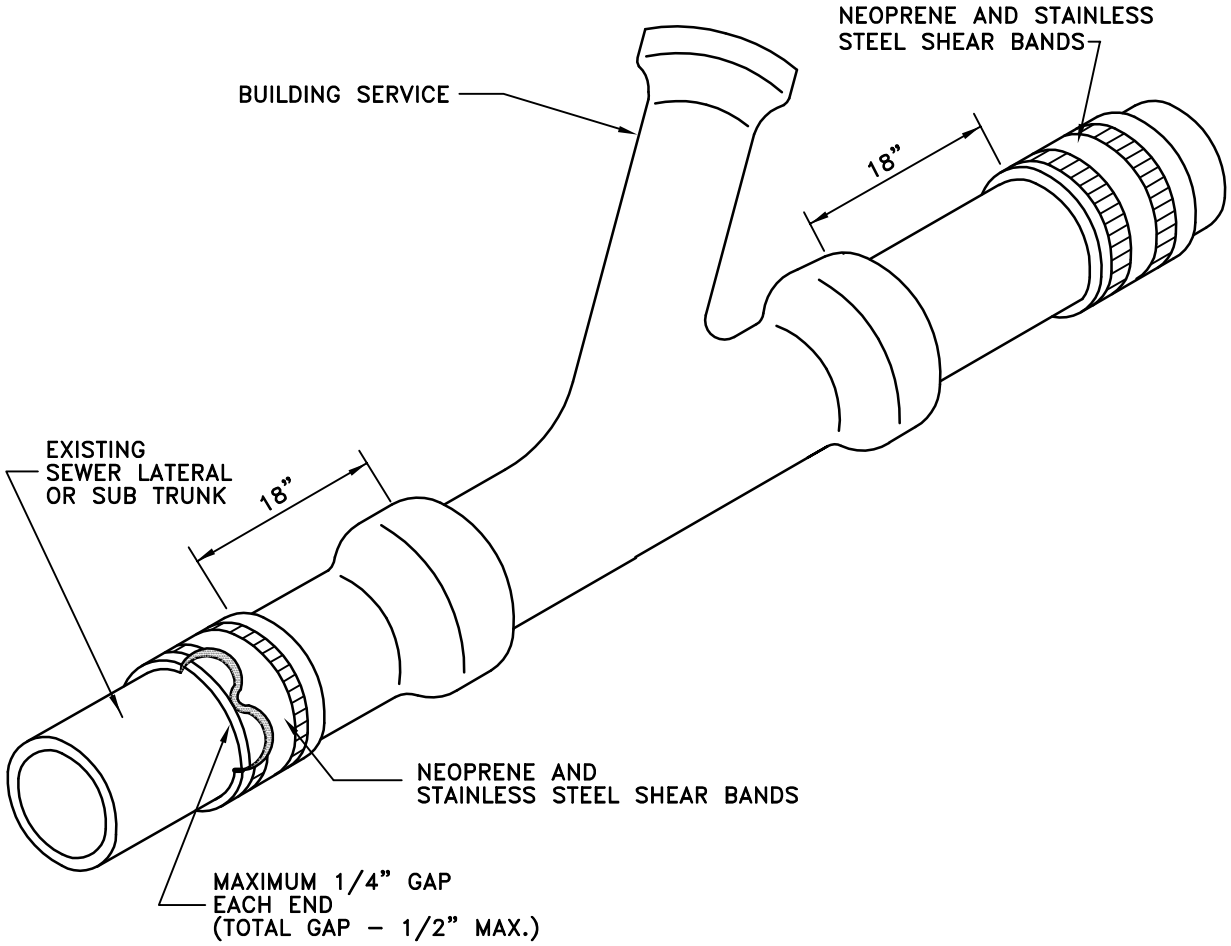
PLAN



SECTION

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	SEWERS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	SERVICE RISER	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 509

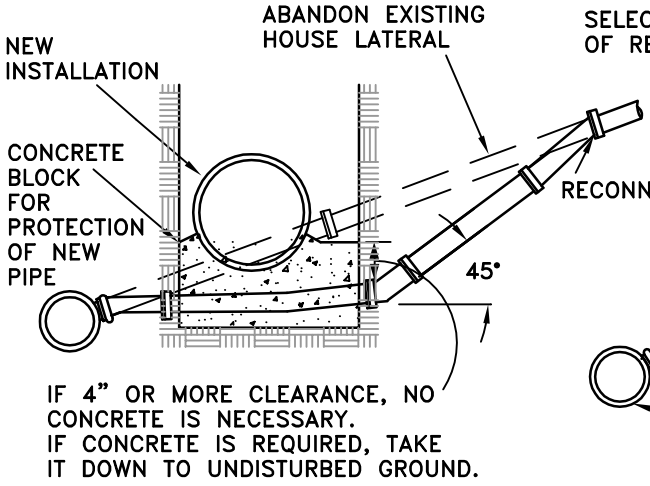
NOTE: TEES AND WYES INSTALLED IN MAINS UNDER CONSTRUCTION SHALL BE INSTALLED CONCURRENTLY WITH THE MAIN. ALL FITTINGS, INCLUDING THE JOINTS, SHALL BE OF THE SAME TYPE AND MATERIAL AS THE MAIN. CUT-IN TEES AND WYES WILL NOT BE PERMITTED ON A MAIN UNDER CONSTRUCTION.



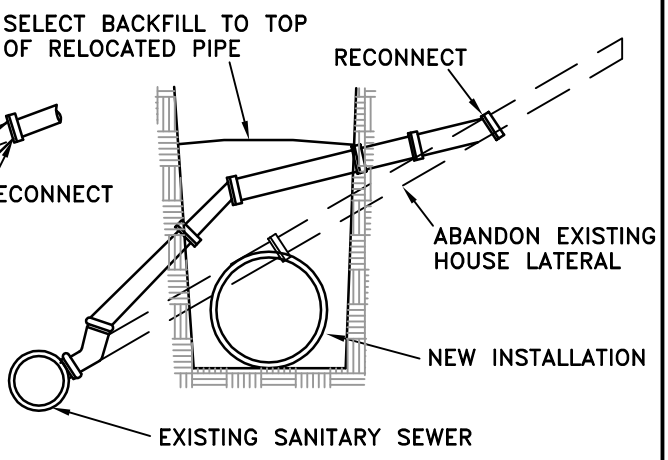
NOTES:

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 SHALL BE USED FOR SEWER MAINS 10' OR DEEPER.
5. NO-HUB BANDS NOT ALLOWED.

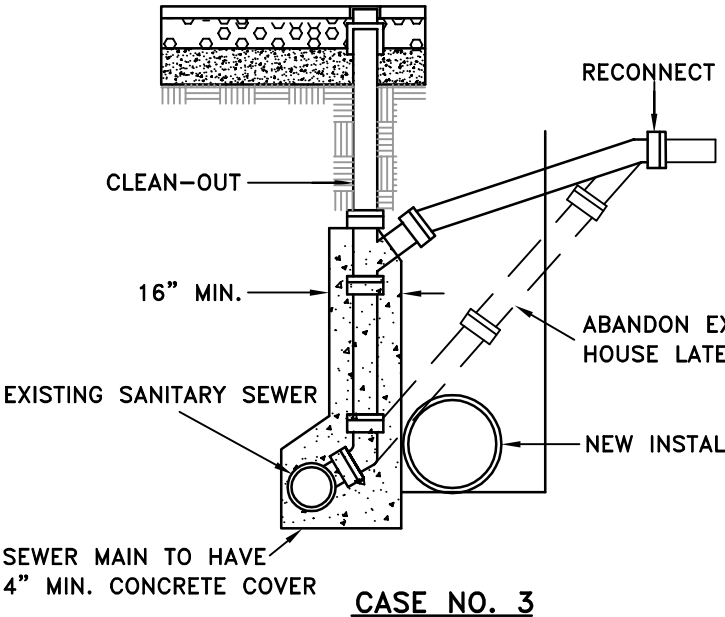
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	SEWERS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wilson	CUT-IN SERVICE	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 510



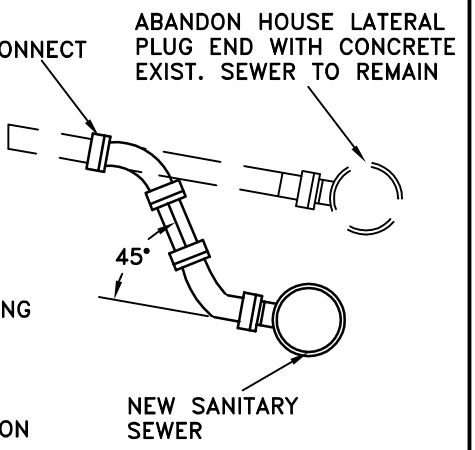
CASE NO. 1



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. WYES MAY BE LAID "FLAT" UPON SPECIAL APPROVAL FROM THE CITY ENGINEER. 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.

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

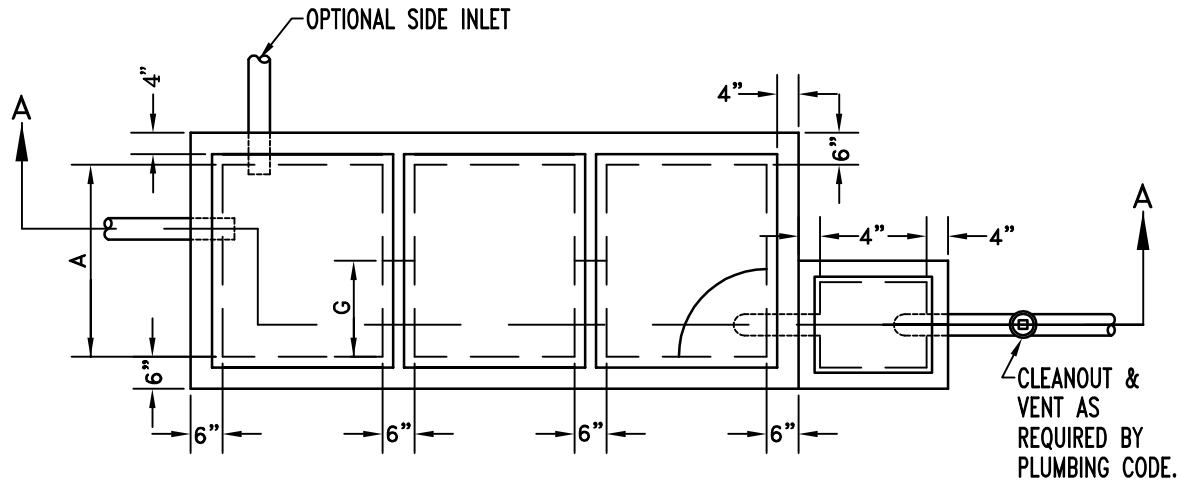
SEWERS

EXISTING HOUSE LATERAL RELOCATION

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

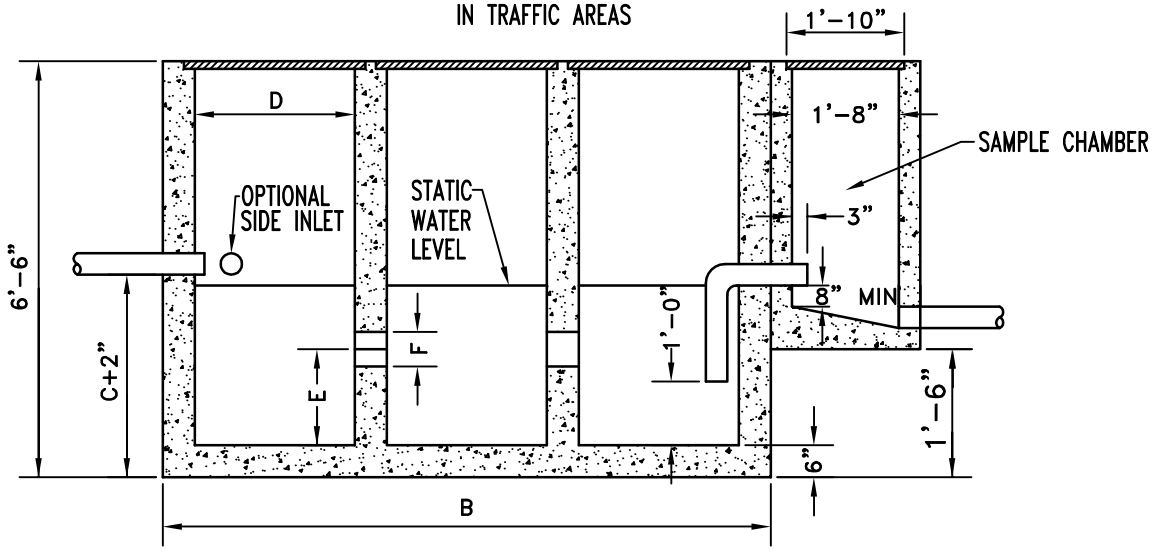
DETAIL NO. 511



PLAN VIEW

NOTE:
AN ACCEPTED ALTERNATE IS P&L CONCRETE PRODUCTS PRECAST GREASE TRAP WITH ADDED SAMPLE CHAMBER ON OUTLET END AS SHOWN ON THIS DRAWING.

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 CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

SEWERS

GREASE & OIL INTERCEPTOR

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO.
512

WHERE IS MY HOUSE SEWER LINE?

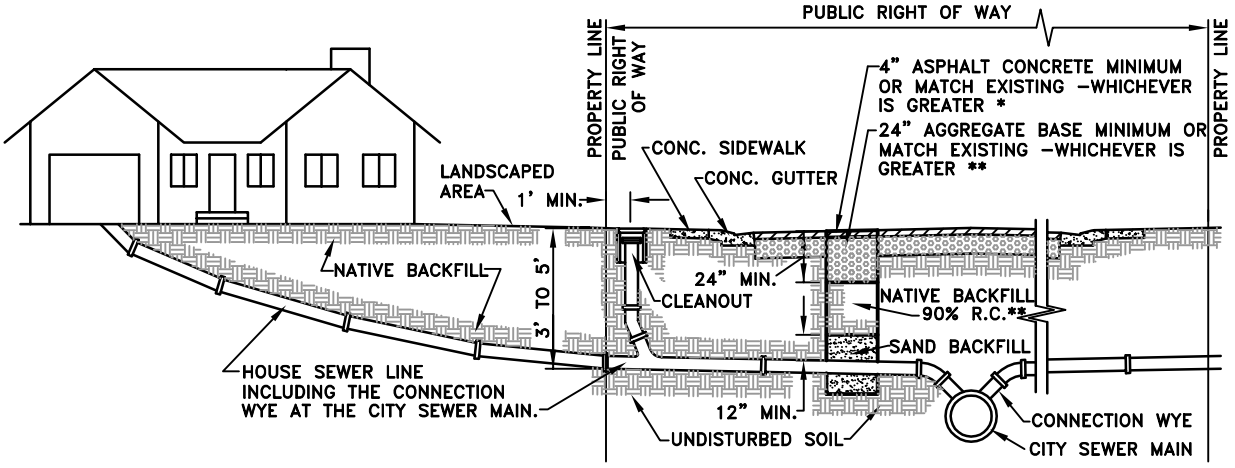
A PICTURE OF A HOUSE SEWER LINE IS SHOWN BELOW. YOU CAN SEE THAT IT STARTS AT YOUR HOUSE AND ENDS AT THE SEWER MAIN NEAR THE MIDDLE OF A STREET OR ALLEY. IT IS THE PROPERTY OWNER'S RESPONSIBILITY TO MAINTAIN AND REPAIR THE ENTIRE LENGTH OF THE HOUSE SEWER LINE, INCLUDING THE CONNECTION WYE AT THE MAIN.

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) 577–5264.



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 CITY COUNCIL RESOLUTION NO. 2006–284	SEWERS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wu	HOUSE SEWER LINE REPAIR – COST–SHARE PROGRAM	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 513

CHAPTER 6

WATER SYSTEM

6.01 GENERAL

A. Description:
All improvements, including extensions, replacements and repairs, shall conform to the requirements of the National Board of Fire Underwriters, American Water Works Association Standards, the Modesto Municipal Code, the approved plans and these Standard Specifications and Details of the City of Modesto. In all cases, water mains shall be of sufficient size to meet fire-flow requirements set forth in the Modesto Fire Code.

B. Definitions:

1. Health Agency - The Department of Health Services. For those water systems supplying fewer than 200 service connections, the local health officer shall act for the Department of Health Services.

2. Water Supplier - "Person operating a public water system" or "supplier of water" means any person who owns or operates a public water system.

3. Low Head Water Main - Any water main which has a pressure of 5 psi or less at any time at any point in the main.

4. Dimensions - Dimensions are measured from outside of water main to outside of sewer line or manhole.

5. Compression Joint - A push-on joint that seals by means of the compression rubber ring or gasket between the pipe and a bell or coupling.

6. Mechanical Joints - Bolted joints.

7. Rated Working Water Pressure or 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.

8. Fused Joint - The jointing of sections of pipe using thermal or chemical bonding processes.

9. Sleeve - A protective tube of steel with a wall thickness of not less than one-fourth inch into which a pipe is inserted.

10. Ground Water - Subsurface water found in the saturation zone.

11. House Lateral - A sewer connection the building drain and the main sewer line

C. Water and Sewer Separation

The following criterion has been extracted form the State of California's Department of Health Standards. In this section, the Department of Health clarifies Section 64630, Title 22, of the California Administrative Code for water and sewer separation.

The City has also received clarification from the State Department of Health that storm drain and irrigation pipes shall be treated with the same respect as sanitary sewers.

The Engineer or Developer has the option to reverse the following cases by re-constructing an existing facility while constructing a new facility. The final product will require any gravity operated system to remain a gravity system.

1. Public Health Considerations

Waterborne disease outbreaks attributed to the entry of sewage-contaminated groundwater into the distribution systems of public water supplies continue to be a problem in the United States. A community with its buried water mains in close proximity to sanitary sewers is vulnerable to waterborne disease outbreaks.

Sanitary sewers frequently leak and saturate the surrounding soil with sewage. This is caused by primarily by structural failure of the sewer line, improperly constructed joints, and subsidence or upheaval of the soil encasing the conduit. A serious public health hazard exists when the water mains are depressurized and no pressure or negative pressures occur. The hazard is further compounded when, in the course of installing or repairing a water main, existing sewer lines are broken. Sewage spills into the excavation and, hence, enters into the water main itself. Additionally, if a water main fails in close proximity to a sewer line, the resultant failure may disturb the bedding of the sewer line and cause it to fail. In the event of an earthquake or man-made disaster, simultaneous failure of both conduits often occurs.

The water supplier is responsible for the quality of the water delivered to consumers and must take all practical steps to minimize the hazard of sewage contamination to the public water supply. Protection of the quality of the water in the public water system is best achieved by the barrier provided by the physical separation of the water mains and sewer lines.

This document sets forth the construction criteria for the installation of water mains and sewer lines to prevent contamination of the public water supplies from nearby sanitary sewers.

2. Basic Separation Standards

The "California Waterworks Standards" sets forth the minimum separation requirements for water mains and sewer lines. These standards, contained in Section 64630, Title 22, California Administrative Code, specify:

a. Parallel Construction: The horizontal distance between pressure water mains and sewer lines shall be at least 10'.

b. Perpendicular Construction (Crossing): Pressure water mains shall be at least one foot above sanitary sewer lines where these lines must cross.

c. Separation distances specified in (1 & 2) shall be measured from the nearest edges of the facilities.

d. Common Trench: Water mains and sewer lines must not be installed in the same trench.

e. When water mains and sanitary sewers are not adequately separated, the potential for contamination of the water supply increases. Therefore, when adequate physical separation cannot be attained, an increase in the factor of safety should be provided by increasing the structural integrity of both the pipe materials and joints.

3. Exceptions to Basic Separation Standards

Local conditions, such as available space, limited slope, existing structures, etc., may create a situation where there is no alternative but to install water mains or sewer lines at a distance less than that required by the Basic Separation Standards. In such cases, alternative construction criteria as specified in Section E should be followed, subject to the special provisions in Section D.

Water mains and sewers of 24" diameter or greater may create special hazards because of the large volumes of flow. Therefore, installation of water mains and sewer lines 24" of diameter or larger should be reviewed and approved by the health agency prior to construction.

4. Special Provisions

a. The Basic Separation Standards are applicable under normal conditions for sewage collection lines and water distribution mains. More stringent requirements may be necessary if conditions, such as, high groundwater exist.

b. Sewer lines shall not be installed within 25' horizontally of a low head (5 psi or less pressure) water main.

c. New water mains and sewers shall be pressure tested where the conduits are located 10' apart of less.

d. In the installation of water mains or sewer lines, measures should be taken to prevent or minimize disturbances of the existing line. Disturbance of the supporting base of this line could eventually result in failure of this existing pipeline.

e. Special consideration shall be given to the selection of pipe materials if corrosive conditions are likely to exist. These conditions may be due to soil type and/or the nature of the fluid conveyed in the conduit., such as a septic sewage which produces corrosive hydrogen sulfide.

f. Sewer Force Mains
   i. Sewer force mains shall not be installed within 10' (horizontally) of a water main.
   ii. When a sewer force main must cross a water line, the crossing should be as close as practical to the perpendicular. The sewer force main should be at least 1' foot below the water line.
   iii. When a new sewer force main must crosses under an existing water main, all portions of the sewer force main within 10' (horizontally) of the water main shall be enclosed in a continuous sleeve.
   iv. When a new water main crosses over an existing sewer force main, the water main shall be constructed of pipe materials with a minimum rated working pressure of 200 psi or equivalent pressure rating.

5. Alternate Criteria for Construction

The construction criteria for sewer lines or water mains, where the Basic Separation Standards cannot be attained, are shown in Details Sections 500 and 600. There are two (2) situations encountered:

CASE 1 - New Sewer Line / New or Existing Water Main
The alternate construction criteria apply to the sewer line

CASE 2 Existing Sewer Line / New Water Main
The alternate construction criteria may apply to either or both the water main and the sewer line.

The construction criteria should apply to the house sewer laterals that cross above a pressure water main but not those house laterals that cross below a pressure water main.

CASE 1: New Sewer Being Installed (Details Section 500)

Zone Special Construction Required for Sewer

A. Sewer lines parallel to water mains shall not be permitted in this zone without approval from the responsible health agency and water supplier.

B. A sewer line placed parallel to a water line shall be constructed of:
   - Extra strength vitrified clay pipe with compression joints.
   - Plastic sewer pipe with rubber ring joints (per ASTM D3034) or equivalent.
   - Cast or ductile iron pipe with compression joints.
   - Reinforced concrete pressure pipe with compression joints (per AWWA C302-74).

CASE 2: New Water Mains Being Installed (Details Section 600)

Zone Special Construction Required for Sewer

A. No water mains parallel to sewers shall be constructed without approval from the health agency.

B. If the sewer paralleling the water main does not meet the Case 1, Zone B,

requirements, the water main shall be constructed of:

- Ductile iron pipe with hot dip bituminous coating.
- Dipped and wrapped ¼" thick welded steel pipe.
- Class 200, Type II, asbestos-cement pressure pipe.
- Class 200 pressure rated plastic water pipe (DR 14 per AWWA C900) or equivalent.

C. Reinforced concrete pressure pipe, steel cylinder type, per AWWA (C300-74 or C301-79 or C303-70).

D. If the sewer crossing the water main does not meet the Case 1, Zone C, requirements, the water main shall have no joints in Zone C and be constructed of:

- Ductile iron pipe with hot dip bituminous coating.
- Dipped and wrapped ¼" thick welded steel pipe.
- Class 200 pressure rated plastic water pipe (DR 14 per AWWA C900) or equivalent.
- Reinforced concrete pressure pipe, steel cylinder type, per AWWA (C300-74 or C301-79 or C303-70 C303-70).

6.02 DESIGN

A. General:
The distribution system, whenever possible, shall employ the "Gridiron System" of water circulation so as to allow pressure equalization. All water pipelines designed for the transmission or distribution of domestic water supply shall be constructed and installed within the right-of-way of public streets or roads.

The Design Engineer shall show, on the profile of Improvement Plans, inverts of pipe at all changes in grade and in all areas where conflicts with other utilities might arise.

B. Vertical Alignment:
Water mains and services shall be installed at a depth which will provide a minimum of 42" from the top of the pipe to finished grade or a minimum of 24" from the top of pipe to the street subgrade, whichever is greater.

When lines are realigned in such a way that an 18" high point is required, a fire hydrant shall be installed in lieu of an air release valve. The fire hydrant shall be located within 3' of lot lines within the right-of-way.

C. Horizontal Alignment:
Alignment shall be parallel to the street centerline wherever possible. In new developments, the horizontal alignment of water mains shall be 10' south or 10' east of the street centerline. When looping the system around the new subdivision, the utility lines may become reversed –10' north or 10' west of the street centerline. In existing streets and non-residential streets, the alignment may vary from the Standard Specifications with approval of the City Engineer, but in no case shall there be less than 10' horizontal clearance to a sanitary sewer or storm drain line.

Curved water mains are allowed in curved streets when curvature does not exceed 80% of the manufacturer's recommendations.

D. Pipe Size:
The minimum size pipe used for water mains shall have a nominal diameter of 8". Water mains serving a cul-de-sac beyond a fire hydrant may use a 6" diameter line. Larger sizes will be required as designated by the City Engineer from the City of Modesto Master Plan. Industrial and commercial areas may require installation of 12" mains. Transmission mains shall be greater than 12".

1. Single-family Residential Areas
All water mains shall be sized to provide 1000 gallons per minute fire flow from each of 2 adjacent fire hydrants flowing simultaneously with 20 pounds per square inch residual pressure.

2. Multi-family, Commercial, & Industrial Areas
All water mains shall be sized to provide fire flow as specified in the Modesto Fire Code, Table A-III-A-1, but shall provide not less than 1500 gallons per minute from each of two (2) adjacent fire hydrants flowing simultaneously with 20 pounds per square inch residual pressure.

3. Fire Flows
The fire flow can generally be obtained using the following Design Standards:
   a. 1/2 mile looped grid – 12" mains or larger
   b. ¼ mile looped grid – 8" mains
   c. Distribution system, looped – 8" mains.

E. Water Services and Meters:
1. Services
   a. The minimum size service is 5/8" for residences that meeting the following conditions:
      i) Single story, single family residences on a lot of 4,000 square feet or less.
      ii) Two-story, single family residences on a lot of 4,000 square feet or less, provided the request for such a service is accompanied by a report from a licensed professional engineer.

      Minimum size services shall be installed in conformance with Standard Detail #612A and 612B. For properties other than single family residential, and for non-typical single family residential, the Design Engineer shall determine the water service size.

   b. 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 of the City Engineer. Water services are not permitted to connect to a transmission main (12" or larger).

   c. For commercial properties, individual services for irrigation, domestic, and fire water shall be installed from the main. The water division will not manifold the water services at property line from a fire service.

d. Water service shall not be installed within the limits of the driveway or drive approach.

2. Meter
   a. All water services shall be metered, except dedicated fire services. Meter setters shall be required. The Contractor will furnish and install the meter box and meter box lid and meter setter and meter as per Standard Detail #612. City forces will install the automated meter ready system (AMR) after passing inspection. AMR will be paid for by Developer fees.

   b. All meter boxes shall be located in the public right-of-way. Meter boxes shall not be located in vehicular traffic areas or driveway or drive approaches. Installing water meter boxes within a concrete slab shall not be permitted.

F. New Subdivisions:
In new subdivisions, water services and water meters shall be supplied and installed by the Developer.

G. Backflow Prevention Device:
1. An approved backflow prevention device shall be installed at all connections to the City water main at Contractor's expense.

2. All backflow prevention devices shall be of the type approved by the Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California or the City of Modesto Water Department Cross-Connection control specialist

3. All backflow prevention devices shall be installed according to manufacturers' specifications, unless otherwise approved by the City Engineer.

4. All backflow prevention devices shall be inspected and approved by the City of Modesto.

5. A Double Check Detector Check assembly will be required on all fire systems. Double detector checks (DCDA) must be above ground and within view for the Fire Marshal's inspection. At a minimum, a DCDA is required at the point of connection at the property line on any private fire system, including a single fire hydrant.

H. Fire Hydrants:
1. Fire hydrants shall only be supplied from the largest available distribution main except transmission mains.

2. Fire hydrants shall be fed from two (2) directions unless specifically approved by the City Engineer and Fire Marshal or unless located in a cul-de-sac.

3. Fire hydrant spacing and distribution shall be determined as follows:
   - R-1 & R-2 Residential Zones - 500', All other zones - 300'.

- In addition, hydrants shall be placed on both sides of a major street and shall be spaced on each side according to the maximum distance allowed. On major streets where buildings and streets are separated by a 6' restrictive wall, hydrants shall be placed at all street intersections with a maximum distance of 1,000' between hydrants. The fire hydrant at the 1,000' spacing is for maintenance of the system and is in lieu of a blow-off.

- On divided streets, planned divided streets or state highways, the above spacing shall apply to both sides of the street.

A fire hydrant shall be located at the end of all cul-de-sacs and permanent dead ends in lieu of a blow-off. The Contractor shall install fire hydrants per the Standard Specifications. The fire hydrant, bury, 6" gate valve (GV) and break-off riser shall be provided by the Developer. This fire hydrant may be used in satisfying the Fire Marshal's spacing requirements.

Fire hydrants shall be located at ends of curb returns or at lot lines. The preferred fire hydrant location is at curb returns.

I. Temporary Blow-offs:
Blow-offs shall be constructed at the end of all temporary DEAD END runs. Blow-offs for future extensions shall be installed at mains to be extended at a later date. The final length of pipe, prior to the blow-off, shall be 18" to 39".

J. Private Fire Protection System:
1. General -
All on-site improvements shall conform to the requirements of the American Water Works Association, the Modesto Municipal Code, the Modesto Fire Code, these Standard Specifications and Details, 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.*

2. Pipe Size -
   a. The minimum pipe size used to supply only a fire sprinkler system may have a nominal diameter of 4" if hydraulic calculations show that the main will supply the total demand, including hose allowances at the available design pressure, and the main size is at least as large as the riser.

   b. The minimum pipe size used for a dead-end main, not exceeding 300' in length, supplying only one (1) fire hydrant, shall have a minimum nominal diameter of 6".

   c. The minimum pipe size used for a dead-end main up to 600' in length, supplying one (1) or more hydrants or a combination of fire hydrant and fire sprinkler system, shall have a nominal diameter of 8".

   d. The minimum pipe size used for a dead-end main exceeding 600' in length shall have a nominal diameter of 10".

   e. The minimum pipe size used for looped mains supplying fire hydrants and fire sprinkler systems shall have a nominal diameter of 6".

f. Larger pipe sizes may be required when minimum fire flow, set forth in Section 6.05, cannot be attained or when hydraulic calculations dictate otherwise.

3. Fire Main Restraints -
   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.

4. Vertical Alignment -
   Water mains shall be buried a minimum of 36" inches under driveways and 48" under railroad tracks. When vehicular traffic is not a concern, the piping may be buried a minimum of 30" to prevent mechanical and damage. Depth of covering shall be measured from the top of pipe to finished grade.

5. Control Valves -
   a. At least one (1) control valve shall be installed in each source of water supply except for fire department connections. The City gate valve may be used as the system control valve for mains supplying only fire hydrants. The distribution system shall also be equipped with a sufficient number of valves so that no single shutdown will result in shutting down a main, or necessitate the removal from service a length of pipe greater than 550 feet. Transmission mains greater than 12” in diameter shall have valves at 1000 feet on center. Additionally, in no case shall more than two fire hydrants be removed from service. One of the valves for a tee or cross at a cul-de-sac must be in the direction of the cul-de-sac. Valves, incorporating a blow off device shall be installed at the boundary of development. A valve shall be installed on each side of services to all hospitals, schools, and major industrial sites as directed by the City Engineer.

      Valves installed on all ten inch (10”) and smaller lines shall be gate valves. Mains twelve inches (12”) and larger shall utilize butterfly valves. When butterfly valves are used, butterfly operator shall be toward nearest property line.

      Valves shall be installed in conformance with Standard Details.

   b. At least one (1) control valve shall be installed on each sprinkler system. Sprinkler system control valves shall be listed indicating type. Outside stem and yoke (OS&Y) used in connection with a double check valve assembly or post indicator valves (PIV) are acceptable.

   c. Post indicator valves shall be set so that the top of the post will be 36" above final grade, and should be located not less than 40' from buildings. When a PIV cannot be placed at this distance, the alternate location shall be approved by the Fire Marshal.

   d. Sectional valves may be required on large systems; Locations and type shall be approved by the Fire Marshal.

6. Check Valves -
   a. All private fire systems shall have installed at least one (1) listed check valve. When there is more than one (1) source of water supply, a check valve shall be installed in each connection.

   b. When installed underground, the required fire sprinkler system check valve shall be in a vault large enough to allow for State mandated inspection, maintenance, and repair of the valve.

   c. Class 1, 2 and 3 private fire systems, including all on-site fire hydrants (direct connection from public water mains, with or without a booster pump) will have a double check detector check valve with OS&Y valves or FM approved indicating valves at the point of connection at the property line. This valve is not to be considered the required sprinkler system check valve. See Standard Detail #620.

   d. Private fire systems and Class 4, 5, and 6 private fire systems (cross-connected to fire pumps, unapproved water sources, or having materials or conditions that could contaminate the potable water) shall have an RPDA with FM approved indicating valves.

7. Fire Hydrants -
   See Section 6.02G, and Standard Details #605 & 606.

6.03 MATERIALS

A. Pipes

The Contractor shall furnish all labor, material, equipment and appliances required to complete the water mains and services specified, with exception to those items listed in these Standards.

1. Ductile Iron Pipe (DIP)
   a. Ductile iron pipe Class 350 Pressure may be substituted for Polyvinyl Chloride Pipe (P.V.C.) through 12". DIP shall conform to the AWWA C151, or the latest AWWA standards. Water pipe materials with diameters over 12" shall be specified by the City Engineer.
   b. Ductile iron pipe shall have “Tyton Joints”, “Ty-Seal Joints”, or approved equal and shall be cement lined in conformance with latest AWWA Specification C-104. All ductile iron pipe shall be protected by a polyethylene encasement in conformance with AWWA C105.

2. Polyvinyl Chloride Pipe (PVC)
   a. Polyvinyl chloride pressure pipe shall be Class 150 DR 18, and shall conform to AWWA C-900. Polyvinyl chloride pipe shall be Pacific Western, John Mansville, Certainteed or approved equal. All polyvinyl chloride pipe shall be 20' laying lengths and shall have cast iron outside diameters (CIOD’s) and the color of the pipe shall be blue to match Under Ground Service Alert color code.
   b. Joints of Polyvinyl Chloride pipe shall have elastomeric-gasket bell ends or couplings. The bell ends shall be integral thickened bell end or integral sleeve-reinforced bell end. The bell end joints shall have a minimum wall thickness of the bell or sleeve-reinforced bell, equal at all points to the

Standard Dimension Ratio (SDR) requirements for the pipe. The minimum wall thickness in the ring groove and bell-entry sections shall be equal to or exceed the minimum wall thickness of the pipe barrel.

c. Butterfly valves may be installed on Class 150 Polyvinyl Chloride Pipe main runs but shall not be used on Class 200 or greater.

B. Fittings and Thrust Blocking

Bends, tees and other fittings shall be Ductile Iron, Class 150, for use with Cast Iron Pipe and Ductile Iron Pipe (Flange Fittings - AWWA 110, Mechanical Fittings - AWWA 111). All fittings for Polyvinyl Chloride Pipe shall be mechanical joints except fittings with valves shall be mechanical joints by flange. Fittings shall be handled and jointed as specified for pipe installation herein before. Reaction or thrust blocking shall be constructed at bends, tees, dead ends and where changes in pipe diameter occur. Blocking shall be made of 3,000 psi concrete, and shall be placed between undisturbed ground and the fitting to be anchored. The area of bearing on the pipe and on the ground shall be that required by City Standard Details. The blocking shall be placed so that the joints of the pipe and fittings will be accessible for repair. “Grip Ring”, pipe restrainer, accessory kit is acceptable for use.

C. Valves and Valve Boxes

All valves shall be Mueller resilient seat gate valve, American Darling compression resilient seat valve, M & H 3067 AWWA resilient seat gate valve, Kennedy resilient seat gate valve, AVK resilient seat gate valve, or Clow resilient seat gate valve or approved equal, and shall be the rubber-seated, tight-closing type conforming to the current AWWA Specifications C-509. Valves shall open left and be equipped with a 2" inch AWWA operating nut. Dresser "450" butterfly valve conforming to the current AWWA Specifications C-504, or approved equal, may be installed on main runs only.

Valve boxes shall be Christy G5 with Christy Cast Iron cover or approved equal. The following materials may be used for extensions: Concrete or 8" Poly-Vinyl Chloride Pipe. All valve boxes shall be installed to finished grade as per the City Standard Detail.

D. Service Materials and Meter Materials

1. 5/8" & 1" Water Services
    a. Plastic Pipe: All Plastic Pipe shall be ultra-high molecular weight polyethylene flexible pipe; Class 160 psi or 200 psi for Class 200 mains; PE 3408 for potable water; 1" iron pipe size (I.P.S.); outside diameter from 1.310" to 1.370" per latest AWWA Specification C901 with inserts.
    b. Manufacturer shall be: YARDLEY - 02223; DRISCOPIPE - 5100 or WESFLEX - PE 3408

2. Greater than 1" Water Service
    a. Polyvinyl Chloride Pipe shall be used for all water services larger than 1½" and 2".
    b. Polyvinyl Chloride Pipe C-900 shall be used for all 4" or larger water services.

3. Meter box: Christy #B12, 12" x 20" with G20 cover/cast iron lid or Christy lid with hinged cast iron lid in pedestrian areas, only.

For vehicular traffic areas, a Christy cover shall be provided as follows:

- Residential: Cast-iron traffic cover
- Commercial or Industrial: Steel checker plate

4. All other water service materials, acceptable brands are Jones, Ford, Mueller, McDonald and Cambridge Brass.
   a. Cambridge Brass pack-joint fitting **cannot** be substituted for all-grip fittings.

b. All bronze saddles must be double strapped.

E. Fire Hydrants

Fire hydrants shall be Jones J-4040, Long Beach Model 425, Clow Model 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.

F. Private Fire Protection System

Pipe materials shall be listed for fire protection service, comply with AWWA Standards, and be designed to withstand a minimum working pressure of 150 psi.

6.04 INSTALLATION

A. Handling of Pipes and Accessories

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 accessories shall be lowered into the trench in such a manner as to prevent damage to pipe fittings.

3. Under no circumstance shall pipe or accessories be dropped or dumped into the trench. Special care shall be exercised so that the coating on pipe, valves and fittings will not be damaged. If such damage should occur, the coating shall be repaired to the satisfaction of the City Engineer. Chain slings will not be permitted.

4. Pipe loaded on trucks or stacked one upon another shall be supported on wooden blocking.

5. Pipe handled sideways shall not be skidded or rolled against pipe already on the ground.

6. All foreign matter or dirt shall be removed from the interior of pipe before lowering into position in the trench. Pipe shall be kept clean by means approved by the City Engineer during and after laying.

7. All pipe and accessories shall be inspected for defects prior to lowering into trench. Any defective, damaged or unsound pipe or accessory shall be repaired or replaced at the Developers' or Contractors' expense.

B. Laying Pipe

1. The Contractor shall field verify the depth and alignment of any existing water line prior to construction. If the existing water line is not exactly as shown on the Improvement Plans, the Contractor shall obtain approval of the City Engineer before proceeding.

2. When waterlines are being installed in new subdivision, mainline pipe and the fire hydrant runs shall be installed prior to the installation of curb, gutter, and sidewalk. Pipe shall be installed in accordance with manufacturer's recommendations. Uniform bearing shall be developed 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. All pipe for water mains and laterals shall be laid to line and grade as shown on the approved plans and in accordance with Chapter 6.03. The Contractor shall be responsible for verifying ultimate finish grade by requesting this information from the City Engineer. When curved alignment is shown on the plans the maximum deflection at any joint shall not exceed the manufacturer's recommendation for the type of pipe and joint being used.

4. Thrust blocks of 3,000 psi concrete shall be cast-in-place at all bends, reducers, behind each tee, or each cross which is valved in such a manner that it can act as a tee, and at the back of fire hydrants. The thrust block shall extend from the fitting to undisturbed soil, shall be kept clear of the joints, and shall be of such bearing area as to assure adequate resistance to the force to be encountered. In lieu of the above, movement may be prevented by the use of pipe collars and stainless steel rods and other joint restraint devices approved by the City Engineer. When straps are used to secure thrust blocks, they shall be stainless steel.

5. Whenever pipe laying is discontinued for short periods, or when work is stopped at the end of the day, the open ends of all mains shall be closed with watertight plugs or bulkheads. The plug or bulkhead shall not be removed unless or until the trench is dry.

6. Valves shall be set plumb and properly fitted to the adjacent sections of the main. A valve box shall be installed over each valve.

7. Tracer (locating) wire shall be laid on top of the PVC pipe and connected at valves per the Standard Details. Tracer tape shall also be installed.

C. Installation of the services

Installation of the services shall consist of the following basic steps:

1. Excavation of the entire service trench.

2. Thoroughly clean the water main.

3. Place and make tap as shown on the Standard Drawing.

4. Open tap valve immediately after making tap to flush material from the main line.

5. Insert stainless steel sleeves in the plastic pipe and tighten service line connections as per manufacturer's recommendation.

6. Place the service line at right angles to the water main.

7. Use boring or pushing methods, but not washing methods, to place pipe under curb and sidewalk.

8. Backfill and compact the dirt above the service line.

9. Service location to be marked by chiseling a "W" on curb face.

10. Stainless steel insert, meter setter and meter per Standard Detail #612B, meter box with a brick at each corner, and lid shall be placed at correct depth and distance from sidewalk. Water services shall be placed a maximum of 2' from a property line and meter setter and meter per Standard Detail #612B shall be accessible from inside of meter box.

11. Plastic service pipe shall not be heat-flared. Because of the variation in the outside diameter of the pipe, a saddle tap in lieu of the Quiktap may be required.

12. Special care shall be exercised to insure proper compaction is made under curb stop so it is vertical and the meter idler is level. Compaction shall be made under and around the meter box so it remains level and at the finished sidewalk grade.

D. Fire Hydrants

Fire hydrant shall be installed in conformance with Standard Details #605 and #606

E. Temporary Blow-offs

Install in conformance with Standard Detail #610. All salvaged temporary blow-offs shall become the property of the Developer or Contractor and shall be removed from the job site before completion.

F. Connections to Existing Mains

1. Existing and Active Lines -

   THE CITY OF MODESTO WATER DIVISION WILL MAKE ALL CONNECTIONS TO THE EXISTING AND ACTIVE CITY WATERLINES. This service includes:
   a. Tapping sleeves and valves.
   b. 1" or larger water service.
   c. Meters, check valves and meter boxes, unless otherwise listed in a previous section of these standards.

2. Temporary Tie-Ins -

   A temporary tie-in for the extension of a water main into a subdivision will be provided by the City at the Developer's expense. The Developer shall be required to install a Reduced Pressure backflow prevention device (RP) as per Standard Detail #610D. Three (3) inspections shall be conducted by the City's Cross-Connection Specialist's office. Prior to backfilling the RP device, the Developer shall contact the Cross-Connection Specialist for proper installation inspection as per Standard Detail #610D. The RP device shall be tested for

proper operation free of charge. The City will accept the waterline after all waterline tests have been completed. The Developer shall properly remove the RP device during the inspection of the Cross-Connection Specialist.

a. Only one (1) temporary tie-in, including water meter, will be allowed for each subdivision during construction. Any remaining tie-ins will be installed by the City upon acceptance of the waterlines and before the street is paved. If pavement has been installed, pavement replacement will be done by the Developer. The installation of the temporary tie-in shall be scheduled by the Contractor with the City of Modesto Water Division at (209) 342-2246.

b. The Developer or Contractor shall pay the appropriate fees to Development Services prior to being connected.

c. The Contractor shall install the water line within 6"inches vertically and with a 10' separation from the tie-in to the existing system. All installations shall not be terminated within 5' of any existing utilities and structures.

d. Connections shall be made at such times as designated by the City Engineer and in such a manner as to insure the least inconvenience to water users. No connection shall be made until the new work has been tested and disinfected as specified hereinafter. The Contractor shall be responsible for safeguarding the existing system from all damage and possible contamination in the performance of the work. The City shall furnish the pipe and materials necessary to make the tie-in with the existing system.

G. Testing

1. Testing -

a. After the pipe has been backfilled to 12" over the top, each section of the pipe to be tested shall be slowly filled with water and all air shall be expelled from the pipe. The release of the air can be accomplished by opening hydrants and service line cocks at the high points of the system and the blow-offs at the dead ends. The valves controlling the admission of water into the section of pipe to be tested should be opened wide before shutting the hydrants or blow-offs. After the system has been filled and pressurized to the service pressure of 50 psi with water and all air expelled, all valves controlling the section to be tested shall be closed and the line be allowed to set pressurized for a period of not less than 24 hours.

b. The pipe shall then be refilled, if necessary, and subjected to a pressure of not less than 150 pounds per square inch or the service pressure plus 50 pounds, whichever is greater, for a period of not less than 1 hour. Meter setter, meter units, per Standard Detail #612B, shall also be included in the hydrostatic test.

c. The Developer or Contractor shall perform the test prior to connecting to the existing system. The Developer or Contractor shall furnish and install temporary caps, plugs for meter setter, meter per Standard Detail #612B , thrust blocks and other necessary materials needed to hold pressures on sections of line being tested.

d. Water for testing may be taken from the nearest blow-off, fire hydrant or other approved source. All pipe, fittings, valves, couplings, and other materials needed to fill the test lines with water shall be supplied and installed by the Developer or Contractor. Care shall be taken not to contaminate the existing system. The pump, gauge, pipe connection, and all necessary apparatus and equipment needed for the test shall be supplied by the Developer or Contractor.

2. Leakage -
Pipe installation will not be accepted if leakage exceeds the following:

TABLE 6.1 Allowable Coupling Leakage

Allowable Leakage Per 100 Couplings	
Pipe Diameter in Inches	**Maximum Gallons per Hour**
6"	1.84
8"	2.45
10"	3.07
12"	3.68
14"	4.28
16"	4.89
18"	5.52
20"	6.12
24"	7.34

The Developer or Contractor shall permanently stop all leaks. All pipe or joints which prove defective shall be replaced and the lines on which such defect or defects occur shall be tested again to determine final acceptability of the installation.

H. Disinfection
Water mains shall be disinfected using one (1) of the following three (3) methods: the Tablet Method, the Continuous Feed Method or the Slug Method.

1. The Tablet Method -
The Tablet Method consists of placing calcium hypochlorite granules and tablets in the water main as it is being installed and filling the water main with potable water when the installation is completed. This method may be used only if the pipes and appurtenances are kept clean and dry during construction. This method cannot 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.

The Tablet Method shall be performed as follows:

a. Placing of calcium hypochlorite granules:
During construction, calcium hypochlorite granules shall be placed at the upstream end of the first section of pipe, at the upstream end of each branch main and at 500' intervals along the pipe length. The quantity of granules shall be as shown in Table 6.1.

TABLE 6.2 Calcium Hypochlorite Granules

Number of ounces of Calcium Hypochlorite Granules to be Placed at Beginning of Main and at each 500' interval.

Pipe Diameter	Calcium Hypochlorite Granules (ounces)
4"	1.7
6"	3.8
8"	6.7
10"	10.5
12"	15.1
14" & larger	D^2 x 15.1

b. Placing of calcium hypochlorite tablets:

During construction, a 5 gram (g) calcium hypochlorite tablet shall be placed in each section of pipe and also one such tablet shall be placed in each hydrant, hydrant branch and other appurtenances. The number of 5-gram (g) tablets required for each pipe section shall be calculated based on the formula 0.0012 d^2 L, where d is the inside pipe diameter, in inches, and L is the length of the pipe section, in feet. The result shall be rounded to the next higher integer. Table 2 shows the number of tablets required for commonly used sizes of pipe.

TABLE 6.3 Calcium Hypochlorite Tablets

Number of 5-gram (g) Calcium Hypochlorite Tablets Required for Dose of 25 Milligrams per Liter (mg/L)*

Pipe Diameter	Length of Pipe Section (Feet) 13' or less	18'	20'	30'	40'
4"	1	1	1	1	1
6"	1	1	1	2	2
8"	1	2	2	3	4
10"	2	3	3	4	5
12"	3	4	4	6	7
16"	4	6	7	10	13

*** Note: Number of tablets is based on 3.25 grams available chlorine per tablet and any portion of a tablet is rounded to the next higher whole number.**

The tablets shall be attached by a food-grade adhesive. There shall be no adhesive on the tablet except on the broad side attached to the surface of the pipe. All tablets shall be attached 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 placed in the trench, their position shall be marked on the section so it can be readily determined that the pipe is installed with the tablets on top.

When installation is completed, the main shall be filled with water at a rate such that water within the main will flow at a velocity no greater than 1' per second. Precautions shall be taken to assure that air pockets are eliminated. This water shall remain in the pipe for at least 24 hours. If the water temperature is less that

41° Fahrenheit (5° Centigrade), the water shall remain in the pipe for at least 48 hours. Valves shall be positioned so that the strong chlorine solution in the treated main will not flow into water mains in active service. Valves and hydrants shall be opened and closed while the system is being disinfected. Treated water shall be retained at least 24 hours after which time it shall be tested for residual chlorine. If less than 5 parts per million is indicated, additional chlorine in solution shall be added until disinfection satisfactory to the City Engineer is obtained. When disinfection has been completed and approved by the City Engineer, the system shall be flushed and filled with clear water. The clear water shall then be flushed into a sewer manhole, using an approved backflow prevention device or approved technique, until all foreign material has been removed from the lines.

The City Engineer shall test the water after refilling the line and, if not found to be of safe bacteriological quality, he shall require the Contractor to re-chlorinate the line until the quality of the water is proven to be satisfactory.

2. The Continuous Feed Method -
   The Continuous Feed Method shall be performed in conformance with AWWA Standard C651-99.

3. The Slug Method
   The Slug Method shall be performed in conformance with AWWA Standard C651-99, Section 4.

I. Sample Stations
Sampling methods shall be performed in conformance with AWWA Standard C651-99, Section 5.

Sampling stations shall be served by a 1" service installed as shown in the Standard Details, except that a meter idler assembly is not required. The testing nozzle shall be threadless and shall be between 36" – 48" in height.

All sampling stations shall be installed as shown in the Standard Details. The piping from the curb stop to the nozzle shall be of brass, copper or Schedule 40 Polyvinyl Chloride Pipe. All piping that is above grade shall be insulated with foam pipe insulation. All station housings shall be "Kupferle Foundry - Mainguard 91", "Koraleen Enterprises - Station Guard", "Max Fusion", or approved equal.

J. Private Fire Protection System
1. Fire Main Restraints -
   Thrust blocking shall be installed in conformance with Standard Detail #609. Other joint restraints shall be installed in conformance with NFPA 24.

2. Fire Department Connections
   a. 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.

b. A listed check valve shall be installed in each FDC.

c. An FDC shall be installed on the system side of the system check and control valves, and on each side of a sectional valve.

d. The FDC shall not be connected to the suction side of a fire pump.

e. 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.

f. Two (2) 2" inch 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.

3. Approval Procedure
   a. Underground fire services for fire hydrants and/or automatic fire protection systems shall be included in civil drawings or on site plan at time of submittal for building permit. Plans shall include piping from street connection to termination at building or at hydrant, or both. Locations of existing (or proposed new) off-site fire hydrants, FDC, and approved shut-off valve shall also be included. If required DCDA also be included, with FM approved shut-offs

   b. Aboveground automatic fire sprinkler and standpipe system plans may be submitted separately to Fire Department after building permit for the structure is issued. A separate permit is not required unless the fire sprinkler installation is the only work being done.

   c. All fire sprinkler systems shall be designed and installed in accordance with NFPA Standard 13; all standpipe systems shall be designed and installed in accordance with NFPA Standard 14.

   d. A minimum of three (3) sets of complete plans shall be submitted.

   e. Plans shall be approved by Fire Department prior to start of construction.

4. Inspection and Test Procedures
   a. All required inspections and tests shall be witnessed by Fire Department personnel. It is the installing contractors 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.

   b. One set of APPROVED plans shall be kept on the job site during construction.

   c. All private fire system trenches, piping, joints, valves and pipe restraints (thrust blocks or other approved method) shall be inspected prior to covering.

   d. 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. Connection to the approved Backflow device will not be made until this test has been completed.

TABLE 6.4 FLOW RATE TO PRODUCE VELOCITY OF 10FT/SEC

Pipe Size (inches)	Flow Rate (gpm)
4"	390
6"	880
8"	1560
10"	2440
12"	3520

e. 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.

f. 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.

6.05 MEASUREMENT AND PAYMENT

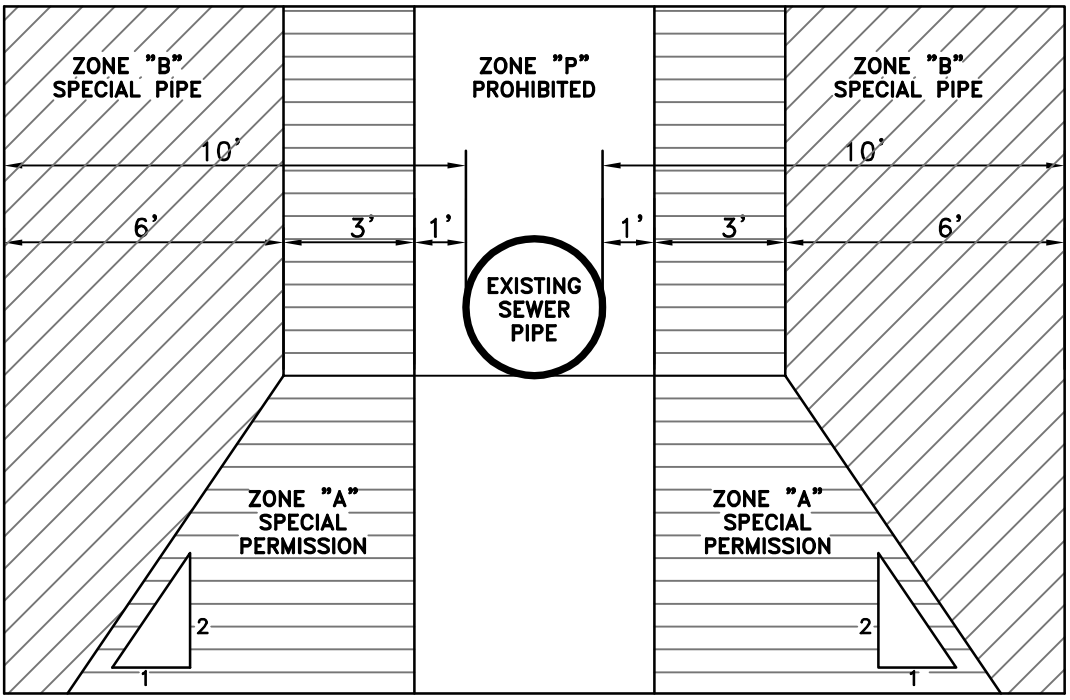
Water main shall be measured horizontally by the linear foot through valves and fittings. Valves greater than 12" shall each be measured as one (1) completed installed unit in operable condition including valve, anchor block, valve box and riser. Valves 12" and smaller shall be considered in the unit price per lineal foot of pipe. Fire hydrants shall each be measured as one (1) complete installed unit in operable condition including hydrant, break-off riser, bury thrust block, 6" valve, and piping from main to bury. Air relief and blow-off assemblies shall each be measured as one (1) complete unit in operable condition including valve, valve box, curb stop, corporation stop, service clamp and any other necessary fittings. Fittings, anchors, and thrust blocks shall not be measured for payment.

The contract price for water main and appurtenances shall constitute full compensation for all labor, materials, and tests necessary to furnish and install the main and appurtenances in accordance with the drawings and specification.

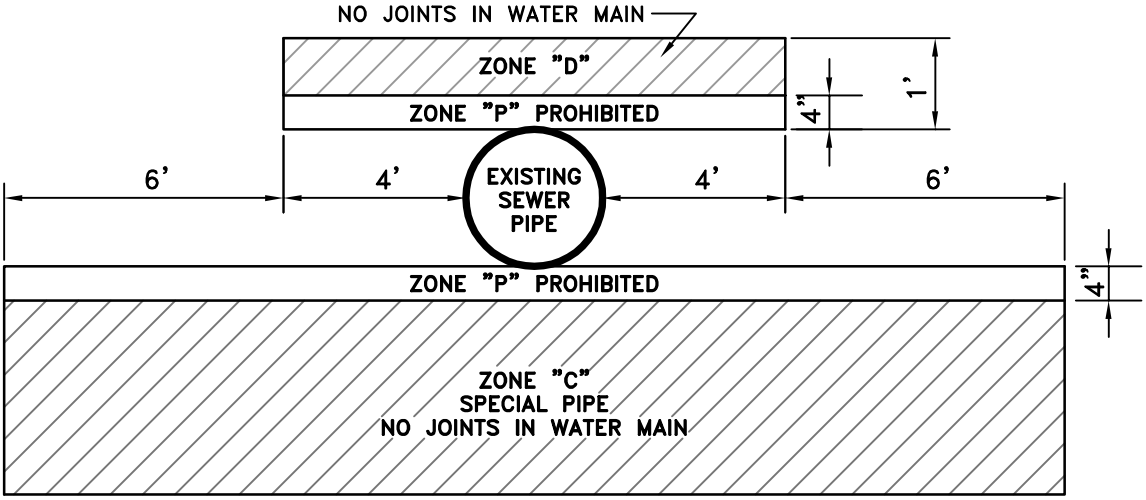
SPECIAL CONSTRUCTION REQUIREMENTS

(TO BE USED ONLY WHERE REQUIRED SEPARATION CANNOT BE OBTAINED)

CASE 2–NEW WATER LINE BEING INSTALLED



PARALLEL CONSTRUCTION

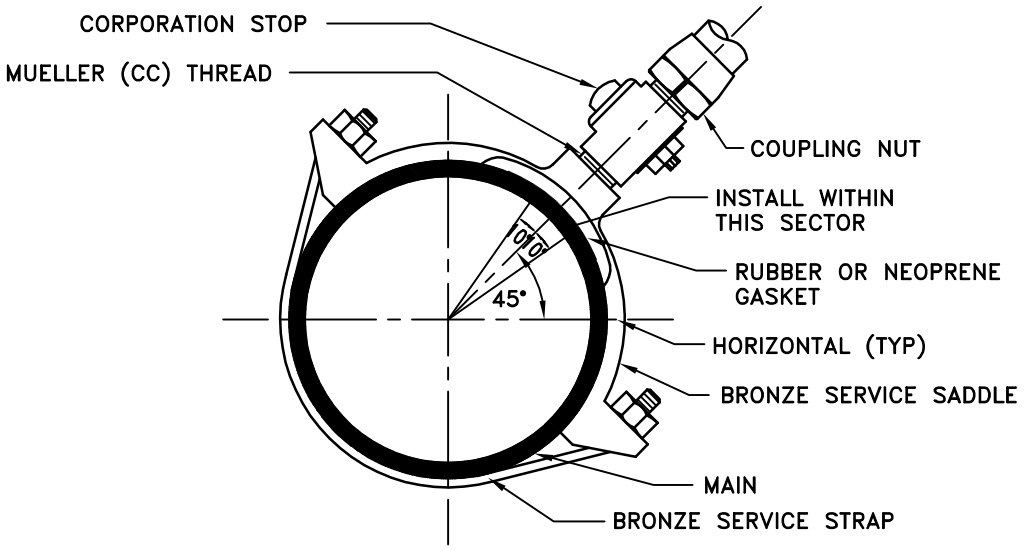


PERPENDICULAR CONSTRUCTION

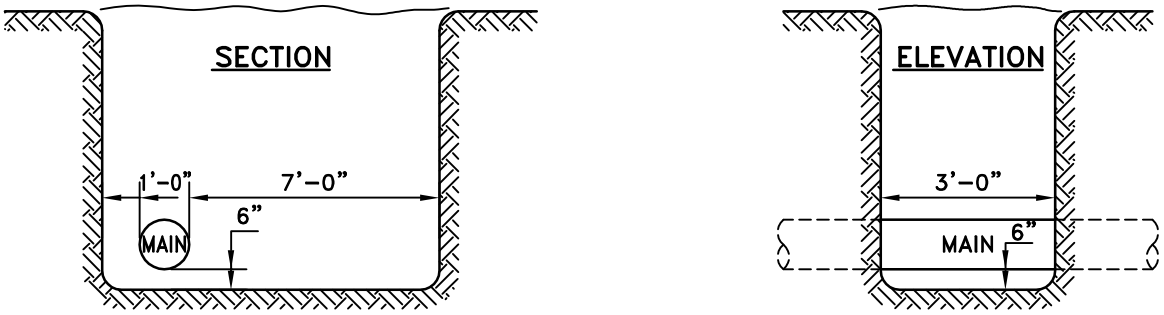
NOTES:

1. ZONE "P" IS A PROHIBITED CONSTRUCTION ZONE.
2. ZONE "C", SPECIAL PIPE, SHALL BE PVC CLASS 200 PER AWWA C900 OR APPROVED EQUAL.

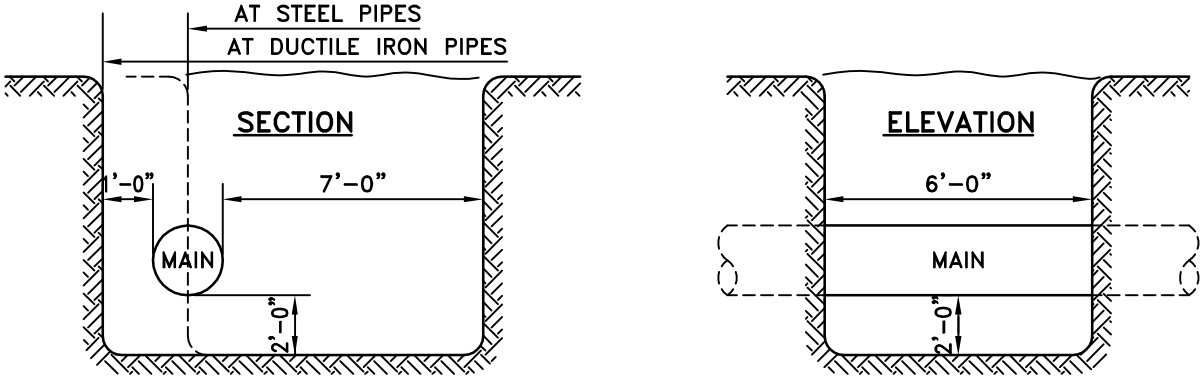
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	WATER	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	CALIFORNIA HEALTH DEPARTMENT REQUIREMENTS	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 600



TYPICAL TAP WITH REQUIRED SERVICE SADDLE



TAP EXCAVATION REQUIREMENTS FOR EXISTING MAINS 4" THRU 12"



TAP EXCAVATION REQUIREMENTS FOR EXISTING MAINS OVER 12"

NOTES:

1. ALL CORPORATION STOPS TO HAVE A.W.W.A. STANDARD CORPORATION STOP THREAD (MUELLER CC) ON INLET END. OUTLET TO BE USED WITH FLARED OR COMPRESSION FITTING.
2. CONTACT ENGINEER FOR APPROVED LIST OF WATER SERVICE CONNECTION MATERIALS.
3. A BRONZE DOUBLE STRAP SERVICE SADDLE IS REQUIRED ON ALL WATER SERVICE TAPS 1" THRU 2" EXCEPT C-900.
4. LOW LEAD OR ENVIROBRASS; CALIFORNIA HEALTH STANDARDS TO BE USED.

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Madden

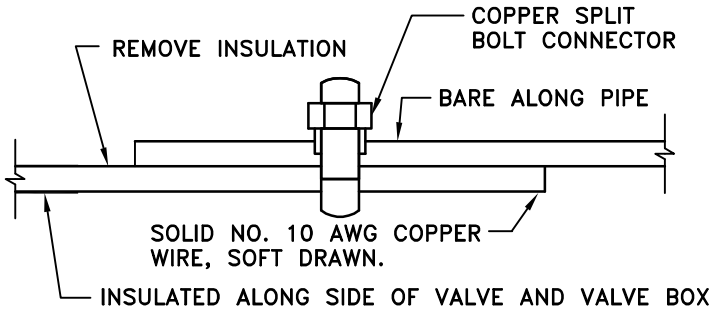
WATER

STANDARD WATER SERVICE TAPS 1" THRU 2" & TAP EXCAVATION REQUIREMENTS

PUBLIC WORKS DEPARTMENT

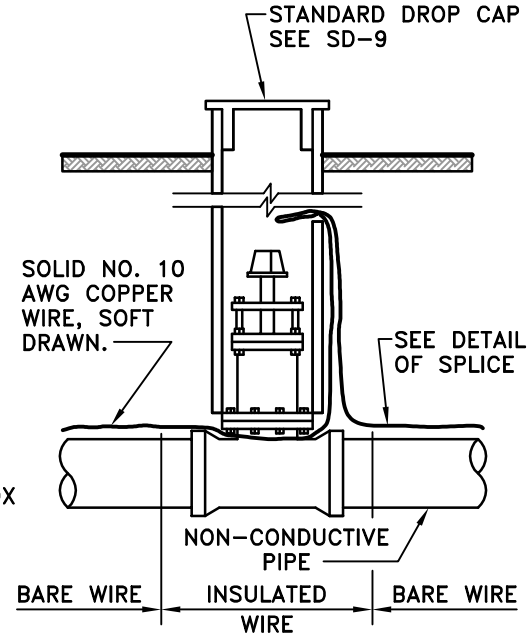
CITY of MODESTO

DETAIL NO. 601

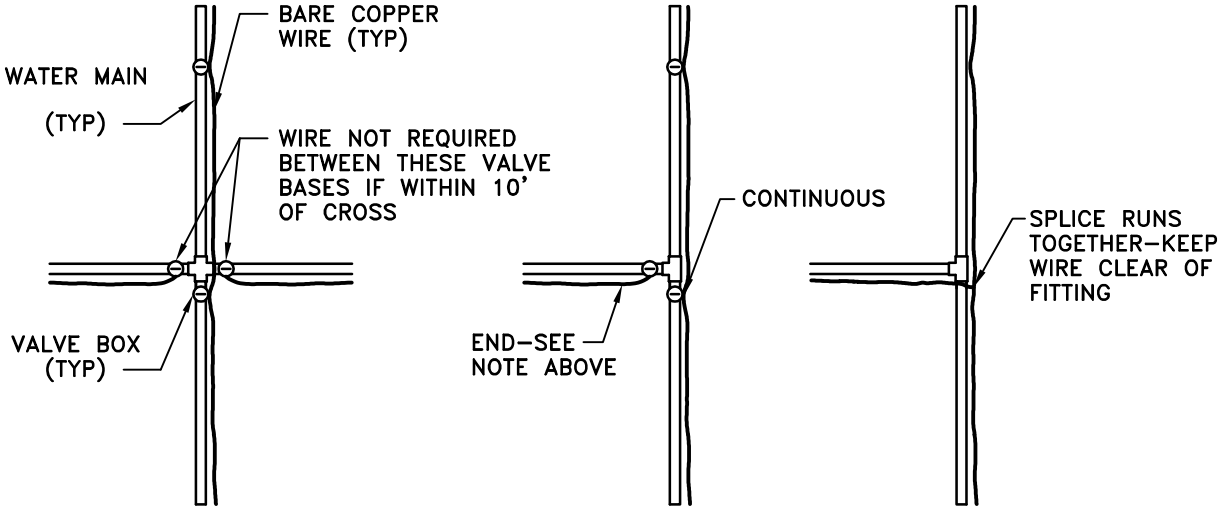


NOTE: IF WIRE ENDS AT VALVE BOX, RUN SINGLE INSULATED LEAD UP TO 10' BELOW GROUND.

DETAIL OF CONNECTION



INSTALLATION AT VALVE BOX



TYPICAL PLACING AT MAIN INTERSECTIONS

NOTES:

1. WIRE TO BE CONTINUOUS BETWEEN VALVE BOXES, EXCEPT WHERE BOXES ARE WITHIN TEN (10') FEET OF PIPE INTERSECTION.
2. BARE WIRE NOT TO TOUCH VALVE OR FITTINGS. (COATED WIRE ONLY)
3. LOCATING WIRE TO BE LAID AT TOP OF PIPE.
4. ANY TIME CONNECTION IS NOT PERPENDICLAR TO MAIN, LOCATING WIRE SHALL BE PLACED.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	WATER	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	PIPE LOCATING WIRE FOR NON-CONDUCTIVE WATER MAINS	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 602

GENERAL:

1. ALL PRIVATE FIRE SYSTEMS SHALL HAVE A DOUBLE CHECK DETECTOR CHECK (DCDA) WITH OS&Y VALVES OR FIRE MARSHAL APPROVED ALARM DEVICE INSTALLED, EXCEPT CLASS 4, CLASS 5, OR CLASS 6 FIRE PROTECTION SYSTEMS, WHICH WILL REQUIRE REDUCED PRESSURE DETECTOR CHECK (RPDA).

2. ALL FIRE PROTECTION SYSTEMS AND PRIVATE "ON SITE" FIRE HYDRANTS SHALL BE DISINFECTED PRIOR TO CONNECTION TO PUBLIC WATER SYSTEM AND SHALL SUBMIT NEGATIVE BACTERIOLOGICAL TEST RESULTS TO THE CITY FO MODESTO CROSS-CONNECTION SPECIALIST. CITY STANDARD SPECIFICATION 6.03 (H) OF THE CONSTRUCTION STANDARDS.

3. WITHIN THE CITY WATER SERVICE AREA ALL ON-SITE FIRE HYDRANTS SHALL HAVE A DOUBLE CHECK DETECTOR CHECK (DCDA) WITH OS&Y VALVES OR FIRE MARSHAL APPROVED ALARM DEVICE AT THE PROPERTY LINE IMMEDIATELY DOWN-STREAM OF THE MAIN SHUT OFF VALVE. PLANS AND SPECIFICATIONS SHALL...OF THE COMUNITY DEVELOPMENT DEPARTMENT.

INSTALLATION REQUIREMENTS:

1. FIRE HYDRANTS, ON-STREET AND/OR ON-SITE, SHALL BE INSTALLED IN ACCORDANCE WITH CITY OF MODESTO STANDARD SPECIFICATIONS. INSPECTION APPROVAL BY THE FIRE MARSHALL IS REQUIRED PRIOR TO ANY BACKFILL. WITNESSED PRESSURE TEST, 150 P.S.I. FOR 2 HOURS, IS REQUIRED FOR ALL ON-SITE SYSTEMS. FIRE DEPARTMENT PLAN LOCATION APPROVAL REQUIRED PRIOR TO CONSTRUCTION. COMBINED SYSTEMS--SPRINKLER AND HYDRANT--SHALL BE TESTED AT 200 POUNDS FOR TWO HOURS.

2. AUTOMATIC SPRINKLER SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH NFPA #13 STANDARD. PRIOR TO CONSTRUCTION, DETAILED PLANS SHALL BE SUBMITTED FOR FIRE DEPARTMENT APPROVAL. PRESSURE AND FLOW TESTING OF BOTH ABOVE GROUND AND UNDERGROUND SYSTEMS SHALL BE AT 200 POUNDS FOR TWO HOURS AND OBSERVED BY THE FIRE DEPARTMENT. A FINAL INSPECTION OF THE COMPLETED SYSTEM SHALL BE CONDUCTED BY THE FIRE DEPARTMENT TO INSURE THAT THE EQUIPMENT AND INSTALLATION CONFORMS TO THE APPROVED PLANS.

3. ALL STANDPIPE SYSTEMS (WET OR DRY) SHALL BE INSTALLED ACCORDING TO NFPA #14 STANDARDS. PRIOR TO CONSTRUCTION DETAILED PLANS SHALL BE SUBMITTED FOR FIRE DEPARTMENT APPROVAL. TESTING AND INSPECTION SHALL CONFORM TO SPRINKLER SYSTEM INSTALLATIONS.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	WATER	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	FIRE PROTECTION SYSTEM STANDARDS	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 603

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

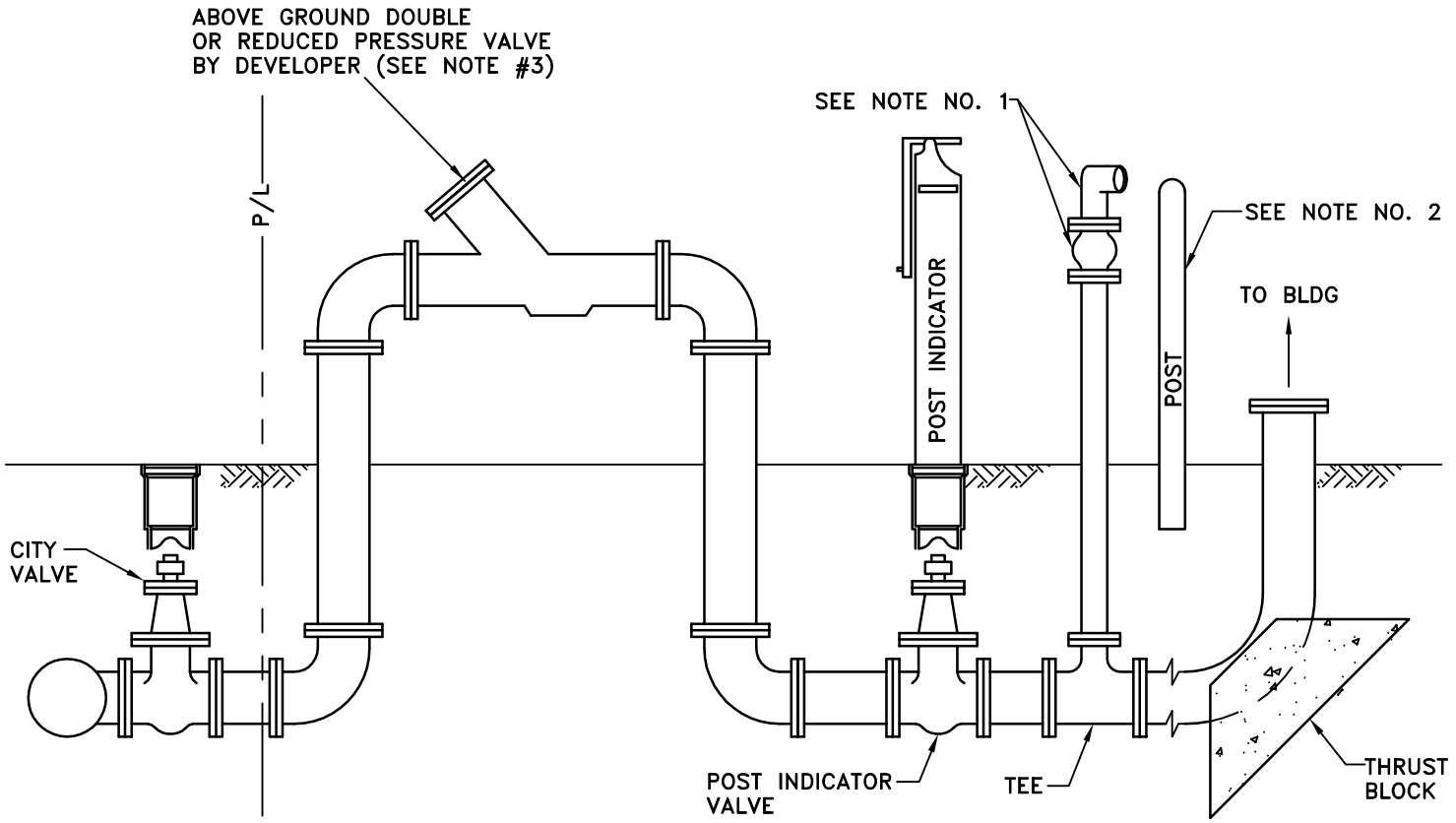
WATER

TYPICAL FIRE SPRINKLER WITH POST INDICATOR VALVE

PUBLIC WORKS
DEPARTMENT

CITY of MODESTO

DETAIL NO.
604

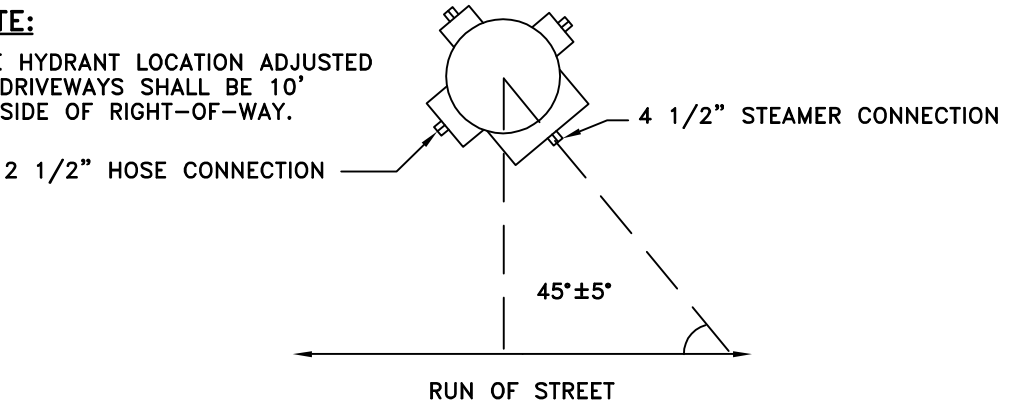


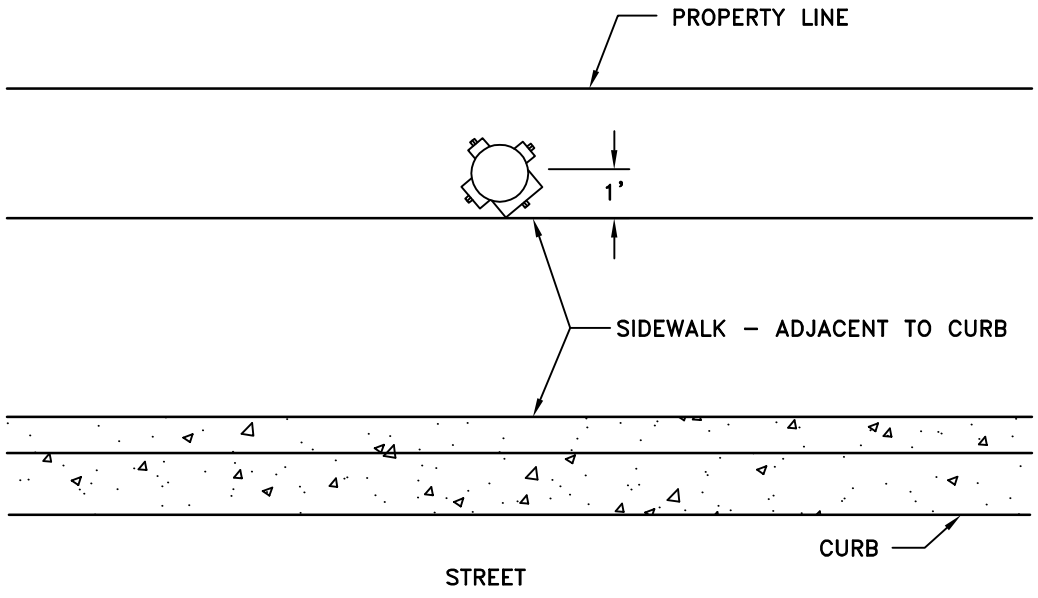
NOTES:

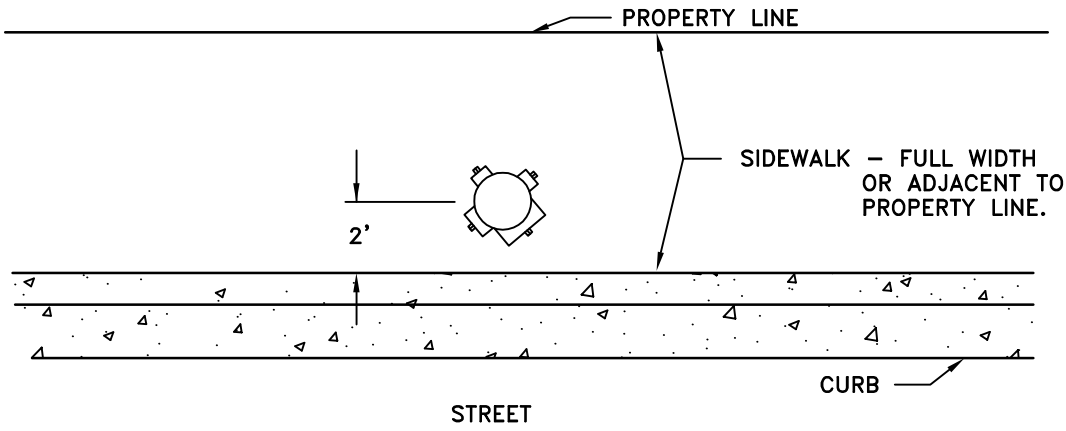
1. LISTED AND APPROVED FIRE DEPT. CONNECTION WITH CHECK VALVE PER CITY OF MODESTO FIRE DEPT. REQUIREMENTS.
2. GUARD POSTS AS REQUIRED.
3. DOUBLE CHECK DETECTOR CHECK (DCDA) W/OS+Y VALVES OR FIRE MARSHALL APPROVED ALARM DEVICE.
4. RPDA REDUCED PRESSURE DETECTOR CHECK FOR CLASS 4, 5, AND 6 FIRE SYSTEMS W/OS+Y OR FIRE MARSHAL APPROVED ALARM DEVICE.

NOTE:

FIRE HYDRANT LOCATION ADJUSTED TO DRIVEWAYS SHALL BE 10' OUTSIDE OF RIGHT-OF-WAY.







APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wu

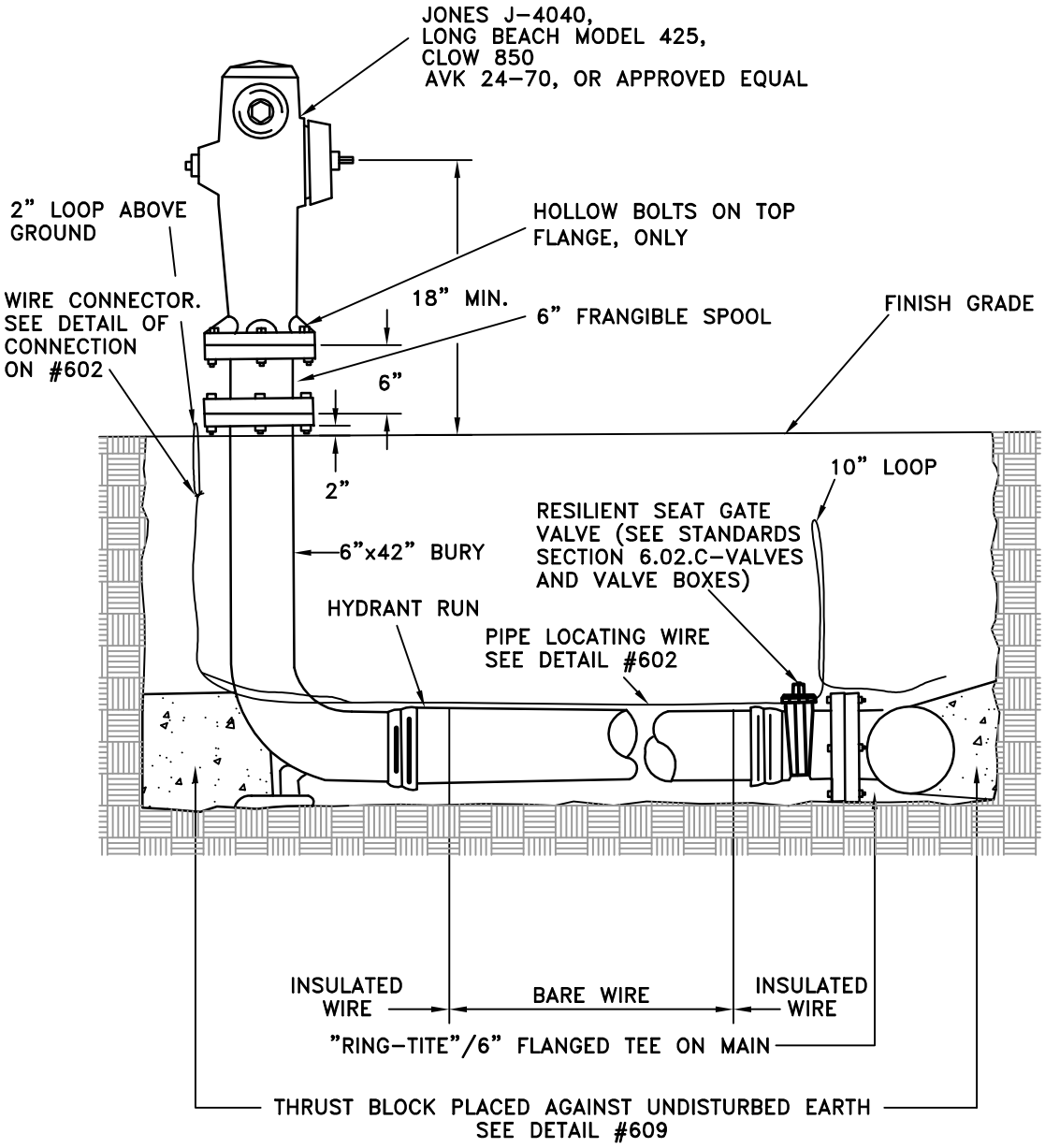
WATER

FIRE HYDRANT LOCATION

PUBLIC WORKS DEPARTMENT

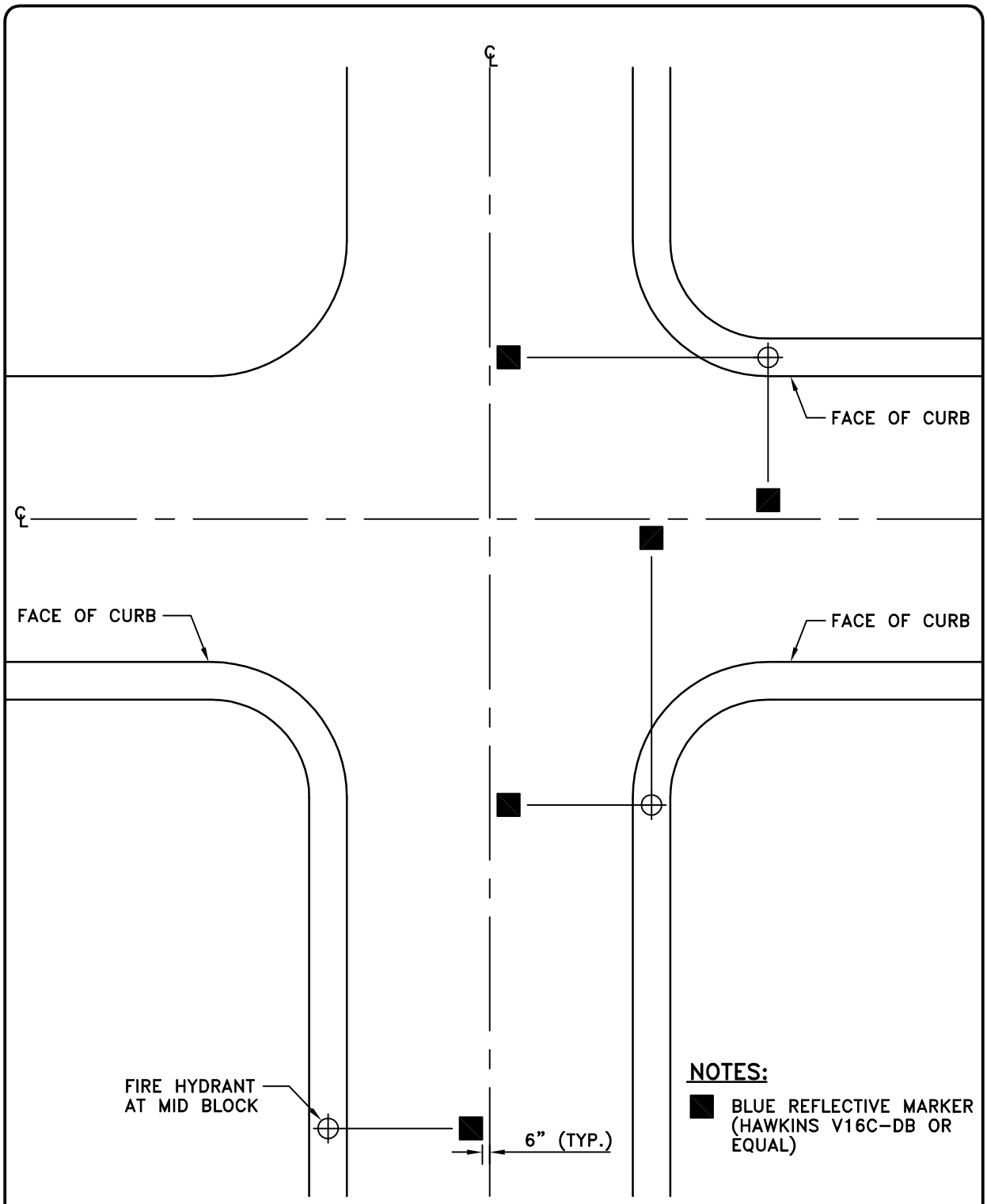
CITY of MODESTO

DETAIL NO. 605



SECTION

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	WATER	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	FIRE HYDRANT INSTALLATION	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 606



APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

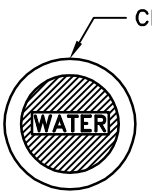
WATER

BLUE REFLECTIVE MARKER PLACEMENT

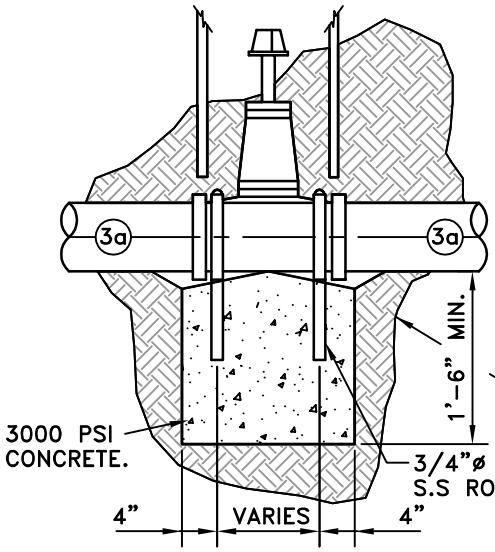
PUBLIC WORKS
DEPARTMENT

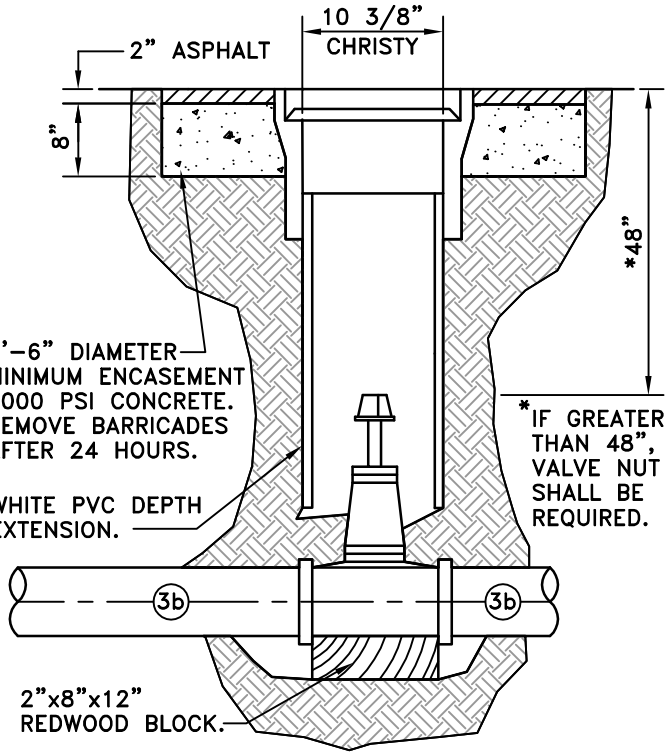
CITY of MODESTO

DETAIL NO.
607



VALVE BOX AND COVER





TYPICAL SECTION 12" VALVE AND SMALLER

TYPICAL SECTION GREATER THAN 12" VALVE

NOTES:

1. VALVE BOX AND COVER SHALL BE CHRISTY CONCRETE PRODUCTS NO. G-5 OR EQUAL WITH DEPTH EXTENSIONS AS REQUIRED.
2. ALL VALVES SHALL HAVE FLANGED CONNECTIONS AT ALL TEES AND CROSSES.
3. ALL VALVES SHALL BE SEPARATED FROM COLLARS AS NOTED:
   A. (1/2 SECTION)
   B. (1/4 SECTION)
4. VALVE SHALL BE RESILIENT SEAT GATE (12" OR LESS) OR BUTTERFLY PER CITY SPECIFICATION.
5. CLEAN INSIDE OF EXTENSIONS SO STEM IS CLEAN OF DIRT.
6. SET VALVE BOX TO FINISH GRADE.
7. COMPACT EARTH AROUND BASE WITH MECHANICAL TAMPER TO 95% RELATIVE COMPACTION AND ENCASE IN 10" OF CONCRETE.
8. AFTER CONCRETE SETS, PATCH WITH 2" AC TO GRADE.
9. VALVE BOXES IN DIRT OR UNDEVELOPED AREAS SHALL HAVE CONCRETE ENCASEMENT POURED TO GRADE (NO 2" AC).

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	WATER	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	VALVE BOX INSTALLATION	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 608

MINIMUM THRUST BLOCK AREAS (IN SQUARE FEET)

PIPE SIZE	TEE	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 CLASS B 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 CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

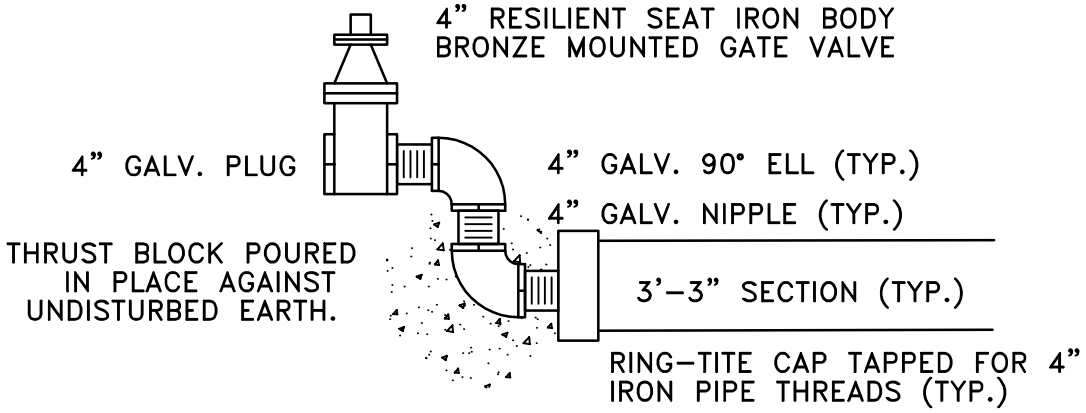
WATER

THRUST BLOCKING

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO. 609

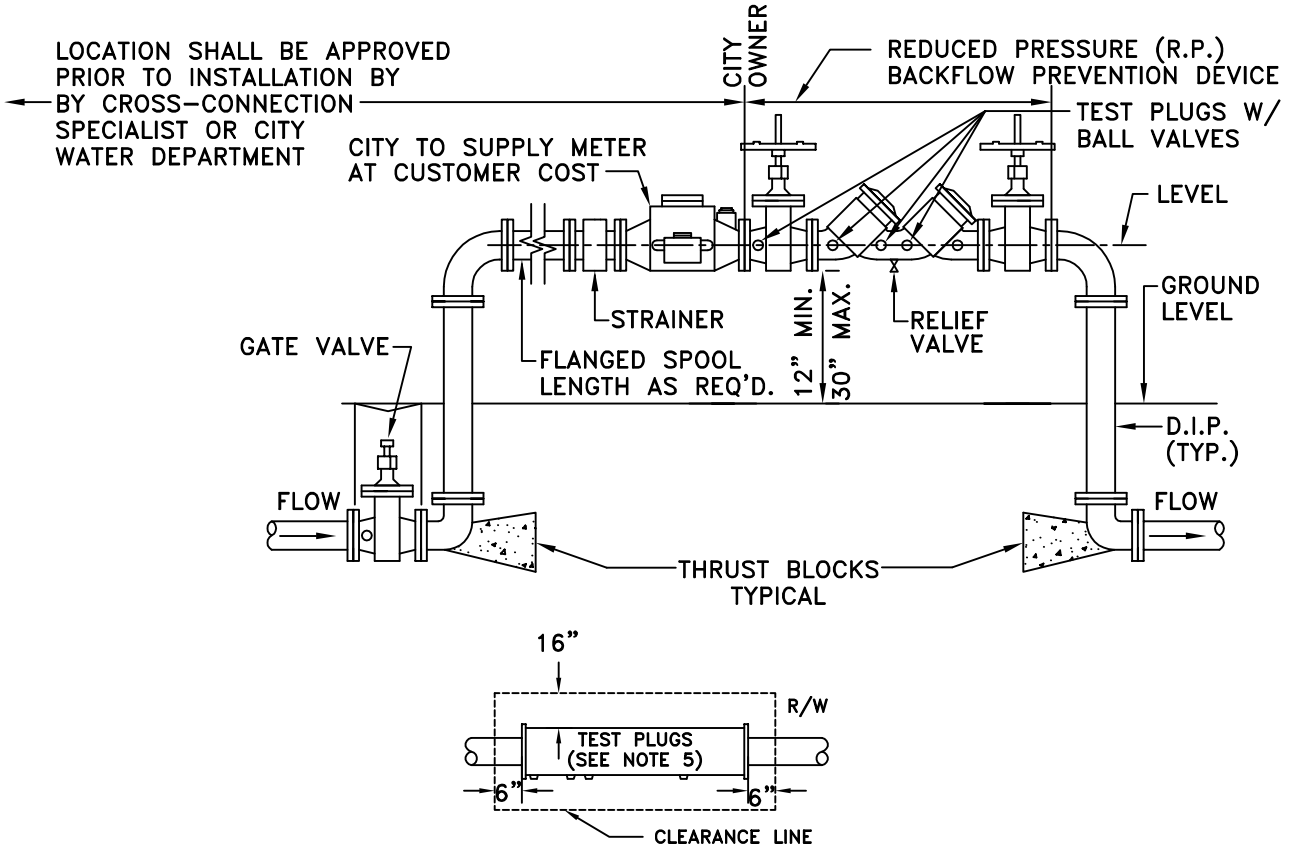


TEMPORARY BLOW-OFF

NOTE:

IN LIEU OF A PERMANENT BLOW OFF, A FIRE HYDRANT SHALL BE INSTALLED AT THE END OF LINES.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	WATER	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	BLOW-OFF	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 610

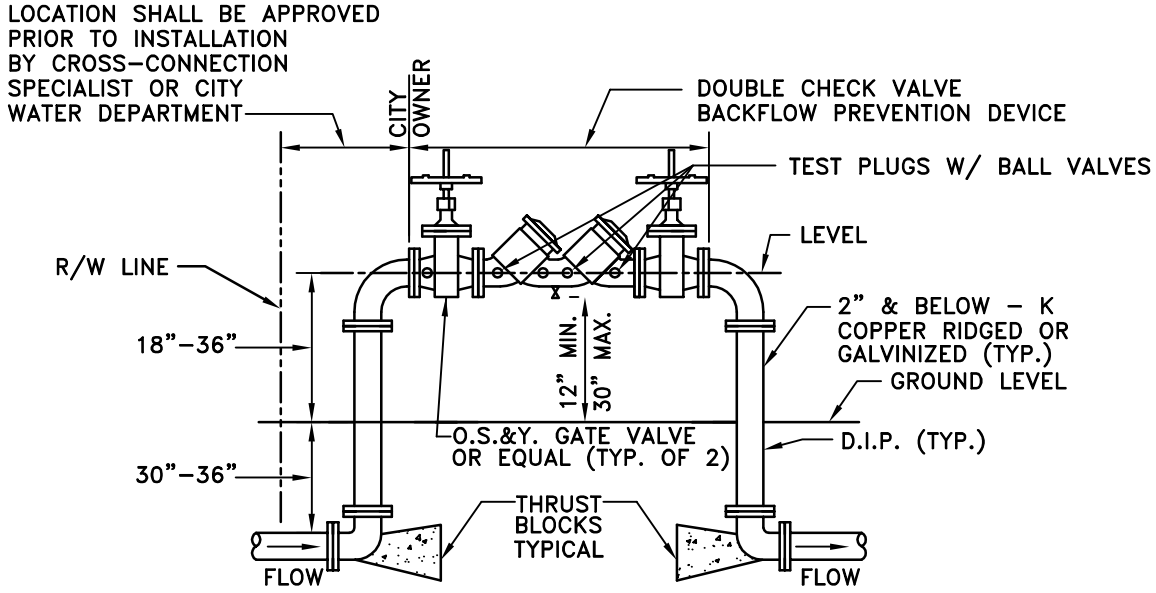


DOMESTIC SERVICE–REDUCED PRESSURE ASSEMBLY

NOTES:

1. DOMESTIC BACKFLOW PREVENTION DEVICE SHALL CONSIST OF APPROVED DETECTOR CHECK REDUCED PRESSURE PRINCIPLE DEVICE: FIRE SERVICE SHALL CONSIST OF DOUBLE CHECK VALVE BACKFLOW PREVENTION DEVICE, AS REQUIRED BY TITLE 17 OF THE CALIF. DEPT. OF HEALTH SERVICES AND THE MODESTO MUNICIPAL CODE, SECTION 11–1.14. MODEL OF BACKFLOW DEVICE TO BE DETERMINED FOR EACH INSTALLATION DEPENDING ON THE TYPE OF HAZARD AND UPON ALLOWABLE HEAD LOSS.
2. BARRIER POST SHALL BE LOCATED TO PROTECT PIPING AND VALVES. CURB AND PARKING BARRIERS CAN BE CONSIDERED PROTECTION IF EFFECTIVELY LOCATED.
3. WATER SUPPLY – NO CONNECTIONS OR TEES WILL BE ALLOWED BETWEEN METER AND DEVICE.
4. DEVICE SHALL BE ACCESSIBLE FOR TESTING AND MAINTENANCE.
5. CERTIFICATION REQUIRED PRIOR TO ACCEPTANCE.
6. ALL DESIGN PLANS ARE TO BE SUBMITTED TO THE CROSS–CONNECTION SPECIALIST FOR APPROVAL AND A CROSS CONNECTION SURVEY IS TO BE COMPLETED TO EVALUATE HAZARDS THAT POSSIBLY EXIST.
7. ALL BACKFLOW PREVENTION DEVICES INSTALLED SHALL BE INSPECTED AND TESTED ANNUALLY.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	WATER	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	BACKFLOW PREVENTION DEVICE	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 610A



FIRE SERVICE-DOUBLE CHECK VALVE REDUCED PRESSURE ASSEMBLY W/O FIRE DEPARTMENT CONNECTOR

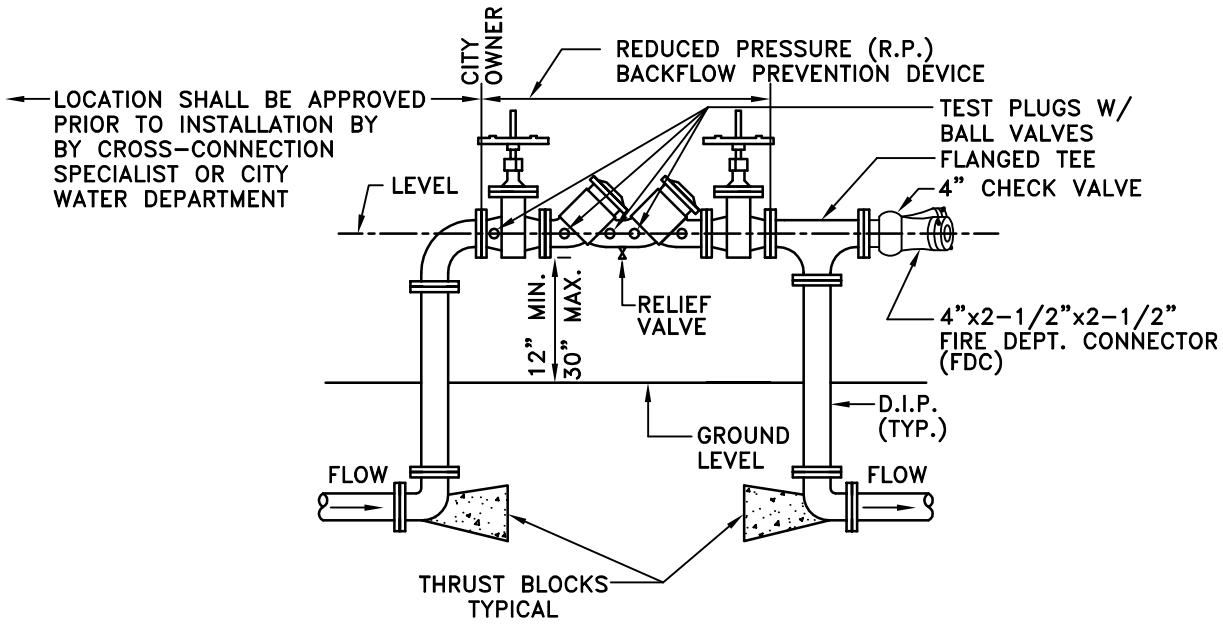
NOTES:

1. REQUIRED BY TITLE 17 OF THE CALIF. DEPT. OF HEALTH SERVICES AND THE MODESTO MUNICIPAL CODE, SECTION 11-1.14. MODEL OF BACKFLOW DEVICE TO BE DETERMINED FOR EACH INSTALLATION DEPENDING ON THE TYPE OF HAZARD AND UPON ALLOWABLE HEAD LOSS.
2. BARRIER POST SHALL BE LOCATED TO PROTECT PIPING AND VALVES. CURB AND PARKING BARRIERS CAN BE CONSIDERED PROTECTION IF EFFECTIVELY LOCATED.
3. WATER SUPPLY - NO CONNECTIONS OR TEES WILL BE ALLOWED BETWEEN METER AND DEVICE.
4. DEVICE SHALL BE ACCESSIBLE FOR TESTING AND MAINTENANCE.
5. CERTIFICATION REQUIRED PRIOR TO ACCEPTANCE.
6. ALL DESIGN PLANS ARE TO BE SUBMITTED TO THE CROSS-CONNECTION SPECIALIST FOR APPROVAL AND A CROSS CONNECTION SURVEY IS TO BE COMPLETED TO EVALUATE HAZARDS THAT POSSIBLY EXIST.
7. ALL BACKFLOW PREVENTION DEVICES INSTALLED SHALL BE INSPECTED AND TESTED ANNUALLY.
8. ELECTRONICALLY MONITORED TAMPER SWITCHES MAY BE REQUIRED IN ACCORDANCE WITH NFPA72.

MATERIALS:

1. ALL STEEL PIPE SHALL BE AS PER AWWA C-200 WITH 1/4" WALL COATED AND LINED BY FUSION BONDED EXPOXY AS PER AWWA C-213, 20 MILS MINIMUM.
2. ALL STEEL FLANGES SHALL BE CLASS D AS PER AWWA C-207.
3. ALL DUCTILE IRON FITTINGS SHALL MEET AWWA C-153 CLASS 150. THE INTERIOR SHALL BE MORTAR LINED AS PER AWWA C-104 AND BELOW GROUND EXTERIOR SHALL HAVE A COAL TAR COATING AS PER AWWA C-203.
4. ALL NUTS AND BOLTS BELOW GROUND SHALL BE POLYETHYLENE ENCASED AS PER AWWA C-105 OR TAPE WRAPPED AS PER AWWA C-209. 20 MILS MINIMUM IN BOTH CASES.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	WATER	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	BACKFLOW PREVENTION DEVICE	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 610B



FIRE SERVICE–DOUBLE CHECK VALVE REDUCED PRESSURE ASSEMBLY WITH FIRE DEPARTMENT CONNECTOR

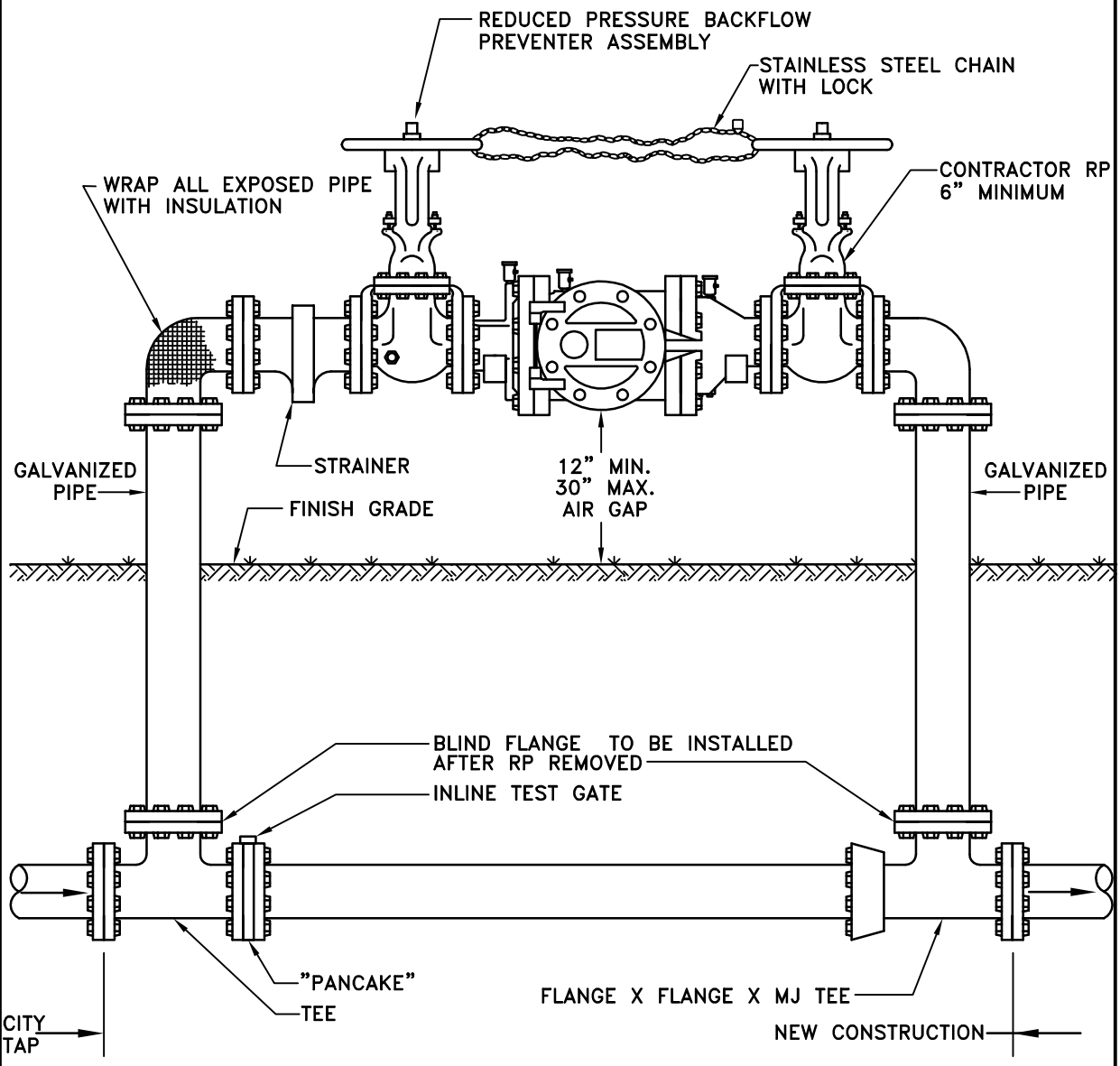
NOTES:

1. REQUIRED BY TITLE 17 OF THE CALIF. DEPT. OF HEALTH SERVICES AND THE MODESTO MUNICIPAL CODE, SECTION 11–1.14. MODEL OF BACKFLOW DEVICE TO BE DETERMINED FOR EACH INSTALLATION DEPENDING ON THE TYPE OF HAZARD AND UPON ALLOWABLE HEAD LOSS.
2. BARRIER POST SHALL BE LOCATED TO PROTECT PIPING AND VALVES. CURB AND PARKING BARRIERS CAN BE CONSIDERED PROTECTION IF EFFECTIVELY LOCATED.
3. WATER SUPPLY – NO CONNECTIONS OR TEES WILL BE ALLOWED BETWEEN METER AND DEVICE.
4. DEVICE SHALL BE ACCESSIBLE FOR TESTING AND MAINTENANCE.
5. CERTIFICATION REQUIRED PRIOR TO ACCEPTANCE.
6. ALL DESIGN PLANS ARE TO BE SUBMITTED TO THE CROSS–CONNECTION SPECIALIST FOR APPROVAL AND A CROSS CONNECTION SURVEY IS TO BE COMPLETED TO EVALUATE HAZARDS THAT POSSIBLY EXIST.
7. ALL BACKFLOW PREVENTION DEVICES INSTALLED SHALL BE INSPECTED AND TESTED ANNUALLY.
8. ELECTRONICALLY MONITORED TAMPER SWITCHES MAY BE REQUIRED IN ACCORDANCE WITH NFPA72.

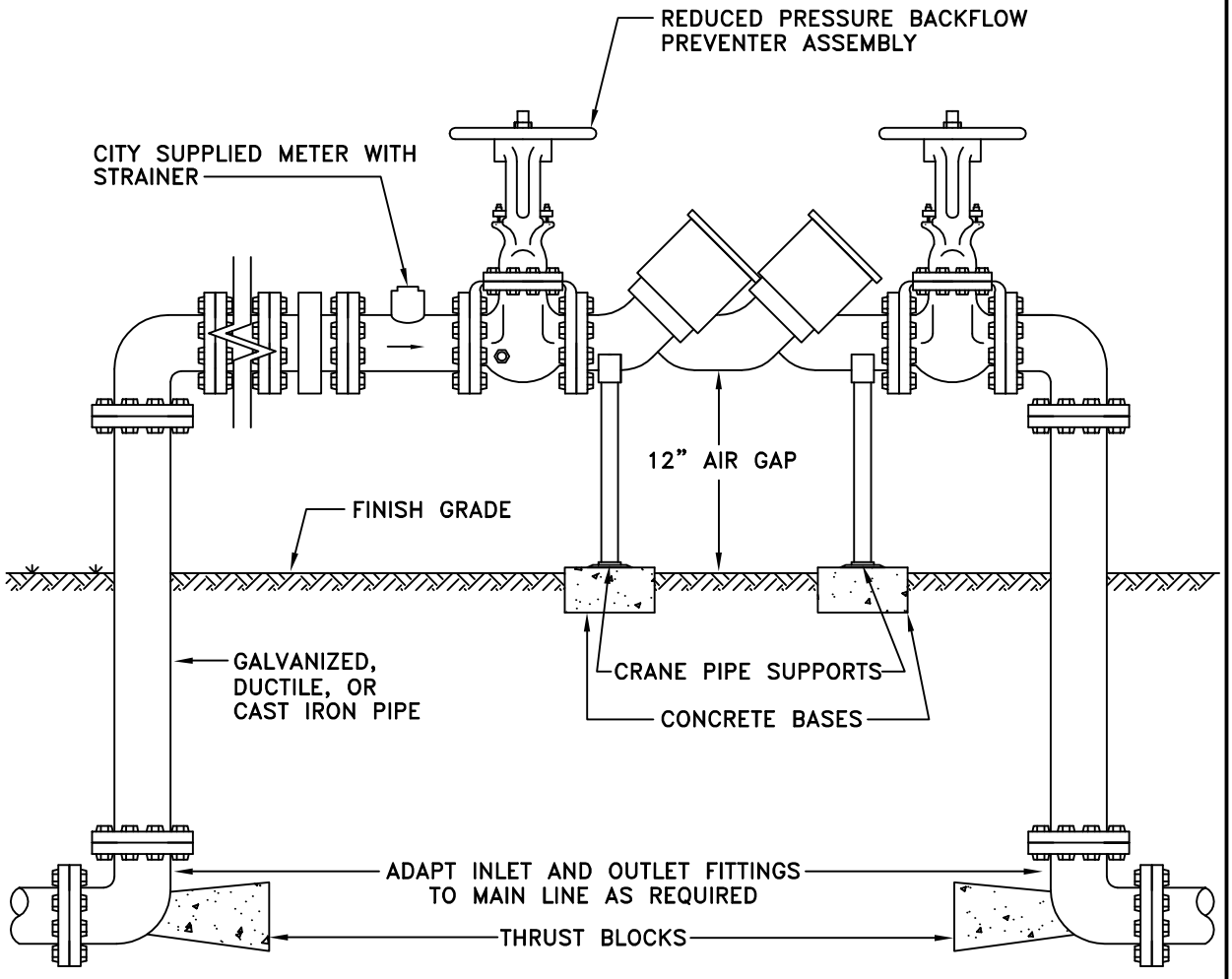
MATERIALS:

1. ALL STEEL PIPE SHALL BE AS PER AWWA C–200 WITH 1/4" WALL COATED AND LINED BY FUSION BONDED EXPOXY AS PER AWWA C–213, 20 MILS MINIMUM.
2. ALL STEEL FLANGES SHALL BE CLASS D AS PER AWWA C–207.
3. ALL DUCTILE IRON FITTINGS SHALL MEET AWWA C–153 CLASS 150. THE INTERIOR SHALL BE MORTAR LINED AS PER AWWA C–104 AND BELOW GROUND EXTERIOR SHALL HAVE A COAL TAR COATING AS PER AWWA C–203.
4. ALL NUTS AND BOLTS BELOW GROUND SHALL BE POLYETHYLENE ENCASED AS PER AWWA C–105 OR TAPE WRAPPED AS PER AWWA C–209. 20 MILS MINIMUM IN BOTH CASES.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	**WATER**	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	**BACKFLOW PREVENTION DEVICE**	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 610C



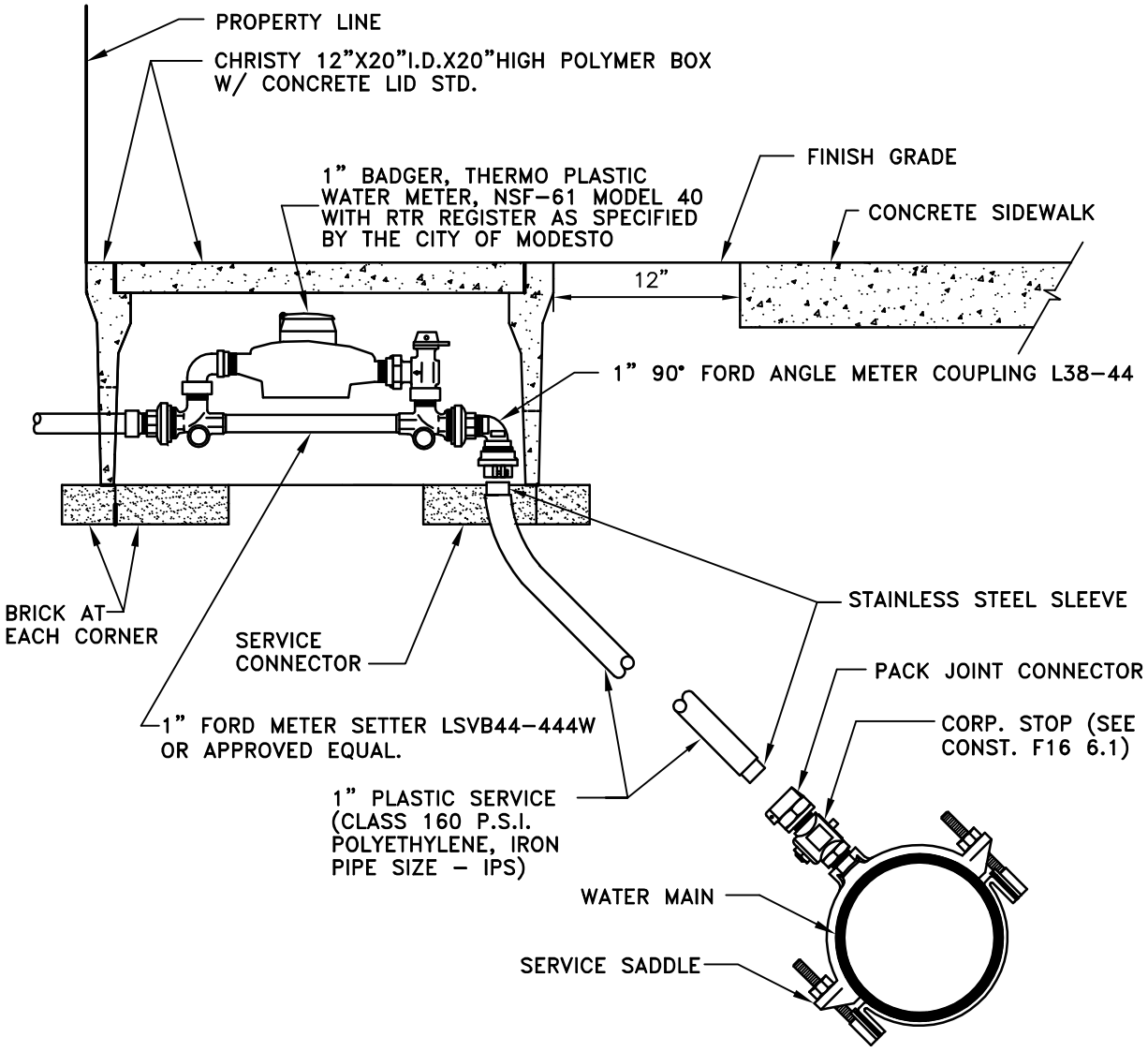
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	WATER	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	TEMPORARY BACKFLOW PREVENTION ASSEMBLY FOR 3" & LARGER	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 610D



NOTES:

1. ALL 4" AND ABOVE METERS SHALL BE INSTALLED ON BACK FLOW PREVENTERS WERE POSSIBLE.
2. A DETAIL DESIGN WILL BE REQUIRED AND APPROVED BY CITY ENGINEER AND CROSS CONNECTION SPECIALIST PRIOR TO INSTALLATION.
3. BY PASS REQUIREMENTS WILL BE DETERMINED BY WATER SUPERINTENDENT OR THE CITY ENGINEER.
4. USE MATERIALS LISTED ABOVE AND OR APPROVED EQUAL.
5. ALL METERS SHALL BE INSTALLED BY CITY CREWS.
6. ALL SERVICE TO BE TAP TO EXISTING SERVICE TO BE INSTALLED BY CITY CREWS
7. INSTALL 12" AIR GAP MINIMUM (CONSULT LOCAL CODE)
8. ALL CONNECTIONS ON ASSEMBLY TO BE FLANGED.
9. A VARIANCE MUST BE APPROVED BY CITY OF MODESTO CROSS CONNECTION SPECIALIST.
10. WATER METER TO BE LOCATED AT THE PROPERTY LINE IMMEDIATELY DOWN STREAM OF MAIN SHUT OFF VALVE.

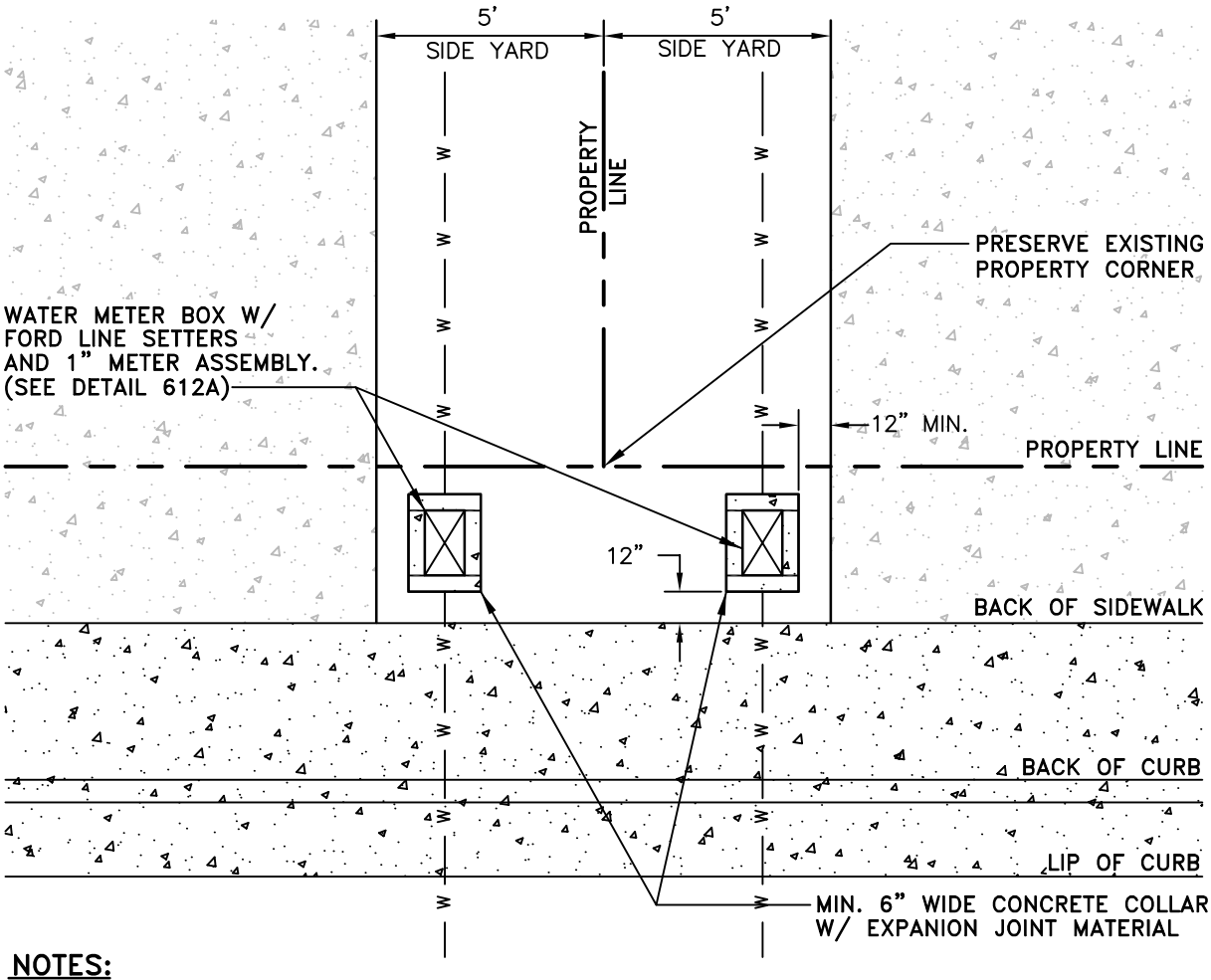
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	**WATER**	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	**WATER METER INSTALLATION 4" AND LARGER**	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. **611**



NOTES:

1. CONTRACTOR OR BUILDER SHALL SUPPLY WATER SERVICE, INSTALL WATER METER, SETTER, AND METER BOXES FOR CONSTRUCTION OF NEW WATER MAINS. CITY CREWS SHALL FURNISH AND INSTALL WATER SERVICES AND WATER METERS ON EXISTING WATER MAINS AT THE BUILDERS EXPENSE.
2. IF THE SERVICE TRENCH IS IN EXISTING PAVING, THE PAVEMENT SHALL BE REPLACED AS PER MAIN LINE TRENCH.
3. SERVICE SHALL BE A MINIMUM OF 24" BELOW BOTTOM OF CURB.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO WATER METER, METER BOX AND LID, CURB, GUTTER AND SIDEWALK, INCLUDING DAMAGE FROM SETTLING OF THE TRENCH.
5. 1" BADGER METER, MODEL 40, THERMO PLASTIC METER, SHALL READ IN CUBIC FEET.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	WATER	CITY of MODESTO
ORIGINAL APPROVED BY THE CITY ENGINEER	1" WATER SERVICE WITH METER BOX	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 612A



NOTES:

1. CITY WATER SERVICE SHALL BE INSTALLED IN THE LOCATION SHOWN ON THIS STANDARD DETAIL AND DETAIL 612A, OF THE CITY OF MODESTO STANDARD SPECIFICATIONS.
2. CITY WATER SERVICE SHALL BE INSTALLED WITHIN THE 5' SIDE YARDS OF THE PROPERTY TO BE SERVED, AND A MINIMUM OF 12" FROM THE SIDE YARD BOUNDARY.
3. NO WATER SERVICES SHALL BE INSTALLED WITHIN THE LIMITS OF THE DRIVEWAY. INSTALLING WATER METER BOXES WITHIN A CONCRETE SLAB SHALL NOT BE PERMITTED.
4. 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 CITY COUNCIL RESOLUTION NO. 2006-284 APPROVED BY THE CITY ENGINEER:	WATER 1" WATER SERVICE METER BOX LOCATION PUBLIC WORKS DEPARTMENT	CITY of MODESTO DETAIL NO. 612B

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

WATER

SCHEDULE OF METERED SERVICES

PUBLIC WORKS
DEPARTMENT

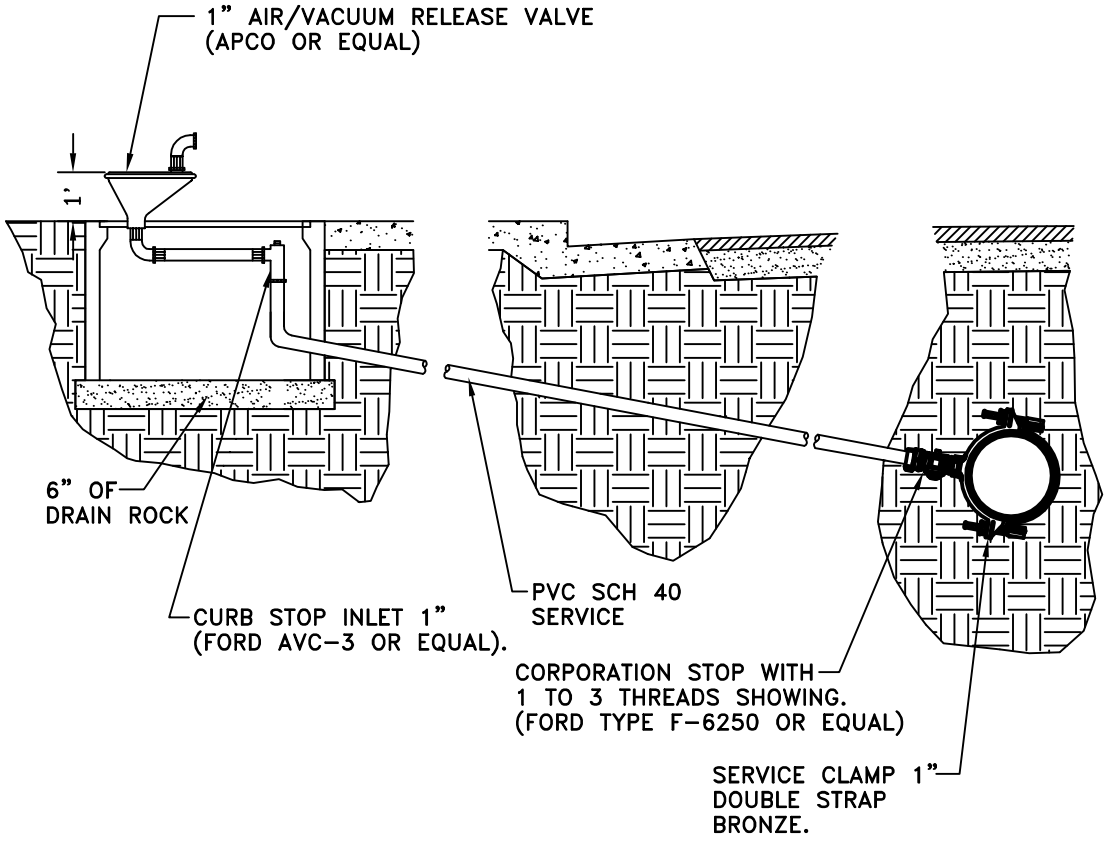
CITY of MODESTO

DETAIL NO.
613

USE (A) / FLOW MAX GPM*	DOMESTIC ONLY (B)		FIRE ONLY		FIRE & DOMESTIC	
	DESCRIPTION (C)	APPLICATION DWELLING UNITS	SIZE		DESCRIPTION	APPLICATION
50	1"	1–2				SINGLE FAMILY RESIDENTS, DUPLEX
160	2"	3–20				TRIPLEX, APARTMENTS, OFFICE BUILDINGS MOBILE HOME PARKS, ETC.
500	4" WITH SCREENS	20–100				
1000	6" WITH SCREENS	100–200	6"	STANDBY FIRE SERVICES REQUIRE DETECTOR CHECKS ONLY.	6" FULL FLOW (E)	FIRE FLOWS WILL NORMALLY DETERMINE SIZE OF SERVICE REQUIRED.
1600	8" WITH SCREENS	200 +	8" OR 6" (D)		8" OR 6" (D) FULL FLOW (E)	
1600*	10" WITH SCREENS		10" OR 8" (D)		10" OR 8" FULL FLOW (E)	

NOTES:

(A) COMMERCIAL OR INDUSTRIAL USERS SHALL SUBMIT FLOW DATA WHEN REQUIRED.
(B) OFFICE BUILDING AND SIMILAR TYPE USES TO BE CALCULATED ON THE BASIS OF TWO CLOSETS OR URINALS EQUAL ONE DWELLING UNIT.
(C) CITY SERVICE AND METER SIZE. CUSTOMER MAY CHANGE SIZE BEYOND METER AS PERMITTED BY BUILDING CODE.
(D) WHERE SYSTEM CAN BE LOOPED, (I.E. TWO CONNECTIONS TO CITY SYSTEM.)
(E) A BACKFLOW PREVENTION DEVICE MAY BE REQUIRED.
(F) STRAINERS FOR 3" AND ABOVE.
(G) MUST MEET ALL AWWA STANDARDS FOR METERED SERVICE.
* MAX. GPM FOR SHORT PERIODS ONLY (NORMAL USE).

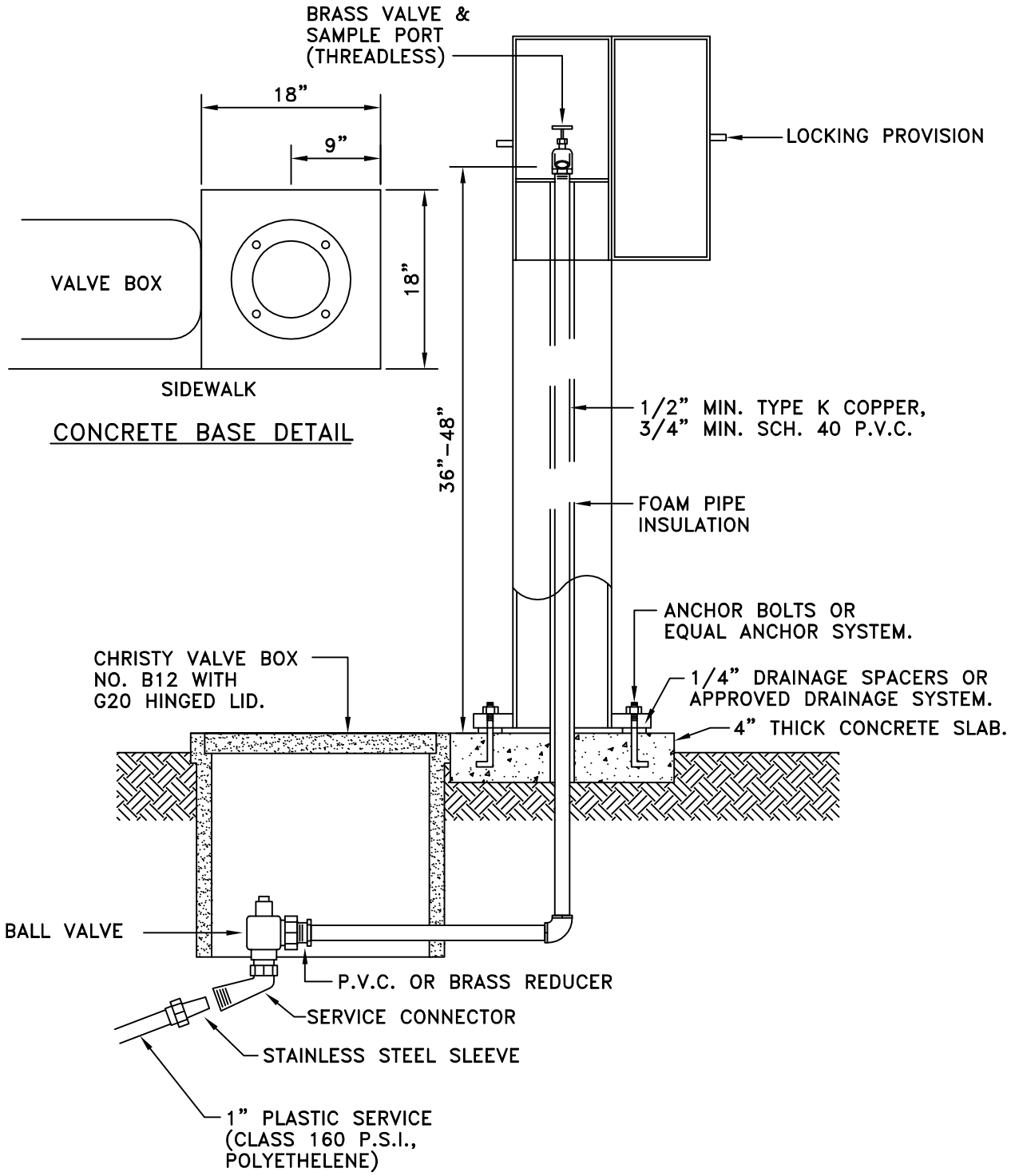


AIR & VACUUM RELEASE VALVE

NOTES:

1. AIR RELEASE VALVE SHALL HAVE CHRISTY B-36 METER BOX AND CHRISTY E-70 LID.
2. PLACE 6 INCHES OF DRAIN ROCK UNDER BOX.
3. ALL FITTINGS AND NIPPLES TO BE BRASS OR COPPER.
4. 1" ARV FOR 6" THROUGH 16" PIPE. 2" ARV FOR 18" AND GREATER.
5. FIRE HYDRANT IS PREFERRED AT HIGH POINTS.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	WATER	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	AIR & VACUUM RELEASE VALVE	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 614



APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	WATER	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	SAMPLE STATION	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 615

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 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 National Electrical Code, 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 Improvements Plans.

The plans shall include the following items:
1. Location of electroliers
2. Intensity of luminaries
3. Location of service points (As-builts)*
4. Location of pull boxes (As-builts)
5. Location of conduit runs (As-builts)

* As-builts - The Consulting Engineer shall provide the final As-builts 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.

After the Consulting Engineer receives the service locations, he/she shall determine the wire size and length of each conduit run. These items may be shown in tabular form or denoted next to each conduit run on the plans. The circuit lengths and conductors shall be sized such that the maximum voltage drop between the source and any street light does not exceed 5% of the nominal circuit voltage. Conductors shall be THW No.10 copper or larger.

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 7.1 SPACING, INTENSITY AND MOUNTING HEIGHTS

Type of Street	Spacing (feet)	Luminaire Wattage	Mounting Height
Local & Collector	330'	100W - mid block 150W - intersections	25' H w/ 15' arm
Arterial & Expressway	150' staggered to each side	200W	28' H w/ 15' arm

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 at 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’.

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 outer 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 lighting be installed at each crosswalk.

B. PULL BOXES

1. Pull boxes shall be spaced at a maximum of 200' to the collector location street standard.

2. Where conduit runs exceed 100', 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. Advance arrangements shall be made to schedule delivery.

   When 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. 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 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:

A. Identification of light distribution patterns.

B. Acceptability of the ballasts, fixtures, and lamps for electrical and noise standards.

C. Verification that all connections are electrically and mechanically sufficient.

D. Conductors shall move, with minimal effort, within the conduit.

7.02 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.

B. Luminaires

The luminaires shall be as follows or an approved equal:

200 watt I.E.S. Type III	I.T.T. 113-62J3 G.E. M2RR20S1A2GMS2 Hubbell RM GT 15 S31 071 0 3 4 0
150 watt I.E.S. Type II	I.T.T. 113-56262 II-4, or Type III G.E. M2RR15S1M2GMS2 Hubbell RM GT 15 S31 061 0 3 4 0
100 watt I.E.S. Type II or Type III	I.T.T. 113-56262 G.E. M2RR10S1M2GMS2 Hubbell RM GT 10 S31 061 0 3 4 0

Luminaires shall have high-pressure sodium vapor lamps, glass refractors, built-in receptacles for photoelectric cells, and regulator or auto-regulator type ballasts with a power factor of not less than 92%.

C. Foundations

Foundations shall be constructed of Portland cement concrete per State Specifications and shall be located per the 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, THWN single conductor, Underwriters Laboratory approved.

E. Conduits

Conduit and fittings shall be rigid metal or intermediate metal in locations where approved by National Code, 1" minimum diameter, as shown on Standard Detail #702. All fittings installed in concrete shall be of the concrete tight type.

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. ID Number

All street lights and park trail lights shall have an identification number on the pole. The identification number shall be installed per the Standard Details.

G. 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.

H. Pull Boxes
All pull boxes shall be Christy N-30 concrete, Brooks Series 38 or approved equal with bolt-down lids. 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 ¼" galvanized steel plate with ½" diameter light hole and bolt holes to match standard stud bolts.

I. Ballast
All street lights shall have regulator ballasts and shall be multi-tap 120-277 volt operational.

J. Trenching
Trenching for street lights shall be in a separate trench. Depth of trenching shall be per Standard Details.

K. Photo Electrical Control
Photoelectric cells shall be adjustable, compatible with related equipment and adequate for the load. They shall be Fisher Price No. 6690B or an approved equal. Photo electric 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.

L. In-Line Fuse Holders
Fused splice connectors shall be installed in pull boxes at the power source adjacent to an electrolier. All splices shall be made with wire connections, ITT No. 10-604, 10-606 or 10-6010 or approved equal. Cabinet location for light circuit as approved by the City Engineer.

M. Fuses
All fuses to be rated at 30 amp. unless otherwise directed by the City Engineer. Fuse shall be the slow blowing type.

N. Anchor Bolts
Anchor bolts shall be 1" in diameter, 40" long with a 4" “L” bend at the bottom end. Anchor bolts shall conform to ASTM Designation A 307.

O. 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 can not 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, or concrete encased Schedule 40 PVC. Schedule 80 PVC plastic conduit shall be used on wood poles, with the first 10' to be rigid metal.

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 insulating 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 l8" 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' up a utility pole. Conduits shall be securely fastened in place. Conduits 1" and smaller may be secured with one (1) hole malleable iron straps. Conduits 1¼" and larger shall be secured with conduit hangers or two (2) hole 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 be identified. 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 weatherproof.

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 pole bases (or in pull boxes when approved by the City Engineer). The splices shall be made as follows:
    a. In pole bases, all splices shall be made with wire connections, ITT No. 10-604, 10-606 or 10-6010 or approved equal.

b. 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 National Electrical Code.

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 a 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.

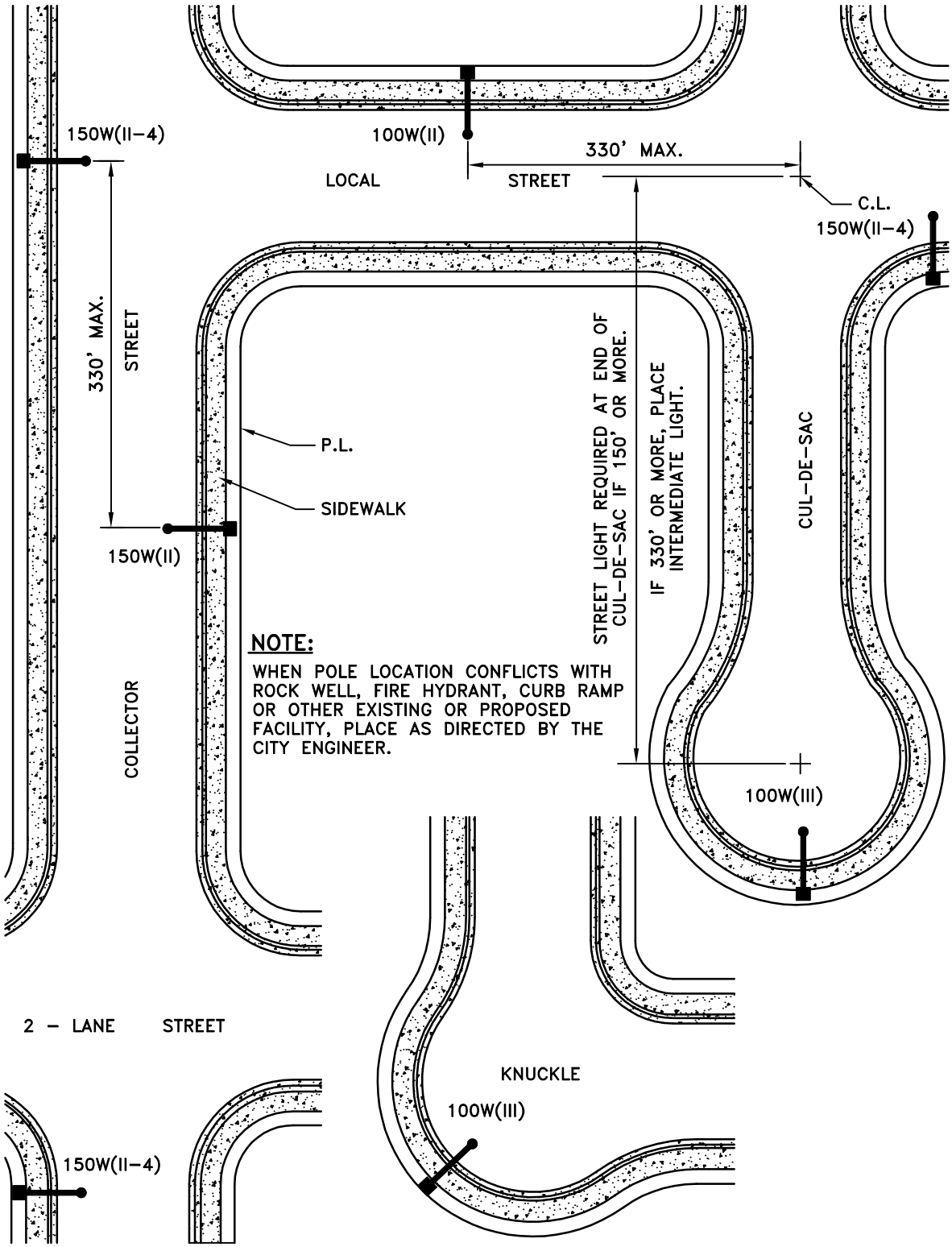
5. Unless otherwise requested by the City Engineer, the Contractor shall deliver to the City refractors, lamps and photoelectric cells in lieu of installing them in the electroliers.

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.



APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006–284

APPROVED BY THE CITY ENGINEER:

Richard D. Wu

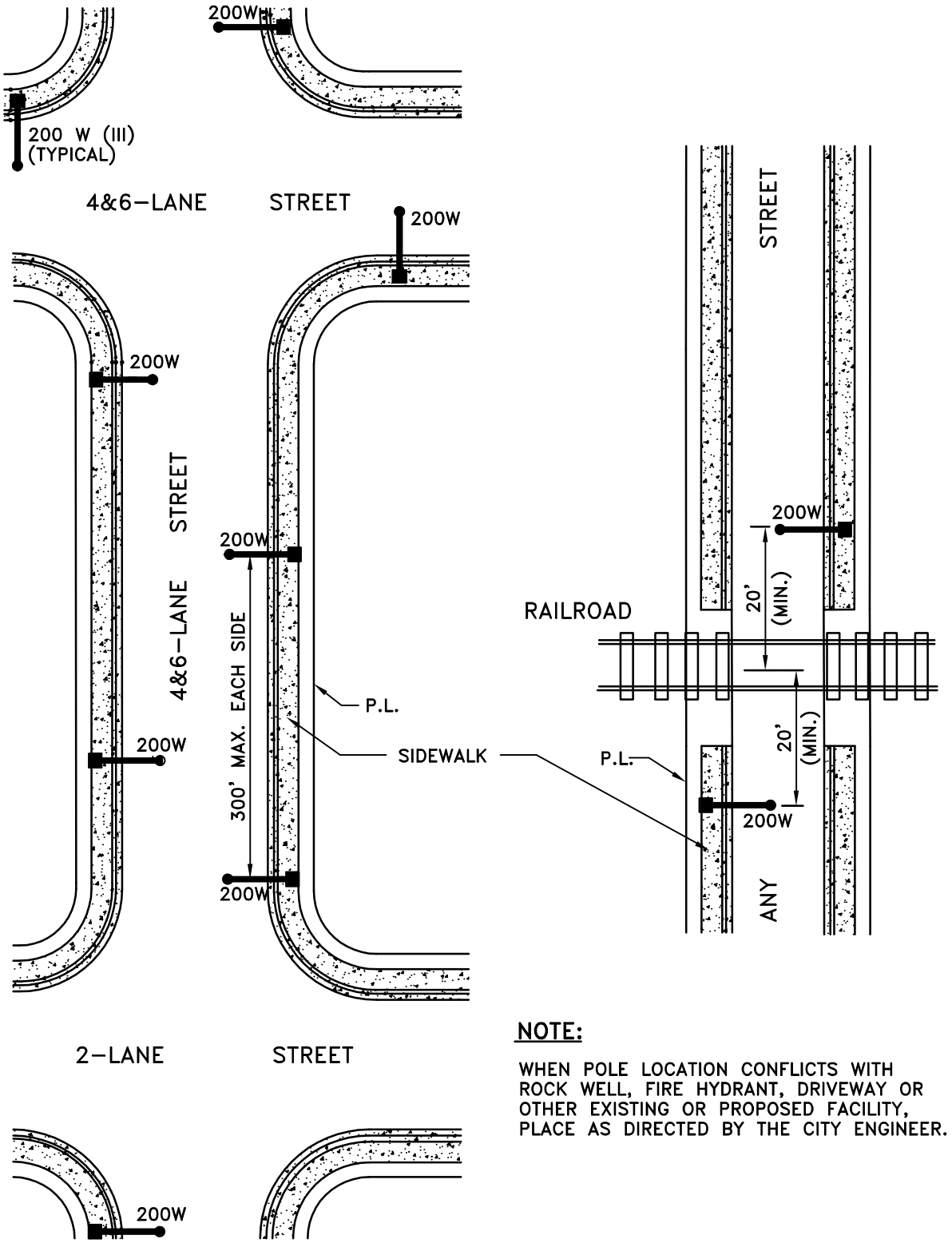
LIGHTING & TRAFFIC

LOCATIONS OF 25' POLES

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO. 700



NOTE:

WHEN POLE LOCATION CONFLICTS WITH ROCK WELL, FIRE HYDRANT, DRIVEWAY OR OTHER EXISTING OR PROPOSED FACILITY, PLACE AS DIRECTED BY THE CITY ENGINEER.

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006–284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

LIGHTING & TRAFFIC

LOCATIONS OF 28" POLES

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO. 701

APPROVED BY THE CITY ENGINEER: Richard D. Wells

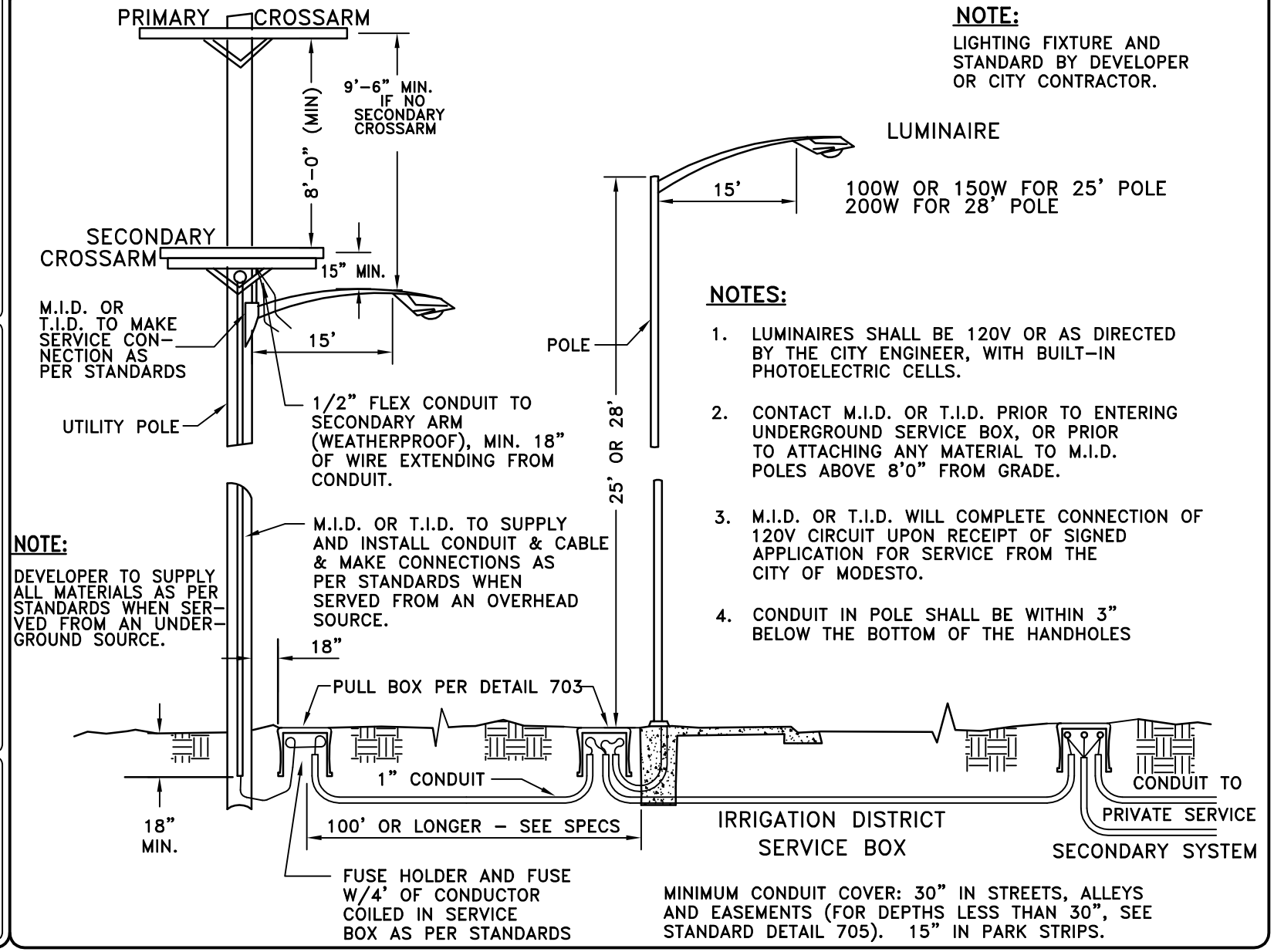
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284

PUBLIC WORKS DEPARTMENT

LIGHTING & TRAFFIC
INSTALLATION LAYOUT

CITY of MODESTO

DETAIL NO. 702



NOTE:

DEVELOPER TO SUPPLY ALL MATERIALS AS PER STANDARDS WHEN SERVED FROM AN UNDERGROUND SOURCE.

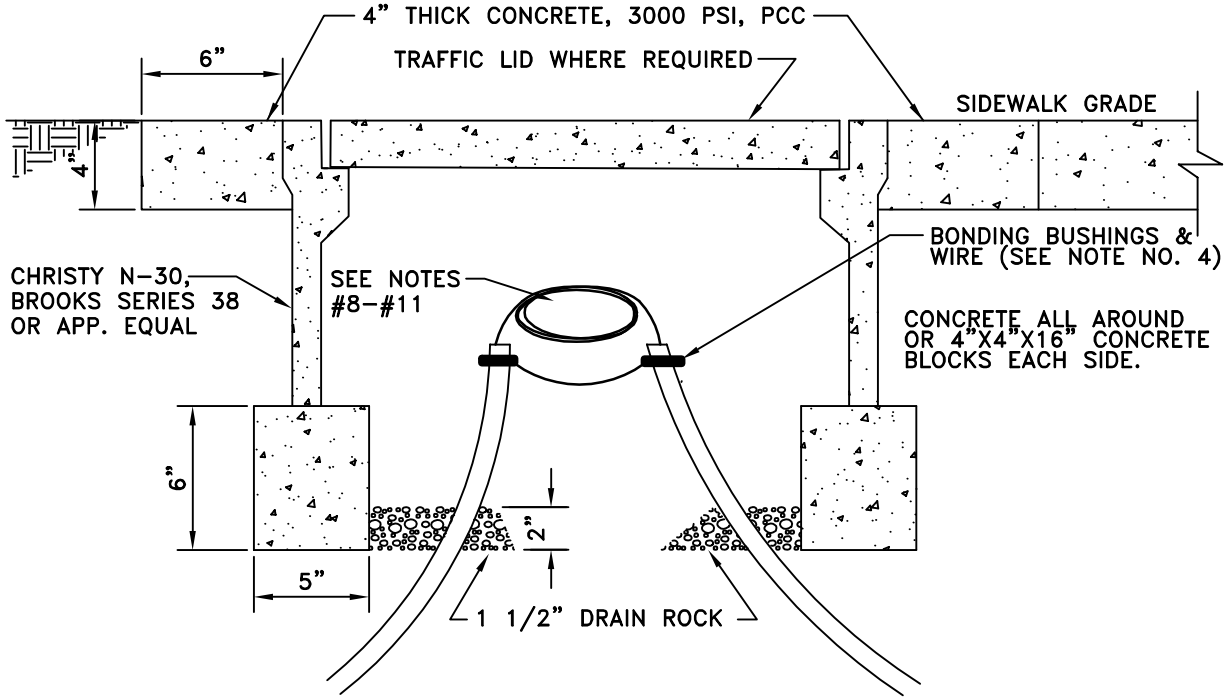
NOTE:

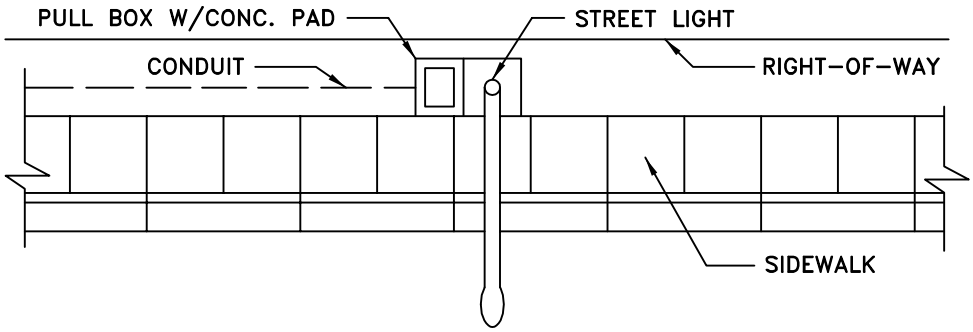
LIGHTING FIXTURE AND STANDARD BY DEVELOPER OR CITY CONTRACTOR.

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

MINIMUM CONDUIT COVER: 30" IN STREETS, ALLEYS AND EASEMENTS (FOR DEPTHS LESS THAN 30", SEE STANDARD DETAIL 705). 15" IN PARK STRIPS.





NOTES:

1. CONDUIT SHALL BE A MINIMUM DEPTH OF 18" BELOW PORTLAND CEMEMT 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. (SEE DRAWING 4-F)
11. THE BONDING WIRE SHALL BE AT LEAST THE SAME GAUGE AS THE LARGEST CIRCUIT CONDUCTOR. (MIN. OF NO. 8 AWG COPPER WIRE)

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	LIGHTING & TRAFFIC	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	PULL BOX	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 703

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

LIGHTING & TRAFFIC

POLE FOUNDATION

PUBLIC WORKS
DEPARTMENT

CITY of MODESTO

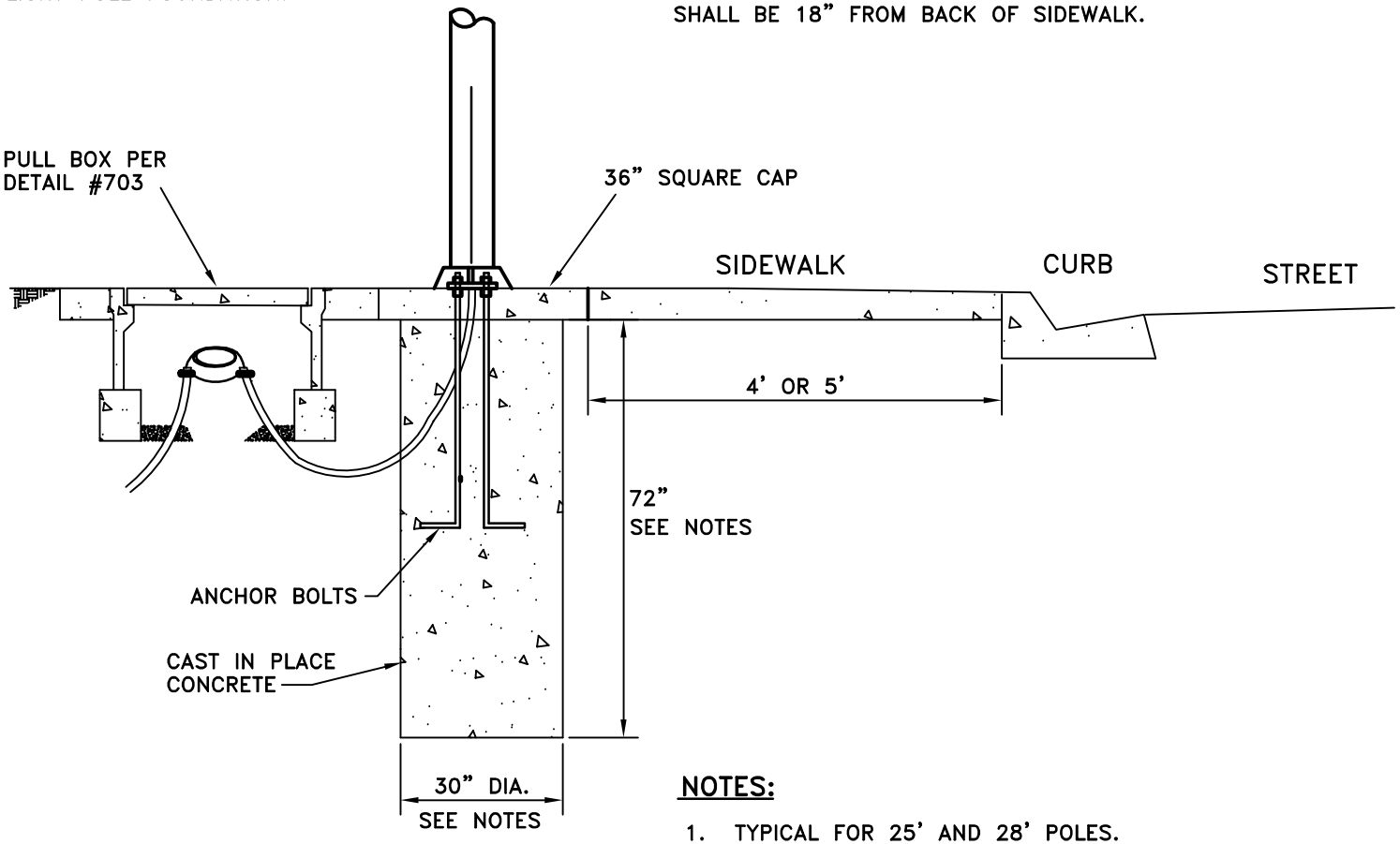
DETAIL NO.
704

NOTE:

PULL BOX MAY BE LOCATED BEHIND OR ADJACENT TO LIGHT POLE FOUNDATION.

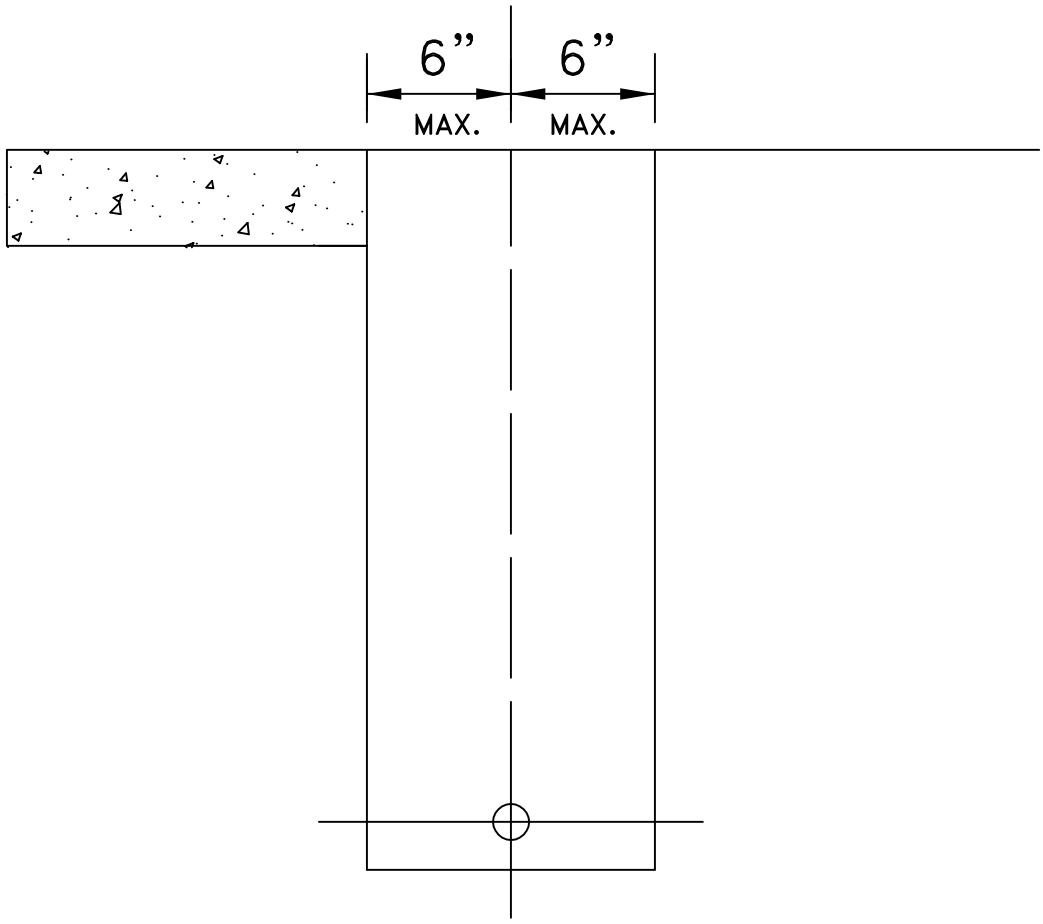
NOTE:

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:

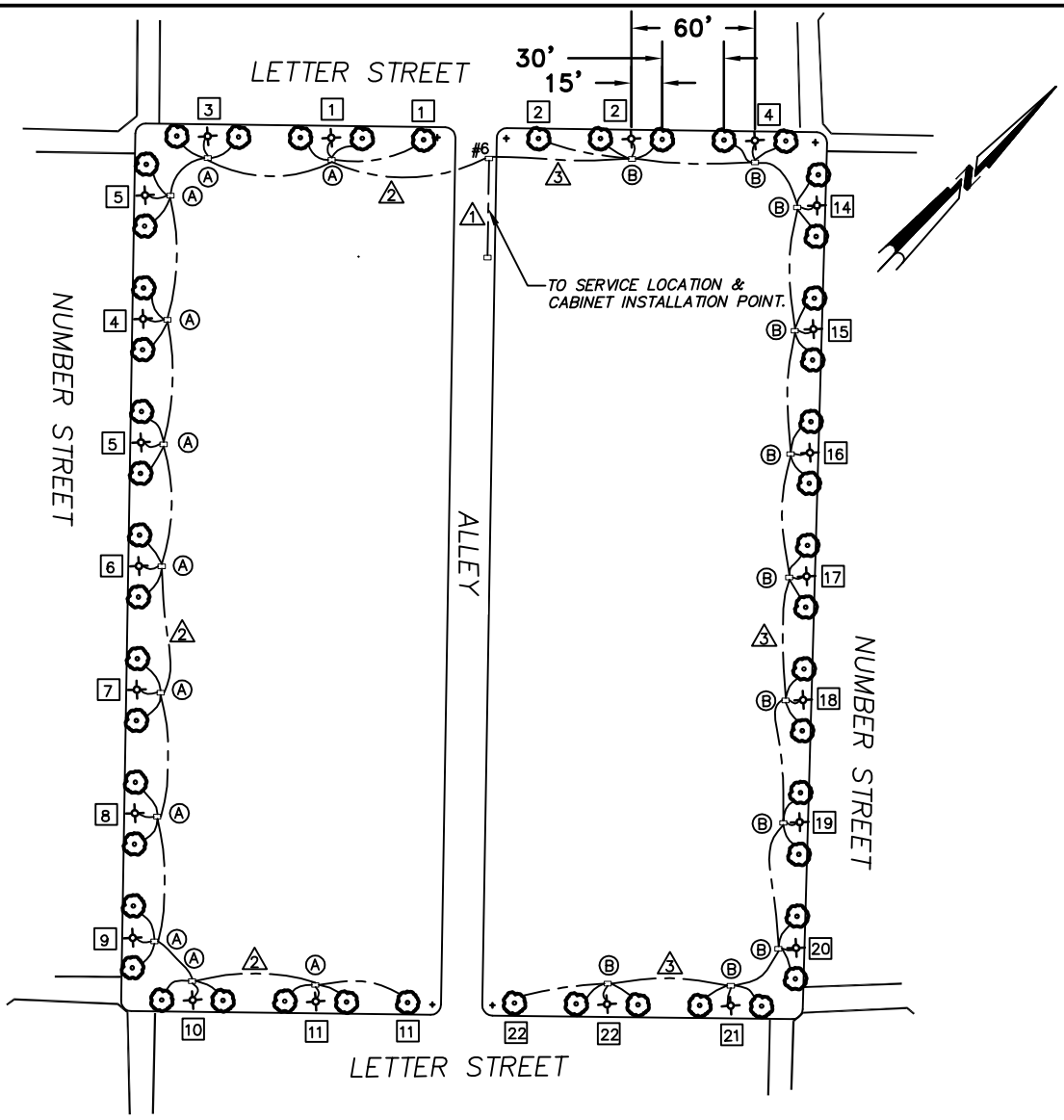
1. TYPICAL FOR 25' AND 28' POLES.
2. FOUNDATIONS MAY BE 36" SQUARE AND 60" DEEP.
3. CONCRETE TO BE PLACED AGAINST UNDISTURBED EARTH.
4. EACH LIGHT POLE MUST HAVE A PULL BOX.



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.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	LIGHTING & TRAFFIC	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	TRENCH SECTION	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 705



NOTES

1. #15 AMP GFI CIRCUIT BREAKER FOR DUPLEX RECEPTACLES 3-OUTLETS PER BREAKER EXCEPT 1, 11, 12, AND 22 WILL HAVE 4-OUTLETS. CONTRACTOR SHALL USE #10 AWG CONDUCTORS.
2. STREET LIGHT CIRCUITS FOR BOTH (A) & (B) SHALL CONTAIN 30 AMP 208 VOLT 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 #5 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

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

LIGHTING & TRAFFIC

DOWNTOWN STREETSCAPE

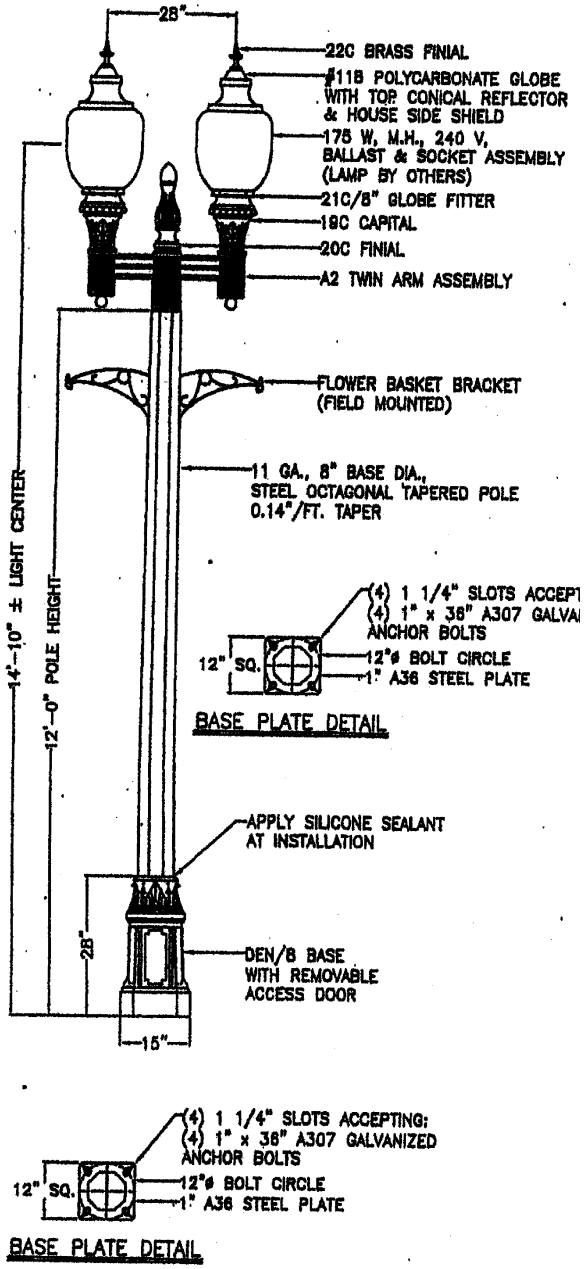
PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO. 706

VI-DEN/8-A2-OCT/12'

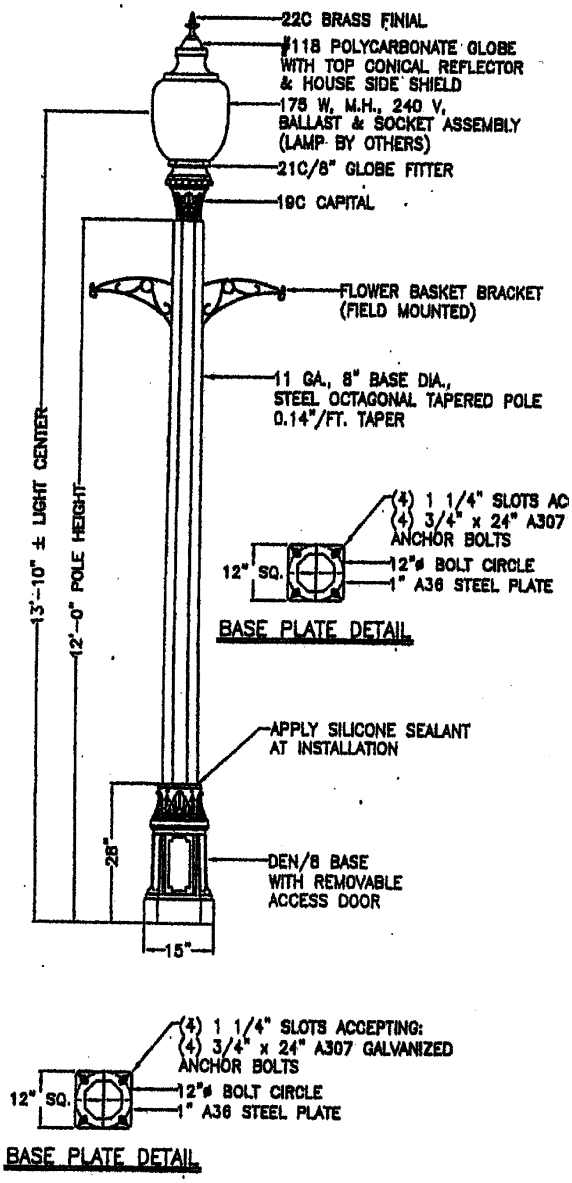
QUANTITY: 14
(TYPE C)



BASE PLATE DETAIL

VI-DEN/8-1-OCT/12'

QUANTITY: 2
(TYPE D)



BASE PLATE DETAIL

PAINT SPECIFICATION

ALL CAST IRON AND STEEL LIGHT PARTS ARE TO BE FACTORY POWDER COATED BLACK PER CITY SPECIFICATIONS.

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Ulm

LIGHTING & TRAFFIC

DOWNTOWN LIGHTING

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO.
707

CHAPTER 8

UTILITY, EXCAVATION & TRENCH SECTION

8.01 GENERAL

These Standards are intended to establish uniform locations and construction procedures for all underground utilities, or as otherwise directed by the specific utility section. 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

All utilities shall obtain an encroachment permit prior to commencement 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. The encroachment permit must be obtained prior to commencement of work.

Any work requiring temporary right-of-way closure shall include a detailed traffic control plan.

Emergency or repair work may be done prior to obtaining a permit if permit is obtained within 48 hours after the start of work.

8.02 DESIGN

A. Standard Location

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.

Street crossings in new subdivisions shall be as shown in Standard Detail #805.

B. Horizontal Alignment

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).

C. Overhead Utility Lines

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 i.e. a 69 KVA line is not economically feasible to underground, therefore, a 12 KVA line on the same

set of poles will not be forced to underground. The utility lines must be consolidated as much as possible. A 69 KVA on one (1) side of the street and a 12 KVA on the other side will be combined onto one (1) set of poles.

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" behind curb. Where the entire area behind curb is concrete, the pole shall be a minimum of 4.5' behind curb.

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 of existing lip of gutter but in no case shall installation be closer than 36" 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' 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' of right-of-way.	Install conduit 1' +/- off 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' and congested areas with 45' 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' of right-of-way, Developer or utility will acquire easement (Standard Detail #808).

8.03 MATERIALS AND INSTALLATION

A. Description

A trench is defined as an excavation in which the depth is greater than the width of the bottom of the excavation.

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. 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

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', 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 shall be allowed only with prior approval of the City Engineer.

C. Maximum and Minimum Width of Trench

The maximum clear width of the trench at the top of the pipe shall not be more than the outside diameter of the pipe at any point plus 2'. A greater width of trench at the top of the pipe shall be permitted only on written approval by the City Engineer. In no case shall the free working space on each side of the pipe be less than 6".

If the maximum trench width is exceeded, or 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

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.

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. Bedding and Backfill

1. Bedding

Bedding shall be defined as that material supporting, surrounding and extending to 1' above the top of pipe, but not exceeding an overall depth of 40".

a. Bedding zone material shall be sand, aggregate base, controlled density fill (approved slurry mix), or native free draining material which conforms with the requirements of Table 8.1. However, the City Engineer requires testing of the native material for conformance to Section 8.09, at the Contractor's expense. The bedding shall be free of rocks or clods greater than 3" in diameter and shall be free of organic or other the unsuitable 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" below the pipe. The 4" depth shall be backfilled with pervious material or approved bedding material suitably densified. Sufficient pervious material shall be installed to provide a stable base approved by the Engineer prior to installation of the utility, pipe, or structure.

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% 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 relative density of 90%.

e. Where pipe is to be installed in new embankment, the embankment shall first be constructed to a height of 12" above the top of pipe and for a distance on each side of the pipe location of not less than five (5) times the diameter of the pipe, after which the trench shall be excavated with sides nearly vertical and the pipe installed.

f. 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' of pervious material and de-water the trench in a manner which has received prior approval of the City Engineer.

g. When installing water line pipe, the open pipe ends of the pipe shall be closed by approved means to prevent entrance of water or dirt into the line. Whenever water is excluded from the pipe, adequate backfill shall be deposited on the pipe to prevent floating. Any pipe, which has floated, shall be removed from the trench and re-laid as directed by the City Engineer.

h. 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, and in case of damage, they shall be restored by him/her, without additional compensation, to their original condition.

2. Backfill

Backfill shall be defined as that material which lies above the pipe bedding or conduit bedding.

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. Whenever it is necessary to cross an existing irrigation pipe, the backfill shall be densified with a pneumatic tamper. The entire area under the irrigation pipe, 2' on either side and 6" on top of the pipe shall be tamped to 95% 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 so that the conduit 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 ten (10) days. Following the expiration of the 10-day period, backfill shall not be placed unless and until the concrete has attained a compressive strength equal to or greater than 85% 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.
    i. Where the void is below the subgrade for bedding conduits or structures, backfill shall be thoroughly densified bedding material.
    ii. Where the void is in the side of the trench, it shall be backfilled with suitable material and densified as approved by the City Engineer.

g. It shall be understood that 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. The cost of such work shall be included in the prices bid for the various items of work.

3. Backfill Placement Requirements
    a. Existing Streets shall be backfilled as shown in Standard Detail #800.

    b. Previously undeveloped land (new construction) shall backfill in accordance with Standard Detail #801.

    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 approved native material. Compaction shall be done mechanically in uniform lifts not exceeding 6' so as to attain a minimum relative compaction of 90%.

4. Control Density Fill Requirements

a. Materials and Criteria:

The controlled density fill shall meet the following design criteria and material requirements:

Description	Criteria	Materials
Unconfined Comprehensive Strength	25-100 pounds per square inch at 28 days	
Cement Content	50-100 pounds per cubic yard	Type I or II Portland Cement conforming to ASTM C 150-04a.
Maximum Fly Ash	20-50 pounds per cubic yard	Conform to ASTM C 618-03, Class C or F
Water Content	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 per cubic yard	Conform to the gradation in ASTM C33-03 3/8": 100 No. 4: 95-100 No. 8: 80-100 No. 16: 50-85 No. 30: 5-60 No. 50: 5-30 No. 100: 0-10
Maximum Entrained Air	20%	
Slump	7-10"	

The actual mix proportions shall be determined by the producer of the controlled density fill. The Contractor shall submit test data on the mix design to the Engineer for approval prior to excavating the trench for which the controlled density fill material is proposed for use.

The design intent is for the controlled density fill to be excavated by hand tools.

b. Placement

Controlled density fill shall be placed equally into the areas on both sides of the pipe, out to the trench walls and over the top of the pipe. The controlled density fill pour shall be made in one (1) lift and made equally to both sides of the pipe to prevent side thrust movement or displacement of the new pipe. Controlled density fill shall be discharged from the transit mixer truck by any reasonable means into the areas to be filled. Controlled density fill shall not be subjected to loads and shall remain undisturbed by construction activities for a period of 48 hours or until a comprehensive strength of 15 psi is obtained. The Contractor shall be responsible for providing evidence to the Engineer that the controlled density fill has reached the above compressive strength. Acceptable evidence shall be based on compressive tests made in accordance with ASTM C 39/C39M-04.

Table 8.2 BEDDING AND BACKFILL MATERIALS

BEDDING

Sieve Size	Polyvinyl Chloride Pipe % Passing	All Other Pipe % Passing
3/4"	100	100
3/8"	-	100
#4	35 – 55	70 – 100
#30	-	20 – 100
#200	3 – 9	0 - 15
Sand Equivalent	30 min.	30 min.
Minimum Dry Density	-	80 lb/cu ft
R -- Value	78 min	-
Coefficient of Permeability	1.4 in/hr	1.4 in/hr

BACKFILL – Native backfill as specified in Section 8.06.

Select Backfill	Sieve Size	% Passing
	3”	100
	#4	35 – 100
	#30	20 – 100
	Sand Equivalent to be 20 Min.	
	Minimum Dry Density 110 lb./cu. ft.	

PERVIOUS MATERIAL

	Sieve Size	% Passing
Washed coarse crushed aggregate, conforming to the following gradation:	1”	100
	3/4 "	90 - 100
	1/2"	60-85%
	3/8”	20-55%
	#4	0 – 15%
	#8	0 – 5%

F. Densification Methods: Mechanically Compacted Backfill
After the placing of backfill has been started, the Contractor shall proceed as soon as practicable with densification.

1. Backfill shall be mechanically compacted by means of tamping rollers, sheepsfoot roller, pneumatic rollers, vibrating rollers, or other mechanical tampers. The City Engineer shall approve all size and type of such equipment.

   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.

Tests for compaction shall be made in accordance with N-Cal-Test Method 216 or 231. Backfill material in undeveloped streets shall be free of objectionable matter, such as vegetation, large clods and asphaltic paving material. All compaction tests shall be paid for by the contractor. Compaction testing is at the discretion of the construction inspector.

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:

a. Impact, free-fall, or "stomping" equipment shall not be used as a means of compaction.

b. Vibratory equipment, vibratory smooth-wheel rollers, and vibratory pneumatic-tired rollers - maximum lift depth 2'.

c. 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 1'.

d. Hand-directed mechanical tampers, including vibratory plates - maximum lift depth of 8".

Mechanically compacted backfill shall be placed in horizontal layers of such depths (not exceeding those specified above) 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.

2. Jetting

Ponding or jetting will not be permitted in the public right-of-way.

G. Restoring Surface

Initial cut in street pavement shall be equal to the width of the trench with the option of being jack hammered or saw cut. Drop hammer shall not be used to cut pavement. Final cut in street pavement shall be 12" wider than the trench width (6" each side) and shall be saw cut in neat parallel lines.

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.

All trenches shall be backfilled and temporarily paved at the end of each working day.

1. Aggregate Base

a. Aggregate base shall be Class II compacted to 95% relative compaction. Aggregate base shall have ¾" maximum combined grading.

b. Asphalt concrete shall be Type B, AR 4000 with ½" maximum aggregate, medium grading. A paint binder of asphaltic emulsion shall be applied to all surfaces in conformance with Section 39-4 of the State Standards.

2. 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 will not be allowed.

   b. Temporary bituminous surfacing (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 at least 2" thick in 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, shall be at no cost to the City.

3. Permanent Trench Pavement
   a. Final paving above the trench section shall be placed within 14 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 days, the City will consider this as incomplete work and will take necessary action in accordance with the prevailing City ordinances and policies.

   b. Temporary cut back shall be removed before placement of final paving. Final paving shall be placed on undisturbed previously inspected and compacted aggregate base or approved slurry mix/controlled density fill. Re-compaction shall be required for any disturbed base or surface.

   c. All asphalt concrete shall conform with Section 3 of these specifications.
      i. Asphalt Concrete: Permanent asphalt concrete pavement section shall consist of asphalt concrete over aggregate base per plans, compacted to 95% relative compaction. If the existing pavement is thicker, the Contractor shall match the existing thickness.
      ii. Portland Cement Concrete: Unless noted on the plans, permanent concrete pavement, where required for alley approaches, driveways, and valley gutters, shall consist of 8" of concrete over 16" of aggregate base compacted to 95% relative compaction. Concrete shall conform to the requirements of Section 3 of these standards.

   4. Sidewalks, Curbs, Gutters, Curb Ramps, and Driveways
      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.)

      Replacement of concrete shall be in kind with existing surrounding area.

8.04 MEASUREMENT AND PAYMENT

Utility trenching and backfill shall include all equipment, material, and labor required for the excavation, de-watering, bedding, backfilling, and compaction required for the installation of various utilities.

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.

Full compensation for providing and placing pervious rock or additional bedding material required to stabilize the bottom of the trench is included in the contract price paid for the utility and no additional payment will be made therefore.

Full compensation for temporary trench pavement and permanent trench pavement shall be included in the contract price for each individual item of work.

8.05 FIBER OPTICS

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.

Table 8.3 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 a Time and Materials rate of $__/hr. _____ company shall provide a $ _____ deposit. This is based on the following calculations:

Description	Quantity	Hourly Rate	Total
Plan Review			
Application			
Pre-Construction			
Inspection			
Trench Cut Fee			
		TOTAL COST	

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) ½" 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: _____ Date: _____

John Doe
Vice President and
General Counsel
Ph (916) 888-0707
Fax (916) 888-0715

Fiber Company
1000 Anywhere Court, Ste. 390
Anytown, CA 95000

CONTRACTOR

By: _____ Date: _____

John Doe
Vice President and
General Counsel
Ph (299) 888-0707
Fax (299) 888-0715

Construction XZ Company
P.O. Box 0007
Salida, CA 95000

Table 8.4 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	☐	☐
b.	Another certificated telephone company	☐	☐
c.	A competitive access provider	☐	☐
d.	A cable television or other entertainment company	☐	☐
e.	Other (Identify in an attachment hereto)	☐	☐

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	☐	☐
b.	An Open Video System under FCC rules	☐	☐
c.	Any service not specifically authorized by applicant's CPUC Certificate	☐	☐

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
_____	_____	_____
_____	_____	_____

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?	☐	☐
Will applicant direct bury (trench) the conduit?	☐	☐
Will conduit be installed for other parties during this construction?	☐	☐
Is applicant willing to lease conduit to other parties?	☐	☐
Is applicant going to participate in joint trench?	☐	☐
Is applicant willing to participate in joint trench?	☐	☐

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?	☐	☐
Share available conduit or inner duct?	☐	☐
Share fiber strands in a fiber cable?	☐	☐
Share splice boxes?	☐	☐
Share trenching costs in a joint construction project?	☐	☐

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.	☐	☐
Checked street resurfacing schedules?	☐	☐
Proposed to use directional boring in areas where it would minimize the impact on traffic, residents and businesses?	☐	☐

If no directional boring is proposed, please explain why below:

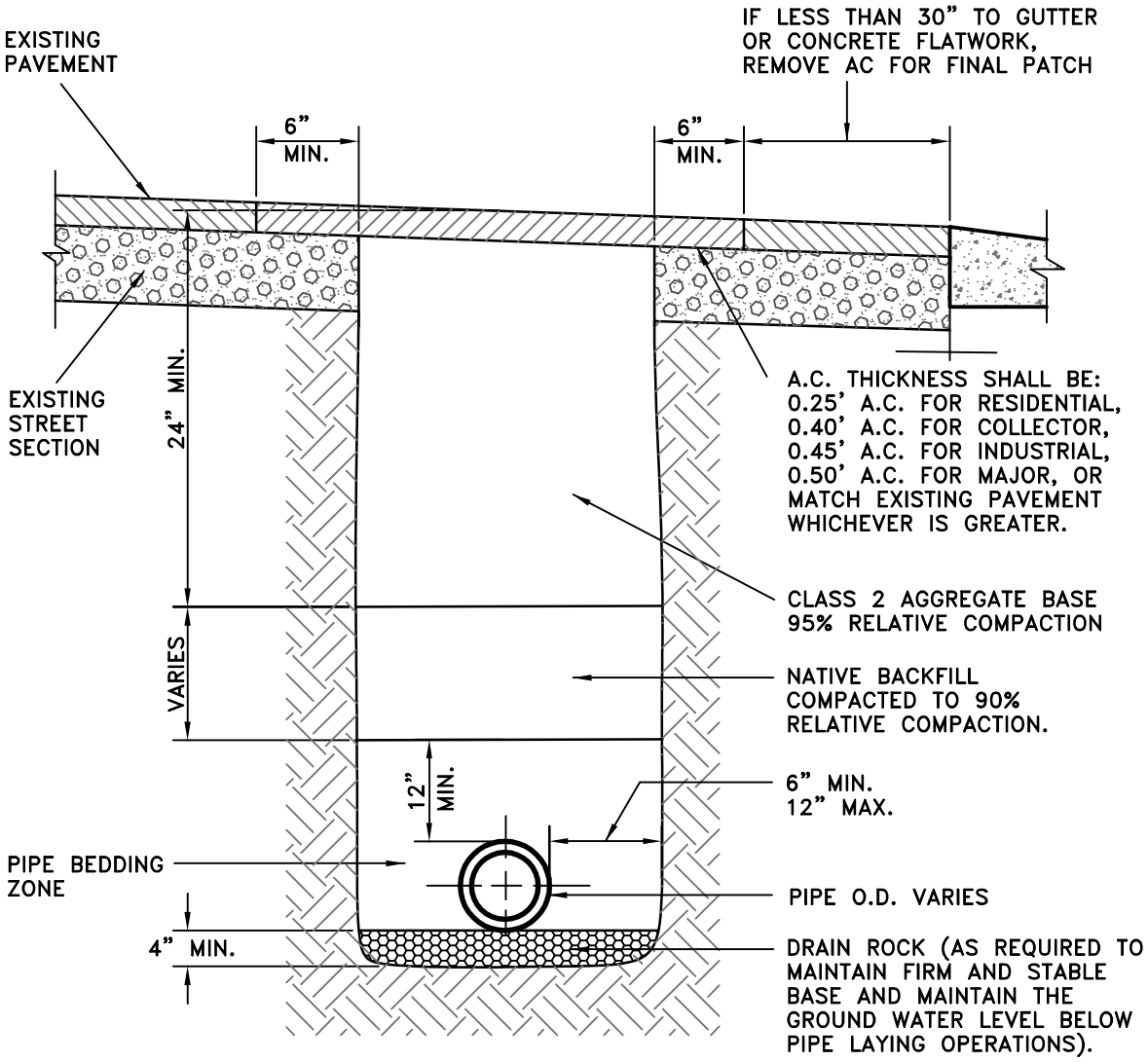
_____

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

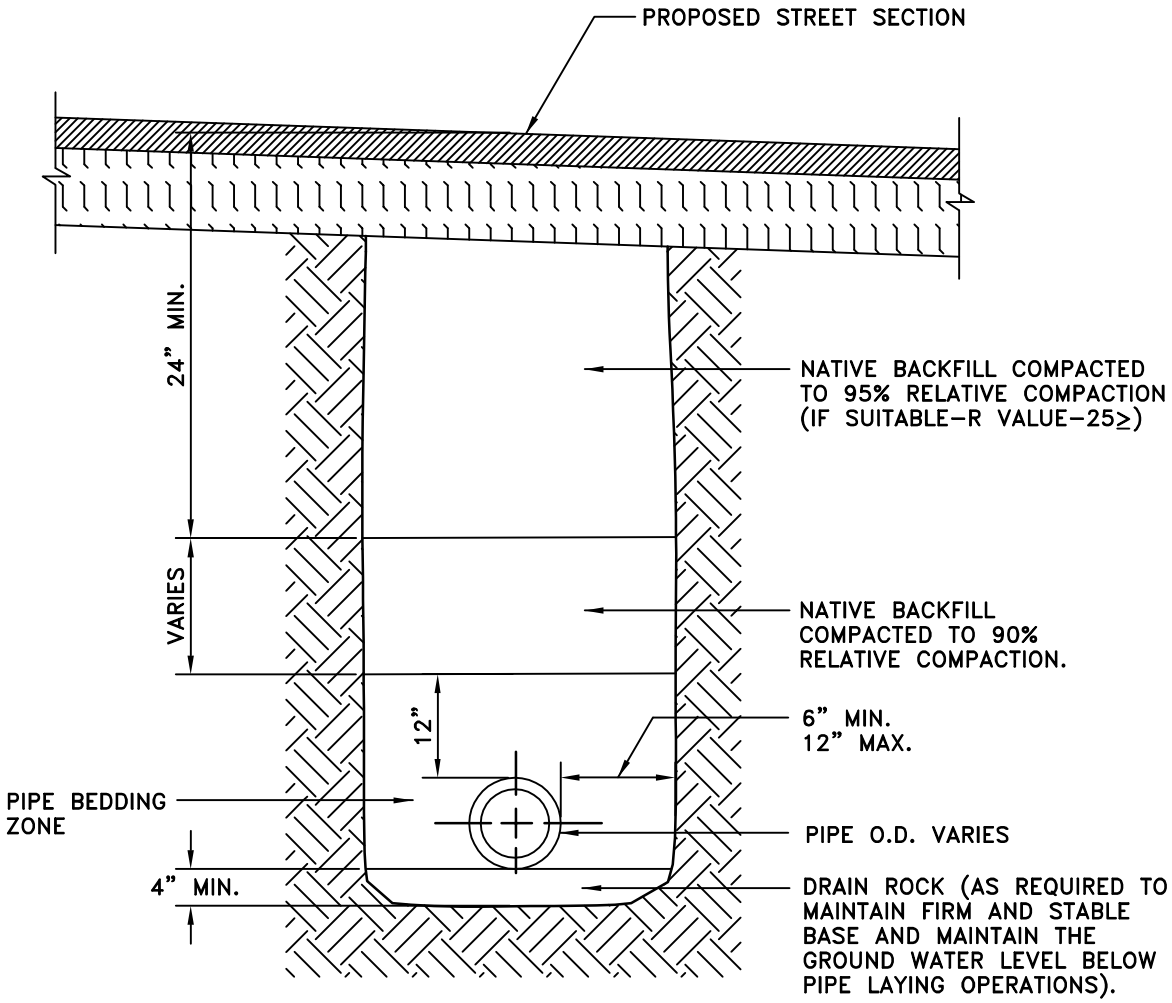


SECTION

NOTES:

1. TRENCH SECTION SHALL BE BACKFILLED AND MECHANICALLY COMPACTED TO GRADE. CONTRACTOR SHALL FURNISH 2" TEMPORARY PAVEMENT, TO BE INSTALLED AND COMPACTED. SECTION 8.10 (BLUE SECTION) OF THESE STANDARDS
2. IF TRENCH IS WITHIN 3' OF EXISTING GUTTER OR CONCRETE FLATWORK, CONTRACTOR SHALL REMOVE AC AND PAVE TRENCH AND ADJACENT PIECE.
3. PRIME COAT REQUIRED ABOVE AGGREGATE BASE.
4. BACKFILL MATERIAL FOR THE PIPE BEDDING ZONE SHALL BE SAND, CLASS 2 AGGREGATE BASE OR A CONTROLLED DENSITY BACKFILL (SLURRY MIX).
5. ALL COMPACTION TESTS SHALL BE PAID FOR BY THE CONTRACTOR. COMPACTION TESTING IS AT THE DISCRETION OF THE CONSTRUCTION INSPECTOR.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	UTILITIES	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wu	TRENCH BACKFILL EXISTING STREETS	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 800



SECTION

NOTES:

1. TRENCH SECTION SHALL BE BACKFILLED AND MECHANICALLY COMPACTED TO GRADE.
2. THE CLEAR WIDTH OF THE TRENCH SHALL BE A MAXIMUM OF THE PIPE O.D. PLUS 2 FEET. IF THE MAXIMUM TRENCH WIDTH MUST BE EXCEEDED OR IF THE PIPE IS INSTALLED IN A COMPACTED EMBANKMENT, THEN EMBEDMENT SHALL BE COMPACTED TO A POINT OF AT LEAST 2 1/2 PIPE DIAMETERS FROM THE PIPE ON BOTH SIDES OF THE PIPE OR TO THE TRENCH WALLS, WHICHEVER IS LESS.
3. IN LANDSCAPED AREAS, THE NATIVE BACKFILL SHALL BE COMPACTED TO 85% RELATIVE COMPACTION.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	UTILITIES	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	TRENCH BACKFILL UNDEVELOPED STREETS	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 801

NOTES:

1. UNSTABLE SUBGRADE MATERIAL SHALL BE EXCAVATED AND STABILIZED WITH #3 ROCK (PER ASTM 33 OR APPROVED EQUAL) OR WITH CEMENT SLURRY/CONCRETE AS APPROVED BY THE CITY ENGINEER.

2. ALL TRENCHES SHALL BE SHORED OR PROTECTED IN ACCORDANCE WITH OSHA AND OTHER STATE AND FEDERAL SAFETY CODES, REGULATIONS AND ORDINANCES.

3. PLACEMENT OF AGGREGATE BASE SHALL BE IN 12" LIFTS EVENLY PLACED AND MECHANICALLY COMPACTED TO RELATIVE DENSITY AS SPECIFIED. COMPACTION TESTS SHALL BE REQUIRED AT THE DISCRETION OF THE CITY ENGINEER. ALL COSTS RELATED TO THESE TESTS SHALL BE BORNE BY THE OWNER/CONTRACTOR/UTILITY COMPANY WHEN SUCH TESTS ARE REQUIRED. IF RESULTS OF THESE TESTS DO NOT MEET SPECIFIED REQUIREMENTS, BACKFILL SHALL BE EXCAVATED, REPLACED, COMPACTED AND RETESTED. IN CASE OF ONE SACK SLURRY MIX OR CONTROLLED DENSITY FILL, NO COMPACTION TEST WILL BE REQUIRED.

4. DROP HAMMER SHALL NOT BE USED TO CUT PAVEMENT.

5. ALL TRENCHES SHALL BE BACKFILLED AND TEMPORARILY PAVED AT THE END OF EACH WORKING DAY. THE USE OF STEEL PLATES MUST BE APPROVED BY THE CITY ENGINEER AT LEAST 48 HOURS IN ADVANCE.

6. MINIMUM 48 HOUR NOTICE SHALL BE REQUIRED FOR ALL CITY INSPECTIONS. CALL CITY OF MODESTO CONSTRUCTION ADMINISTRATION OFFICE AT 577-5452.

7. INITIAL CUT IN STREET PAVEMENT SHALL BE EQUAL TO THE WIDTH OF THE TRENCH WITH THE OPTION OF BEING JACK HAMMERED OR SAW CUT.

8. FINAL CUT IN STREET PAVEMENT SHALL BE 12" WIDER THAN THE TRENCH WIDTH AS SHOWN IN THE DETAIL AND SHALL BE MADE BY SAW CUTTING ONLY.

9. TEMPORARY BITUMINOUS SURFACING (CUT BACK) SHALL BE PLACED AND COMPACTED IMMEDIATELY ABOVE THE TRENCH FOLLOWING COMPACTION AND APPROVED BY THE CITY ENGINEER. MINIMUM DEPTH OF CUT BACK SHALL BE 2" OR AS SPECIFIED BY THE CITY ENGINEER. CUT BACK SHALL BE MAINTAINED IN A CONDITION SATISFACTORY TO THE CITY ENGINEER UP TO THE TIME THE FINAL PAVING IS PLACED ON TRENCH IN ACCORDANCE WITH NOTE #11.

10. FINAL PAVING ABOVE THE TRENCH SECTION SHALL BE PLACED WITHIN 14 DAYS OF ITS BACKFILL AND COMPACTION. EXTENSION MAY BE GRANTED BY THE CITY ENGINEER DUE TO WEATHER CONDTIONS. IN THE EVENT PERMANENT PAVING IS NOT DONE WITHIN 14 DAYS, THE CITY WILL CONSIDER THIS AS INCOMPLETE WORK AND WILL TAKE NECESSARY ACTION IN ACCORDANCE WITH PREVAILING CITY ORDINANCES AND POLICIES.

11. TEMPORARY CUT BACK SHALL BE REMOVED BEFORE PLACEMENT OF FINAL PAVING. FINAL PAVING SHALL BE PLACED ON UNDISTURBED PREVIOUSLY INSPECTED AND COMPACTED AGGREGATE BASE OR ONE SACK SLURRY MIX/CONTROLLED DENSITY FILL. RECOMPACTION SHALL BE REQUIRED FOR ANY DISTURBED BASE OR SURFACE.

12. FOR A PARALLEL TRENCH LONGER THAN ONE HALF LENGTH OF THE BLOCK, A SLURRY SEAL SHALL BE REQUIRED ON THE ENTIRE HALF WIDTH OF THE STREET ON THE TRENCH SIDE AS DIRECTED BY THE CITY ENGINEER.

13. PROPER TRAFFIC CONTROLS AND COVERING OF TRENCHES SHALL BE MAINTAINED IN ACCORDANCE WITH THE CITY OF MODESTO STANDARD SPECIFICATIONS.

14. TRENCHING SHALL NOT BE ALLOWED ON ANY STREET WHICH HAS BEEN RECONSTRUCTED OR REPAVED WITHIN THE PAST 3 YEARS NOR ON SLURRY SEALED STREETS FOR A PERIOD OF EIGHTEEN (18) MONTHS.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	UTILITIES	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Ulm	TRENCHING & RESURFACING	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 802

NOTES:(CONT.)

13. FOR A PARALLEL TRENCH LONGER THAN ONE HALF LENGTH OF THE BLOCK, A SLURRY SEAL SHALL BE REQUIRED ON THE ENTIRE HALF WIDTH OF THE STREET ON THE TRENCH SIDE AS DIRECTED BY THE CITY ENGINEER.

14. PROPER TRAFFIC CONTROLS AND COVERING OF TRENCHES SHALL BE MAINTAINED IN ACCORDANCE WITH THE CITY OF MODESTO STANDARD SPECIFICATIONS.

15. NO TRENCH SHALL BE OPENED IN ANY STREET FOR THE PURPOSE OF LAYING PIPES OR CONDUITS MORE THAN SIX HUNDRED (600) FEET AT A TIME.

16. ASPHALT CONCRETE SHALL BE IN ACCORDANCE WITH THE CITY OF MODESTO STANDARD SPECIFICATIONS.

17. TRENCHING SHALL NOT BE ALLOWED ON ANY STREET WHICH HAS BEEN RECONSTRUCTED OR REPAVED WITHIN THE PAST 3 YEARS NOR ON SLURRY SEALED STREETS FOR A PERIOD OF EIGHTEEN (18) MONTHS.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	UTILITIES	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Ulm	TRENCHING & RESURFACING	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 803

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

UTILITIES

STANDARD LOCATIONS FOR RESIDENTIAL

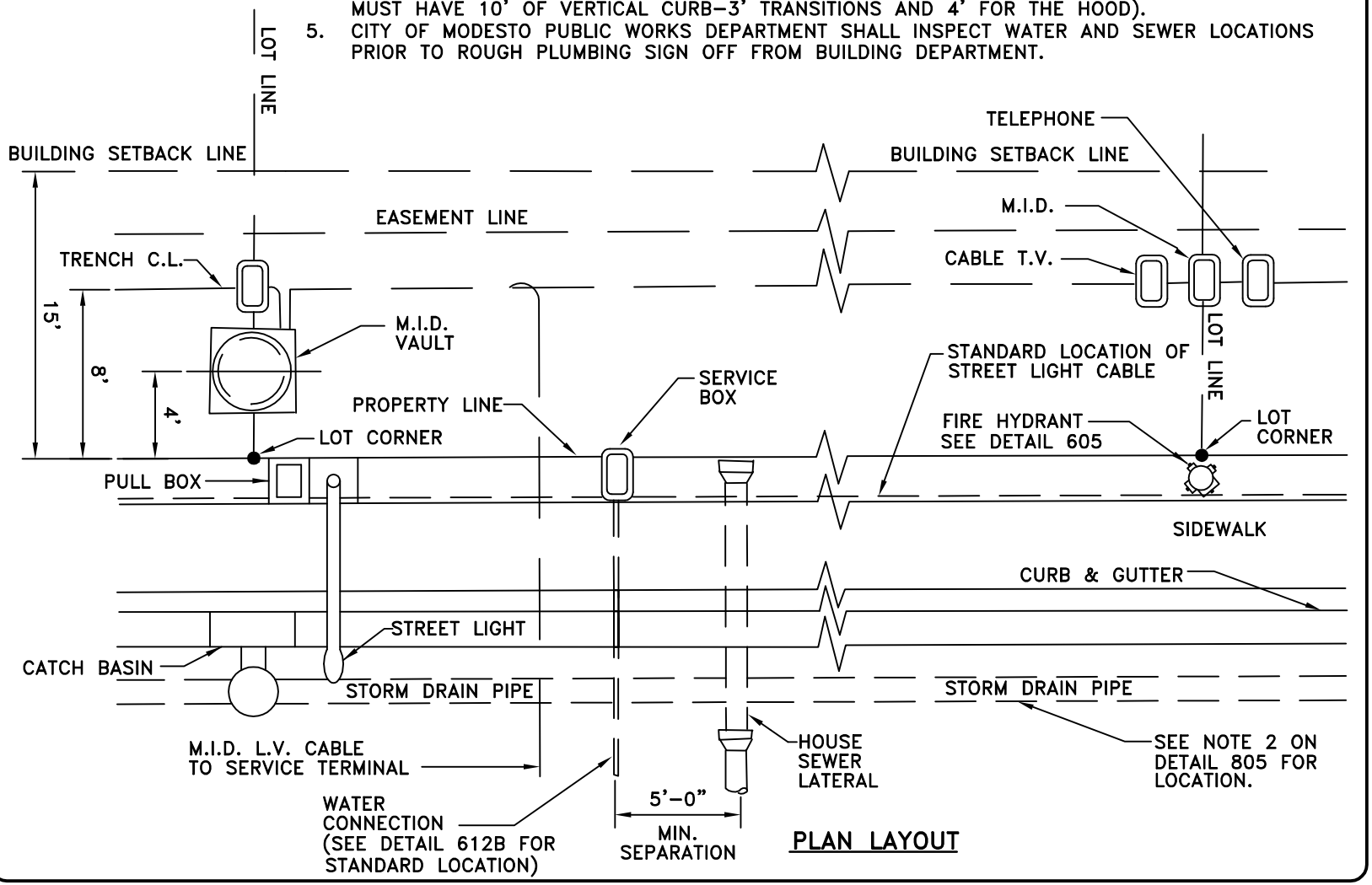
PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO. 804

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 PUBLIC WORKS DEPARTMENT SHALL INSPECT WATER AND SEWER LOCATIONS PRIOR TO ROUGH PLUMBING SIGN OFF FROM BUILDING DEPARTMENT.



PLAN LAYOUT

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

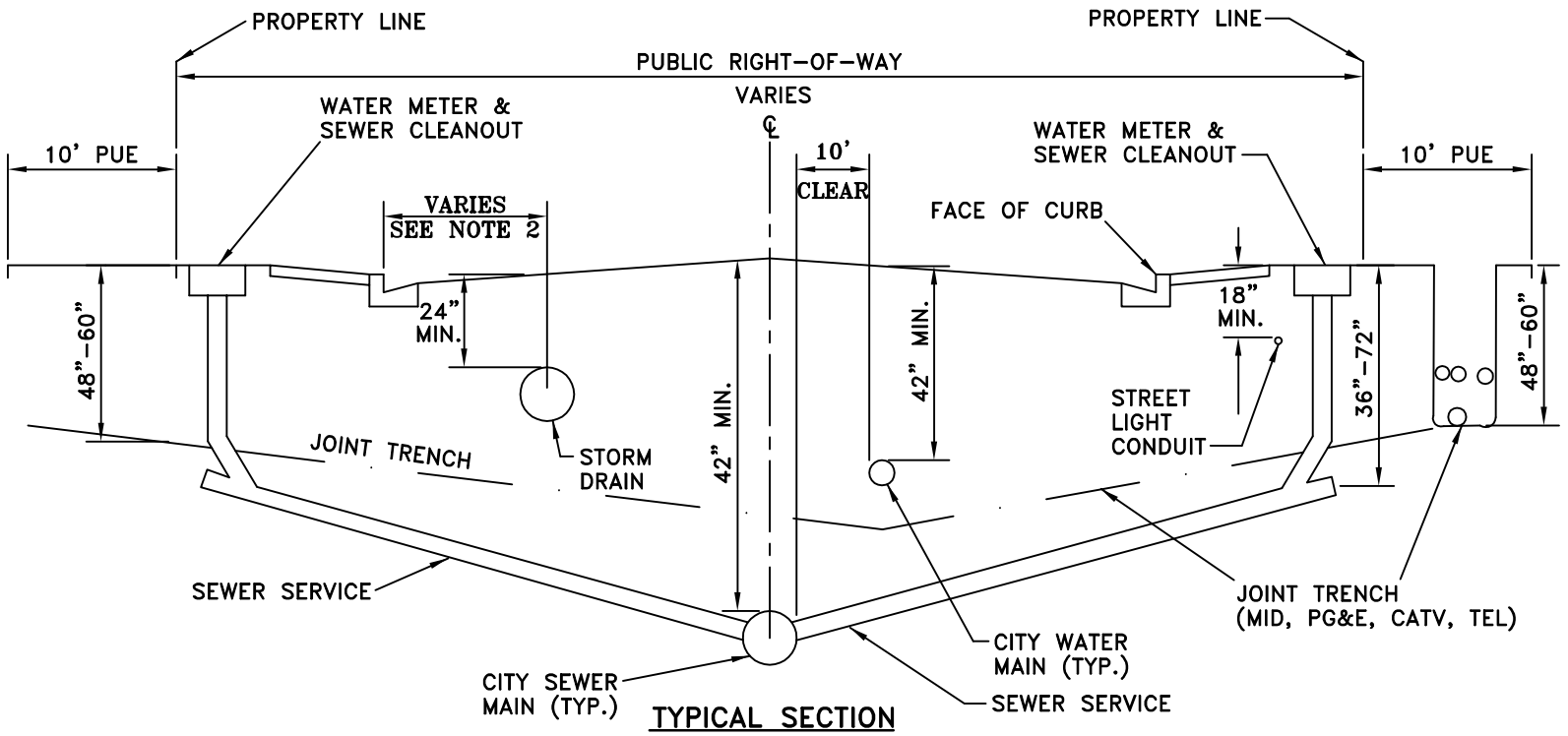
UTILITIES

STREET CROSS SECTION TYPICAL

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

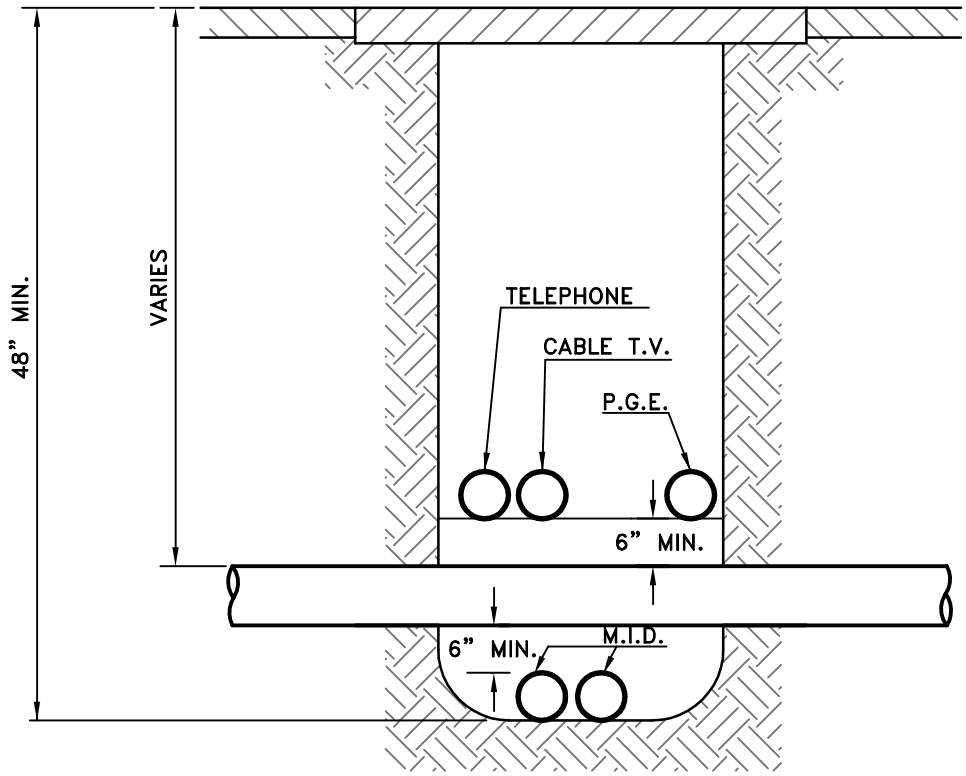
DETAIL NO. 805



TYPICAL SECTION

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.

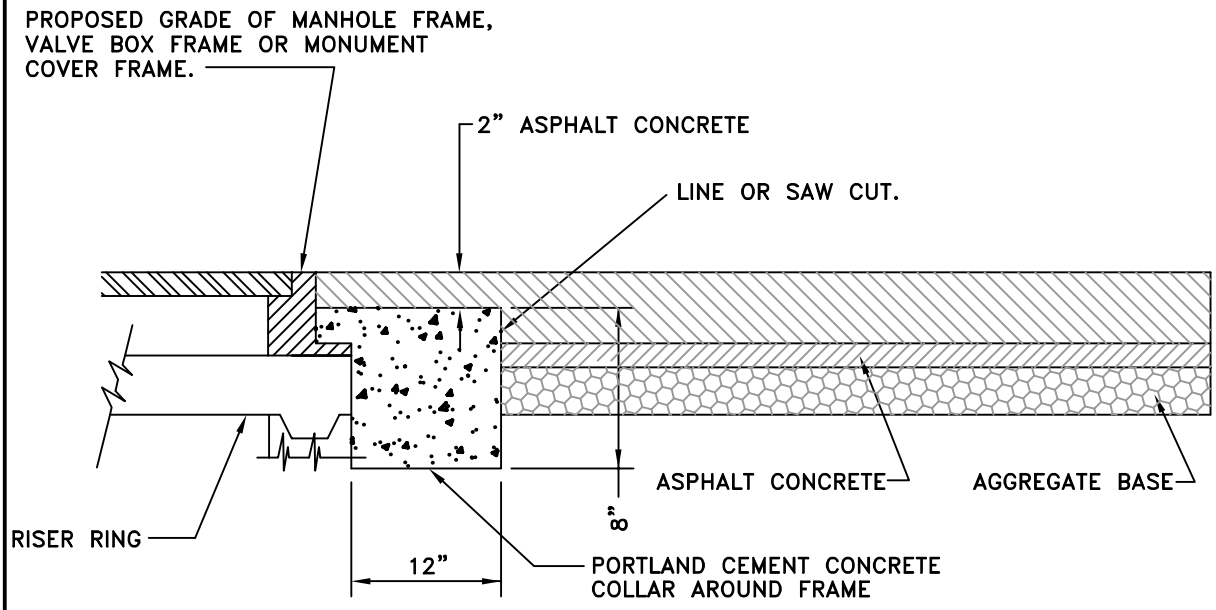


SECTION

NOTES:

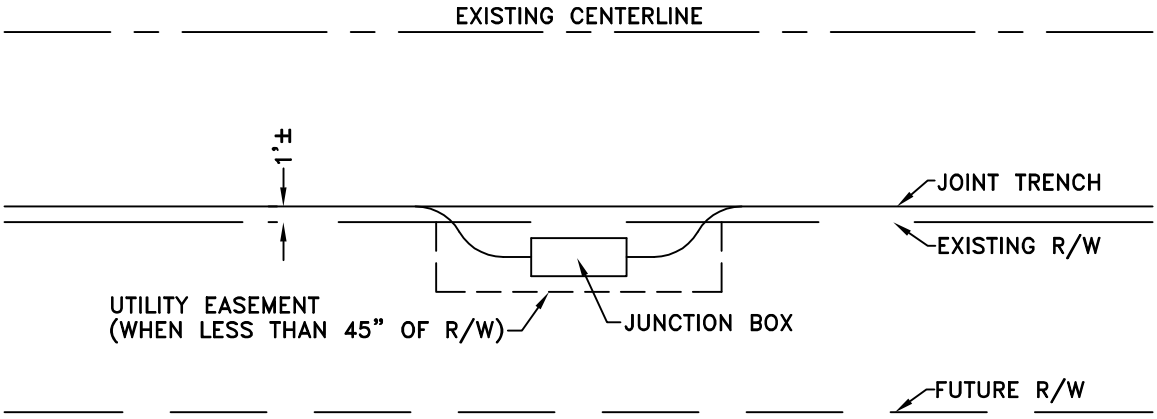
1. A SINGLE UTILITY MAY BE PLACED IN A 4" MINIMUM WIDTH TRENCH. SINGLE UTILITY TRENCH PARALLEL TO THE STREET SHALL BE NEXT TO THE LIP OF GUTTER, UNLESS APPROVED OTHERWISE.
2. FOR BACKFILL AND COMPACTION REQUIREMENTS SEE DETAILS #800–#803.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	UTILITIES	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	TRENCHING IN THE STREET	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 806



ADJUSTING EXISTING FRAMES

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	UTILITIES	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	ADJUSTING STREET FACILITIES TO GRADE	
	PUBLIC WORKS DEPARTMENT	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 CITY COUNCIL
RESOLUTION NO. 2006–284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

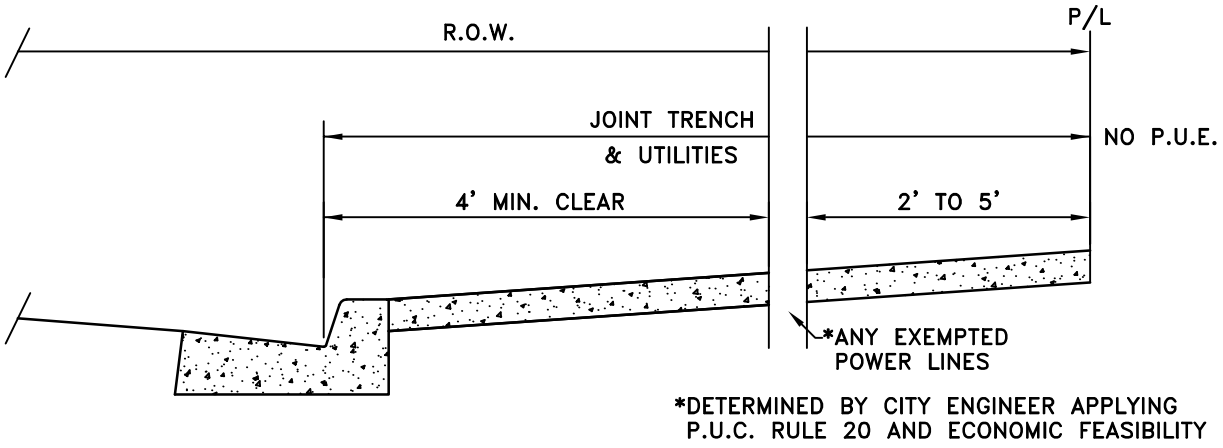
UTILITIES

UTILITY LOCATION W/O ULTIMATE R/W

PUBLIC WORKS DEPARTMENT

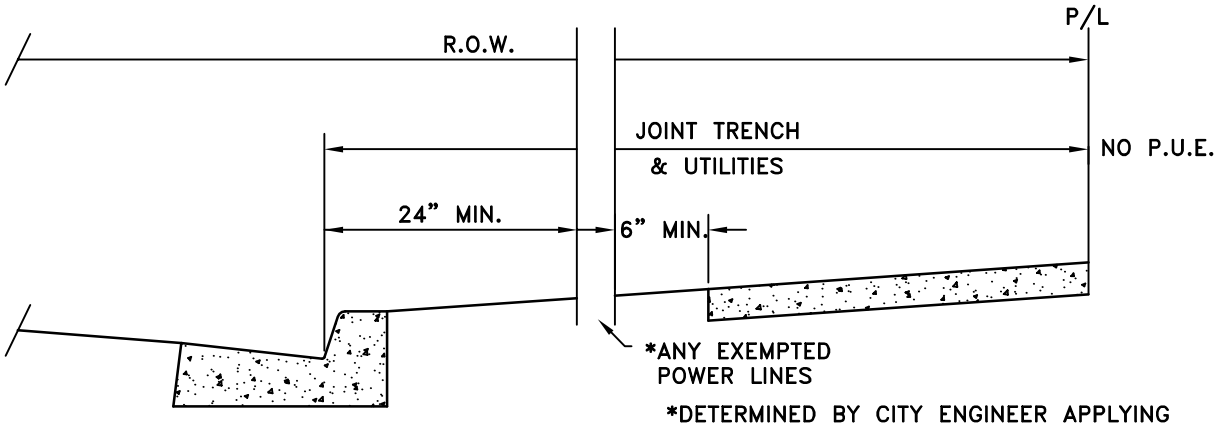
CITY of MODESTO

DETAIL NO. 808



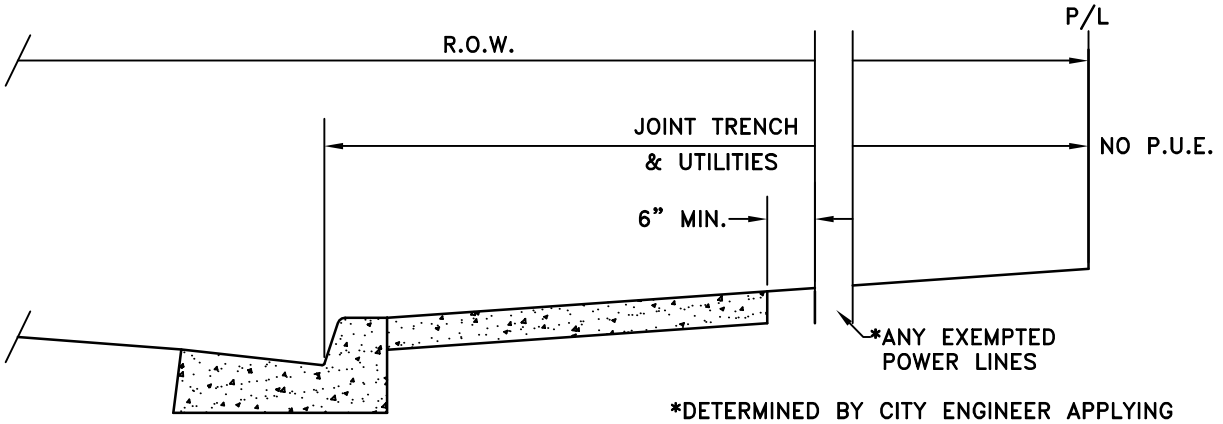
*DETERMINED BY CITY ENGINEER APPLYING P.U.C. RULE 20 AND ECONOMIC FEASIBILITY

CASE A



*DETERMINED BY CITY ENGINEER APPLYING P.U.C. RULE 20 AND ECONOMIC FEASIBILITY

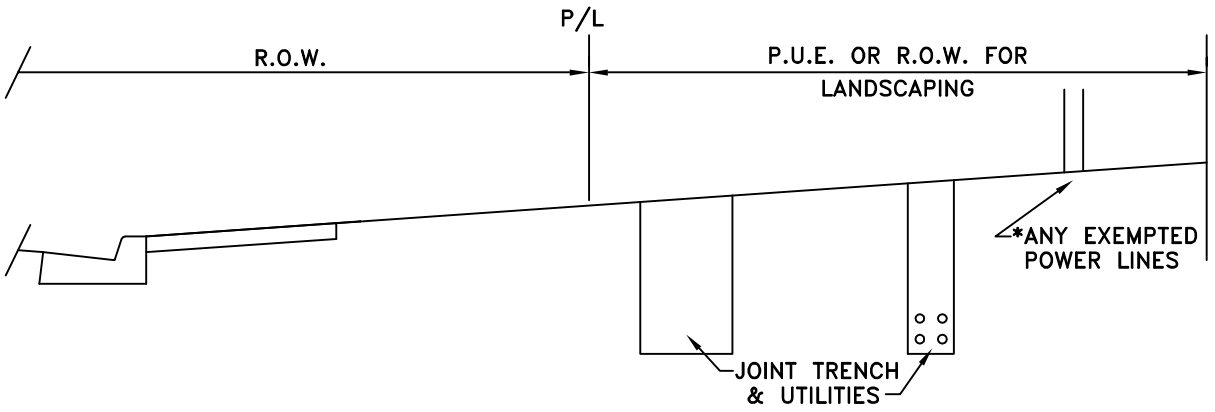
CASE B



*DETERMINED BY CITY ENGINEER APPLYING P.U.C. RULE 20 AND ECONOMIC FEASIBILITY

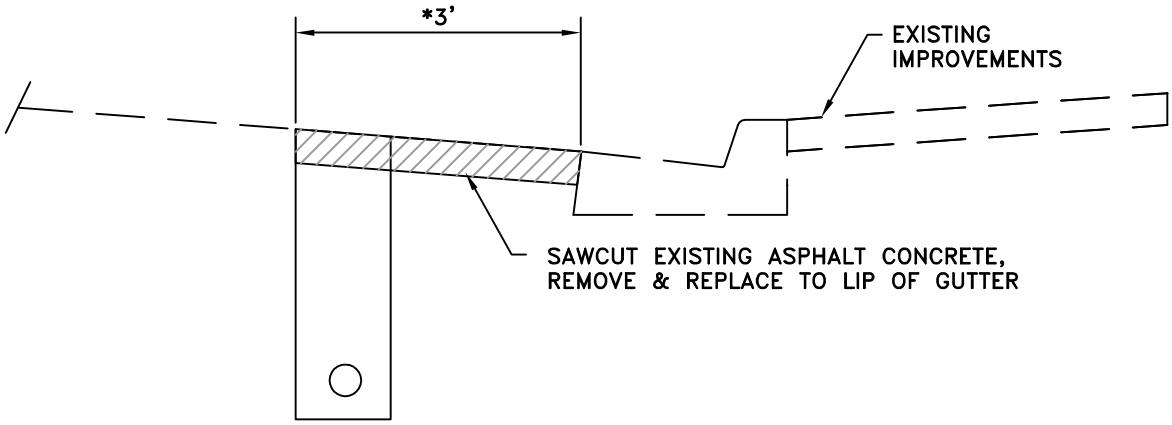
CASE C

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	UTILITIES	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wilson	JOINT TRENCH LOCATIONSCASEA,B+C	
	PUBLIC WORKS DEPARTMENT	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 CITY COUNCIL RESOLUTION NO. 2006-284	UTILITIES	
APPROVED BY THE CITY ENGINEER:	JOINT TRENCH LOCATIONSCASES D&E	CITY of MODESTO
	PUBLIC WORKS DEPARTMENT	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 the street lighting and electrical system in accordance with the approved plans, these specifications, the City 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 National Electrical Code, 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.

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 City/State Standards and Specifications.

Removal of striping and pavement markers shall be per the approved State Standards. Traffic striping and pavement markings work shall conform to the provisions in Sections 15, 84, and 85 "Existing Highway Facilities," "Traffic Stripes and Pavement Markings," and "Pavement Markers" of the California Standard Specifications, dated July 1992, applicable sheets of the California Standard Plans, dated July 1992, 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 Standard Specifications and these special provisions.

B. Signing and Barricades
   1. Street names shall be approved by the City Planning Staff.

2. Street name and stop signs shall be paid for by the Developer. City shall supply and install street name and stop signs.

3. Permanent barricades shall be installed where improvements cover only a portion of the ultimate development or as directed by the City Engineer. The barricade shall be constructed, erected, painted and signed in accordance with the Standard Details.

C. Removable Bollards
Six inch (6") 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" 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 4' 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 Standard Specifications and these special provisions.

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 Standard Specifications and these special provisions.

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 Standard Specifications and these special provisions.

9.04 Measurement & Payment

Payment for all traffic stripes, pavement markings, and pavement markers shall include full compensation for furnishing all labor, material, tools, equipment, adhesive and all other incidentals to completely install the traffic stripes, pavement markings, and pavement markers

A. Traffic Stripes and Pavement Markings

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 of the widths designated in the contract document.

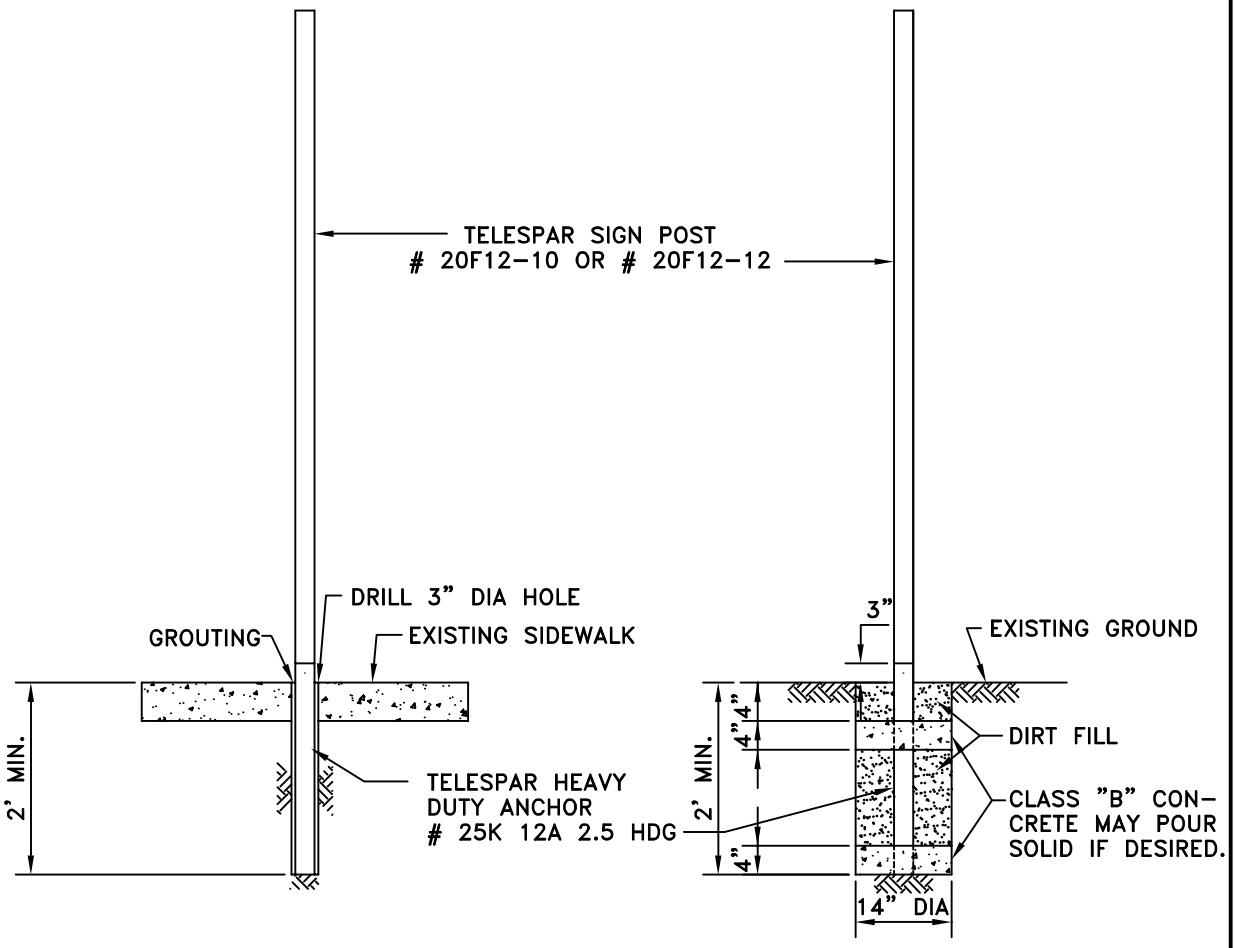
All pavement markings and legends shall be measured by the square foot of the actual area covered. All pavement markings and legends shall be paid for by the square foot of actual area covered.

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.



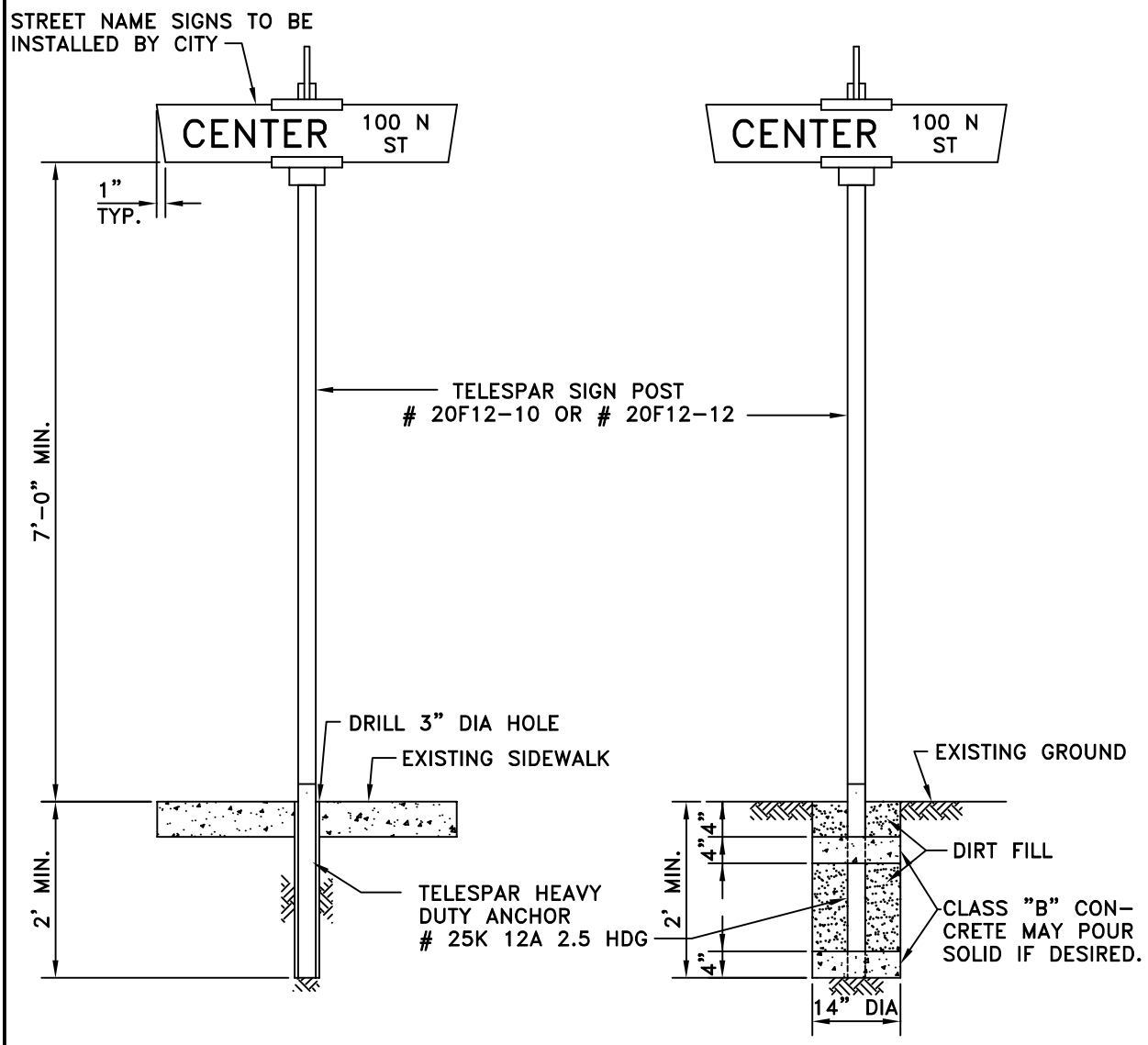
IN EXISTING SIDEWALK AREA

IN PLANT AREA

NOTE:

ANCHOR TO BE DRIVEN OR PLACED WITH 3" MAXIMUM ABOVE GROUND LEVEL.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	SIGNS & STRIPING	
APPROVED BY THE CITY ENGINEER:	SIGN POST	CITY of MODESTO
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 900



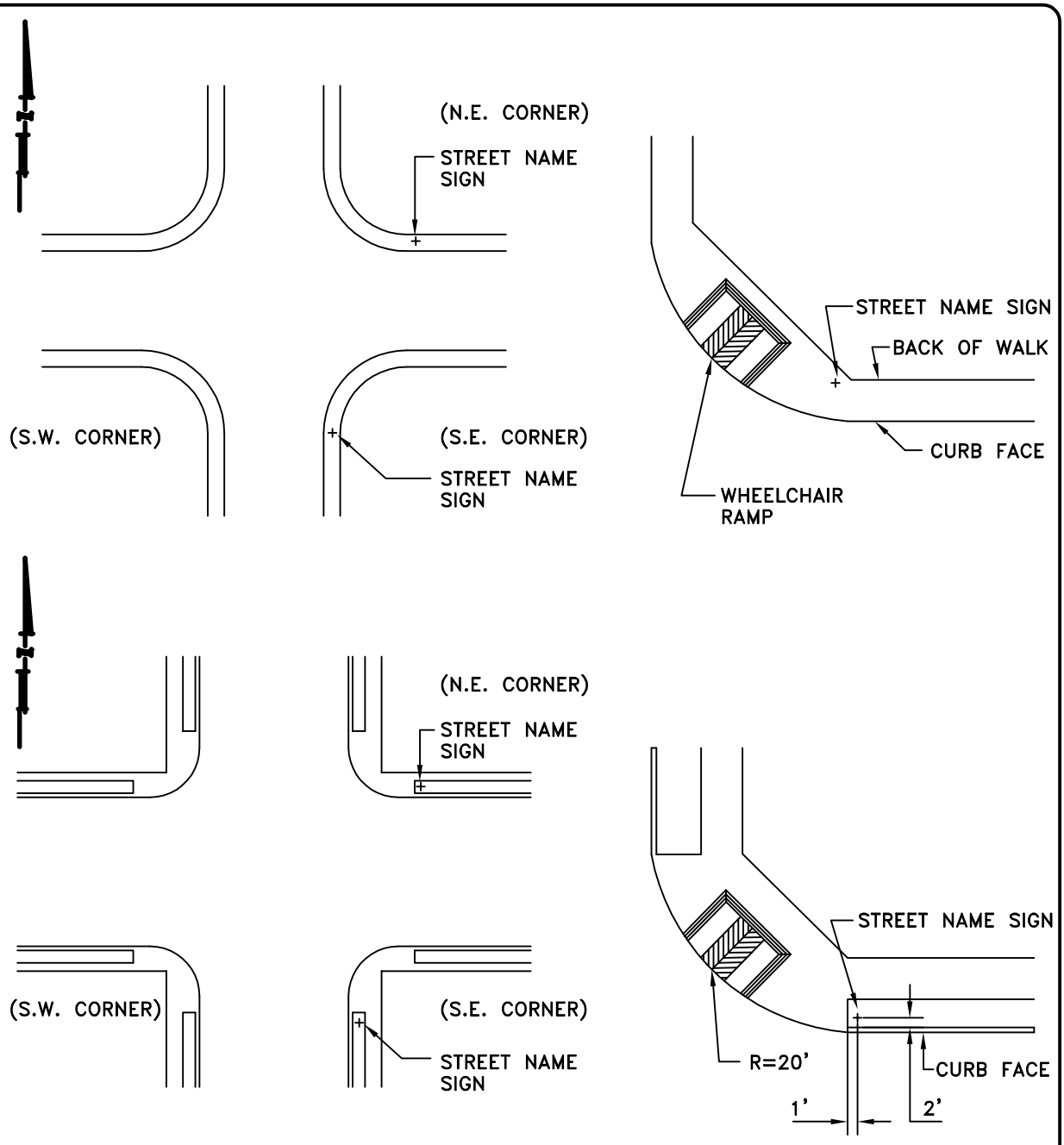
IN EXISTING SIDEWALK AREA

IN PLANTER AREA

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 CITY COUNCIL RESOLUTION NO. 2006-284	SIGNS & STRIPING	
APPROVED BY THE CITY ENGINEER:	STREET NAME SIGN	CITY of MODESTO
	PUBLIC WORKS DEPARTMENT	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 CITY COUNCIL RESOLUTION NO. 2006-284 APPROVED BY THE CITY ENGINEER:	SIGNS & STRIPING STREET SIGN LOCATION PUBLIC WORKS DEPARTMENT	CITY of MODESTO DETAIL NO. 902

TYPICAL OVERHEAD STREET NAME SIGNS

FRONT VIEW

BACK VIEW

NOTES:

1. ALL LETTERS SHALL BE 10" CAPS FOR STREET NAME.
2. ALL BLOCK NUMBERS SHALL BE 4" NUMBERS.
3. ALL ARROWS SHALL BE 4" WIDE.
4. ALL TEXT SHALL BE SERIES "D".
5. SIGNS SHALL BE WHITE ON A GREEN BACKGROUND.
6. SIGNS SHALL BE DIAMOND VIP GRADE SHEETING.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	SIGNS & STRIPING	
APPROVED BY THE CITY ENGINEER: Richard D. Wells	TYPICAL OVERHEAD STREET NAME SIGNS	CITY of MODESTO
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 903

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

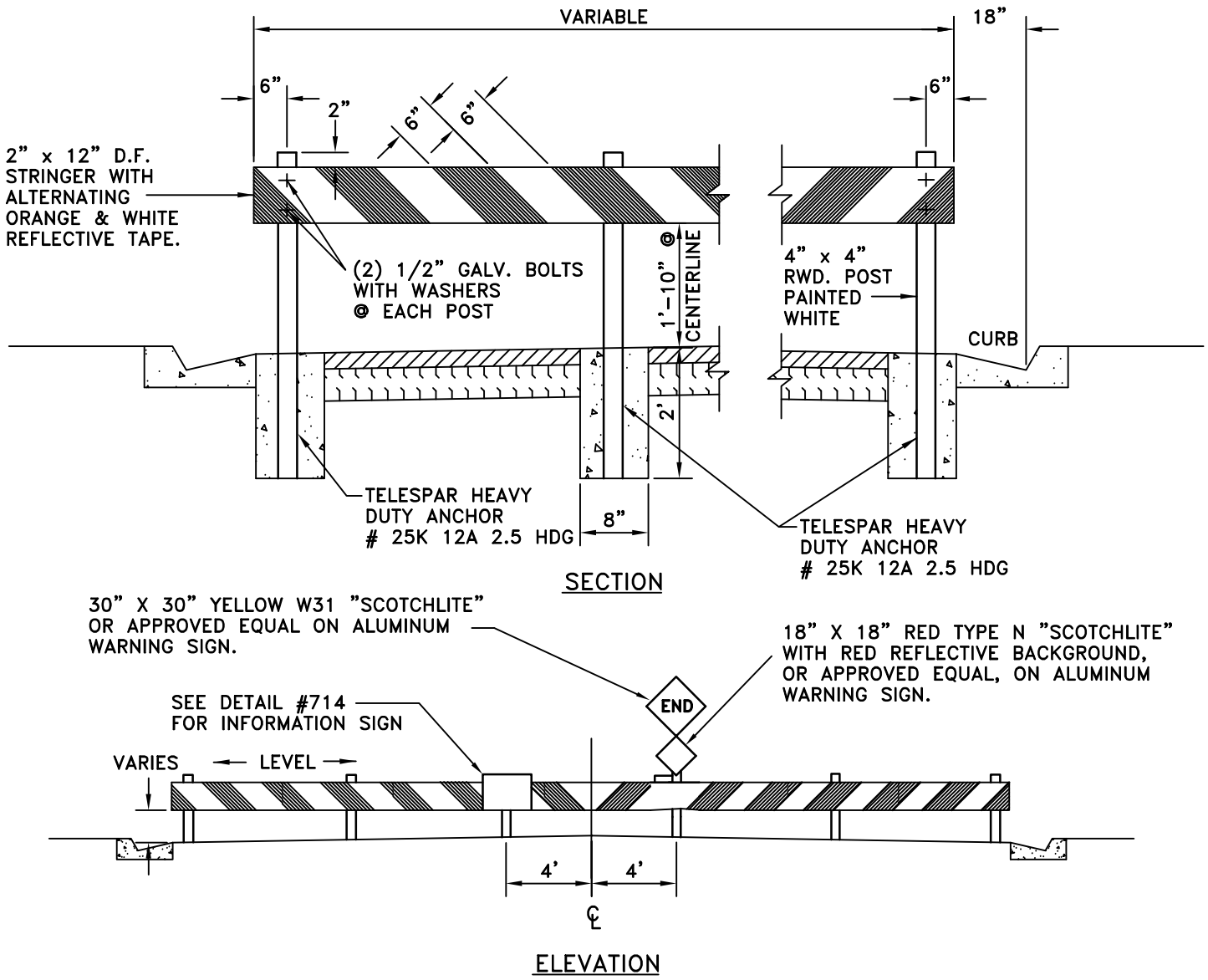
SIGNS & STRIPING

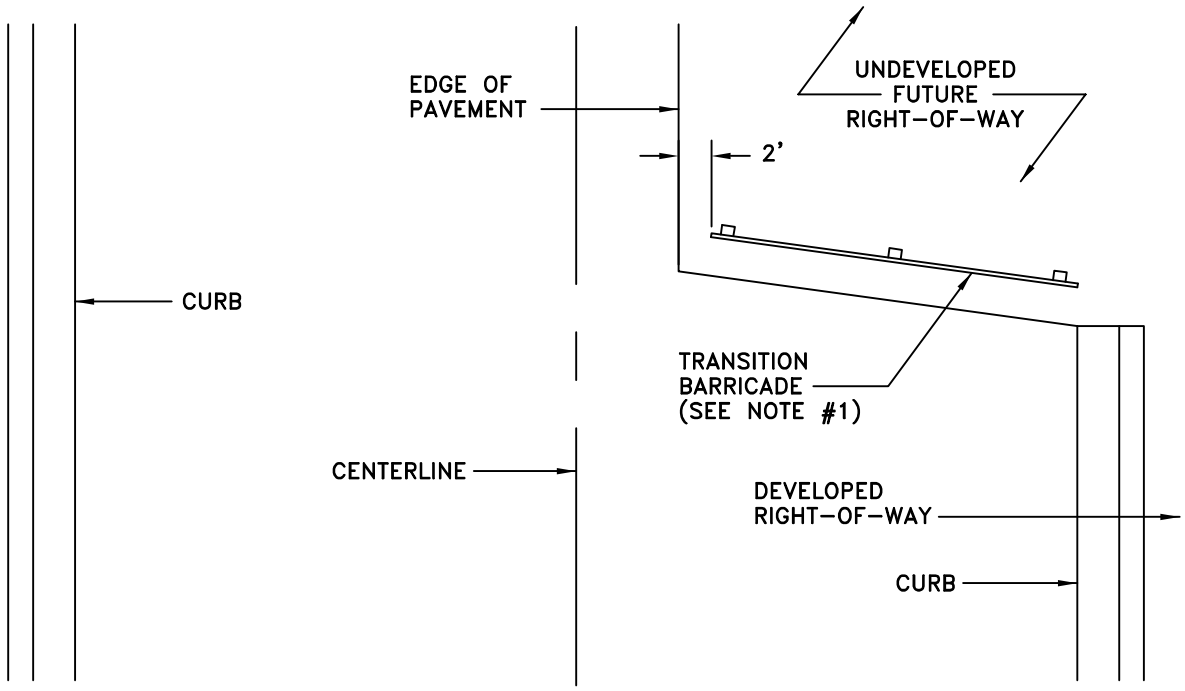
DEAD END STREET BARRICADE

PUBLIC WORKS
DEPARTMENT

CITY of MODESTO

DETAIL NO.
904

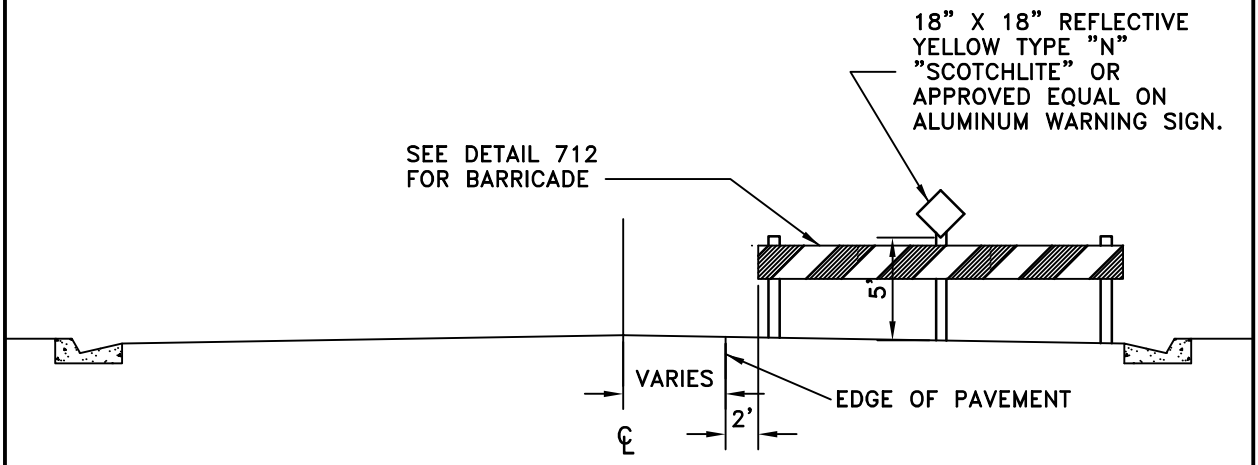




PLAN

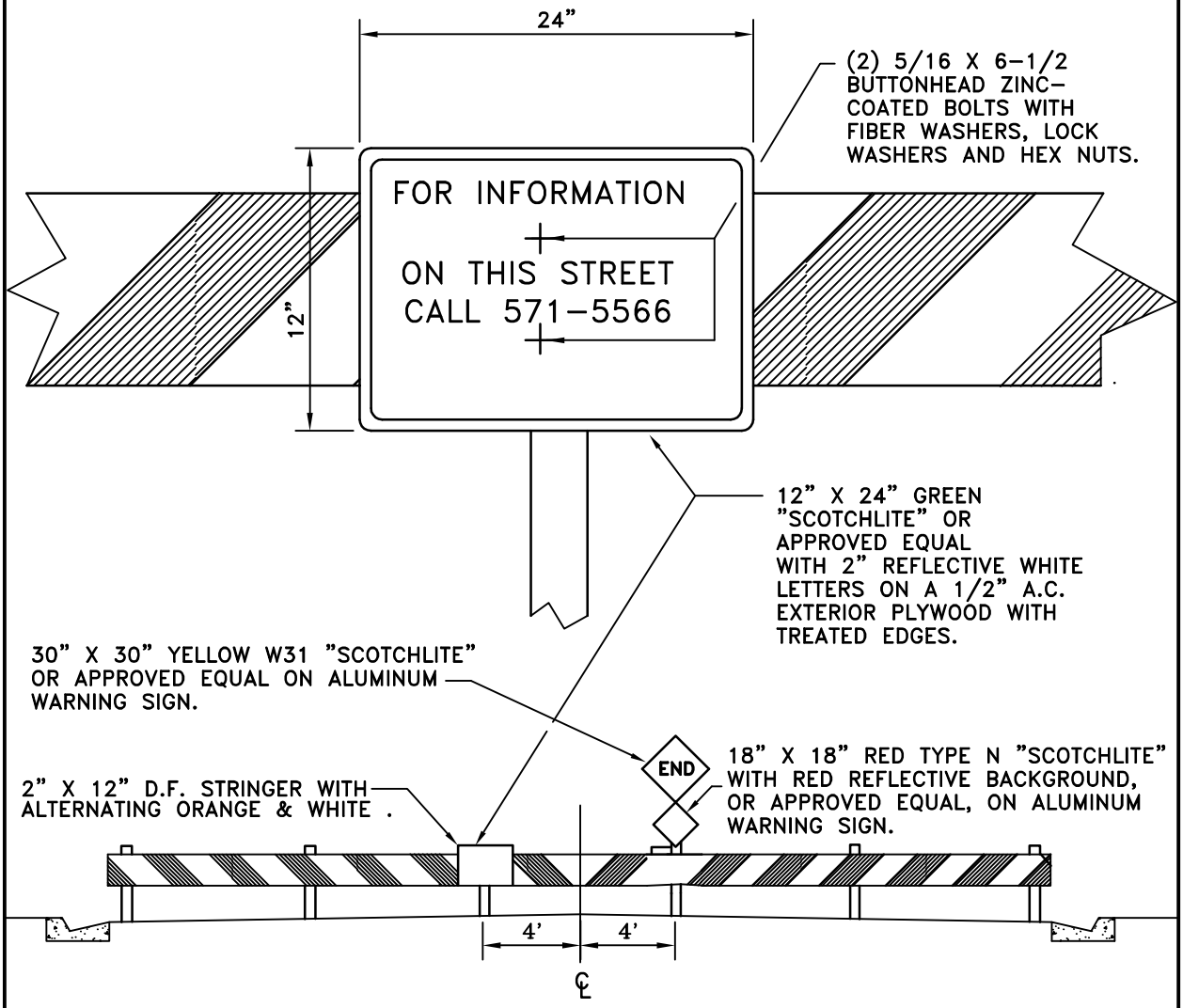
NOTE:

1. ALTERNATE LOCATION SHALL BE AS APPROVED BY THE CITY ENGINEER.



PROFILE

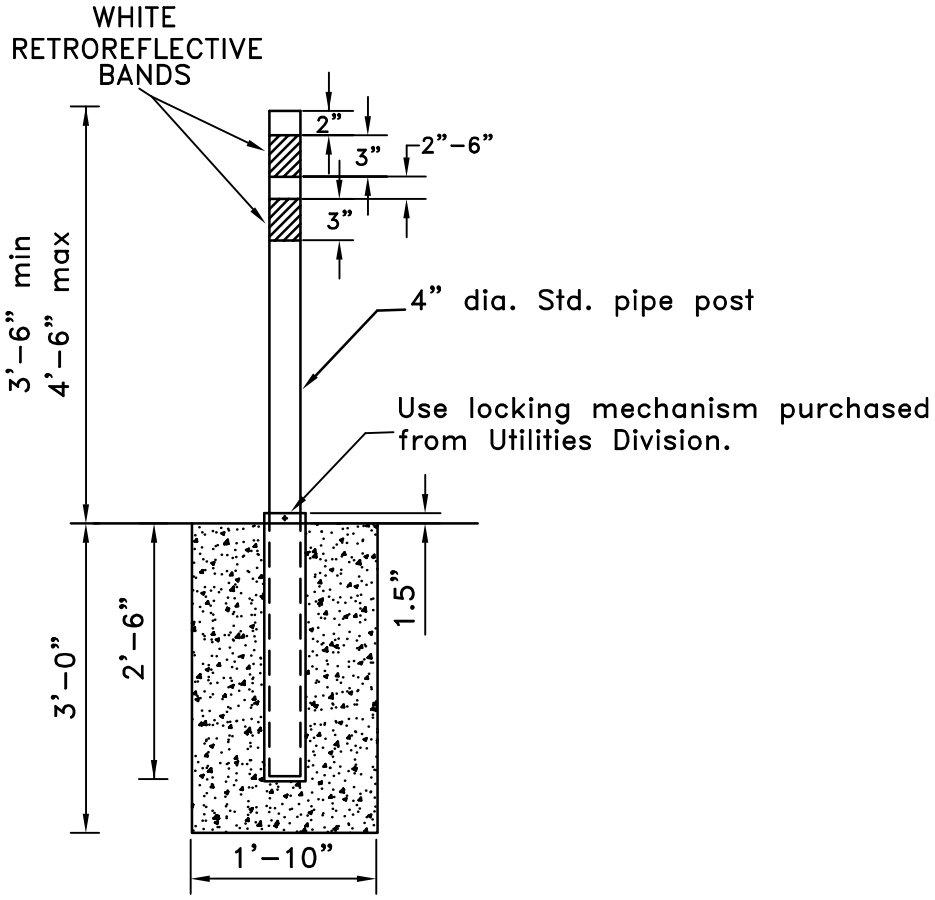
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	SIGNS & STRIPING	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	STEET WIDTH TRANSITION BARRICADE	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 905



APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	SIGNS & STRIPING	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	INFORMATION ON DEAD END BARRICADE	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 906

NOTES:

1. See design section 3.08 for information on location.
2. Gelveniod 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 CITY COUNCIL RESOLUTION NO. 2006-284	SIGNS & STRIPING	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	REMOVEABLE BOLLARD DETAIL	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 907

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. 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.

D. 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. Lots with sufficient frontage to safely meet the design requirements of Section 10.03 shall be permitted their own driveways. The Owner or Developer of property required to use shared driveways shall be responsible for obtaining easements on adjacent property as necessary. The City may, but shall not be required to, assist in the acquisition of off-site easements if the owner is unable to acquire them. With a request for assistance, the owner shall provide the evidence of a reasonable offer made to the adjacent property owner. Upon such a written request for assistance, the City may attempt to acquire these easements through negotiations. If the negotiations are unsuccessful, the request may be submitted to Council for consideration of acquisition through condemnation. In either case, the total cost of the acquisition and the cost of the easements shall be paid by the Owner (Developer). In the event

the City elects not to acquire the property through condemnation, alternate driveway locations and designs in conformance with this standard shall be required.

E. 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 will 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).

F. 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 are required where some or all the following conditions exist:
   1. on-street parking creates extra width to maneuver,
   2. The street facility is residential, minor collector or major collector, and
   3. Traffic volume over the driveway is less than 1,000 vehicles per day.

B. Drop approaches are required where some or all the following conditions exist:
   1. Traffic conditions are at a level of service "D" or "E",
   2. The street facility is rated major or above, and
   3. Traffic volume over the driveway is 1,000 or more 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 Minor Collector Major Collector Arterial & Larger	10' - 28' 10' - 28' 12' - 28' 14' - 28'	24' - 36' 24' - 36' 24' - 36' 30' - 36'	24' - 45' 30' - 45' 35' - 45' 40' - 45'
Driveway Curb Radius (Drop Approach Type Only)	Local Minor Collector Major Collector Arterial & Larger	N/A[2] N/A[2] 10' - 15' 15'	N/A[2] 15' - 20' 15' - 20' 20' - 30'	10' - 20' 15' - 20' 20' - 25' 25' - 50'
Minimum Centerline Driveway[3] Spacing Along Roadway	Local Minor Collector Major Collector Arterial & Larger	28' 28' 100' 100'	100' 150' 200' 350'[4]	100' 150' 200' 350'[4]
Driveway Angle[5]	All	70'- 90'	90'	90'
Minimum Distance[6] From Driveway to Intersection Along:	Local Minor Collector Major Collector Arterial & Larger	30' 50' 150'[7] 350'[8]	75' 150' 150'[7] 350'[8]	75' 100' 150'[7] 350'[8]
Maximum Approach Grade[9] (Drop Approach Only)	Local & Minor Collector All Others	+9% +6%	+6% +3%	+6% +3%
Minimum Distance to Property Line[10]	All	2'[10]	2'	2'
Minimum Approach Length[11] (Drop Approach Only)	Local & Minor Collector All Others	6' 9'	9' 17'	9' 17'

NOTES:

1. The requirements for Driveway Throat is 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, and other factors warrant the variance. 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. Driveways may only be flared or drive over curb in these areas.

3. 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.

4. Driveways on major collectors and larger streets served by deceleration lanes may be spaced at 200' minimum intervals.

5. 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.

6. Distance measured from the intersection as measured from the intersection right-of-way line to the driveway centerline (see Standard Details #1002, #1004 & #1005).

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 150' long raised median from the stop bar at the intersection shall be installed by the Developer at Developer's expense.

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 350' long raised median from the stop bar at the intersection shall 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. 100,000-500,000 sq. ft. >500,000 sq. ft.	25 50 50	50 100 200
Free Standing Retail	<30,000 sq. ft. >30,000 sq. ft.	25 25	50 75
Shopping Center	<100,000 sq. ft. 100,001-200,000 sq. ft. 200,001-300,000 sq. ft. 300,001-500,000 sq. ft. 500,001-750,000 sq. ft. >750,000 sq. ft.	25 50 75 100 125 125	75 100 125 150 200 250
Supermarket	<20,000 sq. ft. >20,000 sq. ft.	50 75	75 125
Apartments	<100 units 101-200 units >200 units	25 50 75	50 75 125
Sit-down Restaurant	<15,000 sq. ft. >15,000 sq. ft.	25 25	50 75
Drive-through Restaurant	<2,000 sq. ft. >2,000 sq. ft.	25 50	75 100
General Office	<50,000 sq. ft. <50,000-100,000 sq. ft. >100,001-200,000 sq. ft. 200,001-500,000 sq. ft. >500,000 sq. ft.	25 25 50 100 125	50 75 100 150 250
Motel	<150 rooms >150 rooms	25 25	75 100

* This table is based on Table 6-4 in Transportation and Land Development by Institute of Transportation Engineers.

** The Public Works Director 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	125
326-380	150

Notes:

1. Storage depths are measured from the street right-of-way line to the gate.

2. Greater than ten (10) dwelling units shall provide a 2nd lane for guest.

3. 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.

4. 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	10 spaces per window[1]
Drive-through Restaurant/Drink Stands	10 spaces per window[2]
Full-service Car Wash	10 spaces per wash line
Self-service Car Wash	3 spaces per wash line
Service Station	3 spaces per service position
Drive-through Retail	3 spaces per window[2]
Drive-through Lube Service	3 spaces per bay

Table Notes:

1. For Drive-through banks, the ten (10) spaces per window will be reduced to three (3) spaces per window for savings and loan institutions and credit unions.

2. A maximum of 30 vehicle-stacking spaces will be required for banks with more than five (5) drive-through windows.

3. 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.

4. 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.

5. 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.

6. Any abandoned driveway shall be completely removed and replaced with standard sidewalk, curb, and gutter.

7. 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. 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.

2. 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.

3. Handicap ramps not exceeding 12:1 slope shall be required on all driveway drop approaches.

4. 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. A residential driveway shared by two (2) or three (3) properties shall have a minimum throat width of 12'. A joint-use private access easement shall also be required.

3. 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 or a minor collector, an off-street maneuvering area approved by the City Engineer shall be provided 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:
   (a) The lot has access to a local street and/or
   (b) The proposed access would create a traffic flow or safety problem.

4. Shared residential driveways may be required for adjoining residential lots on major street facilities to reduce the number of access points on those roadways.

5. 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 of these standards.

10.04 INSTALLATION

A. All Driveway Types (Flared, Drop Approach, Drive-Over Curb)

1. The use of shared driveways shall require the dedication of a joint-use private access easement on each affected property and the filing of a private maintenance agreement with the City. Said dedication shall be provided on the final plat of the subject properties or be filed by separate instrument with Stanislaus County and the City. When the center of the easement is offset from the common lot line, the easement must extend past the lot line in a minimum distance of 1'. The combined size of the access easement must be minimum of 10' wide and 15' deep for residential property, and a minimum of 24' wide and 48' deep (as measured from the right-of-way line) for all other land uses. As a minimum, the easement width shall encompass the entire width of the future planned driveway.

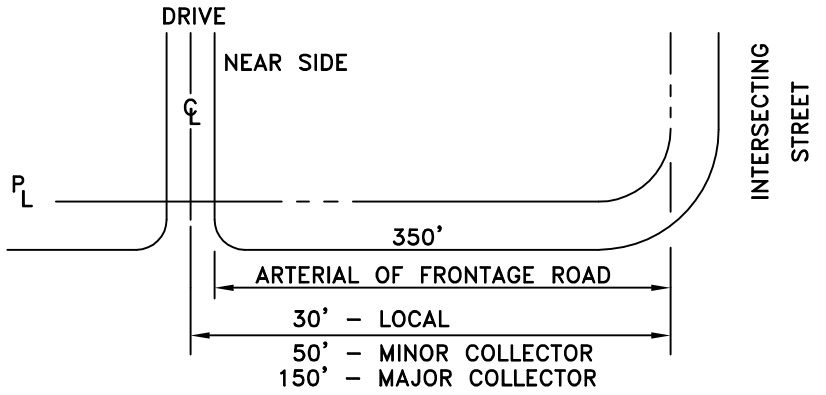
2. No portion of any driveway shall be located within 4' of any fire hydrant, electrical pole or any other surface public utility. At the applicant’s expense, applicant may have the surface utility moved if the public utility agency involved determines that the move will not detrimentally affect the 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.

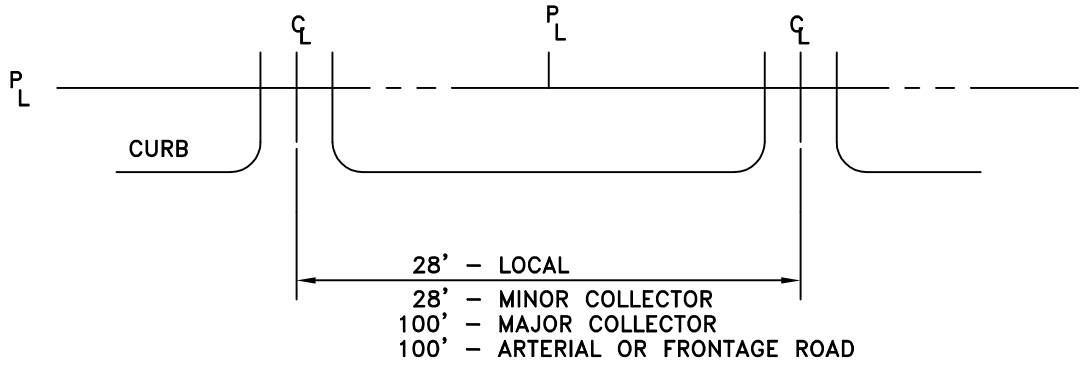
4. All vehicle maneuvering on apartment, commercial and industrial properties into a parking space or up to a loading dock or into any other area shall be accomplished by off-street maneuvering areas and internal driveways. No back-in or back-out vehicle maneuvering from a driveway shall be allowed to 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 MEASURMENT 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



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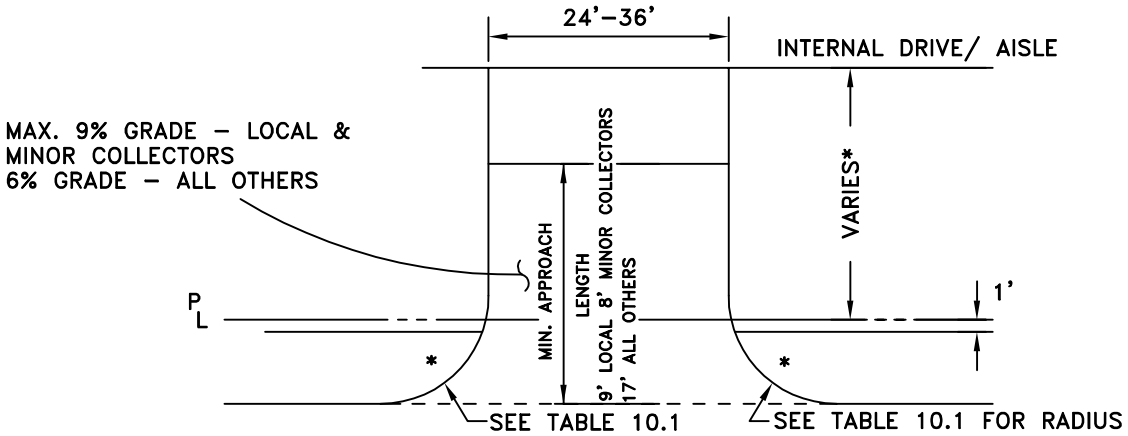


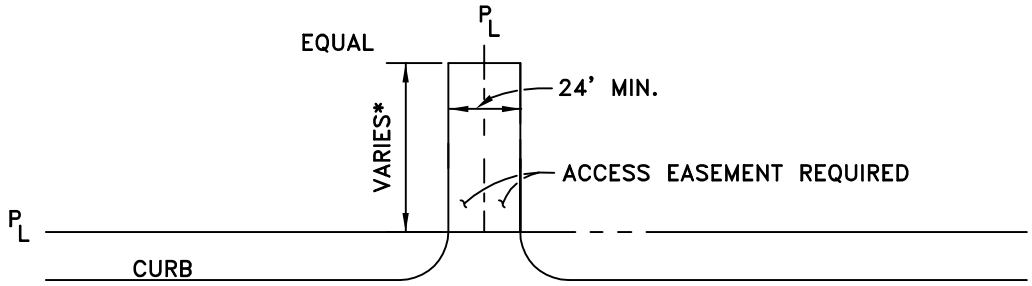
* HANDICAP RAMP–WARP TO FIT MAX. SLOP 12:1
* SEE TABLE 10.2

TYPICAL DESIGN

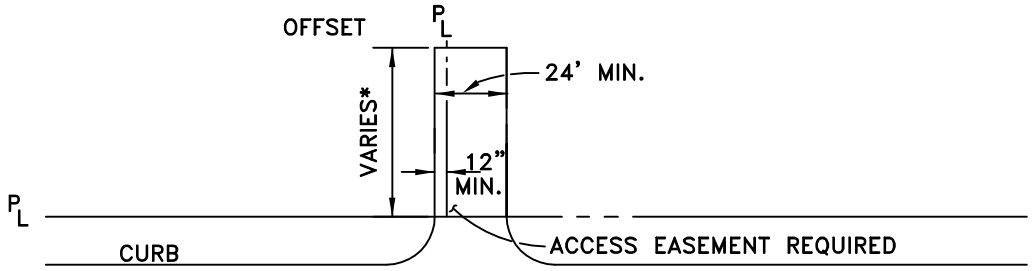
NOTE:

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.

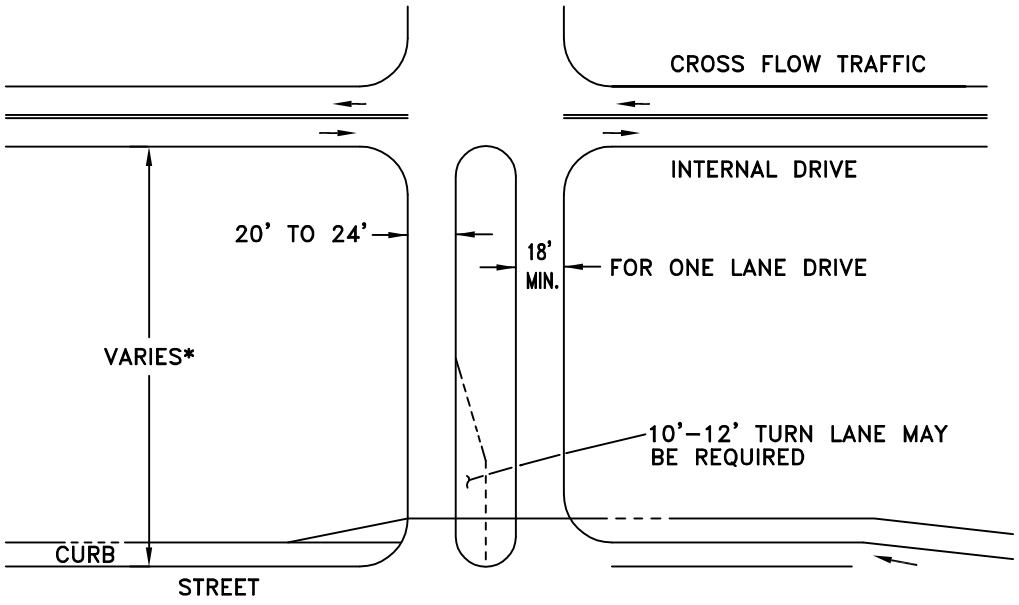
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	DRIVEWAYS	
APPROVED BY THE CITY ENGINEER:	RESIDENTIAL DRIVEWAYS	CITY of MODESTO
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 1000



DROP APPROACH OR FLARED DRIVEWAY



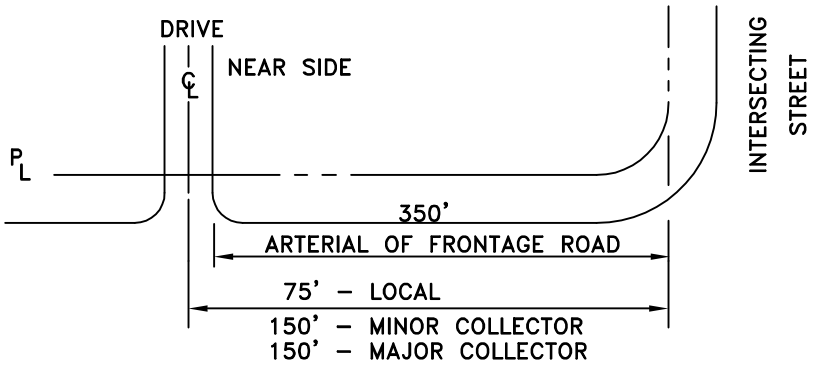
SHARED DRIVEWAYS



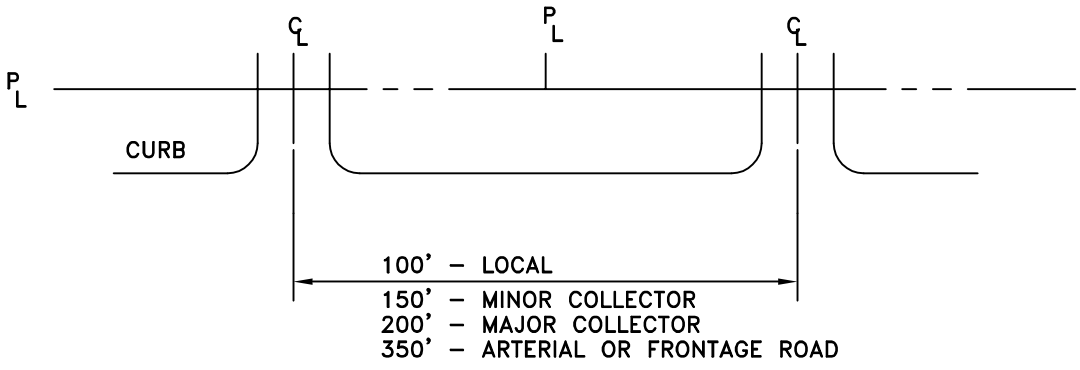
DROP APPROACH ONLY FOR LARGE VOLUME DRIVEWAYS
(OVER 5,000 VEHICLES/DAY)

* SEE TABLE 10.2

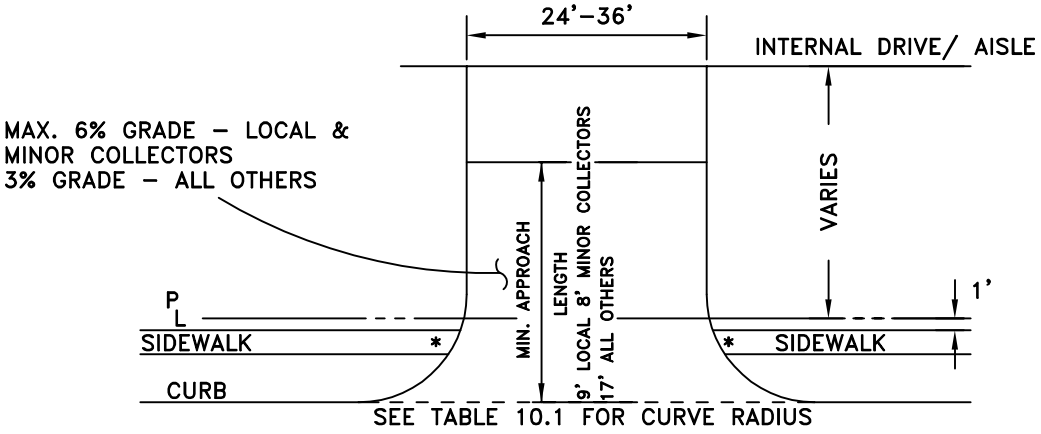
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	DRIVEWAYS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Madden	NON–RESIDENTIAL DRIVEWAYS	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 1001



MINIMUM DISTANCE FROM INTERSECTION



MINIMUM SPACING



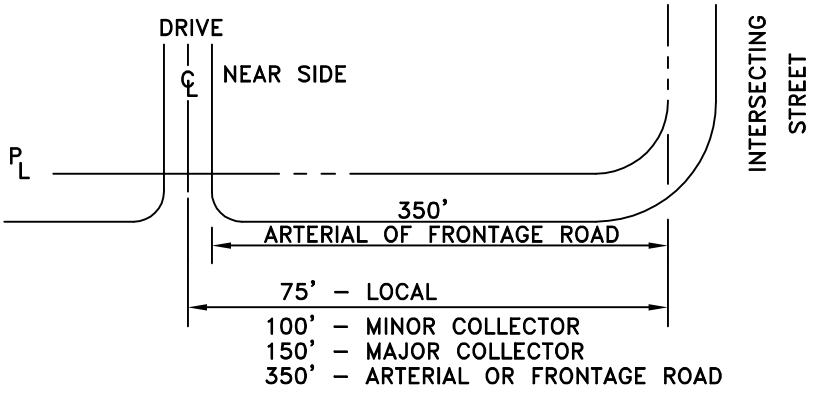
* HANDICAP RAMP–WARP TO FIT MAX. SLOP 12:1

TYPICAL DESIGN

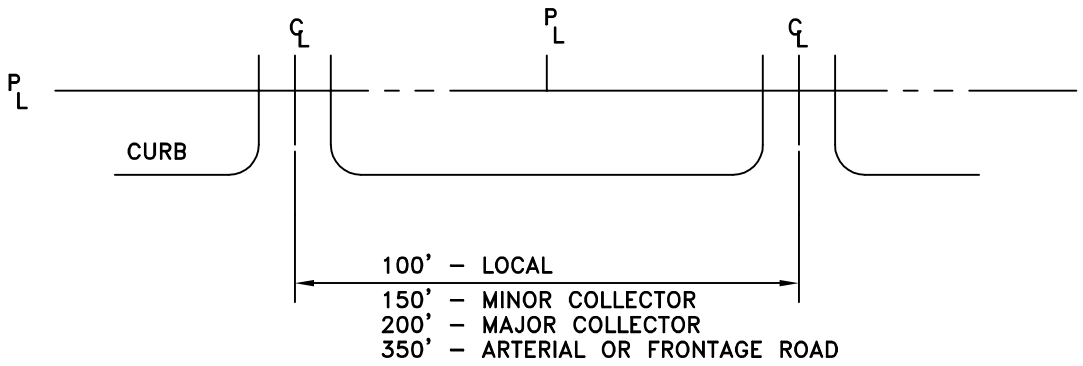
NOTE:

TYPICAL DESIGN MAY BE DROP APPROACH OF FLARED DRIVEWAY DEPENDING ON DRIVEWAY COUNTS AND LEVEL OF SERVICE ON THE ROAD WHERE THE DRIVEWAY CONNECTS.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	DRIVEWAYS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	APARTMENT/ COMMERCIAL DRIVEWAYS	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 1002



MINIMUM DISTANCE FROM INTERSECTION



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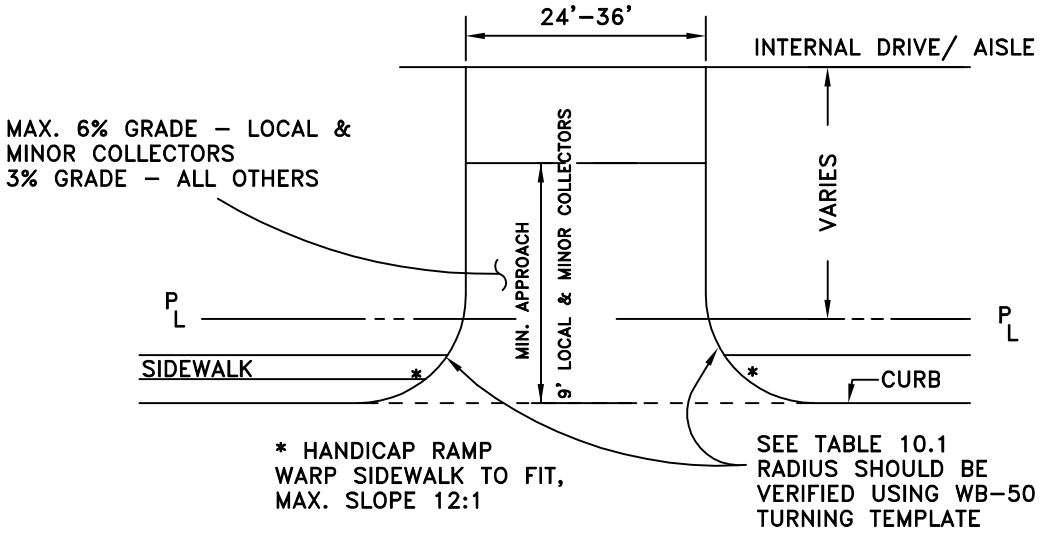


DROP APPROACH TYPICAL DESIGN

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006–284

APPROVED BY THE CITY ENGINEER:

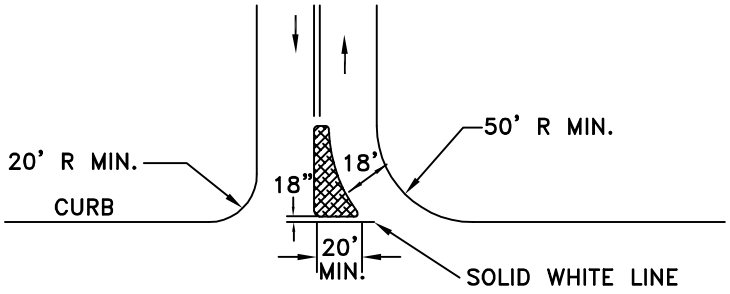
DRIVEWAYS

INDUSTRIAL DRIVEWAYS

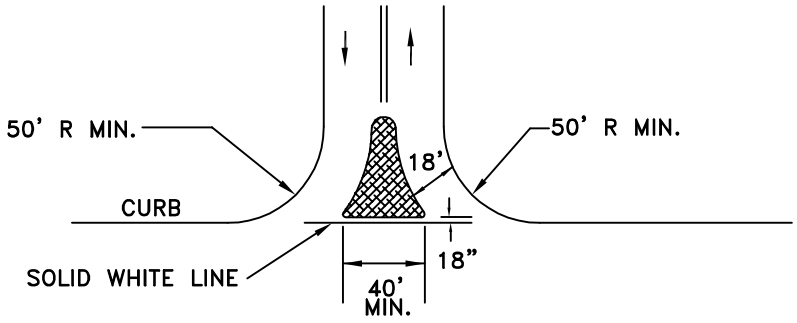
CITY of MODESTO

PUBLIC WORKS DEPARTMENT

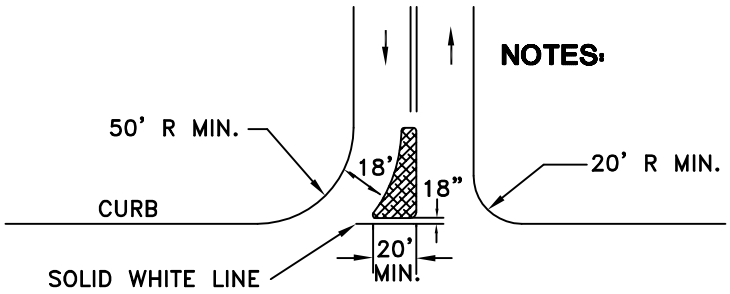
DETAIL NO. 1003



RIGHT–IN, RIGHT–OUT, LEFT–OUT
ACCESS DESIGN

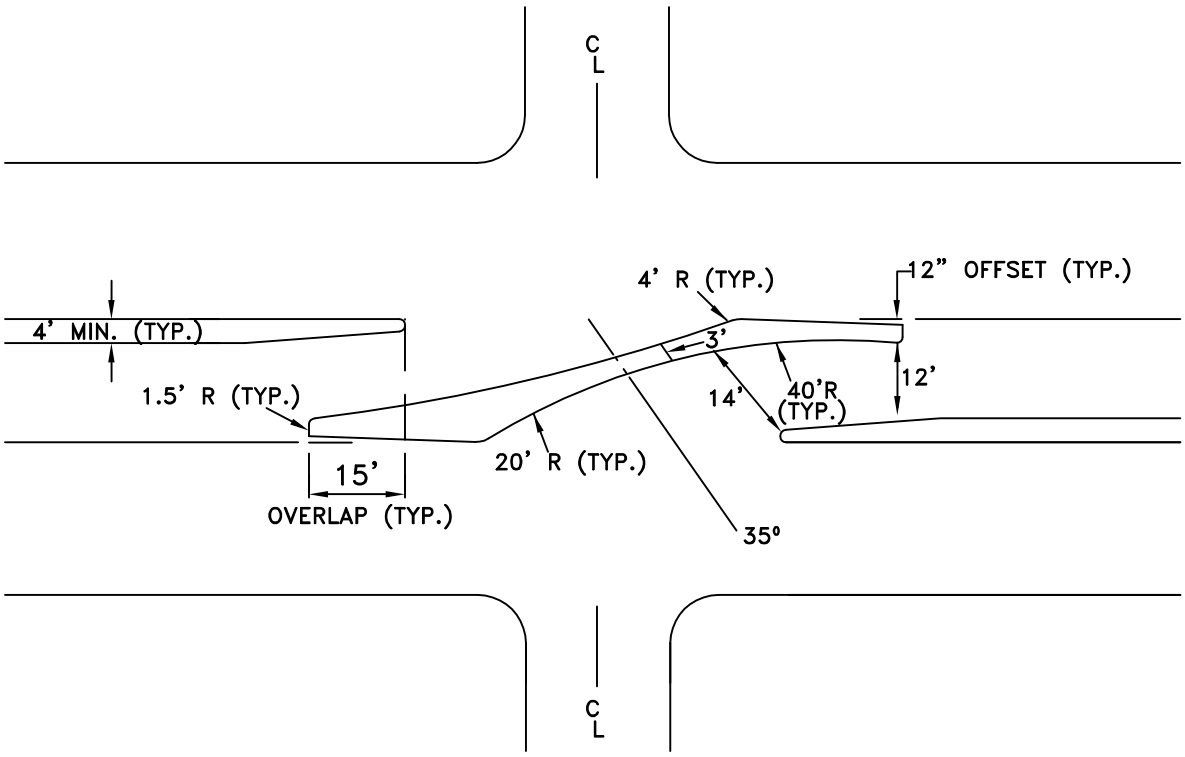


RIGHT–IN, RIGHT–OUT
ACCESS DESIGN

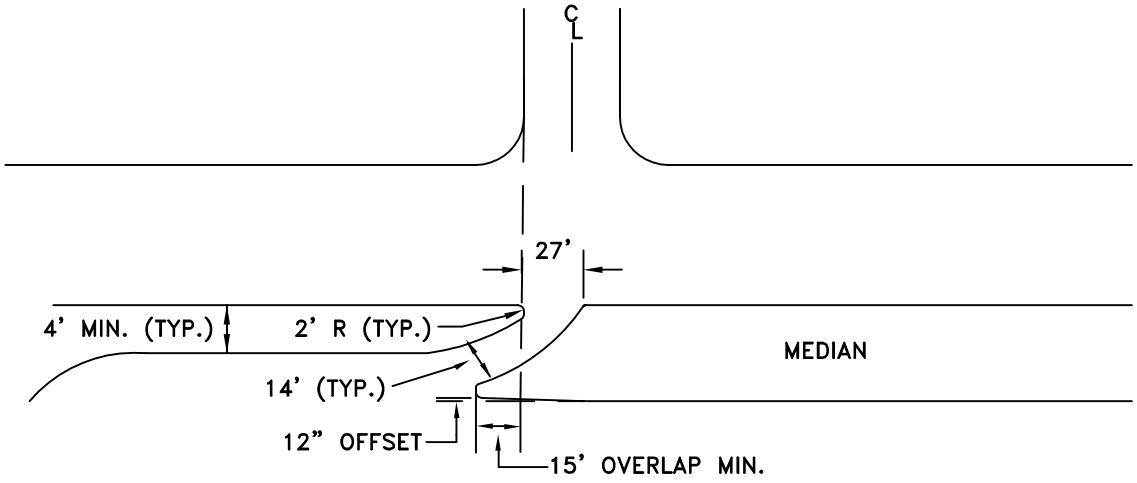


RIGHT–IN, RIGHT–OUT, LEFT–IN
ACCESS DESIGN

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	DRIVEWAYS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	ACCESS DESIGN	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 1004

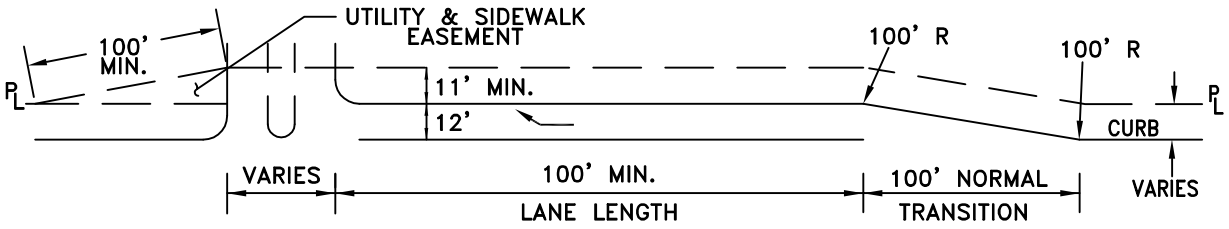


LEFT–IN ONLY MEDIAN DESIGN

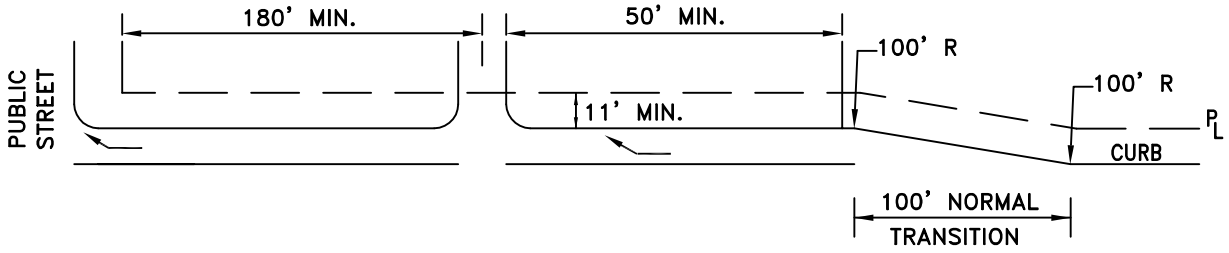


MEDIAN DESIGN TO RESTRICT EXITING LEFT TURNS

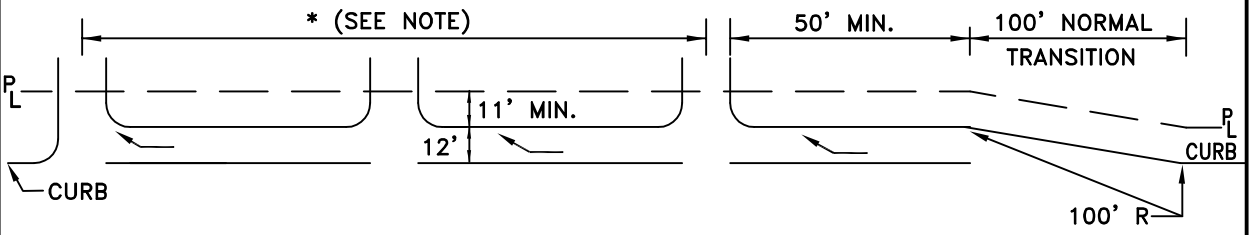
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	DRIVEWAYS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	MEDIAN DESIGN	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 1005



TYPICAL



IN INTERSECTION RIGHT TURN LANE

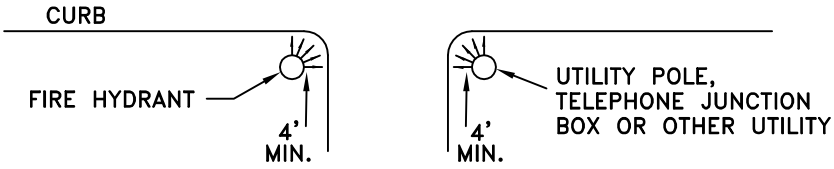


CONTINUOUS DECELERATION LANE

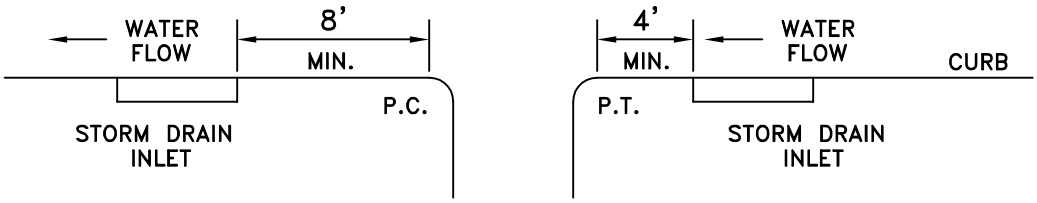
NOTE:

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.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	DRIVEWAYS	
APPROVED BY THE CITY ENGINEER: Richard D. Wells	DECELERATION LANES FOR DRIVEWAYS	CITY of MODESTO
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 1006

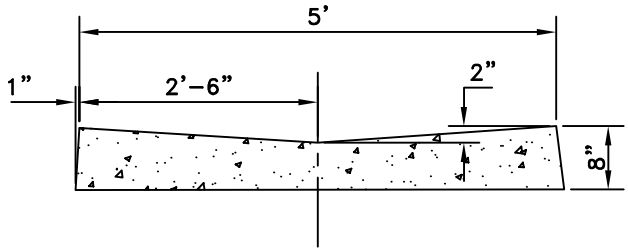


ABOVE GROUND UTILITIES

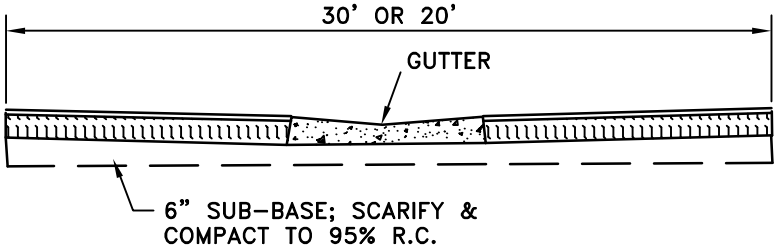


STRAIGHT CURB INLET

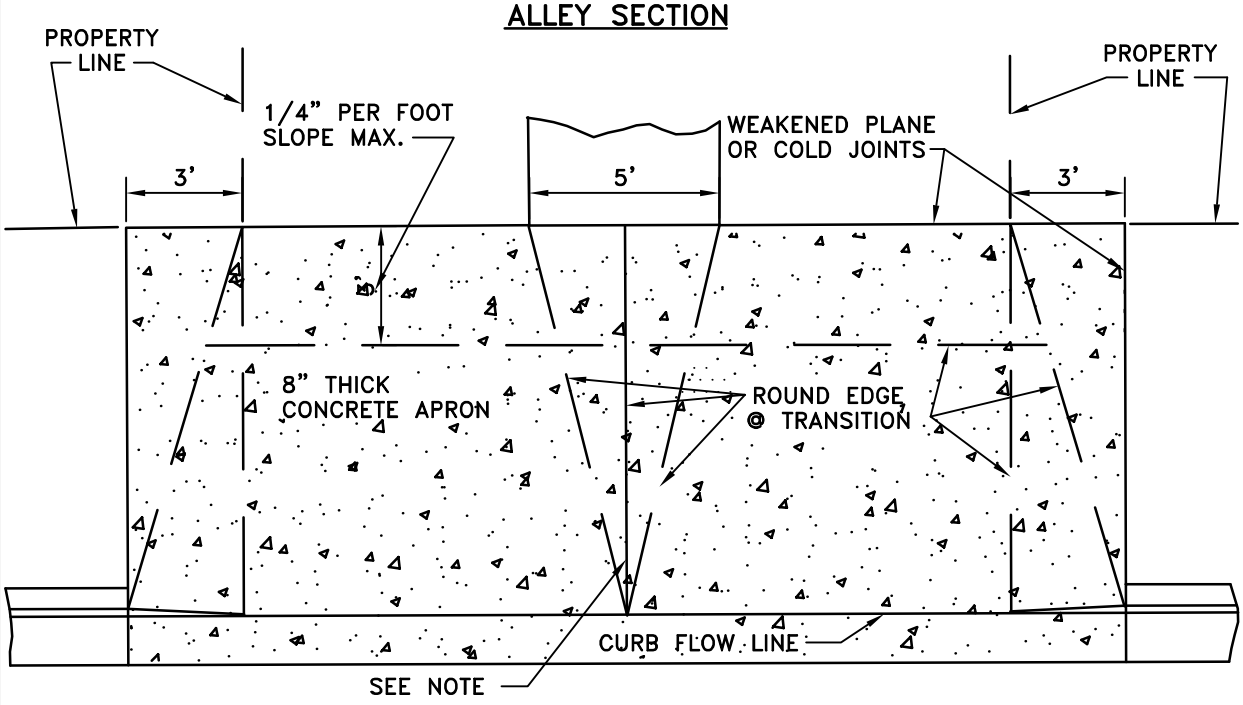
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	DRIVEWAYS	
APPROVED BY THE CITY ENGINEER:	DRIVEWAY DETAILS, UTILITIES	CITY of MODESTO
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 1007



CONCRETE GUTTER
DETAIL



ALLEY SECTION

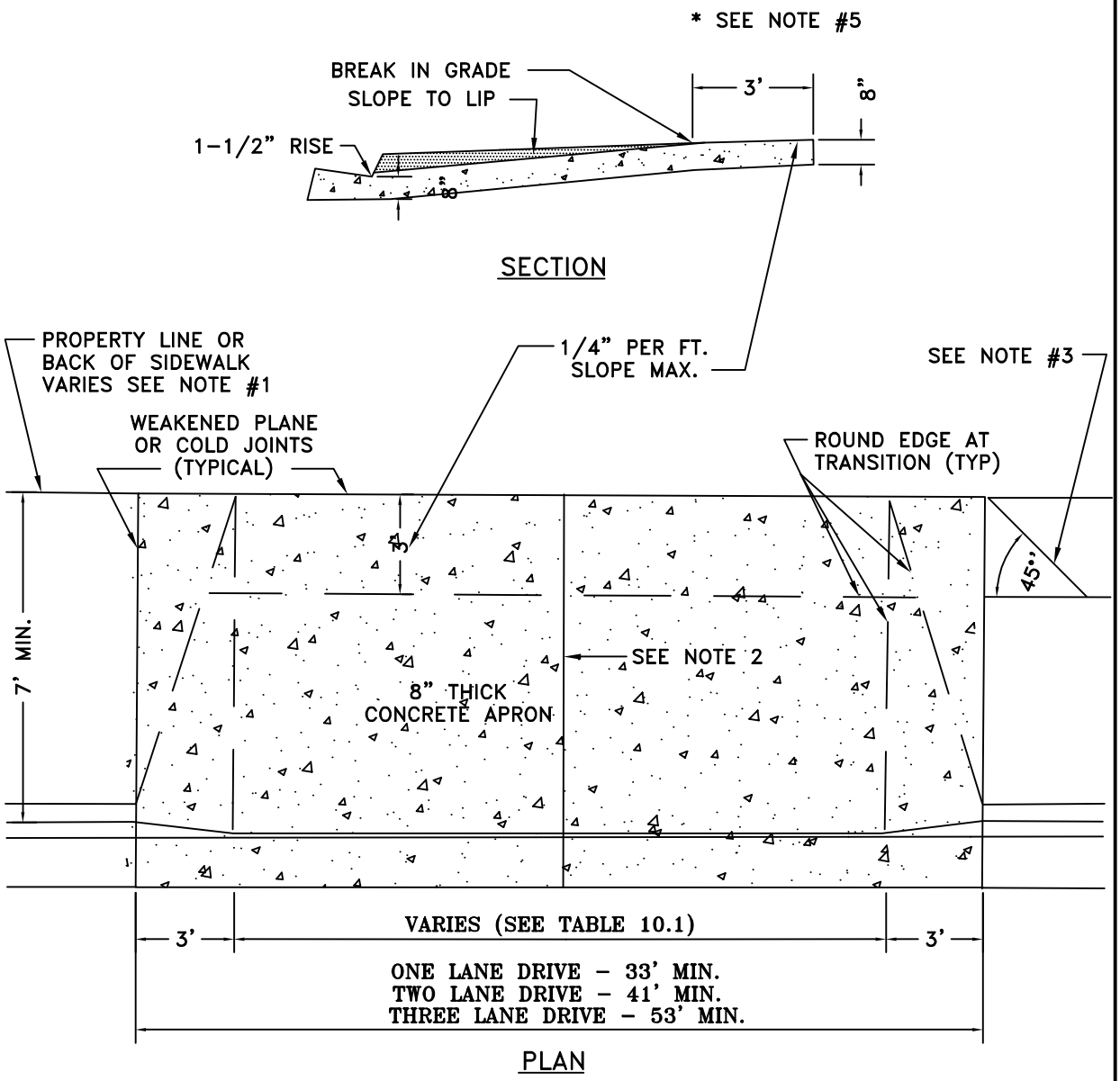


PLAN

NOTE:

INTERMEDIATE WEAKENED PLANE JOINT.

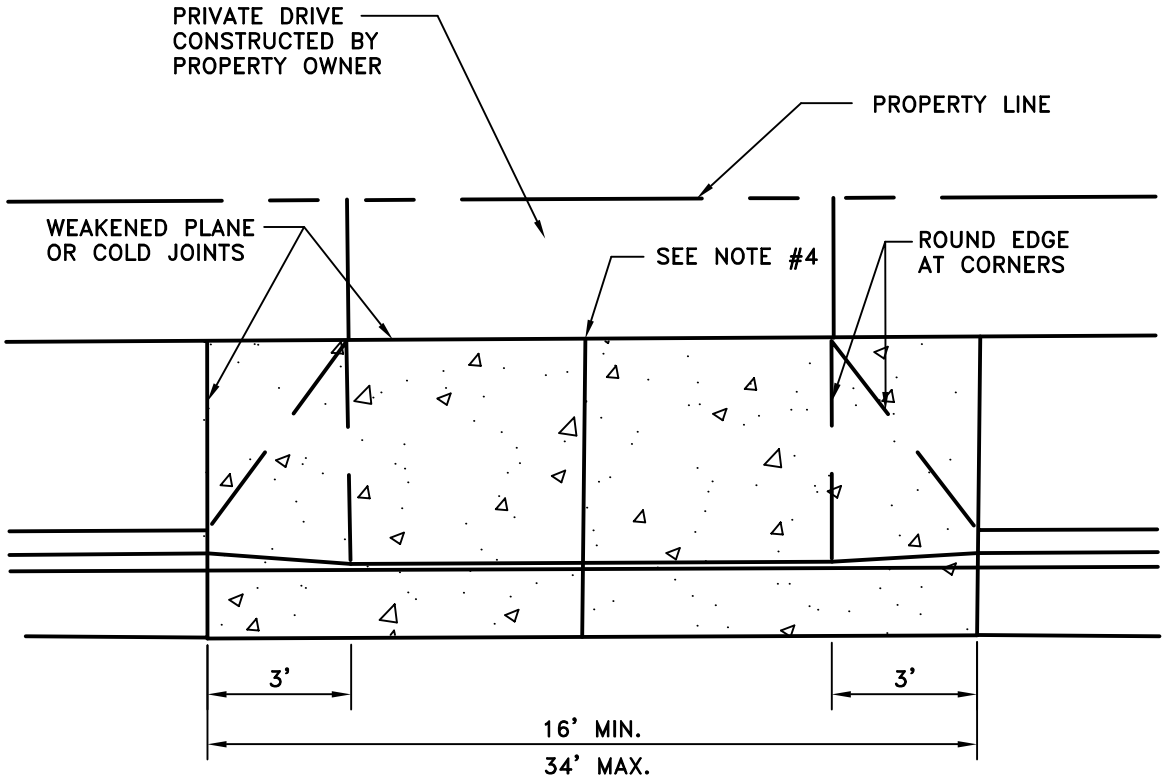
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	DRIVEWAYS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	CONSTRUCTION DETAILS FOR ALLEY FLARED DIVEWAYS	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 1008



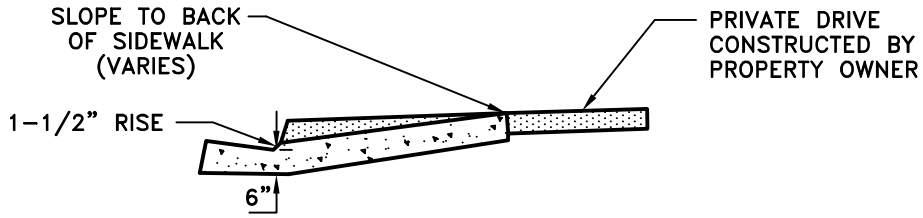
NOTES:

1. REFER TO TYPICAL STREET SECTIONS OR CALL THE PUBLIC WORKS DEPARTMENT AT 577-5569 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 CITY COUNCIL RESOLUTION NO. 2006-284	DRIVEWAYS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	CONSTRUCTION DETAILS FOR COMMERCIAL/APTS FLARED DRIVEWAYS	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 1009



PLAN

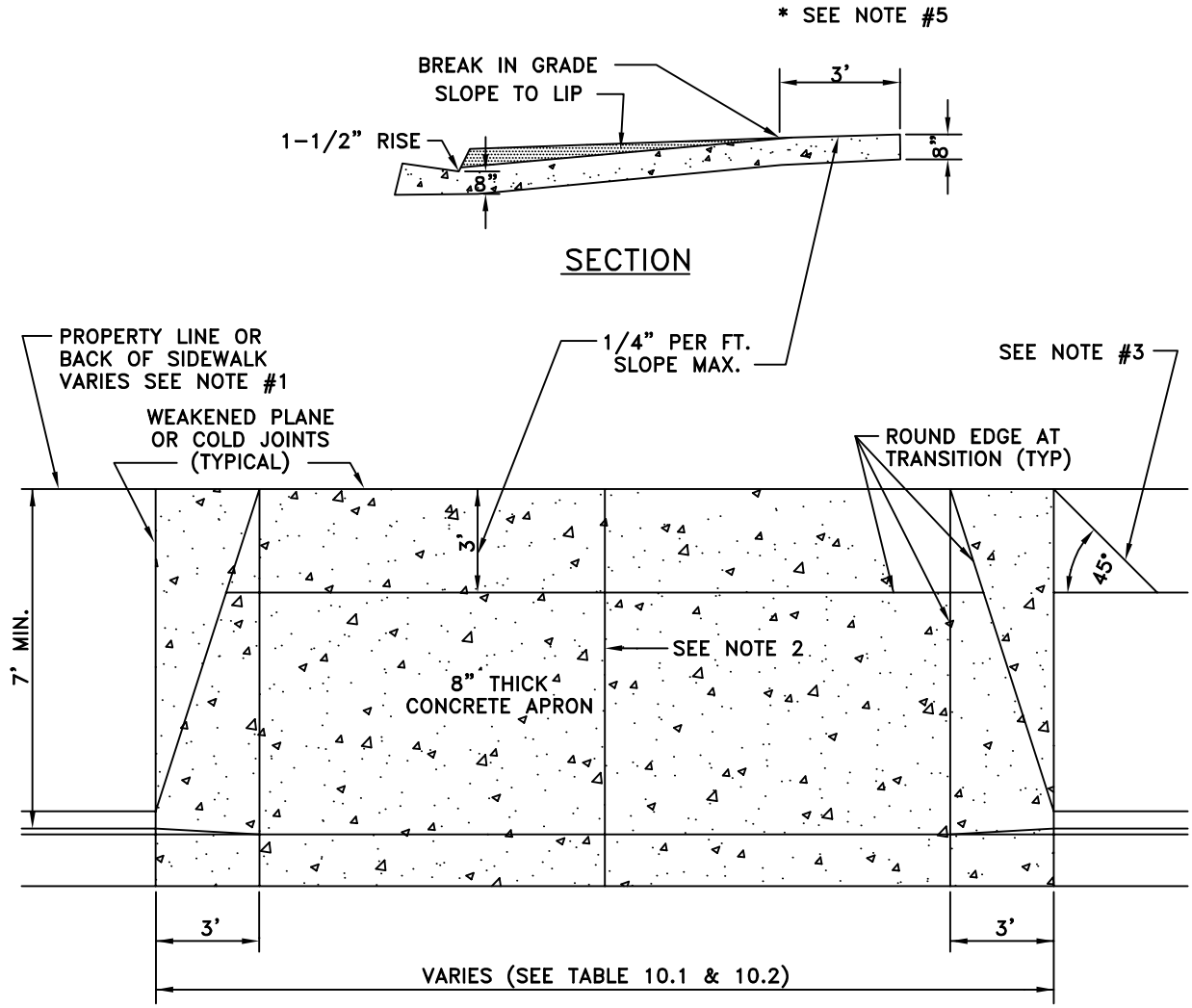


SECTION

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.

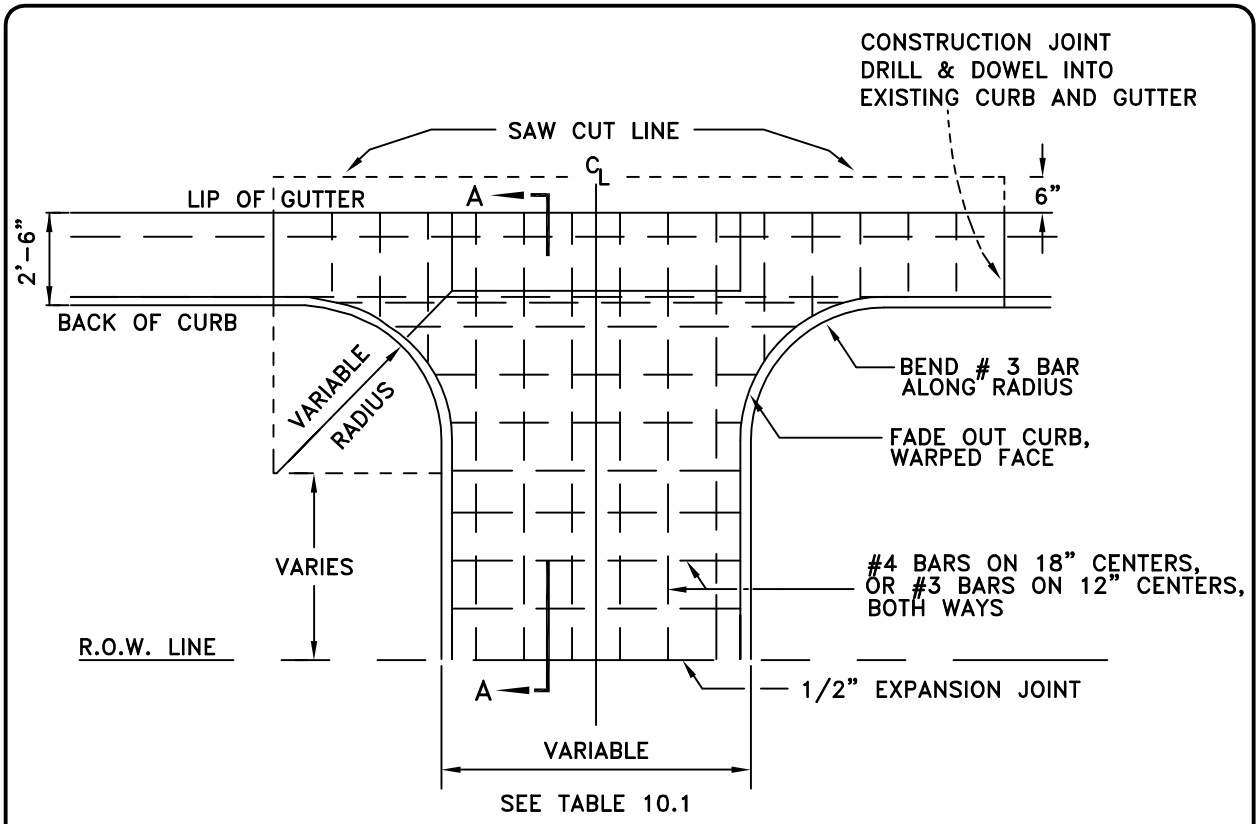
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	DRIVEWAYS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	CONSTRUCTION DETAILS FOR RESIDENTIAL FLARED DRIVEWAYS	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 1010

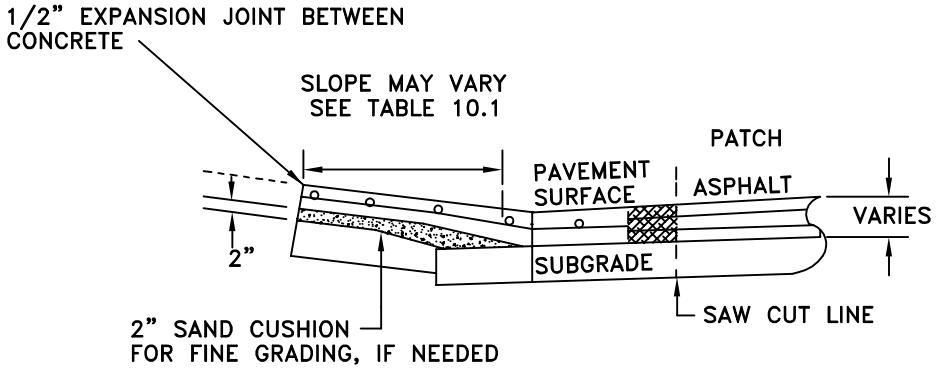


NOTES:

1. REFER TO TYPICAL STREET SECTIONS OR CALL PUBLIC WORKS AT 577-5264 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 CITY COUNCIL RESOLUTION NO. 2006-284	DRIVEWAYS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	CONSTRUCTION DETAILS FOR COMMERCIAL FLARED DRIVEWAYS	
	PUBLIC WORKS DEPARTMENT	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 CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Ulm

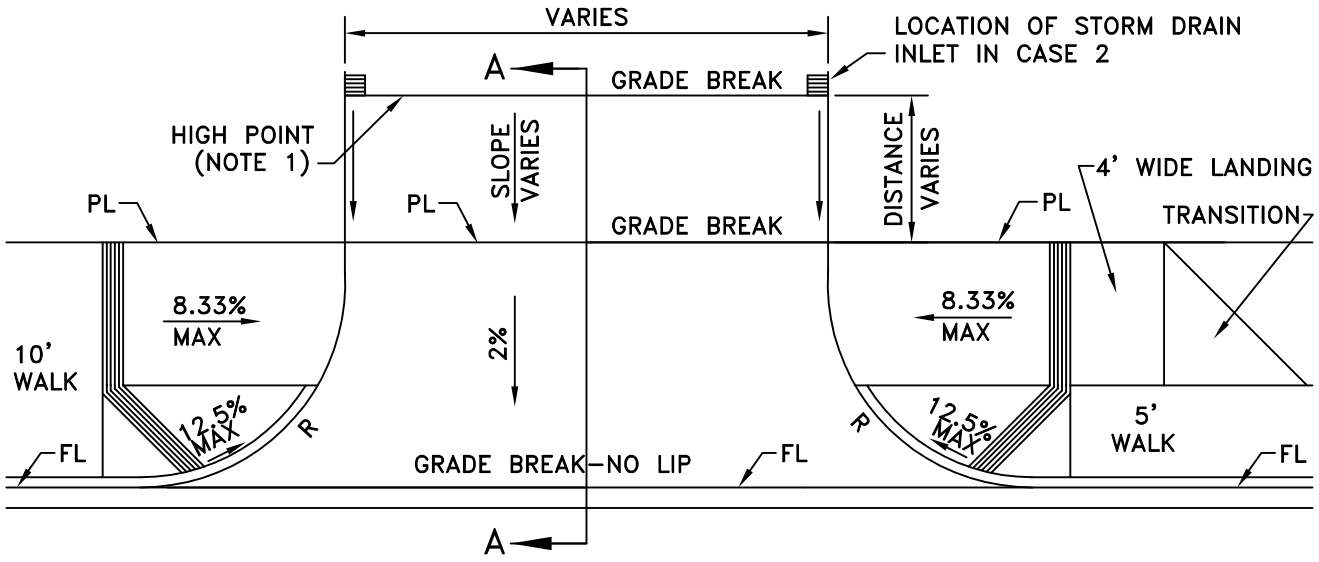
DRIVEWAYS

CONSTRUCTION DETAILS FOR DROP APPROACH DRIVEWAYS

CITY of MODESTO

PUBLIC WORKS
DEPARTMENT

DETAIL NO.
1011



PLAN VIEW

NOTES:

1. RAMPS SHALL BE SLOPED AND GROOVED PER DETAIL # 348.
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 DRIVEWAY DESIGN STANDARDS. SEE TABLE 10.1.
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 3.05.
7. SEE DETAIL #1013 FOR SECTION A–A PROFILE VIEWS FOR CASE 1 AND CASE 2.

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006–284

APPROVED BY THE CITY ENGINEER:

Richard D. Wu

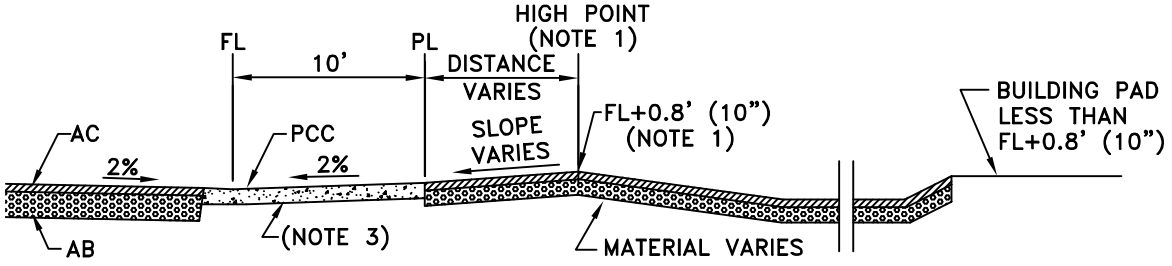
DRIVEWAYS

DROP CURB APPROACH RAMPS AND GRADES

CITY of MODESTO

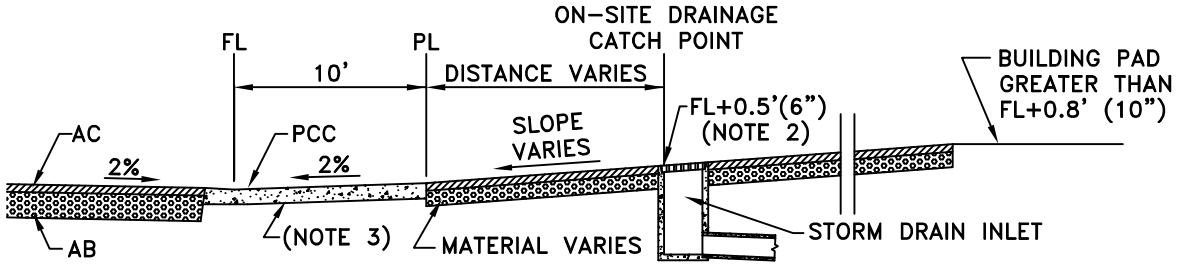
PUBLIC WORKS DEPARTMENT

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 CITY COUNCIL RESOLUTION NO. 2006–284	DRIVEWAYS	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	DROP CURB APPROACH PROFILE VIEW	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 1013

CHAPTER 11

GRADING DESIGN STANDARDS

11.01 GENERAL

All grading shall be designed in accordance with the soils report and Chapter 70 of the latest Uniform Building Code.

11.02 SOILS REPORT

A comprehensive soils report shall be prepared for each project in the City. The report must be prepared by a licensed Geotechnical experienced in soil work or 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, 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 TI. Below the chart shall be the reference source such as “Geotechnical Engineer Name, Legends Village Unit 2, July 99”.

11.03 GRADING AT PROPERTY LINES

A. The property line of 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 owners of the existing parcel.

E. A 12" maximum wood wall (2" x 12" redwood) may be installed along project boundaries to preclude grading on adjacent property.

F. Walls higher than 12" shall be masonry or reinforced concrete. Calculations shall be provided with submittal of improvement plans.

11.04 LOT GRADING

Lots shall be graded or swaled to slope a minimum of 1% toward a public street from the low point in the rear of the lot to the back of fronting sidewalks or top of curb grades. 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.

11.05 POST-GRADING REQUIREMENTS

The project civil engineer of record and the geotechnical engineer of record shall file with the City of Modesto Public Works Department the following certifications for each lot in a subdivision or each pad on a commercial site at the conclusion of rough grading:

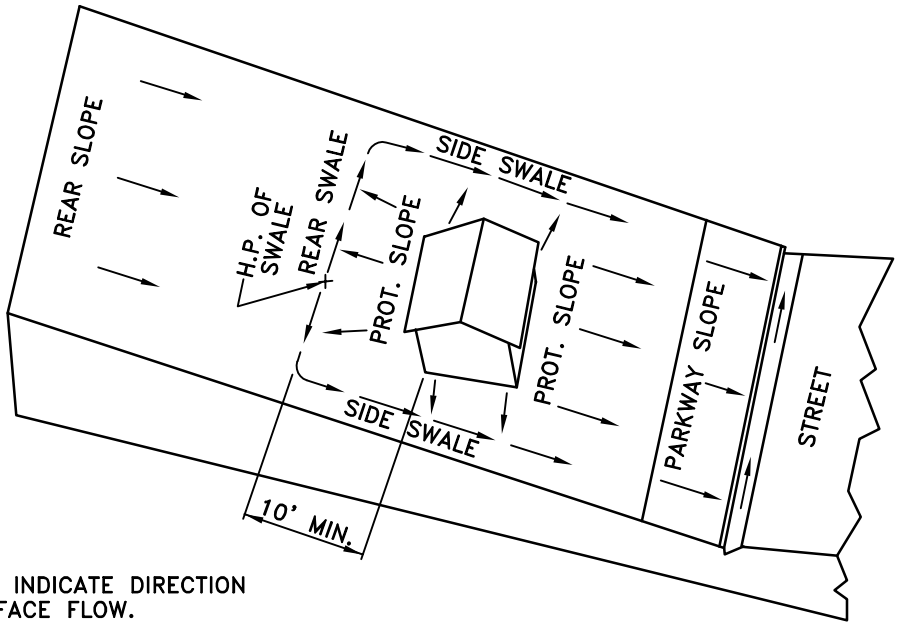
A. The project civil engineer of record shall submit a letter certifying that the lot has been graded to the elevation as shown on the approved grading plans. This letter shall be signed and stamped by the civil engineer or surveyor;

B. The project geotechnical engineer of record shall submit a letter certifying that each lot has been observed, tested and constructed in accordance with the recommendations in the project geotechnical 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 geotechnical engineer of record, and;

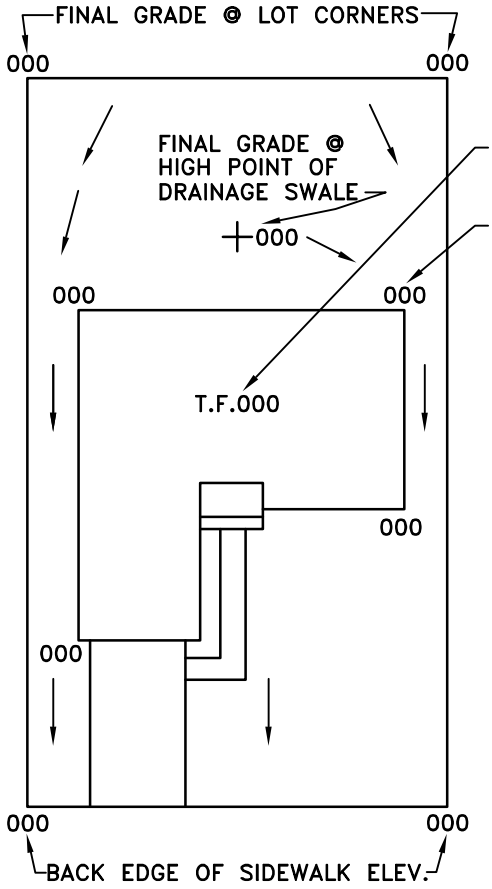
C. The project geotechnical engineer of record shall supply to the City of Modesto a letter stating that he/she has R-value tested the actual street subgrades exposed during rough grading **after** completion of the utility construction in the street and prior to base rock. The geotechnical engineer 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.

11.06 STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

The Consulting Engineer and Developer must apply best management practices in the grading design to minimize erosion and soil run-off. The Design Engineer may want to place applicable details on the grading plans as well as include the details in the SWPPP. A grading permit will not be issued without a copy of the Notice of Intention (NOI) filed with the state (1 acre sites or greater).



NOTE:
ARROWS INDICATE DIRECTION OF SURFACE FLOW.



FINAL TOP OF FOUNDATION ELEVATION MINIMUM 8" ABOVE PROTECTIVE SLOPE.

FINAL ELEVATION PROTECTIVE SLOPE @ 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 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.

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Ulm

STREETS

TYPICAL FINISHED LOT GRADING

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO.
1100

CHAPTER 12

LANDSCAPE PLANTING & IRRIGATION

12.01 GENERAL PLANTING

Landscaping shall be installed to conform to these Standards by 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 for this job.

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 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. This work is to be completed within the stated contract period.

Landscape Maintenance will consist of a period of 60 calendar days, which will begin after completion of the Landscape 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 Parks, Recreation and Neighborhood Department 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 ¾" 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 only when they exceed the specified minimums.

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 ($P_2 0_5$) 10%
- Derived from calcium phosphate

Soluble Potash ($K_2 0$) 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_20_5) 7%
- Derived from Ammonium and Calcium Phosphates

Soluble Potash (K_20) 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_20_5) 12%
- Derived from Ammonium Phosphate

Soluble Potash (K_20) 12%
- Derived from sulfate of potash

Sulfur (S) expressed as elemental 15%
- Derived Sulfate

Calcium (Ca) 2.10%
- Derived from Gypsum

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. Top Dress: Top dress shall be a nitrogen-stabilized bark mulch ground and composted for at least one (1) month at moisture levels of 30-50% and temperatures of 130°-150° F. The product shall be dark brown throughout, screened at a maximum of 1" to remove all contaminants, such as plastic or other debris, and with a minimum of 1% nitrogen to prevent nitrogen deficiency in plant material. Material to be applied at a minimum depth of 3".

I. 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, of Lodge Pole pine, made from the entire bole of the tree with bark removed and completely treated in a solution of pentachlorophenol. 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. Plant material for back-up lot landscaping shall be low-maintenance, require minimal use of irrigation water once established, and shall be appropriate for the landscape situation:
    a. Evergreen shrubs, 2'–3' high in 3' x 20' planters with vines planted so as to cover the wall.
    b. Plant material must be appropriate to full sun, part sun, or shade locations.
    c. Street tree varieties shall be selected by the City Arborist.

J. Herbicide

Submit written chemical weed control program prepared by a licensed pest control advisor for approval by the City Engineer.

K. 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 damp proof structure. Any transit or storage will not be acceptable. Seed Supplier shall be approved by the City Engineer prior to delivery.

L. 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 a 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.

M. Mulch

Mulch shall be a nitrogen-stabilized, fibrous, woody bark mixture called “Walk-on-bark” as distributed by Sun-up Forest Products, 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. 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.

Where sod installation is required, both the soil medium being planted as well as the sod will be tested for compatibility. Testing of the sod will include both sod soil medium and plant tissue analysis.

Drawings to include identification of actual value locations as programmed/installed at controller.

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 only when they exceed the specified minimums.

2. All weed growth within the areas to receive planting shall be removed. Areas containing common Bermuda grass shall be fumigated with materials approved by the City Engineer.

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 at the following rates:
    a. Soil Amendment – 6 cubic yards per 1,000 square feet.
    b. Fertilizer – 20 pounds per 1,000 square feet of 12-12-12 or approved equal.

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 conditioning 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 4" in shrub or ground cover areas prior to placing a 3" layer of top dress.

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 holes shall at all times be in accordance with standard tree planting specifications of City of Modesto.

4. Place backfill in bottom of plant hole after making sure base of hole is loose enough for good drainage. Place approximately one (1) cup of bone meal in bottom of planting hole and mix to a depth of 6" prior to placing of tree.

5. Soil excavated from holes may be reused for planting operations.

6. 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.

7. Glazed sides of augured holes shall be scarified.

8. Trees and shrubs shall be carefully removed from containers. All tin containers, other than knockout cans, shall be cut on two (2) sides to facilitate removal of plants with as little disturbance as possible to the root ball. Cans shall be cut with an approved type of can cutter or similar equipment. In no case shall cans be broken open with an axe, mattock, or similar article.

9. 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.

10. 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.

Fertilizer:

Install planting tablets as follows:

1 gallon plant	1 tablet
5 gallon plants	3 tablets
15 gallon plants	5 tablets

11. 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.

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. After thoroughly watering in all plant material, apply a 3" layer of top dress 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 shall be installed to conform to these standards by Developer or Contractor holding an appropriate license for such work under the provisions of the State of California Business and Professional Code and shall conform to Section 20-5.03A of the State Standards.

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 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 landscape designs for private commercial and public owned lands shall be reviewed and approved by the Parks, Recreation and Neighborhood Department 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 couplings.

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 FMM007 Flex Hose (MIPT x MIPT) or approved equal.
   b. Risers shall in no case 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 Rainbird Pentite connector (or equal) or with 3M-DBY connectors. 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 moisture sensing capability. The controller must have the potential of 8-hour continuous irrigation and be installed in a vandal- resistant case. Controller to be Rainbird ESP-MC only unless otherwise specified and approved by City of Modesto Parks Division representative. Controller shall be suitable for future connection to Rainbird MaxiCom system. A flow sensor, master valve, cluster control unit and related equipment may be required, at the request of the City Engineer.

8. 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.

9. Rain sensor shall be Rain Guard RCS or equal. Mount to side of irrigation controller as per manufacturer's instructions and as shown on drawings.

10. 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 “0” 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.

11. 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.

12. Filter strainer shall have a plastic housing, 1" Female (NPT) with removable screen. Rainbird No. RBY-100-150 with 150 mesh stainless steel screen or approved equal.

13. Pressure reducing valve shall have a plastic housing, with a preset outlet pressure of 25 psi, Rainbird NO. PSI-HMB-25 or approved equal.

14. 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.

15. 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.

16. 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 30minutes 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.
   b. All threaded joints shall be made up with pipe joint 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 us 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 brass connectors and sealing with Pentite or 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.

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 AS-BUILT DRAWINGS

A. The Contractor shall maintain in good order in the field office one (1) complete set of black line 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, obtain reproducible mylars from the City of Modesto and neatly correct the mylars to show the As-built conditions.

E. Provide As-builts in AutoCAD 2004 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.

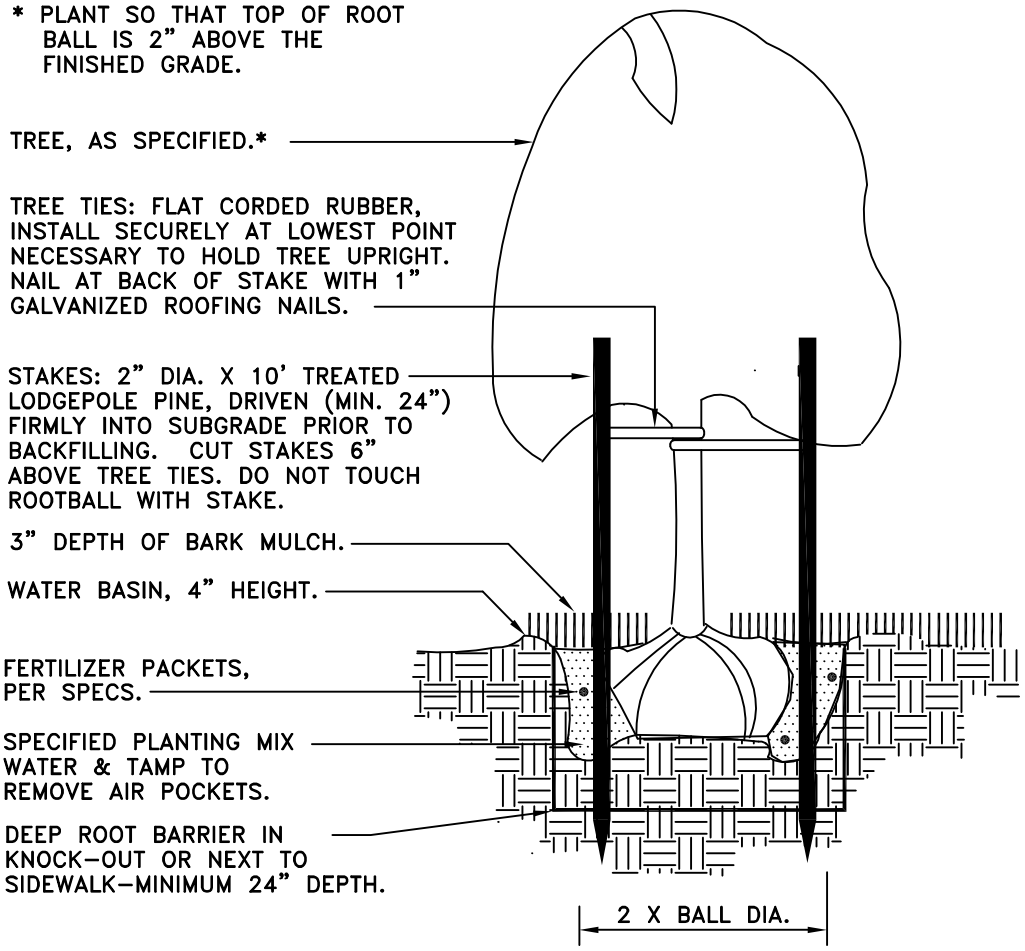
If measured by unit, quantities of sprinkler heads, quick coupling valves, backflow preventers, etc. will be determined from actual count of the items in place in the completed work. Quantities of conduit and the various sizes of pipe will be measured by the lineal foot in place in the completed work.

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.

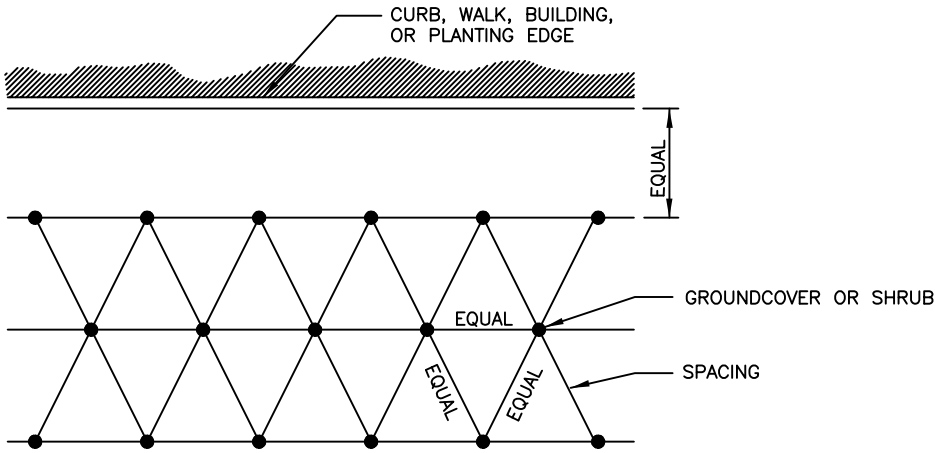
The above prices and payments shall include full compensation for furnishing all labor, materials tools, equipment, and incidentals, and for doing all the work involved in installing the irrigation systems, complete in place, as shown on the plans, and specified in these specifications and the special provisions, and as directed by the City Engineer, including any structure excavation, structure backfill and water involved.



NOTES:

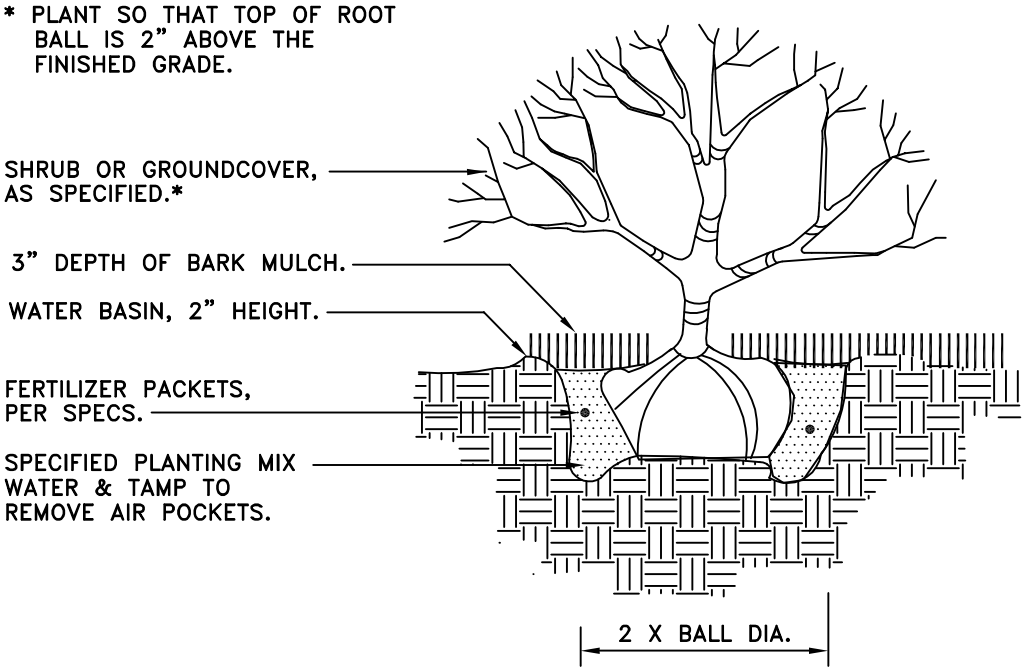
1. TOP SUPPORT OF TREES SHOULD BE AS LOW ON THE TRUNK AS POSSIBLE BUT HIGH ENOUGH THAT THE TREE WILL RETURN TO UPRIGHT AFTER DEFLECTION. TO FIND THE PROPER HEIGHT, HOLD THE TRUNK IN ONE HAND, PULL THE TOP TO ONE SIDE AND RELEASE. THE HEIGHT AT WHICH THE TRUNK WILL JUST RETURN TO UPRIGHT WHEN THE TOP 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.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	LANDSCAPING	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	PLANTING DETAIL TREE	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 1200



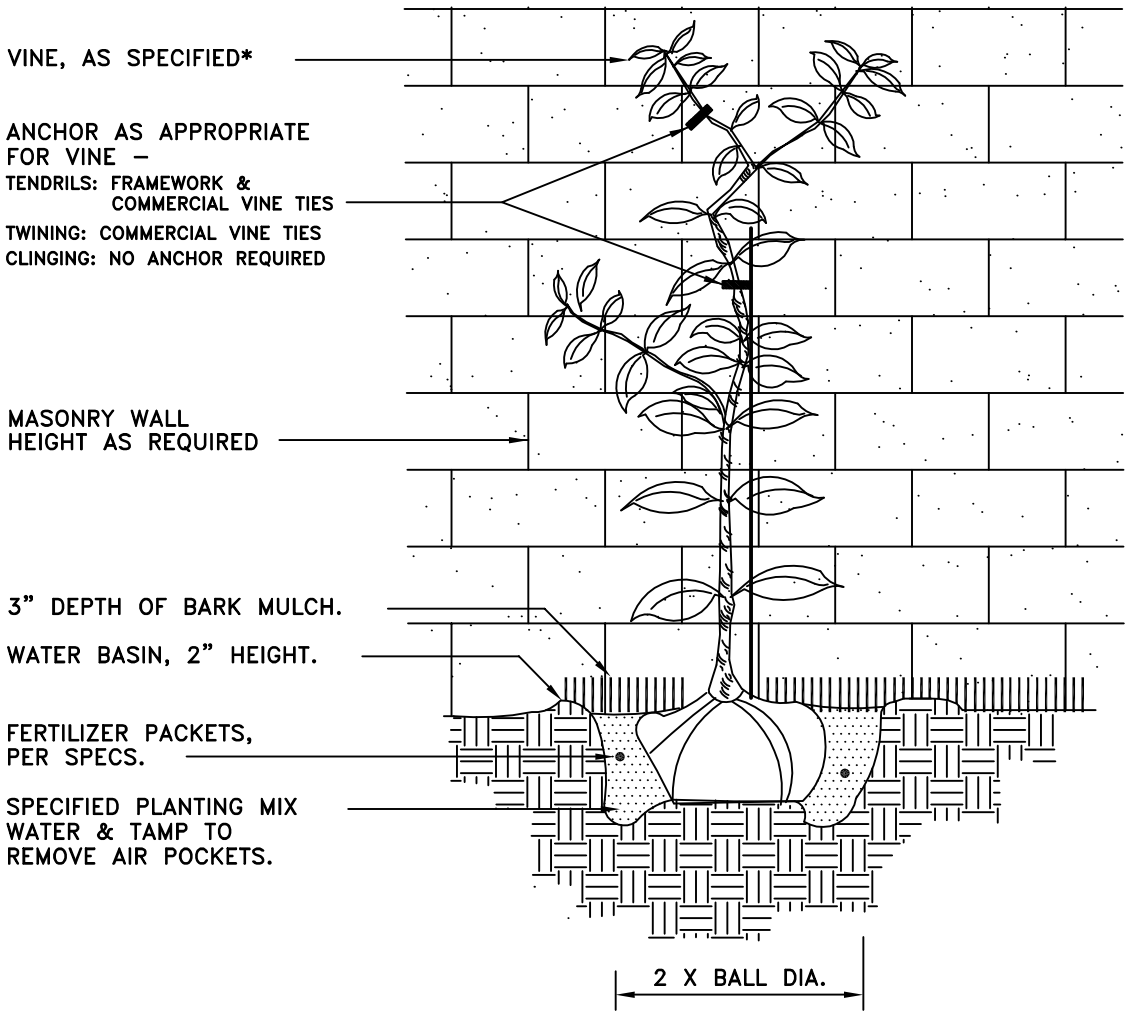
GROUNDCOVER & SHRUB SPACING

PLAN VIEW

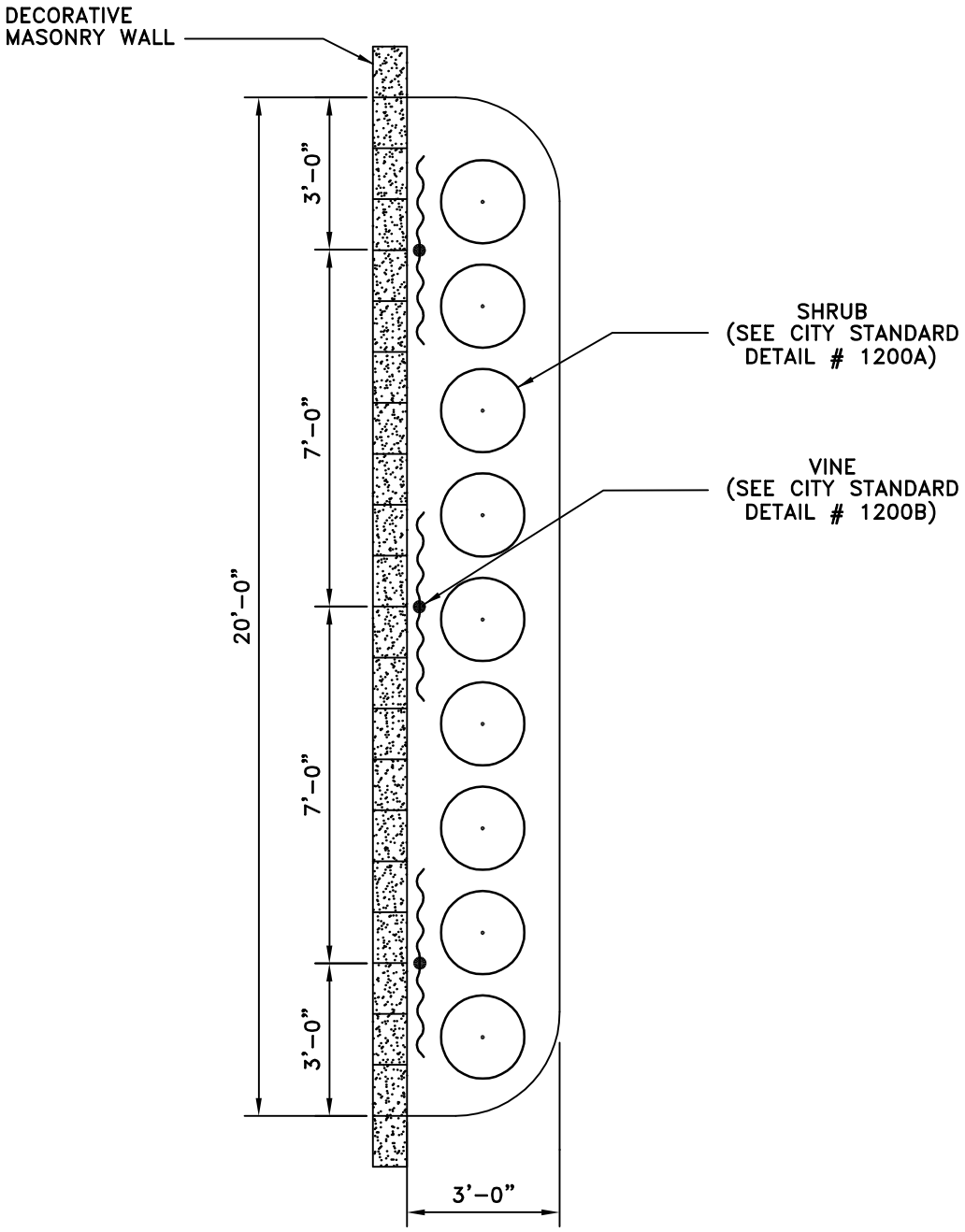


APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	LANDSCAPING	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	PLANTING DETAIL SHRUB & GROUNDCOVER	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 1200A

* PLANT SO THAT TOP OF ROOT BALL IS 2" ABOVE THE FINISHED GRADE.



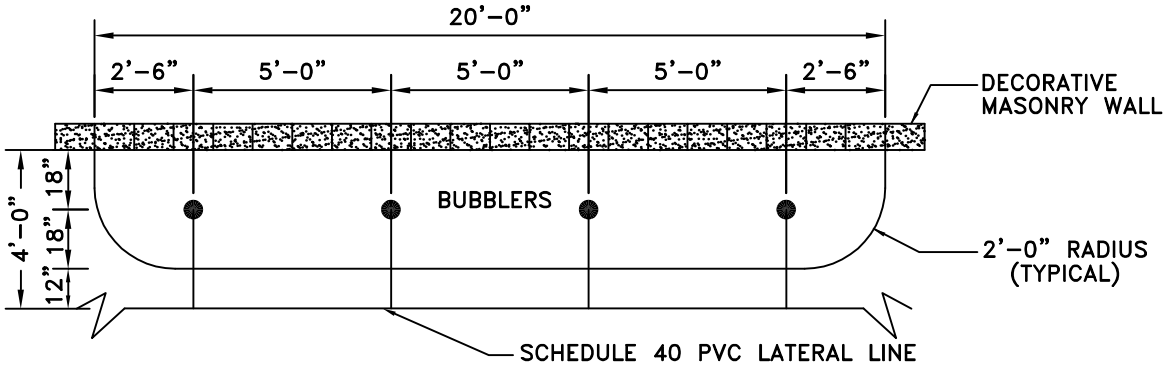
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	LANDSCAPING	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	PLANTING DETAIL VINE	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 1200B

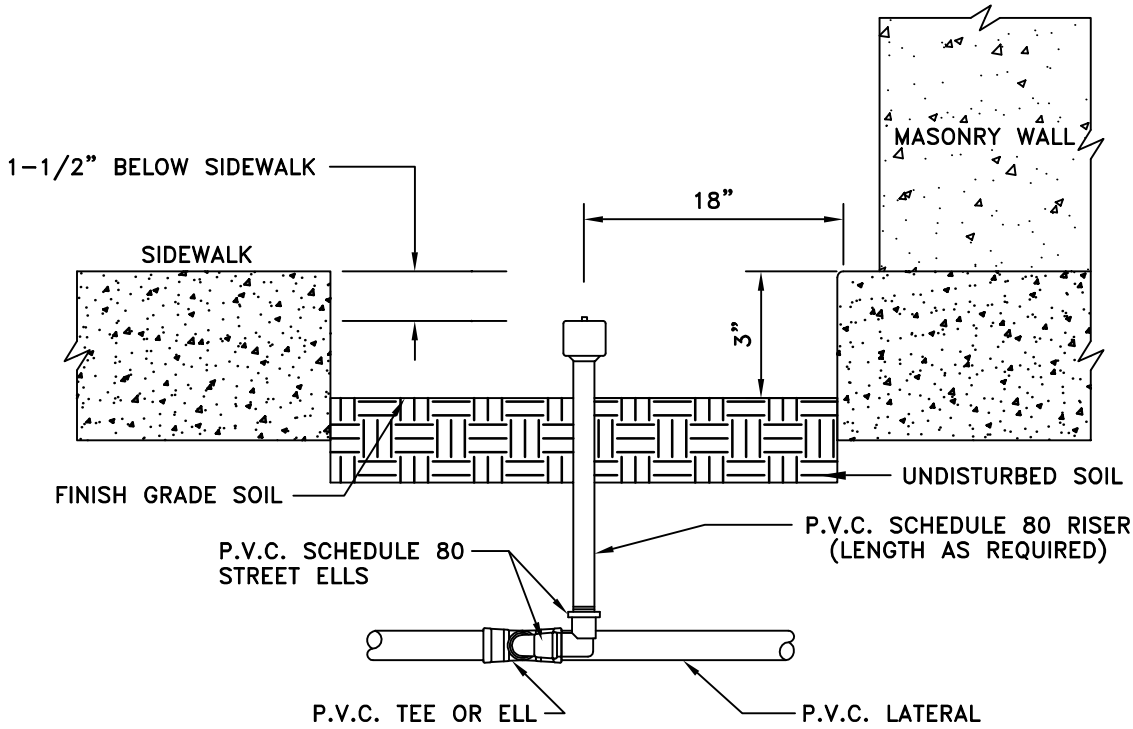


NOTES:

1. PLANT SHRUBS AT 2'-0" ON CENTER.
2. INSTALL 3" OF BARK MULCH IN PLANTER.
3. SEE CITY STANDARD DETAIL #1208 FOR OVERALL PLANTER LAYOUT.
4. ALL LANDSCAPE AND IRRIGATION PLANS MUST BE APPROVED BY THE PARKS, RECREATION AND NEIGHBORHOODS DEPARTMENT.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	LANDSCAPING	
APPROVED BY THE CITY ENGINEER: Richard D. Wells	PLANTER DETAIL PLANTING LAYOUT	CITY of MODESTO
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 1201

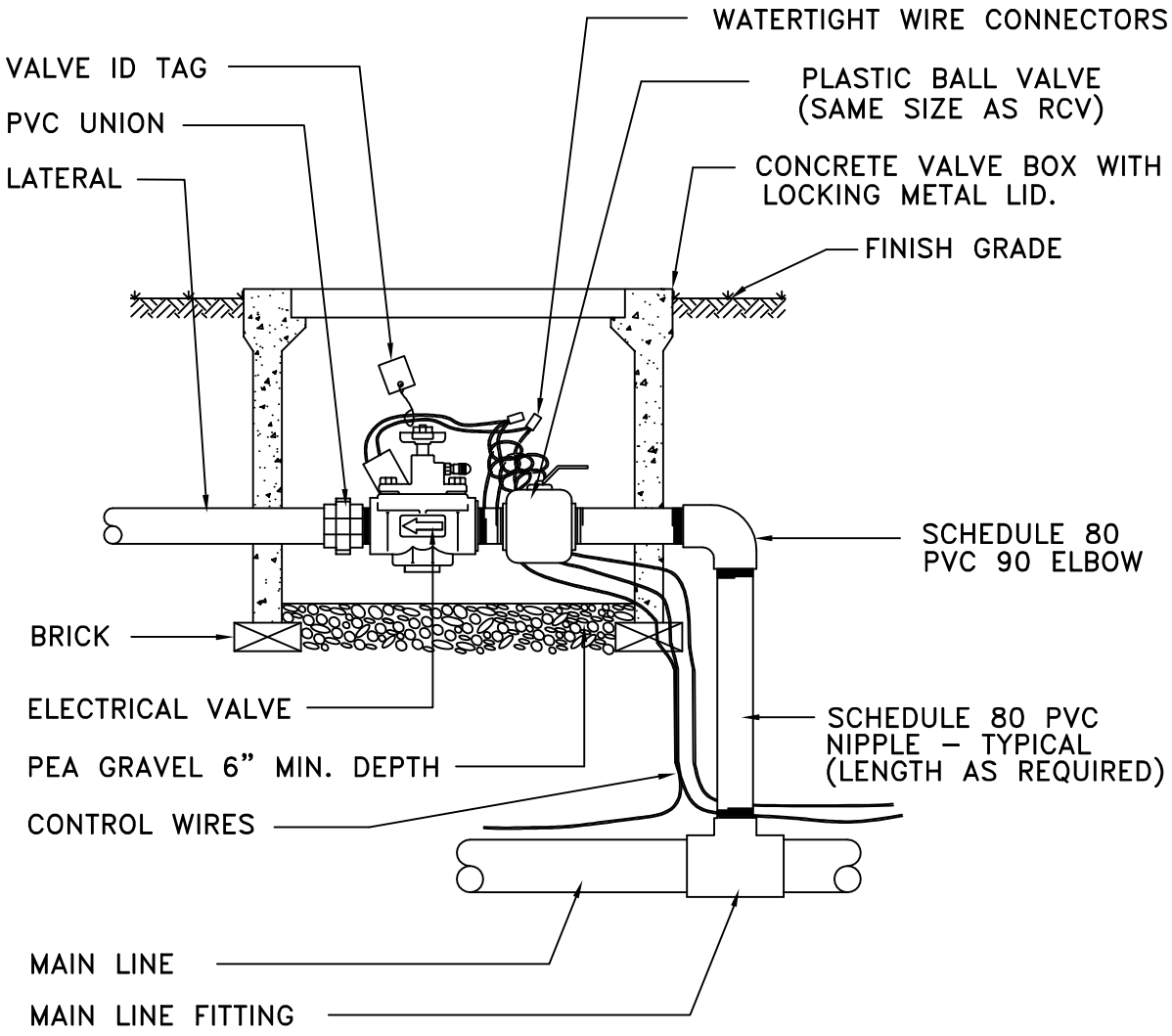




NOTES:

1. USE RAINBIRD 1402 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. IF SOIL IN PLANTER IS NOT PERFECTLY LEVEL BUBBLER IRRIGATION CANNOT BE USED.
5. SEE CITY STANDARD DETAIL #1208 FOR OVERALL PLANTER LAYOUT.
6. ALL LANDSCAPE AND IRRIGATION PLANS MUST BE APPROVED BY THE PARKS, RECREATION AND NEIGHBORHOODS DEPARTMENT.

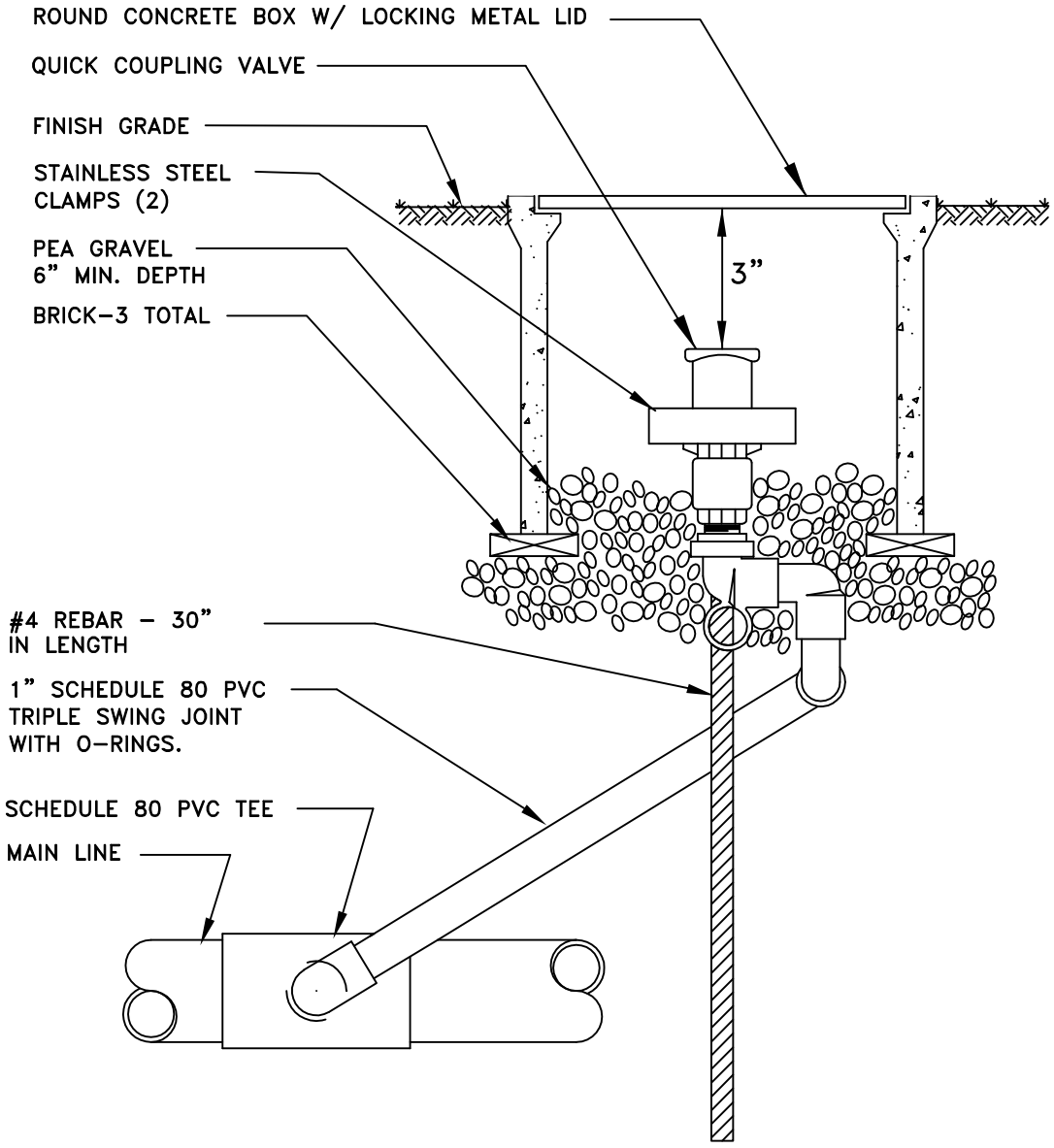
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	LANDSCAPING	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	PLANTER DETAIL IRRIGATION LAYOUT	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 1201A



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.

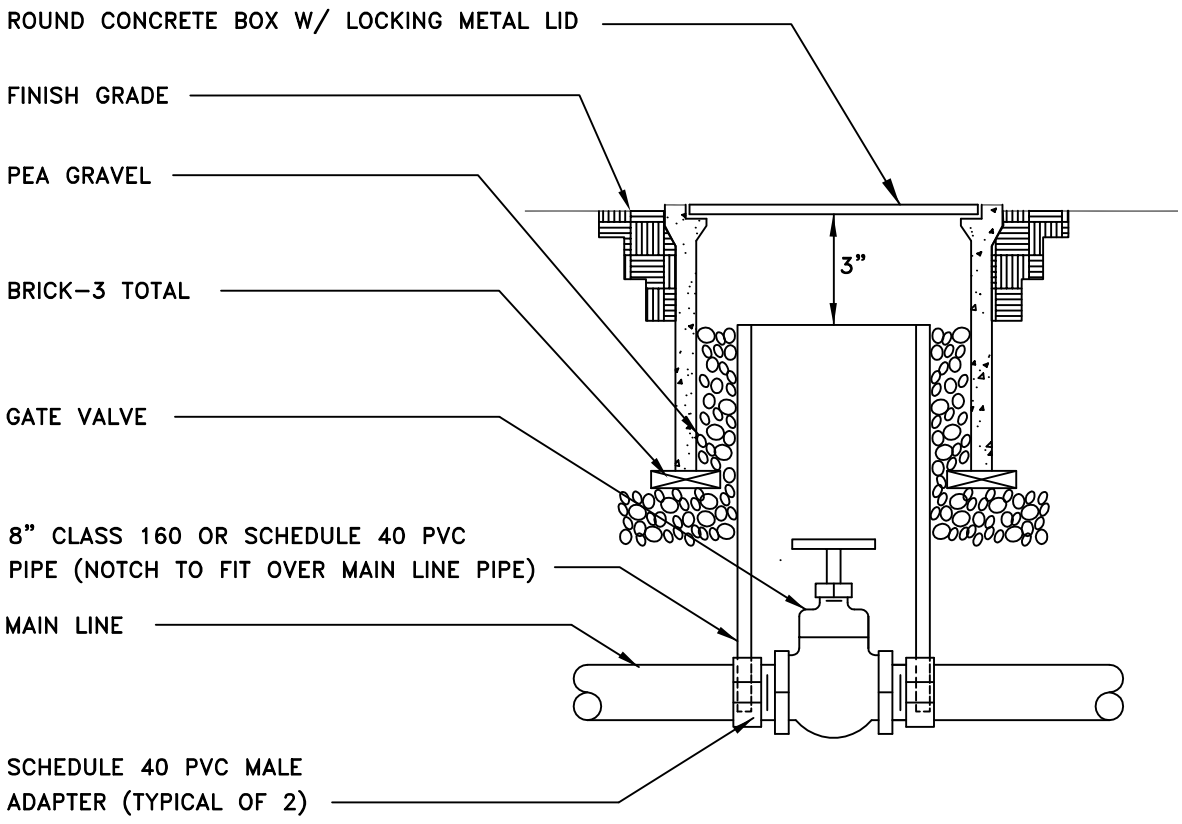
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	LANDSCAPING	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	REMOTE CONTROL VALVE ASSEMBLY	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 1202



NOTES:

1. COMPACT SOIL AROUND VALVE BOX TO SAME DENSITY AS UNDISTURBED ADJACENT SOIL.
2. ALL THREADED FITTINGS SHALL INCLUDE TEFLON TAPE.

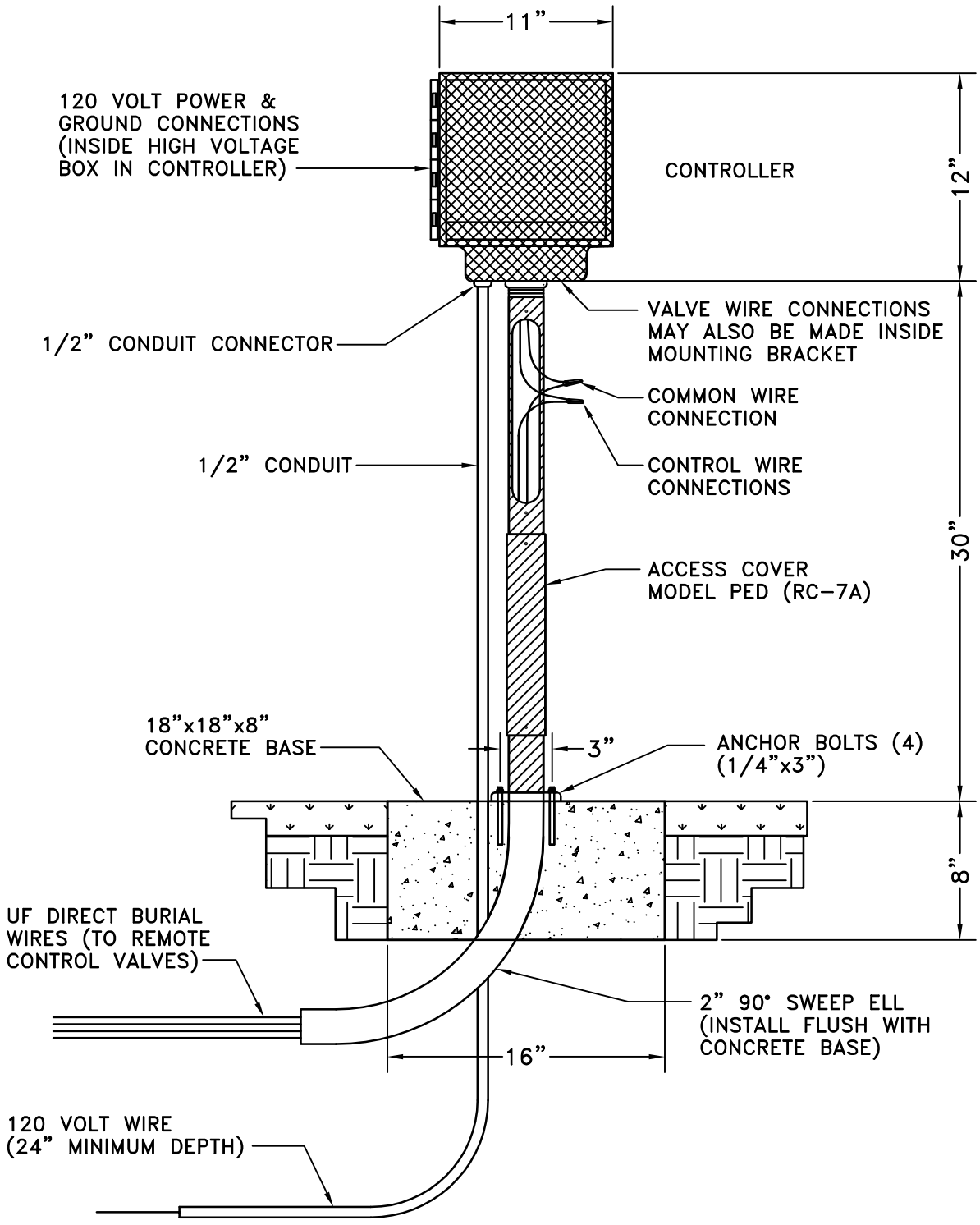
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	LANDSCAPING	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	QUICK COUPLING VALVE ASSEMBLY	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 1202A



NOTES:

1. COMPACT SOIL AROUND VALVE BOX TO SAME DENSITY AS UNDISTURBED ADJACENT SOIL.
2. ALL THREADED FITTINGS SHALL INCLUDE TEFLON TAPE.

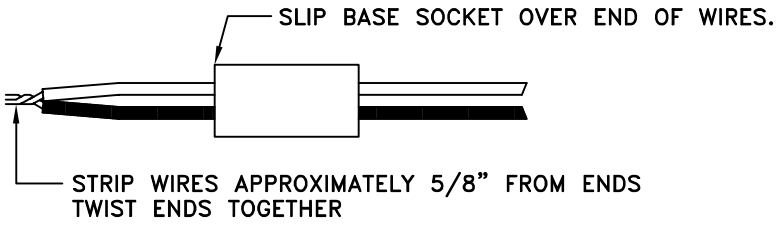
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	LANDSCAPING	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	GATE VALVE ASSEMBLY	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 1203



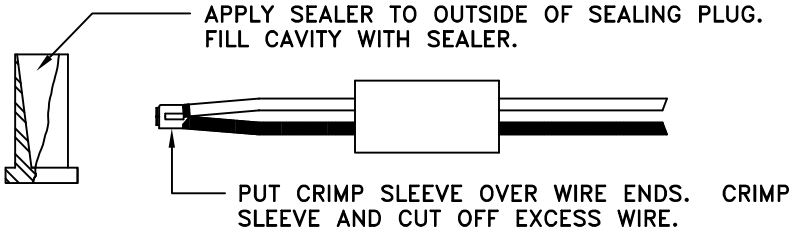
NOTE:

ALL WIRING TO BE INSTALLED AS PER LOCAL CODE.

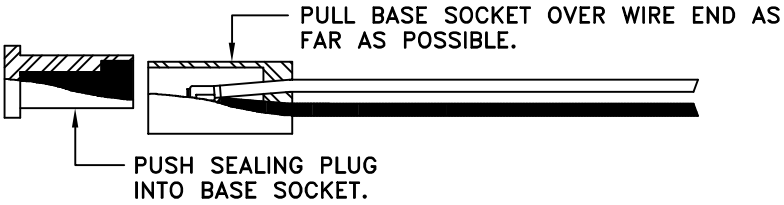
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	LANDSCAPING	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	IRRIGATION CONTROLLER	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 1204



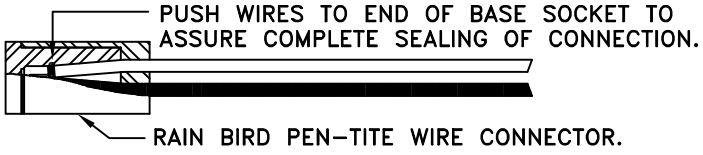
STEP 1



STEP 2



STEP 3

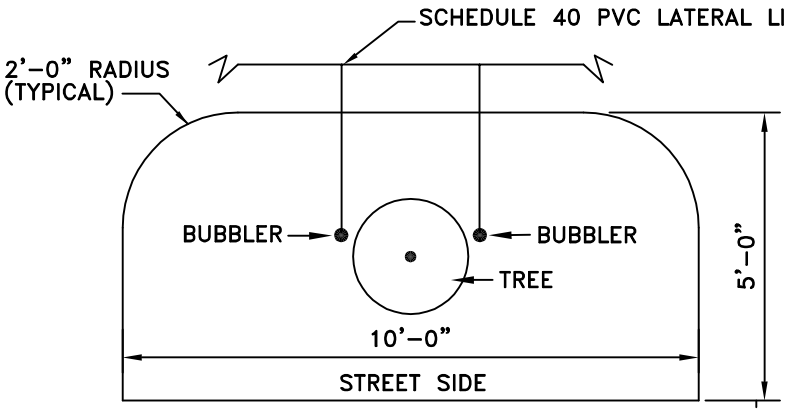


STEP 4

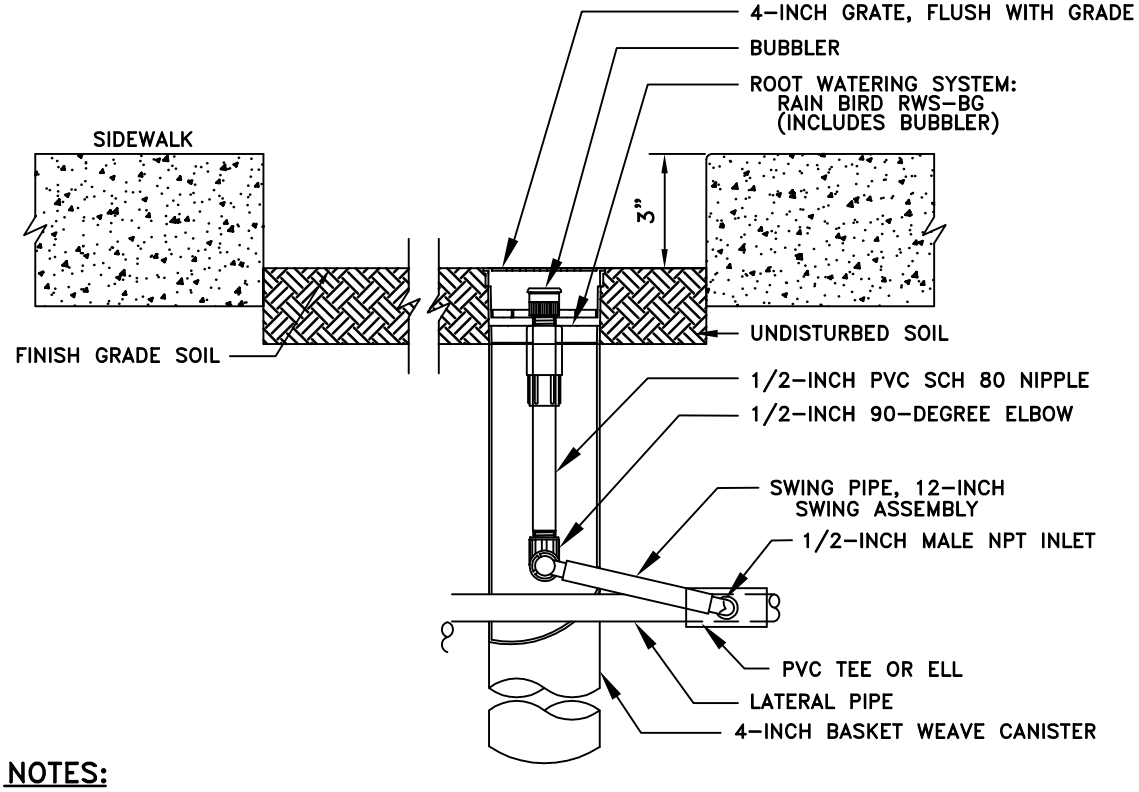
NOTES:

1. FOR WIRE SIZES NO. 14, NO. 12 AND NO. 10.
2. WIRING SHALL BE DIRECT BURIAL WIRE

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	LANDSCAPING	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	TYPICAL WIRE CONNECTION	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 1205



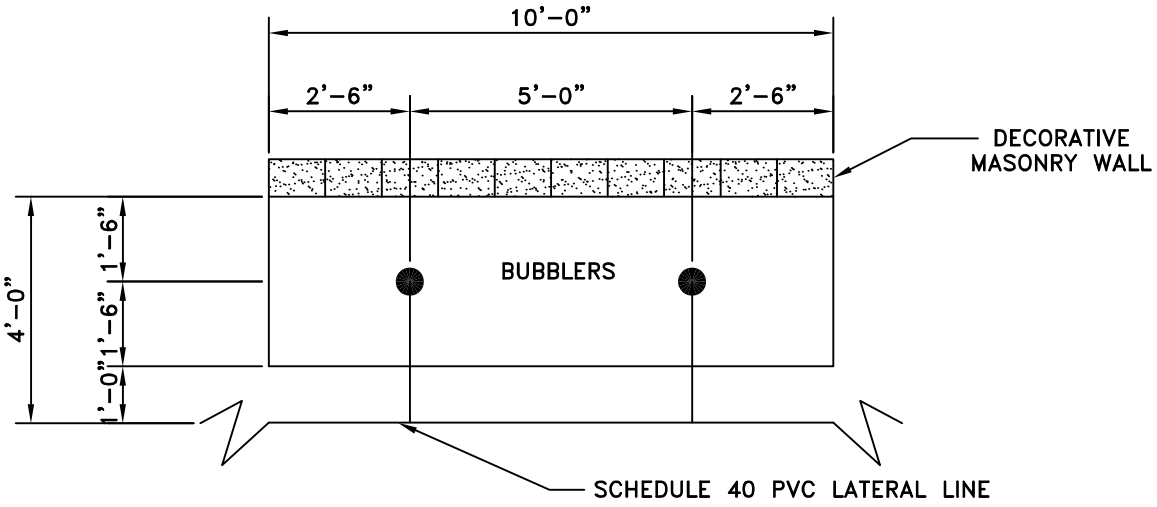
STREET TREE KNOCKOUT DETAIL
PLAN VIEW
N.T.S.

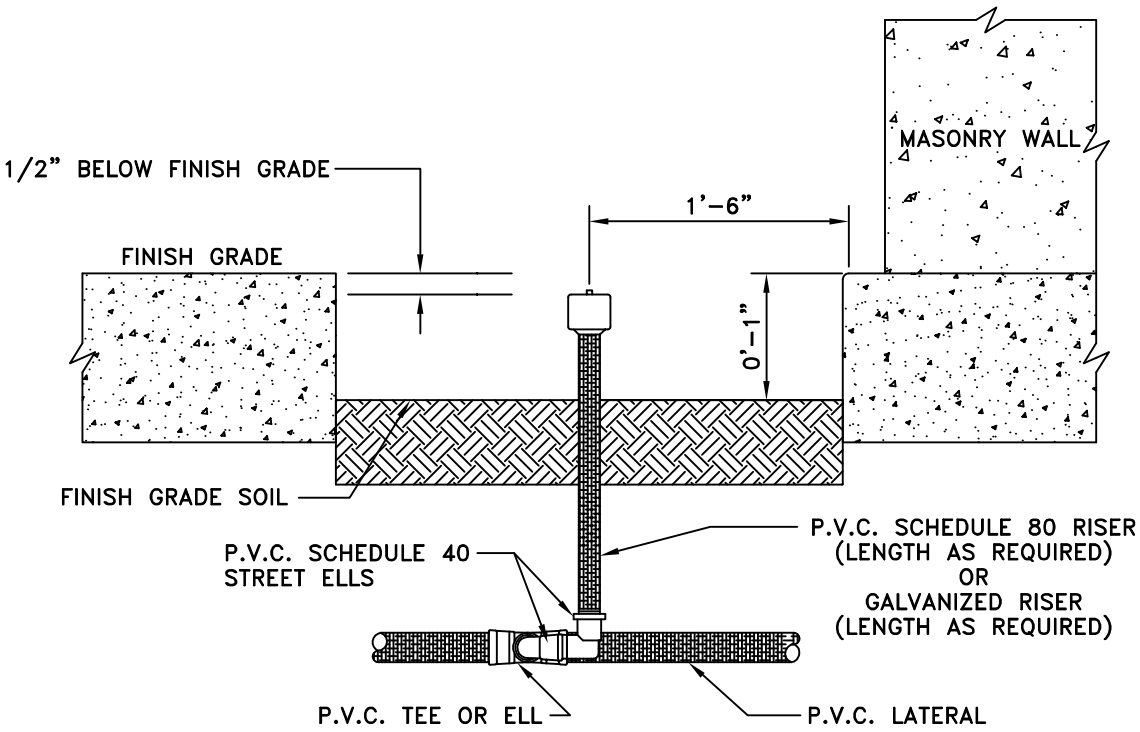


NOTES:

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. SEE CITY STANDARD DETAIL #1208 FOR OVERALL PLANTER LAYOUT.
6. ALL LANDSCAPE AND IRRIGATION PLANS MUST BE APPROVED BY THE PARKS, RECREATION AND NEIGHBORHOODS DEPARTMENT.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	LANDSCAPING	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	SPRINKLER DETAIL STREET TREE BUBBLER	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 1206

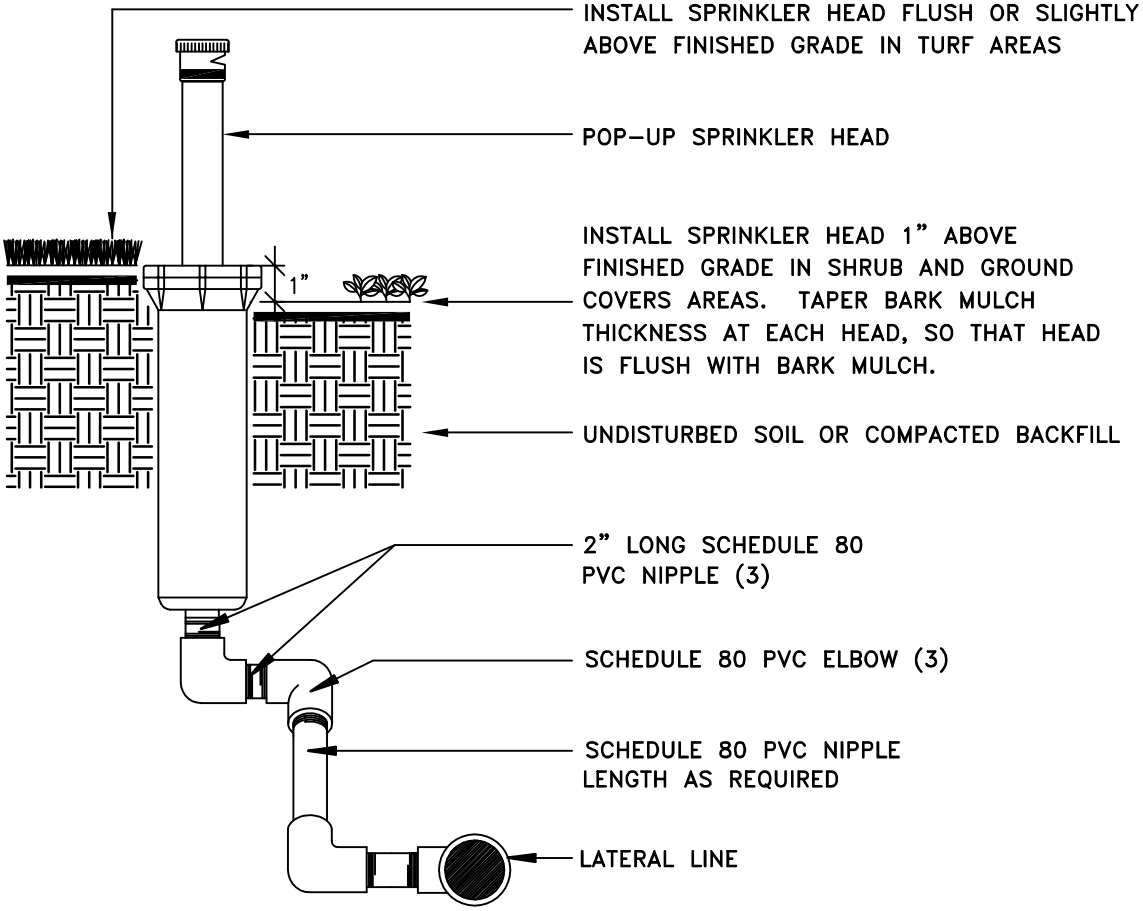




NOTES:

1. USE RAINBIRD 1402 PRESSURE COMPENSATING FULL CIRCLE BUBBLERS.
2. USE "TEFLON TAPE" ON ALL GALVANIZED PIPE CONNECTIONS.
3. P.V.C. THREADED CONNECTIONS TO BE COATED WITH "RECTORSEAL NO. 5."

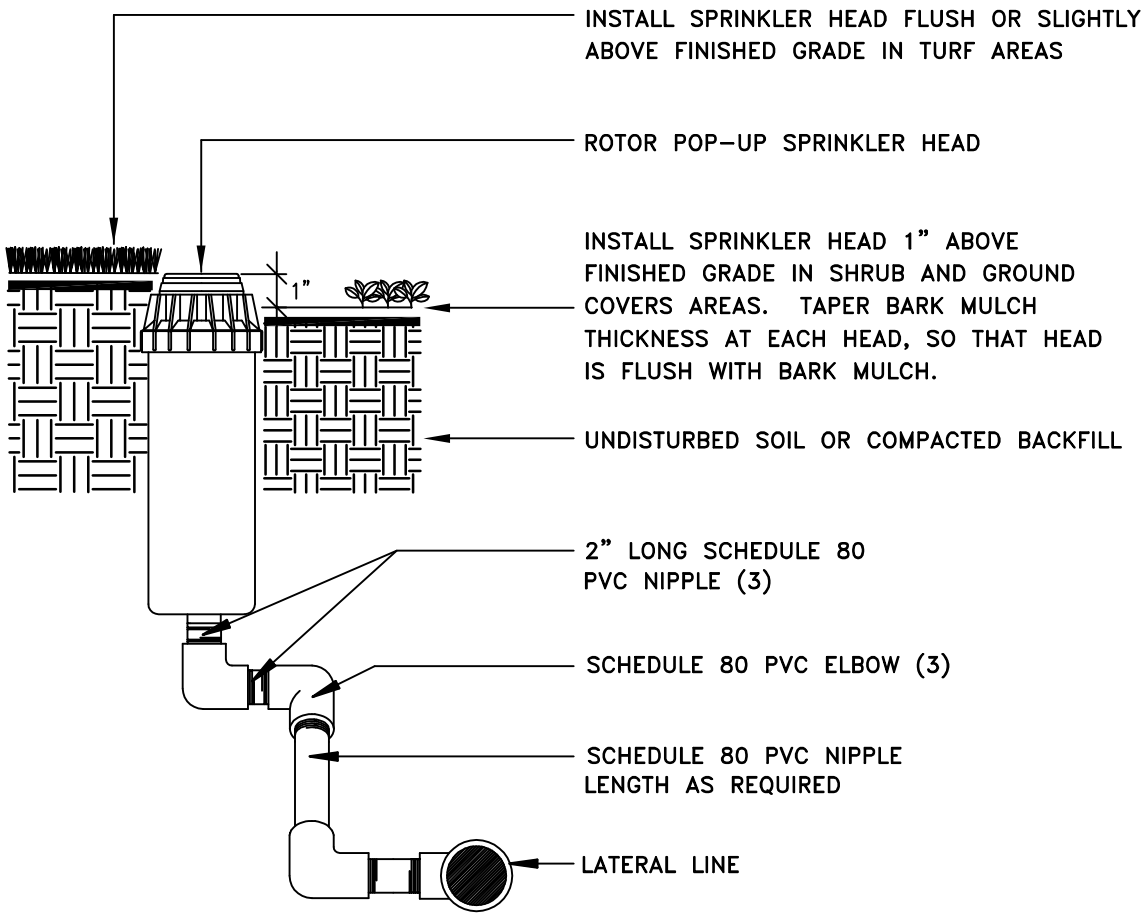
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	LANDSCAPING	
APPROVED BY THE CITY ENGINEER:	BUBBLER DETAIL	CITY of MODESTO
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 1207



NOTES:

1. USE RAINBIRD 1800 SERIES POP-UP HEADS WITH INTEGRAL CHECK VALVES.
2. USE "TEFLON TAPE" ON ALL 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" FROM PAVING EDGE.
5. INSTALL SPRINKLER HEADS PLUMB. ADJUST SPRAYS OR NOZZLE STREAM TO COVER LANDSCAPE AREA WITHOUT OVERSPRAY ONTO PAVING, FENCES, WALLS OR BUILDINGS.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	LANDSCAPING	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	SPRINKLER DETAIL POP-UP SPRAY	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 1207A



NOTES:

1. USE RAINBIRD 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 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" FROM PAVING EDGE.
5. INSTALL SPRINKLER HEADS PLUMB. ADJUST NOZZLE STREAM TO COVER LANDSCAPE AREA WITHOUT OVERSPRAY ONTO PAVING, FENCES, WALLS OR BUILDINGS.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	LANDSCAPING	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wilson	SPRINKLER DETAIL ROTOR HEAD	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 1207B

APPROVED BY CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

LANDSCAPING

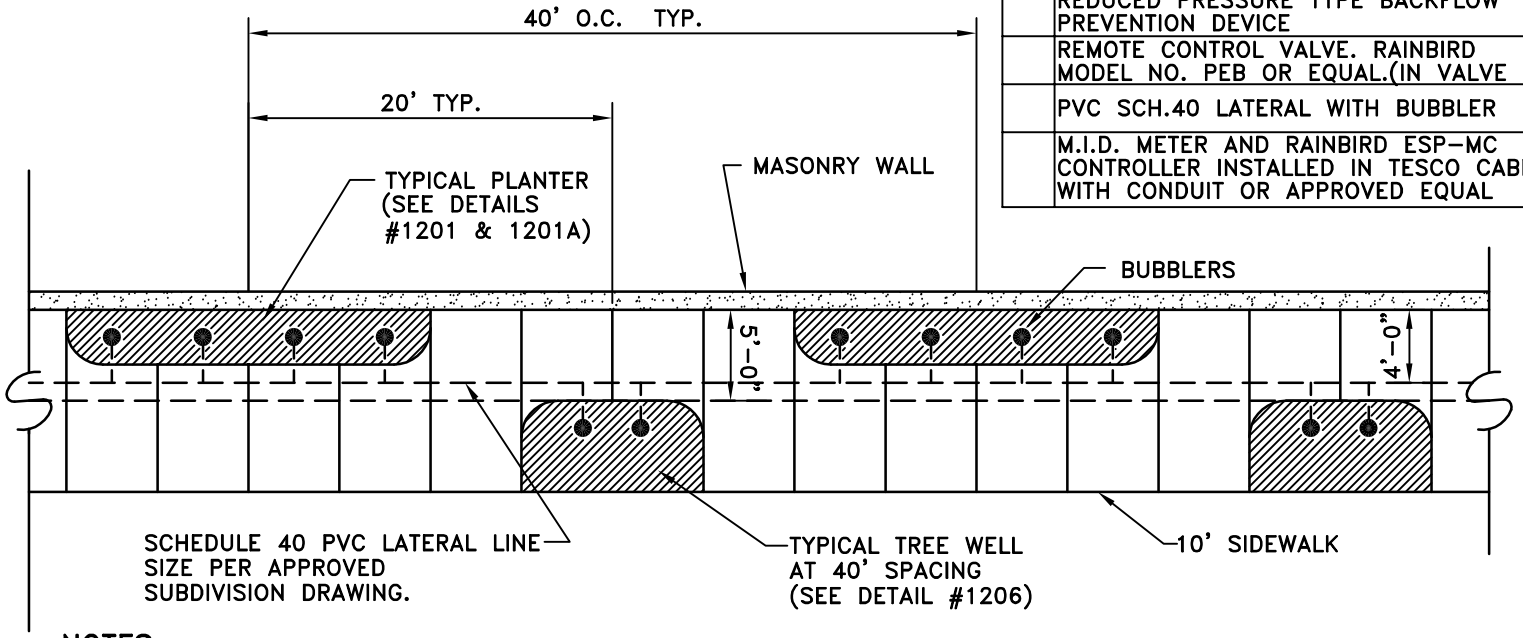
PLANTER LAYOUT
TYPICAL INFILL
STREET LANDSCAPING

PUBLIC WORKS
DEPARTMENT

CITY of MODESTO

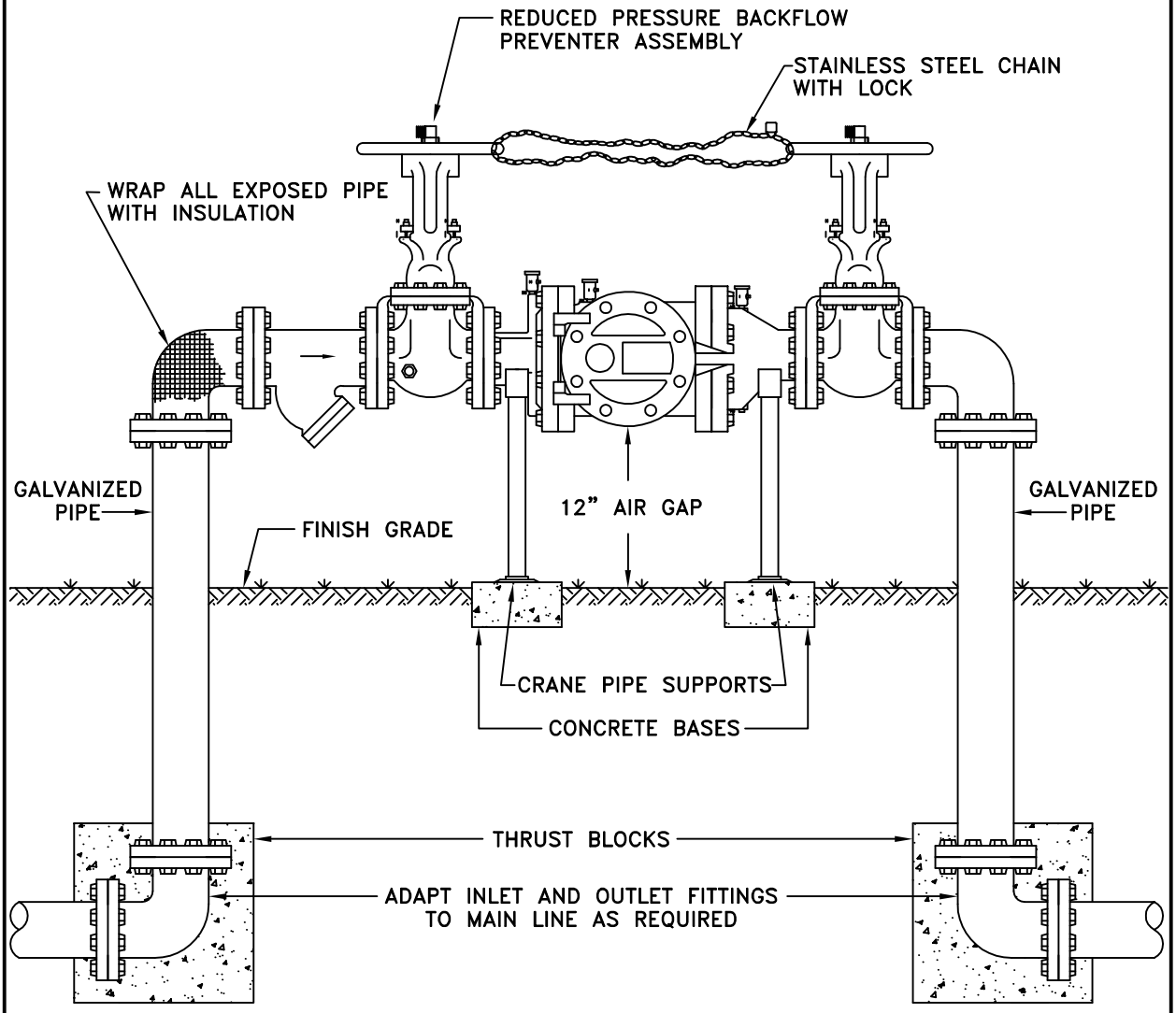
DETAIL NO.
1208

IRRIGATION LEGEND	
KEY	DESCRIPTION
	WATER METER INSTALLED BY OTHERS
	REDUCED PRESSURE TYPE BACKFLOW PREVENTION DEVICE
	REMOTE CONTROL VALVE. RAINBIRD MODEL NO. PEB OR EQUAL.(IN VALVE BOX)
	PVC SCH.40 LATERAL WITH BUBBLER
	M.I.D. METER AND RAINBIRD ESP-MC CONTROLLER INSTALLED IN TESCO CABINET WITH CONDUIT OR APPROVED EQUAL



NOTES:

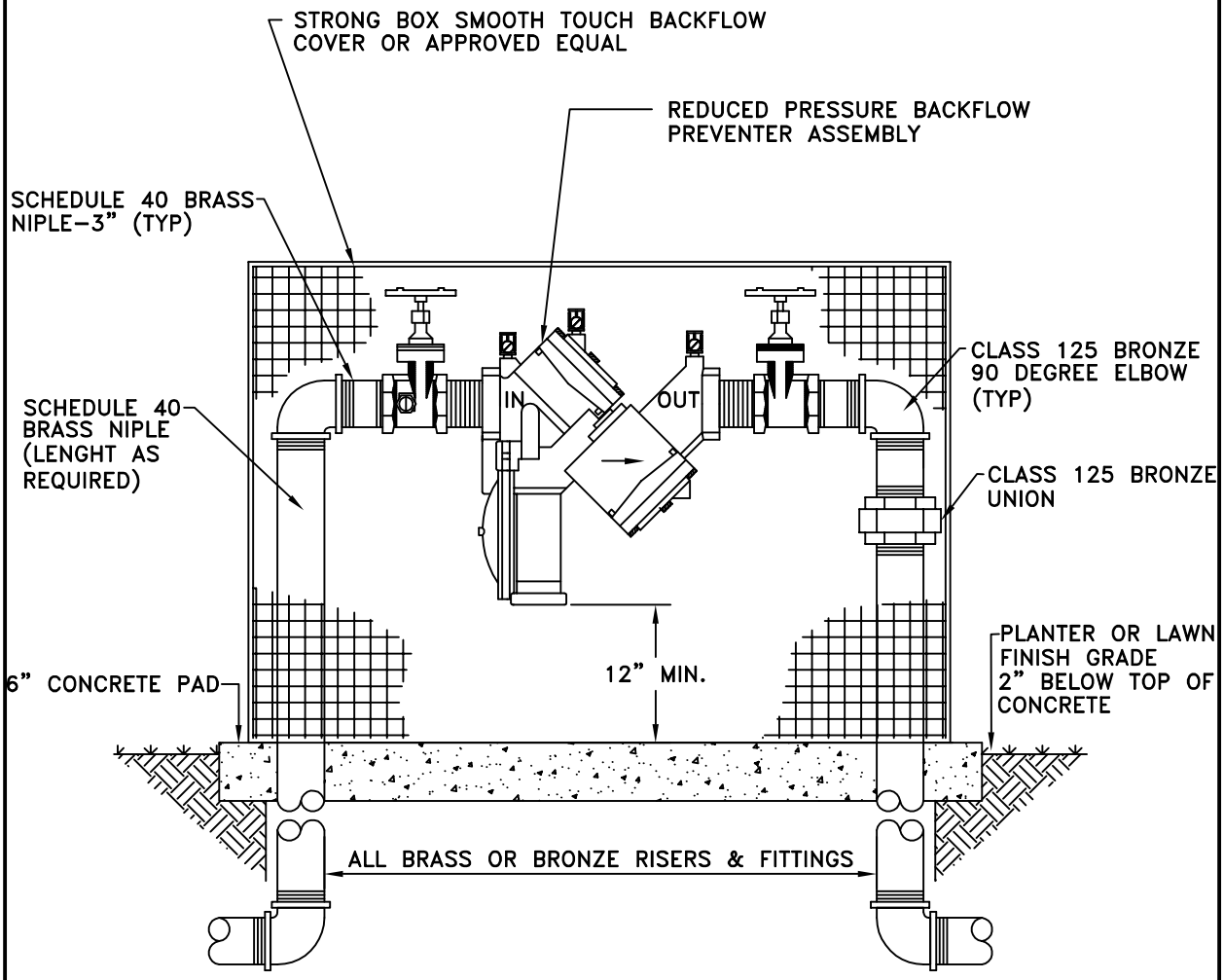
1. THE ENGINEER OR ARCHITECT SHALL USE THIS PLAN AS A GENERAL GUIDELINE FOR IRRIGATION REQUIREMENTS AS RELATING TO STREET FRONTAGE IMPROVEMENTS WHERE TREE WELLS SHALL BE INSTALLED.
2. THE PRIMARY INTENT OF THIS PLAN IS TO DEMONSTRATE THE MINIMUM IRRIGATION DESIGN CALL-OUT TO BE INSTALLED.
3. THE DIAGRAMMATIC IRRIGATION PLAN AS SHOWN ABOVE IS AN EXAMPLE OF MINIMUM REQUIRED INFORMATION FOR CONSTRUCTION PURPOSES. THE IRRIGATION PLAN SUBMITTAL SHALL SHOW ALL POINTS OF INSTALLATION AND CONNECTION AND GIVE DETAILS AS TO HOW INSTALLATION AND CONNECTION SHALL BE MADE. PIPES, VALVES, BACKFLOW PREVENTION, WIRING, ETC. SHALL BE PROPERLY SIZED AND INDICATED ON THE SUBMITTED PLANS.
4. PLANS SHALL SHOW ENTIRE PROJECT AREA WITH PROPOSED IRRIGATION SYSTEM.
5. ALL LANDSCAPE IMPROVEMENT PLANS MUST BE SUBMITTED TO THE PARKS, RECREATION AND NEIGHBORHOODS DEPARTMENT FOR PERMTTING AND APROVAL.



NOTES:

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.

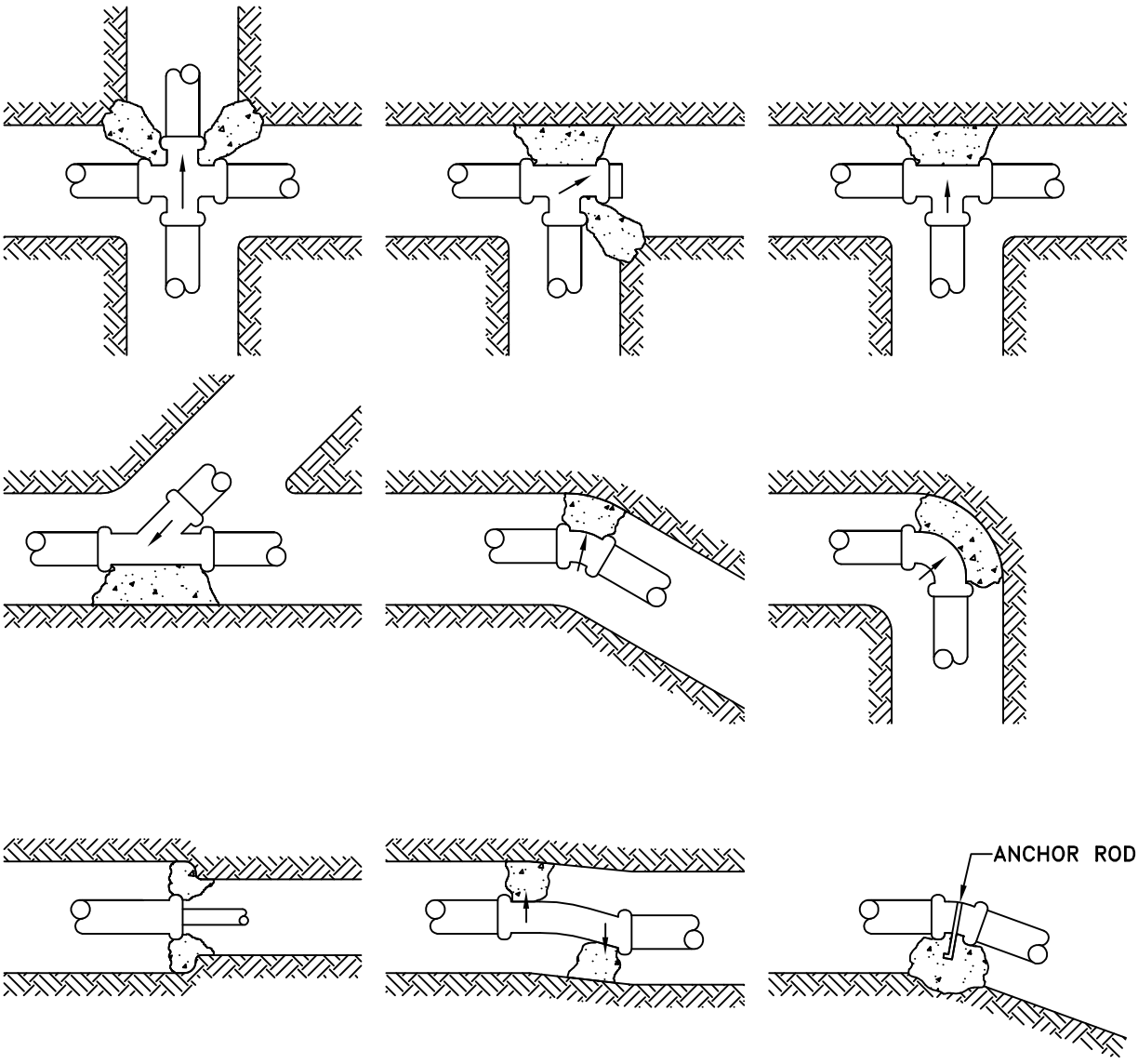
APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	LANDSCAPING	CITY of MODESTO
APPROVED BY THE CITY ENGINEER:	REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY FOR 3" & LARGER	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 1209



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.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006–284	LANDSCAPING	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wilson	REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY 1" TO 2-1/2" SIZE	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 1210

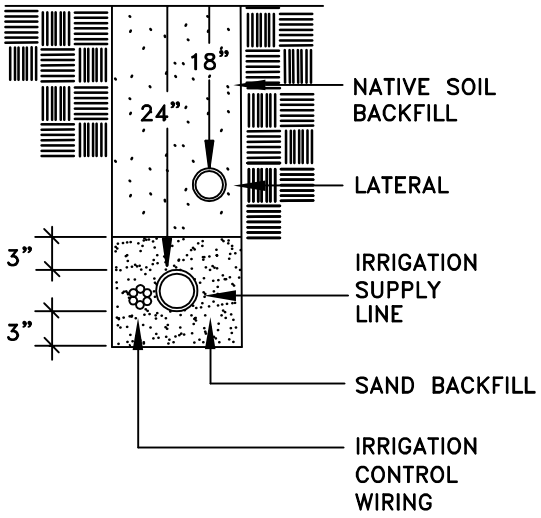


NOTES:

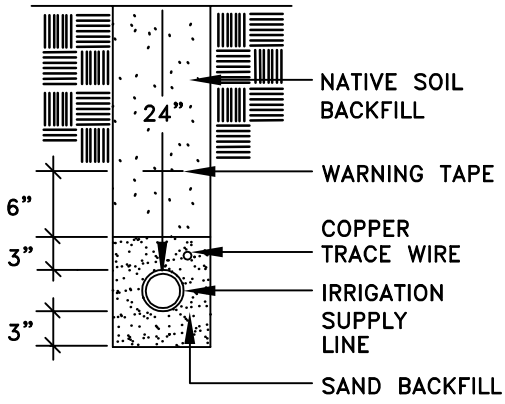
1. CONTRACTOR SHALL ARRANGE FOR SERVICES OF MANUFACTURER'S QUALIFIED INSTRUCTOR.
2. SIZES OF ANCHOR AND THRUST BLOCKS SHALL BE AS RECOMMENDED BY PIPE MANUFACTURER.
3. ANCHOR AND THRUST BLOCKS SHALL BEAR AGAINST UNDISTURBED SOIL.
4. CONCRETE SHALL ATTAIN 2000 PSI COMPRESSIVE STRENGTH.
5. ANCHOR RODS SHALL BE 1/2" DIA. REINFORCING STEEL, ENCASED IN CONCRETE.
6. KEEP CONCRETE CLEAR OF ALL PIPE OPENINGS.

APPROVED BY CITY COUNCIL RESOLUTION NO. 2006-284	LANDSCAPING	CITY of MODESTO
APPROVED BY THE CITY ENGINEER: Richard D. Wells	TYPICAL CONCRETE THRUST BLOCK	
	PUBLIC WORKS DEPARTMENT	DETAIL NO. 1211

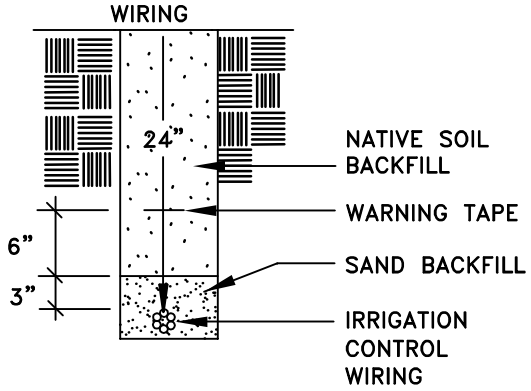
IRRIGATION SUPPLY LINE, LATERAL AND WIRING



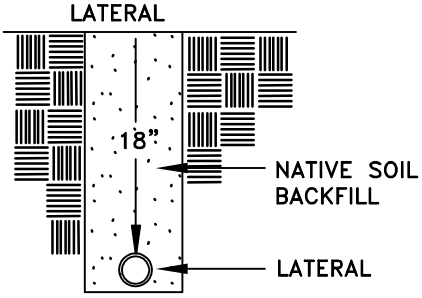
IRRIGATION SUPPLY LINE



WIRING



LATERAL



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 CITY COUNCIL
RESOLUTION NO. 2006-284

APPROVED BY THE CITY ENGINEER:

Richard D. Wells

LANDSCAPING

TYPICAL TRENCHING

PUBLIC WORKS DEPARTMENT

CITY of MODESTO

DETAIL NO. 1212

CHAPTER 13

DEMOLITION AND ABANDONMENT PLAN

13.01 GENERAL

A Demolition and Abandonment plan shall be prepared when the development site has existing improvements upon it. 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.

13.02 CONTENT

The plan, when required, shall show all houses or other structures, wells, existing trees, septic tanks, septic tank leach fields, pipelines, storm drain retention or detention basins, street trees, irrigation facilities, utilities, streets or roads, bridges or other concrete structures that currently exist at the site of the planned development. The Consulting 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 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 Facilities 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 B for bond 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 ie. 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 the Uniform Building Code (UBC).

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 new requirements designed to improve stormwater quality such as, expanded plan check and review, stormwater treatment, source control measures and increased site inspection.

If construction activity will disturb one (1) acre or more, Developer/Contractor must obtain coverage under the General Construction Activity Storm Water Permit (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) must be filed with the SWRCB.

The General Construction Permit requires the Developer/Contractor to prepare and carry out a Stormwater Pollution Prevention Plan (SWPPP) for the project. The California Stormwater Quality Association (CASQA) Stormwater Best Management Practice Handbook for Construction contains guidelines for the preparation of a SWPPP. See Appendix B, SWPPP Template. The CASQA Handbook may be viewed online at: www.cabmphandbooks.com.

The SWPPP must identify appropriate stormwater pollution prevention measures or Best Management Practices (BMPs) to reduce pollutants in stormwater discharges from the construction site. A copy of the SWPPP must be submitted to Development Services, Stormwater, for review, prior to obtaining a Grading Permit. A copy of the SWPPP must be kept readily available on the project site throughout construction.

For more information on State stormwater requirements, call the State Water Resources Control Board's Stormwater Information Line at (916) 341-5537.

LOCAL SWPPP

All construction projects will be required to develop and implement a Local Stormwater Pollution Prevention Plan (Local SWPPP) regardless of size. If the construction project is greater than one (1) acre and a SWPPP has already been prepared according to the requirements of the Regional Water Quality Control Board's General Construction Permit (above), this will be accepted in lieu of a Local SWPPP.

The City of Modesto has adopted and approved for use the Best Management Practices (BMPs) listed in the current edition of the California Stormwater Quality Association (CASQA)

"Stormwater Best Management Practice Handbook for Construction" (referenced below). Developers, Contractors and Engineers are referred to this publication in developing appropriate pollution control measures for individual construction projects. The handbook can be viewed at: www.cabmphandbooks.com and is also available for purchase from CASQA.

At a minimum, the Local SWPPP must contain the following items:

A. Erosion control measures. Refer to CASQA Sections EC-1 to EC-13 and choose appropriate measures for project site.

B. Sediment control measures. Refer to CASQA Sections SE-1 to SE-10 and choose appropriate measures for project site.

C. Drain inlet protection. Refer to CASQA Section SE-10. Mandatory for all projects.

D. Stabilized entrance and egress from construction site. Refer to CASQA Sections TC-1, TC-2, & TC-3 and choose appropriate measures for project site.

E. Concrete wash-out area. Refer to CASQA Section WM-8.

F. Name of party responsible for implementation of and adherence to Local SWPPP.

G. Size of project in acres.

H. Any other BMP's necessary to control the discharge of pollutants from the construction site.

15.02 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.

15.03 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 inspection staff. Violations will be enforced as per the Modesto Municipal Code 5-10, Article 5.

SECTION 90

PORTLAND CEMENT CONCRETE

90-1 GENERAL

90-1.01 DESCRIPTION

- Portland cement concrete shall be composed of cementitious material, fine aggregate, coarse aggregate, admixtures if used, and water, proportioned and mixed as specified in these specifications.

- The Contractor shall determine the mix proportions for concrete in conformance with these specifications. Unless otherwise specified, cementitious material shall be a combination of cement and mineral admixture. Cementitious material shall be either:

  A. "Type IP (MS) Modified" cement; or
  B. A combination of "Type II Modified" portland cement and mineral admixture; or
  C. A combination of Type V portland cement and mineral admixture.

- Type III portland cement shall be used only as allowed in the special provisions or with the approval of the Engineer.

- Class 1 concrete shall contain not less than 675 pounds of cementitious material per cubic yard.

- Class 2 concrete shall contain not less than 590 pounds of cementitious material per cubic yard.

- Class 3 concrete shall contain not less than 505 pounds of cementitious material per cubic yard.

- Class 4 concrete shall contain not less than 420 pounds of cementitious material per cubic yard.

- Minor concrete shall contain not less than 550 pounds of cementitious material per cubic yard unless otherwise specified in these specifications or the special provisions.

- Unless otherwise designated on the plans or specified in these specifications or the special provisions, the amount of cementitious material used per cubic yard of concrete in structures or portions of structures shall conform to the following:

Use	Cementitious Material Content pounds/CY
Concrete designated by compressive strength:	
Deck slabs and slab spans of bridges	675 min., 800 max.
Roof sections of exposed top box culverts	675 min., 800 max.
Other portions of structures	590 min., 800 max.
Concrete not designated by compressive strength:	
Deck slabs and slab spans of bridges	675 min.
Roof sections of exposed top box culverts	675 min.
Prestressed members	675 min.
Seal courses	675 min.
Other portions of structures	590 min.
Concrete for precast members	590 min., 925 max.

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

- Concrete designated by compressive strength shall be proportioned such that the concrete will attain the strength shown on the plans or specified in the special provisions.

- Before using concrete for which the mix proportions have been determined by the Contractor, or in advance of revising those mix proportions, the Contractor shall submit in writing to the Engineer a copy of the mix design.

- Compliance with cementitious material content requirements will be verified in conformance with procedures described in California Test 518 for cement content. For testing purposes, mineral admixture shall be considered to be cement. Batch proportions shall be adjusted as necessary to produce concrete having the specified cementitious material content.

- If any concrete has a cementitious material, portland cement, or mineral admixture content that is less than the minimum required, the concrete shall be removed. However, if the Engineer determines that the concrete is structurally adequate, the concrete may remain in place and the Contractor shall pay to the State $0.25 for each pound of cementitious material, portland cement, or mineral admixture that is less than the minimum required. The Department may deduct the amount from any moneys due, or that may become due, the Contractor under the contract. The deductions will not be made unless the difference between the contents required and those actually provided exceeds the batching tolerances permitted by Section 90-5, "Proportioning." No deductions will be made based on the results of California Test 518.

- The requirements of the preceding paragraph shall not apply to minor concrete or commercial quality concrete.

90-2 MATERIALS

90-2.01 CEMENT

- Unless otherwise specified, cement shall be either "Type IP (MS) Modified" cement, "Type II Modified" portland cement or Type V portland cement.

- "Type IP (MS) Modified" cement shall conform to the requirements for Type IP (MS) cement in ASTM Designation: C 595, and shall be comprised of an intimate and uniform blend of Type II cement and not more than 35 percent by weight of mineral admixture. The type and minimum amount of mineral admixture used in the manufacture of "Type IP (MS) Modified" cement shall be in conformance with the provisions in Section 90-4.08, "Required Use of Mineral Admixtures."

- "Type II Modified" portland cement shall conform to the requirements for Type II portland cement in ASTM Designation: C 150-02a.

- In addition, "Type IP (MS) Modified" cement and "Type II Modified" portland cement shall conform to the following requirements:

  A. The cement shall not contain more than 0.60-percent by weight of alkalies, calculated as the percentage of Na_2O plus 0.658 times the percentage of K_2O, when determined by either direct intensity flame photometry or by the atomic absorption method. The instrument and procedure used shall be qualified as to precision and accuracy in conformance with the requirements in ASTM Designation: C 114;
  B. The autoclave expansion shall not exceed 0.50-percent; and
  C. Mortar, containing the cement to be used and Ottawa sand, when tested in conformance with California Test 527, shall not expand in water more than 0.010-percent and shall not contract in air more than 0.048-percent, except that when cement is to be used for precast prestressed concrete piling, precast prestressed concrete members, or steam cured concrete products, the mortar shall not contract in air more than 0.053-percent.

- Type III and Type V portland cements shall conform to the requirements in ASTM Designation: C 150-02a and the additional requirements listed above for "Type II Modified" portland cement, except that when tested in conformance with California Test 527, mortar containing Type III portland cement shall not contract in air more than 0.075-percent.

- Cement used in the manufacture of cast-in-place concrete for exposed surfaces of like elements of a structure shall be from the same cement mill.

- Cement shall be protected from exposure to moisture until used. Sacked cement shall be piled to permit access for tally, inspection, and identification of each shipment.

- Adequate facilities shall be provided to assure that cement meeting the provisions specified in this Section 90-2.01 shall be kept separate from other cement in order to prevent any but the specified cement from entering the work. Safe and suitable facilities for sampling cement shall be provided at the weigh hopper or in the feed line immediately in advance of the hopper, in conformance with California Test 125.

- If cement is used prior to sampling and testing as provided in Section 6-1.07, "Certificates of Compliance," and the cement is delivered directly to the site of the work, the Certificate of

Compliance shall be signed by the cement manufacturer or supplier of the cement. If the cement is used in ready-mixed concrete or in precast concrete products purchased as such by the Contractor, the Certificate of Compliance shall be signed by the manufacturer of the concrete or product.

- Cement furnished without a Certificate of Compliance shall not be used in the work until the Engineer has had sufficient time to make appropriate tests and has approved the cement for use.

90-2.02 AGGREGATES

- Aggregates shall be free from deleterious coatings, clay balls, roots, bark, sticks, rags, and other extraneous material.

- Natural aggregates shall be thoroughly and uniformly washed before use.

- The Contractor, at the Contractor's expense, shall provide safe and suitable facilities, including necessary splitting devices for obtaining samples of aggregates, in conformance with California Test 125.

- Aggregates shall be of such character that it will be possible to produce workable concrete within the limits of water content provided in Section 90-6.06, "Amount of Water and Penetration."

- Aggregates shall have not more than 10 percent loss when tested for soundness in conformance with the requirements in California Test 214. The soundness requirement for fine aggregate will be waived, provided that the durability index, D_f, of the fine aggregate is 60, or greater, when tested for durability in conformance with California Test 229.

- If the results of any one or more of the Cleanness Value, Sand Equivalent, or aggregate grading tests do not meet the requirements specified for "Operating Range" but all meet the "Contract Compliance" requirements, the placement of concrete shall be suspended at the completion of the current pour until tests or other information indicate that the next material to be used in the work will comply with the requirements specified for "Operating Range."

- If the results of either or both the Cleanness Value and coarse aggregate grading tests do not meet the requirements specified for "Contract Compliance," the concrete that is represented by the tests shall be removed. However, if the Engineer determines that the concrete is structurally adequate, the concrete may remain in place, and the Contractor shall pay to the State $3.50 per cubic yard for paving concrete and $5.50 per cubic yard for the concrete represented by these tests and left in place. The Department may deduct the amount from any moneys due, or that may become due, the Contractor under the contract.

- If the results of either or both the Sand Equivalent and fine aggregate grading tests do not meet the requirements specified for "Contract Compliance," the concrete which is represented by the tests shall be removed. However, if the Engineer determines that the concrete is structurally adequate, the concrete may remain in place, and the Contractor shall pay to the State $3.50 per cubic yard for paving concrete and $5.50 per cubic yard for the concrete represented by these tests and left in place. The Department may deduct the amount from any moneys due, or that may become due, the Contractor under the contract.

- The 2 preceding paragraphs apply individually to the "Contract Compliance" requirements for coarse aggregate and fine aggregate. When both coarse aggregate and fine aggregate do not conform to the "Contract Compliance" requirements, both paragraphs shall apply. The payments specified in those paragraphs shall be in addition to any payments made in conformance with the provisions in Section 90-1.01, "Description."

- No single Cleanness Value, Sand Equivalent or aggregate grading test shall represent more than 300 cubic yards of concrete or one day's pour, whichever is smaller.

- When the source of an aggregate is changed, the Contractor shall adjust the mix proportions and submit in writing to the Engineer a copy of the mix design before using the aggregates.

90-2.02A Coarse Aggregate

- Coarse aggregate shall consist of gravel, crushed gravel, crushed rock, crushed air-cooled iron blast furnace slag or combinations thereof. Crushed air-cooled blast furnace slag shall not be used in reinforced or prestressed concrete.
- Coarse aggregate shall conform to the following quality requirements:

Tests	California Test	Requirements
Loss in Los Angeles Rattler (after 500 revolutions)	211	45% max.
Cleanness Value		
Operating Range	227	75 min.
Contract Compliance	227	71 min.

- In lieu of the above Cleanness Value requirements, a Cleanness Value "Operating Range" limit of 71, minimum, and a Cleanness Value "Contract Compliance" limit of 68, minimum, will be used to determine the acceptability of the coarse aggregate if the Contractor furnishes a Certificate of Compliance, as provided in Section 6-1.07, "Certificates of Compliance," certifying that:

  A. coarse aggregate sampled at the completion of processing at the aggregate production plant had a Cleanness Value of not less than 82 when tested by California Test 227; and
  B. prequalification tests performed in conformance with the requirements in California Test 549 indicated that the aggregate would develop a relative strength of not less than 95 percent and would have a relative shrinkage not greater than 105 percent, based on concrete.

90-2.02B Fine Aggregate

- Fine aggregate shall consist of natural sand, manufactured sand produced from larger aggregate or a combination thereof. Manufactured sand shall be well graded.

- Fine aggregate shall conform to the following quality requirements:

Test	California Test	Requirements
Organic Impurities	213	Satisfactory[a]
Mortar Strengths Relative to Ottawa Sand	515	95%, min.
Sand Equivalent:	217	
Operating Range		75, min.
Contract Compliance		71, min.

a Fine aggregate developing a color darker than the reference standard color solution may be accepted if it is determined by the Engineer, from mortar strength tests, that a darker color is acceptable.

- In lieu of the above Sand Equivalent requirements, a Sand Equivalent "Operating Range" limit of 71 minimum and a Sand Equivalent "Contract Compliance" limit of 68 minimum will be used to determine the acceptability of the fine aggregate if the Contractor furnishes a Certificate of Compliance, as provided in Section 6-1.07, "Certificates of Compliance," certifying that:

  A. fine aggregate sampled at the completion of processing at the aggregate production plant had a Sand Equivalent value of not less than 82 when tested by California Test 217; and
  B. prequalification tests performed in conformance with California Test 549 indicated that the aggregate would develop a relative strength of not less than 95 percent and would have a relative shrinkage not greater than 105 percent, based on concrete.

90-2.03 WATER

- In conventionally reinforced concrete work, the water for curing, for washing aggregates, and for mixing shall be free from oil and shall not contain more than 1,000 parts per million of chlorides as Cl, when tested in conformance with California Test 422, nor more than 1,300 parts per million of sulfates as SO_4, when tested in conformance with California Test 417. In prestressed concrete work, the water for curing, for washing aggregates, and for mixing shall be free from oil and shall not contain more than 650 parts per million of chlorides as Cl, when tested in conformance with California Test 422, nor more than 1,300 parts per million of sulfates as SO_4, when tested in conformance with California Test 417. In no case shall the water contain an amount of impurities that will cause either: 1) a change in the setting time of cement of more than 25 percent when tested in conformance with the requirements in ASTM Designation: C 191 or ASTM Designation: C 266; or 2) a reduction in the compressive strength of mortar at 14 days of more than 5 percent when tested in conformance with the requirements in ASTM Designation: C 109, compared to the results obtained with distilled water or deionized water tested in conformance with the requirements in ASTM Designation: C 109.

- In non-reinforced concrete work, the water for curing, for washing aggregates and for mixing shall be free from oil and shall not contain more than 2,000 parts per million of chlorides as Cl, when tested in conformance with California Test 422, or more than 1,500 parts per million of sulfates as SO_4, when tested in conformance with California Test 417.

- In addition to the above provisions, water for curing concrete shall not contain impurities in a sufficient amount to cause discoloration of the concrete or produce etching of the surface.

- Water reclaimed from mixer wash-out operations may be used in mixing concrete. The water shall not contain coloring agents or more than 300 parts per million of alkalis

(Na_2O + 0.658 K_2O) as determined on the filtrate. The specific gravity of the water shall not exceed 1.03 and shall not vary more than ±0.010 during a day's operations.

90-2.04 ADMIXTURE MATERIALS

- Admixture materials shall conform to the requirements in the following ASTM Designations:

  A. Chemical Admixtures—ASTM Designation: C 494.
  B. Air-entraining Admixtures—ASTM Designation: C 260.
  C. Calcium Chloride—ASTM Designation: D 98.
  D. Mineral Admixtures—Coal fly ash; raw or calcined natural pozzolan as specified in ASTM Designation: C 618; silica fume conforming to the requirements in ASTM Designation: C 1240, with reduction of mortar expansion of 80 percent, minimum, using the cement from the proposed mix design.

- Unless otherwise specified in the special provisions, mineral admixtures shall be used in conformance with the provisions in Section 90-4.08, "Required Use of Mineral Admixtures."

90-3 AGGREGATE GRADINGS

90-3.01 GENERAL

- Before beginning concrete work, the Contractor shall submit in writing to the Engineer the gradation of the primary aggregate nominal sizes that the Contractor proposes to furnish. If a primary coarse aggregate or the fine aggregate is separated into 2 or more sizes, the proposed gradation shall consist of the gradation for each individual size, and the proposed proportions of each individual size, combined mathematically to indicate one proposed gradation. The proposed gradation shall meet the grading requirements shown in the table in this section, and shall show the percentage passing each of the sieve sizes used in determining the end result.

- The Engineer may waive, in writing, the gradation requirements in this Section 90-3.01 and in Sections 90-3.02, "Coarse Aggregate Grading," 90-3.03, "Fine Aggregate Grading," and 90-3.04, "Combined Aggregate Gradings," if, in the Engineer's opinion, furnishing the gradation is not necessary for the type or amount of concrete work to be constructed.
- Gradations proposed by the Contractor shall be within the following percentage passing limits:

Primary Aggregate Nominal Size	Sieve Size	Limits of Proposed Gradation
1 1/2" x 3/4"	1"	19 - 41
1" x No. 4	3/4"	52 - 85
1" x No. 4	3/8"	15 - 38
1/2" x No. 4	3/8"	40 – 78
3/8" x No. 8	3/8"	50 - 85
Fine Aggregate	No. 16	55 - 75
Fine Aggregate	No. 30	34 - 46
Fine Aggregate	No. 50	16 - 29

- Should the Contractor change the source of supply, the Contractor shall submit in writing to the Engineer the new gradations before their intended use.

90-3.02 COARSE AGGREGATE GRADING

- The grading requirements for coarse aggregates are shown in the following tables for each size of coarse aggregate:

Percentage Passing Primary Aggregate Nominal Sizes

Sieve Sizes	1 1/2" x 3/4"		1" x No. 4	
	Operating Range	Contract Compliance	Operating Range	Contract Compliance
2"	100	100	—	—
1 1/2"	88-100	85-100	100	100
1"	X ± 18	X ± 25	88-100	86-100
3/4"	0-17	0-20	X ± 15	X ± 22
1/2"	—	—	—	—
3/8"	0-7	0-9	X ± 15	X ± 22
No. 4	—	—	0-16	0-18
No. 8	—	—	0-6	0-7

Sieve Sizes	1/2" x No. 4		3/8" x No. 8	
	Operating Range	Contract Compliance	Operating Range	Contract Compliance
2"	—	—	—	—
1 1/2"	—	—	—	—
1"	—	—	—	—
3/4"	100	100	—	—
1/2"	82-100	80-100	100	100
3/8"	X ± 15	X ± 22	X ± 15	X ± 20
No. 4	0-15	0-18	0-25	0-28
No. 8	0-6	0-7	0-6	0-7

- In the above tables, the symbol X is the gradation that the Contractor proposes to furnish for the specific sieve size as provided in Section 90-3.01, "General."

- Coarse aggregate for the 1 1/2-inch, maximum, combined aggregate grading as provided in Section 90-3.04, "Combined Aggregate Gradings," shall be furnished in 2 or more primary aggregate nominal sizes. Each primary aggregate nominal size may be separated into 2 sizes and stored separately, provided that the combined material conforms to the grading requirements for that particular primary aggregate nominal size.

- When the one-inch, maximum, combined aggregate grading as provided in Section 90-3.04, "Combined Aggregate Gradings," is to be used, the coarse aggregate may be separated into 2 sizes and stored separately, provided that the combined material shall conform to the grading requirements for the 1" x No. 4 primary aggregate nominal size.

90-3.03 FINE AGGREGATE GRADING

- Fine aggregate shall be graded within the following limits:

Sieve Sizes	Percentage Passing	
	Operating Range	Contract Compliance
3/8"	100	100
No. 4	95-100	93-100
No. 8	65-95	61-99
No. 16	X ± 10	X ± 13
No. 30	X ± 9	X ± 12
No. 50	X ± 6	X ± 9
No. 100	2-12	1-15
No. 200	0-8	0-10

- In the above table, the symbol X is the gradation that the Contractor proposes to furnish for the specific sieve size as provided in Section 90-3.01, "General."

- In addition to the above required grading analysis, the distribution of the fine aggregate sizes shall be such that the difference between the total percentage passing the No. 16 sieve and the total percentage passing the No. 30 sieve shall be between 10 and 40, and the difference between the percentage passing the No. 30 and No. 50 sieves shall be between 10 and 40.

- Fine aggregate may be separated into 2 or more sizes and stored separately, provided that the combined material conforms to the grading requirements specified in this Section 90-3.03.

90-3.04 COMBINED AGGREGATE GRADINGS

- Combined aggregate grading limits shall be used only for the design of concrete mixes. Concrete mixes shall be designed so that aggregates are combined in proportions that shall produce a mixture within the grading limits for combined aggregates as specified herein.

- The combined aggregate grading, except when otherwise specified in these specifications or the special provisions, shall be either the 1 1/2-inch, maximum grading, or the one-inch, maximum grading, at the option of the Contractor.

Sieve Sizes	Percentage Passing			
	1 1/2" Max.	1" Max.	1/2" Max.	3/8" Max.
2"	100	—	—	—
1 1/2"	90-100	100	—	—
1"	50-86	90-100	—	—
3/4"	45-75	55-100	100	—
1/2"	—	—	90-100	100
3/8"	38-55	45-75	55-86	50 - 100
No. 4	30-45	35-60	45-63	45 - 63
No. 8	23-38	27-45	35-49	35 - 49
No. 16	17-33	20-35	25-37	25 - 37
No. 30	10-22	12-25	15-25	15 - 25
No. 50	4-10	5-15	5-15	5 - 15
No. 100	1-6	1-8	1-8	1 - 8
No. 200	0-3	0-4	0-4	0 - 4

- Changes from one grading to another shall not be made during the progress of the work unless permitted by the Engineer.

90-4 ADMIXTURES

90-4.01 GENERAL

- Admixtures used in portland cement concrete shall conform to and be used in conformance with the provisions in this Section 90-4 and the special provisions. Admixtures shall be used when specified or ordered by the Engineer and may be used at the Contractor's option as provided herein.

- Chemical admixtures and air-entraining admixtures containing chlorides as Cl in excess of one percent by weight of admixture, as determined by California Test 415, shall not be used in prestressed or reinforced concrete.

- Calcium chloride shall not be used in concrete except when otherwise specified.

- Mineral admixture used in concrete for exposed surfaces of like elements of a structure shall be from the same source and of the same percentage.

- Admixtures shall be uniform in properties throughout their use in the work. Should it be found that an admixture as furnished is not uniform in properties, its use shall be discontinued.

- If more than one admixture is used, the admixtures shall be compatible with each other so that the desirable effects of all admixtures used will be realized.

90-4.02 MATERIALS

- Admixture materials shall conform to the provisions in Section 90–2.04, "Admixture Materials."

90-4.03 ADMIXTURE APPROVAL

- No admixture brand shall be used in the work unless it is on the Department's current list of approved brands for the type of admixture involved.

- Admixture brands will be considered for addition to the approved list if the manufacturer of the admixture submits to the Transportation Laboratory a sample of the admixture accompanied by certified test results demonstrating that the admixture complies with the requirements in the appropriate ASTM Designation and these specifications. The sample shall be sufficient to permit performance of all required tests. Approval of admixture brands will be dependent upon a determination as to compliance with the requirements, based on the certified test results submitted, together with tests the Department may elect to perform.

- When the Contractor proposes to use an admixture of a brand and type on the current list of approved admixture brands, the Contractor shall furnish a Certificate of Compliance from the manufacturer, as provided in Section 6-1.07, "Certificates of Compliance," certifying that the admixture furnished is the same as that previously approved. If a previously approved admixture is not accompanied by a Certificate of Compliance, the admixture shall not be used in the work until the Engineer has had sufficient time to make the appropriate tests and has approved the admixture for use. The Engineer may take samples for testing at any time, whether or not the admixture has been accompanied by a Certificate of Compliance.

- If a mineral admixture is delivered directly to the site of the work, the Certificate of Compliance shall be signed by the manufacturer or supplier of the mineral admixture. If the mineral admixture is used in ready-mix concrete or in precast concrete products purchased as such by the Contractor, the Certificate of Compliance shall be signed by the manufacturer of the concrete or product.

90-4.04 REQUIRED USE OF CHEMICAL ADMIXTURES AND CALCIUM CHLORIDE

- When the use of a chemical admixture or calcium chloride is specified, the admixture shall be used at the dosage specified, except that if no dosage is specified, the admixture shall be used at the dosage normally recommended by the manufacturer of the admixture.

- Calcium chloride shall be dispensed in liquid, flake, or pellet form. Calcium chloride dispensed in liquid form shall conform to the provisions for dispensing liquid admixtures in Section 90-4.10, "Proportioning and Dispensing Liquid Admixtures."

90-4.05 OPTIONAL USE OF CHEMICAL ADMIXTURES

- The Contractor will be permitted to use Type A or F, water-reducing; Type B, retarding; or Type D or G, water-reducing and retarding admixtures as described in ASTM Designation: C 494 to conserve cementitious material or to facilitate any concrete construction application subject to the following conditions:

  A. When a water-reducing admixture or a water-reducing and retarding admixture is used, the cementitious material content specified or ordered may be reduced by a maximum of 5 percent by weight, except that the resultant cementitious material content shall be not less than 505 pounds per cubic yard, and
  B. When a reduction in cementitious material content is made, the dosage of admixture used shall be the dosage used in determining approval of the admixture.

- Unless otherwise specified, a Type C accelerating chemical admixture conforming to the requirements in ASTM Designation: C 494, may be used in portland cement concrete. Inclusion in the mix design submitted for approval will not be required provided that the admixture is added to counteract changing conditions that contribute to delayed setting of the portland cement concrete, and the use or change in dosage of the admixture is approved in writing by the Engineer.

90-4.06 REQUIRED USE OF AIR-ENTRAINING ADMIXTURES

- When air-entrainment is specified or ordered by the Engineer, the air-entraining admixture shall be used in amounts to produce a concrete having the specified air content as determined by California Test 504.

90-4.07 OPTIONAL USE OF AIR-ENTRAINING ADMIXTURES

- When air-entrainment has not been specified or ordered by the Engineer, the Contractor will be permitted to use an air-entraining admixture to facilitate the use of any construction procedure or equipment provided that the average air content, as determined by California Test 504, of 3 successive tests does not exceed 4 percent, and no single test value exceeds 5.5 percent. If the Contractor elects to use an air-entraining admixture in concrete for pavement, the Contractor shall so indicate at the time the Contractor designates the source of aggregate as provided in Section 40-1.015, "Cement Content."

90-4.08 REQUIRED USE OF MINERAL ADMIXTURES

- Unless otherwise specified, mineral admixture shall be combined with cement to make cementitious material.

- The calcium oxide content shall not exceed 10 percent when determined in conformance with the requirements in ASTM Designation: C 114. The available alkali content (as sodium oxide equivalent) shall not exceed 1.5 percent when determined in conformance with the requirements in ASTM Designation: C 311, or the total alkali content (as sodium oxide equivalent) shall not exceed 5.0 percent when determined in conformance with the requirements in ASTM Designation: D 4326.

- The amounts of cement and mineral admixture used in cementitious material shall be sufficient to satisfy the minimum cementitious material content requirements specified in Section 90-1.01, "Description," or Section 90-4.05, "Optional Use of Chemical Admixtures," and shall conform to the following:

  A. The minimum amount of cement shall not be less than 75 percent by weight of the specified minimum cementitious material content;
  B. The minimum amount of mineral admixture to be combined with cement shall be determined using one of the following criteria:

     1. When the calcium oxide content of a mineral admixture is equal to or less than 2 percent by weight, the amount of mineral admixture shall not be less than 15 percent by weight of the total amount of cementitious material to be used in the mix;
     2. When the calcium oxide content of a mineral admixture is greater than 2 percent, the amount of mineral admixture shall not be less than 25 percent by weight of the total amount of cementitious material to be used in the mix;

3. When a mineral admixture that conforms to the provisions for silica fume in Section 90-2.04, "Admixture Materials," is used, the amount of mineral admixture shall not be less than 10 percent by weight of the total amount of cementitious material to be used in the mix.

C. The total amount of mineral admixture shall not exceed 35 percent by weight of the total amount of cementitious material to be used in the mix. Where Section 90-1.01, "Description," specifies a maximum cementitious content in pounds per cubic yard, the total weight of cement and mineral admixture per cubic yard shall not exceed the specified maximum cementitious material content.

90-4.09 BLANK

90-4.10 PROPORTIONING AND DISPENSING LIQUID ADMIXTURES

Chemical admixtures and air-entraining admixtures shall be dispensed in liquid form. Dispensers for liquid admixtures shall have sufficient capacity to measure at one time the prescribed quantity required for each batch of concrete. Each dispenser shall include a graduated measuring unit into which liquid admixtures are measured to within ±5 percent of the prescribed quantity for each batch. Dispensers shall be located and maintained so that the graduations can be accurately read from the point at which proportioning operations are controlled to permit a visual check of batching accuracy prior to discharge. Each measuring unit shall be clearly marked for the type and quantity of admixture.

Each liquid admixture dispensing system shall be equipped with a sampling device consisting of a valve located in a safe and readily accessible position such that a sample of the admixture may be withdrawn slowly by the Engineer.

If more than one liquid admixture is used in the concrete mix, each liquid admixture shall have a separate measuring unit and shall be dispensed by injecting equipment located in such a manner that the admixtures are not mixed at high concentrations and do not interfere with the effectiveness of each other. When air-entraining admixtures are used in conjunction with other liquid admixtures, the air-entraining admixture shall be the first to be incorporated into the mix.

When automatic proportioning devices are required for concrete pavement, dispensers for liquid admixtures shall operate automatically with the batching control equipment. The dispensers shall be equipped with an automatic warning system in good operating condition that will provide a visible or audible signal at the point at which proportioning operations are controlled when the quantity of admixture measured for each batch of concrete varies from the preselected dosage by more than 5 percent, or when the entire contents of the measuring unit are not emptied from the dispenser into each batch of concrete.

Unless liquid admixtures are added to premeasured water for the batch, their discharge into the batch shall be arranged to flow into the stream of water so that the admixtures are well dispersed throughout the batch. Air-entraining admixtures may be dispensed directly into moist sand in the batching bins provided that adequate control of the air content of the concrete can be maintained.

Liquid admixtures requiring dosages greater than one-half gallon per cubic yard shall be considered to be water when determining the total amount of free water as specified in Section 90-6.06, "Amount of Water and Penetration."

• Special admixtures, such as "high range" water reducers that may contribute to a high rate of slump loss, shall be measured and dispensed as recommended by the admixture manufacturer and as approved by the Engineer.

90-4.11 STORAGE, PROPORTIONING, AND DISPENSING OF MINERAL ADMIXTURES

• Mineral admixtures shall be protected from exposure to moisture until used. Sacked material shall be piled to permit access for tally, inspection, and identification of each shipment.

• Adequate facilities shall be provided to assure that mineral admixtures meeting the specified requirements are kept separate from other mineral admixtures in order to prevent any but the specified mineral admixtures from entering the work. Safe and suitable facilities for sampling mineral admixtures shall be provided at the weigh hopper or in the feed line immediately in advance of the hopper.

• Mineral admixtures shall be incorporated into concrete using equipment conforming to the requirements for cement weigh hoppers, and charging and discharging mechanisms in ASTM Designation: C 94, in Section 90-5.03, "Proportioning," and in this Section 90-4.11.

• When concrete is completely mixed in stationary paving mixers, the mineral admixture shall be weighed in a separate weigh hopper conforming to the provisions for cement weigh hoppers and charging and discharging mechanisms in Section 90-5.03A, "Proportioning for Pavement," and the mineral admixture and cement shall be introduced simultaneously into the mixer proportionately with the aggregate. If the mineral admixture is not weighed in a separate weigh hopper, the Contractor shall provide certification that the stationary mixer is capable of mixing the cement, admixture, aggregates and water uniformly prior to discharge. Certification shall contain the following:

A. Test results for 2 compressive strength test cylinders of concrete taken within the first third and 2 compressive strength test cylinders of concrete taken within the last third of the concrete discharged from a single batch from the stationary paving mixer. Strength tests and cylinder preparation will be in conformance with the provisions of Section 90-9, "Compressive Strength;"
B. Calculations demonstrating that the difference in the averages of 2 compressive strengths taken in the first third is no greater than 7.5 percent different than the averages of 2 compressive strengths taken in the last third of the concrete discharged from a single batch from the stationary paving mixer. Strength tests and cylinder preparation will be in conformance with the provisions of Section 90-9, "Compressive Strength;" and
C. The mixer rotation speed and time of mixing prior to discharge that are required to produce a mix that meets the requirements above.

90-5 PROPORTIONING

90-5.01 STORAGE OF AGGREGATES

• Aggregates shall be stored or stockpiled in such a manner that separation of coarse and fine particles of each size shall be avoided and also that the various sizes shall not become intermixed before proportioning.

• Aggregates shall be stored or stockpiled and handled in a manner that shall prevent contamination by foreign materials. In addition, storage of aggregates at batching or mixing

facilities that are erected subsequent to the award of the contract and that furnish concrete to the project shall conform to the following:

A. Intermingling of the different sizes of aggregates shall be positively prevented. The Contractor shall take the necessary measures to prevent intermingling. The preventive measures may include, but are not necessarily limited to, physical separation of stockpiles or construction of bulkheads of adequate length and height; and
B. Contamination of aggregates by contact with the ground shall be positively prevented. The Contractor shall take the necessary measures to prevent contamination. The preventive measures shall include, but are not necessarily limited to, placing aggregates on wooden platforms or on hardened surfaces consisting of portland cement concrete, asphalt concrete, or cement treated material.

- In placing aggregates in storage or in moving the aggregates from storage to the weigh hopper of the batching plant, any method that may cause segregation, degradation, or the combining of materials of different gradings that will result in any size of aggregate at the weigh hopper failing to meet the grading requirements, shall be discontinued. Any method of handling aggregates that results in excessive breakage of particles shall be discontinued. The use of suitable devices to reduce impact of falling aggregates may be required by the Engineer.

90-5.02 PROPORTIONING DEVICES

- Weighing, measuring, or metering devices used for proportioning materials shall conform to the requirements in Section 9-1.01, "Measurement of Quantities," and this Section 90-5.02. In addition, automatic weighing systems shall comply with the requirements for automatic proportioning devices in Section 90-5.03A, "Proportioning for Pavement." Devices shall be automatic to the extent that the only manual operation required for proportioning the aggregates, cement, and mineral admixture for one batch of concrete is a single operation of a switch or starter.

- Proportioning devices shall be tested at the expense of the Contractor as frequently as the Engineer may deem necessary to ensure their accuracy.

- Weighing equipment shall be insulated against vibration or movement of other operating equipment in the plant. When the plant is in operation, the weight of each batch of material shall not vary from the weight designated by the Engineer by more than the tolerances specified herein.

- Equipment for cumulative weighing of aggregate shall have a zero tolerance of ±0.5-percent of the designated total batch weight of the aggregate. For systems with individual weigh hoppers for the various sizes of aggregate, the zero tolerance shall be ±0.5-percent of the individual batch weight designated for each size of aggregate. Equipment for cumulative weighing of cement and mineral admixtures shall have a zero tolerance of ±0.5-percent of the designated total batch weight of the cement and mineral admixture. Equipment for weighing cement or mineral admixture separately shall have a zero tolerance of ±0.5-percent of their designated individual batch weights. Equipment for measuring water shall have a zero tolerance of ±0.5-percent of its designated weight or volume.

- The weight indicated for any batch of material shall not vary from the preselected scale setting by more than the following:

A. Aggregate weighed cumulatively shall be within 1.0 percent of the designated total batch weight of the aggregate. Aggregates weighed individually shall be within 1.5 percent of their respective designated batch weights;
B. Cement shall be within 1.0 percent of its designated batch weight. When weighed individually, mineral admixture shall be within 1.0 percent of its designated batch weight. When mineral admixture and cement are permitted to be weighed cumulatively, cement shall be weighed first to within 1.0 percent of its designated batch weight, and the total for cement and mineral admixture shall be within 1.0 percent of the sum of their designated batch weights; and
C. Water shall be within 1.5 percent of its designated weight or volume.

- Each scale graduation shall be approximately 0.001 of the total capacity of the scale. The capacity of scales for weighing cement, mineral admixture, or cement plus mineral admixture and aggregates shall not exceed that of commercially available scales having single graduations indicating a weight not exceeding the maximum permissible weight variation above, except that no scale shall be required having a capacity of less than 1,000 pounds, with one-pound graduations.

90-5.03 PROPORTIONING

- Proportioning shall consist of dividing the aggregates into the specified sizes, each stored in a separate bin, and combining them with cement, mineral admixture, and water as provided in these specifications. Aggregates shall be proportioned by weight.

- At the time of batching, aggregates shall have been dried or drained sufficiently to result in a stable moisture content such that no visible separation of water from aggregate will take place during transportation from the proportioning plant to the point of mixing. In no event shall the free moisture content of the fine aggregate at the time of batching exceed 8 percent of its saturated, surface-dry weight.

- Should separate supplies of aggregate material of the same size group, but of different moisture content or specific gravity or surface characteristics affecting workability, be available at the proportioning plant, withdrawals shall be made from one supply exclusively and the materials therein completely exhausted before starting upon another.

- Bulk "Type IP (MS) Modified" cement shall be weighed in an individual hopper and shall be kept separate from the aggregates until the ingredients are released for discharge into the mixer.

- Bulk cement and mineral admixture may be weighed in separate, individual weigh hoppers or may be weighed in the same weigh hopper and shall be kept separate from the aggregates until the ingredients are released for discharge into the mixer. If the cement and mineral admixture are weighed cumulatively, the cement shall be weighed first.

- When cement and mineral admixtures are weighed in separate weigh hoppers**,** the weigh systems for the proportioning of the aggregate, the cement, and the mineral admixture shall be individual and distinct from all other weigh systems. Each weigh system shall be equipped with a hopper, a lever system, and an indicator to constitute an individual and independent material weighing device. The cement and the mineral admixture shall be discharged into the mixer simultaneously with the aggregate.

- The scales and weigh hoppers for bulk weighing cement, mineral admixture, or cement plus mineral admixture shall be separate and distinct from the aggregate weighing equipment.

- For batches with a volume of one cubic yard or more, the batching equipment shall conform to one of the following combinations:

  A. Separate boxes and separate scale and indicator for weighing each size of aggregate.
  B. Single box and scale indicator for all aggregates.
  C. Single box or separate boxes and automatic weighing mechanism for all aggregates.

- In order to check the accuracy of batch weights, the gross weight and tare weight of batch trucks, truck mixers, truck agitators, and non-agitating hauling equipment shall be determined when ordered by the Engineer. The equipment shall be weighed at the Contractor's expense on scales designated by the Engineer.

90-5.03A Proportioning for Pavement

- Aggregates and bulk cement, mineral admixture, and cement plus mineral admixture for use in pavement shall be proportioned by weight by means of automatic proportioning devices of approved type conforming to these specifications.

- The Contractor shall install and maintain in operating condition an electronically actuated moisture meter that will indicate, on a readily visible scale, changes in the moisture content of the fine aggregate as it is batched within a sensitivity of 0.5-percent by weight of the fine aggregate.

- The batching of cement, mineral admixture, or cement plus mineral admixture and aggregate shall be interlocked so that a new batch cannot be started until all weigh hoppers are empty, the proportioning devices are within zero tolerance, and the discharge gates are closed. The interlock shall permit no part of the batch to be discharged until all aggregate hoppers and the cement and mineral admixture hoppers or the cement plus mineral admixture hopper are charged with weights that are within the tolerances specified in Section 90-5.02, "Proportioning Devices."

- When interlocks are required for cement and mineral admixture charging mechanisms and cement and mineral admixtures are weighed cumulatively, their charging mechanisms shall be interlocked to prevent the introduction of mineral admixture until the weight of cement in the cement weigh hopper is within the tolerances specified in Section 90-5.02, "Proportioning Devices."

- The discharge gate on the cement and mineral admixture hoppers or the cement plus mineral admixture hopper shall be designed to permit regulating the flow of cement, mineral admixture, or cement plus mineral admixture into the aggregate as directed by the Engineer.

- When separate weigh boxes are used for each size of aggregate, the discharge gates shall permit regulating the flow of each size of aggregate as directed by the Engineer.

- Material discharged from the several bins shall be controlled by gates or by mechanical conveyors. The means of withdrawal from the several bins, and of discharge from the weigh box, shall be interlocked so that not more than one bin can discharge at a time, and so that

the weigh box cannot be tripped until the required quantity from each of the several bins has been deposited therein. Should a separate weigh box be used for each size of aggregate, all may be operated and discharged simultaneously.

- When the discharge from the several bins is controlled by gates, each gate shall be actuated automatically so that the required weight is discharged into the weigh box, after which the gate shall automatically close and lock.

- The automatic weighing system shall be designed so that all proportions required may be set on the weighing controller at the same time.

90-6 MIXING AND TRANSPORTING

90-6.01 GENERAL

- Concrete shall be mixed in mechanically operated mixers, except that when permitted by the Engineer, batches not exceeding a third of a cubic yard may be mixed by hand methods in conformance with the provisions in Section 90-6.05, "Hand-Mixing."

- Equipment having components made of aluminum or magnesium alloys that would have contact with plastic concrete during mixing, transporting, or pumping of portland cement concrete shall not be used.
- Concrete shall be homogeneous and thoroughly mixed, and there shall be no lumps or evidence of undispersed cement, mineral admixture, or cement plus mineral admixture.

- Uniformity of concrete mixtures will be determined by differences in penetration as determined by California Test 533, or slump as determined by ASTM Designation: C 143, and by variations in the proportion of coarse aggregate as determined by California Test 529.

- When the mix design specifies a penetration value, the difference in penetration, determined by comparing penetration tests on 2 samples of mixed concrete from the same batch or truck mixer load, shall not exceed 1/2 inch. When the mix design specifies a slump value, the difference in slump, determined by comparing slump tests on 2 samples of mixed concrete from the same batch or truck mixer load, shall not exceed the values given in the table below. Variation in the proportion of coarse aggregate will be determined by comparing the results of tests of 2 samples of mixed concrete from the same batch or truck mixer load and the difference between the 2 results shall not exceed 170 pounds per cubic yard of concrete.

Average Slump	Maximum Permissible Difference
Less than 4"	1"
4" to 6"	1 1/2"
Greater than 6" to 9"	2"

- The Contractor, at the Contractor's expense, shall furnish samples of the freshly mixed concrete and provide satisfactory facilities for obtaining the samples.

90-6.02 MACHINE MIXING

- Concrete mixers may be of the revolving drum or the revolving blade type, and the mixing drum or blades shall be operated uniformly at the mixing speed recommended by the manufacturer. Mixers and agitators that have an accumulation of hard concrete or mortar shall not be used.

- The temperature of mixed concrete, immediately before placing, shall be not less than 50° F or more than 90° F. Aggregates and water shall be heated or cooled as necessary to produce concrete within these temperature limits. Neither aggregates nor mixing water shall be heated to exceed 150° F. If ice is used to cool the concrete, discharge of the mixer will not be permitted until all ice is melted.

- The batch shall be so charged into the mixer that some water will enter in advance of cementitious materials and aggregates. All water shall be in the drum by the end of the first fourth of the specified mixing time.

- Cementitious materials shall be batched and charged into the mixer by means that will not result either in loss of cementitious materials due to the effect of wind, in accumulation of cementitious materials on surfaces of conveyors or hoppers, or in other conditions that reduce or vary the required quantity of cementitious material in the concrete mixture.

- Paving and stationary mixers shall be operated with an automatic timing device. The timing device and discharge mechanism shall be interlocked so that during normal operation no part of the batch will be discharged until the specified mixing time has elapsed.

- The total elapsed time between the intermingling of damp aggregates and all cementitious materials and the start of mixing shall not exceed 30 minutes.

- The size of batch shall not exceed the manufacturer's guaranteed capacity.

- When producing concrete for pavement or base, suitable batch counters shall be installed and maintained in good operating condition at jobsite batching plants and stationary mixers. The batch counters shall indicate the exact number of batches proportioned and mixed.

- Concrete shall be mixed and delivered to the jobsite by means of one of the following combinations of operations:

  A. Mixed completely in a stationary mixer and the mixed concrete transported to the point of delivery in truck agitators or in non-agitating hauling equipment (central-mixed concrete).
  B. Mixed partially in a stationary mixer, and the mixing completed in a truck mixer (shrink-mixed concrete).
  C. Mixed completely in a truck mixer (transit-mixed concrete).
  D. Mixed completely in a paving mixer.

- Agitators may be truck mixers operating at agitating speed or truck agitators. Each mixer and agitator shall have attached thereto in a prominent place a metal plate or plates on which is plainly marked the various uses for which the equipment is designed, the manufacturer's guaranteed capacity of the drum or container in terms of the volume of mixed concrete and the speed of rotation of the mixing drum or blades.

- Truck mixers shall be equipped with electrically or mechanically actuated revolution counters by which the number of revolutions of the drum or blades may readily be verified.

- When shrink-mixed concrete is furnished, concrete that has been partially mixed at a central plant shall be transferred to a truck mixer and all requirements for transit-mixed concrete shall apply. No credit in the number of revolutions at mixing speed shall be allowed for partial mixing in a central plant.

90-6.03 TRANSPORTING MIXED CONCRETE

- Mixed concrete may be transported to the delivery point in truck agitators or truck mixers operating at the speed designated by the manufacturer of the equipment as agitating speed, or in non-agitating hauling equipment, provided the consistency and workability of the mixed concrete upon discharge at the delivery point is suitable for adequate placement and consolidation in place, and provided the mixed concrete after hauling to the delivery point conforms to the provisions in Section 90-6.01, "General."

- Truck agitators shall be loaded not to exceed the manufacturer's guaranteed capacity and shall maintain the mixed concrete in a thoroughly mixed and uniform weight during hauling.

- Bodies of non-agitating hauling equipment shall be constructed so that leakage of the concrete mix, or any part thereof, will not occur at any time.

- Concrete hauled in open-top vehicles shall be protected during hauling against rain or against exposure to the sun for more than 20 minutes when the ambient temperature exceeds 75° F.

- No additional mixing water shall be incorporated into the concrete during hauling or after arrival at the delivery point, unless authorized by the Engineer. If the Engineer authorizes additional water to be incorporated into the concrete, the drum shall be revolved not less than 30 revolutions at mixing speed after the water is added and before discharge is commenced.

- The rate of discharge of mixed concrete from truck mixer-agitators shall be controlled by the speed of rotation of the drum in the discharge direction with the discharge gate fully open.

- When a truck mixer or agitator is used for transporting concrete to the delivery point, discharge shall be completed within 1.5 hours or before 250 revolutions of the drum or blades, whichever occurs first, after the introduction of the cement to the aggregates. Under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 85° F or above, the time allowed may be less than 1.5 hours.

- When non-agitating hauling equipment is used for transporting concrete to the delivery point, discharge shall be completed within one hour after the addition of the cement to the aggregates. Under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 85° F or above, the time between the introduction of cement to the aggregates and discharge shall not exceed 45 minutes.

- Each load of concrete delivered at the jobsite shall be accompanied by a weighmaster certificate showing the mix identification number, non-repeating load number, date and time

at which the materials were batched, the total amount of water added to the load, and for transit-mixed concrete, the reading of the revolution counter at the time the truck mixer is charged with cement. This weighmaster certificate shall also show the actual scale weights (pounds) for the ingredients batched. Theoretical or target batch weights shall not be used as a substitute for actual scale weights.

- Weighmaster certificates shall be provided in printed form, or if approved by the Engineer, the data may be submitted in electronic media. Electronic media shall be presented in a tab-delimited format on a $3\frac{1}{2}$-inch diskette with a capacity of at least 1.4 megabytes. Captured data, for the ingredients represented by each batch shall be "line feed, carriage return" (LFCR) and "one line, separate record" with allowances for sufficient fields to satisfy the amount of data required by these specifications.

- The Contractor may furnish a weighmaster certificate accompanied by a separate certificate that lists the actual batch weights or measurements for a load of concrete provided that both certificates are imprinted with the same non-repeating load number that is unique to the contract and delivered to the jobsite with the load.

- Weighmaster certificates furnished by the Contractor shall conform to the provisions in Section 9-1.01, "Measurement of Quantities."

90-6.04 TIME OR AMOUNT OF MIXING

- Mixing of concrete in paving or stationary mixers shall continue for the required mixing time after all ingredients, except water and admixture, if added with the water, are in the mixing compartment of the mixer before any part of the batch is released. Transfer time in multiple drum mixers shall not be counted as part of the required mixing time.

- The required mixing time, in paving or stationary mixers, of concrete used for concrete structures, except minor structures, shall be not less than 90 seconds or more than 5 minutes, except that when directed by the Engineer in writing, the requirements of the following paragraph shall apply.

- The required mixing time, in paving or stationary mixers, except as provided in the preceding paragraph, shall be not less than 50 seconds or more than 5 minutes.

- The minimum required revolutions at the mixing speed for transit-mixed concrete shall not be less than that recommended by the mixer manufacturer, but in no case shall the number of revolutions be less than that required to consistently produce concrete conforming to the provisions for uniformity in Section 90-6.01, "General."

90-6.05 HAND-MIXING

- Hand-mixed concrete shall be made in batches of not more than one-third cubic yard and shall be mixed on a watertight, level platform. The proper amount of coarse aggregate shall be measured in measuring boxes and spread on the platform and the fine aggregate shall be spread on this layer, the 2 layers being not more than one foot in total depth. On this mixture shall be spread the dry cement and mineral admixture and the whole weight turned no fewer than 2 times dry; then sufficient clean water shall be added, evenly distributed, and the whole weight again turned no fewer than 3 times, not including placing in the carriers or forms.

90-6.06 AMOUNT OF WATER AND PENETRATION

- The amount of water used in concrete mixes shall be regulated so that the penetration of the concrete as determined by California Test 533 or the slump of the concrete as determined by ASTM Designation: C 143 is within the "Nominal" values shown in the following table. When the penetration or slump of the concrete is found to exceed the nominal values listed, the mixture of subsequent batches shall be adjusted to reduce the penetration or slump to a value within the nominal range shown. Batches of concrete with a penetration or slump exceeding the maximum values listed shall not be used in the work. When Type F or Type G chemical admixtures are added to the mix, the penetration requirements shall not apply and the slump shall not exceed 9 inches after the chemical admixtures are added.

Type of Work	Nominal		Maximum	
	Penetration inches	Slump inches	Penetration inches	Slump inches
Concrete Pavement	0 - 1	—	$1\frac{1}{2}$	—
Non-reinforced concrete facilities	0 - $1\frac{1}{2}$	—	2	—
Reinforced concrete structures				
Sections over 12 inches thick	0 - $1\frac{1}{2}$	—	$2\frac{1}{2}$	—
Sections 12 inches thick or less	0 - 2	—	3	—
Concrete placed under water	—	6-8	—	9
Cast-in-place concrete piles	$2\frac{1}{2}$ - $3\frac{1}{2}$	5-7	4	8

- The amount of free water used in concrete shall not exceed 310 pounds per cubic yard, plus 20 pounds for each required 100 pounds of cementitious material in excess of 550 pounds per cubic yard.

- The term free water is defined as the total water in the mixture minus the water absorbed by the aggregates in reaching a saturated surface-dry condition.

- Where there are adverse or difficult conditions that affect the placing of concrete, the above specified penetration and free water content limitations may be exceeded providing the Contractor is granted permission by the Engineer in writing to increase the cementitious material content per cubic yard of concrete. The increase in water and cementitious material shall be at a ratio not to exceed 30 pounds of water per added 100 pounds of cementitious material per cubic yard. The cost of additional cementitious material and water added under these conditions shall be at the Contractor's expense and no additional compensation will be allowed therefor.

- The equipment for supplying water to the mixer shall be constructed and arranged so that the amount of water added can be measured accurately. Any method of discharging water into the mixer for a batch shall be accurate within 1.5 percent of the quantity of water required to be added to the mix for any position of the mixer. Tanks used to measure water shall be designed so that water cannot enter while water is being discharged into the mixer and discharge into the mixer shall be made rapidly in one operation without dribbling. All

equipment shall be arranged so as to permit checking the amount of water delivered by discharging into measured containers.

90-7 CURING CONCRETE

90-7.01 METHODS OF CURING

- Newly placed concrete shall be cured by the methods specified in this Section 90-7.01 and the special provisions.

90-7.01A Water Method

- The concrete shall be kept continuously wet by the application of water for a minimum curing period of 7 days after the concrete has been placed.
- When a curing medium consisting of cotton mats, rugs, carpets, or earth or sand blankets is to be used to retain the moisture, the entire surface of the concrete shall be kept damp by applying water with a nozzle that so atomizes the flow that a mist and not a spray is formed, until the surface of the concrete is covered with the curing medium. The moisture from the nozzle shall not be applied under pressure directly upon the concrete and shall not be allowed to accumulate on the concrete in a quantity sufficient to cause a flow or wash the surface. At the expiration of the curing period, the concrete surfaces shall be cleared of all curing mediums.

- At the option of the Contractor, a curing medium consisting of white opaque polyethylene sheeting extruded onto burlap may be used to cure concrete structures. The polyethylene sheeting shall have a minimum thickness of 4 mil, and shall be extruded onto 10-ounce burlap.

- At the option of the Contractor, a curing medium consisting of polyethylene sheeting may be used to cure concrete columns. The polyethylene sheeting shall have a minimum thickness of 10 mil achieved in a single layer of material.

- If the Contractor chooses to use polyethylene sheeting or polyethylene sheeting on burlap as a curing medium as specified above, these mediums and any joints therein shall be secured as necessary to provide moisture retention and shall be within 3 inches of the concrete at all points along the surface being cured. When these mediums are used, the temperature of the concrete shall be monitored during curing. If the temperature of the concrete cannot be maintained below 140° F, this method of curing shall be discontinued, and one of the other curing methods allowed for the concrete shall be used.
- When concrete bridge decks and flat slabs are to be cured without the use of a curing medium, the entire surface of the bridge deck or slab shall be kept damp by the application of water with an atomizing nozzle as specified in the preceding paragraph, until the concrete has set, after which the entire surface of the concrete shall be sprinkled continuously with water for a period of not less than 7 days.

90-7.01B Curing Compound Method

- Surfaces of the concrete that are exposed to the air shall be sprayed uniformly with a curing compound.

- Curing compounds to be used shall be as follows:

A. Pigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 2, Class B, except the resin type shall be poly-alpha-methylstyrene.
B. Pigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 2, Class B.
C. Pigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 2, Class A.
D. Non-pigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 1, Class B.
E. Non-pigmented curing compound conforming to the requirements in ASTM Designation: C 309, Type 1, Class A.
F. Non-pigmented curing compound with fugitive dye conforming to the requirements in ASTM Designation: C 309, Type 1-D, Class A.

- The infrared scan for the dried vehicle from curing compound (A) in the preceeding list shall match the infrared scan on file at the Transportation Laboratory.

- The loss of water for each type of curing compound, when tested in conformance with the requirements in California Test 534, shall not be more than 0.15-kilograms per meter squared in 24 hours.

- The curing compound to be used will be specified elsewhere in these specifications or in the special provisions.

- When the use of curing compound is required or permitted elsewhere in these specifications or in the special provisions and no specific kind is specified, any of the curing compounds listed above may be used.

- Curing compound shall be applied at a nominal rate of one gallon per 150 square feet, unless otherwise specified.

- At any point, the application rate shall be within ±50 square feet per gallon of the nominal rate specified, and the average application rate shall be within ±25 square feet per gallon of the nominal rate specified when tested in conformance with the requirements in California Test 535. Runs, sags, thin areas, skips, or holidays in the applied curing compound shall be evidence that the application is not satisfactory.

- Curing compounds shall be applied using power operated spray equipment. The power operated spraying equipment shall be equipped with an operational pressure gage and a means of controlling the pressure. Hand spraying of small and irregular areas that are not reasonably accessible to mechanical spraying equipment, in the opinion of the Engineer, may be permitted.

- The curing compound shall be applied to the concrete following the surface finishing operation, immediately before the moisture sheen disappears from the surface, but before any drying shrinkage or craze cracks begin to appear. In the event of any drying or cracking of the surface, application of water with an atomizing nozzle as specified in Section 90-7.01A, "Water Method," shall be started immediately and shall be continued until application of the compound is resumed or started; however, the compound shall not be applied over any resulting freestanding water. Should the film of compound be damaged from any cause before the expiration of 7 days after the concrete is placed in the case of

structures and 72 hours in the case of pavement, the damaged portion shall be repaired immediately with additional compound.

- At the time of use, compounds containing pigments shall be in a thoroughly mixed condition with the pigment uniformly dispersed throughout the vehicle. A paddle shall be used to loosen all settled pigment from the bottom of the container, and a power driven agitator shall be used to disperse the pigment uniformly throughout the vehicle.

- Agitation shall not introduce air or other foreign substance into the curing compound.

- The manufacturer shall include in the curing compound the necessary additives for control of sagging, pigment settling, leveling, de-emulsification, or other requisite qualities of a satisfactory working material. Pigmented curing compounds shall be manufactured so that the pigment does not settle badly, does not cake or thicken in the container, and does not become granular or curdled. Settled pigment shall be a thoroughly wetted, soft, mushy mass permitting the complete and easy vertical penetration of a paddle. Settled pigment shall be easily redispersed, with minimum resistance to the sideways manual motion of the paddle across the bottom of the container, to form a smooth uniform product of the proper consistency.

- Curing compounds shall remain sprayable at temperatures above 40°F and shall not be diluted or altered after manufacture.

- The curing compound shall be packaged in clean 274-gallon totes, 55-gallon barrels, or 5-gallon pails, or shall be supplied from a suitable storage tank located at the jobsite. The containers shall comply with "Title 49, Code of Federal Regulations, Hazardous Materials Regulations." The 274-gallon totes, and the 55-gallon barrels shall have removable lids and airtight fasteners. The 5-gallon pails shall be round and have standard full open head and bail. Lids with bungholes shall not be permitted. Settling or separation of solids in containers, except tanks, must be completely redispersed with low speed mixing prior to use, in conformance with these specifications and the manufacturer's recommendations. Mixing shall be accomplished either manually by use of a paddle or by use of a mixing blade driven by a drill motor, at low speed. Mixing blades shall be the type used for mixing paint. On site storage tanks shall be kept clean and free of contaminants. Each tank shall have a permanent system designed to completely redisperse settled material without introducing air or other foreign substances.

- Steel containers and lids shall be lined with a coating that will prevent destructive action by the compound or chemical agents in the air space above the compound. The coating shall not come off the container or lid as skins. Containers shall be filled in a manner that will prevent skinning. Plastic containers shall not react with the compound.

- Each container shall be labeled with the manufacturer's name, kind of curing compound, batch number, volume, date of manufacture, and volatile organic compound (VOC) content. The label shall also warn that the curing compound containing pigment shall be well stirred before use. Precautions concerning the handling and the application of curing compound shall be shown on the label of the curing compound containers in conformance with the Construction Safety Orders and General Industry Safety Orders of the State of California.

- Containers of curing compound shall be labeled to indicate that the contents fully comply with the rules and regulations concerning air pollution control in the State of California.

- When the curing compound is shipped in tanks or tank trucks, a shipping invoice shall accompany each load. The invoice shall contain the same information as that required herein for container labels.

- Curing compound will be sampled by the Engineer at the source of supply or at the jobsite or at both locations.

- Curing compound shall be formulated so as to maintain the specified properties for a minimum of one year. The Engineer may require additional testing before use to determine compliance with these specifications if the compound has not been used within one year or whenever the Engineer has reason to believe the compound is no longer satisfactory.
- Tests will be conducted in conformance with the latest ASTM test methods and methods in use by the Transportation Laboratory.

90-7.01C Waterproof Membrane Method

- The exposed finished surfaces of concrete shall be sprayed with water, using a nozzle that so atomizes the flow that a mist and not a spray is formed, until the concrete has set, after which the curing membrane shall be placed. The curing membrane shall remain in place for a period of not less than 72 hours.

- Sheeting material for curing concrete shall conform to the requirements in AASHTO Designation: M 171 for white reflective materials.

- The sheeting material shall be fabricated into sheets of such width as to provide a complete cover for the entire concrete surface. Joints in the sheets shall be securely cemented together in such a manner as to provide a waterproof joint. The joint seams shall have a minimum lap of 0.33-foot.

- The sheets shall be securely weighted down by placing a bank of earth on the edges of the sheets or by other means satisfactory to the Engineer.

- Should any portion of the sheets be broken or damaged before the expiration of 72 hours after being placed, the broken or damaged portions shall be immediately repaired with new sheets properly cemented into place.

- Sections of membrane that have lost their waterproof qualities or have been damaged to such an extent as to render them unfit for curing the concrete shall not be used.

90-7.01D Forms-In-Place Method

- Formed surfaces of concrete may be cured by retaining the forms in place. The forms shall remain in place for a minimum period of 7 days after the concrete has been placed, except that for members over 20 inches in least dimension the forms shall remain in place for a minimum period of 5 days.

- Joints in the forms and the joints between the end of forms and concrete shall be kept moisture tight during the curing period. Cracks in the forms and cracks between the forms and the concrete shall be resealed by methods subject to the approval of the Engineer.

90-7.02 CURING PAVEMENT

- The entire exposed area of the pavement, including edges, shall be cured by the waterproof membrane method, or curing compound method using curing compound (A) or (B) as the Contractor may elect. Should the side forms be removed before the expiration of 72 hours following the start of curing, the exposed pavement edges shall also be cured. If the pavement is cured by means of the curing compound method, the sawcut and all portions of the curing compound that have been disturbed by sawing operations shall be restored by spraying with additional curing compound.

- Curing shall commence as soon as the finishing process provided in Section 40-1.10, "Final Finishing," has been completed. The method selected shall conform to the provisions in Section 90-7.01, "Methods of Curing."

- When the curing compound method is used, the compound shall be applied to the entire pavement surface by mechanical sprayers. Spraying equipment shall be of the fully atomizing type equipped with a tank agitator that provides for continual agitation of the curing compound during the time of application. The spray shall be adequately protected against wind, and the nozzles shall be so oriented or moved mechanically transversely as to result in the minimum specified rate of coverage being applied uniformly on exposed faces. Hand spraying of small and irregular areas, and areas inaccessible to mechanical spraying equipment, in the opinion of the Engineer, will be permitted. When the ambient air temperature is above 60°F, the Contractor shall fog the surface of the concrete with a fine spray of water as specified in Section 90-7.01A, "Water Method." The surface of the pavement shall be kept moist between the hours of 10:00 a.m. and 4:30 p.m. on the day the concrete is placed. However, the fogging done after the curing compound has been applied shall not begin until the compound has set sufficiently to prevent displacement. Fogging shall be discontinued if ordered in writing by the Engineer.

90-7.03 CURING STRUCTURES

- Newly placed concrete for cast-in-place structures, other than highway bridge decks, shall be cured by the water method, the forms-in-place method, or, as permitted herein, by the curing compound method, in conformance with the provisions in Section 90-7.01, "Methods of Curing."

- The curing compound method using a pigmented curing compound may be used on concrete surfaces of construction joints, surfaces that are to be buried underground, and surfaces where only ordinary surface finish is to be applied and on which a uniform color is not required and that will not be visible from a public traveled way. If the Contractor elects to use the curing compound method on the bottom slab of box girder spans, the curing compound shall be curing compound (A).
- The top surface of highway bridge decks shall be cured by both the curing compound method and the water method. The curing compound shall be curing compound (A).

- Concrete surfaces of minor structures, as defined in Section 51-1.02, "Minor Structures," shall be cured by the water method, the forms-in-place method or the curing compound method.

- When deemed necessary by the Engineer during periods of hot weather, water shall be applied to concrete surfaces being cured by the curing compound method or by the forms-in-place method, until the Engineer determines that a cooling effect is no longer

required. Application of water for this purpose will be paid for as extra work as provided in Section 4-1.03D, "Extra Work."

90-7.04 CURING PRECAST CONCRETE MEMBERS

Precast concrete members shall be cured in conformance with any of the methods specified in Section 90-7.01, "Methods of Curing." Curing shall be provided for the minimum time specified for each method or until the concrete reaches its design strength, whichever is less. Steam curing may also be used for precast members and shall conform to the following provisions:

A. After placement of the concrete, members shall be held for a minimum 4-hour presteaming period. If the ambient air temperature is below 50°F, steam shall be applied during the presteaming period to hold the air surrounding the member at a temperature between 50°F and 90°F.
B. To prevent moisture loss on exposed surfaces during the presteaming period, members shall be covered as soon as possible after casting or the exposed surfaces shall be kept wet by fog spray or wet blankets.
C. Enclosures for steam curing shall allow free circulation of steam about the member and shall be constructed to contain the live steam with a minimum moisture loss. The use of tarpaulins or similar flexible covers will be permitted, provided they are kept in good repair and secured in such a manner as to prevent the loss of steam and moisture.
D. Steam at the jets shall be at low pressure and in a saturated condition. Steam jets shall not impinge directly on the concrete, test cylinders, or forms. During application of the steam, the temperature rise within the enclosure shall not exceed 40°F per hour. The curing temperature throughout the enclosure shall not exceed 150°F and shall be maintained at a constant level for a sufficient time necessary to develop the required transfer strength. Control cylinders shall be covered to prevent moisture loss and shall be placed in a location where temperature is representative of the average temperature of the enclosure.
E. Temperature recording devices that will provide an accurate, continuous, permanent record of the curing temperature shall be provided. A minimum of one temperature recording device per 200 feet of continuous bed length will be required for checking temperature.
F. Members in pretension beds shall be detensioned immediately after the termination of steam curing while the concrete and forms are still warm, or the temperature under the enclosure shall be maintained above 60°F until the stress is transferred to the concrete.
G. Curing of precast concrete will be considered completed after termination of the steam curing cycle.

90-7.05 CURING PRECAST PRESTRESSED CONCRETE PILES

Newly placed concrete for precast prestressed concrete piles shall be cured in conformance with the provisions in Section 90-7.04, "Curing Precast Concrete Members," except that piles in a corrosive environment shall be cured as follows:

A. Piles shall be either steam cured or water cured. If water curing is used, the piles shall be kept continuously wet by the application of water in conformance with the provisions in Section 90-7.01A, "Water Method."
B. If steam curing is used, the steam curing provisions in Section 90-7.04, "Curing Precast Concrete Members," shall apply except that the piles shall be kept continuously wet for

their entire length for a period of not less than 3 days, including the holding and steam curing periods.

90-7.06 CURING SLOPE PROTECTION

- Concrete slope protection shall be cured in conformance with any of the methods specified in Section 90-7.01, "Methods of Curing."

- Concreted-rock slope protection shall be cured in conformance with any of the methods specified in Section 90-7.01, "Methods of Curing," or with a blanket of earth kept wet for 72 hours, or by sprinkling with a fine spray of water every 2 hours during the daytime for a period of 3 days.

90-7.07 CURING MISCELLANEOUS CONCRETE WORK

- Exposed surfaces of curbs shall be cured by pigmented curing compounds as specified in Section 90-7.01B, "Curing Compound Method."

- Concrete sidewalks, gutter depressions, island paving, curb ramps, driveways, and other miscellaneous concrete areas shall be cured in conformance with any of the methods specified in Section 90-7.01, "Methods of Curing."

- Shotcrete shall be cured for at least 72 hours by spraying with water, by a moist earth blanket, or by any of the methods provided in Section 90-7.01, "Methods of Curing."

- Mortar and grout shall be cured by keeping the surface damp for 3 days.

- After placing, the exposed surfaces of sign structure foundations, including pedestal portions, if constructed, shall be cured for at least 72 hours by spraying with water, by a moist earth blanket, or by any of the methods provided in Section 90-7.01, "Methods of Curing."

90-8 PROTECTING CONCRETE

90-8.01 GENERAL

- In addition to the provisions in Section 7-1.16, "Contractor's Responsibility for the Work and Materials," the Contractor shall protect concrete as provided in this Section 90-8.

- Concrete shall not be placed on frozen or ice-coated ground or subgrade nor on ice-coated forms, reinforcing steel, structural steel, conduits, precast members, or construction joints.

- Under rainy conditions, placing of concrete shall be stopped before the quantity of surface water is sufficient to damage surface mortar or cause a flow or wash of the concrete surface, unless the Contractor provides adequate protection against damage.

- Concrete that has been frozen or damaged by other causes, as determined by the Engineer, shall be removed and replaced by the Contractor at the Contractor's expense.

90-8.02 PROTECTING CONCRETE STRUCTURES

- Structure concrete and shotcrete used as structure concrete shall be maintained at a temperature of not less than 45° F for 72 hours after placing and at not less than 40° F for

an additional 4 days. When required by the Engineer, the Contractor shall submit a written outline of the proposed methods for protecting the concrete.

90-8.03 PROTECTING CONCRETE PAVEMENT

- Pavement concrete shall be maintained at a temperature of not less than 40° F for 72 hours. When required by the Engineer, the Contractor shall submit a written outline of the proposed methods for protecting the concrete.

- Except as provided in Section 7-1.08, "Public Convenience," the Contractor shall protect concrete pavement against construction and other activities that abrade, scar, discolor, reduce texture depth, lower coefficient of friction, or otherwise damage the surface. Stockpiling, drifting, or excessive spillage of soil, gravel, petroleum products, and concrete or asphalt mixes on the surface of concrete pavement is prohibited unless otherwise specified in these specifications, the special provisions or permitted by the Engineer.

- When ordered by the Engineer or shown on the plans or specified in the special provisions, pavement crossings shall be constructed for the convenience of public traffic. The material and work necessary for the construction of the crossings, and their subsequent removal and disposal, will be paid for at the contract unit prices for the items of work involved and if there are no contract items for the work involved, payment for pavement crossings will be made by extra work as provided in Section 4-1.03D, "Extra Work." Where public traffic will be required to cross over the new pavement, Type III portland cement may be used in concrete, if permitted in writing by the Engineer. The pavement may be opened to traffic as soon as the concrete has developed a modulus of rupture of 550 psi. The modulus of rupture will be determined by California Test 523.

- No traffic or Contractor's equipment, except as hereinafter provided, will be permitted on the pavement before a period of 10 days has elapsed after the concrete has been placed, nor before the concrete has developed a modulus of rupture of at least 550 psi. Concrete that fails to attain a modulus of rupture of 550 psi within 10 days shall not be opened to traffic until directed by the Engineer.

- Equipment for sawing weakened plane joints will be permitted on the pavement as specified in Section 40-1.08B, "Weakened Plane Joints."

- When requested in writing by the Contractor, the tracks on one side of paving equipment will be permitted on the pavement after a modulus of rupture of 350 psi has been attained, provided that:

  A. Unit pressure exerted on the pavement by the paver shall not exceed 20 psi;
  B. Tracks with cleats, grousers, or similar protuberances shall be modified or shall travel on planks or equivalent protective material, so that the pavement is not damaged; and
  C. No part of the track shall be closer than one foot from the edge of pavement.

- In case of visible cracking of, or other damage to the pavement, operation of the paving equipment on the pavement shall be immediately discontinued.

- Damage to the pavement resulting from early use of pavement by the Contractor's equipment as provided above shall be repaired by the Contractor at the Contractor's expense.

- The State will furnish the molds and machines for testing the concrete for modulus of rupture, and the Contractor, at the Contractor's expense, shall furnish the material and whatever labor the Engineer may require.

90-9 COMPRESSIVE STRENGTH

90-9.01 GENERAL

- Concrete compressive strength requirements consist of a minimum strength that shall be attained before various loads or stresses are applied to the concrete and, for concrete designated by strength, a minimum strength at the age of 28 days or at the age otherwise allowed in Section 90-1.01, "Description." The various strengths required are specified in these specifications or the special provisions or are shown on the plans.

- The compressive strength of concrete will be determined from test cylinders that have been fabricated from concrete sampled in conformance with the requirements of California Test 539. Test cylinders will be molded and initially field cured in conformance with California Test 540. Test cylinders will be cured and tested after receipt at the testing laboratory in conformance with the requirements of California Test 521. A strength test shall consist of the average strength of 2 cylinders fabricated from material taken from a single load of concrete, except that, if any cylinder should show evidence of improper sampling, molding, or testing, that cylinder shall be discarded and the strength test shall consist of the strength of the remaining cylinder.

- When concrete compressive strength is specified as a prerequisite to applying loads or stresses to a concrete structure or member, test cylinders for other than steam cured concrete will be cured in conformance with Method 1 of California Test 540. The compressive strength of concrete determined for these purposes will be evaluated on the basis of individual tests.

- When concrete is designated by 28-day compressive strength rather than by cementitious material content, the concrete strength to be used as a basis for acceptance of other than steam cured concrete will be determined from cylinders cured in conformance with Method 1 of California Test 540. If the result of a single compressive strength test at the maximum age specified or allowed is below the specified strength but is 95 percent or more of the specified strength, the Contractor shall, at the Contractor’s expense, make corrective changes, subject to approval of the Engineer, in the mix proportions or in the concrete fabrication procedures, before placing additional concrete, and shall pay to the State $10 for each in-place cubic yard of concrete represented by the deficient test. If the result of a single compressive strength test at the maximum age specified or allowed is below 95 percent of the specified strength, but is 85 percent or more of the specified strength, the Contractor shall make the corrective changes specified above, and shall pay to the State $15 for each in-place cubic yard of concrete represented by the deficient test. In addition, such corrective changes shall be made when the compressive strength of concrete tested at 7 days indicates, in the judgment of the Engineer, that the concrete will not attain the required compressive strength at the maximum age specified or allowed. Concrete represented by a single test that indicates a compressive strength of less than 85 percent of the specified 28-day compressive strength will be rejected in conformance with the provisions in Section 6-1.04, "Defective Materials."

- If the test result indicates that the compressive strength at the maximum curing age specified or allowed is below the specified strength, but is 85 percent or more of the specified strength, payments to the State as required above shall be made, unless the Contractor, at the Contractor's expense, obtains and submits evidence acceptable to the Engineer that the strength of the concrete placed in the work meets or exceeds the specified 28-day compressive strength. If the test result indicates a compressive strength at the maximum curing age specified or allowed below 85 percent, the concrete represented by that test will be rejected, unless the Contractor, at the Contractor's expense, obtains and submits evidence acceptable to the Engineer that the strength and quality of the concrete placed in the work are acceptable. If the evidence consists of tests made on cores taken from the work, the cores shall be obtained and tested in conformance with the requirements in ASTM Designation: C 42.

- No single compressive strength test shall represent more than 320 cubic yards.

- When a precast concrete member is steam cured, the compressive strength of the concrete will be determined from test cylinders that have been handled and stored in conformance with Method 3 of California Test 540. The compressive strength of steam cured concrete will be evaluated on the basis of individual tests representing specific portions of production. When the concrete is designated by 28-day compressive strength rather than by cementitious material content, the concrete shall be considered to be acceptable whenever its compressive strength reaches the specified 28-day compressive strength provided that strength is reached in not more than the maximum number of days specified or allowed after the member is cast.

- When concrete is specified by compressive strength, prequalification of materials, mix proportions, mixing equipment, and procedures proposed for use will be required prior to placement of the concrete. Prequalification shall be accomplished by the submission of acceptable certified test data or trial batch reports by the Contractor. Prequalification data shall be based on the use of materials, mix proportions, mixing equipment, procedures, and size of batch proposed for use in the work.

- Certified test data, in order to be acceptable, shall indicate that not less than 90 percent of at least 20 consecutive tests exceed the specified strength at the maximum number of cure days specified or allowed, and none of those tests are less than 95 percent of specified strength. Strength tests included in the data shall be the most recent tests made on concrete of the proposed mix design and all shall have been made within one year of the proposed use of the concrete.

- Trial batch test reports, in order to be acceptable, shall indicate that the average compressive strength of 5 consecutive concrete cylinders, taken from a single batch, at not more than 28 days (or the maximum age allowed) after molding shall be at least 580 psi greater than the specified 28-day compressive strength, and no individual cylinder shall have a strength less than the specified strength at the maximum age specified or allowed. Data contained in the report shall be from trial batches that were produced within one year of the proposed use of specified strength concrete in the project. Whenever air-entrainment is required, the air content of trial batches shall be equal to or greater than the air content specified for the concrete without reduction due to tolerances.

- Tests shall be performed in conformance with either the appropriate California Test methods or the comparable ASTM test methods. Equipment employed in testing shall be in good

condition and shall be properly calibrated. If the tests are performed during the life of the contract, the Engineer shall be notified sufficiently in advance of performing the tests in order to witness the test procedures.

- The certified test data and trial batch test reports shall include the following information:

  A. Date of mixing.
  B. Mixing equipment and procedures used.
  C. The size of batch in cubic yards and the weight, type, and source of all ingredients used.
  D. Penetration of the concrete.
  E. The air content of the concrete if an air-entraining admixture is used.
  F. The age at time of testing and strength of all concrete cylinders tested.

- Certified test data and trial batch test reports shall be signed by an official of the firm that performed the tests.

- When approved by the Engineer, concrete from trial batches may be used in the work at locations where concrete of a lower quality is required and the concrete will be paid for as the type or class of concrete required at that location.

- After materials, mix proportions, mixing equipment, and procedures for concrete have been prequalified for use, additional prequalification by testing of trial batches will be required prior to making changes that, in the judgment of the Engineer, could result in a strength of concrete below that specified.

- The Contractor's attention is directed to the time required to test trial batches and the Contractor shall be responsible for production of trial batches at a sufficiently early date so that the progress of the work is not delayed.

- When precast concrete members are manufactured at the plant of an established manufacturer of precast concrete members, the mix proportions of the concrete shall be determined by the Contractor, and a trial batch and prequalification of the materials, mix proportions, mixing equipment, and procedures will not be required.

90-10 MINOR CONCRETE

90-10.01 GENERAL

- Concrete for minor structures, slope paving, curbs, sidewalks and other concrete work, when designated as minor concrete on the plans, in the specifications, or in the contract item, shall conform to the provisions specified herein.

- The Engineer, at the Engineer's discretion, will inspect and test the facilities, materials and methods for producing the concrete to ensure that minor concrete of the quality suitable for use in the work is obtained.

90-10.02 MATERIALS

- Minor concrete shall conform to the following requirements:

90-10.02A Cementitious Material

- Cementitious material shall conform to the provisions in Section 90-1.01, "Description."

90-10.02B Aggregate

- Aggregate shall be clean and free from deleterious coatings, clay balls, roots, and other extraneous materials.

- The Contractor shall submit to the Engineer for approval, a grading of the combined aggregate proposed for use in the minor concrete. After acceptance of the grading, aggregate furnished for minor concrete shall conform to that grading, unless a change is authorized in writing by the Engineer.

- The Engineer may require the Contractor to furnish periodic test reports of the aggregate grading furnished. The maximum size of aggregate used shall be at the option of the Contractor, but in no case shall the maximum size be larger than $1\frac{1}{2}$ inch or smaller than $\frac{3}{4}$ inch.

- The Engineer may waive, in writing, the gradation requirements in this Section 90-10.02B if, in the Engineer's opinion, the furnishing of the gradation is not necessary for the type or amount of concrete work to be constructed.

90-10.02C Water

- Water used for washing, mixing, and curing shall be free from oil, salts, and other impurities that would discolor or etch the surface or have an adverse affect on the quality of the concrete.

90-10.02D Admixtures

- The use of admixtures shall conform to the provisions in Section 90-4, "Admixtures."

90-10.03 PRODUCTION

- Cementitious material, water, aggregate, and admixtures shall be stored, proportioned, mixed, transported, and discharged in conformance with recognized standards of good practice that will result in concrete that is thoroughly and uniformly mixed, that is suitable for the use intended, and that conforms to requirements specified herein. Recognized standards of good practice are outlined in various industry publications such as are issued by American Concrete Institute, AASHTO, or the Department.

- The cementitious material content of minor concrete shall conform to the provisions in Section 90-1.01, "Description."

- The amount of water used shall result in a consistency of concrete conforming to the provisions in Section 90-6.06, "Amount of Water and Penetration." Additional mixing water shall not be incorporated into the concrete during hauling or after arrival at the delivery point, unless authorized by the Engineer.

- Discharge of ready-mixed concrete from the transporting vehicle shall be made while the concrete is still plastic and before stiffening occurs. An elapsed time of 1.5 hours (one hour in non-agitating hauling equipment), or more than 250 revolutions of the drum or blades,

after the introduction of the cementitious material to the aggregates, or a temperature of concrete of more than 90° F will be considered conditions contributing to the quick stiffening of concrete. The Contractor shall take whatever action is necessary to eliminate quick stiffening, except that the addition of water will not be permitted.

- The required mixing time in stationary mixers shall be not less than 50 seconds or more than 5 minutes.

- The minimum required revolutions at mixing speed for transit-mixed concrete shall be not less than that recommended by the mixer manufacturer, and shall be increased, if necessary, to produce thoroughly and uniformly mixed concrete.

- Each load of ready-mixed concrete shall be accompanied by a weighmaster certificate that shall be delivered to the Engineer at the discharge location of the concrete, unless otherwise directed by the Engineer. The weighmaster certificate shall be clearly marked with the date and time of day when the load left the batching plant and, if hauled in truck mixers or agitators, the time the mixing cycle started.

- A Certificate of Compliance conforming to the provisions in Section 6–1.07, "Certificates of Compliance," shall be furnished to the Engineer, prior to placing minor concrete from a source not previously used on the contract, stating that minor concrete to be furnished meets contract requirements, including minimum cementitious material content specified.

90-10.04 CURING MINOR CONCRETE

- Curing minor concrete shall conform to the provisions in Section 90-7, "Curing Concrete."

90-10.05 PROTECTING MINOR CONCRETE

- Protecting minor concrete shall conform to the provisions in Section 90-8, "Protecting Concrete," except the concrete shall be maintained at a temperature of not less than 40° F for 72 hours after placing.

90-10.06 MEASUREMENT AND PAYMENT

- Minor concrete will be measured and paid for in conformance with the provisions specified in the various sections of these specifications covering concrete construction when minor concrete is specified in the specifications, shown on the plans, or indicated by contract item in the Engineer's Estimate.

90-11 MEASUREMENT AND PAYMENT

90-11.01 MEASUREMENT

- Portland cement concrete will be measured in conformance with the provisions specified in the various sections of these specifications covering construction requiring concrete.

- When it is provided that concrete will be measured at the mixer, the volume in cubic feet shall be computed as the total weight of the batch in pounds divided by the density of the concrete in pounds per cubic foot. The total weight of the batch shall be calculated as the sum of all materials, including water, entering the batch. The density of the concrete will be determined in conformance with the requirements in California Test 518.

90-11.02 PAYMENT

- Portland cement concrete will be paid for in conformance with the provisions specified in the various sections of these specifications covering construction requiring concrete.

- Full compensation for furnishing and incorporating admixtures required by these specifications or the special provisions will be considered as included in the contract prices paid for the concrete involved and no additional compensation will be allowed therefor.

- Should the Engineer order the Contractor to incorporate any admixtures in the concrete when their use is not required by these specifications or the special provisions, furnishing the admixtures and adding them to the concrete will be paid for as extra work as provided in Section 4-1.03D, "Extra Work."

- Should the Contractor use admixtures in conformance with the provisions in Section 90-4.05, "Optional Use of Chemical Admixtures," or Section 90-4.07, "Optional Use of Air-entraining Admixtures," or should the Contractor request and obtain permission to use other admixtures for the Contractor's benefit, the Contractor shall furnish those admixtures and incorporate them into the concrete at the Contractor’s expense and no additional compensation will be allowed therefor.

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:

A. AGREEMENT - See Contract.

B. ASTM - American Society for Testing and Materials.

C. AWWA - American Water Works Association.

D. ADDENDA - Written or graphic instruments issued prior to the opening of bids which clarify, correct or change the bidding documents or the contract documents.

E. BID - The offer of a proposal of the bidder submitted on the prescribed form setting forth the prices for the work to be performed.

F. BIDDER - Any individual, firm or corporation submitting a proposal for the work contemplated, acting directly or through a duly authorized representative.

G. BIDDER'S GUARANTY - The cash or certified check or cashiers check or bidders bond accompanying the proposal 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 him or her.

H. BONDS - Bid, performance and payment bonds and other instruments of security.

I. 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.

J. 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.

K. CITY ENGINEER - Public Works 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.

L. CITY STANDARDS - The Standard Specifications of the City of Modesto, Department of Public Works, copies of which are available at the office of the Public Works Director.

M. CONTRACT - The written agreement covering the performance of the work and the furnishing of labor and materials in the construction of the work.

N. 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.

O. COUNCIL - The City Council of the City of Modesto.

P. DAYS - Days shall mean calendar days unless otherwise specified.

Q. DEFECTIVE - An adjective which when modifying the word Work refers to work that is unsatisfactory, faulty of 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.

R. DEPARTMENT OF PUBLIC WORKS - Department of Public Works of the City of Modesto.

S. DIRECTOR OF PUBLIC WORKS - The Director of Public Works 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.

T. 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.

U. ENGINEER - See City Engineer

V. PUBLIC WORKS DIRECTOR - See Director of Public Works.

W. 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.

X. LIQUIDATED DAMAGES - The amount of dollars assessed for each and every calendar day required to complete the contract in excess of the contract time.

Y. 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.

Z. PROPOSAL - The offer of the bidder for the work when completed and submitted on the prescribed proposal form, properly signed, and guaranteed.

AA. PROPOSAL FORM - The approved form on which the City of Modesto requires formal bids be prepared and submitted for the work.

BB. 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.

CC. 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.

DD. SPECIAL PROVISIONS - Specific clauses of the Specifications setting forth conditions or requirements peculiar to the particular work called for by the plans and specifications.

EE. SPECIFICATIONS - The textual directions, provisions and requirements contained herein.

FF. STANDARD DETAILS - Details of City standard construction of the various items of work indicated and/or referred to on the plans, specifications of special provisions.

GG. STANDARD SPECIFICATIONS - City of Modesto Standard Specifications.

HH. STATE - State of California.

II. STATE STANDARD PLANS - The Standard Plans of the State of California, Department of Transportation, a current copy of which is on file in the office of the Public Works Director.

JJ. STATE STANDARDS - The Standard Specifications of the State of California, Department of Transportation, a current copy of which is on file in the office of the Public Works Director.

KK. SUPERINTENDENT - The executive representative of the Contractor present on the project at all times during progress, authorized to receive and fulfill instructions from the Public Works Director.

LL. 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.

MM. SURVEYOR - A land surveyor licensed in the State of California.

NN. 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 60 days after the opening of the proposals.

All bids will be compared on the basis of the Engineers' estimate of the quantities of work to be done.

B. Bid Alternates

Whenever additive or deductive items are included in a bid, the Special Provisions shall specify the method that will be used to determine the lowest bid. In the absence of such a specification, the following method will be used:

1. The lowest bid shall be determined in a manner that prevents any information that would identify any of the bidders or proposed subcontractors or suppliers

from being revealed to the City before the ranking of all bidders from lowest to highest has been determined.

2. In the event the bids are inadvertently opened in a manner that discloses the identity of the bidders prior to determining which bid alternates shall be awarded for the project the following method shall be used to determine the lowest bid:

The lowest bid shall be the lowest total of the bid prices on the base contract and those additive or deductive items taken in order from a specifically identified list of those items that, when in the solicitation, and added to, or subtracted from, the base contract, are less than, or equal to, the amount budgeted for the project.

A responsible bidder who submitted the lowest bid as determined by this section shall be awarded the contract, if it is awarded. This section does not preclude the City from adding to or deducting from the contract any of the additive or deductive items after the lowest responsible bidder has been determined.

C. Delivery of Signed Contract, Project Bonds, Insurance

Within ten (10) working days of the date of receipt of the Notice of Award, the Contractor shall obtain and deliver the required project bonds and insurance, acceptable to the City, and return two (2) copies of signed Contract to the City. If the information is not supplied to the City within the ten (10) working day requirement, the Contractor forfeits his/her rights to the contract and the contract may be awarded to the next lowest responsible bidder at the discretion of 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

The contract shall be signed by the successful bidder and returned, together with the contract bonds and insurance certificates as required under General Provisions (GP) Section 7.14 of these specifications within ten (10) working days after the bidder has received notice that the contract has been awarded. No proposal shall be considered binding upon the City until the execution and return to the City of the contract and the filing of the contract bonds and insurance certificates with the City.

Failure to execute and return a contract and file acceptable bonds and insurance as provided herein within ten (10) working days after the bidder has received notice that the contract has been awarded shall be just cause for the annulment of the award and the forfeiture of the proposal guaranty to the City.

Upon the failure or refusal of the successful bidder to execute and return the contract and file acceptable bonds and insurance, the award may be made to the second lowest responsible bidder and should he or she fail or refuse to execute and return the contract and file acceptable bonds and insurance, the award may be made to the third lowest responsible bidder. On the failure or refusal of the second or third lowest responsible bidders to whom the contract is awarded to execute and file the contract and file acceptable bonds and insurance, their bidders' guarantees shall be likewise forfeited to the City.

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, sublet or 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.

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.

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 GPSection 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 MEETINGS

A preconstruction meeting will be held prior to commencing work. The City shall designate a date and time for a preconstruction meeting. At the preconstruction meeting, the Contractor shall present a project construction schedule and traffic control plan.

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 shall be allowed.

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 legal holidays. 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.

B. Signal System Shutdowns
Signal system shutdowns shall occur only between the hours of 9:00 a.m. and 3:00 p.m. Unless waived by the City, signal shutdowns will be limited to those hours. Contractors working on signals outside these hours shall pay a signal system shutdown penalty.

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, and that is and will be impracticable to determine the actual damage which the City 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 the sum of $100.00 per every 1 hour, 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 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 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 from the City. Prior to installation, the Contractor shall submit a supplemental Equipment List and Drawings to the City 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 for the signal item involved and no additional compensation will be allowed therefore.

4.08 CONSTRUCTION SCHEDULE

At the preconstruction meeting, the Contractor shall submit a proposed construction schedule to the City. The construction schedule shall be in the form of a tabulation, chart, or graph and shall be in sufficient detail to show chronological relationship of all activities of the project. These include, but are not limited to, estimated starting and completion dates of various activities, submittal of shop drawings, procurement of materials, and scheduling of equipment. The construction schedule shall be consistent in all respects with the time and order of work requirements of the contract.

The City's approval will be given only if they are satisfied that the Contractor's construction schedule is sufficiently detailed to show clearly the work to be completed during each month and, if adhered to, will be adequate to assure the completion of the work within the time for completion set forth in the Special Provisions.

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

The City will layout the work and stake the necessary control points for the Contractor's operations. The Contractor shall give at least two (2) working days notice 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 the Contractor.

A. Permanent Survey Markers

The Contractor shall notify the City at least seven (7) days before starting work. This allows the City to take necessary measures to ensure the preservation of survey monuments and benchmarks. The Contractor shall not disturb permanent survey monuments or benchmarks without the consent of the City. The Contractor also shall bear the expense of replacing any that may be disturbed without permission. Replacement shall be done only by the City.

When a change is made in the finished elevation of the pavement of any roadway in which a permanent survey monument is located, the Contractor shall adjust the monument cover to the new 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.

4.13 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 shall have the right to make beneficial use of completed portions of the work. The Contractor shall provide proper access to the work for this purpose, but such use and operation shall not constitute an acceptance of the work until the entire work under this contract is finally accepted by the City Council. The City shall perform normal maintenance on approved portions of work placed in service. Nothing in this section shall be construed as relieving the Contractor from full responsibility for correcting defective work or materials. Nothing in this section shall relieve the Contractor of their responsibility to complete the work specified under the contract within the allotted contract time.

Such action by the City will not relieve the Contractor of responsibility for injury or damage to said completed portions of the improvement resulting from use by public traffic or from the action of the elements or from any other cause, injury or damage resulting from the Contractor's operations or negligence. The Contractor will be required to re-clean such portions of the improvement before final acceptance.

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.

Upon completion of the final inspection, when the work and required contract documents are found to be in compliance with these specifications, the Public Works 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

The Contractor shall submit shop drawings, product literature, etc., as required in the specifications, for review by the City. Within ten (10) working days of signing the Contract Documents and prior to the commencement of work, the Contractor shall submit seven (7) copies of all equipment and material that are to be furnished to the project, including all substitutions in accordance with GP Section 5.07 for approval by the City. Shop drawings shall be submitted at least 21 calendar days before approved drawings will be required for the work. Submitted materials may not be used in the work until favorably reviewed by the City. Shop drawings shall be of a size and scale to clearly show all necessary details. Submittals will be marked as follows:

A. No Exceptions Taken
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.

B. Make Corrections Noted
Same as "A", except that minor (No re-submittal required) Corrections as noted shall be made by the Contractor.

C. Amend and Resubmit
Major inconsistencies or errors shall be resolved or corrected by the Contractor prior to subsequent review by the City.

D. Rejected – Resubmit
Submitted material does not conform to plans and specifications in major respect, i.e.: wrong size, model, capacity or material.

Items "A" and "B" above (no re-submittal required) are considered "favorable review" of a submittal. Items "C" and "D" above (correction and re-submittal required) are considered "unfavorable review."

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.

Preparation of re-submittal of unfavorably reviewed submittals will not be reason for additional compensation.

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.

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 SUBSTITUTIONS

If the Contractor desires to make a substitution, he or she shall submit complete product information to document the equipment or material being offered as being equal to that

specified. No substitutions will be allowed until requested and approved in writing. Only equipment and/or materials approved by the City may be substituted. The City reserves the right to require the originally specified equipment and/or materials.

Shop drawings shall be submitted in a complete package. Partial or incomplete submittals will not be considered.

The specified contract completion time shall not be affected by any circumstance developing from the provisions of this subsection.

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.

5.08 AS-BUILT PLANS

The Contractor shall maintain one (1) set of full size prints and mark thereon any deviations from plan dimensions, elevations, or orientations, and shall submit same in good condition to the City upon completion of the work as a condition of acceptance of the project. Marked prints shall be updated at least once each week and shall be available to the City for review as to accuracy prior to developing progress payment estimates.

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

l. 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

The Contractor shall comply with:

A. All State and Federal laws and regulations including, but not limited to, Occupational Safety and Health Acts.

B. All municipal ordinances and regulations of the City.

C. All orders and decrees of bodies or tribunals having any jurisdiction or authority.

D. National Electrical Code, Uniform Building Code, Uniform Plumbing Code.

E. 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.

F. Applying and receiving Special Dispensation from the California Occupational Safety and Health Administration to conduct operations no closer than 6', but within 10' 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 Citys' 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

The Contractor shall at his or her own expense, furnish, install, maintain, and remove all temporary light, power, and water, including piping, wiring, lamps, and other equipment, necessary for the work. The Contractor shall not draw water from any fire hydrant, except to extinguish a fire, without first obtaining the necessary permits and metering devices. Contractor shall make prompt payment for use of temporary utilities.

7.11 PROTECTION AND RESTORATION OF EXISTING IMPROVEMENTS

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.

Unless otherwise provided, the Contractor shall repair or replace all existing improvements (e.g., curbs, sidewalks, driveways, fences, signs, utilities, street surfaces, structures, etc.) damaged or removed as a result of his or her operations. Repairs and replacements shall be at least equal to existing improvements, and shall match them in finish and dimension.

Trees, lawns, and shrubbery not designated for removal shall be protected from damage or injury. If damaged or removed because of the Contractor's operations, they shall be restored or replaced in as nearly the original condition and location as is reasonably possible. Lawns shall be reseeded and covered with suitable mulch.

All costs to the Contractor for protecting, removing, and restoring existing improvements shall be absorbed in his or her bid.

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.

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

Insurance requirements for Contractors - Bidders' attention is directed to the insurance requirements below. It is strongly recommended that bidders confer with their respective insurance carriers and/or brokers to determine in advance of bid submission the availability of insurance certificates and endorsements as prescribed and provided herein. If an apparent low bidder fails to comply strictly with the insurance requirements, that bidder may be disqualified from award of the contract. These insurance requirements are considered a material element of any contract to be made and failure to effect, maintain, renew, or provide proper proof of coverages may be treated as a material breach of any such contract. The City reserves the right to alter, amend, or otherwise modify these requirements as the City may deem necessary.

The Contractor shall provide at its own expense and maintain at all times the following insurance with insurance companies licensed in the State of California and shall provide evidence of such insurance to the City as may be required by the Risk Manager of the City. The policies or certificates thereof shall provide that, 30 days prior to cancellation or material change in the policy, notices of same shall be given to the Risk Manager of the City by registered mail, return receipt requested, for all of the following stated insurance policies.

A. Workers' Compensation - in compliance with the statutes of the State of California, plus employer's liability with a minimum limit of liability of $500,000.

B. General Liability insurance with a minimum limit of liability per occurrence of $1,000,000 for bodily injury and $100,000 for property damage or $1,000,000 combined single limit. This insurance shall indicate on the certificate of insurance the following coverages and indicate the policy aggregate limit applying to: premises and operations; broad form contractual; independent Contractors and subcontractors; products and completed operations.

C. Automobile Liability insurance with a minimum limit of liability per occurrence of $1,000,000 for bodily injury and $100,000 for property damage or $1,000,000 combined single limit. This insurance shall cover any automobile for bodily injury and property damage.

D. Course of Construction insurance with a minimum limit of the complete project, if required by the Special Provisions.

If at any time any of said policies shall be unsatisfactory to the City, as to form or substance or if a company issuing such policy shall be unsatisfactory to the City, the Contractor shall promptly obtain a new policy, submit the same to the Risk Manager for approval and submit a certificate thereof as hereinabove provided. Upon failure of the Contractor to furnish, deliver or maintain such insurance and certificates as above provided, this contract, at the election of the City, may be forthwith declared suspended, or terminated. Failure of the Contractor to obtain and/or maintain any required insurance shall not relieve the Contractor from any liability under this contract, nor shall the insurance requirements be construed to conflict with or otherwise limit the obligations of the Contractor concerning indemnification. The City, its agents, officers, employees, and volunteers shall be named as an additional insured on all insurance policies required herein, except Workers' Compensation. The Workers' Compensation insurer shall agree to waive all rights of subrogation against the City, its agents, officers, employees, and volunteers for losses arising from work performed by Contractor for the City. The Contractor's insurance policy(ies) shall include a provision that the coverage is primary as respects the City; shall include no special limitations to coverage provided to additional insured; and, shall be placed with insurer(s) with acceptable Best's rating of A:VII or with approval of the Risk Manager.

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 4l50 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 thework 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 CONTROL OF STORM WATER

The Contractor shall comply with all applicable Federal, State, and municipal regulations for the control of storm water pollution from construction activities. The Contractor is hereby alerted to the fact that these regulations impose 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 these regulations.

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.

The Contractor’s attention is directed to the California Stormwater Quality Association (CASQA) Stormwater Best Management Practice Handbook for specific guidance on

selecting best management practices for reducing pollutants in storm water discharges from construction activities.

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 and legal holidays and days on which the Contractor is specifically required by the special provisions to suspend construction operations and except days on which the Contractor is prevented by inclement weather or conditions resulting immediately therefrom adverse to the current controlling operation or operations for at least 60% of the total daily time being currently spent on the controlling operation or operations.

Legal holidays are as follows: New Years' Day, Martin Luther King Jr. Day, Presidents' Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day, the day after Thanksgiving, and Christmas Day.

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 form 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 City will make an estimate of the value of the work done on the contract between the 21st of the previous month and the 20th of the current month. Whenever the said estimate of work done since the last previous estimate exceeds $1,000.00 in amount, 90% of such estimated sum will be paid 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 shall retain 10% of the estimated value of the work done and nonperishable material delivered to the work, as part security for the fulfillment of the contract by the Contractor. After satisfactory completion of 75% of the contract work, the City may reduce the contract retention to 5%, provided the City has no outstanding claims against 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.

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

	DESCRIPTION	UNIT COST
1.	Disc Site	$120/acre
2.	Clear, Grub & Mobilization	If total costs $100K to $200K then15% If total costs $200K to $600K then 8% If total costs exceed $600K then 4%
3.	Roadway Excavation	0 to 5,000 cy - $35.00/cy 5,000 cy and above - $12.00/cy
4.	General Excavation	0 to 5,000 cy - $35.00/cy
5.	Subgrade (paving)	$0.70/sf
6.	Subgrade (concrete)	$0.85/sf
7.	Import (incl. spread)	$8.00/cy
8.	Export	$12.00/cy
9.	Lot Grading	$0.10/sf
10.	Grade Landscape	0 to 20,000sf - $0.30/sf 20K & up - $0.15/sf
11.	Channel Excavation	$10/cy (incl. trimming banks)
12.	Engineer Rock	$55/cy
13.	Cobbles	$50/cy or $3.50/sf
14.	Grouted Cobbles	$65/cy or $4.50/sf
15.	Bridge/Structure Excavation	$35/cy
16.	3/4" AB or ASB	$40/cy
17.	2" AC	$50/tn
18.	Prime Coat	$500/tn or $1.50/gal or $.05/sf
19.	Seal Coat (park top or =)	$0.15/sf
20.	Crushed Rock	$18/tn or $36/cy
21.	Geotextile Fabric (subgrade)	$0.12/sf
22.	Petromat (overlays)	$1.00/sy
23.	AC Overlay (1.5")	$0.55/sf (w/Tack Coat)
24.	12" Lime Treated Base	$0.80/sf (thru Final Trim)

B. CONCRETE WORK

	DESCRIPTION	UNIT COST
1.	Vertical Curb	$16/lf
2.	Curb & Gutter	$16/lf
3.	Extruded Curb (6" epoxied)	$8/lf
4.	Monolithic Curb, Gutter & Sidewalk	$22/lf
5.	Sidewalk	$3.50/sf
6.	Structural Concrete	1 to 50 cy - $900cy
	(Exclude exc. & backfill)	50 cy & above - $350/cy
7.	Rockwell	$3,600/ea
8.	Catch Basin	$1,400/ea
9.	Junction Box	$1,700/ea
10.	Concrete Flatwork	6" conc/4" AB - $7.50/sf
11.	Bomanite	$7/sf
12.	Paving Stones	$5/sf
13.	Concrete Cap (on utilities)	$5/lf
14.	Seeded Concrete Flatwork	Add $0.70/sf to unit cost
15.	Colored Concrete	Add $0.50/sf to unit cost
16.	Concrete Lining (Gunite)	$3/sf
17.	Concrete Lining (w/mesh)	$3.50/sf
18.	Rebar in Lining	$1/lb
19.	Valley Gutter	$25/lf
20.	Handicap Ramp (Labor Only)	$550/ea

C. WATER SYSTEM

	DESCRIPTION	UNIT COST
1.	4" Water Main	$15/lf
2.	6" Water Main	$17/lf
3.	8" Water Main	$50/lf
4.	10" Water Main	$70/lf
5.	12" Water Main	$85/lf
6.	15" Water Main DIP CL-350	$90/lf
7.	18" Water Main DIP CL-350	$100/lf
8.	24" Water Main DIP CL-350	$110/lf
9.	4" Gate Valve	$380/ea
10.	6" Gate Valve	$480/ea
11.	8" Gate Valve	$580/ea
12.	10" Gate Valve	$780/ea
13.	12" B.V.	$950/ea
14.	15" B.V.	$2,200/ea
15.	18" B.V.	$3,100/ea
16.	24" B.V.	$5,200/ea
17.	Air Release Valve (ARV)	$2,000/ea
18.	Blowoff Valve	$1,000/ea
19.	1 1/2 " Irrigation Service	$350/ea
20.	Residential Water Service	$300/ea
21.	2½" dia PVC & Smaller	$12/lf

C. WATER SYSTEM (Con't.)

	DESCRIPTION	UNIT COST
22.	Water Quality Sampler	$2,000/ea
23.	Bore & Jack	$12/lf per diameter inch
24.	Fire Hydrant	$3,000/ea

D. SEWER SYSTEM

	DESCRIPTION	UNIT COST
1.	4" SS VCP	$40/lf
2.	6" SS VCP	$60/lf
3.	8" SS VCP	$80/lf
4.	10" SS VCP	$100/lf
5.	12" SS VCP	$120/lf
6.	15" SS VCP	$150/lf
7.	18" SS VCP	$180/lf
8.	21" SS VCP	$185/lf
9.	24" SS VCP	$210/lf
10.	SS Lateral	$1,000/ea
11.	Cleanout	$1,000/ea
12.	48" SSMH	$2,000/ea
13.	60" SSMH	$2,500/ea
14.	Street Tie-In	$3,000/ea
15.	Adjust Manhole to Grade	$500/ea
16.	Bore & Jack	$10/lf per diameter inch

E. STORM DRAIN SYSTEM

	DESCRIPTION	UNIT COST
1.	4"& 6" Perforated Drain System	$24/lf
2.	10" CP	$18/lf
3.	12" RCP	$20/lf
4.	15" RCP	$22/lf
5.	18" RCP	$24/lf
6.	21" RCP	$26/lf
7.	24" RCP	$28/lf
8.	30" RCP	$45/lf
9.	36" RCP	$65/lf
10.	36" CIPP	$40/lf
11.	36" RG RCP (Cent Spun)	$70/lf
12.	42" RCP	$75/lf
13.	42" CIPP	$48/lf
14.	42" RG RCP (Cent Spun)	$80/lf
15.	48" RCP	$85/lf
16.	48" CIPP	$55/lf
17.	48" RG RCP (Cent Spun)	$90/lf
18.	54" RCP	$100/lf
19.	54" CIPP	$65/lf

E. STORM DRAIN SYSTEM (Con't.)

	DESCRIPTION	UNIT COST

20.	54" RG RCP (Cent Spun)	$105/lf
21.	60" RCP	$125/lf
22.	60" CIPP	$75/lf
23.	60" RG RCP (Cent Spun)	$130/lf
24.	72" RCP	$180/f
25.	72" CIPP	$95/lf
26.	72" RG RCP (Cent Spun)	$185/lf
27.	84" RCP	$230/lf
28.	84" CIPP	$130/lf
29.	96" RCP	$300/lf
30.	96" CIPP	$160/lf
31.	48" Manhole	$2400/ea
32.	60" Manhole	$2500/ea
33.	Rockwell (complete)	$3,500/ea
34.	Rip Rap/Engr. Rock	$55/cy
35.	12" to 18" Corrugated Pipe Stub	$30/lf
36.	12" to 18" FES (Corrugated)	$300/ea
37.	Bore & Jack	$12 per diameter inch per lf

F. ELECTRICAL

	DESCRIPTION	**UNIT COST**
1.	Conduit and Cable/Trench	$20/lf
2.	70W Electrolier	$2,350/ea
3.	100W Electrolier	$2,450/ea
4.	150W Electrolier	$2,500/ea
5.	200W Electrolier	$2,550/ea
6.	Pull Box	$350/ea
7.	Traffic Signal New Rd. w/o Turn Lt	$70,000/ea
8.	Traffic Signal New Rd. w/ Turn Lt	$85,000/ea
9.	Joint Trench	$15/lf

G. MISCELLANEOUS

	DESCRIPTION	**UNIT COST**
1.	AC Patching	$6/sf
2.	Concrete.. Patching (SW gaps)	$400/ea
3.	Hydroseeding	$0.03/sf
4.	Landscape	$3.50/sf
5.	Street Sign w/Stop Sign Attached	$300/ea
6.	Signs	$170/ea
7.	FH Markers	$12/ea
8.	Striping (not thermoplastic)	$1.50/lf
9.	Monuments	$150/ea
10.	Barricades	$40/lf
11.	6' Chain Link Fence	$23/lf

G. MISCELLANEOUS (Con't.)

	DESCRIPTION	**UNIT COST**
12.	3 Strand Barbed Wire Fence	$6/lf

13.	6' Masonry Sound Wall	$55/lf
14.	Chain Link Gates	$50/lf
15.	Header Board	$5/lf
16.	Redwood Fence $25/lf	

APPENDIX B

PRIVATE WATER SYSTEM DESIGN FOR FIRE PROTECTION

1.01 GENERAL

All on-site improvements shall conform to the requirements of the American Water Works Association, the Modesto Municipal Code, the California Fire Code, these Standard Specifications and Details, 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.*

1.02 PIPE SIZE AND MATERIAL

The minimum pipe size used to supply only a fire sprinkler system may have a nominal diameter of 4" if hydraulic calculations show that the main will supply the total demand, including hose allowances at the available design pressure, and the main size is at least as large as the riser.

The minimum pipe size used for a dead-end main, not exceeding 300' in length, supplying only one (1) fire hydrant, shall have a minimum nominal diameter of 6".

The minimum pipe size used for a dead-end main up to 600' in length, supplying one (1) or more hydrants or a combination of fire hydrant and fire sprinkler system, shall have a nominal diameter of 8".

The minimum pipe size used for a dead-end main exceeding 600' in length shall have a nominal diameter of 10".

The minimum pipe size used for looped mains supplying fire hydrants and fire sprinkler systems shall have a nominal diameter of 6".

Larger pipe sizes may be required when minimum fire flow, set forth in Chapter 6.05, cannot be attained or when hydraulic calculations dictate otherwise.

Pipe materials shall be listed for fire protection service, comply with AWWA Standards, and be designed to withstand a minimum working pressure of 150 psi.

1.03 FIRE MAIN RESTRAINTS

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.

Thrust blocking shall be installed in conformance with Standard Detail #609. Other joint restraints shall be installed in conformance with NFPA 24.

1.04 DEPTH OF BURY

Water mains shall be buried a minimum of 36" under driveways and 48" under railroad tracks. When vehicular traffic is not a concern, the piping may be buried a minimum of 30" to prevent mechanical and damage.

Depth of covering shall be measured from the top of pipe to finished grade.

1.05 CONTROL VALVES

At least one (1) control valve shall be installed in each source of water supply except for fire department connections. The City gate valve may be used as the system control valve for mains supplying only fire hydrants.

At least one (1) control valve shall be installed on each sprinkler system. Sprinkler system control valves shall be listed indicating type. Outside stem and yoke (OS&Y) used in connection with a double check valve assembly or Post Indicator Valves (PIV) are acceptable.

PIVs shall be set so that the top of the post will be 36" above final grade, and should be located not less than 40' from buildings. When a PIV cannot be placed at this distance, the alternate location shall be approved by the Fire Marshal.

Sectional valves may be required on large systems; see Chapter 6.08. Locations and type shall be approved by the Fire Marshal.

1.06 CHECK VALVES

All private fire systems shall have installed at least one (1) listed check valve. When there is more than one (1) source of water supply, a double check valve shall be installed at each connection.

When installed underground, the required fire sprinkler system check valve shall be in a vault large enough to allow for State mandated inspection, maintenance, and repair of the valve.

Class 1 and 2 private fire systems (direct connection from public water mains, with or without a booster pump) will have a single check valve installed by the City at the connection to the public water system. This valve is not to be considered the required sprinkler system check valve. See Standard Detail #604

Private fire systems with domestic water connections and Class 3, 4, 5, and 6 private fire systems (cross-connected to fire pumps, unapproved water sources, or having materials or conditions that could contaminate the potable water) shall have an approved back-flow

prevention device as required by AWWA M-14. When FEBCO Models 806 or 825 with OS&Y gates, or equal, is used on a fire sprinkler service, no additional system check valve is required.

1.07 FIRE HYDRANTS

See Chapter 6.05, and Standard Detail #605 & 606.

1.08 FIRE DEPARTMENT CONNECTIONS (FDC)

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.

A listed check valve shall be installed in each FDC.

An FDC shall be installed on the system side of the system check and control valves, and on each side of a sectional valve.

The FDC shall not be connected to the suction side of a fire pump.

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.

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.

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.

1.09 APPROVAL PROCEDURE

Underground fire services for fire hydrants and/or automatic fire protection systems shall be included in civil drawings or on the site plan at time of submittal for building permit. Plans shall include piping from street connection to termination at building or at hydrant, or both. Locations of existing (or proposed new) off-site fire hydrants, FDC, and approved shut-off valve shall also be included. If required fire protection system check valve will be underground, it shall also be included.

Aboveground automatic fire sprinkler and standpipe system plans may be submitted separately to Fire Department after building permit for the structure is issued. A separate permit is not required unless the fire sprinkler installation is the only work being done.

All fire sprinkler systems shall be designed and installed in accordance with NFPA Standard 13; all standpipe systems shall be designed and installed in accordance with NFPA Standard 14.

A minimum of three (3) sets of complete plans shall be submitted.

Plans shall be approved by Fire Department prior to start of construction.

1.10 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 1.1

FLOW RATE TO PRODUCE VELOCITY OF 10FT/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.

APPENDIX C

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 currently adopted 1994 Uniform Fire Code, current department standards, current city standards and nationally recognized recommended standards.

1.02 AUTOMATIC FIRE PROTECTION

With the exception of one and two family dwellings (R3 occupancy) and private garages (U1 occupancy), any new building or structure with a floor area under one roof that exceeds five thousand (5,000) square feet shall be equipped with an approved automatic fire sprinkler system designed and installed in accordance with the current adopted edition of NFPA 13 (or 13R when applicable). MMC 3-1.102 originally adopted in 1982.

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 #715.

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 D-3 - Guidelines for Installing Sidewalks.

FIGURE D.1
FIRE DEPARTMENT NO PARKING SIGNS

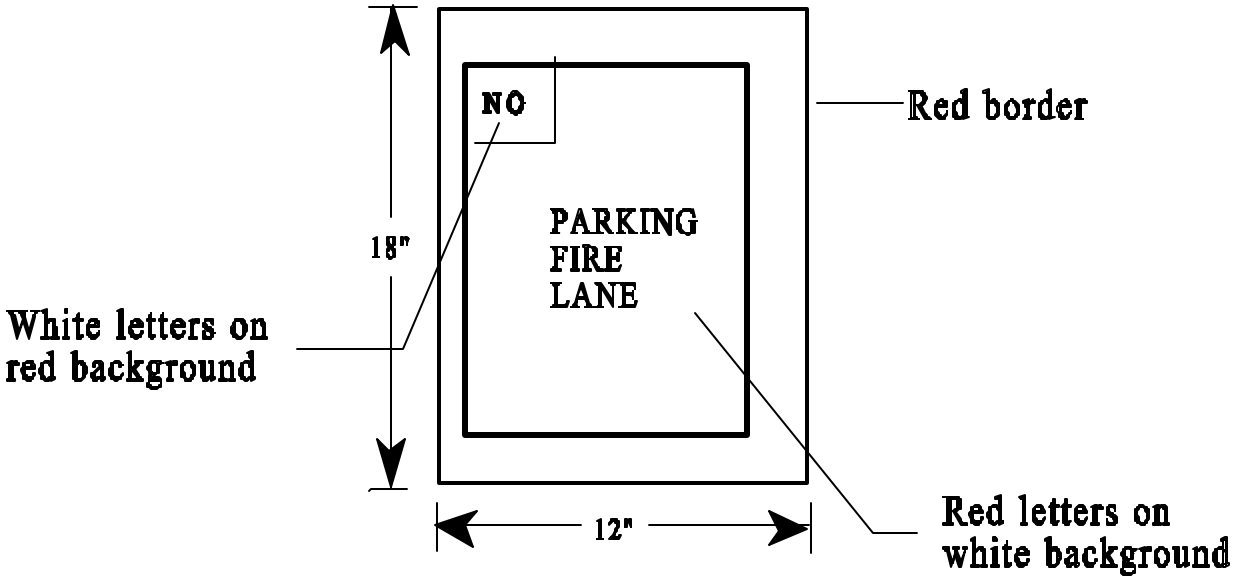


TABLE D.1
GUIDELINES FOR INSTALLING SIDEWALKS.

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.