

ORDINANCE NO. 2009-37

AN ORDINANCE ADOPTING AN ENGINEERING MANUAL TO ESTABLISH MINIMUM STANDARDS AND CONSTRUCTION DETAILS FOR ALL PUBLIC FACILITY IMPROVEMENTS, WITH STANDARD DETAILS FOR EACH TYPE OF IMPROVEMENT.

BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF TAYLOR:

SECTION 1.0 That after a meeting held on December 10, 2009, before the City Council of the City of Taylor for the purpose of introducing Ordinance 2009-37 adopting an Engineering Manual to establish minimum standards and construction details for all public facility improvements, with standard details for each type of improvement.

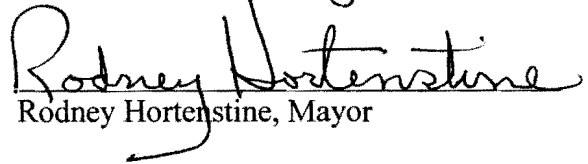
SECTION 2.0 That the Planning and Zoning Commission, on November 10, 2009, recommends approval of the Engineering Manual.

SECTION 3.0 Attachment A is adopted to this Ordinance by reference, known as the Engineering Manual.

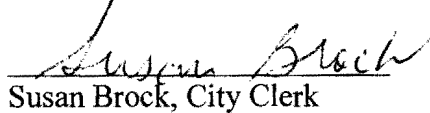
SECTION 4.0 Should any section, paragraph, clause, phrase, or provision of this Ordinance be adjudged invalid or held unconstitutional, the same shall not affect the validity of this Ordinance as a whole or any part of the provisions thereof, other than the part so decided to be invalid or unconstitutional

SECTION 5.0 In accordance with Article 8 of the City Charter, Ordinance 2009-34 was introduced before the Taylor City Council on the 10th day of December, 2009.

PASSED, APPROVED, and ADOPTED on the 9th day of February, 2010.


Rodney Hortenstine, Mayor

ATTEST:


Susan Brock, City Clerk

CERTIFICATE

THE STATE OF TEXAS

COUNTY OF WILLIAMSON

I, Susan Brock, being the current City Clerk of the City of Taylor, Texas, do hereby certify that the attached is a true and correct copy of Ordinance No. 2009-37, passed and approved by the City Council of the City of Taylor, Texas, on the 9th day of February, 2010, and such Ordinance was duly introduced, passed, approved and adopted at meetings open to the public and notices of the meetings, giving the dates, places, and subject matter thereof, were posted as prescribed by Government Code Section 551.043.

Witness my hand and seal of office this 9th day of February, 2010.

Susan Brock

Susan Brock
City Clerk

City of Taylor Engineering Manual

Version - NOV 2009



City of Taylor Engineering Manual

I. Purpose / Introduction

The purpose of this document is to establish the minimum standards and construction details for all public facility improvements.

II. Plan Requirements

All construction plans for proposed public water, wastewater, paving, drainage, and traffic improvements shall be designed, signed, sealed, and dated by a Licensed Professional Engineer licensed in the State of Texas and adhere to the requirements of this Section. All construction plans or drawings must be accompanied by a Geotechnical Engineering Report signed, sealed, and dated by a Licensed Professional Engineer. Plans and drawings shall be furnished in the following format and contain the elements listed herein:

1. Cover Sheet
 - a. Project title including City name
 - b. Legal property description, if applicable
 - c. Vicinity map
 - d. Owner, engineer, and surveyor name, address and telephone number
 - e. Project title in small print placed vertical along the right border
 - f. Sheet index
 - g. Signature block for City approval
2. Copy of Current Plat - When applicable, a copy of the current plat bound with plans. The signed plat shall be bound with the as-built drawings.
3. Drainage Area Map – This map should be accompanied with all drainage calculations. The Drainage Area Map must show all existing and proposed contours, existing and proposed storm sewers, and/or other drainage facilities.
4. Site Plan - indicating the location and width of all proposed and existing paving and driveway approaches noting the back-of-curb radii.
5. Utility Plan - indicating the location and size of all existing and proposed water and wastewater lines with adjacent existing or proposed top of curb grades. Also show the location of all existing and proposed fire hydrants adjacent to the site including the maximum coverage radius of each as outlined in later sections of this manual.
6. Plan and Profile Sheets - for paving, wastewater, storm sewers, flumes, water lines twelve (12") inches in diameter and larger, and drainage channels. Stationing shall be generally left to right and with stationing beginning at the downstream end for all sewers, storm sewers, and channels. Stationing shall be included on the plan view as well as the profile for all roads, water, sewer, storm sewer and channel sheets. Elevations shall be calculated and provided in all profiles as indicated below.
 - a. Straight grade - provide elevations at a maximum interval of 50 feet.
 - b. Vertical curve - provide elevations at the beginning and ending points and at a maximum interval of 25 feet in between.
7. Details - for improvements which are to be dedicated to the City maintenance. Refer to City of Taylor Engineering Manual Details where applicable.
8. Maximum Sheet Size - Plan and profile sheets shall be a maximum of twenty-two (22") inches wide by thirty-four (34") inches long.

9. Scale - Horizontal scale shall be one inch equals fifty feet (1" = 50') or larger, i.e. 1" = 40'. Vertical scale shall be one (1") inch equals five (5') feet or larger.
10. Plotting Drainage Features - Appropriate hydraulic grade line or water surface profile shall be plotted with all drainage design. Capacity, design discharge, velocity, and velocity head shall be noted on each segment of drainage facility in the profile whenever one or more of these parameters changes.
11. Erosion Control and Sedimentation Plan - an erosion control plan shall be submitted for all areas to be disturbed.
12. City Review - Construction plans shall be reviewed by the City Engineer and, upon approval by the City, signed after all comments have been resolved. Construction must start within one (1) year following the City's approval. Plans for projects which have not started construction within this time period must be submitted to the City for a new review.
13. GIS Submittal Standards

Data MUST be to scale and geo-referenced to three points in electronic form to be submitted with required Record Drawings before signature and recordation to ensure that submission standards are met.

 - State Plane Projected Coordinate System -
NAD_1983_StatePlan_Texas_Central_FIPS_4203_Feet
 - Projection - Lambert_Conformal_Conic
 - False Easting - 2296583.33333333
 - False Northing - 9842500.00000000
 - Central Meridian - 100.33333333
 - Standard Parallel 1 - 30.11666667
 - Standard Parallel 2 - 31.88333333
 - Latitude Of Origin - 29.66666667
 - Linear Unit - Foot_US
 - Geographic Coordinate System - GCS_North_American_1983
 - Datum - D_North_American_1983
 - Prime Meridian - Greenwich
 - Angular Unit - Degree

All Data must be provided in one layer, e. g. all lot lines should be in a single layer called "lotlines"; all utilities separate for each type e. g. water, wastewater, electric, etc.

All parcel information must be converted to .DXF files.

One text style to be used for all.

Street Names should be in all capital letters.

No blocks or XREFS may be attached to a file to eliminate imbedded files. Detach COGO files and other survey files.

All submissions must be to scale.

No three dimensional objects

III. Testing / Inspection

All construction, such as grading, paving, drainage structures, storm sewer, curb and gutter, water and wastewater, are subject to inspection during the construction period by the proper authorities of the City, and shall be constructed in accordance with the approved Construction Plans and this Manual.

- A. Periodic inspections will be performed by the City Inspector and/or City Engineer during construction of both proposed City maintained improvements and private maintained improvements. Inspections should be scheduled by the Contractor at the following intervals:

1. Subgrade when:

- a. All tests for subgrade have been witnessed by City and passed.
- b. The subgrade conforms to the Construction Plans.
- c. All grading, including ditches and erosion control, is complete.
- d. All culverts, headwalls, and Safety End Treatments are installed; for cast-in-place concrete structures, inspection of placement of reinforcing bars shall be performed prior to pouring of concrete.

2. Flexible Base when:

- a. All tests for flexible base have passed.
- b. The flexible base conforms to the Construction Plans.

3. Other periodic inspections during testing; and

4. Final inspection when:

- a. All tests have passed.
- b. All improvements are complete and record drawings are revised as per construction.

- B. Request for inspection must be received by the City via e-mail and must include the subdivision name, current date, inspection requested (subgrade, base etc.) and desired date and time of inspection.

Subgrade and flexible base inspections must be scheduled at least two (2) business days in advance of date requested for the inspection. For inspection during geotechnical testing, at least one (1) business day's notice is required in advance of date requested for the inspection. At least five (5) business days notice is required in advance of date requested for final inspections. Note that subgrade testing **MUST** be witnessed by the City.

The reinforcing steel in cast-in-place concrete structures must be inspected by City prior to pouring of concrete. Inspection should be scheduled at least two (2) business days in advance of date requested for the inspection. All cast in place structures should meet TxDOT Standards. Cast in-place concrete structures with uninspected reinforcing steel will be considered defective and must be removed and replaced at Contractor's expense.

- C. If testing or inspection does not occur for the subgrade and/or base while the surface is exposed, the contractor will be required to have an independent testing laboratory, acceptable to the City, perform testing at the Contractor's expense. Such testing may include core samples or additional density tests at 50-foot intervals measured longitudinally along the roadway. If the road surface is concrete, X-ray tests will be required for density tests. During the progress of the work, all materials, equipment and workmanship may be subjected to such inspections and tests as will assure conformance with the engineering requirements. All testing shall be done by an independent testing laboratory acceptable to the City and at the Contractor's expense. All final test reports submitted to the City and must be sealed by a Professional Engineer licensed in the state of Texas. The City shall approve the location of all testing. Testing locations shall be selected at varying distances from the centerline of the road. The Contractor is solely responsible for coordination with the testing laboratory, for scheduling of the tests, and for timely delivery of the results to the City. Additional testing may be required, at the contractor's expense, at the discretion of the City Engineer.

D. Minimum Testing Requirements

1. Subgrade
 - a. Raw Subgrade (when lime or cement stabilized subgrade is not required for pavement design)
 - i. Soil characteristics including liquid limit, plastic limit, plasticity index, and sieve analysis.
 - ii. Density tests are required at a minimum of every 300 feet (measured longitudinally along the roadway) with three tests required in each cul-de-sac and eyebrow.
 - iii. Standard Proctor tests are required for each existing soil type.
 - b. Lime or Cement Stabilized Subgrade
 - i. Soil characteristics including liquid limit, plastic limit, plasticity index, and sieve analysis.
 - ii. Density tests are required at a minimum of every 300 feet (measured longitudinally along the roadway) with three tests required in each cul-de-sac and eyebrow.
 - iii. Standard Proctor tests are required for each existing soil type.
 - iv. Pulverization Gradation tests are required at a minimum of every 300 feet (measured longitudinally along the roadway) with three tests required in each cul-de-sac and eyebrow.
 - v. Core or probe tests are required to show thickness of the subgrade every 500 feet (measured longitudinally along the roadway) with one test required in each cul-de-sac and eyebrow.
2. Base
 - a. Wet Ball Mill, Sieve Analysis, and P.I. tests shall be performed in accordance with TxDOT Standards.
 - b. Density tests are required at a minimum of every 300 feet (measured longitudinally along the roadway) with three tests required in each cul-de-sac and eyebrow.
 - c. Core or Probe tests are required to show thickness of the base every 500 feet (measured longitudinally along the roadway) with three tests required in each cul-de-sac and eyebrow.
3. Hot Mix Asphaltic Concrete
 - a. A mix design is required to be submitted for the HMAC.
 - b. Density tests are required at a minimum of every 500 feet (measured longitudinally along the roadway) with three tests required in each cul-de-sac and eyebrow.
 - c. Core tests are required to show thickness of the HMAC every 500 feet (measured longitudinally along the roadway) with three tests required in each cul-de-sac and eyebrow.
4. Portland Cement Concrete
 - a. A mix design is required to be submitted for the concrete.
 - b. Concrete shall be tested for slump, air content, and compression strength in accordance with ACI 318.
5. Storm Sewer
 - a. The compaction of backfill shall meet or exceed the requirements of the applicable details.
 - b. All storm sewer conduits shall be inspected prior to acceptance by the City. All conduits forty-two inch (42") or less shall be inspected using television inspection. Conduits larger than forty-two inch (42") may be inspected visually.
 - c. A City representative shall be present during the television inspection.
 - d. Televised Inspection Criteria
 - 1) All television equipment used shall have a minimum of two-hundred-twenty (220) lines of horizontal resolution. The picture shall be in color.
 - 2) All video information on DVD must have good picture quality.
 - 3) As a title heading on the tape and during the televising, the operator must:
 - i. Note the project name and Contractor name.
 - ii. Note the name of the company and the operator performing the video inspection.
 - iii. Note line size and material, joint type and length.
 - iv. Line segment to be televised including beginning and ending station numbers.
 - v. Note page of plans used and year plans were stamped.
 - vi. Note date and time of inspection.
 - vii. A footage counter must be displayed on the DVD during the filming.
 - viii. Show the above title block before and after each line segment. Show the title block at

- one-hundred (100') foot intervals while filming the line segment.
 - ix. All defects should be shown on film for a minimum of 10 seconds before proceeding with the televising.
 - 4) The Contractor shall supply a log sheet used in conjunction with the video tape for written documentation. All written information gathered must be legible and clearly understandable.
 - i. Note the project name, Contractor name and contract number.
 - ii. Note the name of the company and the operator performing the video inspection.
 - iii. Note pipe size and material, joint type and length between joints.
 - iv. Note the DVD footage counter, start to end.
 - v. Note line segment to be televised, station numbers from and station numbers to length of line segment as indicated on plans.
 - vi. Note page of plans used and year plans were stamped.
 - vii. Note date and time of inspection.
 - viii. Indicate by sketch the line segment to be televised in relation to surrounding street intersections and street addresses. Identify manhole station numbers. Show direction of flow with arrows and direction the camera is going. Indicate direction of north on the sketch.
 - ix. Note the water depth at the beginning, every fifty (50') foot station, every change in grade, and at the end of the line segment.
 - x. Identify the clock location, direction, size and type of laterals entering main. Indicate laterals as saddles, punched, or glued fittings.
 - xi. Indicate final footage televised at end of the log sheet.
 - 5) One DVD per visual televised inspection project shall be furnished to the Project Inspector.
 - 6) Recording must be done on DVD discs.
 - 7) All DVD's and run sheets shall be submitted to the City. All tapes and log sheets shall become the property of the City.
6. Water and Wastewater
- All water and wastewater testing shall comply with the City of Austin specifications for testing.

IV. Specifications

All referenced specifications shall be implied to mean the latest version of specifications from each mentioned entity. The referenced specifications shall include all amendments thereto, and shall govern and constitute the technical specifications, except as amended by this Manual and is made a part thereof, but is not physically bound within this document.

A. TXDOT SPECIFICATIONS

All applicable public improvements other than those specifically listed in this Manual shall be designed in accordance with the most current edition of *The Texas Department of Transportation's Highway Design Division Operations and Procedures Manual*.

B. TEXAS ARCHITECTURAL BARRIERS ACT

All accessibility design and construction shall comply with the Texas Accessibility Standards in compliance with the Texas Architectural Barriers Act.

C. TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES

All traffic control devices shall conform to the latest edition of the Texas Manual of Uniform Traffic Control Devices.

D. CITY OF AUSTIN

The following City of Austin, TX Standard Specifications are incorporated into this Manual:
SECTION 500 – Pipe and Appurtenances

E. CITY OF TAYLOR FIRE CODE SPECIFICATIONS

All designs, including fire hydrant spacing and location, fire lanes, and turning radii shall conform to the City of Taylor Fire Department requirements

V. Design Criteria

TRAFFIC IMPACT STUDIES

There are two categories of Traffic Impact Studies:

- Level I – Trip Generation and Distribution Study
- Level II – Traffic Impact Analysis (TIA)

Level I Studies are required for all projects that generate at least 50 vehicular trips within the peak a.m. or p.m. periods. A project that generates less than 50 peak-hour trips may still be subject to a Level I Study if there are specific capacity or safety issues that need to be addressed, in the opinion of the City Engineer.

Level II Studies (TIA) are required for all projects that generate at least 100 vehicular trips within the peak a.m. or p.m. periods. A project that generates less than 100 peak-hour trips may still be subject to a Level II Study if there are existing traffic problems, poor roadway alignment, capacity deficiencies, level of service issues, or expected adverse impacts from the proposed development in the opinion of the City Engineer.

RIGHT-OF-WAY WIDTHS

The right-of-way widths shall be designed for the intended use and anticipated traffic volume at optimum development of the area served. Additional right-of-way may be required at street intersections and to provide for left and right turn lanes at high-volume intersections. The following table shall be used as a guide in determining right-of-way widths.

Master Thoroughfare Plan Right-of-Way and Pavement Standards				
Street Classification	R.O.W. Width (feet)	Lane Width (feet)	Total Pavement Width (face to face feet)	Number of Lanes
Local (1)	50	15	30	2
Collector	70	12	40	2
Minor Arterial	80	12	48	4 undivided
Major Arterial 100'	100	12	74	4 divided
Major Arterial 120'	120	12	88	6 divided

- (1) A local street having a total length in excess of one thousand two hundred (1,200) feet or serving more than thirty (30) dwelling units may be required to provide a right-of-way width of not less than sixty (60) feet.

DESIGN SPEED AND MAXIMUM GRADE

All streets shall be designed to conform to the following parameters:

Design Speeds and Maximum Grades				
Street Classification	Minimum Design Speed (MPH)	Maximum Percent Grade (%)	Minimum Percent Grade (%)	Area Free from Storm Water, Using a 100-year Frequency Storm
Local	30	8	0.5	-
Collector	30	6	0.5	One lane or center 12'
Arterial	40	4	0.5	One lane in each direction

DRIVEWAY SPACING AND DESIGN STANDARDS

The criteria contained in the following table shall be the minimum and/or maximum standards to be applied in spacing and designing driveways on public streets. The City Engineer may modify these standards based on anticipated traffic flow and in accordance with sound traffic engineering practices.

Driveway Spacing and Design Criteria					
Description	Street Classification	Residential Driveway		Commercial Driveway	
		Min.	Max.	Min.	Max.
Driveway Throat Width	Local	11'	25'	25'	35'
	Minor Coll.	12'	25'	25'	35'
	Major Coll.	12'	25'	25'	35'
	Arterial	12'	25'	25'	35'
Driveway Curb Radius	Local	5'	10'	10'	20'
	Minor Coll.	5'	10'	10'	20'
	Major Coll.	10'	10'	10'	20'
	Arterial	15'	15'	20'	30'
Driveway Spacing (centerline)	Local	22'	22'	100'	100'
	Minor Coll.	32'	32'	100'	100'
	Major Coll.	80'	80'	150'	150'
	Arterial	100'	100'	250'	250'
Minimum Distance from Driveway to Intersection	Local	30'	30'	75'	75'
	Minor Coll.	50'	50'	100'	100'
	Major Coll.	100'	100'	150'	150'
	Arterial	100'	100'	180'	180'

ALLEYS

1. Alleys serving single family residential and duplex areas shall have a minimum right-of-way width of 20 feet.
2. Alley turnouts shall be paved to the property line and shall be 12 feet wide at that point.
3. Alleys shall be paved in accordance with these Design criteria for a minimum width of 12 feet exclusive of any curbs which may be provided.
4. A uniform transition in alley pavement widths shall be made in a distance of not less than 20 feet.
5. Alleys shall intersect roads at right angles or radially to curved roads.
6. The minimum distance between an alley/road intersection and a road/road intersection shall be the width of at least one (1) lot.
7. Private alleys are prohibited.
8. Maximum alley length between access points to a road shall be six hundred (600) feet.
9. A length greater than six hundred (600) feet may be approved by the City Engineer in the form of a variance pending unusual conditions or limiting factors.
10. In general, alley length shall not exceed one thousand three hundred twenty (1,320) feet between road access points.
11. Dead-end alleys are prohibited.
12. In cases where two alleys intersect or turn a sharp angle, lot corners shall be platted so that a triangular area of 25' x 25' or greater, is dedicated as part of the alley for the purpose of providing a minimum radius of 30 feet to the inside edge of the alley paving.
13. Alley paving shall conform to the paving requirements for roads per this manual.

STREET IMPROVEMENTS

Streets shall be constructed or reconstructed using either hot-mixed asphaltic concrete pavement sections or reinforced Portland Cement Concrete pavement sections that meet or exceed the minimum specifications of this Manual. The developer requiring street construction shall provide a geotechnical report, sealed by a Licensed Professional Engineer, containing recommendations for subgrade thickness and content. The minimum subgrade and pavement thickness shall be in accordance with the specifications contained in this Section.

HOT-MIXED ASPHALTIC CONCRETE PAVEMENT SECTIONS

1. Local Streets

- Density controlled subgrade
- Fourteen (14") inches thick flexible base, Type A, Grade 2, (24") inches past the back of curb line.
- Two (2.0") inches Type "C"
- Lime Stabilized subgrade may be substituted for the above mentioned subgrade and a portion of the flexbase

2. Collector Streets

- Density controlled subgrade
- Eighteen (18") inches thick flexible base, Type A, Grade 2, (24") inches past the back of curb line.
- Two and one-half (2.5") inches Type "C"
- Lime Stabilized subgrade may be substituted for the above mentioned subgrade and a portion of the flexbase

CONCRETE PAVEMENT SECTIONS

1. Local Streets

- Density controlled subgrade
- Six (6.0") inches thick flexible base, Type A, Grade 2, (24") inches past the back of curb line
- Six (6.0") inches of Class A concrete
- #4 rebar on 18"O.C.E.W.
- Lime Stabilized subgrade may be substituted for the above mentioned subgrade and a portion of the flexbase

12. Collector Streets

- Density controlled subgrade
- Eight (8.0") inches thick flexible base, Type A, Grade 2, (24") inches past the back of curb line
- Seven (7.0") inches of Class A concrete
- #4 rebar on 18"O.C.E.W.
- Lime Stabilized subgrade may be substituted for the above mentioned subgrade and a portion of the flexbase

CURB AND GUTTER SPECIFICATIONS

All streets shall be provided with reinforced Portland Cement Concrete curbs and gutters in accordance with the following specifications.

1. Curbs and gutters bases shall not be less than twenty-four (24") inches wide and provide a minimum gutter width of eighteen (18") inches
2. Reinforcement shall be provided by three (3) No. 4 steel reinforcing bars by placing one (1) bar in the curb roll and two (2) bars in the curb and gutter base. Use manufactured chairs for concrete placement.

3. Concrete for curbs and gutters shall be Class "A" and consist of five (5) sacks (minimum) of Portland Cement for each cubic yard of concrete mix and have a seven (7) day flexural strength of five hundred pounds per square inch (500 PSI) and a twenty-eight (28) day compressive strength of three thousand pounds per square inch (3,000 PSI).
4. All driveway entrances constructed in existing curb and gutters shall be saw-cut at the curb return on both sides of the driveway and eighteen (18") inches into the street. After work is completed, the street sidewalk shall be repaired and it shall be the responsibility of the party installing the driveway. All driveways cut into existing curb and gutter areas shall utilize the horizontal curb cutting method, leaving the original gutter in place. Smooth dowels shall be installed into the back of the existing curb.
5. Control joint every 10', expansion joint every 50' or as approved.

STREET DRAINAGE

The following drainage conditions shall be observed:

1. All roads shall be a crowned or roof top section so as to provide proper drainage.
2. All plats shall depict the flow of drainage with arrows sufficient to show predicted path.
3. An explanation and depiction shall be attached to show outflow and inflow availability on high flow areas. Adjoining property where inflow originates or outflow exists must be attached to insure compliance with drainage or excessive run-off factors.
4. No plat shall be considered for approval unless accompanied by a complete set of construction drawings that show the drainage areas and flow calculations.
5. The contractor/developer will assume all responsibility to disperse excess run-off so as not to exceed previous disbursements to the satisfaction of the city.

STREET CONSTRUCTION

No work whatsoever will be initiated without the issuance of an Authorization of Construction letter

1. The street portion of the plat must be reviewed and approved by Fire Chief, Police Chief and City Engineer;
2. An Authorization of Construction letter must be obtained from the City before any construction is initiated;

CONCRETE PIPE

All concrete pipe used for drainage purpose on City streets shall be reinforced.

SUBGRADE

1. Subgrade shall extend ten (10') feet, if feasible, beyond the completed street when a future street is proposed to be built to assure proper conformity.

STREET SIGNS

LOCATION

Street signs shall be six (6") inches extruded, have white lettering on a green background, be engineer grade reflectorized, and include the block numbers along with the street name. Street signs shall be furnished and installed by the subdivider for all intersections within or abutting the subdivision. All signs shall be located in accordance with the *Texas Manual on Uniform Traffic Control Devices*.

SIGNS

All signs and mounts shall conform to the standards as set forth in the *Texas Manual on Uniform Traffic Control Devices*. All road identification signs are to have a green background with three (3) inch white reflective lettering.

INSTALLATION

The sign pole shall be buried to a minimum depth of two (2') feet and placed in a twelve (12") inch diameter concrete filled posthole. The pole shall be tall enough to accommodate all applicable signs. The bottom of the stop sign shall be located seven (7') feet above the finished grade of the surrounding ground.

APPROVAL

The developer shall submit a list of signs to be placed and a graphical representation of the signs for review by City Engineer prior to installation.

SIDEWALKS

SIDEWALK SPECIFICATIONS

1. Right of Way Permit Required - No person shall construct, reconstruct, alter, repair, remove or replace any sidewalk on any public property within the City Limits without first obtaining a permit from the building permit office.
2. Inspection Required - All work done in construction, reconstruction, alteration, repair, or removal or replacement of sidewalks shall be inspected by the city inspector to assure compliance with these regulations. When other public improvements are required, final acceptance of all other improvements shall not be made until sidewalks are approved.
3. Minimum Sidewalk Width - All sidewalks shall be a minimum of four (4') feet in width, except a sidewalk located within or abutting a collector street, or larger, as shown on the Thoroughfare Plan, shall not be less than five (5) feet in width. All sidewalks shall be constructed in the area between the curb or grade line of the public street and the abutting property line. The edge of the sidewalk shall generally be parallel with the curb line. The City Engineer may approve a plan to alter the location of a sidewalk to preserve a tree or for aesthetic purposes. One additional foot of width shall be added to a sidewalk that abuts a street curb.
4. Construction Materials - Sidewalks shall be constructed of Portland cement concrete (minimum thickness four (4") inches). Trail system sidewalks shall be a minimum thickness of five (5") inches. Concrete for sidewalks shall be Class "A" and consist of five (5) sacks (minimum) of Portland cement for each cubic yard of concrete mix and have a seven (7) day flexural strength of 500 pounds per square inch (500 PSI) and twenty-eight (28) day compressive strength of 3,000 pounds per square inch (3,000 PSI). Reinforcement shall be in accordance with the construction detail contained herein
5. Architectural Barriers Act - All sidewalk/street intersections shall be constructed so as to provide a ramp that complies with the Architectural Barriers Act. Barrier free ramps shall be provided for access to the street. Additional information on curb ramp location, design, visibility and texture may be found in the current edition of the Texas Accessibility Standards (TAS) prepared and administered by the Texas Department of Licensing and Regulation (TDLR).

STREET LIGHTING

GENERAL REQUIREMENTS

1. Street lights shall be installed at all intersections, at the end of all cul-de-sac streets, and at additional locations in accordance with the following table:

Street Lighting Requirements			
Required Spacing	Pole Type	Lamp Type	Height
At intervals of not more than three hundred (300) feet	metal	100 watt high pressure sodium	30 feet

2. The number of required street lights shall be equal to the total linear footage between street intersections divided by the required spacing. Fractions of street lights shall be rounded to the next whole number.
3. Street lights shall be placed at approximately equal intervals between intersections and shall be subject to the approval of the City Engineer.
4. Cobra head lamps shall be provided on standard street lighting fixtures, except that other lamp types may be permitted where custom lighting is approved by the City Engineer.

CUSTOM LIGHTING

1. The subdivider may elect to provide custom lighting in lieu of the required standard street lighting, subject to the approval of the city engineer.
2. If a subdivider elects to provide and install custom lighting, a homeowner's association (or some other such private entity) shall be created which will be perpetually liable for all costs associated with the maintenance of the lighting fixtures. The homeowner's association shall also be liable for the electrical energy costs of the custom lighting.

WATER SYSTEM IMPROVEMENTS

GENERAL

This section pertains to general design requirements for water distribution system construction in the City of Taylor. All water lines shall be sized and designed in accordance with the City of Taylor determined by the City Engineer. In the absence of specific standards, all water supply, distribution, pumping, and storage improvements shall be designed in accordance with the most current standards of the American Water Works Association criteria adopted by the Texas Administrative Code, Chapter 290.

LINE SIZES & LOCATIONS

1. Standard water line sizes are, 8 inch, 10 inch, 12 inch, 16 inch, 20 inch, and 24 inch diameter. Other sizes may be approved by the City Engineer.
2. All water lines shall be looped where possible. Dead end lines shall not exceed 600 feet, unless approved by the City Engineer.
3. Water lines shall be located within the right of way, not under paving. Along State Highways, water lines are required on both sides of the roadway. New water lines crossing existing streets shall be placed by boring. A steel casing shall be required under major and minor collector roadways, arterial roadways and State Highway. Open cut excavation will not be allowed to cross existing streets, unless approved by the City Engineer.
4. Automatic flushing valves are required for all dead-end mains of 50' or longer.
5. Easements for water line construction shall meet the following requirements:
 - a. The easement width shall be a minimum of 20 feet.
 - b. In areas where multiple utilities or extended depth or larger utilities exist the easement may need to be wider as specified by the City.
 - c. Larger easements may be required by the City Engineer to provide adequate space for maintenance.
6. All piping with mechanical couplings, push-on, or similar joints subject to internal pressure shall be designed with blocking, anchors, and restraining harnesses to preclude separation of joints.
7. Water lines exclusively for fire protection shall be dedicated to the public, unless the system is isolated from the public system by a detector check. All water lines shall be a minimum of eight (8") inches in diameter and looped when possible. Water lines shall not be located under paved surfaces where possible.
8. Water service for multiple units on a single lot shall be served via one Master Meter. The developer is responsible for providing and metering service to individual units.

MATERIALS

All water lines and fittings shall be new materials and comply with the following:

1. Water Lines – All water lines shall be Polyvinyl Chloride (PVC) material and be designed, manufactured, and tested in accordance with the applicable requirements of AWWA C-900 (eight (8") inch through twelve (12") inch water pipe) AWWA C-905 (sixteen (16") inches and larger water pipe), and AWWA M-23. Pipe larger than 16" shall be Ductile Iron.
2. Other Pipe Material – All other materials must be submitted for approval by the City Engineer.
 - a. All PVC water pipe shall be blue in color.
 - b. Eight (8") inch through twelve (12") inch water pipe shall be pressure class 150, DR 18. Pressure class 200, DR 14 pipe may be required by the City Engineer in areas of high distribution system pressure, under roadways or other unusual circumstances.

3. Fittings - Fittings shall be ductile iron in accordance with AWWA C110 or AWWA C153.
 - a. Fittings: ANSI/AWWA C111/A21.11, except gaskets shall be neoprene or other synthetic rubber and factory installed.
 - b. All waterline pipe and fittings shall be new materials and produced in the USA

INSTALLATION

All installations shall conform to the latest TCEQ, and AWWA Specifications, as amended by these standards.

1. All pipe shall be installed with a minimum of forty-eight (48") inches of cover over top of pipe.
2. The amount of open trench shall not exceed two hundred (200') feet from the end of the pipe laying operations, and no more than three hundred (300') feet of total open trench will be allowed. At the end of each work day, all trench excavation shall be backfilled and compacted to the end of the pipe laying operation.
3. All connections to existing water mains shall be made under pressure unless dry connections will not cause any loss of service. Under special conditions connections that cause an interruption of service may be performed with approval of the City Engineer.
4. Coated tracer wire and tape shall be installed in the embedment material twelve (12") inches above the pipe with the tracer wire terminating in in-line gate valve boxes accessible by City Staff.
5. Density tests shall be taken at a minimum of every three hundred (300') feet for every lift or determined by inspection. A maximum thickness of lift is required for all trench backfill. A geotechnical report should be submitted for all trenches. The density reports shall be submitted to the City Inspector. The City has the right to require additional tests if they are deemed necessary.
6. All density reports and bacteria test reports shall be completed, delivered to the City Engineer and Inspector, and approved before paving is allowed to begin. Bacteria test samples shall be taken by the City.
7. PVC water pipe and appurtenances shall be installed as specified in AWWA M-23 and in accordance with the pipe manufacturer's recommendations.
8. Fittings shall be installed in accordance with AWWA C-600.
 - a. All mechanical joint bends, tees, and reducers which require blocking shall be additionally restrained with EBAA Megalug retainer gland or approved equal.
 - b. All fittings must be polyethylene wrapped.

FIRE HYDRANTS

1. Fire hydrants in commercial and industrial areas shall generally be at street intersections and so located that there will be a fire hydrant every three hundred (300') feet. Fire hydrants in a residential area shall be generally located on street intersections and not over five hundred (500') feet apart. City Fire Chief shall approve final fire hydrant locations.
2. Materials
 - a. Fire hydrants shall be manufactured in accordance with AWWA C-502, Dry-Barrel Fire Hydrants.
 - b. Hydrants shall be manufactured such that all maintenance and adjustments can be performed without excavation and such that hydrants may be faced in any direction in relation to base. The hydrant shall be of a design that will permit extensions without disturbing the bottom section of the hydrant.
 - c. A gate valve shall be installed with each fire hydrant.

3. Manufacturers

Approved fire hydrants manufacturers are as follows:

- a. Clow – Medalion
- b. Mueller - Centurion
- c. Kennedy – K81D
- d. American Darling – B84B

4. Locations

- a. Fire hydrants are to be located a minimum of three (3') feet and a maximum of six (6') feet behind the back of curb.

VALVES

1. Resilient seated gate valves shall be used for six (6") inch and up to twenty-four (24") inch water lines. Butterfly valves may be allowed as an addition to gate valves for lines sixteen (16") inches and larger when approved by the City Engineer.
2. Valves of approved design shall be installed at the intersections of all water mains so as to provide for proper maintenance and operation of the system and to provide a means of shutting off the supply to portions of the system for repairs. Three (3) valves shall be used on a four-way water line intersection and a minimum of two (2) valves shall be used on a three-way intersection.

3. Materials

a. Resilient Seated Gate Valves

- 1) Resilient seated gate valves six (6") inches through sixteen (16") inches shall meet or exceed the latest revisions of AWWA C509 and shall meet or exceed the requirements of these standards.
- 2) Resilient seated gate valves for buried service shall be furnished with a square two (2") inch operating nut. The valve box shall be Tyler Pipe 6850 series or approved equal. The valve box lid shall be painted safety blue. The paint shall be approved via submittal to the City.
- 3) All valves must open left and close right.

b. Butterfly Valves

Butterfly valves shall meet or exceed the latest revision of AWWA Standard C504 for Class 150B butterfly valves and shall meet or exceed the requirements of this specification. All valve components shall conform to Underwriters Laboratories classification in accordance with ANSI/NSF Standard 61.

4. Installation

- a. Valves shall be furnished with extensions, such that the working nut is a maximum of thirty-six (36") inches below grade.
- b. Adjustable valve boxes shall be furnished and set on each valve in accordance with these standards. Valves that are deeper than forty-eight (48") inches, AWWA C900 PVC pipe shall be used for stacks, as long as the adjustable valve box is used at the top.
- c. After the final clean-up and alignment has been complete, the contractor shall cast in place a concrete block, around all valve box tops at the finish grade. See detail W-3.
- d. Valves located within a right-of-way shall be indicated on the face of the curb, or where curbs do not exist, on a conspicuous location adjacent to the valve location. Markings are to be the stamping of a four (4") inch high letter "V" with a three-eighths (3/8") inch stroke with the point of the "V" pointing towards the valve location.

- e. Valve markers shall be provided in rural areas.
- 5. Manufacturers
 - a. Approved manufacturers of six (6") inch through twelve (12") inch resilient seated gate valves are as follows:
 - 1) Mueller, Clow, American Darling and Kennedy
 - b. Approved manufacturers of sixteen (16") inch and larger butterfly valves are as follows:
 - 1) Mueller, Clow, American Darling and Kennedy

AIR RELEASE AND FLUSHING VALVES

1. Adequate air relief, and flushing valves shall be provided for flushing, disinfecting, daily operation requirements, and repairs when required by the City Engineer. Air release valves shall be required on twelve (12") inches and larger water lines. Water lines shall be designed so that each section of the water line can be flushed at its lowest and highest points.
2. All dead end lines shall have a fire hydrant installed for flushing purposes. If installation of a fire hydrant is not possible, a flushing valve is required.
3. A fire hydrant shall be required at high points on water lines smaller than twelve (12") inches for air relief and flushing.
4. Materials - Air release valves and air/vacuum valves shall meet or exceed the latest revision of AWWA C512.
5. Automatic Flushing Valves shall be installed on all dead-end mains of 2" or larger that extend 150 linear feet or longer. Approved Manufacturer: Hydro Guard Standard Unit

TAPPING SLEEVE

A tapping sleeve and valve shall be used when connecting a new water line to an existing line. A resilient seated gate valve shall be flanged to the tapping sleeve. The tapping sleeve shall be a Smith-Blair Spec. 664-665 stainless steel tapping sleeve, or approved equal.

WATER SERVICE

1. The water meter box shall be placed a minimum of two (2') feet behind the back of curb unless sidewalks are adjacent to the curb, then they are to be set seven (7') feet behind the back of curb, and the water service shall be a minimum of twelve (12") inches deep, covered with a meter box in place at grade. If no curb is present, the water service shall be located at the property line, a minimum of twelve (12") inches deep, covered with a meter box in place at grade. Along roadways without a curb the water service line shall be constructed at a minimum of twelve (12") inches below the ditch flow line.
2. Meter and service sizes will be determined by the developer prior to requesting service from the City. The minimum water service size between the water main and the meter shall be one (1") inch.
3. Water services on undeveloped lots shall be located at the property line and shall be a minimum of one (1") inch in diameter.
4. Materials
 - a. Service Saddle

Service saddle shall be double strap bronze with brass body or nylon / epoxy coated stainless steel double bolt wide straps. Minimum size tap shall be 1 inch diameter.

Approved manufacturers:

- 1) Smith Blair - Tapping Saddles up to 2" shall be epoxy coated with stainless steel straps
- 2) Tapping Sleeve 4" and larger shall be epoxy coated steel or ductile iron

b. Service Line

Service lines shall be 1" (single services) to 1.5" (double services) polyethylene SDR9.

c. Corporation.

- 1) Corporation stop shall be ball type with a diameter equal to the pipe size with compression outlet fitting, designed for a minimum working pressure of two hundred pounds per square inch (200 psi) and threaded counter clockwise.
- 2) Approved manufacturers are Ford or Mueller.

d. Angle Stop

- 1) Angle stop shall be set with compression inlet fitting and locking wings.
- 2) Approved manufacturers are Ford, Mueller or Smith Blair.

e. Meter Boxes

- 1) Single Meter boxes are to be DFW 1200 Series with AMR lid
- 2) Double Meter boxes are to be DFW 1500 Series with AMR lid
- 3) Traffic Rated Meter boxes shall be DFC "C" Series

5. Installation

a. General

- 1) All water service shall be installed in accordance with these standards.
- 2) Each individual service location shall be saw cut into the face of the curb with a four (4") inch high "W" painted blue by the Contractor. If no curb exist a similar mark should be placed in the pavement near the edge of the roadway.

FLUSHING VALVES

1. Materials

- a. Corporation stop shall be two (2") inch ball type with compression outlet fitting, designed for a minimum working pressure of two hundred pounds per square inch (200").
- b. Two (2") inch curb stop shall be ball type with compression inlet fitting with tee head shut off.
- c. Pipe shall be two (2") inches diameter, polyethylene.
- d. All flushing valves shall be installed within a twenty-four (24") inch round metal meter box.

WATER LINE BORE

1. Minimum steel casing thickness shall be a quarter (1/4") inch. Casings shall be required under collectors and thoroughfares, highway crossings, and railroad crossings. Casings shall also be required where deemed necessary by the City Engineer. The construction bore pit shall be located at a minimum distance of four (4') feet behind the back of curb or edge of pavement where no curb is present.

2. The design engineer shall design the water line pipe casing for the following loading conditions and applicable combinations thereof:

- a. AASHTO HS20 loading as applicable
- b. Earth loading with the height of fill above the casing as shown on the plans
- c. Loads applied during jacking, including axial load from jacking
- d. All other applicable loading conditions, including loads applied during transportation and handling.

3. Materials

- a. Steel Casing Pipe

Steel casing pipe shall be new (or used if approved by the City Engineer) and suitable for the purpose intended and shall have a minimum yield strength of 35,000 psi. Casing shall meet ASTM A-36, ASTM A-570, ASTM A-135, ASTM A-139, or approved equal. Pipe shall be coated with coal tar epoxy (15 mils min.) in accordance with AWWA C-210. Pipe joints shall be welded in accordance with AWWA C-206. After pipe is welded, coating shall be repaired.

- b. Casing Spacers

Use stainless steel casing spacers for any type of carrier pipe. Insulators shall be high density polyethylene. Insulators shall fit snug over the carrier pipe and position the carrier pipe approximately in the center of the casing pipe to provide adequate clearance between the carrier pipe bell and the casing pipe. Insulators shall be manufactured by "Recon" and be Racci Type or approved equal.

4. Installation

- a. Excavation and Backfill of Access Pits

- 1) Do not allow excavation over the limits of the bore or tunnel as specified. Shore the trench walls as necessary to protect workmen, the public, structures, roadways, and other improvements.
- 2) Excavations within the right-of-way and not under surfacing shall be backfilled and consolidated by mechanical methods as specified in these standards for compaction of trenches under roadways. Surplus material shall be removed from the right-of-way and the excavation finished to original grades. Backfill pits immediately after the installation of the carrier pipe is completed. If carrier pipe is not installed immediately after casing pipe installation, the City may require the access pits be temporarily backfilled until installation of carrier pipe.
- 3) Where seeding or sodding is disturbed by excavation or backfilling operations, such areas shall be restored to the existing or better conditions.

WASTEWATER SYSTEM IMPROVEMENTS

GENERAL

This section pertains to general design requirements for waste water collection system construction in the City of Taylor. All sewer lines shall be sized and as determined by the City Engineer. In the absence of or in conflict with a specific standard contained in this Chapter, all collection, treatment, and disposal systems shall be designed in accordance with the most current criteria adopted by the Texas Administrative Code, Chapter 217, "Design Criteria for Domestic Wastewater Systems".

WASTEWATER MAIN SIZES AND DESIGN

1. Standard wastewater main sizes are eight (8") inches, ten (10') inches, twelve (12") inches, fifteen (15") inches, and eighteen (18") inches in diameter. Other sizes may be approved by the City Engineer.
2. Wastewater lines shall be constructed at a minimum depth of four (4') feet and be located within the R.O.W. or an approved utility easement. A wastewater line is required to be constructed on both sides of a State Highway.
3. Easements for wastewater line construction shall meet the following requirements:
 - a. The easement width shall be a minimum of twenty (20'). Greater easement width may be required for deep lines.
 - b. If the wastewater line is less than twelve (12') feet deep, the outside diameter of the wastewater line shall be located a minimum distance of six (6') feet from the edge of the easement, and if other utilities are located in the same easement, the outside diameter of the wastewater line shall be located a minimum distance of three (3') feet from the outside diameter of the other utilities.
 - c. If the wastewater line is greater than twelve (12') feet deep, the outside diameter of the wastewater line shall be located a minimum distance of nine (9') feet from the edge of the easement, and if other utilities are located in the same easement, the outside diameter of the wastewater line shall be located a minimum distance of six (6') feet from the outside diameter of the other utilities.
 - d. Proper separation of utilities must be maintained per TCEQ regulations.
4. All wastewater mains shall be designed with consideration for serving the full drainage area subject to collection by the wastewater in question; the drainage area may be modified with the concurrence of the City Engineer because of the projected rate of development or the financial feasibility of the proposed extension.
5. Wastewater mains should be designed with straight alignment whenever possible. When horizontal curvatures must be used, radial pipe must be used in accordance with the pipe manufacturer's recommendations. No joint deflection is allowed without the approval of the City Engineer and an appropriate TCEQ variance.
6. All wastewater mains shall be designed with hydraulic slopes sufficient to give mean velocities, when flowing full or half full, of no less than two (2') feet per second.

WASTEWATER LINE MATERIALS

All wastewater lines and fittings shall be new materials and comply with the following:

1. All wastewater pipes shall be Polyvinyl Chloride (PVC) pipe type SDR-26 for wastewater lines where wastewater lines exceed. For depths greater than twenty-four (24') feet material must approved by City Engineer.

2. All PVC wastewater pipe shall be green in color. Developer to provide a manufacturers statement for pipe color other than green.
3. PVC sewer pipe and fittings shall conform to the current ASTM Designation D 3034 for up to eighteen 18" inches and ASTM Designation F 679 for greater than fifteen (15") inches.

WASTEWATER LINE INSTALLATION

1. General
 - a. All installations shall conform to ASTM Designation D2321, and the as amended by these standards.
 - b. Wastewater lines shall not be installed within nine (9') feet horizontally of any water main or fire hydrant. Where this is not possible, separation shall be in accordance with TCEQ standards.
 - c. Construction shall begin at the downstream end of project and continue upstream with the bell facing upstream. No upstream piping shall be installed before downstream piping unless approved by the City Engineer.
2. Excavation and Backfill
 - a. The amount of open trench excavation shall not exceed two hundred (200') feet from the end of the pipe laying operations, and no more than three hundred (300') feet of total open trench will be allowed. At the end of each workday, all trench excavation shall be backfilled to the end of the pipe laying operation
 - b. Density tests shall be taken every three hundred (300') feet for every lift. A maximum thickness of twelve (12") inches per loose lift is required for all trench backfill. A geotechnical report shall be submitted for all trenches. The density reports shall be submitted daily to the City Inspector. The City has the right to require additional tests if they are deemed necessary.
 - c. A City inspector will be on site at all times when testing is being performed. The City Inspector shall be present during the placement of trench backfill lifts.
 - d. All density reports shall be completed, delivered to the City's Engineer and Inspector, and approved before paving is allowed to begin.

MANHOLES

1. Manholes shall be located at all intersections of wastewater lines and at intermediate spacing along the line. Generally the maximum spacing should not exceed five hundred (500') feet. Manholes should be located at all changes in grade and at the ends of all wastewater lines that will be extended.
2. A manhole is required at the junction of wastewater lines with different inside pipe diameters.
3. A drop of at least one tenth of a foot (0.1') is required through the manhole.
4. A drop manhole is required when the flow line in is two (2') feet or greater than the flow line out.
5. Minimum manhole inside diameter is four (4') feet.
6. Drop-connection manholes shall have a minimum inside diameter of four (4') feet, with an exterior drop.
7. Minimum pre-cast wall thickness is five (5") inches.
8. All manholes shall be concrete.
9. NOTE: If depth of cover is greater than 18 feet, Manhole size is subject to city Engineer approval.
 - a. Cast-in-place – only when approved
 - 1) The manhole foundation shall be poured on undisturbed soil or approved subgrade and shall have a minimum thickness of eight (8") inches.

- 2) The inlet and outlet pipes shall be poured into the foundation of the manhole. When straight through flow occurs, the pipe shall be laid continuously through the manhole.
- 3) The invert shall be shaped and smoothed so that no projections will exist and the invert shall be self cleaning.
- 4) When a cast-in-place manhole is used to connect to an existing wastewater line the manhole should be poured, tested and approved before the top of the existing line is cut out.
- 5) Concrete work shall conform to all requirements of ACI 301, Standard Specification for Structural Concrete, published by the American Concrete Institute, except as modified herein.
- 6) Detailing of concrete reinforcement and accessories shall be in accordance with ACI Publication 315.
- 7) Portland cement shall be Type II, low-alkali and conform to ASTM Designation C-150.
- 8) The manhole shall not be backfilled within twelve (12) hours after the concrete placement. Backfill shall be compacted and reports submitted to the City.
- 9) The face of curb shall be stamped with a three (3") inch "MH" to mark the location of all manholes. The location of the stamp shall be a line that intersects the center of the manhole cover and the curb perpendicular to the centerline of the street. For manholes located in intersections, the curb shall be stamped at the closest location to the manhole. If no curb exist a similar mark should be placed in the pavement near the edge of the roadway.

c. Precast Manhole

- 1) Precast manholes shall be constructed in accordance to ASTM Designation C-478.
- 2) Manhole base shall have a spread footing and be placed on a minimum of twelve (12) inches of crushed rock.

MANHOLE FRAME AND COVER

1. Cover

a. Materials

All manhole covers shall conform to the Standard Specifications for Domestic Grey Iron Castings, ASTM A-48, Class 30 B.

b. Installation

- 1) All manhole covers shall be thirty (32") inches in diameter.
- 2) All manhole covers shall have two (2) integrally cast pick bars.

c. Manufacturers (Traffic rated where necessary)

- 1) East Jordan Iron Works
- 2) Bass & Hayes

2. Frames

a. Materials

All manhole frames shall conform to the Standard Specifications for Grey Iron Castings, ASTM A-48, Class 30 B.

b. Installation

All manhole frames shall provide a thirty (30") inch by one quarter (1/4") inch opening to assure proper fit of the manhole cover.

c. Manufacturers

- 1) East Jordan Iron Works
 - 2) Bass & Hayes
- d. Manholes located within the floodplain are to be sealed with an approved bolt-down cover and frame.
3. Extension Ring
 - a. Materials

All precast reinforced concrete extension rings shall conform to ASTM C-478.
 - b. Installation
 - 1) The number of extension ring sections shall be kept to a minimum (i.e. use 1-12 inch extension ring instead of 2-6 inch extension rings).
 - 2) A one (1") inch by three and a half (3 1/2") inch bitumastic gasket shall be used to seal the extension ring at both joints.
6. Manhole Inserts - Rain Pan

Shall be required on all Manholes.

 - a. Materials

Rain pans shall be High Strength Stainless Steel to fit each manhole
 - b. Manufacturers

Southwestern Packing and Seals.

WASTEWATER SERVICE

1. No wastewater service line (lateral) shall be less than six (6") inches in nominal diameter.
2. Wastewater laterals shall be a minimum of ten (10') feet downstream of the water service. Services will be identified in the field by a three (3") inch "S" cut into the curb, on the As-Built Plans and with a stake in the field for location purposes.
3. Wastewater service laterals shall have a minimum of four (4') feet of cover at the property line.
4. Materials
 - a. All lateral wastewater service lines shall be gasketed PVC pipe type SDR-26.
 - b. All PVC wastewater pipe used for lateral services shall meet ASTM 3034.
6. Installation

All service laterals shall be installed in accordance with the wastewater embedment and backfill standards of the City of Taylor.

MAIN LINE CLEANOUTS

Cleanouts may be installed on lines that are permanent dead ends. The line may not exceed four hundred fifty (450') feet. Any line exceeding that length must end with a manhole.

WASTEWATER LINE BORING

SEE WATER LINE

1. Installation

a. Tolerances

- 1) All bores shall be installed at a grade no less than the minimum indicated by TAC30, Chapter 317 for the desired pipe size.
- 2) All bores shall maintain grade enough to ensure desired clearance distances between existing utilities and bore.

b. Excavation and Backfill of Access Pits

SEE WATER SECTION

DRAINAGE AND STORM SEWER IMPROVEMENTS

GENERAL

This section pertains to general design requirements for drainage and storm sewer construction in the City of Taylor. All drainage facilities shall be sized and designed in accordance with the City Engineer.

RUNOFF CALCULATIONS

1. The selection of which method to use for calculating runoff depends upon the size of the contributing drainage area at the most downstream point of the project. The "Rational Method" is acceptable for designing projects in which the drainage area is less than one-hundred (100) acres. A unit hydrograph method is required for projects with larger drainage areas.
2. No matter which method is used to calculate runoff, a developer shall develop the property so that the rate of runoff created by the development as it leaves the property does not exceed the rate of runoff that is currently occurring in the existing conditions. A developer or builder of commercial property greater than one-half (1/2) acre must follow the above guidelines.
3. Runoff computations shall be based upon fully developed watershed conditions in accordance with the land use projections in the latest comprehensive land use plan for the City of Taylor. The design engineer shall size drainage facilities by disregarding the detention effects of upstream property and calculating the runoff as if the off-site property was developed without any detention. If an approved regional detention/retention facility is in operation, the design engineer may size downstream drainage facilities based on consideration of the detention effects of the regional facility.
4. Procedure for drainage areas less than one-hundred (100) acres.
 - a. Computation of storm water runoff for drainage areas less than one-hundred (100) acres shall be by the Rational Method, which is based on the principle that the maximum rate of runoff from a given drainage area for an assumed rainfall intensity occurs when all parts of the area are contributing to the flow at the point of discharge.

The formula for calculation of runoff by the "Rational Method" is: $Q = CIA$

Where: Q = the maximum rate of discharge, expressed in cubic feet per second.

C = Coefficient of Runoff.

Park areas - No developed land	0.30
Developed Park sites	0.40
Single Family Residential	0.50
Duplex	0.60
Multiple Family	0.70
Schools	0.70
Churches	0.70
Neighborhood Commercial	0.70
Office Commercial	0.70
Commercial	0.85
Industrial	0.85

I = Intensity of Runoff in inches per hour

A = Drainage Area in acres.

- b. Time of concentration is the longest time, without interruption of flow by detention devices that a drop of water takes to flow from the farthest point of the drainage area to the point of concentration (i.e. the point

of design). The time of concentration is composed of the inlet time and the flow time in a conduit or channel to the point of design.

The inlet time shall be 10 minutes for property zoned multiple family, churches, schools, local business, central business, commercial, or industrial.

An inlet time of 15 minutes shall be used for property zoned for parks, cemeteries, agricultural, and single family residential.

When designing inlets and laterals, the time of concentration is equal to the inlet time. The design engineer will compare the above specified inlet times to the actual calculated inlet time by computing the flow time overland and along the gutter to the first inlet. Manning's Equation shall be used to determine flow time to the inlet. The design engineer may use the actual calculated or specified inlet time. In no case shall a longer inlet time be used than 10 minutes for multiple family, commercial, churches, schools, industrial and business areas and 15 minutes for parks, cemeteries, agricultural, and single-family areas.

5. Procedures for Drainage Areas greater than one-hundred (100) acres:

- a. For drainage areas in excess of one-hundred (100) acres where the use of the "Rational Method" does not provide reliable results, the use of a unit hydrograph method shall be made. The use of a unit hydrograph calculation will be based upon standard and accepted engineering principles subject to the approval of the City Engineer. Acceptable methods include the Soil Conservation Service (SCS) Technical Release Number 55 or the Corps of Engineers HEC-1 models for drainage areas one-hundred (100) acres or more.
- b. The unit hydrograph method shall be based upon fully developed watershed conditions assuming no effects from the small on-site detention facilities. The detention effects of large regional detention facilities can be taken into account in unit hydrograph methods.
- c. Circumstances that may require the use of a unit hydrograph method include sizing open channels, reclaiming floodplains, creating lakes, or building other types of drainage-related facilities on major drainage courses. Design engineers of these types of facilities should be aware that the requirement of designing for fully developed watershed conditions will mean that they may have to calculate these fully developed flows instead of using the flows calculated in certain Federal Emergency Management Agency's (FEMA) flood insurance studies or from studies performed for or approved by the City of Taylor.

DESIGN STORM FREQUENCIES

All developments submitted must provide data for the following design storm frequencies:

2-Year / 10-year / 25-Year / 100-Year

DRAINAGE FACILITY

Closed Storm Sewer Systems

Closed Storm Sewer Systems and
Inlets at Street Low Point or Sag

Culverts and Bridges

Concrete-lined Channels

Earthen Channels

DESIGN RECURRENCE INTERVAL

25-year with 100-year positive overflow in streets such that the depth of flow in the street does not exceed the right-of-way or drainage easement capacity.

100-year with positive overflow

100-year

100-year

100-year

The approved drainage system shall provide for positive overflow at all low points and these areas must be denoted on the plans as such. The term "positive overflow" means that when the inlets do not function properly or when the design capacity of the conduit is exceeded, the excess flow can be conveyed overland along a grassed or paved course. Normally, this would mean along a street or alley, or shall require the dedications of special drainage easements on private property.

STREET AND ALLEY CAPACITY**1. Streets**

Streets and storm drains within new developments shall be designed so that storm water runoff resulting from a design storm of a one-hundred (100) year frequency is contained within the available right-of-way and/or drainage easement. The capacity of the street and right-of-way and/or easement and the storm sewer pipe working in combination must be designed for a capacity to safely contain a storm water from a design storm of one-hundred (100) year frequency.

2. Alleys

The flows created by the one-hundred (100) year storm shall be contained within the capacity of all paved alleys.

INLET PLACEMENT AND CAPACITY

1. The storm sewer system is to begin at the point where the storm water from a twenty-five (25) year frequency storm reaches curb depth, with the exception of collector streets on which storm sewer facilities must be designed to prevent one twelve (12') foot wide lane from ponding and on major streets on which storm sewer facilities must be designed to prevent one twelve (12') foot wide lane in each direction from ponding. At such point where the combined capacity of the street and storm drain system satisfies the twenty-five (25) year street capacity criteria (as previously described) but the one-hundred (100) year frequency storm runoff can not be contained within the right-of-way additional pick-up points (inlet capacity) shall be provided along with an increase in storm sewer capacity so that the one-hundred (100) year frequency storm runoff will be contained within the right-of-way.
2. Inlets shall be placed upstream from an intersection whenever possible. At any intersection, only one street shall be crossed with surface drainage and this street shall be the lower classified street. When an alley intersects a street, inlets shall be placed in the alley whenever flow down that alley would cause the capacity of the intersecting street to be exceeded.
3. The minimum inlet size shall be ten (10') feet. No more than twenty (20') feet of inlet shall be placed along one gutter at any given location. Minimum sizes of laterals shall be eighteen (18") inches.
4. Manholes are required every three hundred (300') feet. Junction boxes are required at every change in flow line direction, change in pipe size. Manholes are to be a minimum 4' in diameter and shall be precast or cast in place if approved by City Engineer.

PIPE DESIGN STANDARDS

1. Storm sewer conduit shall be sized to flow full. Manning's Equation shall be used to determine the conduit size.
2. Minimum and Maximum Velocities in Pipes
 - a. The minimum velocities in conduit shall be two and a half (2.5') feet per second.
 - b. Maximum velocity in the pipe shall not exceed fifteen (15') feet per second.
 - c. The maximum discharge velocities in the pipe shall also not exceed the permitted velocity of the receiving channel or conduit at the outfall to prevent erosive conditions. The maximum outfall velocity of a conduit in partial flow shall be computed for partial depth and shall not exceed the maximum permissible velocity of the receiving channel unless controlled by an appropriate energy dissipater (e.g. stilling basins, impact basins, rip-rap protection).
3. In general, storm water shall be carried in concrete pipe conduit within the right-of-way but other types of

conduit can be used to carry storm water in areas other than the right-of-way. However, prior permission to use other conduit materials must be obtained from the City Engineer.

4. Hydraulic Gradient

- a. Conduits must be sized, and slopes must be set, such that runoff flows smoothly down the drainage system. To insure this smooth passage, the hydraulic gradient must be at the proper elevations. The hydraulic grade line shall be established and shown on the plans for all storm sewer design.
- b. The hydraulic grade line shall in no case be closer to the surface of the ground or street than one (1') foot. The HGL must not exceed the neck into the inlet.
- c. Hydraulic gradient calculations shall account for all head losses that may occur in the storm sewer line. Friction head loss shall be determined by direct application of Manning's Equation. Minor losses due to turbulence at structures shall be approved by City Engineer.

CULVERT DESIGN

1. One (1') foot of freeboard is required between the one-hundred (100) year water surface elevation and the top of curb elevation. Exceptions must be approved in writing by the City Engineer.
2. Culverts must be designed using standard engineering. Refer to the *Texas Department of Transportation (TxDOT) Hydraulic Design Manual*.
3. Culvert hydraulic grade line calculations shall consider both inlet and outlet control.
4. Culverts shall be skewed such that impacts due to the flood and normal flow angles of attack on the structure are minimized.
5. The maximum velocity through a culvert shall be fifteen (15') feet per second.
6. Stream stability shall be assessed when determining the number of barrels, height and width and culvert skew. Potential for scour shall be accounted for in the design.
7. Hydraulic jumps shall not be allowed from face of culvert to fifty (50') feet from the culvert.

BRIDGES

1. Two (2') feet of freeboard is required between the one-hundred (100) year water surface elevation and the low chord of the bridge. Exceptions to this requirement must be approved by the City Engineer in writing.
2. The skew of the bridge piers and abutments shall be oriented as close to the normal or flood direction of flow resulting in an angle of attack as close to zero (0) degrees as possible.
3. Computer modeling programs used for the hydraulic analysis of bridges shall be HEC-RAS or HEC2.
4. Stream stability shall be assessed when designing the abutments and interior bents of the bridge. Scour shall be accounted for in the design.
5. Flow shall not be supercritical in an area from one-hundred (100') feet upstream from a bridge to twenty-five (25') feet downstream from a bridge.

CHANNELS

1. Open Channel Design Criteria: - either lined bottom or adjacent access easement
 - a. All open channel design must follow the Corp of Engineers Guidelines.

- b. Channels may be left in their natural state provided that the channel velocities are six (6.0') feet per second or less and that one (1') foot of freeboard is available during the design storm event.
 - c. If the natural channel is to be replaced by an improved channel, the flow from the one-hundred (100') year design flood must be contained within the improved channel while allowing for one (1') foot of freeboard.
 - d. Improved channels shall be trapezoidal shaped and include a lined section if the design velocity is greater than six feet per second. Lining types such as concrete, rock walls and gabions may be used upon approval of the City Engineer. The maximum velocity allowed in concrete lined channels is fifteen (15') feet per second.
 - e. Improved channels shall have minimum side slopes of:
 - 4 feet horizontal to 1 foot vertical for earthen, grassed-lined side slopes.
 - 2 feet horizontal to 1 foot vertical for concrete-lined side slopes.
 - f. Where practicable, all unpaved channels should have sufficient grade to avoid ponding. A minimum slope of 0.50% is required for earthen channels and swales, except those used as part of a wetlands area. In areas where 0.50% cannot be obtained a pilot channel approved by the City may be used. All lined channels are to have a minimum slope of 0.50% and natural channels a minimum slope of 1.00%.
 - g. The developer or owner shall use low maintenance vegetation for vegetative cover, as approved by the City Engineer prior to planting.
2. Manning's Equation can be used to design channels and determine water surface elevations and velocities when backwater effects are negligible. Channels where backwater effects occur must be designed using models accepted by FEMA.
 3. All channel sections must consider and account for channel stabilization in their design. This requirement pertains to all sections whether they are left in their natural condition or are modified in any manner. The design of all drainage channels and swales shall assure adequate capacity and minimum maintenance to overcome the result of erosion, silting, sloughing of bends or similar occurrences.
 4. The design of the channel lining shall take into account the super-elevation of the water surface around curves and other changes in direction. In general a radius that is three (3) times the top width of the water surface during the design storm event is recommended for channel bends.
 5. A chain link fence six (6') feet in height, or other improvements as approved on a case by case basis by the City Engineer, shall be constructed on each side of the lined channel.
 6. Articulating Concrete Block flexible channel linings are required in lieu of reinforced concrete lining with the approval of the City Engineer.
 7. Easement width for open or lined channels shall be at least twenty feet (20') wider than the top of the channel, fifteen feet (15') of which shall be on one side to serve as an access for maintenance purposes.

ROAD SIDE SWALE DESIGN

Road side swales may be used along all roadways to convey drainage in accordance with the following criteria.

- a. Swales shall be designed to carry a one hundred (100) year storm and the back water effects of the most restrictive culvert to be placed in the swale.
- b. Swales shall at all times maintain a minimum thirty inch (30") depth.
- c. The entire swale should be contained within the ROW of the road. If the swale cannot be contained additional

ROW may be required. A second option would be to provide a minimum sixteen foot (16') drainage easement and the following note on the plat:

Note: Drainage easements adjacent to roadways shall not be fenced and must be left so that access can be obtained for maintenance purposes.

d. The side-slopes of all swales shall be 4:1 maximum.

e. The minimum allowable bottom slope in any swales shall be 0.50%.

f. Maximum allowable roughness coefficients and velocities for ditches are shown in (Table 3) and (Table 4) respectively.

g. All plan and profile sheets for new roadways shall show the one hundred (100) year hydraulic grade line (HGL) in the profile for each swale (profiles shall be split – left and right swale, top and bottom), the existing grade at the center of each swale, the proposed pavement centerline, proposed swale flow-line, roadway centerline stationing, and elevation information at one hundred foot (100') station intervals.

TABLE 3
ROUGHNESS COEFFICIENT “n” FOR USE IN MANNING EQ.

Materials of Construction	“n”
Monolithic Concrete Structure	0.013
Concrete Pipe	0.013
Corrugated Metal Pipe	0.024
Existing Earth Lined Channels	0.035 to 0.08
New Earth lined Channels	0.035
Rock Lined Channels	0.025 to 0.04
Concrete Lined Channels	0.015 to 0.025

Maximum Velocity: The velocities shown in (Table 4) are maximum allowable in each situation. If a lower velocity cannot be achieved velocity attenuation devices must be constructed or installed. If rock rip-rap is to be used it must be six inch (6”) diameter rock or greater.

TABLE 4
MAXIMUM VELOCITY

Type of Conduit	Maximum Velocity
Culverts	15 fps
Inlet Laterals	15 fps
Storm Sewers	12 fps
Open Channels, ditches and swales	8 fps
Concrete Lined Channels	12 fps

Driveway Culverts:

(1) All driveways and driveway culverts are the responsibility of the individual lot owner or developer. It is the developer's responsibility to insure that all lot owners are aware of this requirement. Driveway culverts shall be made of corrugated metal pipe (CMP) or reinforced concrete pipe (RCP). They shall have a minimum bottom slope of 0.50% and be no less than twenty-four feet (24') in length and no greater than fifty feet (50'). The minimum allowable driveway culvert size shall be fifteen inches (15”) in diameter at the smallest diameter.

(2) Concrete-Safety-Treatments (ends) are required for all new culverts in accordance with TxDOT standard details.

(3) A minimum of six inches (6”) of cover shall be placed above all new culverts below the lowest bank of the ditch.

(4) Where multiple culverts occur in swales, the ditch bottom must be widened to have a bottom width that is six inches

(6") greater on each side than the distance from the outside walls of the outer two culverts. Each culvert shall also be separated by six inches (6") of compacted fill material.

(5) Driveway culverts shall be shown at the most restrictive section to be anticipated for each lot, in the roadway plan and profile. The Hydraulic Grade Line (HGL) shall reflect the effects of backwater in the profile. Proposed upstream and downstream elevations for proposed culverts shall be shown in the plan and profile as well.

(6) All driveway culverts must be installed prior to issuance of building permits or construction activities on the individual lot.

Crossing Culverts:

(1) Crossing culverts shall be placed to relieve drainage at all low-points and drainage crossings. They shall be constructed of Class-III or better, Reinforced Concrete Pipe (RCP).

(2) The minimum bottom slope in all crossing culverts shall be 0.50%. The minimum allowable crossing culvert size shall be eighteen inches (18") in diameter.

(3) Safety ends or headwalls shall be constructed at the ends of all Crossing Culverts to protect the embankment from erosion and culvert from displacement. The safety ends or headwalls shall be constructed in accordance with TxDOT standards as required by the physical conditions of the particular installation. Rock rip-rap or other suitable erosion control may be required at each location as supplemental protection.

(4) All crossing culverts and related structures that are a part of the road construction shall be in place prior to final acceptance of the improvements for the subdivision.

DETENTION DESIGN

Runoff rates from site shall be limited to the rates that would be produced from pre-develop stream. Detention/retention facilities shall be designed for the one-hundred (100) year design flood according to the following criteria:

1. The minimum amount of storage volume of the detention basin shall be that volume required to reduce runoff rate to the undeveloped rate. Dedicated detention/retention basins shall also include an additional one foot of freeboard and two feet of sediment storage. The volume of runoff storage for drainage areas greater than one-hundred (100) acres shall be computed using unit hydrograph procedures. Acceptable unit hydrograph procedures are provided in Section 14.8.B.5 of this document.

For drainage areas less than one-hundred (100) acres, the above methods are recommended; however, an approximate routing method based on the rational formula is allowable.

2. All detention facilities designed shall consider the timing of the flood peak in the main channel into which the detention facility drains. Delaying the peak from a site in lower portions of a watershed may result in a higher peak on the main channel.
3. A detention facility shall have enough gradient to ensure positive drainage to the outlet structures so as to avoid nuisance conditions such as standing water, odors, insects, and weeds. A minimum slope of 0.50% towards the outlet structure is required for all grass lined detention facilities.
4. Detention areas in parking lots should take into consideration flooding of vehicles.
5. Drainage easements shall be provided for all regional detention/retention facilities and for other detention/retention facilities where two or more owners are involved.
6. Detention facilities shall be designed to empty in less than twenty-four (24) hours, unless it is also serving as an erosion control facility.

7. The owner shall maintain detention/retention facilities unless the facilities. Detention facilities must be properly maintained to function as intended over a long period of time.
 - a. Facilities should be mowed at least twice a year to control weeds and discourage woody growth.
 - b. Debris, litter and accumulated sediment should be removed from detention facilities at least twice a year. Particular attention should be given to removal of debris, litter and sediment around outlet structures.
 - c. Detention basins designed for sediment removal shall be maintained as specified in the maintenance plan and approved by the City with construction plan submittal.

FLUMES

1. The use of flumes is discouraged. Flumes shall not be permitted when the purpose of a permanent flume is to carry runoff down the sides of earthen channels.
2. A flume may be used to direct overflow runoff along property lines until the runoff can be intercepted by streets or conduits. A flume shall not carry more than ten (10) cubic feet per second during the one-hundred (100) year storm event with a slope of 1.00%.
3. All flumes crossing sidewalks shall be covered or bridged such as to minimize danger to pedestrians.
4. All edges are to be protected with rock rip-rap or other form of protection for erosion control and scour purposes.

LAKES

Approval to develop in any area subject to inundation by a lake must be obtained from the appropriate agency responsible for that particular lake before the city grants its approval. Agencies that should be contacted include, but are not limited to U.S. Army Corps of Engineers, TCEQ, the Brazos River Authority, and FEMA.

Regardless of approvals obtained from those agencies listed above, no filling, development or construction in any area subject to inundation by a lake shall occur without the approval of the City Engineer. The City Engineer may require any studies necessary to determine that filling, development or construction will not have a detrimental effect on adjacent, upstream or downstream properties and buildings. This subsection in no way diminishes other requirements of this section.

LOT TO LOT DRAINAGE

Grading and drainage of all residential lots shall be designed in a manner which will allow **a maximum of one lot to drain across an adjacent lot** and into a permanent structure, such as a concrete flume, lined channel, or proper inlet to an adequate drainage facility, or to a street right-of-way. If an approved drainage structure is not present, it will be required of the developer to construct the necessary facilities.

1. Sheet flow techniques shall be used for lot to lot drainage where possible.
2. Single lots shall accommodate their own drainage into an approved structure where topographic elevations allow this to occur.

DRAINAGE STUDIES AND ENGINEERING CERTIFICATION

PRELIMINARY DRAINAGE ANALYSIS GUIDELINES

The purpose of a Preliminary Drainage Analysis is to determine the need for drainage facilities and/or drainage easements either within the proposed development or offsite. A Preliminary Drainage Analysis is required for every subdivision plat or a development requesting a building permit on a parcel which does not have a previously approved Drainage Analysis, unless the city engineer has waived this requirement due to existing conditions. The Preliminary Drainage Analysis shall consist of the following information:

1. A topographical map drawn at a scale of 1" = 200' which depicts the watershed that drains to and across the subdivision or development. The map must include the subdivision and an area extending a minimum of 200' in all directions from the proposed subdivision. Sheets shall be either 22" X 34" in size and may contain sheet to sheet match lines. The map must include contour lines at five (5') foot vertical intervals in terrain with a slope of two (2%) percent or more, or two (2') foot vertical intervals in terrain with a slope of less than two (2%) percent. Data from the City topo maps will be acceptable where available. Data from USGS Quad sheets may be acceptable only where City topo maps are not available. The datum for topography shall be that of the United States Coast and Geodetic Survey or the City of Taylor GIS datum.

The map shall indicate any offsite or adjoining areas outside the limits of the area being developed which are relevant to onsite drainage. Show all significant physical features such as proposed or existing drainage and utility easements, water bodies, streams, railroads, parks, and drainage ditches. Show location of existing utilities including gas and petroleum lines, electric, telephone and TV cable. Also, the location of any existing structures located within the area being proposed for development. The plan shall include the building footprint and parking areas when the Preliminary Drainage Analysis is prepared for a building permit.

2. Calculation of the drainage areas, time of concentration, and storm water runoff rate for the 2, 25 and 100 year frequency storms.
3. Identification of special flood hazard areas as defined by the Flood Hazard Area Regulations Ordinance and as located by the current Flood Insurance Rate Map.
4. The Preliminary Analysis shall be sealed by a Licensed professional Engineer licensed by the State of Texas.

DRAINAGE STUDY GUIDELINES

A Drainage Study is required when it has been determined by the city engineer that the area being developed will require storm water drainage facilities or drainage easements either within the development or offsite. The following criteria shall be used for the developer's engineer to prepare a Drainage Study.

1. The study shall analyze the effect of the subdivision or the development on existing downstream and upstream drainage facilities. The study shall be sufficient to verify compliance with the drainage design criteria contained in this chapter.
2. The study shall include a topographical map as defined above in "Preliminary Drainage Analysis Guidelines."
3. Delineation and calculation of drainage areas together with proposed flow arrows shall represent flow patterns from runoff after all proposed improvements have been installed. Surface water drainage patterns shall be shown for each and every lot in the proposed subdivision and for each lot adjacent to the proposed subdivision.
4. In addition to those calculations required by the Preliminary Drainage Analysis, this study shall also include:
 - a. Hydraulic calculations to each lateral, manhole, inlet and outlet structure on the pipe. Head losses shall be calculated as described elsewhere in this chapter.
 - b. Inlet calculations utilizing the minimum time of concentration for the zoning type which is contributing the largest "CA" to the inlet.

5. If any portion of the proposed subdivision or its offsite improvements (including pipes or ditches) fall within the limits of a Federal Emergency Management Agency (FEMA) floodplain, additional backwater calculations may be required. Additional calculations in the form of a Conditional Letter of Map Revision will be required if:
 - a. Any portion of the proposed subdivision is determined to be located within a FEMA Zone "A" floodplain; or
 - b. Any portion of the proposed subdivision is determined to be located within a FEMA Zone "AE" floodplain and the overall subdivision (including all phases) is 5 acres or larger; or
 - c. Any portion of the proposed improvements from a subdivision include dredging or filling within a FEMA designated floodway.

Backwater calculations shall comply with normally accepted standards as required by FEMA for application for a Letter of Map Revision (LOMR). In addition, the calculations must begin with a previously defined Base Flood Elevation (BFE). The calculations shall continue upstream through the project until the proposed BFE is within .01 feet of the existing BFE or the limits of the existing Zone 'A' have been reached. A LOMR will be required prior to issuing building permits.

CERTIFICATION

All drainage studies and/or plans including those which are part of a standard construction plan submittal shall be sealed and signed by an engineer proficient in civil engineering and Licensed in the State of Texas. All drainage submittals shall include the following certifying statement by the "Engineer of Record".

DISCLAIMER OF LIABILITY

The degree of flood protection required by this policy is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. On rare occasions greater floods can and will occur and flood heights may be increased by man-made or natural causes. This policy does not imply that land outside the areas of street rights-of-way, drainage or flood plain easements will be free from flooding or flood damages. This policy shall not create liability on the part of the City of Taylor, Texas or any official or employee thereof for any flood damages that result from reliance on this policy or any administrative decision lawfully made there under.

TRENCH SAFETY

In conformance with House Bills 662 and 665 as passed by the Seventieth Legislature Regular Session of the State of Texas, all construction projects within the City of Taylor or its extraterritorial jurisdiction as provided by the Municipal Annexation Act (Article 970a, Vernon's Texas Civil Statutes) shall contain provisions for trench safety. On construction projects in which trench excavation will exceed a depth of five (5) feet, the uniform set of general conditions must require that the bid documents and the contract include detailed plans and specifications for adequate safety systems that meet Occupational Safety and Health Administration standards and that these plans and specifications include a pay item for these same safety systems.

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1. General Contractor shall call for all utility locates prior to any construction. Water & wastewater owned by the City of Taylor can be located by calling the Utility Department 512-352-3251. Allow three business days for utility locates by the City of Taylor.
2. All construction shall be in accordance with the latest City of Taylor ENGINEERING MANUAL.
3. The contractor shall give the City a minimum of 48 hours notice before beginning each phase of construction. The phases of construction are as follows:
4. Prior to City acceptance of all improvements, all graded and disturbed areas are to be re-vegetated in accordance with the City of Austin Specification Item #604 unless another re-vegetation specification is specifically identified in the plans and/or bid form. When appropriate in the opinion of the Public Works Department, the City of Taylor may require native grasses to be used.
5. The Contractor shall provide the City of Taylor copies of all test results prior to acceptance of this project.
6. City, owner, engineer, contractor, representatives of all utility companies, and a representative from the testing lab shall attend pre-construction conference prior to start of construction. The contractor shall schedule the meeting with the City of Taylor Engineering Department 48 hours prior to this pre-construction meeting (512-352-3633).
7. Excess soil shall be removed at the contractor's expense. Notify the City of Taylor for approval if the disposal site is inside the City's jurisdictional boundaries.
8. Burning is prohibited. No blasting is allowed.
9. Any changes or revisions to these plans must first be submitted to the City by the design engineer for review and written approval.
10. The Contractor will reimburse the City for all cost incurred as a result of any damage to any City utility by the Contractor, regardless of these plans.
11. Prior to City acceptance of this project, an engineer's concurrence letter and 22"x34" record drawings (one Mylar copy, one blue-line or Xerox, and a digital copy on a CD ROM) shall be submitted to the Engineering Department. The Consulting Engineer and Contractor shall verify that all final revisions and changes have been made to the Mylar, blue-line, and digital copy prior to City submittal. Record construction drawings shall be provided to the City in digital format as AutoCad ".dwg" files, or ESRI ".shp" files on CD ROM. Line weights, line types and text size shall be such that if half-size prints (11"x 17") were produced, the plans would still be legible. All required digital files shall contain a minimum of two (2) control points referenced to the State Plane Grid Coordinate System – Texas Central Zone (4203), in US feet and shall include rotation information and scale factor required to reduce surface coordinates to grid coordinates in US feet. Half-size plans may also be

required (see contract).

12. ALL RESPONSIBILITY FOR THE ADEQUACY OF THESE PLANS REMAINS WITH THE ENGINEER WHO PREPARED THEM. IN REVIEWING THESE PLANS, THE CITY OF TAYLOR MUST RELY ON THE ADEQUACY OF THE WORK OF THE DESIGN ENGINEER.
13. A traffic control plan, in accordance with the Texas Manual on Uniform Traffic Control Devices, shall be submitted to the City for review and approval prior to any partial or complete roadway closures.
14. The contractor shall keep the site clean and maintained at all times, to the satisfaction of the City. This project will not be accepted until the site has been cleaned and re-vegetated to the satisfaction of the City.
15. Signs are not permitted in Public Utility Easements or Drainage Easements.
16. Inspect temporary erosion controls on a daily basis. Adjust the controls and/or remove any sediment buildup as necessary.
17. Contractor will be responsible for keeping roads and drives adjacent to and near the site free from soil, sediment and debris. Contractor will not remove soil, sediment or debris from any area or vehicle by means of water, only shoveling and sweeping will be allowed. Contractor will be responsible for dust control from the site.
18. The Contractor shall be responsible for all damage to private property, which occurred as a result of any portion of this project. Any damage to private property shall be repaired to equal or better condition. The Contractor shall coordinate all repairs to private property with the property owner. Contractor shall pay and/or settle with private property owner for all costs related to any damage. The City will not provide separate pay for repair of any damages, reimbursements or settlements.
19. Contractor shall provide the services of the City's approved SCADA consultant and controls instrumentation consultant. (When applicable to SCADA) The cost of the consultant and/or any equipment shall be subsidiary to the cost of the project (no separate pay) unless specifically identified on the bid form.
20. Contractor shall be responsible for any and all utility relocations. Including but not limited to: ONCOR Electric, ATMOS Gas, AT&T Telephone, United States Post Office, Time Warner Cable Television, City of Taylor Water & Wastewater. Contractor shall call 800-DIG-TESS and maintain all confirmation numbers.
21. If telephone service is required by this project, the contractor shall coordinate with phone company to provide/extend/re-locate the service. No separate pay will be provided and the City shall not be responsible for scheduling or coordinating with phone company.
22. Electric and/or telephone poles that need to be re-located for this project will be at the expense of the contractor. The City of Taylor will not provide separate pay for pole re-location and the cost of the relocation is considered subsidiary to the project bid. The contractor is responsible for identifying poles that may conflict with these plans and making arrangements to resolve the conflict with the appropriate utility. If electric, telephone, or CATV service will be interrupted as a result of the re-location; the City shall approve the maximum

allowable time the service will be interrupted.

23. The contractor shall make applications to the electric company for electric service if new service is required. The City will assume the service upon acceptance of the project (if required). The contractor will pay for electric power until the meter is transferred to the City of Taylor. Impact fees and Application Fees required by the electric company will be the responsibility of the Contractor unless specifically identified in the contract.
24. The contractor shall provide combination locks for all gates, hatches, vaults, and MCC boxes. Each lock shall be pre-approved and set to the City's requirements. (No separate pay)
25. All work on these plans shall be performed. Pay for work shown on these plans, which are not identified in the contract, shall be considered incidental to the items specifically identified for payment.
26. The contractor shall provide a competent and qualified superintendent to supervise all work. The superintendent shall be present during all construction activities.
27. Any survey monuments damaged or moved as a result of this project shall be replaced to equal or better condition. A Texas Registered Land Surveyor shall oversee the replacement and certify the replacement for its intended use. No separate pay will be provided.
28. Adequate drainage conditions, in accordance with the City Engineering Manual, shall be maintained at all times.
29. Any tree removed or damaged by this project, which is not specifically identified to be removed by the plans, will be replaced according to the requirements of the City of Taylor Code of Ordinances. No separate pay will be provided.
30. **The contractor shall uncover all utilities within the limits of construction and verify their location prior to any construction activities. The contractor shall notify the City and the Engineer, IN WRITING, of any conflicts prior to any other construction including but not limited to exact locations of conflicts with proposed or existing utilities. No additional pay unless specifically identified for payment in the contract documents. The contractor shall also make his own sub-surface investigation prior to bid.**
31. Only stainless steel casing spacers are allowed in encasement pipe(s).
32. No separate pay will be given to de-water trenches or other excavated areas.
33. Soil material imported for re-vegetation of disturbed areas shall be approved by the Public Works department prior to placement. A sample (submittal) is required.
34. The contractor shall perform pumping stations and/or lift station start-up independently: prior to requesting witness or acceptance by the City. When a final start-up fails to be complete and acceptable and when City personnel are present at start-up, each additional start-up will be charged to the contractor, as liquidated damages, \$500.00 per additional meeting.
35. Shutout of any customers of the City's utility due to tie-ins shall only be scheduled for nighttime work unless approved by the Engineering Department. The City's field representative shall coordinate and inspect all nighttime

shutouts and tie-ins. The contractor shall request shutouts two weeks in advance. Shutouts will only be allowed in the following times and are subject to approval by the City: 10 PM - 6 AM; beginning on Tuesday, Wednesday or Thursday night(s). No extra time will be granted to the contract for unscheduled work in the time period allowed or due to requests outside the approved time periods.

Street Notes:

1. No trenching of compacted base will be allowed. A penalty and/or fine may be imposed to the general contractor if trenching of compacted base occurs without City approval, regardless of who performed the trenching.
2. All sidewalks shall comply with the Americans With Disabilities Act. The City of Taylor has NOT reviewed these plans for compliance with the Americans With Disabilities Act, or any other accessibility legislation, and does not warranty or approve these plans for any accessibility standards.
3. Street barricades shall be installed on all dead end streets and as necessary during construction to maintain job safety.
4. Any damage caused to existing pavement, curbs, sidewalks, ramps, etc., shall be repaired by the contractor to the satisfaction of the City prior to acceptance of this project.
5. Density testing of compacted subgrade material, first course and second course compacted base, shall be made at 500 foot intervals. Any failed tests will be re-tested at the expense of the contractor.
6. The contractor shall coordinate with the City's field representative 48 hours prior to scheduled density testing. The City's field representative shall witness all testing.
7. The CONTRACTOR shall schedule all testing with an approved materials testing laboratory and notify the City's field representative of the time and location of all tests.
8. Traffic control signs and pavement markings in accordance with the Texas Manual on Uniform Traffic Control Devices to be installed as directed by the City of Taylor prior to City acceptance of this project.
9. Slope of natural ground adjacent to the right-of-way shall not exceed 4:1. If a 4:1 slope is not possible, a retaining wall or some other form of slope protection approved by the City shall be placed in a location acceptable to the City.
10. The City, engineer, contractor, and a representative from the testing lab shall attend a pre-paving conference prior to the start of paving. The contractor shall give the City's field representative 48 hours notice prior to this meeting.
11. Failed tests shall be the financial responsibility of the contractor.

Wastewater Notes:

1. The contractor, with City approval, shall raise manhole frames and covers and water valve boxes to finished pavement grade at the contractor's expense. All utility adjustments shall be completed prior to final paving construction.
2. The location of any existing utility lines shown on these plans may not be accurate. Any damage to existing utility lines, both known and unknown, shall

- be repaired at the expense of the contractor. The contractor shall locate all utilities prior to bidding the project.
3. All iron pipe and fittings shall be wrapped with at least 8-mil polyethylene wrap, according to the COA Specification.
 4. All water mains, wastewater mains and service lines shall meet City of Taylor minimum cover specifications. All streets are to be cut to subgrade prior to installation of water mains.
 5. All wastewater lines shall be TV Video taped according to COA 510. The contractor shall supply two copies to the City's Field Representative.
 6. Gasketed PVC sewer main fittings shall be used to connect SDR-35 PVC to SDR-26 PVC pressure pipe or C-900.
 7. SDR-35 WW is not allowed.
 8. All sanitary sewers, excluding service lines, shall be mandrel tested per TCEQ criteria. A mandrel test will not be performed until backfill has been in place for a minimum of 30 days.
 9. All sanitary sewers, including service lines, shall be air tested per City of Austin Standard Specifications.
 10. Density testing of compacted backfill shall be made at a rate of one test per two foot lifts per 500 feet of installed pipe, unless specified otherwise by the City.
 11. City to be given 48 hours notice prior to all testing of water and wastewater lines. City inspection is required for all testing of water and wastewater lines.
 12. Water or wastewater line crossings shall be installed per TCEQ requirements.
 13. All manhole lids outside the pavement shall be bolted.
 14. Contractor to notify City of Taylor 48 hours prior to connecting to existing utilities. Inspection of connections to existing utilities is required.
 15. All pipe bedding material shall conform to City of Austin Standard Specifications.
 16. Unless otherwise specified by the Engineer all concrete is to be Class "A" (5 sack, 3000 psi ~ 28-days), and all reinforcing steel to be ASTM A615 60.
 17. Piping in and around lift station valve vaults will be painted and/or coated to the City's specifications.
 18. MCC's, junction boxes or any housing for electrical components shall be NEMA 4X stainless steel. Painted metal or any other type of box will not be accepted unless specifically identified in the plans.

Water Notes:

1. The top of valve stems shall be at least 18", and no more than 36", below finished grade. Valve stem risers shall be welded on each end to the City's satisfaction.
2. Fire hydrant leads to be ductile iron, Class 350, and installed per City of Taylor standard specifications and detail.
3. The contractor shall provide cuts for all water lines and FH bury lines in accordance with the contract.
4. Approved 5 1/4" fire hydrants: American Flow Control, B84B Mueller Company, Super Centurion 250, Clow Medallion Hydrant
5. *All fire hydrants must meet City of Taylor thread specifications (National

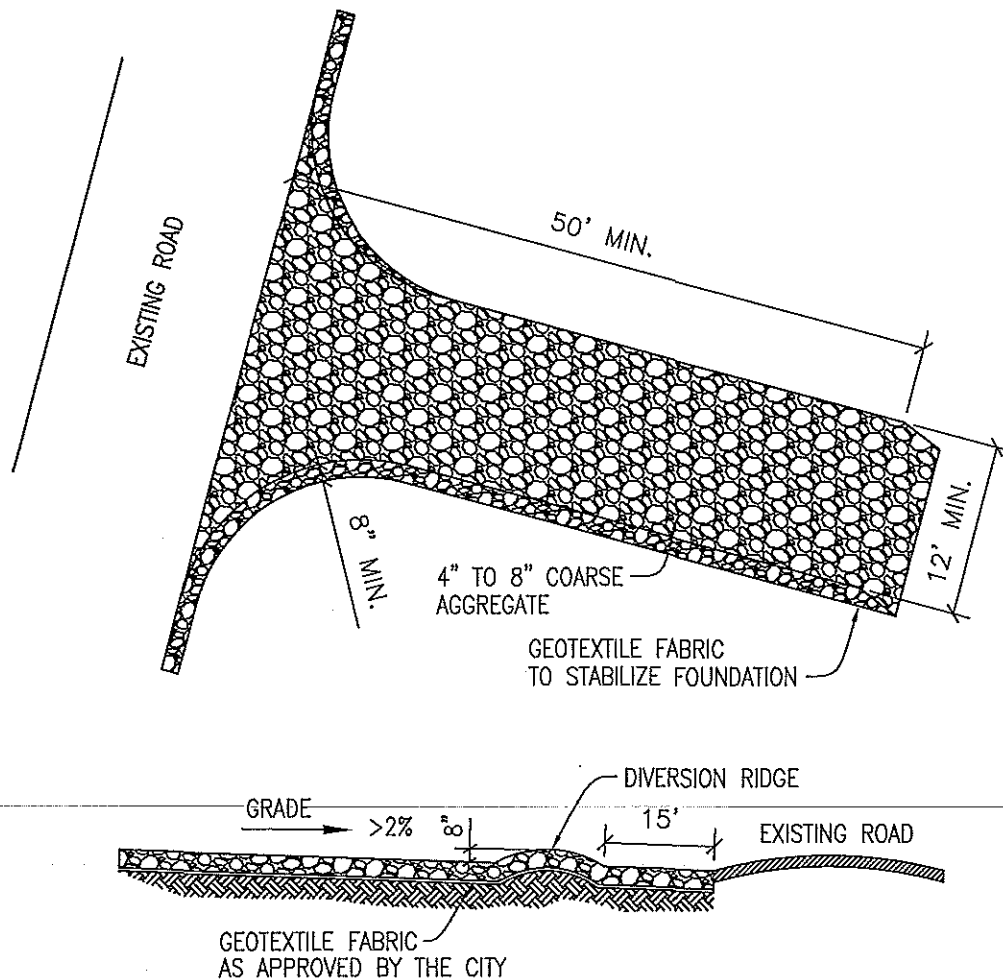
Thread)

6. *Blue reflector markers shall be located on the centerline of the pavement across from all fire hydrants. Pavement markers at intersections shall be four-sided.
7. All water lines, including service lines, shall be pressure and leak tested per City of Austin Standard Specifications and witnessed by the City of Taylor representative. All failed tests shall be the fiscal responsibility of the contractor, and the contractor may be required to re-test lines if the testing is not witnessed by the City. Contractor must notify the City of Taylor 48 hours prior to any testing.
8. All water lines shall be sterilized and bacteriologically tested in accordance with City of Austin Standards. The contractor is responsible for sterilization and the City of Taylor is responsible for submitting bacteriological samples to the State unless otherwise approved by the Engineering department.
9. All water valve risers not in pavement shall be set in concrete in accordance with the City's specifications and details. The standard detail is available on the City's web site.
10. Density testing of compacted backfill shall be made at a rate of one test per two foot lifts per 500 feet of installed pipe unless otherwise approved by the Public Works department.
11. Contractor to obtain a water meter from the City of Taylor for any water that may be required during construction. (512-352-3251)
12. All water pipe and appurtenances larger than 12" shall have a maximum operating pressure greater than 250 psi unless specifically identified on the bid form.
13. Manhole frames and covers and water valve boxes shall be raised to finished pavement grade at the contractor's expense with City inspection. All utility adjustments shall be completed prior to final paving construction.
14. The location of any existing utility lines shown on these plans is the best available and may not be totally accurate. Any damage to existing utility lines, both known and unknown shall be repaired at the expense of the contractor. The Engineer and/or the City make no guarantee or warranty to the accuracy of these plans.
15. All iron pipe and fittings shall be wrapped with at least 8-mil polyethylene wrap in accordance with the COA specification.
16. All water mains, wastewater mains and service lines shall meet City of Austin Specifications minimum cover requirements. All streets are to be cut to subgrade prior to installation of water mains.
17. City to be given 48 hours notice prior to all testing of water and wastewater lines. City inspection is required for all testing of water and wastewater lines.
18. All water valves over 24" in size shall have a by-pass line and valve installed. By-pass valves and lines are subsidiary to the cost of the valve unless specifically identified on the bid form.
19. Contractor to notify City of Taylor 48 hours prior to connecting to existing utilities. Inspection is required.
20. All pipe bedding material shall conform to City of Taylor Standard Details.

21. Tracer tape shall be installed on all water and wastewater mains in accordance with City of Austin Standards regardless of the type of pipe or depth of pipe installed.
22. Unless otherwise specified by the Engineer all concrete is to be Class "A" (5 sack, 3000 psi ~ 28-days), and all reinforcing steel to be ASTM A615 60.
23. The City considers protection of its water system paramount to construction activities. City personnel will operate, or authorize the contractor to operate, all water valves that will pass through the City's potable water. The contractor may not operate any water valve, existing or proposed, that will allow water from the City's water system to flow to a proposed or existing water system without the express consent of the City. Notify the City two business days in advance of any request to operate a water valve. The general contractor may be fined \$500 or more, including additional theft of water fines, if a water valve is operated in an unauthorized manner, regardless of who operated the valve.

Storm Sewer Notes:

1. The contractor with City inspection shall raise manhole frames and covers and water valve boxes to finished pavement grade. All utility adjustments shall be completed prior to final paving construction. The contractor will backfill around manholes and junction boxes with Class A concrete.
2. All manhole lids shall be 32" or larger, unless expressly approved in writing by the Engineering Department. All lids outside the pavement will be bolted.
3. The location of any existing utility lines shown on these plans is the best available and may not be totally accurate. Any damage to existing utility lines, both known and unknown, shall be repaired at the expense of the contractor.
4. Contractor to notify City of Taylor 48 hours prior to connecting to existing utilities.
5. All pipe bedding material shall conform to City of Taylor Standard Details.
6. Unless otherwise specified by the Engineer all concrete is to be Class "A" (5 sack, 3000 psi ~ 28-days), and all reinforcing steel to be ASTM A615 60.
7. Contractor to install and maintain geo-textile fabric barrier (inlet protection) around storm sewer leads and inlets to prevent silt and other material from entering the storm sewer collection system.



INSTALLATION:

- CLEAR THE AREA OF DEBRIS, ROCKS OR PLANTS THAT WILL INTERFERE WITH INSTALLATION.
- GRADE THE AREA FOR THE ENTRANCE TO FLOW BACK ON TO THE CONSTRUCTION SITE. RUNOFF FROM THE STABILIZED CONSTRUCTION ENTRANCE ONTO A PUBLIC STREET WILL NOT BE ACCEPTED.
- PLACE GEOTEXTILE FABRIC AS APPROVED BY THE CITY.
- PLACE ROCK AS APPROVED BY THE CITY.

INSPECTIONS AND MAINTENANCE GUIDELINES:

- THE ENTRANCE SHOULD BE MAINTAINED IN A CONDITION, WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
- ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ON TO PUBLIC RIGHTS-OF-WAY SHOULD BE REMOVED IMMEDIATELY BY CONTRACTOR.
- WHEN NECESSARY, WHEELS SHOULD BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS-OF-WAY.
- WHEN WASHING IS REQUIRED, IT SHOULD BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.
- ALL SEDIMENT SHOULD BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATER COURSE BY USING APPROVED METHODS.



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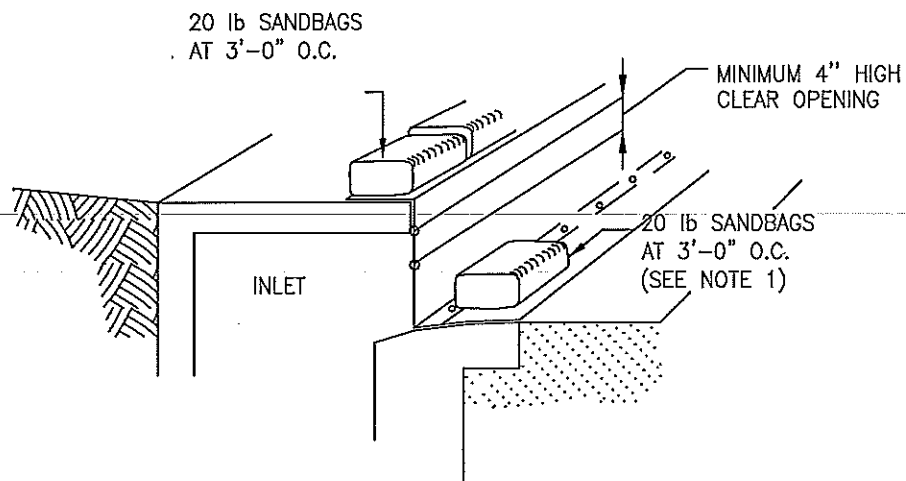
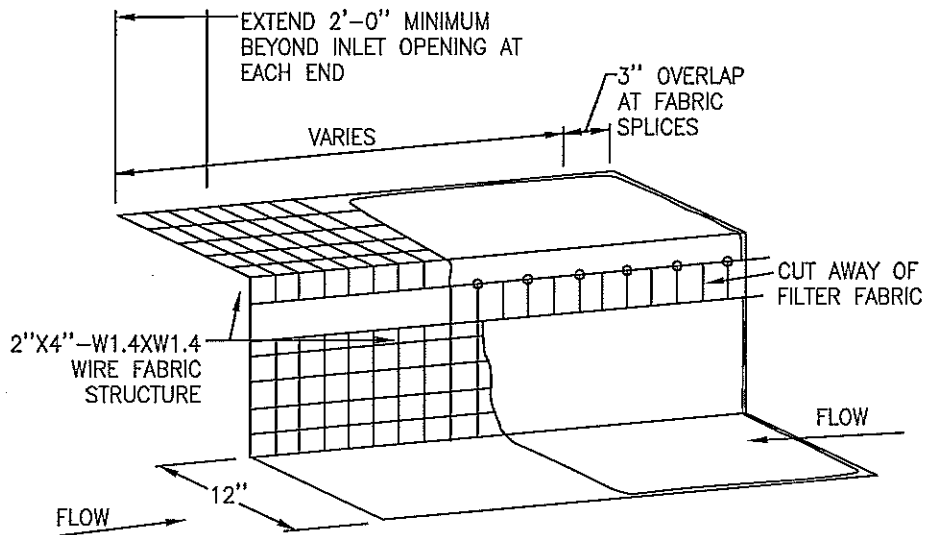
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JULY 2009

CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

STABILIZED CONSTRUCTION ENTRANCE

STANDARD

EN 001



NOTES:

1. WHERE MINIMUM CLEARANCES CAUSE TRAFFIC TO DRIVE IN THE GUTTER, THE CONTRACTOR MAY SUBSTITUTE A 1" X 4" BOARD SECURED WITH CONCRETE NAILS 3' O.C. NAILED INTO THE GUTTER IN LIEU OF SANDBAGS TO HOLD THE FILTER DIKE IN PLACE. UPON REMOVAL, CLEAN ANY DIRT/DEBRIS FROM NAILING LOCATIONS, APPLY CHEMICAL SANDING AGENT AND APPLY NON-SHRINK GROUT FLUSH WITH SURFACE OF GUTTER.
2. A SECTION OF FILTER FABRIC SHALL BE REMOVED AS SHOWN ON THIS DETAIL OR AS DIRECTED BY THE ENGINEER OR DESIGNATED REPRESENTATIVE. FABRIC MUST BE SECURED TO WIRE BACKING WITH CLIPS OR HOG RINGS AT THIS LOCATION.
3. DAILY INSPECTION SHALL BE MADE BY THE CONTRACTOR AND SILT ACCUMULATION MUST BE REMOVED WHEN DEPTH REACHES 2".
4. CONTRACTOR SHALL MONITOR THE PERFORMANCE OF INLET PROTECTION DURING EACH RAINFALL EVENT AND IMMEDIATELY REMOVE THE INLET PROTECTIONS IF THE STORM WATER BEGINS TO OVERTOP THE CURB.
5. INLET PROTECTIONS SHALL BE REMOVED AS SOON AS THE SOURCE OF SEDIMENT IS STABILIZED.



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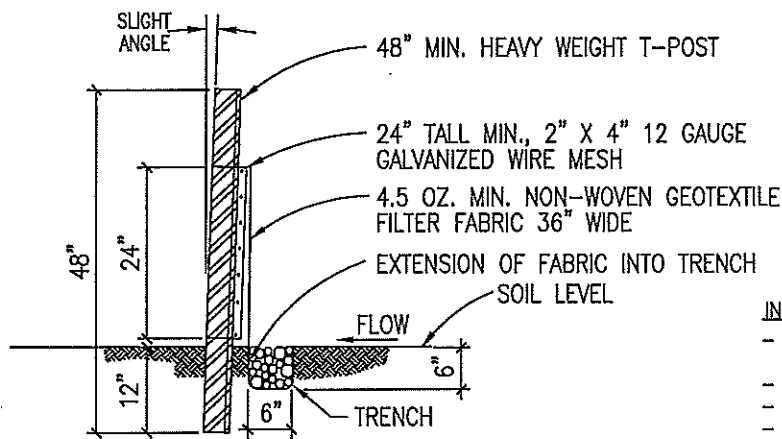
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CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

STANDARD

EN 002

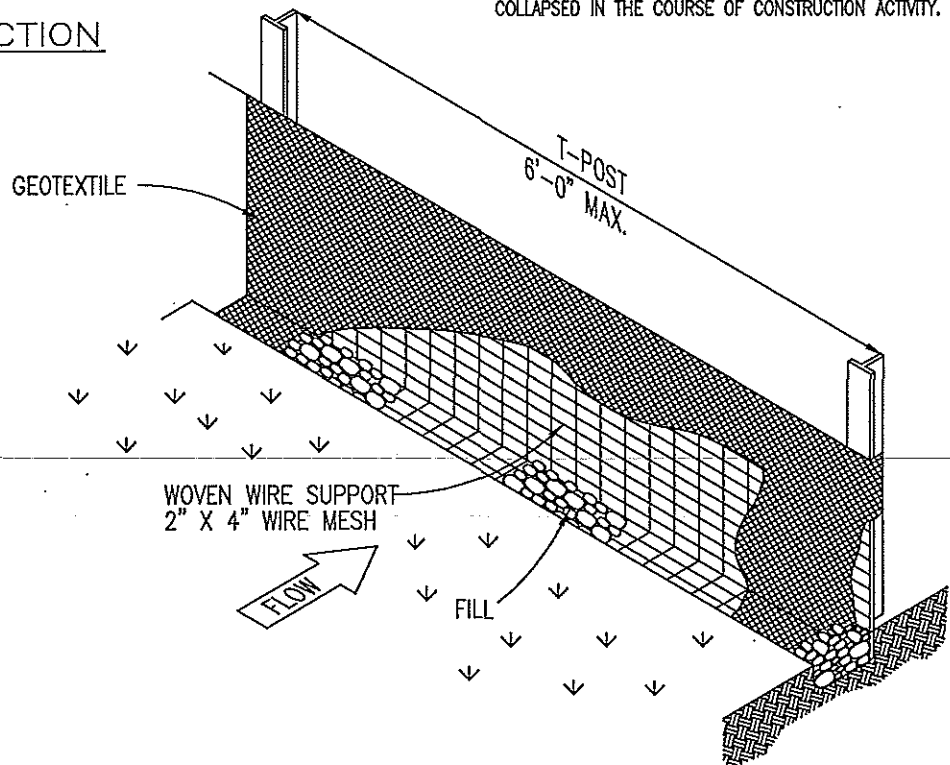
FILTER DIKE CURB INLET PROTECTION



CROSS SECTION

INSPECTION AND MAINTENANCE GUIDELINES:

- INSPECT ALL FENCING WEEKLY, AND AFTER ANY RAINFALL EVENT.
- REMOVE SEDIMENT WHEN BUILDUP REACHES 6 INCHES.
- REPLACE ANY TORN FABRIC.
- REPLACE OR REPAIR ANY SECTIONS CRUSHED OR COLLAPSED IN THE COURSE OF CONSTRUCTION ACTIVITY.



INSTALLATION:

- LAYOUT THE SILT FENCE FOLLOWING AS CLOSELY AS POSSIBLE TO THE CONTOUR.
- CLEAR THE GROUND OF DEBRIS, ROCKS, PLANTS (INCLUDING GRASSES TALLER THAN 2") TO PROVIDE A SMOOTH FLOW APPROACH SURFACE. EXCAVATE 6" DEEP X 6" WIDE TRENCH ON UPSTREAM SIDE OF FACE PER PLANS.
- DRIVE THE HEAVY DUTY T-POST AT LEAST 12 INCHES INTO THE GROUND AND AT A SLIGHT ANGLE TOWARDS THE FLOW.
- ATTACH THE 2" X 4" 12 GAUGE WELDED WIRE MESH TO THE T-POST WITH 11 1/2 GAUGE GALVANIZED T-POST CLIPS. THE TOP OF THE WIRE TO BE 24" ABOVE GROUND LEVEL. THE WELDED WIRE MESH TO BE OVERLAPPED 6" AND TIED AT LEAST 6 TIMES WITH HOG RINGS.
- THE SILT FENCE TO BE INSTALLED WITH A SKIRT A MINIMUM OF 11" WIDE PLACED ON THE UPHILL SIDE OF THE FENCE INSIDE EXCAVATED TRENCH. THE FABRIC TO OVERLAP THE TOP OF THE WIRE BY 1".
- ANCHOR THE SILT FENCE BY BACKFILLING WITH EXCAVATED DIRT AND ROCKS (NOT LARGER THAN 2").
- GEOTEXTILE SPLICES SHOULD BE A MINIMUM OF 18" WIDE ATTACHED IN AT LEAST 6 PLACES. SPLICES IN CONCENTRATED FLOW AREAS WILL NOT BE ACCEPTED.
- SILT FENCE SHALL BE REMOVED WHEN THE SITE IS COMPLETELY STABILIZED SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.



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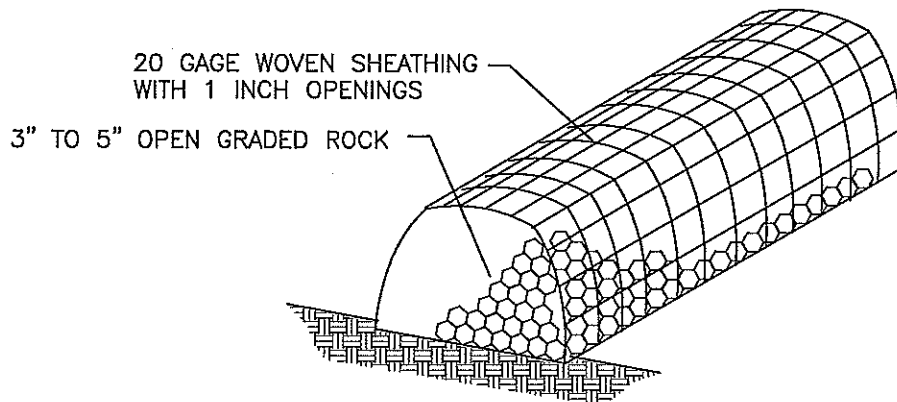
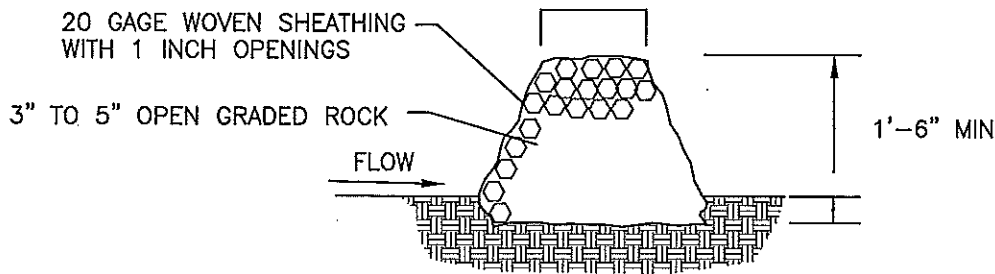
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JULY 2009

CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

SILT FENCE DETAIL

STANDARD

EN 003



INSTALLATION:

- LAYOUT OF ROCK BERM FOLLOWING AS CLOSELY AS POSSIBLE TO THE CONTOUR.
- CLEAR THE AREA OF DEBRIS, ROCKS OR PLANTS THAT WILL INTERFERE WITH INSTALLATION.
- PLACE WOVEN WIRE FABRIC ON THE GROUND ALONG THE PROPOSED INSTALLATION WITH ENOUGH OVERLAP TO COMPLETELY ENCIRCLE THE FINISHED SIZE OF THE BERM.
- PLACE THE ROCK ALONG THE CENTER OF THE WIRE TO THE DESIGNATED HEIGHT.
- WRAP THE STRUCTURE WITH THE PREVIOUSLY PLACED WIRE MESH SECURE ENOUGH SO THAT WHEN WALKED ACROSS THE STRUCTURE RETAINS IT'S SHAPE.
- SECURE WITH TIE WIRE.
- THE ENDS OF THE BERM SHOULD BE TIED INTO EXISTING UPSLOPE GRADE AND THE BERM SHOULD BE BURIED IN A TRENCH APPROX. 4 INCHES DEEP TO PREVENT FAILURE OF THE CONTROL.
- THE ROCK BERM SHOULD BE LEFT IN PLACE UNTIL ALL UPSTREAM AREAS ARE STABILIZED AND ACCUMULATED SILT IS REMOVED.

INSPECTIONS AND MAINTENANCE GUIDELINES:

- INSPECTION SHOULD BE MADE WEEKLY AND AFTER EACH RAINFALL EVENT BY THE RESPONSIBLE PARTY. FOR INSTALLATION IN STREAM BEDS, ADDITIONAL DAILY INSPECTIONS SHOULD BE MADE.
- REMOVE SEDIMENT AND OTHER DEBRIS WHEN BUILDUP REACHES 6 INCHES AND DISPOSE OF THE ACCUMULATED SILT IN AN APPROVED MANNER.
- REPAIR ANY LOOSE WIRE SHEATHING.
- THE BERM SHOULD BE RESHAPED AS NEEDED DURING INSPECTION.
- THE BERM SHOULD BE REPLACED WHEN THE STRUCTURE CEASES TO FUNCTION AS INTENDED DUE TO SILT ACCUMULATION AMONG THE ROCKS, WASHOUT, CONSTRUCTION TRAFFIC DAMAGE, ETC.



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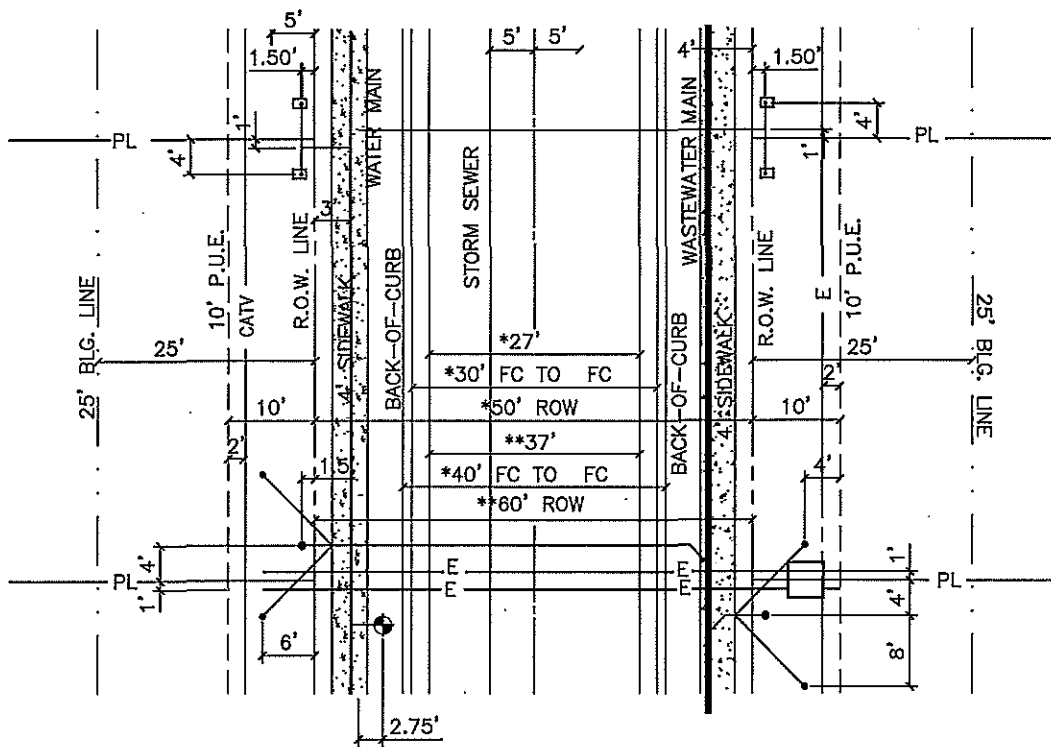
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JULY 2009

CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

ROCK BERM DETAIL

STANDARD

EN 004



MINIMUM COVER BELOW FINISH-GRADE

ELECTRIC PRIMARY	36"
ELECTRIC SECONDARY	24"
WATER	48"
WASTEWATER	48"
STORM SEWER	36"
GAS	24"
TELECOMMUNICATIONS	24"



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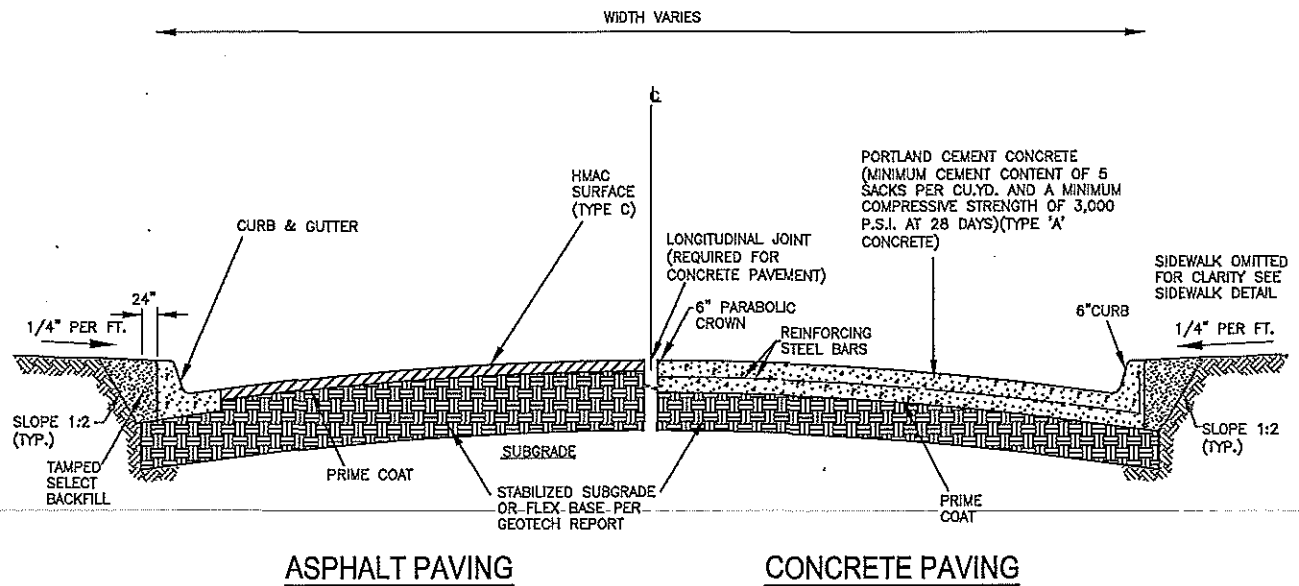
JULY 2009

CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

TYPICAL STREET LAYOUT
AND UTILITY ASSIGNMENTS

STANDARD

PV 001



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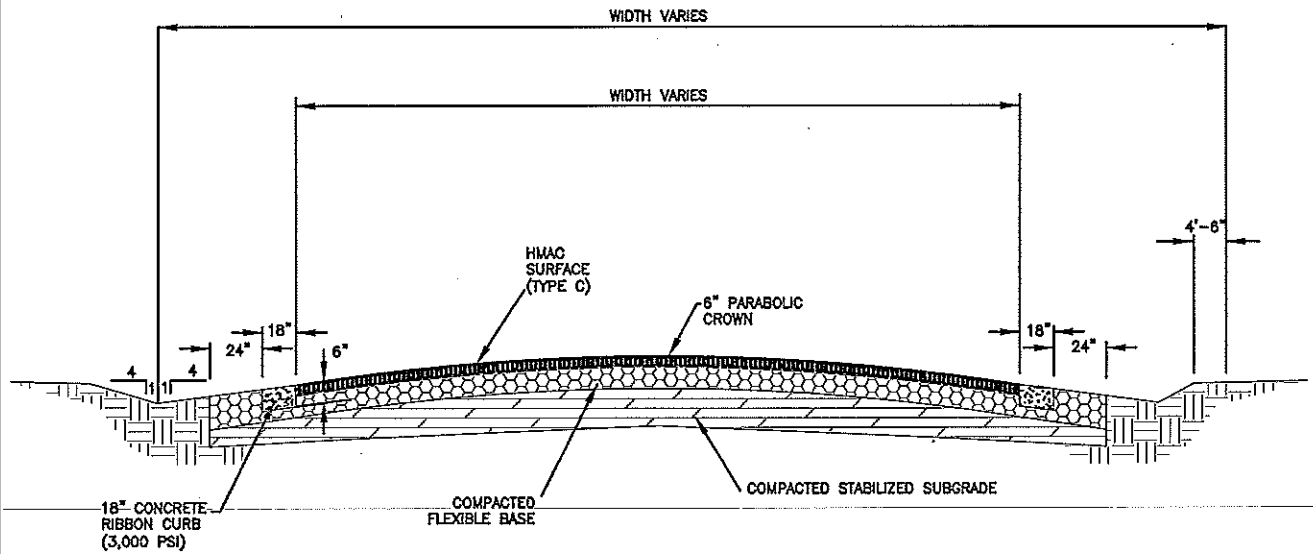
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CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

TYPICAL STREET SECTION DETAIL
W / STANDARD CURB & GUTTER

STANDARD

PV 002



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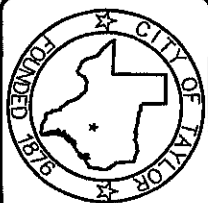
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CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

TYPICAL STREET SECTION DETAIL
W / RIBBON CURB

STANDARD

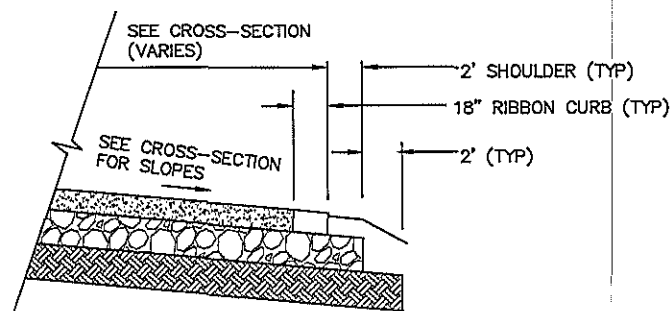
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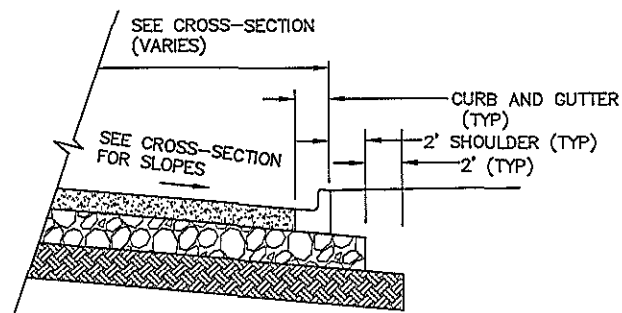
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JULY 2009

CITY OF TAYLOR
WILLAMSON COUNTY, TEXAS
STANDARD DETAILS
PAVEMENT SECTIONS

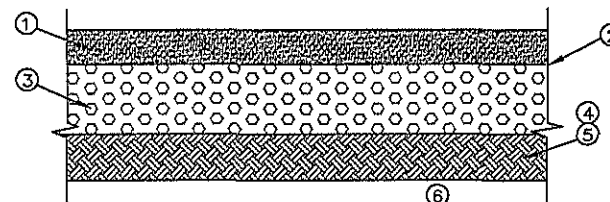
STANDARD
PV 004



TYPICAL STREET SECTION WITH RIBBON CURB
N.T.S.



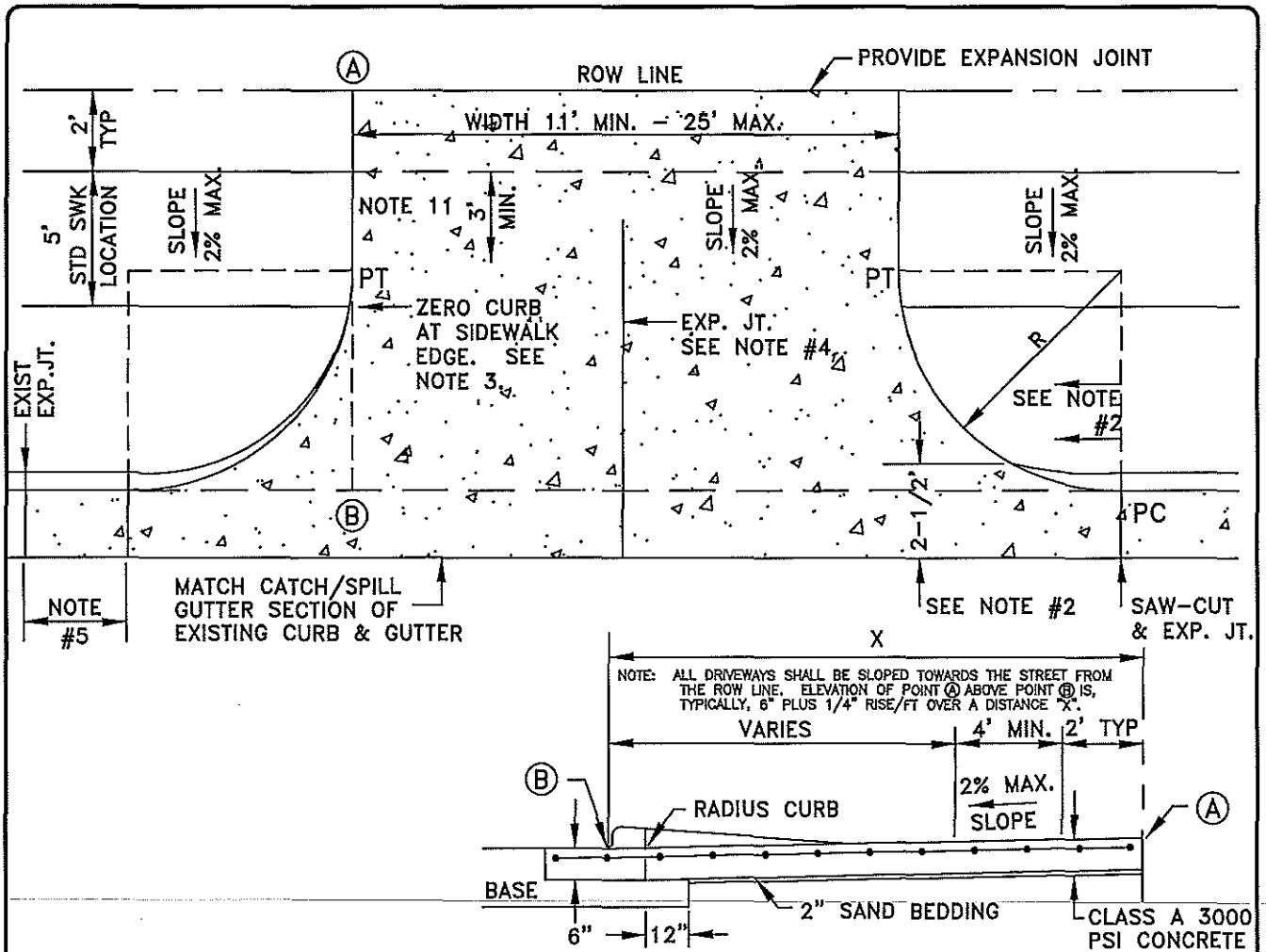
TYPICAL STREET SECTION WITH STANDARD CURB AND GUTTER
N.T.S.



HMAC PAVEMENT SECTION (LIGHT DUTY)
N.T.S.

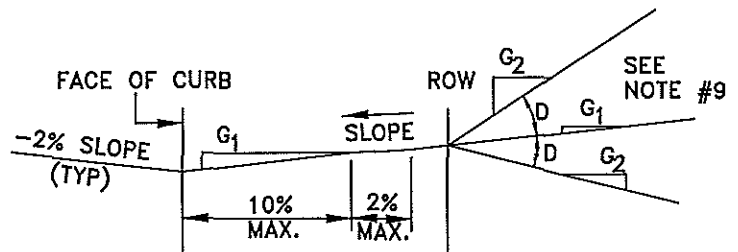
GENERAL NOTES:

1. HOT MIX ASPHALTIC CONCRETE CONFORMING TO TxDOT ITEM 340, TYPE "C"
2. MC-30 PRIME COAT MEETING THE REQUIREMENTS OF TxDOT ITEM 310 SHALL BE APPLIED AT A RATE 0.25 GALLON/SQUARE YARD. (RATE SHALL BE ADJUSTED IN THE FIELD TO PROVIDE UNIFORM COVERAGE WITHOUT RUNOFF. RATE TO BE APPROVED BY THE ENGINEER.)
3. CRUSHED AGGREGATE BASE CONFORMING TO TxDOT ITEM 247, TYPE A, GRADE 1. THE CRUSHED STONE BASE SHALL BE PLACED IN MAXIMUM 6 INCH LOOSE LIFTS AND COMPACTED TO A DENSITY EQUAL TO AT LEAST 100% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY TEST METHOD TEX-113-E, AT $\pm 2\%$ OF OPTIMUM MOISTURE. THE BASE MATERIAL SHOULD EXTEND 24 INCHES BEHIND THE CURB.
4. THE EXPOSED SUBGRADE SHOULD BE PREPARED BY REMOVING ALL TREE ROOTS AND UNDESIRABLE MATERIAL SUCH AS SOFT CLAYS. THE UPPER 6 INCHES SHOULD BE COMPACTED TO A DENSITY EQUAL TO AT LEAST 98% OF THE MAXIMUM DRY DENSITY AS DETERMINED IN ACCORDANCE BY STANDARD PROCTOR (ASTM D-698). SOIL MOISTURE SHOULD BE WITHIN $+3\%$ OR -1% OF OPTIMUM.
5. FILL SECTIONS SHALL BE FREE OF VEGETATION OR ORGANICS. MATERIAL SHALL CONSIST OF COHESIVE SOILS AND HAVE A MAXIMUM LIQUID LIMIT OF 40, PI BETWEEN 6 AND 20, AND A MAXIMUM PARTICAL SIZE OF 3 INCHES. FILLS SHOULD BE COMPACTED IN LIFTS NOT TO EXCEED 6 INCHES AFTER COMPACTION AND BE COMPACTED IN ACCORDANCE WITH ITEM 3, ABOVE. FILL SHALL BE TxDOT ITEM 247, TYPE "A" - GRADE 2.
6. EXISTING UNDISTURBED SOIL.



NOTES:

- ALL DRIVEWAYS SHALL HAVE RADIUS ENDS. MINIMUM 5' RADIUS.
- THE DRIVEWAY EDGE SHALL BE SMOOTHLY TRANSITIONED INTO THE SIDEWALK BEGINNING AT THE RADIUS PC LINE.
- "ZERO" CURB AT PT OR SIDEWALK EDGE, WHICHEVER IS ENCOUNTERED FIRST.
- PLACE AN EXPANSION JOINT DOWN THE CENTER OF DRIVEWAY IF WIDTH IS GREATER THAN 15'.
- IF DIMENSION IS LESS THAN FIVE FEET, REMOVE CURB & GUTTER TO EXISTING EXPANSION JOINT AND POUR MONOLITHICALLY WITH DRIVEWAY.
- IF THE BASE IS OVER-EXCAVATED WHERE THE CURB & GUTTER WAS REMOVED, BACKFILL WITH CONCRETE MONOLITHICALLY WITH THE DRIVEWAY.
- TYPE II DRIVEWAYS ARE TO BE LOCATED NO CLOSER TO THE CORNER OF INTERSECTING RIGHTS OF WAY THAN 60 PERCENT OF PARCEL FRONTAGE OR 100 FEET; WHICHEVER IS LESS.
- DRIVEWAYS SHALL NOT BE CONSTRUCTED WITHIN THE CURB RETURN OF A STREET INTERSECTION.
- WHILE THE PROPERTY OWNER REMAINS RESPONSIBLE FOR GRADE BREAKS WITHIN PRIVATE PROPERTY, THE FIRE DEPARTMENT SHOULD BE CONSULTED WHERE THE DRIVEWAY IS ESSENTIAL TO EMERGENCY VEHICLE ACCESS AND "G2" IS GREATER THAN 15%. "G1" PLUS "D" SHOULD NOT EXCEED 15%.
- DRIVEWAYS SHALL BE 6 INCHES THICK WITH #4 REBAR @ 18" O.C.E.W.



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DATE:
JULY 2009

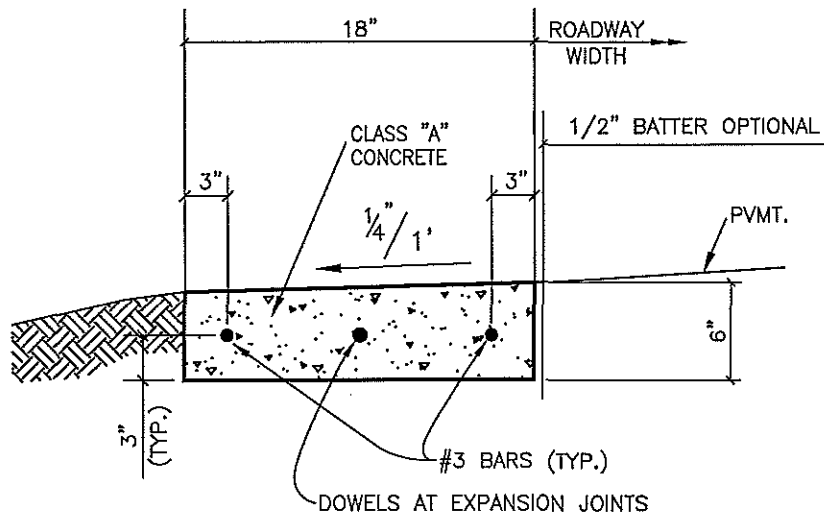
CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

DRIVEWAY DETAIL

STANDARD
PV 005



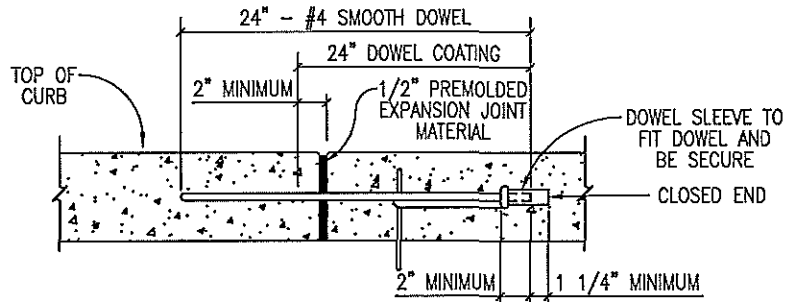
NOTES:



NOTES:

1. ALL WORK AND MATERIAL SHALL CONFORM TO ASTM A615, A615M, C309, AND D1752. BROOM FINISH EXPOSED SURFACE.
2. CONTRACTION JOINT SPACING 10' MAX.
3. EXPANSION JOINTS AS PER STD. ASTM D-1752.

RIBBON CURB



NOTE:

EXPANSION JOINT INTERVALS NOT TO EXCEED 40'-0".

CURB DOWEL DETAIL



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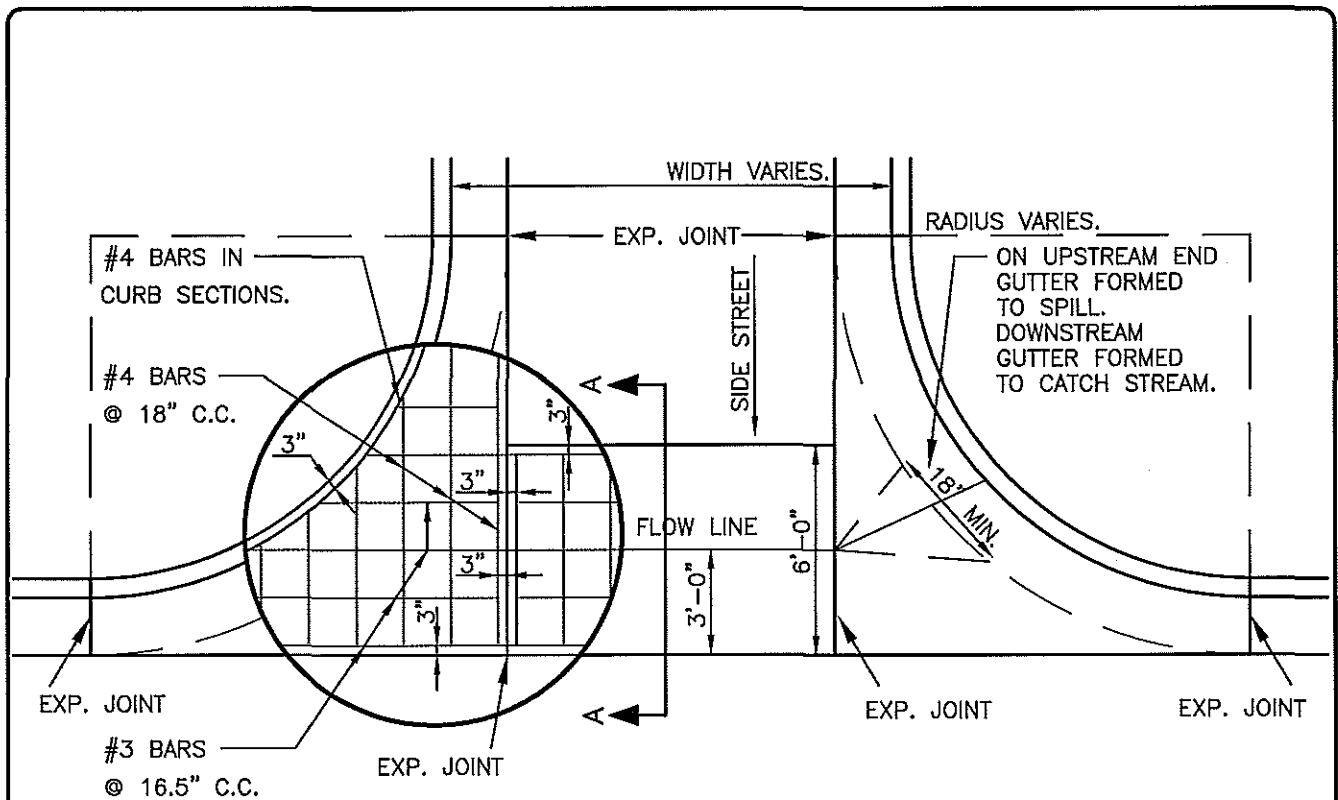
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JULY 2009

CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

RIBBON CURB DETAILS

STANDARD

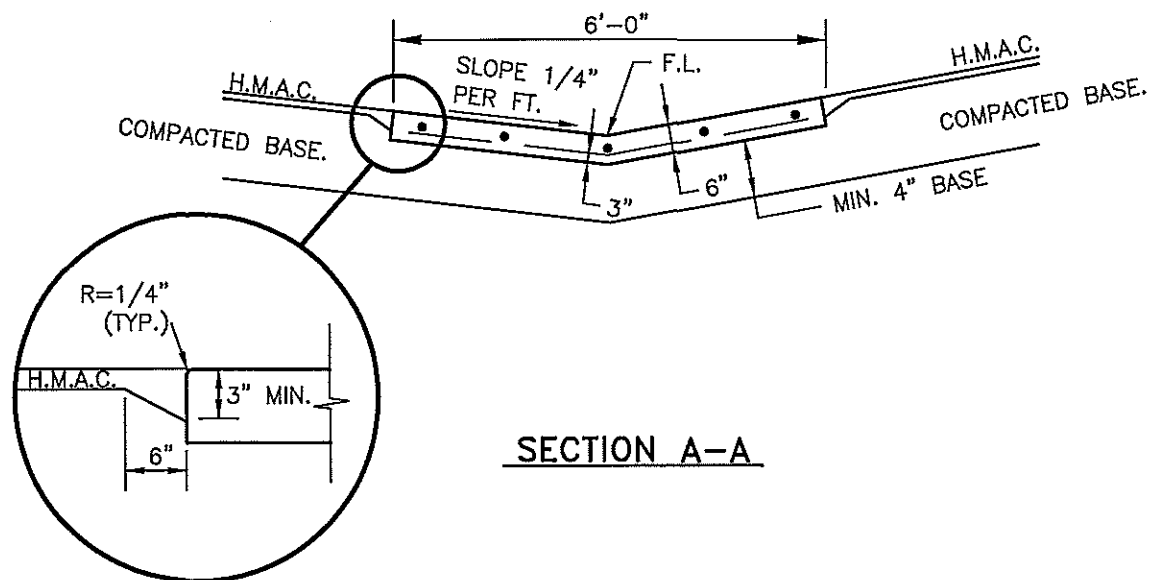
PV 008



NOTE:

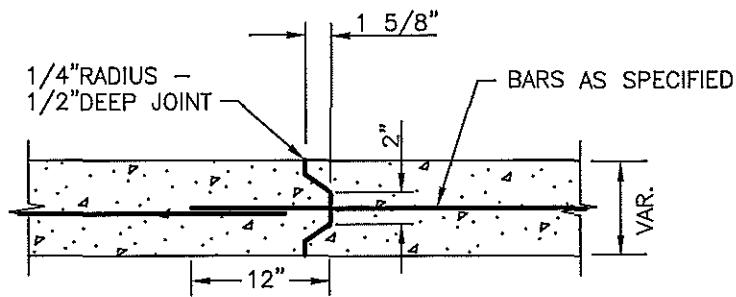
1. ALTERNATE #4 BARS TO BE CONTINUOUS ACROSS EXPANSION JOINT. BREAK BOND 6" ON EACH SIDE OF EXPANSION JOINT.
2. CONCRETE SHALL BE CLASS "A". MINIMUM COMPRESSION STRENGTH 3,000 PSI AT 28 DAYS.

PLAN



SECTION A-A

	APPROVED BY:	DATE:	CITY OF TAYLOR WILLIAMSON COUNTY, TEXAS STANDARD DETAILS	STANDARD PV 009
	CS	JULY 2009		



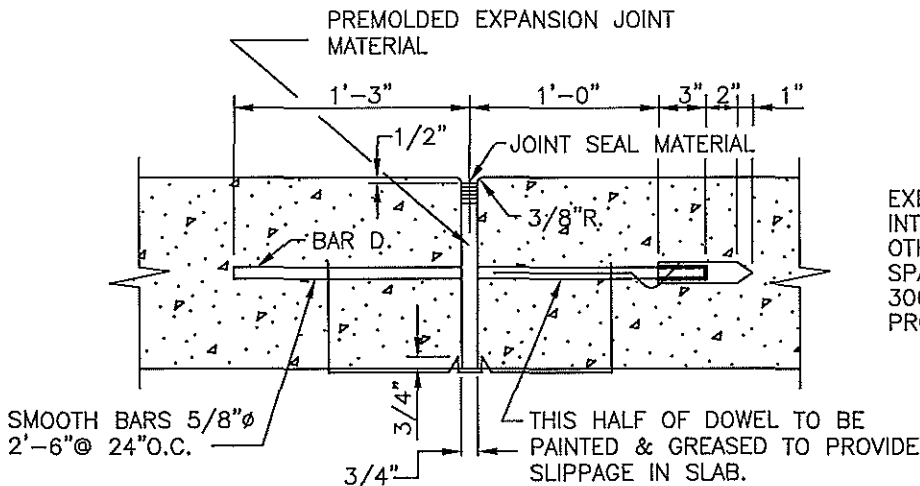
NOTE:
CONTRACTOR SHALL PROVIDE TRANSVERSE CONSTRUCTION JOINT SIMILAR IN
DETAIL TO LONGITUDINAL CONSTRUCTION JT. OR EXPANSION JT. AT THE END
OF EACH DAYS POUR OR WHEN DIRECTED BY ENGINEERS.

GENERAL NOTES:

1. CONCRETE OR BRICK CHAIRS APPROVED BY THE ENGINEER SHALL BE USED TO SUPPORT REINFORCING STEEL AND SHALL BE PLACED AT THE INTERSECTION OF LONGITUDINAL AND TRANSVERSE BARS AT SPACING AT 3'-8" LONGITUDINALLY AND 4'-0" TRANSVERSELY.
2. PAVEMENT LAYOUT WILL NECESSITATE THAT ALL CONSTRUCTION AND WARPING JOINTS COINCIDE WITH LANE LINES - THRU LANE CONSTRUCTION WILL BE CONTINUOUS WITH ALL LEFT TURN LANES AND TRANSITIONS TO BE POURED AS FILL-INS SUBJECT TO APPROVAL BY THE ENGINEER.
3. ALL TRANSVERSE AND LONGITUDINAL CONTRACTION JOINTS SHALL BE SPACED NOT TO EXCEED 20 FEET AND SHALL BE SAWED WITHIN 24 HOURS FOLLOWING CONCRETE PLACEMENT.

LONGITUDINAL CONSTRUCTION JOINT

NOT TO SCALE



EXPANSION JOINTS TO BE AT
INTERSECTIONS, BRIDGES, AND
OTHER STRUCTURES AND AT
SPACINGS NOT TO EXCEED
300 FEET. ALL JOINTS TO BE
PROPERLY SEALED.

CONTINUOUS WELDED DOWEL BAR CHAIR CONSISTING OF 2
WIRE NO. 6 GAUGE WIRE CHAIR & DOWEL HOLDER AT EACH
DOWEL & 2 3/8" ϕ STEEL BARS WELDED AT EACH INTERSECTION.

EXPANSION JOINT

NOT TO SCALE



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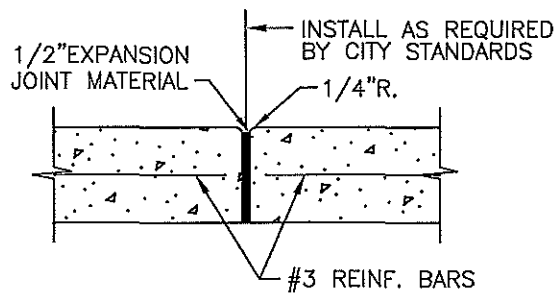
JULY 2009

CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

STANDARD

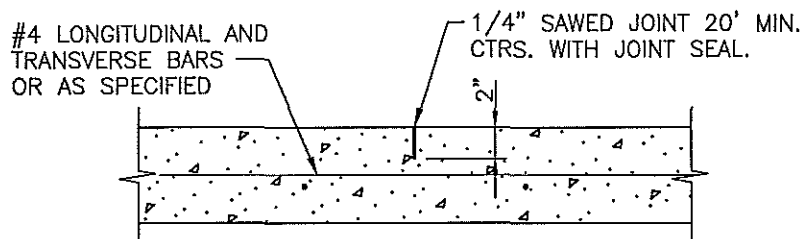
PV 010

JOINT DETAILS (1 OF 2)



CURB & GUTTER EXPANSION JOINT DETAIL

NOT TO SCALE



CONTRACTION JOINT DETAIL

NOT TO SCALE



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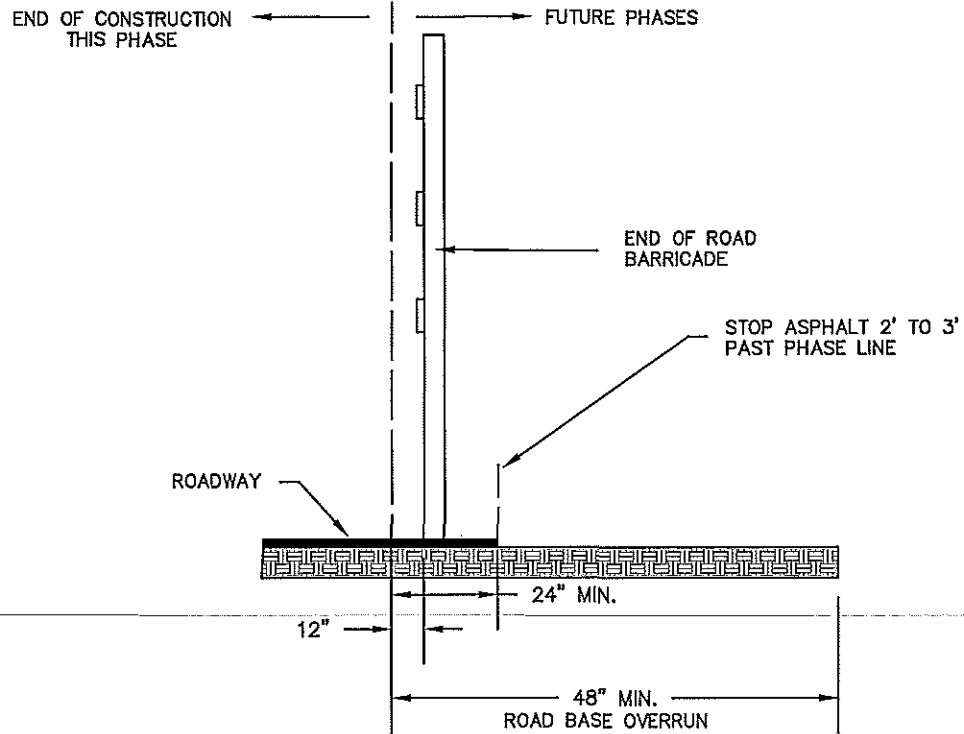
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CITY OF TAYLOR
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STANDARD DETAILS

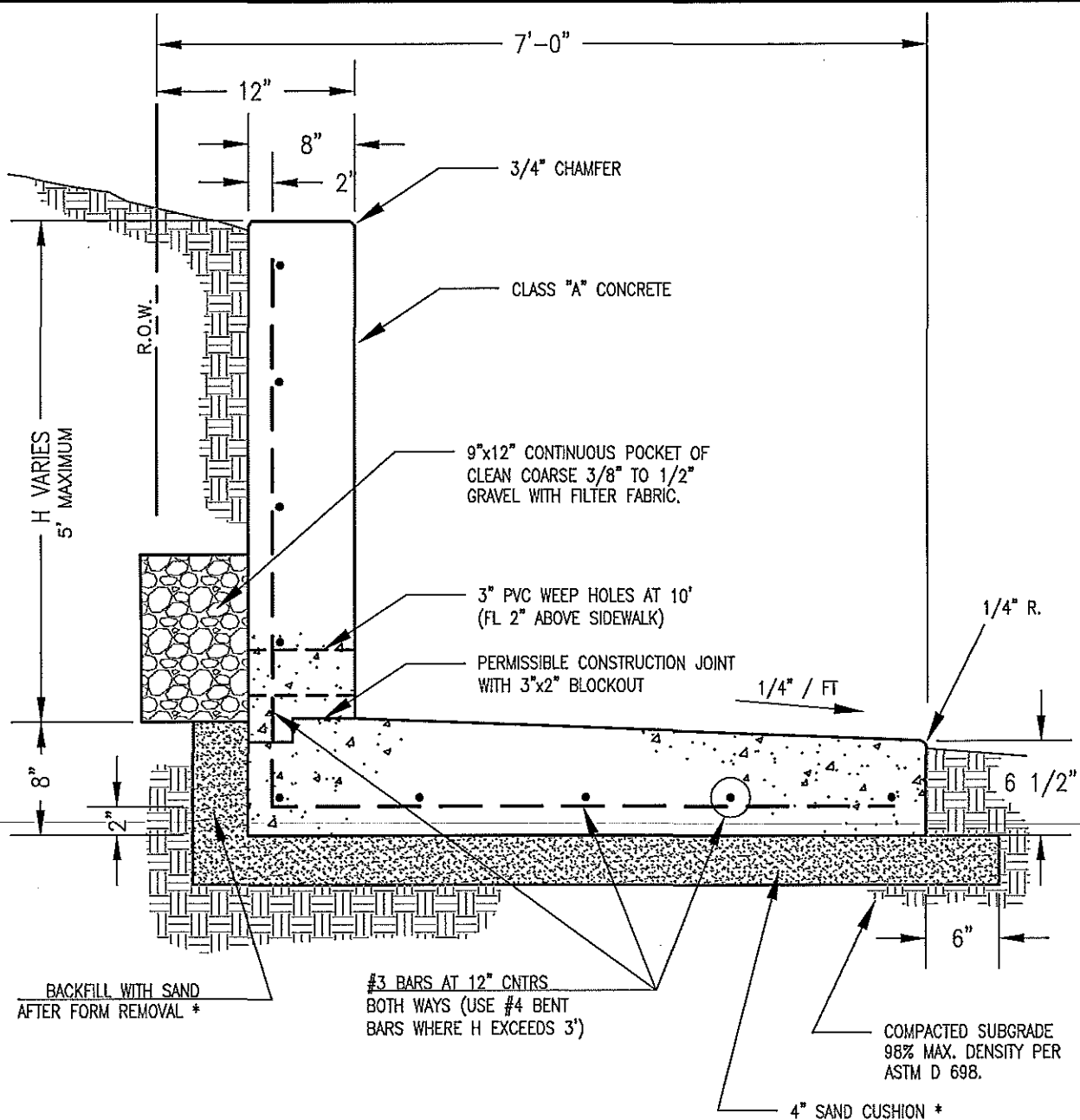
STANDARD

PV 011

JOINT DETAILS (2 OF 2)



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	CS	JULY 2009		
			CONSTRUCTION LIMITS AT STREET HEADER WITH BARRICADE	PV 012



NOTES:

1. PROVIDE VERTICAL EXPANSION IN WALL AT 25' MAXIMUM SPACING (SEE JOINT DETAILS AND MODIFY AS REQUIRED)
2. WALL DESIGN ASSUMES NO SURCHARGE. A SPECIAL ENGINEERING ANALYSIS IS REQUIRED FOR OTHER CONDITIONS.

* WHEN SPECIFIED ON PLANS



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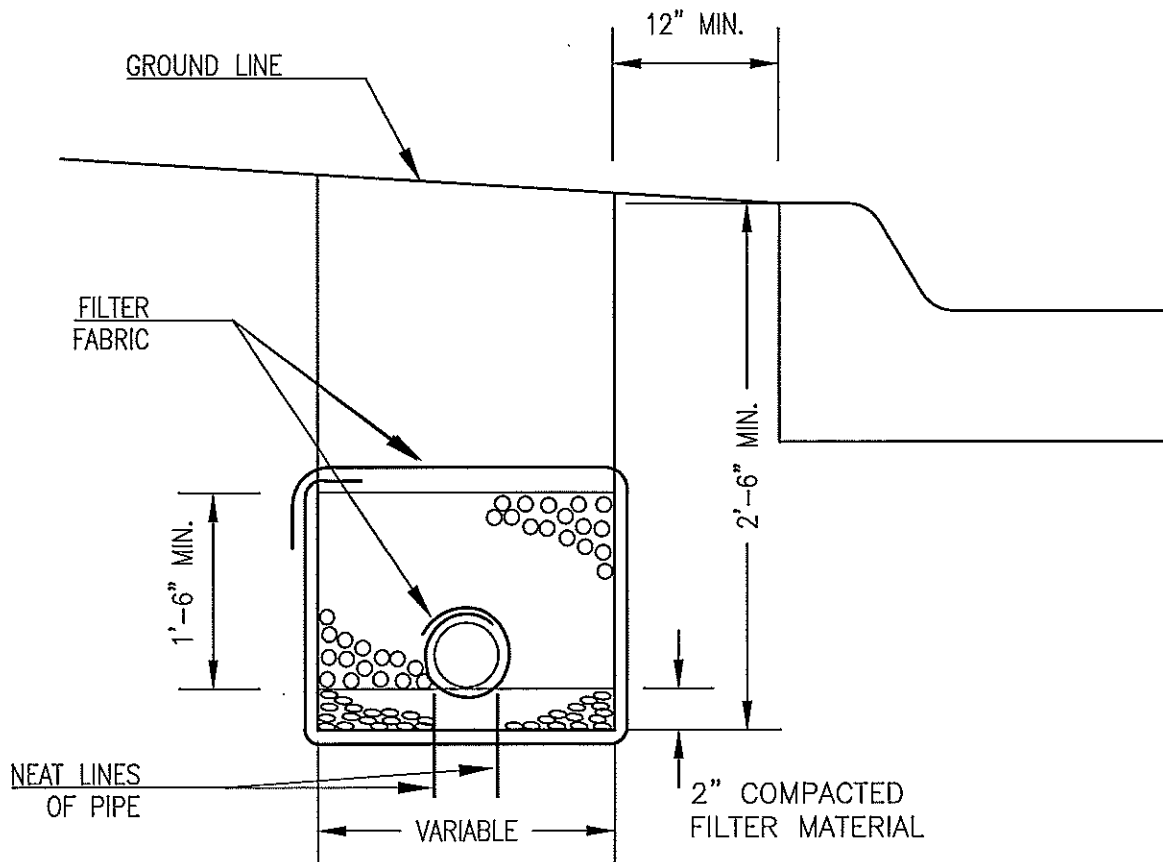
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CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

REINFORCED CONCRETE RETAINING
WALL WITH INTEGRAL SIDEWALK

STANDARD

PV 013



SECTION

LIMITS OF EXCAVATION

DEPTH OF TRENCH	DIST. IN FT. OUTSIDE NEAT LINES OF PIPE SUBDRAIN
0 TO 6	1.00
6 TO 10	1.50
10 TO 15	2.00
OVER 15	2.50

FILTER MATERIAL SPECIFICATIONS

SIEVE SIZE	PERCENTAGE RETAINED ON SIEVE	
	TYPE A	TYPE B
1 1/2	---	0-10
3/4	0-10	20-40
3/8	15-35	---
No. 4	35-55	40-60

TYPES OF PIPES ACCEPTABLE FOR USE AS SUBDRAINS

1. PERFORATED PVC PIPE.
2. PERFORATED POLYETHYLENE PIPE.

MATERIAL FINER THAN No. 4 SIEVE

4	---
20	35-65
50	75-100



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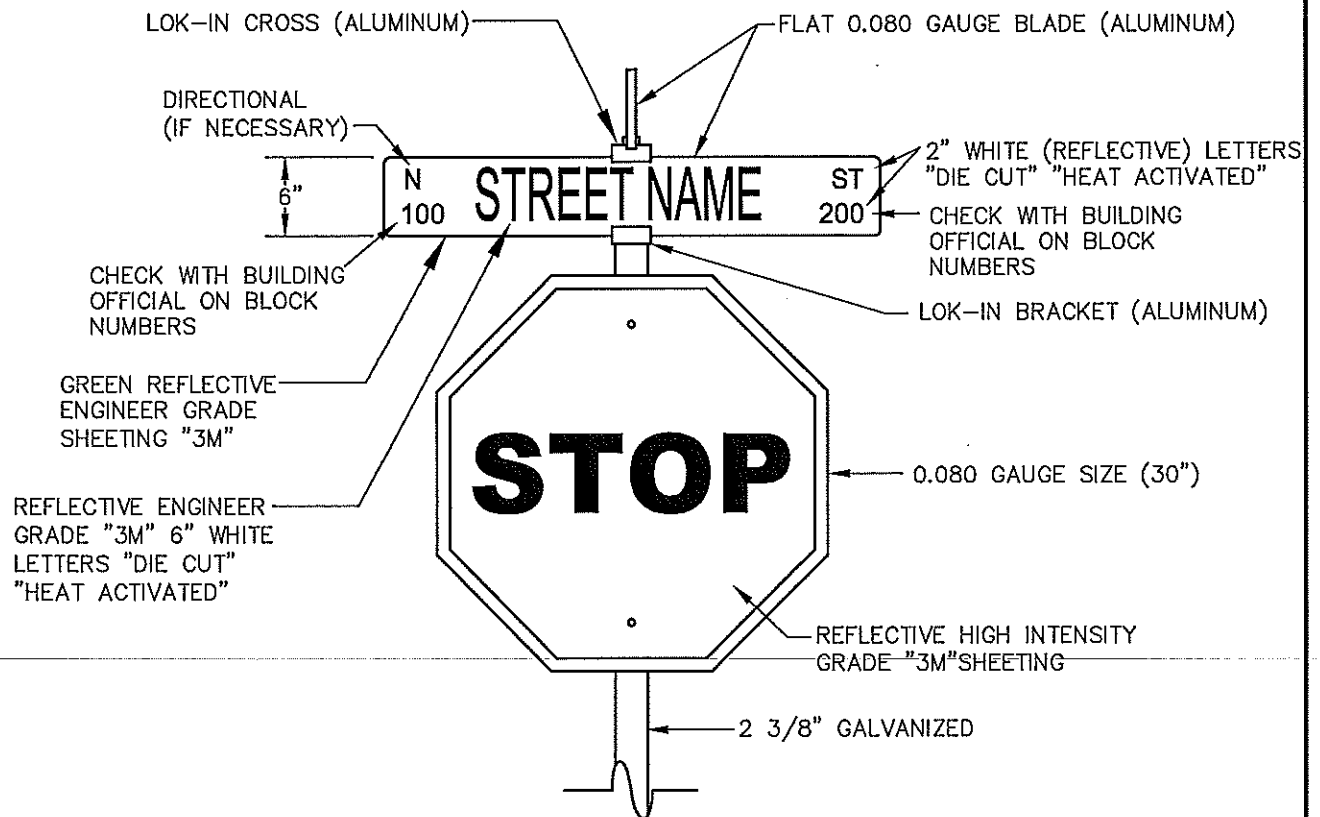
DATE:
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CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

STANDARD

PV 014

PAVEMENT SUBDRAIN DETAIL



NOTE:

1. 7-FOOT MIN. HEIGHT FROM GROUND TO BOTTOM OF LOWEST SIGN



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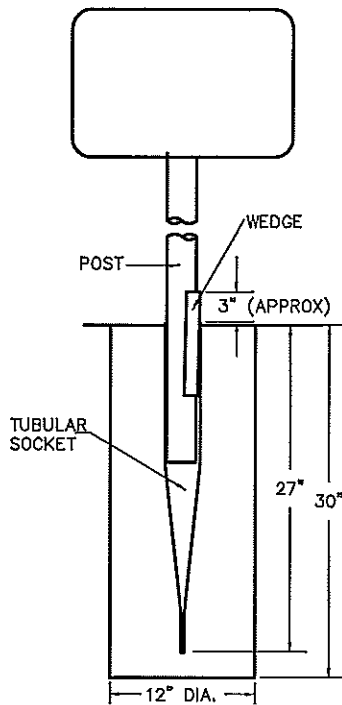
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CITY OF TAYLOR
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STANDARD DETAILS

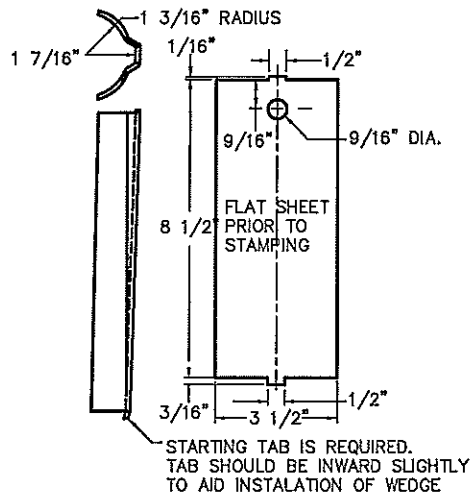
STANDARD STREET SIGN DETAIL

STANDARD

PV 015

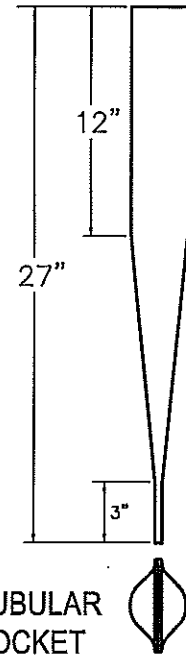


POST DETAIL



WEDGE DETAIL

WEDGE IS FABRICATED FROM 0.109" TO 0.124" THICK GALVANIZED SHEET STEEL PER ASTM A653 SS GRADE 40 G210 STAMPED INTO PROFILE SHOWN.



TUBULAR SOCKET DETAIL

POST — 13 BWM TUBING (2.375" OUTSIDE DIAMETER)

0.095" NOMINAL WALL THICKNESS

SEAMLESS OR ELECTRIC-RESISTANCE WELDED STEEL TUBING

STEEL SHALL BE HSLAS Gr 55 PER ASTM A1011 OR ASTM A1008

OTHER STEEL MAY BE USED IF THEY MEET THE FOLLOWING:

55,000 PSI MINIMUM YIELD STRENGTH

70,000 PSI MINIMUM TENSILE STRENGTH

18% MINIMUM ELONGATION IN 2"

WALL THICKNESS (UNCOATED) SHALL BE WITHIN THE RANGE OF 0.083" TO 0.099"

OUTSIDE DIAMETER (UNCOATED) SHALL BE WITHIN THE RANGE OF 2.369" TO 2.381"

GALVANIZATION PER ASTM A123 OR A653 G210. FOR PRECOATED STEEL TUBING (ASTM A653)

RECOAT TUBE OUTSIDE DIAMETER WELD SEAM BY METALLIZING WIRE PER ASTM B833

SOCKET

TUBULAR SOCKET PREFABRICATED FROM 12 BWM SEAMLESS OR ELECTRIC-RESISTANCE WELDED STEEL TUBING

2.875" OUTSIDE DIAMETER X 0.109" NORMAL WALL THICKNESS

STEEL SHALL BE HSLAS Gr 55 PER ASTM A1011 OR ASTM A1008

OTHER STEEL MAY BE USED IF THEY MEET THE FOLLOWING:

55,000 PSI MINIMUM YIELD STRENGTH

70,000 PSI MINIMUM TENSILE STRENGTH

20% MINIMUM ELONGATION IN 2"

WALL THICKNESS (UNCOATED) SHALL BE WITHIN THE RANGE OF 0.097" TO 0.113"

GALVANIZATION PER ASTM A123 AFTER FABRICATION, OR PER ASTM A653 G210. FOR PERCOATED STEEL TUBING

(ASTM A653) RECOAT TUBE OUTSIDE DIAMETER WELD SEAM BY METALLIZING WITH ZINC WIRE PER ASTM B833.



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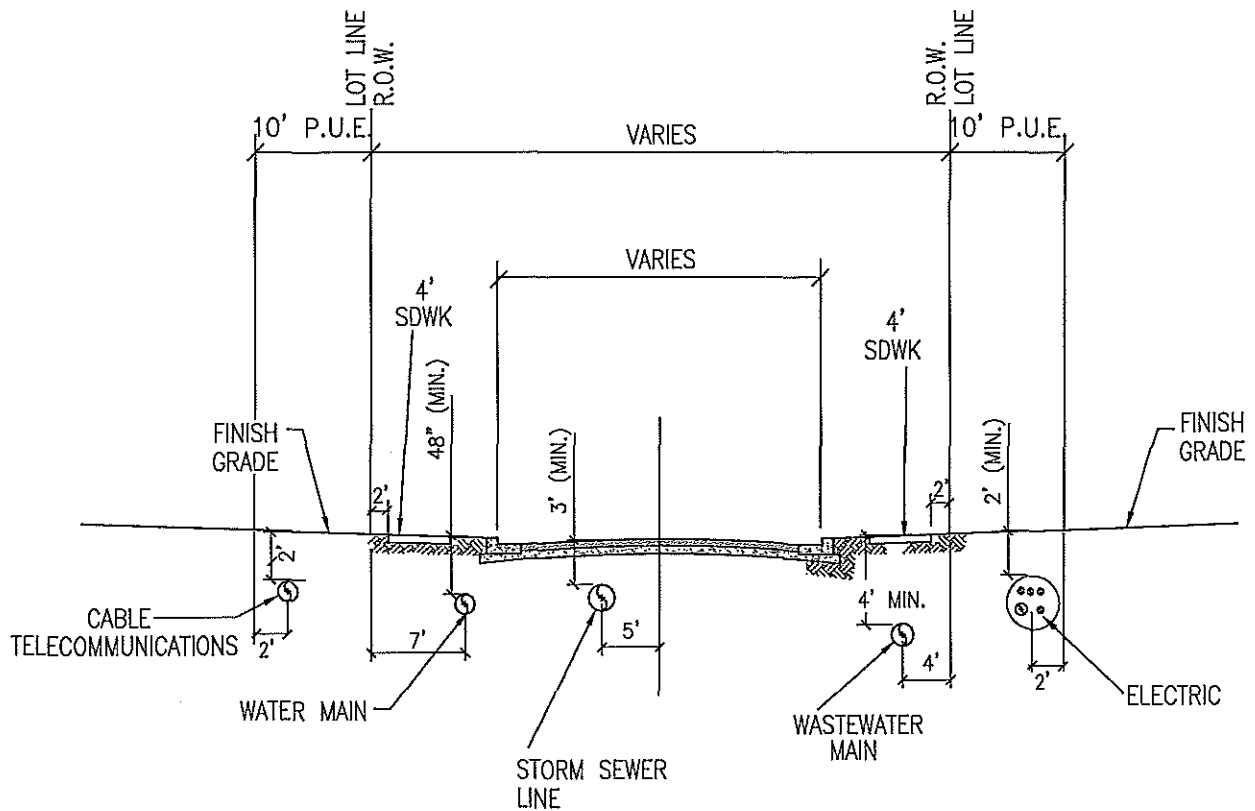
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CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

WEDGE ANCHOR SYSTEM

STANDARD

PV 016



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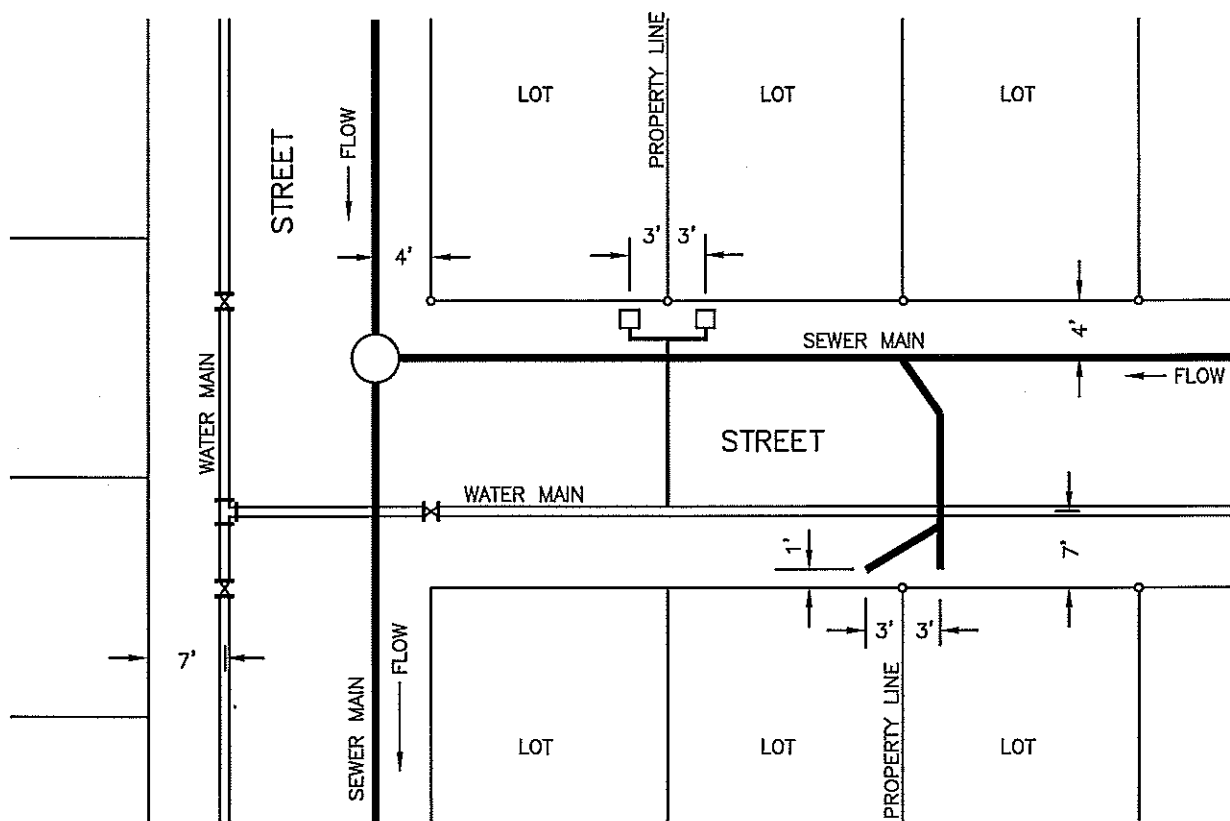
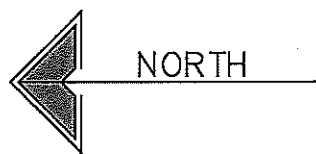
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CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

TYPICAL UTILITY ASSIGNMENTS

STANDARD

UT 001



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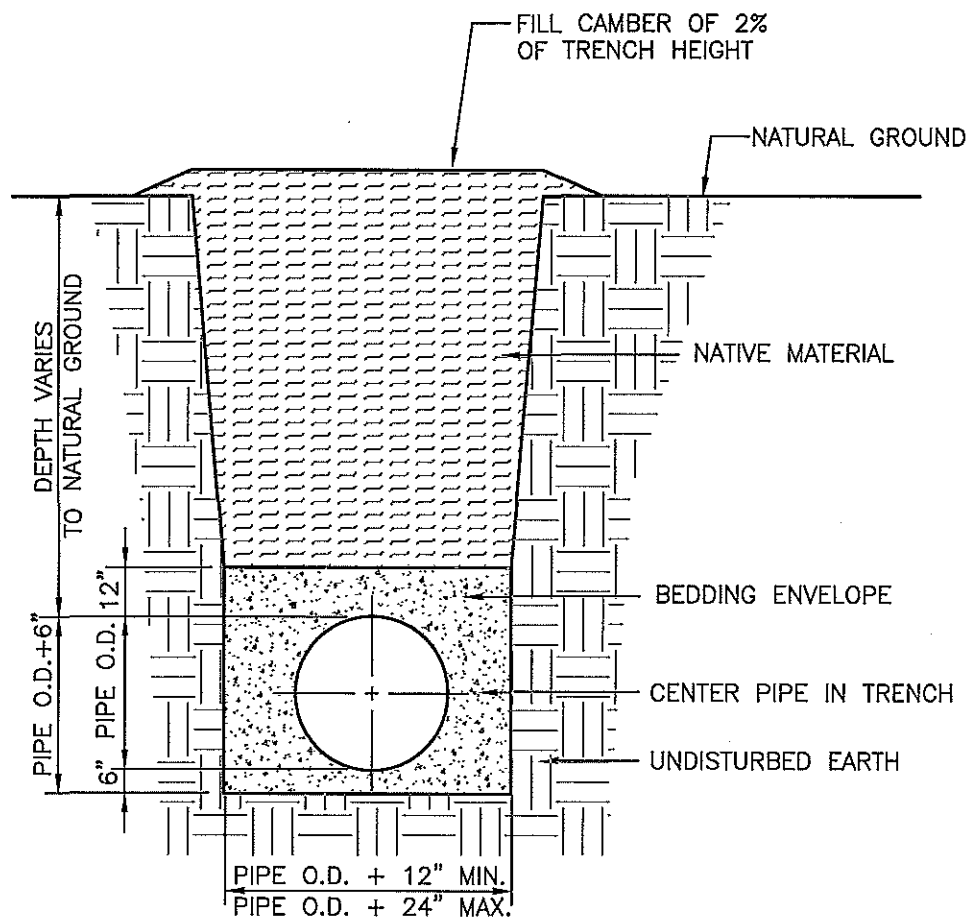
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CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

TYPICAL MAIN & SERVICE LOCATIONS

STANDARD

UT 002



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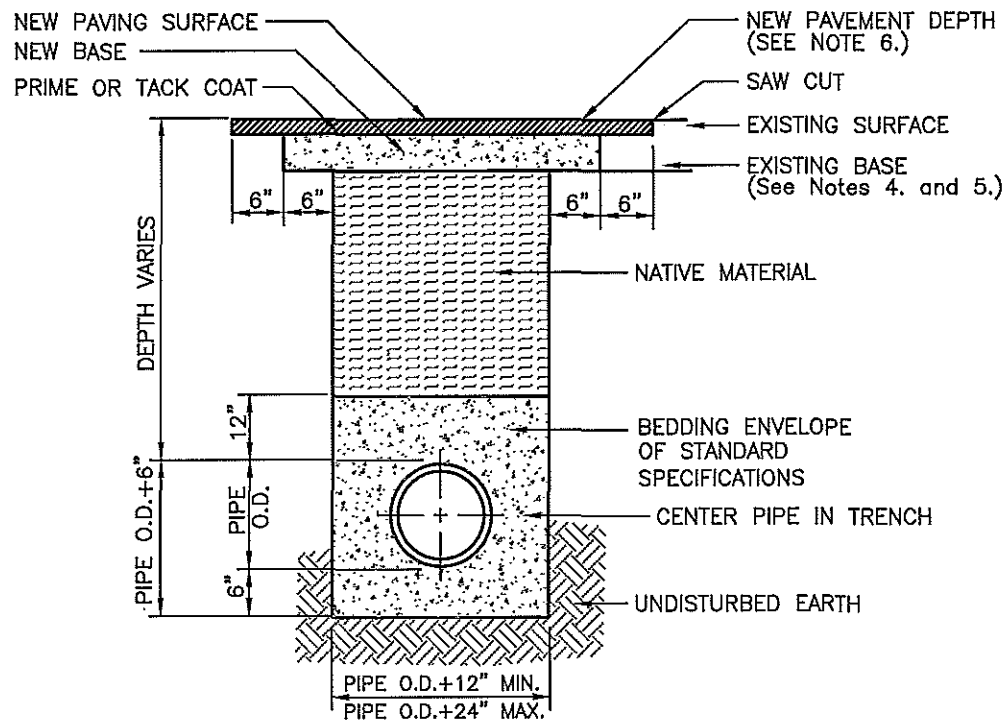
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CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

TYPICAL TRENCH
WITH UNFINISHED SURFACE

STANDARD

UT 003



NOTES:

1. THE EXISTING PAVING SURFACE SHALL BE SAW CUT IN A STRAIGHT LINE A MINIMUM OF 12" WIDER THAN THE UNDISTURBED SIDES OF THE TRENCH, SYMETRICAL ABOUT THE CENTER LINE OF THE EXCAVATION.
2. ANY CONCRETE PAVING SHALL BE SAW CUT 6" WIDER THAN UNDISTURBED SIDES OF EXCAVATION.
3. IF EXCAVATION AREA IS OPEN FOR TEMPORARY PUBLIC USE THE SURFACE SHALL BE MAINTAINED LEVEL WITH ADJACENT RIDING SURFACE WITH COLD MIX OR TEMPORARY HOT MIX.
4. ROAD BASE AND SURFACE MATERIALS IN THE TRENCH CUT SHALL BE REPLACED IN KIND OF EQUAL THICKNESS, OR MINIMUM BASE THICKNESS OF 10 INCHES, WHICHEVER IS GREATER
5. ALL DAMAGED AREAS OF PAVEMENT OUTSIDE THE TRENCH CUT SHALL BE REMOVED AND REPLACED WITH MINIMUM OF 8 INCHES OF BASE OR MATCH EXISTING, WHICHEVER IS GREATER.
6. SURFACE PAVEMENT SHALL BE OF THE KIND AND THICKNESS AS EXISTING, OR MINIMUM 2 INCHES, WHICHEVER IS GREATER
7. ALL PRESSURE PIPE SHALL BE PROVIDED WITH THRUST BLOCKS WHERE CHANGES IN DIRECTION OCCUR, AT TEES, BENDS, CROSSES, CHANGES IN SLOPE, STOPS (DEAD ENDS) VALVES AND OR AS SHOWN, ON THE PLANS OR AS DIRECTED BY THE ENGINEER.



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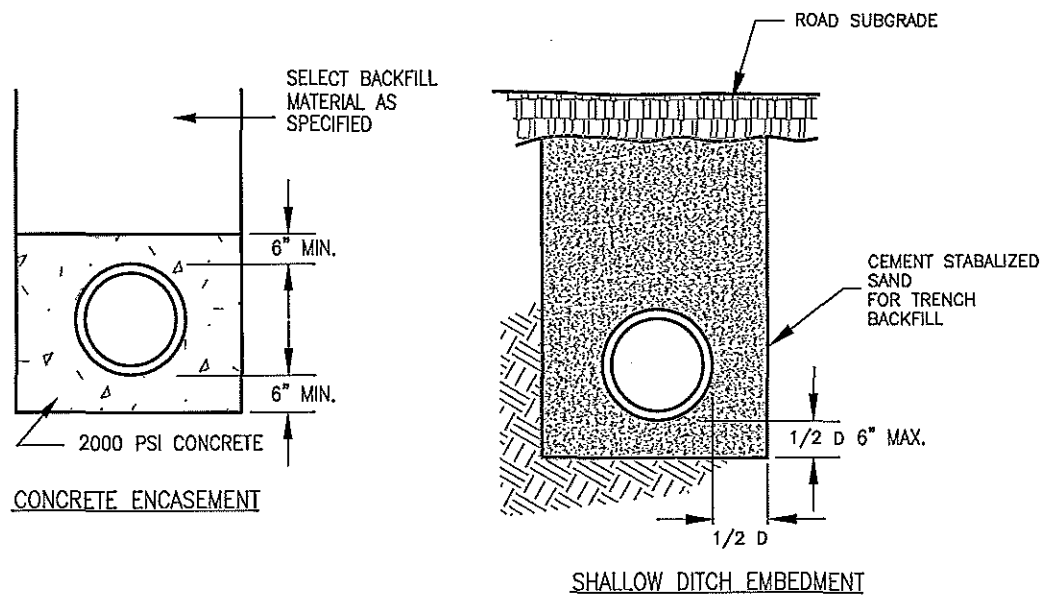
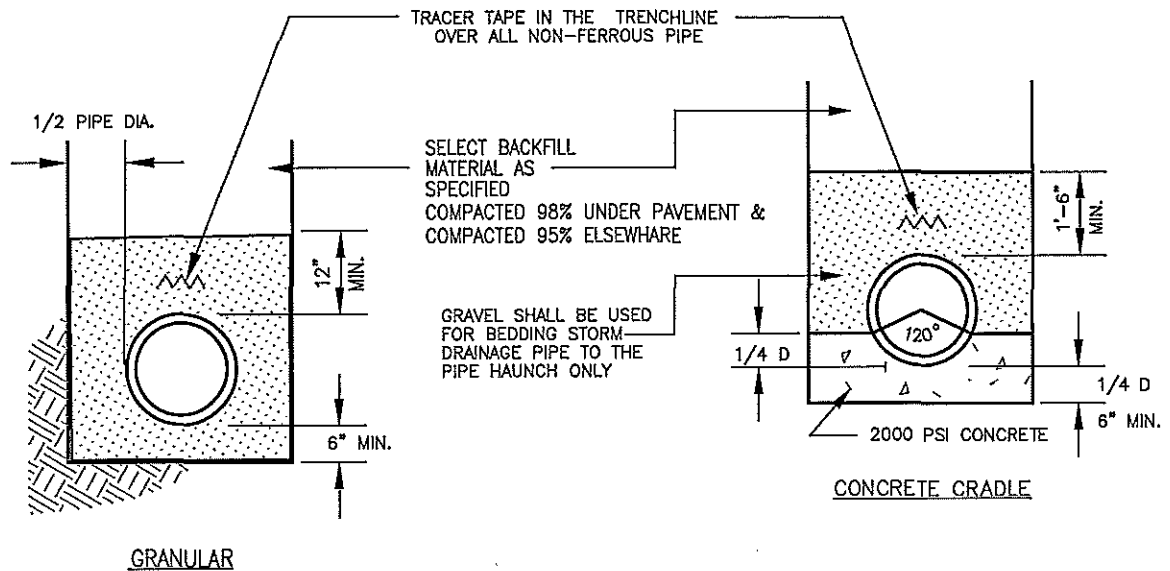
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CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

TYPICAL TRENCH
WITH PAVED SURFACE

STANDARD

UT 004



**** TYPICAL BEDDING SPECIFICATIONS:**

SIEVE SIZE	3/8" F % RETAINED	1/2" D % RETAINED	WASHED GRAVEL % RETAINED
1/2"	0	0	0
3/8"	0-2	5-25	-
4m	40-85	80-100	-
10m	95-100	96-100	-
3/4"	-	-	100



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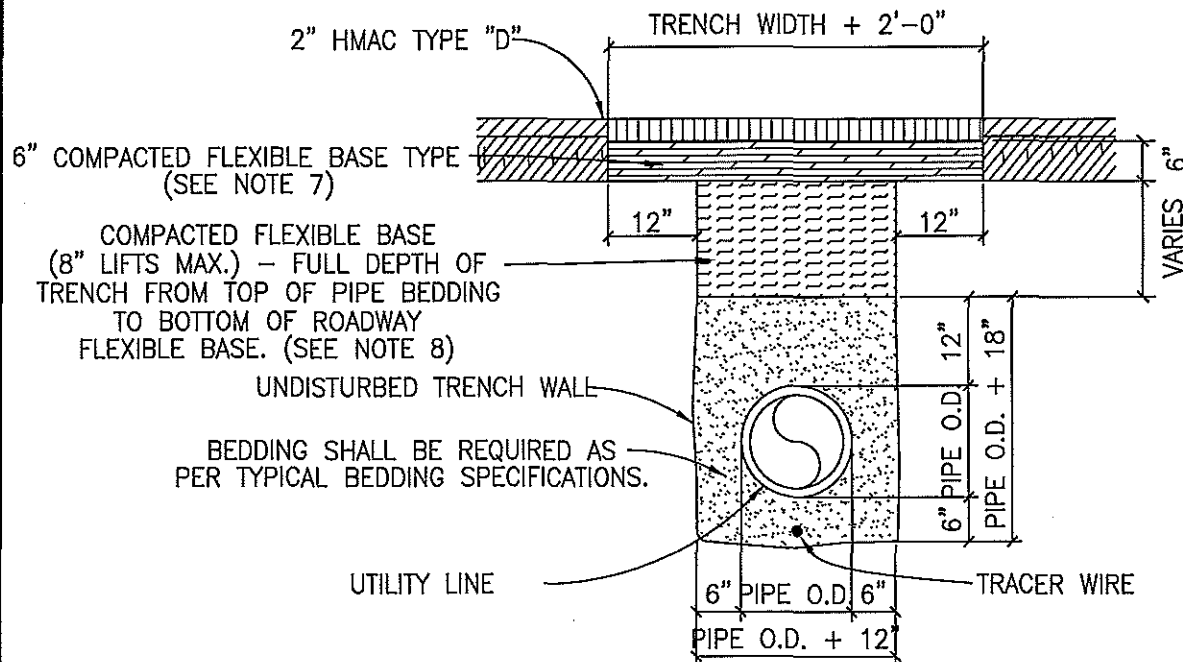
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CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

STANDARD

UT 005

STANDARD
EMBEDMENT AND ENCASEMENT



NOTES:

1. REPLACED BASE MATERIAL OVER DITCH SHALL BE TWICE THE THICKNESS OF THE ORIGINAL BASE.
2. BASE MATERIAL SHALL BE PLACED IN TWO OR THREE LAYERS AND EACH LAYER THOROUGHLY ROLLED OR TAMPED TO SPECIFIED MAXIMUM DENSITY.
3. ASPHALT CONCRETE PAVEMENT JOINTS SHALL BE MECHANICALLY SAWED.
4. SURFACE MATERIAL WILL BE CONSISTENT WITH THE EXISTING SURFACE.
5. A MINIMUM OF ONE DENSITY TEST SHALL BE TAKEN EVERY FIVE HUNDRED (500) FEET FOR EACH SIX (6) INCH LIFT OF SUBGRADE AND EACH OPEN CUT CROSSING. PROCTORS FOR MATERIALS USED IN BACKFILLING SHALL BE OBTAINED BY A CERTIFIED LABORATORY. DENSITY TESTS SHALL BE CONDUCTED BY A CERTIFIED LABORATORY OR THE PERMITTEE'S CONSULTANTS. THE PERCENTAGE OF MAXIMUM DENSITY REQUIRED SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF "THE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" AT THE TIME THE PERMIT WAS ISSUED. ALL DENSITY TESTS SHALL BE COMPLETED AND ACCEPTED ON EACH LAYER PRIOR TO ADDITIONAL BACKFILLING. A COPY OF ALL COMPLETED AND ACCEPTED DENSITY TESTS SHALL BE FURNISHED TO CITY.
6. THESE SPECIFICATIONS MAY BE SUPERSEDED BY THE GOVERNING AGENCY.
7. FLEXIBLE BASE: (ROADWAY BASE)
TxDOT TYPE A - GRADE 2 OR BETTER CRUSHED LIMESTONE BASE COMPACTED TO 100% OF TxDOT 113E AT OPTIMUM MOISTURE. PROCTOR TO BE PROVIDED BY THE CONTRACTOR TO THE CITY INSPECTOR.
8. FLEXIBLE BASE: (TRENCH BACKFILL)
TxDOT TYPE A - GRADE 2 OR BETTER CRUSHED LIMESTONE BASE COMPACTED TO 98% OF TxDOT 113E AT OPTIMUM MOISTURE. PROCTOR TO BE PROVIDED BY THE CONTRACTOR TO THE CITY INSPECTOR.
9. CONTRACTOR OR ENGINEER MAY REQUEST FOR USE OF ALTERNATE BACKFILL MATERIAL. ALTERNATE MATERIALS AND TESTING PROTOCOL MUST BE SUBMITTED TO AND APPROVED BY THE CITY ENGINEER PRIOR TO USE.



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CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

TRENCH DETAIL WITH PAVEMENT
REPLACEMENT UNDER
EXISTING ROADWAY

STANDARD

UT 006



	3/8" F	1/2" D	WASHED GRAVEL
SIEVE SIZE	% RETAINED	% RETAINED	% RETAINED
1/2"	0	0	0
3/8"	0-2	5-25	-
4m	40-85	80-100	-
10m	95-100	96-100	-
3/4"	-	-	100

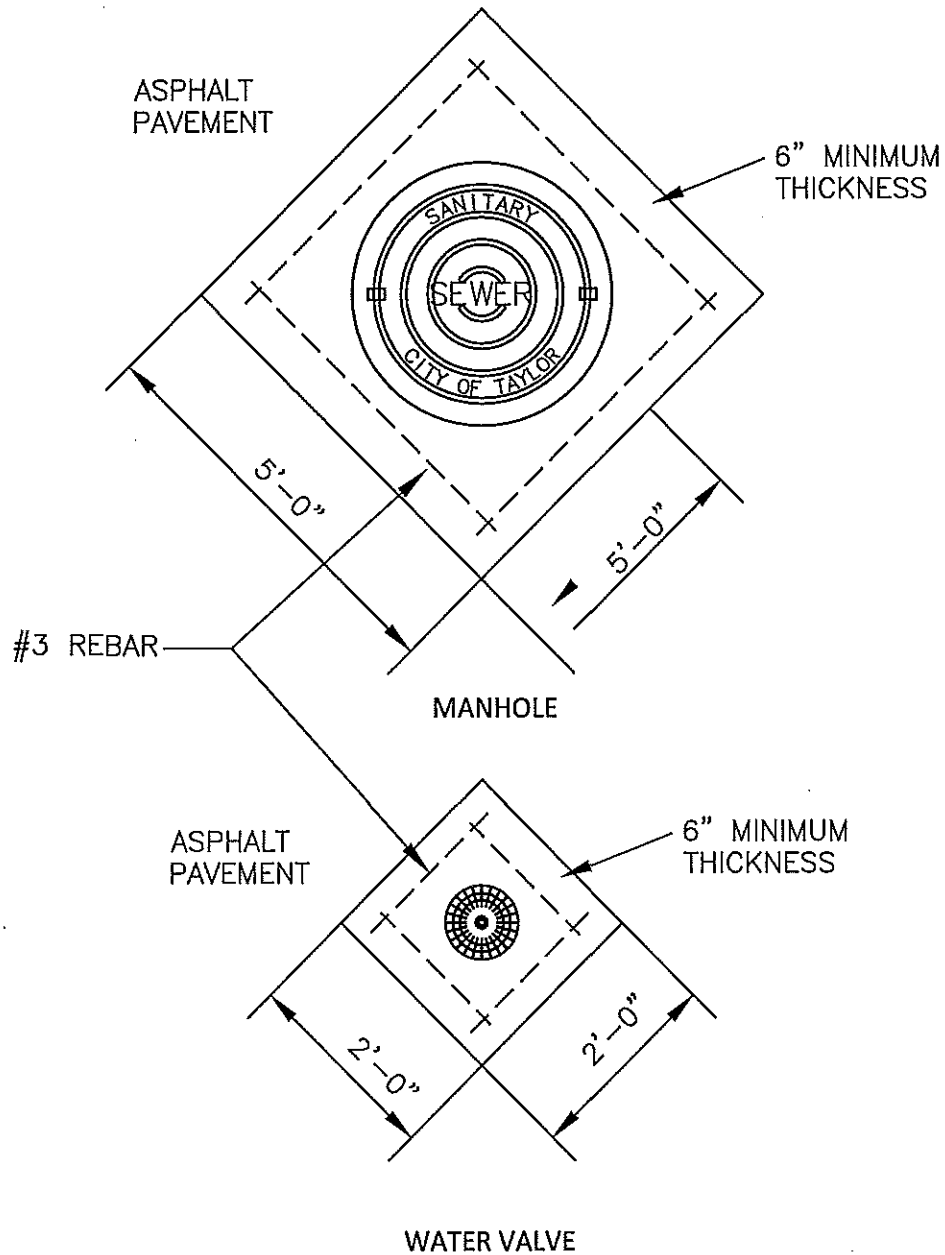


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CONCRETE TRENCH CAP DETAIL

UT 007



NOTES:

1. ALL ASPHALT PAVEMENT SHALL BE REMOVED ALONG NEAT SAW CUT LINES.
2. MANHOLE BOXOUT REQUIRED FOR ALL MANHOLES (STORM AND SANITARY) AND CLEANOUTS LOCATED IN THE STREET.
3. 1/2" RADIUS EDGE ON CONCRETE
4. #3 REBAR - 3000 PSI



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CITY OF TAYLOR
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STANDARD DETAILS

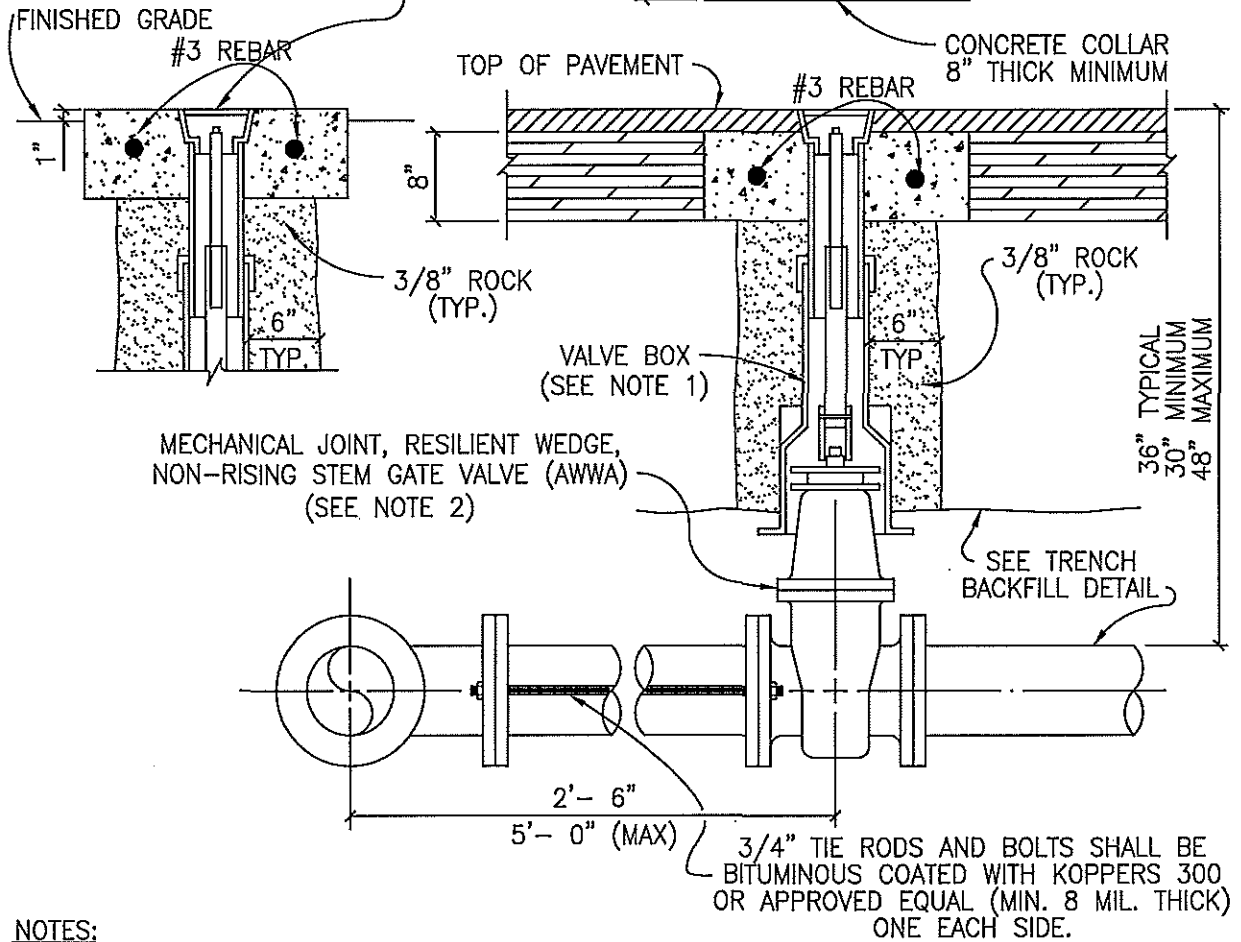
MANHOLE AND WATER VALVE BOXOUT

STANDARD

UT 008

INSTALLATION IN UNPAVED AREAS

"WATER" TO BE CAST IN COVER WHEN
USED ON WATER MAIN OR "SEWER"
WHEN USED ON FORCE MAIN



NOTES:

1. VALVE BOX SHALL BE AMERICAN FLOW CONTROL TRENCH ADAPTER OR APPROVED EQUAL HAVING AN ADJUSTABLE RANGE OF + OR - 6 INCHES FROM INSTALLED FINISH GRADE.
2. ACCEPTABLE GATE VALVES ARE:
 - A. AMERICAN FLOW CONTROL - SERIES 2500
 - B. MUELLER - 2360 SERIES
 - C. CLOW



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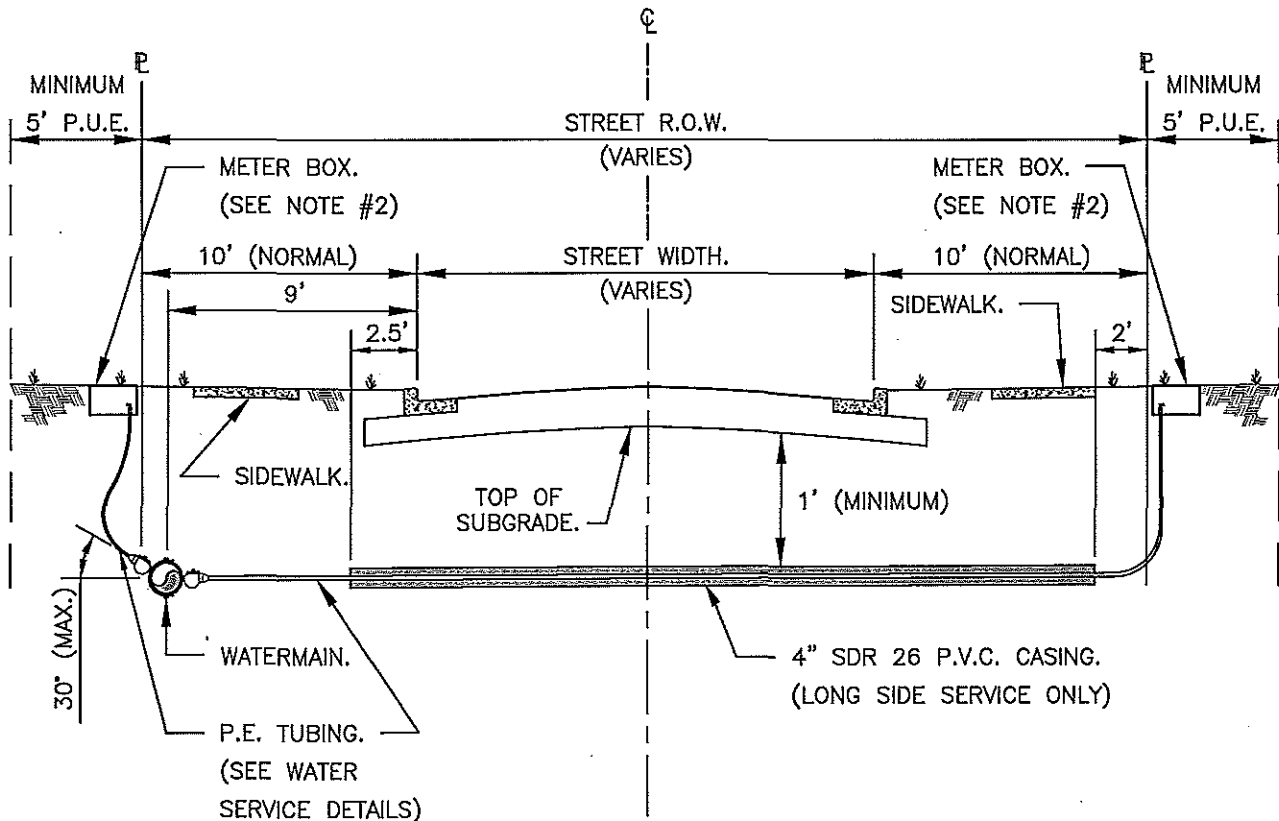
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CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

STANDARD

UT 009

TYPICAL VALVE SETTING



NOTE:

1. REFER TO "STANDARD INSTALLATION DETAIL FOR ONE OR TWO METERS" FOR SERVICE SPECIFICS.
2. METER BOXES SHALL BE SET AS CLOSE TO R.O.W. (\mathcal{R}) AS POSSIBLE, WITH NO PART OF BOX WITHIN R.O.W. METER BOXES SHALL BE LEVEL FROM SIDE TO SIDE AND NO MORE THAN 1/4"/FT. SLOPE FROM FRONT TO BACK (OR BACK TO FRONT). GRADING IN P.U.E. AROUND METER BOX SHALL BE 3:1 MAXIMUM AND SHALL BLEND TO OTHER UTILITY APPURTENANCES WITHOUT ABRUPT ELEVATION CHANGES.



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CITY OF TAYLOR
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STANDARD DETAILS

WATER SERVICE CASING DETAIL

STANDARD

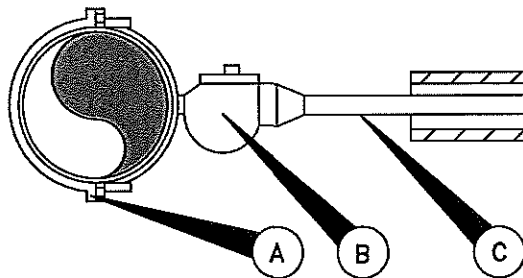
UT 010

MATERIAL LIST

- A. SERVICE CLAMP REQUIRED.
 - B. 1" CORPORATION STOP -- SERVICE PIPE OUTLET.
 - C. 1" SERVICE PIPE.
 - D. LOCKING ANGLE METER STOP; SERVICE PIPE INLET X SWIVEL COUPLING NUT OUTLET:
 -- FOR 5/8" AND 3/4" METERS: 1" x 3/4"
 -- FOR 1" METERS: 1" x 1"
 - E. PLASTIC RECTANGULAR METER BOX. (SEE NOTE #5)
 - F. PIPE CASING WHERE APPLICABLE. (SEE SEPARATE DETAIL)
- NOTE: G THRU J TO BE INSTALLED UNDER SEPARATE BUILDING PERMIT.
- G. WATER METER, CENTERED IN BOX. (SEE TABLE AT RIGHT)
 - H. WATER METER COUPLING; MALE I.P.T. X SWIVEL COUPLING NUT:
 -- FOR 5/8" AND 3/4" METERS: 3/4" x 8 1/2" LONG.
 -- FOR 1" METERS: 1" x 8 1/2" LONG.
 - I. BRONZE GATE VALVE: NON-RISING STEM (3/4" OR 1") FEMALE I.P.T. (PROPERTY OWNERS CUT-OFF OUTSIDE METER BOX IN SEPARATE VALVE CAN WITH LID AS PER CITY STANDARDS).
 - J. 3/4" OR 1" PIPE MEETING CITY PLUMBING CODE REQUIREMENTS.

NOTES:

1. SERVICE PIPE SHALL BE COPPER TUBE SIZE. IT MAY BE 150 PSI ANNEALED SEAMLESS TYPE "K" COPPER TUBING.
2. SERVICE SADDLES SHALL BE WRAPPED COMPLETELY WITH 8 MIL. POLYETHYLENE FILM.
3. TOP OF BOXES SHALL BE 1" ABOVE FINISHED GRADE.
4. PIPING AND TUBING SHALL BE INSTALLED IN ACCORDANCE WITH SECTION 510.3 OF THE STANDARD SPECIFICATIONS. SPECIAL ATTENTION IS CALLED TO "PIPE BEDDING ENVELOPE" AND "BACKFILLING", SECTIONS 510.3 (14) AND 510.3 (25), RESPECTIVELY.
5. METER BOX TO BE MODEL DFW-3612 BY DFW ROTEC, INC. OR APPROVED EQUAL. PROVIDE BLACK-PAINTED METAL LID WITH METER READER.
6. AXIS OF METER ASSEMBLY (METER STOP, METER, PIPING AND OWNERS CUTOFF) SHALL BE 10" BELOW TOP OF BOX.
7. SLOTS PROVIDED IN METER BOX TO ACCOMMODATE PIPING INTO AND OUT OF BOX SHALL NOT BE MODIFIED.



MAXIMUM SLOPE 1/4"/FT.
FRONT TO BACK OR BACK TO FRONT.

BOX TO BE LEVEL
SIDE TO SIDE.

METER SIZE	LENGTH
5/8"	7 3/4"
3/4"	9"
1"	11"



DRAWN BY:	DATE:
PM	01/29/2009
APPROVED BY:	DATE:
CS	-
REVISION NO.:	FILE NAME:
REVISED BY:	DATE:

CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

SINGLE 5/8", 3/4" OR 1"
WATER METER DETAIL

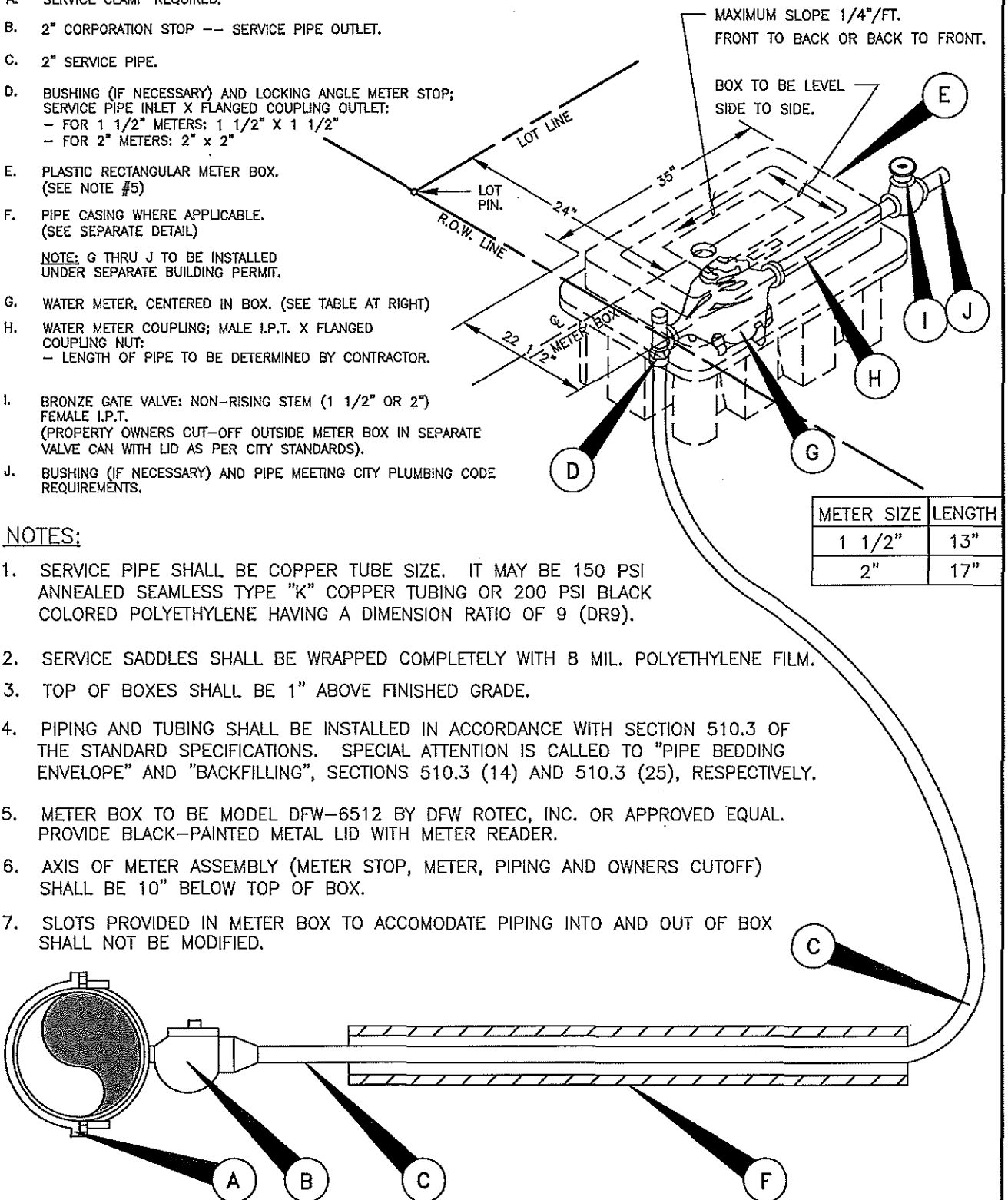
STANDARD
UT 011

MATERIAL LIST

- A. SERVICE CLAMP REQUIRED.
- B. 2" CORPORATION STOP -- SERVICE PIPE OUTLET.
- C. 2" SERVICE PIPE.
- D. BUSHING (IF NECESSARY) AND LOCKING ANGLE METER STOP;
SERVICE PIPE INLET X FLANGED COUPLING OUTLET:
- FOR 1 1/2" METERS: 1 1/2" X 1 1/2"
- FOR 2" METERS: 2" X 2"
- E. PLASTIC RECTANGULAR METER BOX.
(SEE NOTE #5)
- F. PIPE CASING WHERE APPLICABLE.
(SEE SEPARATE DETAIL)
- NOTE: G THRU J TO BE INSTALLED
UNDER SEPARATE BUILDING PERMIT.
- G. WATER METER, CENTERED IN BOX. (SEE TABLE AT RIGHT)
- H. WATER METER COUPLING; MALE I.P.T. X FLANGED
COUPLING NUT:
- LENGTH OF PIPE TO BE DETERMINED BY CONTRACTOR.
- I. BRONZE GATE VALVE: NON-RISING STEM (1 1/2" OR 2")
FEMALE I.P.T.
(PROPERTY OWNERS CUT-OFF OUTSIDE METER BOX IN SEPARATE
VALVE CAN WITH LID AS PER CITY STANDARDS).
- J. BUSHING (IF NECESSARY) AND PIPE MEETING CITY PLUMBING CODE
REQUIREMENTS.

NOTES:

1. SERVICE PIPE SHALL BE COPPER TUBE SIZE. IT MAY BE 150 PSI ANNEALED SEAMLESS TYPE "K" COPPER TUBING OR 200 PSI BLACK COLORED POLYETHYLENE HAVING A DIMENSION RATIO OF 9 (DR9).
2. SERVICE SADDLES SHALL BE WRAPPED COMPLETELY WITH 8 MIL. POLYETHYLENE FILM.
3. TOP OF BOXES SHALL BE 1" ABOVE FINISHED GRADE.
4. PIPING AND TUBING SHALL BE INSTALLED IN ACCORDANCE WITH SECTION 510.3 OF THE STANDARD SPECIFICATIONS. SPECIAL ATTENTION IS CALLED TO "PIPE BEDDING ENVELOPE" AND "BACKFILLING", SECTIONS 510.3 (14) AND 510.3 (25), RESPECTIVELY.
5. METER BOX TO BE MODEL DFW-6512 BY DFW ROTEC, INC. OR APPROVED EQUAL. PROVIDE BLACK-PAINTED METAL LID WITH METER READER.
6. AXIS OF METER ASSEMBLY (METER STOP, METER, PIPING AND OWNERS CUTOFF) SHALL BE 10" BELOW TOP OF BOX.
7. SLOTS PROVIDED IN METER BOX TO ACCOMMODATE PIPING INTO AND OUT OF BOX SHALL NOT BE MODIFIED.



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CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

SINGLE 1 1/2" OR 2"
WATER METER DETAIL

STANDARD

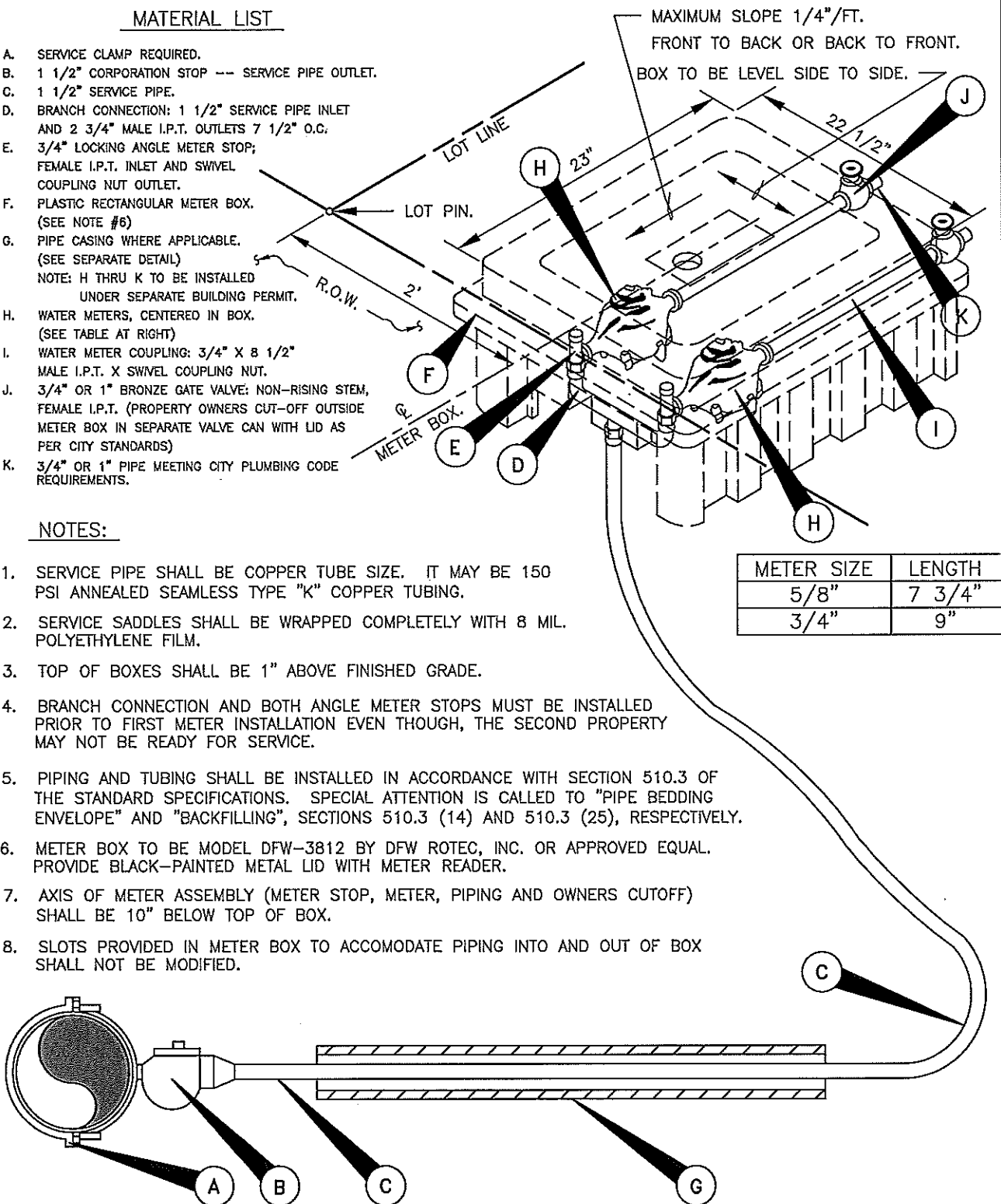
UT 012


MATERIAL LIST

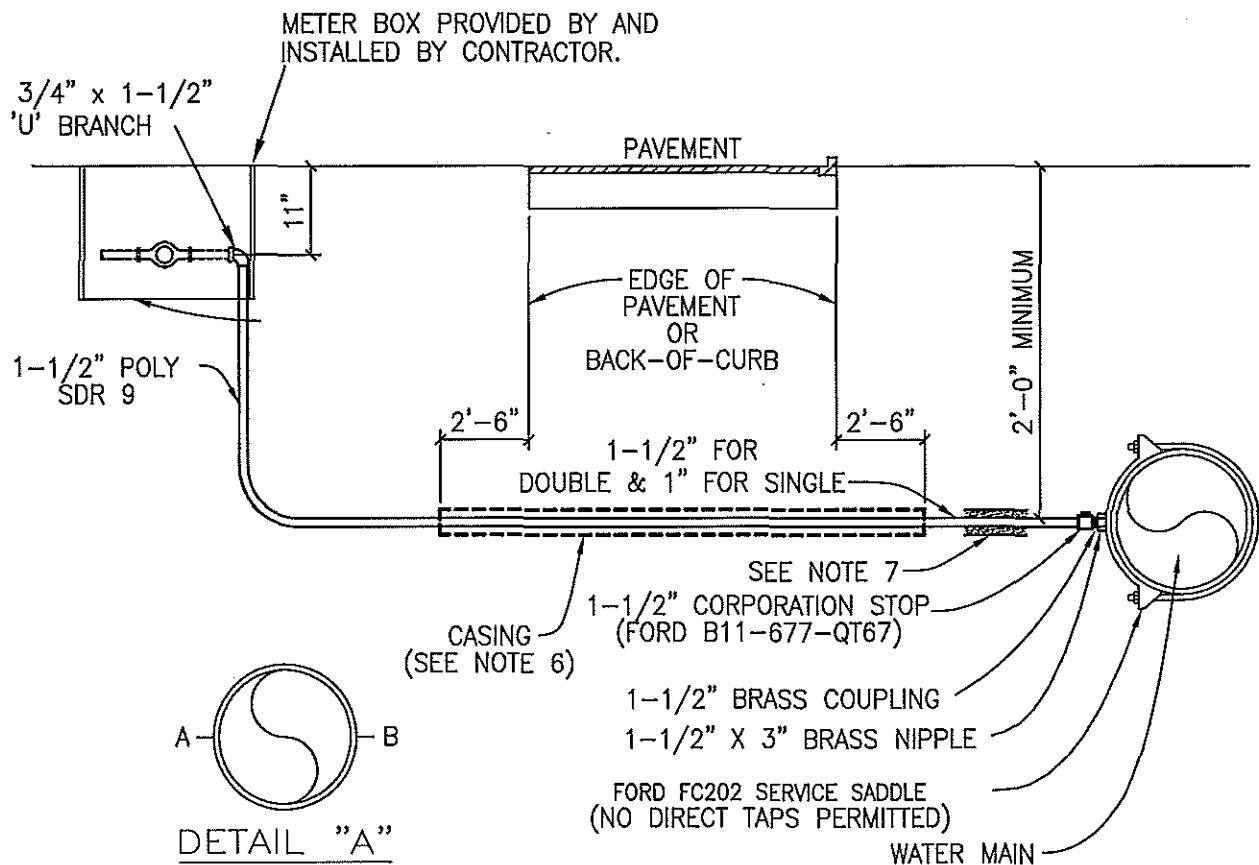
- A. SERVICE CLAMP REQUIRED.
- B. 1 1/2" CORPORATION STOP --- SERVICE PIPE OUTLET.
- C. 1 1/2" SERVICE PIPE.
- D. BRANCH CONNECTION: 1 1/2" SERVICE PIPE INLET AND 2 3/4" MALE I.P.T. OUTLETS 7 1/2" O.C.
- E. 3/4" LOCKING ANGLE METER STOP; FEMALE I.P.T. INLET AND SWIVEL COUPLING NUT OUTLET.
- F. PLASTIC RECTANGULAR METER BOX. (SEE NOTE #6)
- G. PIPE CASING WHERE APPLICABLE. (SEE SEPARATE DETAIL)
NOTE: H THRU K TO BE INSTALLED UNDER SEPARATE BUILDING PERMIT.
- H. WATER METERS, CENTERED IN BOX. (SEE TABLE AT RIGHT)
- I. WATER METER COUPLING: 3/4" X 8 1/2" MALE I.P.T. X SWIVEL COUPLING NUT.
- J. 3/4" OR 1" BRONZE GATE VALVE: NON-RISING STEM, FEMALE I.P.T. (PROPERTY OWNERS CUT-OFF OUTSIDE METER BOX IN SEPARATE VALVE CAN WITH LID AS PER CITY STANDARDS)
- K. 3/4" OR 1" PIPE MEETING CITY PLUMBING CODE REQUIREMENTS.

NOTES:

1. SERVICE PIPE SHALL BE COPPER TUBE SIZE. IT MAY BE 150 PSI ANNEALED SEAMLESS TYPE "K" COPPER TUBING.
2. SERVICE SADDLES SHALL BE WRAPPED COMPLETELY WITH 8 MIL. POLYETHYLENE FILM.
3. TOP OF BOXES SHALL BE 1" ABOVE FINISHED GRADE.
4. BRANCH CONNECTION AND BOTH ANGLE METER STOPS MUST BE INSTALLED PRIOR TO FIRST METER INSTALLATION EVEN THOUGH, THE SECOND PROPERTY MAY NOT BE READY FOR SERVICE.
5. PIPING AND TUBING SHALL BE INSTALLED IN ACCORDANCE WITH SECTION 510.3 OF THE STANDARD SPECIFICATIONS. SPECIAL ATTENTION IS CALLED TO "PIPE BEDDING ENVELOPE" AND "BACKFILLING", SECTIONS 510.3 (14) AND 510.3 (25), RESPECTIVELY.
6. METER BOX TO BE MODEL DFW-3812 BY DFW ROTECH, INC. OR APPROVED EQUAL. PROVIDE BLACK-PAINTED METAL LID WITH METER READER.
7. AXIS OF METER ASSEMBLY (METER STOP, METER, PIPING AND OWNERS CUTOFF) SHALL BE 10" BELOW TOP OF BOX.
8. SLOTS PROVIDED IN METER BOX TO ACCOMMODATE PIPING INTO AND OUT OF BOX SHALL NOT BE MODIFIED.



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	CS	JULY 2009	DOUBLE 5/8" OR 3/4" WATER METERS DETAIL	UT 013



NOTES:

1. SUCCESSIVE TAPS INTO THE WATER MAIN SHALL BE SPACED A MINIMUM OF 18" OFFSET AND AT THE CENTERLINE AS SHOWN ON DETAIL "A".
2. WHERE NO SIDEWALK EXISTS, METER BOXES SHALL BE SET TO CONFORM TO FINISHED GRADE.
3. AUTHORIZED SERVICE LINE MATERIAL: TYPE 'K' COPPER OR POLY SDR 9.
4. SERVICE LINES SHALL BE CONTINUOUS FROM CORPORATION STOP TO CORPORATION STOP WITH NO FITTINGS IN BETWEEN.
5. SERVICE CASING SHALL NOT BE INSTALLED BY WATER JETTING UNDER ROADWAY.
6. CASING REQUIRED FOR ALL PAVEMENT CROSSINGS. 4" SDR-26 REQUIRED FOR OPEN-CUT. STEEL CASING PIPE REQUIRED FOR JACK AND BORE. LIMITS OF CASING SHOULD EXTEND SIX FEET BEYOND THE EDGE OF PAVEMENT OR BACK-OF-CURB WHERE REASONABLE WITH 2.5' MINIMUM.
7. THERE SHALL BE A 6" ENVELOPE OF 3/8" ROCK AROUND ALL SERVICE PIPE.
8. ANY VARIATIONS ON FITTINGS MUST BE APPROVED BY THE CITY ENGINEER.
9. SINGLE METER BOX AND LID - HUGHES SUPPLY PART NO. D12-BAMR, OR APPROVED EQUAL.
DOUBLE METER BOX - HUGHES SUPPLY PART NO. D1500-DUB/O, LID - D15-BAMRL, OR APP. EQUAL.



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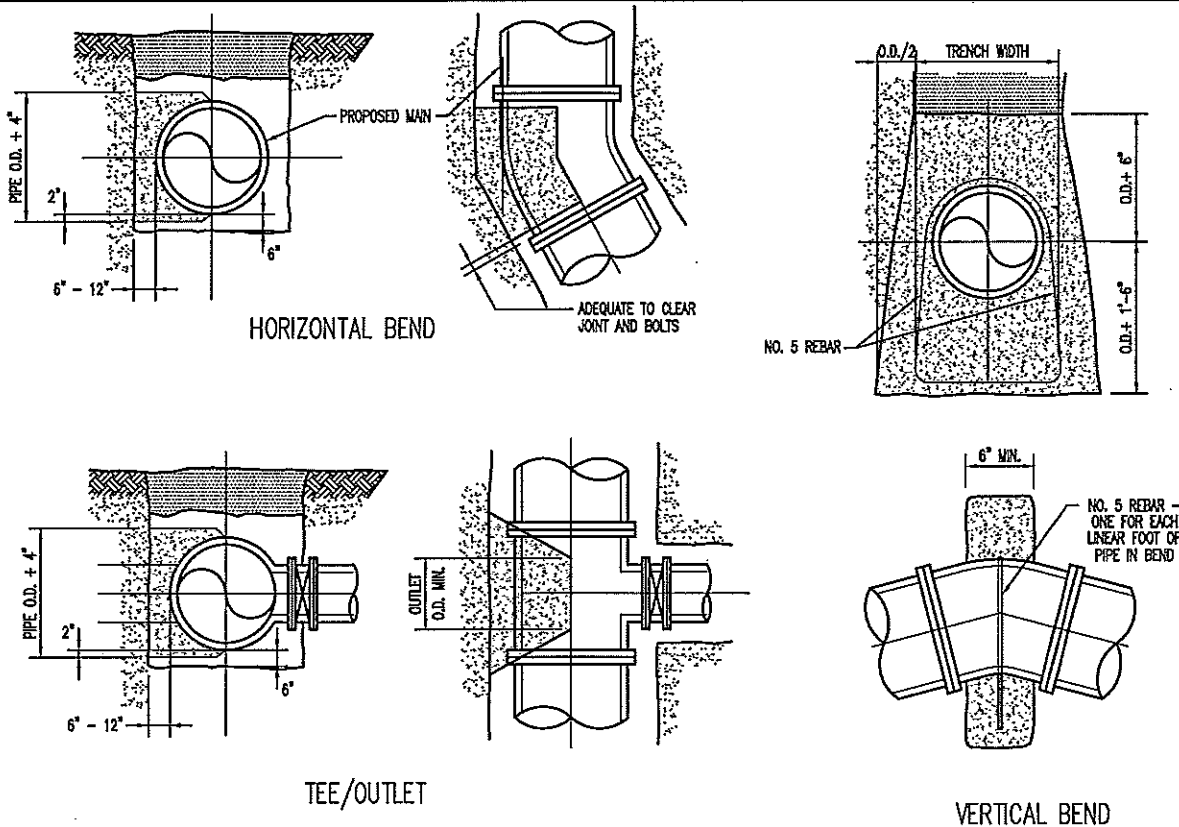
DATE:
JULY 2009

CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

STANDARD

UT 014

TYPICAL WATER SERVICE - ELEVATION



THRUST BLOCK DESIGN AS FOLLOWS:

A. PRESSURE OF 150 P.S.I. (ACTUAL IF HIGHER)
+ 50% SURGE ALLOWANCE

B. MAXIMUM SOIL BEARING:

SOIL TYPE	PRESSURE
LIMESTONE	4000 LBS./SQ. FT.
UNDISTURBED SOIL, CAUCHE	2000 LBS./SQ. FT.
LOOSE OR SPONGY SOIL	1500 LBS./SQ. FT.

CONCRETE THRUST BLOCKING SCHEDULE **

		AREA REQUIRED (SQUARE FEET) BEARING AGAINST TRENCH WALL FOR PRESSURE PIPE						
PIPE SIZE (INCHES)	THRUST (POUNDS)	TEES AND PLUGS	BENDS					
			90°	45°	22-1/2°	11-1/4°	5°	1°
4	2.513	1.00	1.00	0.50	0.50	N/A	N/A	N/A
6	5.655	1.41	2.00	1.08	1.00	0.50	N/A	N/A
8	10.053	2.51	3.55	1.92	1.00	0.50	0.50	N/A
12	22.619	5.65	8.00	4.33	2.21	1.11	0.50	N/A
16	40.212	10.05	14.22	7.69	3.92	1.97	1.00	N/A
24	90.478	22.62	31.99	17.31	8.83	4.43	1.97	0.50
30	141.372	35.34	49.98	27.05	13.79	6.93	3.08	1.00
36	203.575	50.89	71.97	38.95	19.86	9.98	4.44	1.00
42	277.088	69.27	97.97	53.02	27.03	13.58	6.04	1.21
48	361.911	90.48	127.95	69.29	35.30	17.74	7.89	1.58
54	458.044	114.51	161.94	87.64	44.68	22.45	9.99	2.00

** BASED ON A 4,000 P.S.F. SOIL BEARING CAPACITY AND A 200 P.S.I. MAX. LINE PRESSURE INCREASE AND DECREASE BEARING AREA IN ACCORDANCE WITH THE BEARING STRENGTH OF SOIL AS DESCRIBED IN SCHEDULE.



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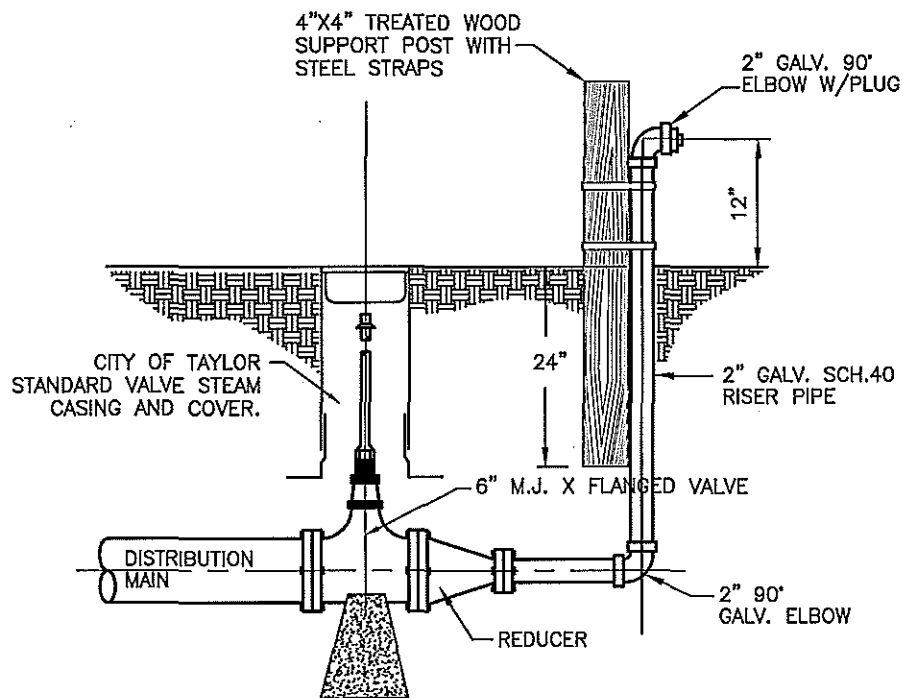
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CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

CONCRETE THRUST BLOCKING

STANDARD

UT 015



FLUSHING VALVE DETAIL

(FOR PERMANENT DEAD END LINES,
USE 2" BALL VALVE – FORD OR EQUAL)



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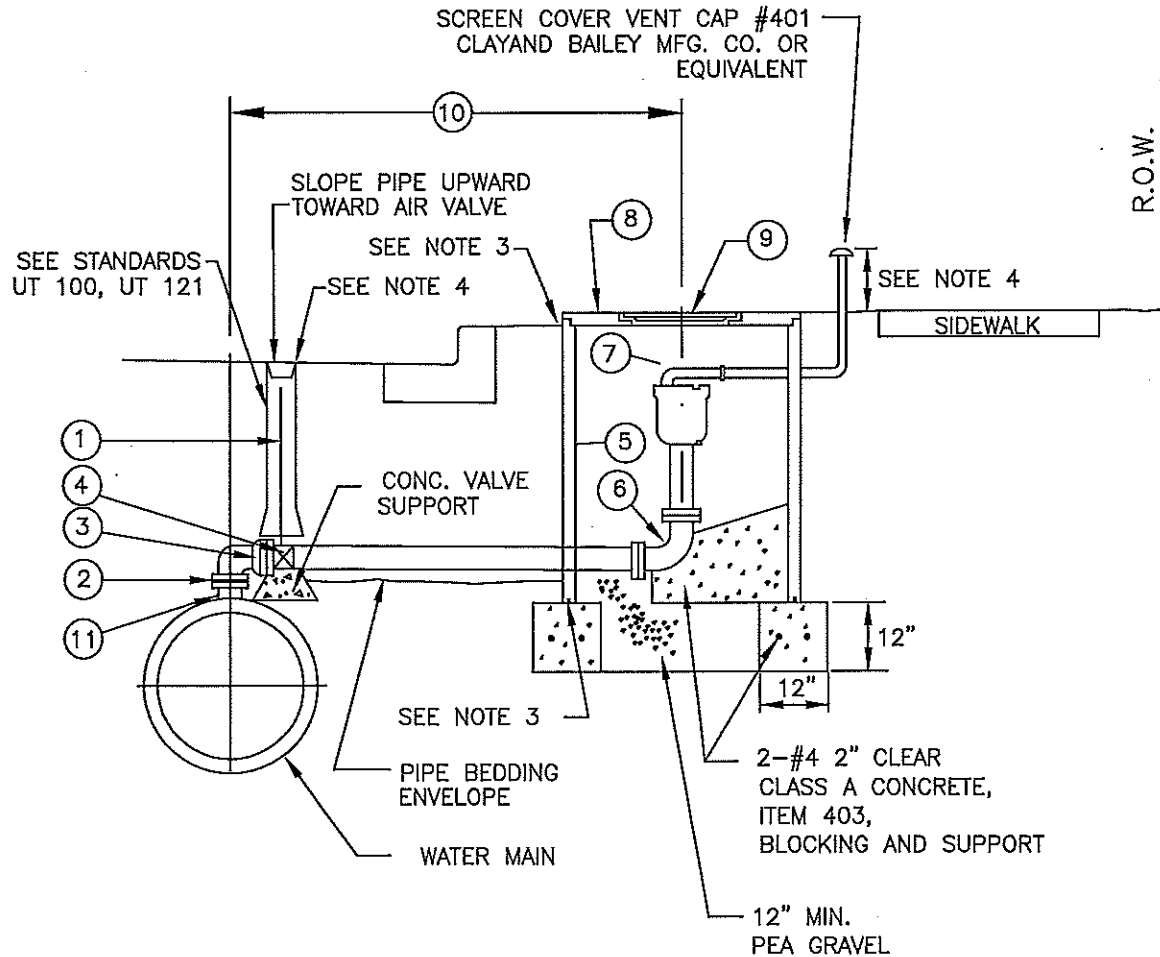
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CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

FLUSHING VALVE DETAIL

STANDARD

UT 016



- | | |
|--|--|
| ① STEM EXTENSION | ⑦ COMBINATION AIR RELEASE VALVE WITH GOOSNECK |
| ② INSULATED FLANGE CONNECTION | ⑧ REINFORCED PRECAST CONCRETE LID (AASHTO H-20 LOADING) |
| ③ 90° BEND (FLG X FLG) | ⑨ RING AND 32" COVER |
| ④ GATE VALVE FLG X MJ | ⑩ PER PLAN DIMENSION OR AS DETERMINED BY ENGINEER OR DESIGNATED REPRESENTATIVE |
| ⑤ CLASS III R.C.P. MANHOLE 60" MIN. I.D. | ⑪ FLANGED OUTLET PER ANSI B16.1 |
| ⑥ 90° BEND (FLG. X FLG.) | |



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CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

STANDARD

3" OR LARGER VENTED
AIR / VACUUM VALVE INSTALLATION

UT 017

1 of 2

NOTES:

1. ON 10" AND LARGER TWO PIECE COMBINATION AIR VALVES, THE OUTLET PIPING OF THE SMALL VALVE SHALL BE VENTED WITHIN THE MANHOLE INTO THE SIDE OF THE LARGER VENT PIPE THAT GOES ABOVE GROUND.
2. AIR VENT PIPE 6" AND LARGER SHALL BE D.I. (CLASS 350 MIN.) PIPE FLANGE FITTINGS ORDERED SPECIAL WITH SHOP APPLIED KOPPER INERTOL RUST INHIBITIVE PRIMER 621, OR EQUAL, IN LIEU OF COAL TAR. EXTERIOR SURFACES OF ALL EXPOSED PIPE SHALL BE PAINTED WITH RUST-OLEUM ACRYLIC 5225 (SAFETY BLUE), OR EQUAL, PER COATING MANUFACTURER'S INSTRUCTIONS PRIOR TO INSTALLATION.
3. SEALANT SHALL BE 1½" FLEXIBLE BUTYL RESIN SEALANT CS-102 AS MANUFACTURED BY CONCRETE SEALANTS, INC. OR EQUAL.
4. INSTALLATION OF VALVE CASING RING SHALL BE PER CITY OF TAYLOR STANDARD NO. UT 100 AND OR UT 121.
5. AIR VENT PIPE INSTALLATION SHALL BE AS NEAR AS PRACTICAL TO THE RIGHT-OF-WAY LINE.
6. CONCRETE MANHOLE PENETRATIONS SHALL BE CORE BIT DRILLED. VOID SHALL BE FILLED BY PRESSING SEAL GASKET COPR. PSX RESILIENT CONNECTOR MEETING ASTM C923 OR APPROVED EQUAL.
7. CROSS SECTIONAL AREA OF OPENING TO BE EQUAL TO OR GREATER THAN CROSS SECTIONAL AREA OF AIR VENT PIPE.
8. AIR/VACUUM VALVE SHALL BE INSTALLED IN A MANNER WHICH WILL ALLOW REMOVAL OF ASSEMBLY WITHOUT REMOVAL OF PRECAST CONCRETE LID.

AIR VALVE	GATE VALVE	VENT PIPE (MIN.)	M.H. DIA. (MIN.)
3"	3"	3"	5'
4"	4"	4"	6'
6"	6"	6"	6'
8"	8"	8"	6'
10"	10"	10"	7'
12"	12"	12"	7'



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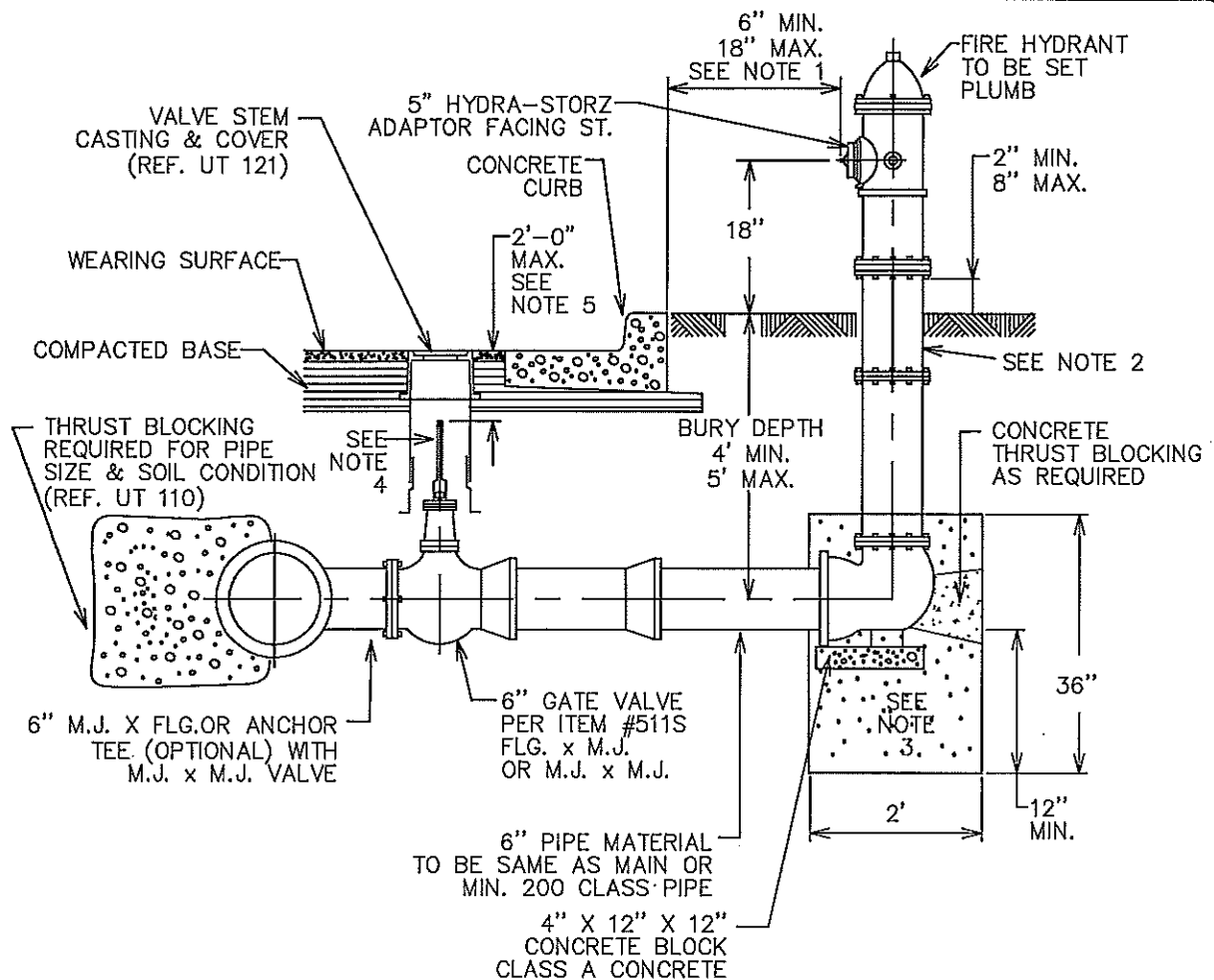
CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

3" OR LARGER VENTED
AIR / VACUUM VALVE INSTALLATION

STANDARD

UT 017

2 of 2



NOTES:

1. DIMENSIONS ARE APPLICABLE IN SPACE BETWEEN CURB AND SIDEWALK. WHERE WALK ABUTS CURB, AND IN PUBLIC OR COMMERCIAL AREAS, DIMENSION FROM BACK OF CURB SHALL BE 3' TO 6'. HYDRANTS ARE NOT TO BE PLACED IN SIDEWALK OR RAMP AREAS. SEE CITY OF TAYLOR STANDARD SPECIFICATIONS FOR LOCATION OF HYDRANT.
2. FOR BURY DEPTHS GREATER THAN 5', ONE BARREL EXTENSION NOT EXCEEDING 2' LENGTH SHALL BE INSTALLED DIRECTLY BELOW THE FIRE HYDRANT.
3. CRUSHED STONE OR GRAVEL SHALL BE PLACED AROUND THE BOTTOM OF THE HYDRANT FOR A RADIUS OF AT LEAST 12" AND EXTEND AT LEAST 12" ABOVE THE OUTLET. DO NOT BLOCK DRAIN HOLES.
4. WELD SOCKET 2½" X 2" DEEP TO 1" SCH. 40 ROUND STEM EXTENSION, FITTED ON OPERATING NUT, SCH. 80 FOR LENGTHS OVER 10'.
5. VALVE EXTENSIONS ARE REQUIRED ON ALL VALVES THAT EXCEED 3' DEEP FROM FINISHED GRADE. VALVE EXTENSIONS SHALL BE PLACED SUCH THAT THE EXTENSION NUT IS BETWEEN 18" & 24" FROM FINISHED GRADE.
6. HYDRANTS ARE TO BE PAINTED BY MANUFACTURER WITH "KEM-LUSTER" VERMILLION RED.
7. HYDRANTS ARE TO BE MUELLER "CENTURION" OR EQUIVALENT, CAPS AND CHAINS ARE NOT TO BE SUPPLIED WITH HYDRANTS.



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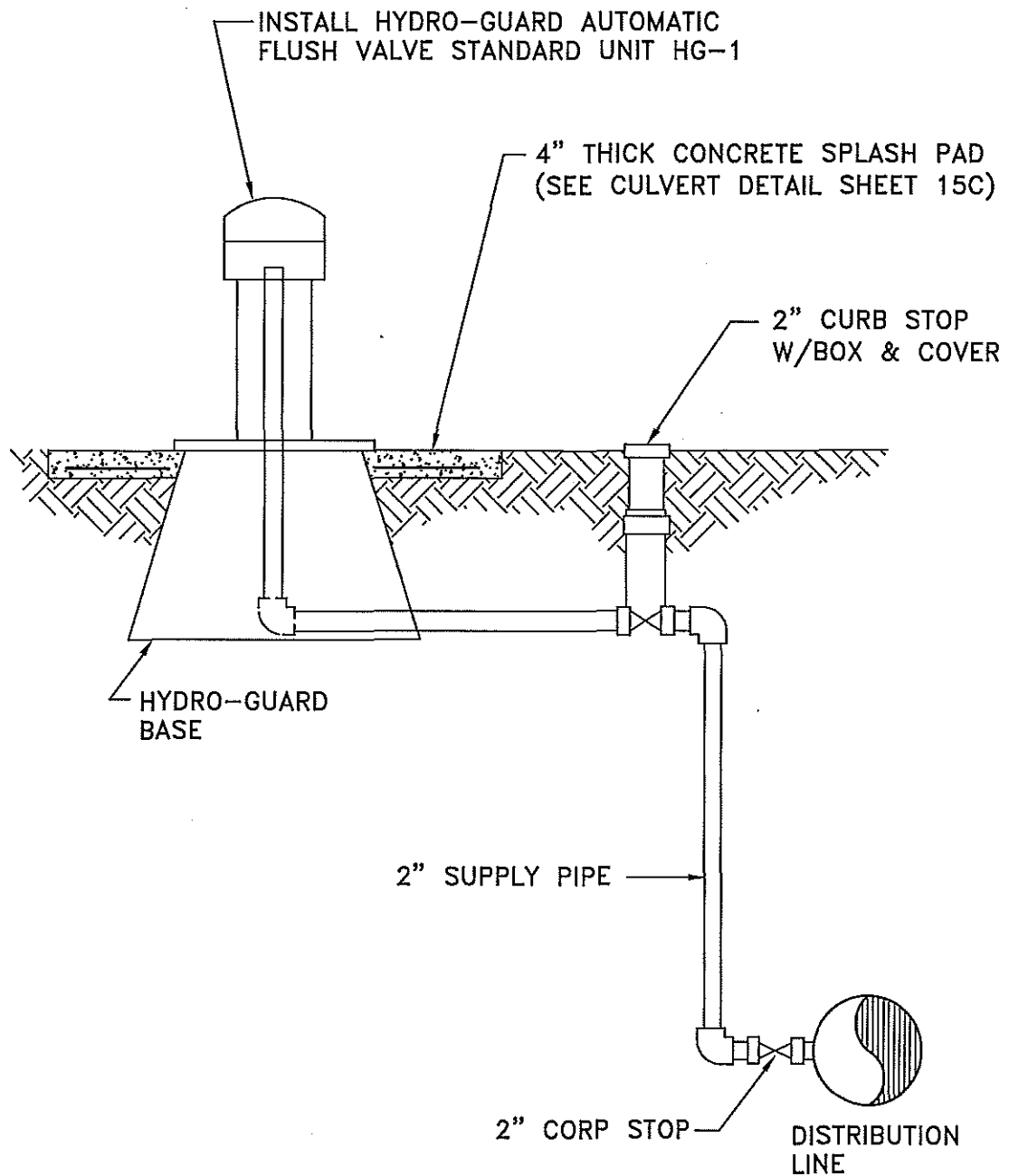
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CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

STANDARD FIRE HYDRANT

STANDARD

UT 018



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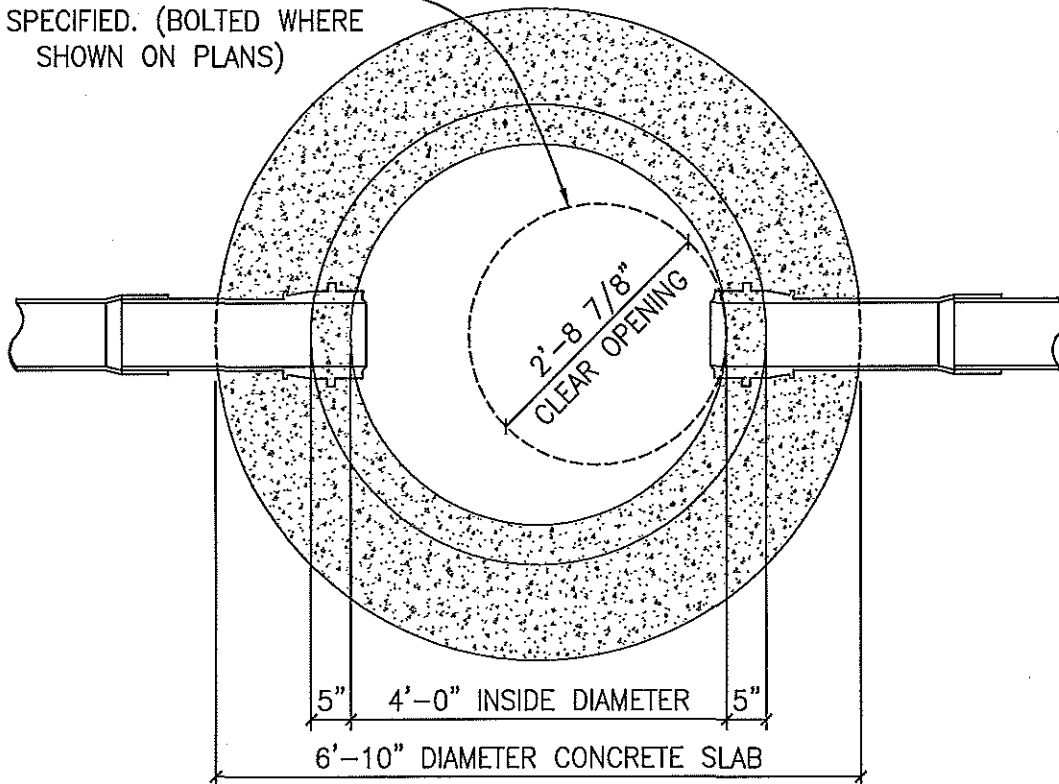
CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

AUTOMATIC FLUSHING VALVE

STANDARD

UT 019

STANDARD CASTING AND COVER,
AS SPECIFIED. (BOLTED WHERE
SHOWN ON PLANS)



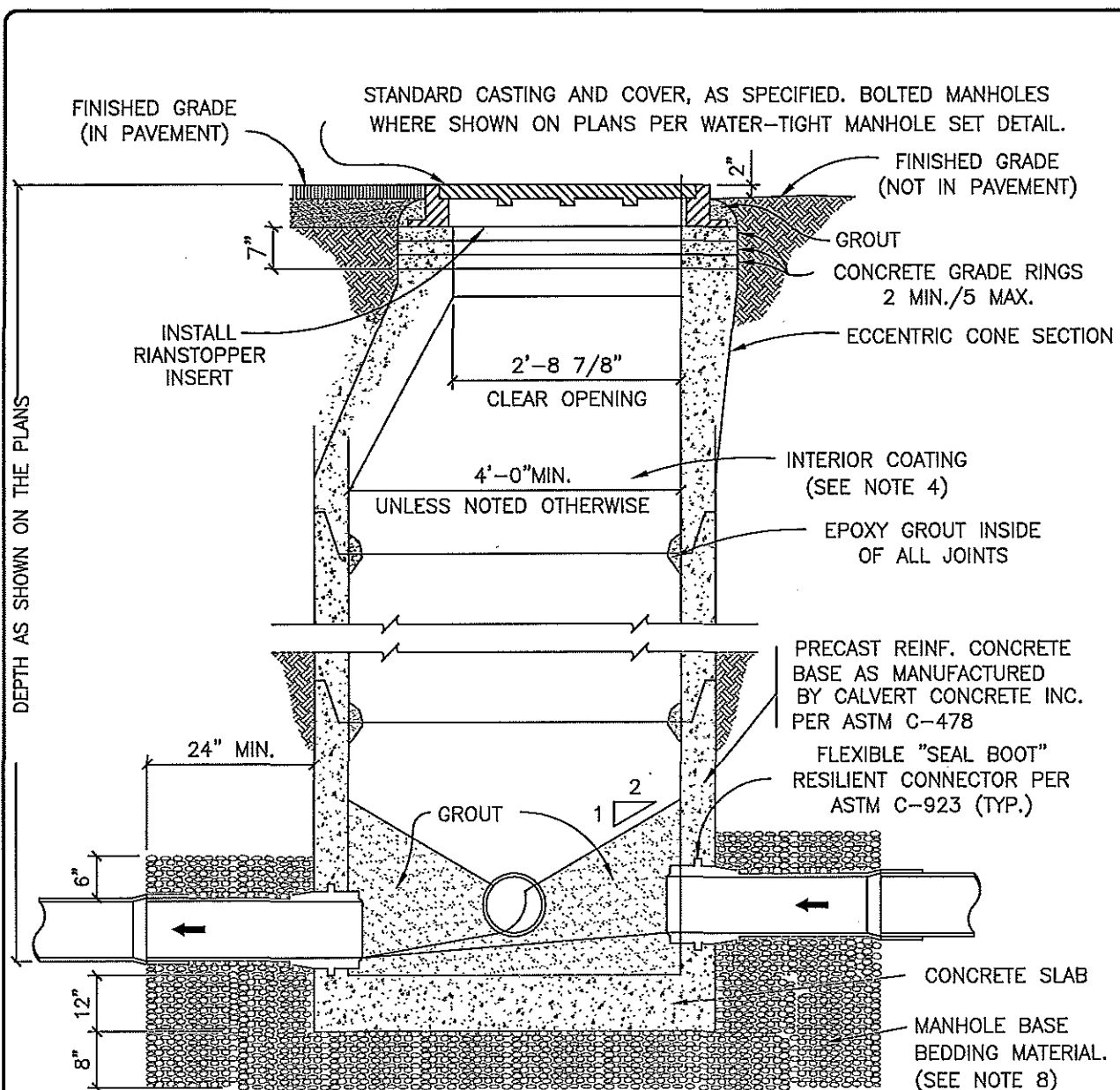
MANHOLE PLAN

CITY OF TAYLOR NOTES:

MANHOLE DETAILS SHALL REFLECT THE CITY'S MINIMUM SPECIFICATIONS, AS STATED BELOW:

- A. ALL MANHOLES SHALL BE 48" I.D., R.C.P., CLASS III, WITH RUBBER O-RING GASKET JOINTS CONFORMING TO ASTM C478, C433 AND C76.
- B. ALL MANHOLES SHALL HAVE WATER-TIGHT FRAME AND COVER, WITH A MINIMUM 36" CLEAR OPENING, AS MANUFACTURED BY EAST JORDAN IRON WORKS (AS PER DETAIL # WW-07) OR APPROVED EQUAL.
- C. ALL MANHOLES SHALL BE CONCRETE WITH CAST IRON FRAME AND COVER.
- D. ALL MANHOLES SHALL HAVE AN ECCENTRIC CONE.
- E. MANHOLES MAY HAVE A FLAT LID, IF APPROVED BY CITY OF TAYLOR, BEING 12" THICK WITH A MINIMUM 30" OPENING, AS MANUFACTURED BY CALVERT CONCRETE OR APPROVED EQUAL M.F.G. CONFORMING TO ASTM C478, 5000 P.S.I. CONCRETE, TRAFFIC BEARING, AND O-RING JOINT CONFORMING TO ASTM C443.
- F. INVERTS AND FLEXIBLE SEAL BOOTS, PER ASTM C-923, SHALL BE CAST INTO BASE SECTION.
- G. MINIMUM DROP BETWEEN INVERTS SHALL BE ONE-TENTH OF A FOOT (0.1').
- H. TWO (2") INCH GRADE RINGS WITH AN I.D. TO MATCH FRAMES CLEAR OPENING, MINIMUM OF TWO (2), MAXIMUM OF FIVE (5) GRADE RINGS REQUIRED.

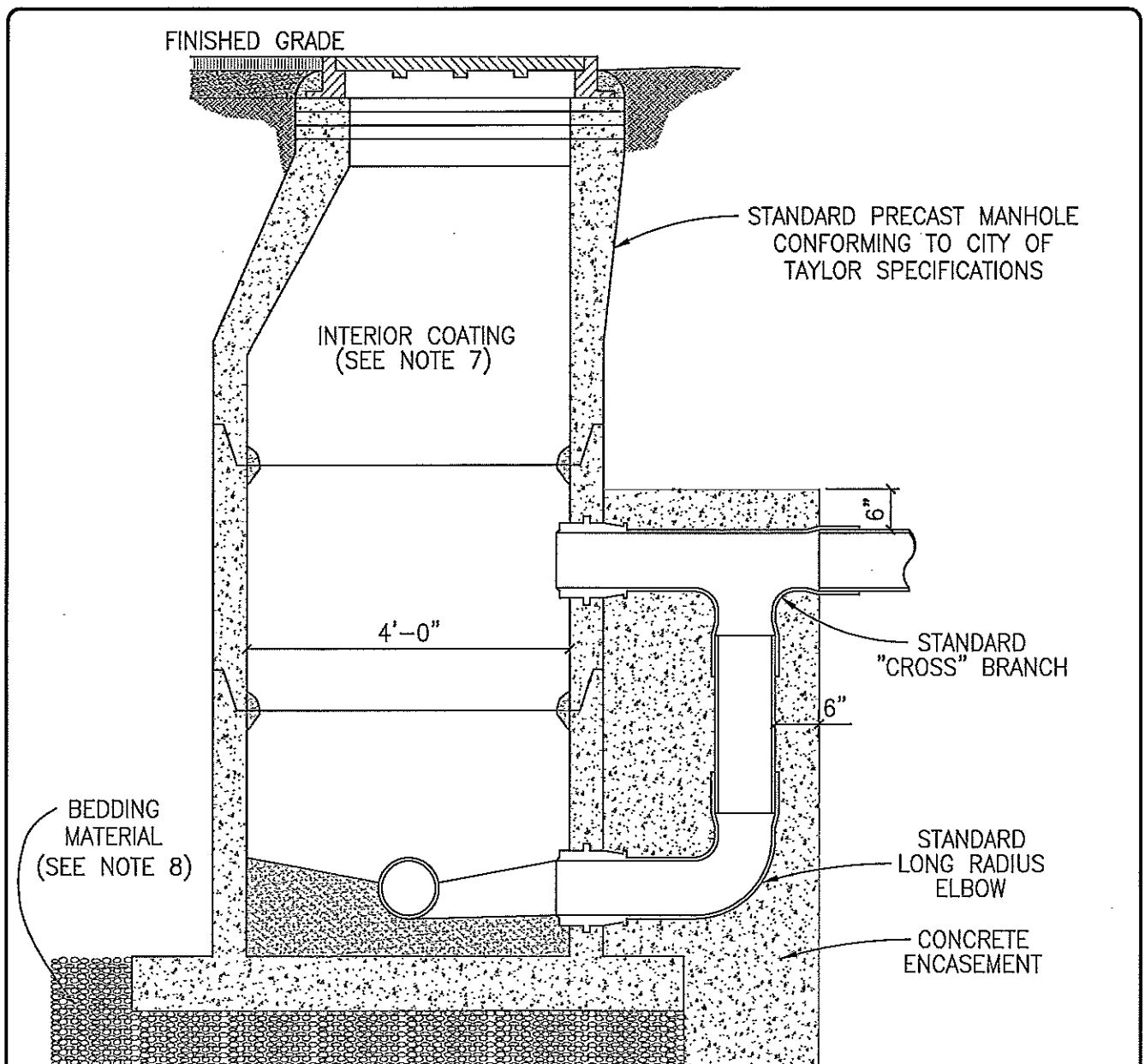
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	CS	JULY 2009		



NOTES:

1. MANHOLES SHALL BE PRECAST ASTM C-478 BELL AND SPIGOT WITH "O" RING JOINTS.
2. SEE PLANS AND MANHOLE SCHEDULE, FOR MANHOLE SIZE, LOCATION, CONFIGURATION, TYPE OF TOP SECTION, VENTING REQUIREMENTS, PIPE SIZE AND TYPES.
3. SEE SPECIFICATIONS ON MATERIALS AND CONSTRUCTION.
4. AN 80 MIL COAT OF RAVEN LINING SYSTEMS, RAVEN 405 ULTRA HIGH BUILD EPOXY COATING, OR APPROVED EQUAL, TO BE APPLIED TO ENTIRE INTERIOR OF EACH WASTEWATER MANHOLE AND UNDERSIDE OF FLAT TOPS.
5. ALL MANHOLE COVERS SHALL BE BOLTED AND GASKETTED WHEN MANHOLES ARE LOCATED OUT FROM PAVEMENT.
6. MANHOLES TO BE VENTED ARE IDENTIFIED ON MANHOLE SCHEDULE. REFERENCE MANHOLE VENT DETAIL.
7. MANHOLES ARE TO BE DESIGNED TO RESIST LATERAL AND VERTICAL SOIL FORCES RESULTING FROM MANHOLE DEPTH. ADDITIONALLY, MANHOLES LOCATED IN PAVEMENT TO BE DESIGNED FOR HS-20 TRAFFIC LOADS.
8. MANHOLE BASE BEDDING MATERIAL SPECS. FOR 3/4" WASHED GRAVEL: SIEVE SIZE 2", PERCENT (%) RETAINED 0-10 SIEVE SIZE 1 1/2", % RETAINED 0-10 SIEVE SIZE 1", % RETAINED 45-80 SIEVE SIZE 3/4", % RETAINED 85-100 SIEVE SIZE 3/8", % RETAINED 95-100

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NOTES:

1. CONCRETE ENCASEMENT FOR DROP CONNECTION TO BE POURED INTEGRALLY WITH BOTH MANHOLE SLAB AND WALL.
2. DROP CONNECTIONS SHALL BE REQUIRED WHENEVER AN INFLUENT SEWER IS LOCATED TWO FEET (2') OR MORE ABOVE THE MAIN INVERT CHANNEL.
3. A FLOW CHANNEL SHALL BE CONSTRUCTED INSIDE MANHOLE TO DIRECT INFLUENT INTO FLOW STREAM.
4. WHEN P.V.C. IS USED IN SANITARY SEWER LINES, SOLVENT TYPE JOINT P.V.C. FITTINGS MAY BE UTILIZED IN THE DROP ASSEMBLY ONLY.
5. MINIMUM PIPE SIZE FOR DROP IS EIGHT INCHES (8").
6. SEE STANDARD MANHOLE DETAIL FOR ADDITIONAL REQUIREMENTS.
7. AN 80 MIL COAT OF RAVEN LINING SYSTEMS, RAVEN 405 ULTRA HIGH BUILD EPOXY COATING, OR APPROVED EQUAL, TO BE APPLIED TO ENTIRE INTERIOR OF EACH WASTEWATER MANHOLE AND UNDERSIDE OF FLAT TOPS.
8. MANHOLE BASE BEDDING MATERIAL
 SPECS. FOR 3/4" WASHED GRAVEL:
 SIEVE SIZE 2", PERCENT (%) RETAINED 0
 SIEVE SIZE 1 1/2", % RETAINED 0-10
 SIEVE SIZE 1", % RETAINED 45-80
 SIEVE SIZE 3/4", % RETAINED 85-100
 SIEVE SIZE 3/8", % RETAINED 95-100

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12" TO 18" NORMAL
(2" MIN-24" MAX) OF
ADJUSTMENT PRECAST
REINFORCED CONCRETE
GRADE RINGS, CONFORMING
TO ASTM C-478, OR EQUAL,
CASTING AND MANHOLE LIDS.

MANHOLE FRAME AND 24" DIA.
COVER, EQUAL TO McKINEY IRON
WORKS No. A24AM WITH PICK SLOTS.
(MUST WITHSTAND DIRECT TRAFFIC
LOADS)

WHERE MH'S ARE BUILT IN STREET
TO BE PAVED, MH RIM TO BE SET
TO PROPOSED PAVING GRADE.

T/G

3'-0"

2'-8 7/8"

MIN. 1/2" CONCRETE MORTAR
INSIDE AND OUTSIDE OF MH.

8"

MANHOLE LOCATION TO
BE STENCILED ON FACE
OF CURB "M.H."

CONCRETE - SEE STANDARD
MANHOLE DETAIL

SLOPE 1" PER
FOOT TYPICAL

VARIES

CLASS "A" (3000 PSI-28 DAY)
CONCRETE. (WHERE MH IS IN
STREET, USE CLASS "C"
(3600 PSI-28DAY) CONCRETE.

*4 FT DIA FOR SEWER PIPE
UP TO 21" DIA., 5 FT DIA.
FOR SEWER PIPE FROM 24"
DIA. TO 39" DIA.

8"
6"

CRUSHED STONE CUSHION FOUNDATION
AS DEEMED NECESSARY BY THE CITY
ENGINEER.



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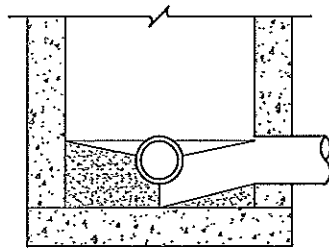
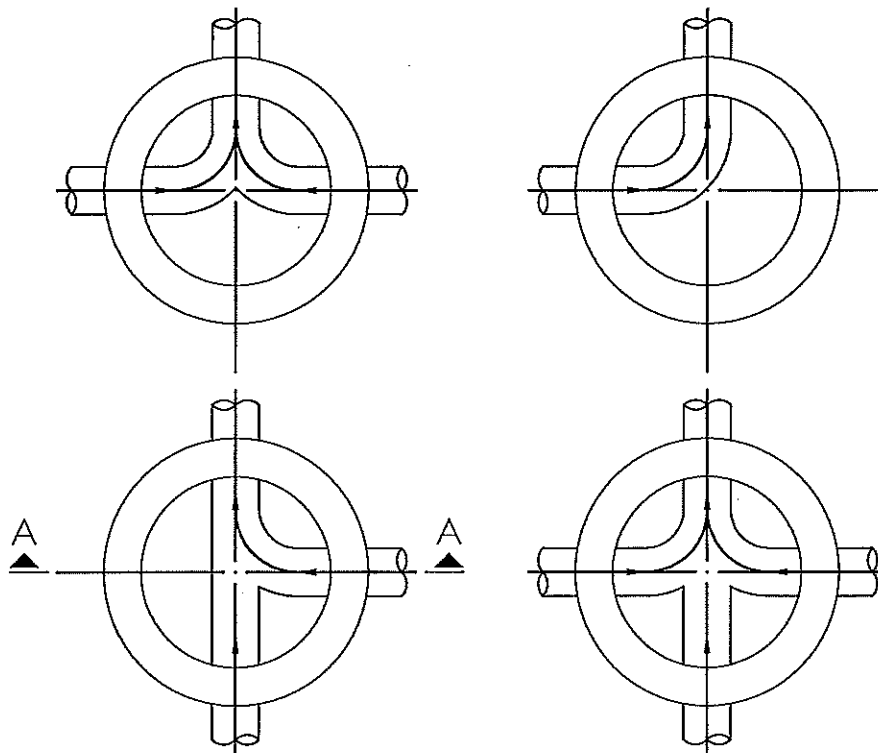
JULY 2009

CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

STANDARD

UT 203

STANDARD CAST-IN-PLACE MANHOLE



SECTION "A-A"

NOTES:

1. INVERT CHANNELS TO BE CONSTRUCTED FOR SMOOTH FLOW WITH NO OBSTRUCTIONS.
2. SPILLWAYS SHALL BE CONSTRUCTED BETWEEN PIPES WITH DIFFERENT INVERT ELEVATIONS PROVIDING FOR SMOOTH FLOW.
3. CHANNELS FOR FUTURE CONSTRUCTIONS (STUBS) SHALL BE CONSTRUCTED, FILLED WITH SAND, AND COVERED WITH 1" OF MORTAR.
4. SLOPE MANHOLE ITSELF WITH A 1:2 SLOPE FROM MANHOLE WALL TO CHANNEL.
5. INVERT SHALL BE A MINIMUM OF 1/2 THE DIAMETER OF THE LARGEST PIPE OR 4" DEEP.



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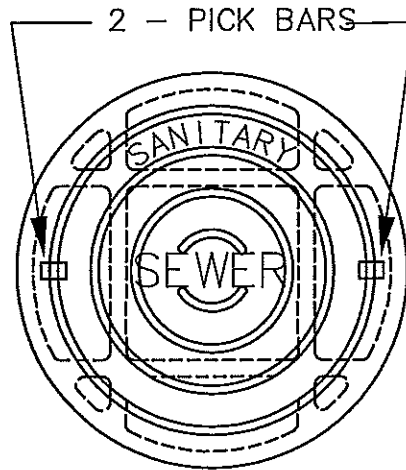
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CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

FLOW PATTERNS FOR
INVERT CHANNELS

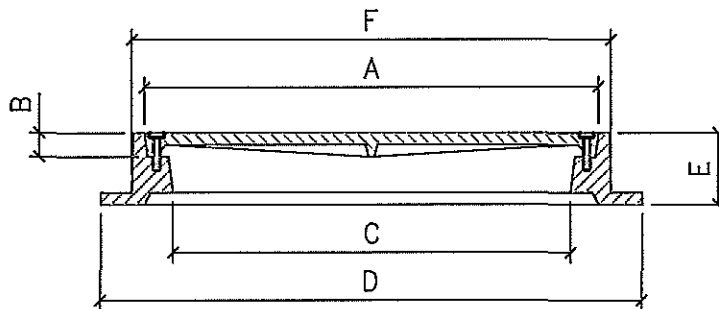
STANDARD

UT 204

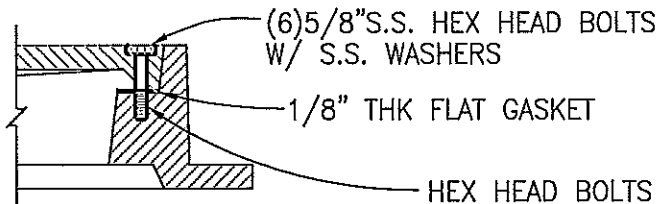


VULCAN #VM-42 OR
APPROVED EQUAL

NOTE:
LID SHALL HAVE TWO (2)
TYPE 4 PICK BAR



PLEASE SPECIFY TOP OR BOTTOM FLANGE WHEN ORDERING.
FOR TOP FLANGE ORDER No. V-1800-5 (East Jordan Iron Works, inc.)
FOR BOTTOM FLANGE ORDER No. V-1600-5 (East Jordan Iron Works, inc.)
THE WATER-TIGHT MANHOLE SETS (V-2600-5) FEATURE SIX STAINLESS STEEL
BOLTS IN COUNTERSUNK POCKETS AND A SEALING FLAT GASKET IN THE RING SET.
BOLTING PADS REDUCE THE STANDARD CLEAR OPENING BY TWO TO THREE INCHES.



WATER-TIGHT DETAIL

HEX HEAD BOLTS
(OPTIONAL PENTA-HEAD BOLTS AVAILABLE)

	DIMENSIONS						COVER		RING		SET
	A	B	C	D	E	F	CASTING	WEIGHT	CASTING	WEIGHT	WEIGHT
V-1600-5	38	2	36	46	6	40	41600523	365 LBS	41600510	320 LBS	685 LBS
V-1800-5	38	2	36	46	6	40	41600523	365 LBS	41600510	320 LBS	685 LBS
V-2600-5	38	2	36	46	6	40	42600523	365 LBS	41600511	320 LBS	685 LBS



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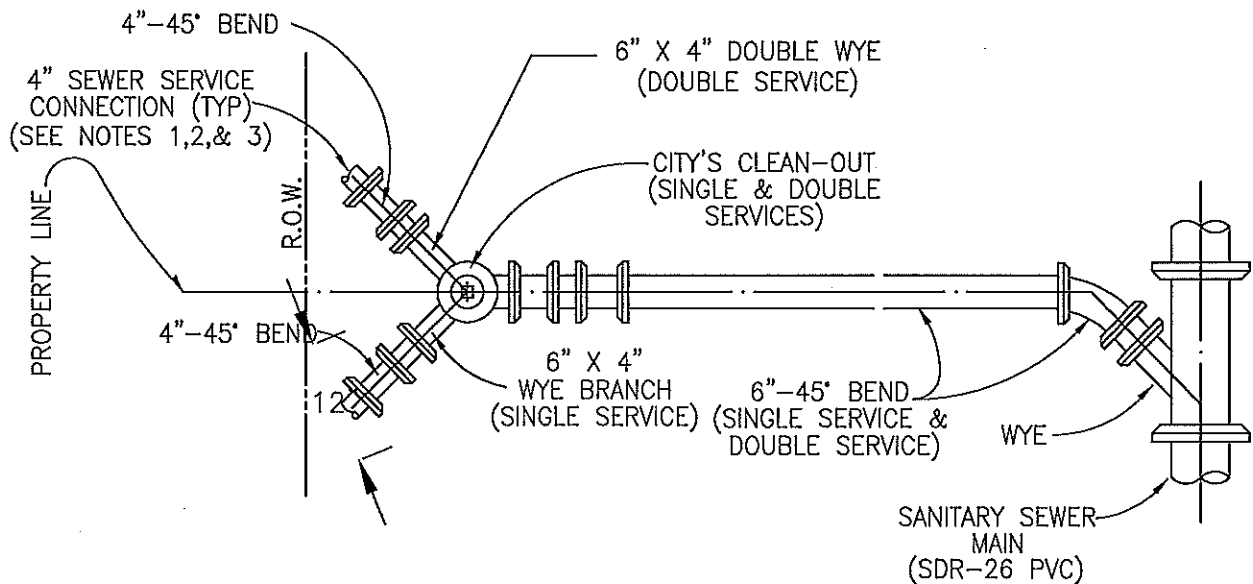
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JULY 2009

CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

STANDARD WASTEWATER MANHOLE
SET

STANDARD

UT 205



PLAN

NOTES:

1. FOR INSTALLATION WITHIN UTILITY EASEMENTS, SERVICE CONNECTION RISERS MAY BE LOCATED INSIDE THE PROPERTY LINE.
2. THE CLEAN-OUT SHALL BE EXTENDED 12" ABOVE FINISH GRADE.
3. EACH SERVICE CONNECTION SHALL BE PLUGGED WATER-TIGHT WITH AN APPROVED CAP OR PLUG.
4. CONNECT YARD LINE TO SERVICE LINE WITH RIGID, SOLVENT-WELDED PVC TO PVC ADAPTER.
5. SOLIDLY TAMP BACKFILL AT LEAST ONE FOOT (1'-0") ABOVE TOP OF PIPE. SERVICES UNDER PAVED AREAS SHALL BE BACKFILLED TO THE SAME SPECIFICATIONS AS SHOWN ON PAVEMENT REPLACEMENT DETAIL.
6. CONTRACTOR SHALL MARK ON A CLEAN SET OF PLANS THE FINAL STATIONING OR DISTANCE AND DIRECTION FROM MANHOLE TO EACH SERVICE LATERAL AND GIVE TO ENGINEER FOR RECORD DRAWING PURPOSES.
7. ANY DEVIATION FROM THESE METHODS MUST BE APPROVED BY THE CITY ENGINEERING DEPARTMENT.
8. SERVICE LINE MATERIAL SHALL BE P.V.C., SDR-26.
9. SEWER SERVICE SLOPE TO BE 45' OFF CENTERLINE OF MAIN.



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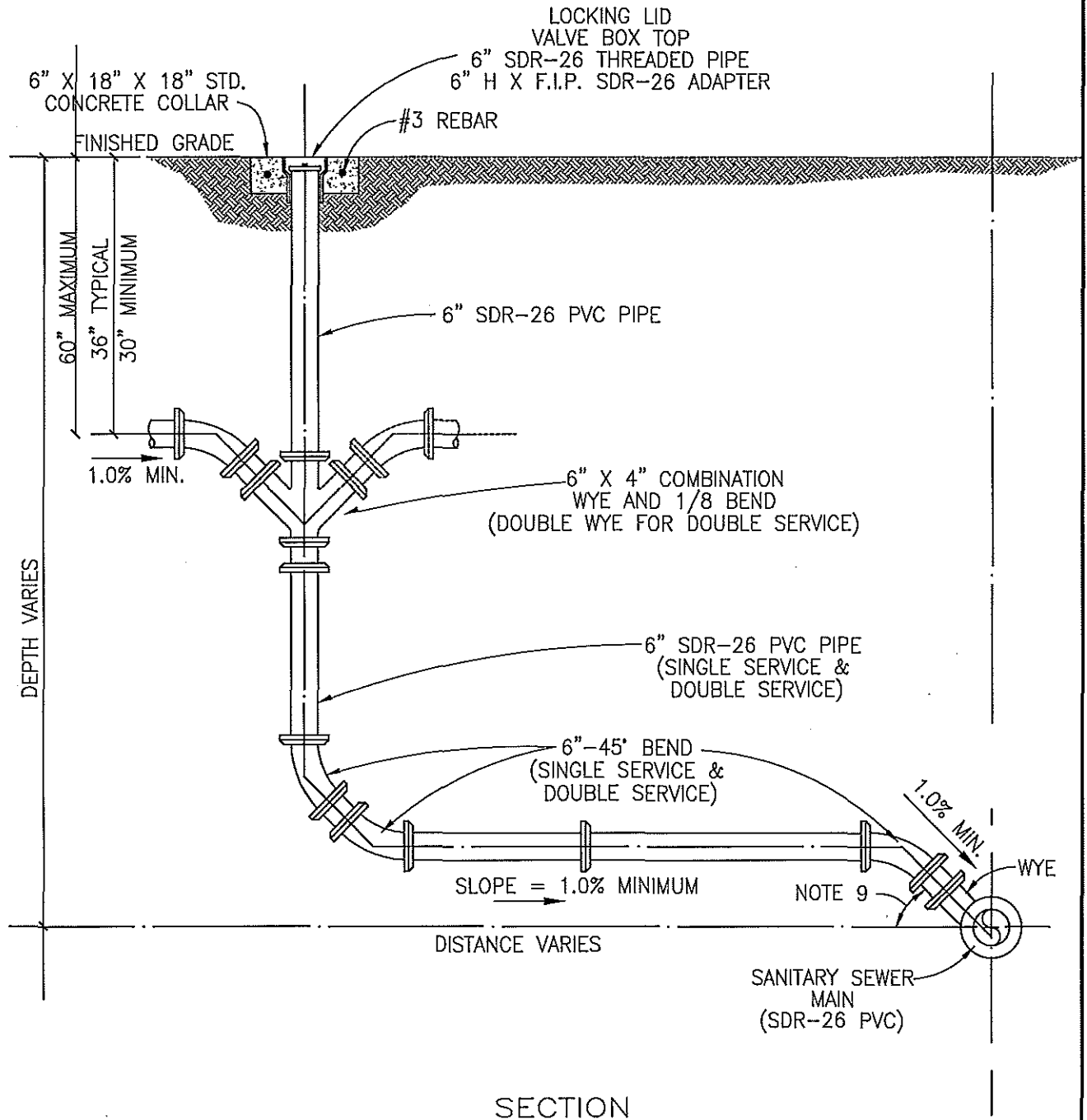
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CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

SEWER SERVICE CONNECTION
PLAN VIEW

STANDARD

UT 206



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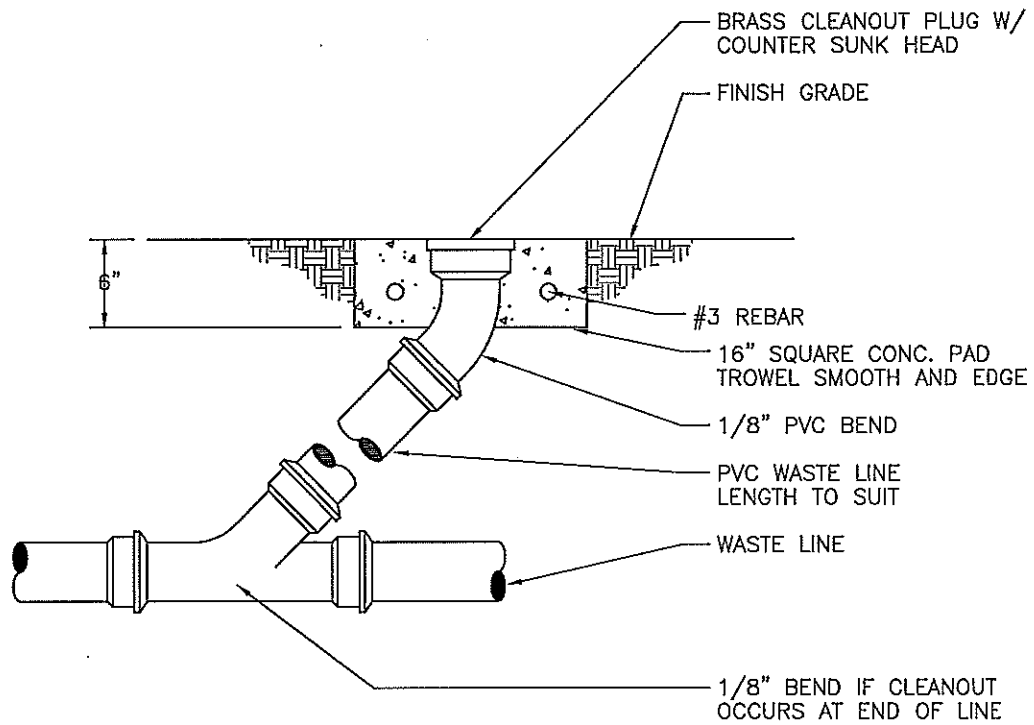
JULY 2009

CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

SEWER SERVICE CONNECTIONS
SECTION VIEW

STANDARD

UT 207



APPROVED BY:

CS

DATE:

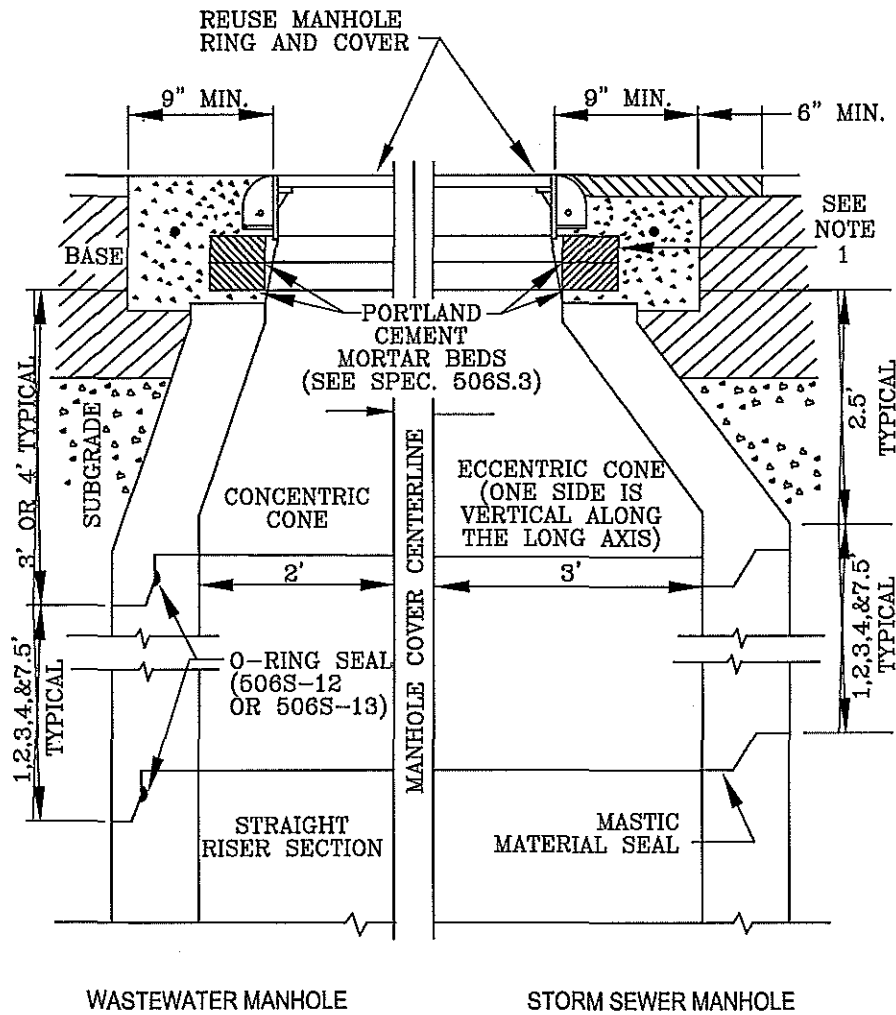
JULY 2009

CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

SANITARY SEWER CLEANOUT

STANDARD

UT 208



1. SEE "MINOR MANHOLE ADJUSTMENTS" STANDARD 506S-4 FOR CLARITY.
2. MANHOLE SECTIONS TEMPORARILY REMOVED FOR ROADWAY CONSTRUCTION MAY BE REUSED ONLY WITH THE WRITTEN APPROVAL OF THE INSPECTOR. O-RINGS SHALL NOT BE REUSED.
3. ANY COMBINATION OF REMOVING THE CONCRETE RINGS, AND / OR THE MANHOLE CONE, AND/OR THE STRAIGHT RISER SECTION OF THE MANHOLE SHALL BE ACCEPTABLE TO TEMPORARILY LOWER THE MANHOLE GRADE FOR ROADWAY RECONSTRUCTION.
4. WHILE THE MANHOLE IS TEMPORARILY LOWERED, A SHEET OF STEEL SUITABLE TO SUPPORT ALL IMPOSED LOADS SHALL BE USED TO COVER THE OPENING. FOR WASTEWATER MANHOLES, THE STEEL PLATE SHALL BE SET IN MORTAR TO PREVENT LEAKAGE.
5. SUBGRADE AND BASE MATERIALS SHALL BE COMPACTED TO 95% AND 100% DENSITIES, RESPECTIVELY, COMPACTION SHALL BE BY MECHANICAL TAMPING TO THE DENSITIES SPECIFIED.



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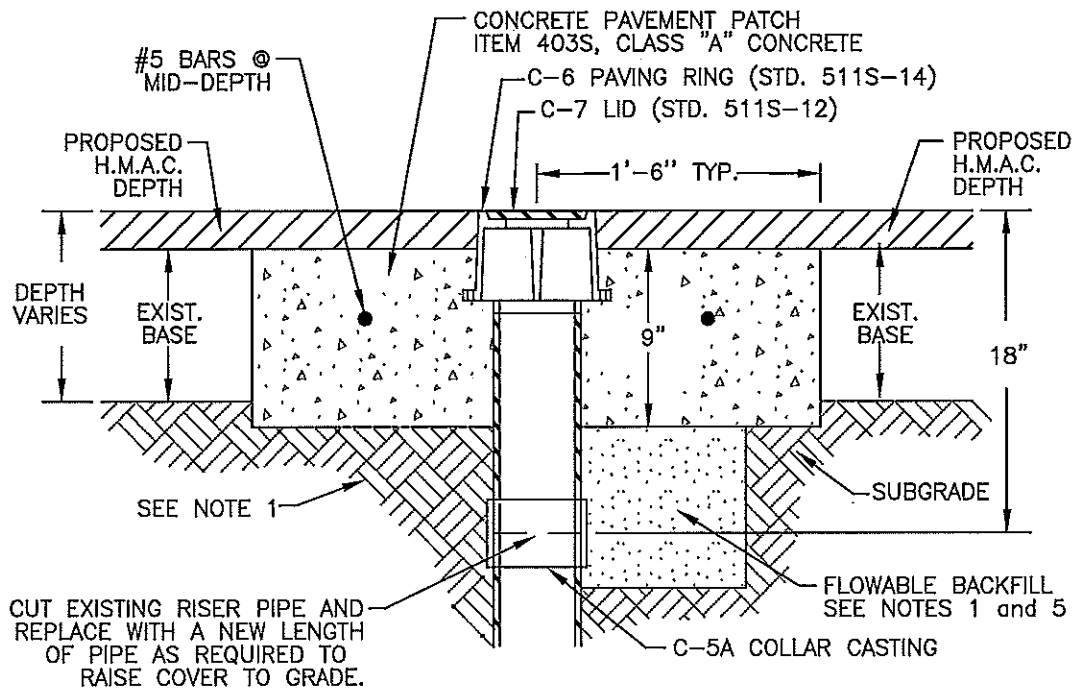
JULY 2009

CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

STANDARD

UT 209

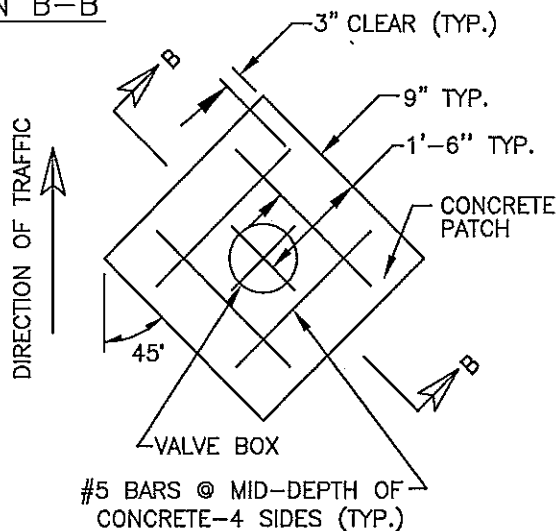
MAJOR MANHOLE ADJUSTMENT



SECTION B-B

NOTES:

1. SUBGRADE SHALL BE COMPACTED AS PER ITEM 201S, SUBGRADE PREPARATION.
2. VALVE CASTINGS SHALL BE ADJUSTED TO GRADE AFTER FINAL LIFT OF OVERLAY IS IN PLACE.
3. CLEAN VALVE BOX OF ALL DEBRIS DOWN TO THE BASE OF THE VALVE.
4. REMOVE EXISTING RISER PIPE DOWN 18" AND REPLACE TO THE NEW ELEVATION NEW PIPE AND A C-5A CASTING.
5. WHERE CAST IRON CASTINGS TO BE REMOVED REQUIRE EXCAVATION GREATER THAN 20" DEEP, CONTRACTOR MAY ELECT TO FILL EXCAVATION WITH CONTROLLED LOW STRENGTH MATERIAL (ITEM 402S) TO THE UNDERSIDE OF THE CONCRETE PAVEMENT PATCH IN LIEU OF COMPACTED BACKFILL.
6. REINFORCING STEEL SHALL MEET ITEM 406S, REINFORCING STEEL.



PLAN VIEW



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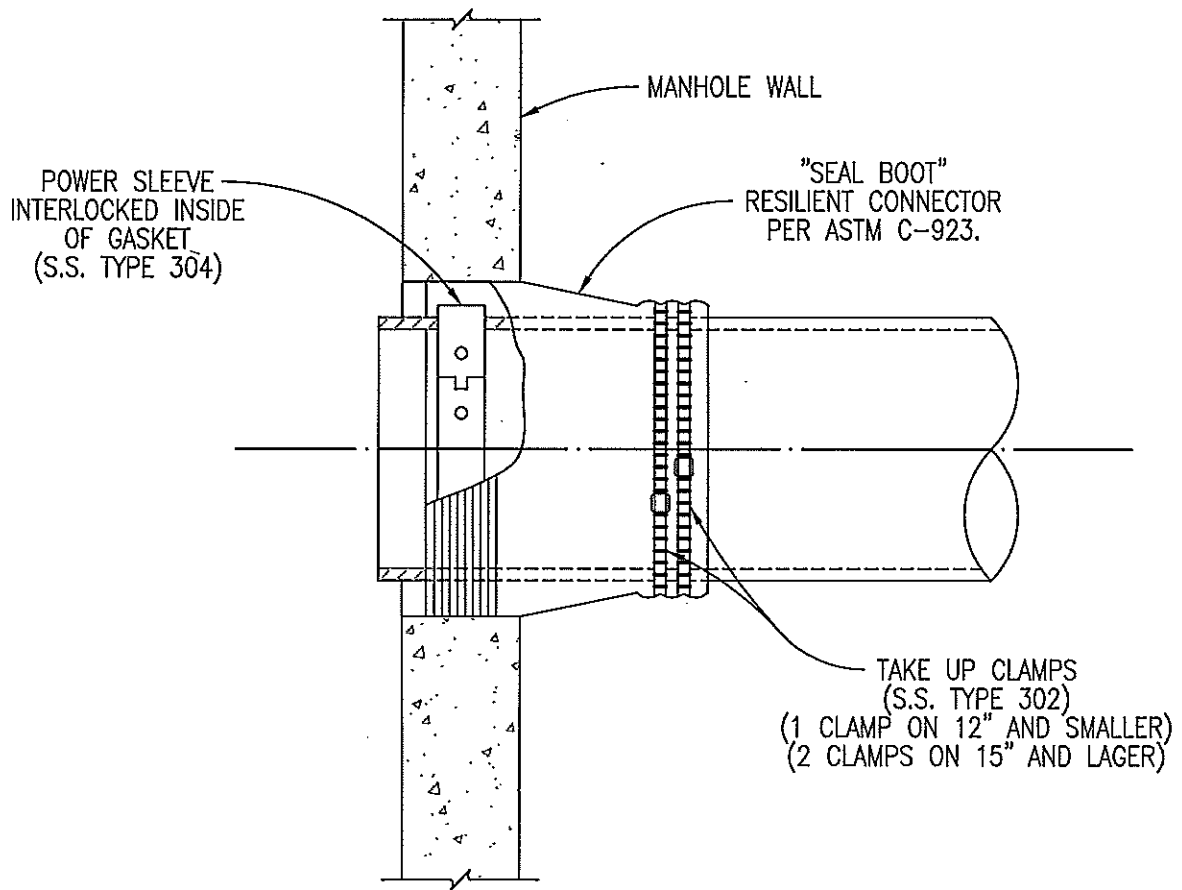
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CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

VALVE BOX ADJUSTMENT
DETAIL

STANDARD

UT 210



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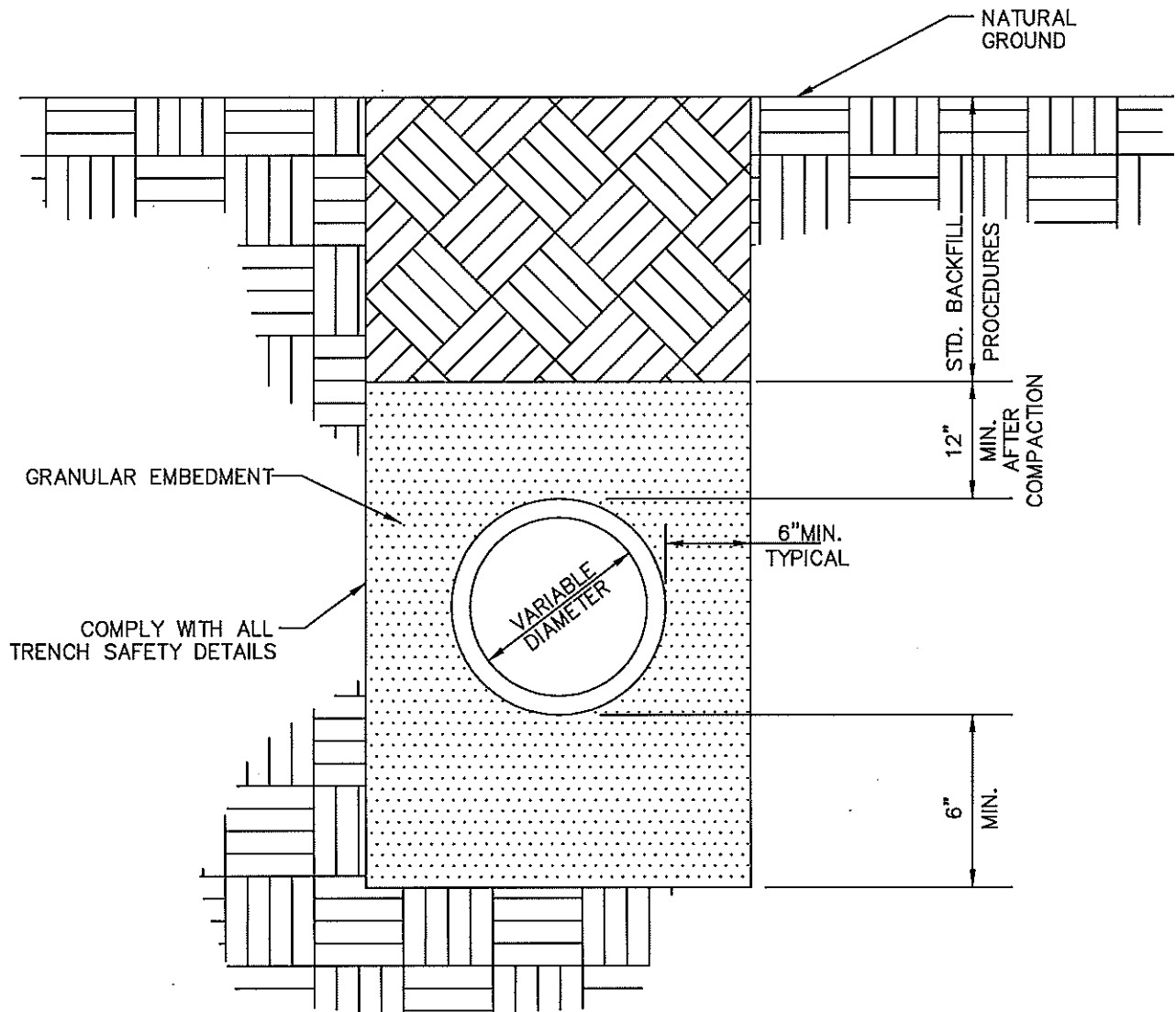
DATE:
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CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

FLEXIBLE "SEAL BOOT" CONNECTOR

STANDARD

UT 211



NOTE:

COST OF GRANULAR EMBEDMENT IS INCLUDED IN PRICE BID PER LINEAR FOOT OF SEWER PIPE.



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CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

STORM DRAIN PIPE EMBEDMENT
DETAIL

STANDARD

UT 300

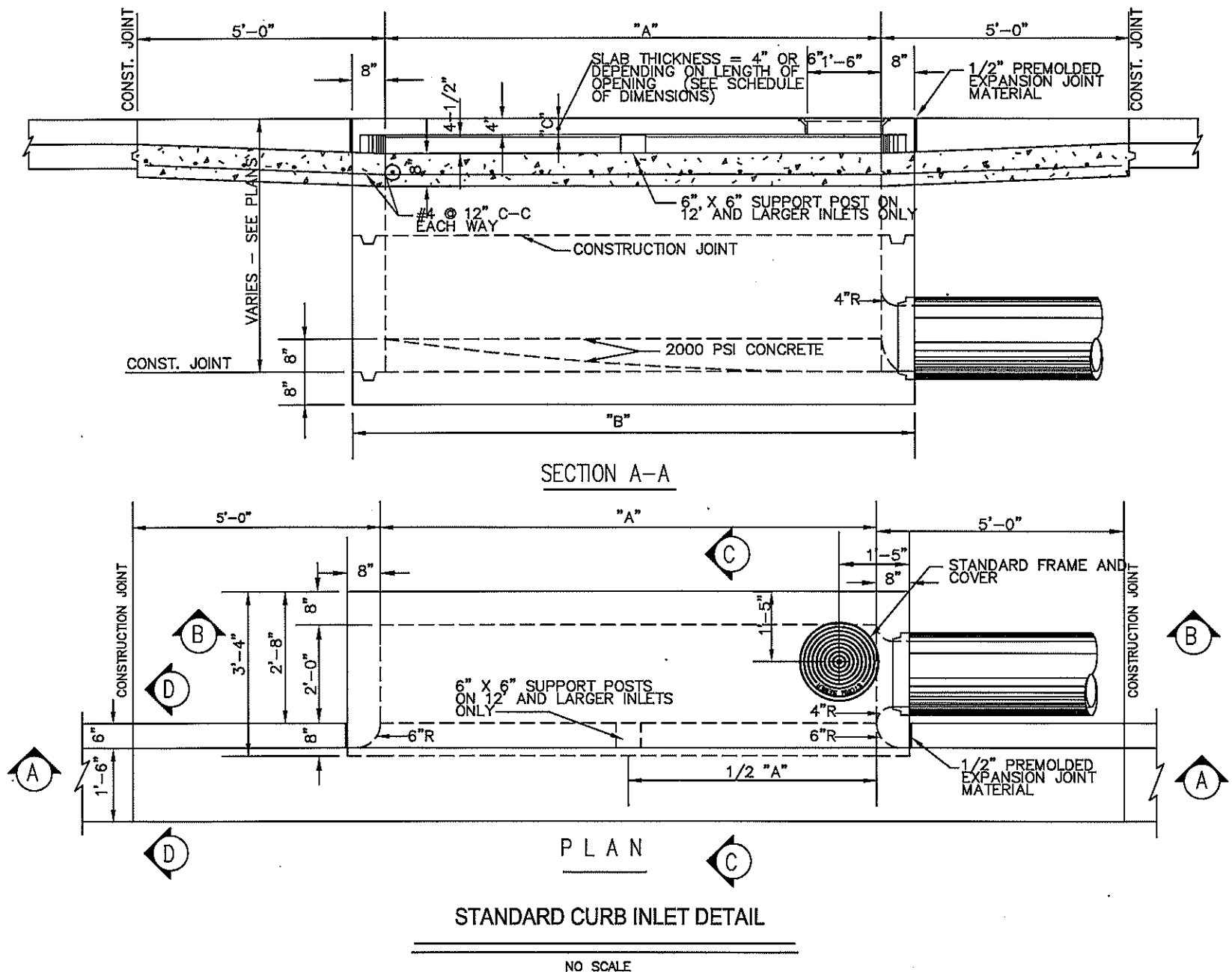


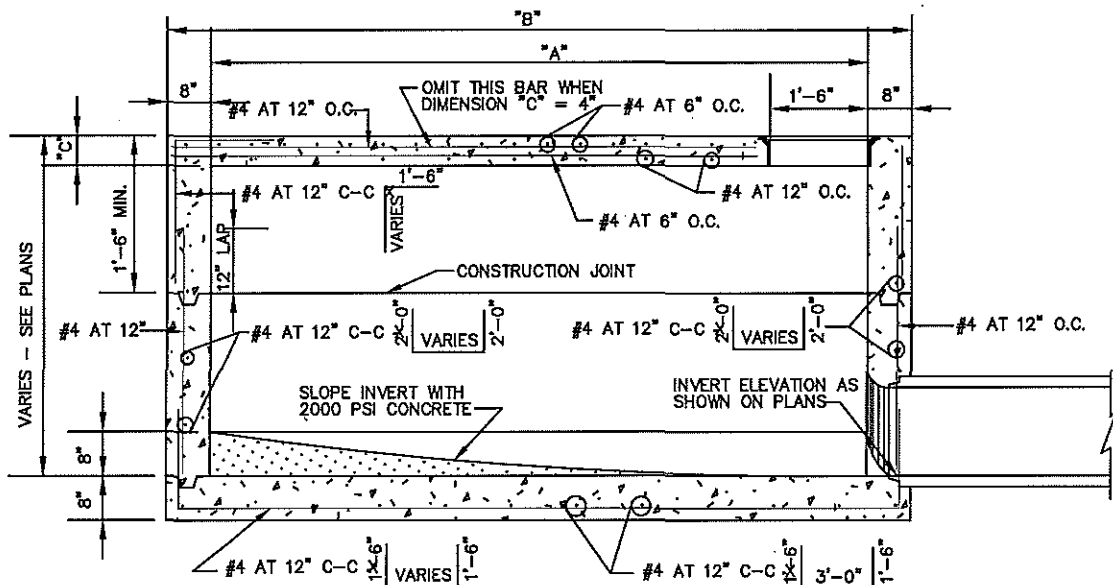
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CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

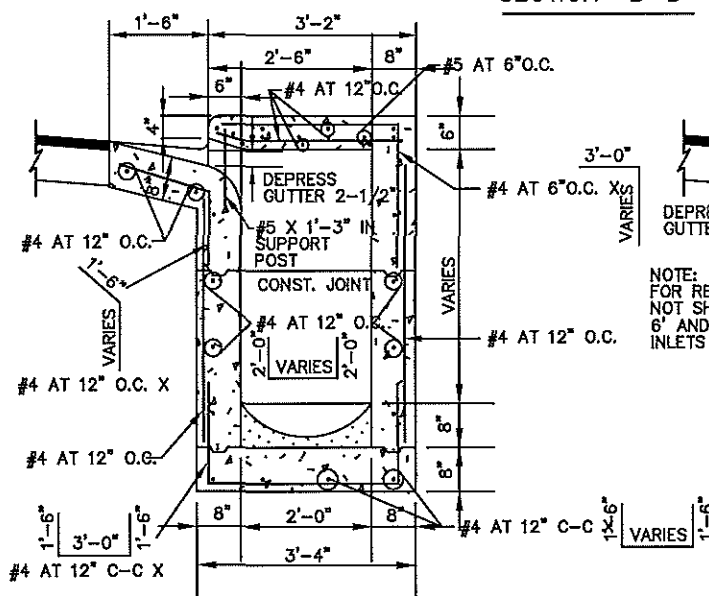
STANDARD CURB INLET DETAIL

STANDARD
UT 301
1 of 2

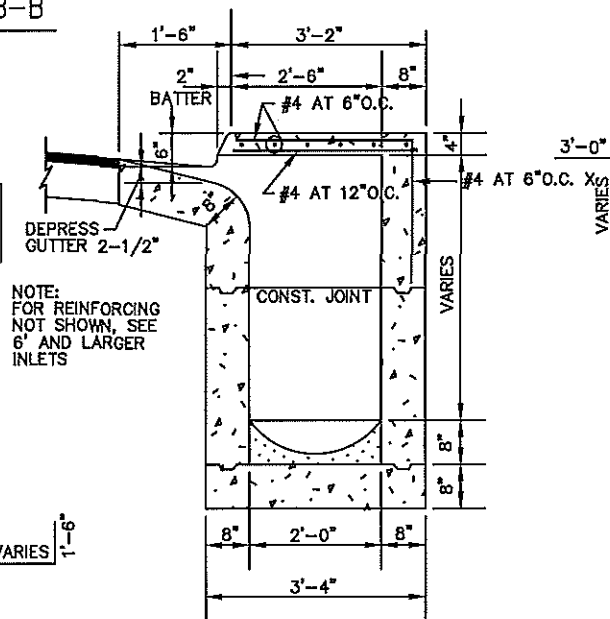




SECTION B-B



(6' AND LARGER INLETS)

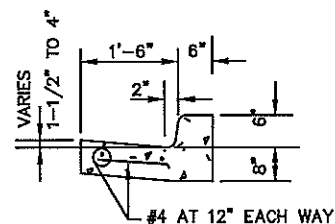


(3'-5' INLETS)

SECTIONS C-C

NO SCALE

SCHEDULE OF DIMENSIONS		
OPENING "A"	OUTSIDE "B"	TOP SLAB "C"
3'-0"	4'-4"	4"
4'-0"	5'-4"	4"
5'-0"	6'-4"	4"
6'-0"	7'-4"	6"
8'-0"	9'-4"	6"
10'-0"	11'-4"	6"
12'-0"	13'-4"	6"
14'-0"	15'-4"	6"
AND LARGER	"A" + 16"	6"



SECTION D-D

NO SCALE



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CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

STANDARD CURB INLET DETAIL

STANDARD

UT 301

2 of 2



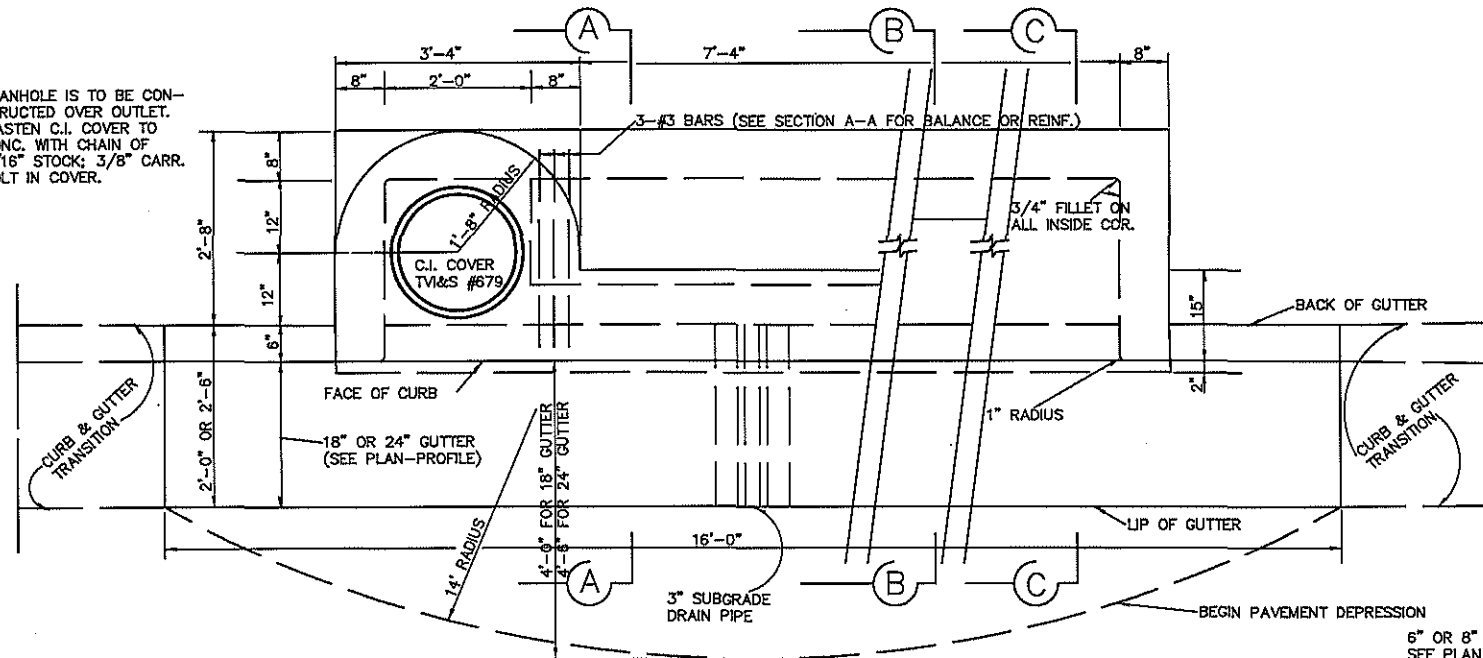
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CITY OF TAYLOR
WILLAMSON COUNTY, TEXAS
STANDARD DETAILS

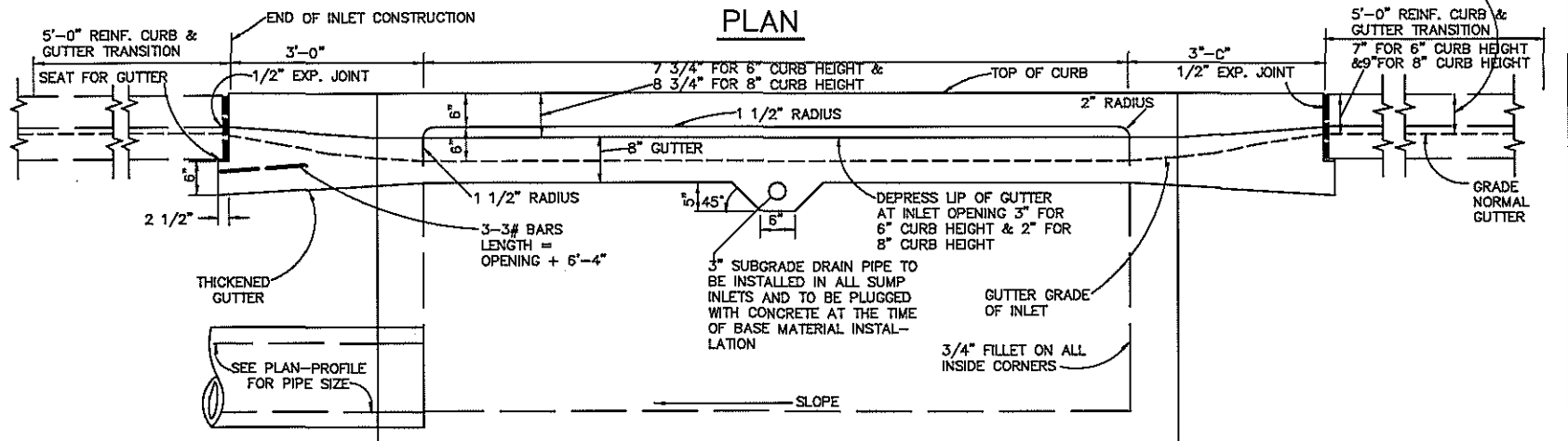
STANDARD 10' CURB
INLET DETAIL

STANDARD
UT 303

NOTE: MANHOLE IS TO BE CON-
STRUCTED OVER OUTLET.
FASTEN C.I. COVER TO
CONC. WITH CHAIN OF
3/16" STOCK; 3/8" CARR.
BOLT IN COVER.

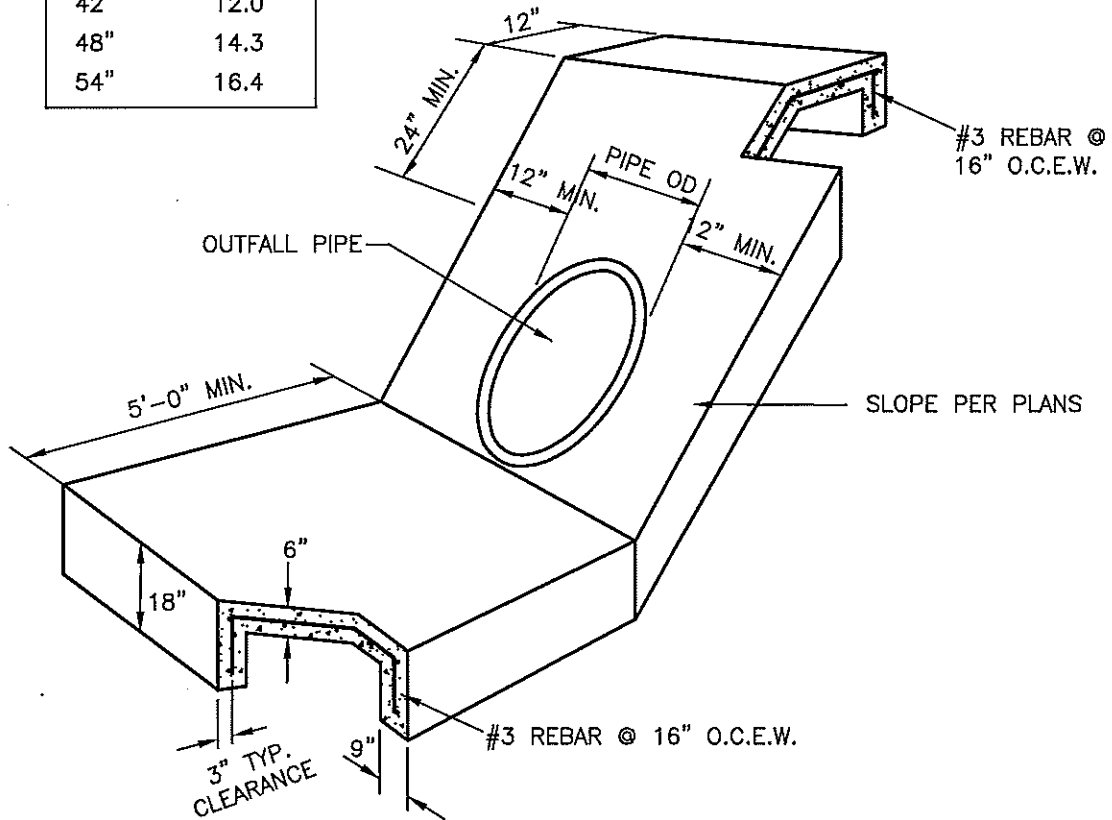


PLAN



ELEVATION

MINIMUM RIP-RAP QUANTITIES	
PIPE	SQ. YDS.
18"	6.2
24"	6.9
27"	7.8
30"	9.5
36"	10.4
42"	12.0
48"	14.3
54"	16.4



NOTES:

1. WHEN HEADWALLS AND WINGWALLS ARE REQUIRED, THEY SHALL CONFORM TO THE TEXAS HIGHWAY DEPARTMENT STANDARDS, OR AS DIRECTED BY THE CITY.
2. ENERGY DISSIPATERS SHALL BE INSTALLED IF PIPE VELOCITY EXCEEDS 5.0 F.P.S., OR AS DIRECTED BY THE CITY.



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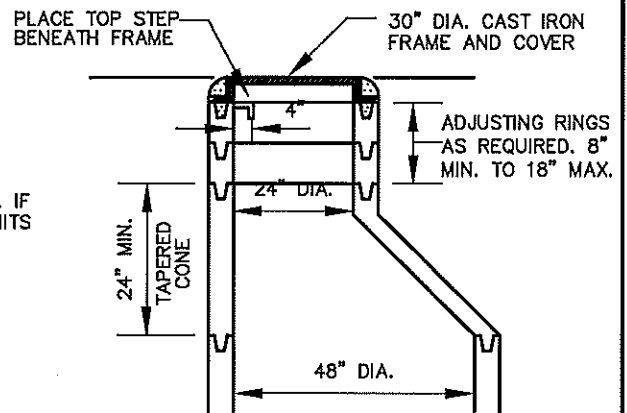
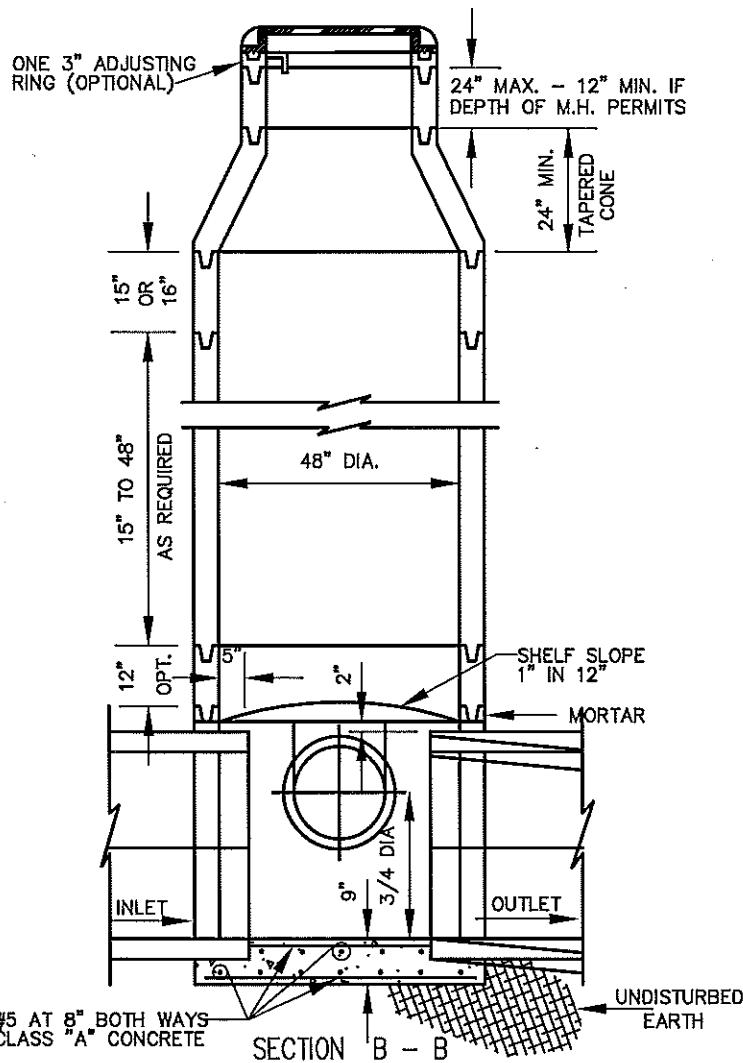
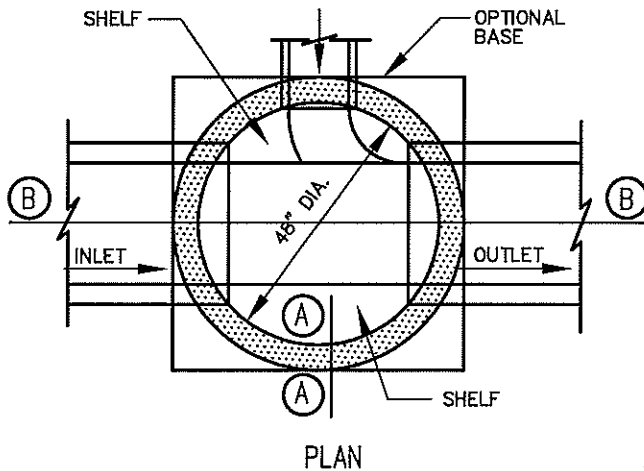
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CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

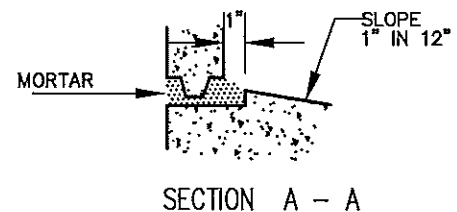
RIP-RAP AT PIPE OUTFALL

STANDARD

UT 304



NOTES: USE 24" FRAME AND COVER
 MINIMUM SIZES:
 4' DIA. - 18" TO 30"
 5' DIA. - 36" TO 42"
 6' DIA. - 48" TO 54"
 7' DIA. - 60" TO 66"
 SIZES TO BE USED ARE
 DEPENDENT ON SEWER
 ANGLES.



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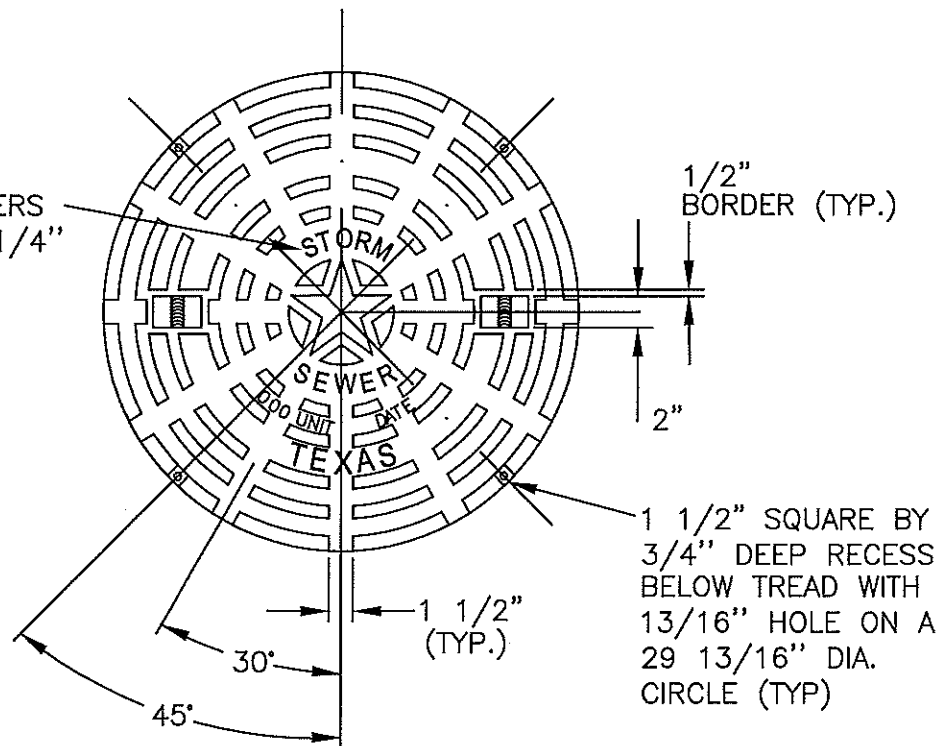
CITY OF TAYLOR
 WILLIAMSON COUNTY, TEXAS
 STANDARD DETAILS

STORM SEWER MANHOLE - PRECAST

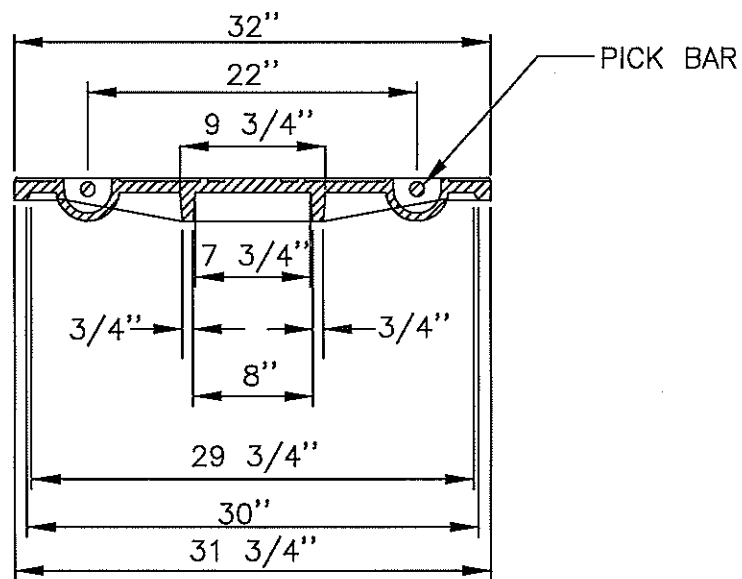
STANDARD

UT 305

1" LETTERS
RAISED 1/4"



LID PLAN VIEW



LID SECTION VIEW



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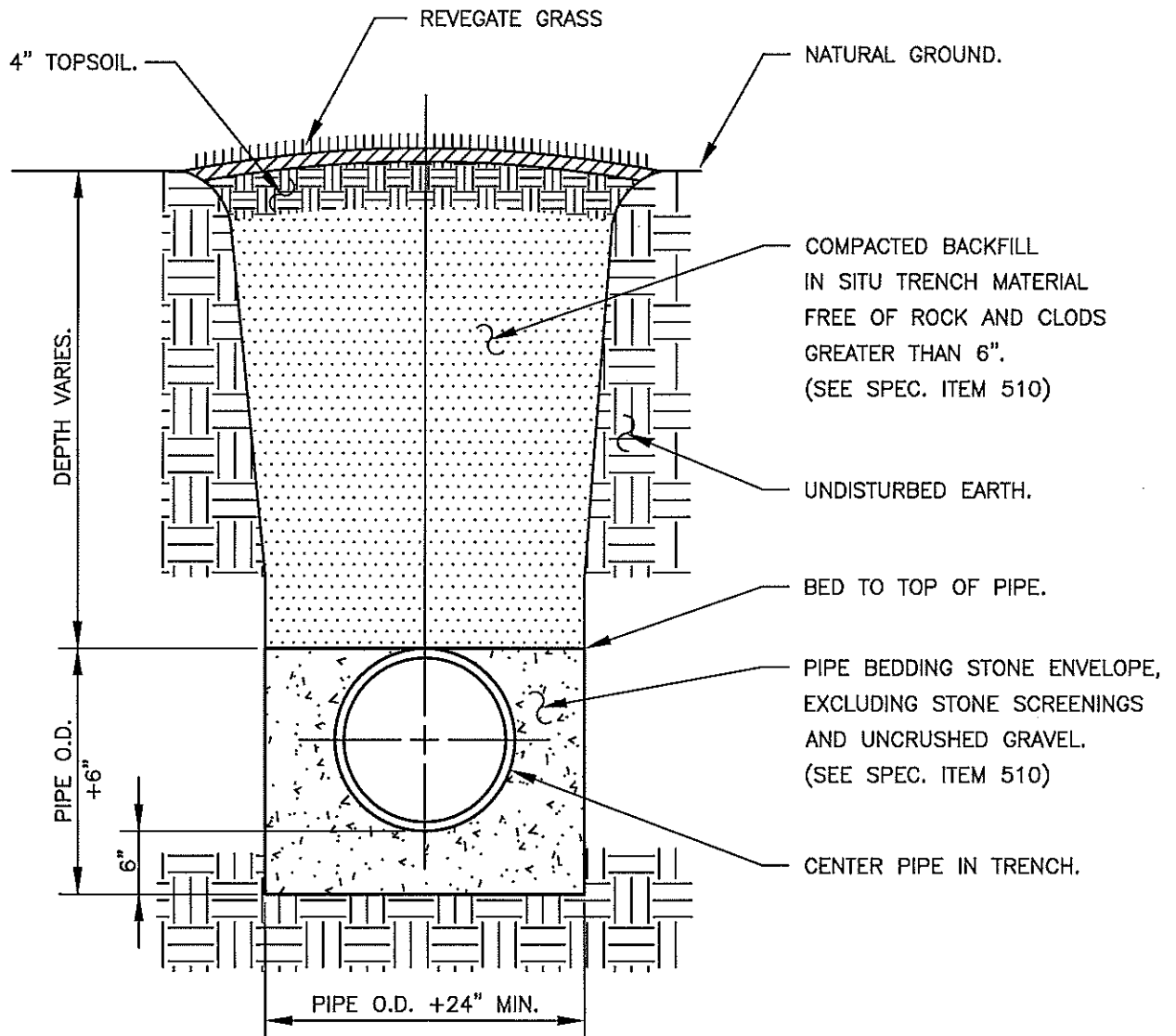
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JULY 2009

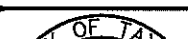
CITY OF TAYLOR
WILLIAMSON COUNTY, TEXAS
STANDARD DETAILS

STANDARD STORM SEWER
MANHOLE COVER (32")

STANDARD

UT 306



	APPROVED BY:	DATE:	CITY OF TAYLOR WILLIAMSON COUNTY, TEXAS STANDARD DETAILS	STANDARD
	CS	JULY 2009		UT 307
			STORM SEWER LINE BEDDING DETAIL (NON-PAVED SURFACE)	

UT 308